

Corporate Actions Taxonomy

# XBRL US Corporate Actions Taxonomy 2011 Architecture

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# Corporate Actions Taxonomy Architecture 2011

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## 1 Goal

The purpose of this document is to identify and explain the taxonomy design for the Corporate Actions Taxonomy (Taxonomy). This includes the logical and physical structure of the Taxonomy.

This document presumes a basic understanding of information modeling, corporate actions and XBRL.

## 2 Overview

This document explains the design for the Corporate Actions Taxonomy. The content of this taxonomy is primarily based on the following:

- DTCC Corporate Actions Elements and Event Configurations used by the DTCC (Depository Trust & Clearing Corporation) for corporate actions processing
- ISO (International Organization for Standardization) corporate actions notification message format (ISO 20022)
- Element and configuration recommendations from industry formed workgroups such as AMF, SMPG and ISITC
- Feedback from institutions involved in the processing of corporate actions

There are multiple institutions that are involved in the process flow for corporate actions. Some are responsible for providing additional information to a corporate actions announcement. Eventually, the Corporate Actions Taxonomy will include concepts to capture all information related to a corporate action; however, currently this release of the Taxonomy will focus on the issuer's view of corporate actions in the United States.

The Corporate Actions Taxonomy describes the instance document that will be created by issuers. The base of these concepts comes from the structures used by the DTCC and the ISO 20022 standard.

The Corporate Actions Taxonomy provides a view for issuers to organize the concepts into a form-like structure. The Taxonomy includes a series of entry points that filter the form-like view for a specific event type and circumstance. This filtered view can be used by the issuer to aid in the tagging of instance documents. With standard XBRL software, an issuer can use the filtered view to identify and tag the necessary concepts for an event.

The Corporate Actions Taxonomy uses much of the same architectural base used for the XBRL US GAAP Taxonomies. This includes table structures (XBRL dimensions), as well as guidelines around presentation and calculation structures, labels and references.

## 3 Basic Logical Taxonomy Structure

The Corporate Actions Taxonomy contains the concepts and structure for two event messages: Issuer Event messages and Issuer Cancellation messages. These two messages are represented as presentations in the Taxonomy, "Issuer View" and "Issuer Cancel View", respectively.

The "Issuer View" represents the view for all event messages. For a particular event message, only a portion of the concepts are used. The necessary concepts for a particular event message are determined by a set of four criteria:

1. Event Type
2. Market
3. Issue Type

#### 4. Mandatory/Voluntary

For each configured combination of the four criteria, there is a filtered issuer view. This could also be thought of as a template. These views are essentially copies of the “Issuer View” with non-applicable concepts filtered out. In some cases, the labels presented in a filtered view are altered for the type of event. For each filtered view, there is a separate entry point to the Taxonomy.

The four criteria are represented in the Taxonomy as a set of four axes of the “Corporate Actions” table. All concepts in the Taxonomy are part of the “Corporate Actions” table. When a fact is instantiated for a concept in the Taxonomy, it is always qualified by a member from each of the four criteria axes.

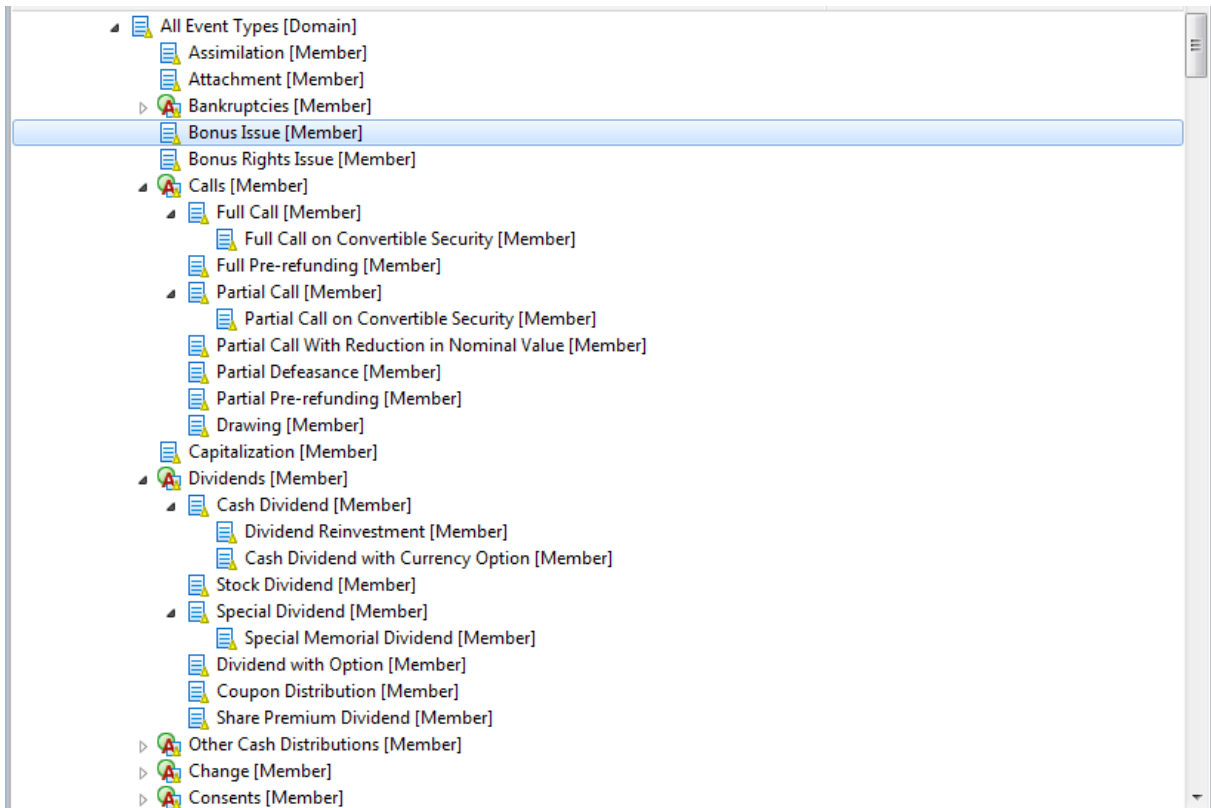
### 3.1 Event Type Axis

The “Event Type” axis contains a hierarchical list of all the event types for a corporate action message. Some of the intermediate members in the hierarchy are only used for organizing the events and are never used as actual events in a corporate action message. For example, the event “Tender Offers” is used to contain the different types of tender offers that can be used in a corporate action message but is never used as an event itself. This is opposed to the “Merger” event which can be used in a corporate action message as well as in the children of a “Merger” in the event type hierarchy.

