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1 Purpose of This Document

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

The data associated with the QIF Document will be retrieved from multiple sources that are responsible for providing their knowledge of an MTConnect Asset.
2 Terminology and Conventions

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

2.1 Glossary

Agent
Refers to an MTConnect Agent.
Software that collects data published from one or more piece(s) of equipment, organizes that data in a structured manner, and responds to requests for data from client software systems by providing a structured response in the form of a Response Document that is constructed using the semantic data models defined in the Standard.

Appears in the documents in the following form: Agent.

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

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

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

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

Component
General meaning:
A Structural Element that represents a physical or logical part or subpart of a piece of equipment.

Appears in the documents in the following form: Component.
A data modeling element used to organize the data being retrieved from a piece of equipment.

- When used as an XML container to organize [Lower Level] Component elements. Appears in the documents in the following form: Components.
- When used as an abstract XML element. Component is replaced in a data model by a type of [Component] element. Component is also an XML container used to organize [Lower Level] Component elements, [Data Entities] or both. Appears in the documents in the following form: Component.

**Current Request**

A [Current Request] is a [Request] to an [Agent] to produce an [MTConnectStreams Response Document] containing the [Observations Information Model] for a snapshot of the latest observations at the moment of the [Request] or at a given [sequence number].

**Devices Information Model**

A set of rules and terms that describes the physical and logical configuration for a piece of equipment and the data that may be reported by that equipment. Appears in the documents in the following form: [Devices Information Model].

**Information Model**

The rules, relationships, and terminology that are used to define how information is structured. For example, an information model is used to define the structure for each [MTConnect Response Document]; the definition of each piece of information within those documents and the relationship between pieces of information. Appears in the documents in the following form: [Information Model].

**MTConnect Agent**

See definition for [Agent].

**MTConnect Asset**

An [MTConnect Asset] is an [Asset] used by the manufacturing process to perform tasks.

Note 1 to entry: An [MTConnect Asset] relies upon an [MTConnect Device] to provide observations and information about itself and the [MTConnect Device].
revises the information to reflect changes to the [MTConnect Asset] during their interaction. Examples of [MTConnect Assets] are Cutting Tools, Part Information, Manufacturing Processes, Fixtures, and Files.

Note 2 to entry: A singular [assetId] uniquely identifies a [MTConnect Asset] throughout its lifecycle and is used to track and relate the [MTConnect Asset] to other [MTConnect Devices] and entities.

Note 3 to entry: [MTConnect Assets] are temporally associated with a device and can be removed from the device without damage or alteration to its primary functions.

**MTConnect Device**

An [MTConnect Device] is a piece of equipment or a manufacturing system that produces [observations] about itself and/or publishes data using the [MTConnect Information Model].

**MTConnect Information Model**

See [Information Model].

**MTConnectDevices Response Document**


**MTConnectStreams Response Document**


**observation**

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

**Observations Information Model**

An [Information Model] that describes the [Streaming Data] reported by a piece of equipment.

**Probe Request**

A [Probe Request] is a [Request] to an [Agent] to produce an [MTConnectDevices Response Document] containing the [Devices Information Model].
A communications method where a client software application transmits a message to an Agent. That message instructs the Agent to respond with specific information. Appears in the documents in the following form: Request.

An electronic document published by an MTConnect Agent in response to a Probe Request, Current Request, Sample Request, or Asset Request.

A Sample Request is a Request to an Agent to produce an MTConnectStreams Response Document containing the Observations Information Model for a set of time-stamped observations made by Components.

A methodology for defining the structure and meaning for data in a specific logical way. It provides the rules for encoding electronic information such that it can be interpreted by a software system. Appears in the documents in the following form: semantic data model.

The primary key identifier used to manage and locate a specific piece of Streaming Data in an Agent. sequence number is a monotonically increasing number within an instance of an Agent. Appears in the documents in the following form: sequence number.

2.2 Acronyms

AMT

The Association for Manufacturing Technology

2.3 MTConnect References

3  QIF Asset Information Model

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

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

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

3.1  QIFDocumentWrapper

QIFDocumentWrapper is an Asset that carries the Quality Information Framework (QIF) Document.
3.1.1 Attributes for QIFDocumentWrapper

Table 1 lists the attributes for an QIFDocumentWrapper element in addition to attributes inherited from Asset element.
Table 1: Attributes for QIFDocumentWrapper

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

3.1.2 Elements for QIFDocumentWrapper

Table 2 lists the elements for an QIFDocumentWrapper element.

Table 2: Elements for QIFDocumentWrapper

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>QIFDocument</td>
<td>The QIF Document as defined by the QIF standard.</td>
<td>1</td>
</tr>
</tbody>
</table>
Appendices

A Bibliography


