

Limit Times to Whole Seconds

CR Number (ID): 140		Submission Date: 3/16/2022	
GENERAL INFORMATION (AUTHOR TO COMPLETE)			
Author	FAA FIXM Development Team		
Brief Description (Subject)	Limit the precision of time values (both date/time and durations) to whole seconds (currently unlimited precision is allowed for fractions of a second).		
Priority*	<input type="checkbox"/> Immediate	<input type="checkbox"/> High	<input checked="" type="checkbox"/> Medium <input type="checkbox"/> Low
Scale*	<input type="checkbox"/> Major	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> Minor
Expected Impact to Implementers*	<input type="checkbox"/> High	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> Low <input type="checkbox"/> None
Target FIXM Component(s)	<input checked="" type="checkbox"/> FIXM Logical Model <input checked="" type="checkbox"/> FIXM Application <input checked="" type="checkbox"/> FIXM XML Schemas <input type="checkbox"/> Other Specify...		
Target FIXM Release	<input checked="" type="checkbox"/> FIXM Core Version 4.3.0 <input checked="" type="checkbox"/> Application Version FF-ICE 1.1.0, Basic 1.1.0		
Related FIXM CRs			
Motivation / Change Reason	<input type="checkbox"/> Requirement <input checked="" type="checkbox"/> Functionality/Operability <input type="checkbox"/> Maintenance <input type="checkbox"/> Defect <input type="checkbox"/> Other Specify ...		

* Optional fields; FIXM Secretariat may update during review

MOTIVATION / CHANGE REASON DESCRIPTION (AUTHOR TO COMPLETE)

Currently the FIXM Core allows unlimited precision for fractions of a second in time values. A brief review of database representation for times showed that many implementations use low precision storage for these values by default. Because sub-second precision is likely unneeded for aviation data, FIXM should limit its time fields to whole seconds rather than allowing boundless precision. This could prevent accidental mismatches in automated systems based on minor changes introduced via database storage and retrieval.

PROPOSED CHANGE (AUTHOR TO COMPLETE)

Change the pattern of the Time class in the Types package from this:

```
-?([1-9][0-9]{3,}|0[0-9]{3})-(0[1-9]|1[0-2])-(0[1-9]|12[0-9]|3[01])T((01[0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9](\.[0-9]+)?|(24:00:00(\.0+)?))Z
```

...to this:

```
-?([1-9][0-9]{3,}|0[0-9]{3})-(0[1-9]|1[0-2])-(0[1-9]|12[0-9]|3[01])T(((01[0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9])|24:00:00)Z
```

Also, add the following pattern to the Duration class in the Types package:

```
-?P([0-9]+Y)?([0-9]+M)?([0-9]+D)?(T([0-9]+H)?([0-9]+M)?([0-9]+S)?)?
```

Update based on CR TIM 1 (March 22, 2022):

During the consolidation TIM, it was generally agreed that sub-second precision would not be needed for most aviation data. However, it was also noted that some fields definitely benefit from higher precision date/times. It was suggested that the CR be written to include two time-based classes. One that continued to employ unrestricted sub-second precision and one that was constrained to only allow whole second precision.

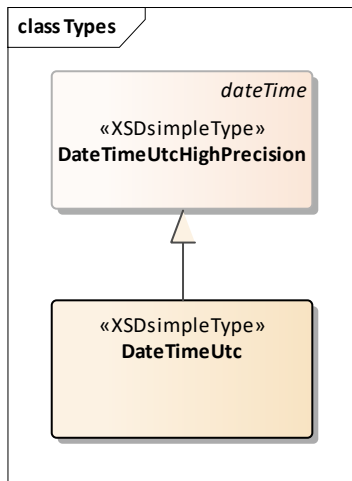
Further discussion of the CR on the FIXM message boards also noted that the naming of the Time class could be improved to be more explicit about what the class represents.