Included with the Corporate Actions Taxonomy files is an XML file that contains the event type hierarchy and identifies which events can be used in a corporate action message.

Figure 1 shows the events in the event type hierarchy.

**Figure 1 Event Type Hierarchy**



### 3.2 Market Type Axis

The “Market Type” axis lists the markets for a corporate action message. Currently, the Taxonomy only contains members for Australia, Europe, Japan and the United States, however, only the United States is configured in the first release of the Corporate Actions Taxonomy.

### 3.3 Issue Type Axis

The “Issue Type” axis identifies the type of security the corporate action message applies to. The three members are: “Equity”, “Debt” and “Other”. For example, a merger event may only affect the equity issues and not the debt issues. For a different merger event, the debt issues may be affected but not the equities.

### 3.4 Mandatory/Voluntary Axis

The “Mandatory/Voluntary” axis identifies the action type for the security holder that is affected by the event. It contains three members that identify if the action is mandatory or voluntary for the security holder. There are two different mandatory action types, one is when the action is simply mandatory and the other is when the security holder has options. In the latter case, there is a default option if the security holder makes no specific election.

The three action types are:

1. Security Holder Action is not Required (Mandatory)
2. Security Holder Action is Request with Default (Mandatory with options)
3. Security Holder Action is Optional (Voluntary)

For example, a dividend event is mandatory. The security holder cannot elect not to receive the dividend. In a usual dividend event there are no options for the security holder, they will simply be paid the dividend. For other types of dividend events, such as a dividend reinvestment event, there may be options that the security holder can elect to determine how the dividend is reinvested. In both of these cases, the event is mandatory for the security holder, as opposed to an odd lot offer event which is strictly voluntary to the security holder. In this case, the security can accept or reject the offer.

### 3.5 Status Axis

The “Status” axis identifies the status of the facts in the instance. The status axis contains three members:

1. Confirmed
2. Unconfirmed
3. Preliminary

Some portions of a corporate action message may not be final. This axis identifies when this occurs. For example, when a merger is first announced, the pricing may be “preliminary”. Later, the message may be updated with the actual price and the price will be indicated as being “confirmed”. The status dimension is not required and is only used when it is necessary to make the distinction between a normal circumstance and a special status for a fact. The default value indicates that the status is not disclosed.

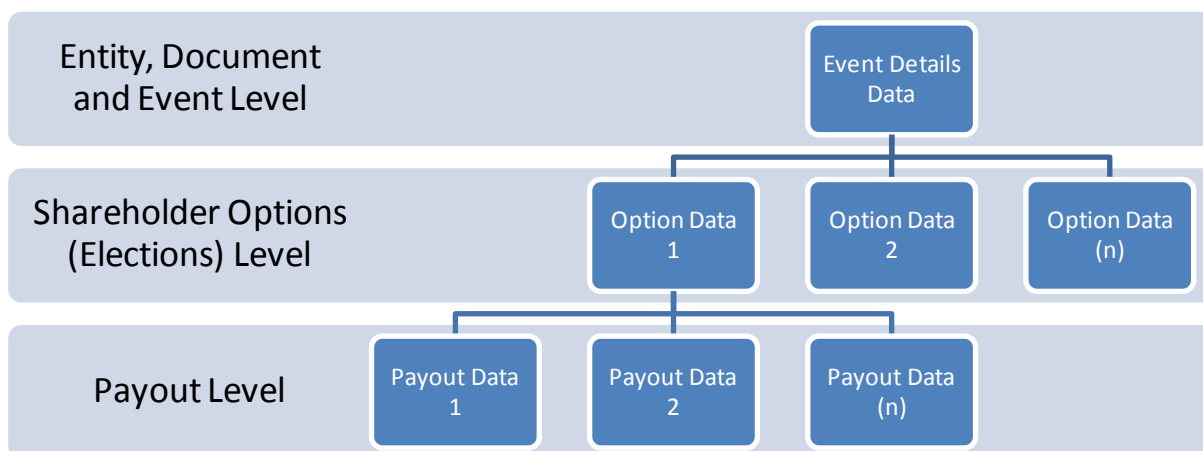
### 3.6 Corporate Actions Table Line Items

The body of an issuer event message is represented in the line items of the Corporate Actions Table. The structure of the Taxonomy is based on a hierarchical representation of the message built as a series of “table within table” structures in the Taxonomy. The

hierarchical structure is based on a combination of the hierarchical structures of the DTCC data model for corporate action events and the ISO 20022 XML message format.

The core DTCC data model and the ISO 20022 message format both contain a multi-level structure to organize their concepts. The Corporate Actions Taxonomy data model follows this structure and organizes concepts along these levels. Refer to Figure 2.

**Figure 2 Taxonomy Structure**



A corporate action event reports information that impacts either the cash distributions to a shareholder or the security holdings of a shareholder. A corporate action can also communicate changes in the characteristics of a security to a shareholder, or actions that a shareholder must undertake, can voluntarily undertake or choices a shareholder can make concerning a security. The Corporate Actions Taxonomy is structured in a number of levels to capture this information in the most effective way possible.

Typically, any corporate action event will have information about the securities impacted, the document describing the event, and the entities that are impacted by the event. In addition, there is information that describes the event and the options that apply to the event as a whole. This information is called “Event Level Information”.

“Event Level Data” is information that is specific to the entire event and only appears once in the XBRL instance. This is information that will remain constant regardless of how many shareholder options or payouts are available.

A shareholder can be presented with a number of options (or elections) to select for a corporate action. The Taxonomy allows the issuer to describe one or more options as part of a single corporate action event. For example, in a merger the shareholder may have the option to take stock in the acquiring entity or cash. These are described as two separate options. All the details associated with each of these options are recorded in each option. Each option is distinguished as an integer typed dimension; i.e., Option1, Option2, etc.

Each option can then have one or more payouts. In the merger example, there would be a single cash payout for Option1 and a security payout for Option2. Information about the payout is captured at the payout level. This is all the information related to the distribution to the shareholder.

At a minimum there must be at least one option per corporate action event. A mandatory event, like a dividend distribution, will have one option and one payout. All mandatory events will only have one option.

The repeating structures for options and payouts are represented by a table with a typed axis that differentiates each occurrence. For example, each option of a corporate action has an option number. This option number is represented as a member of the option number axis of the option table.

