cXML User's Guide

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Table of Contents

Preface

This document describes how to use cXML (commerce eXtensible Markup Language) for communication of data related to electronic commerce.

Audience and Prerequisites

This document is intended for application developers who design cXML-enabled applications.

cXML is an open versatile language for the transaction requirements of:

- Network e-commerce hubs
- Electronic product catalogs
- PunchOut catalogs
- Procurement applications
- Buyers
- Suppliers
- E-commerce service providers

Readers should have a working knowledge of e-commerce concepts, the HTTP Internet communication standard, and XML format.

This document does not describe how to use specific procurement applications or commerce network hubs.

Which Chapters to Read

- **E-commerce Business Managers**—For an overview of cXML capabilities, read Chapter 1, "Introduction to cXML."

- **Web Programmers—**Web programmers who implement e-commerce sites should read all chapters.

- **Catalog Creators**—Suppliers creating cXML catalogs should read Chapter 12, "Catalogs."

- **PunchOut Site Implementors**—Web programmers creating PunchOut websites should read Chapter 4, "PunchOut Transaction."

Typography

cXML elements and attributes are denoted with a monotype font. cXML element and attribute names are case-sensitive. Both are a combination of lower and uppercase, with elements beginning with an uppercase letter, and attributes beginning with a lowercase letter. For example, MyElement is a cXML element, and myAttribute is a cXML attribute.

The following table describes the typographic conventions used in this book:

Typeface or Symbol	Meaning	Example
<AaBbCc123>	Text you need to change is italicized, and appears between angle brackets	http://*<server>:<port>*/ inspector
AaBbCc123	The names of user interface controls, menus, and menu items	Choose **Edit** from the **File** menu.
AaBbCc123	Files and directory names, parameters, fields in CSV files, command lines, and code examples	There is one line in ReportMeta.csv for each report in the system.
AaBbCc123	Book titles	For more information, see *Acme Configuration Overview*.

Chapter 1
Introduction to cXML

This chapter introduces cXML (commerce eXtensible Markup Language) for electronic-commerce transactions.

This chapter describes:

- cXML, an XML Implementation
- cXML Capabilities
- Types of Applications that Use cXML
- Content Delivery Strategy
- cXML DTDs
- Profile Transaction
- Service Status Response
- XML Utilities

cXML, an XML Implementation

XML (eXtensible Markup Language) is a meta-markup language used to create syntaxes for languages. It is also a standard for passing data between applications, particularly those that communicate across the Internet.

XML documents contain data in the form of tag/value pairs, for example:

```
<DeliverTo>Joe Smith</DeliverTo>
```

XML has a structure similar to HTML (HyperText Markup Language), which is an implementation of SGML, XML's parent meta language. Applications can extract and use data from XML documents more easily than from HTML documents, however, because XML data is tagged according to its purpose. XML contains only data, while HTML contains both data and presentation information.

Each cXML document is constructed based on XML Document Type Definitions (DTDs). Acting as templates, DTDs define the content model of a cXML document, for example, the valid order and nesting of elements, and the data types of attributes.

The DTDs for cXML are files available on the www.cXML.org website. For more information, see "Getting cXML DTDs" on page 25.

cXML Capabilities

cXML allows buying organizations, suppliers, service providers, and intermediaries to communicate using a single, standard, open language.

Successful business-to-business electronic commerce (B2B e-commerce) portals depend upon a flexible, widely adopted protocol. cXML is a well-defined, robust language designed specifically for B2B e-commerce, and it is the choice of high volume buying organizations and suppliers.

cXML transactions consist of *documents*, which are simple text files containing values enclosed by predefined tags. Most types of cXML documents are analogous to hardcopy documents traditionally used in business.

The most commonly used types of cXML documents are:

* Catalogs
* PunchOut
* Purchase Orders

The following subsections describe these cXML documents.

Catalogs

Catalogs are files that convey product and service content to buying organizations. They describe the products and services offered by a supplier and their prices, and they are the main communication channel from suppliers to their customers.

Suppliers create catalogs so that organizations that use procurement applications can see their product and service offerings and buy from them. Procurement applications read catalogs and store them internally in their databases. After a buying organization approves a catalog, that content is visible to users, who can choose items and add them to purchase requisitions.

Sending product and service content to a buying organization
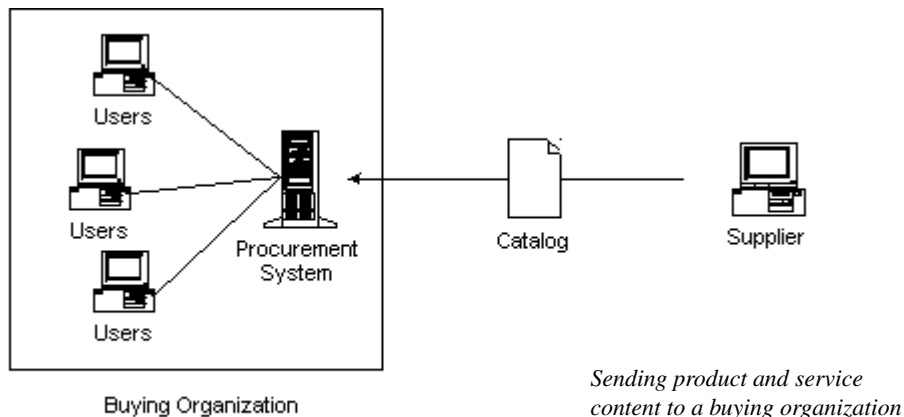
Suppliers can create catalogs for any product or service, regardless of how it is measured, priced, or delivered.

For each item in a catalog, basic information is required, and optional information enables advanced catalog features, such as multi-language descriptions.

PunchOut

PunchOut is an easy-to-implement protocol for interactive sessions managed across the Internet. Using real-time, synchronous cXML messages, PunchOut enables communication between applications, providing seamless user interaction at remote sites.

There are three types of PunchOut:

- Procurement PunchOut
- PunchOut Chaining
- Provider PunchOut

Procurement PunchOut

Procurement PunchOut gives suppliers an alternative to static catalog files. PunchOut sites are live, interactive catalogs running on a website.

Suppliers that have e-commerce websites can modify them to support PunchOut. PunchOut sites communicate with procurement systems over the Internet by using cXML.

For more information:

Chapter 4, "PunchOut Transaction."

For PunchOut sites, procurement applications display a button instead of product or pricing details. When users click this button, their Web browsers display pages from the supplier's local website. Depending on how the supplier implements these pages, users can browse product options, specify configurations, and select delivery methods. When users are done selecting items, they click a button that returns the order information to the procurement application. The fully configured products and their prices appear within users' purchase requisitions.
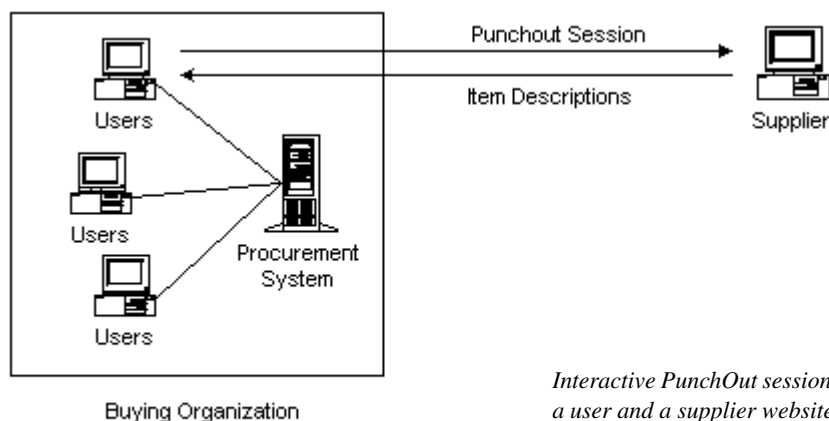
Interactive PunchOut session between a user and a supplier website

Suppliers' websites can offer previously agreed-upon contract products and prices.

PunchOut Chaining

PunchOut chaining is Procurement PunchOut that involves more than one PunchOut. cXML Path Routing enables this functionality.

| Buyer | ←→ | Marketplace | ←→ | Supplier |
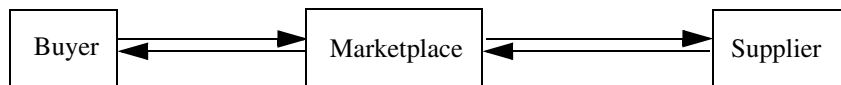
cXML Path Routing allows the order and other subsequent messages to return to the marketplaces and suppliers involved in producing the quote. Path Routing notifies all parties about the final order, and any subsequent PunchOut specifies to the procurement application how to split orders on behalf of the marketplace.

Provider PunchOut

Provider PunchOut enables applications to punch out to a remote applications that supply services to the originating application, such as credit card validation, user authentication, or self-registration.

Purchase Orders

Buying organizations send purchase orders to suppliers to request fulfillment of a contract.

For more information:

Chapter 5, "Purchase Orders."

Buying Organization

Purchase order communicated to a supplier
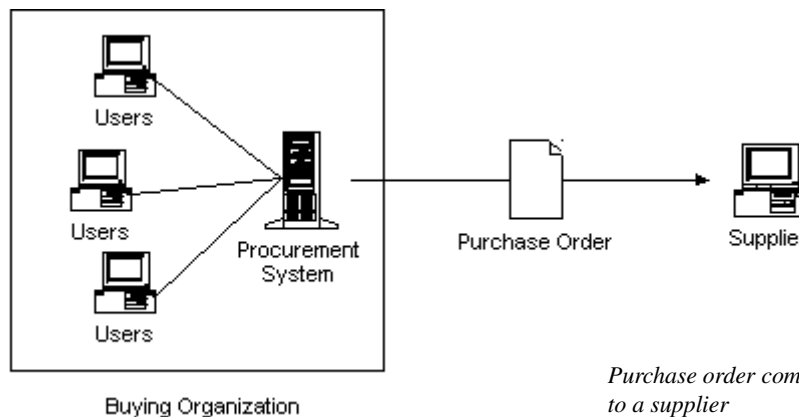
cXML is better for communicating purchase orders than other formats (such as ANSI X12 EDI 850), because it is flexible, inexpensive to implement, and it supports the widest array of data and attachments.

Types of Applications that Use cXML

Any e-commerce application can use cXML. Buying organizations, vertical and horizontal buying communities, suppliers, and application vendors currently use cXML. The following subsections describe the main types of applications that currently use cXML.

Procurement Applications

Procurement applications, such as Ariba Buyer and Ariba Marketplace, Network Edition, use cXML for external transactions.

Ariba Buyer is an enterprise application hosted by large organizations for use by their employees over an intranet.

Ariba Marketplace, Network Edition, is an Internet-based service that allows the creation of buying communities composed of many small- to medium-sized businesses.

These applications allow communities of users to buy contract products and services from vendors approved by their purchasing managers. Managers in the communities first approve requested purchases, and approved purchase orders are transmitted to suppliers through several possible channels, including cXML over the Internet.

Commerce Network Hubs

Commerce network hubs, such as the Ariba Supplier Network, are Web-based services for connecting buyers and suppliers. These Web services provide features such as catalog validation and versioning, catalog publishing and subscription, automated purchase order routing, and purchase order history.

Commerce network hubs can act as intermediaries that authenticate and route requests and responses to and from diverse organizations. Communication between these organizations can occur entirely through cXML over the Internet.

PunchOut Catalogs

As described in the previous section, PunchOut catalogs are interactive catalogs, available at supplier websites. PunchOut catalogs are made possible by Web server applications, written in a programming language such as ASP (Active Server Pages), JavaScript, or CGI (Common Gateway Interface), that manage buyers' PunchOut sessions.

For more information:

Chapter 4, "PunchOut Transaction."

PunchOut catalogs accept PunchOut requests from procurement applications, identify the buying organization, and display the appropriate products and prices in HTML format. Users then select items, configure them, and select options if appropriate.

At the end of the PunchOut session, the PunchOut site sends descriptions of the users' selections, in cXML format, to the procurement applications.

Order-Receiving Systems

Order-receiving systems are applications at supplier sites that accept and process purchase orders sent by buying organizations. Order-receiving systems can be any automated system, such as inventory management systems, order-fulfillment systems, or order-processing systems.

For more information:

Chapter 5, "Purchase Orders."

Because it is simple to extract information from cXML purchase orders, it is relatively easy to create the adapters that enable existing order-receiving systems to accept them.

Content Delivery Strategy

Procurement applications present product and service content to users. Suppliers want to control the way their customers view their products or services, because presentation is critical to their sales process. Buying organizations want to make content easily accessible and searchable to ensure high contract compliance.

Buying organizations and suppliers can choose from multiple methods for delivering product and service content. The particular method to use is determined by agreement between a buying organization and a supplier, and the nature of the products or services traded.

The following table lists example categories of commonly procured products and services, and their preferred content delivery methods.

Commodities	Properties	Content Delivery Method
Office Supplies, Internal Supplies	Static content, stable pricing	Static catalogs
Lab Supplies, MRO (Maintenance, Repair, and Operations), Electronic Parts	Requires normalization to be useful	PunchOut to a vertical commodity portal
Books, Chemicals	Large number of line Items	PunchOut to a supplier hosted site
Computers, Network Equipment, Peripherals	Many possible configurations	PunchOut to a supplier hosted configuration tool
Services, Printed Materials	Content has highly variable attributes	PunchOut to an electronic form at a supplier site

Buying organizations can either store content locally within the organization, or they can access it remotely on the Internet through PunchOut. cXML catalogs support both storage strategies.

As this table indicates, PunchOut offers a flexible framework upon which suppliers, depending on their commodity or customer, can provide customized content. The objective of this content strategy is to allow buyers and suppliers to exchange catalog data by the method that makes the most sense.

cXML DTDs

Because cXML is an XML language, it is thoroughly defined by a set of Document Type Definitions (DTDs). These DTDs are text files that describe the precise syntax and order of cXML elements. DTDs enable applications to validate the cXML they read or write.

The header of each cXML document contains the URL to the DTD that defines the document. cXML applications can retrieve the DTD and use it to validate the document.

For the most robust transaction handling, validate all cXML documents received. If you detect errors, issue the appropriate error code so the sender can retransmit. cXML applications are not required to validate cXML documents received, although it is recommended. However, all cXML documents must be valid and must refer to the cXML DTDs described in the following section.

Getting cXML DTDs

DTDs for all versions of cXML are available on cXML.org. The various kinds of cXML documents are defined in multiple DTDs to reduce DTD size, which enables faster validation in some parsers.

Document	DTD
Basic cXML documents	http://xml.cXML.org/schemas/cXML/*<version>*/cXML.dtd
Confirmation and Ship Notice	http://xml.cXML.org/schemas/cXML/*<version>*/Fulfill.dtd
Invoice	http://xml.cXML.org/schemas/cXML/*<version>*/InvoiceDetail.dtd
Type Definition	http://xml.cXML.org/schemas/cXML/*<version>*/Catalog.dtd
Payment Remittance	http://xml.cXML.org/schemas/cXML/*<version>*/PaymentRemittance.dtd

where *<version>* is the full cXML version number, such as 1.2.020.

cXML applications use these DTDs to validate all incoming and outgoing documents.

Caching DTDs

For best performance, cXML applications should cache DTDs locally. After cXML DTD files are published, they never change, so you can cache them indefinitely. (Each new version of the DTDs has a new URL.) When cXML applications parse a cXML document, they should look at the SYSTEM identifier in the document header and retrieve that DTD if it has not already been stored locally.

Caching DTDs locally offers the advantages of faster document validation and less dependence on the cXML.org site.

In some environments, cXML applications might not be allowed to automatically retrieve DTDs as they receive new documents. In these environments, you must manually retrieve the DTDs, store them locally, and instruct your applications to look for them locally, not at cXML.org. However, generated cXML documents must point to the DTDs at cXML.org, not the local DTDs.

Profile Transaction

The Profile transaction communicates basic information about what transactions a particular cXML server can receive. All cXML servers must support this transaction. It is intended for back-end integrations between applications, making the capabilities of cXML servers available to client systems.

This transaction consists of two documents, ProfileRequest and ProfileResponse. Together, they retrieve server capabilities, including supported cXML version, supported transactions, and options to those transactions.

> **Note:** All cXML 1.1 and higher servers **must** accept the Profile transaction.

ProfileRequest

The ProfileRequest document has no content. It simply routes to the specified cXML server.

ProfileResponse

The server responds with a ProfileResponse document, which lists the cXML transactions it supports, their locations, and any named options with a string value.

Service Status Response

A response with a status code of 200 from an URL that accepts POSTed cXML is up and running. When an HTTP GET is sent to a service location, the service responds with a valid, dynamically generated cXML Response document. A service can be any HTTP URL at which cXML Request documents are received.

XML Utilities

Utilities for editing and validating XML files are available free and for purchase on the Web. The following describes a few of these utilities:

- **Internet Explorer** from Microsoft. An XML-aware Web browser that can validate XML files against DTDs.

  www.microsoft.com/windows/ie/default.htm

- **Turbo XML** from TIBCO Software. An Integrated Development Environment (IDE) for creating, validating, converting and managing XML assets.

  www.tibco.com/software/metadata/turboxml.jsp

- **XML Spy** from Altova. A tool for maintaining DTDs and XML files with a grid, source and browser view.

  www.altova.com

- **XMLwriter** from Wattle Software. A graphical XML authoring tool designed to manage XML projects.

  www.xmlwriter.net

In addition, the following websites list more XML tools:

  www.xml.com
  www-128.ibm.com/developerworks/xml/library/x-matters21/

Chapter 2
cXML Basics

This chapter describes the basic protocol and data formats of cXML. It contains information needed to implement all transactions.

This chapter describes:

- Protocol Specification
- Basic Elements

Protocol Specification

There are two communication models for cXML transactions: Request-Response and One-Way. Because these two models strictly specify the operations, they enable simple implementation. Both models are required, because there are situations when one model would not be appropriate.

Request-Response Model

Request-Response transactions can be performed only over an HTTP or HTTPS connection. The following figure illustrates the steps in a Request-Response interaction between parties A and B:

A Request-Response Transaction
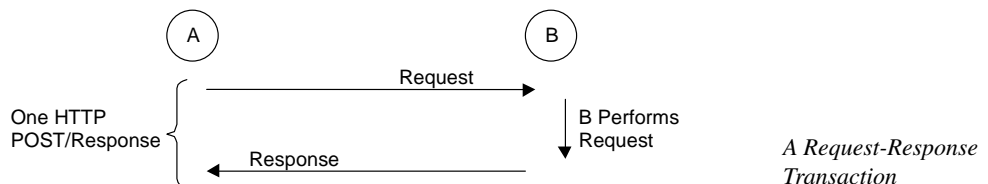
This transaction contains the following steps:

1. *Site A* initiates an HTTP/1.x connection with *Site B* on a predetermined URL that represents *Site B*'s address.

2. *Site A* uses a POST operation to send the cXML document through the HTTP connection. *Site A* then waits for a response.

3. *Site B* has an HTTP/1.x-compliant server that dispatches the HTTP Request to the resource specified by the URL used in step 1. This resource can be any valid location known to *Site B*'s HTTP server, for example, a CGI program or an ASP page.

4. *Site B*'s resource identified in step 3 reads the cXML document contents and maps the Request to the appropriate handler for that request.

5. *Site B*'s handler for the cXML Request performs the work that the Request specifies and generates a cXML Response document.

6. *Site B* sends the cXML Response to *Site A* through the HTTP connection established in step 1.

7. *Site A* reads the cXML Response and returns it to the process that initiated the Request.

8. *Site A* closes the HTTP connection established in step 1.

This process is then repeated for further Request/Response cycles.

To simplify the work in the above steps, cXML documents are divided into two distinct parts:

• Header—Contains authentication information and addressing.

• Request or Response data—Contains a specific request or response and the information to be passed.

Both of these elements are carried in a parent envelope element. The following example shows the structure of a cXML Request document:

```
<cXML>
  <Header>
     Header information
  </Header>
  <Request>
     Request information
  </Request>
</cXML>
```

The following example shows the structure of a cXML Response document:

```
<cXML>
  <Response>
    Response information
  </Response>
</cXML>
```

The Response structure does not use a Header element. It is not necessary, because the Response always travels in the same HTTP connection as the Request.

cXML Conventions

cXML uses elements to describe discrete items, which are properties in traditional business documents. Elements also describe information with obvious subdivisions and relationships between those subdivisions, such as an addresses, which are composed of street, city, and country.

cXML also uses attributes, which modify elements or provide context.

Element and attribute names are case-sensitive and use whole words with capitals (not hyphens) separating the words. Element names begin with an uppercase letter; attribute names begin with a lowercase letter, for example:

Elements: Sender, Credential, Payment, ItemDetail
Attributes: payloadID, lineNumber, domain

If optional elements have no content (they are null), leave them out entirely. Avoid empty or whitespace elements, because missing values can affect some parsers.

In DTD files and in this document, symbols are used to indicate how many times an element can occur in a transaction. A '+' means the element can occur one or more times, a '?' means the element can occur 0 or once, and a '*' means the element can occur 0 or more times.

cXML Document

The cXML element is the body of a cXML document. A document might begin as follows:

```
<?xml version='1.0' encoding='UTF-8'?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML xml:lang="en-US"
  payloadID="1234567.4567.5678@buyer.com"
  timestamp="2002-01-09T01:36:05-08:00">
```

The first characters in cXML documents must be <? or <!. Documents must not start with white space or tabs. For example, the HTML form that contains a PunchOutOrderMessage document must not insert any character between the opening quote and the left angle bracket.

The second line in cXML documents must contain the DOCTYPE document type declaration. This is the only external entity that can appear in cXML documents. This line references the cXML DTD. See "cXML DTDs" on page 24 for more information about cXML DTDs.

cXML documents can have any one of the following top-level elements: cXML, Supplier, Contract, and Index. The cXML element is for "transactional" data. The other elements describe static content.

Wrapping Layers

cXML documents are usually transmitted through HTTP with the HTTP header specifying a MIME (Multipurpose Internet Mail Extensions) media type of text/xml and a charset parameter matching the encoding in the cXML document.

Because HTTP is eight-bit clean, any character encoding supported by the receiving parser can be used without a content-transfer encoding such as base64 or quoted-printable. All XML parsers support the UTF-8 (Universal Transformation Format) encoding, which includes all Unicode characters, including all of US-ASCII. Therefore, applications should use UTF-8 when transmitting cXML documents.

> **Note:** According to IETF RFC 2376 "XML Media Types," the MIME charset parameter overrides any encoding specified in the XML declaration. Further, the default encoding for the text/xml media type is us-ascii, not UTF-8 as mentioned in Section 4.3.3 of the XML Specification. For clarity, cXML documents should include an explicit encoding in the XML declaration. MIME envelopes should use a matching charset parameter for the text/xml. You can also use the application/xml media type, which does not override the XML declaration or affect the recipient's decoding notes, and which does not require the charset parameter.

An HTTP transmission of a cXML document might include the following MIME and HTTP headers:

```
POST /cXML HTTP/1.0
Content-type: text/xml; charset="UTF-8"
Content-length: 1862
Accept: text/html, image/gif, image/jpeg, *; q=.2, */*; q=.2
User-Agent: Java1.1
Host: localhost:8080
Connection: Keep-Alive

<?xml version="1.0" encoding="UTF-8"?>
…
```

Attachments

The cXML protocol supports the attachment of external files of any type to cXML documents. For example, buyers sometimes need to clarify purchase orders with supporting memos, drawings, or faxes. Another example is the CatalogUploadRequest document, which includes catalog files as attachments.

Files referenced by cXML documents can reside either on a server accessible by the receiver or within an envelope that also includes the cXML documents themselves. To attach external files to a cXML document in a single envelope, use Multipurpose Internet Mail Extensions (MIME). The cXML document contains references to external parts sent within a multipart MIME envelope.

Including Attachments

A cXML requirement for this envelope (over the requirements described in IETF RFC 2046 "Multipurpose Internet Mail Extensions Part Two: Media Types") is the inclusion of Content-ID headers with each attached file.

The contained URL must begin with cid:, which is the identifier for the referenced attachment within the larger transmission. The cid: identifier must match the Content-ID header of one (and only one) part of the MIME transmission containing the document being forwarded.

The following example shows the required skeleton of a cXML document with an attached JPEG image (without the HTTP headers shown above):

```
POST /cXML HTTP/1.0
Content-type: multipart/mixed; boundary=something unique

--something unique
Content-type: text/xml; charset="UTF-8"

<?xml version="1.0" encoding="UTF-8"?>
…
  <Attachment>
    <URL>cid:uniqueCID@sender.com</URL>
  </Attachment>
…
--something unique
Content-type: image/jpeg
Content-ID: <uniqueCID@sender.com>
…
--something unique--
```

This skeleton is also all that a receiving MIME parser must be able to process. Applications that make use of the media type described in RFC 2387 "The MIME Multipart/Related Content-type" will get much more information if the skeleton is enhanced:

```
POST /cXML HTTP/1.0
Content-type: multipart/related; boundary=something unique;
   type="text/xml"; start=<uniqueMainCID@sender.com>

--something unique
Content-type: text/xml; charset="UTF-8"
Content-ID: <uniqueMainCID@sender.com>

<?xml version="1.0" encoding="UTF-8"?>
…
  <Attachment>
    <URL>cid:uniqueAttachmentCID@sender.com</URL>
  </Attachment>
…
--something unique
Content-type: image/jpeg
Content-ID: <uniqueAttachmentCID@sender.com>
…
--something unique--
```

Receiving MIME parsers that do not understand the multipart/related media type must treat the two examples above identically. Each part of the MIME transmission can additionally have a Content-transfer-encoding and use that encoding. This addition is not necessary for HTTP transmission. Content-description and Content-disposition headers are optional within the cXML protocol, although they provide useful documentation.

Attachment Examples

The following example shows a CatalogUploadRequest with an attached catalog:

```
POST /cXML HTTP/1.0
Content-type: multipart/related; boundary=kdflkajfdksadjfk;
   type="text/xml"; start="<part1.PCO28.975@saturn.workchairs.com>"
--kdflkajfdksadjfk
Content-type: text/xml; charset=UTF-8
Content-ID: <part1.PCO28.975@saturn.workchairs.com>
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2000-12-28T16:56:03-08:00" payloadID="12345666@10.10.83.39">
   <Header>
     <From>
        <Credential domain="DUNS">
           <Identity>123456789</Identity>
        </Credential>
     </From>
     <To>
        <Credential domain="NetworkID">
           <Identity>AN01000000001</Identity>
        </Credential>
     </To>
     <Sender>
        <Credential domain="DUNS">
           <Identity>123456789</Identity>
           <SharedSecret>abracadabra</SharedSecret>
        </Credential>
     </Sender>
   </Header>
   <Request>
     <CatalogUploadRequest operation="new">
        <CatalogName xml:lang="en">Winter Prices</CatalogName>
        <Description xml:lang="en">premiere-level prices</Description>
        <Attachment>
           <URL>cid:part2.PCO28.975@saturn.workchairs.com</URL>
        </Attachment>
     </CatalogUploadRequest>
   </Request>
</cXML>
--kdflkajfdksadjfk
```

First MIME body part header

ID of MIME attachment

Second MIME body part header

2 cXML Basics

Content-type: text/plain; charset=US-ASCII
Content-Disposition: attachment; filename=PremiereCatalog.cif
Content-ID: <part2.PCO28.975@saturn.workchairs.com>
Content-length: 364

CIF_I_V3.0
LOADMODE: F
CODEFORMAT: UNSPSC
CURRENCY: USD
SUPPLIERID_DOMAIN: DUNS
ITEMCOUNT: 3
TIMESTAMP: 2001-01-15 15:25:04
DATA
942888710,34A11,C11,"Eames Chair",11116767,400.00,EA,3,"Fast MFG",,,400.00
942888710,56A12,C12,"Eames Ottoman",11116767,100.00,EA,3,"Fast MFG",,,100.00
942888710,78A13,C13,"Folding Chair",11116767,25.95,EA,3,"Fast MFG",,,25.95
ENDOFDATA

MIME trailer ——— **--kdflkajfdksadjfk--**

Surround IDs in Content-ID or Content-Type headers with angle brackets (< >), but omit these brackets when referring to IDs in URL elements. Similarly, prepend message IDs with cid: in URL elements, but not in MIME headers.

Special characters in cid URLs must be hex encoded (in %hh format).

Use the Attachment element when attaching text files, PDFs, images, or other such documents to a cXML document. When attaching another cXML document, use cXMLAttachment, regardless of whether that cXML document contains attachments itself. The cXMLAttachment element serves to alert the receiving system that additional cXML processing might be required to handle the attachment.

The following example shows a CopyRequest forwarding a cXML document with attachments using cXMLAttachment. For more information about CopyRequest, see

```
Content-Type: Multipart/Related; boundary=outer-boundary
[Other headers]

--outer-boundary
Content-Type: text/xml; charset=UTF-8
Content-ID: <111@sendercompany.com>
[Other headers]

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="123@sendercompany.com"
        timestamp="2003-11-20T23:59:45-07:00">
    <Header>
        <From>
            <!-- Sender -->
            <Credential domain="AribaNetworkUserId">
                <Identity>sender@sendercompany.com</Identity>
            </Credential>
        </From>
        <To>
            <!-- Recipient -->
            <Credential domain="AribaNetworkUserId">
                <Identity>recipient@recipientcompany.com</Identity>
            </Credential>
        </To>
        <Sender>
            <!-- Sender -->
            <Credential domain="AribaNetworkUserId">
                <Identity>sender@sendercompany.com</Identity>
                <SharedSecret>abracadabra</SharedSecret>
            </Credential>
            <UserAgent>Sender Application 1.0</UserAgent>
        </Sender>
    </Header>
    <Request deploymentMode="production">
        <CopyRequest>
            <cXMLAttachment>
                <Attachment>
                    <URL>cid:222@sendercompany.com</URL>
                </Attachment>
            </cXMLAttachment>
        </CopyRequest>
    </Request>
</cXML>

--outer-boundary
```

```
Content-Type: Multipart/Related; boundary=inner-boundary
Content-ID: <222@sendercompany.com>
[Other headers]

--inner-boundary
Content-Type: text/xml; charset=UTF-8
Content-ID: <333@sendercompany.com>
[Other headers]

[Forwarded cXML]

--inner-boundary
[Attachment 1 of the forwarded cXML]

--inner-boundary
[Attachment 2 of the forwarded cXML]

--inner-boundary--
--outer-boundary--
```

More Information About MIME

For more information about the MIME standard, see the following websites:

> www.hunnysoft.com/mime
> www.ietf.org/rfc/rfc1341.txt
> www.ietf.org/rfc/rfc2046.txt
> www.ietf.org/rfc/rfc2387.txt

For more information about attaching external files to purchase orders, see
"Attachment" on page 128.

cXML Envelope

The cXML element is the root of cXML documents, and it contains all other elements.
The cXML element is present in every cXML transaction. The following example
shows a fully specified cXML element:

```
<cXML xml:lang="en-US"
    payloadID=1234567.4567.5678@buyer.com
    timestamp="1999-03-31T18:39:09-08:00">
```

cXML has the following attributes:

version (deprecated)	This attribute was deprecated in cXML 1.2.007; do not use it in new cXML documents. Specifies the version of the cXML protocol. A validating XML parser could also determine the version attribute from the referenced DTD. Because this version number also appears in the SYSTEM identifier in the cXML document, you should omit this attribute.
xml:lang (optional)	The locale used for all free text sent within this document. The receiver should reply or display information in the same or a similar locale. For example, a client specifying xml:lang="en-UK" in a request might receive "en" data in return. Specify the most descriptive and specific locale possible.
payloadID	A unique number with respect to space and time, used for logging purposes to identify documents that might have been lost or had problems. This value should not change for retry attempts. The recommended implementation is: datetime.process id.random number@hostname
timestamp	The date and time the message was sent, in ISO 8601 format. This value should not change for retry attempts. The format is YYYY-MM-DDThh:mm:ss-hh:mm (for example, 1997-07-16T19:20:30+01:00).
signatureVersion	If present, implies that the document is digitally signed, that is, that the document contains one or more valid *ds:Signature* elements immediately following the *Request*, *Response*, or *Message* element. The only valid value for the attribute is 1.0; other values are reserved for future use. For more information, see Chapter 16, "cXML Digital Signatures."

2 cXML Basics

Locale Specified by xml:lang

The xml:lang attribute also appears with most free text elements (such as Description and Comments). While the XML specification allows the locale for an element to default to that specified for any parent element, such defaults result in inefficient queries of the document tree. cXML attempts to keep the locale identifiers together with the affected strings. The most descriptive and specific locale known should be specified in this attribute.

The xml:lang attributes appearing throughout the cXML protocol have no effect on formatted data such as numbers, dates, and times. As described for the timestamp attribute in the following section, for the timestamp attribute, such discrete values are formatted according to their data types. Longer strings (and referenced Web pages) not intended for machine processing might contain a locale-specific numeric or date format that matches a nearby xml:lang attribute.

Date, Time, and other Data Types

The timestamp attribute, and all other dates and times in cXML, must be formatted in the restricted subset of ISO 8601. This is described in the Word Wide Web Consortium (W3C) Note entitled "Date and Time Formats" available at www.w3.org/TR/NOTE-datetime-970915.html.

Timestamps require a minimum of a complete date plus hours, minutes, and seconds. Fractions of a second are optional. This protocol requires times expressed in local time with a time-zone offset from UTC (Coordinated Universal Time, also known as Greenwich Mean Time). The "Z" time zone designator is not allowed.

For example, 2002-04-14T13:36:00-08:00 corresponds to April 14, 2002, 1:36 p.m., U.S. Pacific Standard Time.

Further references for the date, time, and other data type formats used by cXML are:

- Microsoft's XML Data Types Reference, msdn.microsoft.com/library/default.asp?url=/library/en-us/xmlsdk/html/b24aafc2-bf1b-4702-bf1c-b7ae3597eb0c.asp

- The original XML Data proposal to the Word Wide Web Consortium (W3C), www.w3c.org/TR/1998/NOTE-XML-data-0105

Special Characters

In cXML, as in XML, not all characters can be typed from the keyboard, such as the registered trademark symbol (®). Others, such as < and &, have special meaning to XML. These characters must be encoded using character entities.

XML defines the following built-in character entities:

Entity	Character
<	<
>	>
&	&
"	"
'	'

For characters outside of the encoding you use, use the Unicode number of the character (decimal or hexadecimal), preceded by pound (#). For example, ® and ® represent a registered trademark symbol, ®.

For example,

> <Description xml:lang="en-US">The best prices for software®</Description>

could be encoded as

> <Description xml:lang="en-US">The best prices for software ®</Description>

Single (')or double (")quotation marks must be escaped only within attribute values that are quoted using that delimiter. It is recommended that you use only single quotes to delimit attributes, unless the content will never contain quotes.

▼   **To handle special characters in documents:**

1. Use a template that only uses single quotes to delimit attributes.

2. Add values to the template by doing one of the following:

- If the document is a PunchOutOrderMessage to be transmitted by the cxml-urlencoded hidden field, fill the values in the template using US-ASCII encoding. This encoding requires XML character entities for all characters beyond that encoding. For example, as described above, enter the registered trademark symbol, which is not available in US-ASCII, as ®.

- Otherwise, fill the values in the document using UTF-8 encoding. UTF-8 should be used for all documents sent by HTTP Post directly, or embedded in a cXML-base64 hidden field. UTF-8 includes all of US-ASCII.

3. XML escape attribute values and element content as you create the cXML document. Characters that must be escaped are &, ', < and >.

The following steps are required if you are transmitting the document in a PunchOutOrderMessage.

4. Pay attention to all characters that browsers interpret:

   a. If you are using a cxml-urlencoded hidden field, convert all double quotes to ".

   b. Further (for the cxml-urlencoded field), escape all ampersands that appear in contexts significant to HTML with &. To be safe, you can escape all ampersands. For example, escape & as &amp; and ' as &apos;. Escape the trademark symbol ® as &#174;.

   c. Otherwise, if you are using a cxml-base64 hidden field, base64 encode the entire cXML document.

5. Embed the document in the HTML form with double quotes around the string value. For example, to send a Money element with an attribute having the value ®®'""&<>> and containing the value ®®'"""&<>>", the XML document might appear as:

```
<?xml version='1.0' encoding='UTF-8'?>
<!DOCTYPE Money SYSTEM 'SpecialChars.dtd'>
<Money alternateAmount='&#174;&#xAE;&apos;"&#34;&quot;&amp;&lt;>&gt;'>
&#174;&#xAE;'&apos;"&#34;&quot;&amp;&lt;>&gt;</Money>
```

which should be encoded as follows:

```
<!-- Recommendation for cXML-urlencoding: Uses double quotes to delimit the -->
<!-- field value and single quotes for the contained attributes. -->
<Input type="Hidden" name="cXML-urlencoded" value="<?xml version='1.0'
encoding='UTF-8'?>
<!DOCTYPE Money SYSTEM 'SpecialChars.dtd'>
<Money alternateAmount='&amp;#174;&amp;#xAE;&amp;apos;&#34;&amp;#34;
&amp;quot;&amp;amp;&amp;lt;>&amp;gt;'>&amp;#174;&amp;#xAE;'&amp;apos;
&#34;&amp;#34;&amp;quot;&amp;amp;&amp;lt;>&amp;gt;</Money>">

<!-- Best choice: Base64 encode the value. Don't have to worry about what -->
<!-- the browser interprets. -->
```

```
<Input type="Hidden" name="cXML-
base64"value="PD94bWwgdmVyc2lvbj0nMS4wJyBlbmNvZGluZz0nVVRGLTgnPz4K
PCFET0NUWVBFIE1vbmV5IFNZU1RFTSAnU3BlY2lhbENoYXJzLmR0ZCc+CjxNb
25leSBhbHRlcm5hdGVBbW91bnQ9JyYjMTc0OyYjeEFFOyZhcG9zOyImM0OyZxd
W90OyZhbXA7Jmx0Oz4mZ3Q7Jz4KJiMxNzQ7JiN4QUU7JyZhcG9zOyImM0OyZx
dW90OyZhbXA7Jmx0Oz4mZ3Q7PC9Nb25leT4K">
```

The preceding examples illustrate alternatives for encoding the cXML-urlencoded field. They avoid XML escaping a few characters, such as angle brackets, that are not special to XML in all contexts. A direct implementation of the previous steps would result in an HTML field such as:

```
<Input type="Hidden" name="cXML-urlencoded" value="<?xml version='1.0'
encoding='UTF-8'?>
<!DOCTYPE Money SYSTEM 'SpecialChars.dtd'>
<Money alternateAmount='&amp;#174;&amp;#174;&amp;apos;&#34;&#34;&#34;
&amp;amp;&amp;lt;&amp;gt;&amp;gt;'>&amp;#174;&amp;#174;"&#34;&#34;&#34;
&amp;amp;&amp;lt;&amp;gt;&amp;gt;</Money>">
```

or the XML document:

```
<?xml version='1.0' encoding='UTF-8'?>
<!DOCTYPE Money SYSTEM 'SpecialChars.dtd'>
<Money alternateAmount='&#174;&#174;&apos;"""&amp;&lt;&gt;&gt;'>
&#174;&#174;"""&amp;&lt;&gt;&gt;</Money>
```

Header

The Header element contains addressing and authentication information. The Header element is the same regardless of the specific Request or Response within the body of the cXML message. Applications need the requestor's identity, but not validation that the information provided for identity is correct.

The following example shows the Header element:

```
<Header>
  <From>
    <Credential domain="AribaNetworkUserId">
      <Identity>admin@acme.com</Identity>
    </Credential>
  </From>
  <To>
    <Credential domain="DUNS">
      <Identity>012345678</Identity>
    </Credential>
  </To>
  <Sender>
```

```
              <Credential domain="AribaNetworkUserId">
                 <Identity>sysadmin@buyer.com</Identity>
                 <SharedSecret>abracadabra</SharedSecret>
              </Credential>
              <UserAgent>Network Hub 1.1</UserAgent>
           </Sender>
       </Header>
```

The From and To elements are synonymous with From and To in SMTP mail messages; they are the logical source and destination of the messages. Sender is the party that opens the HTTP connection and sends the cXML document.

Sender contains the Credential element, which allows the receiving party to authenticate the sending party. This credential allows strong authentication without requiring a public-key end-to-end digital certificate infrastructure. Only a user name and password need to be issued by the receiving party to allow the sending party to perform Requests.

When the document is initially sent, Sender and From are the same, However, if the cXML document travels through e-commerce network hubs, the Sender element changes to indicate current sending party.

From

This element identifies the originator of the cXML request.

To

This element identifies the destination of the cXML request.

Sender

This element allows the receiving party to identify and authenticate the party that opened the HTTP connection. It contains a stronger authentication Credential than the ones in the From or To elements, because the receiving party must authenticate who is asking it to perform work.

UserAgent

A textual string representing the UserAgent who is conducting the cXML conversation. This should be a unique per-product string, and ideally, per-version. Analogous to UserAgent for HTTP conversations.

Credential

This element contains identification and authentication values.

Credential has the following attributes:

domain	Specifies the type of credential. This attribute allows documents to contain multiple types of credentials for multiple authentication domains.
	For messages sent on the Ariba Supplier Network, for instance, the domain can be AribaNetworkUserId to indicate an email address, DUNS for a D-U-N-S number, or NetworkId for a preassigned ID.
type (optional)	Requests to or from a marketplace identify both the marketplace and the member company in From or To Credential elements. In this case, the credential for the marketplace uses the type attribute, which is set to the value "marketplace".

Credential contains an Identity element and optionally a SharedSecret or a CredentialMac element. The Identity element states who the Credential represents, while the optional authentication elements verify the identity of the party.

SharedSecret

The SharedSecret element is used when the Sender has a password that the requester recognizes.

>   **Note:** Do not use authentication elements in documents sent through one-way communication. One-way transport routes through users' browsers, so users would be able to see the document source, including Credential elements.

CredentialMac

The CredentialMac element is used for the Message Authentication Code (MAC) authentication method. This authentication method is used in situations where the sender must prove to the receiver that it has been authenticated by shared secret by a trusted third party. For example, a direct PunchOut request can travel directly from a buyer to a supplier without going through a network commerce hub, because it contains a MAC (generated by the network commerce hub) that allows the supplier to authenticate it.

The trusted third party computes the MAC and transfers it to the sender through the Profile transaction. The MAC is opaque to the sender (it is secure and non-reversible). To see how the MAC is transmitted from the trusted third party to the sender, see "ProfileResponse" on page 63.

2 cXML Basics

The receiver computes the MAC using the same inputs as the trusted third party and compares it with the MAC received in the cXML document. If the two values match, the document is authentic.

To learn how to compute the MAC value, see "Message Authentication Code (MAC)" on page 335.

CredentialMac has the following attributes:

type	Identifies the data being authenticated and the method in which it is formatted for authentication. The only supported value is "FromSenderCredentials".
algorithm	Identifies for the MAC algorithm used on the data. The only supported value is "HMAC-SHA1-96".
creationDate	Specifies the date and time the MAC was generated.
expirationDate	Specifies the date and time after which this MAC is no longer valid. Receivers must reject MACs that are received after the expirationDate. Receivers can optionally reject unexpired MACs. For example, a receiver might reject MACs that are scheduled to expire in less than an hour.

The following example shows a Credential element that contains a CredentialMac element:

```
<Sender>
   <Credential domain="NetworkId">
      <Identity>AN9900000100</Identity>
      <CredentialMac type="FromSenderCredentials"
              algorithm="HMAC-SHA1-96"
              creationDate="2003-01-15T08:42:46-0800"
              expirationDate="2003-01-15T11:42:46-0800">
         MnXkusp8Jj0lw3mf
      </CredentialMac>
      <UserAgent>Procurement Application 8.1</UserAgent>
   </Credential>
</Sender>
```

Multiple Credentials

The From, To, and Sender elements can each optionally contain multiple Credential elements. The purpose of supplying multiple credentials is to identify a single organization using different domains. For example, an organization might be identified by including both a DUNS number and a NetworkId number.

The receiver should validate all credentials with domains it recognizes and it should reject the document if any credentials with recognized domains do not match an organization it knows. It should also reject the document if any two credentials in the same From, To, or Sender section appear to refer to different entities.

The receiver should reject the document if there are multiple credentials in a To, From, or Sender section that use different values but use the same domain.

Correspondent

The From and To elements can each optionally contain a Correspondent element. Correspondent elements are used in cases where a party or a connecting hub does not know the originating or receiving organization. The sender, receiver, or connecting hub can use the information in the Correspondent element to identify the unknown organization.

Correspondent has the following attribute:

preferredLanguage (optional)	The preferred language of the organization, if it is known.

Identify the unknown organization by using a Contact element. For more information, see "Contact" on page 60,

Request

Clients send requests for operations. Only one Request element is allowed for each cXML envelope element, which simplifies the server implementations, because no de-multiplexing needs to occur when reading cXML documents. The Request element can contain virtually any type of XML data.

Typical Request elements are:

- OrderRequest
- ProfileRequest
- PunchOutSetupRequest
- StatusUpdateRequest
- GetPendingRequest
- ConfirmationRequest
- ShipNoticeRequest
- ProviderSetupRequest
- PaymentRemittanceRequest

Request has the following attributes:

deploymentMode (optional)	Indicates whether the request is a test request or a production request. Allowed values are "production" (default) or "test".
Id	This attribute can be used to call out an element and all its children as a target for a digital signing. For more information about digital signatures, see Chapter 16, "cXML Digital Signatures."

Response

Servers send responses to inform clients of the results of operations. Because the result of some requests might not have any data, the Response element can optionally contain nothing but a Status element. A Response element can also contain any application-level data. During PunchOut for example, the application-level data is contained in a PunchOutSetupResponse element.

The typical Response elements are:

- ProfileResponse
- PunchOutSetupResponse
- GetPendingResponse

Response has the following attribute:

Id	This attribute can be used to call out an element and all its children as a target for a digital signing. For more information about digital signatures, see Chapter 16, "cXML Digital Signatures."

Status

This element conveys the success, transient failure, or permanent failure of a request operation.

Status has the following attributes:

code	The status code of the request. For example, 200 represents a successful request. See the table of codes, below.
text	The text of the status. This text aids user readability in logs, and is a canonical string for the error in English.
xml:lang (optional)	The language of the data in the Status element. Optional for compatibility with cXML 1.0. Might be required in future versions of cXML.

The attributes of the Status element indicate what happened to the request. For example:

```
<Status xml:lang="en-US" code="200" text="OK"> </Status>
```

The content of the Status element can be any data needed by the requestor and should describe the error. For a cXML 200/OK status code, there might be no data. However, for a cXML 500/Internal Server Error status code, or other similar code, it is strongly recommended that the actual XML parse error or application error be presented. This error allows better one-sided debugging and interoperability testing. For example:

```
<Status code="406" text="Not Acceptable">cXML did not validate. Big Problem!</Status>
```

The following table describes the cXML status code ranges:

Range	Meaning
2xx	Success
4xx	Permanent error. Client should not retry. The error prevents the request from being accepted.
5xx	Transient error. Typically a transport error. Client should retry. The recommended number of retries is 10, with a frequency of one hour. At a minimum a six hour retry window is recommended. For high priority requests, such as rush orders, you might want to increase the retry frequency.

Servers should not include additional Response elements (for example, a PunchOutSetupResponse element) unless the status code is in the cXML 200 range (for example, cXML 200/OK).

Because cXML is layered above HTTP in most cases, many errors (such as HTTP 404/Not Found) are handled by the transport. All transport errors should be treated as transient and the client should retry, as if a cXML 500 range status code had been received. All HTTP replies that don't include valid cXML content, including HTTP 404/Not found and HTTP 500/Internal Server Error status codes, are considered transport errors. Other common transport problems include timeouts, TCP errors (such as "connection refused"), and DNS errors (such as "host unknown"). Validation errors in parsing a Request document would normally result in a cXML permanent error in the 400 range, preferably 406/Not Acceptable.

The following table includes possible cXML status codes:

Status	Text	Meaning
200	OK	The server was able to execute the request or deliver it to the final recipient. The returned Response might contain application warnings or errors: the cXML Request itself generated no errors or warnings, however, this status does not reflect any errors or warnings that might be generated afterward by the application itself. You will receive no further status updates, unless an error occurs during later processing.
201	Accepted	The request has been accepted for forwarding by an intermediate hub, or has been accepted by its ultimate destination and not yet been examined. You will receive updates on the status of the request, if a mechanism to deliver them is available.
		As mentioned in "StatusUpdateRequest" on page 210, the client should expect later StatusUpdate transactions.
204	No Content	All Request information was valid and recognized. The server has no Response data of the type requested.
		In a PunchOutOrderMessage, this status indicates that the PunchOut session ended without change to the shopping cart (or client requisition).
280		The request has been forwarded by an intermediate hub. You will receive at least one more status update. This status could mean that the request was delivered to another intermediary or to the final recipient with 201 status, or that it was forwarded via a reliable non-cXML transport.
281		The request has been forwarded by an intermediate hub using an unreliable transport (such as email). You might receive status updates; however, if you do not received status updates, there is not necessarily a problem.
400	Bad Request	Request unacceptable to the server, although it parsed correctly.
401	Unauthorized	Credentials provided in the Request (the Sender element) were not recognized by the server.
402	Payment Required	This Request must include a complete Payment element.
403	Forbidden	The user has insufficient privileges to execute this Request.
406	Not Acceptable	Request unacceptable to the server, likely due to a parsing failure.
409	Conflict	The current state of the server or its internal data prevented the (update) operation request. An identical Request is unlikely to succeed in the future, but only after another operation has executed, if at all.

Status	Text	Meaning
412	Precondition Failed	A precondition of the Request (for example, a PunchOut session appropriate for a PunchOutSetupRequest edit) was not met. This status normally implies the client ignored some portion of a previous transmission from a server (for example, the operationAllowed attribute of a PunchOutOrderMessageHeader).
417	Expectation Failed	Request implied a resource condition that was not met. One example might be a SupplierDataRequest asking for information about a supplier unknown to the server. This status might imply lost information at the client or server.
450	Not Implemented	The server does not implement the particular Request. For example, PunchOutSetupRequest or the requested operation might not be supported. This status normally implies the client has ignored the server's profile.
475	Signature Required	The receiver is unwilling to accept the document because it does not have a digital signature.
476	Signature Verification Failed	The receiver is unable to validate the signature, possibly because the document was altered in transit, or the receiver does not support one or more algorithms used in the signature.
477	Signature Unacceptable	The signature is technically valid, but is not acceptable to the receiver for some other reason. The signature policies or certificate policies may be unacceptable, the type of certificate used may be unacceptable, or there may be some other problem.
500	Internal Server Error	Server was unable to complete the Request.
550	Unable to reach cXML server	Unable to reach next cXML server to complete a transaction requiring upstream connections. An intermediate hub can return this code when a supplier site is unreachable. If upstream connections complete, intermediate hubs should return errors directly to the client.
551	Unable to forward request	Unable to forward request because of supplier misconfiguration. For example, an intermediate hub failed to authenticate itself to a supplier. Clients cannot rectify this error, but this error might be resolved before the client retries.
560	Temporary server error	For example, a server might be down for maintenance. The client should retry later.

For status codes related to catalog uploading, see "Response" on page 312.

When receiving unrecognized codes, cXML clients must handle them according to their class. Therefore, older clients should treat all new 2*xx* codes as 200 (success), 4*xx* codes as 400 (permanent failure), and 5*xx* codes as 500 (transient error). This behavior allows for both further expansions of the cXML protocol and server-specific codes without loss of interoperability.

One-Way (Asynchronous) Model

Unlike Request-Response transactions, One-Way messages are not restricted to the HTTP transport. One-way messages are for situations when an HTTP channel (a synchronous request-response type operation) is not appropriate. The following figure shows an example of how A and B might communicate with messages instead of the Request-Response transaction.

One-Way Message (Asynchronous)
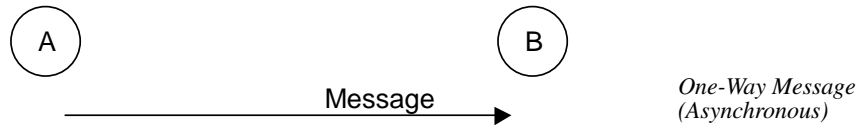
In this case, a possible scenario would be:

1. A formats and encodes a cXML document in a transport that B understands.

2. A sends the document using the known transport. A does not (and cannot) actively wait for a response to come back from B.

3. B receives the cXML document and decodes it out of the transport stream.

4. B processes the document.

In the One-Way model, A and B do *not* have an explicit Request-Response cycle. For example, between One-Way messages, messages from other parties might arrive and other conversations could take place.

To fully specify a one-way transaction, the transport used for the message must also be documented. For the cXML transactions that use the one-way approach, the transport and encoding are specified. A common example of a transaction that uses one-way is the PunchOutOrderMessage.

One-way messages have a similar structure to the Request-Response model:

```
<cXML>
   <Header>
      Header information here…
   </Header>
   <Message>
      Message information here…
   </Message>
</cXML>
```

The Header element is treated exactly as it is in the Request-Response case. The cXML element is also identical to the one described on page 38. The easiest way to tell the difference between a one-way message and a Request-Response message is the presence of a Message element (instead of a Request or Response element). The following section discusses the Message element in more detail.

The Header element in a one-way message should not contain shared secret information in the sender credential. Authentication is done using the BuyerCookie. This is different from Request-Response Header.

Message

This element carries all the body level information in a cXML message. It can contain an optional Status element, identical to that found in a Response element—it would be used in messages that are logical responses to request messages.

Message has the following attributes:

deploymentMode (optional)	Indicates whether the request is a test request or a production request. Allowed values are "production" (default) or "test".
inReplyTo (optional)	Specifies to which Message this Message responds. The contents of the inReplyTo attribute would be the payloadID of a Message that was received earlier. This would be used to construct a two-way conversation with many messages.
Id	This attribute can be used to call out an element and all its children as a target for a digital signing. For more information about digital signatures, see Chapter 16, "cXML Digital Signatures."

The inReplyTo attribute can also reference the payloadID of an earlier Request or Response document. When a Request-Response transaction initiates a "conversation" through multiple one-way interactions, the first message can include the payloadID of the most recent relevant Request or Response that went in the other direction. For example, a Message containing a PunchOutOrderMessage might include an inReplyTo attribute containing the payloadID of the PunchOutSetupRequest that started the PunchOut session. The BuyerCookie included in the PunchOut documents performs a similar function to that of the inReplyTo attribute.

Transport Options

There are two commonly used transports for one-way messages: HTTP and URL-Form-Encoding. These are just two of the well-defined transports today; more could become supported in the future.

HTTP

Procurement applications pull information using one-way HTTP communication. The one type of transaction that uses one-way HTTP communication is GetPendingRequest, discussed on page 316.

HTTPS is preferred, because it encrypts transmitted data for security.

URL-Form-Encoding

URL-Form-Encoding enables integration between remote websites and procurement applications. It also serves as a way to avoid requiring a listening server on the buyer's system that is directly accessible through the Internet. This transport is best understood by examining how the PunchOutOrderMessage transaction works.

Remote websites do not directly send cXML PunchOutOrderMessage documents to procurement applications; instead, they encode them as hidden HTML Form fields and post them to the URL specified in the BrowserFormPost element of the PunchOutSetupRequest. When the user clicks a Check Out button on the website after shopping, the website sends the data to the procurement application as an HTML Form Submit. The following diagram illustrates what happens:
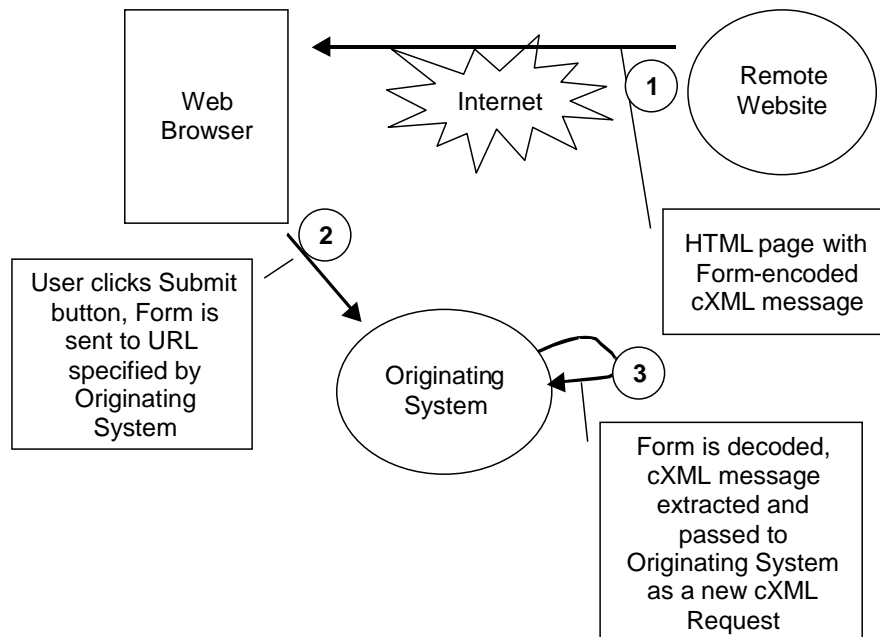
The semantics of packing and unpacking are described below.

Form Packing

Remote websites assign each PunchOutOrderMessage document to a hidden field on the Form named cXML-urlencoded or cXML-base64. They assign the HTML Form element a METHOD of POST and an ACTION consisting of the URL passed in the BrowserFormPost element of the PunchOutSetupRequest. For example:

```
<FORM METHOD=POST
     ACTION="http://workchairs.com:1616/punchoutexit">
   <INPUT TYPE=HIDDEN NAME="cXML-urlencoded"
      VALUE="Entire URL-Encoded PunchOutOrderMessage document">
   <INPUT TYPE=SUBMIT VALUE="Proceed">
</FORM>
```

Additional HTML tags on the page might contain the above fragment to describe the contents of the shopping basket in detail.

> **Note:** When Web servers send the cXML-urlencoded field, it is not yet URL encoded. This encoding is required only when the form is submitted by Web browsers (when users click Check Out in the above example). Web browsers themselves meet this requirement. The Web server must HTML-encode only the field value, escaping quotation marks and other special characters, so the form displays properly for the user.

