EcoStruxure ADMS 3.10

Major Event Mitigation Interface

Functional Specification

Document Version: 1.0

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1. REFERENCES

#	Title	Description
1.	EcoStruxure GridOps Management Suite 3.10 Model Management - Functional Specification	The document describes the general procedure of creating, verifying and distributing network model data and associated changesets within an EcoStruxure GridOps system.
2.	EcoStruxure GridOps Management Suite 3.10 Network Data Integration - Functional Specification	The document describes the Network Data Integration (NDI) module of EcoStruxure GridOps which represents a set of functionalities designed to facilitate the data migration as well as the sustained data integration between the most commonly encountered external data sources (e.g. GIS, EAM, CIS/CRM, MDMS) and EcoStruxure GridOps Network Model data repositories.
3.	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.
4.	EcoStruxure ADMS 3.10 Major Event Mitigation Interface	EcoStruxure ADMS 3.10 Major Event Mitigation Interface zip file contains essential configuration information, as well as web service definitions complemented with message examples.

2. ASSUMPTIONS AND PREREQUISITES

The ADMS Major Event Mitigation Integration is designed and implemented under the following assumptions:

- Details about architecture, error handling and auditing, security are stated in the *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional specification* document [3].
- External system is the source system both for actual (current) or forecast risk index values for Geographical Area.
- Integration is implemented through the ADMS MEM Adapter and supports the update of discrete, analog, and forecast signals if they exist in the Geographical Area.
- Out of the box integration is “one-way”, meaning that external system can push data to the ADMS via SOAP base Web Services exposed by the ADMS MEM Adapter.
- Enterprise integration pattern used is synchronous request/response service call.

3. INTRODUCTION

In recent years, the electrical power system has increasingly been the suspected cause of wildfire ignition. Environmental factors (e.g., climate change, increased temperatures, dry air and land, and high winds) combined with the arcs generated by electric power system equipment significantly increase the risk of wildfire. To ensure public safety, it is vital to plan, prepare, and identify solutions for fire mitigation. The SE EcoStruxure ADMS develop application suite responsible for mitigation of severe impact of extreme weather conditions (wildfire, floods, heavy snow, storms, etc.): Major Event Mitigation (MEM). Fire Mitigation, as the most important MEM application, is being implemented as part of baseline EcoStruxure ADMS 3.10 functionality.

The central component for execution of Major Event Mitigation module is Major Event Mitigation Service (MEMS) which is part of ADMS Real Time services. MEMS is responsible for storing of application input, configuration and output results.

Fire Mitigation application use risk index values for various Geographical Areas, provided from external system as inputs for execution algorithms.

In case of Fire Mitigation, Fire Index Area will be imported as one of the Geographical Area objects in ADMS Network Model.

Geographical Areas will be imported from external database system (most commonly GIS) via Network Import Service (please refer to *EcoStruxure GridOps Management Suite 3.10 Network Data Integration-Functional Specification* document [2]). Therefore, Geographical Areas are expected to be static i.e. not to change frequently and will be maintained using the ADMS model promotion process (for more details about model promotion process please refer to *EcoStruxure GridOps Management Suite 3.10 Model Management - Functional Specification* document [1]). The Figure 3.1 represents the ADMS network model.

To support above mentioned functionalities Major Event Mitigation Integration (MEM Adapter) is developed on ADMS side with web service:

- ReceiveGeographicalAreaIndexService – web service hosted on ADMS side and used for receiving area risk index values from external system:
  - ChangedGeographicalAreaIndex operation.

