VICS CPFR® XML Messaging Model

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Purpose

This document establishes voluntary guidelines for XML message exchange among systems that implement the VICS Collaborative Planning, Forecasting and Replenishment (CPFR®) guidelines.

Feedback

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Contents

Introduction

The VICS CPFR® Guidelines define a process to exchange, compare and alert trading partners to changes in key supply chain data to reduce inventory and improve customer service. Some implementations of CPFR use a shared database, with interactive trading partner access provided via web browsers. Others use a peer-to-peer approach, in which servers at each trading partner synchronize their views through message interchange.

Because the CPFR Guidelines are a public industry specification, the VICS CPFR committee has relied upon published standards for message formats in its work. The existing CPFR Guidelines provide two message mappings: one based upon the VICS EDI, the other using the UCC Standard Interchange Language (SIL).

The advantages of EDI are its status as a public standard, and its broad acceptance by VICS members for electronic commerce purposes. However, existing EDI specifications only cover some of the transactions that CPFR requires, enabling only loose coordination of CPFR servers. The other message mapping in the CPFR Guidelines, in the SIL format, is more comprehensive. Unfortunately, relatively few retailers, manufacturers, or solution providers use the SIL format for electronic commerce.

Since the CPFR Guidelines were published, there has been growing demand for XML-based mappings of CPFR messages. A number of recent developments have made it appropriate for the VICS CPFR committee to specify a CPFR XML protocol:

- The Uniform Code Council recently evolved its strategy of migrating X 12 transaction sets to UN/EDIFACT to one of migrating both X 12 and UN/EDIFACT to common XML-based transaction sets.

- The standards body that oversees XML (the Worldwide Web Coalition, or W3C) has published the XML Schema specification, a metadata standard that is much better suited to the construction of electronic commerce transaction sets than the earlier document type definition (DTD) approach.

- There has been an explosion of XML-related technology and industry specification efforts, including UCCnet, the Global Commerce Initiative, the Open Applications Group (OAG), ebXML, and RosettaNet.

- A number of VICS members have joined B2B marketplaces. These on-line marketplaces for goods and services intend to use both XML transaction sets and CPFR processes.

An XML messaging specification is important for the CPFR Guidelines to remain relevant in this rapidly changing environment of electronic commerce.

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Overview

CPFR implementations can send each other eight different types of messages:

1. *Forecast.* Projected demand for an item sourced at a seller location, and consumed at a buyer location.

2. *Forecast Revision.* A set of proposed changes to a forecast, as the result of promotional activity, weather, distribution or transportation issues, replanning, or some other reason.

3. *Product Activity.* Actual product movement observed, which may include on-hand quantities, DC withdrawals, or POS.

4. *Performance History.* A collection of values gathered for key performance metrics in the trading partner relationship, such as forecast error, sales growth, or the number of emergency orders.

5. *Exception Notification.* Indication of a variance from trading partner guidelines for changes in a forecast, differences between partner forecasts, or key performance metrics (forecast error, overstock, etc.).

6. *Exception Criteria.* Definition of the threshold for variances, beyond which an exception message should be triggered.

7. *Event.* Description of a promotion, inventory policy change, or other planned event, along with its expected and actual impacts on the supply chain.

8. *Item Information Request.* One trading partner’s request to the other to send product activity, forecast, or performance data, when the partner does not automatically send data.

Not all message types are required, depending upon the deployment scenario. For example, if two CPFR implementations have shared exception criteria, and have local means of triggering an exception, they do not have to exchange exception notifications. The CPFR XML specification defines conformance groups that solutions can use to specify which messages they support.

Relationship to other XML Specification Efforts

CPFR is a process that touches many functional areas of the supply chain – including product activity, supply chain performance, forecasts, promotions, and product profile information. Various other efforts are responsible for standardizing XML messages in these areas. The VICS CPFR XML specification has been integrated with the broader set of EAN·UCC XML specifications endorsed by the Global Commerce Initiative (GCI) to ensure full coverage of CPFR process without creating overlapping or redundant message formats. The existing core EAN·UCC messages for item synchronization, party (trading partner) synchronization, purchase order, invoice, despatch (shipment notice) and other information have been augmented with the CPFR product activity, forecast and other transactions.

Other XML-based industry standards efforts, such as RosettaNet and the Open Application Group (OAG) have produced specifications for forecast and product activity data sharing. If companies who wish to deploy CPFR have investments in these transaction sets, they can use the RosettaNet or OAG transactions, supplemented by the appropriate CPFR. See the section on *Conformance* for more details.

Because the CPFR Guidelines are transport independent, the CPFR XML Messaging model does not include message headers that describe transport or routing mechanisms. Several other initiatives, such as RosettaNet, BizTalk, OBI and ebXML include XML-based transport and routing specifications. CPFR implementations can make use of any of these (including transports unrelated to XML) for message exchange.

Methodology

Relationship to the CPFR Technical Specification

The CPFR Guidelines include a logical data model, data dictionary, and EDI/SIL message mappings that provide the content for the CPFR XML Messaging model. The goal of the XML mapping is to remain semantically consistent with these existing guidelines. Differences between the CPFR XML Messaging model and the logical database model are limited to the following:

- *Abstraction.* Many of the CPFR entities have a common structure and attributes; for example, many represent time series data. The CPFR XML Messaging model uses object-oriented modeling techniques to derive CPFR entities from more generic supertypes. In some cases, minor changes were made in translating a data model entity to a class to increase the opportunities for abstraction.

- *Context propagation.* The CPFR logical data model assumes shared access to all data. In distributed scenarios, two CPFR implementations will not always have visibility to the same forecasts or product activity data, so exception messages may need to propagate the values that triggered them, rather than rely upon joining the key fields of the exception message with the appropriate product activity or forecast item tables.

- *Message bundling.* Except for forecasts, the CPFR logical data model does not indicate how data can be bundled together into messages that contain several items. The CPFR XML Messaging model defines a uniform message structure, allowing (for example) several exceptions or item management profiles to be combined in a single message.

- *Errata.* As published in the *Roadmap to CPFR*, the CPFR logical data model and data dictionary have a few inconsistencies and errors. The CPFR XML messaging model incorporates corrections to these errors.

The Role of Unified Modeling Language (UML)

The CPFR XML Messaging model uses class diagrams from the Unified Modeling Language (UML) to represent CPFR entities as a set of object classes. One diagram is used for each related group of messages. Classes contain attributes, which have scalar, string, or structured datatypes. Some classes (such as Message) appear on more then one diagram, because several classes are derived from them. Off-page references indicate a class that is defined elsewhere. Generalization associations indicate subtype/supertype relationships; aggregate associations indicate containment relationships. Reference associations illustrate attributes that are of an enumerated type, because enumerated types are modeled as classes with the stereotype «enumeration».

The Role of XML Schema (XSD)

UML describes the structure and types, but not the syntax (format) of data in a message. The W3C XML Schema Definition (XSD) language is a set of conventions for representing information models in XML terms. The CPFR XML Messaging model includes an XSD mapping that provides a concrete syntax for messages, to encourage interoperability.

Conformance

CPFR solutions may claim conformance to this specification. In many cases, it is not appropriate to demand an "all or nothing" approach to conformance. For example, it is possible to deploy CPFR simply by sharing forecast and product activity data, and allowing all exception criteria and exception processing to be handled locally. It is also possible that two installations may choose VICS EDI, RosettaNet, or OAG message formats to exchange forecast data, but use VICS CPFR XML message formats to share exceptions.

To support most logical scenarios without creating a maze of implementation alternatives, the CPFR XML Messaging specification includes three "conformance groups" of CPFR XML messages. CPFR solutions may declare their support for any or all of these groups:

- ***Interchange:*** Forecast, forecast revision, product activity, performance history and event messages.
- ***Collaboration:*** Exception and exception criteria messages.
- ***Request:*** Item information request message.

None of the groups is dependent on another. Two solutions interoperate by sending and receiving messages that belong to the intersection of the conformance groups that they support.

Message Format Alternatives

In large-scale implementations, much of the data used for collaboration originates in data warehouses, or is extracted from enterprise applications. Most often, this data is available as “flat files”: text files with a single fixed-width or delimited record per line.

Recognizing the important role of bulk data processing in CPFR, the CPFR XML specification provides tow message formatting alternatives. An implementation may send messages with embedded XML markup (“tagged” messages), or may send an XML descriptor that can be used to interpret one or more messages that contain a content record per line, with comma, tab, or field-width delimiters (“batch” messages). In the first case, messages are self-describing; in the second, they only include the data, and the message descriptors are external.

Implementors should carefully consider the advantages and disadvantages of using batches relative to using tagged messages. Batches simplify integration and increase performance when the volume of data is very large. Tagged documents, meanwhile, may be used to generate interactive forms, provide higher levels of data validation, and facilitate protocol extensions.

The tagged format messages in the CPFR XML Schema closely follow the UML model in their structure. The section on “Batch Message Format” describes how to format batch messages for all message types.

Base Classes

Most of the base classes for CPFR are references to classes in the EAN·UCC XML Standard. Product (item) identification, location (party) identification, time and quantity are the basic building blocks of CPFR. Most data is keyed to an item sourced from a specific seller party and distributed to a buyer party. This combination of item, seller party and buyer party is called a *Collaborative Item*.

Item identification in CPFR is abstract. To create an instance document, implementations must use industry-specific item identification conventions. For example, the EAN-UCC has developed a schema that provides identification conventions for the fast-moving consumer goods (FMCG) industry. If a CPFR forecast was for a product that had a Global Trade Item Number (GTIN), the EAN-UCC fmcg schema contains a GTIN tag to validate it. See EAN·UCC specifications for further details on item and party identification.

The time periods used in CPFR are a combination of a beginning date and an ending date.

Quantities in CPFR are either absolute scalar values—used when the unit of measure is known—or qualified quantities that specify a unit of measure. Forecast items and product activity do not require units of measure when the product identifier (GTIN or UPC) implies a base unit of measure. Because the EAN-UCC XML Standard does not currently specify which values implementations can use for unit of measure codes, CPFR implementations should restrict themselves to the three-letter Unit-of-measure codes found in the VICS EDI standard.

All CPFR XML messages have a common header (called *Message*) derived from the EAN·UCC *Document* type, which includes the buyer and seller party IDs, the source of the message (whether buyer or seller), the date and time the message was generated, the date and time the message was sent, and the time period of values included in the message.

Figure 1 illustrates these base CPFR classes.