The names cXML-urlencoded and cXML-base64 are case insensitive.

cXML-urlencoded

The cXML-urlencoded field is URL encoded (per the HTTP specification) by the Web browser, not by the Web server or the supplier. This is because the encoding is required only when the form is submitted by a Web browser, such as when a user clicks Check Out in the previous example. However, the Web server must HTML-encode the field value, escaping quotation marks and other special characters, so that the form will display correctly.

> **Note:** Suppliers should never URL encode the cXML-urlencoded field. This field is automatically URL-encoded by the web browser.

For cXML-urlencoded data, the receiving parser cannot assume a charset parameter beyond the default for media type text/xml. No character encoding information for the posted data is carried in an HTTP POST. The receiving Web server cannot determine the encoding of the HTML page containing the hidden field. The cXML document forwarded in this fashion must therefore use us-ascii character encoding. Any characters (including those "URI encoded" as "%XX") found in the XML source document must be in the "us-ascii" set. Other Unicode symbols can be encoded using character entities in that source document.

cXML-Base64

The cXML-base64 hidden field supports international documents. cXML documents containing symbols outside of "us-ascii" should use this field instead of the cXML-urlencoded hidden field. This alternative has almost identical semantics, but the entire document is base64-encoded throughout transport and not HTML-encoded to the browser or URL-encoded to the receiving Web server. Base64-encoding is described in RFC 2045 "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies."

Base64-encoding from the remote website through the browser and to the receiving Web server at the client maintains the original character encoding of a cXML document. Though no charset parameter arrives with the posted information, the decoded document (after the transfer encoding is removed) can be treated as the media type application/xml. This encoding allows the receiving parser to honor any encoding attribute specified in the XML declaration. For this field (as for any application/xml documents), the default character encoding is UTF-8.

Either of these hidden fields (cXML-urlencoded or cXML-base64) must appear in the data posted to the procurement application. Though recipients should first look for cXML-base64 in the data, it is wasteful to send both fields.

Form Unpacking and Processing

The procurement application, which previously provided the appropriate URL, receives an HTML Form POST containing the Form data as described above. The Form POST processor would first look for the cXML-base64 variable, extract the value and base64-decode its contents. If that field does not exist in the data, the Form POST processor would look for the cXML-urlencoded variable, extract the URL-encoded cXML message and URL-decode it. The decoded content of the field is then processed as if it had been received through a normal HTTP Request/Response cycle.

The implied media type of the document after decoding varies, with different possible character encodings:

- The cXML-urlencoded variable is of media type text/xml with no charset attribute. It is thus restricted to the us-ascii character encoding. The receiving parser must ignore any encoding attribute in the XML declaration of the cXML document because the browser might have changed the encoding.

- The cXML-base64 variable is of media type application/xml and thus might have any character encoding (indicated by the encoding attribute of the contained XML declaration, if any). The default character encoding is UTF-8, as for any application/xml documents.

The primary difference between this transaction and a normal Request-Response transaction is that there is no response that can be generated, because there is no HTTP connection through which to send it.

Service Status Response

This transaction determines whether a particular service is currently available. When an HTTP GET is sent to a service location, the service responds with a valid, dynamically generated cXML Response document. A service can be any HTTP URL at which cXML Request documents are received.

For example, an HTTP GET sent to https://service.ariba.com/service/transaction/cxml.asp yields the following response:

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE cXML "http://xml.cXML.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2001-01-08T10:47:01-08:00" payloadID="978979621537--
4882920031100014936@206.251.25.169">
  <Response>
    <Status code="200" text="OK">Ping Response Message</Status>
  </Response>
</cXML>
```

Note: This combination of transport (HTTP) and protocol (cXML) levels should be used only for the case described above.

Basic Elements

The following entities and elements are used throughout the cXML specification. Most of the definitions listed here are basic vocabulary with which the higher-order business documents are described. The common type entities and the common elements representing low-level objects are defined here.

Type Entities

Most of these definitions are from the XML-Data note submission to the World Wide Web Consortium (W3C). A few higher-level type entities that are also defined here are not from XML-Data. These types are also discussed in "cXML Envelope" on page 38.

isoLangCode

An ISO Language Code from the ISO 639 standard.

isoCountryCode

An ISO Country Code from the ISO 3166 standard.

xmlLangCode

A language code as defined by the XML 1.0 Specification (at www.w3.org/TR/1998/REC-xml-19980210.html). In the most common case, this includes an ISO 639 Language Code and (optionally) an ISO 3166 Country Code separated by a hyphen. Unlike the full XML recommendation, IANA or private language codes should not be used in cXML. IANA and private subcodes are allowed, though they should come after a valid ISO 3166 Country Code.

The recommended cXML language code format is xx[-YY[-zzz]*]? where xx is an ISO 639 Language code, YY is an ISO 3166 Country Code and zzz is an IANA or private subcode for the language in question. Again, use of the Country Code is always recommended. By convention, the language code is lowercase and the country code is uppercase. This is not required for correct matching of the codes.

UnitOfMeasure

UnitOfMeasure describes how the product is packaged or shipped. It must conform to UN/CEFACT Unit of Measure Common Codes. For a list of UN/CEFACT codes, see www.unetrades.net.

URL

A URL (Uniform Resource Locator) as defined by the HTTP/1.1 standard.

Base Elements

These elements, used throughout the specification, range from generic ones such as Name and Extrinsic to specific ones such as Money. For information about the base TermReference element, see page 155.

Money

The Money element has three possible attributes: currency, alternateAmount, alternateCurrency. The attributes currency and alternateCurrecy must be a three-letter ISO 4217 currency code. The content of the Money element and of the aternateAmount attribute should be a numeric value. For example:

> <Money currency="USD">12.34</Money>

The optional alternateCurrency and alternateAmount attributes are used together to specify an amount in an alternate currency. These can be used to support dual-currency requirements such as the euro. For example:

> <Money currency="USD" alternateCurrency="EUR" alternateAmount="14.28">12.34
> </Money>

Note: You can optionally use commas as thousands separators. Do not use commas as decimal separators.

Country

Contains the name of the country in a location. Contained by the PostalAddress element.

CountryCode

Contains the International ITU dial code for the country code. It can be entered onto a telephone keypad after the escape code to reach the country. Used by the Phone and Fax elements.

Contact

The Contact element contains information about any contact important to the current transaction. For example:

```
<Contact>
    <Name xml:lang="en-US">Mr. Smart E. Pants</Name>
    <Email>sepants@workchairs.com</Email>
    <Phone name="Office">
    …
    </Phone>
</Contact>
```

Chapter 3
Profile Transaction

The Profile transaction retrieves cXML server capabilities, including the supported cXML version, transactions, and options on those transactions. The ProfileRequest and ProfileResponse documents must be supported by all cXML 1.1 and higher server implementations.

This chapter describes:

Introduction to the Profile Transaction

The Profile transaction enables one party to query another for cXML capabilities. These parties include suppliers, buyers, commerce network hubs, service providers, and marketplaces. To inquire about server capabilities, send a ProfileRequest document. The server returns a ProfileResponse document containing the server information.

The Profile transaction is the only transaction that all cXML servers must support. It is intended for back-end integration between applications, making the capabilities of cXML servers available to client systems.

The ProfileResponse should list all Requests supported at a particular website, not necessarily all those supported by the organization. Suppliers that can receive OrderRequest documents and send various messages or initiate Request/Response transactions describe their OrderRequest support in the profile transaction. The data returned by a ProfileRequest can be cached and used for a period of time, as determined by the manager of a trading community.

The Profile transaction can also be used to simply "ping" a server within the cXML protocol.

The Profile transaction can also retrieve the locations for follow-up documents. This use replaces the Followup element used in OrderRequest documents. To obtain information about where to send any document, send a ProfileRequest document to the server.

ProfileRequest

This element has no content. It is simply routed to the appropriate cXML server using the Header. The server responds with a single ProfileResponse as described below. The only dynamic portions of this response are the payloadId and timestamp attributes of the cXML element itself. In this particular case, servers are not required to provide responses in multiple locales.

An example Request of this type is:

```
<cXML payloadID="9949494"
    xml:lang="en-US" timestamp="2000-03-12T18:39:09-08:00">
    <Header>
        Routing, identification, and authentication information.
    </Header>
        <Request>
            <ProfileRequest />
        </Request>
</cXML>
```

ProfileRequest documents should be sent to the "root" URL of a commerce network hub, which should never change. Sending a ProfileRequest to this root URL obtains the URL location for every other cXML Request type. The ProfileResponse from a commerce network hub depends on the To element in the ProfileRequest.

ProfileResponse

This element contains a list of supported transactions, their locations, and any supported options. The following is a possible ProfileResponse:

```
<ProfileResponse effectiveDate="2001-03-03T12:13:14-05:00">
   <Option name="Locale">1</Option>
   …
   <Transaction requestName="PunchOutSetupRequest">
      <URL>http://www.workchairs.com/cXML/PunchOut.asp</URL>
      <Option name="operationAllowed">create inspect</Option>
      <Option name="dynamic pricing">0</Option>
      …
   </Transaction>
   …
</ProfileResponse>
```

A more likely ProfileResponse from a current supplier might be:

```
<ProfileResponse effectiveDate="2000-01-01T05:24:29-08:00"
   lastRefresh="2001-09-08T05:24:29-08:00">
   <Transaction requestName="OrderRequest">
      <URL>http://workchairs.com/cgi/orders.cgi</URL>
      <Option name="service">workchairs.orders</Option>
   </Transaction>
   <Transaction requestName="PunchOutSetupRequest">
      <URL>http://workchairs.com/cgi/PunchOut.cgi</URL>
      <Option name="service">workchairs.signin</Option>
   </Transaction>
</ProfileResponse>
```

ProfileResponse has the following attributes:

effectiveDate	The date and time when these services became available. Dates should not be in the future.

lastRefresh	Indicates when the profile cache was last refreshed. When an application receives a ProfileResponse from a profile caching server, it will know the age of the data in the cache.

3 Profile Transaction

Option Element

The Option element contains the value for a defined option for either the overall service or a specific transaction. Option has the following attribute:

name	The name of this option. This attribute should not be viewed directly (because the profile is intended for machine consumption). The client system must understand this before receiving a ProfileResponse document.
	Currently defined values for name are service, attachments, changes, and requestNames.

MAC Options

If the ProfileResponse document is sent by a trusted third party (such as a network commerce hub) and it lists transactions that rely on MAC authentication, it should contain Option elements that list MAC authentication values. The client will insert these values in a CredentialMac element in documents it sends directly to the server.

For example:

```
<ProfileResponse>
    <Option name="CredentialMac.type">FromSenderCredentials</Option>
    <Option name="CredentialMac.algorithm">HMAC-SHA1-96</Option>
    <Option name="CredentialMac.creationDate">2003-01-17T17:39:09-08:00</Option>
    <Option name="CredentialMac.expirationDate">2003-01-17T23:39:09-08:00</Option>
    <Option name="CredentialMac.value">67mURtR6VI6YnIsK</Option>
```

If the server supports direct PunchOut, additional Option elements should appear for PunchOutSetupRequest in the ProfileResponse. For more information, see "PunchOutSetupRequest Options" on page 65.

For more information about MACs, see "Message Authentication Code (MAC)" on page 335.

Service

The Profile transaction can return multiple variations of a single transaction type.

If a cXML server supports multiple implementations of a particular transaction, ProfileResponse can distinguish them. For example, a marketplace might provide two services within the ProviderSetupRequest transaction: marketplace.signin and marketplace.console. The ProfileReponse must list them in a way that differentiates them:

ProfileResponse can uniquely identify a specific location for each variation of a transaction. In the case of ProviderSetupRequest, the variation is the service name. ProfileResponse uses the Option element to include the service name and value, for example:

```
<Transaction requestName="ProviderSetupRequest">
  <URL>http://service.hub.com/signin</URL>
  <Option name="service">signin</Option>
</Transaction>

<Transaction requestName="ProviderSetupRequest">
  <URL>http://service.hub.com/console</URL>
  <Option name="service">console</Option>
</Transaction>
```

If there is only one location for a particular type of transaction, then the Option element is not needed.

When looking for a particular transaction type and Option name="service" is provided, use the transaction that matches the desired service. If there is no such Option name and option value match, use the first transaction with no option name and value.

Each variation of a transaction must uniquely identify its particular location. In the case of ProviderSetupRequest, the unique identifier is "service". These unique identifiers use the Option element in the Transaction element. The Option element contains the unique identifier's name. The value for the Option element is the unique identifier's value.

PunchOutSetupRequest Options

When PunchOutSetupRequest is returned as a supported transaction, three options can be specified to indicate that direct PunchOut is supported. These options inform clients that they can send PunchOutSetupRequest documents directly to servers, without going through network commerce hubs for authentication, and which authentication methods are supported:

- To specify the URL for receiving direct PunchOutSetupRequest documents:

    `<Option name="Direct.URL">https://asp.workchairs.com/directPunchout</Option>`

- To indicate that the server supports Message Authentication Code (MAC) authentication:

    `<Option name="Direct.AuthenticationMethod.CredentialMac">Yes</Option>`

In addition, this option instructs the trusted third party to generate a Message Authentication Code for the server. There are additional Option elements that should appear within the ProfileResponse element for profiles sent by trusted third parties, see "MAC Options" on page 64. For information about MAC authentication, see "Message Authentication Code (MAC)" on page 335.

• To indicate that the server supports the digital certificate authentication method:

<Option name="**Direct.AuthenticationMethod.Certificate**">Yes</Option>

This option indicates that the server sends AuthRequest documents to validate PunchOut requests. For information about the Auth transaction, see "Auth Transaction" on page 340.

These options are not used for regular PunchOut.

For more information about direct PunchOut, see "Direct PunchOut" on page 114.

OrderRequest Options

When OrderRequest is returned as a supported transaction, two options must be specified: attachments and changes. The attachments option indicates whether attachments are accepted. The changes option specifies if change and delete orders are accepted. To specify acceptance of attachments:

<Option name = "**attachments**">Yes</Option>

To specify acceptance of change orders:

<Option name = "**changes**">Yes</Option>

The default for both options is No. Documents with attachments or changes set to No should be handled identically to documents that do not mention the option.

For more information about cXML document attachments, see "Wrapping Layers" on page 32.

SessionStatusRequest Options

When SessionStatusRequest is returned as a supported transaction, one option must be specified: requestNames. There is no default. This option informs the client that the server supports session checks and updates when performing any of the transactions specified in the content of the Option element. This content must be a space-separated list from the set "OrderStatusSetupRequest," "ProviderSetupRequest" and "PunchOutSetupRequest." Transaction elements for each of the listed requests must also be included in the ProfileResponse document.

Transaction

The description of a transaction supported by this service. The Profile definition currently indicates the locations to which to send specific requests. Future versions of cXML might add more Option definitions and extend the Profile information to include more information about supported requests.

The Transaction element must contain a URL element.

Transaction has the following attribute:

requestName	A specific request that this server accepts at the given URL. Values can be the name of any Request document defined by cXML.

Scenarios

ProfileRequest documents can be sent by several possible entities to obtain server capabilities and information from suppliers, buyers, commerce network hubs, service providers, and marketplaces. The possible combinations of these parties and the kinds of transaction information that can be returned are described in the following scenarios.

From Buyer to Supplier

A ProfileRequest document is sent from a buyer to a supplier through a commerce network hub. The network commerce hub queries a supplier periodically, and caches the information to use in ProfileResponse documents sent to buyers.
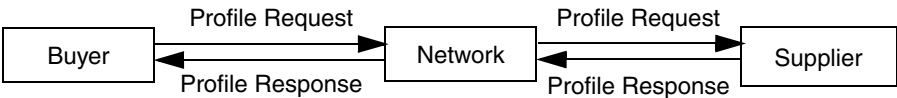
The supplier returns in the ProfileResponse the transactions that it supports. For example:

- OrderRequest

- PunchOutSetupRequest

The ProfileResponse sent to the buyer can include capabilities offered by the network on behalf of that supplier.

From Buyer to the Network

A ProfileRequest document is sent from a buyer to the network.
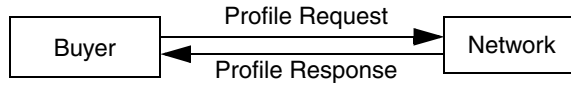
The network returns in the ProfileResponse the transactions that it supports. For example:

- SupplierDataRequest

- SubscriptionListRequest

- SubscriptionContentRequest

- GetPendingRequest

- OrderStatusSetupRequest

- SupplierListRequest

- ProviderSetupRequest

- SessionStatusSetupRequest

Example ProfileRequest document:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="9949494" xml:lang="en-US"
   timestamp="2002-02-04T18:39:09-08:00">
   <Header>
      <From>
         <Credential domain="NetworkId">
            <Identity>AN01001010101</Identity> <!-- marketplace's id -->
         </Credential>
      </From>
      <To>
         <Credential domain="NetworkId">
            <Identity>AN01000000001</Identity> <!-- Network -->
         </Credential>
      </To>
      <Sender>
         <Credential domain="NetworkId">
            <Identity>AN01001010101</Identity>
            <!-- marketplace's shared secret -->
            <SharedSecret>abracadabra</SharedSecret>
```

```
        </Credential>
        <UserAgent>Marketplace 7.5</UserAgent>
      </Sender>
    </Header>
    <Request>
      <ProfileRequest />
    </Request>
</cXML>
```

Example ProfileResponse document:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="9949494" xml:lang="en-US"
        timestamp="2002-02-04T18:39:49-08:00">
  <Response>
    <Status code="200" text="OK"/>
    <ProfileResponse effectiveDate="2002-01-01T05:24:29-08:00">
      <Transaction requestName="OrderStatusSetupRequest">
        <URL>https://superduper.com/a/OrderStatusSetup</URL>
      </Transaction>
      <Transaction requestName="GetPendingRequest">
        <URL>https://superduper.com/a/GetPending</URL>
      </Transaction>
      <Transaction requestName="SubscriptionListRequest">
        <URL>https://superduper.com/b/SubscriptionList</URL>
      </Transaction>
      <Transaction requestName="SubscriptionContentRequest">
        <URL>https://superduper.com/b/SubscriptionContent</URL>
      </Transaction>
      <Transaction requestName="SupplierListRequest">
        <URL>https://superduper.com/c/SupplierList</URL>
      </Transaction>
      <Transaction requestName="SupplierDataRequest">
        <URL>https://superduper.com/c/SupplierData</URL>
      </Transaction>
      <Transaction requestName="ProviderSetupRequest">
        <URL>https://superduper.com/d/ProviderSetup</URL>
      </Transaction>
      <Transaction requestName="SessionStatusRequest">
        <URL>https://superduper.com/d/SessionStatus</URL>
        <Option name="requestNames">OrderStatusSetupRequest</Option>
      </Transaction>
    </ProfileResponse>
  </Response>
</cXML>
```

3 Profile Transaction

From a Network Hub to Supplier

A ProfileRequest is sent from a network commerce hub to a supplier. The network commerce hub queries a supplier periodically, and caches the information to use in ProfileResponse documents sent to buying organizations about a particular supplier.
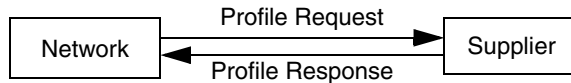
The supplier returns in the ProfileResponse document the transactions that it supports. For example:

- OrderRequest

- PunchOutSetupRequest

Example ProfileRequest document:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="9949494" xml:lang="en-US"
      timestamp="2002-02-04T18:39:09-08:00">
  <Header>
    <From>
      <Credential domain="NetworkId">
        <Identity>AN01001010101</Identity> <!-- Network's id -->
      </Credential>
    </From>
    <To>
      <Credential domain="NetworkId">
        <Identity>AN01234663636</Identity> <!-- any supplier's id -->
      </Credential>
    </To>
    <Sender>
      <Credential domain="NetworkId">
        <Identity>AN01001010101</Identity>
        <!-- Network's sharedscret -->
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>Marketplace 7.5</UserAgent>
    </Sender>
  </Header>
  <Request>
    <ProfileRequest />
  </Request>
</cXML>
```

Example ProfileResponse document:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="9949494" xml:lang="en-US"
     timestamp="2002-02-04T18:39:49-08:00">
  <Response>
    <Status code="200" text="OK"/>
    <ProfileResponse effectiveDate="2002-01-01T05:24:29-08:00">
      <Transaction requestName="PunchOutSetupRequest">
        <URL>https://www.acme.com/cxml/PunchOutSetup</URL>
      </Transaction>
      <Transaction requestName="OrderRequest">
        <URL>https:// www.acme.com/cxml /Order</URL>
        <Option name="attachments">yes</Option>
        <Option name="changes">yes</Option>
      </Transaction>
    </ProfileResponse>
  </Response>
</cXML>
```

From a Network Hub to Service Provider

A ProfileRequest is sent from a network commerce hub to service provider partners. Routing service providers need to specify if one or two ProfileReponses will be returned, because profile information can be returned for both the service provider and downstream supplier accounts.
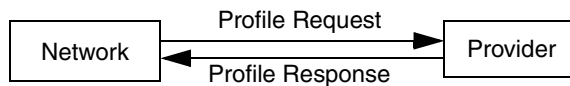
The service provider returns in the ProfileResponse document the transactions that it supports. For example:

- ProviderSetupRequest

- SessionStatus

- OrderRequest

From a Network Hub to Buyer

A ProfileRequest is sent from a network commerce hub to a buyer. The network commerce hub queries a buyer periodically, and caches the information. Later, this information about the buyer is used in ProfileResponse documents sent to service providers and suppliers.

```
                       Profile Request
  ┌─────────────┐ ──────────────────────► ┌─────────────┐
  │   Network   │                          │    Buyer    │
  └─────────────┘ ◄────────────────────── └─────────────┘
                       Profile Response
```
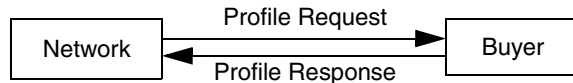
Buyers return in the ProfileResponse document the transactions that they support. For example:

- StatusUpdateRequest
- InvoiceDetailRequest

From Service Provider to Buyer

A ProfileRequest is sent from a service provider to a buyer and routed through a network commerce hub. This scenario is a replacement for the Followup element. The network commerce hub queries the buyer periodically, and caches the information. Later, this information about the buyer is used in ProfileResponse documents sent to service providers.

```
        Profile Request                   Profile Request
  ┌──────────┐ ◄──────────► ┌──────────┐ ◄──────────► ┌──────────┐
  │ Provider │              │ Network  │              │  Buyer   │
  └──────────┘              └──────────┘              └──────────┘
        Profile Response                  Profile Response
```
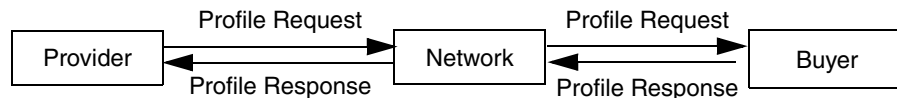
The network commerce hub returns in the ProfileResponse document to the service provider the transactions that it supports on behalf of a buyer. For example:

- StatusUpdateRequest
- InvoiceDetailRequest

Chapter 4
PunchOut Transaction

PunchOut enables users of procurement applications to access supplier contracts for products or services that reside at the supplier's website. It eliminates the need for the suppliers to send whole catalogs to buying organizations. Instead, suppliers send just short index files that name their storefronts, product categories, or products.

This chapter shows how suppliers can modify a website to support PunchOut. It describes:

- PunchOut Requirements

- PunchOut Event Sequence

- PunchOut Documents

- Modifications to the Supplier's Web Pages

- PunchOut Website Suggestions

- PunchOut Transaction

- Direct PunchOut

PunchOut Requirements

Before buying organizations configure their procurement applications for PunchOut, or suppliers implement PunchOut websites, both parties must evaluate the benefits and requirements of PunchOut.

Buying Organizations

Setup and testing of cXML-compatible procurement applications with a PunchOut-enabled supplier can be completed in less than one day.

Therefore, PunchOut is a good solution for buying organizations of all sizes and levels of technical expertise. The decision to use PunchOut should be based on the business practices and types of commodities purchased. (See "Content Delivery Strategy" on page 23 for a list of commodities that are well suited for PunchOut.)

Business Issues

Buying organizations should consider the following questions when deciding whether to use static catalog content such as an Index or Contract documents, or PunchOut:

• Do requisitioners and approvers have Internet access? If not, would controlled access to the Internet be allowed?

• Does the buying organization want their suppliers to create and maintain catalog content (including pricing)?

• Do requisitioners currently procure goods on the Internet? If so, do these goods require a supplier-side configuration tool or contain unique attributes that cannot conform to a static content model?

• Does the buying organization use content aggregators for catalogs (for example, Aspect, TPN Register, or Harbinger)?

• Does the buying organization currently procure services (for example, consultants, temp services, or maintenance) through the Internet?

• Does the buying organization currently conduct online sourcing?

If the answer to any of the above questions is yes, PunchOut might be appropriate for the buying organization.

Technical Issues

Buying organizations must meet the following technical requirements:

• Direct Internet Access—Users within buying organizations must have direct Internet access. PunchOut relies on regular Web browser sessions where the user interacts with live supplier websites. This communication occurs through regular intranet/Internet infrastructure, not through the procurement application.

• Reliable Internet Connection—Internet access must be constantly operational and reliable. If users cannot procure products because of Internet outages, they are likely to make rogue purchases.

• Contracts with PunchOut Suppliers—Purchasing agents must have established contracts with PunchOut-enabled suppliers. PunchOut websites allow access only to known, authenticated buying organizations.

Suppliers

The term *supplier* in the context of PunchOut encompasses more than the traditional definition of the term. The PunchOut protocol was designed as a flexible framework capable of transmitting data about virtually any kind of product or service from any kind of supplier, distributor, aggregator, or manufacturer.

Example products and services include:

- Computers direct from a manufacturer or reseller
- Chemicals and reagents from an aggregator
- Office supplies from a distributor
- Contract services from a temp agency

The supplier might already have a transactive website capable of hosting content and receiving purchase orders. Given this capability, the supplier needs to consider both the supplier's business practices and technical resources in deciding whether to implement PunchOut.

Business Issues

Suppliers should consider the following questions:

- Does the supplier currently sell the supplier's products or services through the Internet? If so, do they offer customer-specific content (contract pricing) through their website?

- Does the supplier's products and services fall into one of the PunchOut categories as described in the chart in "Content Delivery Strategy" on page 23? To review, these categories include:

    Highly configurable products (such as computers)
    Large number of line items (such as books)
    Unique product attributes (such as chemicals)
    Normalized data (such as MRO Supplies)
    Rapidly changing or expanding items (such as temperary services or books)

- Does the supplier prefer to receive purchase orders and/or payment through their website?

If the answer to any of the above questions is yes, PunchOut might be appropriate for the supplier's organization.

4 PunchOut Transaction

Technical Issues

Suppliers must meet the following technical requirements:

- Reliable Internet Connection—The Web server infrastructure and Internet connection must be extremely reliable. If users cannot access remote content, they are likely to go to another supplier.

- Competent website Administrators—The PunchOut website and supporting applications will require periodic maintenance and modification. Users' needs and the supplier's product offerings will change, so the supplier needs personnel to modify the supplier's PunchOut infrastructure.

- Support for Basic Transactions—PunchOut websites do not need to support all cXML functionality, but they must support the following required transactions:

    Profile Transaction
    PunchOutSetupRequest
    PunchOutSetupResponse
    PunchOutOrderMessage

Work Estimate

The following table lists estimates of work required for cXML PunchOut integration based on estimates from suppliers:

Level of Pre-existing Infrastructure	Estimated Time for Completion
cXML enabled and integrated with network commerce hub	1-2 weeks with in-house IT staff 2-3 weeks with contractors
Transactive site with XML infrastructure	3 weeks with in-house IT staff 3-4 weeks with contractors
Transactive site without XML infrastructure	4 weeks with in-house IT staff 4-5 weeks with contractors

Understanding XML

The first step to becoming PunchOut enabled is to understand XML. For an explanation of XML, see "cXML, an XML Implementation" on page 17. To implement a PunchOut website, the supplier must have a fundamental understanding of how to create, parse, query, receive, and transmit XML data to and from a remote source.

The basic tools to process XML documents are XML parsers. These parsers are freely available from Microsoft and other companies (for example, an XML parser is standard in Microsoft Internet Explorer 5). For a list of XML tools, see "XML Utilities" on page 27.

PunchOut Event Sequence

A PunchOut session is composed of several distinct steps.

Steps 1 & 2: PunchOut Request

Users log in to a procurement application and open new purchase requisitions. They find desired items by searching their local catalogs by commodity, supplier, or product description. When they select a PunchOut item, the procurement application opens a new browser window and logs them into their accounts at the supplier's website.

The following figure illustrates the PunchOut request steps:

1. Requisitioner selects supplier for PunchOut. Procurement application makes request to e-commerce network hub.

2. E-commerce network hub authenticates buying organization and opens secure HTTP session with supplier.

4 PunchOut Transaction
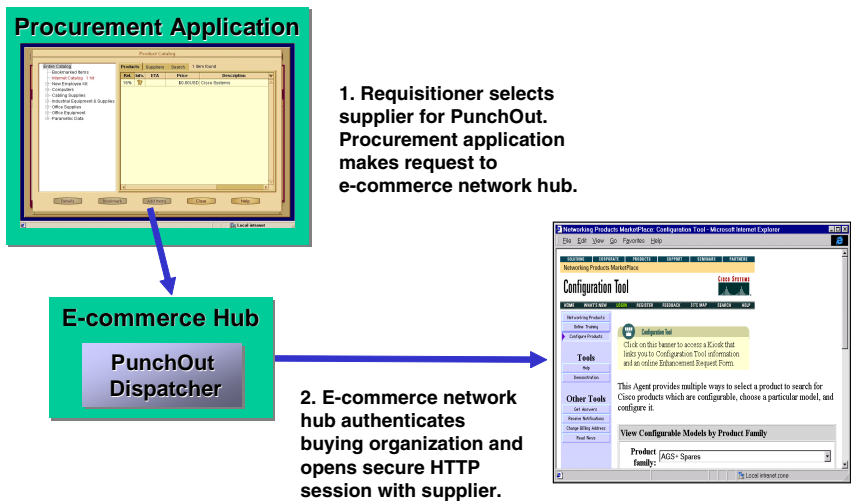
How does it work? When a user clicks a PunchOut item, the procurement application sends a cXML PunchOutSetupRequest document to a network e-commerce hub. Acting as the trusted third party, the hub accepts the request, verifies the buying organization, and passes the request to the supplier's PunchOut website.

> **Note:** All cXML documents sent through the Internet can travel through SSL (Secure Socket Layer) 3.0-encrypted HTTPS connections.

The purpose of this request is to notify the supplier's website of the buyer's identity, and to communicate the operation to be performed. Supported operations include the following:

- **create** – Initiates a new PunchOut session

- **edit** – Re-opens a PunchOut session for editing

- **inspect** – Re-opens a PunchOut session for inspection (no changes can be made to the data)

- **source** – Initiates a PunchOut session for a RFQ (Request for Quote) create/edit session in a sourcing application

After the supplier's website receives a request, it sends back a PunchOutSetupResponse containing a URL that tells the procurement application where to go to initiate a browsing session on the supplier's website.

The procurement application opens a new browser window, which displays a session logged into an account on the supplier's website. This account can be specific to a region, a company, a department, or a user.

Direct PunchOut is an alternative method for initiating PunchOut sessions, where the PunchOut site, not a network commerce hub, authenticates the PunchOut request. For more information, see "Direct PunchOut" on page 114.

Step 3: Product Selection

Users select items from the supplier's inventory using all the features and services provided by the supplier's website:
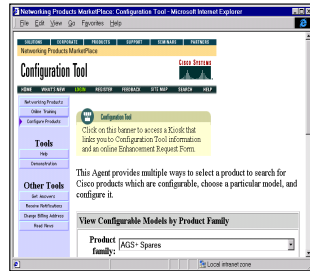
3. Requisitioner uses supplier site to find and configure products.

Depending on the product or customer, these features might include the following:

- Configurator tools for building customized products (for example, computers, organic compounds, or personalized products)

- Search engines for finding desired products from large catalogs.

- Views of normalized data for comparing products based on price, features, or availability (for example, MRO products)

- Views of attributes unique to a particular commodity (for example, printed materials, chemical and reagents, or services)

- Real-time pricing, inventory, and availability checking

- Automatic tax and freight calculations based on ship-to destination, size, or quantity of items (not necessary to calculate during the PunchOut session)

How does it work? After the procurement application directs users to the supplier's website, the shopping experience is the same as if they had logged on to the supplier's website directly. Thus, none of the previously listed features and services require modification.

Step 4: Check Out

The supplier's website calculates the total cost of the user's selections, including tax, freight, and customer-specific discounts. Users then click the supplier's website's "Check Out" button to send the contents of the shopping cart to the their purchase requisitions within the procurement application.

4 PunchOut Transaction

The following figure illustrates the check-out steps:
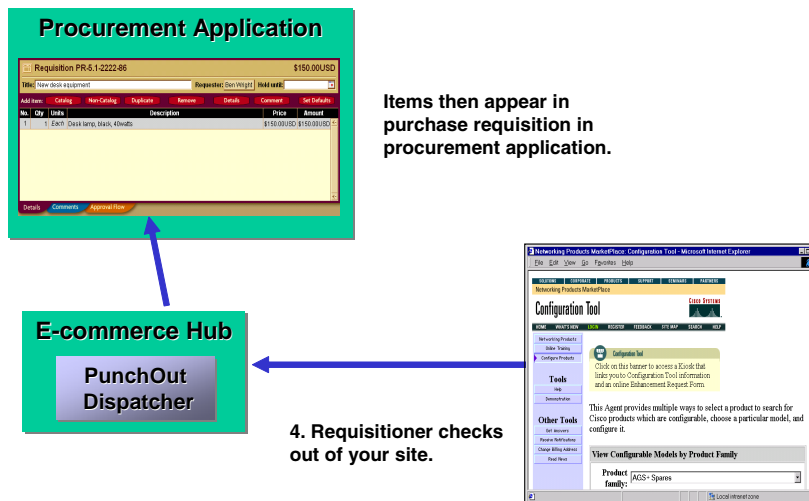
How does it work? When users click the supplier's "Check Out" button, they submit an HTML form back to their procurement application. One form field consists of a cXML PunchOutOrderMessage containing product details and prices. The supplier can also send hidden supplier cookies, which can later associate items with a specific shopping session.

Effectively, the supplier has provided a quote for the requested items—the supplier has not yet received a purchase order, so the supplier cannot yet book the order.

If users, including approvers, later need to edit any of the items in a purchase requisition, the supplier can allow them to "re-PunchOut" to the supplier's website. The procurement application sends back the contents of the original shopping cart to the supplier's website, and users make any changes there. Upon check out, the supplier's website returns the items to the purchase requisition.

The supplier's website is the information source for all PunchOut items. Changes to the quantity or the addition of new items to the requisition might alter tax or shipping charges, which would require recalculation at the supplier's website. Thus, any changes to the original items need to be made at the supplier's website, not in the procurement application, therefore the need to re-PunchOut. A re-PunchOut is simply a PunchOutSetupRequest with "edit" as its operation.

Step 5: Transmittal of Purchase Order

After the contents of the shopping cart have been passed from the supplier's website to the user's purchase requisition, the procurement application approval processes take over. When the purchase requisition is approved, the procurement application converts it into a purchase order and sends it back to the supplier's website for fulfillment. Purchasing card data can be transmitted along with the order, or the supplier can invoice the order separately.

The following figure illustrates purchase order transmittal:
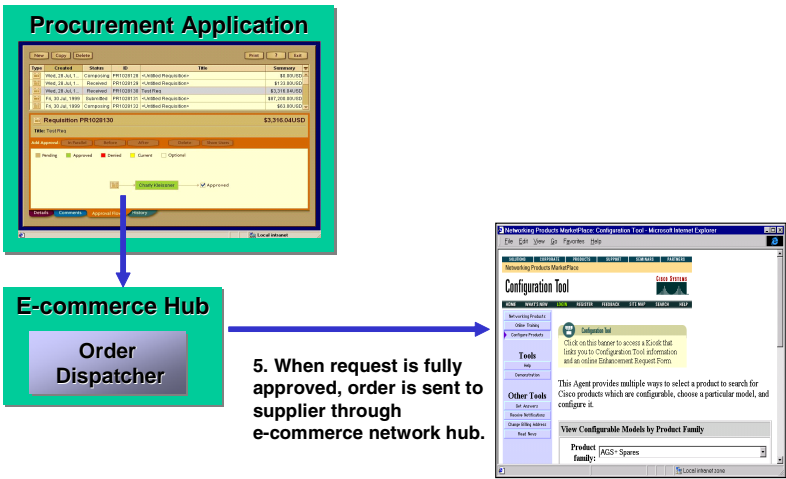
How does it work? The procurement application sends all purchase orders to the e-commerce hub in cXML format. The hub then routes them to the supplier, using the supplier's preferred order-routing method. When the supplier acknowledges the receipt of a purchase order, the supplier has effectively booked the order.

For PunchOut-enabled suppliers, the best order routing method is cXML for the following reasons:

- cXML purchase orders allow embedded supplier cookie information to be transmitted back to the supplier. Because the supplier cookie is of data type "any", it does not easily map to other order routing methods such as fax, e-mail, or EDI.

- PunchOut-enabled suppliers are cXML-aware, so accepting cXML purchase orders is a small incremental effort.

Purchase orders are discussed in detail in Chapter 5, "Purchase Orders."

4 PunchOut Transaction

PunchOut Documents

There are four types of cXML documents:

- PunchOut Index Catalog
- PunchOutSetupRequest
- PunchOutSetupResponse
- PunchOutOrderMessage

All but the PunchOut Index Catalog are considered PunchOut *session* documents because they are used to transmit data between a supplier's PunchOut site and the buyer during a PunchOut session.

PunchOut Index Catalog

PunchOut index catalogs are files that list PunchOut items and point to the supplier's PunchOut website.

The following example shows a PunchOut index catalog:

Type of cXML document and URL of DTD

The supplier's identifier for the PunchOut item

URL of the PunchOut website (launch page) if not configured elsewhere

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE Index SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.016/cXML.dtd">
<Index>
    <SupplierID domain="DUNS">83528721</SupplierID>
    <IndexItem>
        <IndexItemPunchout>
            <ItemID>
                <SupplierPartID>5555</SupplierPartID>
            </ItemID>
            <PunchoutDetail punchoutLevel="shelf">
                <Description xml:lang="en-US">Desk Chairs</Description>
                <Description xml:lang="fr-FR">Chaises de Bureau</Description>
                <URL>http://www.workchairs.com/punchout.asp</URL>
                <Classification domain="UNSPSC">5136030000</Classification>
            </PunchoutDetail>
        </IndexItemPunchout>
    </IndexItem>
</Index>
```

SupplierID identifies the supplier organization. The supplier can use any identification domain, but the recommended ones are D-U-N-S (Dun & Bradstreet Universal Naming System) and NetworkId. For more information about D-U-N-S numbers, see www.dnb.com.

punchoutLevel is an optional attribute that allows suppliers to specify how procurement applications should present the PunchOut item to users. This attribute can have the values store, aisle, shelf, or product. Procurement applications might display PunchOut items differently, depending on how they are tagged by suppliers. For example, they might display store-level items differently than product-level items.

Description specifies the text that the procurement application displays in product catalogs. The supplier can provide the description in multiple languages, and the procurement application displays the appropriate one for the user's locale.

Classification specifies the commodity grouping of the line item to the buyer. All the supplier's products and services must be mapped and standardized to the UNSPSC schema. For PunchOut index catalogs, the Classification determines the location of the PunchOut item within catalogs displayed to users. For a list of UNSPSC codes, see www.unspsc.org.

Creating and Publishing Index Catalogs

Create these catalogs and publish them on an e-commerce hub to the supplier's customers. The catalog manager within buying organizations downloads them and stores them for use with procurement applications.

Users see the contents of the supplier's PunchOut index catalogs alongside regular, static catalog items.

PunchOut Item Granularity

The supplier can create store-level, aisle-level, or product-level catalogs.

- Store-level catalogs list one PunchOut item for all of the supplier's products and services. Users must search the supplier site to find the desired item.
- Aisle-level catalogs list multiple PunchOut items corresponding to related products and services.
- Product-level catalogs list only one product or service. Users do not need to search.

To determine how broad to make PunchOut items, consider the supplier's business model, the makeup of the supplier's product and service offerings, and the structure of the supplier's PunchOut website.

The more search and configuration tools the supplier has on the supplier's website, the more broad they can make the PunchOut items in the supplier's index catalogs.

4 PunchOut Transaction

PunchOutSetupRequest

To initiate a PunchOut session, the user selects the supplier's PunchOut item. The procurement application generates a PunchOutSetupRequest document and sends it to an e-commerce hub, which forwards it to the supplier's PunchOut website.

Following is a sample PunchOutSetupRequest document:

```
<?xml version="1.0"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML xml:lang="en-US" payloadID="933694607118.1869318421@jlee"
timestamp="2002-08-15T08:36:47-07:00">
   <Header>
      <From>
         <Credential domain="DUNS">
            <Identity>65652314</Identity>
         </Credential>
      </From>
      <To>
         <Credential domain="DUNS">
            <Identity>83528721</Identity>
         </Credential>
      </To>
      <Sender>
         <Credential domain="NetworkId">
            <Identity>AN200001</Identity>
            <SharedSecret>abracadabra</SharedSecret>
         </Credential>
         <UserAgent>Procurement System 2.0</UserAgent>
      </Sender>
   </Header>
   <Request>
      <PunchOutSetupRequest operation="create">
         <BuyerCookie>1CX3L4843PPZO</BuyerCookie>
         <Extrinsic name="UserEmail">jsmith</Extrinsic>
         <Extrinsic name="UniqueName">John_Smith</Extrinsic>
         <Extrinsic name="CostCenter">610</Extrinsic>
         <BrowserFormPost>
            <URL>https://bigbuyer.com:2600/punchout?client=NAwl4Jo</URL>
         </BrowserFormPost>
         <SupplierSetup>
            <URL>http://www.workchairs.com/punchout.asp</URL>
         </SupplierSetup>
         <ShipTo>
            <Address addressID="1000467">
               <Name xml:lang="en">1000467</Name>
               <PostalAddress>
                  <DeliverTo>John Smith</DeliverTo>
                  <Street>123 Main Street</Street>
```

Annotations (left margin):

- *Originator (buying organization)* → `<From>`
- *Destination (supplier)* → `<To>`
- *Previous relaying entity (Network hub in this case)* → `<Sender>`
- *Type of request* → `<PunchOutSetupRequest operation="create">`
- *Destination for final PunchOutOrderMessage* → `<BrowserFormPost>`

```
                                   <City>Sunnyvale</City>
                                   <State>CA</State>
                                   <PostalCode>94089</PostalCode>
                                   <Country isoCountryCode="US">United States</Country>
                                </PostalAddress>
                             </Address>
                          </ShipTo>
Item selected by user  ──────────  <SelectedItem>
                             <ItemID>
                                <SupplierPartID>5555</SupplierPartID>
                             </ItemID>
                          </SelectedItem>
                       </PunchOutSetupRequest>
                    </Request>
                 </cXML>
```

The payloadID and timestamp attributes near the beginning are used by cXML clients to track documents and to detect duplicate documents.

The From, To, and Sender elements allow receiving systems to identify and authorize parties. The From and To elements in a document do not change. However, as the document travels to its destination, intermediate nodes (such as the Ariba Supplier Network) change the Sender element.

Network commerce hubs can change credential domains in the From and To elements, if that change results in more reliable identification. So for example, the From credential domain might change from CustomDomain to DUNS.

Create, Edit, Inspect, and Source Operations

The operation attribute specifies the type of session the buyer initiates. It can create, edit, inspect, or source.

- create sessions generate new shopping carts, which correspond to new purchase requisitions.

- edit sessions reopen previously created shopping carts or RFQs for modification. The procurement application sends line-item data as part of the PunchOutSetupRequest. The PunchOut website can use this data to re-instantiate the shopping cart created during the original session.

- inspect sessions reopen previously created shopping carts or RFQs for viewing only. As with the edit operation, the procurement application sends line-item data as part of the PunchOutSetupRequest. However, after re-instantiating the shopping cart, the PunchOut website does not allow modification of its contents.

- source sessions generate a RFQ for a sourcing application.

The following example lists an edit request:

```
<?xml version="1.0"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML xml:lang="en-US" payloadID="933695135608.677295401@jlee"
timestamp="2002-08-15T08:45:35-07:00">
   <Header>
     <From>
        <Credential domain="DUNS">
            <Identity>65652314</Identity>
        </Credential>
     </From>
     <To>
        <Credential domain="DUNS">
            <Identity>83528721</Identity>
        </Credential>
     </To>
     <Sender>
        <Credential domain="NetworkId">
            <Identity>AN200001</Identity>
            <SharedSecret>abracadabra</SharedSecret>
        </Credential>
        <UserAgent>Procure 2.1</UserAgent>
     </Sender>
   </Header>
   <Request>
      <PunchOutSetupRequest operation="edit">
         <BuyerCookie>1CX3L4843PPZO</BuyerCookie>
         <Extrinsic name="UserEmail">jsmith</Extrinsic>
         <Extrinsic name="UniqueName">John_Smith</Extrinsic>
         <Extrinsic name="CostCenter">610</Extrinsic>
         <BrowserFormPost>
            <URL>https://bigbuyer.com:2600/punchout?client=NAwliuo</URL>
         </BrowserFormPost>
         <SupplierSetup>
            <URL>http://www.workchairs.com/punchout.asp</URL>
         </SupplierSetup>
         <ItemOut quantity="2">
            <ItemID>
               <SupplierPartID>220-6338</SupplierPartID>
               <SupplierPartAuxiliaryID>E000028901
               </SupplierPartAuxiliaryID>
            </ItemID>
         </ItemOut>
      </PunchOutSetupRequest>
   </Request>
</cXML>
```

If the user initiated the edit session by selecting a catalog item, the PunchOutSetupRequest would contain a SelectedItem element, like a create session.

Authentication by an E-commerce Hub

PunchOutSetupRequest documents route through an e-commerce hub for authentication and to look up the URL of the supplier's PunchOut website. The steps are:

1. The hub receives the PunchOutSetupRequest document from the user.

2. The hub verifies the buyer's ID (From and Shared Secret) with that buyer's e-commerce account. It also identifies the requested supplier (To).

3. The hub looks up the supplier's shared secret from the supplier's account and inserts it (Shared Secret) into the Sender element.

4. The hub finds the URL of the supplier's PunchOut website in the supplier's account and sends the PunchOutSetupRequest document to it.

5. The supplier's website receives the cXML document and knows that it is authenticated because it contains the supplier's own shared secret.

6. The supplier's website uses information in the From element to identify the requester at the company level (for example, acme.com).

7. The supplier can use the Contact and extrinsic data in the body of the request to uniquely identify the user (for example, John Smith in Finance at acme.com).

The PunchOutSetupRequest and PunchOutSetupResponse documents pass through the e-commerce hub for authentication. The PunchOutOrderMessage document (returning the contents of the shopping basket to the procurement application) travels directly between the supplier's website and the procurement application through standard HTML Form submission.

Direct PunchOut is an alternative method for initiating PunchOut sessions, where the PunchOut site, not a network commerce hub, authenticates the PunchOut request. For more information, see "Direct PunchOut" on page 114.

Supplier Setup URL and SelectedItem

In previous cXML releases, theSupplierSetup element provided the only way to specify the URL of the supplier's PunchOut website. Beginning with cXML 1.1, the e-commerce hub already knows the URL of the supplier's PunchOut website.

Also, starting with cXML 1.1, procurement applications can use the SelectedItem element to specify store-, aisle-, or product-level PunchOut.

4 PunchOut Transaction

The SupplierSetup element has been deprecated. However, the supplier's PunchOut website must handle both methods until all PunchOut websites and procurement applications recognize and send the SelectedItem element.

Contact Data and Extrinsic Data for User Identification

The PunchoutSetupRequest document can contain detailed user information in the Contact element that the supplier's website can use to authenticate and direct users, such as:

- User name and role

- E-mail address

In addition, the PunchOutSetupRequest might also contain *extrinsic* data, data that the supplier can use to further identify users, such as:

- User cost center and subaccount

- Region

- Supervisor

- Default currency

Buying organizations configure their procurement applications to insert contact and extrinsic data. Ask the supplier's customers what data the supplier can expect to receive.

PunchOutSetupResponse

After receiving a PunchOutSetupRequest, the supplier's website sends a PunchOutSetupResponse. The PunchOutSetupResponse document serves two functions:

- It indicates that the PunchOutSetupRequest was successful.

- It provides the procurement application with a redirect URL to the supplier's Start Page.

It contains a URL element that specifies the Start Page URL to pass to the user's Web browser for the interactive browsing session. This URL must contain enough state information to bind to a session context on the supplier's website, such as the identity of the requester and the contents of the BuyerCookie element. Due to URL length restrictions in many applications, this URL should refer to the state information rather than including it all.

The following example lists a PunchOutSetupResponse document:

```
<?xml version="1.0"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML xml:lang="en-US" payloadID="933694607739" timestamp="2002-08-15T08:46:00-
07:00">
   <Response>
     <Status code="200" text="success"></Status>
     <PunchOutSetupResponse>
       <StartPage>
         <URL>
         http://xml.workchairs.com/retrieve?reqUrl=20626;Initial=TRUE
         </URL>
       </StartPage>
     </PunchOutSetupResponse>
   </Response>
</cXML>
```

PunchOutOrderMessage

After the user selects items on the supplier's website, configures them, and clicks the supplier's "Check Out" button, the supplier's website sends a PunchOutOrderMessage document to communicate the contents of the shopping basket to the buyer's procurement application. This document can contain much more data than the other documents, because it needs to be able to fully express the contents of any conceivable shopping basket. This document does not strictly follow the Request/Response paradigm; its use will be explained in detail.

The following example lists a PunchOutOrderMessage:

```
<?xml version="1.0"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML xml:lang="en-US" payloadID="933695160894" timestamp="2002-08-15T08:47:00-
07:00">
   <Header>
     <From>
       <Credential domain="DUNS">
          <Identity>83528721</Identity>
       </Credential>
     </From>
     <To>
       <Credential domain="DUNS">
          <Identity>65652314</Identity>
       </Credential>
     </To>
     <Sender>
       <Credential domain="workchairs.com">
          <Identity>website 1</Identity>
```

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Transaction*

```
              </Credential>
              <UserAgent>Workchairs cXML Application</UserAgent>
            </Sender>
        </Header>
        <Message>
          <PunchOutOrderMessage>
            <BuyerCookie>1CX3L4843PPZO</BuyerCookie>
            <PunchOutOrderMessageHeader operationAllowed="edit">
              <Total>
                 <Money currency="USD">763.20</Money>
              </Total>
            </PunchOutOrderMessageHeader>
            <ItemIn quantity="3">
              <ItemID>
                 <SupplierPartID>5555</SupplierPartID>
                 <SupplierPartAuxiliaryID>E000028901
                 </SupplierPartAuxiliaryID>
              </ItemID>
              <ItemDetail>
                 <UnitPrice>
                    <Money currency="USD">763.20</Money>
                 </UnitPrice>
                 <Description xml:lang="en">
                    <ShortName>Excelsior Desk Chair</ShortName>
                    Leather Reclining Desk Chair with Padded Arms
                 </Description>
                 <UnitOfMeasure>EA</UnitOfMeasure>
                 <Classification domain="UNSPSC">5136030000
                 </Classification>
                 <LeadTime>12</LeadTime>
              </ItemDetail>
            </ItemIn>
          </PunchOutOrderMessage>
        </Message>
      </cXML>
```

BuyerCookie enables the procurement application to associate a given PunchOutOrderMessage with its originating PunchOutSetupRequest. Therefore, the supplier's website should return this element whenever it appears. Do not use the BuyerCookie to track PunchOut sessions, because it changes for every session, from create, to inspect, to edit.

SupplierPartAuxiliaryID acts as a supplier cookie. This field allows the supplier to transmit additional data, such as quote number or another cXML document. The procurement application passes it back to the supplier in any subsequent PunchOut edit or inspect sessions, and in the resulting cXML purchase order. The supplier can use the supplier cookie to associate items in a purchase requisition with the corresponding items in a shopping cart at the supplier's website.

Note: Procurement applications might use SupplierPartAuxiliaryID as part of the unique identifier for items, so PunchOut sites should not change this value during PunchOut edit or inspect sessions.

UnitOfMeasure describes how the product is packaged or shipped. For more information, see "UnitOfMeasure" on page 58.

Classification lists the UNSPSC (United Nations Standard Products and Services Code) commodity code for each selected item. These codes are used by back-end systems within buyer and supplier organizations for accounting and report generation. For the list of UNSPSC codes, see www.unspsc.org.

Modifications to the Supplier's Web Pages

To receive or send the three cXML PunchOut session documents, PunchOutSetupRequest, PunchOutSetupResponse, and PunchOutOrderMessage, the supplier might need to modify or create four pages on the supplier's website:

- Launch Page

- Start Page

- Sender Page

- Order Receiver Page

To illustrate how the supplier might implement these pages, this chapter uses simple Active Server Page (ASP) code samples and the Microsoft Internet Explorer 5 XML Parser. Actual implementation of these pages will vary depending on the supplier development environment (for example, CGI, JavaScript, or WebObjects).