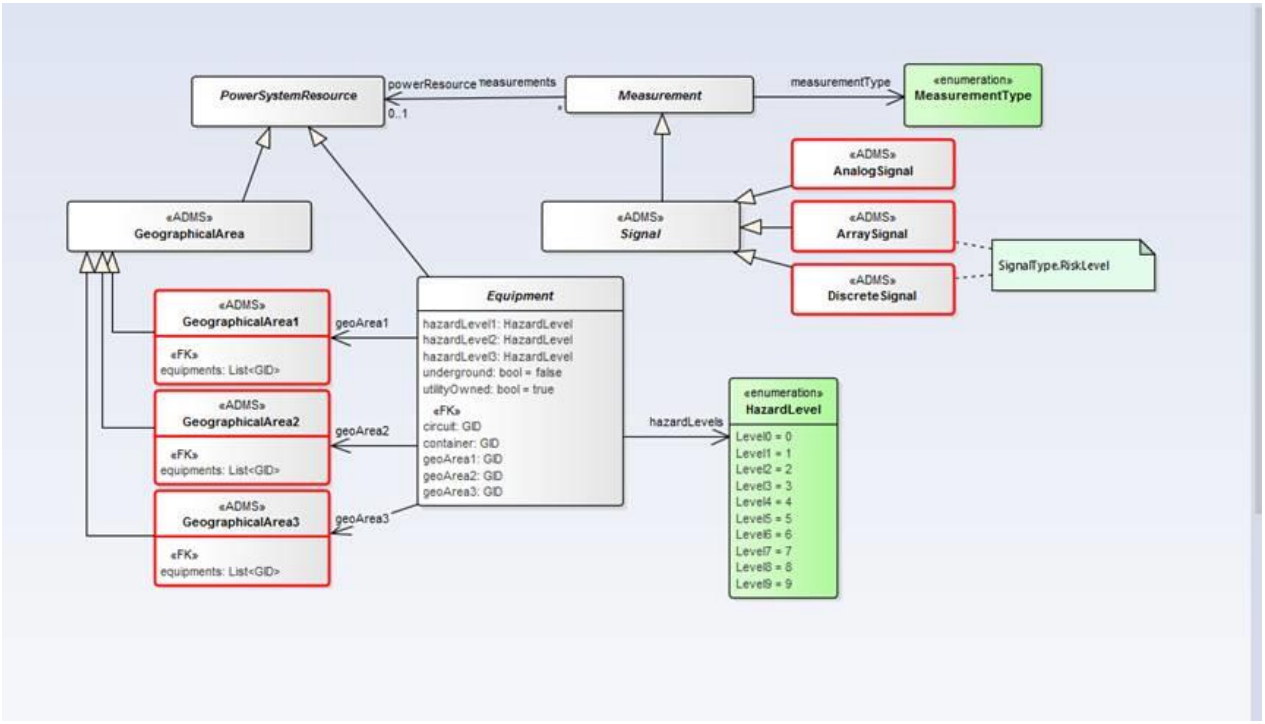

Figure 3.1 – The ADMS network model – Geographical Area objects

3.1. General Architecture

It is thoroughly described in the *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification* [3].

4. INTERFACE OVERVIEW

The ADMS Major Event Mitigation Integration is implemented through the ADMS MEM Adapter component. The aforementioned adapter implements (hosts) the SOAP based Web Service with the appropriate functionality which enables update actual and forecast area risk index values.

- ReceiveGeographicalAreaIndexService – web service hosted on ADMS side and used for receiving area risk index values for Geographical Area from external system:
  - ChangedGeographicalAreaIndex operation.

The following chapters provide more details regarding mentioned interface:

- Web Service details are documented in WSDL in Section 9.1.
- Appropriate operation is described in 5.1.1 and its details are documented in WSDL in 9.1.
- data mappings are given in Section 6.2.

The use case diagram that represents common participants (actors) and users of mentioned interface in the Major Event Mitigation integration is given in Figure 4.1.

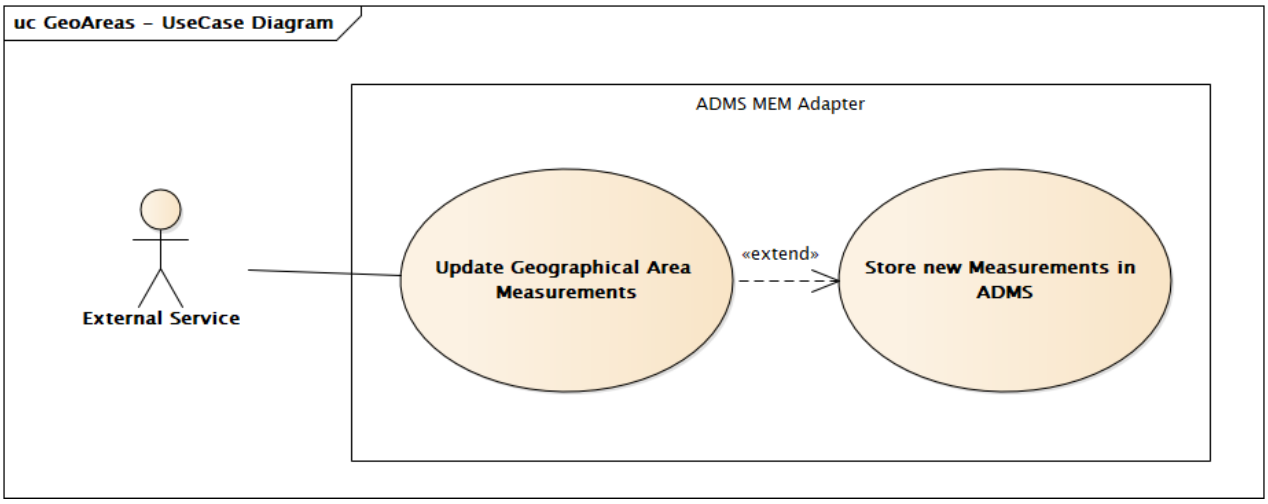

Figure 4.1 – The Major Event Mitigation Integration use case diagram

Use Cases Specification			
Name	**Producer**	**Consumer**	**Description**
Update Geographical Area Measurements	External System	ADMS	By using this use case, the producer provides the information about the area risk index values to the consumer. Area risk index values are changed in source system based on it's internal model update and the updated values need to be sent to ADMS for Major Event Mitigation functionality

5. RECEIVE GEOGRAPHICAL AREA INDEX SERVICE

5.1. ChangedGeographicalAreaIndex Operation

5.1.1. Overview

As it is explained in previous chapters, the MEM Adapter exposes SOAP based Web Service through which area risk index values in the ADMS can be updated by the external system. Received message from external system can contain both actual (current) and forecast values.

