

Standardizing Common Information Model Implementations – A Test Based Approach

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Requirements derived from use cases map to test procedure steps



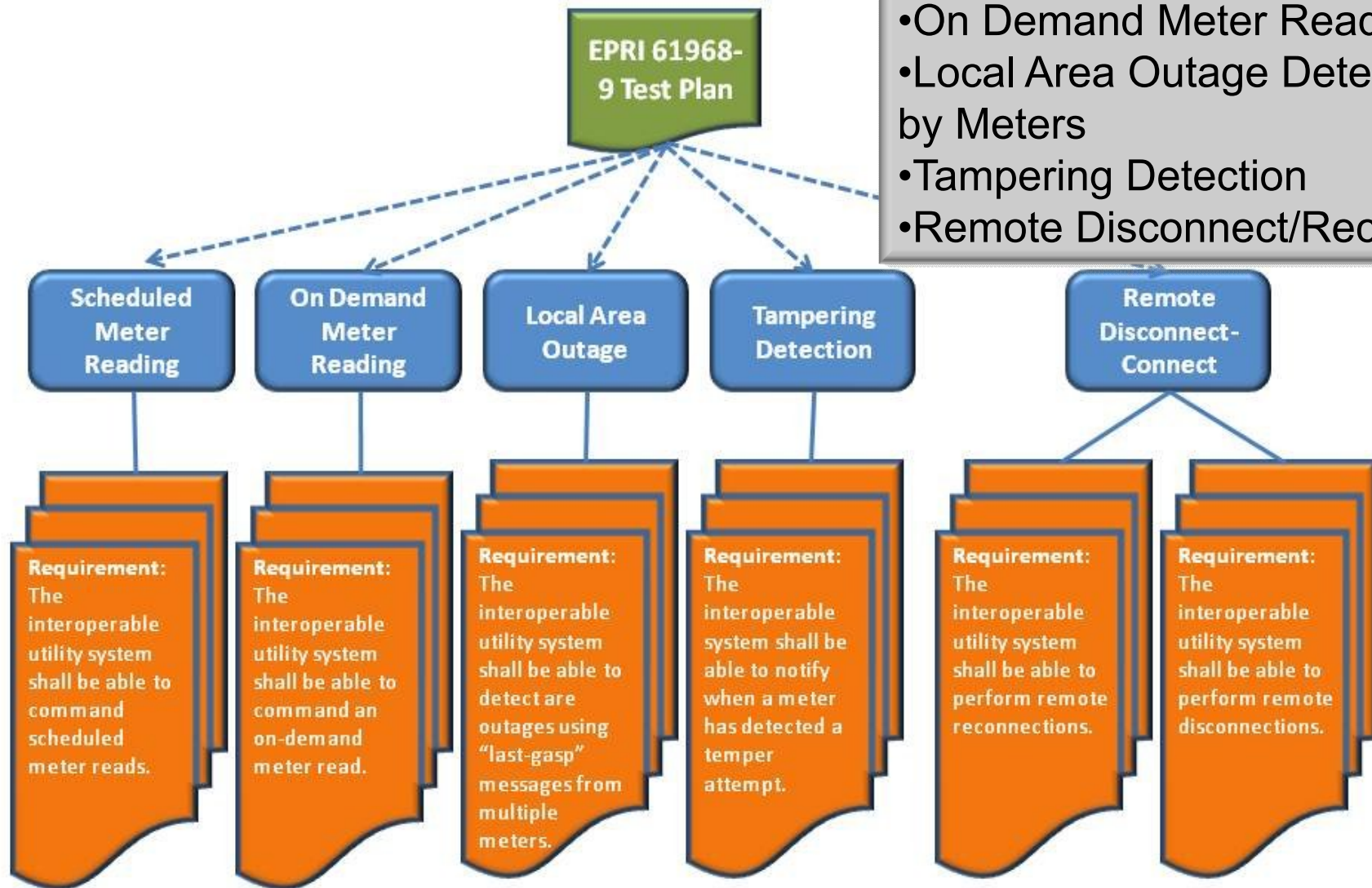
**Southern
California
Edison
(SCE)
Use Cases**

