GridOps Management Suite 3.10

Outage Analysis - MultiSpeak Interface

Functional Specification

Document Version: 1.0

Updated: June, 2024

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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. 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 and EcoStruxure Grid 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.

Outage Analysis (OA) MultiSpeak Interface is developed as a part of the EcoStruxure GridOps Enterprise Integration Platform. It shares the common architecture principles as the rest of platform interfaces. OA Interface is implemented through EcoStruxure OA adapter component. This component is hosted in the Access Services (DMZ) system as a standalone windows process controlled by DMS_Integration OaSyS service component.

Purpose of this interface is to expose a set of predefined actions or queries laying on top of EcoStruxure Outage Management Service (OMS) to various 3rd party systems which can utilized that data. Service Endpoint is implemented against MultiSpeak standard interface definitions for Outage Analysis service domain. Interface utilizes the MultiSpeak OA service definitions in order to provide end users access to outage related data on demand or via proactive notifications. Additionally, it provides option of submitting outage updates from 3rd party systems to EcoStruxure OMS service.

Aforementioned service operations together with mandatory MultiSpeak operations per service domain represent the set of supported EcoStruxure GridOps OA Adapter functionalities.

3. OVERVIEW

EcoStruxure OA Adapter implements following MutliSpeak OA service operations:

- *ODEventNotification* – enables end user the possibility of submitting trouble tickets (customer calls).
- *GetOutages* – defined for retrieving a snapshot of all currently active outages identifiers from EcoStruxure OMS service.
- *GetOutageEvent* – based on the provided outage identifier, user can retrieve the detailed information about a specific outage from EcoStruxure OMS service.
- *GetOutageEventStatus* – based on the provided outage identifier, user can retrieve the status information of a specific outage from EcoStruxure OMS service.
- *GetCustomersForOutage* – based on the provided outage identifier, user can retrieve a list of customers associated to a specific outage from EcoStruxure OMS service.
- *AddRemarkToOutage* – offers a possibility for adding outage information in the form of remarks (comments) to an existing outage in EcoStruxure OMS service.
- *AssignCrewToOutage* – proactive notifications to crews, or crew management systems about outage assignments.
- *RestoreOutage* – offers possibility for field agents to complete field assignments by “restoring” the outage entity and providing reason feedback.
- *GetMethods* – returns the information about the set of implemented OA service operations
  - In regards to the OA adapter component the response contains the names of the all the previously mentioned service operations.
- *PingURL* – defined for health monitoring purpose.

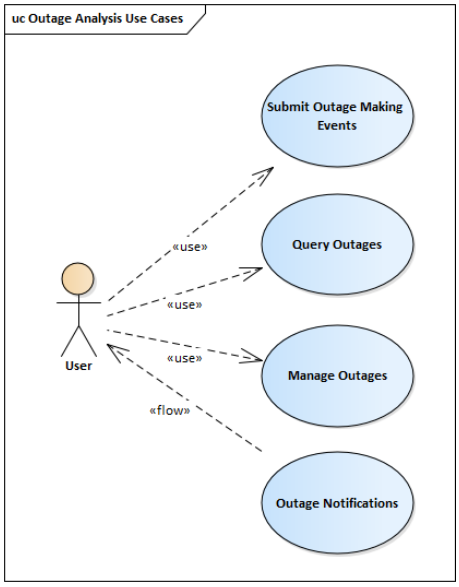

Figure 3.1 – Outage Analysis Use Cases

3.1. General Architecture

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

4. FUNCTIONALITY

The functionality of Outage Analysis Adapter can be split into four subcategories based on the services they provide.

- Outage Queries – predefined set of endpoints which offers end users the possibility of querying outage related details.
- Processing Outage Making Events – offers a possibility to store outage detection events which result in outage creation internally.
- Outage Management – offers set of functions for modifying outage details externally.
- Outage Notifications – proactive outage related notifications for interested parties.

4.1. Submit Outage Making Events

Consumers need a way to report events which may affect their power supply, whether via outage portal, or a phone call. OA Adapter hosts a uniform service endpoint for processing these outage detection events and storing them in Outage Management Service. These endpoints are implemented against the MultiSpeak standard definitions. Figure 4.1 represents the sequence of events occurring during the processing of outage related events.

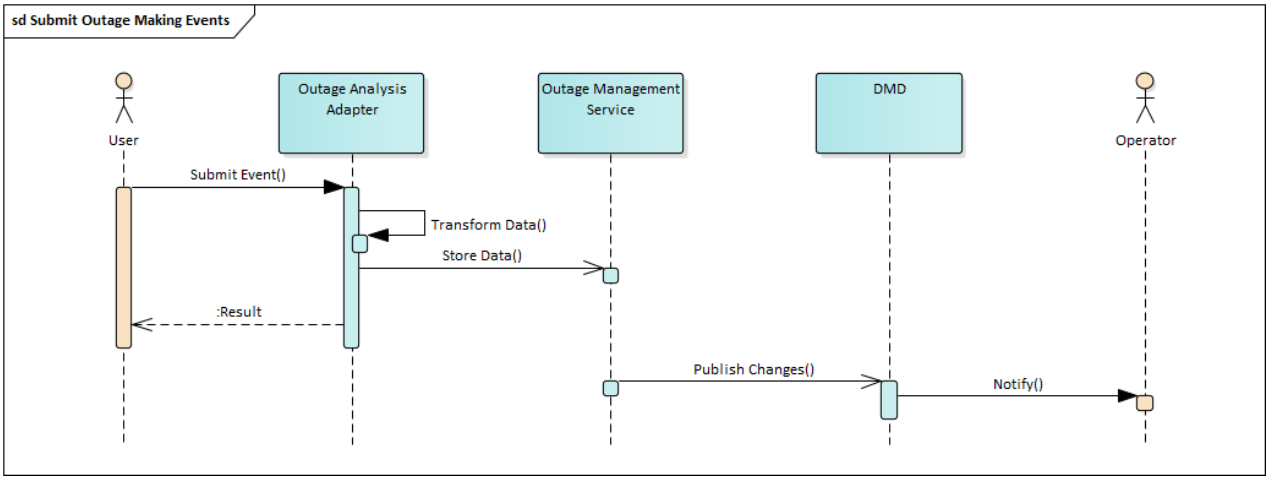

Figure 4.1 – Processing Outage Detection Events Sequence Diagram

User, or an external web service client, invokes the corresponding service endpoint hosted on the OA adapter component. The adapter transforms the data and stores it in the OMS service database. This data is published to the DMD Client application and visible to the operator in the corresponding trouble events browser. Insertion of specific trouble events, like no power customer calls, triggers the creation of an incident (potential outage) in the Outage Management Service.

4.1.1. Outage Detection Event Notification

4.1.1.1. Overview

OA adapter components hosts a service endpoint for receiving trouble tickets from external web service clients. Trouble tickets are processed, associated to the corresponding customer and stored in the OMS

service. Insertion of trouble tickets result in the creation of an unplanned incident affecting the provided customer.

4.1.1.2. Use Cases

Table 4.1 contains the list of supported use cases:

Table 4.1 – Outage Detection Event Notification Use Cases

OD Event Notification			
Name	**Description**	**Result**	
Successful Scenario	OA Adapter receives the *ODEventNotification* message from external system with necessary related data. Adapter processes the request and stores the trouble ticket accordingly. Synchronous response without errors is returned to the calling system.	Status	Success
		Error	N/A
Invalid Message	OA Adapter receives the *ODEventNotofication* message from external system, but the message is invalid against the XSD schema. Adapter rejects the message with the corresponding soap fault.	Status	Failed
		Error	Message is invalid against the XSD schema.
Missing Header Data	OA Adapter receives the *ODEventNotofication* message from external system, but the message has missing mandatory header data (message ID or timestamp. Adapter rejects the message with the corresponding synchronous error response.	Status	Failed
		Error	MessageId (Timestamp) is missing.
Invalid outageEventType	OA Adapter receives the *ODEventNotification* message from external system, but the message contains invalid *outageEventType*. Adapter rejects the message with a corresponding synchronous error message.	Status	Failed
		Error	Invalid Outage Event Type
Event Time in the Future	OA Adapter receives the *ODEventNotification* message from external system, but the message contains event time which is set in the future. Adapter rejects the message with the corresponding synchronous error response.	Status	Failed
		Error	EventTime is in the future.

4.2. Outage Data Querying

In order to provide a way for external systems to query outage related data from EcoStruxure Outage Management service, a set of predefined interfaces are implemented as service endpoints within EcoStruxure Outage Analysis Adapter. As aforementioned, these interfaces are implemented against the MultiSpeak standard definitions. Figure 4.2 represents the sequence diagram for outage query operations.