Once the request is received, the MEM Adapter needs to read data from the received request and from the ADMS Network Model to determine required update actions to be taken to align data in ADMS system with the information received from the external system.

After initial message validation is performed by the MEM Adapter, MEM Adapter transform data into the appropriate ADMS internal format and sends the request to apply changes to ADMS instance in DMZ system. The second level of validation is performed in the ADMS DMZ during the creation of the update request for the area risk index values. After update request is created and accepted in the ADMS in DMZ, update request is asynchronously sent to CORE system. The MEM Adapter returns the appropriate response if no errors have been detected or returns a fault with the detailed explanation of the occurred error in scenarios where error have been detected. Details about error handling scenarios are described in Section 5.1.2.

Actual (current) value of the fire index area index is updated by replacing previously available actual value.

Forecast values are updated in the system by replacing previously available forecast data, meaning that previously available forecast data is reset (completely removed from the system), and newly available forecast values are pushed into the system. Forecast values are never promoted into actual values, forecast values are present in the system to mimic the tendency on how the values would change, but forecasted values are never used as actual values.

Figure 5.1 provide the visual representation for the described sequence of events for SOAP web service operation execution.

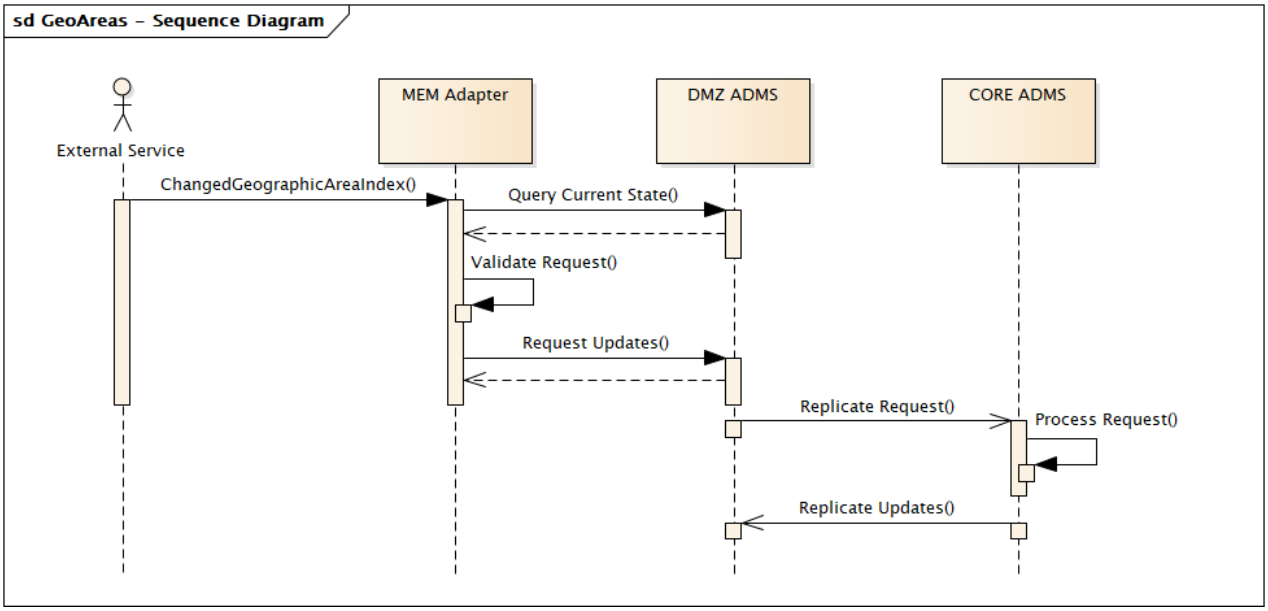

Figure 5.1 – The ChangedGeographicalAreaIndex operation execution

Besides the update of actual and forecast area risk index values, the MEM Adapter implements the logic for data staling of actual signal values. Data staling is not applicable for forecast area risk index values.

Data staling works in the following way, when request message with actual area risk index values is not received for a certain period, real-time area risk index values in the ADMS will not be updated. If the last update time of the actual signal value is older than configurable time interval (default value is 24h), MEM Adapter sets the signal quality to stale and creates event that signal is stale and contains information about last update time, signal name. Described logic can be enabled/disabled within the adapter's configuration file. In this way adapter will indicate to the ADMS Core applications that update of the actual area risk index was not received in expected timeframe.

5.1.2. Use Cases

The list of possible use cases and corresponding faults is given in Table 5.1.

