GridOps Management Suite 3.10

Outage Reporting Interface

Functional Specification

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1. REFERENCES

#	Title	Description
1.	EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification	The document represents a set of common integration principles applied to all baseline integration adapters.
2.	EcoStruxure GridOps Management Suite 3.10 Outage Reporting Interface	EcoStruxure GridOps Management Suite 3.10 Outage Reporting Interface zip file contains essential configuration information, as well as web service definitions complemented with message examples.

2. ASSUMPTIONS ANS PREREQUISITES

The Outage Management integration is designed under the following assumptions:

- EcoStruxure GridOps system is the leading system responsible for entire life cycle of all outage management entities (trouble tickets, incidents, hazards, callbacks, etc.).
- Users of external systems have possibility to insert trouble tickets and incident hazards in order to initiate incident creation.
- Users of external systems have possibility to pull the appropriate outage management data.
- Message exchange is supported utilizing two integration patterns: publish/subscribe and request/reply.
- Since the outage management functionality is highly configurable, appropriate types (enumerations such as hazard codes, outage codes, incident codes, trouble codes, trouble ticket sources, callback results, etc.) that need to be exchanged between the external systems and EcoStruxure GridOps must be defined during design sessions.
- Configurable coordinate conversion is possible for entities which encompass coordinates (incident hazards, incidents, etc.).
- It is expected that incident management operations such as confirm, unconfirm, roll up, roll down, device open, device close are mutually exclusive. Meaning that external system must send only one operation at a time. Combination of mentioned operations is considered to be an invalid request.

3. INTRODUCTION

EcoStruxure GridOps Management Suite is a family of solutions designed to help electric utilities in the operations and management of their grid. It is offered as EcoStruxure ADMS, EcoStruxure Grid Operation, EcoStruxure DERMS or EcoStruxure Energy Transmission Operation solutions, which share the same technology platform.

NOTE: The functionality described in this document applies to the following solutions: EcoStruxure ADMS, EcoStruxure Grid Operation and EcoStruxure Energy Transmission Operation.

NOTE: Most images presented in this document are related to the EcoStruxure ADMS solution and should be used as an example. The images for other solutions may differ slightly.

In the distribution network, where the number of telemetered devices is significantly small comparing to the network size, trouble tickets and incident hazards present the main notification that disturbance in the network exists. Trouble tickets and incident hazards can be collected through various sources: Call Center, IVR, Outage Portals, Field Clients, etc.

The Outage Status and Reporting (OSR) Interface provides capability of inserting incident hazards (problems) into the EcoStruxure GridOps. Based on the incident hazards (problems) semantics, the different type of incident can be created. Problems associated to the incident represent additional information about state in the field and they are equivalent to hazard codes in trouble calls. Incident hazards are usually reported by the Field Crew using Field Client.

Besides above-mentioned functionalities related to the insertion/update of the data, the OSR Interfaces provides wide range of reporting functionalities, related to the incident data. In situations when the utility prefers to pass data for analysis in 3rd party analytic service, there are two separate interfaces through which reporting functionality is supported. One is based on the request/reply pattern where the external system pulls necessary incident data. Other is based on the publish/subscribe pattern where the system publishes all changes of the currently active incidents and affected usage points.

One of the common business processes that involve entire life cycle of an incident is depicted in Figure 3.1.

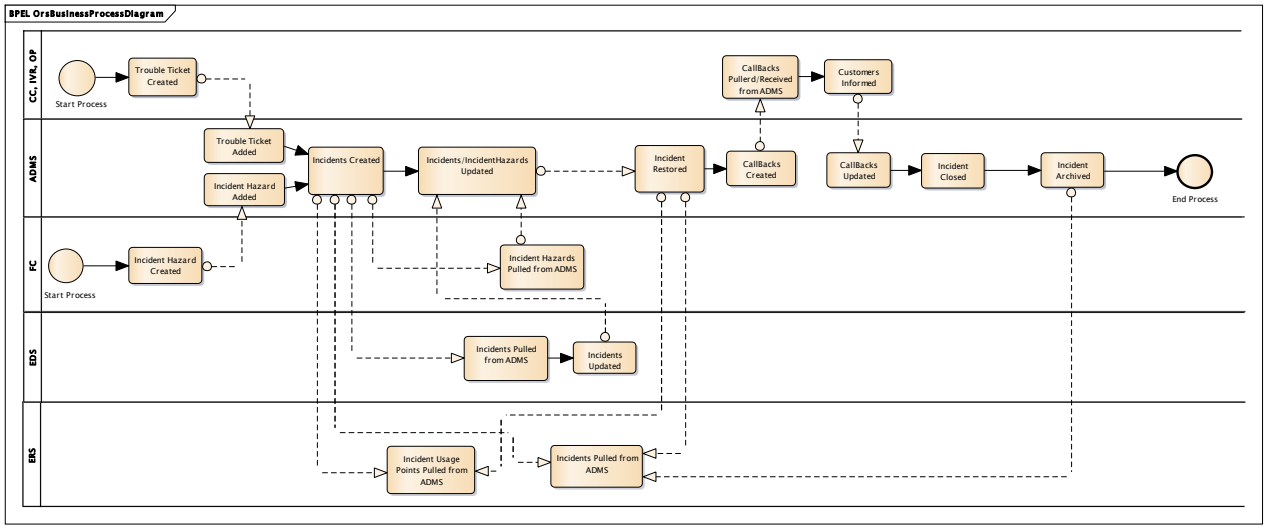

Figure 3.1 – The incident life cycle

In case of a power loss, the customer reports a trouble ticket through the Call Center, Outage Portal or IVR system. The Customer Service Representative creates the trouble ticket and sends it to the EcoStruxure GridOps. Based on the received trouble tickets a new incident/s is/are created. Besides trouble tickets, incidents can be created based on incident hazards noticed on the filed by Field Crew. Also, the Field Crews have possibility to update incident and incident hazards information directly from the field. If needed, created incident/s, along with the association between affected usage points and appropriate incidents can be pulled by External Reporting System (ERS) so that notification letters or SMS are sent to customers. In order to verify whether the outage truly exists, operators usually ping the meters of customers without the power through the AMI interface, if available. Depending on the agreed business process, crew dispatching can be performed either from the EcoStruxure GridOps or External Dispatching System (EDS). If crew dispatching is to be done from EDS, the EDS users can pull incident information from the EcoStruxure GridOps and assign crews to corresponding incident via CREW Interface. Once the crew is dispatched and the problem in the field is resolved, it can be updated. When all incident problems are fixed, the incident can be restored, which results in the callback creation for the customers who requested callback. CSRs pull the callbacks and inform appropriate customers about the power restoration. After all callbacks for one incident are closed, incident is closed as well. Final step in incident lifecycle is archiving of the incident. Once archived, it can be also pulled for various means of analysis and reporting.

3.1. General Architecture

Described in the *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification* [1].

4. INTERFACE OVERVIEW

The Outage Management integration is implemented through the OSR Adapter component. The aforementioned adapter implements (hosts) several SOAP based Web Services with appropriate set of operations:

- ReceiveIncidentHazardsService – used for creating and updating incident hazards.
  - CreatedIncidentHazards operation.
  - ChangedIncidentHazards operation.
- GetIncidentHazardsService – used for pulling active and archived incident hazards.
  - GetIncidentHazards operation.
- ReceiveIncidentsService – used for updating incidents.
  - ChangedIncidents operation.
- GetIncidentsService – used for pulling active and archived incidents.
  - GetIncidents operation.
- GetIncidentUsagePointsService – used for pulling active (affected/unrestored) and archived usage points by an incident.

The following chapters provide more details regarding these interfaces (web services) and appropriate web service operations, data mappings (CIM Profiles → Outage Model), error handling scenarios etc.

The use case diagram that represents common participants (actors) and users of the aforementioned interfaces in the OSR integration is given in Figure 4.1.

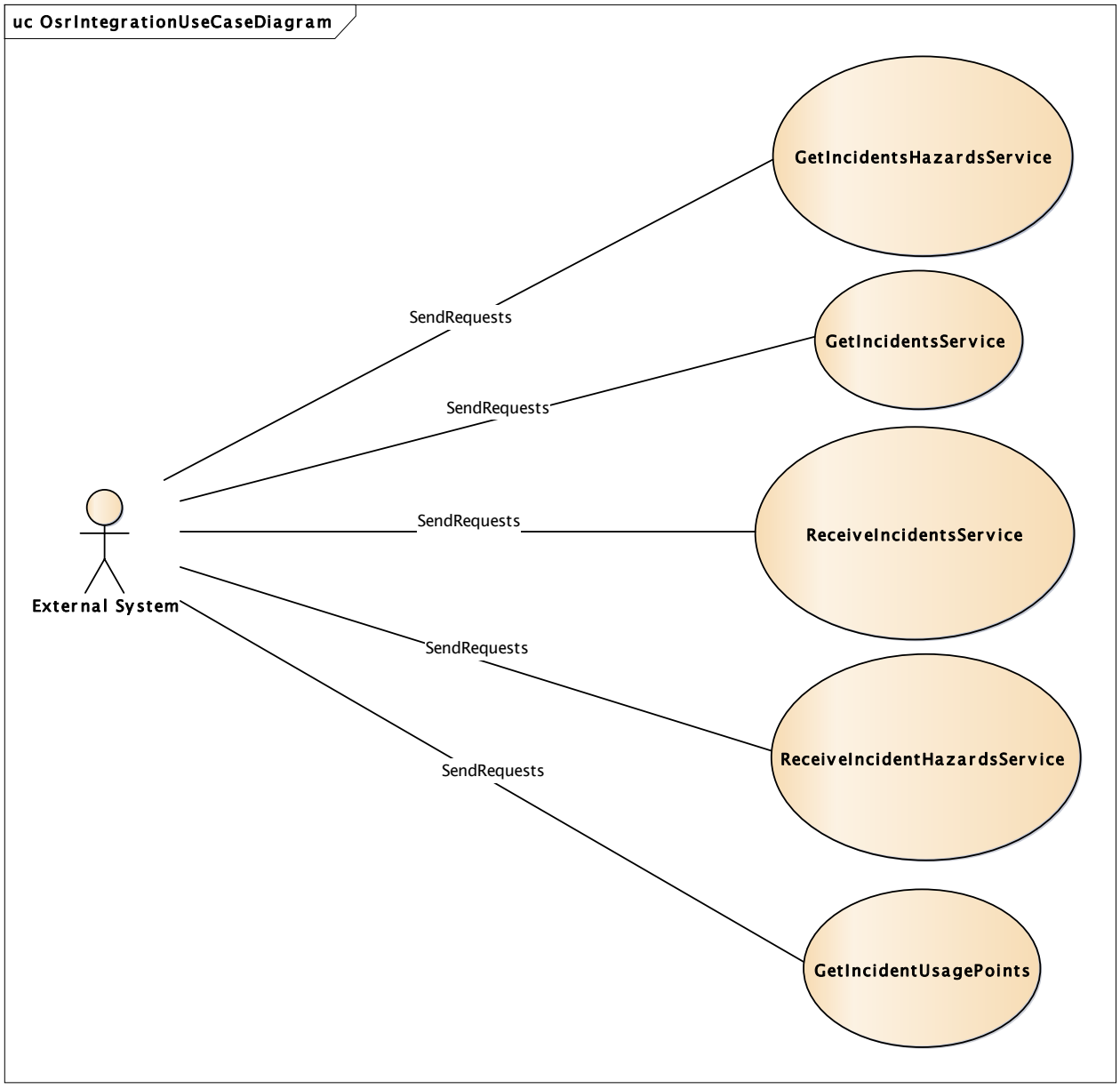

Figure 4.1 – The OSR Integration use case diagram

5. RECEIVEINCIDENTHAZARDS SERVICE

5.1. CreatedIncidentHazards Operation

5.1.1. Overview

Typical users of this interface are utility's crews. They can use the aforementioned interface to report problems (hazards) in the distribution network during the normal work in the field via Field Client.

When incident hazards need to be reported, the external system creates the *CreatedIncidentHazardsEvent* object and invokes appropriate operation. The OSR Adapter performs initial validation of the received data, transforms it into the internal format and applies it to the DMZ system. Second level of validation is performed on the IMS during the insertion of the incident hazard. All changes introduced to the IMS in the DMZ are asynchronously replicated to the IMS in the CORE system.

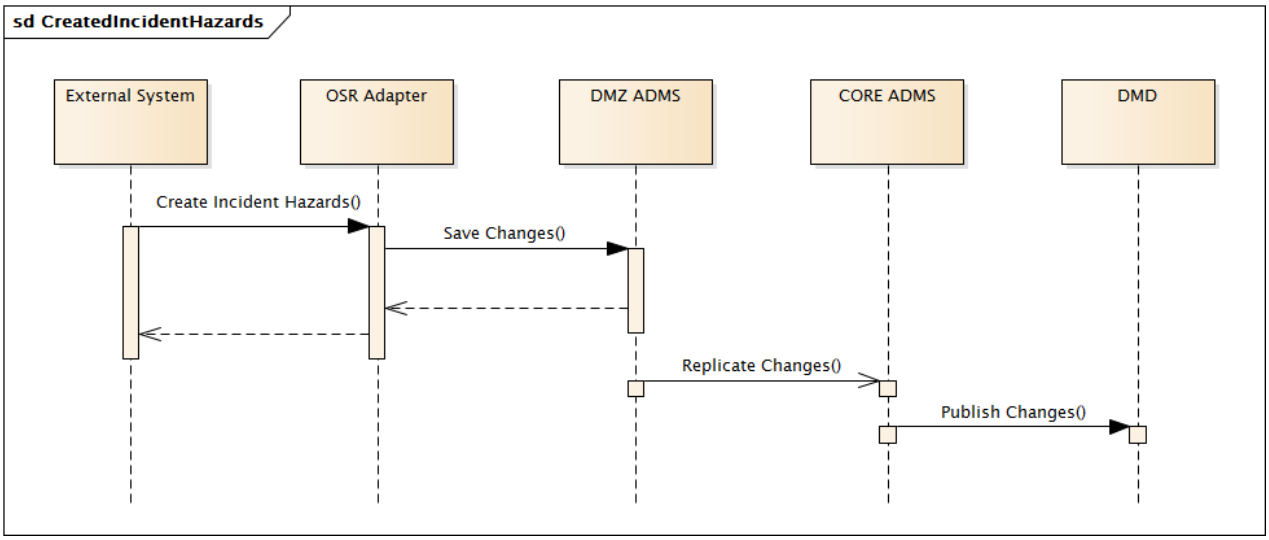

Figure 5.1 – The CreatedIncidentHazards operation execution

Depending on the both stages of validation, the OSR Adapter returns the appropriate *CreatedIncidentHazardsResponse* or *CreatedIncidentHazardsFault* with the detailed explanation of the occurred error. Figure 5.1 provides the visual representation for the described sequence of events.

5.1.2. Use Cases

The list of possible use cases and corresponding faults is given in Table 5.1. Common use cases such as *Invalid Verb, Invalid Noun, Mandatory Element Missing, Element not found in message, Unable to process the request* and *Non-active site fault* are described only in this table. For all other operations, it is only mentioned that they are applicable while whole description is omitted.

Table 5.1 – The CreatedIncidentHazards operation use cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Invalid Verb	Result	String	FAILED	External system sends request message with invalid Verb. Response message is sent by OSR Adapter with FAILED result and message is discarded.
	Error.code	String	2.9	
	Error.level	String	FATAL	
	Error.reason	String	InvalidVerb	
	Error.details	String	Invalid verb: {0}.	
Invalid Noun	Result	String	FAILED	External system sends request message with invalid Noun. Response message is sent by OSR Adapter with FAILED result and message is discarded.
	Error.code	String	2.5	
	Error.level	String	FATAL	
	Error.reason	String	InvalidNoun	
	Error.details	String	Invalid noun: {0}.	
Mandatory Element Missing	Result	String	FAILED	External system sends request message in which some of the mandatory elements are missing. Response message is sent by OSR Adapter with FAILED result and message is discarded.
	Error.code	String	1.8	
	Error.level	String	FATAL	
	Error.reason	String	InvalidMessage	
	Error.details	String	Received message is invalid against XSD schema. Reason: {0}.	
	Result	String	FAILED	

Use Case	Message Mapping			Action
	Property	Type	Value	
Unable to process the request	Error.code	String	5.3	External system sends request message, but for some reason message processing fails due to various internal server error. Fault response message is sent by OSR Adapter.
	Error.level	String	FATAL	
	Error.reason	String	InternalServerError	
	Error.details	String	{0}.	
Created IncidentHazards – Missing created user	Result	String	FAILED	External system sends CreatedIncidentHazards message where created user attribute is not specified. Response message is sent by OSR Adapter with FAILED result and message is discarded.
	Error.code	String	1.2	
	Error.level	String	FATAL	
	Error.reason	String	UserIdMissing	
	Error.details	String	Missing UserID(s) for entity: {1}	
Created IncidentHazards – Comment Exceeds Limits	Result	String	OK	External system sends CreatedIncidentHazards message where several incident hazards have comments that exceed limit. All incident hazards are created while for the ones with comment that exceeds limit, comment is shortened. Response message is sent by OSR Adapter with OK result.
	Error.code	String	6.1	
	Error.level	String	WARNING	
	Error.reason	String	CommentExceedsLimit	
	Error.details	String	Comment exceeds limit for incident hazards: {0}	
Created IncidentHazards – Invalid Damage	Result	String	OK	External system sends CreatedIncidentHazards message where several incident hazards have invalid damage. All incident hazards are created while for the ones, damage is defaulted. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	InvalidDamage	
	Error.details	String	Invalid damage(s) {0} for entities: {1}.	
Created Incident Hazards - Invalid Type	Result	String	PARTIAL/FAILED	External system sends CreatedIncidentHazards message where several incident hazards have invalid type. Valid incident hazards are processed, while for invalid ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidType	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.details	String	Invalid hazard type(s): {0} for entities: {1}	
Created Incident Hazards - Invalid Status	Result	String	OK/PARTIAL/FAILED	External system sends CreatedIncidentHazards message where several incident hazards have invalid status. Valid incident hazards are processed, while for invalid ones, appropriate error is returned, and status is defaulted. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	InvalidProblemStatus	
	Error.details	String	Invalid hazard status: {0} for entities: {1}	
Created Incident Hazards - Invalid Equipment mRIDs	Result	String	OK/PARTIAL/FAILED	External system sends CreatedIncidentHazards message where several incident hazards have invalid equipment mRID. Valid incident hazards are processed, while for invalid ones equipment mRID is set within hazard comment. Response message is sent by OSR Adapter with OK/PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	InvalidEquipmentMrID	
	Error.details	String	Invalid equipment mRID(s): {0} for entities: {1}	
Created Incident Hazards – Missing priority	Result	String	OK	External system sends CreatedIncidentHazards message with missing hazard priority. Since hazard is not mandatory for creation of incident hazard, it will not result in error scenario. A hazard without priority will be created.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Created Incident Hazards - Location Coordinate X/Y is Invalid	Result	String	PARTIAL/FAILED	External system sends CreatedIncidentHazards message where several incident hazards have invalid coordinate (X or Y) format. All valid incident hazards are processed, while for invalid ones coordinates are not imported. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	InvalidPositionPoint	
	Error.details	String	{0} coordinate of the position point {1} is not valid	

5.2. ChangedIncidentHazards Operation

5.2.1. Overview

During work on one incident, the crew can solve and close incident hazards (problems) that are associated to the appropriate incident. To fulfill the possibility to change (update) the status already existing incident hazard, the *ChangeIncidentHazards* operation is introduced in the *ReceiveIncidentHazards* service.

When incident hazards need to be updated, the external system creates the *ChangedIncidentHazardsEvent* object and invokes appropriate operation. The OSR Adapter performs initial validation of the received data, transforms it into the appropriate internal format and applies it to the DMZ system. Second level of validation is performed on the IMS during the update of the incident hazard. All changes introduced to the IMS in the DMZ are asynchronously replicated to the IMS in CORE system.

In some occasions, a communication failure can occur between the external system and EcoStruxure GridOps. In those situations, integration facilitates “last update wins” mechanism. That means if operators in the control room make some changes to the incident hazard, messages that arrive later (due to communication failure) from field crews (external system) will overwrite changes made by the operators. This applies to all incident hazard attributes except status for which state transition validation is automatically triggered. If crew sends change of incident hazard status with the state previous to the one in EcoStruxure GridOps, the appropriate FAILED response will be returned.

Depending on validation, the OSR Adapter returns appropriate *IncidentHazardsResponse* or *IncidentHazardsFault* with the detailed explanation of the occurred error. Figure 5.2 provides the visual representation for the described sequence of events.

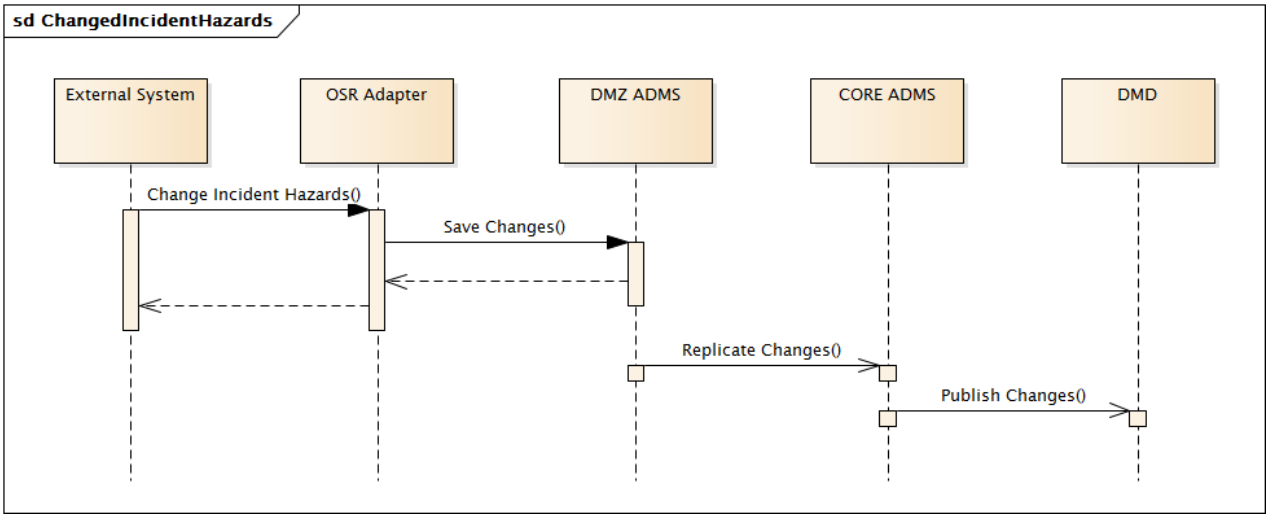

Figure 5.2 – The ChangedIncidentHazards operation execution

5.2.2. Use Cases

The list of possible use cases and corresponding faults is given in Table 5.2.