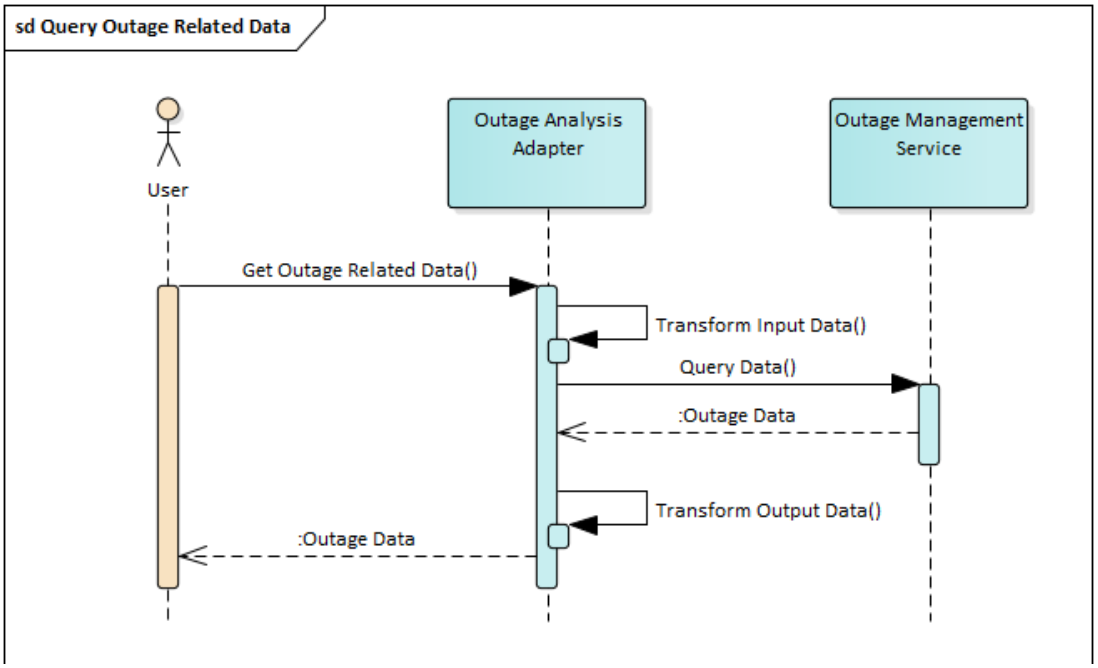

Figure 4.2 – Outage Data Queries Sequence Diagram

User, or an external web service client, invokes the service operation on the EcoStruxure OA Adapter with corresponding input parameters. The adapter transforms the received query request into data format recognizable by the outage managements service. Based on the received input, adapter queries EcoStruxure OMS for the data requested by an external source. The data is later transformed according to the MultiSpeak standard definitions and returned synchronously to the caller.

4.2.1. Get Active Outages

4.2.1.1. Overview

OA adapter component hosts a service endpoint responsible for providing end user the possibility of querying the current outage snapshot from EcoStruxure OMS service. Operation is designed to be as simple as possible. Upon receiving the request which contains no additional information apart from header data, it queries all the currently active outages and returns their unique OMS identifiers to the end user application.

4.2.1.2. Use Cases

Table 4.2 contains the list of supported use cases:

Table 4.2 – Get Active Outages Use Cases

Get Outages			
Name	**Description**	**Result**	
Successful Scenario	OA Adapter receives the *GetActiveOutages* valid request from external system. Adapter processes the request and retrieves all current outage identifiers. Synchronous response with a list of currently active outages is returned.	Status	Success
		Error	N/A
Invalid Message	OA Adapter receives the *GetActiveOutages* request from external system, but the request is invalid against the XSD schema. Adapter rejects the message with the corresponding soap fault.	Status	Failed
		Error	Message is invalid against the XSD schema.
Missing Header Data	OA Adapter receives the *GetActiveOutages* request from external system, but the request has missing mandatory header data (message ID or timestamp. Adapter rejects the message with the corresponding synchronous error response.	Status	Failed
		Error	MessageId (Timestamp) is missing.
Internal Server Error	OA Adapter receives the *GetActiveOutages* valid request from external system, but an unexpected error occurs while processing. Adapter rejects the message with a corresponding soap fault.	Status	Failed
		Error	Server error specifics.

4.2.2. Get Outage Event

4.2.2.1. Overview

OA adapter component hosts a service endpoint responsible for providing end user the possibility of querying the detailed information about a currently existing outage from EcoStruxure OMS service. Upon receiving the request which, apart from header data, contains the unique identifier of the outage, the adapter queries all the necessary data from EcoStruxure network operation services and returns it to the end user.

4.2.2.2. Use Cases

Table 4.3 contains the list of supported use cases:

Table 4.3 – Get Outage Event Use Cases

Get Outage Event			
Name	**Description**	**Result**	
Successful Scenario	OA Adapter receives the *GetOutageEvent* valid request from external system. Adapter processes the request and retrieves the requested outage details. Synchronous response with a list of currently active outages is returned.	Status	Success
		Error	N/A
Invalid Message	OA Adapter receives the *GetOutageEvent* request from external system, but the request is invalid against the XSD schema. Adapter rejects the message with the corresponding soap fault.	Status	Failed
		Error	Message is invalid against the XSD schema.
Missing Header Data	OA Adapter receives the *GetOutageEvent* request from external system, but the request has missing mandatory header data (message ID or timestamp. Adapter rejects the message with the corresponding synchronous error response.	Status	Failed
		Error	MessageId (Timestamp) is missing.
Invalid Outage Identifier	OA adapter receives the *GetOutageEvent* request from the external system, but the request contains invalid (non-existing) outage identifier. Adapter rejects the messages with corresponding synchronous error message.	Status	Failed
		Error	Invalid Incident ID
Internal Server Error	OA Adapter receives the *GetOutageEvent* valid request from external system, but an unexpected error occurs while processing. Adapter rejects the message with a corresponding soap fault.	Status	Failed
		Error	Server error specifics.

4.2.3. Get Outage Event Status

4.2.3.1. Overview

OA adapter component hosts a service endpoint responsible for providing end user the possibility of querying the status information about a currently existing outage from EcoStruxure OMS service. Upon receiving the request which, apart from header data, contains the unique identifier of the outage, the adapter queries outage status information from EcoStruxure OMS service and returns it to the end user.

4.2.3.2. Use Cases

Table 4.4 contains the list of supported use cases:

Table 4.4 – Get Outage Event Status Use Cases

Get Outage Event Status			
Name	**Description**	**Result**	
Successful Scenario	OA Adapter receives the *GetOutageEventStatus* valid request from external system. Adapter processes the request and retrieves the requested outage status details. Synchronous response with a list of currently active outages is returned.	Status	Success
		Error	N/A
Invalid Message	OA Adapter receives the *GetOutageEventStatus* request from external system, but the request is invalid against the XSD schema. Adapter rejects the message with the corresponding soap fault.	Status	Failed
		Error	Message is invalid against the XSD schema.
Missing Header Data	OA Adapter receives the *GetOutageEventStatus* request from external system, but the request has missing mandatory header data (message ID or timestamp. Adapter rejects the message with the corresponding synchronous error response.	Status	Failed
		Error	MessageId (Timestamp) is missing.
Invalid Outage Identifier	OA adapter receives the *GetOutageEventStatus* request from the external system, but the request contains invalid (non-existing) outage identifier. Adapter rejects the messages with corresponding synchronous error message.	Status	Failed
		Error	Invalid Incident ID
Internal Server Error	OA Adapter receives the *GetOutageEventStatus* valid request from external system, but an unexpected error occurs while processing. Adapter rejects the message with a corresponding soap fault.	Status	Failed
		Error	Server error specifics.

4.2.4. Get Customers Affected by Outage

4.2.4.1. Overview

OA adapter component hosts a service endpoint responsible for providing end user the possibility of querying the list of affected customers by a currently existing outage from EcoStruxure OMS service. Upon receiving the request which, apart from header data, contains the unique identifier of the outage, the adapter queries outage affected customers from EcoStruxure OMS service and returns it to the end user.

4.2.4.2. Use Cases

Table 4.5 contains the list of supported use cases:

Table 4.5 – Get Customers Affected by Outage Use Cases

Get Customers Affected By Outage			
Name	**Description**	**Result**	
Successful Scenario	OA Adapter receives the *GetCustomersAffectedByOutage* valid request from external system. Adapter processes the request and retrieves the requested outage customer details. Synchronous response with a list of currently active outages is returned.	Status	Success
		Error	N/A
Invalid Message	OA Adapter receives the *GetCustomersAffectedByOutage* request from external system, but the request is invalid against the XSD schema. Adapter rejects the message with the corresponding soap fault.	Status	Failed
		Error	Message is invalid against the XSD schema.
Missing Header Data	OA Adapter receives the *GetCustomersAffectedByOutage* request from external system, but the request has missing mandatory header data (message ID or timestamp. Adapter rejects the message with the corresponding synchronous error response.	Status	Failed
		Error	MessageId (Timestamp) is missing.
Invalid Outage Identifier	OA adapter receives the *GetCustomersAffectedByOutage* request from the external system, but the request contains invalid (non-existing) outage identifier. Adapter rejects the messages with corresponding synchronous error message.	Status	Failed
		Error	Invalid Incident ID
Internal Server Error	OA Adapter receives the *GetCustomersAffectedByOutage* valid request from external system, but an unexpected error occurs while processing. Adapter rejects the message with a corresponding soap fault.	Status	Failed
		Error	Server error specifics.

4.3. Outage Management

Outage management is often performed externally. Field crews for example often need to provide automated feedback related to the outage assigned to them. For these purposes EcoStruxure OA adapter offers a set of service operations implemented against the MultiSpeak standard definitions. # represents sequence of events present while managing outage details externally.

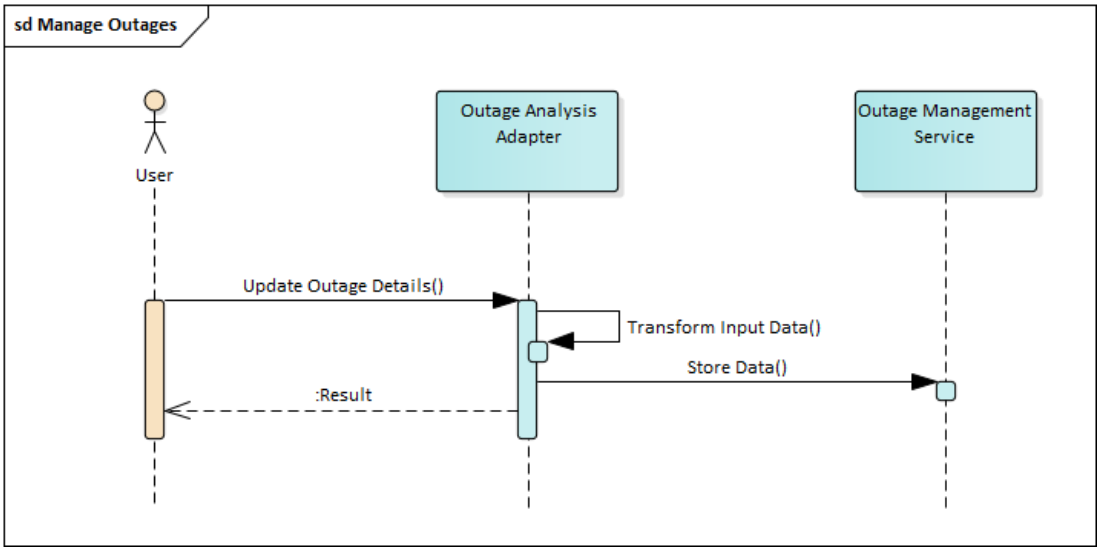

Figure 4.3 – Manage Outage Details Sequence Diagram

User invokes the outage management related service endpoint hosted on the EcoStruxure OA Adapter. The adapter transforms the input data to a format recognizable by the EcoStruxure OMS service and stores it in its database. Synchronous result of the actions is returned to the caller. The data stored is naturally visible to the users managing the outage internally.