Table 5.1 – The ChangedGeographicalAreaIndex operation use cases

Use Case	Message Mapping			Action
	Property	Type	Value	
Successful risk index area values update (current or forecast)	Result	String	OK	External system sends a request with valid risk index area values for geographical areas. Risk signals are updated with risk index area values. Response message is sent by MEM Adapter with OK result. Event message with information that request is successfully processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical area with signals that will be sent to update. NOTE: If for one geographical area incorrect values are received for one of measurement types (discrete, analog or array) update will be processed partially. Only valid measurement types will be updated. Response message will provide appropriate error details.
	Error.code	String	N/A	
	Error.level	String	N/A	
	Error.reason	String	N/A	
	Error.details	String	N/A	
Unable to process the request	Result	String	FAILED	External system sends request message, but for some reason message processing fails in ADMS due to various internal server error (adapter cannot read the data from or send data update request to ADMS DMS RT service (service not available)). Fault response message is sent by MEM Adapter. Adapter creates event and logs an error in application logs.
	Error.code	String	5.3	
	Error.level	String	FATAL	
	Error.reason	String	InternalServerError	
	Error.details	String	{0}.	
Invalid Verb	Result	String	FAILED	External system sends request/event message with invalid Verb. Response message is sent by MEM Adapter with FAILED result and message is discarded. Adapter creates event and logs an error in application logs.
	Error.code	String	2.9	
	Error.level	String	FATAL	
	Error.reason	String	InvalidVerb	
	Error.details	String	Invalid verb: {0}.	
Invalid Noun	Result	String	FAILED	
	Error.code	String	2.5	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.level	String	FATAL	External system sends request/event message with invalid Noun. Response message is sent by MEM Adapter with FAILED result and message is discarded. Adapter creates event and logs an error in application logs.
	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 MEM Adapter with FAILED result and message is discarded. Adapter creates event and logs an error in application logs.
	Error.code	String	1.8	
	Error.level	String	FATAL	
	Error.reason	String	InvalidMessage	
	Error.details	String	Received message is invalid against predefined schema. Reason: {0}.	
Missing Payload	Result	String	FAILED	External system sends a request where payload is not provided. Response message is sent by MEM Adapter with FAILED result and message is discarded. Adapter creates event and logs an error in application logs.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	PayloadNotProvided	
	Error.details	String	Payload not provided.	
Timestamp of the current area risk index value is less than last modified timestamp in ADMS	Result	String	PARTIAL/FAILED	External system sends a request where timestamp for one or more geographical area current risk index values are less than last modified time in ADMS. Adapter will skip geographical area with invalid data and process the rest of the request. Response will contain “PARTIAL” success code with details why some of the received area risk index values were not processed. Event message with information that request is Partially processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update and list of geographical areas with signals that will not be updated. For geographical areas for which risk signals are not updated failure reason will be specified.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	InvalidTimestamp	
	Error.details	String	Provided timestamp for {measurementType} measurement for Geographical Area(s) ‘{2}’ is less than last modified timestamp.	
	Result	String	PARTIAL/FAILED	External system sends a request for one or more geographical area where timestamp for current area risk index values is outside allowed range in the future (allowed range will be
	Error.code	String	2.7	

