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Unit of Measure Extensions

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Document History

Revision	Date	Author	Revision Comments
0.1	August 5, 2010	Ryan Pierce, CME Group	Initial Draft
0.2	August 17, 2010	Ryan Pierce, CME Group	Revised following August 16 GExMC call: <ul style="list-style-type: none">· Fields changed to use "Currency" in the name· Updated Section 3 with issues and discussion points raised on the GExMC call
0.3	August 23, 2010	L. Taikitsadaporn	Wording edits prior to submission to GTC
	Sept. 7, 2010		Submitted for GTC review
0.3	2011-08-21	Jim N	As Built
	Nov. 26, 2011	L. Taikitsadaporn	Updated cover page footer Minor edits to add new tag number references for the new fields

1 Introduction

FIX uses the concept of UnitOfMeasure to indicate the underlying quantity of a commodity on which a derivatives contract is based. The field UnitOfMeasure (996) is used to indicate this within the Instrument component, and UnitOfMeasureQty (1147) indicates the quantity being referenced. For example, the contract size on frozen pork bellies may be 40,000 lbs. This is represented as:

UnitOfMeasure (996) = lbs

UnitOfMeasureQty (1147) = 40000

FIX also uses the concept to describe units for pricing purposes. The fields PriceUnitOfMeasure (1191) and PriceUnitOfMeasureQty (1192) are used to denote this. For example, a contract of feeder cattle may be 50,000 lbs, but the price may be quoted in cents per pound, which is equivalent to dollars per 100 lbs. In this case:

UnitOfMeasure (996) = lbs

UnitOfMeasureQty (1147) = 50000

PriceUnitOfMeasure (1191) = lbs

PriceUnitOfMeasureQty (1192) = 100

The FIX Protocol defines a Unit of Measure of “USD” which denotes US dollars. This can be used for representing many types of financial derivatives, such as Eurodollars and Credit Default Swaps, where the contract size is expressed in dollars. But one is currently unable to utilize Unit of Measure for financial derivatives where the underlying amount is not US dollars, such as Euroyen, an EUR/USD FX future, or a European CDS.

The Gap Analysis aims to deprecate the use of the “USD” unit of measure, and create a general framework for expressing a unit of measure that can express any amount of any currency.

Additionally, this Gap Analysis will also add support for several new units of measure to describe other derivatives contracts.

2 Business Workflow

To address the ability to specify currency, the UnitOfMeasure (996) enumeration “USD” will be deprecated. In its place will be added the enumeration “Ccy” to denote an amount of currency. This change will automatically update the field PriceUnitOfMeasure, as well as the related fields in the UnderlyingInstrument, InstrumentLeg, and DerivativeInstrument components.

The fields UnitOfMeasureCurrency and PriceUnitOfMeasureCurrency will be added for use when UnitOfMeasure or PriceUnitOfMeasure, respectively, are “Ccy”. Likewise, similar fields will be added to UnderlyingInstrument, InstrumentLeg, and DerivativeInstrument.

Additionally, several other UnitOfMeasure enumerations will be added:

- BDFT – Board Feet. Used for lumber.
- IPNT – Index point. Can be used for contracts that use an index or, in the case of financial futures, those traded in percent of par. For example, a Credit Default Swap may use UnitOfMeasure = Ccy
UnitOfMeasureCurrency = USD UnitOfMeasureQty = 1 PriceUnitOfMeasure = IPNT
PriceUnitOfMeasureQty = 1. In this case, the contract is measured in 1 USD of debt protection, but priced and quoted in percent par. A hurricane contract may have a contract size of \$1000 per Carvill Index Point. It would have UnitOfMeasure = IPNT UnitOfMeasureQty = 1000.

- day – Days. Can be used for freight futures, e.g. 1 day of vessel time charter.
- cwt – Hundredweight (US). Also known as a short hundredweight. Defined as 100 lbs., e.g. a rough rice contract may be 2,000 hundredweights.
- g – Grams. Can be used for metals contracts.
- dt – Dry metric tons. For commodities that can absorb or contain moisture, such as iron ore, this is the weight of the commodity in metric tons when dry.