Table 5.2 – The ChangedIncidentHazards operation use cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Supported common use cases are described in Table 5.1 – The CreatedIncidentHazards operation use cases				
Changed IncidentHazards – Missing Last Update User	Result	String	PARTIAL/FAILED	External system sends ChangedIncidentHazards message where incident hazards do not contain information about last update user. Incident hazards from request that have valid data are processed, while for invalid ones appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	UserIdMissing	
	Error.details	String	Missing UserID(s) for message: {1}	
Changed IncidentHazards – Missing IncidentHazards mRIDs	Result	String	PARTIAL/FAILED	External system sends ChangedIncidentHazards message where incident hazards do not contain mRID. Incident hazards from request that have valid data are processed, while for invalid ones appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	1.2	
	Error.level	String	FATAL	
	Error.reason	String	MrIDNotProvided	
	Error.details	String	MrID is not specified for entities.	
Changed IncidentHazards – Invalid IncidentHazards mRIDs	Result	String	PARTIAL/FAILED	External system sends ChangedIncidentHazards message where several incident hazards contain invalid mRID. Incident hazards from request that have valid data are processed, while for invalid ones appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EntityNotFound	
	Error.details	String	Invalid Incident Hazards mRID(s): {0}	
Changed IncidentHazards – Duplicate mRIDs	Result	String	PARTIAL/FAILED	External system sends ChangedIncidentHazards message that contains several duplicate mRIDs. Incident hazards with valid mRIDs are processed,
	Error.code	String	2.7	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.level	String	WARNING	while for invalid (duplicate) ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.reason	String	DuplicateMRIDs	
	Error.details	String	There are duplicate mRIDs in the message.	
Changed IncidentHazards – Last Modified Date Time is in Future	Result	String	OK	External system sends ChangedIncidentHazards message where several incident hazards have last modified timestamp in future. All valid incident hazards are updated, while for invalid ones last modified timestamp is defaulted to the time when message is received. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	LastModifiedDateTimeInvalid	
	Error.details	String	LastModifiedDateTime(s): {0} is in future for incident hazard(s): {1}.	
Changed IncidentHazards – Comment Exceeds Limits	Result	String	OK	External system sends ChangedIncidentHazards message where several incident hazards have comments that exceed limit. All valid incident hazards are updated in a way that comment is overwritten over the existing one. Response message is sent by OSR Adapter with OK result.
	Error.code	String	6.1	
	Error.level	String	WARNING	
	Error.reason	String	CommentExceedsLimit	
	Error.details	String	Comment exceeds limit for incident hazards: {0}	
Changed IncidentHazards – Invalid Damage	Result	String	OK	External system sends ChangedIncidentHazards message where several incident hazards have invalid damage. All incident hazards are updated, while for the ones that have invalid damage, damage defaulted. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	INFORM	
	Error.reason	String	InvalidDamage	
	Error.details	String	Invalid damage(s) {0} for entities: {1}.	
Changed Incident Hazards - Invalid Status	Result	String	PARTIAL/FAILED	External system sends ChangedIncidentHazards message where several incident hazards have invalid status. Valid incident hazards are updated, while for invalid ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidProblemStatus	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.details	String	Invalid Problem status {0} for entities: {1}.	
Changed IncidentHazards - Invalid Equipment mRIDs	Result	String	OK	External system sends ChangedIncidentHazards message where several incident hazards have equipment mRID that does not exist. Valid incident hazards are processed, while for invalid ones, appropriate error is returned. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	InvalidEquipmentMrID	
	Error.details	String	Invalid equipment MRID(s) {0} for entities: {1}.	
Changed IncidentHazards - Invalid Incident Hazard Status Transaction	Result	String	PARTIAL/FAILED	External system sends ChangedIncidentHazards message where several incident hazards have invalid status transaction. Valid incident hazards are processed, while for invalid ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result. Valid status transactions: Unconfirmed -> Confirmed, Unconfirmed -> Cancelled Confirmed -> Follow up, Confirmed -> Completed, Confirmed -> Auto-Completed, Confirmed -> Cancelled Follow up -> Completed, Follow up -> Auto-Completed, Follow up -> Cancelled
	Error.code	String	6.1	
	Error.level	String	FATAL	
	Error.reason	String	InvalidHazardStatusTransaction	
	Error.details	String	Status transaction is not allowed for entities: {0}	
Changed IncidentHazards - Invalid Coordinate Format	Result	String	OK	External system sends ChangedIncidentHazards message where several incident hazards have invalid coordinate (X or Y) format. All valid incident hazards are processed, while for invalid ones coordinates are not imported. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	INFO/WARNING	
	Error.reason	String	InvalidCoordinateX/YFormat	
	Error.details	String	Invalid PositionPoint X/Y coordinate(s) format {0} for entities: {1}.	
Changed IncidentHazards - Location Type Not Supported	Result	String	OK	External system sends ChangedIncidentHazards message where several incident hazards have invalid location type. All valid incident hazards are processed. For all invalid incident hazards, location information will be added to the comment field. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	LocationTypeNotSupported	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.details	String	Landbase search type: {0} is not supported by landbase search configuration.	
Changed IncidentHazards - Invalid Search Type Params Names	Result	String	OK	External system sends ChangedIncidentHazards message where several incident hazards have invalid search type parameter names. All valid incident hazards are processed. For all invalid incident hazards, location information will be added to the comment field. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	InvalidSearchTypeParamsNames	
	Error.details	String	Landbase search type parameters are not valid for defined search type: {0}.	
Changed IncidentHazards - Invalid Search Type Number Of Params	Result	String	OK	External system sends ChangedIncidentHazards message where several incident hazards have invalid number of search type parameters. All valid incident hazards are processed. For all invalid incident hazards, location information will be added to the comment field. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.5	
	Error.level	String	WARNING	
	Error.reason	String	InvalidSearchTypeParamsNames	
	Error.details	String	Landbase search type parameters are not valid for defined search type: {0}.	

6. GETINCIDENTHAZARDS SERVICE

6.1. GetIncidentHazards Operation

6.1.1. Overview

The incident hazards data can have various importance to different utilities. Hence, external systems should be able to request such data from the Outage Model. In order to provide interface for requesting both active and archived incident hazard information *GetIncidentHazards* service with *GetIncidentHazards* operation is available as part of the OSR Interface.

The *GetIncidentHazards* operation provides two options for pulling active and archived incident hazards information:

- Pull incident hazard data related to one incident (by incident mRID).
- Pull incident hazard data per incident hazard unique identifier (incident hazard mRID).
- Pull incident hazard data per type (line down, gas leak, fire, etc.).
- Pull incident hazard data per status (Unconfirmed, Confirmed, Completed, Cancelled, etc.).

When the incident hazard data needs to be pulled, the external system creates *GetIncidentHazardsRequest* object and invokes the appropriate operation. The OSR Adapter performs initial validation of the received data, transforms it into the appropriate internal format and pulls the data from the DMZ system.

The *GetIncidentHazardsRequest* object must have the *Header.Context* attribute populated with information which trouble ticket data is requested: active, archived or all. As for the search criteria itself, there are three possible scenarios:

- Request message does not contain search criteria.
- Incident hazard data can be requested only for one of the mRIDs (incident or incident hazard).
- Incident hazard data can be requested either separately for incident hazard type and incident hazard status or combining mentioned criteria.

In all other scenarios, the request message will be considered as invalid.

When the request message does not contain search criteria, the OSR Adapter populates the response message with all active and/or archived incident hazards.

If the request message contains incident unique identifier (incident mRID), the OSR Adapter populates the response with the information about all incident hazards related to the specified incident. If the request message contains unique identifier of incident hazard (incident hazard mRID) response is populated with information related to incident hazard with specified unique identifier.

In situations when the incident hazard data is requested per type or status OSR Adapter populate the response message with active/archived/all incident hazards sorted by creation time, from latest to oldest.

Number of incident hazards returned within response message complies to the configurable number (500 is default). If both active and archived incident hazards are requestes (context set to all), first part of the result set will be populated with active incident hazards. If number of entities is smaller than configurable

number (by default, it is 500), the remaining number of entities within the response message will be populated with archived incident hazards.

In case when the request message is invalid, the OSR Adapter returns the *IncidentHazardsFault* object to the caller. The *IncidentHazardsFault* object contains detailed explanation of the occurred error.

Figure 6.1 and Figure 6.2 provide the visual representation for the described sequence of events.

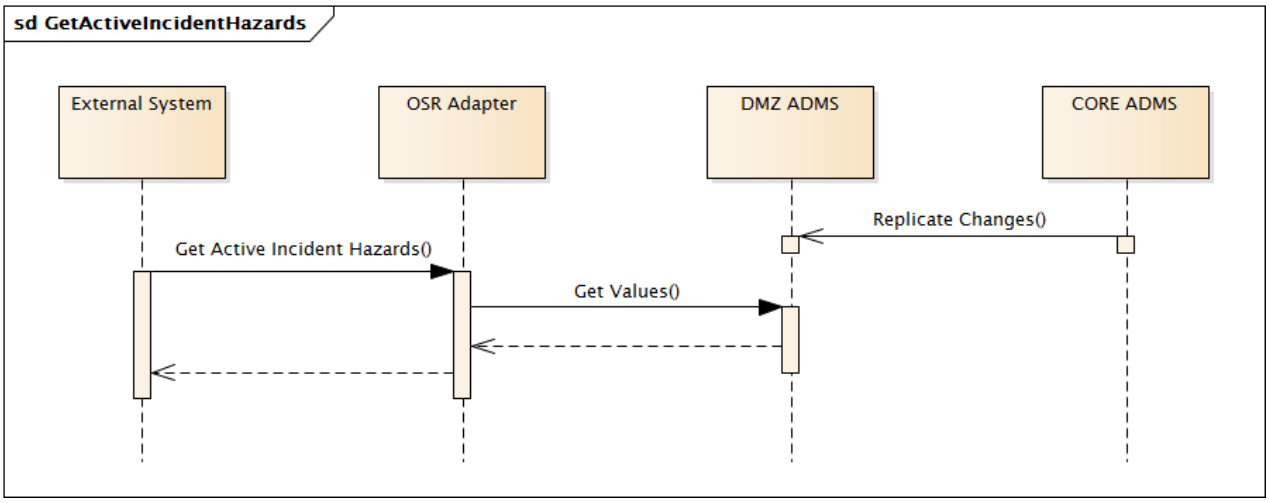

Figure 6.1 – The GetIncidentHazards (active) operation execution

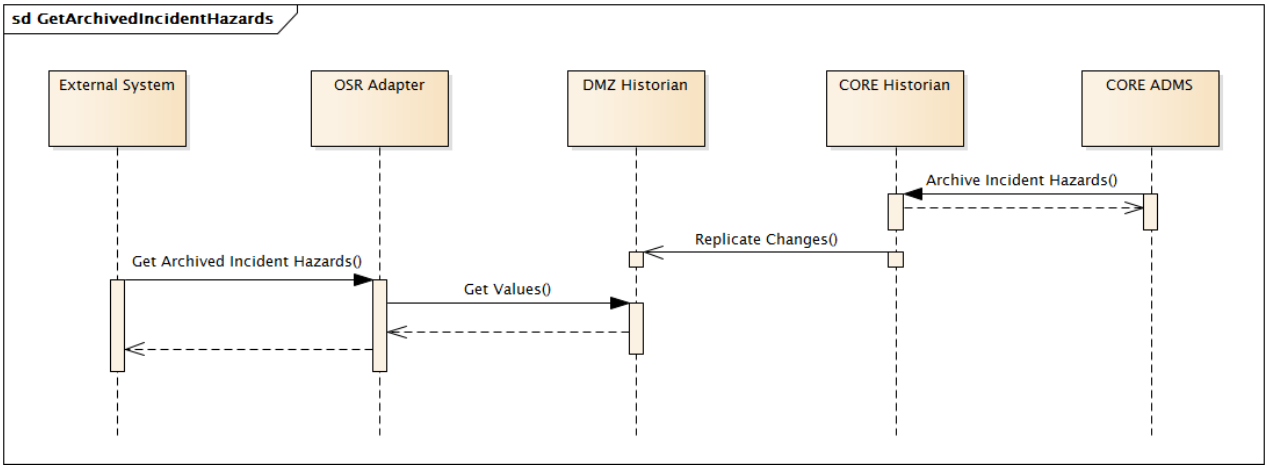

Figure 6.2 – The GetIncidentHazards (archived) operation execution

6.1.2. Use Cases

The list of possible use cases and corresponding faults is given in Table 6.1.

Table 6.1 – The GetIncidentHazards operation use cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Supported common use cases are described in Table 5.1 – The CreatedIncidentHazards operation use cases				
Invalid Context	Result	String	FAILED	External system sends request request message with invalid Context. Response message is sent by OSR Adapter with FAILED result and message is discarded.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidContext	
	Error.details	String	Invalid context: {0}.	
Get IncidentHazards – Message contains valid IncidentHazards mRID	Result	String	OK	External system sends GetIncidentHazards request message with valid IncidentHazard.mRID. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get IncidentHazards – Message contains valid Incident mRID	Result	String	OK	External system sends GetIncidentHazards request message with valid Incident.mRID. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get IncidentHazards –	Result	String	OK	External system sends GetIncidentHazards request message with valid IncidentHazard type. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	

Use Case	Message Mapping			Action
	Property	Type	Value	
Message contains valid Incident Hazard type	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get IncidentHazards – Message contains valid Incident Hazard status	Result	String	OK	External system sends GetIncidentHazards request message with valid IncidentHazard status. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get IncidentHazards – Pull both active and archived incident hazards, regardless of search criteria	Result	String	OK	External system sends GetIncidentHazards request message with valid IncidentHazard.mRID or Incident.mRID. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get IncidentHazards – Message contains multiple search criteria	Result	String	OK	External system sends GetIncidentHazards request message with multiple search criteria combined of IncidentRecord mRID, type and/or status specified. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get IncidentHazards – Message contains invalid IncidentHazards mRID	Result	String	FAILED	External system sends GetIncidentHazards request message with incident hazard mRID that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EntityNotFound	
	Error.details	String	Invalid Incident Hazard mRID(s): {0}	

Use Case	Message Mapping			Action
	Property	Type	Value	
Get IncidentHazards – Message contains invalid Incident mRID	Result	String	FAILED	External system sends GetIncidentHazards request message with incident mRID that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EntityNotFound	
	Error.details	String	Invalid Incident Record mRID(s): {0}	
Get IncidentHazards – Message contains invalid IncidentHazard status	Result	String	FAILED	External system sends GetIncidentHazards request message with IncidentHazard status that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentHazardStatus	
	Error.details	String	Invalid Incident Hazard status: {0}	
Get IncidentHazards – Message contains invalid IncidentHazard type	Result	String	FAILED	External system sends GetIncidentHazards request message with IncidentHazard type that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentHazardType	
	Error.details	String	Invalid Incident Hazard type: {0}	
Get IncidentHazards – Incident does not contain hazards	Result	String	OK	External system sends GetIncidentHazards request message with valid incident mRID, but given incident does not contain any hazards. Response message with empty payload is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	INFORM	
	Error.reason	String	EntityNotFound	
	Error.details	String	No incident hazards found for provided Incident mRID: {0}	
Get IncidentHazards –	Result	String	OK	External system sends GetIncidentHazards request message with valid search criteria. Response message is sent by OSR Adapter with OK result and empty payload.
	Error.code	String	2.7	

Use Case	Message Mapping			Action
	Property	Type	Value	
No Incident Hazards found for provided search criteria	Error.level	String	INFORM	
	Error.reason	String	EntityNotFound	
	Error.details	String	No incident hazards found for provided search criteria.	
Get IncidentHazards – Message does not contain search criteria	Result	String	OK	External system sends GetIncidentHazards request message without IncidentHazard.mRID and Incident.mRID specified. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get IncidentHazards – Message contains multiple search criteria (mRIDs)	Result	String	FAILED	External system sends GetIncidentHazards request message with both IncidentHazard.mRID and Incident.mRID specified. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	1.2	
	Error.level	String	FATAL	
	Error.reason	String	MultipleSearchCriteriaProvided	
	Error.details	String	Multiple search criteria provided in request message.	

7. GETINCIDENTS SERVICE

7.1. GetIncidents Operation

7.1.1. Overview

Due to the need to perform various means of analysis and reporting in external business intelligence systems related to the incident data, the *GetIncidentsService* is introduced. External systems can pull predefined incident data and monitor how data is updated over time. The *GetIncidents* operation provides multiple options of pulling active and archived incidents:

- Pull incident data for all active or archived incidents.
- Pull incident data per incident unique identifier.
- Pull incident data per SDP unique identifier.
- Pull incident data per trouble ticket unique identifier.
- Pull incident data per incident status.
- Pull incident data per incident confirmation.
- Pull incident data per incident power status.
- Pull incident data per incident type.
- Pull incident data per region.
- Pull incident data per AOR Group.

When the incident data needs to be pulled, the external system creates the *GetIncidentsRequest* object and invokes the appropriate operation. The OSR Adapter performs initial validation of the received data, transforms it into the appropriate internal format and pulls the data from the DMZ system.

The *GetIncidentsRequest* object must have the *Header.Context* attribute populated with information which incident data is requested: active, archived or all. As for the search criteria itself, there are two possible scenarios:

- Incident data can be requested only for one of the mRIDs (incident, SPD or trouble ticket).
- Incident data can be requested either separately for incident type, power status, incident status, incident confirmation, region and AOR (Zone.mRID) or combining mentioned criteria.

In all other scenarios, request message will be considered as invalid.

As stated above, the incident data can be obtained by specifying different search criteria in combination with period (if specified) within the request message:

- *Pull incident data for all active or archived incidents* – if the request message does not contain search criteria, the OSR Adapter populates the *GetIncidentsResponse* with the information about all active or archived incidents.
- *Pull incident data per incident unique identifier* – in case that the external system sends the request message which contains the incident unique identifier, the response is populated with information related to that particular incident.
- *Pull incident data per SDP unique identifier* – if the request message contains the service delivery point (SDP) unique identifier, the OSR Adapter populates the response in following manner:

  - If customer is affected by an unconfirmed incident, latest incident data will be returned to the calling system (both outage and non-outage incidents will be considered).
  - If customer is affected by a confirmed incident (only outage incidents will be considered):
    - If customer is under the partially restored part of the network, incident data will not be returned to the calling system.
    - If customer is under the unrestored part of the network, incident data will be returned to the calling system.
- *Pull incident data per trouble ticket unique identifier* – in case that the external system sends the request message which contains the trouble ticket unique identifier, the response is populated with incident information related to the specified trouble ticket.
- *Pull incident data per incident status* – if request message contains incident status, the response is populated with active incident information that are in specified state. This operation is used only for active incidents, since historical incidents are in the archived state.
- *Pull incident data per incident confirmation* – if request message contains incident status remark, the response is populated with active incident information that are confirmed or unconfirmed. This operation is used only for active incidents.
- *Pull incident data per incident power status* – in case that the external system sends the request message which contains the incident power status, the response is populated with information related to active/archived/all incidents in provided power status.
- *Pull incident data per incident type* – in case that external system sends request message which contains the incident type, the response is populated with the information related to active/archived/all incidents of a given type.
- *Pull incident data per region* – external system can also request incident which are located within certain geographic region. In that case response is populated with incident information associated with provided region name.
- *Pull incident data per AOR Group* – the request message can also contain name of the AOR Group and in that case response is populated with incident information associated with a particular AOR Group.

If the time interval is provided within the request message, incidents created in that period are considered. Otherwise, all incidents are considered. Also, since historian data constantly grows over time, the requested data can be too large to be returned to the calling system as part of response message. In that case *GetIncidentsResponse* message is populated in following way:

- If the time interval is not provided in the request message, return configurable number (by default 500) of incidents sorted by creation time, from latest to oldest.
- If the time interval is provided in the request message return configurable number (by default 500) of incidents created in provided time period, and sorted by creation time, from latest to oldest.

For both situations reply result should be set to PARTIAL since response message does not contain all of the incidents.

If the external system requests incident data with context set to all, the OSR Adapter populates response message with all active incidents. If the number of active incidents is larger than configurable number (by default 500), only that part of incidents will be returned. If number of active incidents is smaller than

configurable number (by default 500), the remaining number of incidents will be populated with archived ones. All active and archived incidents will be sorted by creation time, from latest to oldest.

If for some reason external systems sends invalid request message, the OSR Adapter returns the *GetIncidentsFault* object with detailed explanation of the occurred error.

Figure 7.1 and Figure 7.2 provide the visual representation for the *GetIncidents* operation.

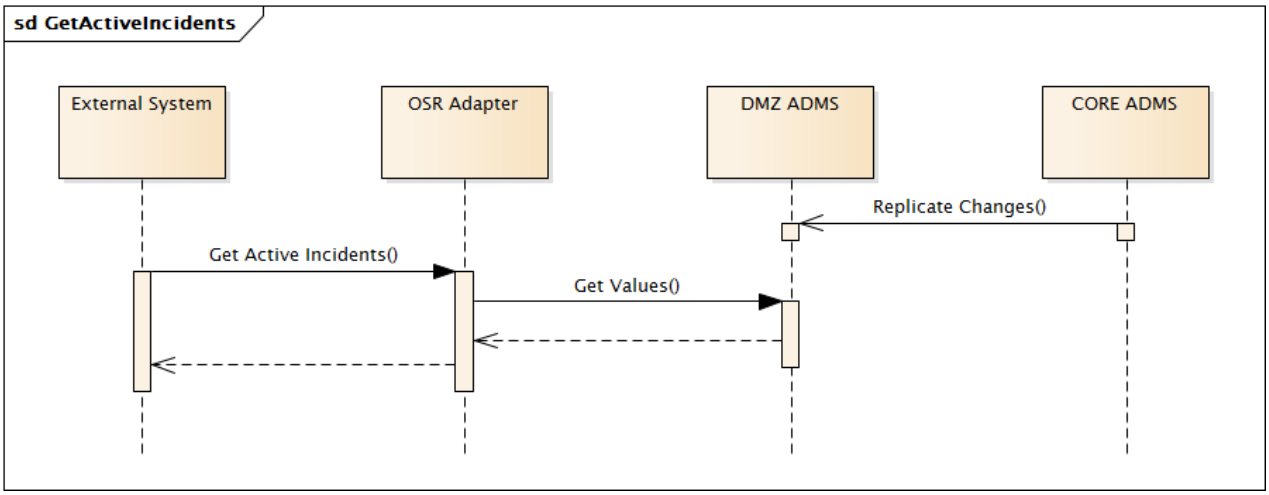

Figure 7.1 – The GetIncidents (active) operation execution

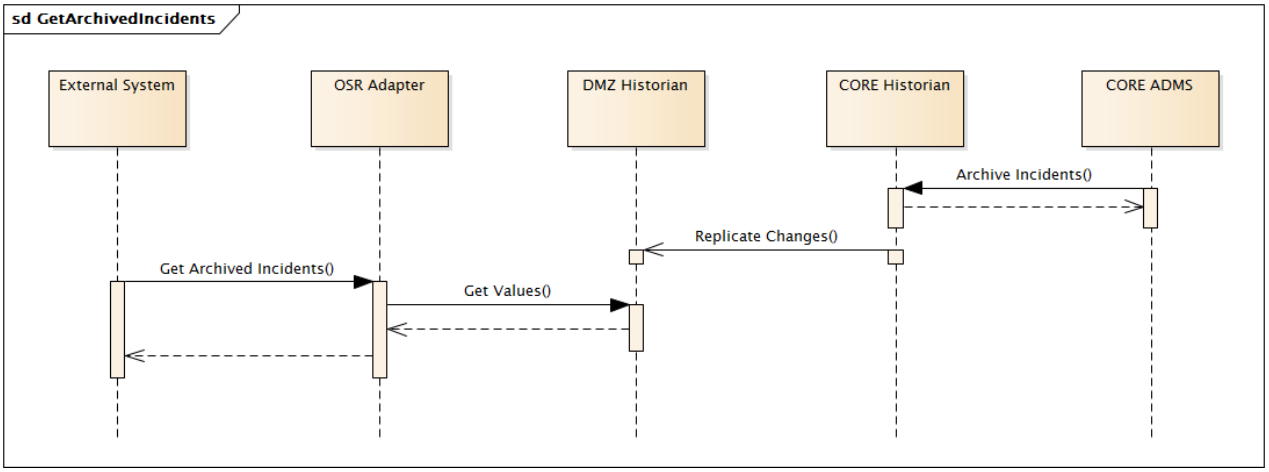

Figure 7.2 – The GetIncidents (archived) operation execution

7.1.2. Use Cases

The list of possible use cases and corresponding faults is given in Table 7.1.