Use Case	Message Mapping			Action
	Property	Type	Value	
Timestamp of the current area risk index value is outside allowed range in the future	Error.level	String	FATAL	configurable in adapter configuration). Adapter will skip geographical area with invalid data and process the rest of the request. Response will contain “PARTIAL” success code with details why some of the received current area risk index values were not processed. Event message with information that request is Partially processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update and list of geographical areas with signals that will not be updated. For geographical areas for which signals are not updated failure reason will be specified.
	Error.reason	String	InvalidTimestamp	
	Error.details	String	Provided timestamp for {measurementType} measurement for Geographical Area(s) ‘{1}’ is too far in the future.	
Timestamp of the current area risk index value is in allowed range in the future	Result	String	OK	External system sends a request for one or more geographical area where timestamp for current fire index area values is in the allowed range in the future (allowed range will be configurable in adapter configuration). Adapter will successfully process the request and future timestamps are defaulted to date time now. Response will contain warning message with appropriate details. Event message with information that request is successfully processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update.
	Error.code	String	2.7	
	Error.level	String	WARNING	
	Error.reason	String	InvalidTimestamp	
	Error.details	String	Provided timestamp for {measurementType} measurement for Geographical Area(s) ‘{2}’ cannot be in the future and it will be set to date time now.	
Received geographical area ID does not exist in ADMS Network Model	Result	String	PARTIAL/FAILED	External system sends a request where for one or more geographical area IDs does/do not exist in ADMS. All other data are valid. Adapter will skip invalid geographical area IDs and process the rest of the request. Response message will contain “PARTIAL” success code with details why some of the received geographical area were not processed. Event message with information that request is Partially processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update and list of geographical areas with signals that will not be updated. For geographical areas for which signals are not updated failure reason will be specified.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	EntityNotFound	
	Error.details	String	Geographical Area(s): ‘{0}’ does/do not exist in ADMS	
Unsupported Measurement Type	Result	String	PARTIAL/FAILED	External system sends a request where one or more geographical area have measurement type that is not supported in ADMS. All other data are valid. Adapter will skip invalid geographical area and process the rest of the request. Response message will
	Error.code	String	2.7	
	Error.level	String	FATAL	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.reason	String	UnsupportedMeasurementType	contain “PARTIAL” success code with details why some of the received geographical area values were not processed. Event message with information that request is Partially processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update and list of geographical areas with signals that will not be updated. For geographical areas for which signals are not updated failure reason will be specified.
	Error.details	String	Geographical Area(s): ‘{1}’ has/have unsupported measurement type. Supported values for measurement type are discrete, analog and array.	
Multiple Measurement Analog Values for Current Value Measurement	Result	String	PARTIAL/FAILED	External system sends a request where for one or more geographical area where current value has more than one measurement analog values. All other data are valid. Adapter will skip geographical area with invalid data and process the rest of the request. Response will contain “PARTIAL” success code with details why some of the received geographical area values were not processed. Event message with information that request is Partially processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update and list of geographical areas with signals that will not be updated. For geographical areas for which signals are not updated failure reason will be specified.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	MultipleAnalogValuesForCurrentValueMeasurement	
	Error.details	String	Geographical Area(s) ‘{1}’ has/have multiple values for {measurementType} measurement value.	
Missing Measurement Values (for current or forecast measurement)	Result	String	PARTIAL/FAILED	External system sends a request where for one or more geographical area measurement values are missing. All other data are valid. Adapter will skip geographical area with invalid data and process the rest of the request. Response will contain “PARTIAL” success code with details why some of the received data were not processed. Event message with information that request is Partially processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update and list of geographical areas with signals that will not be updated. For geographical areas for which signals are not updated failure reason will be specified.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	MissingMeasurementValues	
	Error.details	String	{measurementType} measurement values are missing for Geographical Area(s): ‘{1}’.	
Missing Timestamp for current value	Result	String	OK	External system sends a request where for one or more current area risk index values timestamp is missing. All other data are valid. Adapter will default timestamp to date time now. Response will contain warning message with details that timestamp is missing. Event message with information that request is successfully processed will be created in CORE
	Error.code	String	1.9	
	Error.level	String	WARNING	
	Error.reason	String	MissingTimestamp	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.details	String	{measurementType} measurement timestamp is missing for: '{Geographical Area ID}'.	system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update.
Missing Timestamp for forecast value	Result	String	PARTIAL/FAILED	External system sends a request where for one or more forecast area risk index values timestamp is missing. All other data are valid. Adapter will skip geographical area with invalid data and process the rest of the request. Response will contain "PARTIAL" success code with details why some of the received area risk index values were not processed. Event message with information that request is Partially processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update and list of geographical areas with signals that will not be updated. For geographical areas for which signals are not updated failure reason will be specified.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	MissingTimestamp	
	Error.details	String	Forecast measurement timestamp is missing for: '{Geographical Area ID}'.	
Multiple measurement type (discrete, analog or array) for one geographical area	Result	String	PARTIAL/FAILED	Request message from external system contains more than one discrete measurement type for same geographical area. All other data are valid. Adapter will skip geographical area with invalid data and process the rest of the request. Response will contain "PARTIAL" success code with details why some of the received geographical area values were not processed. Event message with information that request is Partially processed will be created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update and list of geographical areas with signals that will not be updated. For geographical areas for which signals are not updated failure reason will be specified. NOTE: The same use case can be applied can when request message contains more than one analog measurement type, or more than one array measurement type for same geographical area.
	Error.code	String	2.7	
	Error.level	String	FATAL	
	Error.reason	String	MultipleMeasurementType	
	Error.details	String	Geographical Area(s) '{1}' has/have multiple {measurementType} measurements.	
Missing signal in ADMS for provided geographical area	Result	String	OK	External system sends a request where for one or more geographical area does not have signal in ADMS for measurement type specified in message. All other data are valid. Adapter will skip measurement that do not exist in ADMS and update valid data. Response will contain warning message with details that some geographical areas do not have signal in ADMS. Event message with information that request is successfully processed will be
	Error.code	String	1.9	
	Error.level	String	WARNING	
	Error.reason	String	MeasurementNotFoundInAdms	

Use Case	Message Mapping			Action
	Property	Type	Value	
	Error.details	String	Geographical Area(s): '{0}' does/do not have {measurementType} signal in ADMS.	created in CORE system and replicated to DMZ system. Event details will contain a list of geographical areas with signals that will be sent to update.

6. MESSAGES

6.1. Common

6.1.1. 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”.
- **Noun** – to identify the subject of the action and/or the type of the payload, such as GeographicalAreaIndex, 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 6.1 shows the graphical representation of the header field.