### 3.7 US GAAP Compatibility

The Corporate Actions Taxonomy has a similar profile to the US GAAP Taxonomy architecture. A processor that can process the US GAAP taxonomy should be able to process the Corporate Actions Taxonomy. The XBRL features used in the Corporate Actions Taxonomy and not used in the US GAAP Taxonomy are as follows:

XBRL Feature	Corporate Actions	US GAAP Taxonomy
Typed Dimensions	Yes	No
Requires-Element Relationship	Yes	No

## 4 Concepts

The Corporate Actions Taxonomy concepts are based on the DTCC data model for corporate actions, industry workgroups recommendations, and the ISO 20022 standard. In addition, other sources of corporate action information and architectural constraints yield Corporate Actions Taxonomy concepts. In many cases there will be a one-to-one correspondence between the Corporate Actions Taxonomy concepts, the DTCC data model and the ISO 20022 concepts.

### 4.1 Labels

All concepts have standard and documentation labels. The language of the label depends on the entry points selected and the origin of the content. Typically United States events will have US English labels. If a definition is an ISO 20022 label then it will have a UK English label<sup>1</sup>.

DTCC concepts have an additional "DTCC Name" label that contains the name of the concept in the DTCC data model.

ISO 20022 concepts have an additional "ISO Tag" label that contains the name of the ISO 20022 tag. Since the semantics for ISO 20022 tags are determined by the location of the tag in the ISO XML structure, ISO 20022 concepts also have an "ISO Path" label that identifies the location of the concept in the ISO Schema.

Corporate Action Taxonomy concepts can have multiple labels associated with them that are shown depending on the event type selected. In the case of a cash dividend event, the default label "Payout Amount" is presented as "Dividend Rate per Share (Gross)". Depending on the entry point selected, a different presentation linkbase is used. The presentation linkbase can define different preferred labels depending on the event type, jurisdiction, security or option. For example, the preferred label role for cash dividends is as follows: <http://xbrl.us/CorporateActions/role/eventLabel/CashDividend>.

In addition to event labels, the Taxonomy defines a label role that is used to describe the value of a concept. The role <http://xbrl.us/CorporateActions/role/instanceValue> defines the value that should appear in the instance for a given element. Depending on the entry point selected by the issuer, the value for the concept in the instance should match the value of this label. This means software can automatically populate this value based on

<sup>1</sup> All ISO documentation is in UK English.



the entry point selected. For example, if the issuer selects the cash dividend event, the instance value for event type should be "Cash Dividend".

Included in the Taxonomy is a file called "ca-cde-def.xml" which defines semantically the relationship between an axis and an element with the relationship <http://xbrl.us/arcroles/concept-dimension-equivalence>. Where this relationship is defined, a software program should take the value of instanceValue role for the member on the axis defined and put that value into the instance for the concept on the arc<sup>2</sup>. There are currently two relationships defined. The first is between the EventType concept and the EventTypeAxis, and the second is between the MandatoryVoluntaryChoiceIndicator concept and the MandatoryVoluntaryAxis.

## 4.2 Data Types

The Corporate Actions Taxonomy uses existing XBRL and US GAAP Taxonomy data types. Most data types from the DTCC data model and the ISO 20022 message format naturally map to an XBRL or US GAAP Taxonomy data type. Additional data types were created as necessary.

Usually XBRL taxonomies are not so restrictive on lengths for string and numeric data types. The Corporate Actions Taxonomy does not restrict lengths for types unless it is a natural part of the concept format.

Code lists that are unlikely to change are represented by restricting the xbrl:tokenItemType with enumerated values. Code lists that are likely to change will be represented with the xbrli:tokenItemType without restricting it.

## 5 Issuer Templates

The Corporate Actions Taxonomy contains all the concepts necessary for all corporate action events. These concepts are organized in a single hierarchy (the Taxonomy Structure). However, when an issuer prepares an instance they will only be interested in a subset of the concepts that are necessary for the specific event and circumstances of the event.

Generally, the concepts that are needed can be determined from four pieces of information:

1. Market type
2. Issue type
3. Event type
4. Mandatory/Voluntary/Choice type

Based on these criteria, the taxonomy structure is filtered so only the appropriate concepts for a particular combination are presented to the issuer. In the current release of the Corporate Actions Taxonomy there are approximately 60 events, 1 market, 3 issuer types and 3 election types. This means there are a maximum of 540 potential entry points that could be generated. The potential combinations will increase as the Taxonomy is tailored for specific jurisdictions. Figure 3 shows the Corporate Actions Table that defines all the dimensional qualifiers that can exist, and potential filters or templates.

---

<sup>2</sup> The axis is defined rather than the member as the axis can only have one member if a standard entry point is used.

Figure 3 Corporate Actions Table

The screenshot displays a hierarchical tree structure for the Corporate Actions Taxonomy. The root node is 'Corporate Actions [Table] [Issuer Aggregate View - Corporate Actions [Table]]'. It branches into several main categories:

- Event Type [Axis] [Issuer Aggregate View - Corporate Actions [Table]]**
  - All Event Types [Domain]
    - Assimilation [Member]
    - Attachment [Member]
    - Bankruptcies [Member]
    - Bonus Issue [Member]
    - Bonus Rights Issue [Member]
    - Calls [Member]
    - Capitalization [Member]
    - Dividends [Member]
    - Other Cash Distributions [Member]
    - Change [Member]
    - Consents [Member]
    - Convertible Security Issue [Member]
    - Default [Member]
    - Pay in Kind [Member]
    - Exchanges [Member]
    - General Information [Member]
    - Puts [Member]
    - Meeting [Member]
    - Merger [Member]
    - Reorganization [Member]
    - Stock Splits [Member]
    - Security Separation [Member]
    - Spinoff [Member]
    - Subscription Offer [Member]
    - Rights Issue [Member]
    - Warrants Issue [Member]
    - Odd Lot Offer [Member]
    - Dutch Auction [Member]
    - Tender Offers [Member]
    - Termination [Member]
    - Cancel [Member]
- Market Type [Axis] [Issuer Aggregate View - Corporate Actions [Table]]
  - All Markets [Domain]
  - Cancel [Member]
- Issue Type [Axis] [Issuer Aggregate View - Corporate Actions [Table]]
  - All Issue Types [Domain]
  - Cancel [Member]
- Mandatory/Voluntary [Axis] [Issuer Aggregate View - Corporate Actions [Table]]
  - All Mandatory Voluntary [Domain]
  - Cancel [Member]
- Status [Axis] [Issuer Aggregate View - Corporate Actions [Table]]
  - Status, Unspecified [Domain] [DEFAULT]
- Primary items
  - Corporate Actions [Line Items]
    - Corporate Action Event [Text Block]
      - Source Document Details [Abstract]

## 5.1 Taxonomy Entry Points

Included in the Corporate Actions Taxonomy release is a file called "CriteriaTable.xml". This is an XML file that defines all the entry points in the Taxonomy. It is provided as a reference for software tools to identify the entry points, allow users to select markets, events, elections and issues, and get an appropriate entry point of their corporate action. The following is an extract of the file:

```
<market label="United States" value="US">UnitedStatesMember</market>
<issueType label="Debt">DebtMember</issueType>
<eventType label="Liquidation">LiquidationMember</eventType>
<mandatoryVoluntary label="Security Holder Action is not Required (Mandatory)"
value="Mandatory">MandatoryMember</mandatoryVoluntary>
```

<entryPoint>US/Debt/Liquidation/Mand/ca-ent-US-Debt-Liquidation-Mand.xsd</entryPoint>

### 5.1.1 Event Hierarchy

In addition to the “Criteria Table”, the Taxonomy includes an Event Hierarchy file “eventHierachy.xml” that details the event type hierarchy. This file is provided so that software providers can organize corporate action events in a logical manner and issuers can identify the appropriate corporate action event that would be used as the basis for opening the correct taxonomy entry point.