Table 7.1 – The GetIncidents operation use cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Supported common use cases are described in Table 5.1 – The CreatedIncidentHazards operation use cases				
Invalid Context	Result	String	FAILED	External system sends request request message with invalid Context. Response message is sent by OSR Adapter with FAILED result and message is discarded.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidContext	
	Error.details	String	Invalid context: {0}.	
Get Incidents – Message does not contain search criteria	Result	String	OK	External system sends GetIncidents request message without search criteria specified. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Pull both active and archived incidents, regardless of search criteria	Result	String	OK	External system sends GetIncidents request message with or without search criteria. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents –	Result	String	OK	External system sends GetIncidents request message with valid Incident.mRID. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	

Use Case	Message Mapping			Action
	Property	Type	Value	
Message contains valid Incidents mRID	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Message contains valid TroubleTicket.mRID	Result	String	OK	External system sends GetIncidents request message with valid TroubleTicket.mRID. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Incidents found for provided UsagePoint.mRID	Result	String	OK	External system sends GetIncidents request message with UsagePoint.mRID that is/was affected by incidents. If customer is affected by an unconfirmed incident, appropriate incident data will be returned to the calling system. If customer is affected by a confirmed incident: • If customer is under the partially restored part of the network, incident data will not be returned to the calling system. • If customer is under the unrestored part of the network, incident data will be returned to the calling system. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Message contains valid Region.mRID	Result	String	OK	External system sends GetIncidents request message with valid Region.mRID. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents –	Result	String	OK	External system sends GetIncidents request message with valid Zone.mRID. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	

Use Case	Message Mapping			Action
	Property	Type	Value	
Message contains valid Zone.mRID	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Message contains valid Incident status	Result	String	OK	External system sends GetIncidents request message with valid Incident status. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Message contains valid Incident status remark	Result	String	OK	External system sends GetIncidents request message with valid Incident status remark. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Message contains valid Incident power status	Result	String	OK	External system sends GetIncidents request message with valid Incident power status. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Message contains valid Incident type	Result	String	OK	External system sends GetIncidents request message with valid Incident type. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	

Use Case	Message Mapping			Action
	Property	Type	Value	
Get Incidents – Message contains multiple search criteria	Result	String	OK	External system sends GetIncidents request message with more than one search criteria specified (IncidentCodes.name, OutageRecord.status.value, status.value, Zone.mRID, Region.mRID). Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get Incidents – Message contains invalid Incident mRID	Result	String	FAILED	External system sends GetIncidents request message with Incident.mRID that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EntityNotFound	
	Error.details	String	Invalid Incident Record mRID: {0}	
Get Incidents – Message contains invalid Incident status	Result	String	FAILED	External system sends GetIncidents request message with Incident status that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentStatus	
	Error.details	String	Invalid Incident status: {0}	
Get Incidents – Message contains invalid Incident status remark	Result	String	FAILED	External system sends GetIncidents request message with Incident status remark that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentStatusRemark	
	Error.details	String	Invalid Incident status: {0}	
Get Incidents – Message contains invalid Incident power status	Result	String	FAILED	External system sends GetIncidents request message with Incident power status that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.reason	String	InvalidIncidentPowerStatus	
	Error.details	String	Invalid Incident Power status: {0}	
Get Incidents – Message contains invalid Incident type	Result	String	FAILED	External system sends GetIncidents request message with Incident type that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentType	
	Error.details	String	Invalid Incident type: {0}	
Get Incidents – Message contains invalid TroubleTicket.mRID	Result	String	FAILED	External system sends GetIncidents request message with TroubleTicket.mRID that does not exist. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EntityNotFound	
	Error.details	String	Invalid Incident TroubleTicket mRID: {0}	
Get Incidents – Incidents not found for provided UsagePoint.mRID	Result	String	OK	External system sends GetIncidents request message with UsagePoint.mRID that isn't/wasn't affected by any incident. Response message is sent by OSR Adapter with OK result.
	Error.code	String	2.7	
	Error.level	String	INFORM	
	Error.reason	String	EntityNotFound	
	Error.details	String	No incidents found for provided UsagePoint mRID: {0}	
Get Incidents – Message contains Period.end time before Period.start time	Result	String	FAILED	External system sends GetIncidents request message with Period.end time that is before Period.start time. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EndTimeBeforeStartTime	
	Error.details	String	Invalid period is provided. End time is before start time.	
Get Incidents –	Result	String	FAILED	

Use Case	Message Mapping			Action
	Property	Type	Value	
Message contains Period.end time equals Period.start time	Error.code	String	2.7	External system sends GetIncidents request message with Period.end time equals Period.start time. Response message is sent by OSR Adapter with FAILED result.
	Error.level	String	FATAL	
	Error.reason	String	EndTimeEqualsStartTime	
	Error.details	String	Invalid period is provided. End time is equal to start time.	
Get Incidents – Message contains multiple search criteria (mRIDs)	Result	String	FAILED	External system sends GetIncidents request message with more than one search criteria specified (mRID, TroubleTickets.mRID, UsagePoints.mRID). Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	1.2	
	Error.level	String	FATAL	
	Error.reason	String	MultipleSearchCriteriaProvided	
	Error.details	String	Multiple search criteria provided in request message.	
Get Incidents – No incidents found for provided valid search criteria	Result	String	OK	External system sends GetIncidents request message with valid search criteria for which there are no incidents. Response message is sent by OSR Adapter with OK result and empty payload.
	Error.code	String	2.7	
	Error.level	String	INFORM	
	Error.reason	String	EntityNotFound/IncidentsNotFound	
	Error.details	String	No incidents found for provided search criteria.	
Get Incidents – Invalid Search Criteria Provided for Archived incidents	Result	String	FAILED	External system sends GetIncidents request message for archived incidents with the status value other than “Archived”. Response message is sent by OSR Adapter with FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentStatusForCurrentContext	
	Error.details	String	Invalid incident status {0} for provided context.	

8. RECEIVEINCIDENTS SERVICE

8.1. ChangedIncidents Operation

8.1.1. Overview

Usually, during the incident resolution period, crews that are assigned to the incident have a need to update various incident information from the external system. Information such as incident status, status (open/closed) of incident's devices, resolution data, estimated time of arrival, actual time of arrival, estimate time of resolution and notes are subjective to the change. Update of mentioned incident data is exposed through the *ChangedIncidents* operation within the *ReceiveIncidents* web service. Precondition for this operation is that incident is already in the dispatched state (crew is assigned to it), either from the EcoStruxure GridOps or from external system via *ChangedCrewAssignments* operation of the CREW Interface.

When the incident information needs to be updated, the external system creates the *ChangedIncidentsEvent* object and invokes the appropriate operation. The OSR Adapter performs initial validation of the received data, transforms it into the appropriate internal format and applies it to the DMZ system. Second level of validation is performed on the IMS during the update of the Incident. All changes introduced to the IMS in the DMZ are asynchronously replicated to the IMS in the CORE system.

Initial update of the incident data can occur after the crew is already assigned to the incident and estimated arrival time is set. Once crew arrives to the site, actual arrival time can be updated. Followed with the damage examination, initial ETR of the incident can be updated. Or, if there is no issue, the incident can be cancelled by updating its status. In case problem exists and de-energization of customers is necessary, incident can be confirmed. Another option to de-energize the customers is by updating incident's device status (open) is possible. Once incident is resolved, customers can be energized again (device status set to closed). Such action is accompanied by update of incident status (field completed). Any of above-mentioned actions can result with update of resolution data (cause, subcause, refer to, failed component, etc.). When additional data needs to be sent to the operators in the form of notes, note update is also possible. The maximum length of note related to the incident is configurable (default is 500). If any of received incident attributes is invalid, OSR Adapter logs exception and returns the appropriate *ChangedIncidentsResponse,* with the FAILED result to the calling system.

In some occasions, a communication failure can occur between the external system and the EcoStruxure GridOps. In those situations, important fact to point out is that integration facilitates "last update wins" mechanism. That means if operators in the control room make some changes to the incident, messages that arrive later (due to communication failure) from field crews (external system) will overwrite changes made by the operators, if data received in the message is valid and corresponding incident is still active. This applies to all incident attributes except the incident status for which the incident state transition validation is automatically triggered, and if the crew sends change of incident status with state previous to the one in the EcoStruxure GridOps, the appropriate FAILED response will be returned.

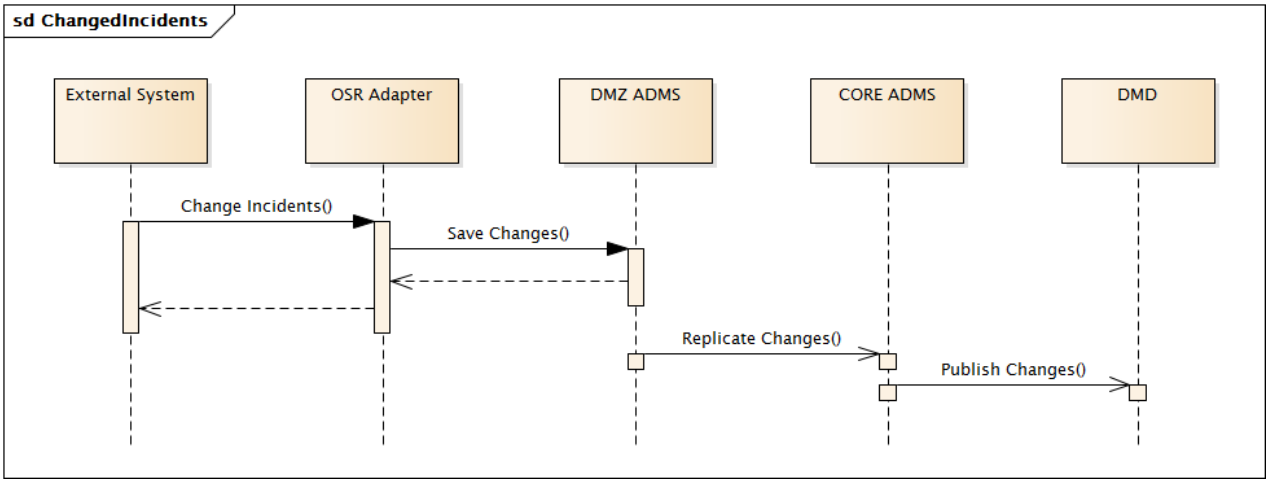

Figure 8.1 – The ChangedIncidents operation execution

Depending on the both stages of validation, the OSR Adapter returns the appropriate *ChangedIncidentsResponse* or *ChangedIncidentsFault* with the detailed explanation of the occurred error. Figure 8.1 provides the visual representation for the described sequence of events.

8.1.2. Use Cases

Due to broad range of functionality that is covered with *ChangedIncidents* operation, use cases are divided in separate tables, based on the incident data that is being updated.

8.1.2.1. Common

Table 8.1 – The ChangedIncidents operation – Common Use Cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Changed Incidents – Missing UserID	Result	String	FAILED	External system sends ChangedIncidents message where UserID within Message.Header is not specified. Incidents that have valid crew in the message are updated. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with FAILED result and message is discarded.
	Error.code	String	1.2	
	Error.level	String	FATAL	
	Error.reason	String	UserIdMissing	
	Error.details	String	Missing UserID(s) for message: {0}	
Changed Incidents – Missing Incidents mRIDs	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where incidents do not contain mRID. Incidents that have mRIDs specified are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	1.2	
	Error.level	String	FATAL	
	Error.reason	String	MrIDNotProvided	
	Error.details	String	MrID is not specified for entities.	
Changed Incidents – Update attempted by unassigned Crew mRID	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message with Crew mRID which is not assigned to the changed incident. Incidents that have corresponding Crew.mRID to the one in the EcoStruxure GridOps are updated. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with FAILED result and message is discarded. Note: If entire Crew object (along with mRID element) is omitted from the request message, Crew.mRID validation will not be triggered. This option is introduced in situations when users of external system (e.g. shift managers) perform incident update.
	Error.code	String	1.2	
	Error.level	String	FATAL	
	Error.reason	String	InvalidCrewId	
	Error.details	String	Crew with ID: {0} is not allowed to change the incident(s): {1} since it is not assigned to it.	

Use Case	Message Mapping			Action
	Property	Type	Value	
Changed Incidents – Multiple Crews Specified for Incident	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message with more than one Crew.mRID per incident. Incidents that have only one crew in the message are updated. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result and message is discarded.
	Error.code	String	1.2	
	Error.level	String	FATAL	
	Error.reason	String	MultipleCrewsForIncidentUpdate	
	Error.details	String	Multiple crews are defined for incident(s): {0} update.	
Changed Incidents – Duplicate Incident mRIDs	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message that contains several duplicate mRIDs. Incidents with valid mRIDs are processed, while for invalid (duplicate) ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	DuplicateIncidentMRIDs	
	Error.details	String	Duplicate incident MRID {0} in message.	
Changed Incidents – Invalid Incidents mRIDs	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid mRID. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EntityNotFound	
	Error.details	String	Invalid Incident Record mRID(s): {0}	
Changed Incidents – Incident is in final state	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents are in final state. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	Operation {0} not allowed for incident {1} in final state.	

8.1.2.2. Incident Data and Operations

Table 8.2 – The ChangedIncidents operation – Incident Operation Use Cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Supported common use cases are described in Table 5.1 – The CreatedIncidentHazards operation use cases				
Changed Incidents – Confirm Incident	Result	String	OK	External system sends ChangedIncidents message where for several incidents confirmation is attempted. Request message must contain incident mRID and status.remark fields populated, while device mRID is optional. All incidents are updated (confirmed). Response message is sent by OSR Adapter with OK result. Note: Incident confirmation can be attempted with or without specified device(s). • If device(s) are specified, validation of provided device mRIDs will be performed. ○ If specified device(s) are valid, confirmation will be performed for the incident. ○ If specified devices are not valid, error message will be sent. • If devices are not specified, confirmation will be performed for the incident. In both situations, change of device status will be performed only if device is non-telemetered.
	Error.code	String	0.0	
	Error.level	String	INFORM	
	Error.reason	String	RequestSent	
	Error.details	String	Request sent for incident: {0}	
Changed Incidents – Unconfirm Incident	Result	String	OK	External system sends ChangedIncidents message where several incidents are unconfirmed. Request message must contain incident mRID and status.remark fields populated. All incidents are updated (unconfirmed). Response message is sent by OSR Adapter with OK result.
	Error.code	String	0.0	
	Error.level	String	INFORM	
	Error.reason	String	RequestSent	
	Error.details	String	Request sent for incident: {0}	
Changed Incidents – Restore Incident	Result	String	OK	External system sends ChangedIncidents message where for several incidents restoration is attempted. Request message must contain incident mRID and status.remark fields populated, while device mRID is optional. For all valid incidents,
	Error.code	String	0.0	
	Error.level	String	INFORM	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.reason	String	RequestSent	status is updated, and customers are restored. Response message is sent by OSR Adapter with OK result. Note: Incident Restoration can be attempted with or without specified device(s). • If device(s) are specified, validation of provided device mRIDs will be performed. ○ If specified device(s) are valid, restoration will be performed for the incident. ○ If specified devices are not valid, error message will be sent. • If devices are not specified, restoration will be performed for the incident. In both situations, change of device status will be performed only if device is non-telemetered.
	Error.details	String	Request sent for incident: {0}	
Changed Incidents – Comment Added Successfully	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid incident comments. All incidents are updated. Comment type is set to Field Crew (or default type specified in OSR configuration). Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident Status	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid incident status. All incidents statuses are updated to the ones from the request message. Response message is sent by OSR Adapter with OK result. Note: In case of changing Incident status to CLOSE, Cause and Subcause should be previously set (by adapter or by operator)
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident ETA	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid incident ETA. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident ATA	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid incident ATA. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident ETR	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid incident ETR. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Invalid remark	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message that contains invalid remark value for some incidents. Incidents with valid remark value are processed, while for invalid ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidRemark	
	Error.details	String	Invalid Remark value: {0} for incident(s): {1}.	
Changed Incidents – ETR is before outage time	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain ETR before outage time. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EtrBeforeOutageTime	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.details	String	Estimated Time of Restoration is before outage time for incident(s): {0}	
Changed Incidents – Invalid Actual Arrival Time (ATA) Update	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message that contains Incident's ATA. ATA is updated only for crews that are already in Arrived state, while for invalid ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidAtaUpdate	
	Error.details	String	Actual Arrival Time cannot be updated for incident(s): {0} because crew must be in Arrived status.	
Changed Incidents – Invalid Incident Status	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid status. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentStatus	
	Error.details	String	Invalid Incident status: {0} for Incident(s): {1}	
Changed Incidents – Invalid Changed Incident Status	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message to update incidents which are in status that prevents further updates. Incidents from request that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidChangedIncidentState	
	Error.details	String	Cannot update incident(s): {0}. Incident is in state {1} which dismisses further update through this interface.	
Changed Incidents – Incident Confirmation attempted with additional actions (data update)	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where for several incidents confirmation is attempted, along with additional actions specified in the message (rollup, rolldown, status change). Request is sent for all incidents for which only confirmation is attempted. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with OK result.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.details	String	Confirmation of incident: {0} not allowed because additional changes are detected.	
Changed Incidents – Unconfirm attempted with additional actions (data update)	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where unconfirm is attempted for several incidents, along with additional actions specified in the message (device open, device close, rollup, rolldown, status change). Request is sent for all incidents for which only unconfirm is attempted. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with OK result.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	Unconfirm of incident: {0} not allowed because additional changes are detected.	
Changed Incidents – Incident Restoration attempted with additional actions (data update)	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where restoration is attempted for several incidents, along with additional actions specified in the message (rollup, rolldown, status change). Request is sent for all incidents for which only restoration is attempted. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with OK result. Note: If restoration attempt is received along with the request for opening a device, such action is valid only if device is already opened. If restoration attempt is received along with the request to close a device, both actions will be performed.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	Restoration of incident: {0} not allowed because additional changes are detected.	
Changed Incidents – Restoration attempted for unconfirmed incident	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where restoration is attempted for several incidents that are unconfirmed. Confirmed incidents from request are restored. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	Restoration cannot be performed for unconfirmed incident(s): {0}.	
Changed Incidents – Confirmation/Restoration attempted along with the Incident Status change	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where confirmation or restoration is attempted for several incidents, along with the incident status change. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	5.3	
	Error.level	String	FATAL	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	Confirmation/restoration and Status change for Incident(s): {0} cannot be executed in one operation.	
Changed Incidents – Incident resolution not allowed	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where restoration of incident is attempted (status changed to Field Completed) but there are still unrestored customers. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentStatusTransaction	
	Error.details	String	Incident: {0} cannot be transferred to state: {1}. Reason: {2}.	
Changed Incidents – Invalid incident state transition	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where change of status for several incidents is attempted and state transition is invalid per incident lifecycle. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result. Allowed incident state transitions are defined per project.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	InvalidIncidentStatusTransaction	
	Error.details	String	Incident: {0} cannot be transferred to state: {1}. Reason: {2}.	
Changed Incidents – Comment Exceeds Limits	Result	String	OK	External system sends ChangedIncidents message where several incidents have comments that exceed limit. All incidents are updated while for the ones for which comment exceeds limit, comment is shortened. Response message is sent by OSR Adapter with OK result.
	Error.code	String	6.1	
	Error.level	String	INFORM	
	Error.reason	String	CommentExceedsLimit	
	Error.details	String	Comment partially created for entities: {0}	
Changed Incidents – Confirm/Unconfirm/Restore Attempted for already	Result	String	OK	External system sends ChangedIncidents message where for several incidents confirm/unconfirm/restored is attempted. All incidents in EcoStruxure GridOps that are in opposite state compared to the one in the request message, are processed.
	Error.code	String	0.0	
	Error.level	String	INFORM	

Use Case	Message Mapping			Action
	Property	Type	Value	
confirmed/unconfirmed/restored incident	Error.reason	String	NoChange	Otherwise, appropriate information is returned. Response message is sent by OSR Adapter with OK result.
	Error.details	String	Confirm/Unconfirm/Restore was not executed for incident(s): {0} because device is in the same state.	

8.1.2.3. Incident Device Operations

Table 8.3 – The ChangedIncidents operation – Incident Device Operations Use Cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Changed Incidents – Incident's Device Roll Up/Roll Down	Result	String	OK	External system sends ChangedIncidents message where for several incidents roll up or roll down is attempted. Request message must contain incident mRID and PSREvent.type fields populated, while device mRID is optional. Request is sent for all incidents to be updated (rolled up/down). Response message is sent by OSR Adapter with OK result. Note: Incident Roll Up/Down can be attempted with or without specified device(s). • If device(s) are specified, validation of provided device mRIDs will be performed. • If devices are not specified, and incident contains several predicted devices, FAILED message will be returned. • If incident contains only one predicted device, OK message will be returned and request for specified action will be sent. Also, Rollup/rolldown is can be attempted only for unconfirmed outage incidents.
	Error.code	String	0.0	
	Error.level	String	INFORM	
	Error.reason	String	RequestSent	
	Error.details	String	{0} request sent for incident(s): {1}	
Changed Incidents – Open Incident's Device	Result	String	OK	External system sends ChangedIncidents message where for several incidents open action is attempted for incident's device(s). Request message must contain incident mRID and PSREvent.type fields populated, while device mRID is optional. Request is sent for all incidents to be updated (open/close). Response message is sent by OSR Adapter with OK result.
	Error.code	String	0.0	
	Error.level	String	INFORM	
	Error.reason	String	RequestSent	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.details	String	{0} request sent for incident(s): {1}	Note: Open for incident's devices can be attempted with or without specified device(s). • If device(s) are specified, validation of provided device mRIDs will be performed. • If devices are not specified, and incident contains several predicted devices, FAILED message will be returned. • If incident contains only one predicted device, OK message will be returned and request for specified action will be sent.
Changed Incidents – Close Incident's Device	Result	String	OK	External system sends ChangedIncidents message where for several incidents open action is attempted for incident's device(s). Request message must contain incident mRID and PSREvent.type fields populated, while device mRID is optional. Request is sent for all incidents to be updated (open/close). Response message is sent by OSR Adapter with OK result. Note: Close for incident's devices can be attempted with or without specified device(s). • If device(s) are specified, validation of provided device mRIDs will be performed. • If devices are not specified, and incident contains several predicted devices, FAILED message will be returned. • If incident contains only one predicted device, OK message will be returned and request for specified action will be sent.
	Error.code	String	0.0	
	Error.level	String	INFORM	
	Error.reason	String	RequestSent	
	Error.details	String	{0} request sent for incident(s): {1}	
Changed Incidents – Open/Close attempted for incident's device that is already in the provided state	Result	String	OK	External system sends ChangedIncidents message where for several incidents close action is attempted with unconfirm action. Close action, along with confirm status is considered as valid action, only if incident is already in confirmed state. For such incidents, appropriate information is returned. Response message is sent by OSR Adapter with OK result.
	Error.code	String	0.0	
	Error.level	String	INFORM	
	Error.reason	String	NoChange	
	Error.details	String	Open/Close was not executed for incident(s): {0} because device is in the same state.	
Changed Incidents – Duplicate Equipment mRIDs	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message that contains several duplicate equipment mRIDs. Incidents with non-duplicate equipment mRIDs are processed
	Error.code	String	2.7	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.level	String	FATAL	(devices are operated), while for invalid (duplicate) ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.reason	String	DuplicateEquipmentMrIds	
	Error.details	String	Received duplicate equipment MRID(s) for incident(s): {0}.	
Changed Incidents – Invalid PSREvent timestamp (before last update time or in future)	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message that contains several invalid PSREvent timestamps (before the last update time or in the future, comparing to the device operation timestamp). Incidents with valid timestamps are updated, while for invalid ones, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidPSREventTimestamp	
	Error.details	String	Cannot update device states for incident(s): {0}. Provided Timestamp: {1} [is after current time] or [is before last update time in ADMS: {2}].	
Changed Incidents – Confirmation attempted for telemetered device	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where confirmation is attempted for several incidents that contain telemetered device, which is not allowed. Incidents from request that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	Change of incident's: {0} device: {1} not allowed because it is telemetered.	
Changed Incidents – Restoration attempted for telemetered device	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where restoration is attempted for several incidents that contain telemetered device, which is not allowed. Incidents from request that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	Change of incident's: {0} device: {1} not allowed because it is telemetered.	
Changed Incidents –	Result	String	PARTIAL/FAILED	

Use Case	Message Mapping			Action
	Property	Type	Value	
Invalid PSREvent.type	Error.code	String	2.7	External system sends ChangedIncidents message where for several incidents confirmation, roll up or roll down is attempted. Incidents from request that have valid PSREvent.type values are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.level	String	FATAL	
	Error.reason	String	InvalidPsrEventType	
	Error.details	String	Requested action cannot be completed due to invalid PsrEventType: {0}.	
Changed Incidents – Roll Up/Roll Down Attempted for already confirmed incident	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where for several incidents roll up or roll down is attempted. All incidents which are not confirmed are updated (rolled up/down). Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	{0} cannot be performed for already confirmed incident(s): {1}.	
Changed Incidents – Roll Up/Roll Down Failed	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where for several incidents roll up or roll down is attempted. For incidents for which roll up or roll down was not executed successfully due to internal business process logic error, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	OperationNotAllowed	
	Error.details	String	{0} cannot be performed for incident(s): {1}. Consult adapter log for more details.	
Changed Incidents – Affected Device Tagged	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message to update incidents whose device is already tagged. All incidents that do not have devices that are tagged with a restricted type of tag assigned to them are updated. Otherwise, an appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	AffectedDeviceTagged	
	Error.details	String	Cannot update device states for incident(s): {0}. Affected device: {1} already tagged.	
Changed Incidents –	Result	String	PARTIAL/FAILED	

Use Case	Message Mapping			Action
	Property	Type	Value	
Affected Phase Tagged	Error.code	String	2.7	External system sends ChangedIncidents message to update incidents where one of the device phases is already tagged. All incidents that do not have device phases that are tagged with a restricted type of tag assigned to them are updated. Otherwise, an appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.level	String	FATAL	
	Error.reason	String	AffectedPhaseTagged	
	Error.details	String	Cannot update device states for incident(s): {0}. Affected Phase: {1} already tagged.	
Changed Incidents – Rollup/Rolldown/Open/Close operation for Incident Without Device	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message to execute some action on the incident that does not have associated device. All incidents that have associated device are updated. Otherwise, an appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidOperationForIncidentWithoutDevice	
	Error.details	String	Invalid operation attempted: {0} for incident: {1}.	

8.1.2.4. Incident Resolution Data

Table 8.4 – The ChangedIncidents operation – Incident Resolution Data Use Cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Changed Incidents – Valid Incident Resolution refer to	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid resolution refer to field status. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents –	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident.

