Draft Standard

MEF 113 Draft (R3)

Trouble Ticketing

Requirements and Use Cases

May 2022

This draft represents MEF work in progress and is subject to change.

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1 List of Contributing Members

The following members of the MEF participated in the development of this specification and have requested to be included in this list.

Member Company

Table 1 - Contributing Member Companies

2 Abstract

This specification identifies the common Use Cases and attributes needed to support Trouble Ticketing Management at the LSO Sonata/Cantata Interface Reference Point.

It supports the requirements defined in the MEF Lifecycle Service Orchestration (LSO) Reference Architecture and Framework (MEF 55.1, "LSO RA") requirements for Trouble Ticketing Management between business applications of a Buyer and a Seller at the LSO Sonata/Cantata Interface Reference Point. Information contained within this specification will be utilized by both the Buyer and Seller for the development of automated Trouble Ticketing API systems.

3 Release Notes

This document is a draft standard, with various comments received in the third Call for Comments Ballot still to be addressed in the next revision of the document. As such, the contents of this document are subject to change. The areas that are expected to have changes in them are as follows:

- Various editorial updates for clarity
- Seller Ticket Lifecycle
- Patch Ticket by Ticket Identifier
- Ticket Resolution Confirmation
- Incidents

4 Terminology and Acronyms

This section defines the terms used in this specification. In many cases, the normative definitions to terms are found in other documents. In these cases, the third column is used to provide the reference that is controlling, in other MEF or external documents.

In addition, terms that are defined in MEF 10.3 [3], MEF 12.2 [4], MEF 26.2 [5], MEF 50.1 [6], MEF 51.1 [7], MEF 55.1 [8], and MEF 79 [10] are included in this document by reference and are not repeated in the table below.

Term	Definition	Reference
Buyer	In the context of this document, denotes the organization acting as the customer in a transaction over a Sonata/Cantata Interface Reference Point.	MEF 80 [11]
Incident	An entry within a Seller's tracking system created by the Seller, which contains information about a Situation in the Seller's network that has a possible negative impact on the operability of a Product for one or more Buyers.	This document
Issue	In the context of this document, denotes a problem with a Product as experienced by the Buyer that is not part of normal operation.	This document
Notification	A message sent from the Seller to the Buyer to inform about an event that has occurred in regard to a specific instance of a Ticket, Incident, Appointment or Workorder.	This document
Seller	In the context of this document, denotes the organization acting as the supplier in a transaction over a Sonata/Cantata Interface Reference Point.	MEF 80 [11]
Situation	In the context of this document, denotes a problem that is not part of normal operation in the Seller's network.	This document
Ticket	An entry within a Seller's tracking system created by the Buyer (or a third party on behalf of the Buyer), which contains information about an Issue impacting normal operation of a Product, along with support interventions made by technical support staff, or third parties.	This document
Trouble Ticketing	In the context of this document, denotes the management of both Tickets and Incidents.	This document
Workorder	In the context of this document, denotes a set of tasks to be scheduled and performed under the responsibility of a Technician at a given location.	This document

Table 2 - Terminology and Abbreviations

5 Scope

This specification defines the process for MEF Trouble Ticketing between a Seller and Buyer. This specification is limited to the business process requirements depicted as Use Cases and attribute definitions needed for Trouble Ticketing Management.

Note: Portions of the Appointment API (defined in TMF 646 [13]) and Workorder Management business process requirements for use with Trouble Ticketing Management have been incorporated into this specification for time to market reasons and may get moved into a separate MEF specification in a future revision.

6 Compliance Levels

The key words "**MUST**", "**MUST NOT**", "**REQUIRED**", "**SHALL**", "**SHALL NOT**", "**SHOULD**", "**SHOULD NOT**", "**RECOMMENDED**", "**NOT RECOMMENDED**", "**MAY**", and "**OPTIONAL**" in this specification are to be interpreted as described in BCP 14 (RFC 2119, RFC 8174) when, and only when, they appear in all capitals, as shown here. All key words must be in bold text.

Items that are **REQUIRED** (contain the words **MUST** or **MUST NOT**) are labeled as **[Rx]** for required. Items that are **RECOMMENDED** (contain the words **SHOULD** or **SHOULD NOT**) are labeled as **[Dx]** for desirable. Items that are **OPTIONAL** (contain the words **MAY** or **OPTIONAL**) are labeled as **[Ox]** for optional**.**

A paragraph preceded by **[CRa]<** specifies a conditional mandatory requirement that **MUST** be followed if the condition(s) following the "<" have been met. For example, "**[CR1]<**[D38]" indicates that Conditional Mandatory Requirement 1 must be followed if Desirable Requirement 38 has been met. A paragraph preceded by **[CDb]<** specifies a Conditional Desirable Requirement that **SHOULD** be followed if the condition(s) following the "<" have been met. A paragraph preceded by **[COc]<** specifies a Conditional Optional Requirement that **MAY** be followed if the condition(s) following the "<" have been met.

7 Introduction

This specification defines the business requirements and process-related guidelines for Trouble Ticketing over the Sonata/Cantata Interface Reference Point. The Sonata/Cantata Interface Reference Point is defined in MEF 55.1 [8] as the Management Interface Reference Point supporting the management and operations interactions (e.g., ordering, billing, trouble ticketing, etc.) between two network providers (e.g., Service Provider Domain and Partner Domain) or between a Customer Domain and a Service Provider Domain. The scope of this specification is limited to interactions between these parties; within this specification, they are referred to as the "Buyer" and the "Seller".

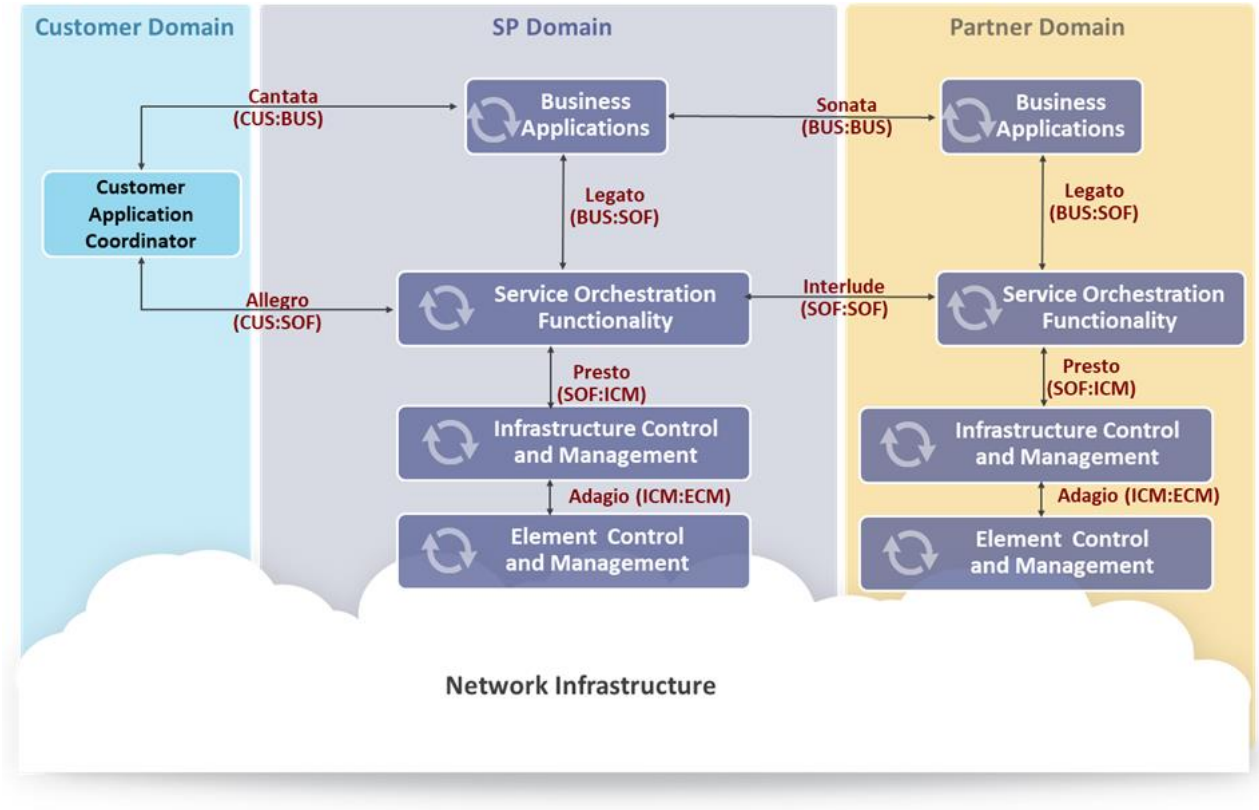

Figure 1 - LSO Reference Architecture Diagram

Figure 1 depicts the LSO Reference Architecture, per MEF 55.1 [8]. This document addresses the interactions between the business applications of the Buyer and Seller at the Sonata/Cantata Interface Reference Point required to support MEF Trouble Ticketing Management.

There are 2 associated "patterns" to the interactivity between the Buyer and Seller when the Buyer submits a Ticket request:

1. The Seller may respond immediately with the results of the request.
2. The Seller may acknowledge that the request has been received, but will not complete processing it immediately, and send notifications to update the Buyer on the Ticket State.

The associated "patterns" to the interactivity between the Buyer and Seller for Incidents is based on the Seller sending notifications to the Buyer on the event occurring on the Incident, whenever the Seller creates, updates or closes an Incident.

Note: The Buyer may retrieve a Ticket or Incident at any time to obtain the status and details.

To fully define the business interactions associated with inter-carrier Trouble Ticketing, this specification is focused on the following key areas:

- Ticket and Incident Use Cases and Business Process Definitions
- Specific Ticket and Incident Attributes supported in this specification
- Notifications of events that occur during processing of Tickets and Incidents
- Ticket and Incident State Diagrams

Incidents are used by the Seller to inform Buyers about Situations in the Seller's network that have a possible negative impact on the operability of a Product for one or more Buyers. A Buyer will only receive Incident Notifications for Products they have activated with the Seller. The Buyer may use an Incident to create a new Ticket, or to defer creating new Tickets (e.g. wait for the Incident to be closed by Seller) or update one or more existing Tickets whenever a notification for an Incident is received.

8 Trouble Ticketing Use Cases and Business Process Definitions

8.1 High-Level Use Cases

This section provides a comprehensive set of Use Cases needed to support Trouble Ticketing (Ticket and Incident) and expands on the Problem Reporting process defined in MEF 50.1 (MEF Services Lifecycle Process Flows). These Use Cases are based on business process standards of interactivity between Buyers and Sellers of Products. The specific attributes associated with each Use Case are defined in section 9. There are mandatory use cases and optional use cases for an implementation to support.

[R1] An implementation of MEF Trouble Ticketing API **MUST** support Use Cases 1 thru 6 and 17.

[R2] An implementation of MEF Trouble Ticketing API **MUST** support Use Case 18 for the following Event Notification Types:

- TICKET_UPDATE
- TICKET_STATE_CHANGE
- TICKET_INFO_REQUIRED
- TICKET_RESOLVED

[R3] An implementation of MEF Appointment API **MUST** support Use Cases 7 thru 12 and 19 and 20.

[R4] An implementation of MEF Workorder API **MUST** support Use Cases 13, 14, 21 and 22.

[O1] An implementation of MEF Trouble Ticketing API **MAY** support Use Cases 15 and 16.

[O2] An implementation of MEF Trouble Ticketing API **MAY** support Use Case 18 for the following Event Notification Types:

- INCIDENT_CREATE
- INCIDENT_UPDATE
- INCIDENT_STATE_CHANGE

[CR1]<[R2] If any of Use Cases 15 or 16 are supported, then Use Cases 15 and 16 **MUST** be supported.

[CR2]<[O2] If Use Case 18 is supported for Incident Notifications, then Use Case 17 **MUST** be supported for Incident Notifications.

Prior arrangements for Buyer authentication, security verification, and system interface requirements are not addressed within these use cases. All onboarding requirements must be defined and negotiated between the Buyer and Seller prior to applying the Trouble Ticketing Use Cases defined in this section.

Trouble Ticketing is part of a broader End-to-End Sonata/Cantata flow. Figure 2 below shows a high-level diagram to get a good understanding of the entire process and Trouble Ticketing position within it.

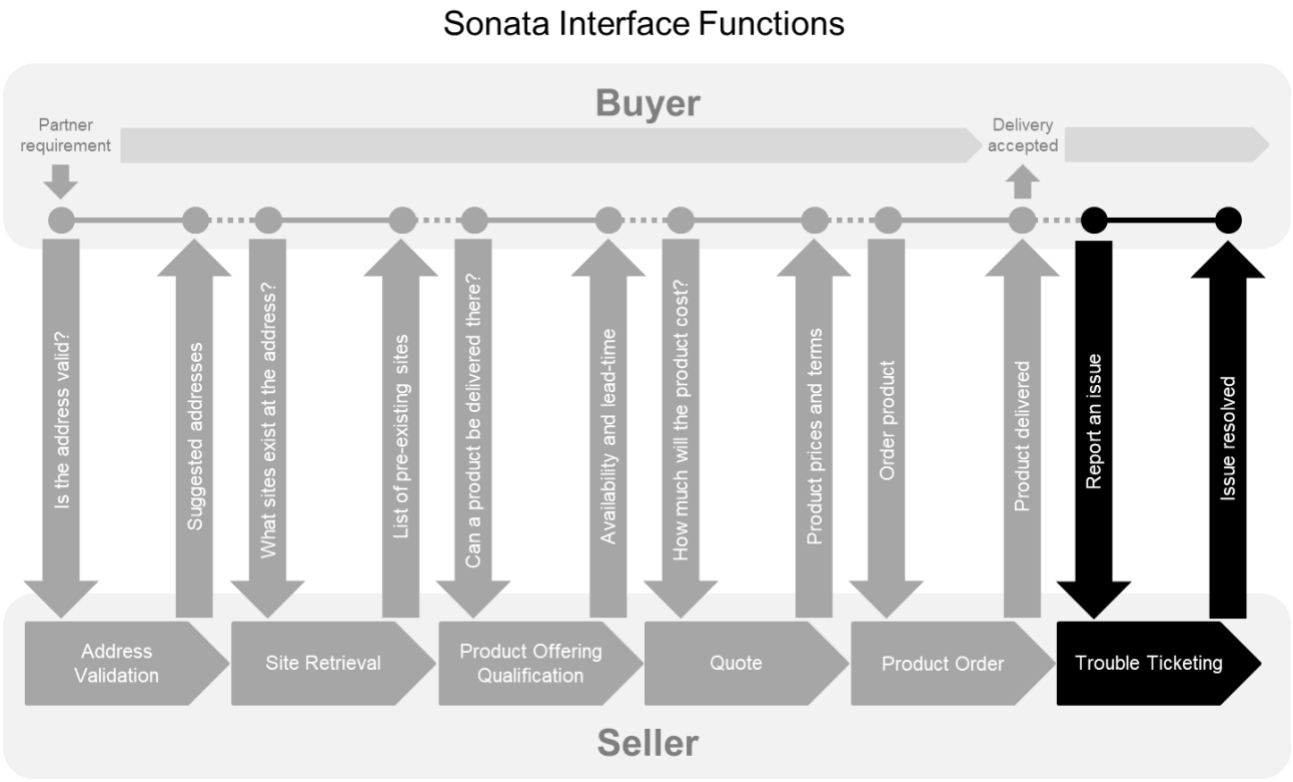

Figure 2 - Sonata and Cantata Interface Focus

Sonata and Cantata Interface Overview:

- Address Validation: Allows the Buyer to validate their address information for Places known to the Seller, including exact formats.
- Site Query: Allows the Buyer to retrieve Service Site information including exact formats for Service Sites known to the Seller.
- Product Offering Qualification: Enables the Buyer to determine whether it is feasible for the Seller to deliver a particular Product with a given configuration to a particular Place.
- Quote: Allows the Buyer to submit a request to find out how much the installation of an instance of a Product Offering, an update to an existing Product, or a disconnect of an existing Product will cost.

- Product Order: Allows the Buyer to request the Seller to initiate and complete the fulfilment process of an installation of a Product Offering, an update to an existing Product, or a disconnect of an existing Product at the Place defined by the Buyer.

- Trouble Ticketing: Supports creating, retrieving, notifications and closure for Tickets and Incidents between a Buyer and Seller as a result of an Issue or Situation for a Product provided by the Seller.

The Trouble Ticketing Use Cases and Requirements are not defined in regard to any particular Product specifications, and thus the Buyer will be able to submit and manage Tickets on any of the Product Offerings supported by the Seller using the Use Cases defined in this specification.

8.2 Trouble Ticketing Use Cases

This section defines the use cases that support Trouble Ticketing.