Launch Page

The Launch Page receives all authenticated PunchOutSetupRequest documents from the e-commerce hub. It reads the HTTP stream sent from the hub and validates the cXML request embedded within that stream against the cXML DTD (in the case of ASP, using method calls to the Internet Explorer 5 XML parser). After validation, the supplier's Launch Page extracts elements from the document in order to:

1. Identify the user and determine where to redirect that user.

2. Compose a PunchOutSetupResponse document and return it to the sender.

The supplier's Launch Page should store the following data for use by the supplier's Start Page:

• Identity of the requester (Sender)

• Identity of the language of the user (xml:lang) so the supplier can provide localized content

• Type of the request (create, edit, or inspect)

• Any extrinsic data that further identifies the user and the user location

Following is a sample Launch Page. This code does not use an XML tool to dynamically generate the PunchOutSetupResponse, but instead uses a static XML template into which line item data is filled. **This code is intended for illustrative purposes only.**

```jscript
<script language=JScript RUNAT=Server>
function elementValue(xml, elem)
{
   var begidx;
   var endidx;
   var retStr;

   begidx = xml.indexOf(elem);
   if (begidx > 0) {
      endidx = xml.indexOf('</',begidx);
      if (endidx > 0)
         retStr = xml.slice(begidx+elem.length,
         endidx);
         return retStr;
      }
      return null;
}

function twoChar( str )
{
   var retStr;
   str = str.toString();
   if ( 1 == str.length ) {
      retStr = "0" + str;
   } else {
   retStr = str;
   }
   return retStr;
   }
```

```
function timestamp( dt )
  {
  var str;
  var milli;
  str = dt.getFullYear() + "-" + twoChar( 1 + dt.getMonth() ) + "-";
  str += twoChar( dt.getDate() ) + "T" + twoChar( dt.getHours() ) + ":";
  str += twoChar( dt.getMinutes() ) + ":" + twoChar( dt.getSeconds() ) + ".";
  milli = dt.getMilliseconds();
  milli = milli.toString();
  if ( 3 == milli.length ) {
     str += milli;
  } else {
     str += "0" + twoChar( milli );
  }
  str += "-08:00";
  return str;
  }

function genProlog( cXMLvers, randStr )
  {
  var dt;
  var str;
  var vers, sysID;
  var nowNum, timeStr;
  vers = "1.2.014";
  sysID = "http://xml.cXML.org/schemas/cXML/" + vers + "/cXML.dtd";
  dt = new Date();
  nowNum = dt.getTime();
  timeStr = timestamp( dt );
  str = '<?xml encoding="UTF-8"?>\n';
  str += '<!DOCTYPE cXML SYSTEM "' + sysID + '">\n';
  str += '<cXML payloadID="' + nowNum + '.';
  str += randStr + '@' + Request.ServerVariables("LOCAL_ADDR");
  str += '" timestamp="' + timeStr + '">';
  return str;
}
</script>
<%
REM Create data needed in prolog.
Randomize
randStr = Int( 100000001 * Rnd )
prologStr = genProlog( "1.0", randStr )
Response.ContentType = "text/xml"
Response.Charset = "UTF-8"
%>
<%
REM This receives the PunchOutSetup request coming from the e-commerce hub.
REM It takes the ORMSURL and buyercookie, attaches them to the Start Page URL,
REM and sends the response back to the requester.
REM punchoutredirect.asp?bc=2133hfefe&url="http://workchairs/com/..&redirect="
```

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```
        Dim ret
        Dim punch
        Dim statusText
        Dim statusCode
        Dim cookie
        Dim url
        Dim xmlstr
        Dim fromUser
        Dim toUser
        cookie = ""
        url = ""
        xmlstr = ""
        dir = ""
        path = Request.ServerVariables("PATH_INFO")
        dir = Left(path, InstrRev(path, "/"))
        if IsEmpty(dir) then
            dir = "/"
        end if
```

REM **This command reads the incoming HTTP cXML request**
```
        xml = Request.BinaryRead(Request.TotalBytes)
        for i = 1 to Request.TotalBytes
            xmlstr = xmlstr + String(1,AscB(MidB(xml, i, 1)))
        Next
        cookie = elementValue(xmlstr, "<BuyerCookie>")
        url = elementValue(xmlstr, "<URL>")
        fromUser = elementValue(xmlstr, "<Identity>")
        newXMLStr = Right(xmlstr, Len(xmlstr) - (InStr(xmlstr,"<Identity>") + Len("<Identity>")))
        toUser = elementValue(newXMLStr, "<Identity>")
%>
```
REM **This formats the cXML PunchOutSetupReponse**
```
<% if IsEmpty(cookie) then %>
<%= prologStr %>
    <Response>
        <Status code="400" Text="Bad Request">Invalid Document. Unable to extract
        BuyerCookie.</Status>
    </Response>
</cXML>
<% else %>
<%= prologStr %>
    <Response>
        <Status code="200" text="OK"/>
        <PunchOutSetupResponse>
            <StartPage>
                <URL>http://<%= Request.ServerVariables("LOCAL_ADDR")%>/<%=
dir%>/punchoutredirect.asp?bc=<%= cookie%>&amp;url="<%= url%>"&amp;from=<%=
fromUser%>&amp;to=<%= toUser%>&amp;redirect=<%= StartPage%>></URL>
            </StartPage>
        </PunchOutSetupResponse>
    </Response>
```

```
</cXML>
<%end if%>
```

The supplier's Launch Page should return a StartPage URL that is unique for that PunchOut session. In addition, this URL should be valid for only a limited amount of time. By deactivating this URL, the supplier makes it more difficult for unauthorized users to access the supplier's Start Page.

Remember to implement functionality for subsequent edit and inspect sessions. Users cannot change order details for PunchOut items (such as quantity) within their procurement application. They must re-PunchOut with an edit session. For the greatest benefit to users, inspect sessions that occur after the supplier receives the order should display order status.

Start Page

The supplier's Start Page logs the requester into an account on the supplier's website. From the supplier's Start Page, users begin their shopping experience. This page might already exist at the supplier's website, so modify it to query user name and password information from the PunchOutSetupRequest document.

Allow only authorized users into the supplier's Start Page. If the supplier waits until the check-out step to authenticate them, their confidential pricing or terms are not protected.

If the supplier uses HTTP browser cookies to track user preferences and sessions, they should be destroyed after the PunchOutOrderMessage is sent to buyers. Destroying these cookies prevents the possibility of offering privileged features to unauthorized users.

Sender Page

The Sender Page sends the contents of the user's shopping cart to the user. As described earlier, after users fill their shopping carts, they click the supplier's "Check Out" button.

Below is a simple ASP implementation of this feature. This code does not use an XML tool to dynamically generate the PunchOutOrderMessage, but instead uses a static XML template into which line item data is filled. **This code is intended for illustrative purposes only.**

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This is a portion of a supplier's website product page:

```
<!--#include file="punchoutitem.inc"-->
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0 Transitional//EN">
<!-- saved from
url=(0093)https://secure1.shore.net/wbird/cgi/vsc.cgi/wbird/houses/urban.htm?L+wbird+w
adt4101+928011405 -->

<TABLE border=0>
  <TBODY>
    <TR>
      <TD><IMG src="UrbanHouses_files/uhjm.gif"> </TD>
      <TD><STRONG>Jefferson Memorial</STRONG>- A birdfeeder with a rotunda!
This famous American monument will be a unique addition to any garden or yard. It attracts
small to medium sized birds and its dimensions are 11" x 9 1/2" x 8" H.
      </TD>
    </TR>
  </TBODY>
</TABLE><BR>
-Jefferson Memorial<STRONG>
$139.95</STRONG><BR>
<% AddBuyButton 139.95,101,"Bird Feeder, Jefferson Memorial",5 %>
<BR>
<HR>
```

The AddBuyButton function sends the PunchOutOrderMessage back to the user.

The following listing is the include file (punchoutitem.inc) referenced in the previous example:

```
<%
REM This asp is included in items.asp, which specifies the item parameters, formats
REM a cXML document, and allows the user to proceed with a checkout of the item.
function CreateCXML(toUser, fromUser, buyerCookie, unitPrice, supPartId, desc)
%>
<?xml version=&quot;1.0&quot; encoding=&quot;UTF-8&quot;?>
<!DOCTYPE cXML SYSTEM
&quot;http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd&quot;>
<cXML payloadID=&quot;<%= Now &"@"&
Request.ServerVariables("LOCAL_ADDR")%>&quot; timestamp=&quot;<%= Now
%>&quot;>
  <Header>
    <From>
      <Credential domain=&quot;hub.com&quot;>
        <Identity><%= toUser%></Identity>
      </Credential>
    </From>
    <To>
      <Credential domain=&quot;hub.com&quot;>
```

```
        <Identity><%= fromUser%></Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain=&quot;hub.com&quot;>
        <Identity><%= toUser%></Identity>
      </Credential>
      <UserAgent>PunchoutSite</UserAgent>
    </Sender>
  </Header>
  <Message>
    <PunchOutOrderMessage>
      <BuyerCookie><%= buyerCookie%></BuyerCookie>
      <PunchOutOrderMessageHeader
      operationAllowed=&quot;edit&quot;>
        <Total>
          <Money currency=&quot;USD&quot;><%=
          unitPrice%></Money>
        </Total>
      </PunchOutOrderMessageHeader>
      <ItemIn quantity=&quot;1&quot;>
        <ItemID>
          <SupplierPartID><%= supPartId%></SupplierPartID>
          <SupplierPartAuxiliaryID><%= supPartAuxId%>
          </SupplierPartAuxiliaryID>
        </ItemID>
        <ItemDetail>
          <UnitPrice>
            <Money currency=&quot;USD&quot;><%= unitPrice%>
            </Money>
          </UnitPrice>
          <Description xml:lang=&quot;en&quot;><%= desc%>
          </Description>
          <UnitOfMeasure>EA</UnitOfMeasure>
          <Classification
            domain=&quot;SupplierPartID&quot;><%= supPartId%>
          </Classification>
        </ItemDetail>
      </ItemIn>
    </PunchOutOrderMessage>
  </Message>
</cXML>
<% end function

function AddBuyButton(unitPrice, supPartId, supPartAuxId, desc)

toUser = Session("toUser")
fromUser = Session("fromUser")

buyerCookie = Session("buyercookie")
```

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```
                    url = Session("urlToPost")
                    if not IsEmpty(buyerCookie) then
                       %>
                       <FORM METHOD=POST ACTION=<%= url%>>
                          <INPUT TYPE=HIDDEN NAME="cxml-urlencoded" VALUE="<% CreateCXML
                    toUser, fromUser, buyerCookie, unitPrice, supPartId, supPartAuxId, desc%>">
                          <INPUT TYPE=SUBMIT  value=BUY>
                       </FORM>
                    <%else%>
                       </p>
                       <%
                    end if
                    end function
                    %>
```

The AddBuyButton function contains the FORM POST that sends the URL-encoded
PunchOutOrderMessage back to the user.

HTTP Form Encoding

To send a PunchOutOrderMessage, the supplier uses *HTML form encoding*, which is a
different transport model from the traditional HTTP request/response model. This
different transport facilitates easier integration between the supplier's website and the
procurement application. It also enables buying organizations to receive XML data
without requiring them to have a Web server available through a firewall.

Instead of sending a PunchOutOrderMessage directly to the procurement application,
the supplier's website encodes it as a hidden HTML Form field and the user's
browser submits it to the URL specified in the BrowserFormPost element of the
PunchOutSetupRequest. The hidden HTML Form field must be named either cxml-
urlencoded or cxml-base64, both case insensitive. Taken from the above example, the
following code fragment inserts a hidden form field named cxml-urlencoded containing
the PunchOutOrderMessage document to be posted:

```
<FORM METHOD=POST ACTION=<%= url%>>
   <INPUT TYPE=HIDDEN NAME="cxml-urlencoded" VALUE="<% CreateCXML toUser,
fromUser, buyerCookie, unitPrice, supPartId, supPartAuxId, desc%>">
   <INPUT TYPE=SUBMIT  value=BUY>
</FORM>
```

This encoding permits the supplier to design a checkout Web page that contains the
cXML document. When users click the supplier's "Check Out" button, the supplier's
website presents the data, invisible to users, to the procurement application as an
HTML Form Submit.

Cancelling PunchOut

The supplier might want to add a "Cancel" button to their pages so that users can cancel their PunchOut session. The "Cancel" button sends an empty PunchOutOrderMessage that tells the procurement application that no items will be returned, and to delete existing PunchOut items from the requisition. The supplier can also use it to perform any housekeeping needed by the supplier's website, such as clearing the shopping cart and closing the user session.

Order Receiver Page

The Order Receiver Page accepts cXML purchase orders sent by buying organizations. It could be similar to the Launch Page discussed above. For information about receiving purchase orders, see Chapter 5, "Purchase Orders."

PunchOut Website Suggestions

This section provides suggestions and information you should consider when planning the implementation of a PunchOut website.

Implementation Guidelines

Follow these guidelines when developing the supplier's PunchOut website:

- Study the *cXML User's Guide* (this document).

- Use an XML parser and validate documents against the cXML DTD.

- Use the xml:lang= property to identify users' languages so the supplier can provide localized content.

- Use the From credential to identify buying organizations.

- Send a unique, temporary URL for the session on redirect.

- Do not persist browser cookies.

- Do not overburden the supplier's customers with extrinsic data requirements.

- For each line item, use UNUOM (United Nations Units of Measure) and UNSPSC (United Nations Standard Products and Services Code).

- Provide real value to the supplier's customers. Display product availability, order status, and special promotions.

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Transaction*

- Checkout should be easy and intuitive. Ideally, users should need to click only three buttons to buy.

- Code for subsequent edit and inspect sessions. Users cannot change order details for PunchOut items (such as quantity) within their procurement application. They must re-PunchOut with an edit session.

- For the greatest benefit to users, inspect sessions should display order status.

- Test the supplier's PunchOut website. Allow time for testing with the supplier's customers' procurement applications.

- PunchOut transactions produce quotes, not purchase orders. Implement a cXML purchase-order receiving page to accept orders.

Buyer and Supplier Cookies

The buyer and supplier cookies enable both buyers and suppliers to re-instantiate their own line-item data for their back-end systems.

- The supplier should return the BuyerCookie element they receive. It should not be changed.

- Make use of the supplier cookie (SupplierPartAuxiliaryID).

The buyer cookie is analogous to a purchase requisition number; it conveys state information that allows the buying organization's system to maintain the relationship between a requisition and a shopping basket.

Likewise, the supplier cookie is analogous to a quote number; it conveys state information that allows the supplier's system to maintain a relationship between a shopping basket and the buyer's requisition and purchase order. Procurement applications pass the supplier cookie back to the supplier in subsequent PunchOut edit or inspect sessions, and in the resulting purchase order. The supplier's website should take advantage of the supplier cookie to eliminate the need to pass visible, supplier-specific data back to the buyer.

Personalization

The header of the PunchOutSetupRequest always identifies the buying organization, but the request might also contain Contact and Extrinsic data (such as user's cost center, user's location, or product category) that the supplier can use to determine the dynamic URL to serve to the user.

Although not all buying organizations send this extrinsic data, it can enable the supplier to customize the supplier's Web store beyond the simple organization level. For example, the supplier could provide a separate Web store for each cost center within the buying organization (or each product category or each user).

The supplier could also store and display the user's previous quotes. The supplier could allow users to reuse quotes, check the status of orders, and create reports on past activity. To avoid security problems, store quote history only at the per-user level.

A key consideration during planning is the amount of effort required to implement a highly dynamic and customized PunchOut website. The supplier needs to balance between customization and complexity—a complex website takes longer to implement and maintain, but it could offer more value to users. It is recommended that the supplier start with a simple PunchOut website and enhance it over time.

PunchOut Transaction

The PunchOut message definitions are request/response messages within the Request and Response elements. All of the following messages must be implemented by suppliers to support PunchOut.

PunchOutSetupRequest and PunchOutSetupResponse are the request/response pair used to set up a PunchOut session to a remote system. The client uses them to identify the procurement application, send setup information, and receive a response indicating where to go to initiate an HTML browsing session on the remote website.

The order of cXML message flow in the PunchOut transaction is shown in the following diagram:

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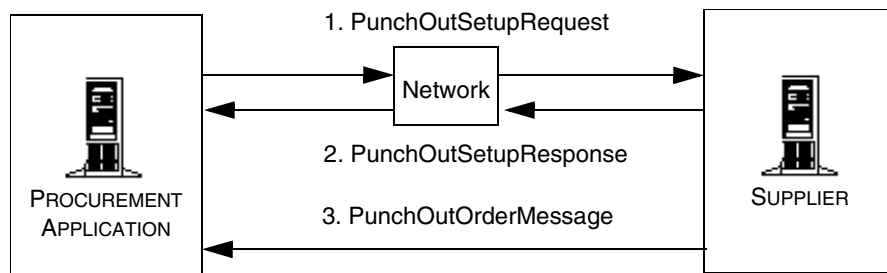
Sourcing

PunchOut can also be used for sourcing. A user can PunchOut from a procurement application to a sourcing application to initiate a RFQ (Request For Quote) session. The sourcing application will return a PunchOutSetupResponse with the URL of the start page of the sourcing application. With the URL, the end user goes to the sourcing application to provide more configuration information for RFQ.

At the end of each user session, a PunchOutOrderMessage is sent by the sourcing application to the procurement application and contains either a new RFQ, update information for an existing RFQ, or a completed RFQ. For information on using this feature, see

PunchOutSetupRequest

The PunchOutSetupRequest document contains a Header element and a PunchOutSetupRequest element.

Header

The Header element contains addressing and authentication information. Following is a sample Header element in a PunchOutSetupRequest.

```
<Header>
   <From>
      <Credential domain="DUNS">
         <Identity>65652314</Identity>
      </Credential>
   </From>
   <To>
      <Credential domain="DUNS">
         <Identity>83528721</Identity>
      </Credential>
   </To>
   <Sender>
      <Credential domain="NetworkId">
         <Identity>AN12345</Identity>
         <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>Procure Software 3.3</UserAgent>
   </Sender>
</Header>
```

From

The buying organization originating the PunchOutSetupRequest.

To

The supplier destination of the PunchOutSetupRequest.

Sender

Authentication details of the buying organization including Identity, SharedSecret (password), and AribaNetworkId, which is specified by Credential domain. The SharedSecret is the supplier's password or login to the PunchOut site.

UserAgent

An unique identifier for application sending the PunchOutSetupRequest. Consists of the software company name, product name, and version. Version details can appear in parentheses.

PunchOutSetupRequest

A PunchOutSetupRequest element is contained within the Request element. The following diagram shows the structure of the PunchOutSetupRequest element.
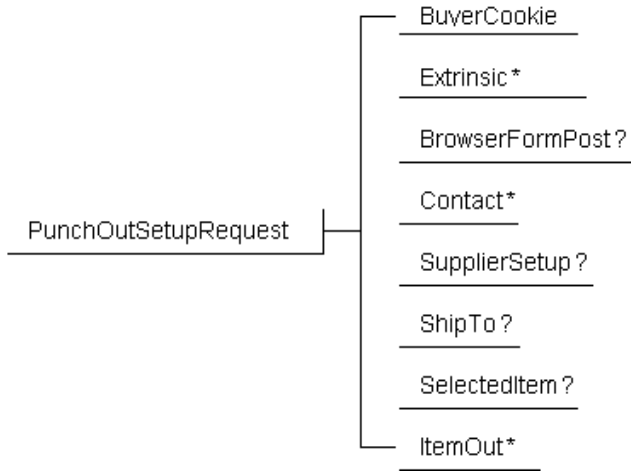
The following example shows a PunchOutSetupRequest:

```
<PunchOutSetupRequest operation="create">
    <BuyerCookie>34234234ADFSDF234234</BuyerCookie>
    <Extrinsic name="UserEmail">betty</Extrinsic>
    <Extrinsic name="UniqueName">BettyBuyer</Extrinsic>
    <Extrinsic name="CostCenter">Marketing</Extrinsic>
```

```
         <BrowserFormPost>
            <URL>http://orms.acme.com:1616/punchoutexit</URL>
         </BrowserFormPost>
         <SelectedItem>
            <ItemID>
               <SupplierPartID>54543</SupplierPartID>
            </ItemID>
         </SelectedItem>
         <SupplierSetup>
            <URL>http://workchairs.com/cxml</URL>
         </SupplierSetup>
         <ShipTo>
            <Address addressID="1000467">
               <Name xml:lang="en">1000467</Name>
               <PostalAddress>
                  <DeliverTo>Betty Buyer</DeliverTo>
                  <Street>123 Main Street</Street>
                  <City>Sunnyvale</City>
                  <State>CA</State>
                  <PostalCode>94089</PostalCode>
                  <Country isoCountryCode="US">United States</Country>
               </PostalAddress>
            </Address>
         </ShipTo>
      </PunchOutSetupRequest>
```

PunchOutSetupRequest has the following attribute:

operation	Specifies the type of PunchOutSetupRequest: "create", "inspect", "edit" or "source".

This element also contains the following elements: BuyerCookie, Extrinsic,
BrowserFormPost, Contact, ShipTo, SelectedItem, SupplierSetup and an ItemOut list. Only the
BuyerCookie element is required. The structure of Extrinsic, Contact, and ShipTo elements
is discussed in more detail in "OrderRequestHeader Element" on page 120. The
ItemOut element is discussed in "ItemOut" on page 130. In this context (outside of an
OrderRequest), the Distribution and Comments elements and lineNumber, requisitionID, and
requestedDeliveryDate attributes of an ItemOut add little or no value and should not be
included. Because PunchOut sessions take place before ordering, this information is
not relevant within a PunchOutSetupRequest.

An ItemOut list describes an existing shopping cart (items from a previous PunchOut session). The inspect operation initiates a read-only PunchOut session (enforced by both the client and the server) to view details about the listed items. The edit operation also starts from the previous shopping cart (described using the ItemOut list), but allows changes. Support for the edit operation implies inspect support (see "PunchOutOrderMessageHeader" on page 109 and "Empty Shopping Carts" on page 110). This list can also describe items to be sourced. For more information, see "Sourcing" on page 102.

The Credential of the supplier is used to obtain the PunchOut location from the E-commerce network hub where suppliers can store the URLs of their PunchOut websites. E-commerce network hubs receive the PunchOutSetupRequest document, read the supplier's ID, find the URL of the PunchOut website from the supplier's account information, and send the PunchOutSetupRequest document to that URL. The e-commerce network hub, not the buyer, specifies the URL of the PunchOut website, which is more flexible. The URL specified in the SupplierSetup element of the PunchOutSetupRequest has been deprecated; cXML servers will ignore this element in the future.

BuyerCookie

This element transmits information that is opaque to the remote website, but it must be returned to the originator for all subsequent PunchOut operations. This element allows the procurement application to match multiple outstanding PunchOut requests. BuyerCookie is unique per PunchOut session.

BrowserFormPost

This element is the destination for the data in the PunchOutOrderMessage. It contains a URL element whose use will be further explained in the PunchOutOrderMessage definition. If the URL-Form-Encoded method is not being used, this element does not have to be included.

Extrinsic

This optional element contains any additional data that the requestor wants to pass to the external website. The cXML specification does not define the content of Extrinsic elements—it is something that each requestor and remote website must agree on and implement.

Extrinsic elements are intended to provide additional machine-readable information. They extend the cXML protocol to support features not required by all implementations. In the following context, the new data further describes the user initiating the PunchOut request.

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```
<Extrinsic name="department">Marketing</Extrinsic>
```

The following example passes the user initiating the PunchOut and their department.

```
<Extrinsic name="CostCenter"">450</Extrinsic>
<Extrinsic name="User">jsmith</Extrinsic>"
```

With cXML 1.1 and higher, the Contact element obsoletes the "Cost Center" and "User" extrinsics.

The Extrinsic element can also appear in the OrderRequestHeader, ItemDetail, SpendDetail, LaborDetail, and ContractItem elements. These contexts are described further elsewhere in this document.

SelectedItem

An optional SelectedItem element allows suppliers to specify PunchOut for an entire store or any subset of product offerings. Suppliers can create their catalogs so that SelectedItem leads to store-, aisle-, or product-level PunchOut. Procurement applications can include the SelectedItem element in PunchOutSetupRequest documents, and PunchOut sites can use it to determine which products to display to users. The more specific the item is in the catalog, the less searching users have to do at the supplier's website. If there is no SelectedItem, suppliers should present their entire (store-level) product offerings.

A SelectedItem contains an ItemID, for example:

```
<SelectedItem>
   <ItemID>
      <SupplierPartID>5555</SupplierPartID>
   </ItemID>
</SelectedItem>
```

For the contents of the SelectedItem element, procurement applications use the ItemID (SupplierPartID and SupplierPartAuxiliaryID) from the PunchOut index catalog. No catalog changes are required.

Procurement applications should initially send both the new SelectedItem element and the old PunchOut URL in the PunchOutSetupRequest. E-commerce network hubs use the old URL only for suppliers that have not yet stored their PunchOut URL destinations.

This element is usually present in create operations. Procurement applications that allow users to punch out directly from a supplier listing should leave out SelectedItem in that case.

For edit and inspect operations, SelectedItem should appear only if the user chose to return to the supplier's website while viewing new information in the local catalog rather than items in an existing requisition. In either case, the current shopping cart must appear in the ItemOut list.

SelectedItem should not be used in a source operation.

SupplierSetup

This optional element specifies the URL to which to post the PunchOutSetupRequest. This element is not needed if the e-commerce network hub knows the supplier's PunchOut URL.

ShipTo

This optional element specifies the Ship To address for the item. Suppliers might want to use this information to formulate delivery time or price estimates.

PunchOutSetupResponse

After the remote website has received a PunchOutSetupRequest, it responds with a PunchOutSetupResponse, as shown below:

```
<PunchOutSetupResponse>
  <StartPage>
    <URL>
        http://premier.workchairs.com/store?23423SDFSDF23
    </URL>
  </StartPage>
</PunchOutSetupResponse>
```

StartPage

This element contains a URL element that specifies the URL to pass to the browser to initiate the PunchOut browsing session requested in the PunchOutSetupRequest. This URL must contain enough state information to bind to a session context on the remote website, such as the requestor identity and the appropriate BuyerCookie element.

At this point, the user who initiated the PunchOutSetupRequest browses the external website, and selects items to be transferred back to the procurement application through a PunchOutOrderMessage.

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PunchOutOrderMessage

This element sends the contents of the remote shopping basket or sourcing RFQ to the originator of a PunchOutSetupRequest. It can contain much more data than the other messages because it must be able to fully express the contents of any conceivable shopping basket on the external website. This message does not strictly follow the Request/Response model.

The remote website generates a PunchOutOrderMessage when the user checks out. This message communicates the contents of the remote shopping basket to the procurement application; for example:

```
<PunchOutOrderMessage>
    <BuyerCookie>34234234ADFSDF234234</BuyerCookie>
    <PunchOutOrderMessageHeader operationAllowed="create">
        <Total>
            <Money currency="USD">100.23</Money>
        </Total>
    </PunchOutOrderMessageHeader>
    <ItemIn quantity="1">
        <ItemID>
            <SupplierPartID>1234</SupplierPartID>
            <SupplierPartAuxiliaryID>
                additional data about this item
            </SupplierPartAuxiliaryID>
        </ItemID>
        <ItemDetail>
            <UnitPrice>
                <Money currency="USD">10.23</Money>
            </UnitPrice>
            <Description xml:lang="en">
                Learn ASP in a Week!
            </Description>
            <UnitOfMeasure>EA</UnitOfMeasure>
            <Classification domain="SPSC">12345</Classification>
            <LeadTime>1</LeadTime>
        </ItemDetail>
    </ItemIn>
</PunchOutOrderMessage>
```

A PunchOutOrderMessage document can be empty, which allows users to end PunchOut shopping sessions without selecting any items. Suppliers can implement a **Cancel** button that generates an empty PunchOutOrderMessage document. Then, both the PunchOut site and the procurement application know when a user has canceled a shopping session, and they can delete the shopping cart, delete items from the requisition, and perform other housekeeping tasks.

BuyerCookie

This element is the same element that was passed in the original PunchOutSetupRequest. It must be returned here to allow the procurement application to match the PunchOutOrderMessage with an earlier PunchOutSetupRequest.

PunchOutOrderMessageHeader

This element contains information about the entire shopping basket contents being transferred. The only required element is Total, which is the overall cost of the items being added to the requisition, excluding tax and shipping charges.

Additional elements that are allowed are Shipping and Tax, which are the amount and description of any shipping or tax charges computed on the remote website.

ShipTo is also optional, and it specifies the Ship-To addressing information the user selected on the remote site or that was passed in the original PunchOutSetupRequest.

All monetary amounts are in a Money element that always specifies currency in a standardized format.

The SourcingStatus element is optional, and relays updated information about a sourced RFQ. The content of the element could be a textual description of the update, such as the actual status update string displayed to the user.

PunchOutOrderMessageHeader has the following attributes:

operationAllowed	Specifies the operations allowed in subsequent PunchOutOrderRequests: create, inspect, or edit.
quoteStatus	Optional attribute specifies whether the order is "pending" or "final". If quoteStatus is "final", the transaction is complete.

The operationAllowed attribute controls whether the user can initiate later PunchOut sessions containing data from this PunchOutOrderMessage:

- operationAllowed="create": disallows subsequent PunchOut sessions for these items. Users cannot inspect or edit these items.

- operationAllowed="inspect": allows subsequent PunchOut sessions only to inspect these items. The items cannot be changed.

- operationAllowed="edit": allows subsequent PunchOut sessions to both inspect and change these items.

*4 PunchOut
Transaction*

The quoteStatus attribute is used for a sourced RFQ or any other long-running operation. The PunchOutOrderMessage will contain the results of an end user session in the sourcing application and contains either status update information for a particular RFQ, a new RFQ, or an update to a completed RFQ.

Empty Shopping Carts

The PunchOutOrderMessage can contain a list of items corresponding to a shopping cart on the supplier website. It always indicates the end of the interactive PunchOut session. The following list describes a few cases when there are no items in the PunchOutOrderMessage. These messages allow clients to resume immediately when the user leaves the supplier website.

- If the operation in the original PunchOutSetupRequest was inspect, the item list of the PunchOutOrderMessage must be ignored by the procurement application. The supplier site should return no ItemIn elements in this case.

- If a PunchOutOrderMessage contains no ItemIn elements and the operation was create, no items should be added to the requisition because the supplier site or the user has cancelled the PunchOut session without creating a shopping cart.

- If the operation was edit and the PunchOutOrderMessage contains no ItemIn elements, existing items from this PunchOut session must be deleted from the requisition in the procurement application.

The Status code "204/No Content" indicates the end of a session without change to the shopping cart. Again, the PunchOutOrderMessage (which is always needed for the BuyerCookie) should not contain ItemIn elements. This code would be handled identically to the other "empty" cases detailed above unless the operation was edit. In that case, the user cancelled the session without making any change and no change should be made to the requisition in the procurement application.

ItemIn

This element adds an item from a shopping basket to a requisition in the procurement application. It can contain a variety of elements, only two of which are required: ItemID and ItemDetail.

ItemIn has the following attributes:

quantity	The number of items selected by the user on the remote website. Because the supplier site can enforce rules for partial units, the protocol allows fractional quantities. Should never be negative.
lineNumber (optional)	The position of this item within an order. Because PunchOut sessions normally take place prior to ordering and the server cannot control placement of items within an order in any case, this attribute is not relevant within a PunchOutOrderMessage.

The optional elements are ShipTo, Shipping, and Tax, which are the same elements as those specified in PunchOutOrderMessage, above. In addition, ItemIn can contain the optional SpendDetail, which can contain the optional TravelDetail, FeeDetail, LaborDetail, and Extrinsic elements. TravelDetail provides detailed information about travel and expense line items, FeeDetail provides information about fees not defined elsewhere, and LaborDetail provides detailed information about temporary labor line items. For more information, see "TravelDetail" on page 134, "FeeDetail" on page 154, "LaborDetail" on page 155, and "Extrinsic" on page 129.

The ItemIn and ItemOut structures match one-to-one, except for the Distribution and Comments elements and requisitionID and requestedDeliveryDate attributes available in the ItemOut element. The procurement application can convert directly between ItemIn and ItemOut lists when initiating an inspect or edit operation. Suppliers can convert one to the other (dropping the listed extensions available in the ItemOut element) when executing an edit operation. The procurement application can perform the direct conversion and add additional shipping and distribution information and comments when initiating an OrderRequest transaction. ItemDetail data (with the possible exception of Extrinsic elements) contained within ItemIn elements must not be removed when converting from ItemIn to ItemOut.

ItemID

This element uniquely identifies the item to the remote website. It is the only element required to return to the remote website to re-identity the item in later PunchOut sessions.

ItemID contains two elements: SupplierPartID and SupplierPartAuxiliaryID. Only SupplierPartID is required. SupplierPartAuxiliaryID helps the remote website transport complex configuration or bill-of-goods information to re-identify the item when it is presented to the remote website in the future.

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If SupplierPartAuxiliaryID contains special characters (for example, if it contains additional XML elements not defined in the cXML protocol), they must be escaped properly. Due to the necessity to pass SupplierPartAuxiliaryID information through applications and back to the originating supplier, an internal subset containing any additional XML elements is insufficient.

ItemDetail

This element contains descriptive information about the item that procurement applications present to users. The contents of an ItemDetail element can be quite complex, but the minimum requirements are simple: UnitPrice, Description, UnitOfMeasure, and Classification. Optional elements include a ManufacturerPartID, a ManufacturerName, a URL, a LeadTime, and any number of Extrinsic elements.

In the context of an ItemIn element, the Extrinsic elements contained within an ItemDetail function identically to those found within an Index (specifically an IndexItemAdd).

The optional LeadTime element describes the number of days needed for the buyer to receive the product. For example:

        <LeadTime>14</LeadTime>

Note that in an IndexItemAdd element, duplicate LeadTime information might come from both ItemDetail, where it is optional, and IndexItemDetail, where it is mandatory. If the LeadTime elements are defined in both cases, then they should be identical.

Description

This element describes the item in a textual form. Because this text might exceed the limits of a short table of line items (or other constrained user interface) and random truncations could occur, the Description element contains an optional ShortName element.

ShortName is a short (30-character recommended, 50-character maximum) name for the item, which fits product lists presented to users. If provided, clients should present the ShortName instead of a truncation of the Description text in any restricted fields. Clients must continue to truncate the Description text if no ShortName is provided.

For example:

```
<Description xml:lang="en-US">
   <ShortName>Big Computer</ShortName>
   This wonder contains three really big disks, four CD-Rom drives, two Zip drives, an
ethernet card or two, much more memory than you could ever use, four CPUs on two
motherboards. We'll throw in two monitors, a keyboard and the cheapest mouse we can
find lying around.
</Description>
```

The ShortName might appear as "Big Computer" where space is tight, and "Big Computer: This wonder … lying around." (or as two separate but complete fields) where there is space to display more text.

Catalog creators should not use ShortName to duplicate the information in Description. Instead, they should use ShortName to name the product, and Description to describe product details.

CIF 3.0 catalog format also supports ShortName. The CIF field name is Short Name.

SupplierList

In a sourced RFQ PunchOutOrderMessage, the ItemOut and ItemIn elements can specify a list of suppliers that can be involved in a sourcing process. SupplierList contains the Name and the list of SupplierIDs for each supplier. The following ItemOut example shows a SupplierList with two suppliers.

```
<ItemOut quantity="6" lineNumber="1">
   <ItemID>
      <SupplierPartID>unknown</SupplierPartID>
   </ItemID>
   <ItemDetail>
      <UnitPrice>
         <Money currency="USD">10.23</Money>
      </UnitPrice>
      <Description xml:lang="en">Learn ASP in a Week!</Description>
      <UnitOfMeasure>EA</UnitOfMeasure>
      <Classification domain="SPSC">12345</Classification>
      <ManufacturerPartID>ISBN-23455634</ManufacturerPartID>
      <ManufacturerName>O'Reilly</ManufacturerName>
      <URL> URL for more information </URL>
      <LeadTime>7</LeadTime>
   </ItemDetail>
   <SupplierList>
      <Supplier>
         <Name xml:lang="en">Supplier #1 </Name>
         <SupplierID domain="duns">0000000</SupplierID>
      </Supplier>
      <Supplier>
         <Name xml:lang="en">Supplier #2 </Name>
         <SupplierID domain="duns">1111111</SupplierID>
         <SupplierID domain="duns">2222222</SupplierID>
      </Supplier>
   </SupplierList>
</ItemOut>
```

4 PunchOut Transaction

Direct PunchOut

Direct PunchOut is a cXML capability that can reduce the time it takes for users to display the first page of a supplier's PunchOut site.

It offers faster PunchOut session initiation than regular PunchOut by allowing clients to send PunchOutSetupRequest documents directly to PunchOut sites for authentication, without first going through a network commerce hub for authentication and forwarding.

If suppliers indicate (through their cXML profile) that they support direct PunchOut, clients send PunchOut requests directly to them. Clients enable PunchOut sites to authenticate these requests by either including a Message Authentication Code (MAC) generated by a trusted third party, or by making a client digital certificate available.

Authentication Methods

Direct PunchOut is made possible by two alternative authentication methods:

- **MAC Authentication** — The server interprets a Message Authentication Code (MAC) in the Sender credential in PunchOutSetupRequest documents. This method is discussed in "Message Authentication Code (MAC)" on page 335.

- **Auth Transaction** — The server asks a network commerce hub to authenticate the client's digital certificate and caches the response for subsequent PunchOut requests. This method is discussed in "Auth Transaction" on page 340.

Servers indicate the authentication method they support through their cXML Profile.

ProfileResponse

PunchOut sites indicate that they support direct PunchOut and specify the authentication methods they support by including the following options for PunchOutSetupRequest in their ProfileResponse documents.

```
<Transaction requestName="PunchOutSetupRequest">
    <URL>https://service.bighub.com/cxml</URL>
    <Option name="Direct.URL">https://bigsupplier.com/punchout</Option>
    <Option name="Direct.AuthenticationMethod.CredentialMac">Yes</Option>
    <Option name="Direct.AuthenticationMethod.Certificate">Yes</Option>
```

For more information about these options, see "PunchOutSetupRequest Options" on page 65.

Chapter 5
Purchase Orders

This chapter describes how to set up a website to receive cXML-format purchase orders. It also describes how to send purchase order status messages to buying organizations or marketplaces.

This chapter describes:

- Purchase Order Process
- OrderRequest Documents
- Response to an OrderRequest
- Accepting Order Attachments

Purchase Order Process

Procurement applications convert approved purchase requisitions into one or more purchase orders. A purchase order is a formal request from a buying organization to a supplier to fulfill a contract.

cXML is just one format for transmitting purchase orders. Other common formats are e-mail, fax, and ANSI X.12 EDI (Electronic Data Interchange). cXML is the best format for purchase orders because it allows you to easily automate order processing. cXML's well-defined structure allows order-processing systems to easily interpret the elements within a purchase order. With little or no human intervention, the appropriate data within purchase orders can be routed to your shipping, billing, and sales departments, as needed.

In addition, the cXML order-routing method allows the transmittal of any supplier cookies (SupplierPartAuxiliaryID) and purchase order attachments.

When you configure your account on a network commerce hub, you specify a URL to which all cXML purchase orders will be sent. Upon receiving a purchase order, you send it to your internal order management system and fulfill it as you normally would.

Your website must also return an Order Response document to the network commerce hub, which tells the buyer that you successfully received and parsed the purchase order.

You do not need a PunchOut website in order to receive cXML purchase orders; PunchOut and cXML order-receiving are distinct capabilities. However, the infrastructure and applications required for supporting PunchOut are the same for receiving cXML purchase orders.

There are two types of cXML documents used in the transaction of purchase orders. Procurement applications send OrderRequest documents, and you respond with generic Response documents. These documents pass through the network commerce hub for authentication and routing.

OrderRequest Documents

The OrderRequest document is analogous to a purchase order. The following diagram shows the structure of the OrderRequest element:
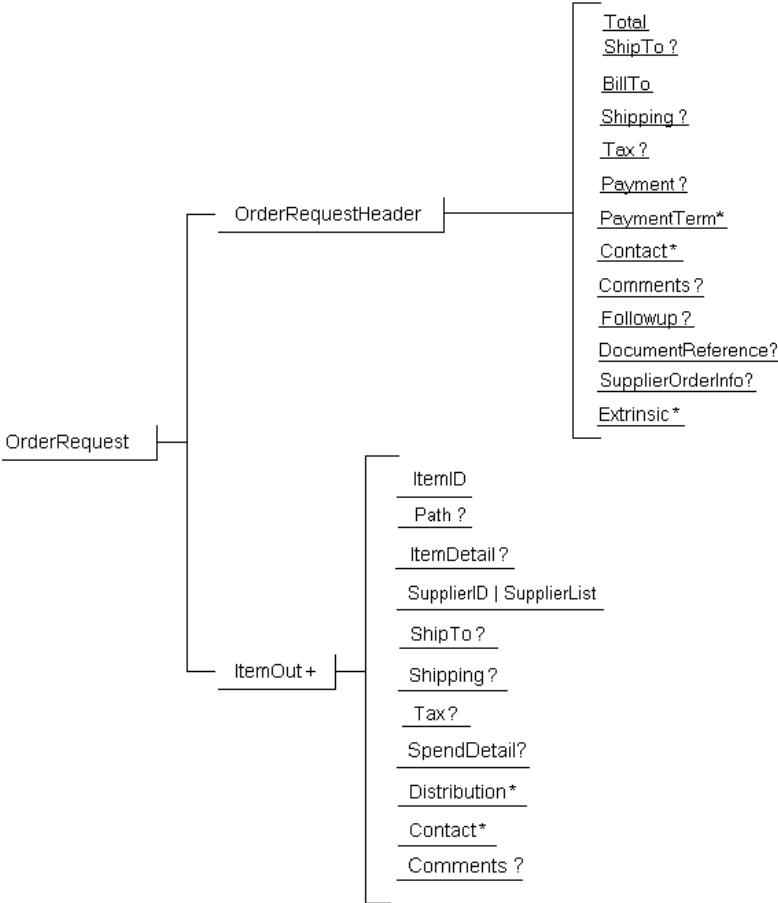
The following example shows the structure of the OrderRequest element:

```
<OrderRequest>
  <OrderRequestHeader … >
     …
  </OrderRequestHeader>
  <ItemOut … >
     …
  </ItemOut>
  <ItemOut … >
     …
  </ItemOut>
</OrderRequest>
```

The following example shows an OrderRequest for an item:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML xml:lang="en-US" payloadID="93369535150910.10.57.136" timestamp="2000-08-
03T08:49:11+07:00">
  <Header>
    <From>
      <Credential domain="AribaNetworkUserId">
        <Identity>admin@acme.com</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="DUNS">
        <Identity>114315195</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="AribaNetworkUserId">
        <Identity>sysadmin@ariba.com</Identity>
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>Network Hub V1.1</UserAgent>
    </Sender>
  </Header>
  <Request>
    <OrderRequest>
      <OrderRequestHeader orderID="DO102880"
              orderDate="2000-08-03T08:49:09+07:00" type="new">
        <Total>
          <Money currency="USD">4688.00</Money>
        </Total>
        <ShipTo>
          <Address isoCountryCode="US" addressID="1000467">
            <Name xml:lang="en">Acme, Inc.</Name>
            <PostalAddress name="default">
              <DeliverTo>John Q. Smith</DeliverTo>
              <DeliverTo>Buyers Headquarters</DeliverTo>
              <Street>123 Main Street</Street>
              <City>Mountain View</City>
              <State>CA</State>
              <PostalCode>94089</PostalCode>
              <Country isoCountryCode="US">United States</Country>
            </PostalAddress>
            <Email name="default">john_smith@acme.com</Email>
            <Phone name="work">
              <TelephoneNumber>
                <CountryCode isoCountryCode="United States">1</CountryCode>
                <AreaOrCityCode>800</AreaOrCityCode>
                <Number>5555555</Number>
```

```
                </TelephoneNumber>
            </Phone>
        </Address>
    </ShipTo>
    <BillTo>
        <Address isoCountryCode="US" addressID="12">
            <Name xml:lang="en">Acme Accounts Payable</Name>
            <PostalAddress name="default">
                <Street>124 Union Street</Street>
                <City>San Francisco</City>
                <State>CA</State>
                <PostalCode>94128</PostalCode>
                <Country isoCountryCode="US">United States</Country>
            </PostalAddress>
            <Phone name="work">
                <TelephoneNumber>
                    <CountryCode isoCountryCode="US">1</CountryCode>
                    <AreaOrCityCode>415</AreaOrCityCode>
                    <Number>6666666</Number>
                </TelephoneNumber>
            </Phone>
        </Address>
    </BillTo>
    <Shipping>
        <Money currency="USD">12.34</Money>
        <Description xml:lang="en-US">FedEx 2-day</Description>
    </Shipping>
    <Tax>
        <Money currency="USD">10.74</Money>
        <Description xml:lang="en">CA State Tax</Description>
    </Tax>
    <Payment>
        <PCard number="1234567890123456" expiration="2002-03-12"/>
    </Payment>
</OrderRequestHeader>
<ItemOut quantity="2" lineNumber="1">
    <ItemID>
        <SupplierPartID>220-3165</SupplierPartID>
        <SupplierPartAuxiliaryID>E000028901</SupplierPartAuxiliaryID>
    </ItemID>
    <ItemDetail>
        <UnitPrice>
            <Money currency="USD">2344.00</Money>
        </UnitPrice>
        <Description xml:lang="en">Laptop Computer Notebook Pentium® II
                processor w/AGP, 300 MHz, with 12.1&quot; TFT XGA Display
        </Description>
        <UnitOfMeasure>EA</UnitOfMeasure>
        <Classification domain="UNSPSC">43171801</Classification>
        <URL>http://www.supplier.com/Punchout.asp</URL>
```

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```
            <Extrinsic name="ExtDescription">Enhanced keyboard</Extrinsic>
         </ItemDetail>
         <Distribution>
            <Accounting name="DistributionCharge">
               <AccountingSegment id="7720">
                  <Name xml:lang="en-US">Account</Name>
                  <Description xml:lang="en-US">Office Supplies
                  </Description>
               </AccountingSegment>
               <AccountingSegment id="610">
                  <Name xml:lang="en-US">Cost Center</Name>
                  <Description xml:lang="en-US">Engineering Management
                  </Description>
               </AccountingSegment>
            </Accounting>
            <Charge>
               <Money currency="USD">4688.00</Money>
            </Charge>
         </Distribution>
      </ItemOut>
   </OrderRequest>
 </Request>
</cXML>
```

OrderRequestHeader Element

The following example shows an OrderRequestHeader in full detail:

```
<OrderRequestHeader
     orderID="DO1234"
     orderDate="1999-03-12T13:30:23+8.00"
     type="new"
     requisitionID="R1234"
     shipComplete="yes">
  <Total>
     <Money currency="USD">12.34</Money>
  </Total>
  <ShipTo>
     <Address>
        <Name xml:lang="en">Acme Corporation</Name>
        <PostalAddress name="Headquarters">
           <DeliverTo>Joe Smith</DeliverTo>
           <DeliverTo>Mailstop M-543</DeliverTo>
           <Street>123 Anystreet</Street>
           <City>Sunnyvale</City>
           <State>CA</State>
           <PostalCode>90489</PostalCode>
           <Country isoCountryCode="US">United States</Country>
        </PostalAddress>
```

```
         </Address>
      </ShipTo>
      <BillTo>
         <Address>
            <Name xml:lang="en">Acme Corporation</Name>
            <PostalAddress name="Finance Building">
               <Street>124 Anystreet</Street>
               <City>Sunnyvale</City>
               <State>CA</State>
               <PostalCode>90489</PostalCode>
               <Country isoCountryCode="United States">United States</Country>
            </PostalAddress>
         </Address>
      </BillTo>
      <Shipping>
         <Money currency="USD">12.34</Money>
         <Description xml:lang="en-US">FedEx 2-day</Description>
      </Shipping>
      <Tax>
         <Money currency="USD">12.34</Money>
         <Description xml:lang="en">CA State Tax</Description>
      </Tax>
      <Payment>
         <PCard number="1234567890123456" expiration="1999-03-12"/>
      </Payment>
      <PaymentTerm payInNumberOfDays="45">
      </PaymentTerm>
      <PaymentTerm payInNumberOfDays="30">
         <Discount>
            <DiscountPercent percent="2">
         </Discount>
      </PaymentTerm>
      <PaymentTerm payInNumberOfDays="20">
          <Discount>
             <DiscountPercent percent="3">
          </Discount>
      </PaymentTerm>
      <Contact role="purchasingAgent">
         <Name xml:lang="en-US">Mr. Purchasing Agent</Name>
         <Email>puragent@acme.com</Email>
         <Phone name="Office">
            <TelephoneNumber>
               <CountryCode isoCountryCode="US">1</CountryCode>
               <AreaOrCityCode>800</AreaOrCityCode>
               <Number>5551212</Number>
            </TelephoneNumber>
         </Phone>
      </Contact>
      <Comments xml:lang="en-US">
         Anything well formed in XML can go here.
```

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```
    </Comments>
    <SupplierOrderInfo orderID=12345>
</OrderRequestHeader>
```

OrderRequestHeader has the following attributes:

orderID	The identifier for this order. Analogous to the purchase order number.
orderDate	The date and time this order was placed, in ISO 8601 format.
orderType (optional)	Type of order: regular, release (a release against a master agreement or against a blanket purchase order), or blanket (a blanket purchase order).
releaseRequired (optional)	Used only if orderType is blanket to indicate whether the blanket order requires releases (purchase orders). If "yes" is specified, the blanket order requires separate release orders before the supplier can act. If not specified, the supplier can act on the blanket order itself. The default is unspecified.
type (optional)	Type of request: new (default), update, or delete. Update and delete orders must use the DocumentReference element with the PayloadId to refer to the original purchase order. See "DocumentReference Element" on page 211.
orderVersion (optional)	Specifies the order version number of change orders, starting with "1" for the original order.
isInternalVersion (optional)	Indicates whether the order includes changes that are relevant only within the buying organization. For example, a minor change was made that does not affect information used by the supplier. Suppliers might not see internal order versions, depending on their customers' configuration.
agreementID (optional)	Used only if orderType is release to indicate the buyer's identifier for associated master agreement or blanket purchase order.
agreementPayloadID (optional)	Used only if orderType is release to indicate the cXML document payload ID for the associated master agreement or blanket purchase order.
parentAgreementID (optional)	Used only if orderType is blanket to indicate the parent blanket order.
parentAgreementPayloadID (optional)	Used only if orderType is blanket to indicate the document reference identifier for the parent blanket order.

effectiveDate	Required if orderType is blanket to indicate the date the blanket order becomes effective (the date from which releases can be created or invoices submitted for the blanket order).
expirationDate (optional)	Used only if orderType is blanket to indicate the date the blanket order expires. Releases cannot be created against the blanket order after this date.
requisitionID (optional)	The buyer's requisition identifier for this entire order. It might be the same as orderID, and it might not be included at all. Must not be included if requisitionID is specified in any ItemOut elements.
shipComplete (optional)	A preference against partial shipments. The only allowed value is "yes". By default, items are shipped when available. Because orders might include items with varying ShipTo elements, only groups of items with common shipping locations should be held until complete when shipComplete="yes".

OrderRequestHeader and ItemOut (when extended with ItemDetail) contain similar information. Where OrderRequestHeader includes overall billing (BillTo) and payment (Payment, PaymentTerm) information, ItemOut describes the individual items (in ItemID, ItemDetail, SpendDetail, and Distribution).

Do not use the information in OrderRequestHeader as the default for item-specific elements. If present, ShipTo, Shipping, Contact, and each named Extrinsic must appear either with every ItemOut or in the OrderRequestHeader. The Comments and Tax elements can appear simultaneously at both levels; however, the header-level Tax element contains a total for the order, whereas the item-level Tax element contains the tax just for the item. Do not include duplicate information in Comments elements at both levels.

The following example shows an OrderRequestHeader for a blanket order:

```
<OrderRequestHeader
parentAgreementPayloadID="1184102133611.2058850054.000000002@1zVE0KpzNZL
O9HTrpqF27Nebqbl=" parentAgreementID="BPO31" expirationDate="2007-07-
31T23:59:59-07:00" orderDate="2007-07-10T14:37:31-07:00" orderID="BPO36"
orderVersion="1" effectiveDate="2007-07-10T00:00:00-07:00" releaseRequired="yes"
orderType="blanket" type="new">
```

Total

This element contains the total cost for the items in the order, excluding any tax and shipping. It is a container for the Money element.

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ShipTo/BillTo

These elements contain the addresses of the Ship To and Bill To entities on the OrderRequest.

All items must be billed to a single entity. Therefore, the BillTo element appears only in the OrderRequestHeader. Items from an order can be sent to multiple locations. Like the Shipping element (see next section), the ShipTo element can therefore appear either in the OrderRequestHeader or in individual ItemOut elements.

The Address element contains an addressID attribute that specifies an ID for the address. This attribute is used to support address codes for relationships that require ID references. This value should not be the name of a company or person. It is intended to deepen application-to-application integration. For example, a ShipTo location identifier could be:

```
<Address isoCountryCode="US" addressID="1000487">
```

The Name element contained within an Address element should always specify the company name.

The DeliverTo element is listed twice, the first line specifying the name of the person to receive the goods, and the second specifying their location (building, city, office, mailstop) where the items should be delivered. The location should always be complete enough to be used in a mailing label. For example,

```
<PostalAddress name="Headquarters">
    <DeliverTo>Joe Smith</DeliverTo>
    <DeliverTo>Mailstop M-543</DeliverTo>
    <Street>123 Anystreet</Street>
    <City>Sunnyvale</City>
    <State>CA</State>
    <PostalCode>90489</PostalCode>
    <Country isoCountryCode="US">UnitedStates</Country>
</PostalAddress>
```

Country contains a human readable name. The isoCountryCode attribute value is the ISO country code from the ISO 3166 standard.

Avoid empty or whitespace elements because missing values can affect EDI and cXML suppliers.

Shipping

This element describes how to ship line items and the shipping cost. If the Shipping element is present in the OrderRequestHeader, it must not appear in the ItemOut elements. If it is not present in the OrderRequestHeader, it must appear in the ItemOut elements.

Tax

This element contains the tax associated with the order. This element is present if the buying organization computes tax. When appearing within the OrderRequestHeader, Tax describes the total tax for an order. Tax elements at the item level can describe line item tax amounts.

The Tax element supports the Extrinsic element for additional tax-related information.

Payment

Describes the payment instrument used to pay for the items requested. In the above example, the Payment element contains a PCard element, which encodes a standard purchasing card into the cXML document. In the future, other payment instruments might be defined.

PaymentTerm

Defines the payment term in orders and invoices. Use PaymentTerm instead of the InvoiceDetailPaymentTerm previously defined. PaymentTerm defines either the net term (without discount) or the discount term (with discount).

PaymentTerm has one attribute:

payInNumberOfDays	Indicates the invoice must be paid in a certain number of days after the invoice effective date.

Discount

The percentage or amount of the discount term. The discount rate applies if the invoice total is paid within the time specified by payInNumberOfDays. Positive rates denote discounts and negative rates denote penalties. Do not use a percentage sign (%) or divide by 100; for example "2" means 2%.

Do not use the Discount element if the PaymentTerm is a net term.

Contact

The supplier uses Contact element information to follow up on an order. This element identifies a person and provides a list of ways to reach that person or entity. The only required element is the Name of the contact. Optional and repeating possibilities include PostalAddress (not recommended for immediate correction of order problems), Email, Phone, Fax, and URL.

In cXML 1.0, the extrinsics User and CostCenter elements often provided contact information. With cXML 1.1 and higher, the Contact element provides alternatives to these extrinsics.

Buying organizations might use this element to identify the original requestor, the procurement application system administrator, or some other contact who can take responsibility for correcting problems with orders. Contact can differ from both BillTo and ShipTo information for an order.

Contact has the following attributes:

role (optional)	The position of this person within the procurement process.
addressID (optional)	An ID for the address. addressID is supports address codes for relationships that require id references.

Possible values for the role attribute:

role value	Description
endUser	Contact details about the end user.
administrator	Contact details about the administrator.
purchasingAgent	Contact details about the purchasing agent.
technicalSupport	Technical support contact
customerService	Customer service contact
sales	Sales contact
supplierCorporate	Contact details about the supplier.
supplierMasterAccount	Contact details about the supplier master account.
SupplierAccount	Contact details about the supplier account.
buyerCorporate	Contact details the supplier has about the buying organization.
buyerMasterAccount	Contact details about the buyer master account.
buyerAccount	Contact details about the buyer account.

role value	Description
buyer	Contact details about the buyer.
subsequentBuyer	Contact details about the subsequent buyer.

The same Contact role must not appear at both the header and item levels.

There is no default role, due to the disparate contents of the Contact element. So, cXML applications treat a Contact without a role attribute as an additional role.

TelephoneNumber

The TelephoneNumber element contains the telephone number of the person or department where the goods are to be shipped or billed. For example, a telephone number in the United States:

```
<TelephoneNumber>
   <CountryCode isoCountryCode="US">1</CountryCode>
   <AreaOrCityCode>800</AreaOrCityCode>
   <Number>5551212</Number>
</TelephoneNumber>
```

For international dialing, the CountryCode contains the dial code for a country after any escape codes. England, for example, would be represented as:

```
<CountryCode isoCountryCode="UK">44</CountryCode>"
```

The following, therefore, is an example for London:

```
<TelephoneNumber>
   <CountryCode isoCountryCode="UK">44</CountryCode>
   <AreaOrCityCode>137</AreaOrCityCode>
   <Number>2801007</Number>
</TelephoneNumber>
```

Fax

The Fax element specifies the Fax number of the person or department where goods are to be shipped or billed. This element contains the TelephoneNumber element described above.

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Comments

Arbitrary human-readable information buyers can send within purchase orders. This string data is not intended for the automated systems at supplier sites.

The Comments element can contain an Attachment element for including external files.

Attachment

Comments can attach external files to augment purchase orders. The Attachment element appears within Comments, and it contains only a reference to the external MIME part of the attachment. All attachments should be sent in a single multipart transmission with the OrderRequest document. Even if this is not possible, the contentID provided by the Attachment element must be usable to retrieve the attachment.

For details about the transfer of attached files, see "Attachments" on page 33.

Attachment contains a single URL with scheme "cid:". An attached file in a cXML document might appear as:

```
<Comments>
  <Attachment>
     <URL>cid: uniqueCID@cxml.org</URL>
  </Attachment>
  Please see attached image for my idea of what this
  should look like
</Comments>
```

The Comments element appears in many places within the cXML protocol, but it can contain the Attachment element only within OrderRequest documents.

Use Comments to provide local comments specific to the current document.

Followup

The use of the Followup element is strongly discouraged. In early implementations, Followup was used to specify the URL to which future StatusUpdateRequest documents should be posted.

All cXML implementations should use the more robust Profile transaction to retrieve and convey information about server capabilities, including supported cXML version, supported transactions, and options to those transactions. See "Profile Transaction" on page 26 for more information.

DocumentReference

This element provides an exact reference to an earlier document (for example, OrderRequest,MasterAgreementRequest, or InvoiceReference). In a StatusUpdateRequest, DocumentReference identifies the purchase order to be updated.

SupplierOrderInfo

This element is used in OrderRequestHeader to define supplier sales order information related to the current order. SupplierOrderInfo is used in OrderRequest and InvoiceDetailRequest documents.

When SupplierOrderInfo is used in a PunchOutOrderMessage, it indicates that the supplier has created an order associated with the PunchOut order message. The buyer can later cancel the order by sending an OrderRequest of type "delete" and including the SupplierOrderInfo element in the OrderRequestHeader. to refer to the sales order to be deleted.

SupplierOrderInfo has one attribute:

orderID	Supplier sales order id of this order.

Extrinsic

This element contains machine-readable information related to the order, but not defined by the cXML protocol. In contrast, the Comments element passes information for human use. Extrinsic elements contain data that is likely to appear in later documents; the Comments element does not. At this level, Extrinsic extends the description of all items contained in the purchase order. Some Extrinsic information might also describe the overall purchase order without affecting the meaning of any contained ItemOut.

Each named Extrinsic can appear only once within the lists associated with the OrderRequestHeader and individual ItemOut elements (within the contained ItemDetail elements). The same name must not appear in both the OrderRequestHeader list and any list associated with the ItemOut elements. If the same Extrinsic name and value is repeated in all ItemOut lists, it should be moved to the OrderRequestHeader.

The Extrinsic element can also appear in the IndexItem, PunchOutSetupRequest and ContractItem elements. These contexts are described later in this document. Extrinsic values are case-insensitive.

5 *Purchase Orders*

ItemOut

The following example shows a minimum valid ItemOut element.

```
<ItemOut quantity="1"
   lineNumber="1">
   <ItemID>
      <SupplierPartID>5555</SupplierPartID>
   </ItemID>
</ItemOut>
```

ItemOut has the following attributes:

quantity	The number of items desired. Fractions are allowed for some units of measure. The value might have already been checked by the supplier during a PunchOut session. This value should never be negative.
lineNumber (optional)	Position of the item within an order. This ordinal value increases once per ItemOut in a "new" OrderRequest. Clients should always specify this attribute in an OrderRequest, although it might not be useful in other ItemOut contexts.
requisitionID (optional)	The buyer's requisition identifier for this line item. Must not be included if requisitionID is specified in the OrderRequestHeader.
agreementItemNumber (optional)	The buyer's master agreement identifier for the line item.
requestedDeliveryDate (optional)	The date item was requested for delivery, which allows item-level delivery dates in the OrderRequest. It must be in ISO 8601 format.
isAdHoc (optional)	Indicates that the item is a non-catalog (ad-hoc) item. Non-catalog purchase orders contain items entered manually by requisitioners, not items selected from electronic catalogs. Often, these items do not have valid part numbers. Non-catalog orders usually require special validation and processing. Users enter non-catalog items to purchase products and services on an ad-hoc basis or because they could not find them in electronic catalogs.

The lineNumber attribute remains constant for any item through updates to the order. Deletion of items from an order never changes the lineNumber of remaining items. New items have higher numbers than those previously included in the order. A change to an existing item (an increased quantity, for example) does not affect the lineNumber of that item.