Use Case	Message Mapping			Action
	Property	Type	Value	
Valid Incident Resolution construction type	Error.code	String	N/A	External system sends ChangedIncidents message with valid resolution construction type field. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident Resolution failed component	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid resolution failed component field. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident Resolution material	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid resolution material field. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident Resolution data problem	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid resolution data problem field. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident Resolution cause	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid incident cause. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Valid Incident Resolution subcause	Result	String	OK	Precondition: Crew which attempts update is assigned to the given incident. External system sends ChangedIncidents message with valid incident subcause. All incidents are updated. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Changed Incidents – Invalid Incident Resolution refer to	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid refer to field. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidReferTo	
	Error.details	String	Invalid refer to: {0} for Incident(s): {1}	
Changed Incidents – Invalid Incident Resolution construction type	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid constructiontype field. Incidents that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidConstructionType	
	Error.details	String	Invalid construction type: {0} for Incident(s): {1}	
Changed Incidents – Invalid Incident Resolution failed component	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid failed component field. Incidents from request that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidFailedComponent	
	Error.details	String	Invalid failed component: {0} for Incident(s): {1}	

Use Case	Message Mapping			Action
	Property	Type	Value	
Changed Incidents – Invalid Incident Resolution material	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid material field. Incidents from request that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidMaterial	
	Error.details	String	Invalid material: {0} for Incident(s): {1}	
Changed Incidents – Invalid Incident Resolution data problem	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid data problem field. Incidents from request that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidDataProblem	
	Error.details	String	Invalid data problem: {0} for Incident(s): {1}	
Changed Incidents – Invalid Incident Resolution cause	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid cause. Incidents from request that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidCause	
	Error.details	String	Invalid Cause: {0} for Incident(s): {1}	
Changed Incidents – Invalid Incident Resolution subcause	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where several incidents contain invalid subcause. Incidents from request that have valid data are processed. Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidSubCause	
	Error.details	String	Invalid Subcause: {0} for Incident(s): {1}	
	Result	String	PARTIAL/FAILED	External system sends ChangedIncidents message where incident's cause and subcause are not correctly associated. Incidents that have valid data are processed.
	Error.code	String	1.2	

Use Case	Message Mapping			Action
	Property	Type	Value	
Changed Incidents – Invalid Cause/Subcause Association	Error.level	String	FATAL	Otherwise, appropriate error is returned. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.reason	String	InvalidCauseSubcauseAssociation	
	Error.details	String	Invalid cause to subcause association: {0} for Incident(s): {1}.	

9. GETINCIDENTUSAGEPOINTS SERVICE

9.1. GetIncidentUsagePoints Operation

9.1.1. Overview

When the external system requires a list of active (affected/unrestored) or archived usage points (Service Delivery Points) for specific incident, the *GetIncidentUsagePointsService* provides such feature.

Obtaining of active (affected/unrestored) or archived usage points affected by specific incident is initiated by forwarding the *GetIncidentsUsagePointsRequest* object and invoking of an appropriate operation. The OSR Adapter performs initial validation of the received data, transforms it into the appropriate internal format and pulls the data from the EcoStruxure GridOps instance or Operations database in the DMZ system.

The request message must contain the *Header.Context* and unique identifier of the incident for which usage point information is requested. The OSR Adapter populates the *GetIncidentUsagePointsResponse* with the information about all active (affected/unrestored) or archived usage points by incident specified in the request message. Population of the contact information is optional and can be configured, depending on the regulatory obligations.

In case when the request message is invalid, the OSR Adapter returns the *GetIncidentUsagePointsFault* with detailed explanation of the occurred error.

Figure 9.1 provides the visual representation for the described sequence of events.

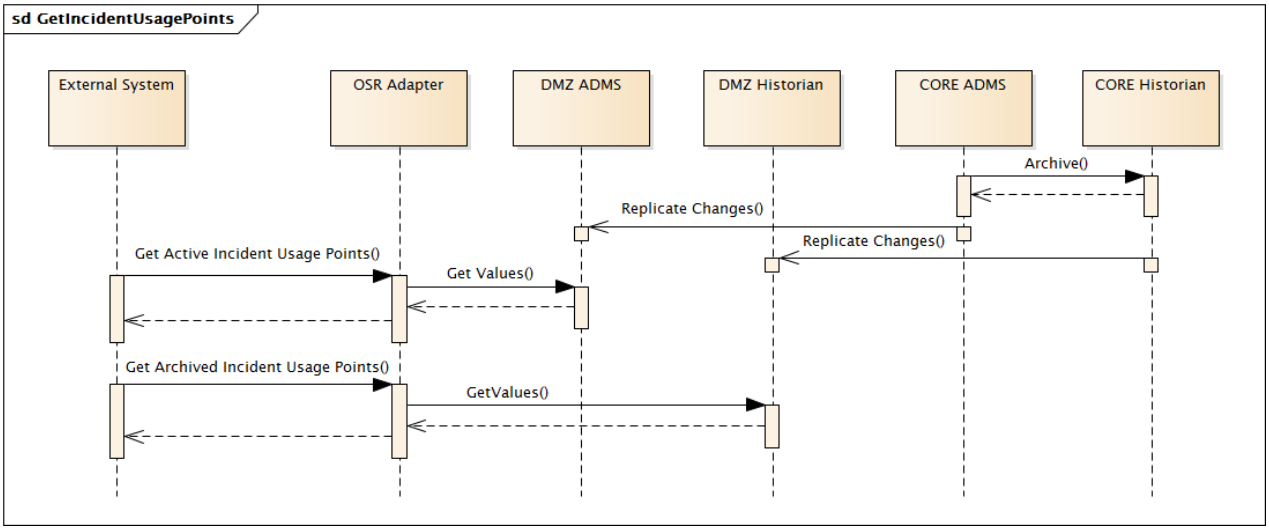

Figure 9.1 – The GetIncidentUsagePoints operation execution

9.1.2. Use Cases

The list of possible use cases and corresponding faults is given in Table 9.1.

Table 9.1 – The GetIncidentUsagePoints use cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Supported common use cases are described in Table 5.1 – The CreatedIncidentHazards operation use cases				
Invalid Context	Result	String	FAILED	External system sends request request message with invalid Context. Response message is sent by OSR Adapter with FAILED result and message is discarded.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidContext	
	Error.details	String	Invalid context: {0}.	
Get IncidentUsagePoints – Message contains valid Incident.mRID	Result	String	OK	External system sends GetIncidentUsagePoints request message with valid Incident.mRID. Payload is populated with the list of active or archived useage points, for given Incident.mRID. Response message is sent by OSR Adapter with OK result.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Get IncidentUsagePoints – Message contains invalid Incident.mRID	Result	String	PARTIAL/FAILED	External system sends GetIncidentUsagePoints request message with several Incident.mRIDs that do not exist. For valid incident mRIDs, usage point data is returned. Otherwise, appropriate error is specified. Response message is sent by OSR Adapter with PARTIAL/FAILED result.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EntityNotFound	
	Error.details	String	Invalid entity mRID(s): {0}	

10. MESSAGES

10.1. Common

10.1.1. Header

The header section is defined according to the IEC 61968-100 standard. Currently, there are two required fields that must be populated:

- ***Verb*** – to identify a specific action to be taken. There is an enumerated set of valid verbs, where commonly used values include “get”, “create”, “change”, “cancel”, “close”, “execute” and “reply”. Within the event notification messages “past tense” verbs are used, which can include “created”, “changed”, “canceled”, “closed” and “executed”. Implementations should treat deprecated verbs “update” and “updated” as synonyms to “change” and “changed”.
- ***Noun*** – to identify the subject of the action and/or the type of the payload, such as Incidents, IncidentHazards, IncidentUsagePoints, etc.

Field that can be optionally supplied include the following:

- Revision – to indicate the revision of the message definition. By default, this should be “1”.
- ReplayDetection – this is a complex element with a timestamp and a nonce used to guard against replay attacks. The timestamp is generated by the source system to indicate when the message was created. The nonce is a sequence number or randomly generated string (e.g. UUID) that would not be repeated by the source system for at least a day. This serves to improve encryption.
- ***Context*** – a string that can be used to identify the context of the message. This can help provide an application level guard against incorrect message consumption in configurations where there may be multiple system environments running over the same messaging infrastructure. Some example values are PRODUCTION, TESTING, STUDY and TRAINING.
- Timestamp – an ISO 8601 compliant string that identifies the time the message was sent. This is analogous to the JMSTimestamp provided by JMS. Either Zulu (‘Z’) time or time with a time zone offset may be used.
- Source – identifying the source of the message, which should be the name of the system or organization.
- AsyncReplyFlag – the Boolean data type (“true” or “false” values) that indicates whether a reply message will be sent asynchronously. By default, replies are assumed to be sent synchronously.
- ReplyAddress – the address to which replies should be sent. This is typically used for asynchronous replies. This should take the form of a URL, topic name or queue name. This is analogous to the JMSReplyTo field provided by JMS. This is ignored when using unidirectional integration patterns (e.g., AckRequired=false). If the reply address is a topic, the topic name should be prefixed by “topic”. If the reply address is a queue, the queue name should be prefixed by “queue”. If the reply address is a web service, the reply address should be a URL beginning with “http://” or “https:/”.
- AckRequired – the Boolean data type (“true” or “false” values) that indicates whether an acknowledgement is required. If false, this would indicate that a unidirectional integration pattern is being used for communicating transactional messages.

- User – a complex structure that identifies the user and associated organization. Should be supplied as it may be required for some interfaces, depending upon underlying implementations. This allows the UsersID string and optional the Organization string as sub-elements.
- MessageID – a string that uniquely identifies a message. Use of the UUID or sequence number is recommended. This is analogous to the JMSMessageID provided by JMS. A process should not issue two messages using the same MessageID value.
- CorrelationID – this is used to “link” messages together. This can be supplied on a request, so that the client can correlate a corresponding reply message. The server will place the incoming CorrelationID value as the CorrelationID on the outgoing reply. If not supplied on the request, the CorrelationID of the reply should be set to the value of the MessageID that was used on the request, if present. This is analogous to the use of the JMSCorrelationID provided by JMS. Given that the CorrelationID is used to ‘link’ messages together, it may be reused on more than one message. Use of a UUID or sequence number is recommended.
- Comment – any descriptive text, but shall never be used for any processing logic.
- Property – a complex type that allows the custom name/value pairs to be conveyed. The source and targets would need to agree upon usage. These are analogous to a Property as defined by JMS.
- Any – it can be used for custom extensions.

Figure 10.1 shows the graphical representation of the header field.

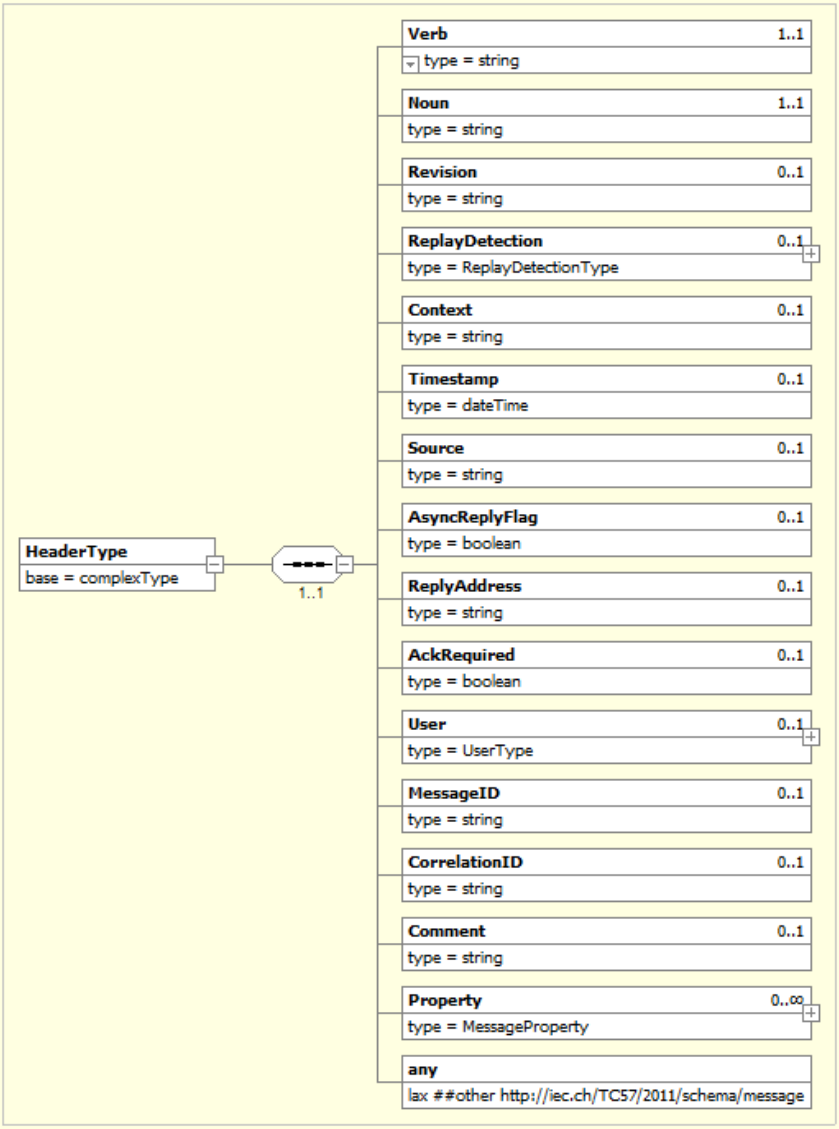

Figure 10.1 – The header field

10.1.2. Reply and Fault

The Reply.result value is an enumeration and would be populated in the following manner:

- "OK" – if there are no errors and all results have been returned. There is no requirement that a Reply.Error element be present.
- "PARTIAL" – if only a partial set of results has been returned, with or without errors. Existence of errors is indicated with one or more Reply.Error.code elements.
- “FAILED" – if no result can be returned due to one or more errors, indicated with one or more Reply.Error elements, each with a mandatory application level ‘code’.

If the result type is “PARTIAL” or “FAILED”, the **Error** field will be populated with the appropriate error description. The contents the **Reply** and **Error** fields are presented in Figure 10.2.

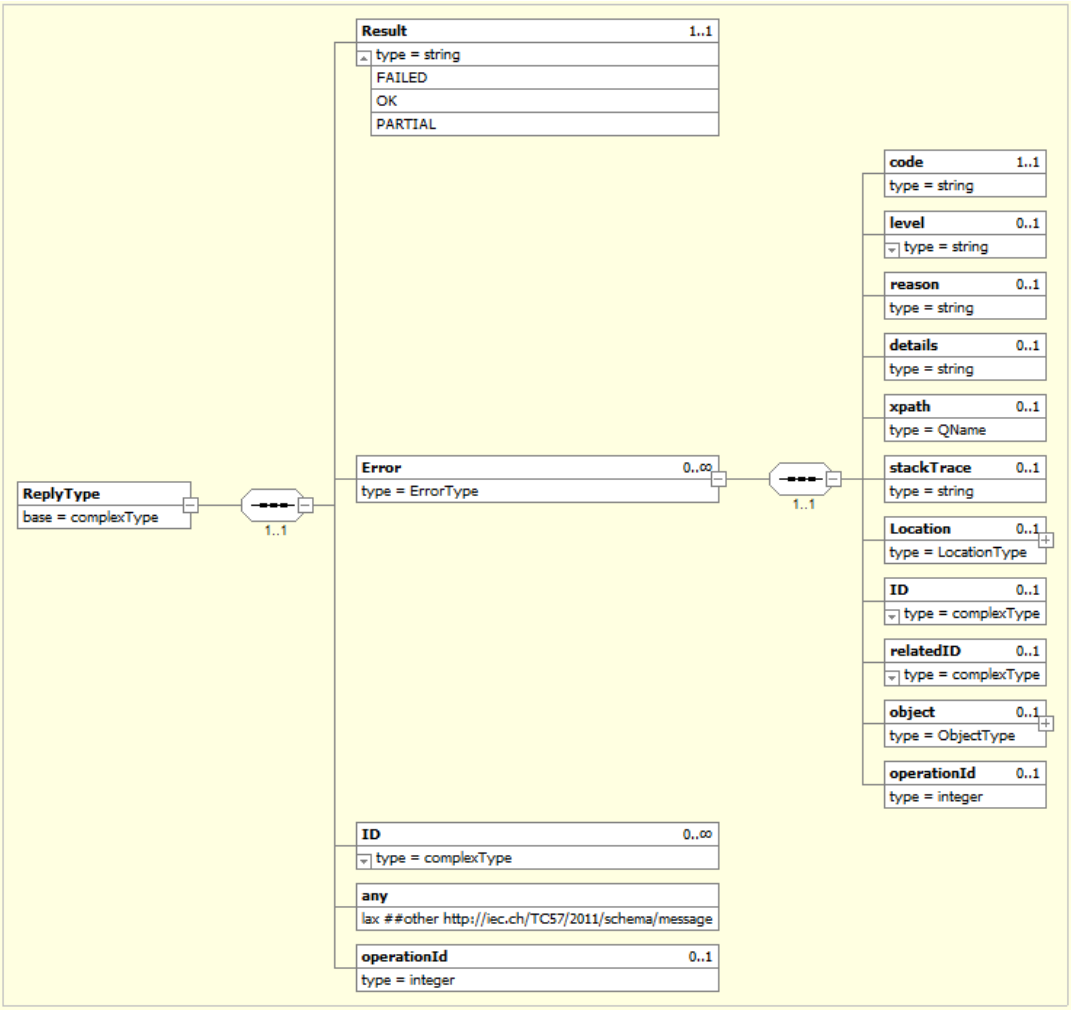

*Figure 10.2 – The **Reply** and **Error** field contents*

10.2. CreatedIncidentHazards Operation Messages

The operation definition:

CreatedIncidentHazardsResponse CreatedIncidentHazards*(CreatedIncidentHazardsEvent)*

10.2.1. Request

The *CreatedIncidentHazards* event message is defined according to the IEC 61968-100 and contains the following two sections:

- Header
- Payload

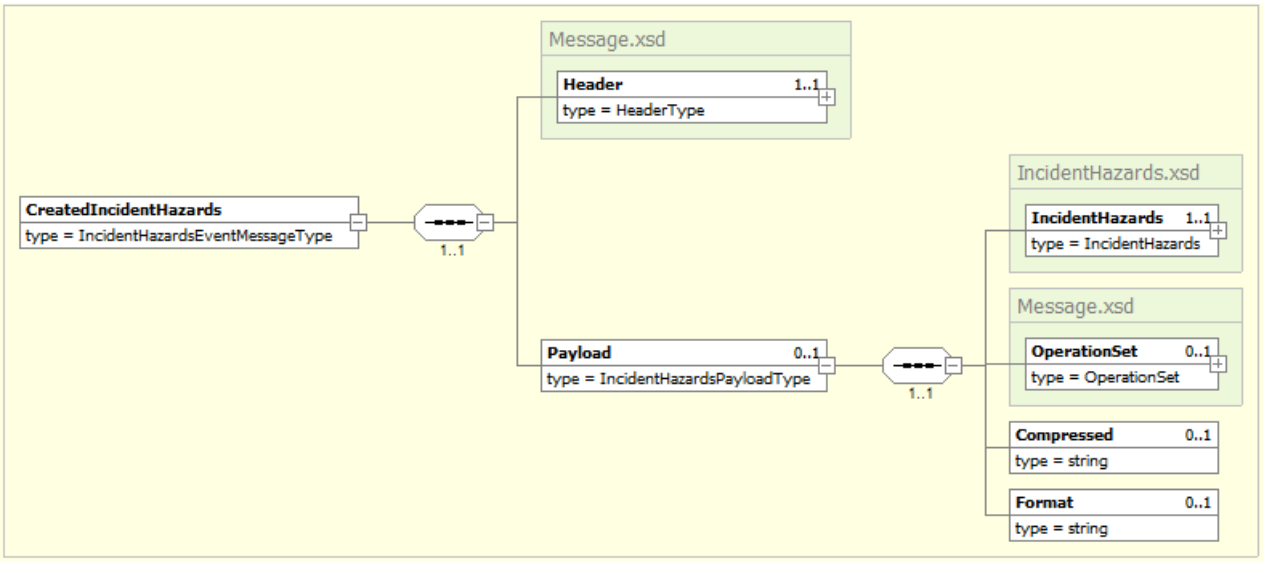

Figure 10.3 – The CreatedIncidentHazardsEvent message

The Payload section carries the CIM defined profile (IncidentHazards.xsd) for insertion of one or several incident hazards. The visual representation of the IncidentHazards.xsd schema is given in Figure 10.4.

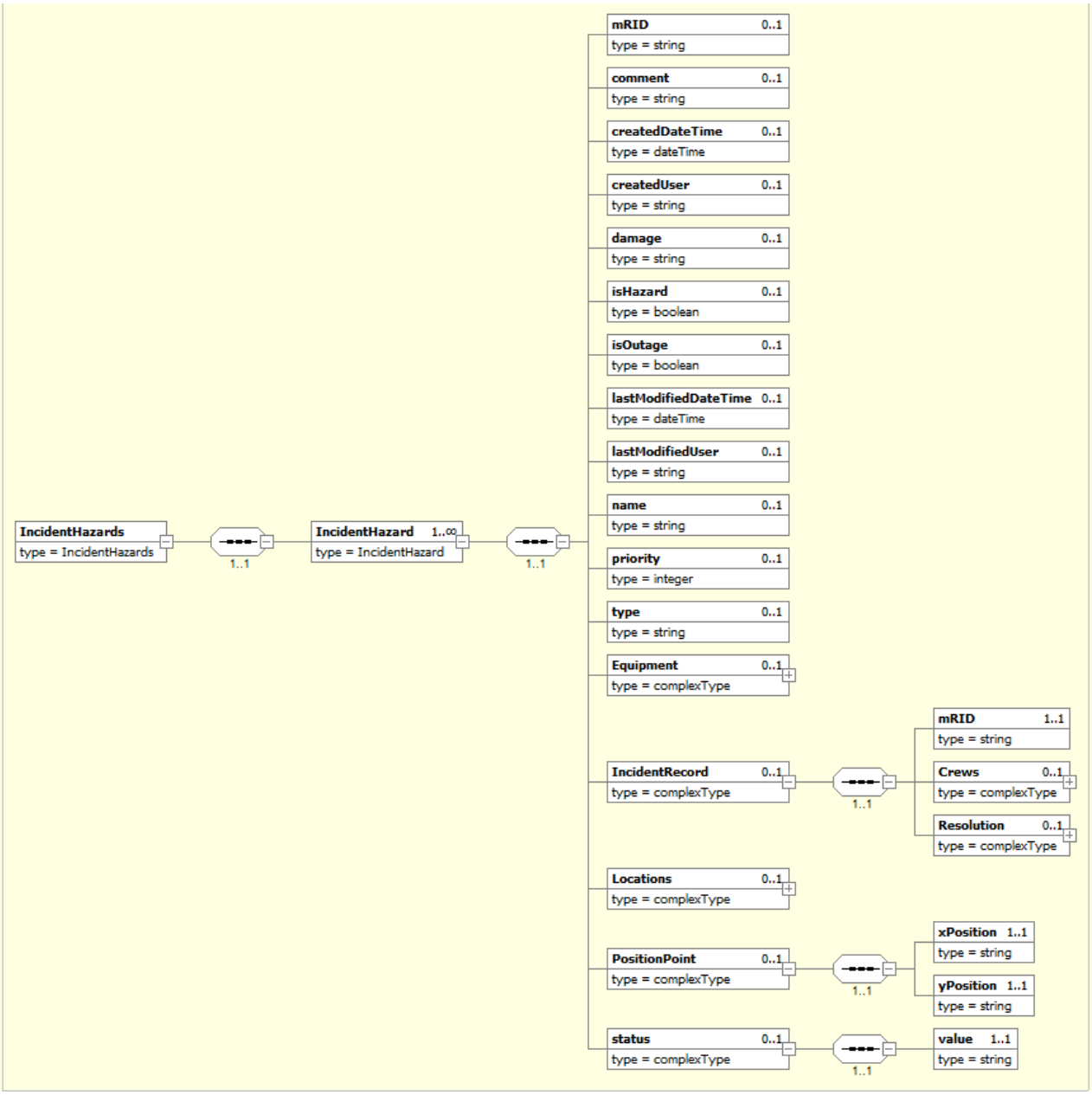

Figure 10.4 – IncidentHazards.xsd

Table 10.1 defines the mapping between the *IncidentHazards.xsd* and the appropriate entities in the outage model.

