



**MTConnect<sup>®</sup> Standard**  
**Part 4.4 – QIF Asset Information Model**  
**Version 1.8.0**

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## 1 **1 Purpose of This Document**

2 This document, *MTCConnect Standard: Part 4.4 - QIF Asset Information Model* of the  
3 MTCConnect Standard, establishes the rules and terminology to be used by designers to  
4 parse a QIF Document as an *MTCConnect Asset* that is provided by an *Agent* from a piece  
5 of equipment.

6 The data associated with the QIF Document will be retrieved from multiple sources that  
7 are responsible for providing their knowledge of an *MTCConnect Asset*.

## 8 2 Terminology and Conventions

9 Refer to Section 2 of *MTConnect Standard Part 1.0 - Overview and Fundamentals* for a  
 10 dictionary of terms, reserved language, and document conventions used in the MTConnect  
 11 Standard.

### 12 2.1 Glossary

#### 13 ***Agent***

14 Refers to an MTConnect Agent.

15 Software that collects data published from one or more piece(s) of equipment, orga-  
 16 nizes that data in a structured manner, and responds to requests for data from client  
 17 software systems by providing a structured response in the form of a *Response Doc-*  
 18 *ument* that is constructed using the *semantic data models* defined in the Standard.

19 Appears in the documents in the following form: *Agent*.

#### 20 ***Asset***

21 item, thing or entity that has potential or actual value to an organization *Ref:ISO*  
 22 *55000:2014(en)*

23 Note 1 to entry: Value can be tangible or intangible, financial or non-financial,  
 24 and includes consideration of risks and liabilities. It can be positive or negative  
 25 at different stages of the asset life.

26 Note 2 to entry: Physical assets usually refer to equipment, inventory and prop-  
 27 erties owned by the organization. Physical assets are the opposite of intangible  
 28 assets, which are non-physical assets such as leases, brands, digital assets, use  
 29 rights, licences, intellectual property rights, reputation or agreements.

30 Note 3 to entry: A grouping of assets referred to as an asset system could also  
 31 be considered as an asset.

32

#### 33 ***Component***

34 General meaning:

35 A *Structural Element* that represents a physical or logical part or subpart of a piece  
 36 of equipment.

37 Appears in the documents in the following form: *Component*.

38        Used in *Information Models*:

39        A data modeling element used to organize the data being retrieved from a piece of  
40        equipment.

- 41            • When used as an XML container to organize *Lower Level* `Component` ele-  
42            ments.

43            Appears in the documents in the following form: `Components`.

- 44            • When used as an abstract XML element. `Component` is replaced in a data  
45            model by a type of *Component* element. `Component` is also an XML con-  
46            tainer used to organize *Lower Level* `Component` elements, *Data Entities*, or  
47            both.

48            Appears in the documents in the following form: `Component`.

49        ***Current Request***

50            A *Current Request* is a *Request* to an *Agent* to produce an *MTConnectStreams Re-*  
51            *sponse Document* containing the *Observations Information Model* for a snapshot of  
52            the latest *observations* at the moment of the *Request* or at a given *sequence number*.

53        ***Devices Information Model***

54            A set of rules and terms that describes the physical and logical configuration for a  
55            piece of equipment and the data that may be reported by that equipment.

56            Appears in the documents in the following form: *Devices Information Model*.

57        ***Information Model***

58            The rules, relationships, and terminology that are used to define how information is  
59            structured.

60            For example, an information model is used to define the structure for each *MTCon-*  
61            *nect Response Document*; the definition of each piece of information within those  
62            documents and the relationship between pieces of information.

63            Appears in the documents in the following form: *Information Model*.

64        ***MTConnect Agent***

65            See definition for *Agent*.

66        ***MTConnect Asset***

67            An *MTConnect Asset* is an *Asset* used by the manufacturing process to perform  
68            tasks.

69            Note 1 to entry: An *MTConnect Asset* relies upon an *MTConnect Device* to  
70            provide *observations* and information about itself and the *MTConnect Device*



71 revises the information to reflect changes to the *MTCConnect Asset* during their  
72 interaction. Examples of *MTCConnect Assets* are Cutting Tools, Part Information,  
73 Manufacturing Processes, Fixtures, and Files.