The following example shows a more complicated ItemOut.

```
<ItemOut quantity="2" lineNumber="1"
   requestedDeliveryDate="1999-03-12">
   <ItemID>
      <SupplierPartID>1233244</SupplierPartID>
      <SupplierPartAuxiliaryID>ABC</SupplierPartAuxiliaryID>
   </ItemID>
   <ItemDetail>
      <UnitPrice>
         <Money currency="USD">1.34</Money>
      </UnitPrice>
      <Description xml:lang="en">hello</Description>
      <UnitOfMeasure>EA</UnitOfMeasure>
      <Classification domain="UNSPSC">12345</Classification>
      <ManufacturerPartID>234</ManufacturerPartID>
      <ManufacturerName xml:lang="en">foobar</ManufacturerName>
      <URL>www.bar.com</URL>
   </ItemDetail>
   <ShipTo>
      <Address>
         <Name xml:lang="en">Acme Corporation</Name>
         <PostalAddress name="Headquarters">
            <Street>123 Anystreet</Street>
            <City>Sunnyvale</City>
            <State>CA</State>
            <PostalCode>90489</PostalCode>
            <Country isoCountryCode="US">United States</Country>
         </PostalAddress>
      </Address>
   </ShipTo>
   <Shipping>
      <Money currency="USD">1.34</Money>
      <Description xml:lang="en-US">FedEx 2-day</Description>
   </Shipping>
   <Tax>
      <Money currency="USD">1.34</Money>
      <Description xml:lang="en">foo</Description>
   </Tax>
   <Distribution>
      <Accounting name="DistributionCharge">
         <AccountingSegment id="23456">
            <Name xml:lang="en-US">G/L Account</Name>
            <Description xml:lang="en-US">Entertainment</Description>
         </AccountingSegment>
         <AccountingSegment id="2323">
            <Name xml:lang="en-US">Cost Center</Name>
            <Description xml:lang="en-US">Western Region Sales
            </Description>
         </AccountingSegment>
```

5 Purchase Orders

```
            </Accounting>
            <Charge>
               <Money currency="USD">.34</Money>
            </Charge>
         </Distribution>
         <Distribution>
            <Accounting name="DistributionCharge">
               <AccountingSegment id="456">
                  <Name xml:lang="en-US">G/L Account</Name>
                  <Description xml:lang="en-US">Travel</Description>
               </AccountingSegment>
               <AccountingSegment id="23">
                  <Name xml:lang="en-US">Cost Center</Name>
                  <Description xml:lang="en-US">Europe Implementation
                  </Description>
               </AccountingSegment>
            </Accounting>
            <Charge>
               <Money currency="USD">1</Money>
            </Charge>
         </Distribution>
         <Comments xml:lang="en-US">Comment</Comments>
      </ItemOut>
```

The ItemDetail element allows additional data to be sent to suppliers instead of just the unique identifier for the item represented by the ItemID.

If isAdHoc="yes" exists for some items and not for others, the requisition should be broken into two requisitions: one for catalog items and one for non-catalog items. Suppliers will then be able to automatically process as many requisition items as possible, instead of having to manually process both catalog and non-catalog items.

The ShipTo, Shipping, Tax, Contact, Comments, and Extrinsic elements (some nested within ItemDetail or SpendDetail) are identical to the ones that can be in the OrderRequestHeader. These elements specify per-item data such as shipping, shipping type, and associated cost. Use these elements either at the OrderRequestHeader level, or at the ItemOut level, but not at both levels. Tax is the only exception, for more information, see "Tax" on page 125.

ItemID

The basic ItemID element, which provides unique identification of an item. ItemID is defined at "ItemID" on page 111.

Path

The basic Path element, which provides node and path information for a document. Path is defined at "Path Element" on page 163.

ItemDetail

The basic ItemDetail element, which contains descriptive information about a line item that procurement applications present to users. ItemDetail is defined at "ItemDetail" on page 112.

BlanketItemDetail

Provides supplier and commodity level details specific to blanket orders (orderType="blanket"). BlanketItemDetail must contain Description. Optional elements include LimitType, MaxAmount, MinAmount, MaxQuantity, MinQuantity, UnitPrice, UnitOfMeasure, and any number of Classification and Extrinsic elements.

SupplierID

See "SupplierID" on page 133.

SupplierList

Defines a list of suppliers that might be associated with a quote item in ItemOut.

SupplierList has no attributes.

Supplier

The common Supplier element is optional in ItemOut.

ShipTo, Shipping, and Tax

The common elements, described elsewhere in this document.

SpendDetail

This optional element provides detailed information regarding travel, fee, and labor line items. The following diagram shows the structure of the SpendDetail element:
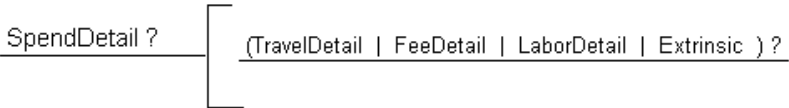
SpendDetail can be present in ItemIn and ItemOut elements for the following types of messages:

- PunchOutSetupRequest
- PunchOutOrderMessage
- OrderRequest
- ConfirmationRequest

SpendDetail has no attributes.

The basic ItemIn element adds an item from a shopping basket to a requisition in the procurement application during a PunchOut session. ItemIn is defined at "ItemIn" on page 110.

TravelDetail

TravelDetail describes information about travel line items.

The following diagram shows the structure of TravelDetail:
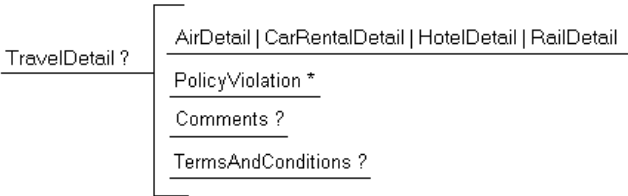
The following example shows the location of SpendDetail and TravelDetail within an OrderRequest document:

```
<OrderRequest... >
  <OrderRequestHeader >
     ...
  </OrderRequestHeader >
  <ItemOut>
    <ItemDetail >
        ...
    </ItemDetail>
    <SpendDetail>
       <TravelDetail>
            ...
       </TravelDetail>
    </SpendDetail>
  </ItemOut>
</OrderRequest>
```

TravelDetail has the following attributes:

confirmationNumber	A unique confirmation number that is understood by both the traveler and the vendor who is providing the service for this travel line item. For example, hotel reservation number or e-ticket number from the airline.
pnrLocator (optional)	Passenger Name Record (PNR) locator used by the travel booking provider.
quoteExpirationTime (optional)	Date and time that this quote will expire. This value is normally supplied in the PunchoutOrderMessage. If no value is supplied, it is assumed that this quote will not expire.

Common Elements

Several common elements are used throughout TravelDetail.

Date and Time in cXML

Dates and times in cXML must be formatted in the restricted subset of ISO 8601. This is described in the Word Wide Web Consortium (W3C) Note entitled "Date and Time Formats" available at www.w3.org/TR/NOTE-datetime-970915.html. See "Date, Time, and other Data Types" on page 40 for more information.

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Vendor

The common Vendor element. When used in TravelDetail, Vendor provides
information about a vendor of a service. Vendor can be used in AirLeg,
CarRentalDetail, HotelDetail, and RailLeg.

Vendor has one attribute:

preferred	Is this a preferred vendor? yes | no

Address

The basic Address element provides the physical address of the vendor.
Typically, this is the address the vendor's a business location or
headquarters. Address is described further in "cXML Conventions" on page
31.

SupplierID

Supplier ID for this vendor. This is a (domain, value) pair so that travel
booking providers can define their SupplierID elements according to the
convention they prefer, such as D-U-N-S or TaxID.

SupplierID has one required attribute:

domain (required)	Domain of the supplier ID.

Each travel booking provider can specify multiple Supplier ID values. This
capability enables a provider to use a single implementation to coordinate
with various enterprise implementations that use different SupplierID
domains.

TermsAndConditions

Text descriptions of terms and conditions associated with a travel line item.
For example, a car rental TermsAndConditions normally includes boundary
limit, additional mileage charges, gasoline charges, and other restriction
information. Multiple TermsAndConditions can be included in a single travel
line item.

Description

Text description of terms and conditions. If TermsAndConditions is present, Description is required.

PolicyViolation

Line-item level policy violation that results from the user selecting this particular travel item. Policy violations are not associated at the header level to ensure clear identification of a violation with the appropriate line item.

PolicyViolation has one attribute:

level	The level of the PolicyViolation: warning	violation
	warning - a non-serious violation
	violation - a serious violation of company policy

Description

Description is a common free-text element, which provides a textual description of an element, such as PolicyViolation.

PolicyViolationJustification

Justification for this PolicyViolation. Typically, the user selects a PolicyViolationJustification from a standard list of justifications at the travel booking provider's web site.

Comments

Additional comments to further clarify the PolicyViolationJustification, given by the user.

Penalty

Penalty (if any) for this travel segment.

Money

The penalty amount.

Description

Textual description of the cause of the penalty. For example, a change fee associated with an air ticket.

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AvailablePrice

The common AvailablePrice element describes other available prices that the user did not select.

AvailablePrice has one attribute:

type	Description of the level of compliance with company policy.

Possible values for the type attribute of AvailablePrice:

Value	Description
lowest	Lowest price available regardless of the travel policies
lowestCompliant	Lowest price available that is compliant with travel policies
highestCompliant	Highest price available that is compliant with travel policies
highest	Highest price available regardless of the travel policies
other	Other, specify in the Description

Money

The amount of an available price.

Description

A text description of an available price, including information on how the price was found or particular requirements for the price.

Rate

Defines the rate for a travel item. The following example shows a Rate element for a CarRentalFee:

```
<CarRentalFee type="baseRate">
   <Total>
      <Money currency="USD">215.99</Money>
   </Total>
   <Rate quantity="4">
      <Total>
         <Money currency="USD">119.96</Money>
      </Total>
      <UnitRate>
         <Money currency="USD">215.99</Money>
         <UnitOfMeasure>WEE</UnitOfMeasure>
```

```
      </UnitRate>
   </Rate>
</CarRentalFee type="baseRate">
```

Rate has one attribute, which is required:

quantity	The quantity for the rate. For example, a four-night stay at a hotel would be expressed as: quantity = 4 UnitofMeasure in UnitRate = DAY

Total

The total amount for the rate. The total amount must equal to quantity x UnitRate. All Rate amounts for a line item must add up to the Total for that line item.

UnitRate

UnitRate defines the rate for a single unit according to the unit of measure. For example, a single nightly rate for a hotel room can be expressed with Money equal to the nightly rate amount and the UnitOfMeausre equal to DAY.

The amount to be paid per unit (of time or other measure). In the case of multiple UnitRates (a rate schedule), use TermReference elements to distinguish them.

Description

Textual description for the rate. For a hotel stay, the Description could contain "hotel nightly rate."

BookingClassCode

BookingClassCode is a common element. When used in a travel line item, it indicates the class of the line item. For example, BookingClassCode is commonly used to convey frequent flyer information for air travel reservations.

Each buyer-travel booking provider pair can use any industry standard they choose. The following example shows a minimal BookingClassCode element:

```
<BookingClassCode code="W">
   <Description xml:lang="en">Coach class</Description>
</BookingClassCode>
```

5 Purchase Orders

For information on car rental codes, see CarRentalDetail.

BookingClassCode has the following attributes:

domain	The domain for this code, for example, IATA.
code	An industry standard code, or per agreement of buyer-travel booking provider pair.

Description

The Description element of BookingClassCode contains a text description of the code.

Airport

The common Airport element, which contains the three-letter IATA airport code, is used in AirLegOrigin, AirLegDestination, CarRentalPickup, CarRentalDropoff, HotelDetail, RailLegOrigin and RailLegDestination.

Airport has one attribute:

	The three-letter IATA airport code.
airportCode	For information on the International Air Transport Association (IATA) standard, see: www.iata.org/nr/rdonlyres/3346f400-3450-48a6-a543-86a3921c23f7/0/xml_fuel_transaction_v202.pdf.

Address

The optional Address element provides the physical address of the airport.

Meal

The Meal element of an AirLeg can contain two optional, common elements: BookingClassCode and Description. The following example represents a heated vegetarian dinner for an AirLeg.

```
<Meal>
    <Description xml:lang="en">vegetarian dinner</Description>
    <BookingClassCode code="H"></BookingClassCode>
</Meal>
```

Description

A text description of the meal, including any special needs such as vegetarian, gluten-free, or dairy-free.

BookingClassCode

The common BookingClassCode element is defined at "BookingClassCode" on page 139. The BookingClassCode of Meal defines the code for the meal. For example, airlines typically use the following meal codes:

Code	Description
B	Breakfast
C	Complimentary liquor
D	Dinner
F	Food for purchase
G	Food and beverage for purchase
H	Hot meal
K	Continental breakfast
L	Lunch
M	Meal
N	No meal service
O	Cold meal
P	Liquor for purchase
R	Refreshments
S	Snack or brunch
V	Refreshments for purchase

AirDetail

The AirDetail element provides information about an air trip. The following diagram shows the structure of AirDetail:

AirDetail has no attributes.

TripType

TripType is a container for the type attribute, which is required in both AirDetail and RailDetail to indicate a round trip, one way, or multi-leg trip.

For example, a TripType for a round trip would appear as:

<TripType type="round"></TripType>

The TripType element has the following attribute:

type	round: round trip oneWay: one-way trip/ multiLeg: multi-leg or open-jaw trip

AirLeg

Each AirDetail must include at least one AirLeg element.

The following diagram shows the structure of AirLeg:

```
                  ┌──────────────────────
                  │   Vendor
                  │   AirLegOrigin
   AirLeg + ──────┤   AirLegDestination
                  │   BookingClassCode ?
                  │   Rate ?
                  │   Meal *
                  └──────────────────────
```
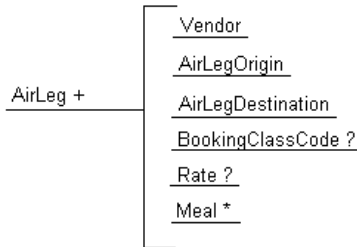
The AirLeg element provides detailed information about a trip that includes one or more airplane flights. The following example shows an AirLeg element for a one-way flight:

```
<AirLeg travelSegment="1"
        departureTime="2004-12-01T16:10:00-08:00"
        arrivalTime="2004-12-01T17:10:00-08:00"
        flightNumber="SW 990"
        seatNumber="20F"
        seatType="aisle"
        stops="0"
        equipment="Boeing 737">
  <Vendor preferred="no">
    <Address>
            ...
    </Address>
```

```
        </Vendor>
        <AirLegOrigin>
          <Airport airportCode="SFO">
            <Address>
                    ...
            </Address>
          </Airport>
        </AirLegOrigin>
        <AirLegDestination>
          <Airport airportCode="BUR">
            <Address>
                    ...
            </Address>
          </Airport>
        </AirLegDestination>
        <BookingClassCode code="W">
          <Description xml:lang="en">Coach class</Description>
        </BookingClassCode>
        <Meal type="snack">
          <Description xml:lang="en">Vegetarian snack</Description>
        </Meal>
      </AirLeg>
```

AirLeg has the following attributes:

travelSegment	Text description to identify this travel segment. This information is specific to the travel booking provider.
departureTime	Local departure date and time for this air leg.
arrivalTime	Local arrival date and time for this air leg.
flightNumber	Flight number for this air leg.
seatNumber (optional)	Seat number for this air leg.
seatType (optional)	Seat type: window, aisle, or middle
upgrade (optional)	Is this ticket an upgrade: no (default), or yes
stops (optional)	The number of stop for this air leg. Use a numeral for the number of stops, or '0' (zero) for a direct flight. If no numeral is entered, '0' (zero) is implied.
equipment (optional)	The plane equipment information for this air leg. For example, the model of airplane used.

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Vendor

The common Vendor element, which provides information about the vendor of a service, is defined at "Vendor" on page 136.

AirLegOrigin / AirLegDestination

These elements contain the addresses of the AirLegOrigin and AirLegDestination entities on the AirLeg.

The following example shows a detailed AirLeg for a flight from San Francisco to Miami.

```
<AirLegOrigin>
   <Airport airportCode="SFO">
      <Address>
         <Name xml:lang="en">San Francisco Internal Airport</Name>
         <PostalAddress>
            <Street>San Francisco International Airport</Street>
            <City>San Francisco</City>
            <State>CA</State>
            <PostalCode>94128</PostalCode>
            <Country isoCountryCode="US">UnitedStates</Country>
         </PostalAddress>
      </Address>
   </Airport>
</AirLegOrigin>
<AirLegDestination>
   <Airport airportCode="MIA">
      <Address>
         <Name xml:lang="en">Miami International Airport</Name>
         <PostalAddress>
            <Street>4200 NW 21 Street>
            <City>Miami</City>
            <State>FL</State>
            <PostalCode>33122</PostalCode>
            <Country isoCountryCode="US">UnitedStates</Country>
         </PostalAddress>
      </Address>
   </Airport>
</AirLegDestination>
```

Airport

The common Airport element, which contains the three-letter IATA airport code in the airportCode attribute, and an optional Address element, is defined at "Airport" on page 140.

For information on the International Air Transport Association (IATA) standard, see: www.iata.org/codes.

BookingClassCode

The common BookingClassCode element is defined at "BookingClassCode" on page 139. The BookingClassCode element of an AirLeg defines the class of travel for the AirLeg according to the de-facto airline standard. The following table shows sample IATA codes:

F, FN, P, R, A	first class
C, CN, D, J, I, Z	business class
Y, YN, B, BN, M, H, V, VN, O, Q, QN, S, K, KN, L, U, T, W	coach class

The sample codes are not guaranteed to be accurate or current. For information on the International Air Transport Association (IATA) standard, see: www.iata.org/codes.

Rate

The common Rate element is defined at "Rate" on page 138. The total of all specified AirLeg rates must equal the line item total.

Meal

The common Meal element, which describes one meal in a travel line item, is defined at "Meal" on page 140.

AvailablePrice

The optional, common AvailablePrice element, which defines available prices that the user did not select, is defined at "AvailablePrice" on page 138. The AvailablePrice element of AirDetail defines available price information for a single-leg, multi-leg, or round trip.

Penalty

The common Penalty element, which describes extra charges assessed by vendors for user changes to travel line items, is defined at "Penalty" on page 137. The Penalty element of an AirLeg describes extra charges for changes to, or cancellation of, an air travel reservation.

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CarRentalDetail

CarRentalDetail provides information about a single car rental event.

The following diagram shows the structure of the CarRentalDetail element.
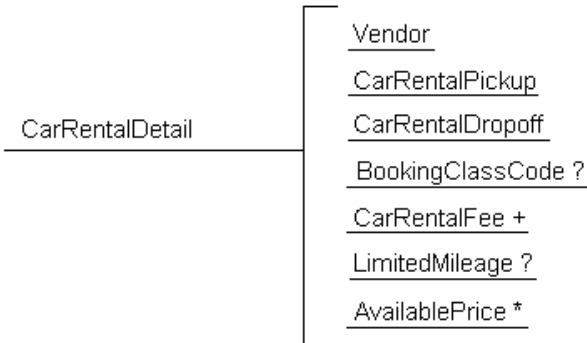
CarRentalDetail has the following attributes:

travelSegment	Text description used to identify this travel segment. The description is specific to the travel booking provider.
pickupTime	Intended local pickup date and time.
dropoffTime	Intended local drop-off date and time.

Vendor

The common Vendor element, which provides information about the vendor of a service, is defined at "Vendor" on page 136.

CarRentalPickup / CarRentalDropoff

These elements contain the addresses of the CarRentalPickup and CarRentalDropoff entities on the CarRentalDetail. Both CarRentalPickup and CarRentalDropoff require the common Airport element, which specifies the airport location.

BookingClassCode

A four-letter code, which indicates the rental car class. Each buyer-travel booking provider pair can use the standard they choose. For example, a common U.S. standard for car rental:

1st Letter	M (Mini) E (Economy) C (Compact) S (Standard) I (Intermediate) F (Full size) P (Premium) L (Luxury) V (MiniVan) X (Special)
2nd Letter	B (2 door) C (2/4 door) D (4 door) T (Convertible) F (Four wheel drive) V (Van) W (Wagon) S (Sport) X (Special)
3rd Letter	A (Automatic) M (Manual)
4th Letter	R (A/C) N (No A/C)

CarRentalFee

CarRentalFee defines the actual charges and fees that apply to this car rental. To capture the breakdown of various fees, use multiple CarRentalFee elements within one CarRentalDetail element. The total of these fees must add up to the total at the line item level.

> **Note:** Use TermsAndConditions text to specify conditional charges for items such as extra mileage that are over the mileage limit.

CarRentalFee has one attribute:

type	The type of fee, expressed in the form "baseRate".

Possible values for the type of a CarRentalFee are:

Value	Description
additionalDriver	Additional driver fee
airportAccessFee	Airport access fee
baseRate	Base rental rate
childSeat	Child seat charge
collisionDamageInsurance	Collision damage insurance
dropOffCharge	Drop off charge
liabilityInsurance	Liability insurance
luggageRack	Luggage rack charge
mobilePhone	Mobile phone base charge
navigationSystem	Navigation system
other	Other charges
prepaidGasoline	Prepaid gasoline charge
touristTax	Tourist tax
vehicleLicensingFee	Vehicle licensing fee

Total

Total amount for this CarRentalFee. All Rate amounts for a line item must must add up to the Total for that line item.

Rate

Fee information for individual charges for this CarRentalFee.

LimitedMileage

LimitedMileage specifies the quantity and unit of measure of the mileage limit.

LimitedMileage has one attribute:

quantity	The mileage limit amount, expressed as a numeral

UnitOfMeasure

Unit of measure, expressed in miles or kilometers. For more information, see "UnitOfMeasure" on page 58.

AvailablePrice

The optional, common AvailablePrice element, which defines available prices that the user did not select, is defined at "AvailablePrice" on page 138.

HotelDetail

The following diagram shows the structure of the HotelDetail element.
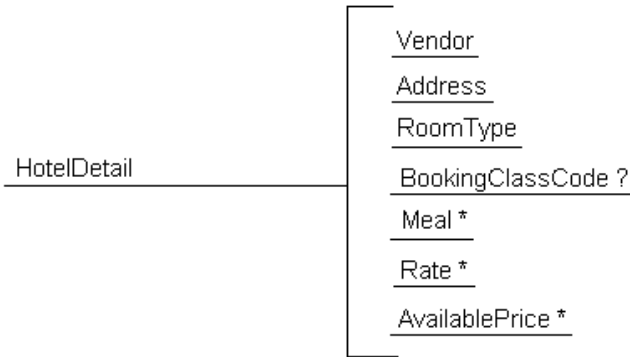
lHotelDetaill has the following attributes:

travelSegment	Text information to identify this travel segment. This information is specific to the travel booking provider.
arrivalTime	Local date and time of arrival at the hotel. This is used as an advisory to the hotel vendor for the arrival time.
departureTime	Local date and time of departure from the hotel. This is an advisory to the hotel vendor for the departure time.
checkinTime	Local official hotel checkin time.
checkoutTime	Local official hotel checkout time.
earlyCheckinAllowed (optional)	Does the hotel allow early checkin? no, or yes (default).
lateCheckoutAllowed (optional)	Does the hotel allow late checkout? no, or yes (default)

Vendor

The common Vendor element, which provides information about the vendor of a service, is defined at "Vendor" on page 136. For HotelDetail, the Vendor element defines the hotel provider.

Address

Physical address of the hotel. This might be different from the address specified in the Vendor field. The Address in Vendor might be the address of the hotel's corporate headquarters, for example, while the Address in HotelDetail would be the address of the individual hotel.

RoomType

Information about the type of hotel room reserved.

RoomType has the following attributes:

smoking	Smoking or non-smoking room: yes | no
numberOfBed (optional)	The number of beds in the room.
bedType (optional)	The type of bed in the room: king | queen | full | double | single | other

Description

Text description of the hotel room.

Amenities

Text description of amenities. For example, DSL connection, two telephone lines, and other information about a hotel room.

Amenities has no attributes.

Description

Text description of the amenities. For example, DSL connection, two telephone lines, and other information about the hotel room.

BookingClassCode

The common BookingClassCode element is defined at "BookingClassCode" on page 139. Each buyer-travel booking provider pair can use any standard they choose.

Meal

The common Meal element is defined at "Meal" on page 140. The Meal element of HotelDetail defines any complimentary meals that are included with the room, such as complimentary continental breakfast.

Rate

The common Rate element is defined at "Rate" on page 138. The Rate element of HotelDetail defines one or more rates for the hotel stay. For example, the nightly rate or valet parking rate.

AvailablePrice

The common AvailablePrice element is defined at "AvailablePrice" on page 138. The AvailablePrice element of HotelDetail defines other available prices that the user did not pick. Available prices can be from the same vendor or another vendor.

RailDetail

The following diagram shows the structure of the RailDetail element.
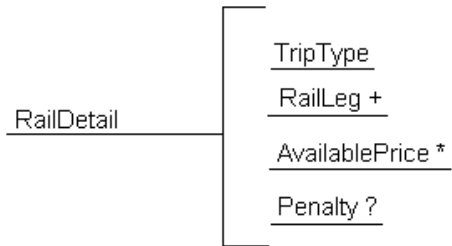
RailDetail has no attributes.

TripType

TripType is a container for the type attribute, which is required in both AirDetail and RailDetail . The TripType element defines a round trip, one way, or multi-leg trip.

For example, a TripType for a round trip would appear as:

<TripType type="round"></TripType>

Possible values for the type attribute of TripType:

Value	Description
round	round trip
oneWay	one-way trip
multiLeg	multi-leg or open-jaw trip

RailLeg

One or more RailLeg elements that make up this RailDetail. Each RailDetail must include
at least one RailLeg.

The following diagram shows the structure of RailLeg:
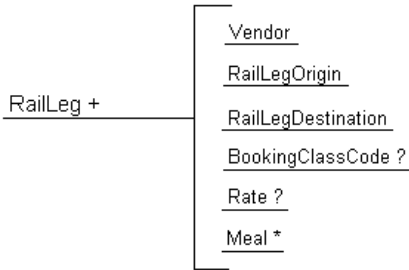
RailLeg has the following attributes:

travelSegment	Text information to identify this travel segment. This information is specific to the travel booking provider.
departureTime	Local date and time of departure from the originating location.
arrivalTime	Local date and time of arrival at the destination location.
trainNumber	Train number.
seatNumber	Seat number.
carType	The type of the rail car.

Vendor

The common Vendor element, which provides information about the vendor of a service, is defined at "Vendor" on page 136. For RailLeg, the Vendor element defines the rail travel provider, such as Amtrak.

RailLegOrigin / RailLegDestination

RailLegOrigin and RailLegDestination have two possible elements, of which exactly one must be included:

Airport

The common Airport element, which contains the three-letter IATA airport code in the airportCode attribute, and an optional Address element, is defined at "Airport" on page 140.

For information on the International Air Transport Association (IATA) standard, see: www.iata.org/codes.

Address

The physical address of the rail station.

Neither RailLegOrigin nor RailLegDestination has any attributes.

BookingClassCode

The common BookingClassCode element is defined at "BookingClassCode" on page 139. The BookingClassCode element of a RailLeg element defines the class of travel for the RailLeg according to a rail standard agreed upon by the buyer-travel booking provider pair.

Rate

The common Rate element is defined at "Rate" on page 138. Rate information for this rail leg. If specified, all the rates in all rail legs must add up to the total at the travel line item level.

Meal

The common Meal element is defined at "Meal" on page 140. The Meal element of HotelDetail defines any complimentary meals that are included with the room, such as complimentary continental breakfast.

5 Purchase Orders

AvailablePrice

The common AvailablePrice element is defined at "AvailablePrice" on page 138. The
AvailablePrice element of RailDetail defines other available prices that the user did not
pick. Available prices can be from the same vendor or another vendor.

Penalty

The common Penalty element, which describes extra charges assessed by vendors for
user changes to travel line items, is defined at "Penalty" on page 137. The Penalty
element of RailLeg defines extra charges for changes to, or cancellation of, a rail travel
reservation.

FeeDetail

Conveys information about one-time or recurring fees that are not explicitly defined
elsewhere in cXML. For example, a one-time fee for furniture rental would not fall
into any category defined in TravelDetail or LaborDetail, but could be described in
FeeDetail.

FeeDetail has the following attribute:

isRecurring (optional)	Indicates that the fee is recurring.

UnitRate

The amount to be paid per unit of time or other measure. In the case of multiple
UnitRates. as in a rate schedule, use TermReference elements to distinguish them.

Period

Defines the period covered by the FeeDetail.

LaborDetail

LaborDetail contains information about an item related to temporary labor. The following diagram shows the structure of the LaborDetail element:
.
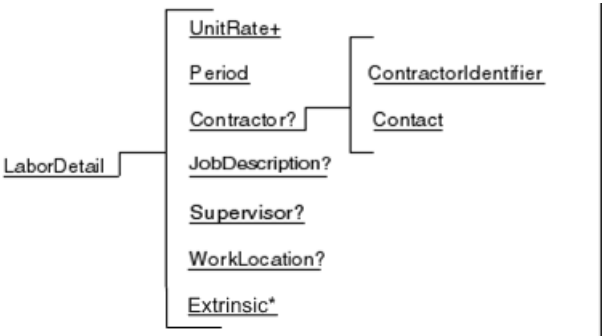
LaborDetail has the following attribute:

supplierReferenceCode	The supplier's quote or proposal ID, for cross reference.

UnitRate

UnitRate represents the amount to be paid per unit of time (or of some other measure). In the case of multiple UnitRates, use TermReference elements to distinguish them.

TermReference

TermReference is a generic base element that identifies the definition of the UnitRate in question. TermReference has these attributes:

termName	The name of the ID attribute containing the term.
term	The value of that attribute, that is, the term itself.

Here is a sample UnitRate with a TermReference:

```
<UnitRate>
    <Money currency="USD">75</Money>
    <UnitOfMeasure>HUR</UnitOfMeasure>
    <TermReference termName="payCode" term="Overtime"/>
</UnitRate>
```

This TermReference identifies this UnitRate as being the rate for the Overtime payCode.

Period

Period specifies the period of time over which the service occurs.

Contractor

Contractor identifies the contractor being engaged for temporary labor. The contractor is uniquely identified by a ContractorIdentifier element, which is exchanged between the buyer and supplier prior to sending orders or timecards. For more information about TimeCard transactions, see Chapter 8, "TimeCard Transaction."

ContractorIdentifier

ContractorIdentifier uniquely identifies the contractor for both the buyer and supplier. ContractorIdentifier has the following attribute:

domain	Required. The domain in which the contractors identity is represented. This attribute allows the buyer and supplier systems to determine who assigned the identification. buyerReferenceID implies that the identification was generated in the buyer system. supplierReferenceID implies that the identification was generated in the supplier system.

Contact

Contact contains contact element for the contractor.

JobDescription

JobDescription is a text description of the job or work to be performed.

Supervisor

Supervisor specifies contact information for the person who will supervise the contractor.

WorkLocation

WorkLocation is the address of the place where the work is to be performed.

Extrinsic

This optional element in LaborDetail contains any additional data that the buying organization wants to pass to the supplier. The cXML specification does not define the content of Extrinsic elements—it is something that each buying organization and supplier must agree on and implement.

The following example passes the region in which the work is to be performed.

```
<Extrinsic name="region"">sfbay</Extrinsic>
```

Extrinsic

Extrinsic is supported in SpendDetail, enabling buyer-supplier pairs to convey detailed information on spend that does not fit within TravelDetail, FeeDetail, or LaborDetail.

Extrinsic elements are intended to provide additional machine-readable information. They extend the cXML protocol to support features not required by all implementations. The cXML specification does not define the content of Extrinsic elements. Each buyer-supplier pair must agree on and implement their definitions of Extrisic elements.

Describes detailed information for any undefined spend category. The name attribute of the Extrinsic element should specify the type of spend category, such as print, market research, or project labor.

It is recommend that all Extrinsic elements in a single SpendDetail element be included under a single Extrinsic with the name attribute used to specify the name of the category. This example shows two Extrinsic elements nested under one heading, within a SpendDetail element:

```
<SpendDetail>
   <Extrinsic name="MarketResearchDetail">
      <Extrinsic name="ResearchObjectives">test objectives</Extrinsic>
      <Extrinsic name="ProjectNumber">PN3434343</Extrinsic>
   </Extrinsic>
</SpendDetail>
```

The Extrinsic element can also appear in the OrderRequestHeader, ItemDetail, and ContractItem elements. These contexts are described further elsewhere in this document. For more information on Extrinsic, see

Distribution

Distribution divides the cost of an item among multiple parties. Suppliers return the Distribution element on invoices to facilitate the buyer's reconciliation process.

Accounting

The Accounting element groups AccountingSegments to identify who is charged.

Accounting has the following attribute:

name	The name for this accounting combination. The account from which this charge will be paid.

AccountingSegment

The AccountingSegment element can contain any relevant accounting code used by a buying organization. Examples of possible values are asset number, billing code, cost center, G/L account, and department. For example:

```
<AccountingSegment id="456">
   <Name xml:lang="en-US">G/L Account</Name>
   <Description xml:lang="en-US">Travel</Description>
</AccountingSegment>
```

AccountingSegment has the following attribute:

id	The unique identifier within this AccountingSegment type. This value might be the actual account code if the type were "Cost Center".

Name

An identifying name for this AccountingSegment with respect to the others in the Accounting element.

Description

A description of the accounting entity.

Charge

This element specifies the amount to be charged to the entity represented by the Accounting element.

Money

Contains the amount of the Charge at the line item level.

currency	The unique ISO standard three-letter currency code. For example, "USD" = United States Dollar.

Response to an OrderRequest

This document is the response part of the synchronous Request-Response transaction. The following example shows a Response to an OrderRequest document:

```
<cXML payloadID="9949494" xml:lang="en"
     timestamp="1999-03-12T18:39:09-08:00">
  <Response>
    <Status code="200" text="OK"/>
  </Response>
</cXML>
```

As shown above, this Response is straightforward. In this case, there is no actual element named "OrderResponse", because the only data that needs to be sent back to the requestor is the Status part of the Response.

The Response tells the requestor its OrderRequest was successfully parsed and acted on by the remote part of HTTP connection. It does not communicate order-level acknowledgement, such as which items can be shipped, or which need to be backordered.

5 Purchase Orders

Accepting Order Attachments

Buyers often need to clarify purchase orders with supporting memos, drawings, or faxes. They can attach files of any type to cXML purchase orders by using MIME (Multipurpose Internet Mail Extensions).

cXML contains only references to external MIME parts sent within one multipart MIME envelope (with the cXML document, in an e-mail or faxed together). Commerce network hubs receive the attachments, and can forward them to suppliers or store them for online retrieval.

For more information about purchase order attachments, see "Attachments" on page 33.

Chapter 6
Path Routing

In complex relationships between buyers and suppliers, a document might be routed through several intermediary systems before reaching the intended recipient. Path Routing enables documents to be routed by and copied to intermediary systems such as marketplaces, and commerce network hubs.

This chapter describes:

- Overview of Path Routing
- Nodes
- Adding Nodes to PunchOutOrderMessage
- Creating OrderRequests
- Other Routable Documents
- CopyRequest

Overview of Path Routing

Path routing is especially useful in direct and indirect marketplaces. In direct marketplaces, suppliers bill buyers directly. In indirect marketplaces, suppliers bill and receive payment from the marketplace host, which in turn bills and receives payment from member buyers.

Direct marketplaces can be PunchOut sites that enable external buyers to access suppliers' PunchOut catalogs. For a marketplace to track transactions originating from it, it must receive copies of all purchase orders as they route to the supplier.

To receive copies of all purchase orders as they route, the marketplace adds itself as a Copy node to the Path of all PunchOutOrderMessage documents sent to the external buyers. This information also allows a marketplace to support edit/inspect PunchOut from procurement applications because it can distinguish which items in the shopping cart come from an external marketplace by inspecting the Path element.

Indirect Marketplaces can receive OrderRequest documents, modify them, split them, and route them to suppliers. Indirect marketplaces are router nodes that create new versions and route OrderRequest documents to suppliers.

To enable path routing in PunchOut:

  1. Each system adds itself as a node to the Path element of PunchOutOrderMessage documents sent by suppliers to procurement applications.

  2. Procurement applications generate OrderRequest documents by splitting the order based on the Path and SupplierID of each of the ItemIn elements of PunchOutOrderMessage documents. Procurement applications put a Path element at the cXML header level of each OrderRequest document.

  3. Subsequent documents, such as OrderRequest, PunchOutSetupRequest, ConfirmationRequest, and ShipNoticeRequest documents are routed and copied by using the Path element at the header level.

Adding a Path element at the item or header level enables copying and routing of cXML documents for marketplaces and commerce network hubs. The Path element records the path taken between the buyer and supplier which documents can later use to find their way back to a supplier.

Nodes

Nodes appear in the Path element of either the header section, or ItemIn and ItemOut elements. Each node in the Path element can be either a router node or a copy node. If the node is of type "copy", the system simply wants a copy of each document passing through. If the node is of type "route", the system will modify and re-route each document passing through. Each system in the path must specify which type it is.

Path Element

The Path element contains nodes that are either of type="copy" or type="route". For example, the following contains a copy node and a router node:

```
<Path>
   <Node type="copy">
      <Credential domain="NetworkId">
          <Identity>AN01000000111</Identity>
      </Credential>
   </Node>
   <Node type="route">
      <Credential domain="NetworkId">
          <Identity>AN01000000233</Identity>
      </Credential>
   </Node>
</Path>
```

Router Nodes

A router node creates a new version of the document it receives and routes it to the next node in the path. The routed document typically changes unit price, bill-to, or ship-to address information.

OriginalDocument Element

The new document must reference the document it is modifying by adding an OriginalDocument element, if it is not already present, at the header level that specifies the payloadID of the original document. This enables the network hub to keep track of each hop in the Path and decide which version of the document to display to the appropriate party.

DocumentReference Element

Each node is responsible for updating any DocumentReference elements in the new document it generates. For example, when an OrderRequest of type update or delete is routed to an intermediary node, this node must change the DocumentReference in the new version of the updated OrderRequest to reference the correct payloadId as illustrated in the following diagram:
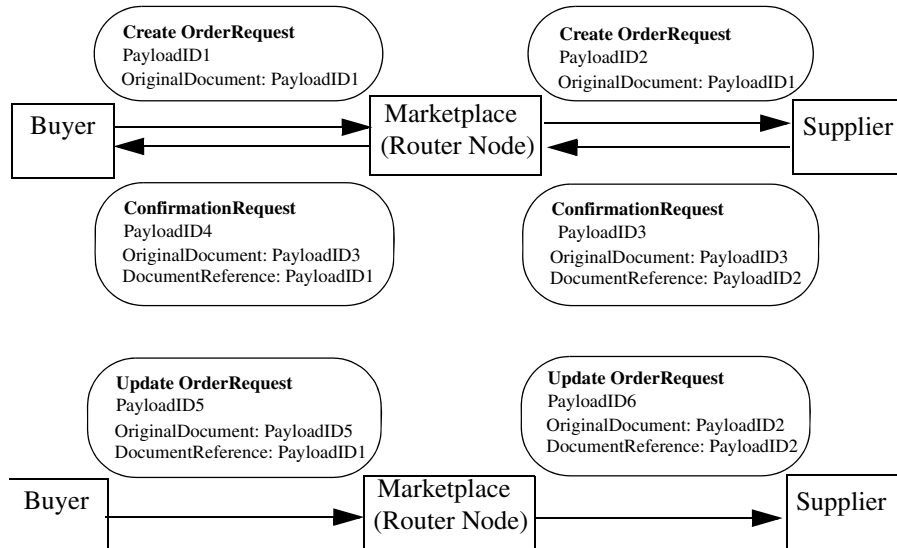
Copy Nodes

A copy node wants a copy of the document. For example, the following except illustrates a copy node:

```
<Node type="copy">
   <Credential domain="NetworkId">
      <Identity>AN01000000111</Identity>
   </Credential>
</Node>
```

Adding Nodes to PunchOutOrderMessage

PunchOutOrderMessage documents generated by PunchOut sessions can go through intermediary sites on their way back to the buyer. Each intermediary site must add itself as a node to the Path element of the relevant ItemIn elements of the PunchOutOrderMessage.

Node sequence is top to bottom, with the originating buyer at the top. The intermediary node closest to the end supplier must add the supplier of record to the path as well, if the supplier has not already created the path.

The procurement application must include itself as the first router node in the path, which allows other documents such as ConfirmationRequest and ShipmentNoticeRequest documents to be routed back to the originating buyer.

Path Element

The Path element contains nodes that are either of type="copy" or type="route". A Path element is in each ItemIn element of a PunchOutOrderMessage. Each system visited by the PunchOutOrderMessage must add itself as a node to the Path element for each ItemIn element it cares about.

The following PunchOutOrderMessage shows the Path element with two nodes:

```
<ItemIn quantity="1">
  <ItemID>
    <SupplierPartID>1234</SupplierPartID>
  </ItemID>
  <Path>
    <Node type="copy">
      <Credential domain="NetworkId">
        <Identity>AN01000000111</Identity>
      </Credential>
    </Node>
    <Node type="route">
      <Credential domain="NetworkId">
        <Identity>AN01000000233</Identity>
      </Credential>
    </Node>
  </Path>
  <ItemDetail>
    <UnitPrice>
      <Money currency="USD">10.23</Money>
    </UnitPrice>
    <Description xml:lang="en">Learn ASP in a Week!</Description>
    <UnitOfMeasure>EA</UnitOfMeasure>
    <Classification domain="SPSC">12345</Classification>
    <ManufacturerPartID>ISBN-23455634</ManufacturerPartID>
    <ManufacturerName>O'Reilly</ManufacturerName>
  </ItemDetail>
</ItemIn>
```

Credentials

The From and To elements of the cXML header in a routed document refer to the buyer and supplier of record. Neither of these parties is required to appear in the Path, because they might be visible only to one of the Router nodes.

Creating OrderRequests

When generating purchase orders, procurement applications split requisitions based on the Path and SupplierID of each of the ItemIn elements.

Path Element

Procurement applications put Path elements in the cXML header level of each of the orders. Procurement applications should not include the identical Path element in any of the ItemOut elements in an OrderRequest.

In OrderRequest documents containing PunchOut items, procurement applications must include nodes for both the originating buyer and the supplier of record.

Credentials

Because commerce network hubs are responsible for routing OrderRequest documents to the next node in the path, the Sender credential is always the network hub credential when received by the next node. The preceding node (most recent originator) can always be found by examining the From Credential list or, the Path for the most recent Router node if the Router node doesn't modify the From element. In addition, the type="marketplace" credential must be one of the router nodes in the path. A From credential list with no type="marketplace" credential implies that the identical node is the originating procurement application.

The following example is the header of an OrderRequest sent from a procurement application. Because the From credential has no type="marketplace", the node sending this OrderRequest must be the procurement application. The first node in the path is a marketplace Router node.

```
<Header>
  <From>
    <Credential domain="AribaNetworkUserId">
       <Identity>admin@acme.com</Identity>
    </Credential>
  </From>
  <To>
    <Credential domain="NetworkId" type="marketplace">
       <Identity>AN01000000233</Identity>
    </Credential>
    <Credential domain="DUNS">
       <Identity>942888711</Identity>
    </Credential>
  </To>
  <Sender>
```

```
      <Credential domain="NetworkId">
        <Identity>AN01000000001</Identity>
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>Network Hub</UserAgent>
    </Sender>
    <Path>
      <Node type="route">
        <Credential domain="AribaNetworkUserId">
          <Identity>admin@acme.com</Identity>
        </Credential>
      </Node>
      <Node type="copy">
        <Credential domain="NetworkId">
          <Identity>AN01000000111</Identity>
        </Credential>
      </Node>
      <Node type="route">
        <Credential domain="NetworkId">
          <Identity>AN01000000233</Identity>
        </Credential>
      </Node>
    </Path>
    <OriginalDocument payloadID="pay1"/>
  </Header>
```

The following example is an OrderRequest from a marketplace Router node:

```
  <Header>
    <From>
      <Credential domain="AribaNetworkUserId">
        <Identity>admin@acme.com</Identity>
      </Credential>
      <Credential domain="NetworkId" type="marketplace">
        <Identity>AN01000000233</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="NetworkId" type="marketplace">
        <Identity>AN01000000233</Identity>
      </Credential>
      <Credential domain="DUNS">
        <Identity>942888711</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="NetworkId">
        <Identity>AN01000000001</Identity>
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
```

```
            <UserAgent>Network Hub</UserAgent>
         </Sender>
         <Path>
           <Node type="route">
             <Credential domain="AribaNetworkUserId">
                <Identity>admin@acme.com</Identity>
             </Credential>
           </Node>
           <Node type="copy">
             <Credential domain="NetworkId">
                <Identity>AN01000000111</Identity>
             </Credential>
           </Node>
           <Node type="route">
             <Credential domain="NetworkId">
                <Identity>AN01000000233</Identity>
             </Credential>
           </Node>
         </Path>
         <OriginalDocument payloadID="pay1"/>
      </Header>
```

Other Routable Documents

Follow-up documents such as PunchOutSetupRequest, ConfirmationRequest, and
ShipNoticeRequest documents also use the Path element to route and copy documents.

PunchOutSetupRequest

Procurement applications must include the same path information in the ItemOut
elements for any subsequent edit or inspect PunchOut sessions.

Procurement applications must not perform any item grouping according to the Path
element during PunchOut sessions.

ConfirmationRequest and ShipNoticeRequest

Route ConfirmationRequest and ShipNoticeRequest documents by using the Path element
from the cXML header of the OrderRequest. The Path must be reversed to route the
ConfirmationRequest or ShipNoticeRequest to the originating application.

CopyRequest

Organizations that want to receive copies of purchase orders, but that are not the primary recipients, are called *copy organizations*. They receive copies of purchase orders as cXML documents within CopyRequest attachments sent by commerce network hubs.

Copy organizations must add the CopyRequest transaction to their cXML profile. When the commerce network hub receives a purchase order containing path routing copy information, it first looks up the copy organization's CopyRequest URL in the organization's cXML profile. It then sends the attached document to the copy organization.

Note that the use of CopyRequest attachments differs from previous implementations of CopyRequest, in which cXML documents were contained as internal elements within CopyRequest/cXML. In cXML 1.2.011, the use of the cXML element as a child of copyRequest is deprecated. Instead, use the cXMLAttachment element to attach another cXML document, whether or not it contains attachments itself. For more information about attachments, see "Attachments" on page 33.

The following example shows a CopyRequest element forwarding a cXML document that does not itself contain attachments:

```
Content-Type: Multipart/Related; boundary=mime-boundary
[Other headers]

--mime-boundary
Content-Type: text/xml; charset=UTF-8
Content-ID: <111@sendercompany.com>
[Other headers]

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="123@sendercompany.com"
      timestamp="2003-11-20T23:59:45-07:00">
  <Header>
    <From>
      <Credential domain="AribaNetworkUserId">
        <Identity>sender@sendercompany.com</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="AribaNetworkUserId">
        <Identity>recipient@recipientcompany.com</Identity>
      </Credential>
    </To>
    <Sender>
```

```
            <Credential domain="AribaNetworkUserId">
               <Identity>sender@sendercompany.com</Identity>
                  SharedSecret>abracadabra</SharedSecret>
            </Credential>
            <UserAgent>Sender Application</UserAgent>
         </Sender>
      </Header>
      <Request deploymentMode="production">
         <CopyRequest>
            <cXMLAttachment>
               <Attachment>
                  <URL>cid:222@sendercompany.com</URL>
               </Attachment>
            </cXMLAttachment>
         </CopyRequest>
      </Request>
</cXML>

--mime-boundary
Content-Type: text/xml; charset=UTF-8
Content-ID: <222@sendercompany.com>
[Other headers]

[Forwarded cXML]

--mime-boundary--
```

For an example showing a CopyRequest forwarding a cXML document with
attachments, see "Attachment Examples" on page 35.

Chapter 7
Payment

Buying organizations use cXML payment documents to pay suppliers for provided products or services. cXML payment documents provides immediate access to payment scheduling information, allowing more accurate forecasting and scheduling of payables and receivables.

This chapter describes:

- Overview of Payment
- PaymentProposalRequest
- PaymentRemittanceRequest
- PaymentRemittanceStatusUpdateRequest
- Example Payment Documents

Overview of Payment

cXML automates the payment process through scheduled payment and remittance advice documents. These documents allow trading partners to track and process payments. The cXML payment process includes scheduled payments (plans for payment), discounts, creating and sending payments regardless of where payments are made, and ensuring that payments have been received.

The PaymentProposalRequest document is a scheduled payment. It allows buying organizations to specify payment due dates and discounts.

The PaymentRemittance document lists payment transaction details for a wide variety of business scenarios, including standard invoices, credit memos, and debit memos.

When a payment is made, the organization making the payment also creates an associated remittance advice document. Remittance advice documents are summary statements that provides details about payments that have been made. A typical remittance advice includes the payment method used, bank information, discount amount, amount paid, and a list of payables included in the payment.

PaymentRemittance DTD

The cXML standard uses multiple DTDs to optimize the performance of validating parsers. The payment transactions described in this chapter are defined in a DTD named PaymentRemittance.dtd, available at:

> http://xml.cXML.org/schemas/cXML/*<version>*/PaymentRemittance.dtd

Payment Document Sequence

Procurement applications send PaymentProposalRequest and PaymentRemittanceRequest documents and suppliers respond with generic Response documents. When payment transaction status levels are updated, procurement applications send PaymentRemittanceStatusUpdateRequest documents. These documents can all pass through a network commerce hub for authentication and routing.

PaymentProposalRequest

cXML PaymentProposalRequest documents represent scheduled payments. They list payment amounts and dates and can be for information only or for triggering payment.

After a buying organization sends scheduled payment to a network commerce hub, it can travel immediately to a supplier, or the network commerce hub can store it until the payment date.

PaymentProposalRequest has the following attributes:

paymentProposalID	A buyer-generated identifier for the scheduled payment.
operation	Defines the operation to be performed: new—Creates a new scheduled payment. update—Updates an existing scheduled payment identified by paymentProposalID. delete—Cancels an existing scheduled payment identified by paymentProposalID. All optional attributes and sub-elements of PaymentProposalRequest will be ignored. hold—Puts on hold an existing scheduled payment identified by paymentProposalID. All optional attributes and sub-elements of PaymentProposalRequest are ignored.
isNetworkPayment	True if this scheduled payment is to be paid through a network commerce hub. By default it is false.
paymentDate	The date that payment will be made.

PayableInfo

A reference to the payable document, such as an invoice, order, or master agreement. PayableInfo is known to both buyer and supplier. For example, the PayableInfo for an invoice would be the PayableInvoiceInfo.

The following example shows the structure of a minimum valid PayableInfo element:

```
<PayableInfo>
   <PayableInvoiceInfo>
      <InvoiceIDReference or InvoiceIDInfo>
         .....
      </InvoiceIDReference or InvoiceIDInfo>
   </PayableInvoiceInfo>
</PayableInfo>
```

The following example shows the structure of a PayableInfo element that includes an optional PayableOrderInfo:

```
<PayableInfo>
   <PayableInvoiceInfo>
      <InvoiceIDReference or InvoiceIDInfo>
         <PayableOrderInfo>
            <OrderIDInfo>
             .....
            </OrderIDInfo>
         </PayableOrderInfo>
      </InvoiceIDReference or InvoiceIDInfo>
   </PayableInvoiceInfo>
</PayableInfo>
```

The following diagram shows the structure of PayableInfo:
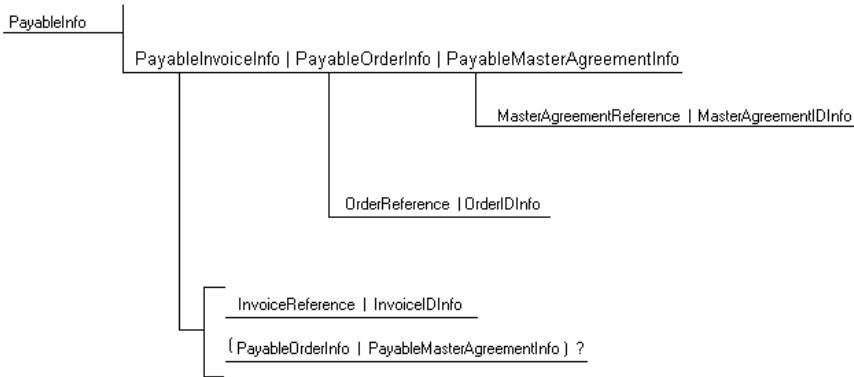
PayableInfo has no attributes.

PayableInvoiceInfo

A reference to the invoice being paid. PayableInvoiceInfo must contain either InvoiceReference or InvoiceIDInfo, and might contain either PayableOrderInfo or PayableMasterAgreementInfo.

InvoiceReference

Provides a clear reference to a prior InvoiceDetailRequest document. The InvoiceReference is copied from the InvoiceDetailRequest message.

InvoiceIDInfo

Defines the ID of an invoice known to the supplier system. InvoiceIDInfo is a container for two attributes:

invoiceID	The ID of an invoice known to the supplier system
invoiceDate	The invoice date

PayableOrderInfo

Provides supplementary information related to the order. For example, a payment against a consolidated invoice might include associated order information. Defines payable information related to an order that was paid.

PayableOrderInfo has no attributes.

OrderReference

The reference to the order being paid.

OrderIDInfo

The order ID from the procurement application.

PayableMasterAgreementInfo

Provides supplementary information related to the master agreement (contract). For example, a payment against a consolidated invoice might include associated master agreement information. Defines payable information related to the master agreement being paid.

PaymentMethod

The method of payment. Must be provided if isNetworkPayment is true.

Buying organizations use this element to identify the method for a payment.

PaymentMethod has one attribute:

type	The type of the payment method: ach—Automated Clearing House cash—Cash payment check—Check payment creditCard—Credit card or PCard payment debitCard—Debit card payment draft—A written payment order, directing a second party to pay a third party wire—Wire transfer other—Other, not defined in cXML

Description

The description of the payment method. Description is mandatory if the type is set to "other." The ShortName element in Description must indicate the name of the payment method.

ShortName

A short string describing something in fewer characters than the entire Description. Use the ShortName element when limited space is available. For example, a table of elements might show the ShortName. A linked "details" view would show the entire Description. Without a ShortName, the user interface must default to a truncation of Description.

This element does not require an xml:lang attribute because it appears only within a Description element. The language of the ShortName must match that of the surrounding Description.

PaymentPartner

Specifies all partners involved in the payment, such as payer, payee, originating bank, receiving bank, and remitTo. The number of payment partners required depends on the payment method used. PaymentPartner has no attributes.

Contact

Contact information of the payment partner.

Contact has one attribute:

role	The role of the payment partner:
	payer—The payer of this transaction
	payee—The recipient of the payment
	originatingBank—The bank from which the payment will be drawn. Required for bank transfers.
	receivingBank—The bank to which the payment will be deposited. Required for bank transfers.
	originatingCorrespondentBank—(optional) The bank that will hold the payment and transfer it to the receiving bank or the receiving correspondent bank
	receivingCorrespondentBank—(optional) The bank that will receive the payment and transfer it to the receiving bank
	intermediaryBank—(optional) The intermediary bank
	remitTo—(optional) The supplier's remittance address. For this role value, the IdReference and PCard elements can be omitted.

Contact elements with role payer and payee are always required. If the payment method indicates a bank transfer, then Contact elements with role originatingBank and receivingBank are required.

The remitTo element must be provided if isNetworkPayment is true.

IdReference

Contains a unique identification reference for the payment partner, including information such as bank account identification, bank identification, and optional bank branch identification.

IdReference is mandatory for all transactions that involve electronic payments. It is optional only for non-electronic payment methods, such as check or cash.

IdReference has the following attributes:

identifier	The unique identifier of the IdReference within the domain
domain	The domain of the IdReference:
	bankRoutingID—The routing ID of this payment partner's bank
	accountReceivableID—The ID of the payee's accounts receivable account or department
	bankAccountID—The ID of this payment partner's bank account
	ibanID—The International Bank Account Number for this payment partner, as specified in ISO 13616
	abaRoutingNumber—The American Banking Association 9-digit routing transit number of this payment partner's bank
	bankNationalID—A national clearing code that is specific to a country. This should uniquely identify the bank within the country specified in the Contact
	isoBicID—ISO BIC ID (Bank Identifier Code) as specified in ISO 9362. The Bank Identifier Code (BIC) is a universal method of identifying financial institutions. The BIC consists of 8 or 11 characters, comprising a bank code (4 characters), a country code (2 characters), a location code (2 characters) and an optional branch code (3 characters)
	swiftID—SWIFT ID (Society for Worldwide Interbank Financial Telecommunications) identification number
	bankBranchID—The identification number of the bank branch

The value supplierTaxID is deprecated and will be treated as federalTaxID.

The bank account identification is specified as follows:

identifier	The unique identifier of the IdReference within the domain
domain	The domain of the account ID abaRoutingNumber—ABA (American Banking Association) routing number swiftID—SWIFT ID (Society for Worldwide Interbank Financial Telecommunications) identification number chipsID—CHIPS ID (Clearing House Interbank Payment System) identification number isoBicID—ISO BIC ID (Bank Identifier Code) as specified in ISO 9362. The Bank Identifier Code (BIC) is a universal method of identifying financial institutions. The BIC consists of 8 or 11 characters, comprising a bank code (4 characters), a country code (2 characters), a location code (2 characters) and an optional branch code (3 characters). bankNationalID—If none of the above bank identification methods is applicable, then use the bankNationalID to indicate national clearing codes that are specific to a country. This should uniquely identify the bank within the country specified in the Contact.

The bank branch identification, if necessary, is specified as follows:

Value	Description
bankBranchID	The bank branch ID

The following table illustrates some valid role - domain value combinations for Contact and IdReference:

Contact@role	IdReference@domain
payer	bankAccountID ibanID
payee	bankAccountID ibanID
originatingBank	abaRoutingNumber bankNationalID isoBicID swiftID bankBranchID (optional)

receivingBank	abaRoutingNumber bankNationalID isoBicID swiftID bankBranchID (optional)
originatingCorrespondentBank	abaRoutingNumber isoBicID swiftID
receivingCorrespondentBank	abaRoutingNumber isoBicID swiftID
intermediaryBank	abaRoutingNumber isoBicID swiftID

Creator

The creator of this IdReference, such as United Parcel Service or Bank of America.

Description

Text description of the IdReference. This is especially useful when the Creator value is not immediately understood by the reader.

PCard

Specifies purchasing card information, such as card number and expiration date. This element allows buying organizations to charge PCards after they approve invoices. If you specify a PCard, use Contact with role="payer".

Contact

(Deprecated) Use the PaymentPartner element and the remitTo role to specify this information.

GrossAmount

The gross payment amount.

DiscountAmount

The discount amount.

AdjustAmount

The total of various adjustment amounts. The adjustment amount can be positive indicating a decrease in payment amount, or negative indicating an increase in payment amount (such as for late charges or penalties).