Table 10.1 – The CreatedIncidentHazardsEvent message → the outage model mapping

CreatedIncidentHazards message			Description	Outage model		
Section	**Property**	**Type**		**Property**	**Type**	**Model Code**
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is created.	Populated by external system	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentHazards.	Populated by external system	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by external system	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source can be: FieldClient, etc.	Populated by external system	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by external system	N/A	N/A
Header	**CorrelationID**	String	Same as message ID.	Populated by external system	N/A	N/A
Payload	comment	String	Comment submitted with an incident hazard	Comment	String	OMS_PROBLEM_COMMENT
Payload	createdDateTime	String	Timestamp of incident hazard creation.	Comment	String	OMS_PROBLEM_CREATE_TIME
Payload	createdUser	String	User that created the incident hazard.	Comment	String	OMS_PROBLEM_CREATE_USER
Payload	damage	String	Determines the level of damage. Some of the values No Damage, Live wires down, Life-threatening, Safety facilities, Transmission lines, Substation equipment, Main lines, Secondary line, Service line, etc. Default: No Damage.	DamageRef	Long	OMS_PROBLEM_DAMAGE_TYPE_REF
Payload	isHazard	Boolean	Determines whether reported incident hazard is hazard. Default: false	isHazard	Boolean	OMS_PROBLEM_IS_HAZARD
Payload	isOutage	Boolean	Determines whether reported incident hazard is an actual outage. Default: false	isOutage	Boolean	OMS_PROBLEM_IS_OUTAGE
Payload	name	String	Optional name of the incident hazard. Can be set by an external system	N/A	N/A	N/A
Payload	priority	Integer	Priority of a hazard. If not specified it will be defaulted according to OMS configuration and type of hazard.	Priority	Integer	OMS_PROBLEM_PRIORITY

CreatedIncidentHazards message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Payload	**type**	String	Incident hazard type. Examples are line down, gas leak, fire, etc.	ProblemTypeRef	Long	OMS_PROBLEM_TYPEREF
Payload	Equipment.mRID	String	Unique identifier of the equipment to which incident hazard is associated to	Device	Long	OMS_PROBLEM_DEVICE
Payload	Location	Location	Used for location based incident hazards (hazards that are not connected to any electrical device). Contains information about the search type and search criteria. Detailed information is given in Table 10.2.	DeviceLocation	String	OMS_PROBLEM_LANDBASE_LOCATION
Payload	PostionPoint. xPosition	String	X coordinate of the incident hazard	CoordinateX	Double	OMS_PROBLEM_COORDINATE_X
Payload	PostionPoint. yPosition	String	Y coordinate of the incident hazard	CoordinateY	Double	OMS_PROBLEM_COORDINATE_Y
Payload	status.value	String	Incident hazard status. Examples: Unconfirmed, Confirmed, Completed, Cancelled, etc. Default: Unconfirmed and can only be updated.	ProblemStatusRef	Long	OMS_PROBLEM_STATUSREF

Table 10.2 – The location → the outage model mapping

Location			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Note: Location highly depends on available landbase data, meaning that attributes given in this table must contain exact values of landbase objects from imported landbase schema.						
Payload	type	String	Search type value from landbase search configuration file.	EventLocation	String	OMS_PROBLEM_LANDBASE_LOCATION
Payload	description	String	Search parameter name from landbase search configuration file	EventLocation	String	OMS_PROBLEM_LANDBASE_LOCATION
Payload	name	String	Search parameter value from landbase search configuration file.	EventLocation	String	OMS_PROBLEM_LANDBASE_LOCATION

10.2.2. Response

After incident hazards are created, the response is returned in form of the *IncidentHazardsResponse* message. The unique identifier of the created incident hazard along with its status is returned within the response message. The content is given in Figure 10.5.

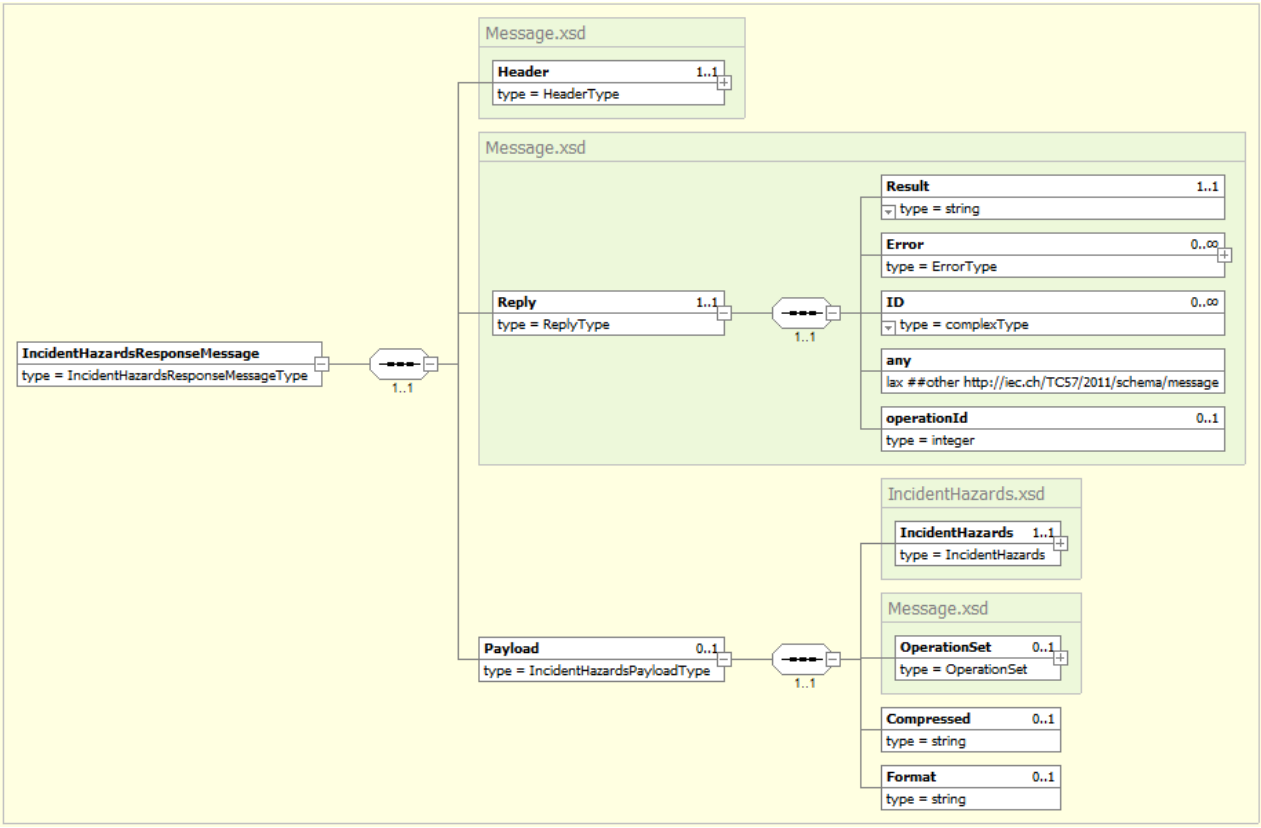

Figure 10.5 – The IncidentHazardsResponse message

Table 10.3 defines the mapping between the *IncidentHazards.xsd* object and the appropriate entities in the outage model for the response message.

Table 10.3 – The IncidentHazardsResponse message → the outage model mapping

IncidentHazardsResponse message			Description	Outage model		
Section	**Property**	**Type**		**Property**	**Type**	**Model Code**
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentHazards.	Populated by OSR Adapter	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A	N/A
Payload	mRID	String	Unique identifier of the incident hazard. Generated by EcoStruxure GridOps and returned within a response message	CustomID	String	OMS_IMSOBJ_UID
Payload	status.value	String	Creation result for incident hazard.	Populated by OSR Adapter	String	N/A

10.2.3. Fault

The *IncidentHazardsFault* message is depicted in Figure 10.6.

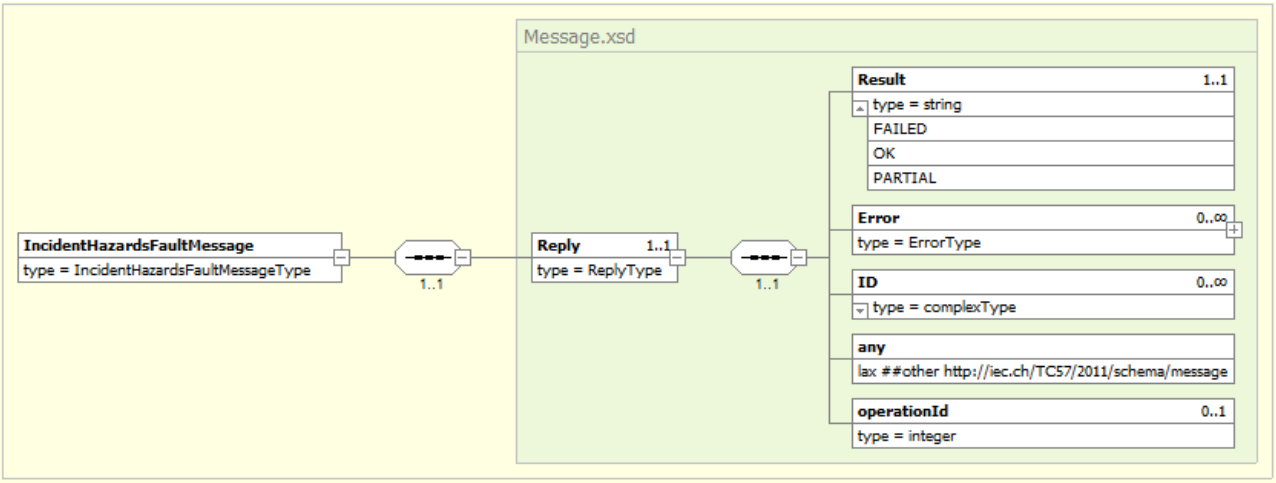

Figure 10.6 – The IncidentHazardsFault message

10.3. ChangedIncidentHazards Operation Messages

The operation definition:

ChangedIncidentHazardsResponse ChangedIncidentHazards*(ChangedIncidentHazardsEvent)*

10.3.1. Request

The *ChangedIncidentHazards e*vent message is defined according to the IEC 61968-100 and contains the following two sections:

- Header
- Payload

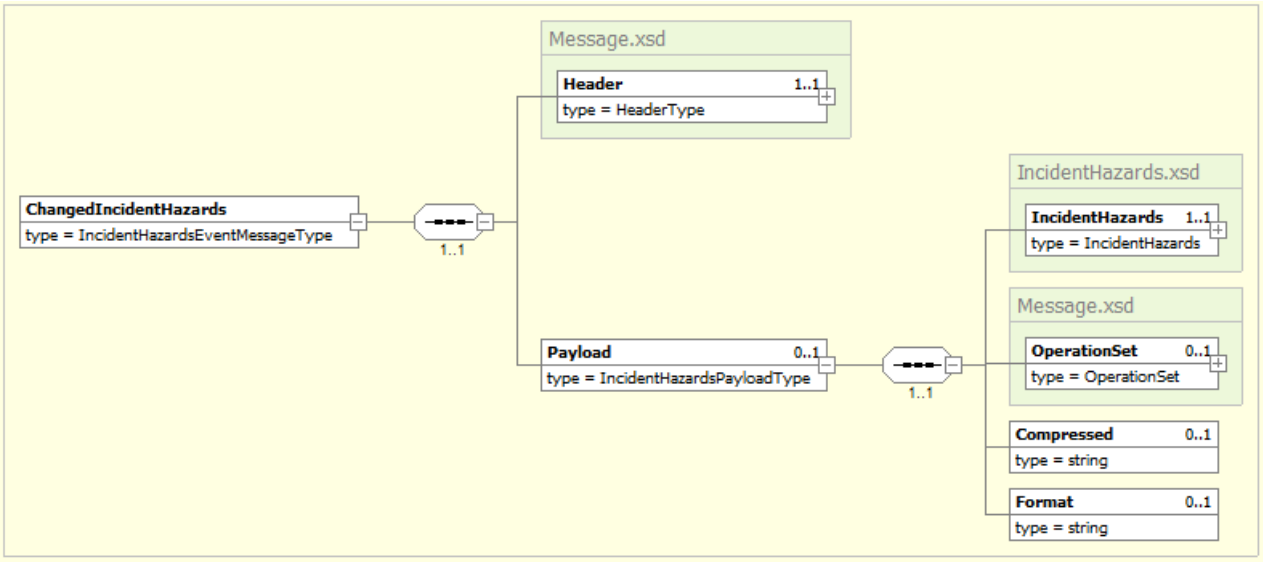

Figure 10.7 – The ChangedIncidentHazardsEvent message

The Payload section carries the CIM defined profile (*IncidentHazards.xsd*) for update of one or several incident hazards. The visual representation of the *IncidentHazards.xsd* schema is given in Figure 10.4.

Even though the same schema is used for updating the operation such as for the insert operation, only attributes given in the Table 10.4 can be updated from the external system, based on the given mRID.

Table 10.4 – The ChangedIncidentHazardsEvent message → the outage model mapping

ChangedIncidentHazards message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is changed.	Populated by external system	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentHazards.	Populated by external system	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by external system	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source can be: FieldClient, etc.	Populated by external system	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by external system	N/A	N/A
Header	**CorrelationID**	String	Same as message ID.	Populated by external system	N/A	N/A
Payload	mRID	String	Unique identifier of the incident hazard based on which related data is updated.	CustomID	String	OMS_IMSOBJ_UID
Payload	comment	String	Comment submitted with an incident hazard.	Comment	String	OMS_PROBLEM_COMMENT
Payload	damage	String	Determines the level of damage. Some of the values: No Damage, Small, Medium, Large.	DamageRef	Long	OMS_PROBLEM_DAMAGE_TYPE_REF
Payload	isHazard	Boolean	Determines whether reported incident hazard is hazard to someone.	isHazard	Boolean	OMS_PROBLEM_IS_HAZARD
Payload	lastModifiedDateTime	String	Last update time of the hazard.	LastUpdateTime	String	OMS_PROBLEM_LAST_UPDATE_TIME
Payload	lastModifiedUser	String	Last update user of the hazard.	LastUpdateUser	String	OMS_PROBLEM_LAST_UPDATE_USER
Payload	name	String	Optional name of the incident hazard. Can be set by an external system	N/A	N/A	N/A

ChangedIncidentHazards message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Payload	priority	Integer	Priority of a hazard	Priority	Integer	OMS_PROBLEM_PRIORITY
Payload	Equipment.mRID	String	Unique identifier of the equipment to which incident hazard is associated to	Device	Long	OMS_PROBLEM_DEVICE
Payload	IncidentRecord. mRID	String	Unique identifier of the incident.	N/A	N/A	N/A
Payload	Location	Location	Used for location based incident hazards (hazards that are not connected to any electrical device). Contains information about the search type and search criteria. Detailed information is given in Table 10.2.	DeviceLocation	String	OMS_PROBLEM_LANDBASE_LOCATION
Payload	PostionPoint. xPosition	String	X coordinate of the incident hazard	CoordinateX	Double	OMS_PROBLEM_COORDINATE_X
Payload	PostionPoint. yPosition	String	Y coordinate of the incident hazard	CoordinateY	Double	OMS_PROBLEM_COORDINATE_Y
Payload	status.value	String	Incident hazard status. Examples: Unconfirmed, Confirmed, Completed, Cancelled, etc. Initially set to Unconfirmed and can only be updated.	ProblemStatusRef	Long	OMS_PROBLEM_STATUSREF

10.3.2. Response

After incident hazards are updated, the response is returned in form of the *IncidentHazards* response message. The unique identifier of the changed incident hazard along with its status is returned within the response message (Table 10.3). The content is given in Figure 10.5.

10.3.3. Fault

The *IncidentHazardsFault* message is depicted in Figure 10.6.

10.4. GetIncidentHazards Operation Messages

The operation definition:

GetIncidentHazardsResponse GetIncidentHazards*(GetIncidentHazardsEvent)*

10.4.1. Request

The *GetIncidentHazards request* message is defined according to the IEC 61968-100 and contains the following three sections:

- Header
- Request
- Payload

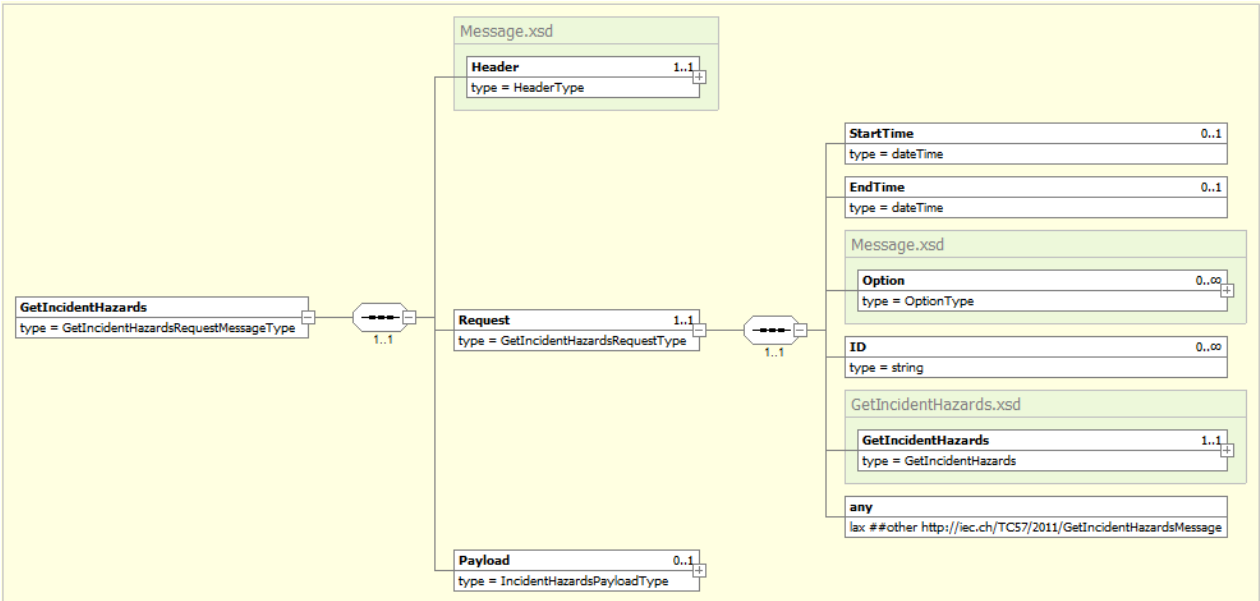

Figure 10.8 – The GetIncidentHazards request message

The request message contains the payload in form of the *GetIncidentHazards.xsd* schema while the response message contains the payload in form of the *IncidentHazards.xsd* schema which represents the CIM Profile for incident hazards. The visual representation of the *IncidentHazards.xsd* schema is given in Figure 10.4 while the *GetIncidentHazards.xsd* is shown in Figure 10.9.

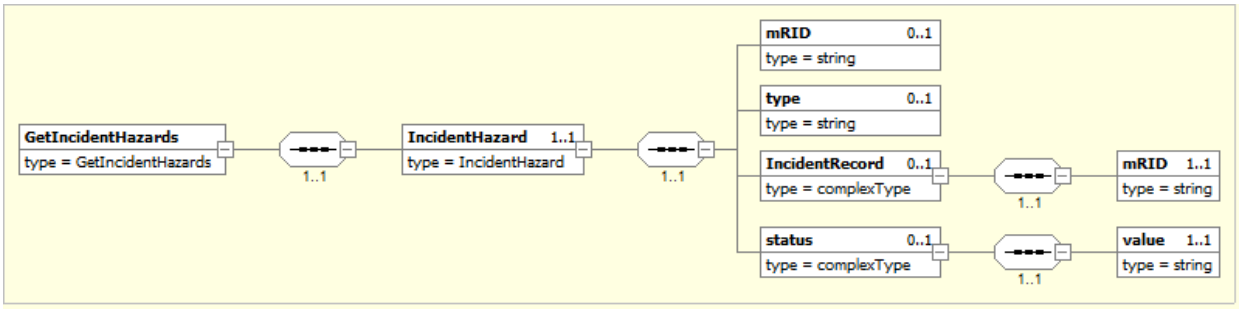

Figure 10.9 – GetIncidentHazards.xsd

Table 10.5 defines the mapping between the *GetIncidentHazards.xsd* and the appropriate entities in the outage model.

Table 10.5 – The GetIncidentHazards message → the outage model mapping

GetIncidentHazards message			Description	Outage model		
Section	**Property**	**Type**		**Property**	**Type**	**Model Code**
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is get.	Populated by external system	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentHazards.	Populated by external system	N/A	N/A
Header	**Context**	String	Context of the incident hazard information that needs to be pulled. Valid values: active, archived and all.	Populated by external system	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by external system	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source can be: FieldClient, BI, etc.	Populated by external system	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by external system	N/A	N/A
Header	**CorrelationID**	String	Same as message ID.	Populated by external system	N/A	N/A
Request	mRID	String	Unique identifier of the incident hazard for which data is being requested.	Problem.CustomID PROBLEM.UID	String nvarchar(MAX)	OMS_IMSOBJ_UID UID
Request	IncidentRecord. mRID	String	Unique identifier of the incident for which related incident hazard data is being requested.	Incident.CustomID INCIDENT.UID	String nvarchar(MAX)	OMS_IMSOBJ_UID UID
Request	Type	String	Incident hazard type. Examples: line down, gas leak, fire, etc.	ProblemTypeRef PROBLEM_TYPE_GID	Long bigint	OMS_PROBLEM_TYPEREF PROBLEM_TYPE_GID
Request	status.value	String	Incident hazard status. Examples: Unconfirmed, Confirmed, Completed, Cancelled, etc.	ProblemStatusRef PROBLEM_STATUS_GID	Long bigint	OMS_PROBLEM_STATUSREF PROBLEM_STATUS_GID

10.4.2. Response

After the *GetIncidentHazards* operation is invoked, the appropriate incident hazards are returned within the *IncidentHazardsResponse* message. The content of the response message is given in Figure 10.10.

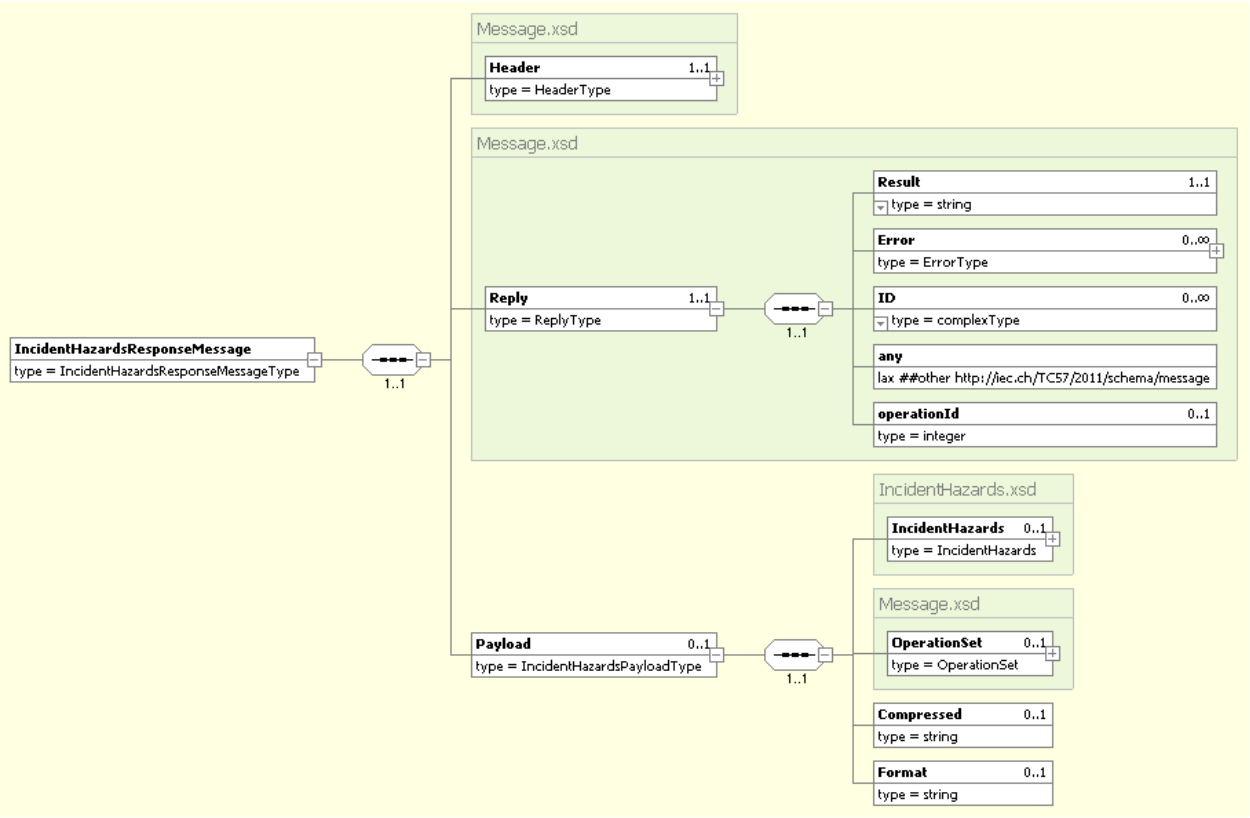

Figure 10.10 – The IncidentHazardsResponse message

Depending on the information provided in the *GetIncidentHazards* request message, the response message contains the different level of details related to incident hazards.

In case when the request message contains the unique identifier of incident (mRID), the response message to the calling system contains only the basic information for all incident hazards related to the incident with the provided unique identifier.

10.4.2.1. Active-Reduced Set

Table 10.6 defines the mapping between the *IncidentHazards.xsd* and the appropriate entities in the outage model for the response message when the external system requests all **active** incident hazards per type, status or unique incident identifier.

Table 10.6 – The IncidentHazardResponse message → the outage model mapping (limited details)

IncidentHazardsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentHazards.	Populated by OSR Adapter	N/A	N/A
Header	**Context**	String	Same as Context from request message. Valid values: active, archived and all.	Populated by OSR Adapter	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A	N/A
Payload	mRID	String	Unique identifier of the incident hazard.	CustomID	String	OMS_IMSOBJ_UID
Payload	comment	String	Comment submitted with an incident hazard.	Comment	String	OMS_PROBLEM_COMMENT
Payload	createdDateTime	DateTime	Creation time of the hazard.	CreatedDateTime	DateTime	OMS_PROBLEM_CREATE_TIME
Payload	priority	Integer	Priority of the incident hazard.	Priority	Integer	OMS_PROBLEM_PRIORITY

IncidentHazardsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Payload	type	String	Incident hazard type. Examples: line down, gas leak, fire, etc.	ProblemTypeRef	Long	OMS_PROBLEM_TYPEREF
Payload	IncidentRecord. mRID	String	Unique identifier of the incident.	IncRef	Long	OMS_PROBLEM_INCREF
Payload	status.value	String	Incident hazard status. Examples: Unconfirmed, Confirmed, Completed, Cancelled, etc.	ProblemStatusRef	Long	OMS_PROBLEM_STATUSREF

10.4.2.2. Active-Full Set

When the incident hazard information is requested by the unique identifier of incident hazard, more details are provided to calling system. Table 10.7 defines the mapping between the *IncidentHazards.xsd* and the appropriate entities in the outage model for the response message when the **active** incident hazard data is requested by the incident hazard unique identifier in the EcoStruxure GridOps.