## 6 Mapping

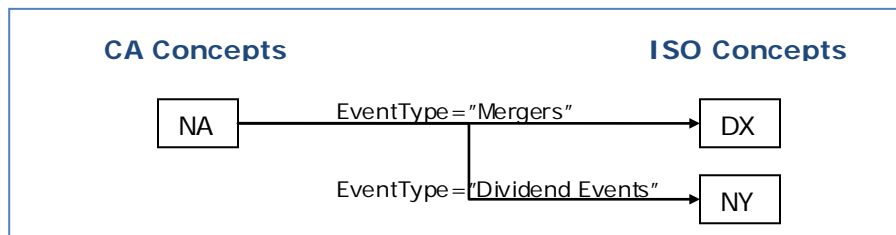
The Corporate Actions Taxonomy includes mappings between the Corporate Actions Taxonomy and the ISO 20022 schema.

The Corporate Actions Taxonomy is linked to the ISO 20022 Standard using a mapping logic defined in an XBRL generic linkbase. The Taxonomy includes an XBRL representation of the ISO 20022 data model. Links are then defined between the concepts in the XBRL Corporate Action data model and the concepts the ISO 20022 data model.

The mapping relationship also supports conditional logic that determines if a mapping should exist in different circumstances. For example, the concept NA will map to the ISO concept DX when the event type is “Mergers” but will map to the ISO concept DY when the even type is “Cash Dividends”.

Mappings are represented by generic relationships between the concepts in each model hierarchy. These relationships use the “mapConcept” relationship type. For basic one-to-one mappings, only the relationship is needed. For more complicated mappings, the relationship can have a “mappingRule” attribute which contains a Boolean expression. For a given instance document, if the Boolean expression evaluates to true, then the relationship is used for the mapping. Where there are multiple conditional relationships between the same two concepts, only one can have a true Boolean expression (the evaluation of the set of Boolean expressions for any two concepts must be mutually exclusive for a given instance).

**Figure 4 Rule Based Mapping**



### 6.1 General Mapping Rules

The mapping from the Corporate Actions Taxonomy to the ISO Corporate Actions Schema is defined in an XBRL generic linkbase. This linkbase allows relationships to be defined between two or more concepts. In order to do this, the ISO schema has been represented in the Corporate Actions Taxonomy using tuples. This allows the ISO 20022 CANO schema to be represented 98% the same as it is in the ISO 20022 CANO schema. Variances do exist between the XBRL and ISO Types because of limitations in XBRL item types. For example, XBRL does not support defining a union of types. Fortunately, there are very few of these, and for the purposes of mapping it has no impact.

A *generic link* links one concept to another and allows the user to express attributes of the link. A new link type has been defined called "mapConcept" which has the following attributes:

- Attribute Name
- Attribute Value
- Mapping Rule
- Target Path
- Value From
- Value To

### 6.1.1 Attribute Name and Attribute Value

The Attribute Name is used to define an attribute in the mapped concept. For example, the item <PriceValue> has a currency attribute of "Ccy". This is defined in the link between "Payout Amount" and "PriceValue".

Attribute Value defines the value that should populate the attribute defined by "Attribute Name". For example, in the case of Ccy this will be an ISO currency code. To determine the currency code used in the XBRL instance we use the function "cafn:currency(.)". This returns the ISO currency used for a monetary amount defined in the XBRL taxonomy. For example, the item "Bid Increments Amount" in the XBRL taxonomy maps to "CorpActnNtfctn/CorpActnDtIs/RateAndAmtDtIs/BidIntrvl/Amt" in the ISO schema. The ISO amount requires a currency attribute. In the map between the "Bid Increments Amount" and "Amt", the Attribute Name has a value of "Ccy" and the Attribute Value has a value of "cafn:currency(.)". See Figure 5 below.

**Figure 5 Attribute Mapping**

	AttributeName	AttributeValue	targetPath
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Bid Increments Amount               <ul style="list-style-type: none"> <li>Amount</li> </ul> </li> </ul> </li> </ul>	Ccy	cafn:currency(.)	CorpActnNtfctn/CorpActnDtIs/RateAndAmtDtIs/BidIntrvl/Amt

### 6.1.2 Mapping Rule

The Mapping Rule defines specific instructions that the transformation should follow if specific conditions are met. A mapping rule should always return a Boolean result, which indicates if the mapping between the two elements should be performed. If there is no mapping rule then it is assumed to be "TRUE". In some cases, the mapping rule just lists an element name. This is the equivalent of saying "Does this element have a value in the XBRL instance". If yes, then it is considered to be "TRUE".

The mapping rules use standard XSL functions which are prefixed with "fn:". The taxonomy also defines a number of custom functions to assist in the mapping process. Functions have a prefix of "cafn:". The following mapping functions are defined:

- cafn:typed-dimension-value-normalized-space()
- cafn:explicit-dimension-member()

#### 6.1.2.1 cafn:typed-dimension-value-normalized-space()

This function is used to return the CNAME or element name of the typed member of the XBRL instance value that it being processed. If an instance value is qualified by a typed dimension then the function will return the value of that typed dimension. This function should be used in an expression to check equivalence so that a Boolean result is returned. The syntax is as follows:

**cafn:typed-dimension-value-normalized-space(dim::prefix:dimensionName)**

For example, the following function checks if there is an event option for the XBRL instance value that is being processed: *“fn:exists(cafn:typed-dimension-value-normalized-space(dim::ca:EventOptionsAxis))”*. If the instance value is qualified by the EventOptionsAxis then the value will be true.

In addition to these corporate action defined functions, the mapping process supports standard XSL functions, such as fn:exists.