3 Issues and Discussion Points

3.1 Use of Mixed Case Enumerations

One point raised during review of this proposal is that the UnitOfMeasure field uses mixed case enumerations, e.g. Gal and MWh, which are rare for a String field in the FIX Protocol. This requires that applications using the field employ case sensitive processing.

From a technical standpoint, the FIX documentation is perfectly clear that String fields are case sensitive, and this is true even for old protocol versions. Further investigation shows that there are, indeed, other important examples of fields that use mixed case enumerations, such as ExecInst and MsgType, however in these cases the enumeration values themselves are not mixed case (e.g. A and a).

Further investigation shows that international standards for units of measure place much importance on case sensitivity, e.g. t is a tonne, while T is a Tesla, and mW is a milliwatt while MW is a megawatt.

Resolution: At the GExMC Aug. 18, 2010, call the group agreed that mixed case enumerations values would be allowed for UnitOfMeasure to comply with conventions. A suggestion was made whether the enumeration values should be integer values (e.g. 1 = MWh). This can be raised in the GTC review for comments.

3.2 Alignment with ISO Standards

Standards, as published by recognized standards bodies, for Unit of Measure are not necessarily consistent in agreeing with each other, and often incomplete.

ISO 2955, which has been withdrawn, defines representations for SI (metric) units. Of these:

The existing SI enumeration “t” and the proposed enumeration “g” comply. Megawatt hours and cubic meters are not considered standard metric units and do not appear in ISO 2955. The proposed enumeration “day” is not in compliance with ISO 2955, which uses “d”. However, the more terse representation “d” could be considered confusing in the specification, while “day” is unambiguous.

ANSI X.350 extends ISO 2955 to include certain US customary units, but it is not comprehensive. It is not freely available and does not appear to be available in ANSI’s web store catalog.

ISO 80000 is a fairly recent standard which appears very wide in scope, but is not freely available.

A single standard called UCUM (Unified Code for Units of Measure) exists. It is very comprehensive and freely available. However, it appears to be an ad hoc standard not under the control of any recognized standards body. It appears to diverge substantially from many of the units already appearing in FIX, e.g. “[lb_av]” for pounds, “[ston_av]” for US tons, “[gal_us]” for US gallons, etc. More information is available at:

<http://www.unitsofmeasure.org/>

Resolution: On the GExMC call it was decided that this be discussed at GTC level as to how closely aligned FIX’s enumeration values should be with existing standards, noting that no single standard covers the requirement for the Unit of Measure field.

3.3 Use of External Code Lists

Use of an external code list was suggested during the review process. In other words, the UnitOfMeasure field could reference an external standard, and would have the advantage of being able to support all defined units, as well as availability of new units when they are published by the external standards body.

Resolution: On the GExMC call it was decided that this should be raised at the GTC level as to whether the use of external code lists is appropriate and how it should be expressed as the values may need to be a union of existing standard code lists as well as some FIX defined enumeration values.

4 Proposed Message Flow

Existing message flow will be unchanged.

5 FIX message tables

Existing FIX messages will be unchanged.

6 FIX component blocks

6.1 Instrument

- Add UnitOfMeasureCurrency(1716) following UnitOfMeasure
- Add PriceUnitOfMeasureCurrency(1717) following PriceUnitOfMeasure

6.2 UnderlyingInstrument

- Add UnderlyingUnitOfMeasureCurrency(1718) following UnderlyingUnitOfMeasure
- Add UnderlyingPriceUnitOfMeasureCurrency(1719) following UnderlyingPriceUnitOfMeasure

6.3 InstrumentLeg

- Add LegUnitOfMeasureCurrency(1720) following LegUnitOfMeasure
- Add LegPriceUnitOfMeasureCurrency(1721) following LegPriceUnitOfMeasure

6.4 DerivativeInstrument

- Add DerivativeUnitOfMeasureCurrency(1722) following DerivativeUnitOfMeasure
- Add DerivativePriceUnitOfMeasureCurrency(1723) following DerivativePriceUnitOfMeasure