**SCE
and
AMI Enterprise
(AMI-ENT)
Requirements**

**All
Vendors**

**Reusable
Methodology
Allows
Additional
Tests to be
added
at any Time**

- 5 Major Test Case Areas**
- Scheduled Meter Read
 - On Demand Meter Read
 - Local Area Outage Detected by Meters
 - Tampering Detection
 - Remote Disconnect/Reconnect



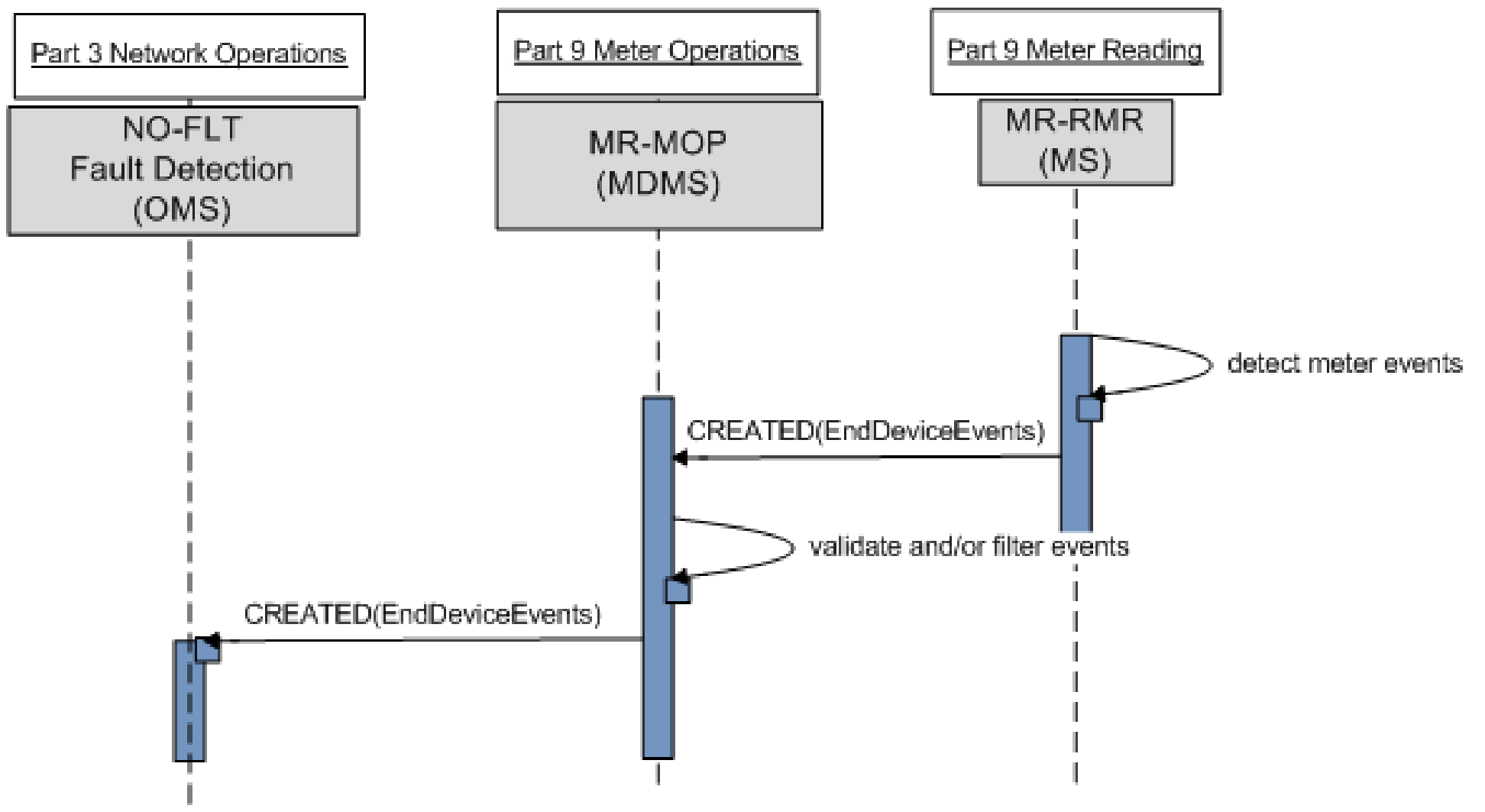
Test Description:

CIM standard Part-9 meter messages to/from the Meter Data Management System (MDMS) and from/to the Customer Information System (CIS) are verified to be in conformance with the IEC 61968 part 9.