74 Note 2 to entry: A singular `assetId` uniquely identifies an *MTCConnect Asset*  
75 throughout its lifecycle and is used to track and relate the *MTCConnect Asset* to  
76 other *MTCConnect Devices* and entities.

77 Note 3 to entry: *MTCConnect Assets* are temporally associated with a device and  
78 can be removed from the device without damage or alteration to its primary  
79 functions.

80

### 81 ***MTCConnect Device***

82 An *MTCConnect Device* is a piece of equipment or a manufacturing system that pro-  
83 duces *observations* about itself and/or publishes data using the *MTCConnect Infor-*  
84 *mation Model*.

### 85 ***MTCConnect Information Model***

86 See *Information Model*

### 87 ***MTCConnectDevices Response Document***

88 A *Response Document* published by an *MTCConnect Agent* in response to a *Probe*  
89 *Request*.

### 90 ***MTCConnectStreams Response Document***

91 A *Response Document* published by an *MTCConnect Agent* in response to a *Current*  
92 *Request* or a *Sample Request*.

### 93 ***observation***

94 The observed value of a property at a point in time.

### 95 ***Observations Information Model***

96 An *Information Model* that describes the *Streaming Data* reported by a piece of  
97 equipment.

### 98 ***Probe Request***

99 A *Probe Request* is a *Request* to an *Agent* to produce an *MTCConnectDevices Re-*  
100 *sponse Document* containing the *Devices Information Model*.

101 ***Request***

102 A communications method where a client software application transmits a message  
103 to an *Agent*. That message instructs the *Agent* to respond with specific information.

104 Appears in the documents in the following form: *Request*.

105 ***Response Document***

106 An electronic document published by an *MTCConnect Agent* in response to a *Probe*  
107 *Request*, *Current Request*, *Sample Request* or *Asset Request*.

108 ***Sample Request***

109 A *Sample Request* is a *Request* to an *Agent* to produce an *MTCConnectStreams Re-*  
110 *sponse Document* containing the *Observations Information Model* for a set of time-  
111 stamped *observations* made by *Components*.

112 ***semantic data model***

113 A methodology for defining the structure and meaning for data in a specific logical  
114 way.

115 It provides the rules for encoding electronic information such that it can be inter-  
116 preted by a software system.

117 Appears in the documents in the following form: *semantic data model*.

118 ***sequence number***

119 The primary key identifier used to manage and locate a specific piece of *Streaming*  
120 *Data* in an *Agent*.

121 *sequence number* is a monotonically increasing number within an instance of an  
122 *Agent*.