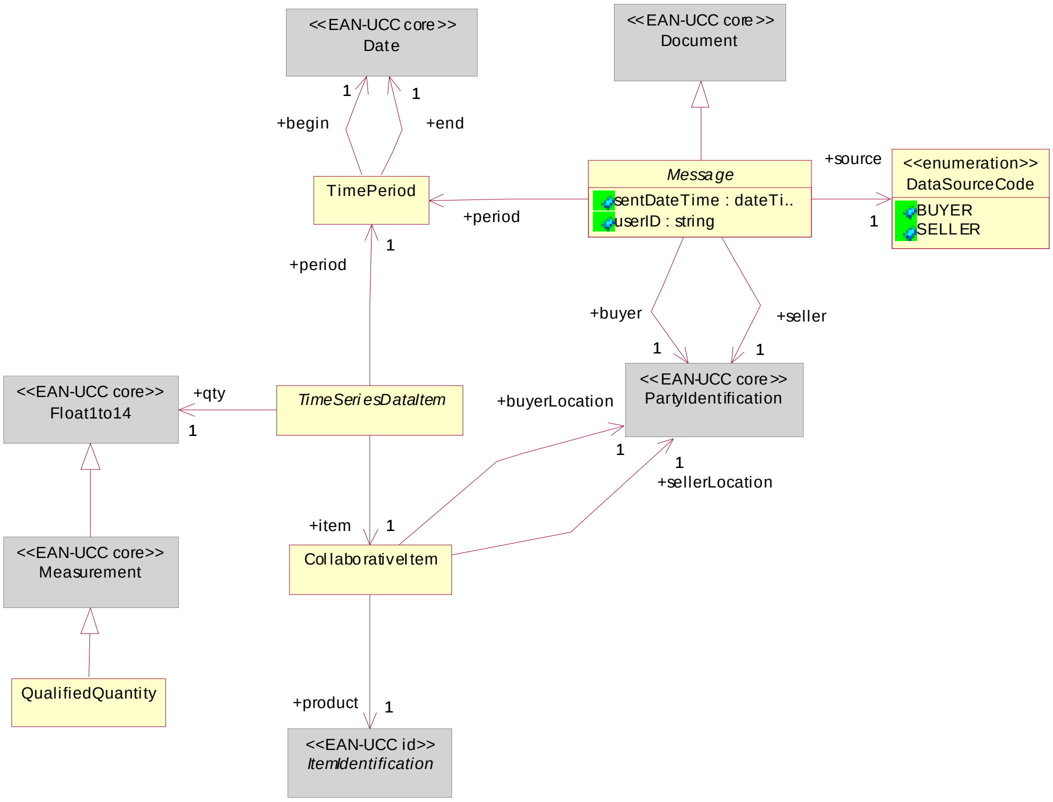

Figure 1 – Base CPFR Classes

Interchange Conformance Group

Forecast and Forecast Revision

A forecast is a collection of time series data items, called forecast items, which describe future demand for products sourced from a seller organization and distributed at a specific buyer location. Forecasts are either *sales* forecasts – which reflect consumer demand or manufacturing consumption – or *order* forecasts, which indicate the supply needed to meet future consumption requirements. Each forecast item within a forecast represents a quantity of demand or supply for a specific product that is expected between buyer and seller locations for a given time interval. An item may be for the total volume during the period, or a component (base/turn, promotional, or seasonal) of the total demand. Promotional forecast items may also identify an associated promotion and the number of buyer locations that are participating.

Forecast items may be frozen, in which case they may not be adjusted. Otherwise, the receiving organization has the option of revising the item and notifying an appropriate trading partner via a forecast revision message.

Forecast revision messages have the same structure as forecasts. However, forecast revisions items have a comment and an adjustment reason code, which explain why the revision is being proposed. Forecast revision items also include the timestamp of the forecast being revised, so that comparisons with the original forecast can be made. Forecast revisions may be submitted, acknowledged, accepted, rejected or superseded, as illustrated in Figure 3. Figure 2 presents the class diagram for forecast and forecast revision.

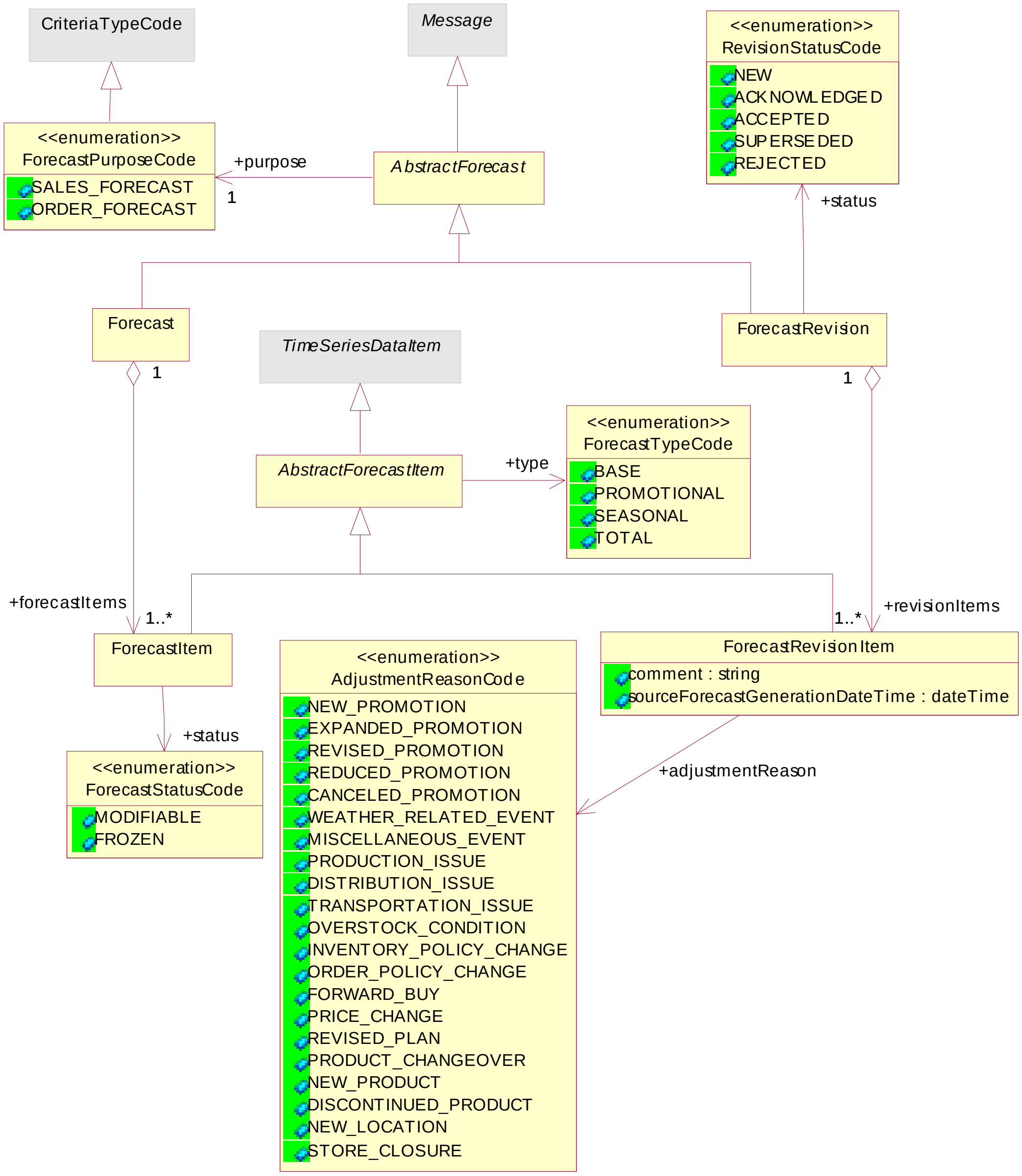

Figure 2 – Forecasts and Forecast Revision Message Classes

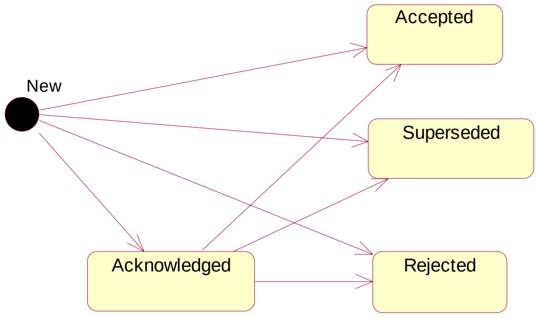

Figure 3 – Forecast Revision State Changes

Product Activity and Performance History

Trading partners can share two types of historical data using CPFR: product activity and performance history. Product activity represents movement of a product through a location. Product activity is always in terms of the base unit of measure for the item, so no unit of measure is specified. Types of product activity include sales (which may also be interpreted as manufacturing consumption or warehouse withdrawals, depending upon the type of buyer/seller relationship), orders, canceled orders, emergency orders, receipts, shipments, and on-hand inventory. Product activity reports are collections of product activity items that indicate the quantities of product movement during the specified time intervals.

Performance history captures key supply chain metrics for a pair of trading partners. These metrics can include forecast accuracy, in-stock percentage, fill rate, days of supply, or on-time delivery percentage. Because many of these measures are ratios, they require a unit of measure to be meaningful.

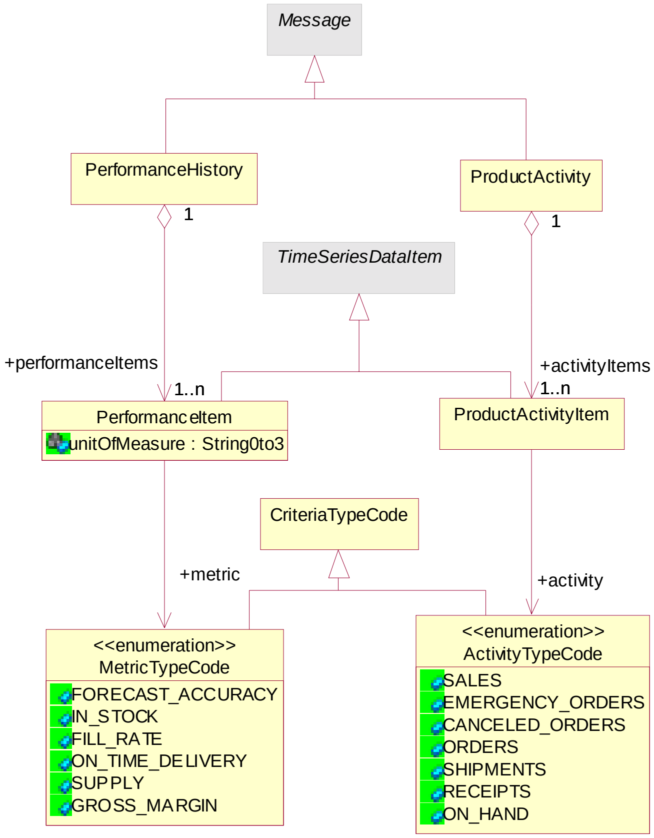

Figure 4 – Product Activity and Performance History Message Classes

Event

Event messages describe discrete events that affect supply or demand. For example, a sale on an item increases demand. Events are not restricted to promotions; they may include weather-related activity, or inventory policy changes.