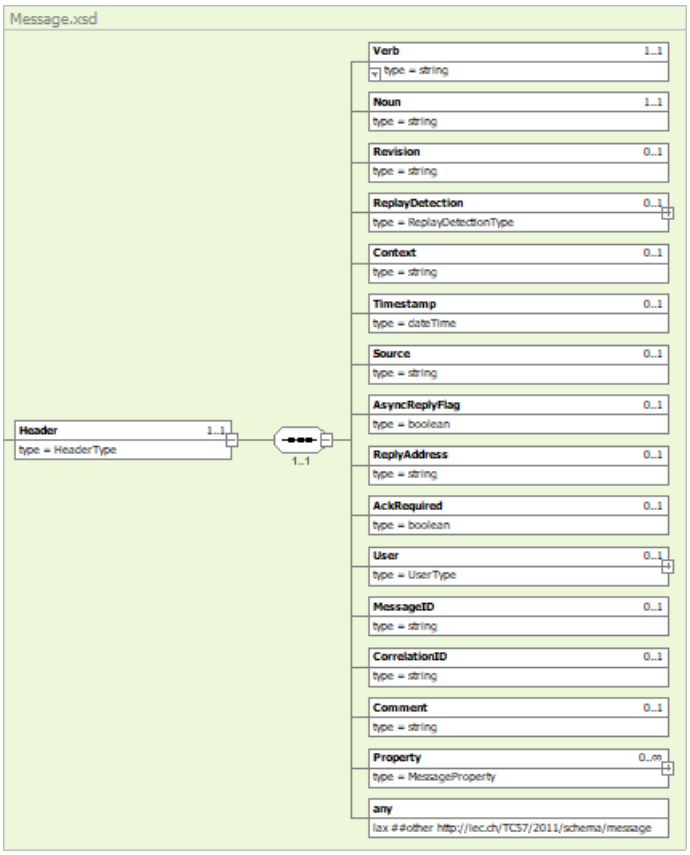

Figure 6.1 – The Header field

6.2. ChangedGeographicalAreaIndex Operation Messages

The operation definition:

SOAP:

- Operation: ChangedGeographicalAreaIndex (ChangedGeographicalAreaIndexEvent):
  - Request: ChangedGeographicalAreaIndexEvent message
  - Response: GeogprahicalAreaIndexResponse message
  - Fault: GeographicalAreaIndexFault message

6.2.1. Request

The *ChangedGeographicalAreaIndex e*vent message is defined according to the IEC 61968-100 standard. The visual representation of the *ChangedGeographicalAreaIndex e*vent message is given in Figure 6.2. *ChangedGeographicalAreaIndex* message contains the following two sections:

- Header (header is defined in Section 6.1.1)
- Payload

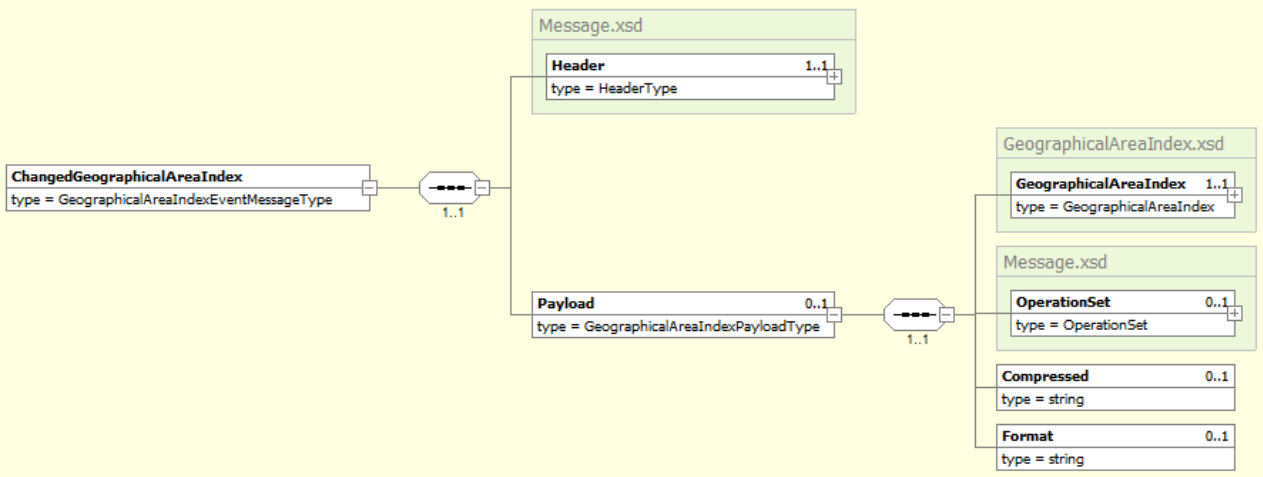

Figure 6.2 – The ChangedGeographicalAreaIndex message

The Payload section carries the CIM defined profile (GeographicalAreaIndex.xsd) for update of actual and forecast area risk index values in the ADMS. The visual representation of the GeographicalAreaIndex.xsd schema is given in Figure 6.3.