4.3.1. Add Remark to Outage

4.3.1.1. Overview

OA adapter component hosts a service endpoint responsible for providing end users the possibility of adding remarks (comments) to an existing outage in EcoStruxure OMS service. Adapter expects to receive corresponding outage identifier together with remark and accompanying timestamp. Data is processed and stored in the EcoStruxure OMS service.

4.3.1.2. Use Cases

Table 4.6 contains the list of supported use cases:

Table 4.6 – Add Remark to Outage Use Cases

Add Remark to Outage			
Name	**Description**	**Result**	
Successful Scenario	OA Adapter receives the *AddRemarkToOutage* valid request from external system. Adapter processes the request and stores the remark as a comment on an existing outage. Synchronous response without errors is returned.	Status	Success
		Error	N/A
Invalid Message	OA Adapter receives the *AddRemarkToOutage* request from external system, but the request is invalid against the XSD schema. Adapter rejects the message with the corresponding soap fault.	Status	Failed
		Error	Message is invalid against the XSD schema.
Missing Header Data	OA Adapter receives the *AddRemarkToOutage* request from external system, but the request has missing mandatory header data (message ID or timestamp. Adapter rejects the message with the corresponding synchronous error response.	Status	Failed
		Error	MessageId (Timestamp) is missing.
Invalid Outage Identifier	OA adapter receives the *AddRemarkToOutage* request from the external system, but the request contains invalid (non-existing) outage identifier. Adapter rejects the messages with corresponding synchronous error message.	Status	Failed
		Error	Invalid Incident ID
Internal Server Error	OA Adapter receives the *AddRemarkToOutage* valid request from external system, but an unexpected error occurs while processing. Adapter rejects the message with a corresponding soap fault.	Status	Failed
		Error	Server error specifics.

4.3.2. Restore Outage

4.3.2.1. Overview

OA adapter component hosts a service endpoint responsible for providing end users the possibility of restoring the outage from the field. Adapter expects to receive corresponding outage identifier in order to associate it to an existing outage present in the EcoStruxure OMS Service, together with optional outage reason details, accompanying timestamp. It is important to note that the outage needs to be in a state where it can transition to the restored state, otherwise the request will fail and error details returned to the caller.

4.3.2.2. Use Cases

Table 4.7 contains the list of supported use cases:

Table 4.7 – Restore Outage Use Cases

Add Remark to Outage			
Name	**Description**	**Result**	
Successful Scenario	OA Adapter receives the *RestoreOutage* valid request from external system. Adapter processes the request and stores the remark as a comment on an existing outage. Synchronous response without errors is returned.	Status	Success
		Error	N/A
Invalid Message	OA Adapter receives the *RestoreOutage* request from external system, but the request is invalid against the XSD schema. Adapter rejects the message with the corresponding soap fault.	Status	Failed
		Error	Message is invalid against the XSD schema.
Missing Header Data	OA Adapter receives the *RestoreOutage* request from external system, but the request has missing mandatory header data (message ID or timestamp. Adapter rejects the message with the corresponding synchronous error response.	Status	Failed
		Error	MessageId (Timestamp) is missing.
Invalid Outage Identifier	OA adapter receives the *RestoreOutage* request from the external system, but the request contains invalid (non-existing) outage identifier. Adapter rejects the messages with corresponding synchronous error message.	Status	Failed
		Error	Invalid Incident ID
Outage Transition Fault	OA Adapter receives the valid *RestoreOutage* request from the external system, but the associated outage in the OMS service is not restorable (still has unrestored customers). Adapter rejects the message with corresponding synchronous error message	Status	Failed
		Error	Outage not Restorable.
Internal Server Error	OA Adapter receives the *RestoreOutage* valid request from external system, but an unexpected error occurs while processing. Adapter rejects the message with a corresponding soap fault.	Status	Failed
		Error	Server error specifics.

4.4. Outage Notifications

Outage notifications offer proactive feedback to external parties originated from internal outage management. EcoStruxure OA adapter is subscribed to certain outage management related events, which originate in EcoStruxure OMS services and notifies the interested parties. The outage notifications service clients are also implemented against MultiSpeak standard definitions. Figure 4.4 represents sequence of events present during generation of outage notifications.

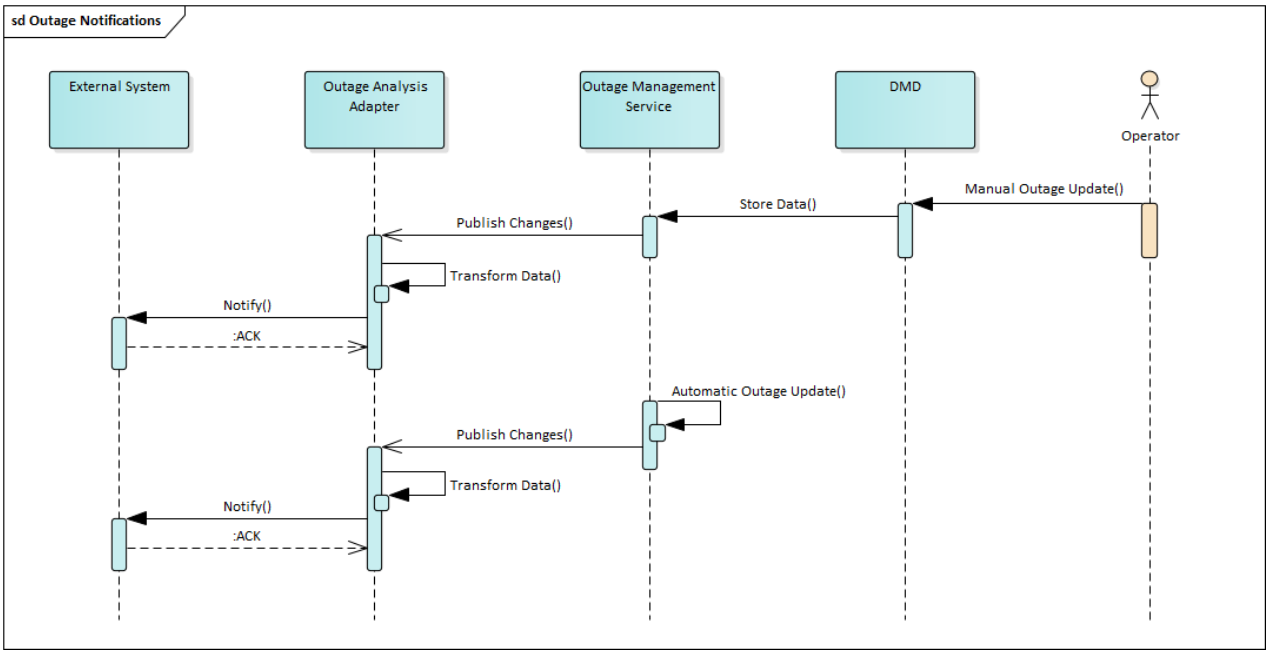

Figure 4.4 – Outage Notifications Sequence Diagram

Notification triggers can be a result from a manual action during incident management lifecycle, or a result of an automatic outage service operation. In both cases, if the change is of interest for the EcoStruxure OA adapter process, it will receive the publication and generate a notification message for the external parties.

4.4.1. Assign Crews to Outage

4.4.1.1. Overview

EcoStruxure OA adapter offers a proactive crew notification as a result of their association to a specific active outage in the EcoStruxure OMS service. When dispatcher adds crew to an incident in the DMD client application, adapter receives a publication message containing those details. It generates a notification message based on the publication data and sends it to the external service designed to process these notifications and delegate them to the specific crews.

4.4.1.2. Use Cases

Table 4.8 contains the list of supported use cases:

Table 4.8 – Assign Crews to Outage Use Cases

Initiate Outage Detection Event Request			
Name	**Description**	**Result**	
Successful Scenario	OA Adapter successfully sends the request to the external system. External crew dispatching system responds with a synchronous acknowledgement message which contains no errors.	Status	Success
		Error	N/A
External system is unavailable	OA Adapter tries to send the request message to the external system but fails due to unavailability of the service endpoint. Adapter retries configurable number of times. Upon unsuccessful retry process completion, adapter updates the status of the request to Failed,	Status	Failed
		Error	Service Endpoint is unavailable
External system responds with an error message	MDM adapter successfully sends the request message to the AMI HES (MDMS). AMI HES responds with a synchronous response which contains error information. Adapter logs the information and updates the meter status update request to Failed.	Status	Failed.
		Error	Service processing error.

5. MESSAGES

MultiSpeak standard is transport specific. SOAP messages using HTTP, TCP/IP socket connections directly between applications are used for transferring data in MultiSpeak. XML schemas are used for message definitions.