7 Appendix A - Data Dictionary

Tag	Field Name	Action	Data type	Description	FIXML Abbreviation	Add to / Deprecate from Message type or Component block
996	UnitOfMeasure	Update	String	<p>The unit of measure of the underlying commodity upon which the contract is based. Two groups of units of measure enumerations are supported.</p> <p>Fixed Magnitude UOMs are primarily used in energy derivatives and specify a magnitude (such as, MM, Kilo, M, etc.) and the dimension (such as, watt hours, BTU's) to produce standard fixed measures (such as MWh - Megawatt-hours, MMBtu - One million BTUs).</p> <p>The second group, Variable Quantity UOMs, specifies the dimension as a single unit without a magnitude (or more accurately a magnitude of one) and uses the UnitOfMeasureQty(1147) field to define the quantity of units per contract. Variable Quantity UOMs are used for both commodities (such as lbs of lean cattle, bushels of corn, ounces of gold) and financial futures.</p> <p>Examples: For lean cattle futures contracts, a UnitOfMeasure of 'lbs' with a UnitOfMeasureQty(1147) of 40,000, means each lean cattle futures contract represents 40,000 lbs of lean cattle.</p> <p>For Eurodollars futures contracts, a</p>	UOM	

				<p>UnitOfMeasure of Ccy with a UnitOfMeasureCurrency(1716) of USD and a UnitOfMeasureQty(1147) of 1,000,000, means a Eurodollar futures contract represents 1,000,000 USD.</p> <p>For gold futures contracts, a UnitOfMeasure is oz_tr (Troy ounce) with a UnitOfMeasureQty(1147) of 1,000, means each gold futures contract represents 1,000 troy ounces of gold.</p> <p>Valid Values:</p> <p>Fixed Magnitude UOM Bcf - Billion cubic feet MMbbl - Million Barrels(deprecated in FIX.5.0SP1) MMBtu - One Million BTU MWh - Megawatt hours CBM - Cubic Meters</p> <p>Variable Quantity UOM Bbl - Barrels Bu - Bushels lbs - pounds Gal - Gallons oz_tr - Troy Ounces t - Metric Tons (aka Tonne) tn - Tons (US) USD - US Dollars [DEPRECATE] Alw - Allowances CER - Certified Emissions Reduction PRINC - Principal with relation to debt instrument CRT - Climate Reserve Tonnes Ccy – Amount of currency BDFT – Board feet IPNT – Index point day – Days cwt – Hundredweight (US)</p>	
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				g – Grams dt – Dry metric tons		
1716	UnitOfMeasureCurrency	Add	Currency	Indicates the currency of the unit of measure. Conditionally required when UnitOfMeasure(996) = Ccy	UOMCcy	Add to Instrument
1717	PriceUnitOfMeasureCurrency	Add	Currency	Indicates the currency of the price unit of measure. Conditionally required when PriceUnitOfMeasure(1191) = Ccy	PxUOMCcy	Add to Instrument
1718	UnderlyingUnitOfMeasureCurrency	Add	Currency	Indicates the currency of the underlying unit of measure. Conditionally required when UnderlyingUnitOfMeasure(998) = Ccy	UOMCcy	Add to UnderlyingInstrument
1719	UnderlyingPriceUnitOfMeasureCurrency	Add	Currency	Indicates the currency of the underlying price unit of measure. Conditionally required when UnderlyingPriceUnitOfMeasure(1424) = Ccy	PxUOMCcy	Add to UnderlyingInstrument
1720	LegUnitOfMeasureCurrency	Add	Currency	Indicates the currency of the unit of measure. Conditionally required when LegUnitOfMeasure(999) = Ccy	UOMCcy	Add to InstrumentLeg
1721	LegPriceUnitOfMeasureCurrency	Add	Currency	Indicates the currency of the price unit of measure. Conditionally required when LegPriceUnitOfMeasure(1421) = Ccy	PxUOMCcy	Add to InstrumentLeg
1722	DerivativeUnitOfMeasureCurrency	Add	Currency	Indicates the currency of the unit of measure. Conditionally required when DerivativeUnitOfMeasure(1269) = Ccy	UOMCcy	Add to DerivativeInstrument
1723	DerivativePriceUnitOfMeasureCurrency	Add	Currency	Indicates the currency of the price unit of measure. Conditionally required when DerivativePriceUnitOfMeasure(1315) = Ccy	PxUOMCcy	Add to DerivativeInstrument

8 Appendix B - Glossary Entries

Term	Definition	Field where used

9 Appendix C - Usage Examples