NetAmount

The net amount.

$$NetAmount = GrossAmount - DiscountAmount - AdjustAmount$$

If NetAmount is negative, it indicates a credit to the buyer. In this case, except for paymentProposalID, operation, and PayableInfo, NetAmount, all other attributes and sub-elements of PaymentProposalRequest are ignored.

Comments

Contains buyer's comments when the status is changed. For example, if the status is changed to hold, the buyer can enter a reason which would be included in this field. Only update, hold, and delete operations have comments.

PaymentRemittanceRequest

The PaymentRemittanceRequest document is analogous to remittance detail advice for payment or remittance.

The following diagram shows the structure of the PaymentRemittanceRequest element:
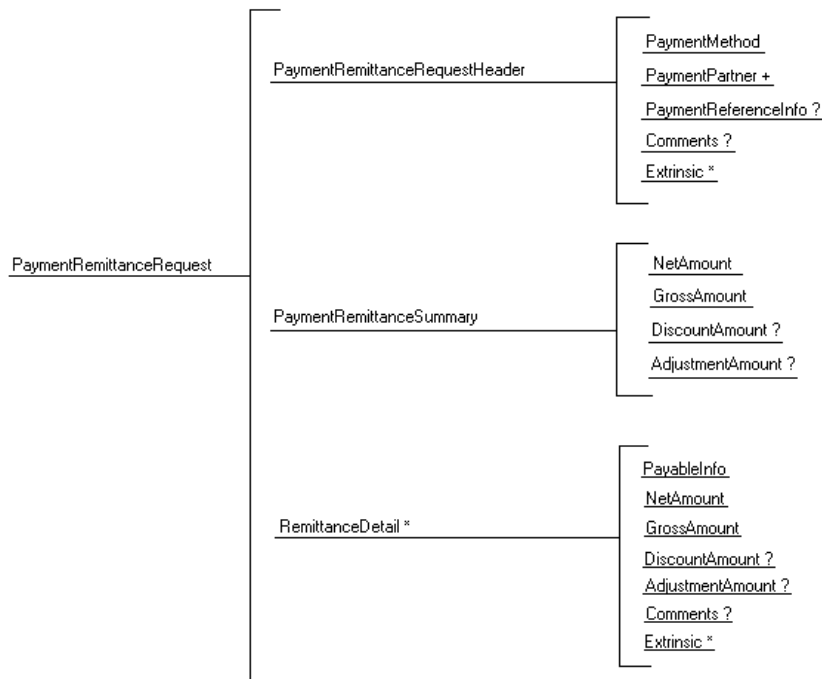
The following example shows the structure of the PaymentRemittanceRequest element:

```
<PaymentRemittanceRequest>
    <PaymentRemittanceRequestHeader>
        header information
    </PaymentRemittanceRequestHeader>
    <PaymentRemittanceSummary>
        summary-level remittance information
    </PaymentRemittanceSummary>
    <RemittanceDetail>
        detail-level remittance information
    </RemittanceDetail>
</PaymentRemittanceRequest>
```

PaymentRemittanceRequest has no attributes.

For an example of a PaymentRemittanceRequest for an invoice, see
"PaymentRemittanceRequest Example" on page 191.

PaymentRemittanceRequestHeader

The PaymentRemittanceRequestHeader element defines header information that applies to the entire payment or remittance.

The following diagram shows the structure of the PaymentRemittanceRequestHeader element:

PaymentRemittanceRequestHeader has the following attributes:

paymentRemittanceID	A unique identifier for this PaymentRemittance, generated by the buying organization's system.
paymentDate	The date and time this Payment or Remittance transaction was created. paymentDate should be earlier than the timestamp of the actual PaymentRemittanceRequest.
isPayment	Indicates whether this request is intended for making payment or is for remittance advice only. If the request is for payment purposes, set the attribute to "yes." Remittance advice information can be included in a PaymentRemittanceRequest with isPayment = yes. If isPayment is not specified, the document is assumed to be for remittance advice only.
paymentReferenceNumber	Indicates a payment transaction reference or payment identification number. For example, for check payments, the paymentReferenceNumber is the check number, and for electronic payments, it is an electronic reference or confirmation number.

PaymentMethod

Identifies the method for a payment. For more information, see "PaymentMethod" on page 175.

PaymentPartner

Identifies a party involved in the payment. For more information, see
"PaymentPartner" on page 176.

PaymentReferenceInfo

Defines the ID of an earlier payment made by a buying organization. This ID should
uniquely identify the payment made in the buyer system.

PaymentReferenceInfo has no attributes.

PaymentReference

Reference to an earlier PaymentRemittanceRequest. If the earlier payment was made
through cXML, this element is required.

PaymentReference has the following attributes:

paymentRemittan ceID	The paymentRemittanceID of the request. **Note:** Do not use the transaction identification number, such as check number.
paymentDate	The payment date.

DocumentReference

The DocumentReference element of a PaymentReference is a container for the
payloadID attribute, which refers to a prior PaymentRemittanceRequest.

payloadID	A unique identifier for the prior PaymentRemittanceRequest. The payloadID is copied directly from the cXML element of the PaymentRemittanceRequest.

PaymentIDInfo

The PaymentIDInfo of a PaymentReference refers to the unique identifier for this payment
in the buying organization's system. PaymentIDInfo is a container for
paymentRemittanceID and paymentDate attributes.

PaymentIDInfo has the following attributes:

paymentRemittanceID	The paymentRemittanceID of the request.
	Note: Do not use the transaction identification number, such as check number.
paymentDate	The payment date.

Comments

Header-level textual comments about the payment remittance, for the
PaymentRemittanceRequestHeader.

Extrinsic

Additional information related to this payment. Information in the Extrinsic element of
PaymentRemittanceRequestHeader should not duplicate information in the
PaymentRemittanceRequest.

PaymentRemittanceSummary

The PaymentRemittanceSummary element defines summary information of a
PaymentRemittanceRequest. Each money amount in a PaymentRemittanceSummary element
is expressed as a flat amount with currency.

PaymentRemittanceSummary has no attributes.

NetAmount

The NetAmount element defines the total net payment amount. NetAmount should satisfy
the following equation:

NetAmount = GrossAmount - DiscountAmount - AdjustmentAmount

GrossAmount

The total gross amount.

DiscountAmount

The total discount amount.

AdjustmentAmount

The total adjustment amount.

RemittanceDetail

The RemittanceDetail element defines the remittance detail of a specific payable that has been paid. Each money amount in a RemittanceDetail element is expressed as a flat amount with currency.
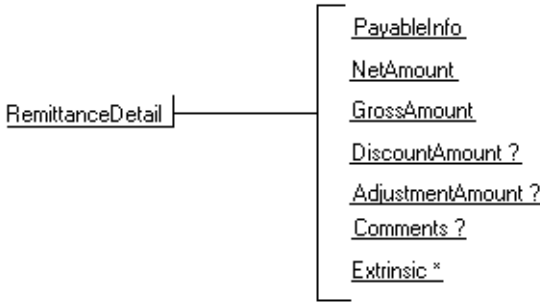
RemittanceDetail has one attribute:

lineNumber	The line number of the associated payable

PayableInfo

A reference to the payable document, such as an invoice, order, or master agreement. For more information, see "PayableInfo" on page 173.

PayableInvoiceInfo

A reference to the invoice being paid. PayableInvoiceInfo must contain either InvoiceReference or InvoiceIDInfo, and might contain either PayableOrderInfo or PayableMasterAgreementInfo.

InvoiceReference

Provides a clear reference to a prior InvoiceDetailRequest document. The InvoiceReference is copied from the InvoiceDetailRequest message.

InvoiceIDInfo

Defines the ID of an invoice known to the supplier system. InvoiceIDInfo is a
container for two attributes:

invoiceID	The ID of an invoice known to the supplier system
invoiceDate	The invoice date

PayableOrderInfo

Provides supplementary information related to the order. For example, a payment
against a consolidated invoice might include associated order information. Defines
payable information related to an order that was paid.

PayableOrderInfo has no attributes.

OrderReference

The reference to the order being paid.

OrderIDInfo

The order ID from the procurement application.

PayableMasterAgreementInfo

Provides supplementary information related to the master agreement (contract). For
example, a payment against a consolidated invoice might include associated master
agreement information. Defines payable information related to the master agreement
being paid.

NetAmount

The detail-level net amount for this payable:

NetAmount = GrossAmount - DiscountAmount - AdjustmentAmount

GrossAmount

The detail-level gross payment amount for this payable.

DiscountAmount

Defines the detail-level discount information for this payable.

AdjustmentAmount

The total of various adjustment amounts for this payable, if any. The adjustment amount can be positive, indicating a decrease in payment amount, or negative, indicating an increase in payment amount. For example, a negative AdjustmentAmount might be used to account for late charges or other penalties.

PaymentRemittanceStatusUpdateRequest

The PaymentRemittanceStatusUpdateRequest document provides status information for a payment remittance. Buying organizations send PaymentRemittanceStatusUpdateRequest documents to suppliers to inform suppliers of the status of their payables. The PaymentRemittanceStatus element supports Extrinsic elements.

The following example shows the structure of the PaymentRemittanceStatusUpdateRequest element:

```
<Request>
   <PaymentRemittanceStatusUpdateRequest>
      <DocumentReference>
        .....
      </DocumentReference>
      <PaymentRemittanceStatus>

        ....
      <Extrinsic name="OriginalSupplierAccountNumber">4232334545</Extrinsic>
      <Extrinsic name="CorrectedSupplierAccountNumber">004232334545</Extrinsic>
      <Extrinsic name="OriginalSupplierBankAbaNumber">121000358</Extrinsic>
      <Extrinsic name="CorrectedSupplierBankAbaNumber">221000358</Extrinsic>
</PaymentRemittanceStatusUpdateRequest>

        ....
      </PaymentRemittanceStatus>
   </PaymentRemittanceStatusUpdateRequest>
<Request>
```

DocumentReference

The DocumentReference element is a container for payloadID, which associates a status update with a particular PaymentRemittanceRequest document. DocumentReference repeats a required attribute of the earlier document and adds one optional identifier generated by the supplier. For example:

```
<DocumentReference payloadID="0c300508b7863dcclb_14999"/>
```

DocumentReference contains no elements, but has the following attribute:

payloadID	A unique identifier for the document. Copied directly from the cXML element of the previous PaymentRemittanceRequest.

PaymentRemittanceStatus

Defines the status for a payment transaction specified by an existing PaymentRemittanceRequest. PaymentRemittanceStatus has the following attributes:

type	The status type of the payment transaction.
paymentReferenceNumber	Indicates a unique number for a payment. For a check payment, for example, the paymentReferenceNumber would be the check number.

Possible values of the type attribute in PaymentRemittanceStatus are:

Value	Description
paid	The payment transaction was completed successfully.
failed	The payment transaction failed. Under certain conditions, a PaymentRemittance of type "failed" can be resubmitted by the buying organization.
canceled	The payment transaction was canceled.

For a discussion of the common Status element, see "Status" on page 48.

PaymentRemittanceStatusDetail

Defines status details of the payment transaction specified by an existing PaymentremittanceStatusDetail. PaymentRemittanceStatusDetail contains a PCDATA string. Typically, this element describes the specifics of a problem.

PaymentRemittanceStatusDetail has the following attributes:

code	Payment transaction status code provided by the payment provider.
description	Textual description of the status code (not specific issue).
xml:lang	The language in which the text attribute and element content are written.

Extrinsic

The Extrinsic element list can be used to insert additional data. These elements can include pre-defined keywords and values affecting workflow in the receiving system.

Elements in the Extrinsic list can appear in any order.

Extrinsic has the following attribute:

name	The value used to indicate the type or nature of the data.

Example Payment Documents

The following examples illustrate payment documents:

- PaymentProposalRequest Example
- PaymentRemittanceRequest Example
- PaymentRemittanceStatusUpdateRequest Example

PaymentProposalRequest Example

The following scheduled payment is for an ACH payment.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/
PaymentRemittance.dtd">
<cXML payloadID="123@bigbuyer.com" timestamp="2005-04-20T23:59:45-07:00">
   <Header>
     <From>
        <Credential domain="NetworkId">
           <Identity>AN99123456789</Identity>
        </Credential>
     </From>
     <To>
        <Credential domain="NetworkId">
           <Identity>AN99987654321</Identity>
        </Credential>
     </To>
     <Sender>
        <Credential domain="NetworkId">
           <Identity>AN99123456789</Identity>
           <SharedSecret>abracadabra</SharedSecret>
        </Credential>
```

```
            <UserAgent>Procurement Application 1.0</UserAgent>
        </Sender>
    </Header>
    <Request>
        <PaymentProposalRequest
                paymentProposalID="proposal123"
                operation="new"
                paymentDate="2005-07-20T23:59:20-07:00">
            <PayableInfo>
                <PayableInvoiceInfo>
                    <InvoiceReference invoiceID="ABC">
                        <DocumentReference payloadID="25510.10.81.231"/>
                    </InvoiceReference>
                    <PayableOrderInfo>
                        <OrderReference orderID="DEF">
                            <DocumentReference payloadID="25510.10.81.002"/>
                        </OrderReference>
                    </PayableOrderInfo>
                </PayableInvoiceInfo>
            </PayableInfo>
            <PaymentMethod type="ach"/>
            <Contact role="remitTo" addressID="Billing">
                <Name xml:lang="en">Lisa Dollar</Name>
                <PostalAddress name="billing department">
                    <DeliverTo>Lisa Dollar</DeliverTo>
                    <Street>100 Castro Street</Street>
                    <City>Mountain View</City>
                    <State>CA</State>
                    <PostalCode>95035</PostalCode>
                    <Country isoCountryCode="US">United States</Country>
                </PostalAddress>
                <Email name="default">ldollar@workchairs.com</Email>
                <Phone name="work">
                    <TelephoneNumber>
                        <CountryCode isoCountryCode="US">1</CountryCode>
                        <AreaOrCityCode>650</AreaOrCityCode>
                        <Number>9990000</Number>
                    </TelephoneNumber>
                </Phone>
            </Contact>
            <GrossAmount>
                <Money currency="USD">3000.00</Money>
            </GrossAmount>
            <DiscountAmount>
                <Money currency="USD">160.00</Money>
            </DiscountAmount>
            <AdjustmentAmount>
                <Money currency="USD">30.00</Money>
            </AdjustmentAmount>
            <NetAmount>
```

```
            <Money currency="USD">2810.00</Money>
          </NetAmount>
        </PaymentProposalRequest>
      </Request>
    </cXML>
```

PaymentRemittanceRequest Example

This example shows a minimum valid PaymentRemittanceRequest.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/
PaymentRemittance.dtd">
<cXML xml:lang="en-US" timestamp="2004-03-10T14:20:53-08:00" payloadID="PR-031004-01">
  <Header>
    <From>
      <Credential domain="NetworkId">
        <Identity>AN99123456789</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="NetworkId">
        <Identity>AN99987654321</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="NetworkId">
        <Identity>AN99123456789</Identity>
      </Credential>
      <UserAgent>Procurement Application 1.0</UserAgent>
    </Sender>
  </Header>
  <Request deploymentMode="production">
    <PaymentRemittanceRequest>
      <PaymentRemittanceRequestHeader paymentDate="2004-10-10T00:00:00-08:00"
        paymentReferenceNumber="ACH123456789" paymentRemittanceID="PR-031204-01">
        <PaymentMethod type="ach"></PaymentMethod>
          <PaymentPartner>
            <Contact role="payer">
              <Name xml:lang="en">buyer</Name>
              <PostalAddress>
                <Street>100 1st Street</Street>
                <City>Anywhere</City>
                <State>CA</State>
                <PostalCode>94089</PostalCode>
                <Country isoCountryCode="US">United States</Country>
              </PostalAddress>
            </Contact>
          </PaymentPartner>
```

```
<PaymentPartner>
  <Contact role="payee">
    <Name xml:lang="en">Supplier</Name>
    <PostalAddress>
      <Street>100 Main Street</Street>
      <City>Anywhere</City>
      <State>CA</State>
      <PostalCode>94089</PostalCode>
      <Country isoCountryCode="US">United States</Country>
    </PostalAddress>
  </Contact>
</PaymentPartner>
<PaymentPartner>
  <Contact role="originatingBank">
    <Name xml:lang="en">Moose Credit Union</Name>
    <PostalAddress>
      <Street>100 Elk Drive</Street>
      <City>Mooseville</City>
      <State>CA</State>
      <PostalCode>94087</PostalCode>
      <Country isoCountryCode="US">United States</Country>
    </PostalAddress>
  </Contact>
  <IdReference domain="abaRoutingNumber" identifier="234567890"></IdReference>
</PaymentPartner>
<PaymentPartner>
  <Contact role="receivingBank">
    <Name xml:lang="en">Gold Rush Bank</Name>
    <PostalAddress>
      <Street>100 Bret Harte Road</Street>
      <City>Gold Rush</City>
      <State>CA</State>
      <PostalCode>97123</PostalCode>
      <Country isoCountryCode="US">United States</Country>
    </PostalAddress>
  </Contact>
  <IdReference domain="abaRoutingNumber" identifier="678902345"></IdReference>
</PaymentPartner>
</PaymentRemittanceRequestHeader>
<PaymentRemittanceSummary>
  <NetAmount>
    <Money currency="USD">2.00</Money>
  </NetAmount>
  <GrossAmount>
    <Money currency="USD">2.85</Money>
  </GrossAmount>
  <DiscountAmount>
    <Money currency="USD">0.35</Money>
  </DiscountAmount>
  <AdjustmentAmount>
```

```
               <Money currency="USD">0.50</Money>
            </AdjustmentAmount>
         </PaymentRemittanceSummary>
         <RemittanceDetail lineNumber="1">
            <PayableInfo>
               <PayableInvoiceInfo>
                  <InvoiceIDInfo invoiceID="INV-031204-01"></InvoiceIDInfo>
                  <PayableOrderInfo>
                     <OrderIDInfo orderID="P0-031204-01"></OrderIDInfo>
                  </PayableOrderInfo>
               </PayableInvoiceInfo>
            </PayableInfo>
            <NetAmount>
               <Money currency="USD">2.00</Money>
            </NetAmount>
            <GrossAmount>
               <Money currency="USD">2.85</Money>
            </GrossAmount>
            <DiscountAmount>
               <Money currency="USD">0.35</Money>
            </DiscountAmount>
            <AdjustmentAmount>
               <Money currency="USD">0.50</Money>
            </AdjustmentAmount>
         </RemittanceDetail>
      </PaymentRemittanceRequest>
   </Request>
</cXML>
```

PaymentRemittanceStatusUpdateRequest Example

This example shows a PaymentRemittanceStatusUpdateRequest sent from a buyer to a
supplier:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/
PaymentRemittance.dtd">
<cXML payloadID="1068173501644--6417095366782271471@10.10.13.124" timestamp="2003-04-
20T23:59:45-07:00">
   <Header>
      <From>
         <Credential domain="NetworkId">
            <Identity>AN99123456789</Identity>
         </Credential>
      </From>
      <To>
         <Credential domain="NetworkId">
            <Identity>AN99987654321</Identity>
         </Credential>
```

```
        </To>
        <Sender>
          <Credential domain="NetworkId">
              <Identity>Procurement Application 1.0</Identity>
          </Credential>
        </Sender>
      </Header>
      <Request deploymentMode="production">
        <PaymentRemittanceStatusUpdateRequest>
          <DocumentReference
                payloadID="1234567890123-1234567890123456789@10.10.10.100">
          </DocumentReference>
          <PaymentRemittanceStatus type="canceled"
          paymentReferenceNumber="PaymentRefNumber">1234</
          </PaymentRemittanceStatus>
        </PaymentRemittanceStatusUpdateRequest>
      </Request>
    </cXML>
```

Chapter 8
TimeCard Transaction

Timecards are used for placing orders related to temporary labor and contractors. They can be generated and sent by either the buyer or the supplier, depending upon which system captures the timecard information.

TimeCard Requests

Because of the two-way nature of timecards, there are two requests that involve the TimeCard element: TimeCardRequest and TimeCardInfoRequest.

The contractor—that is, the temporary laborer in question—enters timecard information in either the buyer or supplier system, depending upon the situation. Therefore, either buyers or suppliers can send timecard documents, and timecard documents can flow in either direction. In this way, timecards differ from invoices, which are typically sent only by suppliers.
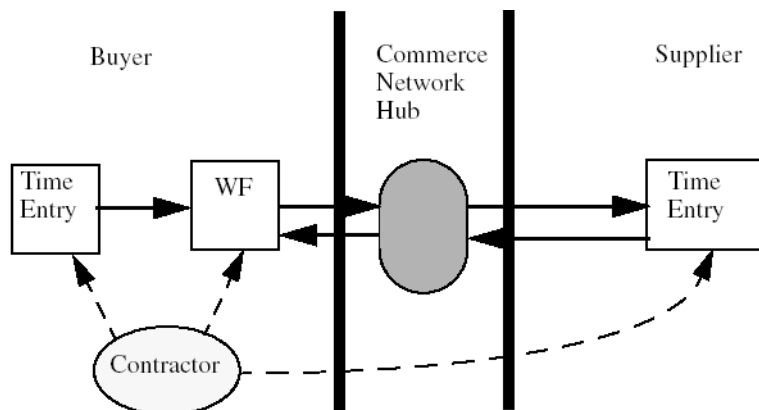
Supplier to Buyer Request

TimeCardRequest describes a timecard document that is sent from a supplier, such as a staffing agency, to a buyer. The from and sender credentials are the supplier's, and the to credential is the buyer's. When the timecard is approved, the buyer sends a StatusUpdateRequest with the DocumentApprovalStatus element indicating whether the timecard was approved or rejected.

Buyer to Supplier Request

TimeCardInfoRequest describes a timecard document that is sent from a buyer to a supplier. The from credential is the buyer's, and to credential is the supplier's.

TimeCard Element

The TimeCard element is used to capture the hours worked by a contractor or other temporary laborer, and has the following structure:
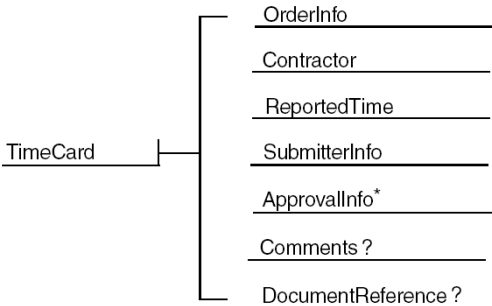
The TimeCard element has the following attributes:.

type	Possible values are new, update, and delete. The value defaults to new, unless the original timecard is updated.
status	Possible values are submitted, approved, denied. The default value is submitted.
timeCardID	Represents the unique identifier for this timecard in the buyer and supplier systems. Required.

OrderInfo

The OrderInfo element is used to reference the order. One timecard can reference only one order.

Contractor

The Contractor element is the definition of a contractor used in the context of temporary labor.

ContractorIdentifier

ContractorIdentifier uniquely identifies the contractor in both the buyer and supplier systems, and is agreed upon by the buyer and the supplier prior to sending out orders or timecards. The ContractorIdentifier element contains the following attribute:

domain	The domain in which the ContractorIdentifier is represented. Possible values are supplierReferenceID or buyerReferenceID, indicating the system in which the ContractorIdentifier originated.

Contact

The generic Contact element describes the contractor.

ReportedTime

The ReportedTime element captures the line items for the timecard.

Period

Period denotes the period of time for which the timecard is being submitted.

TimeCardTimeInterval

The TimeCardTimeInterval element represents the time interval being reported on a timecard. It contains the following attributes:

duration	The duration of time being claimed for the line item, represented in the ISO 8601 format PnYn MnDTnH nMnS, where nY represents the number of years, nM the number of months, nD the number of days, T the date/time separator, nH the number of hours, nM the number of minutes and nS the number of seconds. For example, to indicate a duration of 1 year, 2 months, 3 days, 10 hours, and 30 minutes, one would write: P1Y2M3DT10H30M. In the event that duration and TimeRange do not agree, duration takes precedence. For example, if duration is 2 hours, and TimeRange is from 4:00 p.m. to 8:00 p.m., then the 2 hour duration takes precedence. However, if duration is not present, then it is computed from the TimeRange.
payCode	The pay code to be used. Recommended pay codes include: Regular Overtime Doubletime Mealbreak Tripletime WeeklyRestDay HolidayWorked RegularNightShift OvertimeNightShift DoubletimeNightShift TripletNightShift WeeklyRestDayNightShift RegularMixedShift OvertimeMixedShift DoubletimeMixedShift TripletimeMixedShift WeeklyRestDayMixedShift
isNonBillable	Implied attribute that designates whether or not the time is billable. The default behavior is billable.

Expense

The *Expensel* element represents any expense a contractor reported on a timecard. It contains the following attributes

expenseDate	The date of the expense.
expenseType	The type of expense. Recommended expense types include: mileage airfare fuel taxi perDiem hotel
isNonBillable	Implied attribute that designates whether or not the expense is billable. The default behavior is billable.

ExpenseAmount

The ExpenseAmount element represents the monetary value and currency of an expense a contractor reported on a timecard.

The ExpenseAmount element contains the following attributes:

alternateCurrency	The currency of the expense.
alternateAmount	The total monetary value of the expense.

TimeRange

The TimeRange element defines a time range in which the start and end dates can be unbounded.

The TimeRange element contains the following attributes:

startDate	The first date in the billable period. Required.
endDate	The last date in the billable period. Optional, because the difference in time between the endDate and startDate attributes need not agree with the duration attribute in the TimeCardTimeInterval element.

SubmitterInfo

The SubmitterInfo element contains information about the person submitting the timecard.

The SubmitterInfo element contains the following attributes:

Contact

If the Contact element is absent, then it is assumed that the contractor is also the submitter.

submittedDate	The time when the timecard was submitted. Required.

ApprovalInfo

The ApprovalInfo element includes information about the approver of the timecard. This information is sent by the supplier for informational purposes only, and can include all the approvers in the chain. There can be multiple approvals because many people might need to approve the timecard in question.

The ApprovalInfo element has the following attributes:

approvedDate	The time when the timecard was approved. Required.

DocumentReference

DocumentReference is used on an update operation to refer to a previous TimeCardRequest or TimeCardInfoRequest.

TimeCard Examples

The following example shows a TimeCardInfoRequest sent upon submission to the supplier:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/Fulfill.dtd">
<cXML xml:lang="en-US"
      payloadID=" tc1@buyer.com"
      timestamp="2003-10-01T23:00:06-08:00">
  <Header>
    <From>
      <Credential domain="NetworkId">
        <Identity>AN0100023456</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="NetworkId">
        <Identity> AN0100023457</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="NetworkId">
        <Identity> AN0100023456</Identity>
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>Our Procurement Application 2.0</UserAgent>
    </Sender>
  </Header>
  <Request>
    <TimeCardInfoRequest>
      <TimeCard type="new" status="submitted" timeCardID="TC101">
      <OrderInfo>
        <OrderIDInfo orderID="PO12" orderDate="2003-07-22T08:00:00-08:00"/>
      </OrderInfo>
      <Contractor>
        <ContractorIdentifier domain="supplierReferenceID">Doe8610</ContractorIdentifier>
        <Contact>
          <Name xml:lang="en">John Doe</Name>
        </Contact>
      </Contractor>
      <ReportedTime>
        <Period startDate="2003-09-22T08:00:00-08:00"
                endDate="2003-09-26T18:00:00-08:00"/>
          <TimeCardTimeInterval duration="PT8H" payCode="Regular">
            <TimeRange startDate="2003-09-22T08:00:00-08:00"
                    endDate="2003-09-22T18:00:00-08:00"/>
          </TimeCardTimeInterval>
```

```
                <TimeCardTimeInterval duration="PT2H"
                        payCode="Mealbreak" isNonBillable="yes">
                    <TimeRange startDate="2003-09-22T012:00:00-08:00"
                            endDate="2003-09-22T14:00:00-08:00"/>
                </TimeCardTimeInterval>
                <TimeCardTimeInterval duration="PT2H" payCode="Overtime">
                    <TimeRange startDate="2003-09-22T18:00:00-08:00"
                            endDate="2003-09-22T20:00:00-08:00"/>
                </TimeCardTimeInterval>
                <TimeCardTimeInterval duration="PT8H" payCode="Regular">
                    <TimeRange startDate="2003-09-23T08:00:00-08:00"/>
                </TimeCardTimeInterval>
                <TimeCardTimeInterval duration="PT8H" payCode="Regular">
                    <TimeRange startDate="2003-09-24T08:00:00-08:00"/>
                </TimeCardTimeInterval>
                <TimeCardTimeInterval duration="PT8H" payCode="Regular">
                    <TimeRange startDate="2003-09-25T08:00:00-08:00"/>
                </TimeCardTimeInterval>
                <TimeCardTimeInterval duration="PT8H" payCode="Regular">
                    <TimeRange startDate="2003-09-26T08:00:00-08:00"/>
                </TimeCardTimeInterval>
            </ReportedTime>
            <SubmitterInfo submittedDate="2003-10-01T08:00:00-08:00">
                <Contact>
                    <Name xml:lang="en">John Doe</Name>
                </Contact>
            </SubmitterInfo>
        </TimeCard>
    </TimeCardInfoRequest>
  </Request>
</cXML>
```

This example show an update sent upon approval to the supplier.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/Fulfill.dtd">
<cXML xml:lang="en-US"
        payloadID=" tc1-update@buyer.com"
        timestamp="2003-10-01T23:00:06-08:00">
    <Header>
        <From>
            <Credential domain="NetworkId">
                <Identity>AN0100023456</Identity>
            </Credential>
        </From>
        <To>
            <Credential domain="NetworkId">
                <Identity> AN0100023457</Identity>
            </Credential>
        </To>
```

```
            <Sender>
               <Credential domain="NetworkId">
                  <Identity> AN0100023456</Identity>
                  <SharedSecret>abracadabra</SharedSecret>
               </Credential>
               <UserAgent>Suppliers Time Card Application 5.0</UserAgent>
            </Sender>
         </Header>
         <Request>
            <TimeCardInfoRequest>
               <TimeCard type="update" status="approved" timeCardID="TC101">
                  <OrderInfo>
                     <OrderIDInfo orderID="PO123" orderDate="2003-07-22T08:00:00-08:00"/>
                  </OrderInfo>
                  <Contractor>
                     <ContractorIdentifier domain="supplierReferenceID">Doe8610</ContractorIdentifier>
                     <Contact>
                        <Name xml:lang="en">John Doe</Name>
                     </Contact>
                  </Contractor>
               <ReportedTime>
                  <Period startDate="2003-09-22T08:00:00-08:00"
                          endDate="2003-09-26T18:00:00-08:00"/>
                     <TimeCardTimeInterval duration="PT8H" payCode="Regular">
                        <TimeRange startDate="2003-09-22T08:00:00-08:00"
                                endDate="2003-09-22T18:00:00-08:00"/>
                     </TimeCardTimeInterval>
                     <TimeCardTimeInterval duration="PT2H"
                             payCode="Mealbreak" isNonBillable="yes">
                        <TimeRange startDate="2003-09-22T012:00:00-08:00"
                                endDate="2003-09-22T14:00:00-08:00"/>
                     </TimeCardTimeInterval>
                     <TimeCardTimeInterval duration="PT2H" payCode="Overtime" >
                        <TimeRange startDate="2003-09-22T18:00:00-08:00"
                                endDate="2003-09-22T20:00:00-08:00"/>
                     </TimeCardTimeInterval>
                     <TimeCardTimeInterval duration="PT8H" payCode="Regular" >
                        <TimeRange startDate="2003-09-23T08:00:00-08:00"/>
                     </TimeCardTimeInterval>
                     <TimeCardTimeInterval duration="PT8H" payCode="Regular" >
                        <TimeRange startDate="2003-09-24T08:00:00-08:00"/>
                     </TimeCardTimeInterval>
                     <TimeCardTimeInterval duration="PT8H" payCode="Regular" >
                        <TimeRange startDate="2003-09-25T08:00:00-08:00"/>
                     </TimeCardTimeInterval>
                     <TimeCardTimeInterval duration="PT8H" payCode="Regular" >
                        <TimeRange startDate="2003-09-26T08:00:00-08:00"/>
                     </TimeCardTimeInterval>
                  </ReportedTime>
                  <SubmitterInfo submittedDate="2003-10-01T08:00:00-08:00">
```

8 TimeCard Transaction

```
            <Contact>
                <Name xml:lang="en">John Doe</Name>
            </Contact>
        </SubmitterInfo>
        <ApprovalInfo approvedDate="2003-10-02T08:00:00-08:00">
            <Contact>
                <Name xml:lang="en">John Doe</Name>
            </Contact>
        </ApprovalInfo>
        <DocumentReference payloadID="tc1@buyer.com"/>
      </TimeCard>
    </TimeCardInfoRequest>
  </Request>
</cXML>
```

Chapter 9
Master Agreements

cXML supports the transmission of Master Agreement documents, which are contracts between trading partners.

This chapter describes:

- Overview of Master Agreements
- MasterAgreementRequest

Overview of Master Agreements

Master Agreements enable buyers to establish a commitment for goods and services with suppliers. They represent a common mechanism for managing supplier and budget commitments, and they enable buyers to negotiate better discounts by basing the discounts on future purchases, while enabling suppliers to more accurately forecast demand.

The Master Agreement transaction enables procurement application to facilitate the negotiation and creation of Master Agreements with suppliers and creation of Release Orders from those Master Agreements. These Agreement documents can be routed from the procurement application to the supplier by a network hub. The execution of an order against a contract is called a release.

MasterAgreementRequest

The MasterAgreementRequest document defines the Master Agreement created by the buying organization. It specifies beginning and end dates, and the committed maximum and minimum values of the agreement. It also lists maximum and minimum values and quantities for individual items.

The following example shows a MasterAgreementRequest document:

```
<MasterAgreementRequest>
    <MasterAgreementRequestHeader
            agreementID="MA123"
            agreementDate="2001-12-01"
            type="value"
            effectiveDate="2002-01-01"
            expirationDate="2002-12-31"
            operation="new">
        <MaxAmount>
            <Money currency="USD">10000</Money>
        </MaxAmount>
        <MaxReleaseAmount>
            <Money currency="USD">10000</Money>
        </MaxReleaseAmount>
        <Contact role="BuyerLocation">
            <Name xml:lang="en">Buyer Company</Name>
            <PostalAddress name="default">
                <DeliverTo>Joe Smith</DeliverTo>
                <DeliverTo>Mailstop M-543</DeliverTo>
                <Street>123 Anystreet</Street>
                <City>Sunnyvale</City>
                <State>CA</State>
                 <PostalCode>90489</PostalCode>
                <Country isoCountryCode="US">United States</Country>
            </PostalAddress>
        </Contact>
        <Comments xml:lang="en-US">well formed XML can go here.</Comments>
    </MasterAgreementRequestHeader>
    <AgreementItemOut maxQuantity="100">
        <MaxAmount>
            <Money currency="USD">1000</Money>
        </MaxAmount>
        <MaxReleaseAmount>
            <Money currency="USD">100</Money>
        </MaxReleaseAmount>
        <ItemOut quantity="1">
            <ItemID>
                <SupplierPartID>1233244</SupplierPartID>
            </ItemID>
            <ItemDetail>
                <UnitPrice>
                    <Money currency="USD">1.34</Money>
                </UnitPrice>
                <Description xml:lang="en">Blue Ballpoint Pen</Description>
                <UnitOfMeasure>EA</UnitOfMeasure>
                <Classification domain="UNSPSC">12345</Classification>
                <ManufacturerPartID>234</ManufacturerPartID>
                <ManufacturerName>foobar</ManufacturerName>
```

```
                        <URL>www.foo.com</URL>
                    </ItemDetail>
                    <Shipping trackingDomain="FedEx" trackingId="1234567890">
                        <Money currency="USD">2.5</Money>
                        <Description xml:lang="en-us">FedEx 2-day</Description>
                    </Shipping>
                    <Comments xml:lang="en-US">Any well formed XML</Comments>
                </ItemOut>
            </AgreementItemOut>
        </MasterAgreementRequest>
```

MasterAgreementRequestHeader Element

The MasterAgreementRequestHeader contains information about the Master Agreement common to all contained items.

MasterAgreementHeader has the following attributes:

agreementDate	The date and time the agreement request was created. This is different from the effective and expiration date of the agreement.
type	Specifies whether the agreement refers to a value or quantity.
effectiveDate	Specifies the date the agreement is available for ordering or releases.
expirationDate	Specifies the date the agreement is no longer available
operation	Specifies the type of the agreement request. Can be "new", "update" or "delete". Defaults to "new". The "delete" operation is used to cancel an existing agreement. The delete request should be an exact replica of the original request.
parentAgreementPayloadID	PayloadID for the corresponding parent document from which this agreement is derived. Optional.
agreementID	The procurement system agreementID for this request.

MasterAgreementHeader can contain the following optional child elements:

MaxAmount	(Optional) Contains the maximum amount for all line items in the Master Agreement.
MinAmount	(Optional) Contains the committed amount for all line items on the Master Agreement.
MaxReleaseAmount	(Optional) The contractual maximum amount per Release of this Master Agreement.

MinReleaseAmount	(Optional) The contractual minimum amount per Release of this Master Agreement.
Contact	(Optional) Use "Contact" element to supply any additional Address or Location information.
Comments	(Optional) Can contain additional information about the status of the overall Master Agreement.
Extrinsic	(Optional) Can be used to insert additional data about the MasterAgreement for application consumption.

AgreementItemOut Element

The AgreementItemOut element specifies the requirements of a particular line item that is part of the Master Agreement contract.

AgreementItemOut has the following attributes:

maxQuantity	(Optional) Specifies the maximum quantity for this particular line Item.
minQuantity	(Optional) Specifies the minimum quantity for this particular line Item.
maxReleaseQuantity	(Optional) Specifies the maximum quantity per release for this particular line Item.
minReleaseQuantity	(Optional) Specifies the minimum quantity per release for this particular line Item.

AgreementItemOut can contain the following child elements:

MaxAmount	(Optional) Contains the maximum amount for this particular line Item.
MinAmount	(Optional) Contains the minimum amount for this particular line Item.
MaxReleaseAmount	(Optional) Indicates the item level maximum amount per release.
MinReleaseAmount	(Optional) Indicates the item level minimum amount per release.
ItemOut	A line item that is part of the master agreement. Required. The lineNumber attribute in the ItemOut specifies the corresponding lineNumber on the Master Agreement in the Procurement Application. The quantity attribute in the ItemOut should be set to "one" and ignored at the Master Agreement implementation processing stage.

Chapter 10
Later Status Changes

cXML allows entities to set the status of purchase orders and line items within them.

This chapter describes:

- Overview of Status
- StatusUpdateRequest
- ConfirmationRequest
- ShipNoticeRequest

Overview of Status

After the OrderRequest transaction has completed, suppliers and intermediate servers might need to communicate additional information back to the buying organization. In addition, after a buying organization receives an invoice, it might need to communicate back to the supplier about invoice status. The transactions described in this chapter are used for that purpose. These transactions share some common semantics and elements.

Like the response to an OrderRequest (see "Response to an OrderRequest" on page 159), none of these transactions includes a specific Response element. Instead, the returned document contains a nearly empty Response (only a Status). Each returned document has the form:

```
<cXML payloadID="9949494@supplier.com"
    timestamp="2000-01-12T18:39:09-08:00" xml:lang="en-US">
  <Response>
    <Status code="200" text="OK"/>
  </Response>
</cXML>
```

The returned code is "200" only if the operation completed successfully.

StatusUpdateRequest

This transaction informs an earlier node about changes in the processing status of an order or invoice.

One change is of particular significance: when an intermediate hub successfully transmits a document onward, it can inform the original sender or a previous hub about that success. Transitions through various queues and processing steps at a supplier or hub might also be significant to the buying organization.

Order-processing partners (such as fax or EDI service providers) send StatusUpdateRequest transaction messages to network commerce hubs to set purchase order status. It affects the order status indicator on the hub, which is visible to both buyers and suppliers. Additionally, suppliers can send this transaction to allow buying organizations to see the status of document processing within the supplier's organization.

Buying organizations use StatusUpdateRequest to update the status of invoices on network commerce hubs, which can in turn forward them to suppliers.

The StatusUpdateRequest updates the processing status of a single OrderRequest document. For example:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML xml:lang="en-US"
    payloadID="0c30050@supplierorg.com"
    timestamp="2000-01-08T23:00:06-08:00">
  <Header>
    <From>
      <Credential domain="NetworkId">
        <Identity>AN00000123</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="NetworkId">
        <Identity>AN00000456</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="NetworkId">
        <Identity>AN00000123</Identity>
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>Supplier's Super Order Processor</UserAgent>
    </Sender>
  </Header>
```

```
<Request>
   <StatusUpdateRequest>
      <DocumentReference
         payloadID="0c300508b7863dcclb_14999"/>
      <Status code="200" text="OK" xml:lang="en-US">Forwarded
         to supplier</Status>
   </StatusUpdateRequest>
</Request>
</cXML>
```

This request contains only a DocumentReference and a Status element. The Status can communicate a later transport error encountered by an intermediate hub. The semantics of this element are identical to a Status that might have been returned in the initial HTTP response to an OrderRequest document.

The 200/OK code is especially important when documents are stored and forwarded. This code indicates that a supplier has begun processing the OrderRequest or a hub has forwarded the document. The recipient should expect no further StatusUpdateRequest documents after 200/OK arrives.

Suppliers and hubs utilizing the StatusUpdate transaction must return code 201/ Accepted when an OrderRequest is queued for later processing. After it sends 200/OK (in the immediate Response to an OrderRequest or a later StatusUpdateRequest), the server should send no further StatusUpdate transactions for that order. Errors later in processing might lead to exceptions to this rule.

DocumentReference Element

The DocumentReference element associates a status update with a particular OrderRequest or InvoiceDetailRequest document. It repeats a required attribute of the earlier document and adds one optional identifier generated by the supplier. For example:

```
<DocumentReference
   payloadID="0c300508b7863dcclb_14999"/>
```

DocumentReference contains no elements, but has the following attribute:

payloadID	A unique number with respect to space and time that is used for logging purposes to identify documents. This value should not change in the case of retry attempts.
	The recommended implementation is:
	datetime.process id.random number@hostname
	Taken directly from the cXML element of the OrderRequest or InvoiceDetailRequest document.

DocumentReference is optional. StatusUpdateRequest documents for invoices can use InvoiceIDInfo elemenets within InvoiceStatus elements to identify the invoices.

PaymentStatus Element

The PaymentStatus element contains the status of a PCard transaction. The status update includes information such as the success of the transaction, transaction ID, authorization ID, order ID, total, tax, shipping information, and the time stamp of the original submission.

A StatusUpdateRequest document is sent to a supplier in response to a ConfirmationRequest with type="RequestToPay" to a network hub. This ConfirmationRequest invokes a payment service where the network hub requests a payment service provider to perform a point of sale transaction against the PCard listed in the purchase order and return the status of the transaction. The network hub then sends the transaction status back to the supplier in a StatusUpdateRequest document. For example:

```
<StatusUpdateRequest>
    <DocumentReference payloadID="0c300508b7863dcclb_14999"/>
    <Status code="0" text="Approved">Approved</Status>
    <PaymentStatus orderID="PC100" transactionTimestamp="2000-01-08T10:00:06-
        08:00" type="Sale" transactionID="V20000212000" authorizationID="PN123">
        <PCard number="1234567890123456" expiration="2003-03-31"/>
        <Total>
            <Money currency="USD">500.00</Money>
        </Total>
        <Shipping>
            <Money currency="USD">20.00</Money>
            <Description xml:lang="en">shipping charge</Description>
        </Shipping>
        <Tax>
            <Money currency="USD">40.00</Money>
            <Description xml:lang="en">CA Sales Tax</Description>
        </Tax>
    </PaymentStatus>
</StatusUpdateRequest>
```

The PaymentStatus element contains the required PCard and Total element, and optionally Shipping, Tax, and Extrinsic elements.

The PCard element contains two attributes that specify the number of the PCard and its expiration date.

PaymentStatus has the following attributes

orderID	Identifies the referenced order. It is copied from the ConfirmationRequest or the OrderRequest.
transactionTimeStamp	Specifies the time when the payment transaction was submitted.
type (required)	Specifies the type of PCard transaction. The value must be one of the following: Authorization—Authorizes the PCard. No charge is made. There is one authorization per order. Settlement—Transfers the funds secured by a previous authorization transaction. Sale—Initiates a charge to the PCard. Credit—Initiates a credit against the original charge. Compensates for an order that did not meet buyer expectations, to make adjustments to an account that was overcharged, or to credit an account for items returned by a buyer.
transactionID	Assigned to the transaction by the payment processing gateway.
authorizationID	The authorization code for the transaction provided by the bank.

SourcingStatus Element

The SourcingStatus element provides update information for a RFQ sourcing transaction, PunchOutSetupRequest document with operation="source".

```
<StatusUpdateRequest>
    <DocumentReference payloadID="123345678.RFQID:1234456787" />
    <Status code="200" text="OK">Approve Request</Status>
    <SourcingStatus action="approve" xml:lang="en"/>
</StatusUpdateRequest>
```

The action attribute identifies the update type for the transaction. Can be "approve", "cancel", or "deny". The body of the SourcingStatus element can contain human-readable information about the new state of the RFQ.

InvoiceStatus Element

When using StatusUpdateRequest for invoices, include the InvoiceStatus element.

```
<StatusUpdateRequest>
    <Status code="201" text="OK">Approved</Status>
    <InvoiceStatus type="reconciled">
        <InvoiceIDInfo invoiceID="INV123" invoiceDate="2005-04-20T23:59:20-07:00"/>
    </InvoiceStatus">
</StatusUpdateRequest>
```

InvoiceStatus has the following attribute:

type (required)	Refers to the action taken by the buying organization on the invoice. It can have the following values:
	processing—The invoice was received by the buying organization and is being processed.
	reconciled—The invoice successfully reconciled. The amounts in the invoice have not yet been paid.
	rejected—The invoice failed reconciliation. The buying organization is rejecting the invoice. The Comments element should contain free text explaining why the invoice was rejected, and the actions the supplier should take. The supplier can then resubmit a corrected invoice (a new invoice document with a new invoice number).
	paying—The invoice has been approved for payment and is in the payment process.
	paid—The invoice amounts have been paid by the buying organization.

InvoiceIDInfo Element

Use the InvoiceIDInfo element if the DocumentReference element is omitted. It identifies a specific invoice document by invoice ID and date, not by payloadID as required by DocumentReference.

InvoiceIDInfo has the following attributes:

invoiceID (required)	A supplier-generated identifier for the Invoice. This value is the invoiceID attribute that was in the InvoiceDetailRequestHeader of the invoice.
invoiceDate	Date and time the invoice was created.

PartialAmount Element

The PartialAmount element allows buying organizations to specify different amounts paid than the amounts specified in invoices. If invoices are paid in full, do not include PartialAmount. The existence of PartialAmount alerts the supplier to read the Comments elements which should contain more explanations on the differences.

Extrinsic Element

The Extrinsic element allows inclusion of additional information about the status of a document being updated.

ConfirmationRequest

This transaction provides detailed status updates on a specific Order Request. It extends the simple acknowledgment of an order, provided by StatusUpdateRequest, to a more detailed item level confirmation and ship notification.

> **Note:** The DTD for this transaction is contained in Fulfill.dtd rather than cXML.dtd.

No specific Response document is required for this transaction. Servers must respond to a ConfirmationRequest with a generic Response document.

A document is one of the following types, specified by the type attribute of the ConfirmationHeader element: "accept," "allDetail," "detail," "backordered," "except," "reject," "requestToPay," and "replace." With a type of "detail", you can update portions of a purchase order, such as prices, quantities, and delivery dates, reject portions, and add tax and shipping information. Only the line items mentioned are changed. With a type of "allDetail", you can update all information of specified line items without rejecting or accepting the order. You can apply the confirmation to the entire order request using the types "accept", "reject", and "except". "allDetail" and "detail" update individual lines, they do not accept or reject the entire order.

A ConfirmationRequest with type="requestToPay" invokes a payment service where the network hub requests a payment service provider to perform a point of sale transaction against the PCard listed in the purchase order and return the status of the transaction. The network hub then sends the transaction status back to the supplier in a StatusUpdateRequest document.

The following example shows a ConfirmationRequest element that is of type "accept".

```
<ConfirmationRequest>
    <!-- Without the confirmID, it remains possible to update this
    confirmation. An update would refer (in the OrderReference element) to the same
    OrderRequest document, would describe the status of the same items, and would
    point to this document through its DocumentReference element. However, the
    confirmID makes the update much more explicit.-->
    <ConfirmationHeader type="accept" noticeDate="2000-10-12T18:39:09-08:00"
        confirmID="C999-234" invoiceID="I1010-10-12">
        <Shipping>
            <Money currency="USD">2.5</Money>
            <Description xml:lang="en-CA">FedEx 2-day</Description>
        </Shipping>
        <Tax>
            <Money currency="USD">0.19</Money>
            <Description xml:lang="en-CA">CA Sales Tax</Description>
        </Tax>
        <Contact role="shipFrom">
            <Name xml:lang="en-CA">Workchairs, Vancouver</Name>
            <PostalAddress>
                <Street>432 Lake Drive</Street>
                <City>Vancouver</City>
                <State>BC</State>
                <PostalCode>B3C 2G4</PostalCode>
                <Country isoCountryCode="CA">Canada</Country>
            </PostalAddress>
            <Phone>
                <TelephoneNumber>
                    <CountryCode isoCountryCode="CA">1</CountryCode>
                    <AreaOrCityCode>201</AreaOrCityCode>
                    <Number>9211132</Number>
                </TelephoneNumber>
            </Phone>
        </Contact>
        <Comments xml:lang="en-CA">Look's great</Comments>
    </ConfirmationHeader>
    <!-- The orderID and orderDate attributes are not required in the
        OrderReference element. -->
    <OrderReference orderID="DO1234">
        <DocumentReference payloadID="32232995@hub.acme.com" />
    </OrderReference>
</ConfirmationRequest>
```

Multiple "detail" ConfirmationRequest documents can refer to a single purchase order, but they must not refer to common line items.

To perform a substitution, include a ConfirmationItem element to specify the item to be replaced, then provide an ItemIn element for the replacement. Only use ItemIn elements for substitutions. You should then wait for a corresponding change order from the buyer before shipping.

The ConfirmationRequest element is a request to add confirmation information to the data known about an order at the receiving server. It can contain three elements: ConfirmationHeader, OrderReference, and an optional ConfirmationItem. If the Confirmation Request type specified in the ConfirmationHeader is either "detail" or "except", you can include ConfirmationItem elements to update specific line items from a purchase order.

While suppliers send multiple confirmations for a purchase order, each confirmation must mention a line item only once. In addition, a line item must not be mentioned in more than one confirmation request. Multiple confirmations are allowed, and sensible, only for "allDetail" or "detail". Only one confirmation per order is allowed for "accept", "except", or "reject". When a confirmation with one of these types arrives, the receiving system must discard all previous confirmations for the purchase order.

ConfirmationItem elements can appear in any order within the ConfirmationRequest document. However, listing the lineNumber elements in ascending order is preferred. Again, no line item can appear more than once within a ConfirmationRequest element.

OrderReference Element

The OrderReference element provides a clear reference to a purchase order. While the contained DocumentReference provides an unambiguous reference, the additional attributes of the OrderReference allow the ConfirmationRequest and ShipNoticeRequest to be viewed independently. The OrderReference contains a DocumentReference element (see page 231) and two attributes: orderID and orderDate.

orderID Attribute

Specifies the buyer system orderID for the confirmation, that is, the PO number. When used, it must be copied directly from the referenced OrderRequest OrderRequestHeader element.

orderDate Attribute

Specifies the date and time the OrderRequest was created. If present, it must be copied directly from the referenced OrderRequest OrderRequestHeader element.

10 Later Status Changes

ConfirmationHeader Element

The ConfirmationHeader element contains information that is common to all items contained in the ConfirmationRequest. It has the following attributes:

- type
- noticeDate
- invoiceID
- operation
- ConfirmID
- incoTerms

The ConfirmationHeader element can contain the following elements:

- DocumentReference
- Tax
- Shipping
- Total
- Contact
- Hazard
- Comments
- Extrinsic

If the ConfirmationHeader (see page page 220) is either, "allDetail", "detail" or "except", you can include ConfirmationItem elements to update specific line items from a purchase order.

The following example shows a ConfirmationRequest of type "except":

```
<ConfirmationRequest>
    <!-- Without the confirmID, it remains possible to update the original confirmation.
    This update refers (in the OrderReference element) to the same OrderRequest
    document, describes the status of the same items and refers to the original
    confirmation document in the DocumentReference element. However, the confirmID
    makes the update much more explicit.
    Note: The noticeDate changes to match the time of the update and not the original
    confirmation time.-->

    <ConfirmationHeader type="except" noticeDate="2000-10-13T18:39:09-08:00"
        confirmID="C999-234" operation="update"
        invoiceID="I1102-10-13">
    <DocumentReference payloadID="1233444-2001@premier.workchairs.com" />
    <Total>
        <Money currency="USD">190.60</Money>
    </Total>
    <Shipping>
```

```
              <Money currency="USD">2.5</Money>
              <Description xml:lang="en-CA">FedEx 2-day</Description>
          </Shipping>
          <Tax>
              <Money currency="USD">0.19</Money>
              <Description xml:lang="en-CA">CA Sales Tax</Description>
          </Tax>
          <Contact role="shipFrom">
              <Name xml:lang="en-CA">Workchairs, Vancouver</Name>
              <PostalAddress>
                  <Street>432 Lake Drive</Street>
                  <City>Vancouver</City>
                  <State>BC</State>
                  <PostalCode>B3C 2G4</PostalCode>
                  <Country isoCountryCode="CA">Canada</Country>
              </PostalAddress>
              <Phone>
                  <TelephoneNumber>
                      <CountryCode isoCountryCode="CA">1</CountryCode>
                      <AreaOrCityCode>201</AreaOrCityCode>
                      <Number>9211132</Number>
                  </TelephoneNumber>
              </Phone>
          </Contact>
          <Comments xml:lang="en-CA">Look's great, but for the price.</Comments>
      </ConfirmationHeader>
      <!-- The orderID and orderDate attributes are not required in the OrderReference
      element. -->
      <OrderReference orderID="DO1234">
          <DocumentReference payloadID="32232995@hub.acme.com" />
      </OrderReference>
      <ConfirmationItem lineNumber="1" quantity="10">
          <UnitOfMeasure>EA</UnitOfMeasure>
          <ConfirmationStatus quantity="10" type="detail" shipmentDate="2000-10-14"
              deliveryDate="2000-10-19">
              <UnitOfMeasure>EA</UnitOfMeasure>
              <UnitPrice>
                  <Money currency="USD">1.64</Money>
              </UnitPrice>
              <Comments xml:lang="en-CA">Very sorry. There's been a slight
              (30 cents) price increase for that colour and it will be one day late.
              </Comments>
          </ConfirmationStatus>
      </ConfirmationItem>
</ConfirmationRequest>
```

type Attribute

This required attribute specifies the type of confirmation.

accept	Accepts the entire order as described in the referenced purchase order.
	A document of this type can contain ConfirmationItem elements. They must contain only ConfirmationStatus elements of type="accept".
allDetail	Updates only specific line items. Line items not mentioned retain their current status. Unlike the "detail" type, this type of confirmation includes all information known by the supplier, whether or not it differs from the data provided in the original OrderRequest document.
	This confirmation is compatible with current EDI and order entry tools, which commonly send buyers a snapshot of an order in supplier's systems. Due to the reconciliation issues caused by confirmations of this type, it is recommended that this type be considered as a "bridge" strategy for the short term.
	This confirmation must contain ConfirmationItem elements and ConfirmationStatus elements must have types "allDetail", "reject", or "unknown". Do not include "accept" or "detail" ConfirmationStatus types because they could conflict.
detail	Updates individual line items. Line items not mentioned retain their current states. This document type should include only information that differs from the information in the purchase order.
	Do not include the variations described in an earlier ConfirmationRequest in later ConfirmationRequest documents that restore information provided in the purchase order. For example, the Tax element might appear in the ConfirmationStatus of one ConfirmationRequest but not in an update to that confirmation. This signifies that the purchase order contained the correct charge.
	This document type must contain ConfirmationItem elements and ConfirmationStatus elements can have any type except "allDetail".
backordered	Sets the entire purchase order to backordered status. The supplier does not have the items in stock, but will ship them when they are available.
except	Accepts the entire purchase order with exceptions. Line items not mentioned are as described in the purchase order.
	This document type must contain ConfirmationItem elements and ConfirmationStatus elements can have any type except "allDetail".
reject	Rejects the entire purchase order. Specify a reason for the rejection in the Comments element. This document must not contain ConfirmationItem elements.

requestToPay	Requests the initiation of payment transactions for either the entire purchase order or some line items.
	If there are no ConfirmationItem elements, the payment is against the total amount of the purchase order, except those being rejected.
	If there are ConfirmationItem elements, the payment is against the specified items and quantities.
	This document does not have to describe the complete line item. It contains "requestToPay" ConfirmationStatus elements for new payment transactions.
replace	Replaces all of the items from the purchase order. This document includes only "detail" ConfirmationStatus elements, and they must include an ItemIn element.
	If the buyer sends a change order before receiving this type of OrderConfirmation, the supplier should accept the change order.

noticeDate Attribute

Specifies the date and time the confirmation document was created.

invoiceID Attribute

The invoiceID attribute is an optional supplier-generated identifier for an invoice associated with the items described in this confirmation. It is identical to the Invoice Number that appears at the top of a physical invoice.

confirmID Attribute

A supplier-specified optional identifier for the document assigned by the supplier. The attribute is user-visible and secondary to the document's PayloadID.

This value does not vary as a particular confirmation is updated. That is, documents with operation="update" describing the status of the same items in the same order share a confirmID with the original ConfirmationRequest with operation="new".

When the confirmID does not appear in an operation="new" ConfirmationRequest, it must not appear in a corresponding operation="update" document. The DocumentReference element contained in the update's ConfirmationHeader and the payloadID attribute of the original or previous update link the two documents.

operation Attribute

This optional attribute specifies whether the confirmation is new, or an update to a previous confirmation.

new	Default value. No previous confirmation request has been sent.
update	Updates a previous confirmation request. The confirmID must match a previous request's confirmID.