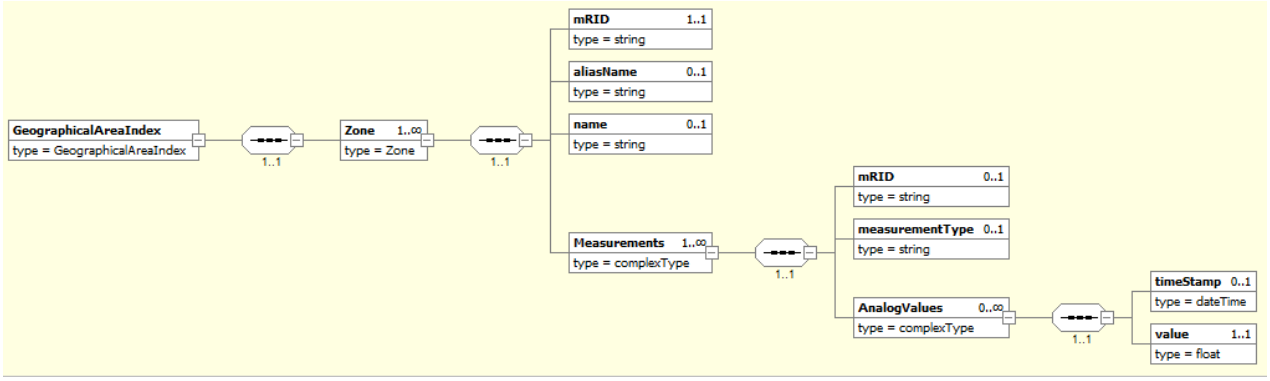

Figure 6.3 – GeographicalAreaIndex.xsd

The mapping between the request message and the appropriate entities in the ADMS model is given in Table 6.1.

Table 6.1 – The ChangedGeographicalAreaIndex message → the ADMS model mapping

Request Message			Description	ADMS Model	
Property	**Type**	**Mandatory**		**Property**	**Type**
Header.**Verb**	String	**Yes**	Identifier for a specific action to be taken. For this message, Verb is **changed**.	Populated by external system	N/A
Header.**Noun**	String	**Yes**	Identifier for the subject of the action and/or the type of the payload. For this message, Noun is **GeographicalAreaIndex**.	Populated by external system	N/A
Header.Revision	String	No	Revision of CIM standard used. Default value is 2.0.	Populated by external system	N/A
Header.**TImestamp**	DateTime	**Yes**	Timestamp when message was produced. Example: 2015-12-31T12:34:56+02:00	Populated by external system	N/A
Header.Source	String	No	Source system or application that sends the message.	Populated by external system	N/A
Header.**MessageID**	String	**Yes**	Unique message ID to be used for tracking messages.	Populated by external system	N/A
Header.CorrelationID	String	No	Same as message ID.	Populated by external system	N/A
GeographicalArea.Zone.mRID	String	**Yes**	GeographicalArea unique mRID	IDOBJ_CUSTOMID	String
GeographicalArea.Zone.aliasName	String	No	GeographicalArea alias	IDOBJ_ALIAS	String
GeographicalArea.Zone.name	String	No	GeographicalArea name	IDOBJ_NAME	String
GeographicalArea.Zone.Measurements .measurementType	String	**Yes**	Measurement type can be: Analog, Discrete and Array. Depends of signal type that should be updated in ADMS it should be set on one of those values. For updating current value, it should be set on Analog or Discrete depends of signal type in ADMS. For updating forecast value, it should be set to Array.	MEASUREMENT_TYPE	Enum
GeographicalArea.Zone.Measurements .AnalogValues.timeStamp	DateTime	**Yes**	For current measurement represents last update time in ADMS. For forecast measurement represents timestamp when value becomes active	SIGVAL_TIMESTAMP	DateTime
GeographicalArea.Zone.Measurements .AnalogValues.value	String	**Yes**	Current or forecast value	ASIGVAL_VALUE	Float

6.2.2. Response

After actual (current) and forecast area risk index values are sent for update, the appropriate synchronous response is returned to the calling system. A format of the response message is given in Figure 6.4.

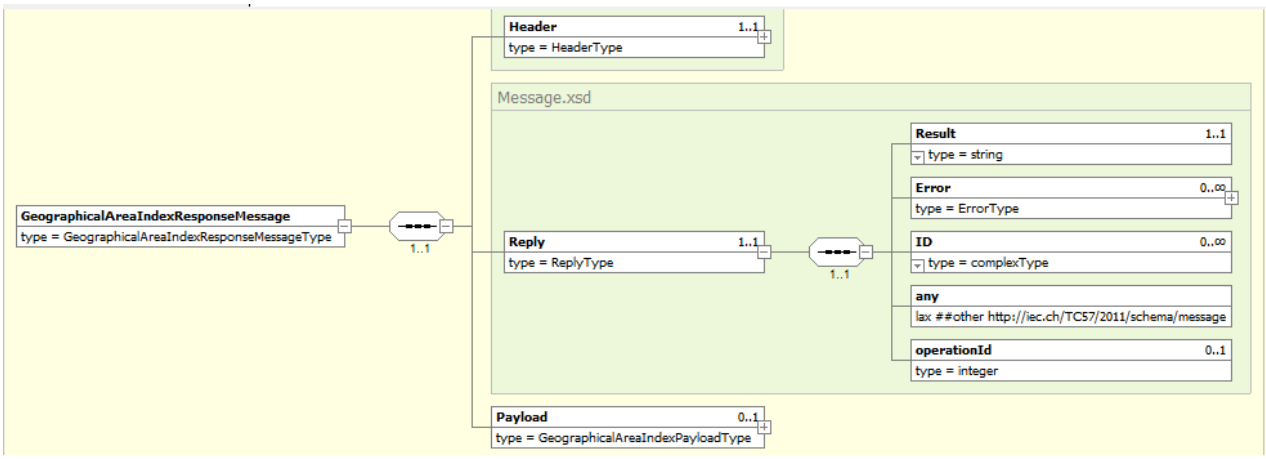

Figure 6.4 – The GeographicalAreaIndexResponse message

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.