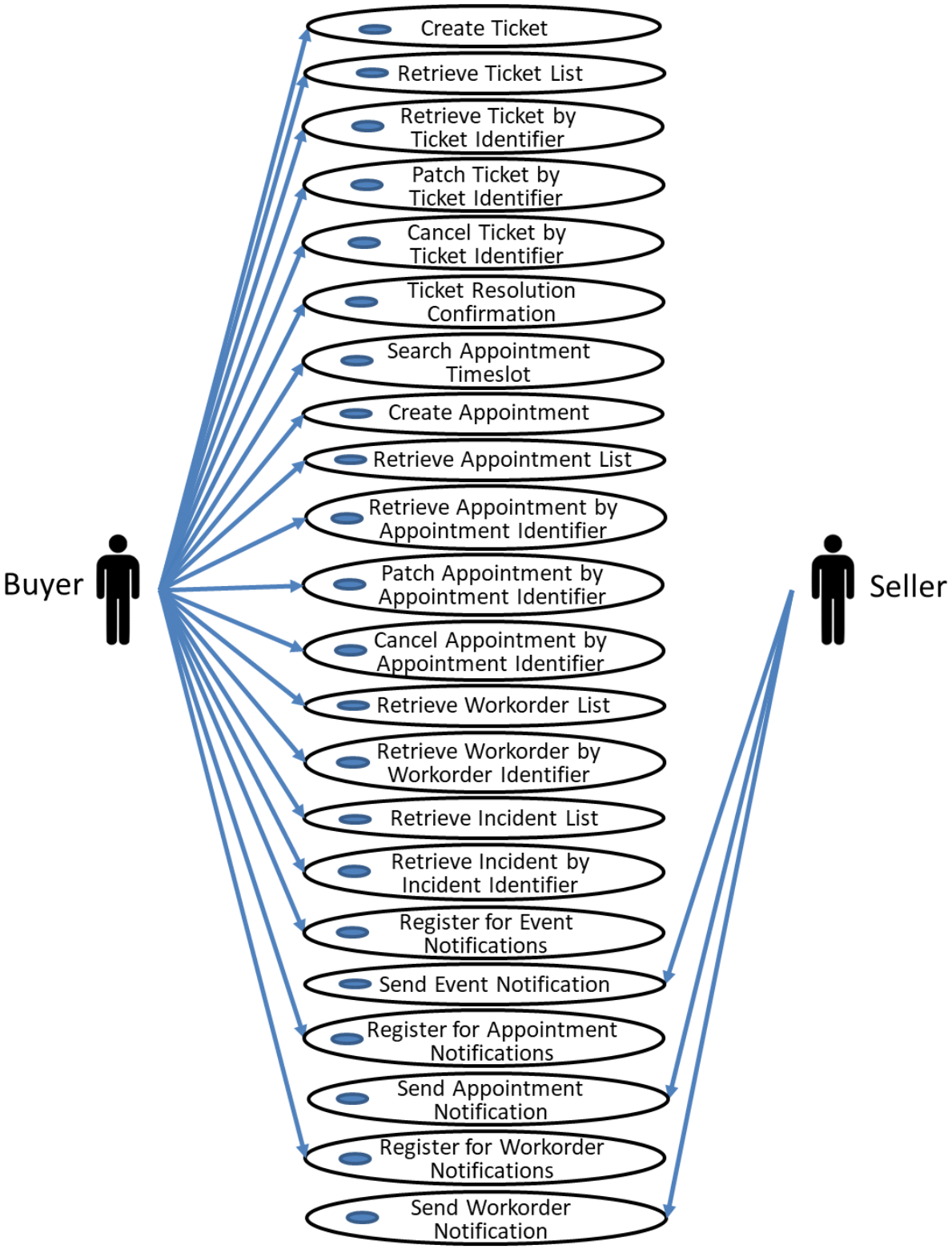

Figure 3 - Trouble Ticketing Use Cases

Figure 3 shows the Use Cases defined in this specification and indicates whether the Use Case is initiated by the Buyer or Seller.

Use Case #	Use Case Name	Use Case Description
1	Create Ticket	A request initiated by the Buyer to create a Ticket in the Seller's system to report an Issue experienced by the Buyer or their end-user.
2	Retrieve Ticket List	The Buyer requests a list of Tickets from the Seller based on a set of specified filter criteria. The Seller returns a summarized list of Tickets.
3	Retrieve Ticket by Ticket Identifier	The Buyer requests detailed information about a single Ticket based on a Ticket Identifier.
4	Patch Ticket by Ticket Identifier	A request by the Buyer to patch/partial update a Ticket based on a Ticket Identifier.
5	Cancel Ticket by Ticket Identifier	A request by the Buyer to cancel a Ticket based on a Ticket Identifier.
6	Ticket Resolution Confirmation	A reply from the Buyer confirming whether they agree that a Ticket can be closed, since the reported Issue is no longer observed. This reply is the action taken by a Buyer after receiving a Ticket Notification from the Seller with Event Notification Type TICKET_RESOLVED.
7	Search Appointment Timeslot	A request by the Buyer to find a set of available time slots for scheduling or rescheduling an Appointment for a Workorder with a Seller Technician.
8	Create Appointment	A request by the Buyer to create an Appointment for a Workorder with a Seller Technician.
9	Retrieve Appointment List	The Buyer requests a list of Appointments from the Seller based on a set of specified filter criteria. The Seller returns a summarized list of Appointments.
10	Retrieve Appointment by Appointment Identifier	The Buyer requests detailed information about a single Appointment based on an Appointment Identifier.
11	Patch Appointment by Appointment Identifier	A request by the Buyer to patch or reschedule an Appointment for a Workorder with a Seller Technician.
12	Cancel Appointment by Appointment Identifier	A request by the Buyer to cancel an Appointment for a Workorder with a Seller Technician.
13	Retrieve Workorder List	The Buyer requests a list of Workorders from the Seller based on a set of specified filter criteria. The Seller returns a summarized list of Workorders.
14	Retrieve Workorder by Workorder Identifier	The Buyer requests detailed information about a Workorder based on a Workorder Identifier.
15	Retrieve Incident List	The Buyer requests a list of Incidents from the Seller based on a set of specified filter criteria. The Seller returns a summarized list of Incidents.
16	Retrieve Incident by Incident Identifier	The Buyer requests detailed information about a single Incident based on an Incident Identifier.

Use Case #	Use Case Name	Use Case Description
17	Register for Event Notifications	The Buyer requests to subscribe to Ticket and Incident Notifications.
18	Send Event Notification	The Seller sends a notification regarding a Ticket or Incident to the Buyer indicating one of the following Event Notification Types has occurred: • TICKET_UPDATE • TICKET_STATE_CHANGE • TICKET_INFO_REQUIRED • TICKET_RESOLVED • INCIDENT_CREATE • INCIDENT_UPDATE • INCIDENT_STATE_CHANGE
19	Register for Appointment Notifications	The Buyer requests to subscribe to Appointment Notifications.
20	Send Appointment Notification	The Seller sends a notification regarding an Appointment to the Buyer indicating one of the following Appointment Notification Types has occurred: • APPOINTMENT_UPDATE • APPOINTMENT_STATE_CHANGE
21	Register for Workorder Notifications	The Buyer requests to subscribe to Workorder Notifications.
22	Send Workorder Notification	The Seller sends a notification regarding an Appointment to the Buyer indicating one of the following Workorder Notification Types has occurred: • WORKORDER_CREATE • WORKORDER_STATE_CHANGE • WORKORDER_APPOINTMENT_REQUIRED

Table 3 - Use Case Table

8.2.1 Ticket Use Cases

The following Use Cases are described in this section:

- Create Ticket
- Retrieve Ticket List
- Retrieve Ticket by Ticket Identifier
- Patch Ticket by Ticket Identifier
- Cancel Ticket by Ticket Identifier

- Ticket Resolution Confirmation

8.2.1.1 Create Ticket Use Case

The Create Ticket Use Case is detailed in this section.

Field	Description
Use Case Number	1
Use Case Name	Create Ticket
Description	A request initiated by the Buyer to create a Ticket in the Seller's system to report an Issue experienced by the Buyer or their end-user.
Actors	Buyer/Seller
Pre-Conditions	The Buyer has experienced an Issue for which they would like to create a Ticket.
Process Steps	1. The Buyer may check if an existing Incident is related to the Issue they want to report and if yes, they can link the Incident to the Ticket using the Related Objects defined in Table 31. 2. The Buyer initiates and submits a Create Ticket request as specified in section 9.2.1. 3. The Seller validates the request. 4. The Seller creates the new Ticket, assigns a Ticket Identifier to the Ticket, sets the Ticket State to ACKNOWLEDGED and provides a response as specified in section 9.2.2.
Post-Conditions	The Buyer receives a Ticket with a Ticket Identifier. The Seller will take up the Ticket for action.
Alternative Paths	The Seller will return an error message if an error is encountered during processing.
Business Process	MEF 50.1 Problem-to-Resolution

Table 4 - Create Ticket

8.2.1.2 Retrieve Ticket List Use Case

The Retrieve Ticket List Use Case is detailed in this section.

Field	Description
Use Case Number	2
Use Case Name	Retrieve Ticket List
Description	The Buyer requests a list of Tickets from the Seller based on a set of specified filter criteria. The Seller returns a summarized list of Tickets.
Actors	Buyer/Seller
Pre-Conditions	The Buyer knows which filter criteria can be used to find a specific set of Tickets (filtering is allowed on specific attributes of a Ticket as specified in section 9.3.1).

Field	Description
Process Steps	1. The Buyer submits a Retrieve Ticket List request as specified in section 9.3.1 based on the selected filter criteria options. 2. The Seller validates that the filter is well formulated. 3. The Seller determines if there are any Tickets that match the filter criteria in the request. 4. The Seller returns a summarized list of Tickets as specified in section 9.3.2.
Post-Conditions	The Buyer has received a summarized list of Tickets.
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. The Seller returns an empty list if there are no Tickets that meet the filter criteria. 3. If the quantity of Tickets to be returned exceeds the Seller's policy limit, the Seller must choose to respond with either: • A Too Many Records response code indicating the result set is too large and that the Buyer should submit a new more specific filter criteria matching fewer Tickets or • A success response code and include a subset of the matching Tickets and an indication the result set is incomplete.
Business Process	MEF 50.1 Problem-to-Resolution

Table 5 - Retrieve Ticket List

Note: The Seller specified limit of the maximum number of Tickets to be returned per request will be determined by the Seller.

8.2.1.3 Retrieve Ticket by Ticket Identifier Use Case

The Retrieve Ticket by Ticket Identifier Use Case is detailed in this section.

Field	Description
Use Case Number	3
Use Case Name	Retrieve Ticket by Ticket Identifier
Description	The Buyer requests detailed information about a single Ticket based on a Ticket Identifier.
Actors	Buyer/Seller
Pre-Conditions	The Buyer knows the identifier of the Ticket to retrieve details for.

Field	Description
Process Steps	1. The Buyer submits a Retrieve Ticket by Ticket Identifier request with a single Ticket Identifier as specified in section 9.4.1. 2. The Seller validates the request. 3. The Seller determines if there is a Ticket instance that matches the Ticket Identifier. 4. The Seller returns the matching Ticket instance with all the attributes as specified in section 9.4.2.
Post-Conditions	Buyer has detailed information on the Ticket identified by the Ticket Identifier.
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. If the Seller has archived a Ticket after reaching a final state, the Seller may return an error because it is no longer possible to retrieve the Ticket. 3. The Seller will return an error if the Ticket with the Ticket Identifier is not found.
Business Process	MEF 50.1 Problem-to-Resolution

Table 6 - Retrieve Ticket by Ticket Identifier

Note: The timeframe that a Ticket in a final state remains able to be retrieved will be determined by the Seller.

8.2.1.4 Patch Ticket by Ticket Identifier Use Case

The Patch Ticket by Ticket Identifier Use Case is detailed in this section.

Field	Description
Use Case Number	4
Use Case Name	Patch Ticket by Ticket Identifier
Description	A request by the Buyer to patch/partial update a Ticket based on a Ticket Identifier.
Actors	Buyer/Seller
Pre-Conditions	1. The Seller's system contains Tickets. 2. The Buyer knows the identifier of the Ticket to patch. 3. The Buyer has the list of attributes to patch. The attributes that can be changed are specified in section 9.5.1. 4. The Ticket can be patched if the Ticket State is any of the following: ACKNOWLEDGED, IN_PROGRESS, PENDING, REOPENED or RESOLVED.

Field	Description
Process Steps	1. The Buyer submits a Patch Ticket by Ticket Identifier request with all attributes to be patched as specified in section 9.5.1. 2. The Seller verifies that a Ticket instance with the Ticket Identifier exists, that the referenced Ticket may be patched and validates the intended updates. 3. The Seller patches the Ticket. 4. The Seller provides a response as specified in section 9.5.2.
Post-Conditions	1. The Ticket attributes are patched as requested by the Buyer. 2. The Ticket State is updated if needed, as specified in section 9.5.2.
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. The Seller will return an error if the Ticket with the Ticket Identifier is not found.
Business Process	MEF 50.1 Problem-to-Resolution

Table 7 - Patch Ticket by Ticket Identifier

8.2.1.5 Cancel Ticket by Ticket Identifier Use Case

The Cancel Ticket by Ticket Identifier Use Case is detailed in this section.

Field	Description
Use Case Number	5
Use Case Name	Cancel Ticket by Ticket Identifier
Description	A request by the Buyer to cancel a Ticket based on a Ticket Identifier.
Actors	Buyer/Seller
Pre-Conditions	1. The Seller's system contains Tickets. 2. The Buyer knows the identifier of the Ticket to cancel. 3. The Ticket can be cancelled if the Ticket State is any of the following: ACKNOWLEDGED, IN_PROGRESS or PENDING.
Process Steps	1. The Buyer submits a Cancel Ticket by Ticket Identifier request with a Ticket Identifier as specified in section 9.6.1 2. The Seller verifies that a Ticket instance with the Ticket Identifier exists and that the Ticket State of the referenced Ticket allows a transition as specified in section 9.6.2. 3. The Seller sets the Ticket State to ASSESSING_CANCELLATION and starts the assessing cancellation process. 4. The Seller provides a response as specified in section 9.6.2.

Field	Description
Post-Conditions	The Seller has started the assessing cancellation process to determine whether to just cancel the Ticket, or may also choose to resolve the Issue to prevent similar Create Ticket requests from other Buyers. If the Seller chooses to resolve the Issue, the Seller might create an Incident or an internal Ticket for the Issue, but that is outside the scope of this document. After the Seller has completed the assessing cancellation process, the Seller updates the Ticket State to CANCELLED.
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. The Seller will return an error if the Ticket with the Ticket Identifier is not found.
Business Process	MEF 50.1 Problem-to-Resolution

Table 8 - Cancel Ticket by Ticket Identifier

8.2.1.6 Ticket Resolution Confirmation Use Case

The Ticket Resolution Confirmation Use Case is detailed in this section.

Field	Description
Use Case Number	6
Use Case Name	Ticket Resolution Confirmation
Description	A reply from the Buyer confirming whether they agree that a Ticket based on a Ticket Identifier can be closed, since the reported Issue is no longer observed. This reply is the action taken by a Buyer after receiving a Ticket Notification from the Seller with Event Notification Type TICKET_RESOLVED.
Actors	Buyer/Seller
Pre-Conditions	1. The Seller's system contains Tickets. 2. The Buyer knows the identifier of the Ticket to close. 3. The Buyer has received a Ticket Notification with a Event Notification Type TICKET_RESOLVED. 4. The Buyer has verified that the Issue on which the Ticket was based has been resolved satisfactorily.
Process Steps	1. The Buyer accepts closure of the Ticket using "Closure Acceptance Indicator" set as specified in section 9.7.1. 2. The Seller verifies that a Ticket instance with the Ticket Identifier exists and that the Ticket State of the referenced Ticket is RESOLVED. 3. The Seller sets the Ticket State to CLOSED. 4. The Seller provides a response as specified in section 9.7.2.
Post-Conditions	The Ticket State is changed to CLOSED.

Field	Description
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. The Seller will return an error if the Ticket with the Ticket Identifier is not found. 3. The Buyer rejects closing of the Ticket using "Closure Acceptance Indicator" set to FALSE if the Issue on which the Ticket was based has not been resolved in a satisfactory manner to the Buyer. The Seller will then set the Ticket State to REOPENED. (Note: this is instead of process step #1 thru #3 above).
Business Process	MEF 50.1 Problem-to-Resolution

Table 9 - Ticket Resolution Confirmation

Note: The Seller will return an error if the Buyer responds to the TICKET_RESOLVED Notification after the Ticket was CLOSED due to the expiration of the pre-agreed timeframe/timeout for the Buyer to confirm that the Issue on which the Ticket was based has been resolved satisfactorily.

8.2.2 Appointment Use Cases

The following Use Cases are described in this section:

- Search Appointment Timeslot
- Create Appointment
- Retrieve Appointment List
- Retrieve Appointment by Appointment Identifier
- Patch Appointment by Appointment Identifier
- Cancel Appointment by Appointment Identifier

8.2.2.1 Search Appointment Timeslot Use Case

The Search Appointment Timeslot Use Case is detailed in this section.