5.1. Common

5.1.1. MultiSpeak Message Header

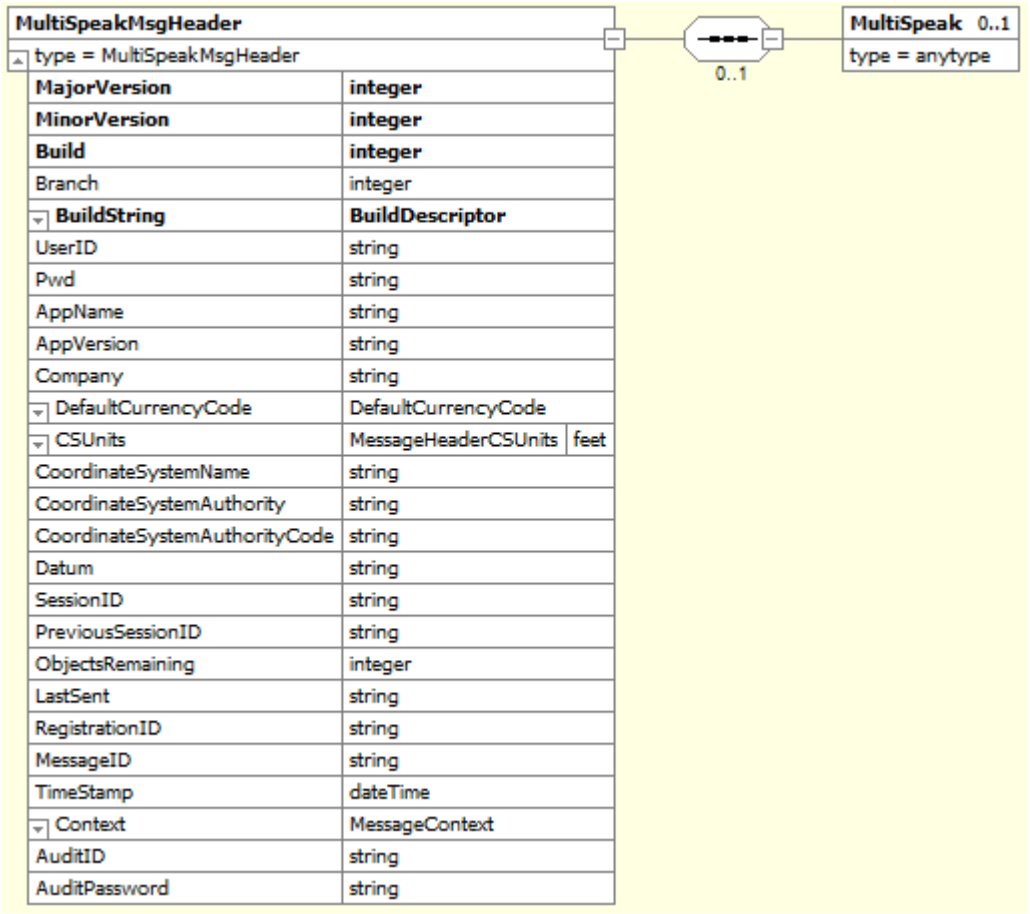

Figure 5.1 – MultiSpeakMsgHeader Schema

MultiSpeakMsgHeader is a common object for all MultiSpeak SOAP messages. It is transferred within the SOAP envelope header object, whilst the concrete data structures related to the service operations are transferred within the SOAP envelope body.

EcoStruxure MDM adapter component utilizes only two of the *MultiSpeakMsgHeader* attributes visible on Figure 5.1, and those are MessageID and Timestamp.

- MessageID – represents unique identifier for this instance of a message and is utilized for tracing.
- Timestamp – indicates the moment in time when the message was created.

5.2. OD Event Notification

The interface specification is provided in the:

Table 5.1 – ODEventNotification Service Endpoint Specifications

Specification	
Interface (Service) name	OutageAnalysisService
Operation name	ODEventNotification
Hosting	Internal
Role	Service
Integration Style	Remote Procedure Invocation
Transport (Integration) Technology	SOAP WS
Transport Protocol	HTTPS
Transport Port	443
Request	ODEventNotification
Response	ODEventNotificationResponse
Concurrency	Multiple
Instances	Single
WSDL	MultiSpeak OA WSDL

5.2.1. Request Message

ODEventNotification is transferred within the SOAP message envelope body. The message schema definitions is visible on Figure 5.2.

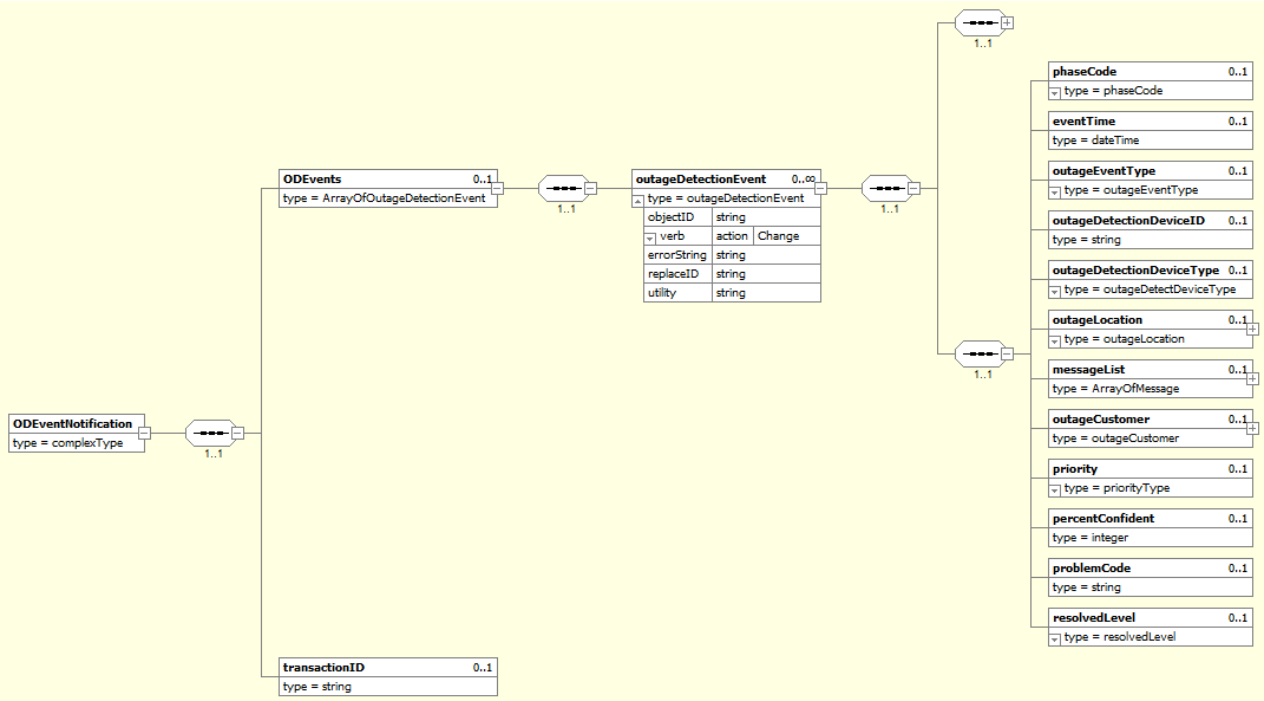

Figure 5.2 – ODEventNotification Schema

Table 5.2 represents the request message mapping in regard to the EcoStruxure GridOps SMMS data model.

Table 5.2 – OD Event Notification Data Mapping

Request Message		Description	Model Code
Element (Attribute)	**Type**		
outageDetectionEvent. eventTime	datetime	Date and time outage event detected	OMS_TROUBLE _EVENT_EVENTTIME
outageDetectionEvent. outageEventType	outageEventType*	Type of outage event(see enumerations)	OMS_EVENT _REASON_NAME
outageDetectionEvent. outageLocation	outageLocation*	Outage location identifier.	OMS_TROUBLE _EVENT_SDP _CUSTOMID
problemCode	string	Type of the problem which occurred.	OMS_PROBLEM _TYPE_NAME

outageEventType is a restricted string type which offers a set of values visible in Figure 5.3. Since it maps to ADMS_EVENT_REASON_NAME, which represents a set of predefined configurable values, a mapping between two enums needs to be defined. The mapping is defined in

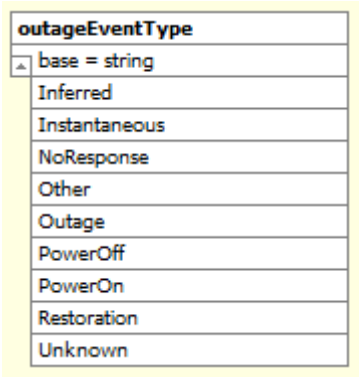

Figure 5.3 – Outage Event Type Enum

Table 5.3 – Outage Event Type Related Mapping

Outage Event Type Related Mapping	
Outage Event Type	**Event Reason**
Inferred	Voltage Problem
Instantaneous	No Power
NoResponse	N\A
Other	N\A
Outage	No Power
PowerOff	No Power
PowerOn	Power Restored
Restoration	Power Restored
Unknown	N\A

outageLocation represents the customer identifier. It's schema is represented on Figure 5.4. Outage location offers a choice of four possible customer identifiers:

- serviceLocationID – custom identifier of the service location (service delivery point in EcoStruxure GridOps network model).
- meterID – custom identifier of the associated electrical meter.
- account number – customer account number.
- phone number – customer phone number.

Only one outage location identifier must be present in *ODEventNotificaiton* message. Multiple outage location identifiers will result in processing failure as described in the use cases section. Since trouble tickets (customer calls) are created based on service delivery point (service location), adapter components associates the provided location identifier to a service delivery point based on the data from the EcoStruxure Customer database.