Table 10.7 – The IncidentHazardsResponse message → the outage model mapping

IncidentHazardsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentHazards.	Populated by OSR Adapter	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A	N/A

IncidentHazardsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A	N/A
Payload	mRID	String	Unique identifier of the incident hazard.	CustomID	String	OMS_IMSOBJ_UID
Payload	comment	String	Comment submitted with an incident hazard.	Comment	String	OMS_PROBLEM_COMMENT
Payload	createdDateTime	DateTime	Creation time of the hazard.	CreatedDateTime	DateTime	OMS_PROBLEM_CREATE_TIME
Payload	damage	String	Determines the level of damage. Some of the values: No Damage, Small, Medium, Large.	DamageRef	Long	OMS_PROBLEM_DAMAGE_TYPE_REF
Payload	isHazard	Boolean	Determines whether reported incident hazard is hazard to someone.	isHazard	Boolean	OMS_PROBLEM_IS_HAZARD
Payload	isOutage	Boolean	Determines whether reported incident hazard is an actual outage.	isOutage	Boolean	OMS_PROBLEM_IS_OUTAGE
Payload	lastModifiedDateTime	DateTime	Last modified time of the hazard.	LastUpdateDateTime	DateTime	OMS_PROBLEM_LAST_UPDATE_TIME
Payload	lastModifiedUser	String	Last update user of the hazard.	LastUpdateUser	String	OMS_PROBLEM_LAST_UPDATE_USER
Payload	priority	Integer	Priority of the incident hazard.	Priority	Integer	OMS_PROBLEM_PRIORITY
Payload	type	String	Incident hazard type. Examples are line down, gas leak, fire, etc.	ProblemTypeRef	Long	OMS_PROBLEM_TYPEREF
Payload	Equipment. mRID	String	Unique identifier of the equipment to which incident hazard is associated to.	Device	Long	OMS_PROBLEM_DEVICE
Payload	Equipment. name	String	Optional name of the equipment.	DeviceName	String	N/A
Payload	IncidentRecord.	String	Unique identifier of the incident.	IncRef	Long	OMS_PROBLEM_INCREF

IncidentHazardsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
	mRID					
Payload	IncidentRecord. Resolution. constructionType	String	Field for defining type of the construction on which work was performed.		Long	
Payload	IncidentRecord. Resolution.dataProblem	String	Indication whether there was problem with data.		Long	
Payload	IncidentRecord. Resolution. failedComponent	String	Field to define type of component on which was problem.		Long	
Payload	IncidentRecord. Resolution.material	String	Material used for repair.		Long	
Payload	IncidentRecord. Resolution.referTo	String	Field used to set who was processing incident.		Long	
Payload	Location	Location	Used for location based incident hazards (hazards that are not connected to any electrical device). Contains information about the search type and search criteria. Detailed information is given in Table 10.2.	DeviceLocation	String	OMS_PROBLEM_LANDBASE_LOCATION
Payload	PostionPoint. xPosition	String	X coordinate of the incident hazard.	CoordinateX	Double	OMS_PROBLEM_COORDINATE_X
Payload	PostionPoint. yPosition	String	Y coordinate of the incident hazard.	CoordinateY	Double	OMS_PROBLEM_COORDINATE_Y
Payload	status.value	String	Incident hazard status. Examples: Unconfirmed, Confirmed, Completed, Cancelled, etc.	ProblemStatusRef	Long	OMS_PROBLEM_STATUSREF

10.4.2.3. Archived-Reduced Set

In situation when the external system requests the **archived** incident hazard data per type, status or incident identifier, Table 10.8 contains the mapping between the *IncidentHazards.xsd* and the appropriate entities in the Operations database.

Table 10.8 – The IncidentHazardsResponse message → the Operations database mapping (limited details)

IncidentHazardsResponse message			Description	Outage model	
Section	Property	Type		Property	Type
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentHazards.	Populated by OSR Adapter	N/A
Header	**Context**	String	Same as Context from request message. Valid values: active, archived and all.	Populated by OSR Adapter	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A
Payload	mRID	String	Unique identifier of the incident hazard.	UID	nvarchar(MAX)
Payload	comment	String	Comment submitted with an incident hazard.	COMMENT	nvarchar(MAX)
Payload	createdDateTime	DateTime	Creation time of the hazard.	CREATED_DATE_TIME	DateTime
Payload	priority	Integer	Priority of the incident hazard.	PRIORITY	int
Payload	type	String	Incident hazard type. Examples are line down, gas leak, fire, etc.	PROBLEM_TYPE_GID	bigint
Payload	IncidentRecord. mRID	String	Unique identifier of the incident.	INCIDENT_GID	bigint
Payload	status.value	String	Incident hazard status. Examples: Unconfirmed, Confirmed, Completed, Cancelled, etc.	PROBLEM_STATUS_GID	bigint

10.4.2.4. Archived-Full Set

When the **archived** incident hazard information is requested by the unique identifier of the incident hazard, more details for the specified incident hazard are provided to the calling system. Table 10.9 defines the mapping between the *IncidentHazards.xsd* and the appropriate entities in the Operations database for the response message when the archived incident hazard information is requested by the incident hazard unique identifier in the EcoStruxure GridOps.

Table 10.9 – The IncidentHazardResponse message → the Operations database mapping

IncidentHazardsResponse message			Description	Operations database	
Section	Property	Type		Property	Type
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentHazards.	Populated by OSR Adapter	N/A
Header	**Context**	String	Same as Context from request message. Valid values: active, archived and all.	Populated by OSR Adapter	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A
Payload	mRID	String	Unique identifier of the incident hazard.	UID	nvarchar(MAX)
Payload	comment	String	Comment submitted with an incident hazard.	COMMENT	nvarchar(MAX)
Payload	damage	String	Determines the level of damage. Some of the values: No Damage, Small, Medium, Large	DAMAGE_TYPE_GID	bigint
Payload	isHazard	Boolean	Determines whether reported incident hazard is hazard to someone	IS_HAZARD	bit

IncidentHazardsResponse message			Description	Operations database	
Section	Property	Type		Property	Type
Payload	lastModifiedDateTime	DateTime	Last modified time of the hazard.	LAST_UPDATE_TIME	DateTime
Payload	lastModifiedUser	String	Last update user of the hazard.	LAST_UPDATE_USER	String
Payload	priority	Integer	Priority of the incident hazard.	PRIORITY	int
Payload	type	String	Incident hazard type. Examples are line down, gas leak, fire, etc.	PROBLEM_TYPE_GID	bigint
Payload	Equipment. mRID	String	Unique identifier of the equipment to which incident hazard is associated to.	DEVICE_CUSTOM_ID	nvarchar(MAX)
Payload	Equipment. name	String	Optional name of the equipment.	DEVICE_NAME	nvarchar(MAX)
Payload	IncidentRecord. mRID	String	Unique identifier of the incident.	INCIDENT_GID	bigint
Payload	IncidentRecord. Resolution. constructionType	String	Field for defining type of the construction on which work was performed.		bigint
Payload	IncidentRecord. Resolution.dataProblem	String	Indication whether there was problem with data.		bigint
Payload	IncidentRecord. Resolution. failedComponent	String	Field to define type of component on which was problem.		bigint
Payload	IncidentRecord. Resolution.material	String	Material used for repair.		bigint
Payload	IncidentRecord. Resolution.referTo	String	Field used to set who was processing incident.		bigint
Payload	Location	Location	Used for location-based incident hazards (hazards that are not connected to any electrical device). Contains information about the search type and search criteria. Detailed information is given in Table 10.2.	LANDBASE_LOCATION	nvarchar(MAX)

IncidentHazardsResponse message			Description	Operations database	
Section	Property	Type		Property	Type
Payload	PostionPoint. xPosition	String	X coordinate of the incident hazard.	COORDINATE_X	float
Payload	PostionPoint. yPosition	String	Y coordinate of the incident hazard.	COORDINATE_Y	float
Payload	status.value	String	Incident hazard status. Examples: Unconfirmed, Confirmed, Completed, Cancelled, etc.	PROBLEM_STATUS_GID	bigint

10.4.3. Fault

The *IncidentHazardsFault* message is depicted in Figure 10.6.

10.5. GetIncidents Operation Messages

The operation definition:

GetIncidentsResponse GetIncidents*(GetIncidentsRequest)*

10.5.1. Request

The *GetIncidents* request message is defined according to the IEC 61968-100 and contains the following three sections:

- Header
- Request
- Payload

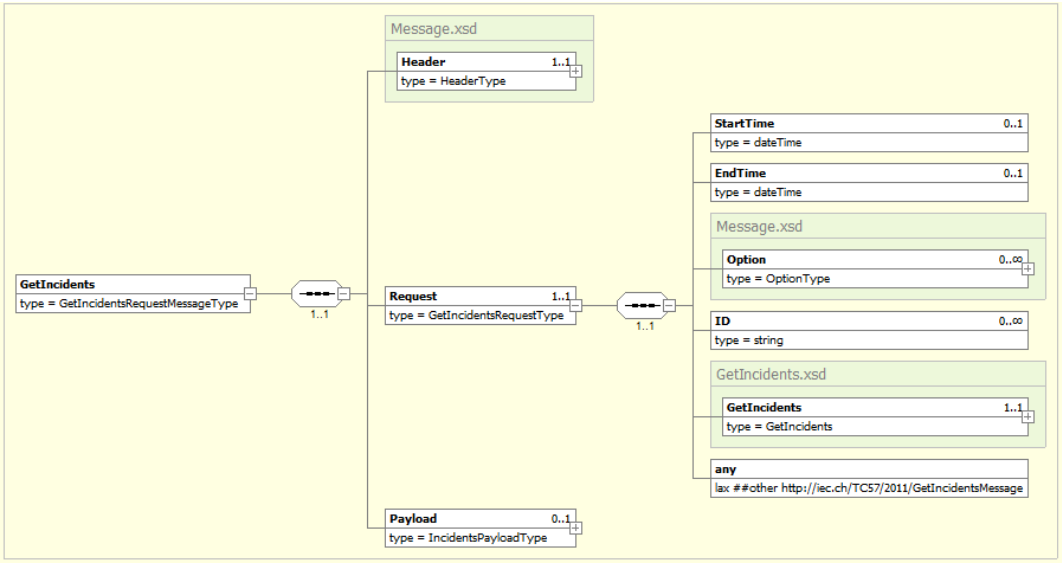

Figure 10.11 – The GetIncidents request message

The request message contains the payload in form of the *GetIncidents.xsd* schema. The visual representation of the aforementioned schema is given in Figure 10.12.

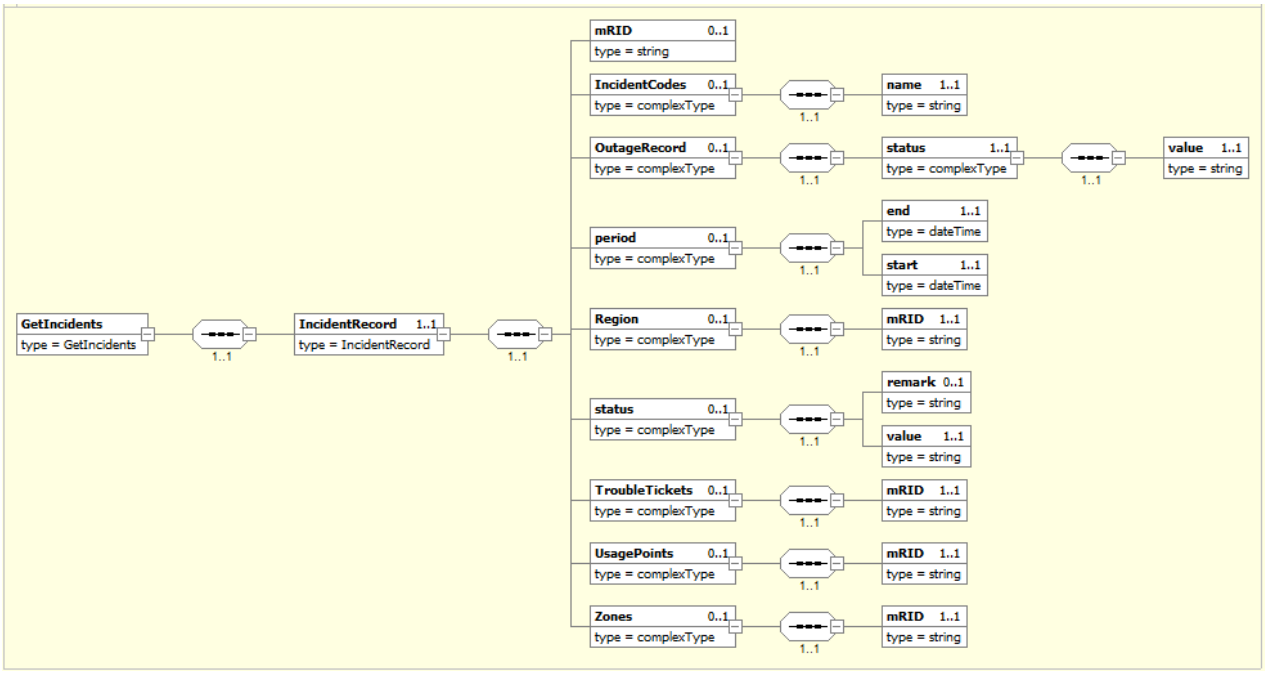

Figure 10.12 – GetIncidents.xsd

Table 10.10 defines the mapping between the payload of the *GetIncidents* message and the appropriate entities in the outage model.

Table 10.10 – The GetIncidents message → the outage model mapping

GetIncidents message			Description	Outage model		
Section	**Property**	**Type**		**Property**	**Type**	**Model Code**
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is get.	Populated by external system	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is Incidents.	Populated by external system	N/A	N/A
Header	**Context**	String	Context of the incident hazard information that needs to be pulled. Valid values: active, archived and all.	Populated by external system	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by external system	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source can be: FieldClient, External Analysis System, etc.	Populated by external system	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by external system	N/A	N/A
Header	**CorrelationID**	String	Same as message ID.	Populated by external system	N/A	N/A
Request	mRID	String	Unique identifier of the incident.	CustomID UID	String	
Request	IncidentCodes. name	String	Incident type. Examples: Non-outage, Planned Outage, Unplanned Outage, Planned Work, etc.	IncidentTypeRef	Long	
Request	OutageRecord. status.value	String	Incident power status. Examples: NoOutage, Restored NotRestored, PartiallyRestored.	IncidentPowerStatus	Enum	
Request	Period. start	DateTime	Start point of interval in which requested incidents are created.	CreationTime TIMESTAMP	datetime	OMS_INCIDENT_CREATE_TIME
Request	Period. end	String	End point of interval in which requested incidents are created.	CreationTime TIMESTAMP	datetime	OMS_INCIDENT_CREATE_TIME

GetIncidents message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Request	Region.mRID	String	Geographic region of the incident.	IncidentRegionName N/A	String	OMS_INCIDENT_REGION_NAME
Request	status.value	String	Incident status. Examples: New, Dispatched, Damage Assessed, Field Completed, Closed, Archived, Cancelled.	IncidentStatusRef N/A	Long	
Request	status.remark	String	Incident confirmation indicator: Confirmed, Unconfirmed. If value is omitted, all incidents are returned, regardless of confirmation.	IncidentConfirmation	Enum	
Request	TroubleTickets. mRID	String	Unique identifier of the TroubleTicket	PhoneCallEventRef PHONE_CALL_EVENT.UID	String	
Request	UsagePoints. mRID	String	Unique identifier of the SDP	SdpCustomID SERVICE_DELIVERY_POINT_ CUSTOMID	String	
Request	Zones. mRID	String	Unique identifier the AOR Group	AORGroup AOR_GROUP	String	

10.5.2. Response

After the *GetIncidents* operation is invoked, the appropriate incidents are returned within the *IncidentsResponse* message. The content of the response message is given in Figure 10.13.

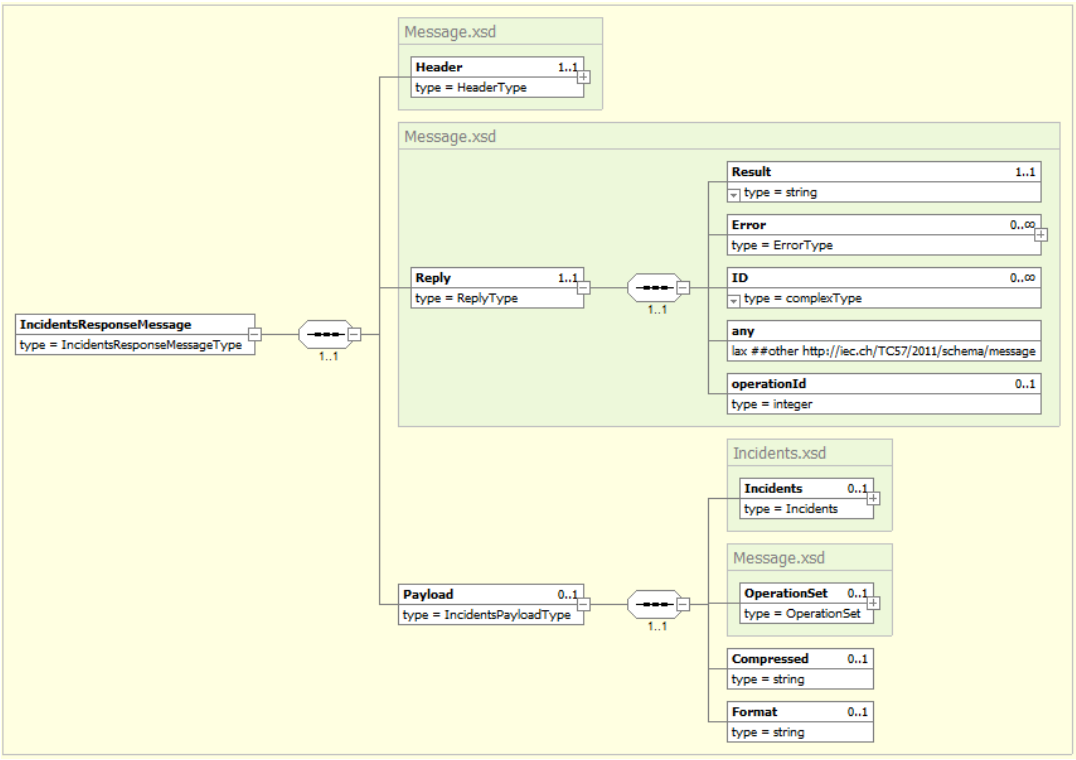

Figure 10.13 – The IncidentsResponse message

The response message contains the payload in form of the *Incidents.xsd* schema which represents the CIM Profile for incidents. The visual representation of the aforementioned schema is given in Figure 10.14.

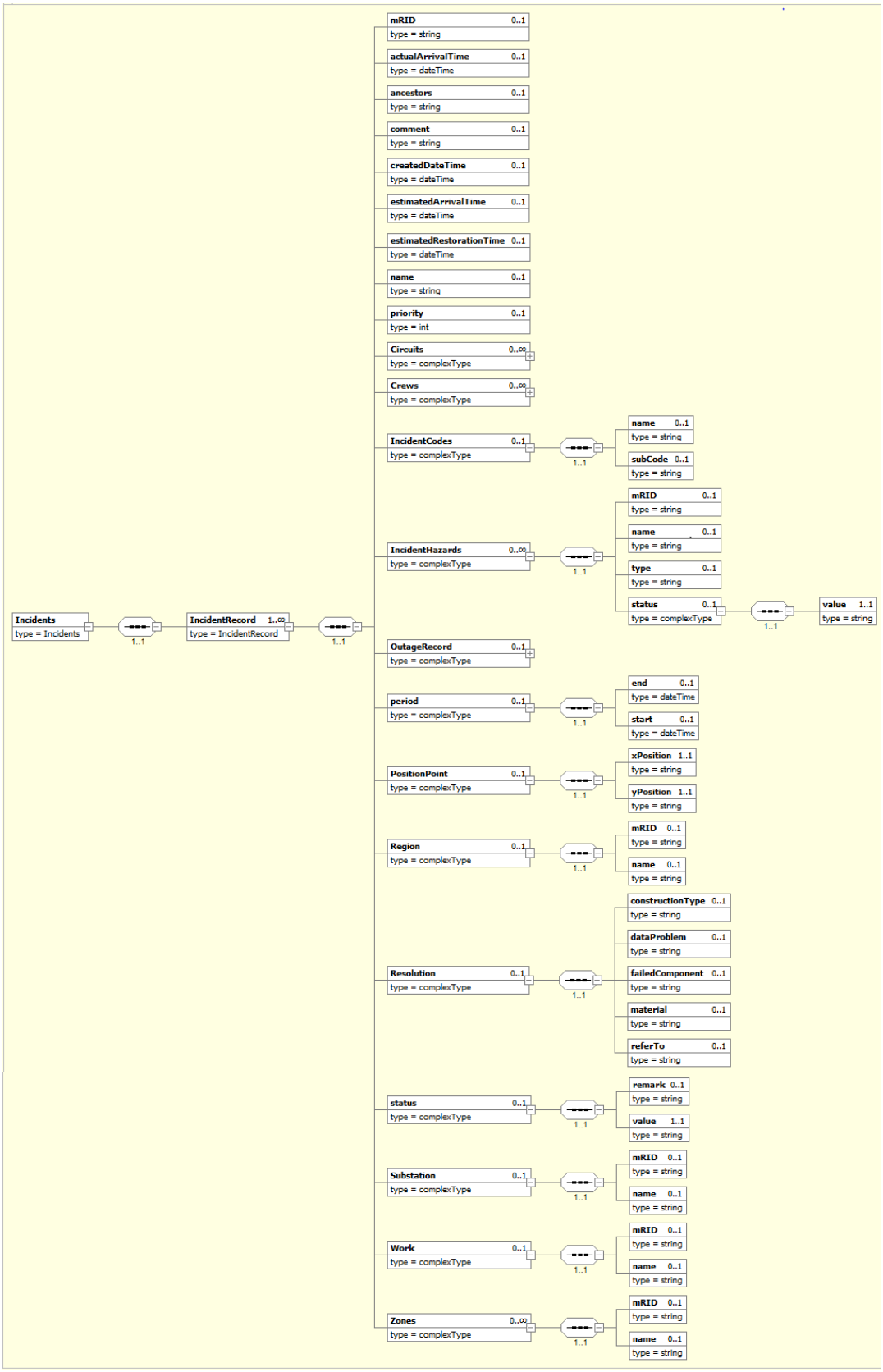

Figure 10.14 – Incidents.xsd

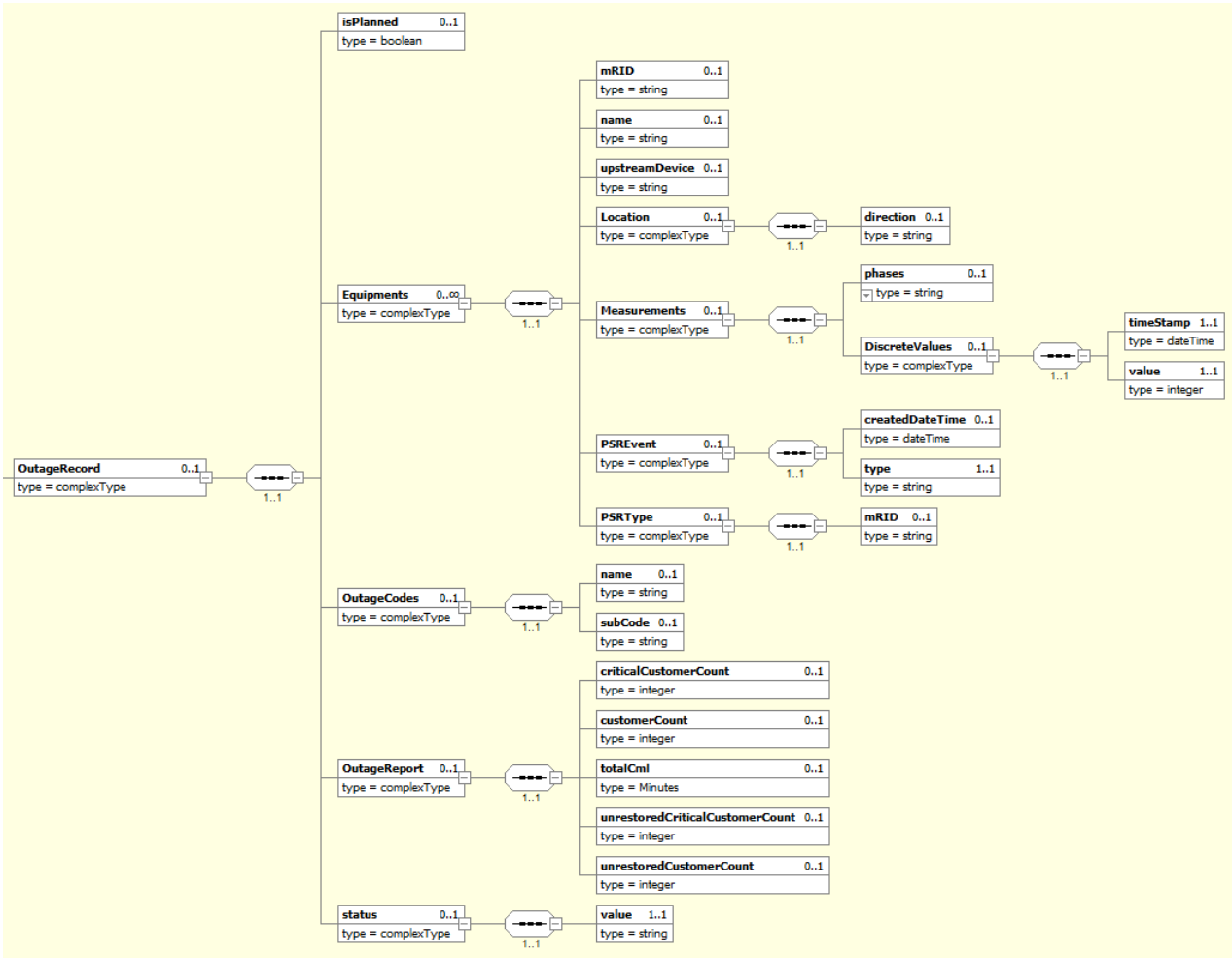

Figure 10.15 – The OutageRecord object

The incident contains the data about the actual outage present in the distribution network and all incident problems reported either through the trouble tickets (as hazards) or through the incident hazards interface. The aforementioned outage data are transferred within the *OutageRecord* object displayed in Figure 10.15.