Field	Description
Use Case Number	7
Use Case Name	Search Appointment Timeslot
Description	A request by the Buyer to find a set of available time slots for scheduling or rescheduling an Appointment for a Workorder with a Seller Technician.
Actors	Buyer/Seller

Field	Description
Pre-Conditions	There is Workorder related to a Ticket for which the Buyer needs to create an appointment.
Process Steps	1. The Buyer submits a request to search for available time slots for an appointment by a Technician as specified in section 9.8.1. 2. The Seller verifies if a Technician will be available for an appointment at the Appointment location for the requested time slots. 3. The Seller returns a list of available time slots for an appointment as specified in section 9.8.2.
Post-Conditions	The Buyer has a list of available time slots for an appointment.
Alternative Paths	The Seller returns an empty list of available time slots, if no Technician is available for an appointment at the Appointment location during any of the requested time slots.
Business Process	MEF 50.1 Problem-to-Resolution

Table 10 - Search Appointment Timeslot

Note: The Seller may specify a limit of the maximum number of Available Timeslots returned per request. In addition, the Seller may limit the range of requested time slots within which the Seller will search for available time slots.

8.2.2.2 Create Appointment Use Case

The Create Appointment Use Case is detailed in this section.

Field	Description
Use Case Number	8
Use Case Name	Create Appointment
Description	A request by the Buyer to create an Appointment for a Workorder with a Seller Technician.
Actors	Buyer/Seller
Pre-Conditions	The Buyer has done a Search Appointment Timeslot request to identify an available time slot for the Appointment to create.
Process Steps	1. The Buyer submits Create Appointment as specified in section 9.9.1. 2. The Seller validates the request. 3. The Seller creates the Appointment with the Appointment State set to SCHEDULED. 4. The Seller sets the Workorder State of the Workorder related to the Appointment to PLANNED. 5. The Seller provides a response as specified in section 9.9.2.
Post-Conditions	The Buyer receives an Appointment with an Appointment Identifier and linked to a Workorder.

Field	Description
Alternative Paths	1. The Seller will return an error message if an error is encountered during the processing. 2. The Seller will return an error if the related Workorder for the Appointment to create is not found. 3. The Seller will return an error if a Technician is not available at the Appointment location for the Appointment Timeslot.
Business Process	MEF 50.1 Problem-to-Resolution

Table 11 - Create Appointment

8.2.2.3 Retrieve Appointment List Use Case

The Retrieve Appointment List Use Case is detailed in this section.

Field	Description
Use Case Number	9
Use Case Name	Retrieve Appointment List
Description	The Buyer requests a list of Appointments from the Seller based on a set of specified filter criteria. The Seller returns a summarized list of Appointments.
Actors	Buyer/Seller
Pre-Conditions	The Buyer knows which filter criteria can be used to find a specific set of Appointments (filtering is allowed on specific attributes of an Appointment as specified in section 9.10.1).
Process Steps	1. The Buyer submits a Retrieve Appointment List request as specified in section 9.10.1 based on the selected filter criteria options. 2. The Seller validates that the filter is well formulated. 3. The Seller determines if there are any Appointments that match the filter criteria in the request. 4. The Seller returns a summarized list of Appointments as specified in section 9.10.2.
Post-Conditions	Buyer has received a summarized list of Appointments.
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. The Seller returns an empty list if there are no Appointments that meet the filter criteria. 3. If the quantity of Appointments to be returned exceeds the Seller's policy limit, the Seller must choose to respond with either: • A Too Many Records response code indicating the result set is too large and that the Buyer should submit a new more specific filter criteria matching fewer Appointments or • A success response code and include a subset of the matching Appointments and an indication the result set is incomplete.

Field	Description
Business Process	MEF 50.1 Problem-to-Resolution

Table 12 - Retrieve Appointment List

Note: The Seller specified limit of the maximum number of Appointments to be returned per request will be determined by the Seller.

8.2.2.4 Retrieve Appointment by Appointment Identifier Use Case

The Retrieve Appointment by Appointment Identifier Use Case is detailed in this section.

Field	Description
Use Case Number	10
Use Case Name	Retrieve Appointment by Appointment Identifier
Description	The Buyer requests detailed information about a single Appointment based on an Appointment Identifier.
Actors	Buyer/Seller
Pre-Conditions	The Buyer knows the identifier of the Appointment to retrieve details for.
Process Steps	1. The Buyer submits Retrieve Appointment by Appointment Identifier request as specified in section 9.11.1. 2. The Seller validates the request. 3. The Seller determines if there is an Appointment instance that matches the Appointment Identifier. 4. The Seller returns the matching Appointment instance with all the attributes as specified in section 9.11.2.
Post-Conditions	Buyer has detailed information on the Appointment with the Appointment Identifier.
Alternative Paths	1. The Seller will return an error message if an error is encountered during the processing. 2. The Seller will return an error if the Appointment with the Appointment Identifier is not found.
Business Process	MEF 50.1 Problem-to-Resolution

Table 13 - Retrieve Appointment by Appointment Identifier

8.2.2.5 Patch Appointment by Appointment Identifier Use Case

The Patch Appointment by Appointment Identifier Use Case is detailed in this section.

Field	Description
Use Case Number	11
Use Case Name	Patch Appointment by Appointment Identifier

Field	Description
Description	A request by the Buyer to patch or reschedule an Appointment for a Workorder with a Seller Technician.
Actors	Buyer/Seller
Pre-Conditions	1. The Buyer knows the identifier for the Appointment to patch/update. 2. The Buyer has the list of attributes to patch. The attributes that can be changed are specified in section 9.12.1. 3. The Appointment can be patched if the Appointment State is SCHEDULED.
Process Steps	1. The Buyer submits Patch Appointment by Appointment Identifier request as specified in section 9.12.1. 2. The Seller verifies that an Appointment instance with the Appointment Identifier exists and that the Appointment State allows updating as specified in section 9.12.2. 3. The Seller patches the Appointment. 4. The Seller provides a response as specified in section 9.12.2.
Post-Conditions	The Appointment attributes are patched as requested by the Buyer.
Alternative Paths	1. The Seller will return an error message if an error is encountered during the processing. 2. The Seller will return an error if the Appointment with the Appointment Identifier is not found. 3. The Seller will return an error if the Appointment Timeslot is being updated and a Technician is not available at the Appointment location for the specified timeslot.
Business Process	MEF 50.1 Problem-to-Resolution

Table 14 - Patch Appointment by Appointment Identifier

8.2.2.6 Cancel Appointment by Appointment Identifier Use Case

The Cancel Appointment by Appointment Identifier Use Case is detailed in this section.

Field	Description
Use Case Number	12
Use Case Name	Cancel Appointment by Appointment Identifier
Description	A request by the Buyer to cancel an Appointment for a Workorder with a Seller Technician.
Actors	Buyer/Seller
Pre-Conditions	1. The Buyer knows the identifier for the Appointment to cancel. 2. The Appointment can be cancelled if the Appointment State is SCHEDULED.

Field	Description
Process Steps	1. The Buyer submits a Cancel Appointment by Appointment Identifier as specified in section 9.13.1. 2. The Seller verifies that an Appointment instance with the Appointment Identifier exists and that the Appointment State allows cancelling as specified in section 9.13.2. 3. The Seller sets the Appointment State to CANCELLED. 4. The Seller provides a response as specified in section 9.13.2.
Post-Conditions	The Seller has cancelled the Appointment identified by the Appointment Identifier.
Alternative Paths	1. The Seller will return an error message if an error is encountered during the processing. 2. The Seller will return an error if the Appointment with the Appointment Identifier is not found.
Business Process	MEF 50.1 Problem-to-Resolution

Table 15 - Cancel Appointment by Appointment Identifier

8.2.3 Workorder Use Cases

The following Use Cases are described in this section:

- Retrieve Workorder List
- Retrieve Workorder by Workorder Identifier

8.2.3.1 Retrieve Workorder List Use Case

The Retrieve Workorder List Use Case is detailed in this section.

Field	Description
Use Case Number	13
Use Case Name	Retrieve Workorder List
Description	The Buyer requests a list of Workorders from the Seller based on a set of specified filter criteria. The Seller returns a summarized list of Workorders.
Actors	Buyer/Seller
Pre-Conditions	The Buyer knows which filter criteria can be used to find a specific set of Workorders (filtering is allowed on specific attributes of an Workorders as specified in section 9.14.1).

Field	Description
Process Steps	1. The Buyer submits a Retrieve Workorder List request as specified in section 9.14.1 based on the selected filter criteria options. 2. The Seller validates that the filter is well formulated. 3. The Seller determines if there are any Workorders that match the filter criteria in the request. 4. The Seller returns a summarized list of Workorders as specified in section 9.14.2.
Post-Conditions	Buyer has received a summarized list of Workorders.
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. The Seller returns an empty list if there are no Workorders that meet the filter criteria. 3. If the quantity of Workorders to be returned exceeds the Seller's policy limit, the Seller must choose to respond with either: • A Too Many Records response code indicating the result set is too large and that the Buyer should submit a new more specific filter criteria matching fewer Workorders or • A success response code and include a subset of the matching Workorders and an indication the result set is incomplete.
Business Process	MEF 50.1 Problem-to-Resolution

Table 16 - Retrieve Workorder List

Note: The Seller specified limit of the maximum number of Workorders to be returned per request will be determined by the Seller.

8.2.3.2 Retrieve Workorder by Workorder Identifier Use Case

The Retrieve Workorder by Workorder Identifier Use Case is detailed in this section.

Field	Description
Use Case Number	14
Use Case Name	Retrieve Workorder by Workorder Identifier
Description	The Buyer requests detailed information about a Workorder based on a Workorder Identifier.
Actors	Buyer/Seller
Pre-Conditions	The Buyer knows the identifier of the Workorder to retrieve details for.

Field	Description
Process Steps	1. The Buyer submits Retrieve Workorder by Workorder Identifier request as specified in section 9.15.1. 2. The Seller validates the request. 3. The Seller determines if there is a Workorder instance that matches the Workorder Identifier. 4. The Seller returns the matching Workorder instance with all the attributes as specified in section 9.15.2.
Post-Conditions	Buyer has detailed information on the Workorder with the Workorder Identifier.
Alternative Paths	1. The Seller will return an error message if an error is encountered during the processing. 2. The Seller will return an error if the Workorder with the Workorder Identifier is not found.
Business Process	MEF 50.1 Problem-to-Resolution

Table 17 - Retrieve Workorder by Workorder Identifier

8.2.4 Incident Use Cases

The following Use Cases are described in this section:

- Retrieve Incident List
- Retrieve Incident by Incident Identifier

8.2.4.1 Retrieve Incident List Use Case

The Retrieve Incident List Use Case is detailed in this section.

Field	Description
Use Case Number	15
Use Case Name	Retrieve Incident List
Description	The Buyer requests a list of Incidents from the Seller based on a set of specified filter criteria. The Seller returns a summarized list of Incidents.
Actors	Buyer/Seller
Pre-Conditions	The Buyer knows which filter criteria can be used to find a specific set of Incidents (filtering is allowed on specific attributes of an Incident as specified in section 9.16.1).

Field	Description
Process Steps	1. The Buyer submits a Retrieve Incident List request as specified in section 9.16.1 based on the desired filter criteria options. 2. The Seller validates that the filter is well formulated. 3. The Seller determines if there are any Incidents that match the filter criteria in the request. 4. The Seller returns a summarized list of Incidents as specified in section 9.16.2.
Post-Conditions	The Buyer has received a summarized list of Incidents.
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. The Seller returns an empty list if there are no Incidents that meet the filter criteria. 3. If the quantity of Incidents to be returned exceeds the Seller's policy limit, the Seller must choose to respond with either: • A Too Many Records response code indicating the result set is too large and that the Buyer should submit a new more specific filter criteria matching fewer Incidents or • A success response code and include a subset of the matching Incidents and an indication the result set is incomplete.
Business Process	MEF 50.1 Problem-to-Resolution

Table 18 - Retrieve Incident List

Note: The Seller specified limit of the maximum number of Incidents to be returned per request will be determined by the Seller.

8.2.4.2 Retrieve Incident by Incident Identifier Use Case

The Retrieve Incident by Incident Identifier Use Case is detailed in this section.

Field	Description
Use Case Number	16
Use Case Name	Retrieve Incident by Incident Identifier
Description	The Buyer requests detailed information about a single Incident based on an Incident Identifier.
Actors	Buyer/Seller
Pre-Conditions	The Buyer knows the identifier of the Incident to retrieve details for.

Field	Description
Process Steps	1. The Buyer submits a Retrieve Incident by Incident Identifier request with a single Incident Identifier as specified in section 9.17.1. 2. The Seller validates the request. 3. The Seller determines if there is an Incident instance that matches the Incident Identifier. 4. The Seller returns the matching Incident instance with all the attributes as specified in section 9.17.2.
Post-Conditions	Buyer has detailed information on the Incident identified by the Incident Identifier.
Alternative Paths	1. The Seller will return an error message if an error is encountered during processing. 2. The Seller will return an error if the Incident with the Incident Identifier is not found.
Business Process	MEF 50.1 Problem-to-Resolution

Table 19 - Retrieve Incident by Incident Identifier

8.2.5 Notification Use Cases

The following Use Cases are described in this section:

- Register for Event Notifications
- Send Event Notification
- Register for Appointment Notifications
- Send Appointment Notification

8.2.5.1 Register for Event Notifications Use Case

The Register for Event Notifications Use Case is detailed in this section.

Field	Description
Use Case Number	17
Use Case Name	Register for Event Notifications
Description	The Buyer requests to subscribe to Ticket and Incident Notifications.
Actors	Buyer/Seller
Pre-Conditions	None

Field	Description
Process Steps	1. The Buyer sends the Register for Event Notifications requests as shown in section 9.18.1 to the Seller specifying where to send such notifications and which Event Notification Types to include in notifications. 2. The Seller receives this request, records which Event Notification Types to send, where to send such notifications for this Buyer, and returns an acknowledgement to the Buyer as specified in section 9.18.2.
Post-Conditions	The Seller is aware of where to send Event Notifications described in Use Case 18 (see Table 21).
Alternative Paths	The Seller returns an error message if an error is encountered while processing that prevents the Seller from completing the request.
Business Process	MEF 50.1 Problem-to-Resolution

Table 20 - Register for Event Notifications

8.2.5.2 Send Event Notification Use Case

The Send Event Notification Use Case is detailed in this section.

Field	Description
Use Case Number	18
Use Case Name	Send Event Notification
Description	The Seller sends a notification regarding a Ticket or Incident to the Buyer indicating one of the following Event Notification Types has occurred: • TICKET_UPDATE • TICKET_STATE_CHANGE • TICKET_INFO_REQUIRED • TICKET_RESOLVED • INCIDENT_CREATE • INCIDENT_UPDATE • INCIDENT_STATE_CHANGE
Actors	Buyer/Seller
Pre-Conditions	1. The Seller's system contains Tickets or Incidents. 2. A Ticket or Incident has gone through a qualifying Event Notification Type.
Process Steps	The Seller sends the notification to the location(s) registered by the Buyer, as specified in section 9.19.
Post-Conditions	The Seller has sent the appropriate Event Notification.
Alternative Paths	None
Business Process	MEF 50.1 Problem-to-Resolution

Table 21 - Send Event Notification

If the Buyer Event Notification endpoint is unreachable an error is returned to the Seller. The Seller may, at the Seller's discretion, continue to try to send notifications to the endpoint or may mark that endpoint as failed and stop sending notifications to that endpoint.

8.2.5.3 Register for Appointment Notifications Use Case

The Register for Appointment Notifications Use Case is detailed in this section.

Field	Description
Use Case Number	19
Use Case Name	Register for Appointment Notifications
Description	The Buyer requests to subscribe to Appointment Notifications.
Actors	Buyer/Seller
Pre-Conditions	The Seller supports Appointment notifications.
Process Steps	1. The Buyer sends the Register for Appointment Notifications requests as shown in section 9.20.1 to the Seller specifying where to send such notifications and for which Appointment Notification Types to include in notifications. 2. The Seller receives this request, records which Appointment Notification Types to send, where to send such notifications for this Buyer, and returns an acknowledgement to the Buyer as specified in section 9.20.2.
Post-Conditions	The Seller is aware of where to send Appointment Notifications described in Use Case 20 (see Table 23).
Alternative Paths	The Seller returns an error message if an error is encountered while processing that prevents the Seller from completing the request.
Business Process	MEF 50.1 Problem-to-Resolution

Table 22 - Register for Appointment Notifications

8.2.5.4 Send Appointment Notification Use Case

The Send Appointment Notification Use Case is detailed in this section.

Field	Description
Use Case Number	20
Use Case Name	Send Appointment Notification
Description	The Seller sends a notification regarding an Appointment to the Buyer indicating one of the following Appointment Notification Types have occurred: • APPOINTMENT_UPDATE • APPOINTMENT_STATE_CHANGE
Actors	Buyer/Seller

Field	Description
Pre-Conditions	1. The Seller's system supports Appointment Notifications. 2. The Buyer has registered to receive Appointment Notifications. 3. An Appointment has gone through a qualifying Appointment Notification Type.
Process Steps	The Seller sends the notification to the location(s) registered by the Buyer, as specified in section 9.21.
Post-Conditions	The Seller has sent an Appointment related notification.
Alternative Paths	None
Business Process	MEF 50.1 Problem-to-Resolution

Table 23 - Send Appointment Notification

If the Buyer Appointment Notification endpoint is unreachable an error is returned to the Seller. The Seller may, at the Seller's discretion, continue to try to send notifications to the endpoint or may mark that endpoint as failed and stop sending notifications to that endpoint.