Events are important in CPFR because they are typically responsible for the greatest volatility in a forecast. When events are properly correlated to the base forecast for an item, forecast accuracy improves.

A single event can encompass many products and locations. The event has a common description, category, and type. For each product/location combination included in the event, there may be expected or actual impact values. Event impacts may include price changes, sales increases, or inventory reductions.

Events may also be revised or canceled, as illustrated in Figure 5.

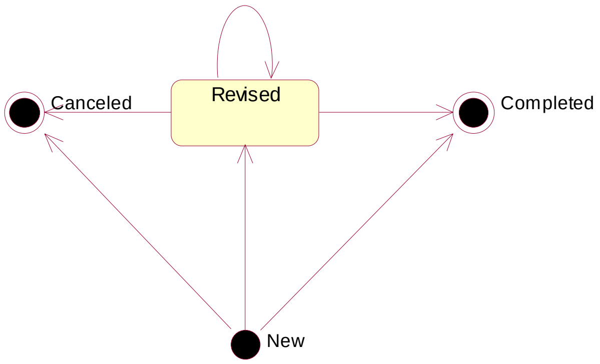

Figure 5 – Event State Diagram

Figure 6 shows the class diagram for Events.

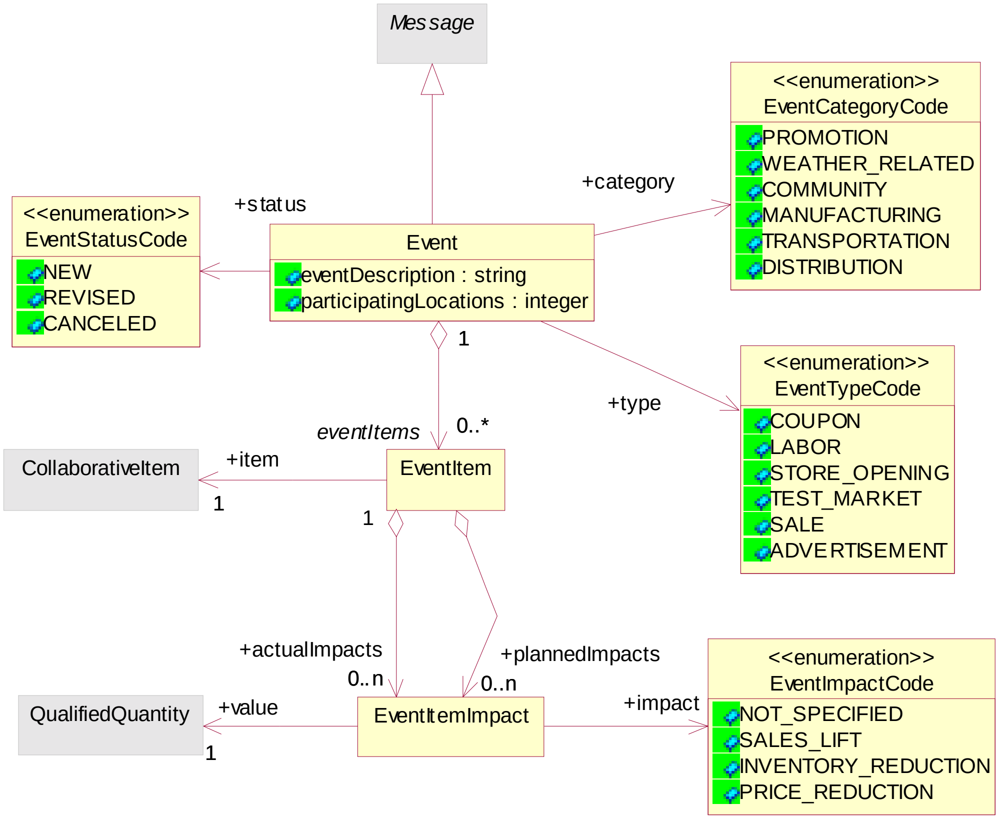

Figure 6 – Event Message Classes

Collaboration Conformance Group

Exception

There are several types of exceptions, but all types describe a variance of a data item from an expected value during a particular time interval.

- *Operational Exceptions* alert users to a variance from expected product activity data values, such as a surge in emergency orders, an overstock condition, or reduced shipment levels.

- *Metric Exceptions* identify variances in key performance metrics – such as forecast accuracy and fill rate – from expected values in a particular time period.

- Forecast Item Exceptions are of two kinds. *Forecast Accuracy Exceptions* compare a forecasted item with the actual value observed. For example, a sales forecast would be compared to point-of-sale data for the same period, and an exception is triggered if the numbers vary by more than the forecast item exception criterion threshold. *Forecast Comparison Exceptions* compare two forecast streams—either the buyer's forecast to the seller's, or two generations of a forecast produced by the same trading partner.

Exceptions have a lifecycle, as illustrated in Figure 7. The exception status attribute on the exception message indicates the state of the exception on the remote CPFR implementation.

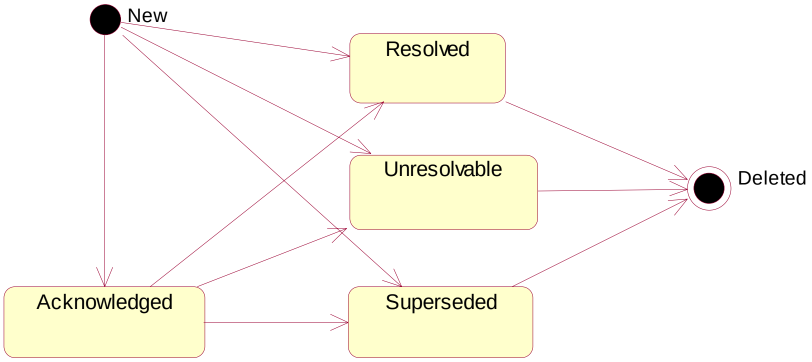

Figure 7 – Exception State Transitions

Exception messages indicate the item, location, time period, priority, observed value, and variance, along with a reference to the data stream or streams being compared. Figure 8 is the class diagram for exception messages.

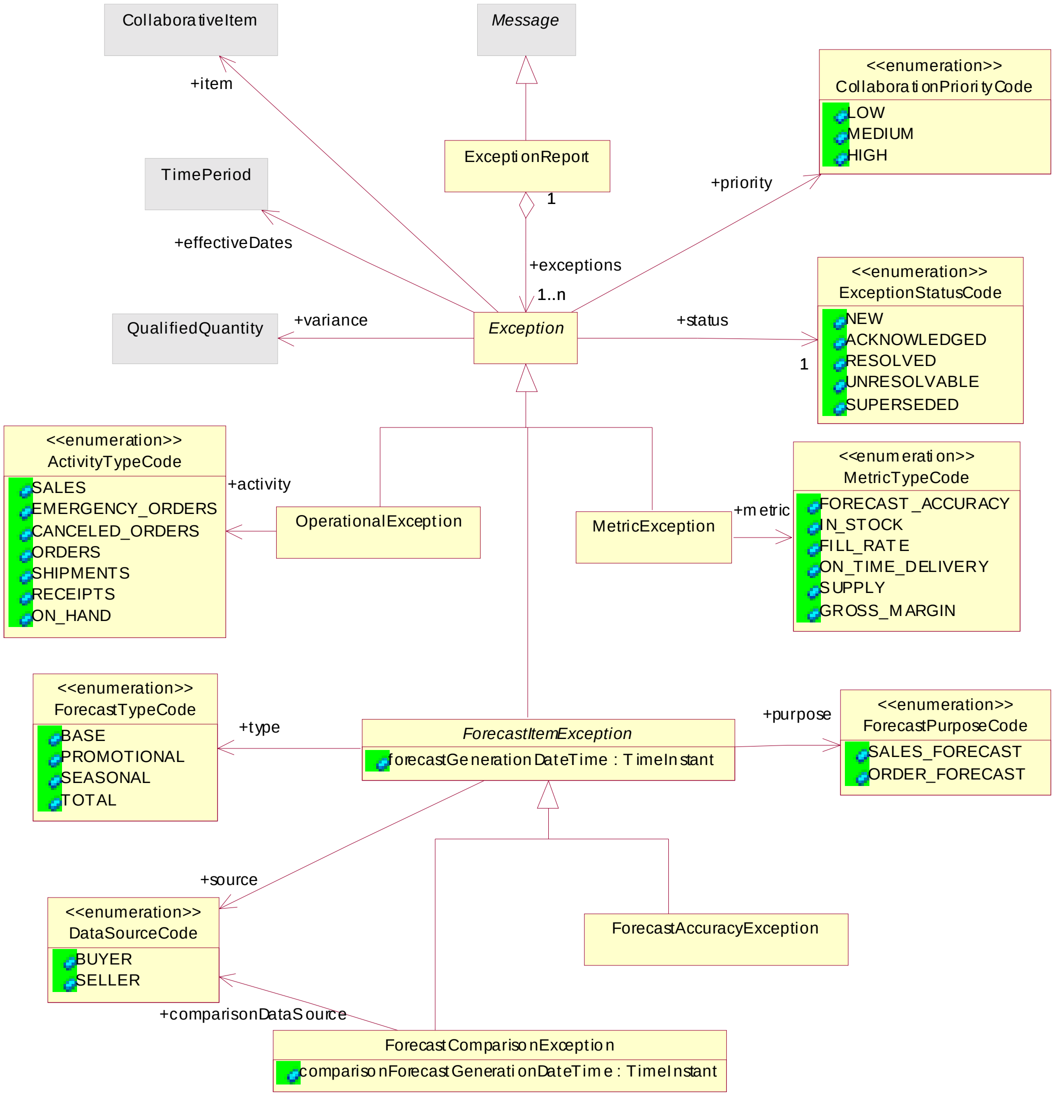

Figure 8 – Exception Message Classes

Exception Criteria

Exception criteria are rules that describe the thresholds for forecast variance, product activity, and performance history beyond which exceptions should be triggered. CPFR implementations exchange exception criteria so that their respective exception engines can use the same rules to evaluate data, and trigger identical exceptions in parallel.

Forecast item exception criteria may be restricted to a single component of a forecast (for example, a variance in the promotional component of two sales forecasts), or they can compare totals. The effective dates for an exception describe a horizon in which a criterion is valid. Figure 9 illustrates the CPFR exception criteria classes.