**6.1.2.2 cafn:explicit-dimension-member()**

This function is used to return the CNAME or element name of the explicit domain member of the XBRL instance value that it being processed. If an instance value is qualified by

```
<xbrldi:explicitMember
dimension="ca:PayoutSecurityIdentifierSchemeAxis">ca:ISINMember</xbrldi:explicitMember>
```

then the function will return the value *“ca:ISINMember”*. This function should be used in an expression to check equivalence so that a Boolean result is returned. The syntax is as follows:

**cafn:explicit-dimension-member(dim::prefix:dimensionName)**

For example, the following function checks if the instance fact is qualified by the ISIN Member on the *UnderlyingInstrumentIdentifierSchemeAxis*. *cafn:explicit-dimension-member(.,ca:UnderlyingInstrumentIdentifierSchemeAxis) =ca:ISINMember*. In addition to these corporate action defined functions, the mapping process supports standard XSL functions.

**6.1.3 Target Path**

The Target Path defines the location of the element in the ISO XML schema. Because the same element name can be used multiple times in traditional XML, simply linking to an element is not sufficient to describe the relationship between the XBRL item and the XML schema item. To make the mapping unique, the target path is the location in the schema hierarchy where the element being mapped to is located. Each level of the hierarchy is separated by a *“/”*. For example, the target path for currency option is as follows:

*“CorpActnNtfcfn/CorpActnOptnDtIs/CcyOptn”*. Note the root element *“Document”* is not included in the target path.

**6.1.4 Value From and Value To**

When items are mapped, the value in the XBRL instance is placed in the map location of the ISO 20022 instance. However, sometimes these values may need to be changed to comply with ISO codes<sup>3</sup>. The *“Value From”* attribute is linked to the *“Value To”* attribute to tell the processor how to populate the ISO instance. This occurs when enumerated lists are used and the values expected are different in the two schemas. For example, in the XBRL taxonomy there is an option type called *“Abstain”*. When this value is captured in the ISO 20022 instance it has a code called *“ABST”*. The *“Value From”* attribute will have a value of *“Abstain”* and the *“Value To”* attribute will have a value of *“ABST”*.

<sup>3</sup> Enumerated values in the Corporate Actions Taxonomy are expressed as human readable codes. In the ISO taxonomy, enumerated values are often 4 letter codes that reflect the historical codes used in the 15022 standard.

In a number of cases, there is no “Value From” and no “Value To”. In these cases, the value in the mapped XBRL instance is copied straight into the ISO instance with no changes.

In some cases, there is no “Value From” and a “Value To”; in these cases, the value of the “Value To” attribute is copied straight into the ISO instance with no transformation. No matter what the value is in the XBRL instance it is ignored, and the value in the “Value From” attribute is inserted.

To assist in creating values in the ISO instance, some custom functions were created to create values and access attributes of the XBRL instance. Note that any standard XSL function can be used to define output values.

#### 6.1.4.1 Concatenate – fn:concat()

Concatenate is used to take values from the XBRL instance and combine them into one field in the ISO instance. The structure of this function is as follows:

*fn:Concat(XBRL element Name or “string value”,...)*

E.g. fn:Concat (ExpirationDate,“:”,ExpirationTime)

This instruction is commonly used when a date and a time field is concatenated together to create a datetime value.

#### 6.1.4.2 Unit

Unit is used to return the value of the unit used in the XBRL instance. If the item is a monetary item it will return the currency. This is useful as the corporate action message records this as a value as opposed to an attribute.

E.g.: local-name(xfi: unit-numerator(xfi: unit(.))) will return the value used for the unit.

#### 6.1.4.3 format-number

Format-Number is used to format numbers in the format that the ISO 20022 standard expects. This is useful as a number of items expressed in XBRL as integers use 3 character strings in ISO.

E.g.: fn:format-number(xs: integer(cafn: typed-dimension-value-normalized-space(.,ca:EventOptionsSequenceTypedAxis)),’000’).

This example formats the option number as “001” as opposed to “1”.

## 6.2 Handling of Empty Values

Where no value in an XBRL instance exists but a mapping is defined in the mapping table, then a value or structure will not be created in the ISO instance document. In some cases, a “Value To” is defined in a mapping table as a fixed value. This fixed value is only populated when the linked value in the XBRL instance has a value defined.

## 6.3 Default Values

In some cases, the issuer will not populate a value but the ISO schema requires a value. A number of default values have been defined in the mapping rules that define values for the ISO instance. Those items that take on default values are linked to the element “Corporate Actions Table”. This is the root node of the Corporate Actions Taxonomy and is an abstract item. Anything linked to this abstract element is a default. If another mapping is defined that provides a value for the same element then the default value is

overridden. This is the only case where a value has to be overridden as part of the ISO message generation using the mapping logic.

### 6.4 Mapping to Enumerated Values

Because the ISO standard uses a large number of codes, the mapping logic encodes the relationship between common industry terms and the codes used in the ISO standard. The mapping of enumerated values is encoded in the mapping rules, and is defined using the "Value From" and "Value To" attributes. The conversion process reads the value in the XBRL instance, looks up the value in the "Value From" attribute, and populates the matching "Value To" value in the ISO instance.

### 6.5 Mapping to Unbounded (repeating) Items

The ISO Taxonomy captures repeating data using unbounded complex types. In XBRL, either dimensions or explicitly defined element names are used to capture repeating data fields that are defined in the ISO format.

#### 6.5.1 Repeating Items in ISO Represented as Concepts in CA Taxonomy

In a number of cases items need to be mapped to repeating (unbounded) concepts in the ISO schema. This is defined by defining multiple children of an XBRL concept in the mapping linkbase, one of which is the repeating concept (represented as a tuple) and the remainder is the children of the repeating concept. The repeating concept is used to indicate where the root of the repeating concept is. For example, the item Extension at the bottom of the list in Figure 6 is unbounded and can be repeated. In Figure 7 **Error! Reference source not found.**, the item "Date Declared Worthless" is mapped to the items "PlaceAndName" and "Text". The value of the unbounded field is "CorpActnNtfcctn/Xtnsn" which is the path for the element name for the "Extension" element in Figure 7 **Error! Reference source not found.**. This directs that the value of "Date Declared Worthless" would be constructed as follows:

```
<Xtsn >
    <PlcAndNm >" Document/CorpActnNtfcctn/CorpActDtIs/DtDtIs/DtDclrdWrthls" </PlcAndNm >
    <txt >31-12-09</txt >
</Xtsn >
```