8.2.5.5 Register for Workorder Notifications Use Case

The Register for Workorder Notifications Use Case is detailed in this section.

Field	Description
Use Case Number	21
Use Case Name	Register for Workorder Notifications
Description	The Buyer requests to subscribe to Workorder Notifications.
Actors	Buyer/Seller
Pre-Conditions	The Seller supports Workorder notifications.
Process Steps	1. The Buyer sends the Register for Workorder Notifications requests as shown in section 9.22.1 to the Seller specifying where to send such notifications and for which Workorder Notification Types to include in notifications. 2. The Seller receives this request, records which Workorder Notification Types to send, where to send such notifications for this Buyer, and returns an acknowledgement to the Buyer as specified in section 9.22.2.
Post-Conditions	The Seller is aware of where to send Workorder Notifications described in Use Case 22 (see Table 25).
Alternative Paths	The Seller returns an error message if an error is encountered while processing that prevents the Seller from completing the request.
Business Process	MEF 50.1 Problem-to-Resolution

Table 24 - Register for Workorder Notifications

8.2.5.6 Send Workorder Notification Use Case

The Send Workorder Notification Use Case is detailed in this section.

Field	Description
Use Case Number	22
Use Case Name	Send Workorder Notification
Description	The Seller sends a notification regarding a Workorder to the Buyer indicating one of the following Workorder Notification Types have occurred: • WORKORDER_CREATE • WORKORDER_STATE_CHANGE • WORKORDER_APPOINTMENT_REQUIRED
Actors	Buyer/Seller
Pre-Conditions	1. The Seller's system supports Workorder Notifications. 2. The Buyer has registered to receive Workorder Notifications. 3. A Workorder has gone through a qualifying Workorder Notification Type.
Process Steps	The Seller sends the notification to the location(s) registered by the Buyer, as specified in section 9.23.
Post-Conditions	The Seller has sent a Workorder related notification.
Alternative Paths	None
Business Process	MEF 50.1 Problem-to-Resolution

Table 25 - Send Workorder Notification

If the Buyer Workorder Notification endpoint is unreachable an error is returned to the Seller. The Seller may, at the Seller's discretion, continue to try to send notifications to the endpoint or may mark that endpoint as failed and stop sending notifications to that endpoint.

9 Trouble Ticketing Operation Attributes

This section identifies the attributes needed for each of the Trouble Ticketing Use Cases defined previously. It is important to note that this section defines the superset of all MEF-defined attributes needed to support Trouble Ticketing Management for the Use Cases defined in this document.

The columns in the tables are as follows:

- **Attribute** The name of the attribute
- **Description** A short description of the attribute
- **Type** String, List, DateTime, or Reference to another entry in the table
- **Comments** Additional information about the attribute

9.1 Attribute Tables

The tables below identify and describe all attributes related to Trouble Ticketing. The "Comments" column indicates which attributes the Buyer may set and which the Seller may set.

9.1.1 Buyer and Seller Attributes

Table 26 lists the Buyer and Seller attributes.

Attributes	Description	Type	Comments
Buyer	The mutually agreed unique name of the organization that is acting as the customer in this transaction.	String	See section MEF 79 [10] section 8.8 for rules on use of Buyer.
Seller	The mutually agreed unique name of the organization that is acting as the supplier in this transaction.	String	See section MEF 79 [10] section 8.8 for rules on use of Seller.
Seller Response Code	A response identifier, indicating if the Seller was able to successfully accept the request. The detailed response options are for further study but include Success and Failure.	String	Set by the Seller. For further study.

Table 26 - Buyer and Seller Attributes

9.1.2 Ticket Attributes

Table 27 lists the Ticket attributes.

Attributes	Description	Type	Comments
Ticket Identifier	Unique (within the Seller Ticket domain) identifier for the Ticket.	String	Created by the Seller when the Ticket instance is created.
Buyer Ticket Identifier	Identifier provided by the Buyer to allow the Buyer to use as a search attribute in Retrieve Ticket List.	String	Set by the Buyer.
Product Identifier	Unique identifier provided by the Seller during activation to refer to the Product where the Buyer is experiencing the Issue.	String	Set by the Buyer
Description	Summarized description of the Issue the Buyer is experiencing.	String	Set by the Buyer
Severity	The severity or impact (ITIL) of the Issue as evaluated by the Buyer.	One of: • EXTENSIVE • SIGNIFICANT • MODERATE • MINOR	Set by the Buyer
Seller Severity	The severity or impact (ITIL) of the Issue on the Buyer as evaluated by the Seller.	One of: • EXTENSIVE • SIGNIFICANT • MODERATE • MINOR	Set by the Seller
Priority	The priority (ITIL) is based on the assessment of the impact and urgency of how quickly the Ticket should be resolved as evaluated by the Buyer. The Priority is used by the Seller to determine the order in which Tickets get resolved across Buyers.	One of: • CRITICAL • HIGH • MEDIUM • LOW	Set by the Buyer

Attributes	Description	Type	Comments
Seller Priority	The priority (ITIL) is based on the assessment of the impact and urgency of how quickly the Ticket should be resolved after evaluation by the Seller of the impact of the Issue on the Buyer.	One of: • CRITICAL • HIGH • MEDIUM • LOW	Set by the Seller
Observed Impact	The type of impact observed by the Buyer for this Product.	One of: • DEGRADED • INTERMITTENT • DOWN	Set by the Buyer DEGRADED: When the Product is impacted and not meeting the Product specifications. INTERMITTENT: When the Product is not operational as intended on an intermittent basis. DOWN: When the Product is non-operational.
Type	The presumed cause of the Issue as evaluated by the Buyer.	One of: • INSTALLATION • MAINTENANCE • INFORMATION • ASSISTANCE	Set by the Buyer INSTALLATION: Related to installation of Product, provisioning is complete, but Product is not operational. MAINTENANCE: Any scheduled or non-scheduled maintenance related Issue. INFORMATION: Buyer is requesting information on the Product Configuration. ASSISTANCE: Requesting help for an Issue (not a failure) requiring attention that is not categorized.

Attributes	Description	Type	Comments
Ticket Creation Date	The date the Ticket was created in the Seller's system.	DateTime	Set by the Seller
Issue Start Date	Date indicating when the Buyer first observed the Issue, to provide the Seller with additional insight.	DateTime	Set by the Buyer
Expected Resolved Date	The date provided by the Seller to indicate when the Ticket is expected to be RESOLVED.	DateTime	Set by the Seller
Resolved Date	The date the Ticket State was set to RESOLVED by the Seller.	DateTime	Set by the Seller
Ticket State	The current state of the Ticket (see Table 45).	One of: • ACKNOWLEDGED • IN_PROGRESS • RESOLVED • CLOSED • REOPENED • PENDING • ASSESSING_CANCELLATION • CANCELLED	Set by the Seller
Notes	A set of comments or information associated to the Ticket. This list can be empty.	List of Note (see Table 28)	Added by the Buyer and Seller. Notes may be added but may not be modified or deleted (for historical reasons).
Attachments	Attachments to the Ticket, such as a file, screen shot or embedded content.	List of Attachment (see Table 29)	Added by the Buyer and Seller. Attachments may be added but may not be modified or deleted (for historical reasons).
Reporter Contact	The contact information for the person, team or organization representing the Buyer that reported the Issue.	Contact Information (see Table 30)	Set by the Buyer

Attributes	Description	Type	Comments
Buyer Technical Contacts	The contact information for the person, team or organization representing the Buyer that has technical knowledge about the Issue.	List of Contact Information (see Table 30)	Set by the Buyer
Seller Ticket Contact	The contact information for the person, team or organization representing the Seller assigned to the Ticket.	Contact Information (see Table 30)	Set by the Seller
Seller Technical Contacts	The contact information for the person, team or organization representing the Seller that has technical knowledge about the installation and/or Seller's network.	List of Contact Information (see Table 30)	Set by the Seller
Related Objects	The related object(s) allows correlating related Tickets and/or related Incidents with the Ticket.	List of Related Object (see Table 31)	A specific Related Object (either a Ticket or Incident) in the list may be set by either the Buyer or Seller, as indicated by the Relation Source.
Workorders	A Reference to a set of workorders to be performed under the responsibility of Seller Technician(s) to resolve the Ticket.	List of Reference to Workorder (see Table 32)	Set by the Seller.

Table 27 - Ticket Attributes

9.1.3 Note Attributes

Table 28 lists the Note attributes.

Attributes	Description	Type	Comments
Note Source	Indicates if this Note was added by the Buyer or Seller.	One of: • BUYER • SELLER	Set by the Buyer or Seller
Note Date	The date the Note was created.	DateTime	Set by the Note Source
Note Author	The author of the Note.	String	Set by the Note Source

Note Text	The text of the Note.	String	Set by the Note Source

Table 28 - Note Attributes

[R5] A Seller **MUST** have the ability to add a Note with a Note Source of SELLER.

[R6] A Seller **MUST NOT** have the ability to add a Note with a Note Source of BUYER.

[R7] A Buyer **MUST** have the ability to add a Note with a Note Source of BUYER.

[R8] A Buyer **MUST NOT** have the ability to add a Note with a Note Source of SELLER.

[R9] A Note **MUST NOT** be able to be modified or deleted once added.

[R10] A Note **MUST** contain the following attributes defined in Table 28:

- Note Source
- Note Date
- Note Author
- Note Text

9.1.4 Attachment Attributes

Table 29 lists the Attachment attributes.

Attributes	Description	Type	Comments
Attachment Source	Indicates if the Attachment was added by the Buyer or Seller.	One of: • BUYER • SELLER	Set by the Buyer or Seller
Attachment Date	The date the Attachment was added.	DateTime	Set by the Attachment Source
Attachment Author	The name of the person or organization who added the Attachment.	String	Set by the Attachment Source
Attachment Name	The file name of the attachment.	String	Set by the Attachment Source
Attachment Description	A summary of the contents of the attachment.	String	Set by the Attachment Source
URL	URL where the attachment is located.	String	Set by the Attachment Source

Attributes	Description	Type	Comments
Content	The actual contents of the attachment.	Base64binary	Set by the Attachment Source
Mime Type	Attachment mime type such as extension for video, picture, and document.	String	Set by the Attachment Source
Size	Size of the attachment.	Size: • Unit • Value	Set by the Attachment Source. A visual indicator to a user of how long the file transfer may take.

Table 29 - Attachment Attributes

[R11] A Seller **MUST** have the ability to add an Attachment with an Attachment Source of SELLER.

[R12] A Seller **MUST NOT** have the ability to add an Attachment with an Attachment Source of BUYER.

[R13] A Buyer **MUST** have the ability to add an Attachment with an Attachment Source of BUYER.

[R14] A Buyer **MUST NOT** have the ability to add an Attachment with an Attachment Source of SELLER.

[R15] An Attachment **MUST NOT** be able to be modified or deleted once added.

[R16]

[R17] An Attachment **MUST** contain the following attributes defined in Table 29:

- Attachment Source
- Attachment Date
- Attachment Author
- Attachment Name

[R18] If the attachment is URL, the URL attribute defined in Table 29 **MUST** be provided.

[R19] If the attachment is content, the following attributes defined in Table 29 **MUST** be provided.

- Content
- Mime Type

[O3] An Attachment **MAY** contain the following attribute defined in Table 29:

- Attachment Description
- Size

9.1.5 Contact Information Attributes

Table 30 lists the Contact Information attributes. All the attributes are set by either the Buyer or Seller, depending on if it is a Buyer or Seller Contact Information attribute.

Attributes	Description	Type	Comments
Contact Name	The person or organization to be contacted.	String	
Contact Phone Number	The telephone number for this contact.	String	
Contact Phone Number Extension	The telephone number extension for this contact.	String	
Contact Email Address	The email address for this contact.	String	
Contact Organization	The organization or company that the contact belongs to	String	
Contact Postal Address	Identifies the postal address of the person or office to be contacted.	Postal address that includes all attributes of the Fielded Address (see MEF 79 [10] section 8.9.2)	

Table 30 - Contact Information Attributes

[R20] A Contact Information **MUST** contain the following attributes defined in Table 30:

- Contact Name
- Contact Phone Number
- Contact Email Address

[O4] A Contact Information **MAY** contain the following attributes defined in Table 30:

- Contact Phone Number Extension
- Contact Organization
- Contact Postal Address

9.1.6 Related Object Attributes

Table 31 lists the Related Object attributes. A Related Object can be used to define the relationship between a specific Ticket or Incident and related Tickets and/or Incidents. A Related Object can also be used to define the relationship between a specific Incident and related Incidents and/or Tickets.

Attributes	Description	Type	Comments
Relation Source	Indicates if this Related Object was added by the Buyer or Seller.	One of: • BUYER • SELLER	Set by the Buyer or Seller
Relation Type	The type of relationship between the two objects. For example DUPLICATE, DEPENDS ON, CAUSES.	String	Set by the Relation Source
Related Object Type	The type of this object related to the Ticket or Incident.	One of: • TICKET • INCIDENT	Set by the Relation Source
Related Object Identifier	The identifier of the object related to the Ticket or Incident. The related object can be either a Ticket or Incident.	String	Set by the Relation Source
Relation Creation Date	The date the relationship between Related Object was created by the Relation Source.	DateTime	Set by the Relation Source
Relation Reason Description	A description of the reason for the Relation Source to set the relationship.	String	Set by the Relation Source

Table 31 - Related Object Attributes

[R21] A Seller **MUST** have the ability to add a Related Object with a Relation Source of SELLER.

[R22] A Seller **MUST NOT** have the ability to add a Related Object with a Relation Source of BUYER.

[R23] A Buyer **MUST** have the ability to add a Related Object with a Relation Source of BUYER.

[R24] A Buyer **MUST NOTE** have the ability to add a Related Object with a Relation Source of SELLER.

[R25] If a relationship is added between a Ticket or Incident and another Incident or Ticket, the following attributes defined in Table 31 **MUST** be included in the Related Object:

- Relation Source
- Relation Type
- Related Object Type
- Related Object Identifier
- Relation Creation Date
- Relation Reason Description

9.1.7 Workorder Attributes

Table 32 lists the Workorder attributes.

Attributes	Description	Type	Comments
Workorder Identifier	Unique (within the Seller domain) identifier for the Workorder.	Identifier	Created by the Seller when the Workorder instance is created.
Workorder Related Entity	A Reference to the Related Entity the Workorder is for.	Related Entity (see Table 36)	Set by the Seller.
Tasks	A set of actions to be performed under the responsibility of the Technician to fulfill the Workorder.	List of String	Set by the Seller Each String is a description of a specific task to be performed under the responsibility of the Technician.

Workorder Notes	A set of unstructured comments or information associated with the Workorder. For example the reason of the result of the Workorder, test results or other inability to complete some of the Tasks.	List of Note (see Table 28)	Set by the Seller
Workorder Contact	The Seller Contact responsible for the Workorder.	Contact Information (see Table 30)	Set by the Seller
Technician	The Seller Technician assigned to the Workorder and responsible for performing a set of tasks. In certain instances this could be a Buyer Technician who is authorized to work on the Seller's network.	Contact Information (see Table 30)	Set by the Seller
Workorder State	The state of the Workorder (see Table 47).	One of: • OPEN • PLANNED • IN_PROGRESS • CANCELLED • UNABLE_TO_ COMPLETE • COMPLETED	Set by the Seller
Appointment Required	Indicates that the Buyer must schedule an Appointment to fulfill the Worder.	Boolean	Set by the Seller If set to TRUE, the Seller is Requesting the Buyer to schedule an Appointment.
Workorder Place	The location where the Workorder Tasks are to be performed. If an appointment is needed, this will also be the location where the Appointment takes place.	Place Relationship attribute as defined in MEF 57.2 [9] Section 8.13	Set by the Seller

Workorder Duration	The anticipated amount of time the Seller Technician will be onsite.	Duration	Set by the Seller.
Workorder Appointments	A Reference to a set of appointments for the Workorder.	List of Reference to Appointment (see Table 34)	Set by the Seller. A Workorder may contain only one open Appointment at a time (e.g. with Appointment State of SCHEDULED).

Table 32 - Workorder Attributes

[R26] A Workorder **MUST** contain the following attributes defined in Table 32:

- Workorder Identifier
- Workorder Related Entity
- Workorder Contact
- Workorder State
- Appointment Required
- Workorder Place
- Workorder Duration

[R27] A Workorder **MUST** contain the Tasks attribute defined in Table 32.

[O5] A Workorder **MAY** contain the following attributes defined in Table 32:

- Workorder Notes
- Technician
- Workorder Appointments

9.1.8 Timeslot Attributes

Table 33 lists the Timeslot attributes.