Based on the above, the following additional changes are recommended for this proposed change:

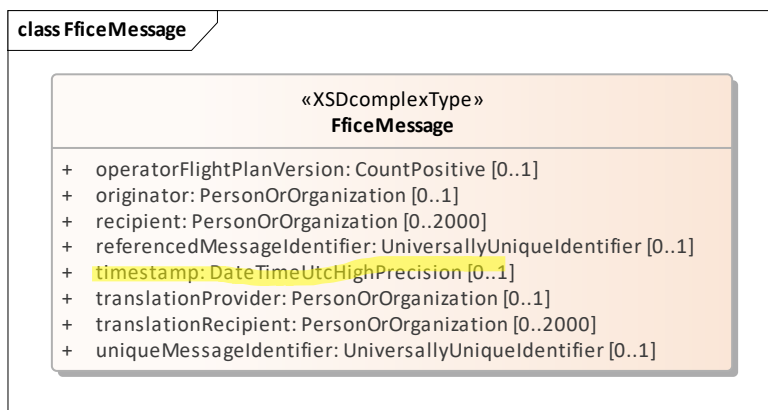
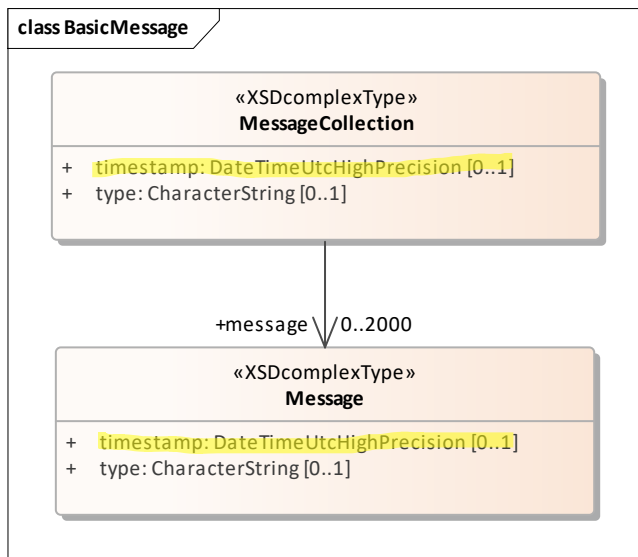
Create a new XSDsimpleType class in the Types package that inherits from dateTime with a name of DateTimeUtcHighPrecision and a definition of: "Describes instances identified by the combination of a date and a time expressed in Coordinated Universal Time (UTC). [FIXM]". Apply the following pattern to the new DateTimeUtcHighPrecision class:

```
-?([1-9][0-9]{3,}|0[0-9]{3})-(0[1-9]|1[0-2])-(0[1-9]|12[0-9]|3[01])T((01[0-9]|2[0-3]):[0-5][0-9]:[0-5][0-9](\.[0-9]+)?|(24:00:00(\.0+)?))Z
```

Rename the existing Time class (modified as stated in the CR above) to DateTimeUtc with a new definition of: "Describes instances identified by the combination of a date and a time expressed in Coordinated Universal Time (UTC) and restricted to whole second precision. [FIXM]". Replace the dateTime parent class of DateTimeUtc with the new DateTimeUtcHighPrecisionClass.



Modify the “timestamp” attribute of the MessageCollection and Message classes in the BasicMessage package and the FficeMessage class in the FficeMessage package to use DateTimeUtcHighPrecision.



CCB SECRETARIAT	
External Standard Consistency Checked	<input type="checkbox"/> AIDX <input type="checkbox"/> AIRM
CR Status	<input checked="" type="checkbox"/> Proposed <input type="checkbox"/> Implemented <input type="checkbox"/> Withdrawn <input type="checkbox"/> Rejected
Decision Date	Click or tap to enter a date
Implemented In	X.X.X
Comments	Click or tap here to add any additional information or comments.

IMPLEMENTATION NOTES (CCB SECRETARIAT TO COMPLETE)

CCB Secretariat notes on any deviations that were required during implementation.