Unit or Systems Under Test (SUTs/UUTs) are the MDMS and CIS or equivalent systems. A scheduled meter disconnect is initiated with the MeterServiceRequest message and the meter reading data is sent in the MeterReadings message. A scheduled meter reconnect is then initiated with the MeterServiceRequest message and the meter reading data is again sent in the MeterReadings message.

As shown in diagram MR 2.09-5, the main test steps are as follows:

- 1) The MeterServiceRequest messages is sent from the CIS to the MDMS..
- 2) The EndDeviceControl message is sent from the MDMS to the AMI Head End or similar system.
- 3) The meter performs a remote disconnect.
- 4) The MeterReadings message is sent from the MDMS to request meter usage data for the meter.
- 5) The CreatedMeterReading is sent from the meter/simulator to the MDMS and onto the CIS. The required IEC 61968 part 9 XSD is used to send the CreatedMeterReading message.
- 6) System error conditions e.g. missing and incomplete data reads are simulated and correct error processing verified.



Nominal and Error requirements

Use Case B2 1.050106 AMI-ENT version REQ0224 - Customer representative shall be able to schedule Date and Time for electric service turn On/Off and electric service limiting using AMI back office system(s). See

<http://www.smartgridipedia.org/images/a/a3/ARCHB2USECASEv12050106.pdf>

Use Case B2 ver. 1.050106 AMI-ENT version REQ0231 - The AMI Head End shall periodically send electric service turn off messages to the Meter until the Meter acknowledges that the turn off has been completed successfully

Use Case B2 ver. 1.050106 AMI-ENT version REQ0027 REQ-B2001-Send scheduled turn off notification

Use Case B2 ver. 1.050106 AMI-ENT REQ-B2002-Send scheduled turn off command

Use Case B2 ver. 1.050106 AMI-ENT REQ-B2003-Send scheduled turn off command confirmation

Use Case B2 ver. 1.050106 AMI-ENT REQ-B2004-Send meter read (final)

Use Case B2 ver. 1.050106 AMI-ENT REQ-B2007-Send scheduled turn on command

Use Case B2 ver. 1.050106 AMI-ENT REQ-B2008-Send scheduled turn on command confirmation