Attributes	Description	Type	Comments
Start Time	The starting Date and Time of the Timeslot.	DateTime	Set by the Buyer or Seller

End Time	The ending Date and Time of the Timeslot.	DateTime	Set by the Buyer or Seller

Table 33 - Timeslot Attributes

[R28] A Timeslot **MUST** contain the Start Time and End Time attributes.

[R29] The End Time **MUST** be chronologically later than Start Time.

9.1.9 Appointment Attributes

Table 34 lists the Appointment attributes.

Attributes	Description	Type	Comments
Appointment Identifier	Unique (within the Seller domain) identifier for the Appointment.	String	Created by the Seller when the Appointment instance is created.
Appointment Related Entity	A Reference to the Related Entity the Appointment is for.	Related Entity (see Table 36)	Set by the Buyer
Appointment Timeslot	The Date and Time interval the Seller Technician is scheduled to arrive at the Appointment.	Timeslot (see Table 33)	Set by the Buyer. This needs to be one of the Available Timeslots returned by the Seller in a Search Appointment Timeslot response.
Appointment State	The state of the Appointment (see Table 50).	One of: • SCHEDULED • CANCELLED • MISSED • FAILED • COMPLETED	Set by the Seller
Appointment Place	The location of the Appointment.	Place Relationship attribute as defined in MEF 57.2 [9] Section 8.13	Set by the Seller. Derived from the location in the related entity (e.g. Workorder).

Appointment Place Contacts	The site contact(s) which the Seller Technician may need to contact in order to get access to the Appointment Place during the Appointment. This could be an end-user, security personnel or any authorized person.	List of Contact Information (see Table 30)	Set by the Buyer
Buyer Appointment Contacts	The Buyer contact(s) assigned to and responsible for the Appointment.	List of Contact Information (see Table 30)	Set by the Buyer
Seller Appointment Contacts	The Seller contact(s) assigned to and responsible for the Appointment.	List of Contact Information (see Table 30)	Set by the Seller
Appointment Notes	Notes describing the purpose of and the results of the Appointment.	List of Note (see Table 28)	Added by the Buyer and Seller. Notes may be added but may not be modified or deleted (for historical reasons).
Appointment Attachments	Attachments to the Appointment, such as a file, screen shot or embedded content.	List of Attachment (see Table 29)	Added by the Buyer and Seller. Attachments may be added but may not be modified or deleted (for historical reasons).

Table 34 - Appointment Attributes

9.1.10 Search Appointment Timeslot Attribute

Table 35 lists the Search Appointment Timeslot attributes used by the Buyer to find a set of available time slots for scheduling or rescheduling an appointment .

Attributes	Description	Type	Comments

Appointment Related Entity	A Reference to the Related Entity the Appointment is for.	Related Entity (see Table 36)	Set by the Buyer Should contain the necessary information for the Seller to determine availability of the required Technicians (e.g. Workorder).
Requested Timeslots	A set of preferred time slots the Buyer is requesting the Seller to verify for availability by a Seller's Technician at the Place referenced in the Appointment Related Entity. For example Monday thru Friday, or a set of specific time slots.	List of Timeslot	Set by the Buyer
Available Timeslots	A set of time slots with availability of a Seller's Technician returned by the Seller, which the Buyer may select for creating or rescheduling an Appointment.	List of Timeslot	Set by the Seller

Table 35 - Search Appointment Timeslot Attributes

9.1.11 Related Entity Attributes

Table 36 lists the Related Entity attributes used for referencing an entity, where the type of the entity is not known in advance to support Appointments and Workorders in a generic manner.

Attributes	Description	Type	Comments
Entity Type	The type of Related Entity (e.g. Workorder).	String	Set by the Buyer
Entity Identifier	Identifier of the Related Entity.	String	Set by the Buyer

Table 36 - Related Entity Attributes

9.1.12 Incident Attributes

Table 37 lists the Incident attributes.

Attributes	Description	Type	Comments
Incident Identifier	Unique (within the Seller Ticket domain) identifier for the Incident.	String	Created by the Seller when the Incident instance is created.
Product Identifiers	A set of unique identifiers provided by the Seller during activation to refer to the Products on which the Incident could have an impact on the normal operation.	List of String	Set by the Seller
Incident Description	Description of the Incident.	String	Set by the Seller
Incident Severity	The severity or impact (ITIL) of the Incident as evaluated by the Seller.	One of: • EXTENSIVE • SIGNIFICANT • MODERATE • MINOR	Set by the Seller
Incident Priority	The priority (ITIL) is based on the assessment of the impact and urgency of how quickly the Incident should be resolved after evaluation by the Seller of the impact of the Incident.	One of: • CRITICAL • HIGH • MEDIUM • LOW	Set by the Seller
Incident Type	The presumed cause of the Incident as evaluated by the Seller.	One of: • MAINTENANCE • DEGRADED • INTERMITTENT • DOWN	Set by the Seller MAINTENANCE: Any scheduled or non-scheduled maintenance related Incident. DEGRADED: When the Product is impacted and not meeting the Product specifications. INTERMITTENT: When the Product is not operational as intended on an intermittent basis. DOWN: When the Product is non-operational.

Attributes	Description	Type	Comments
Incident Creation Date	The date the Incident was created in the Seller's system.	DateTime	Set by the Seller
Situation Start Date	The date when the Situation was first identified, for example via error logs.	DateTime	Set by the Seller
Incident Expected Closed Date	The date provided by the Seller to indicate when the Incident is expected to be CLOSED.	DateTime	Set by the Seller
Incident Closed Date	The date the Incident State was set to CLOSED by the Seller.	DateTime	Set by the Seller
Incident State	The current state of the Incident (see Table 49).	One of: • CREATED • IN_PROGRESS • CLOSED	Set by the Seller
Incident Notes	A set of unstructured comments or information associated to the Incident. This list can be empty.	List of Note (see Table 28)	Added by the Seller. Notes may be added but may not be modified or deleted (for historical reasons).
Incident Attachments	Attachments to the Incident, such as a file, screen shot or embedded content.	List of Attachment (see Table 29)	Added by the Seller. Attachments may be added but may not be modified or deleted (for historical reasons).
Incident Contact	The contact information for the person, team or organization representing the Seller assigned to the Incident.	Contact Information (see Table 30)	Set by the Seller
Incident Technical Contact	The contact information for the person, team or organization representing the Seller that has technical knowledge about the Incident.	Contact Information (see Table 30)	Set by the Seller
Incident Related Objects	The related object(s) allows correlating related Tickets and/or related Incidents with the Incident.	List of Related Objects (see Table 31)	Set by the Seller.

Table 37 - Incident Attributes

9.1.13 Ticket Resolution Confirmation Attributes

Table 38 lists the Buyer's attributes for the Ticket Resolution Confirmation Use Case.

Attributes	Description	Type	Comments
Ticket Identifier	Unique (within the Seller Ticket domain) identifier for the Ticket.	String	Set by the Buyer to specify Ticket to close.
Closure Acceptance Indicator	Indicates if the Buyer agrees that the Ticket can be closed or needs to be reopened.	Boolean	Set by the Buyer If set to TRUE, Buyer confirms the Issue on which the Ticket was based has been resolved satisfactorily. If set to FALSE, Buyer confirms the Issue has not been resolved satisfactorily and the Ticket needs to be reopened.
Closure Rejection Reason	Unstructured comment describing the reason the Buyer doesn't agree on the resolution and needs the Ticket to be reopened.	String	Set by the Buyer if the Issue on which the Ticket was based has not been resolved satisfactorily. If the Buyer wants this Closure Rejection Reason to be included in the Ticket Notes for historical reasons, the Buyer needs to patch the Ticket.

Table 38 - Ticket Resolution Confirmation Attributes

9.1.14 Register for Event Notifications Attributes

Table 39 lists the Register for Event Notifications attributes.

Attributes	Description	Type	Comments
Notification Target Information	The detailed information on the technical API endpoint address specifying where the Seller is to send any Ticket or Incident Notifications. There can be multiple locations for one Buyer.		This is the Callback target in the API.
Notification Type	The type of notification to register for.	One of: • TICKET • INCIDENT	Set by the Buyer
List of Event Notification Types	The type of notifications the Buyer wishes to receive.	If Resource Type is TICKET, then a list of one or more of: • TICKET_UPDATE • TICKET_STATE_CHANGE • TICKET_INFO_REQUIRED • TICKET_RESOLVED If Resource Type is INCIDENT, then a list of one or more of: • INCIDENT_CREATE • INCIDENT_UPDATE • INCIDENT_STATE_CHANGE	Set by the Buyer
Action	Request to start or stop receiving Notifications.	One of: • START • STOP	Set by the Buyer

Table 39 - Register for Event Notifications Attributes

9.1.15 Send Event Notification Attributes

Table 40 lists the Send Event Notification attributes used by the Seller in the Send Event Notification to registered Buyers.

Attributes	Description	Type	Comments
Event Notification Type	The type of notification that triggered the Send Event notification (see Table 46).	One of: • TICKET_UPDATE • TICKET_STATE_CHANGE • TICKET_INFO_REQUIRED • TICKET_RESOLVED • INCIDENT_CREATE • INCIDENT_UPDATE • INCIDENT_STATE_CHANGE	Set by the Seller
Event Identifier	Unique (within the Seller domain) identifier for the Ticket or Incident.	String	Set by the Seller

Table 40 - Send Event Notification Attributes

9.1.16 Register for Appointment Notifications Attributes

Table 41 lists the Register for Appointment Notifications attributes.

Attributes	Description	Type	Comments
Notification Target Information	The detailed information on the technical API endpoint address specifying where the Seller is to send any Appointment Notifications. There can be multiple locations for one Buyer.		This is the Callback target in the API.
List of Appointment Notification Types	The type of notifications the Buyer wishes to receive.	List of one or more of: • APPOINTMENT_UPDATE • APPOINTMENT_STATE_CHANGE	Set by the Buyer
Action	Request to start or stop receiving Notifications.	One of: • START • STOP	Set by the Buyer

Table 41 - Register for Appointment Notifications Attributes

9.1.17 Send Appointment Notification Attributes

Table 42 lists the Send Appointment Notification attributes used by the Seller in the Send Appointment Notification to registered Buyers.

Attributes	Description	Type	Comments
Appointment Notification Type	The type of notification that triggered the Send Appointment notification (see Table 51).	One of: • APPOINTMENT_UPDATE • APPOINTMENT_STATE_CHANGE	Set by the Seller
Appointment Identifier	Unique (within the Seller domain) identifier for the Appointment.	String	Set by the Seller

Table 42 - Send Appointment Notification Attributes

9.1.18 Register for Workorder Notifications Attributes

Table 43 lists the Register for Workorder Notifications attributes.

Attributes	Description	Type	Comments
Notification Target Information	The detailed information on the technical API endpoint address specifying where the Seller is to send any Workorder Notifications. There can be multiple locations for one Buyer.		This is the Callback target in the API.
List of Workorder Notification Types	The type of notifications the Buyer wishes to receive.	List of one or more of: • WORKORDER_CREATE • WORKORDER_STATE_CHANGE • WORKORDER_APPOINTMENT_REQUIRED	Set by the Buyer
Action	Request to start or stop receiving Notifications.	One of: • START • STOP	Set by the Buyer

Table 43 - Register for Workorder Notifications Attributes

9.1.19 Send Workorder Notification Attributes

Table 44 lists the Send Workorder Notification attributes used by the Seller in the Send Workorder Notification to registered Buyers.

Attributes	Description	Type	Comments
Workorder Notification Type	The type of notification that triggered the Send Workorder notification (see Table 48Table 51).	One of: • WORKORDER_CREATE • WORKORDER_STATE_CHANGE • WORKORDER_APPOINTMENT_REQUIRED	Set by the Seller
Workorder Identifier	Unique (within the Seller domain) identifier for the Workorder.	String	Set by the Seller

Table 44 - Send Workorder Notification Attributes

9.2 Create Ticket

This section lists the requirements for Use Case 1.

9.2.1 Create Ticket - Buyer Request

The following are the requirements on the Buyer for the Create Ticket request.

[R30] The Buyer's Create Ticket request **MUST** include the following attributes defined in Table 27 - Ticket Attributes:

- Product Identifier
- Description
- Severity
- Priority
- Observed Impact
- Type
- Reporter Contact

[O6] The Buyer's Create Ticket request **MAY** include the following attributes defined in Table 27 - Ticket Attributes:

- Buyer Ticket Identifier
- Issue Start Date
- Notes
- Attachments
- Buyer Technical Contacts
- Related Objects

[R31] If the Buyer's Create Ticket request includes Attachments, the Buyer **MUST** specify either the URL or Content for the Attachments.

9.2.2 Create Ticket - Seller Response

The following are the requirements on the Seller's response to a Create Ticket request.

[R32] When providing a response to a Create Ticket request, the Seller **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R33] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 27 - Ticket Attributes.

The following requirements apply when the Seller Response Code indicates success.

[R34] The Seller's response **MUST** echo back all attributes and values set by the Buyer in the Create Ticket request.

[R35] The Seller **MUST** set the Ticket State to ACKNOWLEDGED.

[R36] The Seller's response to a Create Ticket request **MUST** include the following attributes defined in Table 27 - Ticket Attributes:

- Ticket Identifier
- Seller Severity
- Seller Priority
- Ticket Creation Date
- Ticket State
- Seller Ticket Contact

[O7] The Seller's response to a Create Ticket request **MAY** include the following attributes defined in Table 27 - Ticket Attributes:

- Expected Resolved Date
- Notes
- Attachments
- Seller Technical Contacts
- Related Objects
- Workorders

9.2.3 Seller Ticket Lifecycle Updates

The following are the requirements for subsequent updates performed by the Seller on a Ticket during the lifecycle of the Ticket.

[O8] The Seller **MAY** add a Note as specified in section 9.1.3.

[R37] The Seller **MUST** add a Note as specified in section 9.1.3 when any of the following Ticket attributes are updated:

- Expected Resolved Date
- Related Objects

[R38] The Seller **MUST NOT** modify or delete any existing Notes.

[O9] The Seller **MAY** add an Attachment as specified in section 9.1.4.

[R39] The Seller **MUST NOT** modify or delete any existing Attachments.

[O10] The Seller **MAY** add, modify or delete Seller Technical Contacts as specified in section 9.1.5.

[O11] The Seller **MAY** add a Related Object as specified in section 9.1.6.

[R40] The Seller **MUST NOT** modify or delete any Related Objects with Relation Source of BUYER.

[O12] The Seller **MAY** add or modify Workorders as specified in section 9.1.7.

Note: The method for a Seller to add Notes, Attachments or Related Objects to a Ticket, to add, modify or delete Seller Technical Contacts and to add or modify Workorders to a Ticket are outside the scope of this document. If a Seller modifies a Ticket, the Seller sends a TICKET_UPDATE notification to the Buyer.

9.3 Retrieve Ticket List

This section lists the requirements for Use Case 2.

9.3.1 Retrieve Ticket List - Buyer Request

The following are the requirements on the Buyer for the Retrieve Ticket List request.

[O13] The Buyer **MAY** use any of the following filter criteria specified in Table 27 - Ticket Attributes for a Retrieve Ticket List request:

- Buyer Ticket Identifier
- Product Identifier
- Severity
- Seller Severity
- Priority
- Seller Priority
- Observed Impact
- Type
- Ticket Creation Date (range of dates)
- Expected Resolved Date (range of dates)
- Resolved Date (range of dates)
- Ticket State

[O14] The Buyer **MAY** use a combination of filter criteria to avoid getting a Too Many Records response code.

9.3.2 Retrieve Ticket List - Seller Response

The following are the requirements on the Seller for the Retrieve Ticket List response.

[R41] When providing a response to a Retrieve Ticket List request, the Seller **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R42] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 27 - Ticket Attributes.

[R43] If the Seller Response Code indicates success, the Seller **MUST** respond to a Retrieve Ticket List containing the following attributes defined in Table 27 - Ticket Attributes for each Ticket that matches the Buyer's filter criteria:

- Ticket Identifier
- Buyer Ticket Identifier
- Product Identifier
- Description
- Severity
- Seller Severity
- Priority
- Seller Priority
- Observed Impact
- Type
- Ticket Creation Date
- Expected Resolved Date
- Resolved Date
- Ticket State

9.4 Retrieve Ticket by Ticket Identifier

This section lists the requirements for Use Case 3.

9.4.1 Retrieve Ticket by Ticket Identifier - Buyer Request

The following are the requirements on the Buyer for the Retrieve Ticket by Ticket Identifier request.

[R44] The Buyer **MUST** include the Ticket Identifier defined in Table 27 - Ticket Attributes.

9.4.2 Retrieve Ticket by Ticket Identifier - Seller Response

The following are the requirements on the Seller for the Retrieve Ticket by Ticket Identifier response.

[R45] The Seller's response **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R46] The Seller Response Code **MUST** return an error if the Ticket with the Ticket Identifier is not found.

[R47] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 27 - Ticket Attributes.

The following requirements apply when the Seller Response Code indicates success.