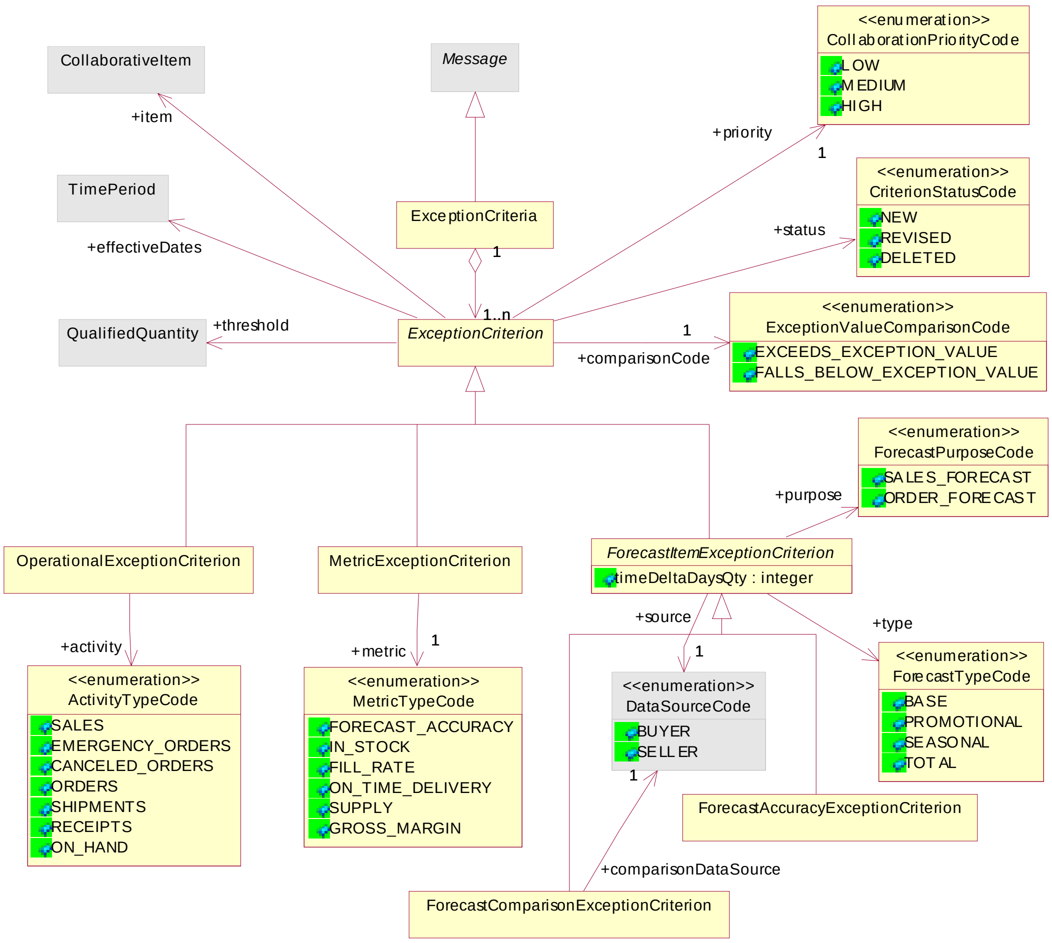

Figure 9 – Exception Criteria Message Classes

Request Conformance Group

Item Information Request

One trading partner sends an item information request to another to request forecast, product activity, or performance history for one or more products. A request of this type is needed if one party does not regularly send information to the other, but sends it only upon request.

A request can contain many items. Each item specifies the product, buyer location, seller location, and criteria type desired, along with a bucket type code. The bucket type code indicates whether data is desired as a time series of daily, weekly, monthly, quarterly, or annualized values.

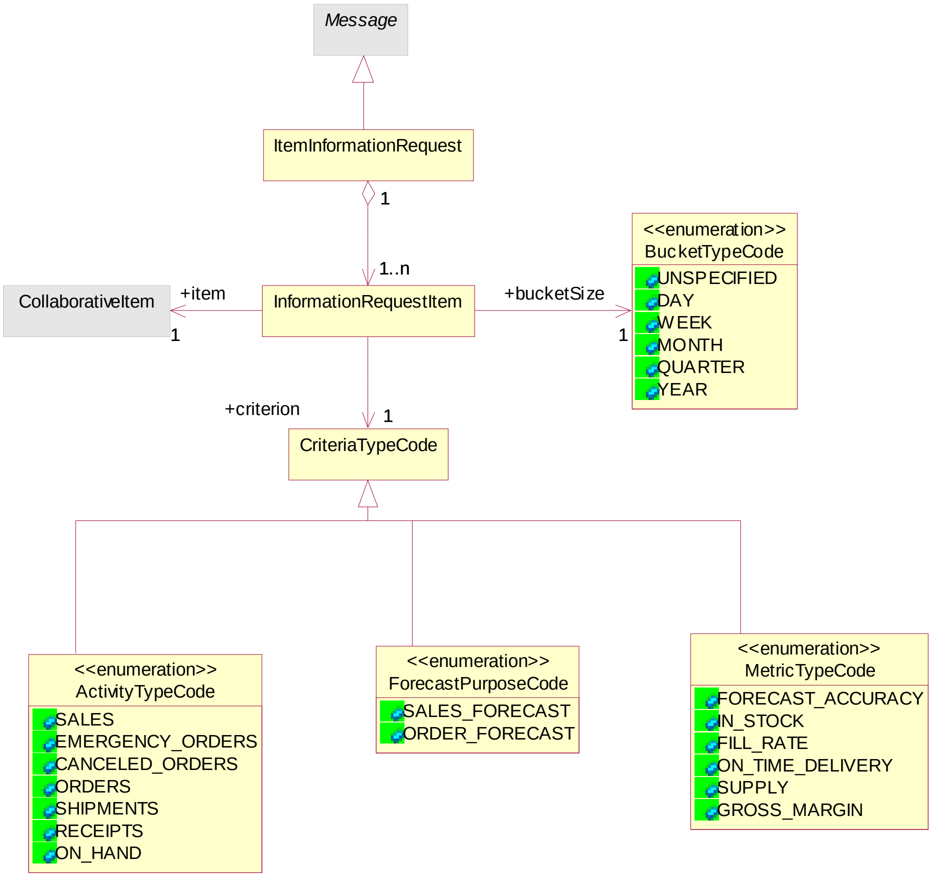

Figure 10 – Item Information Request Message Classes

Batch Message Format

Each batch message is a uniform series of records of a single message type. Records may be fixed width, with a specific beginning and ending column numbers, or delimited (typically with a comma, space or tab character). Fields may be in any order. Default values may be specified for required items that are not in the file itself.

For example, the following lines show a comma-separated sequence of base weekly forecast items. Each line begins with a product ID (GTIN), then the buyer and seller IDs, the begin and end dates, quantity, and forecast type code.

```
04358697320134,0929347132001,06752993100001,20000723,20000729,2041.3,1
04358697320134,0929347132001,06752993100001,20000730,20000805,1497.8,1
04358697320134,0929347132001,06752993100001,20000806,20000812,1877.5,1
```

A batch description may be provided with every batch file, or a single description may be used to describe all files of that type exchanged between a buyer and a seller. The path name identifies the specific file to be interpreted using a batch description; a file extension may also be specified, if all files with a particular extension share the same format.

Figure 11 illustrates the class diagram for batch descriptions.

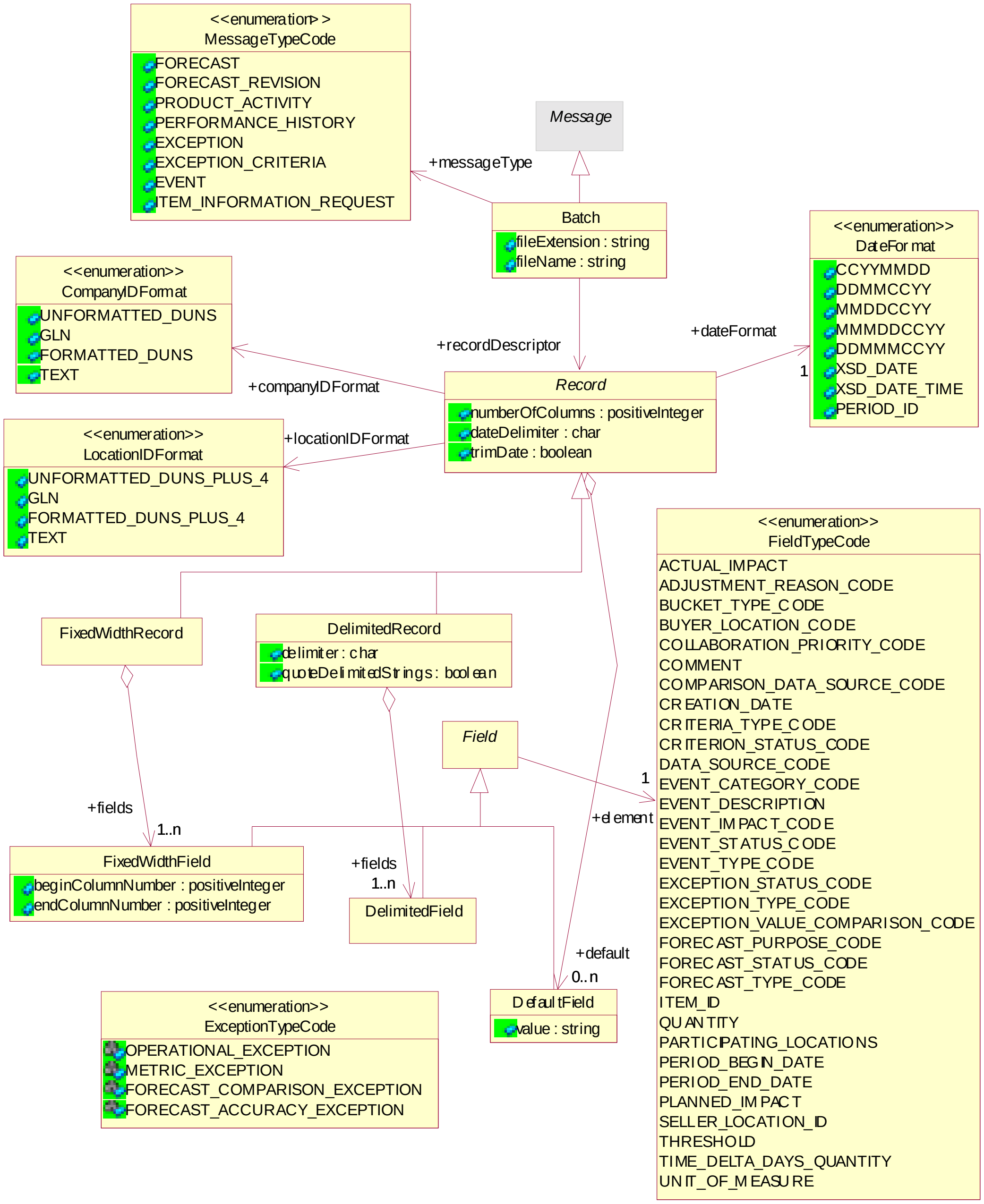

Figure 11 – Batch Description Message Classes

XML Schema Mapping

The XML Schema Definition (XSD) language offers many alternatives for modeling structured business data. The following sections describe the conventions that have been used for CPFR.