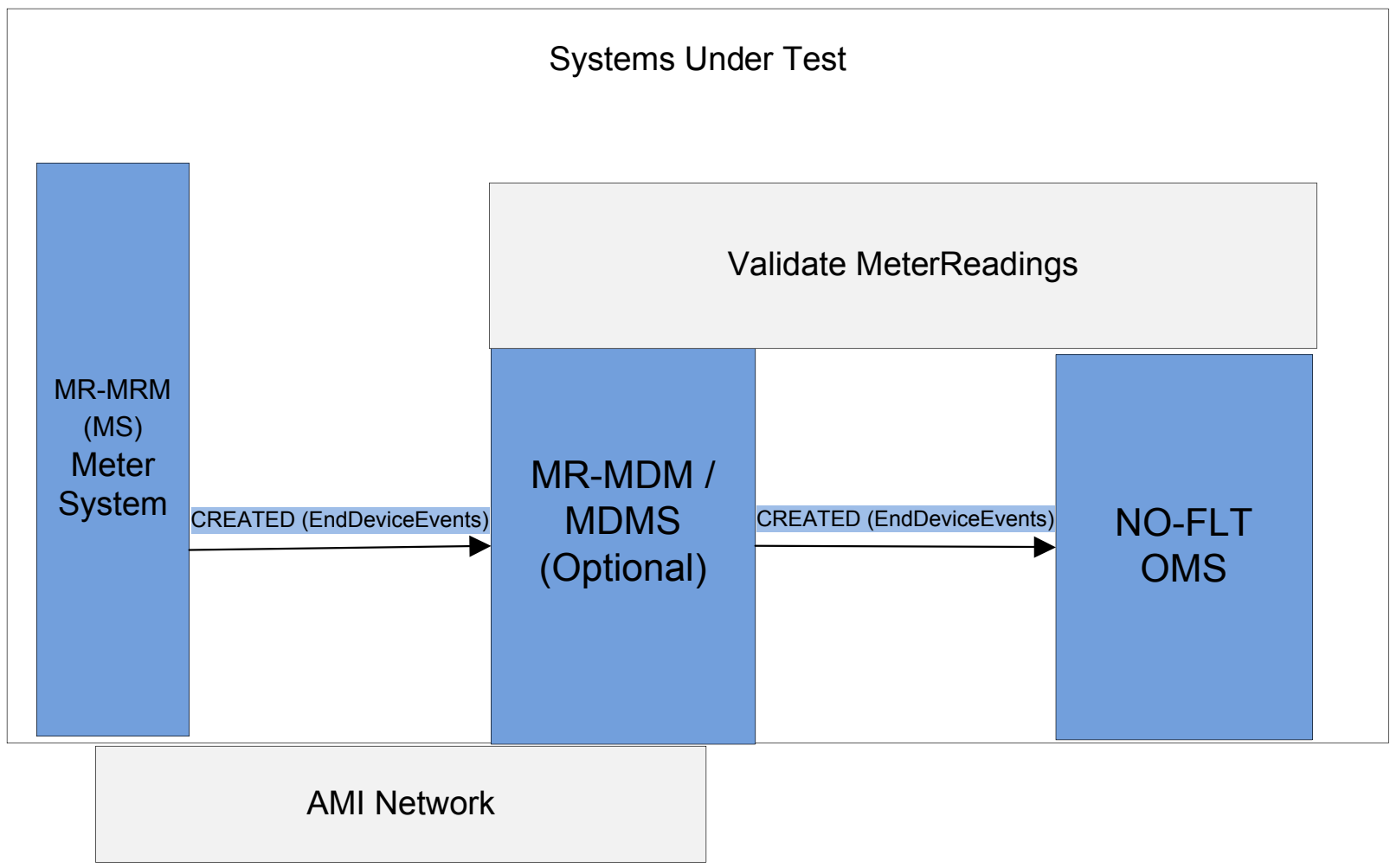
Use Case B2 ver. 1.050106 AMI-ENT REQ-B2009-Send meter read (initial)

Off nominal and error requirements

Use Case B1 REQ0201 v1.2 - The Meter Data Unification System shall have the ability to automatically identify and immediately log missing or incomplete data from the previous day.

Use Case B1 REQ0202 v1.2- The Meter Data Unification System shall have the ability to identify and log Meters that have had missing or incomplete data in the past.

Use Case B1 REQ0203 v1.2- The Meter Data Unification System shall identify and log Meters where missing or incomplete meter data for the previous day was successfully recovered through the automated on-demand read request.



- Item(s) Tested
- Item used in test

Semantic Test Harness

- Lower cost of adopting CIM
- Provide framework for future certification
- Provide extensible framework for additional standards

- Vendor “self service” application
 - Validate outgoing messages
 - Request incoming well formed messages
- Ready to use messages and working examples
- Immediate and exact feedback on success/failure
- Amazon cloud for cost effective hosting

- Extend database logging
- Develop orchestration of related services

- Any XML based payload message
 - MultiSpeak
 - OpenADR, openADE
 - SEP 2.0
- Very little coding required – auto generation based on wsdl/xsd/config files
- Simple to support multiple message versions

- Amazon cloud hosting
 - Uses smallest possible instance, very cost effective
- One instance per vendor
 - multiple vendor roles can be configured
- Very simple administration
 - scripted deployment of harness

- Tomcat/Spring/Java
 - Application server
- MySQL
 - database
- Ruby/Rails for UI
 - UI viewer
- SoapUI
 - for working examples