**Error! Reference source not found.**  
**Figure 6 ISO Schema**

Element Name	Cardinality	Cardinality
CorporateActionNotificationV01	1	1
sequence	1	1
Identification	1	1
NotificationGeneralInformatik	1	1
NotificationIdentification	0	1
InstructionIdentification	0	1
OtherDocumentIdentification	0	unbounded
EventsLinkage	0	unbounded
CorporateActionGeneralInfor	1	1
IntermediateSecurity	0	1
AccountDetails	1	unbounded
CorporateActionDetails	0	1
CorporateActionOptionDetail	0	unbounded
AdditionalInformation	0	1
MessageOriginator	0	1
MessageRecipient	0	1
IssuerAgent	0	unbounded
PayingAgent	0	unbounded
SubPayingAgent	0	unbounded
Registrar	0	1
Extension	0	unbounded

Figure 7 Mapping Arcs

	mappingRule	targetPath	valueTo
Current Pay Factor			
Date Declared Worthless			
Extension	CorpActnNtfctn:Xtnsn		
PlaceAndName	CorpActnNtfctn:Xtnsn:PlcAndNm		*/Document/CorpActnNtfctn/CorpActDtls/DtDtls/DtDclrdWrthls*
Text	CorpActnNtfctn:Xtnsn:Txt		
Default Option Indicator			

## 6.5.2 Dimensions

Dimensions allow the expression of repeating items within the XBRL instance document. These can map either to non-repeating structures in ISO or repeating structures in ISO.

### 6.5.2.1 Non Repeating Items in ISO

A dimensional item may be defined in XBRL which maps to a single item in the ISO schema. To accommodate this in the mapping, a specific mapping rule is defined that evaluates dimensional qualifiers of the value in the instance and links it to the corresponding item in the ISO instance. For example, a mapping rule is defined as:

```
cafn:explicit-dimension-member(.,ca:UnderlyingInstrumentIdentifierSchemeAxis)=ca:ISINMember
```

If a security identifier element appearing in the XBRL instance has this qualifier (ISIN) then the value will be created in the ISO instance in the ISIN element.

### 6.5.2.2 Repeating Items in ISO

In the second case, the XBRL taxonomy has repeating structures that need to be mapped to repeating structures defined in the ISO schema. Repeating structures in the Corporate Actions Taxonomy are defined by the existence of a dimension with more than one member. In order to match these, the dimensions are mapped to an unbounded or repeating concept in the ISO schema.

For example, in the XBRL taxonomy there is a one to many relationship between one event and many options. ISO has an equivalent repeating structure between Corporate Action Notification and Corporate Action Option Details.

To capture this equivalence, a "mapconcept" arc is defined between the dimension "EventOptionsSequenceTypedAxis" and the element "CorpActnOptnDtIs".

When the conversion XSL reads values in the XBRL instance, it determines if the value is qualified by one or more dimension members. If it is, then the program determines if that dimension is linked to a repeating (unbounded) concept in the ISO schema. If it is, then the program puts the values for the elements that are split across multiple dimensions into separate repeating structures in the ISO instance. This may, in some cases, require multiple layers of recursion.

For Example, the XBRL instance defines the following ISIN that is a payout that is part of an option for a Merger event.

```
<ca:InstrumentIdentifier
contextRef="Option1_Payout2_ISINMember">US5899751016</ca:InstrumentIdentifier>
```

The fact is qualified by the following:

Option Sequence = 1



## Payout Sequence = 2

In this case the item is dimensionally Qualified and the element "InstrumentIdentifier" is mapped in the ca-isocanomapping role using the "MapConcept" relationship role.

The element Instrument Identifier is mapped to

"CorpActnNtfctn/CorpActnOptnDtIs/SctiesMvmntDtIs/SctyDtIs/SctyId/Id/ISIN" with a mapping rule of

"cafn:explicit-dimension-member(.,ca:UnderlyingInstrumentIdentifierSchemeAxis) = ca:ISINMember"

A conversion stylesheet evaluates all the axis and associated members used to qualify the item. The stylesheet checks if the axis is mapped to an unbounded concept. If the axis is not mapped to an unbounded concept this indicates that the mapping is defined explicitly in the mapping rules. In this instance, the element "InstrumentIdentifier" is qualified by dimension="ca:PayoutSecurityIdentifierSchemeAxis" with the member "ca:ISINMember", dimension="ca:PayoutSequenceTypeAxis" with the member "ca:Payout2Member" and the default dimension="ca:EventOptionsSequenceTypedAxis" with the member 'ca:Option1Member.

Those dimensions that are mapped to an unbounded concept are ignored for element mapping purposes (dimension="ca: PayoutSequenceTypeAxis" with the member "ca:Payout2Member" and the default dimension="ca: EventOptionsSequenceTypedAxis" with the member 'ca:Option1Member). The program therefore looks up the element InstrumentIdentifier in the mapping table where the mapping rule is dim::ca:PayoutSecurityIdentifierSchemeAxis=ca:ISINMember. This maps to the Value ISIN in the ISO instance. The program then looks up the target path on the arc to find the location of the value in the ISO instance, which is "CorpActnNtfctn/CorpActnOptnDtIs/SctiesMvmntDtIs/SctyId/Id/ISIN". This target path is used to create the structure defined in the ISO instance. The value that is placed in the ISO instance is the value in the XBRL instance "US5899751016".

The style sheet then evaluates the axis to unbounded ISO concepts mapping to determine where the structure needs to be repeated. The Event Options Sequence Axis is used to determine that the XML structure is a child of the first option (in this case there is only one). The "ca:PayoutSequenceTypeAxis" is used to determine if the data is inserted in the first, second, or third occurrence of "SctiesMvmntDtIs". In this case, it is the first, as the member "payout2Member" is the first member that maps to <SctiesMvmntDtIs>.

The resulting structure that is written out is shown in red:

```
<CorpActnOptnDtIs >
  <OptnNb>001 </OptnNb >
    <OptnTp >
      <Cd>CASE </Cd >
    </OptnTp >
    <SctiesMvmntDtIs >
      <SctyId >
        <Id >
          <ISIN>US5899751016 </ISIN >
        </Id >
      </SctyId >
    </SctiesMvmntDtIs >
  </CorpActnOptnDtIs >
```

## 6.6 Mapping to Proprietary Items

The ISO 20022 standard provides for a number of proprietary fields to provide flexibility for users of the schema. These fields are used when an appropriate element does not exist in the ISO schema. These proprietary elements are located throughout the ISO schema. For example, security identification is denoted by an ISIN but the ISO schema provides proprietary elements to support other identifiers such as CUSIP and SEDOL. If a CUSIP is provided in the XBRL instance then this is mapped to these proprietary fields using a standard link plus additional values that may be appropriate for the security type. A number of fields have been mapped in the XBRL Corporate Actions Taxonomy to these proprietary fields. Figure 8 shows how a non ISIN security identifier would be mapped into the ISO proprietary fields. In this case, a CUSIP would be mapped to the country code value of "US" (this represents the identification scheme used in the country; in the case of the US, it is CUSIP) and the identification filed would be populate with the actual CUSIP number.