Enumerated Types

Enumerated types (modeled as classes in the UML diagrams) are treated as attributes in the XML schema mapping. For example, an indicator of whether a forecast is a sales or order forecast is an attribute.

```
<Forecast purpose=”Sales”>
```

Namespace References

The CPFR XML mapping defines and references the namespace www.cpfr.org/cpfr. Local references to types defined in the CPFR XML schema are qualified with *cpfr*. The CPFR XML schema also references the W3C schema for schemas, www.w3.org/2001/XMLSchema.xsd, and the EAN-UCC core schema: www.uc-council.org/core.xsd. No other external namespace references are required.

Name Formatting

Type and element names are capitalized. Attribute names are begin with a lowercase character, with subsequent name parts capitalized. All spaces have been removed from the type and attribute names in the UML diagrams during conversion to XML.

File Structure

CPFR XML is implemented as an extension of the EAN-UCC XML Standard. The EAN-UCC XML Standard schemas are divided into a set of core types, basic transactions such as order, invoice, and despatch advice, and specific industry process profiles that elaborate the basic transaction types with industry-specific extensions.

CPFR is a specific business process. However, some of the CPFR document types (forecast, product activity, event) have broader applicability, and are not currently represented in the EAN-UCC core schema. To create a CPFR schema based upon the set of EAN-UCC schemas, the forecast, product activity and other generic document types will be added to the EAN-UCC core types, and a new CPFR schema, with its own namespace, will be created that contains CPFR-process-specific types, and imports EAN-UCC core types. CPFR-process-specific types include the exception, exception criteria, and batch documents, which themselves will be placed in separate files.

Figure 1 illustrates the relationships among the existing EAN-UCC schema files, with the addition of the new CPFR files.

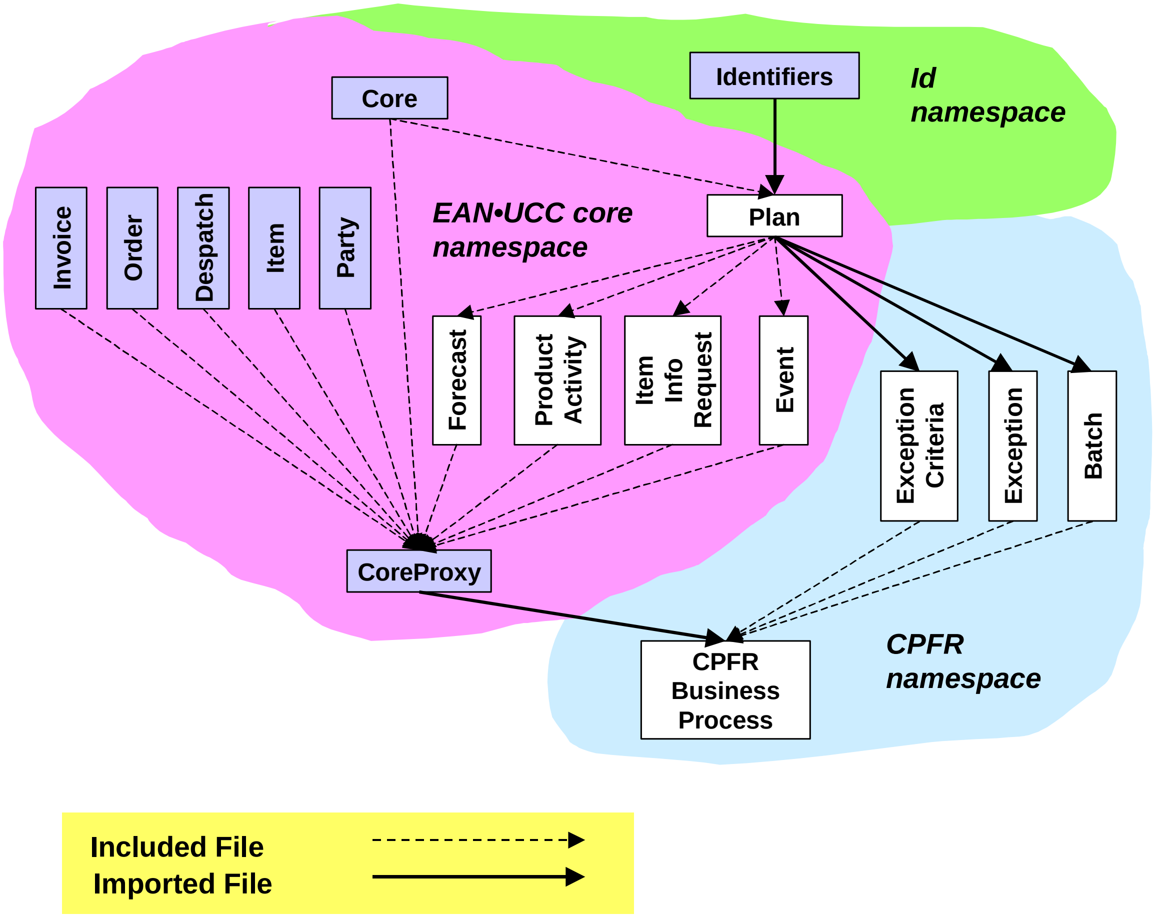

Figure 1 – Schema Files and Namespaces for the Combined Framework

The “Plan” file contains types that are common to all messages related to planning data, including CollaborativeItem (item-location combination), TimeSeriesDataType, Message, TimePeriod, etc.

Example Document

Figure 12 shows an example forecast document created using the VICS CPFR XML schema. The forecast is for two days of consumer demand for a fast-moving consumer goods product with GTIN 12345678901234. The buyer sent the forecast on February 19th, in the afternoon. The two days of demand are for 12 and 20 units.

```
<core:Forecast xmlns:core="http://www.uc-council.org/core" xmlns:cpfr="http://www.cpfr.org/cpfr"
xmlns:fmcg="http://www.uc-council.org/fmcg" xsi:schemaLocation="http://www.cpfr.org/cpfr
cpfrbusinessprocess.xsd http://www.uc-council.org/fmcg fmcg.xsd"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" source="BUYER"
purpose="SALES_FORECAST" creationDate="1212-12-12T12:12:12" creationTimeZone="est"
documentStatus="ORIGINAL" contentVersion="1.0" documentStructureVersion="1.0"
lastUpdateDate="1212-12-12">
   <buyerID>
     <gln>1234567890123</gln>
     </buyerID>
   <sellerID>
     <gln>1234567890123</gln>
     </sellerID>
     <sentDateTime>2001-02-19T15:30:00</sentDateTime>
     <period begin="2001-03-28" end="2001-03-29" />
     <userID>rajesh</userID>
   <forecastItem type="BASE" status="MODIFIABLE">
   <item>
   <productItem xsi:type="fmcg:ItemIdentificationType">
     <fmcg:gtin>12345678901234</fmcg:gtin>
     </productItem>
   <buyerLocation>
     <gln>1234567890123</gln>
     </buyerLocation>
   <sellerLocation>
     <gln>1234567890123</gln>
     </sellerLocation>
     </item>
     <period begin="2001-03-28" end="2001-03-28" />
     <qty>12</qty>
     </forecastItem>
   <forecastItem type="BASE" status="MODIFIABLE">
   <item>
   <productItem xsi:type="fmcg:ItemIdentificationType">
     <fmcg:gtin>12345678901234</fmcg:gtin>
     </productItem>
   <buyerLocation>
     <gln>1234567890123</gln>
     </buyerLocation>
   <sellerLocation>
     <gln>1234567890123</gln>
     </sellerLocation>
     </item>
     <period begin="2001-03-29" end="2001-03-29" />
     <qty>20</qty>
     </forecastItem>
   </core:Forecast>
```

Figure 12 – Sample CPFR XML Forecast Document

Schema Files

Plan

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns:id="http://www.uc-council.org/id"
elementFormDefault="unqualified" attributeFormDefault="unqualified" targetNamespace="http://www.uc-
council.org/core" xmlns="http://www.uc-council.org/core">
    <!-- Import of fmcg namespace is temporary until ItemIdentification is added to Identifiers -->
    <xsd:annotation>
        <xsd:documentation>
        CPFR XML Schema - Draft 20 - June 19, 2001