[R48] The Seller's response to a Retrieve Ticket by Ticket Identifier request **MUST** include the following attributes defined in Table 27 - Ticket Attributes:

- Ticket Identifier
- Product Identifier
- Description
- Severity
- Seller Severity
- Priority
- Seller Priority
- Observed Impact
- Type
- Ticket Creation Date
- Ticket State
- Reporter Contact
- Seller Ticket Contact

[R49] The Seller's response to a Retrieve Ticket by Ticket Identifier request **MUST** include all of the following optional attributes defined in Table 27 - Ticket Attributes, if they were set by the Buyer or the Seller:

- Buyer Ticket Identifier
- Issue Start Date
- Expected Resolved Date

- Notes
- Attachments
- Buyer Technical Contacts
- Seller Technical Contacts
- Related Objects
- Workorders

[R50] The Seller's response to a Retrieve Ticket by Ticket Identifier request **MUST** include the Resolved Date and a Note added by the Seller describing how the Ticket was resolved if the Ticket State is CLOSED or RESOLVED.

9.5 Patch Ticket by Ticket Identifier

This section lists the requirements for Use Case 4.

9.5.1 Patch Ticket by Ticket Identifier - Buyer Request

The following are the requirements on the Buyer for the Patch Ticket by Ticket Identifier request.

[R51] The Buyer **MUST** include the Ticket Identifier defined in Table 27 - Ticket Attributes.

[R52] The Buyer **MUST** include at least one of the following attributes defined in Table 27 - Ticket Attributes:

- Buyer Ticket Identifier
- Severity
- Priority
- Issue Start Date
- Notes
- Attachments
- Buyer Technical Contacts
- Related Objects

[R53] The Buyer **MUST** add a Note to a Ticket as specified in section 9.1.3 when any of the following Ticket attributes is patched:

- Severity
- Priority
- Issue Start Date
- Related Objects

[O15] The Buyer's Patch Ticket by Ticket Identifier request **MAY** contain any of the following attributes defined in Table 27 - Ticket Attributes:

- Buyer Ticket Identifier
- Severity
- Priority
- Issue Start Date
- Notes
- Attachments
- Buyer Technical Contacts
- Related Objects

[R54] If the Buyer's Patch Ticket by Ticket Identifier request includes Attachments, the Buyer **MUST** specify either the URL or Content for the Attachments.

[R55] The Buyer **MUST NOT** modify or delete any Seller specified Related Objects.

Note: Existing Notes and Attachments cannot be modified or deleted. Notes and Attachments can only be added to the existing lists, as specified in the Seller response below.

Note: Patching the Buyer Technical Contacts or Related Objects requires sending the list which will replace the existing Buyer Technical Contacts or Related Objects, as specified in the Seller response section below.

9.5.2 Patch Ticket by Ticket Identifier - Seller Response

The following are the requirements on the Seller for the Patch Ticket by Ticket Identifier response.

[R56] The Seller's response **MUST** include the Seller Response Code defined in Table 26 - Buyer and Seller Attributes.

[R57] The Seller Response Code **MUST** return an error if the Ticket with the Ticket Identifier is not found.

[R58] The Seller Response Code **MUST** return an error if any of the attributes requested to be changed by the Buyer cannot be updated.

[R59] The Seller Response Code **MUST** return an error if the Ticket State is CLOSED, ASSESSING_CANCELLATION or CANCELLED.

The following requirements are to be performed by the Seller on the Ticket when the Seller Response Code indicates success.

[R60] If the Buyer's request contains Notes, the Seller **MUST** append the Notes to the list of existing Notes.

[R61] If the Buyer's request contains Attachments, the Seller **MUST** append the Attachments to the list of existing Attachments.

[R62] If the Buyer's request contains Related Objects, the Seller **MUST** use that to replace the existing Related Objects.

[R63] If the Buyer's request contains Buyer Technical Contacts, the Seller **MUST** use that to replace the existing Buyer Technical Contacts.

[R64] If the Ticket State is PENDING, the Seller **MUST** update the Ticket State to IN_PROGRESS.

9.6 Cancel Ticket by Ticket Identifier

This section lists the requirements for Use Case 5.

The Buyer may cancel a Ticket if the Ticket State is ACKNOLWEDGED, IN_PROGRESS or PENDING by sending a Cancel Ticket by Ticket Identifier request. If the request is formulated properly, the Seller updates the Ticket State to ASSESSING_CANCELLATION, starts the assessing cancellation process and immediately responds with success.

During the assessing cancellation process the Seller determines whether to just close the Ticket, or may also choose to resolve the Issue to prevent similar Create Ticket requests from other Buyers. If the Seller chooses to resolve the Issue, the Seller might create an Incident or an internal Ticket for the Issue, but that is outside the scope of this document. After the Seller has completed the assessment, the Seller updates the Ticket State to CANCELLED (see section 10.1 for details on the Ticket Process Flow).

9.6.1 Cancel Ticket by Ticket Identifier - Buyer Request

The following are the requirements on the Buyer for the Cancel Ticket by Ticket Identifier request.

[R65] The Buyer **MUST** include the Ticket Identifier defined in Table 27 - Ticket Attributes.

9.6.2 Cancel Ticket by Ticket Identifier - Seller Response

The following are the requirements on the Seller for the Cancel Ticket by Ticket Identifier response.

[R66] The Seller's response **MUST** include the Seller Response Code defined in Table 26 - Buyer and Seller Attributes.

[R67] The Seller Response Code **MUST** return an error if the Ticket with the Ticket Identifier is not found.

[R68] The Seller Response Code **MUST** return an error if the Ticket State is RESOLVED, CLOSED, REOPENED, ASSESSING_CANCELLATION or CANCELLED.

[R69] If the Seller Response Code indicates success, the Seller **MUST** update the Ticket State to ASSESSING_CANCELLATION.

9.7 Ticket Resolution Confirmation

This section lists the requirements for Use Case 6.

9.7.1 Ticket Resolution Confirmation - Buyer Request

The following are the requirements on the Buyer for the Ticket Resolution Confirmation request.

[R70] The Buyer **MUST** include the Ticket Identifier and Closure Acceptance Indicator defined in Table 38 - Ticket Resolution Confirmation Attributes.

[R71] The Buyer **MUST** respond with Closure Acceptance Indicator set to FALSE if the Issue on which the Ticket was based has not been resolved in a satisfactory manner to the Buyer.

[R72] If the Closure Acceptance Indicator is FALSE, the Buyer **MUST** include a Closure Rejection Reason describing why the Buyer doesn't agree that the Ticket has been resolved in a satisfactory manner and is requesting the Ticket to be reopened.

[R73] The Buyer **MUST** respond with Closure Acceptance Indicator set to TRUE if the Issue on which the Ticket was based has been resolved in a satisfactory manner to the Buyer.

9.7.2 Ticket Resolution Confirmation - Seller Response

The following are the requirements on the Seller for the Ticket Resolution Confirmation response.

[R74] The Seller's response **MUST** include the Seller Response Code defined in Table 26 - Buyer and Seller Attributes.

[R75] The Seller Response Code **MUST** return an error if the Ticket with the Ticket Identifier is not found.

The following requirements apply when the Seller Response Code indicates success.

[R76] If Buyer Closure Acceptance Indicator is FALSE, the Seller **MUST** change the Ticket State to REOPENED.

[R77] If Buyer Closure Acceptance Indicator is TRUE, the Seller **MUST** change the Ticket State to CLOSED.

9.8 Search Appointment Timeslot

This section lists the requirements for Use Case 7.

The Search Appointment Timeslot request is used by the Buyer to find a set of time slots for which the Buyer and Seller have resources available for an appointment. The Buyer provides the Seller the Requested Timeslots that the Buyer has availability for an appointment. The Seller verifies if the required Seller resources are available for an appointment based on the Appointment Related Entity, that fall within any of the Requested Timeslots specified by the Buyer and returns the Available Timeslots. All of the Available Timeslots returned by the Seller need to be within the timeframe(s) specified by the Buyer's Requested Timeslots. The Buyer will then need to select one Timeslot from the returned Available Timeslots for the Create Appointment request when scheduling a new appointment and for the Patch Appointment by Appointment Identifier request when rescheduling an existing appointment.

If no Available Timeslots are returned by the Seller, the Buyer needs to initiate another Search Appointment Timeslot request with a different set of Requested Timeslots.

9.8.1 Search Appointment Timeslot - Buyer Request

The following are the requirements on the Buyer for the Search Appointment Timeslot request.

[R78] The Buyer's request **MUST** include the following attributes defined in Table 35 - Search Appointment Timeslot Attributes:

- Appointment Related Entity
- Requested Timeslots

Note: The following requirement is Trouble Ticketing specific.

[R79] The Buyer **MUST** set the Appointment Related Entity attribute defined in Table 35 - Search Appointment Timeslot Attributes to the Workorder (Type & Identifier).

9.8.2 Search Appointment Timeslot - Seller Response

The following are the Seller requirements for the Search Appointment Timeslot response.

[R80] When providing a response to a Search Appointment Timeslot request, the Seller **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R81] The Seller Response Code **MUST** return an error if any of the included attributes in the Buyer's request are invalid or not properly formatted.

[R82] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 35 - Search Appointment Timeslot Attributes.

The following requirements apply when the Seller Response Code indicates success.

[R83] The Seller's response **MUST** echo back all attributes and values set by the Buyer in the Search Appointment Timeslot request.

[R84] The Seller's response **MUST** return an empty list of Available Timeslots if no Seller resources are available for an appointment that falls within any of the Requested Timeslots.

[R85] The Seller's response **MUST** include one or more Available Timeslots defined in Table 35 - Search Appointment Timeslot Attributes, if Seller resources are available for an appointment that falls within the Requested Timeslots.

9.9 Create Appointment

This section lists the requirements for Use Case 8.

9.9.1 Create Appointment - Buyer Request

The following are the requirements on the Buyer for the Create Appointment request.

[R86] The Buyer's request **MUST** include the following attributes defined in Table 34 - Appointment Attributes:

- Appointment Related Entity
- Appointment Timeslot
- Appointment Place Contacts
- Buyer Appointment Contacts

[O16] The Buyer's request **MAY** include the Appointment Notes and Appointment Attachments attributes defined in Table 34 - Appointment Attributes.

Note: The following requirement is Trouble Ticketing specific.

[R87] The Buyer **MUST** set the Appointment Related Entity attribute defined in Table 34 - Appointment Attributes to the Workorder (Type & Identifier).

9.9.2 Create Appointment - Seller Response

The following are the requirements on the Seller for the Create Appointment response.

[R88] When providing a response to a Create Appointment request, the Seller **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R89] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 34 - Appointment Attributes.

[R90] The Seller **MUST** return an error if the Appointment Timeslot is not valid.

[R91] The Seller **MUST** return an error if a Seller Technician is not available for an appointment at the Appointment Place for the specified timeslot.

The following requirements apply when the Seller Response Code indicates success.

[R92] The Seller's response **MUST** echo back all attributes and values set by the Buyer in the Create Appointment request.

[R93] The Seller's response to a Create Appointment request **MUST** include the following attributes defined in Table 34 - Appointment Attributes:

- Appointment Identifier
- Appointment State
- Appointment Place
- Seller Appointment Contacts

[O17] The Seller's response **MAY** include the Appointment Notes and Appointment Attachments attributes defined in Table 34 - Appointment Attributes.

[R94] The Seller **MUST** set the Appointment State to SCHEDULED.

Note: The following requirements are Trouble Ticketing specific.

[R95] The Seller **MUST** return an error if the Appointment Related Entity references a Workorder that contains a Reference to an Appointment with Appointment State of SCHEDULED.

[R96] The Seller **MUST** return an error if the related Workorder State is not OPEN.

[R97] After creating an Appointment, the Seller **MUST** add the Appointment Identifier to the Workorder Appointments of the related Workorder.

[R98] The Seller **MUST** set the Appointment Required attribute to FALSE in the related Workorder.

[R99] The Seller **MUST** set the related Workorder State to PLANNED.

[R100] The Seller **MUST** update the related Ticket State to IN_PROGRESS.

9.10 Retrieve Appointment List

This section lists the requirements for Use Case 9.

9.10.1 Retrieve Appointment List - Buyer Request

The following are the requirements on the Buyer for the Retrieve Appointment List request.

[O18] The Buyer **MAY** use any of the following filter criteria specified in Table 34 for a Retrieve Appointment List request.

- Appointment Related Entity
- Appointment Timeslot (range of times)
- Appointment State
- Appointment Place

[O19] The Buyer **MAY** use a combination of filter criteria to avoid getting a Too Many Records response code.

9.10.2 Retrieve Appointment List - Seller Response

The following are the requirements on the Seller for the Retrieve Appointment List response.

[R101] When providing a response to a Retrieve Appointment List request, the Seller **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R102] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 34 - Appointment Attributes.

[R103] If the Seller Response Code indicates success, the Seller **MUST** respond to a Retrieve Appointment List containing the following attributes defined in Table 34 - Appointment Attributes for each Appointment that matches the Buyer's filter criteria:

- Appointment Identifier

- Appointment Related Entity
- Appointment Timeslot
- Appointment State
- Appointment Place

[R104] The Seller response **MUST** include all Appointments with an Appointment Timeslot that partially or completely overlaps with the Appointment Timeslot filter criteria.

9.11 Retrieve Appointment by Appointment Identifier

This section lists the requirements for Use Case 10.

9.11.1 Retrieve Appointment by Appointment Identifier - Buyer Request

The following are the requirements on the Buyer for the Retrieve Appointment by Appointment Identifier request.

[R105] The Buyer **MUST** include the Appointment Identifier defined in Table 34 - Appointment Attributes.

9.11.2 Retrieve Appointment by Appointment Identifier - Seller Response

The following are the requirements on the Seller for the Retrieve Appointment by Appointment Identifier response.

[R106] The Seller's response **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R107] The Seller Response Code **MUST** return an error if the Appointment with the Appointment Identifier is not found.

[R108] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 34 - Appointment Attributes.

The following requirements apply when the Seller Response Code indicates success.

[R109] The Seller's response to a Retrieve Appointment by Appointment Identifier request **MUST** include the following attributes defined in Table 34 - Appointment Attributes:

- Appointment Identifier
- Appointment Related Entity
- Appointment Timeslot

- Appointment State
- Appointment Place
- Appointment Place Contacts
- Buyer Appointment Contacts
- Seller Appointment Contacts

[R110] The Seller's response to a Retrieve Appointment by Appointment Identifier request **MUST** include all of the following optional attributes defined in Table 34 - Appointment Attributes, if they were set by the Buyer or the Seller:

- Appointment Notes
- Appointment Attachments

9.12 Patch Appointment by Appointment Identifier

This section lists the requirements for Use Case 11.

9.12.1 Patch Appointment by Appointment Identifier - Buyer Request

The following are the requirements on the Buyer for the Patch Appointment by Appointment Identifier request.

[R111] The Buyer **MUST** include the Appointment Identifier as specified in Table 34 - Appointment Attributes.

[R112] The Buyer **MUST** include at least one of the following attributes defined in Table 34 - Appointment Attributes:

- Appointment Timeslot
- Appointment Place Contacts
- Buyer Appointment Contacts
- Appointment Notes
- Appointment Attachments

[R113] The Buyer **MUST NOT** change the Appointment Related Entity attribute defined in Table 34 - Appointment Attributes.

Note: Existing Appointment Notes and Appointment Attachments cannot be modified or deleted. Appointment Notes and Appointment Attachments can only be added to the existing lists, as specified in the Seller response below.

9.12.2 Patch Appointment by Appointment Identifier - Seller Response

The following are the requirements on the Seller for the Patch Appointment by Appointment Identifier response.

[R114] The Seller's response **MUST** include the Seller Response Code defined in Table 26 - Buyer and Seller Attributes.

[R115] The Seller Response Code **MUST** return an error if the Appointment with the Appointment Identifier is not found.

[R116] The Seller Response Code **MUST** return an error if the Appointment State is not SCHEDULED.

[R117] If an Appointment Timeslot was included by the Buyer, the Seller Response Code **MUST** return an error if the Appointment Timeslot is not valid.

[R118] If an Appointment Timeslot was included by the Buyer, the Seller Response Code **MUST** return an error if a Seller Technician is not available for an appointment at the Appointment Place for the specified timeslot.

The following requirements apply when the Seller Response Code indicates success.

[R119] If the Buyer's request contains new Appointment Notes, the Seller **MUST** append the new Appointment Notes to the existing Appointment Notes.

[R120] If the Buyer's request contains new Appointment Attachments, the Seller **MUST** append the new Appointment Attachments to the existing Appointment Attachments.

[R121] If contained in the Buyer's request, the Seller **MUST** update the following attributes as requested by the Buyer:

- Appointment Timeslot
- Appointment Place Contacts
- Buyer Appointment Contacts

Note: The following requirement is Trouble Ticketing specific:

[R122] The Seller **MUST** update the related Ticket State to IN_PROGRESS.

9.13 Cancel Appointment by Appointment Identifier

This section lists the requirements for Use Case 12.

9.13.1 Cancel Appointment by Appointment Identifier - Buyer Request

The following are the requirements on the Buyer for the Cancel Appointment by Appointment Identifier request.