**Figure 8 Example Mapping Rules**

mappingRule	targetPath	valueFrom	value
ISIN	fn:getMemberName(dim::ca:UnderlyingSecurityIdentifierSchemeAxis)=ca:ISINMember	CorpActnNtfctn:CorpActnGnlInf:UndrlygScty:SctyId:Id:ISIN	
Identification	fn:getMemberName(dim::ca:UnderlyingSecurityIdentifierSchemeAxis)=ca:CUSIPMem...	CorpActnNtfctn:CorpActnGnlInf:UndrlygScty:SctyId:Id:OthrId:Id	
Domestic	fn:getMemberName(dim::ca:UnderlyingSecurityIdentifierSchemeAxis)=ca:CUSIPMem...	CorpActnNtfctn:CorpActnGnlInf:UndrlygScty:SctyId:Id:OthrId:IdSrc:Dst	US
Identification	fn:getMemberName(dim::ca:UnderlyingSecurityIdentifierSchemeAxis)=ca:SEDOLMem...	CorpActnNtfctn:CorpActnGnlInf:UndrlygScty:SctyId:Id:OthrId:Id	
Domestic	fn:getMemberName(dim::ca:UnderlyingSecurityIdentifierSchemeAxis)=ca:SEDOLMem...	CorpActnNtfctn:CorpActnGnlInf:UndrlygScty:SctyId:Id:OthrId:IdSrc:Dst	UK
ISIN	fn:getMemberName(dim::ca:PayoutSecurityIdentifierSchemeAxis)=ca:ISINMember	CorpActnNtfctn:CorpActnOptnDtls:SctesMvmtDtls:SctyId:Id:ISIN	
Identification	fn:getMemberName(dim::ca:PayoutSecurityIdentifierSchemeAxis)=ca:CUSIPMember	CorpActnNtfctn:CorpActnOptnDtls:SctesMvmtDtls:SctyId:Id:OthrId:Id	
Domestic	fn:getMemberName(dim::ca:PayoutSecurityIdentifierSchemeAxis)=ca:CUSIPMember	CorpActnNtfctn:CorpActnOptnDtls:SctesMvmtDtls:SctyId:Id:OthrId:IdSrc:...	US
Identification	fn:getMemberName(dim::ca:PayoutSecurityIdentifierSchemeAxis)=ca:SEDOLMember	CorpActnNtfctn:CorpActnOptnDtls:SctesMvmtDtls:SctyId:Id:OthrId:Id	
Domestic	fn:getMemberName(dim::ca:PayoutSecurityIdentifierSchemeAxis)=ca:SEDOLMember	CorpActnNtfctn:CorpActnOptnDtls:SctesMvmtDtls:SctyId:Id:OthrId:IdSrc:...	UK

## 6.7 ISO 20022 Extensions

The ISO schema also supports the transmission of user defined elements in the ISO instance. These extension items are defined at the end of the message. The Corporate Actions Taxonomy defines a number of extension elements that are used to capture information specific to a particular jurisdiction or corporate action user.

The mapping links from the Corporate Actions Taxonomy to extension elements defined in an extension schema included as part of the taxonomy. The extension schema is represented in an XBRL format in the "ca-isocano" taxonomy. All extension elements have a label that is prefixed with "Ext\_".

## 6.8 Processing Model

The mapping rules do not define the sequence order of items in the complex types defined in the ISO schema. In order to ensure that the sequence is in the correct order, the style sheet that generates the ISO instance starts with a ISO schema template and

populates the template based on the mapping. This ensures that the sequence order is correct.

The processor moves through the XBRL instance and populates the values into the template. After the template has been populated any extra metadata structures are removed.

The steps are as follows:

1. Create template based on ISO schema and repeating structures defined in the instance document.
2. Populate default values.
3. Populate the template by working through the XBRL instance.
4. Remove surplus meta data structures.
5. Validate the schema.
6. Report any errors.

## 6.9 Mapping Resources

Included as part of the taxonomy package are the following files:

- XBRL mapping linkbase (XBRL Generic Linkbase)
- XSL style sheet (XSL)
- Mapping spreadsheet (Excel)

The mapping linkbase contains the mapping logic between the XBRL taxonomy and the ISO 20022 schema. The linkbase file "ca-isocano-gen.xml" is located in the directory "ca-isocano". The XSL style sheet "xbri-to-iso-converter.xsl" takes the XBRL file as an input and outputs the ISO 20022 instance. This style sheet can be run with a SAXON parser. The style sheet is automatically generated from the mapping linkbase and is updated with every taxonomy release. A spreadsheet of the mappings is also provided to allow a user to review the mappings between the XBRL taxonomy and the ISO schema. This spreadsheet is automatically generated from the mapping linkbase.

## 7 General Architecture

The Corporate Actions Taxonomy follows the style guidelines of the XBRL US GAAP Taxonomies. This includes conventions for element names and attributes, as well as labels and rules for how calculations and tables are represented in the presentations.

### 7.1 Logical Architecture

The Corporate Actions Taxonomy makes use of tables within the taxonomy. Tables are used to represent repeating structures. The Taxonomy allows tables within tables with the presentation linkbase. For example, the options table contains the payout table. In the definition linkbase, a child table incorporates the axes of the parent table (including axes the parent table inherited). The parent table includes the line items of the child tables (included line items the child table inherited).

The taxonomy is also constrained by four global dimensions that represent each of the four filter criteria. Every fact in an XBRL taxonomy is qualified by these global dimensions.

### 7.2 Physical Architecture

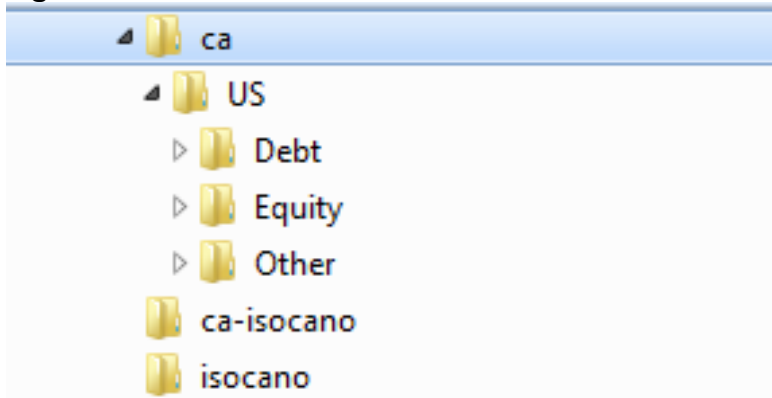
The Corporate Actions Taxonomy is processed through a publish process to generate a consistent file structure. The file structure includes the Corporate Actions Taxonomy, a combined Corporate Actions Taxonomy and ISO 20022 Taxonomy, and an XBRL

representation of ISO 20022 schema. This allows a user to see how the Corporate Actions Taxonomy relates to the ISO 20022 schema.