10.5.2.1. Active-Reduced Set

Table 10.11 defines the mapping between the payload of the *IncidentsResponse* message and the appropriate entities in the outage model in case that incident data is requested for the active incidents based on:

- No search criteria (all active incidents are returned)
- Incident status
- Incident confirmation
- Incident power status,
- Incident type
- Incident region
- Incident zone (AOR)

Table 10.11 – The IncidentsResponse message → the outage model mapping (limited details)

IncidentsResponse message			Description	Outage model		
Section	**Property**	**Type**		**Property**	**Type**	**Model Code**
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is Incidents.	Populated by OSR Adapter	N/A	N/A
Header	**Context**	String	Context of the incident information that needs to be pulled. Valid value: active.	Populated by OSR Adapter	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A	N/A

IncidentsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A	N/A
Payload	mRID	String	Unique identifier of the incident.	CustomID	String	
Payload	actualArrivalTime	DateTime	Actual arrival time of first crew to the incident.	ata	DateTime	
Payload	ancestors	String	IDs of incidents based on which current incident occurred in case of complex incident actions (merge, split, roll up, roll down, etc.).	AncestryIDs	String	
Payload	estimatedArrivalTime	DateTime	Estimated arrival time of first crew to the incident.	eta	DateTime	
Payload	comment	String	Comments for incident entered by the operator.	NoteRefs	List<Long>	
Payload	createdDateTime	DateTime	Creation time of the incident	CreateTime	DateTime	
Payload	estimatedRestorationTime	DateTime	Estimated end time of the incident	EstimatedEndTime	DateTime	
Payload	priority	Integer	Priority of an incident	Priority	Integer	
Payload	IncidentCodes.name	String	Determines the type of the incident.	IncidentTypeRef	Long	
Payload	OutageRecord.isPlanned	Boolean	Indicate if outage is planned	IsPlanned	Boolean	
Payload	OutageRecord.status	String	Incident power status. Examples: NoOutage, Restored NotRestored, PartiallyRestored.	IncidentPowerStatus	Enum	
Payload	period. start	DateTime	Outage time of the incident.	OutageTime	DateTime	
Payload	period. end	DateTime	Restoration time of the incident.	ActualEndTime	DateTime	
Payload	status.value	String	Incident status. Examples: New, Dispatched, Damage Assessed, Field Completed, Closed, Archived, Cancelled.	IncidentStatusRef	Long	

IncidentsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Payload	status.remark	String	Incident confirmation indicator: Confirmed, Unconfirmed.	IncidentConfirmation	Enum	
Payload	Zones.mRID	String	Unique identifiers of AOR Groups	AORGroup	List<String>	
Payload	Region.mRID	String	Unique identifier of the region to which incident belongs to.	RegionRef	Long	

10.5.2.2. Active-Full Set

Table 10.12 defines the mapping between the payload of the *IncidentsResponse* message and the appropriate entities in the outage model in case that incident data is requested for the active incidents based on:

- Incident unique identifier.
- SDP unique identifier.
- TroubleTicket unique identifier.

Table 10.12 – The IncidentsResponse message → the outage model mapping

IncidentsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is Incident.	Populated by OSR Adapter	N/A	N/A
Header	**Context**	String	Context of the incident information that needs to be pulled. Valid value: active.	Populated by OSR Adapter	N/A	N/A

IncidentsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A	N/A
Payload	mRID	String	Unique identifier of the incident.	CustomID	String	
Payload	actualArrivalTime	DateTime	Actual arrival time of first crew to the incident.	ata	DateTime	
Payload	ancestors	String	IDs of incidents based on which current incident occurred in case of complex incident actions (merge, split, roll up, roll down, etc.).	AncestryIDs	String	
Payload	estimatedArrivalTime	DateTime	Estimated arrival time of first crew to the incident.	eta	DateTime	
Payload	comment	String	Comments for incident entered by the operator or field crew.	NoteRefs	List<Long>	
Payload	createdDateTime	DateTime	Creation time of the incident.	CreateTime	DateTime	
Payload	estimatedRestorationTime	DateTime	Estimated end time of the incident.	EstimatedEndTime	DateTime	
Payload	name	String	Optional name of the incident. Not used by EcoStruxure GridOps.	N/A	N/A	
Payload	priority	Integer	Priority of an incident.	Priority	Integer	
Payload	Circuits.mRID	List<Circuit>	List of feeders affected by the incident, concatenated with coma.	AffectedFeederNames	List<String>	

IncidentsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Payload	Crews.mRID	List<Crew>	IDs and Names of the crews assigned to the incident.	CrewRefs	List<Long>	
Payload	Crews.Assignments. status.mRID	String	Crew status	AssignmentStatus	String	
Payload	IncidentCodes.name	String	Determines the type of the incident.	IncidentTypeRef	Long	
Payload	IncidentCodes.subCode	String	Determines the subtype of the incident.	IncidentSubTypeRef	Long	
Payload	IncidentHazards	List<Incident Hazard>	Information about all incident hazards associated to the incident. mRID, Type (line down, gas leak, fire, etc) and status of each hazard.	IncidentProblemRef	String	
Payload	OutageRecord. isPlanned	Boolean	Indicate if outage is planned.	IsPlanned	Boolean	
Payload	OutageRecord. OutageCodes. name	String	Incident cause.	IncidentCauseRef	Long	
Payload	OutageRecord. OutageCodes. subCode	String	Incident subcause.	IncidentSubCasuseRef	Long	
Payload	OutageRecord. Equipments. mRID	String	Incident device unique identifier.	DeviceRefs	String	OMS_DEVICE_CUSTOM_ID
Payload	OutageRecord. Equipments. name	String	Device name.	DeviceRefs	String	OMS_DEVICE_NAME
Payload	OutageRecord. Equipments. upstreamDevice	String	Information about upstream device(s).	UpstreamDeviceRefs	String	OMS_DEVICE_UPSTREAM_DEVICES_ NAMES
Payload	OutageRecord.	String	Location description.	DeviceLocation	String	OMS_DEVICE_ADDRESS

IncidentsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
	Equipments. Location.direction					
Payload	OutageRecord. Equipments.Measurement. DiscreteValues.phases	String	Device phases.	DevicePhases	Enum	OMS_DEVICE_PHASES
Payload	OutageRecord. Equipments.Measurement. DiscreteValues.value	Integer	Device status. Example: Open – 1, Closed – 2.	DeviceRefs	Bool	OMS_DEVICE_IS_OPEN
Payload	OutageRecord. Equipments. PSRType.type	String	Custom Type.	DeviceType	String	OMS_DEVICE_TYPE
Payload	OutageRecord. OutageReport. criticalCustomerCount	Integer	Number of affected critical customers.	NumCriticalCustomers	Integer	
Payload	OutageRecord. OutageReport. customerCount	Integer	Number of affected customers.	NumCustomers	Integer	
Payload	OutageRecord. OutageReport. unrestoredCritical CustomerCount	Integer	Number of unrestored critical customers.	NumUnrestCriticalCustomer	Integer	
Payload	OutageRecord. OutageReport. unrestoredCustomerCount	Integer	Number of unrestored customers.	NumUnrestCustomers	Integer	
Payload	OutageRecord. OutageReport. totalCml	Integer	Total customer minutes lost.	TotalCustInterruptionMinutes	Integer	

IncidentsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Payload	OutageRecord.status	String	Incident power status. Examples: NoOutage, Restored, NotRestored, PartiallyRestored.	IncidentPowerStatus	Enum	
Payload	period.start	DateTime	Outage time of the incident.	OutageTime	DateTime	
Payload	period.end	DateTime	Restoration time of an incident, set when incident is Completed or Canceled.	ActualEndTime	DateTime	
Payload	PostionPoint.xPosition	String	X coordinate of the incident.	CoordinateX	Double	
Payload	PostionPoint.yPosition	String	Y coordinate of the incident.	CoordinateY	Double	
Payload	Region.mRID	String	Unique identifier of the region to which incident belongs to.	RegionRef	Long	
Payload	Resolution. constructionType	String	Field for defining type of the construction on which work was performed.		Long	
Payload	Resolution.dataProblem	String	Indication whether there was problem with data.		Long	
Payload	Resolution. failedComponent	String	Field to define type of component on which was problem.		Long	
Payload	Resolution.material	String	Material used for repair.		Long	
Payload	Resolution.referTo	String	Field used to set who was processing incident.		Long	
Payload	status.value	String	Incident status. Examples: New, Dispatched, Damage Assessed, Field Completed, Closed, Archived, Cancelled.	IncidentStatusRef	Long	
Payload	status.remark	String	Incident confirmation indicator: Confirmed, Unconfirmed.	IncidentConfirmation	Enum	
Payload	Substation.mRID	String	Unique identifier of the substation.	SubstationRef	Long	
Payload	Work.mRID	String	Unique identifier of a work plan assigned to incident.	WorkPlanGid	Long	
Payload	Zones.mRID	String	Unique identifiers of AOR Groups	AORGroup	List<String>	

10.5.2.3. Archived-Reduced Set

Table 10.13 defines the mapping between the payload of the *IncidentsResponse* message and the appropriate entities in the Operations database in case that incident data is requested for the archived incidents based on:

- No search criteria (all archived incidents are returned)
- Service delivery point identifier
- Incident zone (AOR)
- Incident type
- Incident power status

Table 10.13 – The IncidentsResponse message → the Operations database mapping (limited details)

IncidentsResponse message			Description	Operation Database	
Section	Property	Type		Property	Type
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is Incidents.	Populated by OSR Adapter	N/A
Header	**Context**	String	Context of the incident information that needs to be pulled. Valid value: archived.	Populated by OSR Adapter	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A
Payload	mRID	String	Unique identifier of the incident.	UID	nvarchar(MAX)

IncidentsResponse message			Description	Operation Database	
Section	Property	Type		Property	Type
Payload	actualArrivalTime	DateTime	Actual arrival time of first crew to the incident.		datetime
Payload	ancestors	String	IDs of incidents based on which current incident occurred in case of complex incident actions (merge, split, roll up, roll down, etc.).		nvarchar(MAX)
Payload	estimatedArrivalTime	DateTime	Estimated arrival time of first crew to the incident.		datetime
Payload	comment	String	Comments for incident entered by the operator or field crew.	NOTE	nvarchar(MAX)
Payload	createdDateTime	DateTime	Creation time of the incident.	CREATE_TIME	datetime
Payload	estimatedRestorationTime	DateTime	Estimated end time of the incident.	ESTIMATED_END_TIME	datetime
Payload	priority	Integer	Priority of the incident.	PRIORITY	int
Payload	IncidentCodes. name	String	Determines the type of the incident.	INCIDENT_TYPE_GID	bigint
Payload	OutageRecord. isPlanned	Boolean	Indicate if outage is planned.	IS_PLANNED	bit
Payload	OutageRecord. status	String	Incident power status. Examples: NoOutage, Restored, NotRestored, PartiallyRestored.	N/A	N/A
Payload	period. start	DateTime	Outage time of the incident.	OutageTime	datetime
Payload	period. end	DateTime	Restoration time of an incident, set when incident is Completed or Canceled.	ActualEndTime	datetime
Payload	status.value	String	Incident status. Examples: New, Dispatched, Damage Assessed, Field Completed, Closed, Archived, Cancelled.	INCIDENT_STATUS_GID	bigint
Payload	status.remark	String	Incident confirmation indicator: Confirmed, Unconfirmed.	IncidentConfirmation	Enum

IncidentsResponse message			Description	Operation Database	
Section	Property	Type		Property	Type
Payload	Zones.mRID	String	Unique identifiers of AOR Groups	AORGroup	List<String>
Payload	Region.mRID	String	Unique identifier of the region to which incident belongs to.		

10.5.2.4. Archived-Full Set

Table 10.14 defines the mapping between the payload of the *IncidentsResponse* message and the appropriate entities in the Operations database in case that incident data is requested for the archived incidents based on:

- Incident unique identifier
- TroubleTicket unique identifier

Table 10.14 – The IncidentsResponse message → the Operations database mapping

IncidentsResponse message			Description	Operations database	
Section	Property	Type		Property	Type
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is Incidents.	Populated by OSR Adapter	N/A
Header	**Context**	String	Context of the incident information that needs to be pulled. Valid value: archived.	Populated by OSR Adapter	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A

IncidentsResponse message			Description	Operations database	
Section	Property	Type		Property	Type
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A
Payload	mRID	String	Unique identifier of the incident.	UID	nvarchar(MAX)
Payload	actualArrivalTime	DateTime	Actual arrival time of first crew to the incident.	ata	DateTime
Payload	ancestors	String	IDs of incidents based on which current incident occurred in case of complex incident actions (merge, split, roll up, roll down, etc.).	AncestryIDs	String
Payload	estimatedArrivalTime	DateTime	Estimated arrival time of first crew to the incident.	eta	DateTime
Payload	comment	String	Comments for incident entered by the operator or field crew.	NOTE	nvarchar(MAX)
Payload	createdDateTime	DateTime	Creation time of the incident.	CREATE_TIME	datetime
Payload	estimatedRestorationTime	DateTime	Estimated end time of the incident.	ESTIMATED_END_TIME	datetime
Payload	name	String	Optional name of the incident. Not used by EcoStruxure GridOps.	N/A	N/A
Payload	priority	Integer	Priority of an incident.	PRIORITY	Integer
Payload	Circuits. mRID	List<Circuit>	List of feeders affected by the incident, concatenated with coma.	INCIDENT_AFFECTED_FEEDER	N/A
Payload	Crews. mRID	List<Crew>	IDs and Names of the crews assigned to the incident.	INCIDENT_CREW	N/A
Payload	IncidentCodes. name	String	Determines the type of the incident.	INCIDENT_TYPE_GID	bigint
Payload	IncidentCodes. subCode	String	Determines the subtype of the incident.	INCIDENT_TYPE_GID	bigint
Payload	IncidentHazards	List<IncidentHazard>	Information about all incident hazards associated to the incident. mRID, Type (line down, gas leak, fire, etc) and status of each hazard.	PROBLEM	N/A
Payload	OutageRecord.	Boolean	Indicate if outage is planned.	IS_PLANNED	bit

IncidentsResponse message			Description	Operations database	
Section	Property	Type		Property	Type
	isPlanned				
Payload	OutageRecord. OutageCodes. name	String	Incident cause.	INCIDENT_CAUSE_GID	bigint
Payload	OutageRecord. OutageCodes. subCode	String	Incident subcause.	INCIDENT_SUBCAUSE_GID	bigint
Payload	OutageRecord. Equipments. mRID	String	Incident device unique identifier.	DeviceRefs	nvarchar(MAX)
Payload	OutageRecord. Equipments. name	String	Device name.	DeviceRefs	nvarchar(MAX)
Payload	OutageRecord. Equipments. upstreamDevice	String	Information about upstream device(s).	UpstreamDeviceRefs	nvarchar(MAX)
Payload	OutageRecord. Equipments. Location.direction	String	Location description.	DeviceLocation	nvarchar(MAX)
Payload	OutageRecord. Equipments.Measurement. DiscreteValues.phases	String	Device phases.	DevicePhases	Enum
Payload	OutageRecord. Equipments.Measurement. DiscreteValues.value	Integer	Device status. Example: Open – 1, Closed – 2.	DeviceRefs	bit
Payload	OutageRecord. Equipments. PSRType.type	String	Custom Type.	DeviceType	nvarchar(MAX)

IncidentsResponse message			Description	Operations database	
Section	Property	Type		Property	Type
Payload	OutageRecord. OutageReport. criticalCustomerCount	Integer	Number of affected critical customers.	NUM_CRITICAL_CUSTOMERS	int
Payload	OutageRecord. OutageReport. customerCount	Integer	Number of affected customers.	NUM_CUSTOMERS	int
Payload	OutageRecord. OutageReport. unrestoredCritical CustomerCount	Integer	Number of unrestored critical customers.	NUM_CRITICAL_CUSTOMERS_UN RESTORED	int
Payload	OutageRecord. OutageReport. unrestoredCustomerCount	Integer	Number of unrestored customers.	NUM_CUST_UNRESTORED	int
Payload	OutageRecord. OutageReport. totalCml	Integer	Total customer minutes lost.	OMS_INCIDENT_TOTAL_CUST_IN TERRUPTION_DURATION	bigint
Payload	OutageRecord. status	String	Incident power status. Examples: NoOutage, Restored, NotRestored, PartiallyRestored.	N/A	N/A
Payload	period. start	DateTime	Outage time of the incident.	OutageTime	datetime
Payload	period. end	DateTime	Restoration time of an incident, set when incident is Completed or Canceled.	ACTUAL_END_TIME	datetime
Payload	PostionPoint. xPosition	String	X coordinate of the incident.	N/A	N/A
Payload	PostionPoint. yPosition	String	Y coordinate of the incident.	N/A	N/A
Payload	Region.	String	Unique identifier of the region to which incident belongs to	REGION_GID	bigint

IncidentsResponse message			Description	Operations database	
Section	Property	Type		Property	Type
	mRID				
Payload	Resolution. constructionType	String	Field for defining type of the construction on which work was performed.		bigint
Payload	Resolution.dataProblem	String	Indication whether there was problem with data.		bigint
Payload	Resolution. failedComponent	String	Field to define type of component on which was problem.		bigint
Payload	Resolution.material	String	Material used for repair.		bigint
Payload	Resolution.referTo	String	Field used to set who was processing incident.		bigint
Payload	status.value	String	Incident status. Examples: New, Dispatched, Damage Assessed, Field Completed, Closed, Archived, Cancelled.	INCIDENT_STATUS_GID	bigint
Payload	status.remark	String	Incident confirmation indicator: Confirmed, Unconfirmed.	IncidentConfirmation	Enum
Payload	Substation. mRID	String	Unique identifier of the substation.	SUBSTATION_GID	bigint
Payload	Work. mRID	String	Unique identifier of a work order assigned to incident.	WORK_PLAN_GID	bigint
Payload	Zones. mRID	String	Unique identifiers of the AOR Groups.	AOR_GROUP	nvarchar(MAX)

10.5.3. Fault

The *IncidentsFault* message is depicted in Figure 10.16.

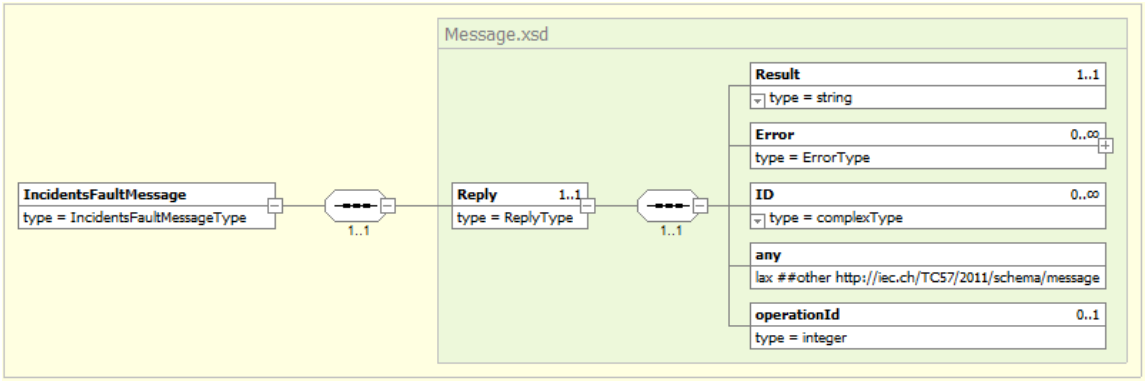

Figure 10.16 – The IncidentsFault message

10.6. ChangedIncidents Operation Messages

The operation definition:

ChangedIncidentsResponse ChangedIncidents(ChangedIncidentsEvent)

10.6.1. Request

The *ChangedIncidents* event message is defined according to the IEC 61968-100 and contains the following two sections:

- Header
- Payload

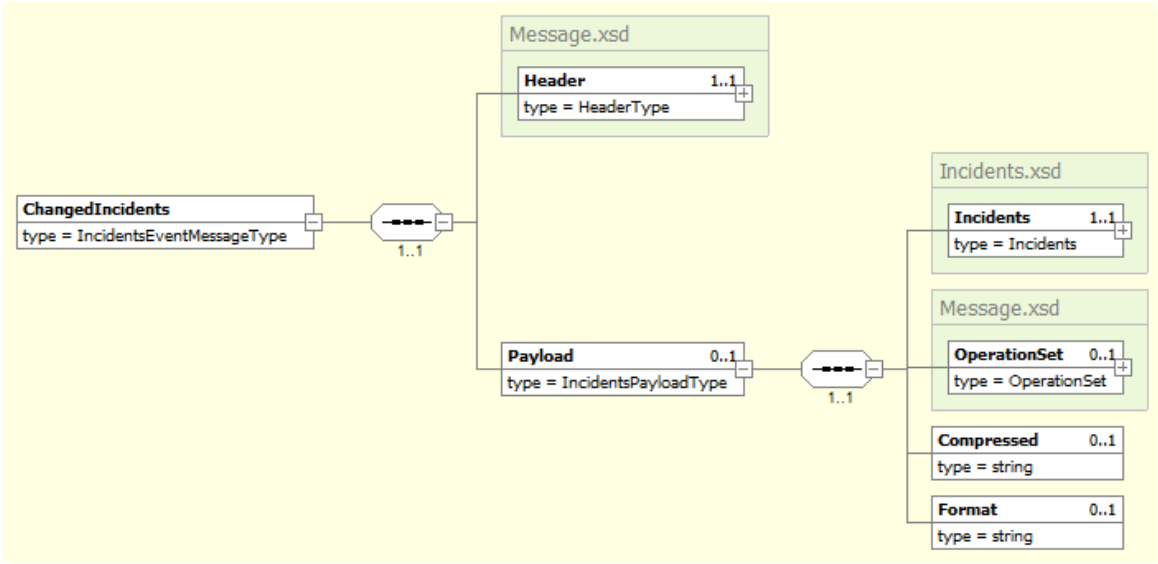

Figure 10.17 – The ChangedIncidentsEvent message

The Payload section carries the CIM defined profile (*Incidents.xsd*) for update of one or several incidents. The visual representation of the *Incidents.xsd* schema is given in Figure 10.14.

Only attributes given in Table 10.15 can be updated from the external system based on the given incident unique identifier.