- Five 61968-9 packages
 - Meter Connect
 - Meter On Demand
 - Meter Scheduled
 - Meter Outage
 - Meter Tamper
- One 61968-6 package
 - Work Request

<p>RequestEndDeviceControls_Port</p> <ul style="list-style-type: none"> • CloseEndDeviceControls • CancelEndDeviceControls • CreateEndDeviceControls • ChangeEndDeviceControls • DeleteEndDeviceControls 	<p>Endpoint address: http://ec2-50-17-88-225.compute-1.amazonaws.com:8080/epriConnect/mdms/ami/requestReply WSDL : http://ws.server.sixthc.com/RequestEndDeviceControlsImplService Target namespace: http://ws.server.sixthc.com/</p>
<p>RequestMeterReadings_Port</p> <ul style="list-style-type: none"> • CreateMeterReadings • CloseMeterReadings • ChangeMeterReadings • CancelMeterReadings • DeleteMeterReadings 	<p>Endpoint address: http://ec2-50-17-88-225.compute-1.amazonaws.com:8080/epriConnect/mdms/ami/requestMeterReading WSDL : http://ws.server.sixthc.com/RequestMeterReadingsImplService Target namespace: http://ws.server.sixthc.com/</p>
<p>RequestMeterServiceRequests_Port</p> <ul style="list-style-type: none"> • CreateMeterServiceRequests • DeleteMeterServiceRequests • ChangeMeterServiceRequests • CancelMeterServiceRequests • CloseMeterServiceRequests 	<p>Endpoint address: http://ec2-50-17-88-225.compute-1.amazonaws.com:8080/epriConnect/mdms/cis/requestUpdate WSDL : http://ws.server.sixthc.com/RequestMeterServiceRequestsImplService Target namespace: http://ws.server.sixthc.com/</p>
<p>RequestMeterServiceRequests_Port</p> <ul style="list-style-type: none"> • CreateMeterServiceRequests • DeleteMeterServiceRequests • ChangeMeterServiceRequests • CancelMeterServiceRequests • CloseMeterServiceRequests 	<p>Endpoint address: http://ec2-50-17-88-225.compute-1.amazonaws.com:8080/epriConnect/mdms/cis/request WSDL : http://ws.server.sixthc.com/RequestMeterServiceRequestsImplService Target namespace: http://ws.server.sixthc.com/</p>
<p>RequestMeterServiceRequests_Port</p> <ul style="list-style-type: none"> • CreateMeterServiceRequests • DeleteMeterServiceRequests • ChangeMeterServiceRequests • CancelMeterServiceRequests • CloseMeterServiceRequests 	<p>Endpoint address: http://ec2-50-17-88-225.compute-1.amazonaws.com:8080/epriConnect/cis/mdms/requestCreate WSDL : http://ws.server.sixthc.com/RequestMeterServiceRequestsImplService Target namespace: http://ws.server.sixthc.com/</p>



Test Status

CIS	MDMS	AMI	OMS
Meter Connect 0%	Meter Connect 0%	Meter Connect 0%	Outage Management 0%
OnDemand Read 0%	OnDemand Read 0%	Meter Tamper 0%	
Meter Tamper 0%	Scheduled Read 0%	OnDemand Read 0%	
	Meter Tamper 0%	Scheduled Read 0%	
	Outage Management 0%		

EPRI InterOp [Home](#) [Logs](#)

Package Status

FAILED	MD_CIS-MDM_Create(MeterServiceRequest)	Logs
No Data	MD_CIS-MDM_Request_Reply(MeterServiceRequest)	Logs
No Data	MD_CIS-MDM_Request_Updated(MeterServiceRequest)	Logs

EPRI InterOp

[Home](#)[Logs](#)

Log Entry

ID: 72

create date: 2011-08-01 23:59:40 UTC

address: http://ec2-107-20-45-188.compute-1.amazonaws.com:8080/epriConnect/mdms/cis/send

result code: fail

response code:

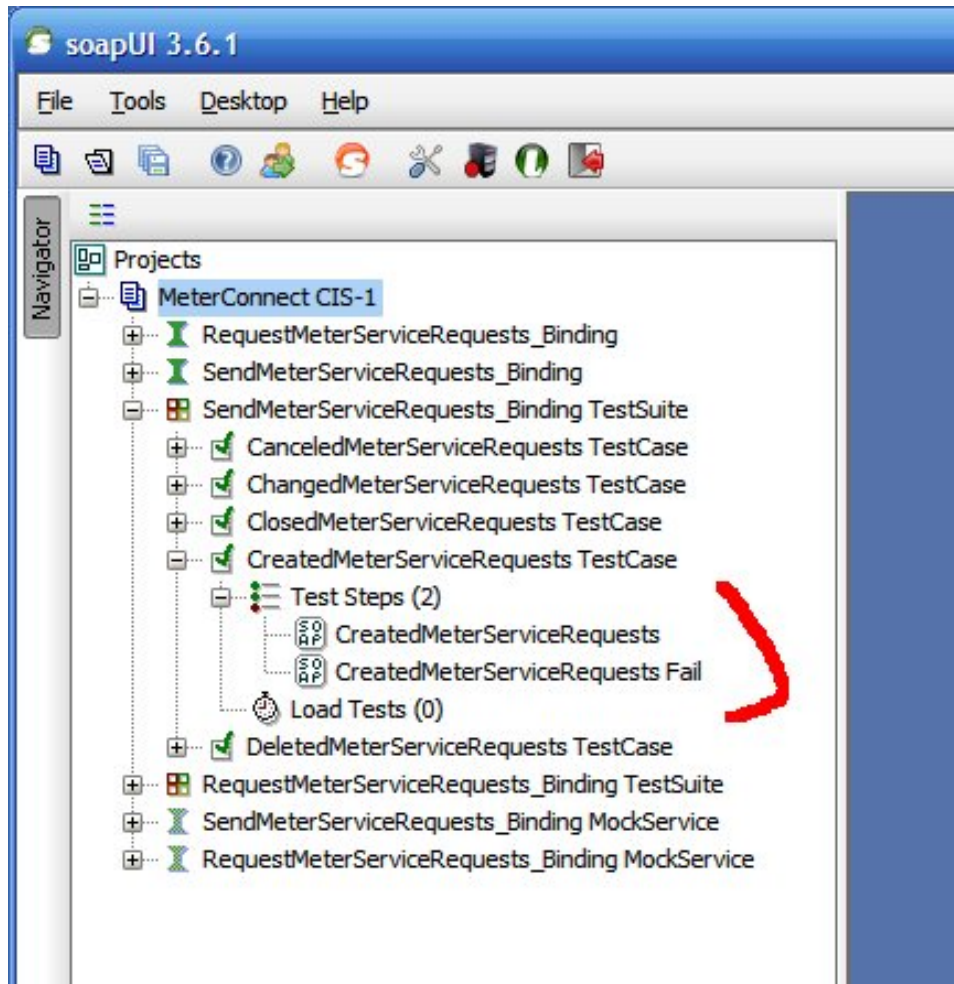
http method: POST

header: {accept-encoding=[gzip,deflate], Content-Length=[5389], content-type=[text/xml;charset=UTF-8], host=[ec2-107-20-45-188.compute-1.amazonaws.com:8080], SOAPAction=["http://iec.ch/TC57/2011/MeterServiceRequests/CreatedMeterServiceRequests"], user-agent=[Jakarta Commons-HttpClient/3.1]}

message:

operation: http://iec.ch/TC57/2011/MeterServiceRequests/CreatedMeterServiceRequests

payload: <soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:met="http://www.iec.ch/TC57/2011/MeterServiceRequestsMessage" xmlns:mes="http://www.iec.ch/TC57/2011/schema/message" xmlns:met1="http://iec.ch/TC57/2011/MeterServiceRequests#"> <soapenv:Header/> <soapenv:Body> <met:CreatedMeterServiceRequests> <met:Header> <mes:Verb>create</mes:Verb> <mes:Noun>MeterServiceRequests</mes:Noun> <mes:Context>TESTING</mes:Context> <mes:Timestamp?>



- Provides working examples
- Sending and Receiving

Questions?