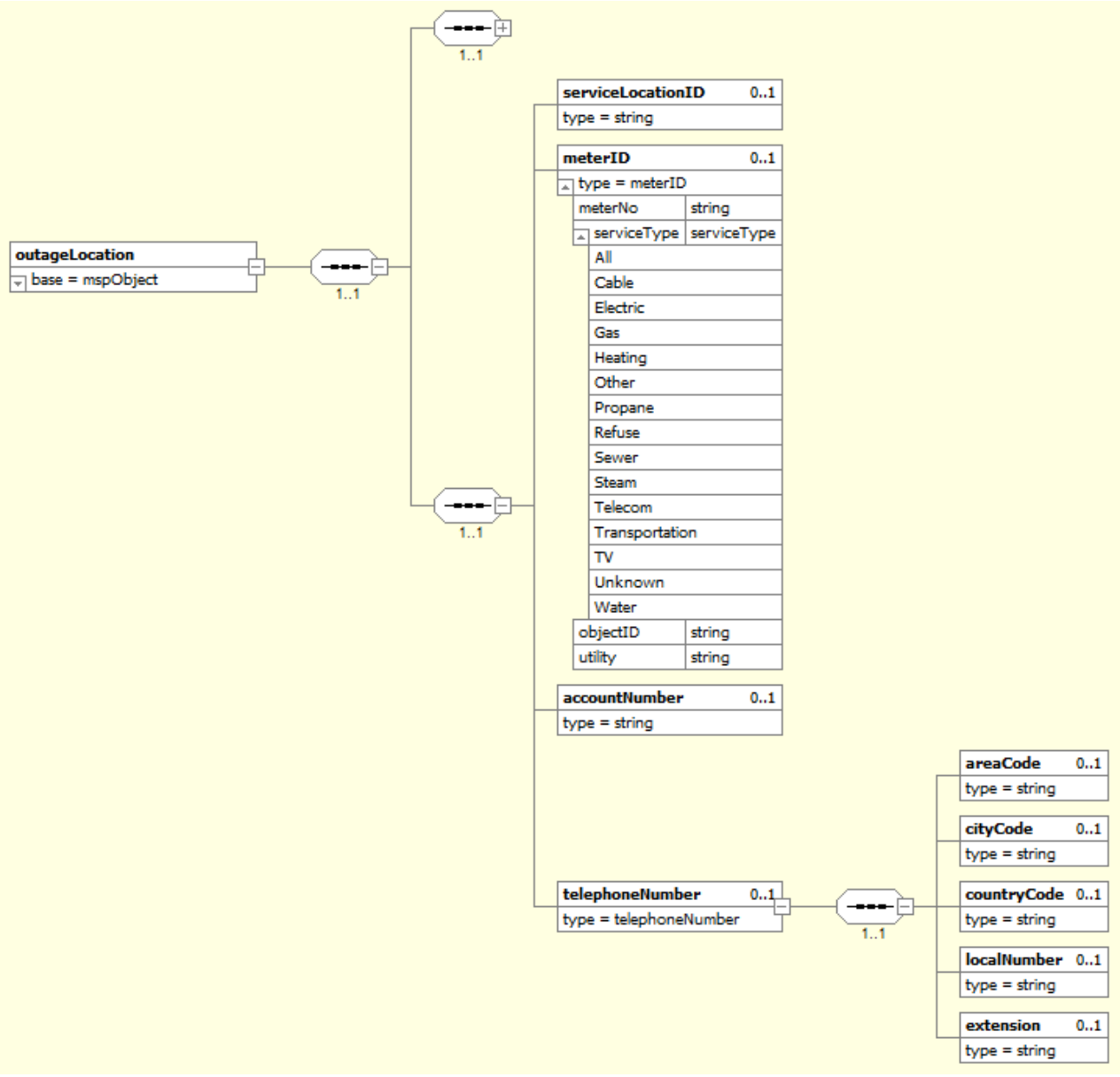

Figure 5.4 – outageLocation Schema

5.2.2. Response Message

The *ODEventNotificationResponse* message schema is visible on Figure 5.5.

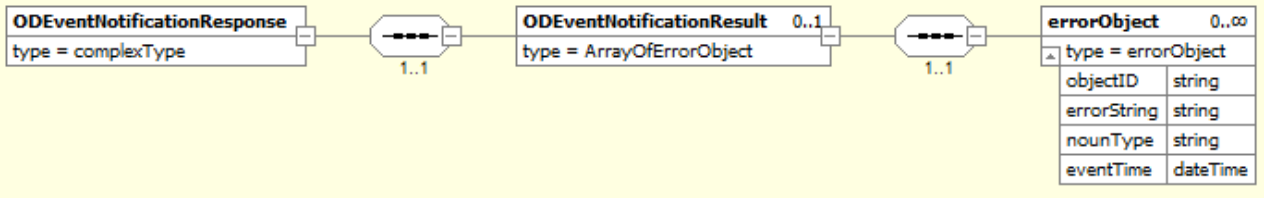

Figure 5.5 – ODEventNotificationResponse Schema

The response message is consisted only with an array of error objects. Table 5.4 represents the data mapping of error objects according to MultiSpeak standard definitions.

Table 5.4 – errorObject data mapping

errorObject		Description	Model Code
Element (Attribute)	Type		
objectId	string	Identifier for object with error	N\A
errorString	string	Text description of the error itself	N\A
nounType	string	Type of noun for which this error is associated	N\A
eventTime	datetime	Failure timestamp	N\A

Since error objects are situational, no model mapping is applicable.

5.3. Get Active Outages

The interface specification is provided in the:

Table 5.5 – GetActiveOutages Service Endpoint Specifications

Specification	
Interface (Service) name	OutageAnalysisService
Operation name	GetActiveOutages
Hosting	Internal
Role	Service
Integration Style	Remote Procedure Invocation
Transport (Integration) Technology	SOAP WS
Transport Protocol	HTTPS
Transport Port	443
Request	GetActiveOutages
Response	GetActiveOutagesResponse
Concurrency	Multiple
Instances	Single
WSDL	MultiSpeak OA WSDL

5.3.1. Request Message

As mentioned in the operation overview, *GetActiveOutages* messages carries no information. An empty object is transferred via soap message body. It represents a trigger for the OA adapter to query all active outages from OMS service. No data mapping is necessary.

5.3.2. Response Message

GetActiveOutagesResponse schema is visible on Figure 5.6.

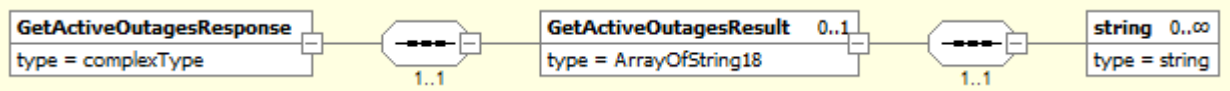

Figure 5.6 – GetActiveOutagesResponse Schema

Table 5.6 contains the response message data mapping.

Table 5.6 – GetActiveOutagesResponse Data Mapping

Response Message		Description	Model Code
Element (Attribute)	Type		
GetActiveOutagesResult	string	Unique identifier of the active outage	OMS_IMSOBJ_UID (OMS_INCIDENT)

5.4. Get Outage Event

The interface specification is provided in the Table 5.7:

Table 5.7 – GetOutageEvent Service Endpoint Specification

Specification	
Interface (Service) name	OutageAnalysisService
Operation name	GetOutageEvent
Hosting	Internal
Role	Service
Integration Style	Remote Procedure Invocation
Transport (Integration) Technology	SOAP WS
Transport Protocol	HTTPS
Transport Port	443
Request	GetOutageEvent
Response	GetOutageEventResponse
Concurrency	Multiple
Instances	Single
WSDL	MultiSpeak OA WSDL

5.4.1. Request Message

GetOutageEvent request message is show on Figure 5.7. The request carries only the unique outage identifier, which is used to filter out the corresponding outage in OMS service.

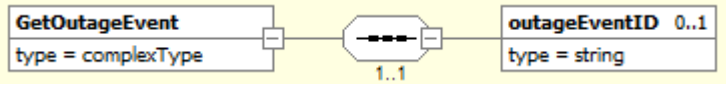

Figure 5.7 – GetOutageEvent Schema

Table 5.8 contains the *GetOutageEvent* message data mapping.

Table 5.8 – GetOutageEvent Data Mapping

Request Message		Description	Model Code
Element (Attribute)	Type		
outageEventId	string	Unique identifier of the active outage	OMS_IMSOBJ_UID (OMS_INCIDENT)

5.4.2. Response Message

GetOutageEventResponse message schema is visible on Figure 5.8.