Table 10.15 – The ChangedIncidentsEvent message → the outage model mapping

ChangedIncidents message			Description	Outage model		
Section	**Property**	**Type**		**Property**	**Type**	**Model Code**
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is changed.	Populated by external system	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is Incidents.	Populated by external system	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by external system	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source can be: FieldClient, etc.	Populated by external system	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by external system	N/A	N/A
Header	**CorrelationID**	String	Same as message ID.	Populated by external system	N/A	N/A
Header	**User.UserID**	String	User that changed the incident.	LastUpdateUser	String	
Payload	**mRID**	String	Unique identifier of the incident based on which related data is updated.	CustomID	String	
Payload	actualArrivalTime	DateTime	Actual arrival time of first crew to the incident.	ata	DateTime	
Payload	estimatedArrivalTime	DateTime	Estimated arrival time of first crew to the incident.	eta	DateTime	
Payload	comment	String	Comment field that will be added as new Note to the current list of notes related to the appropriate incident.	NoteRefs	List<Long>	
Payload	estimatedRestorationTime	DateTime	Estimated end time of the incident.	EstimatedEndTime	DateTime	
Payload	OutageRecord. OutageCodes.name	String	Incident cause.	IncidentCauseRef	Long	

ChangedIncidents message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Payload	OutageRecord. OutageCodes.subCode	String	Incident subcause.	IncidentSubCasus eRef	Long	
Payload	Crews.mRID	List<Crew>	IDs and Names of the crews assigned to the incident.	CrewRefs	List<Long>	
Payload	OutageRecord. Equipments. mRID	String	Incident device unique identifier.	DeviceRefs	String	
Payload	OutageRecord. Equipments.PSREvent. type	String	Action that was performed on the device: open, close, rollup, rolldown.	N/A	N/A	N/A
Payload	OutageRecord. Equipments.PSREvent. createdDateTime	DateTime	Timestamp of the action when device is open, closed, rolled up, rolled down.	N/A	N/A	N/A
Payload	Resolution. constructionType	String	Field for defining type of the construction on which work was performed.		Long	
Payload	Resolution.dataProblem	String	Indication whether there was problem with data.		Long	
Payload	Resolution. failedComponent	String	Field to define type of component on which was problem.		Long	
Payload	Resolution.material	String	Material used for repair.		Long	
Payload	Resolution.referTo	String	Field used to set who was processing incident.		Long	
Payload	status.value	String	Valid incident status transitions. Depends on the configuration. Some examples are: Dispatched -> Damage Assessed, Dispatched -> Field Completed, Dispatched -> Cancelled. Field Completed -> Closed, Etc.	IncidentStatusRef	Long	
Payload	status.remark	String	Action that was performed on the incident: confirm, unconfirm, restore.		Long	

10.6.2. Response

After the incident data are updated, the response is returned in form of the *IncidentsResponse* message. The unique identifier of the changed incident along with the status of operation is returned within the response message. The content of the response message is given in Figure 10.13.

Table 10.16 – The IncidentsResponse message → the outage model mapping

IncidentsResponse message			Description	Outage model		
Section	Property	Type		Property	Type	Model Code
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is Incidents.	Populated by OSR Adapter	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	N/A	N/A	N/A
Payload	mRID	String	Unique identifier of the incident for which data was updated.	CustomID	String	OMS_IMSOBJ_UID
Payload	status.value	String	Used to set the information about the incident update result.	Populated by OSR Adapter	String	N/A

10.6.3. Fault

The *IncidentsFault* message is depicted in Figure 10.16.

10.7. GetIncidentUsagePoints Operation Messages

The operation definition:

GetIncidentUsagePointsResponse GetIncidentUsagePoints(GetIncidentUsagePointsRequest)

10.7.1. Request

The *GetIncidentUsagePoints* request message is defined according to the IEC 61968-100 and contains the following three sections:

- Header
- Request
- Payload

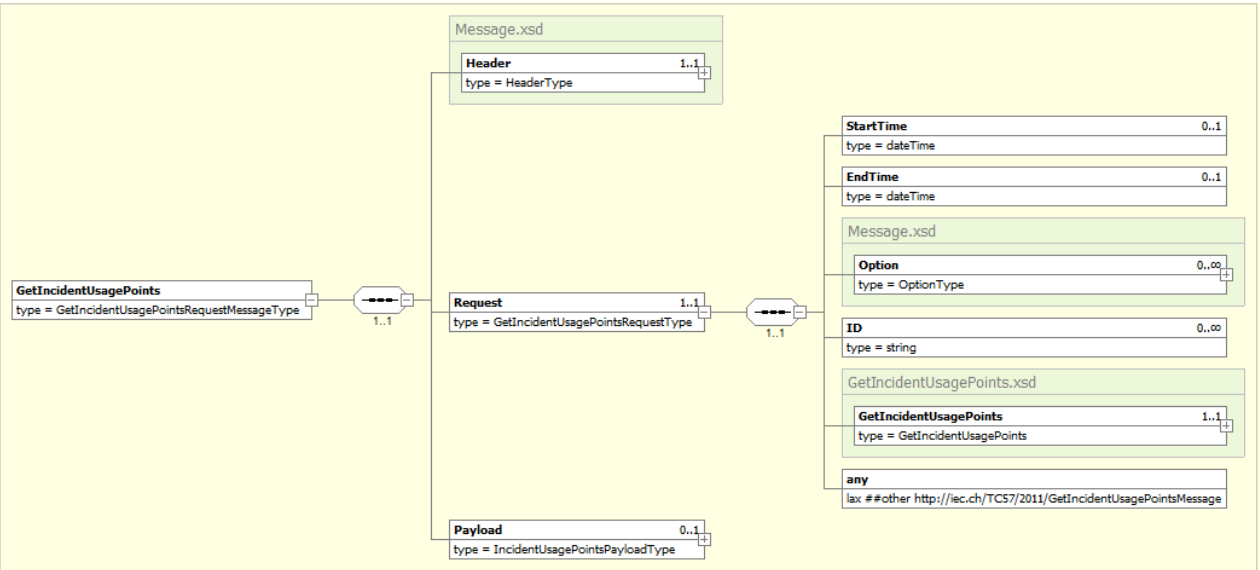

Figure 10.18 – The GetIncidentUsagePoints request message

The request message contains the payload in form of the *GetIncidentUsagePoints.xsd* schema. The visual representation of the aforementioned schema is given Figure 10.19.

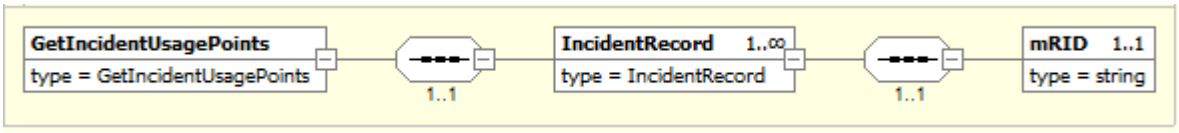

Figure 10.19 – GetIncidentUsagePoints.xsd

Table 10.17 defines the mapping between the *GetIncidentUsagePoints* message and the appropriate entities in the outage model.

Table 10.17 – The GetIncidentUsagePoints message → the outage model mapping

GetIncidentUsagePoints message			Description	Outage model		
Section	**Property**	**Type**		**Property**	**Type**	**Model Code**
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is get.	Populated by external system	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentUsagePoints.	Populated by external system	N/A	N/A
Header	**Context**	String	Context of the incident hazard information that needs to be pulled. Valid values: affected, unrestored, archived.	Populated by external system	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by external system	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source can be: FieldClient, External Analysis System, etc.	Populated by external system	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by external system	N/A	N/A
Header	**CorrelationID**	String	Same as message ID.	Populated by external system	N/A	N/A
Request	**mRID**	String	Unique identifier of the incident for which active/archived usage points are requested.	CustomID	String	OMS_IMSOBJ_UID

10.7.2. Response

After the *GetIncidentUsagePoints* operation is invoked, the appropriate usage points are returned within the *IncidentUsagePointsResponse* message. The content of the response message is given in Figure 10.20.

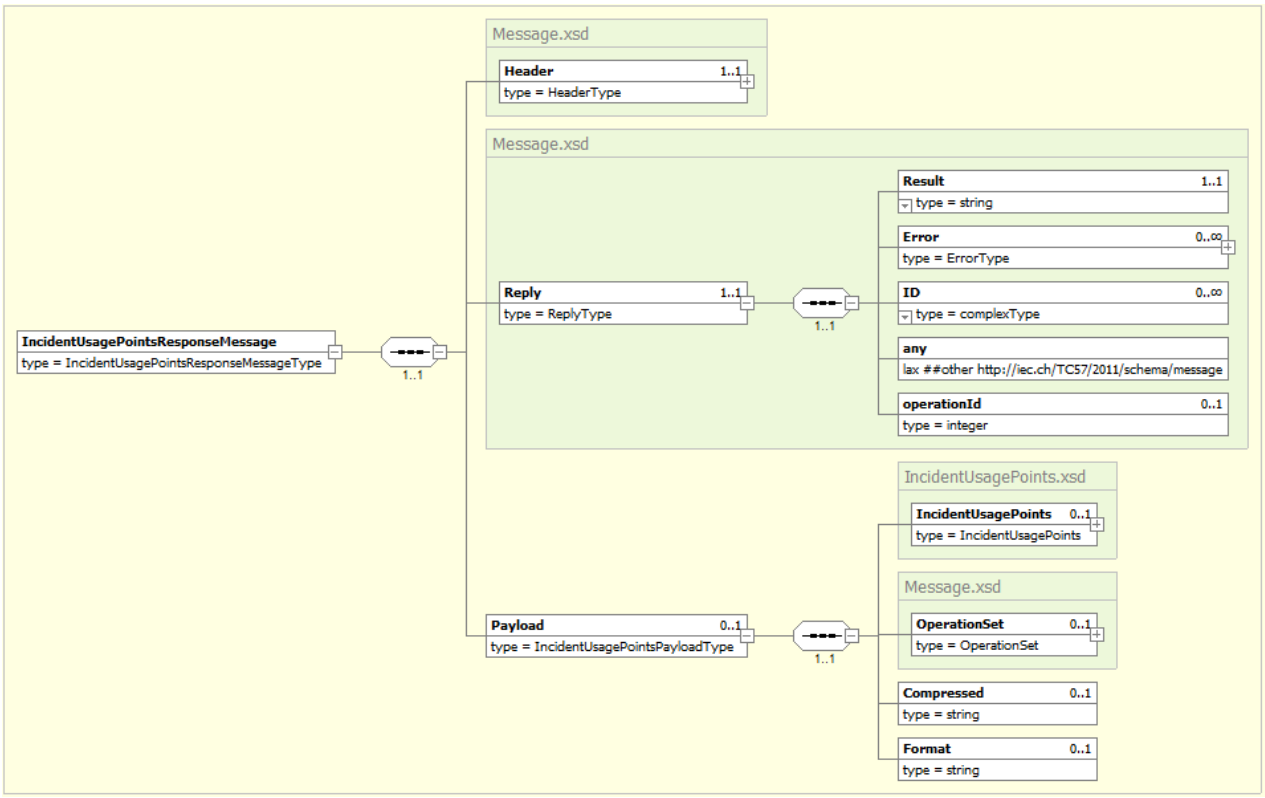

Figure 10.20 – The AffectedUsagePointsResponse message

The response message contains the payload in form of the *IncidentUsagePoints.xsd* schema which represents the CIM Profile for affected and unrestored usage points by an incident.

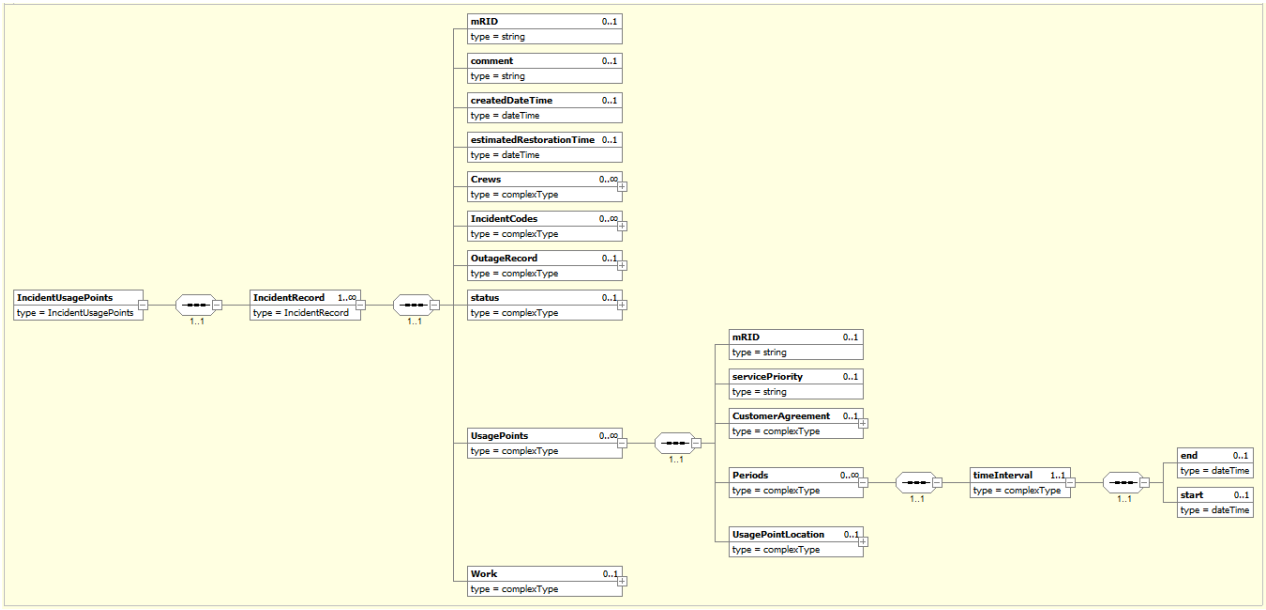

Figure 10.21 – IncidentUsagePoints.xsd

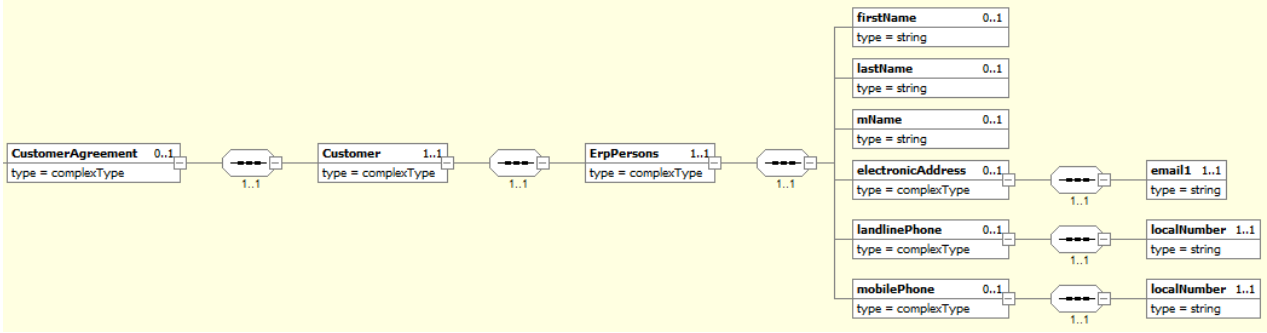

Figure 10.22 – The CustomerAgreement element

Table 10.18 defines the mapping between the *IncidentUsagePointsResponse* message and the outage model.

Table 10.18 – The IncidentUsagePointsResponse message → the outage model mapping

IncidentUsagePoints.xsd			Description	Outage Model		
Section	**Property**	**Type**		**Property**	**Type**	**Model Code**
Header	**Verb**	String	Identifier for a specific action to be taken. For this message, Verb is reply.	Populated by OSR Adapter	N/A	N/A
Header	**Noun**	String	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is IncidentUsagePoints.	Populated by OSR Adapter	N/A	N/A
Header	**Context**	String	Context of the incident information that needs to be pulled. Valid values: affected, unrestored.	Populated by OSR Adapter	N/A	N/A
Header	**Timestamp**	DateTime	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by OSR Adapter	N/A	N/A
Header	Source	String	Source system or application that sends the message. For this message, Source is EcoStruxure GridOps.	Populated by OSR Adapter	N/A	N/A
Header	**MessageID**	String	Unique message ID to be used for tracking messages.	Populated by OSR Adapter	N/A	N/A
Header	**CorrelationID**	String	Same as correlation ID from request message.	Populated by OSR Adapter	N/A	N/A
Reply	**Result**	String	Returned as part of synchronous response. Valid values are: OK, PARTIAL or FAILED.	Populated by OSR Adapter	N/A	N/A
Payload	mRID	String	Unique identifier of the incident.	CustomID	String	
Payload	estimatedRestorationTime	DateTime	Estimated end time of the incident	EstimatedEndTime	int	
Payload	OutageRecord. isPlanned	Boolean	Indicate if outage is planned	IsPlanned	Bool	
Payload	UsagePoint. mRID	String	Custom ID of the SDP that is affected or unrestored.	SdpCustomID	String	

IncidentUsagePoints.xsd			Description	Outage Model		
Section	Property	Type		Property	Type	Model Code
Payload	UsagePoint.servicePriority	String	Priority of service for this usage point. Note that usage points at the same service location can have different priorities.	SdpPriority	Integer	OMS_SDP_PRIORITY
Payload	UsagePoint.CustomerAgreement.Customer.ErpPerson.firstName	String	Name of the customer whose account is connected to this usage point.	AccountName	DateTime	
Payload	UsagePoint.CustomerAgreement.Customer.ErpPerson.lastName	String	Last name of the customer whose account is connected to this usage point.	AccountLastName	String	
Payload	UsagePoint.CustomerAgreement.Customer.ErpPerson.mName	String	Middle name(s) or initial(s).	N/A	N/A	N/A
Payload	UsagePoint.CustomerAgreement.Customer.ErpPerson.electronicAddress.email1	String	Electronic address. Primary email address.	Type, Value	String	
Payload	UsagePoint.CustomerAgreement.Customer.ErpPerson.landlinePhone.localNumber	String	Landline phone number.	Type, Value	String	
Payload	UsagePoint.CustomerAgreement.Customer.ErpPerson.landlinePhone.localNumber	String	Mobile phone number.	Type, Value	String	

IncidentUsagePoints.xsd			Description	Outage Model		
Section	Property	Type		Property	Type	Model Code
Payload	Periods	TimeInterval	Start and End times of UsagePoint interruptions			
Payload	Work. mRID	String	ID of a work order assigned to incident.	WorkOrderID	Long	OMS_INCIDENT_INCIDENT_FOLLOW_UP _WORKPLAN_REFS

10.7.3. Fault

The *IncidentUsagePointsFault* message is depicted in Figure 10.23.

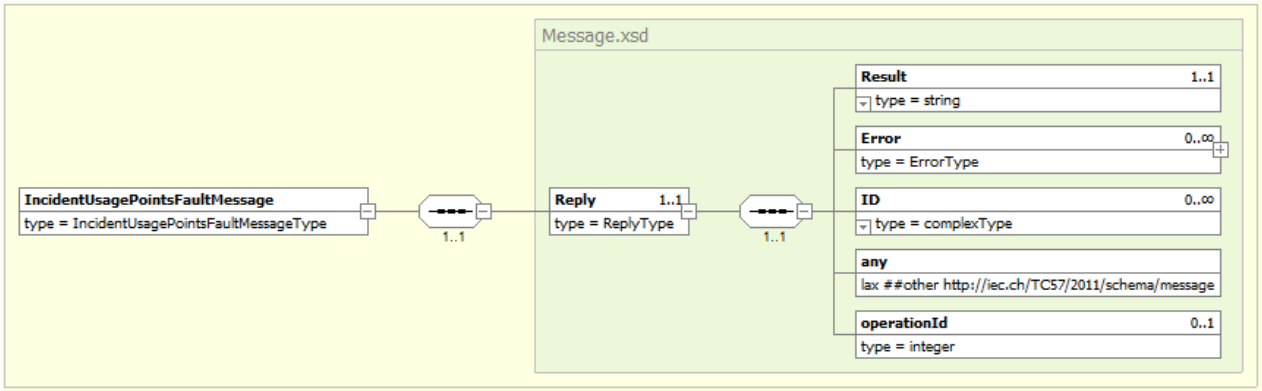

Figure 10.23 – The IncidentUsagePointsFault message

11. DEPLOYMENT SPECIFICATION

Described in the *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification* [1].

The deployment specification is provided in the following table:

Table 11.1 – The deployment specification

Deployment Specification	
Application	AdapterOSR
Critical process	No
OASyS service	OASyS DNA DMS_INTEGRATION Service
Servers	pdmz-int-1, pdmz-int-2, bdmz-int-1, bdmz-int-2
Zone	pdmz, bdmz
Installation Type	Product
Installation add-on name	Integration Adapters

12. INTERFACE CONFIGURATION

OSR adapter provides certain amount of configurability so that smaller adjustments in the functionality can be easily applied to the system, without interface down time. Such feature is provided through dedicated configuration files of the OSR adapter.

Table 12.1 – The configuration files specification

Name of the config file	Configuration File Description
AdapterOsr	Registry configuration xml file
OsrAdapter_GetIncidents_ErrorConfiguration	Error configuration xml file for GetIncidents interface
OsrAdapter_GetIncidentUsagePoints_ErrorConfiguration	Error configuration xml file for GetIncidentUsagePoints interface
OsrAdapter_GetIncidentHazards_ErrorConfiguration	Error configuration xml file for GetIncidentHazards interface
OsrAdapter_CreatedIncidentHazards_ErrorConfiguration	Error configuration xml file for ReceiveIncidentHazards interface
OsrAdapter_ChangedIncidentHazards_ErrorConfiguration	Error configuration xml file for ReceiveIncidentHazards interface
OsrAdapter_ChangeIncidents_ErrorConfiguration	Error configuration xml file for ReceiveIncidents interface
AdapterOsr_WebServiceConfiguration	Web service configuration xml file

Details about the structure and shared content of common interface configuration files are located in *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification* [1].

Detailed content of above-mentioned configuration files is provided within the *Configuration* folder in the *EcoStruxure GridOps Management Suite 3.10 Outage Reporting Interface.zip* file [1].

13. APPENDIX

13.1. WSDL

The WSDL file, XSD schemas and sample messages defined according to the IEC 61968-100 for all OSR web services are provided within the *Web Service Definitions* folder in the *EcoStruxure Grid Management Suite 3.10 Outage Reporting Interface.zip* file [2].

13.2. Message Examples

Message examples for several use cases are provided within the *Message Examples* folder in the *EcoStruxure Grid Management Suite 3.10 Outage Reporting Interface.zip* file [2].

14. RELEASE NOTES

The following new features related to the Product OSR Interface were introduced in the software, starting from version 3.8.

14.1. Software Version 3.8.0

Feature	Description
Pull All Incidents	Context value All was added to the list of available values when users want to pull both active and archived incidents and incident hazards, in one operation call.
Result Set Extension	Incident CIM profile was extended so that users now receive following set of newly added incident attributes: all resolution fields (refer to, construction type, failed component, material and data problem), estimated arrival time, actual arrival time, device state, ancestors, etc.

Comprehensive Incident Data Filtering	Comprehensive capability to pull both incident and incident hazard data per various input criteria. Users are now able to obtain both active and archived data in one action. Data can be pulled per:
	• Incident:
	  ○ Type
	  ○ Power Status
	  ○ Status
	• Incident Hazard:
	  ○ Type
	  ○ Status

Extensive Incident Data Update	Capability to update an extensive set of incident data was granted to the end user. Such capability was accompanied with advanced set of validation rules to ensure model validity and consistency. Users are now able to update the following incident information, from 3rd party systems: • Resolution fields (refer to, material, construction type, failed component, data problem, cause, subcase) • Notes • Estimated time of arrival • Actual time of arrival • Estimated end time • Status • Device state
Generic Coordinates Conversion	Generic outage data coordinate conversion was introduced within OSR Interface. External systems now receive data in a desired projection and can easily display incidents and incident hazards on an appropriate map.

Feature	Description
Incident Lifecycle Management	Capability to manage incident lifecycle from external system is added. Users are now capable of confirming, restoring, rolling up/down the incidents through ChangedIncident operation.

14.2. Software Version 3.8 SP1

Feature	Description
Profile Extensions	IncidentHazards profile extended with Created User, Created Time, Last Update User and Last Update Time attributes. GetIncident and Incident profiles extended with confirmation flag (status.remark). IncidentUsagePoints profile extended with servicePriority attribute.
Incident Operations Management Optimization	Time needed for incident management operations (confirm, unconfirm, roll up, roll down, device open, device close) in reduced. External field client application can now send minimal amount of data to execute above-mentioned operations, thus increasing the efficiency during incident resolution.

14.3. Software Version 3.8 MHF

Feature	Description
Query incident data for restored customers	Added support for optional querying of active incident information for restored customers. Additional attribute is added to adapter's registry configuration file that enables this feature. Default configuration value is false, which indicates that the feature is disabled (that is, restored customers will not be included in the response message).

14.4. Software Version 3.9

There are no changes in functionality since Software Version 3.8 MHF.

15. DEFINITIONS AND ABBREVIATIONS

Definition/Abbreviation	Description
ADMS	Advanced Distribution Management System
CC	Call Center
CIM	Common Information Model
CSR	Customer Service Representative
CTA	Call Taking Application
DMD	Dynamic Mimic Diagram
DMZ	Demilitarized Zone
EDS	External Dispatching System
ERS	External Reporting System
ESB	Enterprise Service Bus
FC	Field Client
IVR	Interactive Voice Response
OMS	Outage Management System
OP	Outage Portal
OSR	Outage Status and Reporting
SOAP	Simple Object Access Protocol
SDP	Service Delivery Point
WCF	Windows Communication Foundation
WS	Web Service
XML	Extensible Markup Language
XSD	XML Schema Definition