An "update" confirmation allows a supplier to correct an error in a confirmation or to add additional information learned later. In either case, an "update" document must be complete: all data from the original confirmation or a previous update should be discarded by the recipient.

The requirement that the confirmation be complete enables ConfirmationRequest information to expand. There are no restrictions on new items not yet referenced in an "update" ConfirmationRequest. New items must not have already been mentioned in another ConfirmationRequest unless all of the items from the other confirmation are now described in the consolidated document. This protocol does not support splitting confirmations (sending an "update" ConfirmationRequest document describing a subset of items in an earlier version), or partial consolidations of confirmations (sending an "update" ConfirmationRequest document that contains a subset of information from another confirmation).

An "update" ConfirmationRequest must contain the same confirmID, if any, as the previous version of the confirmation. This attribute is an unambiguous and a direct connection between all versions of the confirmation.

An "update" ConfirmationRequest must also include a DocumentReference element in the ConfirmationHeader. See "DocumentReference Element" on page 223 for more information on this element. This element sequences multiple versions of a confirmation and is the only link between those versions. See "confirmID Attribute" on page 221 for more of the implications of leaving out the attribute. Other confirmations discarded through consolidations as previously described are not explicitly referenced by the new, larger ConfirmationRequest document.

A confirmation can not be deleted; the protocol does not include a delete option for this request. Suppliers must replace incorrect or invalid confirmations with correct information. A type="unknown" ConfirmationStatus will reset such information to its original state. This covers the case of an error in accepting or rejecting an item that has not been researched.

incoTerms Attribute

The incoTerms attribute specifies optional shipping terms defined by the *International Chamber of Commerce*. These terms inform the buyer which portion of the shipping charges are their responsibility. Allowed values include:

cfr	Cost and freight
cif	Cost, insurance, and freight
cip	Carriage and insurance paid to
cpt	Carriage paid to
daf	Delivered at frontier
ddp	Delivered duty paid
ddu	Delivered duty unpaid
deq	Delivered ex quay (duty paid)
des	Delivered ex ship
exw	Ex works
fas	Free alongside ship
fca	Free carrier
fob	Free on board vessel

DocumentReference Element

The DocumentReference element should appear only when operation is "update" (see page 222). It should reference the most recent ConfirmationRequest document for this particular confirmation, usually indicated by a common confirmID. For example, when a confirmation is created, updated, and then updated again, the final document should contain a DocumentReference referring to the previous ConfirmationRequest with operation="update". That document, in turn, refers to the original operation="new" ConfirmationRequest document (see page 222).

Tax and Shipping Elements

Tax and Shipping amounts can be updated and included in the confirmation with new values without any corresponding line item information.

Total Element

The Total value should match the OrderRequest document value unless a
ConfirmationItem describes a new UnitPrice or quantity. It is not necessary to copy this
information from the OrderRequest document: although permissible, Total, Tax, and
Shipping information should not be included if they match those amounts in the
original order.

Contact Element

The Contact element should be used primarily to add new information about an order.
It is not necessary to copy this information from the OrderRequest document.

Contact role values include:

technicalSupport	Technical support
customerService	Customer service
sales	Sales
shipFrom	Starting point for shipments related to this order
shipTo	Copies the ShipTo element from the OrderRequest document
payTo	Where payment for this order should be sent
billTo	Copies the BillTo element from the OrderRequest document
supplierCorporate	Supplier at corporate

Elements in the Contact list can appear in any order. A contact role must not appear
more than once within a ConfirmationHeader element.

Hazard Element

Elements in the Hazard list can appear in any order. The same hazard should not be
listed more than once in a ConfirmationHeader element. Each hazard listed at this level
should apply to the entire order or all items mentioned in the confirmation. A
ConfirmationRequest that updates the status of a single line item should not include
Hazard elements in the ConfirmationItem element. See "Hazard Element" on page 240 for
more information.

Comments Element

The Comments element can contain additional information about the status of the
overall order, or the portion described in this confirmation, such as payment terms,
additional details on shipping terms and clarification of the status. For status
information, terms such as "backordered", "shipped", and "invalid" might be
appropriate. All such data are intended for human use.

Extrinsic Element

The Extrinsic element list can be used to insert additional data about the order for application consumption. These elements can include pre-defined keywords and values affecting workflow in the receiving system.

Elements in the Extrinsic list can appear in any order. An extrinsic type must not appear more than once within a ConfirmationHeader element. A type must not be mentioned both in this list and in a particular ConfirmationStatus element. The ConfirmationHeader must not contain a default extrinsic value overridden at the lower level.

ConfirmationItem Element

The ConfirmationItem element completely describes the status of a specific line item. The ConfirmationItem element can contain the following elements: UnitOfMeasure, ConfirmationStatus, Contact, and Hazard. ConfirmationStatus can occur more than once, and only Contact is optional.

ConfirmationItem has the following attributes:

quantity	Specifies how many items were ordered. Expressed in units given in the UnitOfMeasure element. Matches the quantity value for the line item's ItemOut element in the corresponding OrderReference element. Required.
lineNumber	Position, counting from 1, of the item in an order. Matches the corresponding line item, ItemOut, in the document referenced by the OrderReference element. Required.

You can use more than one ConfirmationRequest document to update the status of an entire order, but only mention a particular line item in one document and in only one ConfirmationItem within that document.

Contact Element

Use Contact elements in the ConfirmationItem to describe contacts specific to the item. The elements can be in any order. If you specify a particular Contact role, specify it in the ConfirmationItem or ConfirmationHeader but not both. Do not specify the role more than once within a ConfirmationItem.

List elements in the Contact list in any order. Do not add a Contact role attribute more than once within a ConfirmationItem element.

Hazard Element

List elements in the Hazard list in any order. Do not list the same hazard more than once in a ConfirmationItem. Each hazard listed at this level, in a ConfirmationItem element, must apply to this specific line item. A ConfirmationRequest that updates the status of a single line item should not include Hazard elements in the ConfirmationItem element.

ConfirmationStatus Element

The ConfirmationStatus element provides the status of a specific line item or portion thereof. Quantities at this level must sum to the quantity in the containing ConfirmationItem. Use a consistent UnitOfMeasure in the ConfirmationItem element and its contained ConfirmationStatus element. In a substitution, you can use a different UnitOfMeasure in the ItemDetail contained within the ItemIn element.

When accepting or rejecting an item, include only a UnitOfMeasure element in the ConfirmationStatus element.

Use an ItemIn element only to recommend a substitution. With a substitution, you must match the quantity of the ItemIn element to that of the containing ConfirmationStatus, unless the UnitOfMeasure has changed. This requires an ItemDetail element within the ItemIn element.

You can update UnitPrice, Tax and Shipping amounts in the ConfirmationStatus element without a complete part substitution. It is not necessary to copy this information from the OrderRequest document. Do not include UnitPrice, Tax, and Shipping if they match those in the original ItemOut element.

When the type is "accept", "allDetail", or "detail", you can add tax or shipping amounts not mentioned in the original order. Use the "accept" type when these additions are the only changes to the order. Use the "detail" type to indicate a substitution if there is an ItemIn element, a price change if there is a UnitPrice element, or a delayed shipment if there is a deliveryDate attribute. The "allDetail" type requires reconciliation software to determine what has changed since the original order.

Use the Comments element to add information about the status of this portion of the item. Terms such as "backordered", "shipped", and "invalid" might be sensible. All such data is intended for human use.

Alternately, use the Extrinsic element list to insert additional data about this particular item portion for application consumption. These elements can include pre-defined keywords and values affecting workflow in the receiving system.

Elements in the Extrinsic list can appear in any order. An extrinsic attribute value must not appear more than once within a ConfirmationStatus element. A type must not be mentioned both in this list and in the overall ConfirmationHeader element. The ConfirmationHeader must not contain a default extrinsic value overridden at this lower level.

quantity Attribute

Specifies how many items have this status. Expressed in the units specified in the UnitOfMeasure element.

type Attribute

Specifies the status of this portion of the order.

accept	Accept this portion as described in the referenced ItemOut element.
allDetail	Accept this portion of the line item as detailed in the contents of this ConfirmationStatus element. These contents completely describe what will be shipped. Unlike the "detail" type, this confirmation type includes all information known by the supplier, whether or not it differs from the data provided in the original OrderRequest document.
	This type is provided for compatibility with current EDI and order entry tools, which commonly send the buyer a snapshot of an order in the supplier's systems. Due to the reconciliation issues caused by confirmations of this type, it is recommended that you use this type as a "bridge" strategy suitable only for the short term.
	Allowed only in documents whose ConfirmationHeader type is "allDetail".
detail	Accept this portion with the changes detailed in the ConfirmationStatus element. At least one of the UnitPrice, Shipping, Tax, or ItemIn elements, or the deliveryDate attribute must be present. This is a substitution if there is an ItemIn element, a price change if there is a UnitPrice element, or a delayed shipment if there is a deliveryDate attribute.
reject	Reject this portion of the line item.
requestToPay	Requests payment for this portion of the line item. It initiates a request to the financial institution to begin the settlement process of the portion of the line item.
	This type is allowed in documents with overall request (ConfirmationHeader) type "requestToPay".

unknown	The status of this portion of the line item is not known at the time of this confirmation. This line item status provides a placeholder while the supplier does further research. Update confirmations can also reset the status of a line item portion to "unknown" when an earlier confirmation incorrectly accepted or rejected that portion. Allowed only in documents whose ConfirmationHeader type is "allDetail", "detail", or "except".
backordered	Sets this portion of the line item to backordered status. The supplier does not have the items in stock, but will ship them when they are available.

shipmentDate Attribute

Specifies the date and time this shipment is expected to leave the supplier. Use the ConfirmationStatus element to include this information if the type is "accept", "allDetail", or "detail".

deliveryDate Attribute

Specifies the new date and time this shipment is expected to arrive. Do not include if the value matches the requestedDeliveryDate attribute, if any, in the corresponding OrderRequest document. Otherwise, use the ConfirmationStatus element to include this information if its type is "accept", "allDetail", or "detail".

ShipNoticeRequest

Suppliers use the ShipNoticeRequest document to send shipment information about orders. This transaction describes a single shipment and can contain portions of multiple orders as well as hazard information for the entire shipment or individual line items.

> **Note:** The DTD for this transaction is contained in Fulfill.dtd rather than cXML.dtd.

ShipNoticeRequest can contain the following elements:

- ShipNoticeHeader
- ShipControl
- ShipNoticePortion

ShipNoticeRequest documents do not provide updates to tax and shipping amounts. This information should be transmitted with ConfirmationRequest documents. If necessary, you can send a ConfirmationRequest with operation="update" with this information after the shipment has been delivered.

ConfirmationRequest and ShipNoticeRequest documents with operation="update" must include all relevant information from the original OrderRequest document.

The following example shows a ShipNoticeRequest element:

```
<ShipNoticeRequest>
  <ShipNoticeHeader shipmentID="S2-123" noticeDate="2000-10-14T18:39:09-08:00"
      shipmentDate="2000-10-14T08:30:19-08:00"
      deliveryDate="2000-10-18T09:00:00-08:00">
    <Contact role="shipFrom">
      <Name xml:lang="en-CA">Workchairs, Vancouver</Name>
      <PostalAddress>
        <Street>432 Lake Drive</Street>
        <City>Vancouver</City>
        <State>BC</State>
        <PostalCode>B3C 2G4</PostalCode>
        <Country isoCountryCode="CA">Canada</Country>
      </PostalAddress>
      <Phone>
        <TelephoneNumber>
          <CountryCode isoCountryCode="CA">1</CountryCode>
          <AreaOrCityCode>201</AreaOrCityCode>
          <Number>9211132</Number>
        </TelephoneNumber>
      </Phone>
    </Contact>
    <Comments xml:lang="en-CA">Got it all into one shipment.</Comments>
  </ShipNoticeHeader>
  <ShipControl>
    <CarrierIdentifier domain="SCAC">FDE</CarrierIdentifier>
    <CarrierIdentifier domain="companyName">Federal Express</CarrierIdentifier>
    <ShipmentIdentifier>8202 8261 1194</ShipmentIdentifier>
  </ShipControl>
  <ShipNoticePortion>
  <!-- The orderID and orderDate attributes are not required in the OrderReference
      element. -->
    <OrderReference orderID="DO1234">
      <DocumentReference payloadID="32232995@hub.acme.com" />
    </OrderReference>
  </ShipNoticePortion>
</ShipNoticeRequest>
```

The ShipNoticeRequest element contains information about a ship notice common to all contained items. It is not necessary to copy this information from the OrderRequest document. The Contact element should be used primarily to add new information about an order.

The ShipNoticeRequest element contains three elements: ShipNoticeHeader, ShipControl, and ShipNoticePortion. All are required, and both ShipNoticePortion and ShipControl can occur more than once.

Shipments with multiple responsible carriers are described in one of two ways:

1. A single carrier or third-party logistics provider creates a tracking identifier that can be used to retrieve information about the entire trip. Suppliers send such information in a single ShipControl element.

2. Each segment requires a separate tracking number. Suppliers send such information with one ShipControl element per segment.

ShipControl elements must appear in the order the shipment will travel. The first such element must not have an explicit starting date, the ShipControl startDate attribute must not be present, and that carrier's control must begin at the shipment's orgination time specified by the ShipNoticeHeader shipmentDate attribute value. All later ShipControl elements must have increasing, or later, starting dates specified by the ShipControl startDate attribute value.

ShipNoticePortion elements can appear in any order. A particular order, with ShipNoticePortion, OrderReference, or DocumentReference payloadID attribute value, must not appear more than once in a ShipNoticeRequest element.

> **Note:** Many elements and attributes in the ShipNoticeRequest and ShipNoticeHeader elements are optional only for the operation="delete" case. For other operations, one or more ShipControl and ShipNoticePortion elements must appear in a ShipNoticeHeader element.

ShipNoticeHeader Element

The ShipNoticeHeader element contains information about a ship notice common to all contained items. The ShipNoticeHeader element can contain the following elements: ServiceLevel, DocumentReference, Contact, Hazard, Comments, and Extrinsic, all of which are optional.

ServiceLevel Element

One or more ServiceLevel elements must appear in all ShipNoticeRequest documents, except when operation="delete" is specified. Each ServiceLevel must contain a single string corresponding to the level of service, such as "overnight", provided by the carrier for this shipment. When multiple ServiceLevel elements appear, all must describe the same level of service in different languages or locales. No two ServiceLevel elements can have the same xml:lang attribute. Elements in such a list can appear in any order.

DocumentReference Element

The contained DocumentReference element appears only when the operation is "update" or "delete". In that case, the DocumentReference element references the most recent ShipNoticeRequest document for this particular ship notice, usually indicated by a common shipmentID. For example, when a ship notice is created, updated, and then updated again, the final document should contain a DocumentReference referring to the previous ShipNoticeRequest with operation="update". That document, in turn, refers to the original operation="new" ShipNoticeRequest document.

Contact Element

Contact roles can include: technicalSupport, customerService, sales, shipFrom (starting point for this shipment), shipTo (should echo the ShipTo element from the OrderRequest documents), buyerCorporate (details the supplier has about the buying organization), and supplierCorporate. Generally, it is not necessary to copy information from the various OrderRequest documents: the Contact element should be used primarily to add information to that known about an order.

Elements in the Contact list can appear in any order. A Contact role attribute value must not appear more than once within a ShipNoticeHeader element.

Hazard Element

Elements in the Hazard list can appear in any order. The same hazard should not be listed more than once in a ShipNoticeHeader. Each hazard listed at this level, in a ShipNoticeHeader element, should apply to the entire shipment, or to all items contained in this shipment. A ShipNoticeRequest for a single line item should not include Hazard elements in the ShipNoticeItem element.

Comments Element

Use the Comments element to include additional information about the shipment. In the ShipNoticeHeader element, that information must be common to all contained items and routes. All such data must be intended for human use.

Extrinsic Element

Alternately, use the Extrinsic element list to insert additional data about the shipment for application consumption. These elements can include pre-defined keywords and values affecting workflow in the receiving system.

Elements in the Extrinsic list can appear in any order. An extrinsic type, Extrinsic name attribute value, must not appear more than once within a ShipNoticeHeader element. A type must not be mentioned both in this list and in a particular ShipControl or ShipNoticePortion element. The ShipNoticeHeader must not contain a default extrinsic value overridden at either lower level.

shipmentID Attribute

A supplier-specified optional identifier for the document. The attribute is user-visible and secondary to the document's PayloadID. It is required.

This value does not vary as a particular ship notice is updated. That is, "update" or "delete" documents describing the same shipment share a shipmentID with the original "new" ShipNoticeRequest.

operation Attribute

This optional attribute specifies whether the ShipNoticeRequest document is new or an update to a previous ship notice.

new	Default value. No previous ship notice has been sent.
update	Updates a previous ship notice request. Allows a supplier to correct an error in a ship notice or to add additional information learned later. In either case, an "update" document must be complete: all data from the original should be discarded by the recipient. The shipmentID must match a previous request's shipmentID.
delete	Removes the changes described in the previous new or updated ShipNoticeRequest from the state of the shipment. Only use when the supplier discards a planned shipment or incorrectly sends a ShipNoticeRequest about an order that will not take place. The shipmentID must match a previous request's shipmentID.

If the operation is not "new", explicitly or by default, you must also include in the ShipNoticeRequest a DocumentReference element in the ShipNoticeHeader element. See "DocumentReference Element" on page 231 for more information on this element. This effectively sequences multiple versions of a ship notice.

noticeDate Attribute

Specifies the date and time the ShipNoticeRequest document was created. Required.

shipmentDate Attribute

The date and time the shipment left the supplier. You must specify this attribute in all ShipNoticeRequest documents except when the operation is "delete".

deliveryDate Attribute

Specifies the date and time this shipment is expected to arrive. While this value can default to the requestedDeliveryDate of a single order, that attribute is optional in an OrderRequest document, and the ShipNoticeRequest can refer to multiple OrderRequest documents. You must include this attribute in all ShipNoticeRequest documents except when the operation is "delete".

ServiceLevel Element

Specifies a language-specific string for the service level code. Each ServiceLevel must contain a string in the specified language that corresponds to the level of service, such as "overnight", provided by the carrier for this shipment. It has the required attribute xml:lang (see page 92).

ShipControl Element

Specifies the carrier responsible for some portion of the shipment. A ShipControl element contains the CarrierIdentifier, ShipmentIdentifier, PackageIdentification, Route, Contact, Comments, and Extrinsic elements.

The shipment is tracked using the identifiers provided at this level. Those identifiers should be valid from the startDate of one ShipControl element or the shipment's shipmentDate until the startDate of the next.

CarrierIdentifier

The CarrierIdentifier list can include multiple identifiers for the same carrier. Elements in this list can appear in any order. A particular identification domain (CarrierIdentifier@domain attribute value) must not appear more than once in a ShipControl element. The identification provided by all elements of the CarrierIdentifier list must correspond to the same company.

Route Element

If present, Route elements must be in the order the shipment will travel.

Contact Element

The most common Contact roles in this element are:

carrierCorporate	Details the contact information the supplier has about the carrier organization.
shipFrom	A Contact element with role "shipFrom" must appear in all ShipControl elements after the first. This role must not appear in the first ShipControl element because it would duplicate that role in the overall ShipNoticeHeader element.

Do not use a "shipTo" role in this element because a Contact with role "shipTo" would always duplicate information in the following ShipControl element or that role in the ShipNoticeHeader. Control passes from one carrier to another at a particular location and estimated time.

List the elements in Contact in any order. A Contact role attribute value must not appear more than once within a ShipControl element.

Comments Element

The Comments element can contain additional information about the shipment while under the control of this carrier. In the context of the ShipControl element, that information must be common to all contained routes or made clear which Route is affected. All such data must be intended for human use.

Extrinsic Element

Alternately, the Extrinsic element list can be used to insert additional data about this carrier or their period of responsibility for application consumption. These elements can include pre-defined keywords and values affecting workflow in the receiving system.

Elements in the Extrinsic list can appear in any order. An Extrinsic name attribute value must not appear more than once within a ShipControl element. The same type must not be mentioned both in this list and in the overall ShipNoticeHeader element. The ShipNoticeHeader must not contain a default extrinsic value overridden at this lower level.

startDate Attribute

Specifies the date and time this shipment started this part of the route. Required for all ShipControl elements after the first. This attribute must not appear in the first ShipControl element because it would duplicate the ShipNoticeHeader's shipmentDate attribute.

Route Element

Specifies how the shipment will travel on this segment. If two ShipmentIdentifier values are present, the second defines the end of a contiguous and inclusive range of numbers that appear on the shipment. Route can contain a Contact element.

The only Contact role should be "carrierCorporate", which details the contact information the supplier has about the carrier organization, "shipFrom", and "shipTo".

Each carrier within a segment controlled by a third-party logistics provider provides tracking information to that provider externally. The ShipNoticeRequest includes tracking information at the ShipControl level only.

A Route element can describe only a single mode of travel. If described at all, each mode of a multi-modal route must be described by a separate Route element. It is not necessary to describe every leg of the journey to the buyer's ShipTo location.

The "carrierCorporate" role is relevant at this level only when a third party is providing tracking information across multiple carriers. A Contact element with role "shipFrom" must appear in all Route elements after the first. Route elements are not required to describe the entire travel under a specific carrier's control. They can describe a discontinuous stream of events, starting and ending at different times and locations.

Elements in the Contact list can appear in any order. A Contact role attribute value must not appear more than once within a Route element.

method Attribute

Identifies the transportation type code.

air	Transportation by flight
motor	Transportation by land motor craft, common carrier
rail	Transportation by rail
ship	Transportation by boat; ocean

Because shipments can travel through multiple segments with different methods, this attribute has no default.

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startDate Attribute

Specifies the date and time this shipment started this part of the trip. Required in all Route elements after the first.

endDate Attribute

Specifies the date and time this shipment ended this part of the trip. Must come after startDate. If any Route elements follow, the startDate of that element must not precede this value.

CarrierIdentifier Element

Identifies the carrier that will transport this shipment. There is one attribute, called domain.

domain Attribute

Specifies the domain in which CarrierIdentifier value has meaning. For example, "SCAC" for Standard Carrier Alpha Code, or the legal company name.

Recognized domains include the following:

company name	The legal name for this company. In some cases, this can also be provided in a Contact element with role "carrierCorporate". Using a Contact element should be reserved for cases in which additional detail about the carrier must be conveyed.
SCAC	Standard Carrier Alpha Code. www.nmfta.org
IATA	International Air Transport Association. www.iata.org
AAR	Association of American Railroads. www.aar.org
UIC	International Union of Railways. www.uic.asso.fr
EAN	European Article Numbering. www.ean-ucc.org
DUNS	Dun and Bradstreet's Data Universal Numbering System. www.dnb.com/dnbhome.htm

ShipmentIdentifier Element

A tracking number defined by the carrier that appears on the shipment that can be used to obtain additional detail about the shipment. Has meaning in the domain described by the CarrierIdentifier values in the containing Route element.

Different carriers have different names for shipment identifiers. This is commonly called a way bill number, a pro number, and also a bill of lading. They all represent tracking numbers.

PackageIdentification Element

Specifies the identifiers that appear on the containers, skids, boxes, or packages that constitute the shipment. The range of numbers described is inclusive at both extremes.

rangeBegin Attribute

Specifies the earliest number that appears on the separate elements in this shipment.

rangeEnd Attribute

Specifies the highest number that appears on the separate elements in this shipment. Must be greater than or equal to rangeBegin.

ShipNoticePortion Element

Contains purchase order and item information. Specifies what will be in the shipment. It contains three elements, OrderReference, ShipNoticeItem, Contact, Comments, and Extrinsic. All but OrderReference are optional. It contains two attributes: quantity and lineNumber.

OrderReference Element

A particular OrderRequest specified in the OrderReference element must be mentioned in at most one ShipNoticePortion element. While multiple shipments can be sent for one order, a ship notice must mention each order only once.

If a ShipNoticePortion element contains no ShipNoticeItem elements, the entire referenced order is included in the shipment. This simplifying option prevents inclusion of hazard and packaging information.

10 Later Status Changes

Contact Element

Any Contact elements provided at this level describe contacts specific to this portion of the order. The ShipNoticeHeader description mentions roles appropriate at this level as well, though shipFrom, shipTo, buyerCorporate, and supplierCorporate information should not vary at this level. A particular Contact role must not appear in both the ShipNoticePortion and ShipNoticeHeader elements. Therefore, roles such as "technicalSupport", "customerService", and "sales" are most appropriate within the ShipNoticePortion.

Elements in the Contact list can appear in any order. A Contact role attribute value must not appear more than once within a ShipNoticePortion element.

Comments Element

The Comments element can contain additional information about the order in this shipment. In this context (the ShipNoticePortion element), that information must be common to all contained items or make it clear which ShipNoticeItem is affected. All such data must be intended for human use.

Extrinsic Element

Alternately, the Extrinsic element list can be used to insert additional data about this order for application consumption. These elements can include pre-defined keywords and values affecting workflow in the receiving system.

Elements in the Extrinsic list can appear in any order. An Extrinsic name attribute value must not appear more than once within a ShipNoticePortion element. A type must not be mentioned both in this list and in the overall ShipNoticeHeader element. The ShipNoticeHeader must not contain a default extrinsic value overridden at this lower level.

ShipNoticeItem Element

The portion of a specific line item that is part of this shipment. Each line item from an order must be mentioned in at most one ShipNoticeItem element. ShipNoticeItem contains four elements: UnitOfMeasure (for more information, see "UnitOfMeasure" on page 58), Packaging, Hazard, and AssetInfo.

Elements in the Hazard list can appear in any order. The same Hazard should not be listed more than once in a ShipNoticeItem. Each Hazard listed at this level (in a ShipNoticeItem element) must apply to this specific line item. A ShipNoticeRequest for a single line item should not include Hazard elements in the ShipNoticeItem element.

quantity Attribute

Quantity specifies how many items were shipped. Expressed in units given in the UnitOfMeasure element.

lineNumber Attribute

Position, counting from 1, of the item in an order. Matches the corresponding line item, ItemOut, in the document referenced by the OrderReference element.

Packaging Element

Details about the packaging of this line item. The dimensions mentioned in the Dimension element list can appear in any order. The Packaging element contains one or more PackagingCode elements and optional Dimension element (see page 239). A particular Dimension type attribute value must not appear more than once in a Packaging element.

PackagingCode Element

Specifies one language-specific code for the packaging of the item. Values such as "pallet", "skid" and "truck load" might be appropriate for an English-based locale. The xml:lang attribute specifies the language or locale in which the PackagingCode content is written.

Dimension Element

Specifies a single dimension for the packaging of the item.

- quantity attribute

  Specifies the size in this dimension. Expressed in the units given in the UnitOfMeasure element.

- type attribute

  Type of dimension. Supported values include:

length	The length of the packaging.
width	The width of the packaging.
height	The height of the packaging.
weight	The weight of the packaging.
volume	The volume of the packaging

Hazard Element

The Hazard element provides a textual description and optional codes about hazards inherent in both an item and an overall shipment. A hazard for an entire shipment can be due to either identical hazards for all items or to hazards inherent in shipping the various products together. It can also include detailed handling requirements. There are two elements: Description, and Classification. Classification is optional and can occur more than once.

The Description element list, if provided, should include detailed handling requirements. Elements in this list can appear in any order. A description locale specified by the xml:lang attribute must not appear more than once. When more than one Description element is present, each must contain translations of a common description.

Classification elements can appear in any order. A Classification domain attribute must not appear more than once in a Hazard element.

All listed Classification elements and the Description, if provided, must relate to a single hazard. Additional hazards must use separate Hazard elements.

The following Classification domain values are expected in this context:

UNDG	United Nations Dangerous Goods
IMDG	International Marine Organization Dangerous Goods
NAHG	North American Hazardous Goods

AssetInfo Element

The AssetInfo element provides asset tag numbers or serial numbers for individual items in a shipment of goods. The buyer might want to know this information before receiving the shipment. This element can include the following attributes:

- tagNumber attribute

  Specifies a buyer-specific asset tag number identfier for the item. In order for the supplier to assign asset tag numbers on behalf of the buyer, the buyer and supplier must agree in advance which asset tag numbers the supplier should use and how they should be assigned.

- serialNumber attribute

  Specifies the serial number of the item.

- location attribute

  Specifies the location of the item.

Even though all attributes for AssetInfo are optional, the element should not be used unless at least one attribute is specified. If more than one attribute is specified, they should all refer to the properties of the same item.

OrderReference Element

The OrderReference element refers to a prior OrderRequest document. It contains a DocumentReference element.

orderID Attribute

Specifies the buyer system orderID for the ship notice, that is, the PO number. When used, it must be copied directly from the referenced OrderRequest document's OrderRequestHeader element.

orderDate Attribute

Specifies the date and time the OrderRequest was created. The date format is yyyy-mm-dd per international ISO standard 8601.

Chapter 11
Invoices

The cXML InvoiceDetail transaction enables suppliers to send invoices to buying organizations or marketplaces. This transaction supports invoice details for a wide variety of business scenarios, including standard invoices, credit memos, line-item credit memos, debit memos, and receipts.

This chapter describes:

- Overview of Invoices
- InvoiceDetailRequest
- Response
- Invoice Status Update
- Example Invoices

Overview of Invoices

Suppliers use cXML invoices to bill buying organizations or marketplaces for provided products or services. Invoices can be generated against any portion of any line items from single or multiple purchase orders. The InvoiceDetail transaction supports cancel invoices, credit memos, line-item credit memos, debit memos, and receipts.

Invoices describe purchase orders, line items, partners involved, accounting distribution, payment terms, discounts, shipping and special handling, taxes, deposit and prepayment, and remittance information.

Suppliers send invoices to commerce network hubs. Commerce network hubs route invoices to the buying organization by either querying the buying organization's ProfileResponse or by looking up routing information in the buying organization's network account.

The cXML InvoiceDetailRequest document represents an invoice. After a receiving system accepts an invoice document, it responds with a generic cXML Response.

After buying organizations begin processing invoices, they send StatusUpdateRequest documents to notify the commerce network hub about their reconciliation progress. The commerce network hub can forward these documents to suppliers.

Early InvoiceRequest Document

Previously, cXML support for invoicing was provided by the InvoiceRequest document, which contained less detail than InvoiceDetailRequest and did not support line item or summary invoices.

InvoiceRequest is deprecated in cXML 1.2.011. All cXML invoice projects should implement InvoiceDetailRequest.

Debit and Credit Amounts

In invoices, positive amounts are debits the buying organization owes the supplier; negative amounts are credits issued by the supplier to the buying organization. For example, the supplier can specify a SubtotalAmount of -50 USD to issue a credit of fifty US dollars to the buying organization. Debit can be used in both standard invoices and debit memos. Credit can be used in standard invoices, credit memos, and line-item credit memos.

For PCard-enabled purchase orders, suppliers can request payment by using either invoices or the request-to-pay functionality provided by ConfirmationRequest documents (for more information, see "ConfirmationRequest" on page 215.)

Shipping Information

Invoices can include shipping information such as shipping charges, dates, from/to addresses, and carrier IDs. Ones of the reasons invoices support shipping information is because it can affect the final prices and taxes for orders shipped internationally.

The shipping information in invoices is not meant to be a substitute for sending ShipNoticeRequest documents.

Types of Invoices

InvoiceDetailRequest has the features and flexibility to support most business scenarios.

Individual and Summary Invoices

cXML supports both *individual* and *summary* invoices:

Invoice Category	Description
Individual Invoice	Applies against a single purchase order.
Summary Invoice	Applies against multiple purchase orders.

Invoice Level

cXML supports both header and detailed invoices:

Invoice Level	Description
Header Invoice	Applies against the entirety of one or more purchase orders, without describing their line items.
	Specify isHeaderInvoice="yes" and use InvoiceDetailHeaderOrder elements, which do not contain line-item information.
Detailed Invoice	(Line-item level invoice) Applies against specific line items from one or more purchase orders.
	Leave out isHeaderInvoice and use InvoiceDetailOrder elements, which contain line-item information.

Invoice Purpose

Use the InvoiceDetailRequestHeader attributes to specify the purpose of the invoice.

Invoice Purpose	Description
Standard Invoice	Request for payment after providing products or services.
	Specify purpose="standard" and operation="new".
Credit Memo	Specifies credit to a buying organization.
	Specify purpose="creditMemo" and operation="new". Must be a header invoice. Amounts must be negative.
Line-Item Credit Memo	Specifies credit to a buying organization.
	Specify purpose="lineLevelCreditMemo" and operation="new". Must not be a header invoice. Amounts must be negative.
Debit Memo	Specifies debit to a buying organization.
	Specify purpose="debitMemo" and operation="new". Must be a header invoice. Amounts must be positive.
Information Only	Provides a record of charges, similar to a receipt. No action is expected.
	Specify isInformationOnly="yes" and operation="new".
Cancel Invoice	Cancels a previously sent invoice.
	Specify operation="delete".

Invoice DTD

The cXML standard uses multiple DTDs to optimize the performance of validating parsers. The InvoiceDetail transaction is defined in a separate DTD named InvoiceDetail.dtd, available at:

> http://xml.cXML.org/schemas/cXML/*<version>*/InvoiceDetail.dtd

InvoiceDetailRequest

InvoiceDetailRequest documents represent invoices.

The structure of the InvoiceDetailRequest document is:

```
<Request>
  <InvoiceDetailRequest>
     <InvoiceDetailRequestHeader>
        header information
     </InvoiceDetailRequestHeader>
     <InvoiceDetailHeaderOrder>
        order-level invoice information
     </InvoiceDetailHeaderOrder>
     . . .
or
     <InvoiceDetailOrder>
        detailed line-item information
     </InvoiceDetailOrder>
     . . .
     <InvoiceDetailSummary>
        invoice summary
     </InvoiceDetailSummary>
  </InvoiceDetailRequest>
</Request>
```

InvoiceDetailOrder elements are for detailed (line-item level) invoices and
InvoiceDetailHeaderOrder elements are for header invoices. Invoices must not contain
both types of elements. Both types of elements contain *invoice lines*.

All invoice line level amounts must add up to the total specified in
InvoiceDetailSummary.

InvoiceDetailRequestHeader

Defines header information that applies to the entire invoice.

InvoiceDetailHeader has the following attributes:

invoiceID	A supplier-generated identifier for the Invoice. Identical to the Invoice Number that appears at the top of a physical Invoice.
isInformationOnly	Indicates whether the buying organization needs to take action:
	yes — Invoice is for the buying organization's information only (no action needs to be taken by the buying organization).
	Not specified — (default) Invoice is functional. The buying organization needs to take action upon receiving this document (submit payment or accept credit).
purpose	Purpose of the invoice:
	standard — (default) A standard billing statement from the supplier to the buying organization.
	creditMemo — A credit memo for issuing credit to the buying organization. isHeaderInvoice must be yes. Also, the element InvoiceDetailSummary/DueAmount must be a negative amount.
	debitMemo — A debit memo for billing a balance owed by the buying organization. isHeaderInvoice must be yes. Also, the element InvoiceDetailSummary/DueAmount must be a positive amount.
	lineLevelCreditMemo — A line-item credit memo for issuing credit to the buying organization. isHeaderInvoice must be no. Also, the element InvoiceDetailSummary/DueAmount must be a negative amount.
operation	How this document is acting on the invoice:
	new — (default) Creates a new invoice.
	delete — Cancels an existing invoice. The PayloadID of the existing invoice must be specified in a DocumentReference.
invoiceDate	Date and time Invoice was created (should be earlier than the cXML timestamp).
invoiceOrigin	Indicates the originator of the invoice for categorization:
	supplier — Invoice originated by supplier.
	buyer — Invoice originated by buying organization.
	Not specified — Invoice origin is unknown.

InvoiceDetailHeaderIndicator

Defines indicators that describe overall attributes of the invoice. By default, all indicators are false.

InvoiceDetailHeaderIndicator has the following attributes:

isHeaderInvoice	Category of the invoice:
	yes — Header invoice. Invoice uses InvoiceDetailHeaderOrder, which contains header level invoice information without item details
	Not specified — Detail invoice. Invoice uses InvoiceDetailOrder, which contains item details.
isVatRecoverable	yes — The entire invoice is VAT (Value Added Tax)-recoverable.

InvoiceDetailLineIndicator

Indicates the presence of invoicing details at invoice line level (in InvoiceDetailItem, InvoiceDetailServiceItem, or InvoiceDetailOrderSummary). By default, all indicators are false.

If this element indicates that invoicing details exist at invoice line level, invoice lines that do not provide such information are assumed to have values of zero, or "not available" for that information.

InvoiceDetailLineIndicator has the following attributes:

isTaxInLine	yes — Tax (Tax) is provided at invoice line level. If header tax is specified, it will be ignored.
isSpecialHandlingInLine	yes — Special handling (InvoiceDetailLineSpecialHandling) is provided at invoice line level.
isShippingInLine	yes — Shipping (InvoiceDetailLineShipping) is provided at invoice line level.
isDiscountInLine	yes — Discount (InvoiceDetailDiscount) is provided at invoice line level.
isAccountingInLine	yes — Accounting distribution (Distribution) is provided at invoice line level. If isHeaderInvoice is true, this indicator must nor be specified, because Distribution is available only at item level.

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InvoicePartner

Defines a party involved in invoicing, including the issuer of the invoice and the person sold to.

Invoices support InvoicePartner because the Contact element alone does not support the wide variety of reference identifiers involved in invoicing.

Do not use this element to specify ship from or ship to; instead, use InvoiceDetailShipping.

Contact

Contact information of the invoice partner. Allowed contact roles are from, issuerOfInvoice, soldTo, billTo, remitTo.

Note that from and issuerOfInvoice must be synonymous.

IdReference

Defines an ID reference. The identifier/domain pair should be unique within each trading partner relationship (a buying organization and a supplier).

IdReference has the following attributes:

identifier	The unique identifier of the IdReference within the domain.
domain	The domain of the IdReference. One of the following values: accountID bankRoutingID accountPayableID federalTaxID stateTaxID accountReceivableID provincialTaxID vatID gstID taxExemptionIS Values can be application-specific, such as 1099ID or courtRegisterID. supplierTaxID has been deprecated and is treated as federalTaxID.

Creator

The creator of the IdReference (for example, the name of the bank, shipper, or other organization).

Description

Textual description of the IdReference for human readability.

DocumentReference

Identifies an earlier InvoiceDetailRequest document. If operation="delete", DocumentReference is required and it must reference the original InvoiceDetailRequest document (with operation="new"). In all other situations, DocumentReference is optional.

DocumentReference has the following attribute:

payloadID	The payloadID attribute of another cXML document.

InvoiceDetailShipping

The shipping details of the invoice.

InvoiceDetailShipping has the following attribute:

shippingDate	The date and time this shipment leaves the supplier.

Contact

The ship from and ship to addresses. Both ship from and ship to must be specified.

Contact has the following attributes:

role	The role name of the contact. Allowed roles are shipFrom, shipTo, and carrierCorporate.
addressID	Unique identifier for the contact's address.

Name

Name of the contact

PostalAddress

Postal address of the contact

Email

Email address of the contact

Email has the following attributes:

preferredLang	The language in which the recipient prefers to receive emails. This attribute is optional. See "xmlLangCode" on page 58 for more information.

Phone

Telephone number of the contact

Fax

Fax number of the contact

URL

Web address of the contact

CarrierIdentifier

This list can include multiple identifiers for the same carrier. Elements in this list can appear in any order. An identification domain (CarrierIdentifier domain) must not appear more than once in an InvoiceDetailShipping element. All identification provided by elements of one CarrierIdentifier list must correspond to the same company.

CarrierIdenifier has the following attribute:

domain	Domain for this value. Recognized domains include: companyName - The legal name for this company. In some cases, this could also be provided in a Contact element with role "carrierCorporate". That option should be reserved for cases in which additional detail about the carrier appears in this element. SCAC - Standard Carrier Alpha Code. www.nmfta.org/StandardCarrierAlphaCode/tabid/59/Default.aspx IATA - International Air Transport Association. www.iata.org AAR - Association of American Railroads. www.aar.org UIC - International Union of Railways. www.uic.asso.fr EAN - European Article Numbering. www.ean-ucc.org DUNS - D&B's Data Universal Numbering System. www.dnb.com

ShipmentIdentifier

The tracking number of this shipment.

DocumentReference

Identifies an earlier ShipNoticeRequest.

For more information, see "DocumentReference" on page 251.

InvoiceDetailPaymentTerm (deprecated)

InvoicedetailPaymentTerm is deprecated in cXML 1.2.011, in favor of PaymentTerm.

PaymentTerm

Defines a payment term in an invoice or order. PaymentTerm defines either the net term (without discount) or the discount term (with discount).

PaymentTerm has the following attributs:

payInNumberOfDays	The number of days after invoice date to pay in full.

Discount

The percentage or amount of the discount term. The discount rate applies if the invoice total is paid within the time specified by payInNumberOfDays. Positive rates denote discounts and negative rates denote penalties. Do not use a percentage sign (%) or divide by 100; for example "2" means 2%.

Do not use the Discount element if the PaymentTerm is a net term.

Period

The period over which the services were rendered.

Period has the following attributes:

startDate	The starting date of the service.
endDate	The ending date of the service.

InvoiceDetailOrder

Defines the invoice information of an order with item details, used only when isHeaderInvoice is false (not specified).

An invoice line is an InvoiceDetailItem or an InvoiceDetailServiceItem and its invoice line number is specified by the invoiceLineNumber attribute.

InvoiceDetailOrderInfo

Defines information related to the corresponding purchase order, including order reference and related master agreement reference, if any. Applications use this information to match the invoice with the corresponding purchase order or master agreement. The more definitive the reference, the more likely applications can successfully perform document matching.

InvoiceDetailOrderInfo can contain several possible elements for refering to documents. OrderReference is strongly recommended, but if that information is not available, use MasterAgreementReference, MasterAgreementIDInfo, OrderIDInfo, or SupplierOrderInfo, in that order.

OrderReference

The reference to the purchase order being invoiced.

MasterAgreementReference

Defines a reference to an earlier MasterAgreementRequest document. This element identifies the master agreement of the release order to be invoiced.

MasterAgreementReference has the following attributes:

agreementID	The ID number of a master agreement known to the buying organization's system.
agreementDate	The date and time the master agreement request was created.

MasterAgreementIDInfo

Defines the buying organization's ID number of the corresponding master agreement if the order being invoiced is a release. This element identifies the master agreement of the contract or release order to be invoiced.

MasterAgreementIDInfo has the following attributes:

agreementID	The ID number of a master agreement known to the buying organization's system.
agreementDate	The date and time the master agreement request was created.

OrderIDInfo

Identifies a purchase order known to the buying organization.

OrderIDInfo has the following attributes:

orderID	The ID of a purchase order (purchase order number) known to the buying organization.
orderDate	The date and time the purchase order was created.

SupplierOrderInfo

Defines supplier sales order information related to a purchase order.

SupplierOrderInfo has the following attribute:

orderID	Supplier sales order ID of the purchase order.

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InvoiceDetailItem

Defines an invoice line item.

The buying organization might require information provided here to match the information provided in the purchase order. For example, the buying organization might require there to be no change in the UnitOfMeasure value.

InvoiceDetailItem has the following attributes:

invoiceLineNumber	Supplier defined ID for the current invoice line. Should be unique across all invoice lines within an invoice.
quantity	The quantity being invoiced for the line item.
referenceDate	The reference date for the blanket order or contract item. The usage of this attribute is optional in most cases, and must be defined by the trading partners involved in the transaction. Procurement software might use this date in reconciling an invoice against a blanket order or contract.
inspectionDate	The date when the transfer of goods or the delivery of services occurs according to legal tax definitions. The usage of this attribute is optional in most cases, and must be defined by the trading partners involved in the transaction.

UnitOfMeasure

The line item's unit of measure. For more information, see "UnitOfMeasure" on page 58.

UnitPrice

The unit price.

InvoiceDetailItemReference

Defines all references related to an invoice line item.

InvoiceDetailItemReference has the following attributes:

lineNumber	The purchase order line number of current line item, copied from the OrderRequest.
serialNumber (deprecated)	The product serial number for the current line item. This attribute was deprecated in cXML 1.2.009. Use SerialNumber elements, instead.

ItemID

The supplier part number of current line item, from the OrderRequest.

Description

The line item description, from the OrderRequest.

SerialNumber

A serial number that uniquely identifies an accountable item that is being invoiced.

You can include multiple SerialNumber elements; the number of SerialNumber elements should match the invoice item quantity.

Use SerialNumber elements instead of the InvoiceDetailItemReference serialNumber attribute, which was deprecated in cXML 1.2.009.

ManufacturerPartID

The manufacturer part number.

ManufacturerName

The name of the manufacturer.

Country

The country of origin of the product listed in the line item.

SubtotalAmount

The invoice subtotal of the current line item: UnitPrice times quantity.

Tax

The tax for the line item. Ignored if isTaxInLine is false (not specified).

Money

The amount owed for tax.

Description

Textual description of the tax.

TaxDetail

Detailed information about the tax.

TaxDetail has the following attributes:

purpose	The purpose of the tax. For example, "tax" or "custom duty".
category	The category of the tax. For example, "sales", "usage", "vat", or "gst".
percentageRate	The tax rate percentage. Do not include a percent symbol (%).
isVatRecoverable	Set to "true" if the tax amount is recoverable.
taxPointDate	The date on which VAT becomes due
paymentDate	The date on which payment must be made (used only for transactions in France).
isTriangularTransaction	Set to "true" to indicate that the transaction occurred between three parties in three different countries, but the movement of goods did not follow the invoicing route. Add a Contract element with role="subsequentBuyer" to identify the subsequent buying organization in triangular transactions.
exemptDetail	When the tax rate is zero percentage, regulations may require that suppliers specify if the tax is required, or if the goods or services are exempt from taxations. This attribute can have the following values: - zeroRated: This indicates the goods and services are taxable, but the tax rate is zero percent. - exempt: This indicates the goods and services are tax exempt.

TaxableAmount

The amount that is taxable.

TaxAmount

The amount of tax.

TaxLocation

The locale in which the tax applies.

Description

Textual description of the tax.

TriangularTransactionLawReference

Reference to the relevant EU law covering the VAT for triangular transactions. For example, "VAT - EC Article 28 Simplification Invoice".

Extrinsic

Additional information related to TaxDetail. This information should not duplicate any information in TaxDetail.

InvoiceDetailLineSpecialHandling

The special handling information for the line item. Ignored if isSpecialHandlingInLine is false (not specified).

InvoiceDetailLineShipping

The shipping information for the line item. Ignored if isShippingInLine is false (not specified).

GrossAmount

The SubtotalAmount plus taxes, shipping, and special handling charges for the line item.

InvoiceDetailDiscount

The discount for the line item. Ignored if isDiscountInLine is false (not specified).

NetAmount

The GrossAmount minus discounts for the line item.

Distribution

Accounting information generated by the buying organization, such as cost center or general ledger category. This information should be copied from the OrderRequest. Ignored if isAccountingInLine is false (not specified).

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Comments

Textual comments for the line item.

Extrinsic

Additional information related to the line item. Should not duplicate anything in InvoiceDetailItem or InvoiceDetailOrder.

InvoiceDetailServiceItem

Specifies a service being invoiced.

InvoiceDetailServiceItem has the following attributes:

invoiceLineNumber	Supplier defined ID for the current invoice line. Should be unique across all invoice lines within an invoice.
quantity	The quantity being invoiced for the line item. For service items, quantity represents the number of units of service rendered. For example, 2 hours of service, where UnitOfMeasure is "HUR"
referenceDate	The reference date for the service item. This can indicate the date at which the service line item is being invoiced.
inspectionDate	The date when the transfer of goods or the delivery of services occurs according to legal tax definitions. The usage of this attribute is optional in most cases, and must be defined by the trading partners involved in the transaction.

InvoiceDetailServiceItemReference

InvoiceDetailServiceItemReference has the following attribute:

lineNumber	The line number of current line item on the master agreement. This value is required if the item being invoiced is part of a detailed master agreement that specifies detailed pricing terms at the line item or commodity level. It is optional if the item being invoiced is part of a master supplier agreement or blanket purchase order which do not contain detailed line item pricing information.

Classification

Commodity classification of the service.

ItemID

The Supplier's part number for the service

Description

Description of the service.

SubtotalAmount

The subtotal amount of the service item. If unit price and invoiced quantity are specified, then subtotal should be the product of them.

Period

The period during which the service was rendered.

For more information, see "Period" on page 253.

UnitRate

The rate at which the service item is charged. In cXML version 2.1.011 or later, use the UnitRate element rather than UnitOfMeasure and UnitPrice, because UnitRate includes the rate code. For some services, such as temporary labor, UnitRate is required.

UnitRate represents the amount to be paid per unit of time (or of some other measure). In the case of multiple UnitRates, each UnitRate should include a TermReference to distinguish it from others. TermReference is a generic base element that identifies the definition of the UnitRate in question. See "UnitRate" on page 155.

UnitOfMeasure (deprecated)

UnitOfMeasure is deprecated in cXML 1.2.011, and should not be used in new cXML documents. Use UnitRate instead. UnitOfMeasure is the unit of measure for the service. For example, HUR for per hour or MON for per month.

UnitPrice (deprecated)

UnitPrice is deprecated in cXML 1.2.011, and should not be used in new cXML documents. Use UnitRate instead. UnitPrice is the price, per unit of measure.

Tax

The tax for the line item. Ignored if isTaxInLine is false (not specified).

For more information, see "Tax" on page 257

GrossAmount

The SubtotalAmount plus taxes, shipping, and special handling charges for the line item.

InvoiceDetailDiscount

The discount for the line item. Ignored if isDiscountInLine is false (not specified).

NetAmount

The GrossAmount minus discounts for the line item.

Distribution

Accounting information generated by the buying organization, such as cost center or general ledger category. This information should be copied from the OrderRequest. Ignored if isAccountingInLine is false (not specified).

Comments

Textual comments for the line item.

InvoiceLaborDetail

Contains information about an item related to temporary labor. l

Contractor

The contractor whose work is being invoiced.

JobDescription

A text description of the job being performed.

Supervisor

Specifies contact information for the person who supervises the contractor.

WorkLocation

The address of the place where the work is performed.

InvoiceTimeCardDetail

Invoice details about a temporary labor service. The pay code for this invoice line item is in the UnitRate of the containing InvoiceDetailServiceItem.

TimeCardReference

Provides a clear reference to a prior TimeCard cXML document. TimeCardReference has the following attribute:

timeCardID	Unique ID for the timecard as sent on the TimeCard document during TimeCardInfoRequest or TimeCardRequest. For more information, see Chapter 8, "TimeCard Transaction."

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TimeCardIDInfo

Defines the unique ID of the timecard known to the buyer and supplier systems. TimeCardIDInfo has the following attribute:

timeCardID	Unique ID for the timecard as sent on the TimeCard document during TimeCardInfoRequest or TimeCardRequest. For more information, see Chapter 8, "TimeCard Transaction."

Extrinsic

Additional information related to this line item. Do not duplicate information in InvoiceDetailItem or InvoiceDetailOrder.

Use Extrinsic elements to specify line item related attributes such as service location, overtime/regular, and union/non- union.

For simple attributes such as overtime/regular, use a simple name, value pair, for example:

```
<Extrinsic name="serviceType">Temporary</Extrinsic>.
```

For structured attributes such as service location, use a structured element, for example:

```
<Extrinsic name="serviceLocation">
   <Contact role="serviceLocation">
      <Name>XYZ Inc</Name>
      <PostalAddress>
         <Street>123 Easy St</Street>
         <City>Sunnyvale</City>
         <State>California</State>
         <PostalCode>94089</PostalCode>
         <Country isoCountryCode="US">USA</Country>
      </PostalAddress>
   </Contact>
</Extrinsic>
```

InvoiceDetailHeaderOrder

Defines the header invoice information of a purchase order, without item details, used only when isHeaderInvoice="yes".

In this case, an invoice line is an InvoiceDetailHeaderOrder and its invoice line number is specified by the invoiceLineNumber attribute.

InvoiceDetailOrderInfo

Defines information related to the corresponding purchase order.

For more information, see "InvoiceDetailOrderInfo" on page 254

InvoiceDetailOrderSummary

Defines header level summary info of an order in an invoice line.

InvoiceDetailOrderSummary has the following attribute:

invoiceLineNumber	Supplier defined ID for the current invoice line. It should be unique across all invoice lines of the same InvoiceDetailRequest.
inspectionDate	The date when the transfer of goods or the delivery of services occurs according to legal tax definitions. The usage of this attribute is optional in most cases, and must be defined by the trading partners involved in the transaction.

SubtotalAmount

The invoice subtotal of the this order.

Period

The period over which the services were rendered.

For more information, see "Period" on page 253.

Tax

The tax for this order. Ignored if isTaxInLine is false (not specified).

For more information, see "Tax" on page 257.

InvoiceDetailLineSpecialHandling

The special handling information for this order. Ignored if isSpecialHandlingInLine is false (not specified).

InvoiceDetailLineShipping

The shipping information for this invoice line. Ignored if isShippingInLine is false (not specified).

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InvoiceDetailShipping

The shipping details. For more information, see "InvoiceDetailShipping" on page 251.

Money

The shipping amount.

GrossAmount

The SubtotalAmount plus taxes, shipping, and special handling charges.

InvoiceDetailDiscount

The discount or penalty for this invoice line. Ignored if isDiscountInLine is false (not specified).

InvoiceDetailDiscount has the following attribute:

percentageRate	Discount or penalty rate percentage. Positive rates denote discounts and negative rates denote penalties. Do not include a percentage sign (%) or divide by 100; for example "2" means 2%.

NetAmount

The GrossAmount minus discount amount.

Comments

Textual comments for the line item.

Extrinsic

Additional information related to the line item. Should not duplicate anything in InvoiceDetailOrderSummary or InvoiceDetailHeaderOrder.

InvoiceDetailSummary

Defines the summary information of an invoice.

SubtotalAmount

Sum of line item quantities multiplied by unit price.

Tax

Total tax information.

For more information, see "Tax" on page 257.

SpecialHandlingAmount

Total special handling charge. You can optionally add a Description element to explain the charge.

ShippingAmount

Total shipping charge.

GrossAmount

Sum of subtotal, taxes, special handling charges, and shipping charges, before discounts.

InvoiceDetailDiscount

The total discount or penalty applied in the invoice.

For more information, see "InvoiceDetailDiscount" on page 266.

NetAmount

Total GrossAmount minus discounts.

DepositAmount

Total deposit or prepayment amount.

DueAmount

Total amount due and payable: NetAmount minus DepositAmount. If purpose="creditMemo", this amount must be negative. If purpose="debitMemo", this amount must be positive.

Response

Immediately after receiving an invoice, the receiving system should respond with a
generic cXML Response document, for example:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/
InvoiceDetail.dtd">
<cXML timestamp="2001-10-31T23:07:22-08:00" payloadID="1004598442900-
83672738151974670 70@10.10.13.100">
   <Response>
     <Status code="201" text="Accepted">Acknowledged</Status>
   </Response>
</cXML>
```

For a list of possible status codes, see "Status" on page 48.

Invoice Status Update

After buying organizations receive invoices, they can perform reconciliation to match
the charges within them to amounts within purchase orders or master agreements.
They can then set invoice status to indicate whether charges reconciled successfully.

Buying organizations update the status of invoices by sending StatusUpdateRequest
documents to commerce network hubs, which can forward them to suppliers.

StatusUpdateRequest documents for invoices contain InvoiceStatus elements. Invoice
status can be processing, reconciled, rejected, paying, or paid, which refers to the action
taken by the buying organization on the invoice:

processing	The invoice was received by the buying organization and is being processed.
reconciled	The invoice reconciled. The amounts in the invoice have not yet been paid.
rejected	The invoice failed to reconcile. The buying organization is rejecting the invoice. The Comments element should contain free text explaining why the invoice was rejected, and the actions the supplier should take. The supplier can resubmit a corrected invoice (a new invoice document with a new invoice number).
paying	The invoice is in the payment process or has been partially paid.

paid   The invoice amounts have been paid by the buying organization.

The PartialAmount element enables buying organizations to specify different amounts paid than the amounts specified in invoices. PartialAmount should not appear for invoices that are paid in full. The existence of PartialAmount alerts the supplier to read the Comments elements, which should explain the differences.

The DocumentReference within the StatusUpdateRequest must refer to the InvoiceDetailRequest document. The Status element should have status code 200.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2001-09-05T16:34:28-07:00" payloadID="999732868377--
681956365911302107@10.11.128.161">
   <Header>
      <From>
         <Credential domain="AribaNetworkUserId">
            <Identity>jill@buyerorg.com</Identity>
         </Credential>
      </From>
      <To>
         <Credential domain="AribaNetworkUserId">
            <Identity>jack@supplierorg.com</Identity>
         </Credential>
      </To>
      <Sender>
         <Credential domain="AribaNetworkUserId">
            <Identity>jill@buyerorg.com</Identity>
            <SharedSecret>abracadabra</SharedSecret>
         </Credential>
         <UserAgent>Procurement Application V1.0</UserAgent>
      </Sender>
   </Header>
   <Request>
      <StatusUpdateRequest>
         <DocumentReference payloadID="Inv123"></DocumentReference>
         <Status code="200" text=""></Status>
         <InvoiceStatus type="paid">
            <PartialAmount>
               <Money currency="USD">10.99</Money>
            </PartialAmount>
         <Comments>This charge is paid, minus $2.00 due to missing items.</Comments>
         </InvoiceStatus>
      </StatusUpdateRequest>
   </Request>
</cXML>
```

For more information about the StatusUpdate transaction, see "StatusUpdateRequest" on page 210.

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Example Invoices

The following examples illustrate several types of invoices.