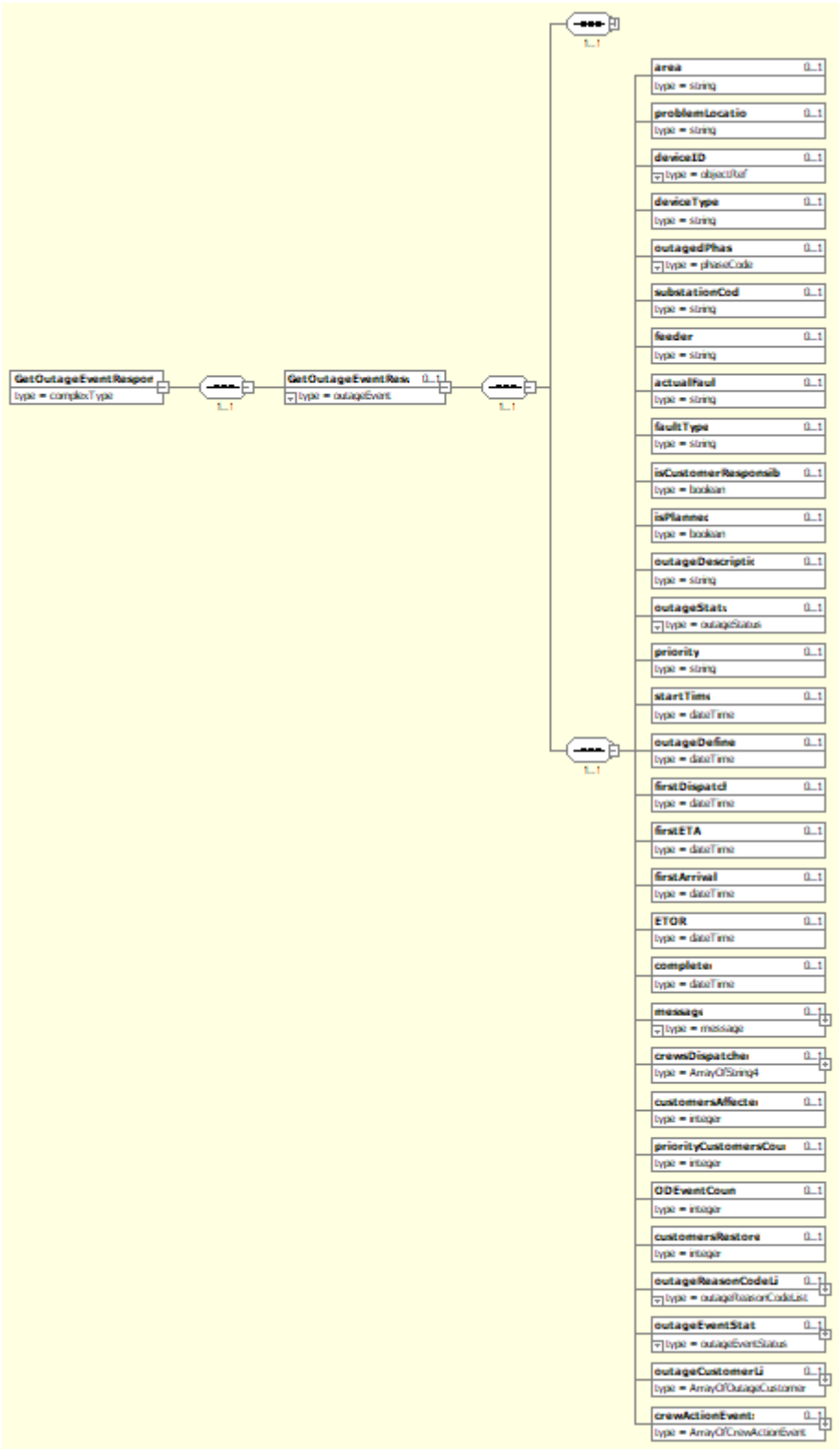

Figure 5.8 – GetOutageEventResponse Schema

Table 5.9 contains the *GetOutageEventResponse* data mapping.

Table 5.9 – GetOutageEventResponse Data Mapping

Response Message		Description	Model Code
Element (Attribute)	Type		
problemLocation	string	Location of the problem causing outage	OMS_INCIDENT _COORDINATES_X; OMS_INCIDENT _COORDINATES_Y
deviceId	string	Outage devices. In case where there are multiple, they are concatenated into a single string array representation, comma separated	OMS_DEVICE _CUSTOMID
deviceType	string	Type of outage devices. Same applies for multiple devices.	OMS_DEVICE_TYPE
substationCode	string	Name of the HV/MV substation where outage belongs	OMS_INCIDENT _SUBSTATION_NAME
feeder	string	Name of the affected feeders	OMS_INCIDENT _AFFECTED_FEEDER _NAMES
actualFault	string	List of the problem types.	OMS_PROBLEM_TYPE _NAME
isPlanned	boolean	True if outage is planned, false otherwise	OMS_INCIDENT _IS_PLANNED
outageDescription	string	Outage description.	OMS_INCIDENT _INSTRUCTION
outageStatus	string	Current status of the outage. Since MultiSpeak outageStatus values are not translated to a specific outage model attribute, it is generated based on several outage model attributes.	OMS_INCIDENT_STATUS _NAME; OMS_INCIDENT_POWER _STATUS; OMS_INCIDENT_TYPE _NAME; OMS_INCIDENT _CONFIRMATION_STATUS
priority	string	Outage priority.	OMS_INCIDENT _PRIORITY

Response Message		Description	Model Code
Element (Attribute)	Type		
startTime	dateTime	outage creation timestamp	OMS_INCIDENT _CREATE_TIME
outageDefined	dateTime	Outage defined timestamp	OMS_INCIDENT _OUTAGE_TIME
customersAffected	int	Number of affected customers	OMS_INCIDENT _NUM_CUSTOMERS
priorityCustomersCount	int	Number of priority customers affected	OMS_INCIDENT_NUM _CRITICAL_CUSTOMERS
ODEventCount	int	Number of associated outage detection events (calls)	OMS_INCIDENT_CALL _REFS
customersRestored	int	Number of currently restored customers	OMS_INCIDENT_NUM _CUSTOMERS; OMS_INCIDENT_NUM _UNREST_CUSTOMERS
outageReasonCodeList	outage Reason CodeList*	#TODO	
outageEventStatus	outageEvent Status*	Outage event status, described in Table 5.11.	N\A
crewActionEvents	arrayOf CrewAction Events*	#TODO	

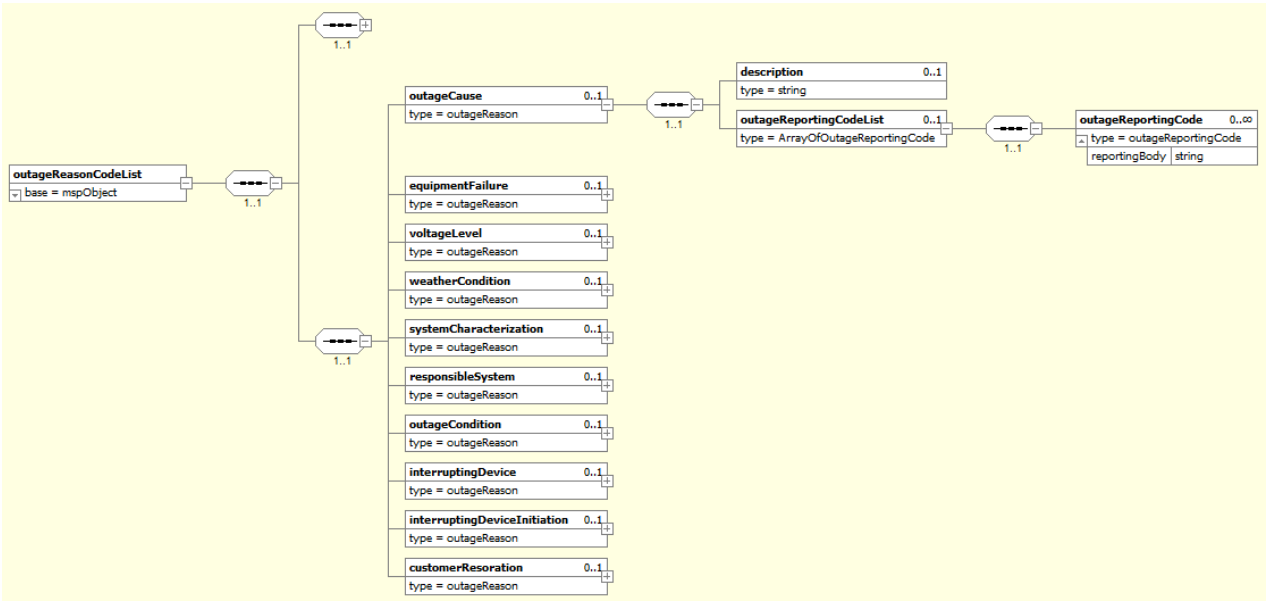

Figure 5.9 – OutageReasonCodeList Schema

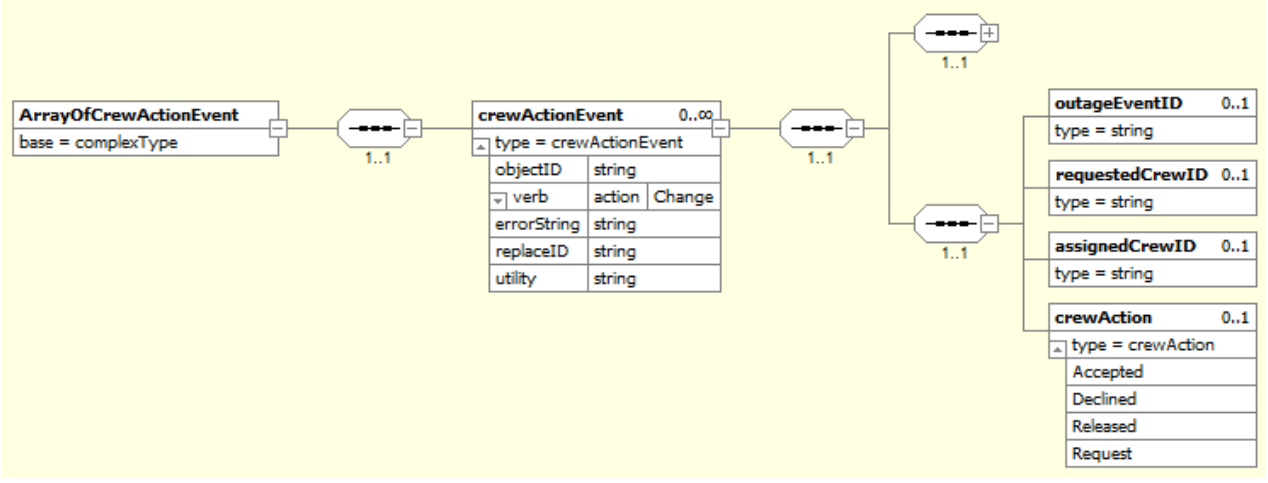

Figure 5.10 – ArrayOfCrewActionEvents Schema

5.5. Get Outage Event Status

The interface specification is provided in the Table 5.10:

Table 5.10 – GetOutageEventStatus Service Endpoint Specification

Specification	
Interface (Service) name	OutageAnalysisService
Operation name	GetOutageEventStatus
Hosting	Internal
Role	Service

Specification	
Integration Style	Remote Procedure Invocation
Transport (Integration) Technology	SOAP WS
Transport Protocol	HTTPS
Transport Port	443
Request	GetOutageEventStatus
Response	GetOutageEventStatusResponse
Concurrency	Multiple
Instances	Single
WSDL	MultiSpeak OA WSDL

5.5.1. Request Message

GetOutageEvent request message is show on Figure 5.11. The request carries only the unique outage identifier, which is used to filter out the corresponding outage in EcoStruxure OMS service.