[R123] The Buyer's request **MUST** include the Appointment Identifier as specified in Table 34 - Appointment Attributes.

9.13.2 Cancel Appointment by Appointment Identifier - Seller Response

The following are the requirements on the Seller for the Cancel Appointment by Appointment Identifier request.

[R124] The Seller's response **MUST** include the Seller Response Code defined in Table 26 - Buyer and Seller Attributes.

[R125] The Seller Response Code **MUST** return an error if the Appointment with the Appointment Identifier is not found.

[R126] The Seller Response Code **MUST** return an error if the Appointment State is not SCHEDULED.

[R127] The Seller Response Code **MUST** return an error if the related Workorder State is not PLANNED.

The following requirements apply when the Seller Response Code indicates success.

[R128] The Seller **MUST** set the Appointment Required attribute to TRUE in the related Workorder.

[R129] The Seller **MUST** set the related Workorder State to OPEN.

[R130] The Seller **MUST** set the Appointment State to CANCELLED.

9.14 Retrieve Workorder List

This section lists the requirements for Use Case 13.

9.14.1 Retrieve Workorder List - Buyer Request

The following are the requirements on the Buyer for the Retrieve Workorder List request.

[O20] The Buyer **MAY** use any of the following filter criteria specified in Table 32 for a Retrieve Workorder List request.

- Workorder Related Entity
- Workorder State

- Appointment Required
- Workorder Place

[O21] The Buyer **MAY** use a combination of filter criteria to avoid getting a Too Many Records response code.

9.14.2 Retrieve Workorder List - Seller Response

The following are the requirements on the Seller for the Retrieve Workorder List response.

[R131] When providing a response to a Retrieve Workorder List request, the Seller **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R132] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 32 - Workorder Attributes.

[R133] If the Seller Response Code indicates success, the Seller **MUST** respond to a Retrieve Workorder List containing the following attributes defined in Table 32 - Workorder Attributes for each Workorder that matches the Buyer's filter criteria:

- Workorder Identifier
- Workorder Related Entity
- Workorder State
- Appointment Required
- Workorder Place

9.15 Retrieve Workorder by Workorder Identifier

This section lists the requirements for Use Case 14.

9.15.1 Retrieve Workorder by Workorder Identifier - Buyer Request

The following are the requirements on the Buyer for the Retrieve Workorder by Workorder Identifier request.

[R134] The Buyer **MUST** include the Workorder Identifier attribute defined in Table 32 - Workorder Attributes.

9.15.2 Retrieve Workorder by Workorder Identifier - Seller Response

The following are the requirements on the Seller for the Retrieve Workorder by Workorder Identifier response.

[R135] The Seller's response **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R136] The Seller Response Code **MUST** return an error if the Workorder with the Workorder Identifier is not found.

[R137] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 32 - Workorder Attributes.

The following requirements apply when the Seller Response Code indicates success.

[R138] The Seller's response to a Retrieve Workorder by Workorder Identifier request **MUST** include the following attributes defined in Table 32 - Workorder Attributes:

- Workorder Identifier
- Workorder Related Entity
- Tasks
- Workorder Contact
- Workorder State
- Appointment Required
- Workorder Place

[R139] The Seller's response to a Retrieve Workorder by Workorder Identifier request **MUST** include all of the following optional attributes defined in Table 32 - Workorder Attributes, if they were set by the Seller.

- Workorder Notes
- Technician
- Workorder Appointments

9.16 Retrieve Incident List

This section lists the requirements for Use Case 15.

9.16.1 Retrieve Incident List - Buyer Request

The following are the requirements on the Buyer for the Retrieve Incident List request.

[O22] The Buyer **MAY** use any of the following attributes defined in Table 37 - Incident Attributes as a filter criteria:

- Product Identifier
- Incident Severity
- Incident Priority
- Incident Type
- Incident Creation Date (range of dates)
- Situation Start Date (range of dates)
- Incident Expected Closed Date (range of dates)
- Incident Closed Date (range of dates)
- Incident State

[O23] The Buyer **MAY** use a combination of filter criteria to avoid getting a Too Many Records response code.

9.16.2 Retrieve Incident List - Seller Response

The following are the requirements on the Seller for the Retrieve Incident List response.

[R140] When providing a response to a Retrieve Incident List request, the Seller **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R141] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 37 - Incident Attributes.

[R142] If the Seller Response Code indicates success, the Seller **MUST** respond to a Retrieve Incident List containing the following attributes defined in Table 37 - Incident Attributes for each Incident that matches the Buyer's filter criteria:

- Incident Identifier
- Product Identifiers
- Incident Description
- Incident Severity
- Incident Priority
- Incident Type
- Incident Creation Date

- Situation Start Date
- Incident Expected Closed Date
- Incident Closed Date
- Incident State

9.17 Retrieve Incident by Incident Identifier

This section lists the requirements for Use Case 16.

9.17.1 Retrieve Incident by Incident Identifier - Buyer Request

The following are the requirements on the Buyer for the Retrieve Incident by Incident Identifier request.

[R143] The Buyer **MUST** include the Incident Identifier defined in Table 37 - Incident Attributes.

9.17.2 Retrieve Incident by Incident Identifier - Seller Response

The following are the requirements on the Seller for the Retrieve Incident by Incident Identifier response.

[R144] The Seller's response **MUST** specify the Seller Response Code attribute defined in Table 26 - Buyer and Seller Attributes.

[R145] The Seller Response Code **MUST** return an error if the Incident with the Incident Identifier is not found.

[R146] If the Seller Response Code does not indicate success, the Seller **MUST NOT** reply with any of the attributes in Table 37 - Incident Attributes.

The following requirements apply when the Seller Response Code indicates success.

[R147] The Seller's response to a Retrieve Incident by Incident Identifier request **MUST** include the following attributes defined in Table 37 - Incident Attributes:

- Incident Identifier
- Product Identifiers
- Incident Description
- Incident Severity
- Incident Priority

- Incident Type
- Incident Creation Date
- Situation Start Date
- Incident State
- Incident Contact

[R148] The Seller's response to a Retrieve Incident by Incident Identifier request **MUST** include all of the following optional attributes defined in Table 37 - Incident Attributes, if they were set by the Seller:

- Incident Expected Closed Date
- Incident Notes
- Incident Attachments
- Incident Technical Contact
- Incident Related Objects

[R149] The Seller's response to a Retrieve Incident by Incident Identifier request **MUST** include the Incident Closed Date if the Incident State is CLOSED.

9.18 Register for Event Notifications

This section lists the requirements for Use Case 17.

9.18.1 Register for Event Notifications - Buyer Request

The following are the requirements on the Buyer for the Register for Event Notifications request.

[R150] The Seller **MUST** support Event Notifications.

[R151] The Seller **MUST** support all Event Notification Types for Resource Type TICKET.

[R152] The Buyer **MUST** register for all Event Notification Types for Resource Type TICKET.

[R153] The Buyer **MUST** include all attributes defined in Table 39 - Register for Event Notifications Attributes.

[R154] If the Action attribute is START, the Buyer **MUST** specify the List of Event Notification Types to be started.

[R155] If the Action attribute is STOP, the Buyer **MUST** specify the List of Event Notification Types to be stopped.

9.18.2 Register for Event Notifications - Seller Response

The following are the requirements on the Seller for the Register for Event Notifications response.

[R156] The Seller Response **MUST** include the Seller Response Code defined in Table 26 - Buyer and Seller Attributes.

If the Seller Response Code indicates success, then subsequent notifications are sent. If the Seller Response Code does not indicate success, then subsequent notifications are not sent.

9.19 Send Event Notification

This section lists the requirements for Use Case 18.

The following are the requirements for all Event Notification Types.

[R157] The Seller **MUST NOT** send Event Notifications for an Event Notification Type to Buyers who have not registered for the Event Notification Type.

[R158] The Seller **MUST** send Event Notifications to Buyers who have registered for the Event Notification Type.

[R159] The Seller **MUST** include all attributes defined in Table 40 - Send Event Notification Attributes:

9.20 Register for Appointment Notifications

This section lists the requirements for Use Case 19.

9.20.1 Register for Appointment Notifications - Buyer Request

The following are the requirements on the Buyer for the Register for Appointment Notifications request.

[R160] If the Action attribute is START, the Buyer **MUST** specify the Return Address Information and List of Appointment Notification Types attributes to be started as defined in Table 41 - Register for Appointment Notifications Attributes.

[R161] If the Action attribute is STOP, the Buyer **MUST** specify the List of Appointment Notification Types attributes to be stopped as defined in Table 41 - Register for Appointment Notifications Attributes.

9.20.2 Register for Appointment Notifications - Seller Response

The following are the requirements on the Seller for the Register for Appointment Notifications response.

[R162] The Seller Response **MUST** include the Seller Response Code defined in Table 26 - Buyer and Seller Attributes.

If the Seller Response Code indicates success, then subsequent notifications are sent. If the Seller Response Code does not indicate success, then subsequent notifications are not sent.

9.21 Send Appointment Notification

This section lists the requirements for Use Case 20.

The following are the requirements for all Appointment Notification Types.

[R163] The Seller **MUST NOT** send Appointment Notifications for an Appointment Notification Type to a Buyer who has not registered for the Appointment Notification Type.

[R164] The Seller **MUST** send Appointment Notifications to a Buyer who has registered for the Appointment Notification Type.

[R165] The Seller **MUST** include all attributes defined in Table 42 - Send Appointment Notification Attributes:

9.22 Register for Workorder Notifications

This section lists the requirements for Use Case 21.

9.22.1 Register for Workorder Notifications - Buyer Request

The following are the requirements on the Buyer for the Register for Workorder Notifications request.

[R166] If the Action attribute is START, the Buyer **MUST** specify the Return Address Information and List of Workorder Notification Types attributes to be started as defined in Table 43 - Register for Workorder Notifications Attributes.

[R167] If the Action attribute is STOP, the Buyer **MUST** specify the List of Workorder Notification Types attributes to be stopped as defined in Table 43 - Register for Workorder Notifications Attributes.

9.22.2 Register for Workorder Notifications - Seller Response

The following are the requirements on the Seller for the Register for Workorder Notifications response.

[R168] The Seller Response **MUST** include the Seller Response Code defined in Table 26 - Buyer and Seller Attributes.

If the Seller Response Code indicates success, then subsequent notifications are sent. If the Seller Response Code does not indicate success, then subsequent notifications are not sent.

9.23 Send Workorder Notification

This section lists the requirements for Use Case 22.

The following are the requirements for all Workorder Notification Types.

[R169] The Seller **MUST NOT** send Workorder Notifications for a Workorder Notification Type to a Buyer who has not registered for the Workorder Notification Type.

[R170] The Seller **MUST** send Workorder Notifications to a Buyer who has registered for the Workorder Notification Type.

[R171] The Seller **MUST** include all attributes defined in Table 44 - Send Workorder Notification Attributes:

10 State Diagrams

10.1 Ticket Process Flow

The Ticket process flow is shown below. The diagram and state definitions are adapted and aligned with TMF621 [12] (Trouble Ticketing Management API REST Specification) and captures the various states that the Ticket goes through in its lifecycle. The specific states and notifications are managed by the Seller based on its processing and/or based on the Buyer's action.

[R173] The Seller **MUST** support all Ticket States and their associated state transitions shown in Figure 4, Table 45 and Table 46.

[R174] The Seller **MUST** send an Event Notification with Event Notification Type TICKET_UPDATE whenever the Seller has updated any of the following Ticket attributes defined in Table 27 - Ticket Attributes:

- Seller Severity
- Seller Priority
- Expected Resolved Date
- Notes
- Attachments
- Seller Ticket Contact
- Seller Technical Contacts
- Related Objects
- Workorders

[R175] The Seller **MUST** send an Event Notification with Event Notification Type TICKET_STATE_CHANGE whenever a Ticket State change has occurred.

[R176] Whenever the Ticket State is changed to PENDING, the Seller **MUST** add a Note to the Ticket to inform the Buyer about what additional information is required for the Ticket or for the Buyer to schedule an Appointment to continue processing the Ticket.

[R177] The Seller **MUST** send an Event Notification with Event Notification Type TICKET_INFO_REQUIRED whenever the Ticket State has been changed to PENDING and the Appointment Required attribute for all Workorders linked to the Ticket are FALSE.

[R178] The Seller **MUST** send an Event Notification with Event Notification Type TICKET_RESOLVED whenever the Ticket State is changed to RESOLVED.

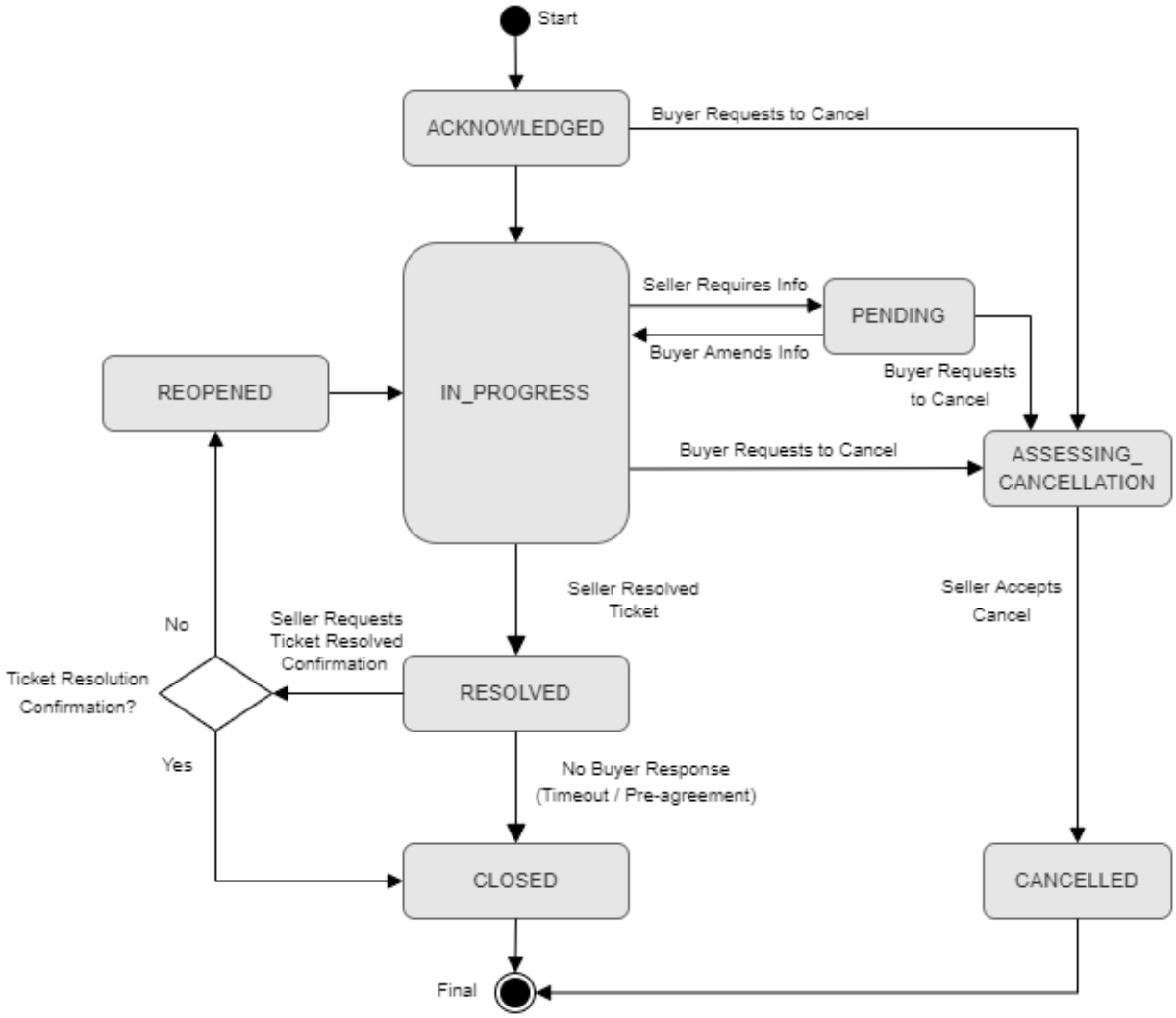

Figure 4 - Ticket Process Flow

The definitions of the various Ticket State values are as follows:

State	Description
ACKNOWLEDGED	A request to create a Ticket was received and accepted by the Seller. The Ticket Create request has been validated and a Ticket has been created by the Seller and allocated a unique Ticket Identifier.
IN_PROGRESS	The Ticket is in the process of being handled and investigated for resolution by the Seller.