        Revision History:
        19 June 2001 - Changed TimePeriodType begin and end attributes to xsd:date, to match CPFR logical data
model.
        14 June 2001 – Adjusted capitalization conventions for enumerated values to match EAN-UCC usage.
        13 June 2001 - Reorganized into separate file per message; merged generic message types with EAN-UCC
core namespace; replaced redundant types with EAN-UCC types; derived Message from EAN-UCC DocumentType.
        6 June 2001 - Made status element in ForecastRevisionType into an attribute; changed timeInstant references
to dateTime
        5 June 2001 - Changed use="default" value="x" to use="optional" default="x" in optional attribute definitions, to
match final W3C XML Schema syntax.
        15 March 2001 - Changed enumerated type capitalization to match ebXML conventions;
also eliminated dashes and underscores in identifiers, and eliminated some acronyms (UOM), as required.
        16 March 2001 - Fixed two schema errors: Made ProductID and LocationID extensions, rather than restrictions
of string, and changed optional to default for forecast item type and exception priority code attribute values.
    </xsd:documentation>
    </xsd:annotation>
    <!--<xsd:include schemaLocation="core.xsd"/>-->
    <xsd:import namespace="http://www.uc-council.org/id" schemaLocation="identifiers.xsd"/>
    <!--
        A place holder for product id till we get the identifier.xsd with this ijn place
    -->
    <xsd:complexType name="BusinessID">
        <xsd:complexContent>
            <xsd:extension base="PartyIdentificationType"/>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="LocationID">
        <xsd:complexContent>
            <xsd:extension base="PartyIdentificationType"/>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="TimePeriodType">
        <xsd:attribute name="begin" type="xsd:date"/>
        <xsd:attribute name="end" type="xsd:date"/>
    </xsd:complexType>
    <xsd:simpleType name="DataSourceCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="BUYER"/>
            <xsd:enumeration value="SELLER"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:complexType name="MessageType" abstract="true">
        <xsd:complexContent>
            <xsd:extension base="DocumentType">
                <xsd:sequence>
                    <xsd:element name="buyerID" type="BusinessID"/>
                    <xsd:element name="sellerID" type="BusinessID"/>
                    <xsd:element name="sentDateTime" type="xsd:dateTime"/>
                    <xsd:element name="period" type="TimePeriodType"/>
                    <xsd:element name="userID" type="xsd:string" minOccurs="0"/>
                </xsd:sequence>
                <xsd:attribute name="source" type="DataSourceCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:simpleType name="UOMCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="EACH"/>
            <xsd:enumeration value="CASE"/>
            <xsd:enumeration value="PALLET_UNIT_LOAD"/>
            <xsd:enumeration value="PERCENT"/>
            <xsd:enumeration value="TRUCKLOAD"/>
            <xsd:enumeration value="DOLLARS"/>
            <xsd:enumeration value="EUROS"/>
            <xsd:enumeration value="POUNDS_STERLING"/>
            <xsd:enumeration value="YEN"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:complexType name="QualifiedQuantityType">
        <xsd:complexContent>
            <xsd:extension base="MeasurementValueType">
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="CollaborativeItemType">
        <xsd:sequence>
            <xsd:element name="productItem" type="id:ItemIdentificationType"/>
            <xsd:element name="buyerLocation" type="LocationID"/>
            <xsd:element name="sellerLocation" type="LocationID"/>
        </xsd:sequence>
    </xsd:complexType>
    <xsd:complexType name="TimeSeriesDataItemType" abstract="true">
        <xsd:sequence>
            <xsd:element name="item" type="CollaborativeItemType"/>
            <xsd:element name="period" type="TimePeriodType"/>
            <xsd:element name="qty" type="Float1to14"/>
        </xsd:sequence>
    </xsd:complexType>
    <xsd:simpleType name="ForecastTypeCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="BASE"/>
            <xsd:enumeration value="PROMOTIONAL"/>
            <xsd:enumeration value="SEASONAL"/>
            <xsd:enumeration value="TOTAL"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="ForecastPurposeCode">
        <xsd:restriction base="CriteriaTypeCode">
            <xsd:enumeration value="SALES_FORECAST"/>
            <xsd:enumeration value="ORDER_FORECAST"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="CriteriaTypeCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="SALES_FORECAST"/>
            <xsd:enumeration value="ORDER_FORECAST"/>
            <xsd:enumeration value="SALES"/>
            <xsd:enumeration value="EMERGENCY_ORDERS"/>
            <xsd:enumeration value="CANCELED_ORDERS"/>
            <xsd:enumeration value="ORDERS"/>
            <xsd:enumeration value="SHIPMENTS"/>
            <xsd:enumeration value="RECEIPTS"/>
            <xsd:enumeration value="ENDING_ON_HAND"/>
            <xsd:enumeration value="FORECAST_ACCURACY"/>
            <xsd:enumeration value="IN_STOCK"/>
            <xsd:enumeration value="FILL_RATE"/>
            <xsd:enumeration value="ON_TIME_DELIVERY"/>
            <xsd:enumeration value="SUPPLY"/>
            <xsd:enumeration value="GROSS_MARGIN"/>
        </xsd:restriction>
    </xsd:simpleType>
    <!--Forecast and Forecast Revision-->
    <xsd:simpleType name="AdjustmentReasonCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="NEW_PROMOTION"/>
            <xsd:enumeration value="EXPANDED_PROMOTION"/>
            <xsd:enumeration value="REVISED_PROMOTION"/>
            <xsd:enumeration value="REDUCED_PROMOTION"/>
            <xsd:enumeration value="CANCELED_PROMOTION"/>
            <xsd:enumeration value="WEATHER_RELATED_EVENT"/>
            <xsd:enumeration value="MISCELLANEOUS_EVENT"/>
            <xsd:enumeration value="PRODUCTION_ISSUE"/>
            <xsd:enumeration value="DISTRIBUTION_ISSUE"/>
            <xsd:enumeration value="TRANSPORTATION_ISSUE"/>
            <xsd:enumeration value="OVERSTOCK_CONDITION"/>
            <xsd:enumeration value="INVENTORY_POLICY_CHANGE"/>
            <xsd:enumeration value="ORDER_POLICY_CHANGE"/>
            <xsd:enumeration value="FORWARD_BUY"/>
            <xsd:enumeration value="PRICE_CHANGE"/>
            <xsd:enumeration value="REVISED_PLAN"/>
            <xsd:enumeration value="PRODUCT_CHANGEOVER"/>
            <xsd:enumeration value="NEW_PRODUCT"/>
            <xsd:enumeration value="DISCONTINUED_PRODUCT"/>
            <xsd:enumeration value="NEW_LOCATION"/>
            <xsd:enumeration value="LOCATION_CLOSURE"/>
        </xsd:restriction>
    </xsd:simpleType>
    <!--Exceptions-->
    <xsd:simpleType name="CollaborationPriorityCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="HIGH"/>
            <xsd:enumeration value="MEDIUM"/>
            <xsd:enumeration value="LOW"/>
        </xsd:restriction>
    </xsd:simpleType>
    <!--Exception Criteria-->
    <xsd:simpleType name="CriterionStatusCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="NEW"/>
            <xsd:enumeration value="REVISED"/>
            <xsd:enumeration value="DELETED"/>
        </xsd:restriction>
    </xsd:simpleType>
    <!--Product Activity and Metrics-->
    <xsd:simpleType name="ActivityTypeCode">
        <xsd:restriction base="CriteriaTypeCode">
            <xsd:enumeration value="SALES"/>
            <xsd:enumeration value="EMERGENCY_ORDERS"/>
            <xsd:enumeration value="CANCELED_ORDERS"/>
            <xsd:enumeration value="ORDERS"/>
            <xsd:enumeration value="SHIPMENTS"/>
            <xsd:enumeration value="RECEIPTS"/>
            <xsd:enumeration value="ENDING_ON_HAND"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="MetricTypeCode">
        <xsd:restriction base="CriteriaTypeCode">
            <xsd:enumeration value="FORECAST_ACCURACY"/>
            <xsd:enumeration value="IN_STOCK"/>
            <xsd:enumeration value="FILL_RATE"/>
            <xsd:enumeration value="ON_TIME_DELIVERY"/>
            <xsd:enumeration value="SUPPLY"/>
            <xsd:enumeration value="GROSS_MARGIN"/>
        </xsd:restriction>
    </xsd:simpleType>
    <!--Events-->
    <xsd:simpleType name="EventCategoryCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="PROMOTION"/>
            <xsd:enumeration value="WEATHER_RELATED"/>
            <xsd:enumeration value="COMMUNITY"/>
            <xsd:enumeration value="MANUFACTURING"/>
            <xsd:enumeration value="TRANSPORTATION"/>
            <xsd:enumeration value="DISTRIBUTION"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="EventTypeCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="COUPON"/>
            <xsd:enumeration value="LABOR"/>
            <xsd:enumeration value="STORE_OPENING"/>
            <xsd:enumeration value="TEST_MARKET"/>
            <xsd:enumeration value="SALE"/>
            <xsd:enumeration value="ADVERTISEMENT"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="EventStatusCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="NEW"/>
            <xsd:enumeration value="REVISED"/>
            <xsd:enumeration value="CANCELED"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="EventImpactCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="SALES_LIFT"/>
            <xsd:enumeration value="INVENTORY_REDUCTION"/>
            <xsd:enumeration value="PRICE_REDUCTION"/>
        </xsd:restriction>
    </xsd:simpleType>
    <!--Item Information Request-->
    <xsd:simpleType name="BucketTypeCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="UNSPECIFIED"/>
            <xsd:enumeration value="DAY"/>
            <xsd:enumeration value="WEEK"/>
            <xsd:enumeration value="MONTH"/>
            <xsd:enumeration value="QUARTER"/>
            <xsd:enumeration value="YEAR"/>
        </xsd:restriction>
    </xsd:simpleType>
    <!-- Batch -->
</xsd:schema>
```

Forecast

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="unqualified"
attributeFormDefault="unqualified" xmlns="http://www.uc-council.org/core" targetNamespace="http://www.uc-council.org/core">
    <xsd:complexType name="AbstractForecastType" abstract="true">
        <xsd:complexContent>
            <xsd:extension base="MessageType">
                <xsd:attribute name="purpose" type="ForecastPurposeCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:element name="Forecast" type="ForecastType"/>
    <xsd:complexType name="ForecastType">
```

```
        <xsd:complexContent>
            <xsd:extension base="AbstractForecastType">
                <xsd:sequence>
                    <xsd:element name="forecastItem" type="ForecastItemType" maxOccurs="unbounded"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="AbstractForecastItemType" abstract="true">
        <xsd:complexContent>
            <xsd:extension base="TimeSeriesDataItemType">
                <xsd:attribute name="type" type="ForecastTypeCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="ForecastItemType">
        <xsd:complexContent>
            <xsd:extension base="AbstractForecastItemType">
                <xsd:attribute name="status" type="ForecastStatusCode" use="optional" default="MODIFIABLE"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:simpleType name="ForecastStatusCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="MODIFIABLE"/>
            <xsd:enumeration value="FROZEN"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:element name="ForecastRevision" type="ForecastRevisionType"/>
    <xsd:complexType name="ForecastRevisionType">
        <xsd:complexContent>
            <xsd:extension base="AbstractForecastType">
                <xsd:sequence>
                    <xsd:element name="revisionItem" type="ForecastRevisionItemType" maxOccurs="unbounded"/>
                </xsd:sequence>
                <xsd:attribute name="status" type="RevisionStatusCode" use="optional" default="NEW"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:simpleType name="RevisionStatusCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="NEW"/>
            <xsd:enumeration value="ACKNOWLEDGED"/>
            <xsd:enumeration value="ACCEPTED"/>
            <xsd:enumeration value="REJECTED"/>
            <xsd:enumeration value="SUPERSEDED"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:complexType name="ForecastRevisionItemType">
        <xsd:complexContent>
            <xsd:extension base="AbstractForecastItemType">
                <xsd:sequence>
                    <xsd:element name="comment" type="xsd:string" minOccurs="0"/>
                </xsd:sequence>
                <xsd:attribute name="sourceForecastGenerationDateTime" type="xsd:dateTime" use="optional"/>
                <xsd:attribute name="adjustmentReason" type="AdjustmentReasonCode" use="optional"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
</xsd:schema>
```

ProductActivity

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

```
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="unqualified"
attributeFormDefault="unqualified" xmlns="http://www.uc-council.org/core" targetNamespace="http://www.uc-
council.org/core">
    <xsd:element name="ProductActivity" type="ProductActivityType"/>
    <xsd:complexType name="ProductActivityType">
        <xsd:complexContent>
            <xsd:extension base="MessageType">
                <xsd:sequence>
                    <xsd:element name="activityItem" type="ProductActivityItemType" maxOccurs="unbounded"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="ProductActivityItemType">
        <xsd:complexContent>
            <xsd:extension base="TimeSeriesDataItemType">
                <xsd:attribute name="activity" type="ActivityTypeCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
</xsd:schema>
```