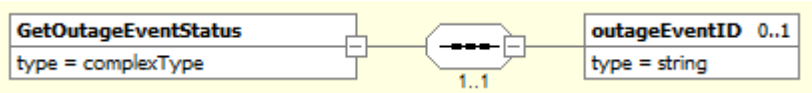

Figure 5.11 – GetOutageEventStatus Schema

Since the request message resembles the request message from *GetOutageEvent* operation, the data mapping displayed in Table 5.8 applies to the operation also.

5.5.2. Response Message

GetOutageEventResponse message schema is visible on Figure 5.12.

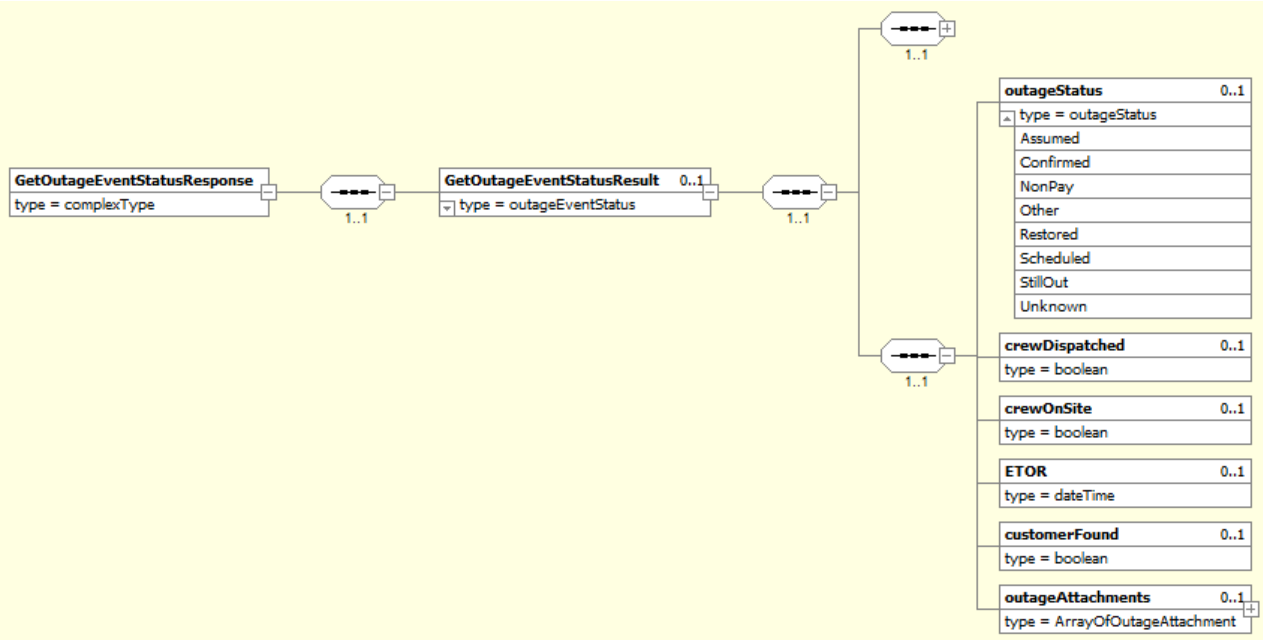

Figure 5.12 – GetOutageEventStatusResponse Schema

Table 5.11 contains the *GetOutageEventResponse* data mapping.

Table 5.11 – GetOutageEvenStatustResponse Data Mapping

Response Message		Description	Model Code
Element (Attribute)	Type		
outageStatus	string	Current status of the outage. Since MultiSpeak outageStatus values are not translated to a specific outage model attribute, it is generated based on several outage model attributes.	OMS_INCIDENT_STATUS _NAME; OMS_INCIDENT_POWER _STATUS; OMS_INCIDENT_TYPE _NAME; OMS_INCIDENT _CONFIRMATION_STATUS
crewDispatched	bool	True if any crew is assigned to the outage, false otherwise	OMS_INCIDENT _CREWREFS
crewOnSite	bool	True if any of the assigned crews is onsite, false otherwise	OMS_INCIDENT_CREW _ASSIGNMENT_STATUS
ETOR	datetime	Estimated time of restoration	OMS_INCIDENT _ESTIMATED_END_TIME

5.6. Get Customers Affected by Outage

The interface specification is provided in the Table 5.12:

Table 5.12 – GetCustomersAffectedByOutage Service Endpoint Specification

Specification	
Interface (Service) name	OutageAnalysisService
Operation name	GetCustomersAffectedByOutage
Hosting	Internal
Role	Service
Integration Style	Remote Procedure Invocation
Transport (Integration) Technology	SOAP WS
Transport Protocol	HTTPS
Transport Port	443
Request	GetCustomersAffectedByOutage
Response	GetCustomersAffectedByOutageResponse
Concurrency	Multiple
Instances	Single
WSDL	MultiSpeak OA WSDL

5.6.1. Request Message

GetCustomersAffectedByOutage request message is show on Figure 5.13. The request carries only the unique outage identifier, which is used to filter out the corresponding outage in EcoStruxure OMS service.

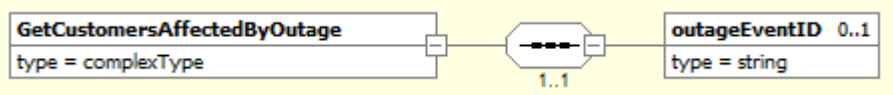

Figure 5.13 – GetCustomersAffectedByOutage Schema

Since the request message resembles the request message from *GetOutageEvent* operation, the data mapping displayed in Table 5.8 applies to the operation also.

5.6.2. Response Message

GetCustomersAffectedByOutageResponse message schema is visible on Figure 5.14.

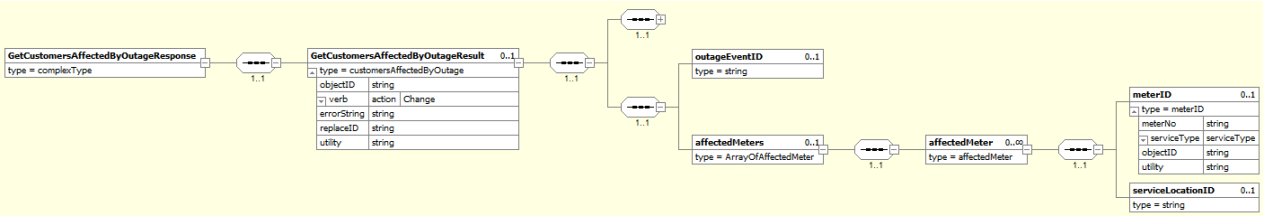

Figure 5.14 – GetCustomersAffectedByOutageResponse Schema

Table 5.13 contains the *GetOutageEventResponse* data mapping.

Table 5.13 – GetCustomersAffectedByOutageResponse Data Mapping

Response Message		Description	Model Code
Element (Attribute)	Type		
outageEventId	String	Unique identifier of the outage affecting customers	OMS_IMSOBJ_UID (OMS_INCIDENT)
affectedMeter .meterID	String	Unique identifier of the customer meter	OMS_SDP_METERID
affectedMeter .serviceLocationId	String	Unique identifier of the customer service delivery point	OMS_SDP_CUSTOMID

It is important to state that the response message contains a list of single customer location identifiers, “meterID” or “serviceLocationID”. Which is returned is configurable in the adapters process registry configuration file.

5.7. Add Remark to Outage

The interface specification is provided in the Table 5.14:

Table 5.14 – AddRemarkToOutage Service Endpoint Specification

Specification	
Interface (Service) name	OutageAnalysisService
Operation name	AddRemarkToOutage
Hosting	Internal
Role	Service
Integration Style	Remote Procedure Invocation
Transport (Integration) Technology	SOAP WS
Transport Protocol	HTTPS
Transport Port	443
Request	AddRemarkToOutage

Specification	
Response	AddRemarkToOutageResponse
Concurrency	Multiple
Instances	Single
WSDL	MultiSpeak OA WSDL

5.7.1. Request Message

AddRemarkToOutage request message schema is visible on Figure 5.15.

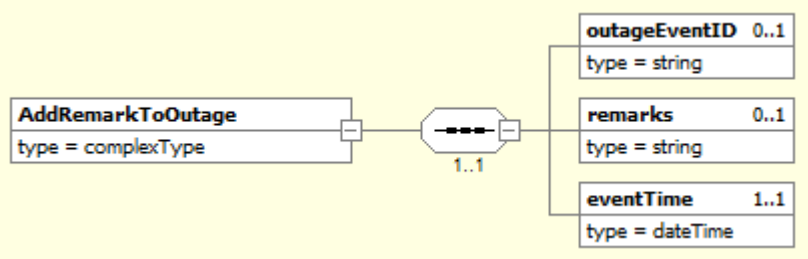

Figure 5.15 – AddRemarkToOutage Schema

Table 5.15 contains *AddRemarkToOutage* data mapping:

Table 5.15 – AddRemarkToOutage Data Mapping

Request Message		Description	Model Code
Element (Attribute)	Type		
outageEventId	string	Unique identifier of the outage affecting customers	OMS_IMSOBJ_UID (OMS_INCIDENT)
remarks	string	Outage remark	OMS_INCIDENT_NOTE _NOTE
eventTime	string	Remark timestamp	OMS_INCIDENT_NOTE _TIMESTAMP

Incident (outage) notes in OMS service require a mandatory type attribute in order to store it. OA adapter offers users a possibility of configuring the baseline note type for the *AddRemarksToOutage* interface in the process registry configuration file. Baseline configuration for note type is set to “Operator”.

5.7.2. Response Message

AddRemarksToOutageResponse message schema is visible on Figure 5.16.