State	Description
RESOLVED	The Buyer's Issue described in the Ticket was resolved by the Seller. The Seller assumes that normal operation is re-established for the Buyer's product and is waiting for the Buyer to confirm that the Issue they reported is no longer observed.
CLOSED	The Buyer has confirmed that the Issue they reported is no longer observed, or the pre-defined timeframe/timeout (agreed upon between Buyer and Seller) for confirming that the Issue has been resolved has passed without a response by the Buyer. This is a terminal state.
REOPENED	The Buyer has verified that the Issue described in the Ticket is still observed and has not been resolved satisfactorily. The Buyer rejects the Seller's request to close the Ticket. The Ticket has been reopened and is waiting for further actions from the Seller.
PENDING	The Seller is waiting on the Buyer to provide additional information for the Ticket, or for the Buyer to schedule an Appointment for the Workorder (linked to the Ticket) in order to continue processing the Ticket. This may result in the clock being stopped for the service level agreement until the Buyer has responded to the request.
ASSESSING_CANCELLATION	A request has been made by the Buyer to cancel the Ticket and is being assessed by the Seller to determine whether to just cancel the Ticket, or continue to resolve the Issue to prevent similar Create Ticket requests from other Buyers. If the Seller chooses to resolve the Issue, the Seller might create an Incident or an internal Ticket for the Issue, but that is outside the scope of this document. After the Seller has completed the assessing cancellation process, the Seller updates the Ticket State to CANCELLED.
CANCELLED	The Ticket has been successfully cancelled by the Buyer. The Buyer will receive no further no further Event Notifications for the Ticket. This is a terminal state.

Table 45 - Ticket State Values

The definitions of the various Event Notification Type values for a Ticket or Incident are as follows:

Notification Type	Description
TICKET_UPDATE	The Seller settable attributes for a Ticket were updated by the Seller. Note: Buyer initiated Ticket updates due to Patch Ticket by Ticket Identifier will not trigger a Ticket Notification of Event Notification Type TICKET_UPDATE.
TICKET_STATE_CHANGE	A Ticket State was changed by the Seller.
TICKET_INFO_REQUIRED	The Seller requires more information from the Buyer for a Ticket to continue processing a Ticket. The details on what information is needed from the Buyer will be provided via a Ticket Note. The Ticket State is PENDING. Note: The Buyer uses the Patch Ticket by Ticket Identifier to provide more information for a Ticket.
TICKET_RESOLVED	The Seller is informing the Buyer the Ticket is resolved and the Buyer to verify that the Issue on which the Ticket was based is no longer observed. The Ticket State is RESOLVED. Note: The Buyer confirms if the Issue has been resolved satisfactorily or not using a Ticket Resolution Confirmation request.
INCIDENT_CREATE	A new Incident was created by the Seller.
INCIDENT_UPDATE	An open Incident was updated by the Seller.
INCIDENT_STATE_CHANGE	An Incident State was changed by the Seller.

Table 46 - Event Notification Type Values

10.2 Workorder Process Flow

The Workorder process flow is shown below. The diagram captures the various states that the Workorder goes through in its lifecycle. The specific states and notifications are managed by the Seller based on its processing and/or based on the Buyer's action.

[R179] The Seller **MUST** support all Workorder States and the associated state transitions shown in Figure 5, Table 47 and Table 48.

[R180] If the Appointment Required attribute in a Workorder is TRUE, the Seller **MUST** set the Ticket State of the associated Ticket to PENDING.

[R181] The Seller **MUST** send a Workorder Notification with Workorder Notification Type WORKORDER_CREATE whenever a new Workorder has been created.

[R182] The Seller **MUST** send a Workorder Notification with Workorder Notification Type WORKORDER_STATE_CHANGE whenever a Workorder State change has occurred.

[R183] The Seller **MUST** send a Workorder Notification with Workorder Notification Type WORKORDER_APPOINTMENT_REQUIRED when the Seller sets the Appointment Required attribute in the Workorder to TRUE.

[R184] If the Appointment Required attribute in a Workorder is TRUE, the Buyer **MUST** schedule an appointment using a Search Appointment request followed by a Create Appointment request before the Seller is able to continue processing the associated Ticket.

Note: If the Buyer does not schedule an Appointment in the pre-defined timeframe/timeout (agreed upon between Buyer and Seller) the Seller may move the associated Ticket State to RESOLVED.

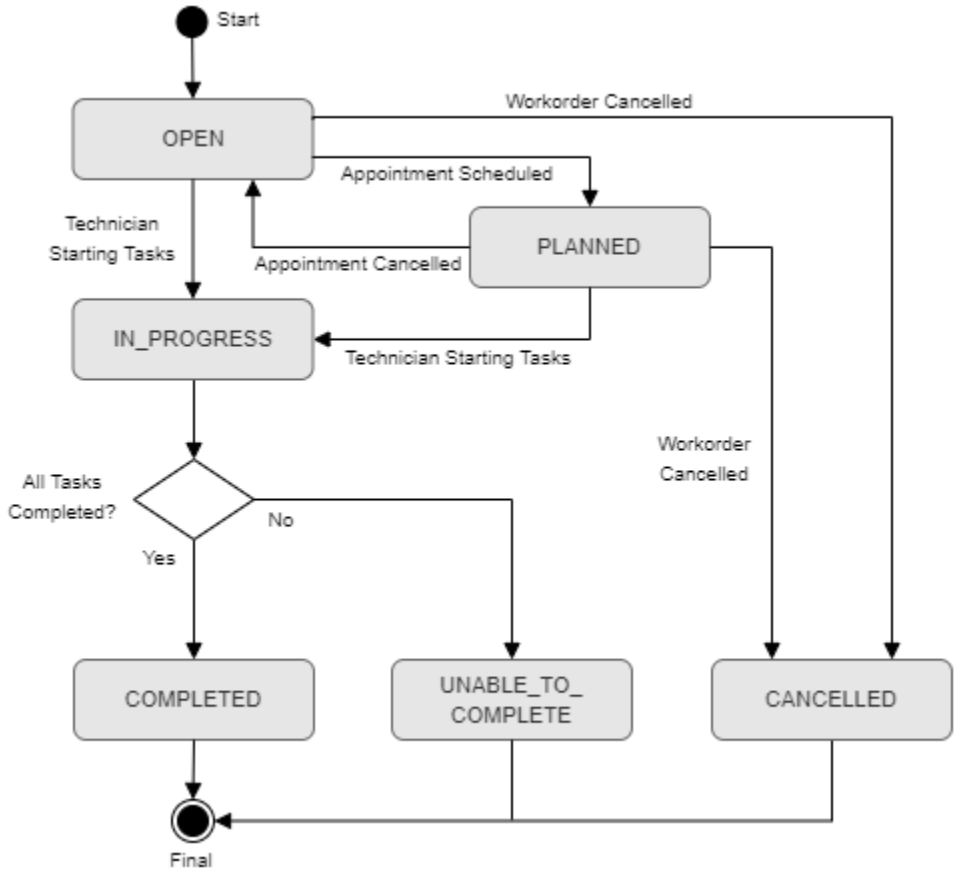

Figure 5 - Workorder Process Flow

The definitions of the various Workorder State values for a Ticket are as follows:

State	Description
OPEN	A Workorder was initiated by the Seller to be assigned to a Technician responsible for fulfilling the Tasks in the Workorder.

State	Description
PLANNED	An Appointment for the Workorder has been assigned with an Appointment State of SCHEDULED.
IN_PROGRESS	The Seller Technician responsible for fulfilling the Workorder has been assigned and started one or more of the Tasks in the Workorder.
CANCELLED	The Workorder has been cancelled by the Seller.
UNABLE_TO_COMPLETE	The Seller Technician responsible for the Workorder was unable to complete all of the assigned Tasks, for example additional skills or information is required or the Appointment was missed/failed. Additional tasks are required to resolve the Issue and a new Workorder needs to be created.
COMPLETED	The Seller Technician responsible for the Workorder has successfully completed all the Tasks in the Workorder.

Table 47 - Workorder State Values

The definitions of the various Workorder Notification Type values for a Workorder are as follows:

Notification Type	Description
WORKORDER_CREATE	A new Workorder has been created by the Seller.
WORKORDER_STATE_CHANGE	A Workorder State change occurred in the Seller's system.
WORKORDER_APPOINTMENT_REQUIRED	The Seller is waiting on the Buyer to schedule an Appointment for the Workorder.

Table 48 - Workorder Notification Type Values

10.3 Incident Process Flow

The Incident process flow is shown below. The diagram captures various states that an Incident goes through in its lifecycle. The specific states and notifications are managed by the Seller based on its processing.

[R185] The Seller **MUST** support all Incident States, Event Notifications and their associated state transitions shown in Figure 6, Table 46 and Table 49.

[R186] The Seller **MUST** send an Event Notification with Event Notification Type INCIDENT_CREATE whenever a new Incident has been created.

[R187] The Seller **MUST** send an Incident Notification with Incident Notification Type INCIDENT_UPDATE whenever the Seller has updated any of the following Incident attributes defined in Table 37 - Incident Attributes:

- Product Identifiers
- Incident Description
- Incident Severity
- Incident Priority
- Incident Type
- Situation Start Date
- Incident Expected Closed Date
- Incident Notes
- Incident Attachments
- Incident Contact
- Incident Technical Contact
- Incident Related Objects

[R188] The Seller **MUST** send an Event Notification with Event Notification Type INCIDENT_STATE_CHANGE whenever an Incident State change has occurred.

[R189] When the Incident State moves to IN_PROGRESS, the Seller **MUST** set the Incident Expected Closed Date.

[R190] The Seller **MUST NOT** send an Incident Notification to a Buyer for a Product Identifier that the Buyer has not activated.

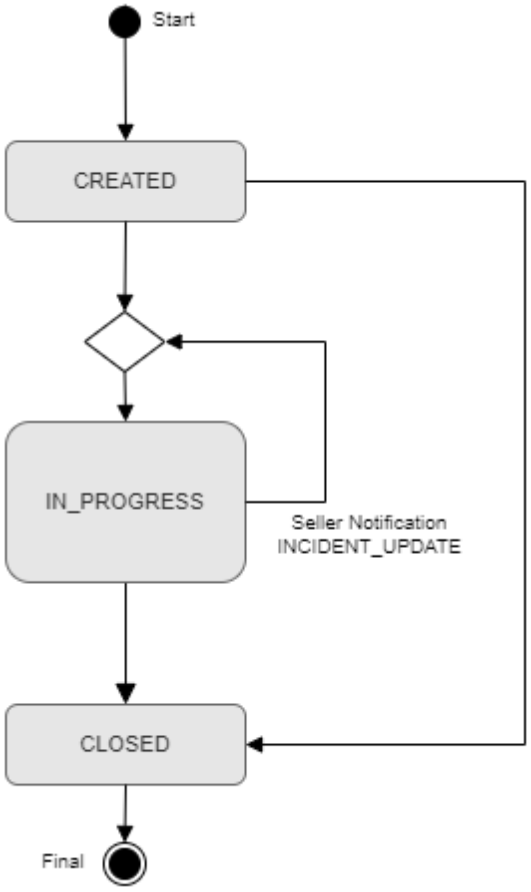

Figure 6 - Incident Process Flow

The definitions of the various Incident State values are as follows:

State	Description
CREATED	A new Incident has been created and allocated a unique Incident Identifier.
IN_PROGRESS	The Incident is in the process of being handled by the Seller.
CLOSED	The Situation described in the Incident was closed by the Seller. This is a terminal state.

Table 49 - Incident State Values

10.4 Appointment Process Flow

The Appointment process flow is shown below. The diagram captures various states that an Appointment goes through in its lifecycle. The specific states and notifications are managed by the Seller based on its processing and/or based on the Buyer's action.

[R191] The Seller **MUST** support all Appointment States, Appointment Notifications and their associated state transitions shown in Figure 7, Table 50 and Table 51.

[R192] The Seller **MUST** send an Appointment Notification with Appointment Notification Type APPOINTMENT_STATE_CHANGE whenever an Appointment State change has occurred.

[R193] The Seller **MUST** send an Appointment Notification with Appointment Notification Type APPOINTMENT_UPDATE whenever the Seller has updated any of the following Appointment attributes defined in Table 34 - Appointment Attributes:

- Seller Appointment Contacts
- Appointment Notes
- Appointment Attachments

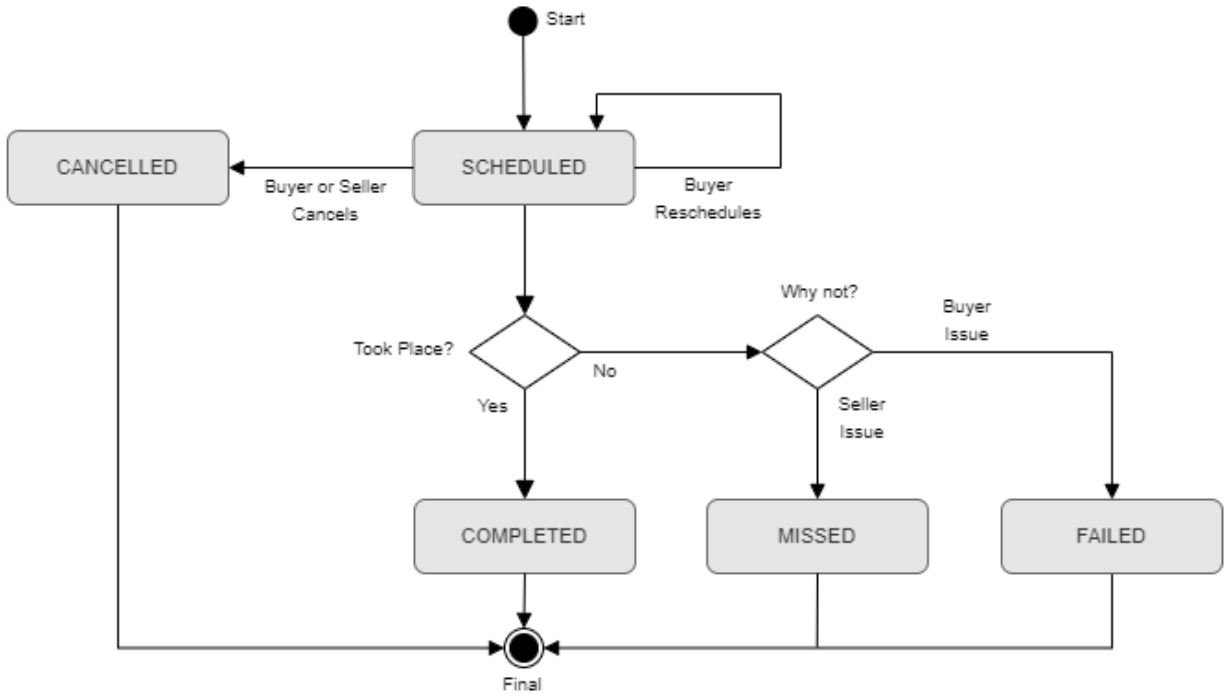

Figure 7 - Appointment Process Flow

The Appointment state definitions below are adapted from TMF646 [13] (Appointment API REST Specification) and captures the various states that an Appointment goes through in its lifecycle. The functional definitions of the states are the same, with slightly different names for consistency with Ticket states. The specific states are managed by the Seller based on its processing and/or based on Buyer's action.

The definitions of the various Appointment State values for a Ticket are as follows:

State	Description
SCHEDULED	The Buyer has negotiated and scheduled the Appointment with the Seller.
CANCELLED	The Appointment was cancelled by the Buyer or the Seller determined that an Appointment was not required. This is a terminal state.
MISSED	The Appointment did not take place, because of a Seller related issue. For example, no Seller Technician was available on the date of the appointment.
FAILED	The Appointment did not take place, because of an issue with the Buyer. For example, Seller Technician was unable to get to the Appointment due to an incorrect location or unable to get access to the Buyer's site. This is a terminal state.
COMPLETED	The Appointment took place as scheduled. This is a terminal state.

Table 50 - Appointment State Values

The definitions of the various Appointment Notification Type values for an Appointment are as follows:

Notification Type	Description
APPOINTMENT_UPDATE	An Appointment was updated by the Seller.
APPOINTMENT_STATE_CHANGE	An Appointment State change occurred in the Seller's system.

Table 51 - Appointment Notification Type Values

11 References

[1] Internet Engineering Task Force RFC 2119, *Key words for use in RFCs to Indicate Requirement Levels*, March 1997

[2] Internet Engineering Task Force RFC 8174, *Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words*, May 2017

[3] MEF 10.3, *Ethernet Service Attributes Phase 3*, October 2013

[4] MEF 12.2, *Carrier Ethernet Network Architecture Framework Part 2: Ethernet Services Layer*, May 2014

[5] MEF 26.2, *External Network Network Interfaces (ENNI) and Operator Services Attributes*, August 2016

[6] MEF 50.1, *MEF Services Lifecycle Process Flows*, August 2017

[7] MEF 51.1, *Operator Services Definitions*, December 2018

[8] MEF 55.1, *LSO Reference Architecture and Framework*, February 2021

[9] MEF 57.2, *Product Order Management Requirements and Use Cases*, May 2021

[10] MEF 79, *Address, Service Site, and Product Offering Qualification Management Requirements and Use Cases*, June 2019

[11] MEF 80, *Quote Management Requirements and Use Cases*, May 2021

[12] TMF621 TM Forum, *TMF621 Trouble Ticket Management API REST Specification R19.0.1*, November 2019.

[13] TMF646 TM Forum, *TMF646 Appointment API REST Specification R19.0.1*, November 2019.