- Standard Header Invoice
- Standard Detail Invoice
- Service Invoice
- Marketplace Invoice

Standard Header Invoice

This example shows a header invoice against a single purchase order.

```
<?xml version="1.0" encoding="UTF-8"?> <!DOCTYPE cXML SYSTEM "http://
xml.cXML.org/schemas/cXML/1.2.020/InvoiceDetail.dtd">
<cXML timestamp="2009-03-10T16:23:01-07:00" payloadID="Mar102009_0447pm">
   <Header>
      <From>
         <Credential domain="AribaNetworkUserID">
            <Identity>jack@supplierorg.com</Identity>
         </Credential>
      </From>
      <To>
         <Credential domain="AribaNetworkUserID">
            <Identity>jill@buyerorg.com</Identity>
         </Credential>
      </To>
      <Sender>
         <Credential domain="AribaNetworkUserID">
            <Identity>jack@supplierorg.com</Identity>
            <SharedSecret>abracadabra</SharedSecret>
         </Credential>
         <UserAgent>Supplier's Super Invoice Generator</UserAgent>
      </Sender>
   </Header>
   <Request>
      <InvoiceDetailRequest>
         <InvoiceDetailRequestHeader invoiceDate="2009-03-09T00:00:00-07:00"
            invoiceID="Mar102009_0447pm" purpose="standard" operation="new"
            invoiceOrigin="supplier">
         <InvoiceDetailHeaderIndicator isHeaderInvoice="yes" />
         <InvoiceDetailLineIndicator isTaxInLine="yes" isShippingInLine="yes"
            isSpecialHandlingInLine="yes" isDiscountInLine="yes" />
         <InvoicePartner>
            <Contact role="billTo">
               <Name xml:lang="en-US">Buyer Headquarters</Name>
```

```
                  <PostalAddress>
                     <Street>111 Main Street</Street>
                     <City>Anytown</City>
                     <State>CA</State>
                     <PostalCode>94089</PostalCode>
                     <Country isoCountryCode="US">United States</Country>
                  </PostalAddress>
               </Contact>
            </InvoicePartner>
            <InvoicePartner>
               <Contact role="remitTo">
               <Name xml:lang="en-US">Supplier Accts. Receivable</Name>
               <PostalAddress>
                  <Street>One Bank Avenue</Street>
                  <City>Any City</City>
                  <State>CA</State>
                  <PostalCode>94087</PostalCode>
                  <Country isoCountryCode="US">United States</Country>
               </PostalAddress>
               </Contact>
               <IdReference identifier="123456789" domain="bankRoutingID" />
               <IdReference identifier="3456" domain="accountID" />
            </InvoicePartner>
            <Comments xml:lang="en-US">This is an invoice for DO789</Comments>
         </InvoiceDetailRequestHeader>
         <InvoiceDetailHeaderOrder>
            <InvoiceDetailOrderInfo>
               <OrderReference>
                  <DocumentReference payloadID="99576652.982.090.136" />
               </OrderReference>
            </InvoiceDetailOrderInfo>
            <InvoiceDetailOrderSummary invoiceLineNumber="1">
               <SubtotalAmount>
                  <Money currency="USD">5000.00</Money>
               </SubtotalAmount>
               <Tax>
                  <Money currency="USD">500.00</Money>
                  <Description xml:lang="en-US">State Tax</Description>
               </Tax>
               <InvoiceDetailLineSpecialHandling>
                  <Money currency="USD">110.00</Money>
               </InvoiceDetailLineSpecialHandling>
               <InvoiceDetailLineShipping>
                  <InvoiceDetailShipping>
                     <Contact role="shipFrom" addressID="1000487">
                        <Name xml:lang="en">Main Shipping Dock</Name>
                        <PostalAddress name="default">
                           <Street>15 Oak Road</Street>
                           <City>Bigtown</City>
                           <State>CA</State>
```

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```
                    <PostalCode>95032</PostalCode>
                    <Country isoCountryCode="US">United States</Country>
                 </PostalAddress>
                 <Email name="default">shipper@supplierorg.com</Email>
                 <Phone name="work">
                    <TelephoneNumber>
                       <CountryCode isoCountryCode="US">1</CountryCode>
                       <AreaOrCityCode>888</AreaOrCityCode>
                       <Number>1234567</Number>
                    </TelephoneNumber>
                 </Phone>
              </Contact>
              <Contact role="shipTo" addressID="1000487">
                 <Name xml:lang="en">Main Receiving</Name>
                 <PostalAddress name="default">
                    <DeliverTo>Jason Lynch</DeliverTo>
                    <Street>77 Nowhere Street</Street>
                    <City>Industrial Town</City>
                    <State>CA</State>
                    <PostalCode>95035</PostalCode>
                    <Country isoCountryCode="US">United States</Country>
                 </PostalAddress>
                 <Email name="default">jlynch@buyerorg.com</Email>
                 <Phone name="work">
                    <TelephoneNumber>
                       <CountryCode isoCountryCode="US">1</CountryCode>
                       <AreaOrCityCode>999</AreaOrCityCode>
                       <Number>3582000</Number>
                    </TelephoneNumber>
                 </Phone>
              </Contact>
           </InvoiceDetailShipping>
           <Money currency="USD">200.00</Money>
        </InvoiceDetailLineShipping>
        <GrossAmount>
           <Money currency="USD">5810.00</Money>
        </GrossAmount>
        <InvoiceDetailDiscount percentageRate="10">
           <Money currency="USD">581.00</Money>
        </InvoiceDetailDiscount>
        <NetAmount>
           <Money currency="USD">5229.00</Money>
        </NetAmount>
        <Comments>This a Standard Header Level Invoice</Comments>
     </InvoiceDetailOrderSummary>
  </InvoiceDetailHeaderOrder>
  <InvoiceDetailSummary>
     <SubtotalAmount>
        <Money currency="USD">5000.00</Money>
     </SubtotalAmount>
```

```
            <Tax>
               <Money currency="USD">500.00</Money>
               <Description xml:lang="en-US">State Tax</Description>
            </Tax>
            <SpecialHandlingAmount>
               <Money currency="USD">110.00</Money>
               <Description xml:lang="en">Invoice Surcharge</Description>
            </SpecialHandlingAmount>
            <ShippingAmount>
               <Money currency="USD">200.00</Money>
            </ShippingAmount>
            <GrossAmount>
               <Money currency="USD">5810.00</Money>
            </GrossAmount>
            <InvoiceDetailDiscount percentageRate="10">
               <Money currency="USD">581.00</Money>
            </InvoiceDetailDiscount>
            <NetAmount>
               <Money currency="USD">5229.00</Money>
            </NetAmount>
            <DepositAmount>
               <Money currency="USD">1000.00</Money>
            </DepositAmount>
            <DueAmount>
               <Money currency="USD">4229.00</Money>
            </DueAmount>
         </InvoiceDetailSummary>
      </InvoiceDetailRequest>
   </Request>
</cXML>
```

Standard Detail Invoice

This example shows a detail invoice for two line items in a single purchase order. It
contains payment terms that define discounts for early payment and penalties for late
payment. It also contains the buying organization's accounting information copied
from the purchase order.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/
InvoiceDetail.dtd">
<cXML payloadID="Oct102001_1204pm" timestamp="2001-04-20T23:59:45-07:00">
   <Header>
            From, To, and Sender credentials
   </Header>
   <Request>
      <InvoiceDetailRequest>
         <InvoiceDetailRequestHeader invoiceID="Oct102001_1204pm"
            purpose="standard" operation="new"
```

```
            invoiceDate="2001-04-20T23:59:20-07:00">
      <InvoiceDetailHeaderIndicator/>
      <InvoiceDetailLineIndicator isTaxInLine="yes" isShippingInLine="yes"
            isAccountingInLine="yes"/>
      <InvoicePartner>
         Sell To contact information
      </InvoicePartner>
      <InvoicePartner>
         Remit To contact information
      </InvoicePartner>
      <PaymentTerm payInNumberOfDays="10">
         <Discount>10</Discount>
      </PaymentTerm>
      <PaymentTerm payInNumberOfDays="20">
         <Discount>5</Discount>
      </PaymentTerm>
      <PaymentTerm payInNumberOfDays="30">
         <Discount>0</Discount>
      </PaymentTerm>
      <PaymentTerm payInNumberOfDays="40">
         <Discount>-5</Discount>
      </PaymentTerm>
      <PaymentTerm payInNumberOfDays="50">
         <Discount>-9</Discount>
      </PaymentTerm>
   </InvoiceDetailRequestHeader>
   <InvoiceDetailOrder>
      <InvoiceDetailOrderInfo>
         <OrderReference>
            <DocumentReference payloadID="99576652.982.090.136"/>
         </OrderReference>
         <MasterAgreementReference>
            <DocumentReference payloadID="99576652.980.000.423"/>
         </MasterAgreementReference>
         <SupplierOrderInfo orderID="DO1234"></SupplierOrderInfo>
      </InvoiceDetailOrderInfo>
      <InvoiceDetailItem invoiceLineNumber="1" quantity="1">
          <UnitOfMeasure>EA</UnitOfMeasure>
         <UnitPrice><Money currency="USD">15.40</Money></UnitPrice>
         <InvoiceDetailItemReference lineNumber="1">
            <ItemID>
               <SupplierPartID>TEX08134</SupplierPartID>
            </ItemID>
            <Description xml:lang="en">
               Texas Instruments Superview Calculator - 12-Digit Print/Display
            </Description>
            <SerialNumber>45993823469876</SerialNumber>
         </InvoiceDetailItemReference>
         <SubtotalAmount>
            <Money currency="USD">15.40</Money>
```

```
          </SubtotalAmount>
          <Tax>
             <Money currency="USD">1.54</Money>
             <Description xml:lang="en">total item tax</Description>
             <TaxDetail purpose="tax" category="sales" percentageRate="8">
                <TaxableAmount>
                   <Money currency="USD">15.40</Money>
                </TaxableAmount>
                <TaxAmount>
                   <Money currency="USD">1.23</Money>
                </TaxAmount>
                <TaxLocation xml:lang="en">CA</TaxLocation>
             </TaxDetail>
             <TaxDetail purpose="tax" category="sales" percentageRate="2">
                <TaxableAmount>
                   <Money currency="USD">15.40</Money>
                </TaxableAmount>
                <TaxAmount>
                   <Money currency="USD">0.31</Money>
                </TaxAmount>
                <TaxLocation xml:lang="en">US</TaxLocation>
             </TaxDetail>
          </Tax>
          <InvoiceDetailLineShipping>
             <InvoiceDetailShipping>
                   Ship From and Ship To contact information
             </InvoiceDetailShipping>
             <Money currency="USD">2.00</Money>
          </InvoiceDetailLineShipping>
          <GrossAmount>
             <Money currency="USD">18.94</Money>
          </GrossAmount>
          <NetAmount>
             <Money currency="USD">18.94</Money>
          </NetAmount>
          <Distribution>
             <Accounting name="Buyer assigned accounting code 15">
                <AccountingSegment id="ABC123456789">
                   <Name xml:lang="en">Purchase</Name>
                   <Description xml:lang="en">Production Control</Description>
                </AccountingSegment>
             </Accounting>
             <Charge>
                <Money currency="USD">18.94</Money>
             </Charge>
          </Distribution>
          <Distribution>
             <Accounting name="Buyer assigned accounting code 16">
                <AccountingSegment id="ABC000000001">
                   <Name xml:lang="en">Trade</Name>
```

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```
                          <Description xml:lang="en">Misc (Expensed)</Description>
                       </AccountingSegment>
                    </Accounting>
                    <Charge>
                       <Money currency="USD">18.94</Money>
                    </Charge>
                 </Distribution>
              </InvoiceDetailItem>
              <InvoiceDetailItem invoiceLineNumber="2" quantity="1">
                 <UnitOfMeasure>PK</UnitOfMeasure>
                 <UnitPrice><Money currency="USD">4.95</Money></UnitPrice>
                 <InvoiceDetailItemReference lineNumber="2">
                    <ItemID>
                       <SupplierPartID>PENCIL123</SupplierPartID>
                    </ItemID>
                    <Description xml:lang="en">
                       One dozen wood #2 pencils with eraser
                    </Description>
                 </InvoiceDetailItemReference>
                 <SubtotalAmount>
                    <Money currency="USD">4.95</Money>
                 </SubtotalAmount>
                 <Tax>
                    <Money currency="USD">0.50</Money>
                    <Description xml:lang="en">total item tax</Description>
                    <TaxDetail purpose="tax" category="sales" percentageRate="8">
                       <TaxableAmount>
                          <Money currency="USD">0.40</Money>
                       </TaxableAmount>
                       <TaxAmount>
                          <Money currency="USD">4.95</Money>
                       </TaxAmount>
                       <TaxLocation xml:lang="en">CA</TaxLocation>
                    </TaxDetail>
                    <TaxDetail purpose="tax" category="sales" percentageRate="2">
                       <TaxLocation xml:lang="en">US</TaxLocation>
                       <TaxableAmount>
                          <Money currency="USD">4.95</Money>
                       </TaxableAmount>
                       <TaxAmount>
                          <Money currency="USD">0.10</Money>
                       </TaxAmount>
                    </TaxDetail>
                 </Tax>
                 <InvoiceDetailLineShipping>
                    <InvoiceDetailShipping>
                       Ship From and Ship To contact information
                    </InvoiceDetailShipping>
                    <Money currency="USD">1.00</Money>
                 </InvoiceDetailLineShipping>
```

```
                  <GrossAmount>
                     <Money currency="USD">6.45</Money>
                  </GrossAmount>
                  <NetAmount>
                     <Money currency="USD">6.45</Money>
                  </NetAmount>
               </InvoiceDetailItem>
            </InvoiceDetailOrder>
            <InvoiceDetailSummary>
               <SubtotalAmount>
                  <Money currency="USD">20.35</Money>
               </SubtotalAmount>
               <Tax>
                  <Money currency="USD">2.04</Money>
                  <Description xml:lang="en">total tax</Description>
                  <TaxDetail purpose="tax" category="sales" percentageRate="8">
                     <TaxableAmount>
                        <Money currency="USD">20.35</Money>
                     </TaxableAmount>
                     <TaxAmount>
                        <Money currency="USD">1.63</Money>
                     </TaxAmount>
                     <TaxLocation xml:lang="en">CA</TaxLocation>
                  </TaxDetail>
                  <TaxDetail purpose="tax" category="sales" percentageRate="2">
                     <TaxableAmount>
                        <Money currency="USD">20.35</Money>
                     </TaxableAmount>
                     <TaxAmount>
                        <Money currency="USD">0.41</Money>
                     </TaxAmount>
                     <TaxLocation xml:lang="en">US</TaxLocation>
                  </TaxDetail>
               </Tax>
               <ShippingAmount>
                  <Money currency="USD">3.00</Money>
               </ShippingAmount>
               <GrossAmount>
                  <Money currency="USD">25.39</Money>
               </GrossAmount>
               <NetAmount>
                  <Money currency="USD">25.39</Money>
               </NetAmount>
               <DueAmount>
                  <Money currency="USD">25.39</Money>
               </DueAmount>
            </InvoiceDetailSummary>
         </InvoiceDetailRequest>
      </Request>
</cXML>
```

Service Invoice

The following invoice is for both regular items and service items.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/
InvoiceDetail.dtd">
<cXML payloadID="combo-1@supplier.com" timestamp="2001-04-20T23:59:45-07:00">
  <Header>
          From, To, and Sender credentials
  </Header>
  <Request deploymentMode="test">
    <InvoiceDetailRequest>
      <InvoiceDetailRequestHeader
              invoiceID="123456"
              purpose="standard"
              operation="new"
              invoiceDate="2001-04-20T23:59:20-07:00">
        <InvoiceDetailHeaderIndicator/>
        <InvoiceDetailLineIndicator
                isTaxInLine="yes"
                isShippingInLine="yes"
                isAccountingInLine="yes"/>
        <InvoicePartner>
          <Contact role="soldTo" addressID="B2.4.319">
            <Name xml:lang="en">Mike Smith</Name>
                    Postal address, email address, phone, and fax information
          </Contact>
        </InvoicePartner>
        <InvoicePartner>
          <Contact role="remitTo" addressID="Billing">
            <Name xml:lang="en">Lisa King</Name>
                    Postal address, email address, phone, and fax information
          </Contact>
          <IdReference identifier="00000-11111" domain="accountReceivableID">
            <Creator xml:lang="en">Supplier ERP</Creator>
          </IdReference>
          <IdReference identifier="123456789" domain="bankRoutingID">
            <Creator xml:lang="en">Supplier Bank</Creator>
          </IdReference>
        </InvoicePartner>
        <IPaymentTerm payInNumberOfDays="10">
          <Discount>10</Discount>
        </PaymentTerm>
        <PaymentTerm payInNumberOfDays="20">
          <Discount>5</Discount>
        </PaymentTerm>
        <PaymentTerm payInNumberOfDays="30">
          <Discount>0</Discount>
        </PaymentTerm>
```

```
                              <PaymentTerm payInNumberOfDays="40">
                                 <Discount>-5</Discount>
                              </PaymentTerm>
                           </InvoiceDetailRequestHeader>
                           <InvoiceDetailOrder>
                              <InvoiceDetailOrderInfo>
                                 <MasterAgreementIDInfo agreementID="MA-1234"/>
                              </InvoiceDetailOrderInfo>
                              <InvoiceDetailItem invoiceLineNumber="1" quantity="100">
                                 <UnitOfMeasure>EA</UnitOfMeasure>
                                 <UnitPrice>
                                    <Money currency="USD">57.13</Money>
                                 </UnitPrice>
                                 <InvoiceDetailItemReference lineNumber="2">
                                    <ItemID>
                                       <SupplierPartID>TOW08134</SupplierPartID>
                                    </ItemID>
                                    <Description xml:lang="en">Roll Towel Series 2000</Description>
                                 </InvoiceDetailItemReference>
                                 <SubtotalAmount>
                                    <Money currency="USD">5713</Money>
                                 </SubtotalAmount>
                                 <Tax>
                                    <Money currency="USD">287</Money>
                                    <Description xml:lang="en">total item tax</Description>
                                    <TaxDetail purpose="tax" category="State sales tax"
percentageRate="8">
                                       <TaxableAmount>
                                          <Money currency="USD">5713</Money>
                                       </TaxableAmount>
                                       <TaxAmount>
                                          <Money currency="USD">200</Money>
                                       </TaxAmount>
                                       <TaxLocation xml:lang="en">CA</TaxLocation>
                                    </TaxDetail>
                                 </Tax>
                                 <GrossAmount>
                                    <Money currency="USD">6000</Money>
                                 </GrossAmount>
                                 <NetAmount>
                                    <Money currency="USD">6000</Money>
                                 </NetAmount>
                              </InvoiceDetailItem>
                              <InvoiceDetailServiceItem
                                    invoiceLineNumber="2"
                                    quantity="100">
                                 <InvoiceDetailServiceItemReference lineNumber="1">
                                    <Classification domain="UNSPC">76111501</Classification>
                                    <Description xml:lang="en">
                                       Window cleaning services at $30/hour
```

```
        </Description>
      </InvoiceDetailServiceItemReference>
      <SubtotalAmount>
        <Money currency="USD">3000.00</Money>
      </SubtotalAmount>
      <Period startDate="2001-02-01T12:00:00-00:00"
            endDate="2001-03-30T12:00:00-00:00"/>
      <UnitOfMeasure>HUR</UnitOfMeasure>
      <UnitPrice>
        <Money currency="USD">30</Money>
      </UnitPrice>
      <Distribution>
        <Accounting name="Buyer assigned accounting code 1">
          <AccountingSegment id="ABC123456789">
            <Name xml:lang="en">Facilities</Name>
          <Description xml:lang="en">Facilities</Description>
          </AccountingSegment>
        </Accounting>
        <Charge>
          <Money currency="USD">3000</Money>
        </Charge>
      </Distribution>
      <Extrinsic name="serviceLocation">
        <Contact role="serviceLocation">
          <Name xml:lang="en">Jerry Seinfeld : NEW YORK</Name>
          <PostalAddress>
            <Street>2345 S. SAN PEDRO</Street>
            <City>New York</City>
            <State>NY</State>
            <PostalCode>10002</PostalCode>
            <Country isoCountryCode="US">USA</Country>
          </PostalAddress>
        </Contact>
      </Extrinsic>
    </InvoiceDetailServiceItem>
        <!--- timecard invoice service line item -->
    <InvoiceDetailServiceItem
        invoiceLineNumber = "3" quantity = "12">
      <InvoiceDetailServiceItemReference lineNumber = "1">
        <Classification domain = "UNSPC">80111604</Classification>
        <Description xml:lang = "en">Assistant AA101</Description>
      </InvoiceDetailServiceItemReference>
      <SubtotalAmount>
        <Money currency = "USD">1200</Money>
      </SubtotalAmount>
      <Period startDate = "2001-04-01T12:00:00-00:00"
            endDate = "2001-04-30T12:00:00-00:00"/>
      <UnitRate>
        <Money currency = "USD">100.00</Money>
        <UnitOfMeasure>HUR</UnitOfMeasure>
```

```
                        <TermReference termName="payCode" term="regular"/>
                    </UnitRate>
                    <GrossAmount>
                        <Money currency = "USD">1200</Money>
                    </GrossAmount>
                    <NetAmount>
                        <Money currency = "USD">1200</Money>
                    </NetAmount>
                    <InvoiceLaborDetail>
                       <Contractor>
                          <ContractorIdentifier domain="ContractorId">
                             Contr1234
                          </ContractorIdentifier>
                          <Contact>
                             <Name>John Doe</Name>
                          </Contact>
                       </Contractor>
                       <JobDescription>
                          Assistant left-handed broom closet monitor.
                       </JobDescription>
                       <Supervisor>
                          <Contact>
                             <Name>Jill Hill</Name>
                          </Contact>
                       </Supervisor>
                    <InvoiceTimeCardDetail>
                       <TimeCardIDInfo timeCardID="TC123">
                    </InvoiceTimeCardDetail>
                 </InvoiceLaborDetail>
              </InvoiceDetailServiceItem>
                 </InvoiceDetailOrder>
                 <InvoiceDetailOrder>
                    <InvoiceDetailOrderInfo>
                       <MasterAgreementIDInfo agreementID="MA-1235"/>
                    </InvoiceDetailOrderInfo>
                                  <!---  milestone invoicing -->
                    <InvoiceDetailServiceItem invoiceLineNumber="4">
                       <InvoiceDetailServiceItemReference lineNumber="1">
                          <Classification domain="UNSPC">78102694</Classification>
                          <Description xml:lang="en">
                             Market Research preliminary analysis
                          </Description>
                       </InvoiceDetailServiceItemReference>
                       <SubtotalAmount>
                          <Money currency="USD">5000</Money>
                       </SubtotalAmount>
                    </InvoiceDetailServiceItem>
                 </InvoiceDetailOrder>
```

```
<InvoiceDetailSummary>
   <SubtotalAmount>
      <Money currency="USD">13713</Money>
   </SubtotalAmount>
   <Tax>
      <Money currency="USD">287</Money>
      <Description xml:lang="en">total tax</Description>
         <TaxDetail purpose="tax"
                 category="State sales tax"
                 percentageRate="8">
            <TaxableAmount>
               <Money currency="USD">5713</Money>
            </TaxableAmount>
            <TaxAmount>
               <Money currency="USD">200</Money>
            </TaxAmount>
            <TaxLocation xml:lang="en">CA</TaxLocation>
         </TaxDetail>
         <TaxDetail purpose="tax"
                 category="Federal sales tax"
                 percentageRate="2">
            <TaxableAmount>
               <Money currency="USD">5713</Money>
            </TaxableAmount>
            <TaxAmount>
               <Money currency="USD">87</Money>
            </TaxAmount>
         </TaxDetail>
   </Tax>
   <GrossAmount>
      <Money currency="USD">14000.00</Money>
   </GrossAmount>
   <NetAmount>
      <Money currency="USD">14000.00</Money>
   </NetAmount>
   <DueAmount>
      <Money currency="USD">14000.00</Money>
   </DueAmount>
</InvoiceDetailSummary>
      </InvoiceDetailRequest>
   </Request>
</cXML>
```

Marketplace Invoice

This example shows the header of an invoice sent to a marketplace. It illustrates how to generate correct credentials for a marketplace.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/
InvoiceDetail.dtd">
<cXML payloadID="123344-2001@.supplierorg.com"
    timestamp="2001-04-20T23:59:45-07:00">
  <Header>
    <From>
      <!-- Supplier -->
      <Credential domain="AribaNetworkUserId">
        <Identity>chef@supplierorg.com</Identity>
      </Credential>
    </From>
    <To>
      <!-- Marketplace -->
      <Credential domain="AribaNetworkUserId" type="marketplace">
        <Identity>bigadmin@marketplace.org</Identity>
      </Credential>
      <!-- Marketplace Member Organization -->
      <Credential domain="AribaNetworkUserId">
        <Identity>admin@acme.com</Identity>
      </Credential>
    </To>
    <Sender>
      <!-- Supplier -->
      <Credential domain="AribaNetworkUserId">
        <Identity>chef@supplierorg.com</Identity>
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>Our Nifty Invoice Generator V1.0</UserAgent>
    </Sender>
  </Header>
  <Request>
    <InvoiceDetailRequest>
```

Chapter 12
Catalogs

Catalogs are documents that convey product and service content to buying organizations. Suppliers use them to describe the products and services they offer and their prices.

This chapter describes:

- Catalog Definitions
- Type Definitions
- Subscription Management Definitions
- Catalog Upload Transaction

Catalog Definitions

The cXML catalog definitions consist of two main elements: Supplier and Index. These elements describe data intended for persistent or cached use within a hub or a buying organization's procurement system.

- Supplier—Contains basic data about the supplier, such as address, contact, and ordering information.
- Index—Describes data about the supplier's inventory of goods and services, such as description, part numbers, and classification codes.

The catalog Contract element was deprecated in cXML 1.2.008.

Note that Index uses several sub-elements to describe line items in suppliers' inventories. Suppliers can send either price information for caching within buyers' systems or PunchOut information to enable buyers to punch out to remote websites for pricing and other information.

These elements are unusual in cXML because they commonly appear as the top level element in a compliant XML document. In fact, Index rarely appears elsewhere in a cXML document.

Supplier

The Supplier element encapsulates a named supplier of goods or services. It must have a Name element and a SupplierID element. Additionally, it describes optional address and ordering information for the supplier:
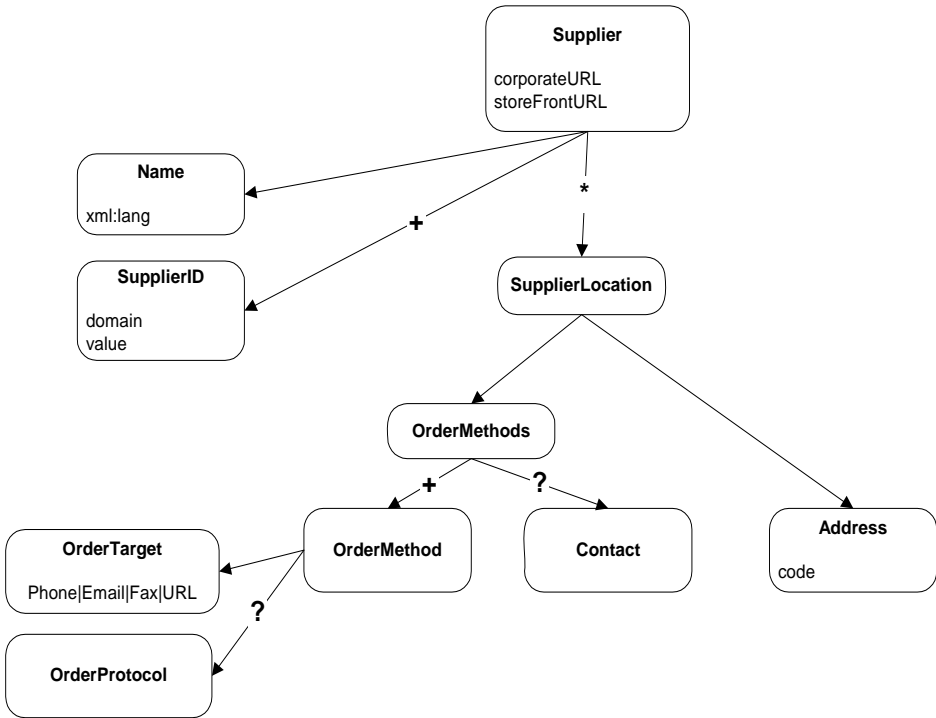
Supplier has the following attributes:

corporateURL (optional)	URL for supplier's website.
storeFrontURL (optional)	URL for website for shopping or browsing.

The following example shows an outline of the Supplier element:

```
<Supplier>
   <Name xml:lang="en-US">Workchairs </Name>
   <SupplierID domain="oracle107">29</SupplierID>
   <SupplierID domain="DUNS">76554545</SupplierID>
   <SupplierLocation>
      <Address>
         <Name xml:lang="en-US">Main Office</Name>
         <PostalAddress>
            …
         </PostalAddress>
      <Email>bobw@workchairs.com</Email>
      <Phone name="Office">
         …
      </Phone>
      <Fax name="Order">
         …
      </Fax>
      <URL>http://www.workchairs.com/Support.htm</URL>
      </Address>
      <OrderMethods>
         <OrderMethod>
            <OrderTarget>
               <URL>http://www.workchairs.com/cxmlorders</URL>
            </OrderTarget>
         </OrderMethod>
         <Contact>
            <Name xml:lang="en-US">Mr. Smart E. Pants</Name>
            <Email>sepants@workchairs.com</Email>
            <Phone name="Office">
               …
            </Phone>
         </Contact>
      </OrderMethods>
   </SupplierLocation>
</Supplier>
```

SupplierLocation

Some suppliers conduct business from more than one location. A SupplierLocation element can be used for each location. This element also encapsulates how that location does business or the ways that it can accept orders. A SupplierLocation element contains an Address and a set of OrderMethods.

OrderMethods and OrderMethod

The OrderMethods element is a grouping of one or more OrderMethod elements for the given SupplierLocation element. The position of OrderMethods in the list is significant— the first element is the preferred ordering method, the second element is the next priority, and so on in decreasing order of preference.

OrderMethod encapsulates ordering information in the form of an order target (such as phone, fax, or URL) and an optional protocol to further clarify the ordering expectations at the given target; for example, "cxml" for a URL target.

Index

This element is the root element for updating catalogs within buying organizations' procurement systems.

An Index element is associated with a single supplier. The Index element allows for a list of supplier IDs, where each ID is considered a synonym for that supplier.

The Index contains one or more IndexItem elements. The IndexItem element contains elements that add or delete from the buying organization's cached catalog. The following example shows an outline of an Index element:

```
<Index loadmode="Incremental">
  <SupplierID> ... </SupplierID>
  ...
  <IndexItem>
    <IndexItemAdd>
      <ItemID>
      ...
      </ItemID>
      <ItemDetail>
      ...
      </ItemDetail>
      <IndexItemDetail>
        <SearchGroupData>
        ...
        </SearchGroupData>
      ...
      </IndexItemDetail>
    </IndexItemAdd>
  </IndexItem>

  <IndexItem>
    <IndexItemDelete>
      <ItemID>
      ...
```

```
              </ItemID>
           </IndexItemDelete>
        </IndexItem>
        <IndexItem>
           <IndexItemPunchout>
              <ItemID>
              ...
              </ItemID>
              <PunchOutDetail>
                 <SearchGroupData>
                 ...
                 </SearchGroupData>
              ...
              </PunchOutDetail>
           </IndexItemPunchout>
        </IndexItem>
     </Index>
```

Index has the following attribute:

	The mode in which the target application should load the Index:
loadmode (optional)	"Full" Completely replaces a previously loaded index.
	"Incremental" Imports the index on top of the existing index, replacing or deleting existing items and adding new items. The recommended application default is incremental.

IndexItem, IndexItemAdd, IndexItemDelete, and IndexItemPunchout

The IndexItem element is a container for the list of items in an index. It contains three types of elements:

- IndexItemAdd—Inserts a new item or updates an existing item in the index. It contains an ItemID element, an ItemDetail element, and an IndexItemDetail element.

- IndexItemDelete—Removes an item from the index. It contains an ItemID element identifying the item.

- IndexItemPunchout—Inserts an item for initiating puchout to the supplier's website. It contains a PunchoutDetail element and an ItemID element. It is similar to an IndexItemAdd element except that it does not require price information. Buyers acquire item details in real-time from the supplier's website.

ItemID

The ItemID element uniquely identifies a supplier's items. It contains a SupplierPartID element and an optional SupplierPartAuxiliaryID element.

If SupplierPartID does not uniquely identify the item, the supplier should use SupplierPartAuxiliaryID to specify an "auxiliary" key that identifies the part uniquely when combined with the SupplierID and SupplierPartID. For example, a supplier might use the same SupplierPartID for an item, but have a different price for units of "EA" and "BOX". In this case, a reasonable SupplierPartAuxiliaryID for the two items might be "EA" and "BOX."

SupplierPartAuxiliaryID could also be used as a supplier cookie, enabling the supplier to refer to complex configuration or part data. It could contain all the data necessary for the supplier to reconstruct what the item in question is in their computer system (a basket or cookie of data that makes sense only to the supplier). For more information, see "Buyer and Supplier Cookies" on page 100.

ItemDetail

ItemDetail contains detailed information about an item, or all the data that a user might want to see about an item beyond the essentials represented in the ItemID. It must contain a UnitPrice, a UnitOfMeasure, one or more Description elements, and a Classification, and it can optionally contain a ManufacturerPartID, a ManufacturerName, a URL, a LeadTime, and any number of Extrinsic elements. For more information, see "ItemDetail" on page 112.

The optional LeadTime element describes the number of days needed for the buyer to receive the product. For example:

        <LeadTime>14</LeadTime>

Note that in an IndexItemAdd element, duplicate LeadTime information might come from both ItemDetail, where it is optional, and IndexItemDetail, where it is mandatory. If the LeadTime elements are defined in both cases, then they should be identical.

In the context of an IndexItemAdd, Extrinsic elements extend information about a particular item. These extensions should not be transmitted to a supplier within an OrderRequest, because the supplier can retrieve the same data using the unique ItemID.

IndexItemDetail

The IndexItemDetail element contains index-specific elements that define additional aspects of an item, such as LeadTime, ExpirationDate, EffectiveDate, SearchGroupData, or TerritoryAvailable.

PunchoutDetail

PunchoutDetail is similar to ItemDetail, except it requires only one or more Description elements and a Classification. It can also contain UnitPrice, UnitOfMeasure, URL, ManufacturerName, ManufacturerPartID, ExpirationDate, EffectiveDate, SearchGroupData, TerritoryAvailable, LeadTime, and Extrinsic elements. Price values are approximate; users can punch out to the supplier's website to obtain the current pricing information.

PunchoutDetail has the following attribute:

punchoutLevel (optional)	Specifies how the procurement application should present the PunchOut item to users. This attribute can have the value store, aisle, shelf, or product. Procurement applications might display these items differently, depending on how they are tagged by suppliers. For example, they might display store-level items differently than product-level items.

Use punchoutLevel="aisle" for top level product categories; for example, Computer Accessories or Electrical Component Supplies. Use punchoutLevel="shelf" for similar products from which a user would choose while shopping; for example, if multiple manufacturers make the same product or a single product is available in multiple configurations. Use punchoutLevel="product" for specific items that appear by themselves on PunchOut site pages.

Type Definitions

Types allow type providers such as content aggregators, suppliers, and marketplaces to extend root catalog item definitions and to define named groupings of commodity-specific attributes such as parametric types.

Types are named collections of named attributes. Each attribute is further defined in terms of a type, that is, types can contain other types. Types can also derive from or extend other types.

Type definitions describe supplemental catalog attributes and parametric data types. They provide a rich framework for defining parametric types, and they allow the definition and standardization of parametric types from *type provider* organizations independent of index data.

Use the SearchGroupData and SearchDataElement elements to specify the actual parametric data for a given catalog item. SearchGroupData must reference a defined type, and SearchDataElement specifies data for each type attribute within that type.

A TypeDefinition document contains a TypeProvider element and either Type or PrimitiveType elements.

TypeProvider

TypeProvider specifies the provider of the types being defined, identified by a name and one or more IDs (for example, NetworkId or DUNS).

TypeProvider has the following attribute:

name (required)	The canonical name used to reference the type provider when fully qualifying the name of a type (for example, in a SearchGroupData element reference).

Name

The Name element is for localized display purposes, allowing different names to be provided per locale.

OrganizationID

Unique identifier for the type provider organization.

Type

Type elements are named elements containing one or more TypeAttribute elements. Types can extend (or derive from) other types, thus inheriting their parents' TypeAttribute elements.

There is one important distinction between type inheritance and standard object-oriented inheritance models: child TypeAttributes cannot override parent TypeAttributes.

It is illegal to define a TypeAttribute of the same name as a parent TypeAttribute.

Type has the following attributes:

name (required)	Canonical name of the type.
extends (optional)	Name of the type that is being extended.

Name

Type names are always scoped by TypeProvider names, allowing for the existence of multiple type taxonomies. Applications should respect the following notation for a fully-qualified type name outside a defined TypeProvider scope:

> *Type Provider Name:Type Name*

For example, if an organization named Acme provides a type definition named Pipes, that type would be referenced as "Acme:Pipes" in SearchGroupData names.

Description

You can provide names in multiple locales through the optional Description element list. The ShortName element within that Description should be used to provide an alternative locale specific name for the type. The required name attribute should be used within the SearchGroupData element to reference a given type.

TypeAttribute

TypeAttribute elements define attributes within a type. The name attribute is required and is the name used in the SearchDataElement element. Optional Name elements provide locale-specific alternative names for this attribute.

TypeAttribute elements themselves are of a named type, as indicated by the "type" attribute. The name can be another Type, or a PrimitiveType, defined below.

name (required)	Specifies the canonical name of this attribute.
type (required)	Specifies the data type of this attribute. Can be one of: "integer" A whole number, with no fraction. "string" A group of characters with words that can be individually indexed for free text searching. "literal" A group of characters with words that cannot be individually indexed for free text searching. "double" A floating point number. "date" A date of the form yyyy-mm-dd; for example, 2002-01-25 "boolean" A Boolean value; yes, no, 1, 0, true, false, t, or f.
shortTag	Alias for this attribute.
mappedFrom	Specifies the name of another object in the system that implicitly defines this attribute.
isRequired	Indicates whether this attribute requires a (non-empty) value.

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isRequiredForOrdering	Indicates that the value for an attribute must be provided (usually by the requisitioner) before the item can be included in an order for the supplier. Typically used for ad-hoc or partially specified catalog items.
isRefinable	Indicates whether this attribute is refinable in search queries.
isSearchable	Indicates whether this attribute is searchable in search queries.
isCollection	Indicates whether this attribute allows repeating values.
isCaseSensitive	Indicates whether this attribute preserves letter case. This property applies only to attributes of type string or literal. It has no effect on numeric, boolean, or date attributes, nor does it apply to attributes of complex type.
isInKey	Indicates whether this attribute is part of the unique key for the type.
isInFreeTextSearch	Indicates whether this attribute should be indexed to be a candidate in a free-text (All) query.
isHidden	Indicates whether this attribute is displayed to users.
isSortable	Indicates whether this attribute can be sorted.
isReadOnly	Indicates whether values assigned to this attribute are frozen and cannot be changed by the receiving application.
unit	Specifies the unit of this attribute, if applicable. For example, if the TypeAttribute is of a PrimitiveType with a scalar type of "integer", this unit might be "IN" to indicate inches.

Name

Localized name of the TypeAttribute.

Description

Localized description of the TypeAttribute.

EnumerationValue

EnumerationValue allows you to optionally specify a set of one or more valid data values for the TypeAttribute.

For example:

```
<TypeAttribute name="COLOR"
      type="Name"
      isRefinable="yes">
   <Name xml:lang="en">Color</Name>
   <EnumerationValue>Red</EnumerationValue>
   <EnumerationValue>Yellow</EnumerationValue>
   <EnumerationValue>Black</EnumerationValue>
</TypeAttribute>
```

Range

Range allows you to optionally specify a range of valid data values for the TypeAttribute. It contains RangeBegin, RangeEnd, or both.

For example:

```
<TypeAttribute name="WEIGHT"
      type="Number"
      isRefinable="yes">
   <Name xml:lang="en">Weight</Name>
   <Range>
      <RangeBegin>12</RangeBegin>
      <RangeEnd inclusive="no">100</RangeEnd>
   </Range>
</TypeAttribute>
```

Both RangeBegin and RangeEnd can optionally specify the attribute inclusive="no", which excludes the specified beginning or ending value as legal values.

PrimitiveType

PrimitiveType is a named scalar type, where the list of recognized scalar types is given above. These types are building blocks for defining simple TypeAttributes. For example a PrimitiveType could define a TypeAttribute that is a string of length 255.

PrimitiveType has the following optional attributes:

min	The minimum length for a TypeAttribute of scalarType "string" or "literal".
max	The maximum length for a TypeAttribute of scalarType "string" or "literal".
maxPrecision	The maximum precision for a TypeAttribute of scalarType "double".
maxScale	The maximum scale for a TypeAttribute of scalarType "double".

Subscription Management Definitions

Intermediaries such as network commerce hubs can manage supplier information and catalogs used by procurement systems.

This section describes request-response elements for managing supplier data and catalogs. In all cases, the requests are initiated by the procurement system.

This section discusses:

• Supplier Data

• Supplier Profile Information

• Catalog Subscriptions

Supplier Data

Supplier data management uses three types of transactions:

• SupplierList – Returns the names of suppliers with which the buyer has relationships.

• SupplierData – Returns supplier details.

• SupplierChange – Returns the names of suppliers whose information has changed.

SupplierListRequest

SupplierListRequest requests a list of the suppliers with whom the buyer has established trading relationships.

```
<Request>
   <SupplierListRequest/>
</Request>
```

SupplierListResponse

SupplierListResponse lists the suppliers with whom the buyer has established trading relationships.

```
<Response>
   <Status code="200" text="OK"/>
   <SupplierListResponse>
      <Supplier corporateURL=http://www.workchairs.com
           storeFrontURL="http://www.workchairs.com">
```

```
        <Name xml:lang="en-US">Workchairs, Inc.</Name>
        <Comments xml:lang="en-US">this is a cool company</Comments>
        <SupplierID domain="DUNS">123456</SupplierID>
     </Supplier>
     <Supplier corporateURL=http://www.computersRus.com
         storeFrontURL="http://www.computersRus.com">
        <Name xml:lang="en-US">Computers R us</Name>
        <Comments xml:lang="en-US">another cool company</Comments>
        <SupplierID domain="DUNS">123456789</SupplierID>
     </Supplier>
   </SupplierListResponse>
</Response>
```

SupplierDataRequest

SupplierDataRequest requests data about a supplier.

```
<Request>
   <SupplierDataRequest>
      <SupplierID domain="DUNS">123456789</SupplierID>
   </SupplierDataRequest>
</Request>
```

SupplierDataResponse

SupplierDataResponse contains data about a supplier.

```
<Response>
   <Status code="200" text="OK"/>
   <SupplierDataResponse>
      <Supplier corporateURL=http://www.workchairs.com
          storeFrontURL="http://www.workchairs.com">
        <Name xml:lang="en-US">Workchairs, Inc.</Name>
        <Comments xml:lang="en-US">this is a cool company</Comments>
        <SupplierID domain="DUNS">123456</SupplierID>
        <SupplierLocation>
          <Address>
             <Name xml:lang="en-US">Main Office</Name>
             <PostalAddress>
                <DeliverTo>Bob A. Worker</DeliverTo>
                <Street>123 Front Street</Street>
                <City>Toosunny</City>
                <State>CA</State>
                <PostalCode>95000</PostalCode>
                <Country isoCountryCode="US">USA</Country>
              </PostalAddress>
             <Email>bobw@workchairs.com</Email>
             <Phone name="Office">
                <TelephoneNumber>
```

```
                              <CountryCode
                                isoCountryCode="US">1</CountryCode>
                              <AreaOrCityCode>800</AreaOrCityCode>
                              <Number>5551212</Number>
                           </TelephoneNumber>
                        </Phone>
                        <Fax name="Order">
                           <TelephoneNumber>
                              <CountryCode
                                isoCountryCode="US">1</CountryCode>
                              <AreaOrCityCode>408</AreaOrCityCode>
                              <Number>5551234</Number>
                           </TelephoneNumber>
                        </Fax>
                        <URL>http://www.workchairs.com/Support.htm</URL>
                     </Address>
                     <OrderMethods>
                        <OrderMethod>
                           <OrderTarget>
                              <URL>http://www.workchairs.com/cxmlorder</URL>
                           </OrderTarget>
                           <OrderProtocol>cXML</OrderProtocol>
                        </OrderMethod>
                     </OrderMethods>
                  </SupplierLocation>
               </Supplier>
            </SupplierDataResponse>
         </Response>
```

For information about the Supplier element, see "Supplier" on page 286.

SupplierChangeMessage

This element is for notification of changes to supplier data.

This message relies on the GetPending transaction. The buying organization sends a
GetPendingRequest to query for waiting messages. If the network commerce hub has a
message waiting, it includes it within the GetPendingResponse. For more information,
see Chapter 13, "Get Pending/Data Download Transaction."

```
         <Message>
            <SupplierChangeMessage type="new">
               <Supplier corporateURL=http://www.workchairs.com
                  storeFrontURL="http://www.workchairs.com">
                  <Name xml:lang="en-US">Workchairs, Inc.</Name>
                  <Comments xml:lang="en-US">this is a cool company</Comments>
                  <SupplierID domain="DUNS">123456</SupplierID>
                  <SupplierLocation>
                     <Address>
```

```
                    <Name xml:lang="en-US">Main Office</Name>
                    <PostalAddress>
                        <DeliverTo>Bob A. Worker</DeliverTo>
                        <Street>123 Front Street</Street>
                        <City>Toosunny</City>
                        <State>CA</State>
                        <PostalCode>95000</PostalCode>
                        <Country isoCountryCode="US">USA</Country>
                    </PostalAddress>
                    <Email>bobw@workchairs.com</Email>
                    <Phone name="Office">
                        <TelephoneNumber>
                            <CountryCode
                            isoCountryCode="US">1</CountryCode>
                            <AreaOrCityCode>800</AreaOrCityCode>
                            <Number>5551212</Number>
                        </TelephoneNumber>
                    </Phone>
                    <Fax name="Order">
                        <TelephoneNumber>
                            <CountryCode
                            isoCountryCode="US">1</CountryCode>
                            <AreaOrCityCode>408</AreaOrCityCode>
                            <Number>5551234</Number>
                        </TelephoneNumber>
                    </Fax>
                    <URL>http://www.workchairs.com/Support.htm</URL>
                </Address>
                <OrderMethods>
                    <OrderMethod>
                        <OrderTarget>
                            <URL>http://www.workchairs.com/cxmlorder</URL>
                        </OrderTarget>
                        <OrderProtocol>cXML</OrderProtocol>
                    </OrderMethod>
                </OrderMethods>
            </SupplierLocation>
        </Supplier>
    </SupplierChangeMessage>
</Message>
```

Supplier Profile Information

Supplier profile management uses three types of transactions:

- OrganizationDataRequest – Requests profile information for suppliers with which the buyer has relationships.

- OrganizationDataResponse – Returns supplier profile information.

- OrganizationChangeMessage – Returns profile information for suppliers whose profile has changed.

OrganizationDataRequest

OrganizationDataRequest requests profile information for suppliers with whom the buyer has established trading relationships.

```
<Request>
<OrganizationDataRequest>
      <OrganizationID>
        <Credential domain="NetworkID">
            <Identity>AN01022222222222</Identity>
        </Credential>
        <Credential domain="DUNS">
            <Identity>123456789</Identity>
        </Credential>
      </OrganizationID>
   </OrganizationDataRequest>
  </Request>
</cXML>
```

OrganizationDataResponse

OrganizationDataResponse returns profile information for suppliers with whom the buyer has established trading relationships.

```
<Response>
    <Status code="200" text="OK"/>
    <OrganizationDataResponse>
      <Organization>
        <Name xml:lang="en-US">Workchairs</Name>
        <Credential domain="NetworkID">
            <Identity>AN01022222222222</Identity>
        </Credential>
        <Credential domain="DUNS">
            <Identity>123456789</Identity>
        </Credential>
        <OrganizationRole name="supplier"/>
```

```
            <Address>
               <Name xml:lang="en-US">Workchairs</Name>
               <PostalAddress>
                  <Street>123 Front Street</Street>
                  <City>Toosunny</City>
                  <State>CA</State>
                  <PostalCode>95000</PostalCode>
                  <Country isoCountryCode="US">United States</Country>
               </PostalAddress>
               <Email>bobw@workchairs.com</Email>
               <Phone>
                  <TelephoneNumber>
                  <CountryCode isoCountryCode="US">1</CountryCode>
                  <AreaOrCityCode>800</AreaOrCityCode>
                  <Number>555-1212</Number>
                  </TelephoneNumber>
               </Phone>
               <Fax>
                  <TelephoneNumber>
                  <CountryCode isoCountryCode="US">1</CountryCode>
                  <AreaOrCityCode>408</AreaOrCityCode>
                  <Number>555-1234</Number>
                  </TelephoneNumber>
               </Fax>
               <URL>http://www.workchairs.com/Support.htm</URL>
            </Address>
            <Person>
               <Contact>
                  <Name xml:lang = "en-US">Joe Hannyman</Name>
                  <PostalAddress>
                     <Street>321 The Main Street</Street>
                     <City>Sunnyvale</City>
                     <State>CA</State>
                     <PostalCode>90488</PostalCode>
                     <Country isoCountryCode = "US">United States</Country>
                  </PostalAddress>
                  <Email>support@workchairs.com</Email>
               </Contact>
               <PersonRole name="buyerAccount"/>
               <PersonRole name="supplierMasterAccount"/>
            </Person>
         </Organization>
         <Extrinsic name="OrderRoutingMethod">email</Extrinsic>
      </OrganizationDataResponse>
   </Response>
```

OrganizationChangeMessage

OrganizationChangeMessage returns updated profile information for suppliers with whom the buyer has established trading relationships.

```
<Message>
<OrganizationChangeMessage type="update">
      <Organization>
     <Name xml:lang="en-US">BOISE CASCADE OFFICE PRODUCTS
CORPORATION</Name>
     <Credential domain="NetworkID">
       <Identity>AN01000000125</Identity>
     </Credential>
     <Credential domain="DUNS">
       <Identity>178923231</Identity>
     </Credential>
   <OrganizationRole name="supplier"/>
  <Address>
     <Name xml:lang="en-US">BOISE CASCADE OFFICE PRODUCTS
CORPORATION</Name>
       <PostalAddress>
       <Street>800 W BRYN MAWR AVEEDI profile</Street>
          <City>ITASCA</City>
       <State>IL</State>
       <PostalCode>60143</PostalCode>
          <Country isoCountryCode="US">United States</Country>
     </PostalAddress>
     <Email>nramani@ariba.com</Email>
     <Phone name="">
       <TelephoneNumber>
          <CountryCode isoCountryCode="US">1</CountryCode>
          <AreaOrCityCode></AreaOrCityCode>
            <Number>555-555-5555</Number>
       </TelephoneNumber>
     </Phone>
     <Fax name="">
       <TelephoneNumber>
            <CountryCode isoCountryCode="US">1</CountryCode>
          <AreaOrCityCode></AreaOrCityCode>
          <Number>666-666-6666</Number>
          </TelephoneNumber>
     </Fax>
        <URL name="website1">http://main.url.com</URL>
   </Address>
</Organization>
      </OrganizationChangeMessage>
```

Catalog Subscriptions

Catalog subscription management uses four types of transactions:

- SubscriptionList – Returns the names of catalogs to which the buyer has subscribed.

- SubscriptionContent – Returns catalog contents.

- SubscriptionChange – Returns the names of catalogs that have changed.

- SubscriptionStatusUpdateRequest – Returns the catalog subscription status from the buyer.

Subscription

All catalog subscription transactions use the Subscription element to describe metadata about a catalog subscription.

For example:

```
<Subscription>
    <InternalID>1234</InternalID>
    <Name xml:lang="en-US">Q2 Prices</Name>
    <Changetime>2002-03-12T18:39:09-08:00</Changetime>
    <SupplierID domain="DUNS">123456789</SupplierID>
    <Format version="2.1">CIF</Format>
    <Description xml:lang="en-US">The best prices for software</Description>
</Subscription>
```

The elements within Subscription include:

InternalID   A unique ID internal to the intermediary. Contains an optional domain attribute.

Name   The name of the subscription.

ChangeTime   The date and time when any aspect of the subscription last changed.

SupplierID   The ID of the supplier.

Format   The format of the catalog.

Description   A description of the catalog.

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SubscriptionListRequest

This element requests the buyer's current list of catalog subscriptions.

```
<Request>
    <SubscriptionListRequest/>
</Request>
```

SubscriptionListResponse

This element lists the buyer's current list of catalog subscriptions.

```
<Response>
    <Status code="200" text="OK"/>
    <SubscriptionListResponse>
        <Subscription>
            <InternalID>1234</InternalID>
            <Name xml:lang="en-US">Q2 Software Prices</Name>
            <Changetime>1999-03-12T18:39:09-08:00</Changetime>
            <SupplierID domain="DUNS">123456789</SupplierID>
            <Format version="2.1">CIF</Format>
            <Description xml:lang="en-US">The best prices for software</Description>
        </Subscription>
        <Subscription>
            <InternalID>1235</InternalID>
            <Name xml:lang="en-US">Q2 Hardware Prices</Name>
            <Changetime>1999-03-12T18:15:00-08:00</Changetime>
            <SupplierID domain="DUNS">555555555</SupplierID>
            <Format version="2.1">CIF</Format>
            <Description xml:lang="en-US">The best prices for hardware
            </Description>
        </Subscription>
    </SubscriptionListResponse>
</Response>
```

SubscriptionContentRequest

This element requests the contents of a subscribed catalog. The request includes the InternalID and SupplierID for the catalog.

```
<Request>
    <SubscriptionContentRequest>
        <InternalID>1234</InternalID>
        <SupplierID domain="DUNS">123456789</SupplierID>
    </SubscriptionContentRequest>
</Request>
```

SubscriptionContentResponse

This element contains the contents of a catalog. The catalog format can be either CIF (Catalog Interchange Format) or cXML. If it is CIF, it is base64 encoded and included as the content of a CIFContent element. If it is cXML, the Index element is directly included.

```
<Response>
   <Status code="200" text="OK"/>
   <SubscriptionContentResponse>
      <Subscription>
         <InternalID>1234</InternalID>
         <Name xml:lang="en-US">Q2 Software Prices</Name>
         <Changetime>1999-03-12T18:39:09-08:00</Changetime>
         <SupplierID domain="DUNS">123456789</SupplierID>
         <Format version="3.0">CIF</Format>
         <Description xml:lang="en-US">The best prices for software</Description>
      </Subscription>
      <SubscriptionContent filename="april_prices.cif">
         <CIFContent>
            <!-- base64 encoded data -->
            ABCDBBDBDBDBDB
            . . .
         </CIFContent>
      </SubscriptionContent>
   </SubscriptionContentResponse>
</Response>
```

SubscriptionChangeMessage

This element signals to the buyer's procurement system that a subscribed catalog has changed.

This message relies on the GetPending transaction. The buying organization sends a GetPendingRequest to query for waiting messages. If the network commerce hub has a message waiting, it includes it within the GetPendingResponse. For more information, see Chapter 13, "Get Pending/Data Download Transaction."

```
<Message>
   <SubscriptionChangeMessage type="new">
      <Subscription>
         <InternalID>1234</InternalID>
         <Name xml:lang="en-US">Q2 Software Prices</Name>
         <Changetime>1999-03-12T18:39:09-08:00</Changetime>
         <SupplierID domain="DUNS">123456789</SupplierID>
         <Format version="2.1">CIF</Format>
      </Subscription>
   </SubscriptionChangeMessage>
```

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```
</Message>
```

The type attribute describes the type of change: new, delete, or update.

SubscriptionStatusUpdateRequest

This element requests the subscription status of a catalog. It enables buying
organizations to send the catalog subscription status to suppliers through Ariba SN.

On a buying organization's system, a catalog can have various status updates from the
time it is downloaded until it is activated. Each catalog status on the buying
organization's system can be sent to the supplier using this element. Ariba SN
receives and updates the subscription status of the catalog using the InternalID.

A SubscriptionStatusUpdateRequest includes the InternalID of the catalog, and the
SubscriptionVersion and SubscriptionStatus elements.

```
<Request >
  <SubscriptionStatusUpdateRequest>
      <InternalID>1234</InternalID>
      <SubscriptionVersion versionNumber="2"//>>
      <SubscriptionStatus status="activated" />
  </SubscriptionStatusUpdateRequest>
 </Request>
```

SubscriptionVersion

This element stores the version number of the catalog.

When a supplier edits a catalog, Ariba SN creates a new version of the catalog and
assigns a version number. This version number is used with the InternalID in all
messages sent from the buyer to Ariba SN. This is an optional attribute. When it is not
defined, Ariba SN uses the last published version of the catalog as the InternalID.

SubscriptionStatus

This element stores the status of the catalog. Catalog status values are: approved,
rejected, validation error, deleted, received, validated, activated, deactivated, and
changed.

Catalog Upload Transaction

The cXML Catalog Upload transaction enables suppliers to programmatically upload and publish catalogs on network commerce hubs.

The Catalog Upload transaction gives you an alternative to logging on to network hubs to interactively upload and publish catalogs. You can use it to automatically distribute updated catalogs whenever you change pricing or availability of your products or services.

The Catalog Upload transaction supports both CIF and cXML catalogs.

The Catalog Upload transaction consists of two cXML documents:

CatalogUploadRequest

Sent by suppliers to upload a catalog. It contains the catalog as an attachment and specifies whether the catalog is new or an update, and whether to automatically publish it after upload.

Response   Sent by the network commerce hub to acknowledge the receipt of a CatalogUploadRequest.