## 7.2.1 Corporate Actions Taxonomy

The Corporate Actions Taxonomy is located in the ca directory of the Corporate Actions Taxonomy.

**Figure 9 Root File Structure**



The ca directory contains the following files.

**Table 1. CA Files**

Files	Description
1. ca-ca-cancel-def-2011-05-31.xml	Definition linkbase for cancellation event.
2. ca-ca-cancel-pre-2011-05-31.xml	Presentation linkbase for the cancellation event.
3. cancel-ent-2011-05-31.xsd	Entry point to select a cancel event.
4. ca-cde-def-2011-05-31.xml	Linkbase that defines the equivalence between a dimension and a concept. This should be used by software to automatically populate instance values depending on the entry points selected.
5. ca-def-2011-05-31.xml	Definition linkbase for the all corporate action events.
6. ca-ent-all-2011-05-31.xsd	Global entry point to see all corporate action events including the notification cancellation.
7. ca-ent-2011-05-31.xsd	Global entry point for the notification event.
8. ca-lab-2011-05-31.xml	Label linkbase for the Corporate Actions Taxonomy. Note that there is only one label linkbase. There are not separate labels for event entry points.
9. ca-pre-2011-05-31.xml	Presentation linkbase for all corporate action events.
10. ca-2011-05-31.xsd	Global schema file for the Corporate Actions Taxonomy.

The ca directory also contains a directory for every jurisdiction configured in the taxonomy. This is currently restricted to the US but can be expanded for multiple jurisdictions. Each jurisdiction directory contains a directory for the issue type (Equity, Debt, Other) and each of these directories contain the possible event types applicable to a particular issue type. The items contained in the child directories are restricted only to those events that are specific for a particular issue type or jurisdiction.

The namespace of this taxonomy is <http://xbrl.us/corporateActions/2011>.

## 7.2.2 ISOCANO Taxonomy

The ISO Corporate Action Notification (ISOCANO) Taxonomy is a representation of the ISO 20022 corporate action notification and cancellation messages in an XBRL format. Complex types have been represented as XBRL tuples, and data types have been represented as XBRL data types. The XML structure of the message has been simulated using an XBRL presentation linkbase. Not all element names in this taxonomy are identical to the ISO schema due to the fact that the ISO schema in a number of cases used the same element name but used a different data type. In those cases where duplicates exist, the data type name has been concatenated to the end of the element name using an underscore as a delimiter.

**Table 2. ISOCANO Files**

Files	Description
1. isocano-2011-05-31.xsd	Main schema for the ISOCANO taxonomy.
2. isocano-ent-2011-05-31.xsd	Entry point for the ISOCANO taxonomy.
3. isocano-lab-2011-05-31.xml	Labels for the ISOCANO taxonomy. This includes the "Standard Label", "Documentation Label" and "Path in ISO Label".
4. isocano-pre-2011-05-31.xml	Presentation linkbase that simulates the structure of the ISOCANO schema.

In some cases the ISO schema defines data types as groups of item types. For example, a value could be a date or a string. This is not possible using the XBRL specification so only one data type is used.

In addition to the standard and documentation label types, a label type called "Path in ISO" is included. This details all the locations that a particular item appears in the ISO schema.

The namespace of this taxonomy is <http://xbrl.us/isocano/2011>

## 7.2.3 Corporate Actions and ISOCANO Taxonomy

The ISO Corporate Action ISOCANO Taxonomy (ca-isocano) is a combination of the Corporate Actions Taxonomy and the ISO20022 Taxonomy represented in an XBRL format. The ISO Corporate Actions ISOCANO Taxonomy provides a single entry point to see both the ISOCANO taxonomy and the XBRL taxonomy simultaneously.

Those items defined in the XBRL taxonomy that do not exist in the ISOCANO schema are overlaid so that a user can see where these items would appear if they were included in the ISO 20022 message. When an ISO20022 message is created using an XBRL instance, these extra facts are inserted into the extension envelope provided in the ISO schema. However, this taxonomy provides a view that allows a user to see what the additional

items in the XBRL message are. Extension items defined as an extension item to ISO have a standard label prefixed with "Ext\_".

The ISO Corporate Actions ISOCANO Taxonomy also includes a generic linkbase that defines the relationship between the XBRL element and the ISO 20022 element. The attributes of the generic linkbase are defined in section 6 of this document. In addition to the generic linkbase, an Excel version of the mapping logic is provided so that all aspects of the mapping can be inspected. The Excel spreadsheet "ca-isocano-mapping.xls" is derived from the file "ca-isocano-gen.xml" file.

**Table 3. CA- ISOCANO Files**

Files	Description
1. ca-isocano-2011-05-31.xsd	Definition linkbase for cancellation event.
2. ca-isocano-ent-2011-05-31.xsd	Entry point for the CA and ISOCANO entire view.
3. ca-isocano-gen-2011-05-31.xml	Generic linkbase that defines the mapping from the XBRL Taxonomy to the ISO 20022 Taxonomy.

The namespace of this taxonomy is <http://xbrl.us/ca-isocano-mapping/2011>

## 7.2.4 Taxonomy Location

The Corporate Actions Taxonomy is located at the following address: <http://taxonomies.xbrl.us/corpactions/2011/>

## 7.2.5 ISOCANO Extension Schema

Provided with the corporate actions taxonomy is a schema called "ca-isocano-ext-2011-05-31.xsd" which is used to validate the extension items "Ext\_" that are contained within the extension envelope of the converted ISO instance. The schema does not import the ISO schema, but re-defines the specific data types defined in the ISO schema. At some future date we will seek approval from the ISO registration authority to recognize this as an official schema. All ISO instances created using the style sheet provided reference to this schema for validation purposes.

# 8 Limited Extensions

Over time, the Corporate Actions Taxonomy can expand. In particular, additional corporate message formats may be modeled and included in the Taxonomy. Also, the main focus of the Corporate Actions Taxonomy is the issuer view. Additional views for other parties may be added in the future. It is expected that these additional party views would use many of the concepts from the issuer view, and new concepts would be added that are specialized for the additional party.

It is expected that the issuer will use the Corporate Actions Taxonomy without extending it. The Taxonomy provides concepts for capturing general text information related to the event. These concepts can be used when the issuer has additional information that is not defined by the Corporate Actions Taxonomy.