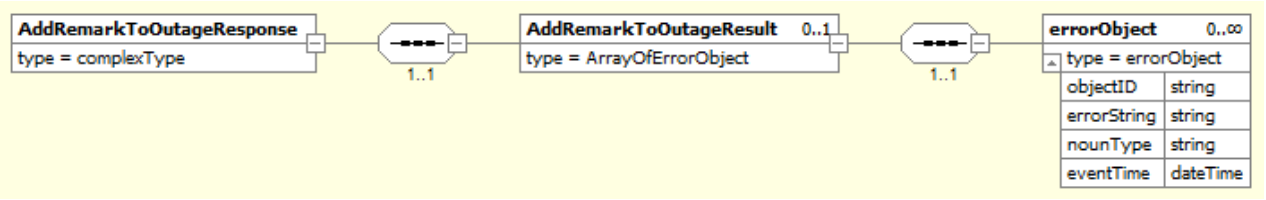

Figure 5.16 – AddRemarksToOutageResponse Schema

The response message is consisted only with an array of error objects. Table 5.4 represents the data mapping of error objects according to MultiSpeak standard definitions.

5.8. Assign Crew to Outage

The interface specification is provided in the Table 5.16.

Table 5.16 – AssignCrewsToOutage Service Endpoint Specification

Specification	
Interface (Service) name	OutageAnalysisService
Operation name	AssignCrewsToOutage
Hosting	Internal
Role	Client
Integration Style	Remote Procedure Invocation
Transport (Integration) Technology	SOAP WS
Transport Protocol	HTTPS
Transport Port	443
Request	AssignCrewsToOutage
Response	AssignCrewsToOutageResponse
Concurrency	Multiple
Instances	Single
WSDL	MultiSpeak OA WSDL

5.8.1. Request Message

AssignCrewsToOutage message schema is visible on Figure 5.17.

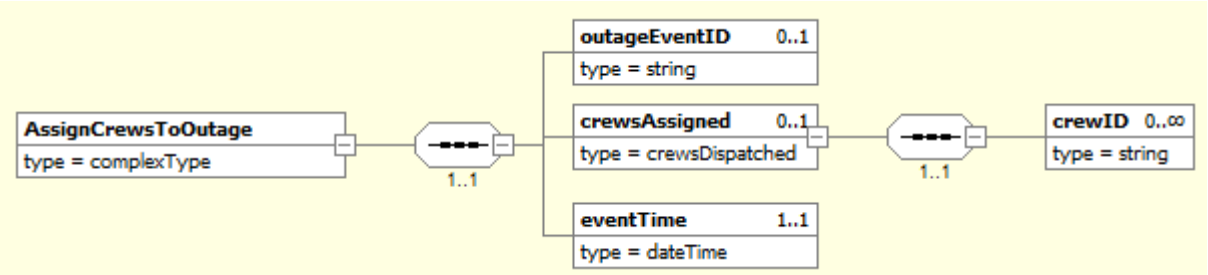

Figure 5.17 – AssignCrewsToOutage Schema

Table 5.17 Table 5.15 contains *AddRemarkToOutage* data mapping:

Table 5.17 – AssignCrewsToOutage Data Mapping

Request Message		Description	Model Code
Element (Attribute)	Type		
outageEventId	string	Unique identifier of the outage affecting customers	OMS_IMSOBJ_UID (OMS_INCIDENT)
crewAssigned. crewID	string	Crew Identifier	OMS_INCIDENT_CREW _CUSTOMID or OMS_INCIDENT_CREW_NAME
eventTime	string	Assignment timestamp	OMS_INCIDENT_CREW _ASSIGNMENT_ASSIGNED_TIME

5.8.2. Response Message

AssignCrewsToOutageResponse message schema is visible on Figure 5.18.

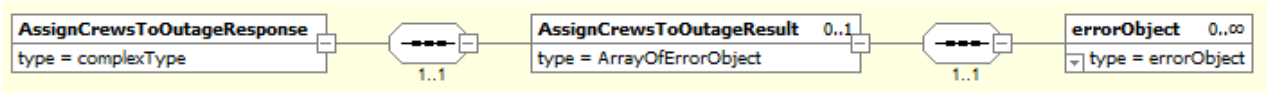

Figure 5.18 - AssignCrewsToOutageResponse Schema

The response message is consisted only with an array of error objects. Table 5.4 represents the data mapping of error objects according to MultiSpeak standard definitions.

5.9. Restore Outage

Table 5.18 – RestoreOutage Service Endpoint Specification

Specification	
Interface (Service) name	OutageAnalysisService
Operation name	RestoreOutage
Hosting	Internal

Specification	
Role	Service
Integration Style	Remote Procedure Invocation
Transport (Integration) Technology	SOAP WS
Transport Protocol	HTTPS
Transport Port	443
Request	RestoreOutage
Response	RestoreOutageResponse
Concurrency	Multiple
Instances	Single
WSDL	MultiSpeak OA WSDL

5.9.1. Request Message

RestoreOutage message schema is visible on Figure 5.19.

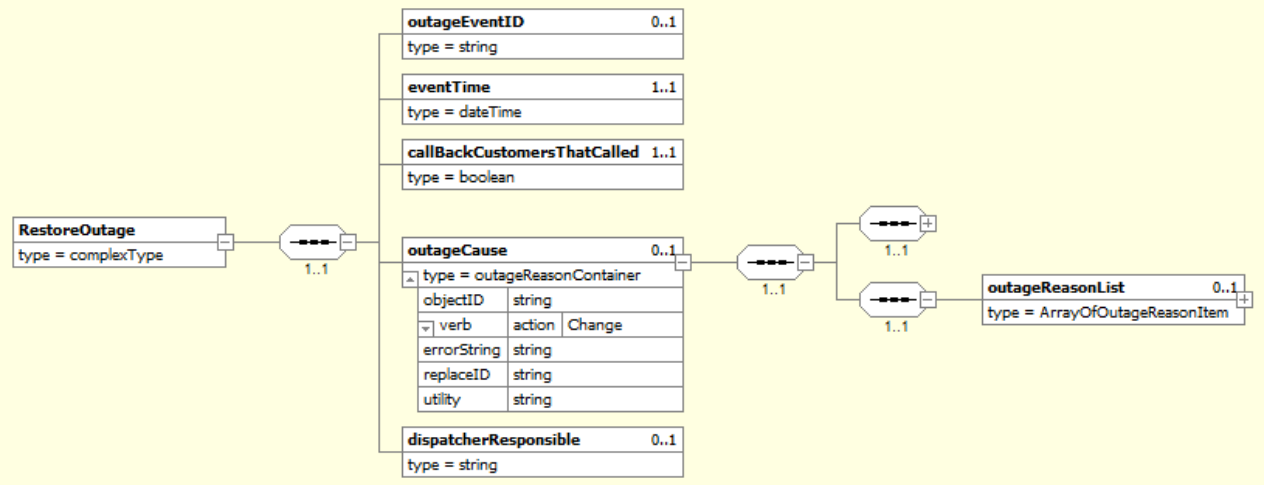

Figure 5.19 – RestoreOutage Schema

ArrayOfOutageReasonItem schema is visible on Figure 5.20.

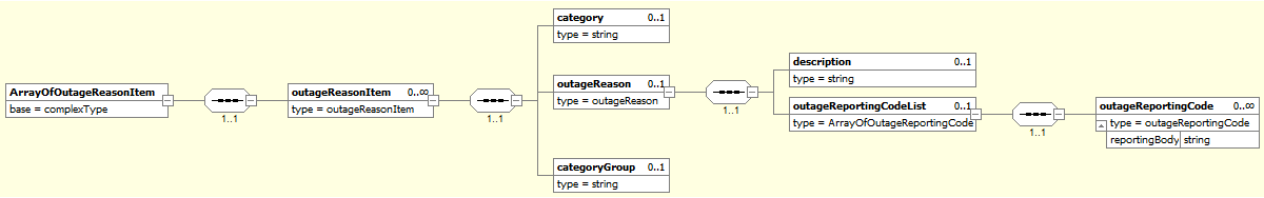

Figure 5.20 – ArrayOfOutageReasonItem Schema

Table 5.19 contains *RestoreOutage* data mapping:

Table 5.19 – AssignCrewsToOutage Data Mapping

Request Message		Description	Model Code
Element (Attribute)	Type		
outageEventID	string	Unique identifier of the outage	OMS_IMSOBJ_UID (OMS_INCIDENT)
eventTime	datetime	Timestamp of restoration	OMS_INCIDENT _ACTUAL_END_TIME
callbackCustomers ThatCalled	bool	Indicator which shows whether callbacks need to be generated for the associated customer calls	OMS_INCIDENT _CALL_REFS -> OMS_PHONE_CALL _EVENT_CALLBACK _REQ
dispatcherResponsible	string	User assigned to the outage (incident)	OMS_INCIDENT _ASSIGNED_USER

Table 5.20 contains the mapping of outage reason list (outage resolution properties). The adapter interface will query all outage resolution attributes (cause, sub-cause, etc…) and generate the outage reason list property of the *RestoreOutage* message.

Table 5.20 – Outage Reason List Mapping

outageReasonList		Description	Model Code
Element (Attribute)	Type		
description	string	Outage resolution Attribute (ModelCode – human readable)	/
outageReasonCode	datetime	Outage resolution attribute value	/

5.9.2. Response Message

RestoreOutageResponse message schema is visible on Figure 5.21.

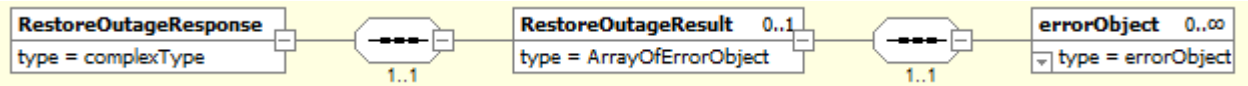

Figure 5.21 – RestoreOutageResponse Schema

The response message is consisted only with an array of error objects. Table 5.4 represents the data mapping of error objects according to MultiSpeak standard definitions.

6. DEFINITIONS AND ABBREVIATIONS

Definition/Abbreviation	Description
ADMS	Advanced Distribution Management System
DMZ	Demilitarized Zone
HTTP	Hypertext Transport Protocol
OMS	(EcoStruxure) Outage Management Service
SOAP	Simple Object Access Protocol
TCP/IP	Transmission Control Protocol / Internet Protocol
WS	Web Service
WSDL	Web Service Description Language
XML	eXtensible Markup Language
XSD	XML schema definition