CatalogUploadRequest

The following example shows a CatalogUploadRequest:

MIME header —

```
--kdflkajfdksadjfklasdjfkljdfdsfdkf
Content-type: text/xml; charset=UTF-8
Content-ID: <part1.PCO28.975529413484@saturn.workchairs.com>
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2000-12-28T16:56:03-08:00" payloadID="155556789@10.10.83.39">
  <Header>
    <From>
      <Credential domain="DUNS">
        <Identity>123456789</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="NetworkID">
        <Identity>AN01000000001</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="DUNS">
        <Identity>123456789</Identity>
```

ID of network hub —

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```
                              <SharedSecret>abracadabra</SharedSecret>
                            </Credential>
                            <UserAgent>My Homemade Catalog Manager V2.0</UserAgent>
                          </Sender>
                        </Header>
                        <Request>
                          <CatalogUploadRequest operation="update">
                            <CatalogName xml:lang="en">Winter Prices</CatalogName>
                            <Description xml:lang="en">This catalog contains our premiere-level prices for
office chairs and other durable furniture.</Description>
                            <Attachment>
```
ID of MIME attachment ───────────
```
                              <URL>cid:part2.PCO28.975529413154@saturn.workchairs.com</URL>
                            </Attachment>
                            <Commodities>
                              <CommodityCode>52</CommodityCode>
                            </Commodities>
                            <AutoPublish enabled="true"/>
                            <Notification>
                              <Email>judy@workchairs.com</Email>
                              <URLPost enabled="true"/>
                            </Notification>
                          </CatalogUploadRequest>
                        </Request>
                      </cXML>
```

```
--kdflkajfdksadjfklasdjfkljdfdsfdkf
```
MIME attachment
header ─────────
```
Content-type: text/plain; charset=US-ASCII
Content-Disposition: attachment; filename=PremiereCatalog.cif
Content-ID: <part2.PCO28.975529413154@saturn.workchairs.com>
Content-length: 364
```
```
CIF_I_V3.0
LOADMODE: F
CODEFORMAT: UNSPSC
CURRENCY: USD
SUPPLIERID_DOMAIN: DUNS
ITEMCOUNT: 3
TIMESTAMP: 2001-01-15 15:25:04
DATA
942888710,34A11,C11,"Eames Chair, Black Leather",11116767,400.00,EA,3,"Fast
MFG",,,400.00
942888710,56A12,C12,"Eames Ottoman, Black Leather",11116767,100.00,EA,3,"Fast
MFG",,,100.00
942888710,78A13,C13,"Folding Chair, Grey Stackable",11116767,25.95,EA,3,"Fast
MFG",,,25.95
ENDOFDATA
```
MIME trailer ─────── **--kdflkajfdksadjfklasdjfkljdfdsfdkf--**

CatalogUploadRequest Element

CatalogUploadRequest has the following attribute:

	Specifies the type of upload to perform:
operation	"new" Uploads a new catalog. A catalog with the same name must not exist.
	"update" Overwrites an exiting catalog. A catalog with the same name must exist.

CatalogUploadRequest contains the following elements.

CatalogName

CatalogName specifies the name of the uploaded catalog. This value is the user-visible name, not the file name of the catalog.

CatalogName has the following attribute:

	Specifies the language used for the catalog name.
	Language codes are defined in the XML 1.0 Specification (at www.w3.org/TR/1998/REC-xml-19980210.html). In the most common case, this includes an ISO 639 Language Code and, optionally, an ISO 3166 Country Code separated by a hyphen.
xml:lang	The recommended cXML language code format is xx[-YY[-zzz]*] where xx is an ISO 639 Language code, YY is an ISO 3166 Country Code, and zzz is an IANA or private subcode for the language in question. Again, use of the Country Code is always recommended. By convention, the language code is lowercase and the country code is uppercase. This is not required for correct matching of the codes.

Description

Description briefly describes the catalog contents. Buying organizations can search and view this information.

Description has the following attribute:

	Specifies a language used for the catalog name.
xml:lang	For more information, see the description of xml:lang for CatalogName, above.

Attachment

Attachment specifies the URL of the attached catalog.

The Attachment element contains one URL element with the scheme "cid:".

For more information about attachments, see

Commodities

Commodities specifies the top-level commodity codes for the items in your catalog. Buying organizations use these codes to search for new catalogs.

The Commodities element contains one or more CommodityCode elements.

Use two-digit UNSPSC (United Nations Standard Products and Services Code) segment codes.

For a list of UNSPSC segment codes, go to the UNSPSC website at www.unspsc.org.

AutoPublish

AutoPublish automatically publishes the catalog to buyers after upload.

You can automatically publish only if both of the following requirements are met:

1. A previous version of the catalog exists in your account and you are performing an update operation.

2. The previous version is in the "published" state. It must have been published private (with a list of buyers) or public.

AutoPublish has the following attribute:

	Specifies whether to automatically publish the catalog:
Enabled	"true" Publishes the catalog. It must be an update to a previously published catalog.
	"false" Does not publish the catalog. You can log on to your account and manually publish the catalog.

Notification

Notification sends catalog-status notifications through e-mail or cXML POST. For examples of these messages, see

Notification contains either one Email element or one URLPost element, or both elements.

Email specifies the mailbox to the newtork commerce hub e-mails status messages. You can use only one Email element, and it can contain only one e-mail address.

URLPost specifies whether the newtork commerce hub sends catalog status messages as cXML StatusUpdateRequest documents.

The URL destination of the StatusUpdateRequest is determined by your website's response to the ProfileRequest transaction. For more information see Chapter 3, "Profile Transaction."

URLPost has the following attribute

	Specifies whether the network sends catalog-status notifications through StatusUpdateRequest:
Enabled	"true" Enables this feature.
	"false" Disables this feature.

Attaching Your Catalog

Send your catalog attached to the CatalogUploadRequest document. Large catalogs must be zipped to compress them before uploading.

Using a MIME envelope

Include the catalog file in the CatalogUpdateRequest as a MIME (Multipurpose Internet Mail Extensions) attachment. cXML contains only references to external MIME parts sent within one multipart MIME envelope.

The referenced catalog file must reside within a multipart MIME envelope with the cXML document. A cXML requirement for this envelope (over the basics described in RFC 2046 "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types") is the inclusion of Content-ID headers with the attached file.

> **Note:** The cXML specification allows attachments to reside outside of the MIME envelope, but the Catalog Upload transaction does not support that attachment method.

The Attachment element contains only a reference to the external MIME part of the attachment. Attachment contains a single URL with the scheme "cid:".

For more information about attachments in cXML, see the discussion of the "Attachment" on page 128.

Catalog files can be zipped to compress them.

Response

After you send a CatalogUploadRequest, the network commerce hub replies with a standard cXML Response document:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="980306507433-6714998277961341012@10.10.83.39"
timestamp="2001-01-23T19:21:47-08:00">
   <Response>
      <Status code="201" text="Accepted">The catalog upload request is
processing</Status>
   </Response>
</cXML>
```

The following table lists possible status codes:

Status	Text	Meaning
200	Success	The catalog-upload request succeeded.
201	Accepted	The catalog-upload request is processing.
461	Bad Commodity Code	The commodity code you assigned to the catalog is invalid.
462	Notification Error	No notification method (e-mail or URL) provided.
463	Bad Catalog Format	The zip file is invalid.
464	Bad Catalog	No catalog is attached, or more than one is attached.
465	Duplicate Catalog Name	The name of the catalog exists.
466	No Catalog to Update	The catalog to be updated does not exist.
467	Publish Not Allowed	You attempted to publish a catalog that was not previously published.
468	Catalog Too Large	The size of the uploaded file exceeds the 4 MB limit. Zip the catalog to compress it before uploading it.
469	Bad Catalog Extension	The file name of the catalog must have .cif, .xml, or .zip extensions.
470	Catalog Has Errors	The message is the status of the catalog. (HasErrors)

Status	Text	Meaning
499	Document Size Error	The cXML document is too large.
561	Too Many Catalogs	You cannot upload more than a specific number of catalogs per hour.
562	Publish Disabled	Catalog publishing is temporarily unavailable due to scheduled maintenance. It will be back online by the specified date and time.
563	Catalog Validating	You attempted to update a catalog before validation finished on a previous version of the catalog.

For other possible status codes, see "Status" on page 48.

Receiving Later Catalog Status

If you include the Notification element to request later catalog-status notification, the network sends a message when the catalog reaches its final status. The possible final catalog states are:

Validated	The catalog contains no syntax errors.
BadZipFormat	The zip format is incorrect.
HasErrors	The catalog contains syntax errors, and it cannot be published.
Published	The catalog has been published (private or public).

URLPost

The following example shows a StatusUpdateRequest notification sent by a network commerce hub:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">

<cXML timestamp="2001-01-23T18:39:44-08:00" payloadID="980303984882--
3544419350291593786@10.10.83.39">
  <Header>
    <From>
      <Credential domain="NetworkID">
        <Identity>AN01000000001</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="DUNS">
        <Identity>123456789</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="NetworkID">
        <Identity>AN01000000001</Identity>
```

```
            <SharedSecret>abracadabra</SharedSecret>
          </Credential>
          <UserAgent>ANValidator</UserAgent>
        </Sender>
      </Header>
      <Request>
        <StatusUpdateRequest>
          <DocumentReference payloadID="123456669131--
1234567899555556789@10.10.83.39"></DocumentReference>
          <Status text="Success" code="200">
            Validated
          </Status>
        </StatusUpdateRequest>
      </Request>
    </cXML>
```

The possible status codes are:

Status Code	Meaning
200 Success	The catalog-upload request succeeded.
463 Bad Catalog Format	The zip file is invalid.
470 Catalog Has Errors	The message is the status of the catalog. (HasErrors)

Chapter 13
Get Pending/Data Download Transaction

Some organizations do not have an HTTP entry point for receiving cXML documents posted by entities outside of their corporate firewalls. The cXML get pending and data download transactions enables these organizations to poll for waiting documents and download them.

This chapter describes:

- Introduction to Get Pending/Data Download Transaction
- GetPendingRequest
- GetPendingResponse
- DataRequest
- DataResponse

Introduction to Get Pending/Data Download Transaction

Client systems use the get pending and data download transactions to pull documents at their convenience. The get pending transaction indicates whether there are waiting documents. If there are waiting documents, they either appear in the response, or the client retrieves them with the data download transaction.

Examples of documents that depend on this polling for transmission are:

- SupplierChangeMessage — Notifies buying organizations about changes to supplier data.
- SubscriptionChangeMessage — Notifies buying organizations about changes to supplier catalogs.
- DataAvailableMessage — Notifies any organization about waiting documents that can be retrieved using the data download transaction.

GetPendingRequest

This element pulls a set of messages that are waiting for the requester. The MessageType element and the lastReceivedTimestamp and maxMessages attributes control the type and count of the fetched documents.

lastReceivedTimestamp (optional)	The timestamp of the most recent document received.
maxMessages (optional)	Maximum number of documents in a single response that the requester can handle.

Upon receiving the request, the receiver returns the oldest documents, of the specified types, with timestamps equal to or later than the specified timestamp. If there are multiple documents meeting this criterion, they are returned, subject to the maxMessages attribute. The queuing system discards all pending documents of the specified message types with timestamps earlier than the specified timestamp.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="1105574416.19583@hydra.buyer.com" timestamp="2005-01-
13T00:00:16+00:00">
    <Header>
        <From>
            <Credential domain="NetworkId">
                <Identity>AN13000000259</Identity>
            </Credential>
        </From>
        <To>
            <Credential domain="SystemID">
                <Identity>ERP01</Identity>
            </Credential>
        </To>
        <Sender>
            <Credential domain="NetworkId">
                <Identity>AN13000000259</Identity>
                <SharedSecret>abracadabra</SharedSecret>
            </Credential>
            <UserAgent>Our Buyer App 1.0</UserAgent>
        </Sender>
    </Header>
    <Request>
        <GetPendingRequest lastReceivedTimestamp="2005-03-12T18:39:09-08:00"
            maxMessages="5">
            <MessageType>SubscriptionChangedMessage</MessageType>
        </GetPendingRequest>
    </Request>
</cXML>
```

GetPendingResponse

The server returns a Response document in the same HTTP connection. If the Response contains no GetPendingResponse document, no documents are waiting. If it contains a GetPendingResponse document, there are documents waiting.

No Documents Waiting

The following example indicates that there are no waiting documents of the requested message type:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2005-01-12T16:00:25-08:00" payloadID="1105574420906--
451266344000288275@10.10.13.125">
    <Response>
        <Status code="200" text="OK"/>
    </Response>
</cXML>
```

Documents Waiting

If there is a GetPendingResponse document, there are documents waiting. The GetPendingResponse document can contain waiting documents in-line or contain a DataAvailableMessage element that refers to waiting documents.

Documents In-Line

The server can send waiting document in-line in the GetPendingResponse document, in which case the client does not need to use the data download transaction.

The following example contains a waiting SubscriptionChangeMessage document:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2005-01-12T16:00:25-08:00" payloadID="1105574420906--
451266344000288275@10.10.13.125">
<Response>
    <Status code="200" text="OK"/>
        <GetPendingResponse>
            <cXML xml:lang="en-US"
                    payloadID="456778@hub.com"
                    timestamp=""2005-01-12T16:00:25-08:00">
                <Header>
                    <From>
```

```
            <Credential domain="NetworkId">
               <Identity>AN01000000001</Identity>
            </Credential>
         </From>
         <To>
            <Credential domain="NetworkId">
               <Identity>AN13000000259</Identity>
            </Credential>
         </To>
         <Sender>
            <Credential domain="NetworkId">
               <Identity>AN01000000001</Identity>
            </Credential>
         <UserAgent>Network Hub 2.0</UserAgent>
         </Sender>
      </Header>
      <Message>
         <SubscriptionChangeMessage type="new">
            <Subscription>
               <InternalID>1234</InternalID>
               <Name xml:lang="en-US">Q2 Prices</Name>
               <Changetime>2002-03-12T18:39:09-08:00</Changetime>
               <SupplierID domain="DUNS">123456789</SupplierID>
               <Format version="2.1">CIF</Format>
            </Subscription>
         </SubscriptionChangeMessage>
      </Message>
    </cXML>
  </GetPendingResponse>
 </Response>
</cXML>
```

For information about the SupplierChangeMessage element, see
"SupplierChangeMessage" on page 298. For information about the
SubscriptionChangeMessage element, see "SubscriptionChangeMessage" on page 305.

Documents Referenced through DataAvailableMessage

GetPendingReponse documents can refer to waiting documents with a
DataAvailableMessage element, instead of including them in-line. This element contains
an internal identifier, which the client uses to retrieve the documents. The client uses
the data download transaction, which transports documents as Multipurpose Internet
Mail Extensions (MIME) attachments, not embedded in cXML documents.

There are several reasons why servers might use the MIME attachment method used
by the data download transaction instead of the in-line method used by the
GetPendingResponse document:

- MIME can transport documents that use different DTDs or DTD versions than the
  GetPendingResponse document.

- MIME attachments are simpler to process than nested documents with multiple
  parent and child elements.

- MIME is better for large documents, which transport as separate files, rather than
  one very large document.

The following example contains a DataAvailableMessage element, which indicates that
there documents waiting for retrieval through the data download transaction.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2005-01-12T16:00:18-08:00" payloadID="1105574420906--
451266344000288275@10.10.13.125">
  <Response>
    <Status code="200" text="OK"/>
    <GetPendingResponse>
      <cXML timestamp="2005-01-12T16:00:18-08:00"
            payloadID="1105574420141-977399960268715709@10.10.13.125">
        <Header>
          <From>
            <Credential domain="NetworkId">
              <Identity>AN01000000001</Identity>
            </Credential>
          </From>
          <To>
            <Credential domain="NetworkId">
              <Identity>AN13000000259</Identity>
            </Credential>
          </To>
          <Sender>
            <Credential domain="NetworkId">
              <Identity>AN01000000001</Identity>
              <UserAgent>ANCXMLDispatcher</UserAgent>
            </Credential>
```

```
                    </Sender>
                  </Header>
                  <Message>
                    <DataAvailableMessage>
                      <InternalID domain="PendingMessages">3738</InternalID>
                    </DataAvailableMessage>
                  </Message>
                </cXML>
              </GetPendingResponse>
            </Response>
        </cXML>
```

The DataAvailableMessage element contains an internal ID, which corresponds to one or
more documents waiting for download. Use the data download transaction to retrieve
them.

DataRequest

After you obtain a DataAvailableMessage, use its internal ID value to download the
waiting documents by sending a cXML DataRequest document. For example:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="1105574421.19583@hydra.buyer.com" timestamp="2005-01-
13T00:00:21+00:00">
  <Header>
    <From>
      <Credential domain="NetworkId">
        <Identity>AN13000000259</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="NetworkId">
        <Identity>AN01000000001</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="NetworkId">
        <Identity>AN13000000259</Identity>
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>Our Buyer App 1.0</UserAgent>
    </Sender>
  </Header>
  <Request>
    <DataRequest>
```

```
            <InternalID domain="PendingMessages">3738</InternalID>
        </DataRequest>
    </Request>
</cXML>
```

DataResponse

The server responds with a cXML DataResponse document and the requested
documents together in a MIME envelope in the same HTTP connection. The Content-
Type HTTP header defines the MIME boundary.

The following DataResponse document has one StatusUpdateRequest document attached.

```
Content-Type: multipart/mixed; boundary="----=_Part_0_10550230.1105574425445"

------=_Part_0_10550230.1105574425445
Content-Type: text/xml; charset=UTF-8
Content-ID: <1105574425572.1197583259@cetus.hub.com>

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2005-01-12T16:00:25-08:00"
        payloadID="1105574425428-5167970095322563427@10.10.13.103">
    <Response>
        <Status code="200" text="OK"/>
        <DataResponse>
            <Attachment>
                <URL>cid:1105574422695.1816707419@cetus.hub.com</URL>
            </Attachment>
        </DataResponse>
    </Response>
</cXML>

------=_Part_0_10550230.1105574425445
Content-Type: text/xml; charset=UTF-8
Content-ID: <1105574422695.1816707419@cetus.hub.com>

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cxml.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="1105573919487--7116204576911739136@10.10.13.125"
        timestamp="2005-01-12T15:51:59-08:00">
    <Header>
        <From>
            <Credential domain="NetworkId">
                <Identity>AN12000000259</Identity>
            </Credential>
```

```
            </From>
            <To>
               <Credential domain="NetworkId">
                   <Identity>AN13000000259</Identity>
               </Credential>
            </To>
            <Sender>
               <Credential domain="NetworkId">
                   <Identity>AN01000000001</Identity>
               </Credential>
               <UserAgent>Network Hub 2.0</UserAgent>
            </Sender>
         </Header>
         <Request deploymentMode="production">
            <StatusUpdateRequest>
               <DocumentReference payloadID="DO123@hydra.buyer.com"/>
               <Status code="200" message="OK"/>
            </StatusUpdateRequest>
         </Request>
      </cXML>

         ------=_Part_0_10550230.1105574425445--
```

For more information on MIME attachments, see "Attachments" on page 33.

You do not need to authenticate documents downloaded through the data download transaction if they come from a trusted source.

Chapter 14
Provider PunchOut Transaction

Provider PunchOut enables applications to punch out to a remote application that supplies some service to the originating application, such as credit card validation, single login, or self registration.

cXML documents provide a means for the originator and the provider to communicate during this transaction. These cXML documents are ProviderSetupRequest, ProviderSetupResponse, and ProviderDoneMessage and are tailored specifically to handle the interaction between an originating application and a service provider. They pass details such as what service is to be provided, session information, the return URL of the originator, and status or followup information.

This chapter describes:

- Message Flow
- ProviderSetupRequest Document
- ProviderSetupResponse Document
- ProviderDoneMessage Document

Message Flow

The order of cXML message flow in the Provider PunchOut transaction is shown in the following diagram.
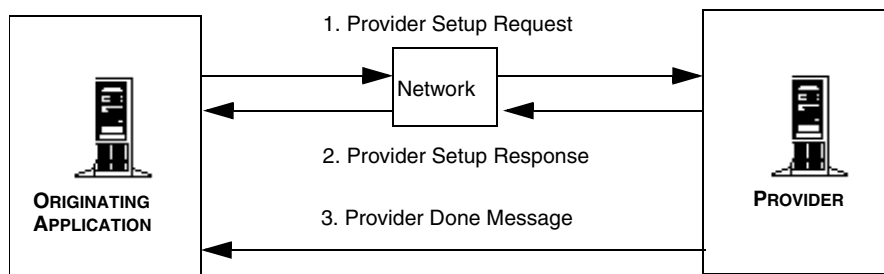
To initiate a Provider PunchOut, the originating application sends a ProviderSetupRequest document to the provider. This document includes credential information for the user and the user's organization, the return URL, and the service requested from the provider. To acknowledge the request, the provider sends a ProviderSetupResponse document to the originating application and includes a URL for the start page indicating where the user should be redirected. When the user has finished, the provider sends a ProviderDoneMessage document back to the originating application, indicating that the user has completed their session at the provider's site.

ProviderSetupRequest Document

The ProviderSetupRequest document initiates a Provider PunchOut transaction and passes several items of information to the provider, including information about the member organization and user, the return URL, and which service is being requested.

The document contains two sections, one specified by a Header element, the other by a Request element. The Header contains credential information about the user and the requesting organization and the Request contains the actual ProviderSetupRequest element that contains information needed to initiate the Provider PunchOut.

Header

The Header portion of the document contains addressing and authentication information. The following sample is the header portion taken from a ProviderSetupRequest document. The UserAgent element contains the digital signature of the provider; a string that corresponds to the application and the version making the request. For example, "www.triton.com" or "Procurement Application 7.0." The two parties must agree on a common certificate format and authority.

```
<Header>
  <From>
  <!-- Triton Bank -->
    <Credential domain="NetworkId" type="marketplace">
       <Identity>AN01000001709</Identity>
    </Credential>
    <Credential domain="triton.com">
       <Identity>9999</Identity>
    </Credential>
  </From>
  <To>
  <!-- Marketplace -->
    <Credential domain="NetworkId">
       <Identity>AN01000000003</Identity>
    </Credential>
  </To>
  <Sender>
  <!-- Triton Bank -->
    <Credential domain="NetworkId">
       <Identity>AN01000001709</Identity>
       <SharedSecret>abracadabra</SharedSecret>
    </Credential>
    <UserAgent>www.triton.com</UserAgent>
  </Sender>
</Header>
```

Because the Header element is similar for each message type, see "Header" on page 43 for specifics on how to construct this portion of the message.

Request

The Request portion of the document contains a ProviderSetupRequest, which has several items of information about the transaction from the originator, including a cookie to track the session for the originator, a return URL, what service is being requested from the provider, and other information contingent upon the type of service and the provider.

```
<Request>
  <ProviderSetupRequest>
    <OriginatorCookie>iTRk9bG49EJOGhJC</OriginatorCookie>
    <BrowserFormPost>
      <URL>https://www.triton.com/providerdone.asp</URL>
    </BrowserFormPost>
    <SelectedService>signin</SelectedService>
    <Extrinsic name="Brand">Triton</Extrinsic>
    <Extrinsic name="User">
      <Identity>0001</Identity>
    </Extrinsic>
    <Extrinsic name="QueryString">req=R532&login=gtou&</Extrinsic>
  </ProviderSetupRequest>
</Request>
```

The following table provides guidelines for the structure of the request section of the
Provider PunchOut message.

Element	Instances	Parent Elements	Child Elements	Attributes
ProviderSetupRequest	1	Request	OriginatorCookie, BrowserFormPost, SelectedService, Extrinsic	None
OriginatorCookie	1	ProviderSetupRequest, ProviderDoneMessage	None	None
BrowserFormPost	0 or 1	ProviderSetupRequest	URL	None
URL	0 or 1	BrowserFormPost, Followup	None	None
SelectedService	1	ProviderSetupRequest	None	None
Extrinsic	Any	ProviderSetupRequest	Varies	name

The elements in the header section are:

Request

Contains a request to initiate a Provider PunchOut transaction, and in this case
contains a ProviderSetupRequest element.

ProviderSetupRequest

A request from an originating application to a provider to initiate a transaction.

OriginatorCookie

OriginatorCookie is tied to the user's session on the requestor's site and is returned to the requestor later with the ProviderDoneMessage. This implements a one-time key allowing the user to return to the same session on the originating application.

BrowserFormPost URL

The originating application provides the BrowserFormPost location so that the provider can display a "Done" button, and provide information, such as a Status, at the end of the interactive session. Inclusion should lead to a ProviderDoneMessage document being sent from the provider at the end of each session. URL contains the location on the requestor's site to return the user when they have finished at the provider site.

SelectedService

Identifies the service requested by the originating application and offered by the provider.

Extrinsic

The extrinsics for the Provider PunchOut depend upon what service the provider supplies. Please see specific documentation for your specific ProviderSetupRequest.

> **Note:** XML content, elements, and their attributes must be defined in the cXML DTD or XML escaped.

Sample

To demonstrate a typical ProviderSetupRequest document, the following is a request from a marketplace member named Triton Bank, to a marketplace.

```
<cXML timestamp="2000-07-11T15:03:14-07:00" payloadID="963352994214--
8721789825238347285@10.10.83.151">
   <Header>
      <From>
         <Credential domain="NetworkId" type="marketplace">
            <Identity>AN01000001709</Identity>
         </Credential>
         <Credential domain="triton.com">
            <Identity>9999</Identity>
         </Credential>
      </From>
      <To>
         <Credential domain="NetworkId">
```

```
            <Identity>AN01000000003</Identity>
          </Credential>
        </To>
        <Sender>
          <Credential domain="NetworkId">
            <Identity>AN01000001709</Identity>
            <SharedSecret>abracadabra</SharedSecret>
          </Credential>
          <UserAgent>www.triton.com</UserAgent>
        </Sender>
      </Header>
      <Request>
        <ProviderSetupRequest>
          <OriginatorCookie>iTRk9bG49EJOGhJC</OriginatorCookie>
          <BrowserFormPost>
            <URL>https://www.triton.com/providerdone.asp</URL>
          </BrowserFormPost>
          <SelectedService>signin</SelectedService>
          <Extrinsic name="Brand">Triton</Extrinsic>
          <Extrinsic name="User">
            <Identity>0001</Identity>
          </Extrinsic>
          <Extrinsic name="QueryString">req=R532&login=gtou&</Extrinsic>
        </ProviderSetupRequest>
      </Request>
    </cXML>
```

ProviderSetupResponse Document

The ProviderSetupResponse document notifies the originating application of the results of the request. Status and start page information is included.

```
    <cXML payloadID="456789@marketplace.com"
        xml:lang="en-US" timestamp="2000-03-12T18:40:15-08:00">
      <Response>
        <Status code="200" text="OK"/>
        <ProviderSetupResponse>
          <StartPage>
            <URL>http://sun@marketplace.com/enter?23423SDFSDF23</URL>
          </StartPage>
        </ProviderSetupResponse>
      </Response>
    </cXML>
```

The following table provides guidelines for the structure of the ProviderSetupResponse document of the Provider PunchOut transaction.

Element	Instances	Parent Elements	Child Elements	Attributes
Response	1	cXML	Status, ProviderSetupResponse	None
Status	1	Response	None	code, text
ProviderSetupReponse	1	Response	StartPage	None
StartPage	1	ProviderSetupReponse	URL	None
URL	1	StartPage	None	None

Response

Contains the Status and ProviderSetupResponse elements.

Status

Provides information on the success or failure of the provider request. The content of the Status element can be any data needed by the requestor and can describe the error in more detail. Status has the following attributes:

code	The status code of the request. This follows the HTTP status code model. For example, 200 represents a successful request.
text	The text of the status message. This text aids user readability in logs, and it consists of canonical strings in English.

For a 200/OK status code, there might be no data. However, for a 500/Internal Server Error status code, it is strongly recommended that the actual XML parse error or application error be presented. This error allows better one-sided debugging and inter-operability testing.

The provider should not include the ProviderSetupResponse element unless the status code is in the 200 range. See "Status" on page 48 for a list of all possible status code values.

ProviderSetupResponse

If the request was successful, the ProviderSetupResponse element is included in the response document and contains the StartPage and URL elements which indicate where the user should be redirected.

StartPage URL

This element contains a URL element that specifies the URL to pass to the browser to initiate the Provider PunchOut browsing session requested in the ProviderSetupRequest element. This URL must contain enough state information to bind to a session context on the provider website.

Sample

The following ProviderSetupResponse document is in reply to Triton Bank from a provider from the previous ProviderSetupRequest section.

```
<cXML payloadID="456789@marketplace.com"
    xml:lang="en-US" timestamp="2000-03-12T18:40:15-08:00">
    <Response>
       <Status code="200" text="OK"/>
       <ProviderSetupResponse>
          <StartPage>
             <URL>http://sun@marketplace.com/enter?23423SDFSDF23</URL>
          </StartPage>
       </ProviderSetupResponse>
    </Response>
</cXML>
```

ProviderDoneMessage Document

The ProviderDoneMessage document contains any information the originating application must know about the completed operation at the provider site.

Header

The ProviderDoneMessage Header section is similar to the header sections in the Request and Response messages; however, because this message is sent with a Form Post, you should not include a SharedSecret in the Sender element. The UserAgent element contains the digital signature of the provider. The two parties must agree on a common certificate format and authority.

```
<Header>
  <From>
    <Credential domain="NetworkId">
      <Identity>AN01000000003</Identity>
    </Credential>
  </From>
  <To>
    <Credential domain="NetworkId">
      <Identity>AN01000001709</Identity>
    </Credential>
  </To>
  <Sender>
  <Credential domain="NetworkId">
    <Identity>AN01000000003</Identity>
  </Credential>
  <UserAgent>Purchase</UserAgent>
  </Sender>
</Header>
```

Because the Header element is similar for each message type, see "Header" on page 43 for the specifics on how to construct this portion of the message.

Message

The Message portion of the document contains the ProviderDoneMessage element, which contains any information requested by the originating application, and information to return to the user to their session at the originating application's site.

```
<Message>
  <Status code="200" text="OK"/>
  <ProviderDoneMessage>
    <OriginatorCookie>c546794949</OriginatorCookie>
    <ReturnData name="method">
      <ReturnValue>Triton.transact</ReturnValue>
      <Name xml:lang="en-US">Triton OM transact</Name>
    </ReturnData>
  </ProviderDoneMessage>
</Message>
```

The following table details guidelines for the structure of the message section of the ProviderDoneMessage document.

Element	Instances	Parent Elements	Child Elements	Attributes
Message	1	None	Status, ProviderDoneMessage	None
Status	1	Message	None	text, code
ProviderDoneMessage	1	Message	OriginatorCookie, ReturnData, ReturnValue, Name	None
OriginatorCookie	1	ProviderDoneMessage	None	None
ReturnData	Any	ProviderDoneMessage	ReturnValue, Name	name
ReturnValue	1	ProviderSetupRequest	None	None
Name	1	BrowserFormPost, Followup	None	xml:lang

The elements in the message section are:

OriginatorCookie

The same element that was passed in the original ProviderSetupRequest document. It must be returned here to allow the requesting application to match the ProviderDoneMessage document with an earlier ProviderSetupRequest document and return the user to the correct session.

ReturnData

Contains any information the originator must know about the completed operation at the provider site. The name attribute identifies the type (domain) of the ReturnData to the requestor.

ReturnValue

A value that is used by the originating application. This value depends on what service the provider supplies.

Name

An identifier for the data returned. Provides a description for the contents of the ReturnData element.

When displaying values, keep in mind that Name and ReturnValue have similar semantics, but different uses in the originating application.

Sample

The provider sends the following ProviderDoneMessage document, which notifies the originating application, Triton Bank, that the user has finished with their session on the provider site.

```
<cXML timestamp="2000-07-11T15:13:28-07:00" payloadID="963353608827--
3642656259900210849@10.10.83.151">
  <Header>
    <From>
    <!-- marketplace -->
      <Credential domain="NetworkId">
        <Identity>AN01000000003</Identity>
      </Credential>
    </From>
    <To>
      <!-- Triton bank -->
      <Credential domain="NetworkId">
        <Identity>AN01000001709</Identity>
      </Credential>
    </To>
    <Sender>
    <!-- marketplace -->
      <Credential domain="NetworkId">
        <Identity>AN01000000003</Identity>
      </Credential>
      <UserAgent>Purchase</UserAgent>
    </Sender>
  </Header>
  <Message>
    <Status code="200" text="OK"/>
    <ProviderDoneMessage>
      <OriginatorCookie>c546794949</OriginatorCookie>
      <ReturnData name="method">
        <ReturnValue>Triton.transact</ReturnValue>
        <Name xml:lang="en-US">Triton OM transact</Name>
      </ReturnData>
    </ProviderDoneMessage>
  </Message>
</cXML>
```

Chapter 15
Alternative Authentication Methods

cXML supports alternatives to the shared secret authentication method for verifying the sender of cXML documents.

This chapter describes:

- Message Authentication Code (MAC)

- Auth Transaction

Message Authentication Code (MAC)

Message Authentication Code (MAC) authentication allows the authentication of documents sent directly from a client to a server without passing through a trusted third party (such as a network commerce hub) for authentication. These documents contain a credential with an authentication code that can be interpreted only by the trusted third party and the receiving server, not by the sender.

The format of the Credential element containing the MAC is described in "Credential" on page 45.

Overview of MACs

The primary purpose of MACs is to convey receivers' shared secrets without revealing them to senders. MACs keep shared secrets secure by encoding them through a hash.

MACs are as secure as shared secrets. Senders must guard MACs as carefully as shared secrets. Compromising either piece of information could make trading partners vulnerable.

To use MAC authentication, both the trusted third party and the receiver must be able to compute MACs.

Computation Algorithm

MACs are created by an algorithm that combines data known by both the trusted third party and the receiver.

cXML specifies the use of the HMAC-SHA1 algorithm described in IETF RFC 2104, "HMAC: Keyed-Hashing for Message Authentication".

The HMAC-SHA1 algorithm provide the security required for cXML, and it has been formally proven to be as secure as the underlying hash algorithm.

For more information about IETF RFC 2104, see www.ietf.org/rfc/rfc2104.txt.

Creation and Expiration Dates

Creation and expiration dates add additional security to MACs.

If a MAC is stolen, changing the sender's shared secret has no effect. It is impractical to expect the sender to contact the receiver out-of-band to invalidate the MAC, because they might not have an established relationship. To address this problem, a creation date (creationDate) and an expiration date (expirationDate) are embedded in MACs. The expiration date limits the damage that can be result from a stolen MAC, because MACs eventually expire. The shorter the expiration period, the greater the security afforded. Receivers must reject MACs that are received after their expiration date.

Receivers can also reject unexpired MACs based on the amount of time that has elapsed since the creation date. For example, if a receiver receives a MAC that was created several years ago, but expires tomorrow, the receiver might not wish to accept the MAC. This decision is left with the implementors of the receiving systems.

It is mandatory for receivers to check that the creation date is in the past and the expiration date is in the future, and to reject it if either is not the case. However, it is optional for receivers to check whether the creation date is too long in the past.

Receivers must not only check that MACs are valid, but also that the data authenticated by MACs is acceptable. Specifically, receivers must validate that they wish to accept messages from the entities identified by the From and Sender credentials.

Computation Process

This section describes how to compute a MAC of type="FromSenderCredentials". The inputs for this MAC type are known only by the trusted third party and the receiver.

The trusted third party uses this computation to generate ProfileResponse Option elements and the receiving server uses it to validate the CredentialMac element.

Assembling the Hash Inputs

The MAC function takes two inputs, the *data input* and the *secret key input*:

- The data input is the UTF-8-encoded byte representation of each value listed below, in order, after normalization, with each value terminated by a single null byte (0x00):

    From/Credential@domain
    From/Credential/Identity
    Sender/Credential@domain
    Sender/Credential/Identity
    Sender/Credential/CredentialMac@creationDate
    Sender/Credential/CredentialMac@expirationDate

- The secret key input is the cXML shared secret used between the receiver and the third party.

Normalizing the Inputs

Normalize the values listed above to remove differences in case and formatting before computation:

Value	Normalize by...	Normalized Example
domain	Use the lowercase version of the string, unless it is known to be case sensitive, for example, "AribaNetworkUserId". Note that "NetworkId" and "DUNS" are not case-sensitive.	networkid
Identity	Discard leading or trailing whitespace and use the lowercase version of the string.	an9900000100
creationDate expirationDate	No normalization needed, because they are in ISO8601 format described in "Date, Time, and other Data Types" on page 40.	2003-01-15T11:42:46-08:00

Do not normalize the shared secret.

MAC Algorithm

The only supported MAC algorithm value is "HMAC-SHA1-96", which corresponds to the HMAC-SHA1 algorithm, which produces a 160 bit (20 byte) output, and retaining only the left-most 96 bits (12 bytes). The 12 bytes are then base-64 encoded, yielding a 16-byte character string consisting only of characters in the set [A-Z a-z 0-9 +/].

▼ **To computer the MAC:**

1. Concatenate the UTF-8-encoded byte representation of the following strings, each followed by a null byte (0x00). (The strings have been normalized as described above):

"networkid", "an9900000100", "networkid", "an9900000100", "2003-01-15T08:42:46-08:00", "2003-01-15T11:42:46-08:00"

The concatenation yields the following byte sequence:

```
   6e 65 74 77 6f 72 6b 69 64 00 61 6e 39 39 30 30
30 30 30 31 30 30 00 6e 65 74 77 6f 72 6b 69 64
00 61 6e 39 39 30 30 30 30 30 31 30 30 00 32 30
30 33 2d 30 31 2d 31 35 54 30 38 3a 34 32 3a 34
36 2d 30 38 3a 30 30 00 32 30 30 33 2d 30 31 2d
31 35 54 31 31 3a 34 32 3a 34 36 2d 30 38 3a 30
30 00
```

2. Use HMAC-SHA1 to hash the above sequence with the receiver's shared secret, for example, "abracadabra" (61 62 72 61 63 61 64 61 62 72 61), which yields:

71 1e 89 a7 3e 7c 9e b8 97 11 10 cd 78 57 fd a0 94 da fd

Do not terminate or normalize the shared secret.

3. Truncate the above result to 96 bits (12 bytes):

71 1e 89 a7 3e 7c 9e b8 97 11 10 cd

Truncation helps increase the security of the hash.

4. Base-64 encode the above result to yield the final result:

cR6Jpz58nriXERDN

The trusted third party inserts the final result in ProfileResponse documents it sends to the entity that will be the client (document sender), and the client inserts it in a CredentialMac element in all direct communication to the server (document receiver).

ProfileResponse

The following cXML example shows a ProfileResponse sent from a trusted third party (such as a commerce network hub) to a client (such as a procurement application) so the client can send direct requests to the receiving server.

```
<cXML payloadID="1234567890@bighub.com"
      timestamp="2003-01-15T09:39:09-08:00" xml:lang="en-US">
  <Response>
    <Status code="200" text="OK"/>
    <ProfileResponse>
      <Option name="CredentialMac.type">FromSenderCredentials</Option>
      <Option name="CredentialMac.algorithm">HMAC-SHA1-96</Option>
      <Option name="CredentialMac.creationDate">2003-01-15T08:42:46-0800</Option>
      <Option name="CredentialMac.expirationDate">2003-01-15T11:42:46-0800</Option>
      <Option name="CredentialMac.value">cR6Jpz58nriXERDN</Option>
      <Transaction requestName="OrderRequest">
        <URL>https://service.hub.com/ANCXMLDispatcher.aw/ad/cxml</URL>
      </Transaction>
      <Transaction requestName="PunchOutSetupRequest">
        <URL>https://service.hub.com/AN/cxml</URL>
        <Option name="Direct.URL">https://bigsupplier.com/punchout</Option>
        <Option name="Direct.AuthenticationMethod.CredentialMac">Yes</Option>
        <Option name="Direct.AuthenticationMethod.Certificate">Yes</Option>
      </Transaction>
    </ProfileResponse>
  </Response>
</cXML>
```

For more information about the Profile transaction, see Chapter 3, "Profile Transaction."

CredentialMac

The following cXML document fragment shows an example CredentialMac element as it would be inserted by the client in documents sent directly to the server.

```
<cXML>
  <Header>
    <To>
      <Credential domain="DUNS">
        <Identity>049329048</Identity>
      </Credential>
    </To>
    <From>
      <Credential domain="NetworkId">
        <Identity>AN9900000100</Identity>
      </Credential>
```

```
          </From>
          <Sender>
            <Credential domain="NetworkId">
              <Identity>AN9900000100</Identity>
              <CredentialMac type="FromSenderCredentials"
                  algorithm="HMAC-SHA1-96"
                  creationDate="2003-01-15T08:42:46-0800">
                  expirationDate="2003-01-15T11:42:46-0800">
                cR6Jpz58nriXERDN
              </CredentialMac>
              <UserAgent>Procure System 3.0</UserAgent>
            </Credential>
          </Sender>
        </Header>
      [. . .]
    </cXML>
```

For more information about the CredentialMac element see "Credential" on page 45.

Auth Transaction

The Auth transaction allows receivers to validate organizations' credentials through a mutually trusted third party. It should be used to authenticate received documents that do not contain either a shared secret or a MAC.

The receiver encloses the credential of the sender (the principal) in an AuthRequest document and sends it to the trusted third party for validation.

If the principal attempts to authenticate using a client digital certificate, the receiver includes both the principal's credential and information about the principal's certificate in the AuthRequest document. (The receiver obtains this certificate information from its Webserver or SSL/TLS implementation.)

The trusted third party receives the AuthRequest and looks up the principal's credential to see if it is a recognized organization. If the principal's certificate information was included, the trusted third party makes sure the certificate is valid and that it matches the organization associated with the credential.

If the credential (and optional certificate) authenticates, the trusted third party responds with a positive AuthResponse that contains the validated credential. If the credential is invalid, the trusted third party responds with an empty cXML response of status 403 (Forbidden).

The receiver can cache the results of the Auth transaction until the expiration date indicated in the AuthResponse. During this period, if the principal presents the same credential and certificate, the receiver need not send another AuthRequest.

AuthRequest

A request sent to a mutually trusted third party to authenticate an entity.

The following example includes X509 certificate information, which comes from the requesting entity's client digital certificate.

```
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML timestamp="2000-12-28T16:56:03-08:00" payloadID="foo123@bigsupplier.com">
  <Header>
    <From>
      <Credential domain="NetworkId">
        <Identity>AN99000000092</Identity>
      </Credential>
    </From>
    <To>
      <Credential domain="NetworkId">
        <Identity>AN99000000092</Identity>
      </Credential>
    </To>
    <Sender>
      <Credential domain="NetworkId">
        <Identity>AN99000000092</Identity>
        <SharedSecret>abracadabra</SharedSecret>
      </Credential>
      <UserAgent>cXML application 2.0</UserAgent>
    </Sender>
  </Header>
  <Request>
    <AuthRequest>
      <Credential domain="DUNS">
        <Identity>12345</Identity>
      </Credential>
      <X509Data>
        <X509IssuerSerial>
          <X509IssuerName>Verisign</X509IssuerName>
          <X509SerialNumber>12345</X509SerialNumber>
        </X509IssuerSerial>
      </X509Data>
    </AuthRequest>
  </Request>
</cXML>
```

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Credential

A cXML credential.

For more information, see "Credential" on page 45.

X509Data

Describes the X.509 client certificate being used for authentication.

X509IssuerSerial

A container for the serial number and issuer name of the X.509 certificate.

X509IssuerName

The distinguished name of the issuer of the X.509 certificate. The distinguished name should be a string representation of an LDAP Distinguished Name, as described in RFC 2253. For example,

C=US, O="John Doe Data Security, Inc.", OU=Secure Server Certification Authority

X509SerialNumber

The serial number of the X.509 certificate.

X509SKI

The Subject Key Identifier of the X.509 certificate.

X509 SubjectName

The distinguished name of the subject of the X.509 certificate. This should be a string representation of an LDAP distinguished name, as described in RFC 2253.

X509Certificate

Contains the Base-64-encoded X.509v3 certificate.

X509CRL

Contains a Base-64-encoded X.509v3 Certificate Revocation List.

AuthResponse

Returns a list of valid credentials of the person entity in the AuthRequest document. Note that this response is for successful authentications only.

AuthResponse has the following attribute:

expirationDate (optional)	Specifies the time beyond which the information contained in the AuthResponse must be discarded. The inclusion of this attribute specifies that the receiver can cache the AuthResponse information until the expirationDate.

The absence of an expirationDate should be interpreted to forbid caching.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.014/cXML.dtd">
<cXML payloadID="234234@hub.com" timestamp="2001-01-25T15:19:07-08:00">
   <Response>
      <Status code="200" text="OK"/>
      <AuthResponse expirationDate="2002-12-31T09:00:00-08:00">
         <Credential domain="DUNS">
            <Identity>12345</Identity>
         </Credential>
      </AuthResponse>
   </Response>
</cXML>
```

15 *Alternative Authentication Methods*

Chapter 16
cXML Digital Signatures

Any cXML request, response, or message can be signed using World Wide Web Consortium (W3C) XML Digital Signatures. Support for the XML Advanced Electronic Signature (XAdES) standard is also included.

This chapter describes:

- Digital Signature Overview
- Signing cXML Documents

Readers of this chapter should be familiar with electronic signature terminology and concepts such as asymmetric key pairs, certificates, and smart cards.

Digital Signature Overview

Digital signatures confirm the identity of the sender of an electronic document, and ensure that the document was not modified after it was generated by the signer. They consist of a series of bytes that contain cryptographic information, including the sender's public key and detailed information about the contents of the document being signed.

An XML digital signature—which is a specific arrangement of a digital signature—is an element that contains other information besides the cryptographic signature itself, including a list of what was signed, the signer's public key, and other attributes. A cXML signature is an XML digital signature of a certain form, as described later in this chapter.

XML Advanced Electronic Signature (XAdES) provides basic authentication and integrity protection.

W3C XML signatures and XAdES have many options designed to allow for flexibility. These options are described in the following resources:

- For information about W3C XML digital signatures, see www.w3.org.

- For information about XAdES, see uri.etsi.org/01903/v1.3.2.

Options for Signing

You can use a service to sign documents on your behalf, or you can implement the necessary hardware or software systems to sign the documents yourself. If you implement your own signing system, you must obtain a certificate signed by a Certificate Authority (CA) trusted by the receiver. Meeting receiver requirements might mean obtaining hardware that keeps the private key secret, such as a smart card or Hardware Security Module.

Note that signature and certificate requirements vary according to local laws and regulations. Prior to implementing a signing system, be sure you learn the requirements of the relevant locale.

Signing cXML Documents

A valid cXML digital signature is not just an XML signature, but an XML signature that uses particular options, has particular elements present, and signs (or does not sign) certain portions of the document.

cXML Digital Signatures

Note that namespace prefix conventions are used here when referring to elements that come from other specifications. All W3C XML Digital Signature elements use the ds prefix, and all XAdES elements use the xades prefix.

ds:Signature Element

The cXML element contains a space for the ds:Signature element after the Request, Response, or Message element. The ds:Signature element holds information about what is being signed, one or more signatures, and the keys used to create the signature or signatures. It also has a place to store additional information such as XAdES extensions or attachment manifests.

The cXML element also contains a space for the signatureVersion attribute. For more general information about the cXML envelope, see page 38.

signatureVersion	If present, signatureVersion implies that the document is digitally signed, that is, that the document contains a valid ds:Signature element immediately following the Request, Response, or Message element. If the document is signed, this attribute must be present. The only valid value for the attribute is 1.0; other values are reserved for future use.

The Message, Request, and Response elements contain an Id attribute. For more complete information about the Message, Request, and Response elements, see the relevant sections of Chapter 2, "cXML Basics.".

Id	This attribute can be used to call out an element and all its children as a target for signing. For example, if a document contains <Request Id="foo">, then in the digital signature <Reference URI="#foo"> will refer to the Request element and all its children. If the document is signed, this attribute must be present.

cXMLSignedInfo

The cXMLSignedInfo element includes cXML-specific details about the signature, and has the following attributes:

signatureVersion	Required. signatureVersion implies that the document is digitally signed, that is, that the document contains a valid ds:Signature element immediately following the Request, Response, or Message element. The only valid value for the attribute is 1.0; other values are reserved for future use.
payloadID	Required. The payloadID attribute is used to establish links between documents. The payloadID in the cXMLSignedInfo element must be the same as the payloadID in the document's main cXML element.

Signing Essentials

Because some information from the cXML header is significant, it must be signed. To sign these attributes from the header, repeat the information in a cXMLSignedInfo element placed within a ds:Object element. The ds:Object must be the first ds:Object in the signature. For example:

```
<ds:Object>
<cXMLSignedInfo Id="cXMLSignedInfo"
        signatureVersion="1.0"
        payloadID="xxx"/>
</ds:Object>
```

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The value of the Id attribute must be "cXMLSignedInfo". The values of the signatureVersion and payloadID attributes must exactly match the values specified in the cXML element, and the receiver of the document must verify this match. No transforms should be used in this ds:Reference. This element must be signed via the first ds:Reference object in the ds:SignedInfo, as follows:

```
<ds:Reference URI="#cXMLSignedInfo">
<ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1"/>
<ds:DigestValue>xxxxxxxxxxxxxxxxxxxxxxxxxxxx</ds:DigestValue>
</ds:Reference>
```

The Request, Response, or Message element should be signed in its entirety. To do this, specify the string "cXMLData" as the value of the Id attribute on the Request, Response, or Message element and include a ds:Reference element with the URI "#cXMLData" in the ds:SignedInfo. No transforms should be applied to this reference. This ds:Reference must be the second ds:Reference in the ds:SignedInfo.

The ds:KeyInfo element should be present with a single ds:X509Certificate element. This should include the Base64 encoding of the DER representation of an X.509 certificate containing the public key corresponding to the private key used to sign the document.

Using XAdES

The use of XAdES is required for digital signatures. In the signature, xades:QualifyingProperties should be the second ds:Object. The xades:SignedProperties element and all its children must be signed by specifying "XAdESSignedProps" as the value for the Id attribute of xades:SignedProperties and including a ds:Reference with the URI "#XAdESSignedProps" and no transforms in the ds:SignedInfo. When using XAdES, the certificate referred to in the xades:Cert element must be the same as that contained in the ds:KeyInfo element, the Id attribute of the ds:Signature element must be set to cXMLSignature and the Target attribute of xades:QualifyingProperties must be #cXMLSignature.

Signing Attachments

If the document in question includes attachments, digital signatures can be used to sign just the document, or both the document and its attachments. Signatures are structured in such a way that if the attachments are discarded, the signature on the document itself can still be validated.

The attachments should be signed using ds:Reference elements in a ds:Manifest element included under a ds:Object contained in the signature. The Id attribute of the ds:Manifest element must be "AttachmentManifest". The ds:Object should occur immediately after the ds:Object containing the xades:QualifyingProperties element, if it is present. Otherwise, it should occur immediately after the ds:Object containing the cXMLSignedInfo element.

Each ds:Reference in the manifest should use a URI with the "cid:" scheme to refer to the attachments through their MIME Content-Id. The ds:Manifest element itself should be signed using a fragment URI reference included in the ds:SignedInfo. This requirement exists because a compliant XML signature implementation must validate all the ds:Reference elements under ds:SignedInfo. Base validation ensures that the manifest itself has not been corrupted, but will not validate the objects referred to in the manifest. This approach makes it possible to validate the document on its own if the attachments have been discarded. For example:

```
<ds:Object>
    <ds:Manifest Id="AttachmentManifest">
        <ds:Reference URI="cid:23482390498.34284203.part1@some.host.com">
            <ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1"/>
            <ds:DigestValue>P6ua59kKBLLtMBFE+IwPUgp2xqc=</ds:DigestValue>
        </ds:Reference>
        <ds:Reference URI="cid:23482390498.34284203.part2@some.host.com">
            <ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1"/>
            <ds:DigestValue>P6ua59kKBLLtMBFE+IwPUgp2xqc=</ds:DigestValue>
        </ds:Reference>
    </ds:Manifest>
</ds:Object>
```

Error Status Codes for Digital Signatures

The following table lists cXML digital signature status codes:

Status	Text	Meaning
475	Signature Required	The receiver is unwilling to accept the document because it does not have a digital signature.
476	Signature Verification Failed	The receiver is unable to validate the signature, possibly because the document was altered in transit, or the receiver does not support one or more algorithms used in the signature.
477	Signature Unacceptable	The signature is technically valid, but is not acceptable to the receiver for some other reason. The signature policies or certificate policies might be unacceptable, the type of certificate used might be unacceptable, or there might be some other problem.

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Digital Signature Example

The following example shows a signed invoice. Note that the digest values and signature value are not correct, because parts of the invoice document have been abbreviated for this example.

```
<?xml version="1.0" ?>
<!DOCTYPE cXML SYSTEM "http://xml.cXML.org/schemas/cXML/1.2.0.11/InvoiceDetail.dtd">
<cXML payloadID="20030912.jdoe004@live.company.com" signatureVersion="1.0"
timestamp="200104-20T23:59:45-07:00">
    <Header>
      <From>
        <Credential domain="AribaNetworkUserId">
          <Identity>jdoe@company.com</Identity>
        </Credential>
      </From>
      <To>
        <Credential domain="AribaNetworkUserId">
          <Identity>smistry@company.com</Identity>
        </Credential>
      </To>
      <Sender>
        <Credential domain="AribaNetworkUserId">
          <Identity>jdoe@company.com</Identity>
          <SharedSecret>abracadabra</SharedSecret>
        </Credential>
        <UserAgent>Our Invoice Application 4.0</UserAgent>
      </Sender>
    </Header>
    <Request Id="cXMLData" deploymentMode="production">
      <InvoiceDetailRequest>
        <InvoiceDetailRequestHeader invoiceDate="2001-04-20T23:59:20-07:00"
              invoiceID="123456-004" operation="new" purpose="standard">
        ...
        </InvoiceDetailRequestHeader>
        <InvoiceDetailOrder>

          ...
        </InvoiceDetailOrder>
        <InvoiceDetailSummary>

          ...
        </InvoiceDetailSummary>
      </InvoiceDetailRequest>
    </Request>
<ds:Signature xmlns:ds="http://www.w3.org/2000/09/xmldsig#" Id="cXMLSignature">
    <ds:SignedInfo>
      <ds:CanonicalizationMethod Algorithm="http://www.w3.org/TR/2001/REC-xml-c14n20010315">
      </ds:CanonicalizationMethod>
      <ds:SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1">
      </ds:SignatureMethod>
      <ds:Reference URI="#cXMLSignedInfo">
```

```
            <ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1">
            </ds:DigestMethod>
            <ds:DigestValue>mxtVp6Rg9K5wo/c5BO88g7sZYEg=</ds:DigestValue>
          </ds:Reference>
          <ds:Reference URI="#cXMLData">
             <ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1">
             </ds:DigestMethod>
             <ds:DigestValue>1uBJgSa3BXewh/1wsPDWCzn8Sgk=</ds:DigestValue>
          </ds:Reference>
          <ds:Reference URI="#XAdESSignedProps">
             <ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1">
             </ds:DigestMethod>
             <ds:DigestValue>XIasOHckorH8fz/thdyZIZvV2yI=</ds:DigestValue>
          </ds:Reference>
       </ds:SignedInfo>
       <ds:SignatureValue>
nNfsBpc22u9aypYLvgE5cuiHVO077vnaolS76LoAuks9bAwLO0kz/nkTQfb2zKSQTy8jj6W/
TJGCQj691PlKBnIqaMPPN3k+hbi6A5cJHPRd3HNPexU5sSi4StTuxlWAiHe/
XEeBEeclu7K6sR4Rh1gzzELg05v21aRX4oVGbjk=</ds:SignatureValue>
       <ds:KeyInfo>
          <ds:X509Data>
             <ds:X509Certificate>
MIICgDCCAekCAw7cUTANBgkqhkiG9w0BAQQFADCBijELMAkGA1UEBhMCVV
w7cUTANBgkqhkiG9w0BAQQFADCBijELMAkGA1UEBhMCVVMxEzARBgNV
MIICgDCCAekCAw7cUTANBgkqhkiG9w0BAQQFADCBijELMAkGA1UEBhMCVV
w7cUTANBgkqhkiG9w0BAQQFADCBijELMAkGA1UEBhMCVVMxEzARBgNVBA
MIICgDCCAekCAw7cUTANBgkqhkiG9w0BAQQFADCBijELMAkGA1UEBhMCVV
zuRel/9tb8M95FuN5yR9GUGl5PgkzwuCQYobJqIcAs=</ds:X509Certificate>
             </ds:X509Data>
          </ds:KeyInfo>
          <ds:Object>
             <cXMLSignedInfo Id="cXMLSignedInfo"
                payloadID="20030912.rsmith004@live.hub.com" signatureVersion="1.0">
             </cXMLSignedInfo>
          </ds:Object>
          <ds:Object>
             <xades:QualifyingProperties xmlns:xades="http://uri.etsi.org/01903/v1.1.1#"
                Target="#cXMLSignature">
             <xades:SignedProperties Id="XAdESSignedProps">
                <xades:SignedSignatureProperties>
                   <xades:SigningTime>2003-09-30T18:32:27Z</xades:SigningTime>
                   <xades:SigningCertificate>
                     <xades:Cert
                        <xades:CertDigest>
                           <ds:DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1">
                           </ds:DigestMethod>
                           <ds:DigestValue>LETnT8c7gvZqp3oVt8/BLOJpeeA=</ds:DigestValue>
                        </xades:CertDigest>
                        <xades:IssuerSerial>
```

```
                              <ds:X509IssuerName>EMAILADDRESS=an_ops@company.com,
                                 CN=anrc.hub.com, O="Hub, Inc.", L=Mountain View, ST=California,
                                 C=US</ds:X509IssuerName>
                              <ds:X509SerialNumber>973905</ds:X509SerialNumber>
                           </xades:IssuerSerial>
                        </xades:Cert>
                     </xades:SigningCertificate>
                     <xades:SignaturePolicyIdentifier>
                        <xades:SignaturePolicyImplied>
                        </xades:SignaturePolicyImplied>
                     </xades:SignaturePolicyIdentifier>
                  </xades:SignedSignatureProperties>
               </xades:SignedProperties>
            </xades:QualifyingProperties>
         </ds:Object>
      </ds:Signature>
   </cXML>
```

Appendix A
New Features in cXML 1.2.021

cXML 1.2.021 contains the following new features:

- "exemptDetail Attribute" on page 353
- "Extrinsic Element Support" on page 353

DTDs and documentation for this version are available at www.cXML.org.

exemptDetail Attribute

The following new attribute is included in the TaxDetail element: exemptDetail.

For more information, see "TaxDetail" on page 258.

Extrinsic Element Support

The following elements now include an Extrinsic element:

- Tax
- TaxDetail
- StatusUpdateRequest

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