Performance History

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="unqualified"
attributeFormDefault="unqualified" xmlns="http://www.uc-council.org/core" targetNamespace="http://www.uc-
council.org/core">
    <xsd:element name="PerformanceHistory" type="PerformanceHistoryType"/>
    <xsd:complexType name="PerformanceHistoryType">
        <xsd:complexContent>
            <xsd:extension base="MessageType">
                <xsd:sequence>
                    <xsd:element name="performanceItem" type="PerformanceItemType" maxOccurs="unbounded"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="PerformanceItemType">
        <xsd:complexContent>
            <xsd:extension base="TimeSeriesDataItemType">
                <xsd:attribute name="unitOfMeasure" type="String0to3"/>
                <xsd:attribute name="metric" type="MetricTypeCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
</xsd:schema>
```

ItemInformationRequest

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="unqualified"
attributeFormDefault="unqualified" xmlns="http://www.uc-council.org/core" targetNamespace="http://www.uc-
council.org/core">
    <xsd:element name="ItemInformationRequest" type="ItemInformationRequestType"/>
    <xsd:complexType name="ItemInformationRequestType">
        <xsd:complexContent>
            <xsd:extension base="MessageType">
                <xsd:sequence>
                    <xsd:element name="request" type="InformationRequestItemType" maxOccurs="unbounded"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="InformationRequestItemType">
        <xsd:sequence>
```

```
            <xsd:element name="item" type="CollaborativeItemType"/>
        </xsd:sequence>
        <xsd:attribute name="criterion" type="CriteriaTypeCode"/>
        <xsd:attribute name="bucketSize" type="BucketTypeCode" use="optional" default="UNSPECIFIED"/>
    </xsd:complexType>
</xsd:schema>
```

Event

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="unqualified"
attributeFormDefault="unqualified" xmlns="http://www.uc-council.org/core" targetNamespace="http://www.uc-
council.org/core">
    <xsd:element name="Event" type="EventType"/>
    <xsd:complexType name="EventType">
        <xsd:complexContent>
            <xsd:extension base="MessageType">
                <xsd:sequence>
                    <xsd:element name="description" type="xsd:string" minOccurs="0"/>
                    <xsd:element name="participatingLocationsQty" type="xsd:positiveInteger" minOccurs="0"/>
                    <xsd:element name="eventItem" type="EventItemType" maxOccurs="unbounded"/>
                </xsd:sequence>
                <xsd:attribute name="category" type="EventCategoryCode"/>
                <xsd:attribute name="type" type="EventTypeCode"/>
                <xsd:attribute name="status" type="EventStatusCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="EventItemType">
        <xsd:sequence>
            <xsd:element name="item" type="CollaborativeItemType"/>
            <xsd:element name="plannedImpact" type="EventItemImpactType" minOccurs="0"
maxOccurs="unbounded"/>
            <xsd:element name="actualImpact" type="EventItemImpactType" minOccurs="0"
maxOccurs="unbounded"/>
        </xsd:sequence>
    </xsd:complexType>
    <xsd:complexType name="EventItemImpactType">
        <xsd:sequence>
            <xsd:element name="value" type="QualifiedQuantityType"/>
        </xsd:sequence>
        <xsd:attribute name="impact" type="EventImpactCode"/>
    </xsd:complexType>
</xsd:schema>
```

Exception

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema targetNamespace="http://www.cpfr.org/cpfr" xmlns:cpfr="http://www.cpfr.org/cpfr"
xmlns:core="http://www.uc-council.org/core" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
elementFormDefault="qualified" attributeFormDefault="unqualified" version="1.0">
    <xsd:import namespace="http://www.uc-council.org/core" schemaLocation="plan.xsd"/>
    <xsd:element name="ExceptionReport" type="cpfr:ExceptionReportType"/>
    <xsd:complexType name="ExceptionReportType">
        <xsd:complexContent>
            <xsd:extension base="core:MessageType">
                <xsd:sequence>
                    <xsd:element name="exception" type="cpfr:ExceptionType" maxOccurs="unbounded"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="ExceptionType" abstract="true">
        <xsd:sequence>
            <xsd:element name="item" type="core:CollaborativeItemType"/>
            <xsd:element name="effectiveDates" type="core:TimePeriodType"/>
            <xsd:element name="variance" type="core:QualifiedQuantityType"/>
        </xsd:sequence>
        <xsd:attribute name="status" type="cpfr:ExceptionStatusCode"/>
        <xsd:attribute name="priority" type="core:CollaborationPriorityCode" use="optional"/>
    </xsd:complexType>
    <xsd:simpleType name="ExceptionStatusCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="NEW"/>
            <xsd:enumeration value="ACKNOWLEDGED"/>
            <xsd:enumeration value="RESOLVED"/>
            <xsd:enumeration value="UNRESOLVABLE"/>
            <xsd:enumeration value="SUPERSEDED"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:complexType name="OperationalExceptionType">
        <xsd:complexContent>
            <xsd:extension base="cpfr:ExceptionType">
                <xsd:attribute name="activity" type="core:ActivityTypeCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="MetricExceptionType">
        <xsd:complexContent>
            <xsd:extension base="cpfr:ExceptionType">
                <xsd:attribute name="metric" type="core:MetricTypeCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="ForecastItemExceptionType" abstract="true">
        <xsd:complexContent>
            <xsd:extension base="cpfr:ExceptionType">
                <xsd:sequence>
                    <xsd:element name="forecastGenerationDateTime" type="xsd:dateTime"/>
                </xsd:sequence>
                <xsd:attribute name="purpose" type="core:ForecastPurposeCode"/>
                <xsd:attribute name="type" type="core:ForecastTypeCode" use="optional" default="TOTAL"/>
                <xsd:attribute name="source" type="core:DataSourceCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="ForecastAccuracyExceptionType">
        <xsd:complexContent>
            <xsd:extension base="ForecastItemExceptionType"/>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="ForecastComparisonExceptionType">
        <xsd:complexContent>
            <xsd:extension base="ForecastItemExceptionType">
                <xsd:sequence>
                    <xsd:element name="comparisonForecastGenerationDateTime" type="xsd:dateTime"/>
                </xsd:sequence>
                <xsd:attribute name="comparisonDataSourceCode" type="core:DataSourceCode"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
</xsd:schema>
```

ExceptionCriteria

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema targetNamespace="http://www.cpfr.org/cpfr" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:core="http://www.uc-council.org/core" xmlns:cpfr="http://www.cpfr.org/cpfr" elementFormDefault="unqualified"
attributeFormDefault="unqualified" version="1.0">
    <xsd:import namespace="http://www.uc-council.org/core" schemaLocation="plan.xsd"/>
    <xsd:element name="ExceptionCriteria" type="cpfr:ExceptionCriteriaType"/>
    <xsd:complexType name="ExceptionCriteriaType">
```