6.2.3. Fault

The *GeographicalAreaIndexFault* message is depicted in Figure *6.5*.

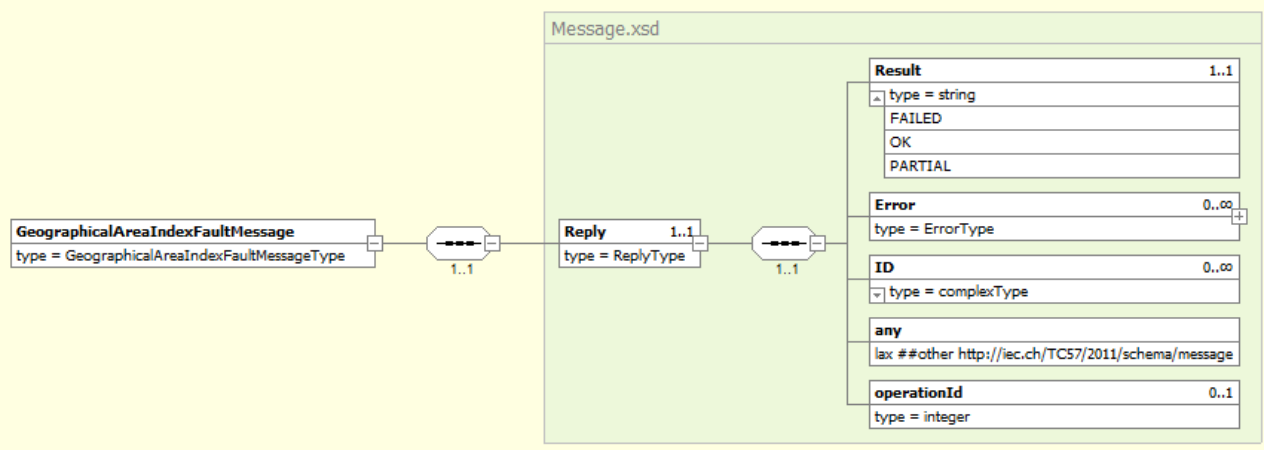

Figure 6.5 – *The GeographicalAreaIndexFault message*

7. DEPLOYMENT SPECIFICATION

It is thoroughly described in the *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification* [3].

The deployment specification is provided in the following table:

Table 7.1 – The deployment specification

Deployment Specification	
Application	MEMAdapter
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

8. INTERFACE CONFIGURATION

MEM 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 MEM adapter.

Initially, following configuration files are used the adapter:

Table 8.1 – The configuration files specification

Name of the config file	Configuration File Description
AdapterMEM	Registry configuration xml file
MemAdapter_ChangedGeographicalAreaIndex_ErrorConfiguration	Error configuration xml file
AdapterMem_WebServiceConfiguration	Web service configuration xml file

For more details about adapters configuration files refer to the *EcoStruxure GridOps Management Suite 3.10 Enterprise Integration Platform - Functional Specification* [3].

Detailed content of above-mentioned configuration files is provided within the *Configuration* folder in the *EcoStruxure ADMS 3.10 Major Event Mitigation Interface.zip* file [4].

9. APPENDIX

9.1. WSDL

The WSDL file and XSD schemas defined according to the IEC 61968-100 for the Weather web services is provided within the *Web Service Definitions* folder in the *EcoStruxure ADMS 3.10 Major Event Mitigation Interface.zip* file [4].

9.2. Message Examples

Message examples are provided within the *Message Examples* folder in the *EcoStruxure ADMS 3.10 Major Event Mitigation Interface.zip* file [4].

10. RELEASE NOTES

The following new features related to Product MEM Interfaces were introduced in the ADMS, starting from version 3.9.

10.1. Software Version 3.10

No new features.

11. DEFINITIONS AND ABBREVIATIONS

Definition/Abbreviation	Description
ADMS	Advanced Distribution Management System (to be provided by Schneider Electric).
CIM	Common Information Model
DMD	Dynamic Mimic Diagram
DMZ	ADMS Demilitarized Zone
ESB	Enterprise Service Bus
NB	Network Builder
REST	Representational State Transfer
SOAP	Simple Object Access Protocol
WCF	Windows Communication Foundation
MEM	Major Event Mitigation
MEMS	Major Event Mitigation Service
WS	Web Service
XML	Extensible Markup Language
XSD	XML Schema Definition