123 Appears in the documents in the following form: *sequence number*.

124 **2.2 Acronyms**

125 ***AMT***

126 The Association for Manufacturing Technology

127 **2.3 MTCConnect References**

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131 *Version 1.8.0.*

## 132 **3 QIF Asset Information Model**

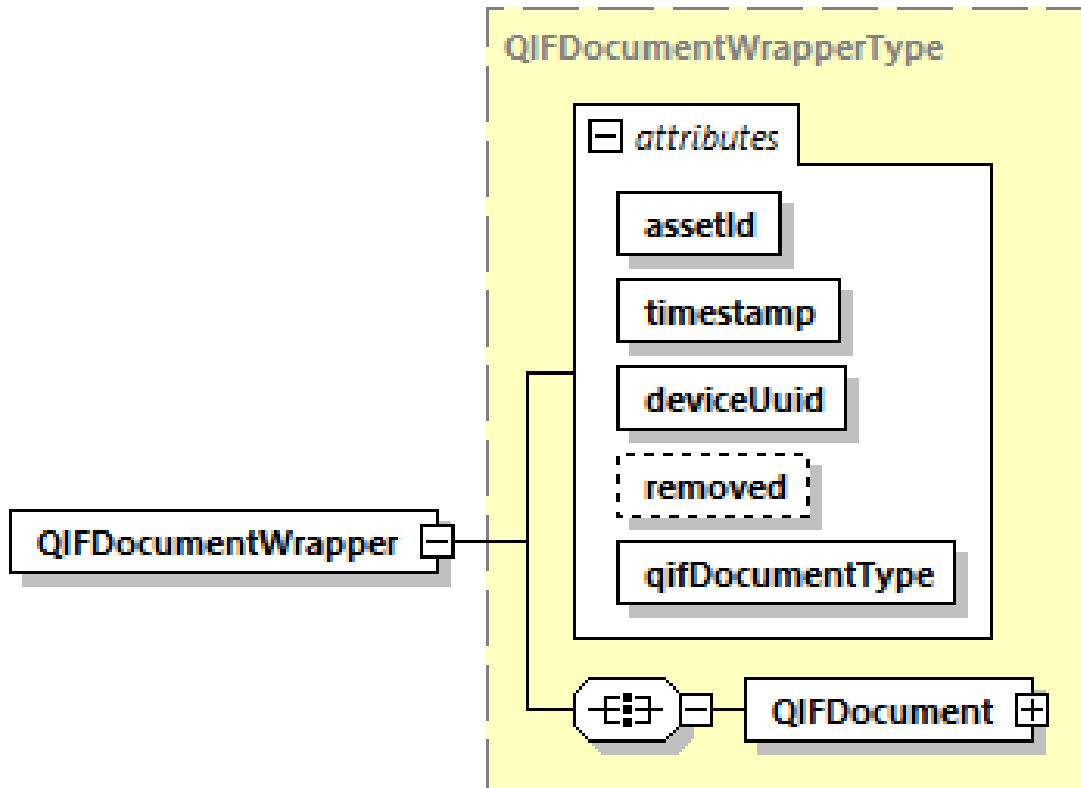
133 The Quality Information Framework (QIF) is an American National Standards Institute  
134 (ANSI) accredited standard developed by the Digital Metrology Standards Consortium  
135 (DMCS) standards development organization and an A-liaison to the International Stan-  
136 dards Organization (ISO) Technical Committee (TC) 184. QIF addresses the needs of the  
137 metrology community to have a semantic information model for the exchange of metrol-  
138 ogy data throughout the verification lifecycle from product design to execution, analysis,  
139 and reporting.

140 The MTConnect QIF Asset Model provides a wrapper around the QIF Information model  
141 in its native XML representation utilizing the QIF XML Schema Definition Language  
142 (XSDL) references in the wrapper to validate the document. The MTConnect standard  
143 does not alter or extend the QIF standard and regards the QIF standard as a pass-through.

144 Information about the QIF standards is at the following location: <https://qifstandards.org>

### 145 **3.1 QIFDocumentWrapper**

146 `QIFDocumentWrapper` is an `Asset` that carries the Quality Information Framework  
147 (QIF) Document.



Generated by XMLSpy

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Figure 1: QIFDocumentWrapper Diagram

### 148 3.1.1 Attributes for QIFDocumentWrapper

149 *Table 1* lists the attributes for an QIFDocumentWrapper element in addition to at-  
150 tributes inherited from Asset element.

**Table 1:** Attributes for QIFDocumentWrapper

Attribute	Description	Occurrence
qifDocumentType	The contained QIF Document type as defined in the QIF Standard.  The value of qifDocumentType <b>MUST</b> be one of the current documents types as per QIF: MEASUREMENT_RESOURCE, PLAN, PRODUCT, RESULTS, RULES or STATISTICS.	0..1

### 151 3.1.2 Elements for QIFDocumentWrapper

152 *Table 2* lists the elements for an QIFDocumentWrapper element.

**Table 2:** Elements for QIFDocumentWrapper

Element	Description	Occurrence
QIFDocument	The QIF Document as defined by the QIF standard.	1

## 153 Appendices

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