```
            <xsd:complexContent>
                <xsd:extension base="core:MessageType">
                    <xsd:sequence>
                        <xsd:element name="criterion" type="cpfr:ExceptionCriterionType" maxOccurs="unbounded"/>
                    </xsd:sequence>
                </xsd:extension>
            </xsd:complexContent>
        </xsd:complexType>
        <xsd:complexType name="ExceptionCriterionType" abstract="true">
            <xsd:sequence>
                <xsd:element name="item" type="core:CollaborativeItemType"/>
                <xsd:element name="effectiveDates" type="core:TimePeriodType" minOccurs="0"/>
                <xsd:element name="thresholdUOM" type="core:UOMCode"/>
            </xsd:sequence>
            <xsd:attribute name="status" type="core:CriterionStatusCode"/>
            <xsd:attribute name="priority" type="core:CollaborationPriorityCode"/>
            <xsd:attribute name="comparisonCode" type="cpfr:ExceptionValueComparisionCode"/>
        </xsd:complexType>
        <xsd:simpleType name="ExceptionValueComparisionCode">
            <xsd:restriction base="xsd:string">
                <xsd:enumeration value="EXCEEDS_EXCEPTION_VALUE"/>
                <xsd:enumeration value="FALLS_BELOW_EXCEPTION_VALUE"/>
            </xsd:restriction>
        </xsd:simpleType>
        <xsd:complexType name="OperationalExceptionCriterionType">
            <xsd:complexContent>
                <xsd:extension base="cpfr:ExceptionCriterionType">
                    <xsd:attribute name="activity" type="core:ActivityTypeCode"/>
                </xsd:extension>
            </xsd:complexContent>
        </xsd:complexType>
        <xsd:complexType name="MetricExceptionCriterionType">
            <xsd:complexContent>
                <xsd:extension base="cpfr:ExceptionCriterionType">
                    <xsd:attribute name="metric" type="core:MetricTypeCode"/>
                </xsd:extension>
            </xsd:complexContent>
        </xsd:complexType>
        <xsd:complexType name="ForecastItemExceptionCriterionType" abstract="true">
            <xsd:complexContent>
                <xsd:extension base="cpfr:ExceptionCriterionType">
                    <xsd:sequence>
                        <xsd:element name="timeDeltaDaysQty" type="xsd:nonNegativeInteger" minOccurs="0"/>
                    </xsd:sequence>
                    <xsd:attribute name="purpose" type="core:ForecastPurposeCode"/>
                    <xsd:attribute name="type" type="core:ForecastTypeCode" use="optional" default="TOTAL"/>
                    <xsd:attribute name="source" type="core:DataSourceCode"/>
                </xsd:extension>
            </xsd:complexContent>
        </xsd:complexType>
        <xsd:complexType name="ForecastAccuracyExceptionCriterionType">
            <xsd:complexContent>
                <xsd:extension base="cpfr:ForecastItemExceptionCriterionType"/>
            </xsd:complexContent>
        </xsd:complexType>
        <xsd:complexType name="ForecastComparisonExceptionCriterionType">
            <xsd:complexContent>
                <xsd:extension base="cpfr:ForecastItemExceptionCriterionType">
                    <xsd:attribute name="comparisonDataSource" type="core:DataSourceCode"/>
                </xsd:extension>
            </xsd:complexContent>
        </xsd:complexType>
    </xsd:schema>
```

Batch

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema targetNamespace="http://www.cpfr.org/cpfr" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:core="http://www.uc-council.org/core" xmlns:cpfr="http://www.cpfr.org/cpfr" elementFormDefault="qualified"
attributeFormDefault="unqualified" version="1.0">
    <xsd:import namespace="http://www.uc-council.org/core" schemaLocation="plan.xsd"/>
    <xsd:simpleType name="Character"> <!-- Candidate for inclusion in EAN-UCC core -->
        <xsd:restriction base="xsd:string">
            <xsd:length value="1"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:element name="Batch" type="cpfr:BatchType"/>
    <xsd:complexType name="BatchType">
        <xsd:complexContent>
            <xsd:extension base="core:MessageType">
                <xsd:sequence>
                    <xsd:element name="recordDescriptor" type="cpfr:RecordType"/>
                </xsd:sequence>
                <xsd:attribute name="messageType" type="cpfr:MessageTypeCode"/>
                <xsd:attribute name="fileExtension" type="xsd:string" use="optional"/>
                <xsd:attribute name="fileName" type="xsd:string" use="optional"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="RecordType" abstract="true">
        <xsd:sequence>
            <xsd:element name="default" type="cpfr:DefaultFieldType" minOccurs="0" maxOccurs="unbounded"/>
        </xsd:sequence>
        <xsd:attribute name="numberOfColumns" type="xsd:positiveInteger"/>
        <xsd:attribute name="companyIDFormat" type="cpfr:CompanyIDFormat" use="optional" default="GLN"/>
        <xsd:attribute name="locationIDFormat" type="cpfr:LocationIDFormat" use="optional" default="GLN"/>
        <xsd:attribute name="dateFormat" type="cpfr:DateFormat" use="optional" default="CCYYMMDD"/>
        <xsd:attribute name="dateDelimiter" type="cpfr:Character" use="optional"/>
        <xsd:attribute name="trimDate" type="xsd:boolean"/>
    </xsd:complexType>
    <xsd:simpleType name="CompanyIDFormat">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="UNFORMATTED_DUNS"/>
            <xsd:enumeration value="GLN"/>
            <xsd:enumeration value="FORMATTED_DUNS"/>
            <xsd:enumeration value="TEXT"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="MessageTypeCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="FORECAST"/>
            <xsd:enumeration value="FORECAST_REVISION"/>
            <xsd:enumeration value="PRODUCT_ACTIVITY"/>
            <xsd:enumeration value="PERFORMANCE_HISTORY"/>
            <xsd:enumeration value="EXCEPTION"/>
            <xsd:enumeration value="EXCEPTION_CRITERIA"/>
            <xsd:enumeration value="EVENT"/>
            <xsd:enumeration value="ITEM_INFORMATION_REQUEST"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="LocationIDFormat">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="UNFORMATTED_DUNS_PLUS_4"/>
            <xsd:enumeration value="GLN"/>
            <xsd:enumeration value="FORMATTED_DUNS_PLUS_4"/>
            <xsd:enumeration value="TEXT"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:simpleType name="DateFormat">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="CCYYMMDD"/>
            <xsd:enumeration value="DDMMCCYY"/>
            <xsd:enumeration value="MMDDCCYY"/>
            <xsd:enumeration value="MMMDDCCYY"/>
            <xsd:enumeration value="DDMMMCCYY"/>
            <xsd:enumeration value="XSD_DATE"/>
            <xsd:enumeration value="XSD_DATE_TIME"/>
            <xsd:enumeration value="PERIOD_ID"/>
        </xsd:restriction>
    </xsd:simpleType>
    <xsd:complexType name="FixedWidthRecordType">
        <xsd:complexContent>
            <xsd:extension base="cpfr:RecordType">
                <xsd:sequence>
                    <xsd:element name="field" type="cpfr:FixedWidthFieldType" maxOccurs="unbounded"/>
                </xsd:sequence>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="FieldType">
        <xsd:attribute name="datatype" type="cpfr:FieldTypeCode"/>
    </xsd:complexType>
    <xsd:complexType name="FixedWidthFieldType">
        <xsd:complexContent>
            <xsd:extension base="cpfr:FieldType">
                <xsd:attribute name="beginColumnNumber" type="xsd:positiveInteger"/>
                <xsd:attribute name="endColumnNumber" type="xsd:positiveInteger"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:complexType name="DefaultFieldType">
        <xsd:complexContent>
            <xsd:extension base="cpfr:FieldType">
                <xsd:attribute name="value" type="xsd:string"/>
            </xsd:extension>
        </xsd:complexContent>
    </xsd:complexType>
    <xsd:simpleType name="FieldTypeCode">
        <xsd:restriction base="xsd:string">
            <xsd:enumeration value="ACTUAL_IMPACT"/>
            <xsd:enumeration value="ADJUSTMENT_REASON_CODE"/>
            <xsd:enumeration value="BUCKET_TYPE_CODE"/>
            <xsd:enumeration value="BUYER_LOCATION_ID"/>
            <xsd:enumeration value="COMMENT"/>
            <xsd:enumeration value="CREATION_DATE"/>
            <xsd:enumeration value="CRITERION_STATUS_CODE"/>
            <xsd:enumeration value="COLLABORATION_PRIORITY_CODE"/>
            <xsd:enumeration value="COMPARISON_DATA_SOURCE_CODE"/>
            <xsd:enumeration value="CRITERIA_TYPE_CODE"/>
            <xsd:enumeration value="DATA_SOURCE_CODE"/>
            <xsd:enumeration value="EVENT_CATEGORY_CODE"/>
            <xsd:enumeration value="EVENT_DESCRIPTION"/>
            <xsd:enumeration value="EVENT_IMPACT_CODE"/>
            <xsd:enumeration value="EVENT_STATUS_CODE"/>
            <xsd:enumeration value="EVENT_TYPE_CODE"/>
            <xsd:enumeration value="EXCEPTION_TYPE_CODE"/>
            <xsd:enumeration value="EXCEPTION_VALUE_COMPARISON_CODE"/>
            <xsd:enumeration value="FORECAST_PURPOSE_CODE"/>
            <xsd:enumeration value="FORECAST_STATUS_CODE"/>
            <xsd:enumeration value="FORECAST_TYPE_CODE"/>
            <xsd:enumeration value="ITEM_ID"/>
            <xsd:enumeration value="QUANTITY"/>
            <xsd:enumeration value="SOURCE_VALUE"/>
            <xsd:enumeration value="COMPARED_VALUE"/>
            <xsd:enumeration value="PARTICIPATING_LOCATIONS"/>
            <xsd:enumeration value="PERIOD_BEGIN_DATE"/>
```

```
                <xsd:enumeration value="PERIOD_END_DATE"/>
                <xsd:enumeration value="PLANNED_IMPACT"/>
                <xsd:enumeration value="SELLER_LOCATION_ID"/>
                <xsd:enumeration value="THRESHOLD"/>
                <xsd:enumeration value="TIME_DELTA_DAYS_QUANTITY"/>
                <xsd:enumeration value="UNIT_OF_MEASURE"/>
            </xsd:restriction>
        </xsd:simpleType>
        <xsd:simpleType name="ExceptionTypeCode">
            <xsd:restriction base="xsd:string">
                <xsd:enumeration value="OPERATIONAL_EXCEPTION"/>
                <xsd:enumeration value="METRIC_EXCEPTION"/>
                <xsd:enumeration value="FORECAST_COMPARISON_EXCEPTION"/>
                <xsd:enumeration value="FORECAST_ACCURACY_EXCEPTION"/>
            </xsd:restriction>
        </xsd:simpleType>
        <xsd:complexType name="DelimitedRecordType">
            <xsd:complexContent>
                <xsd:extension base="cpfr:RecordType">
                    <xsd:sequence>
                        <xsd:element name="field" type="cpfr:DelimitedFieldType" maxOccurs="unbounded"/>
                    </xsd:sequence>
                    <xsd:attribute name="delimiter" type="cpfr:Character"/>
                    <xsd:attribute name="quoteDelimitedStrings" type="xsd:boolean"/>
                </xsd:extension>
            </xsd:complexContent>
        </xsd:complexType>
        <xsd:complexType name="DelimitedFieldType">
            <xsd:complexContent>
                <xsd:extension base="cpfr:FieldType"/>
            </xsd:complexContent>
        </xsd:complexType>
    </xsd:schema>
```

CPFRBusinessProcess

```
<?xml version="1.0" encoding="UTF-8"?>
<xsd:schema targetNamespace="http://www.cpfr.org/cpfr" xmlns="http://www.cpfr.org/cpfr" xmlns:core="http://www.uc-council.org/core" xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified" attributeFormDefault="unqualified" version="1.0">
    <xsd:annotation>
        <xsd:documentation>Comment describing your root element</xsd:documentation>
    </xsd:annotation>
    <xsd:import namespace="http://www.uc-council.org/core" schemaLocation="coreproxy.xsd"/>
    <xsd:include schemaLocation="exceptioncriteria.xsd"/>
    <xsd:include schemaLocation="exception.xsd"/>
    <xsd:include schemaLocation="batch.xsd"/>
</xsd:schema>
```

Extensions

A major limitation of the EDI- and SIL-based CPFR guidelines is that format of the messages is fixed. Any implementation-specific extensions make the messages non-standard and limit interoperability. Yet CPFR is ripe for many extensions: additional scorecard measures, forecast data types, and state transitions are simple examples. Other initiatives, such as VICS Collaborative Transportation Management, may also wish to use CPFR as a basis for their own modeling. CPFR solution providers wish to provide many vendor-specfic extensions.

The CPFR XML specification offers a better means for extending the structure and meaning of CPFR messages, while preserving interoperability. The XML Schema Language used to define CPFR XML allows implementations to derive subtypes of the standard datatypes, which provide new attributes, additional enumerated values, or relaxed constraints. The extended datatypes leave the standard types untouched. Implementations that are aware of the extended content can process it; those that are not can ignore the extended content and act upon only the standard content.

Figure 13 illustrates how implementations of varying capabilities might interoperate using CPFR XML. Buyer 1 and Seller 2, who both use the same Demand Planning solution, can take advantage of the investment in that technology by using CPFR XML Schema extensions pertaining to that Demand Planning system. Users of the two systems can share additional information that can be used easily and simply to enrich their CPFR "experience". Buyer 2 and Seller 2 gain no additional advantage from any investment in any Demand Planning solution. They can however both implement CPFR based on the standard set of XML Schema messages.

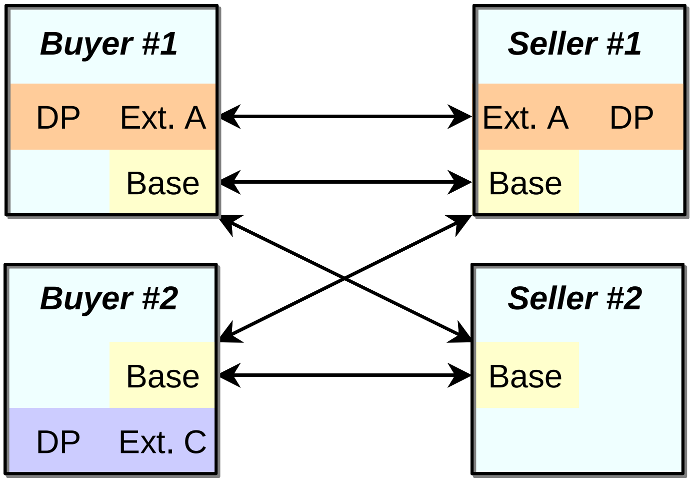

Figure 13 – Standard vs. Extended Protocol Deployment

Using an object-oriented schema extension approach, the CPFR Committee only needs to approve the base XML Schema set, rather than every proposed extension. Vendors that subscribe to CPFR will simply have to support that minimal set and are enabled and empowered and indeed encouraged to extend the set according their domain expertise. It is even possible that over time several vendors will replicate certain extensions that will evolve to become part of the base XML schema set. This is very likely as the body of CPFR knowledge grows and extends.