The Standards Based Integration Company

Systems Integration Specialists Company, Inc.

61968 Messages (Part 3, 6, 8, 9)

CIM University
Austin, Texas
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Introduction

- Information Model & Reference Model
- Part 3 Network Operations
  - Scope
  - Outage and FLISR Work Flows
- Part 6 Maintenance and Construction
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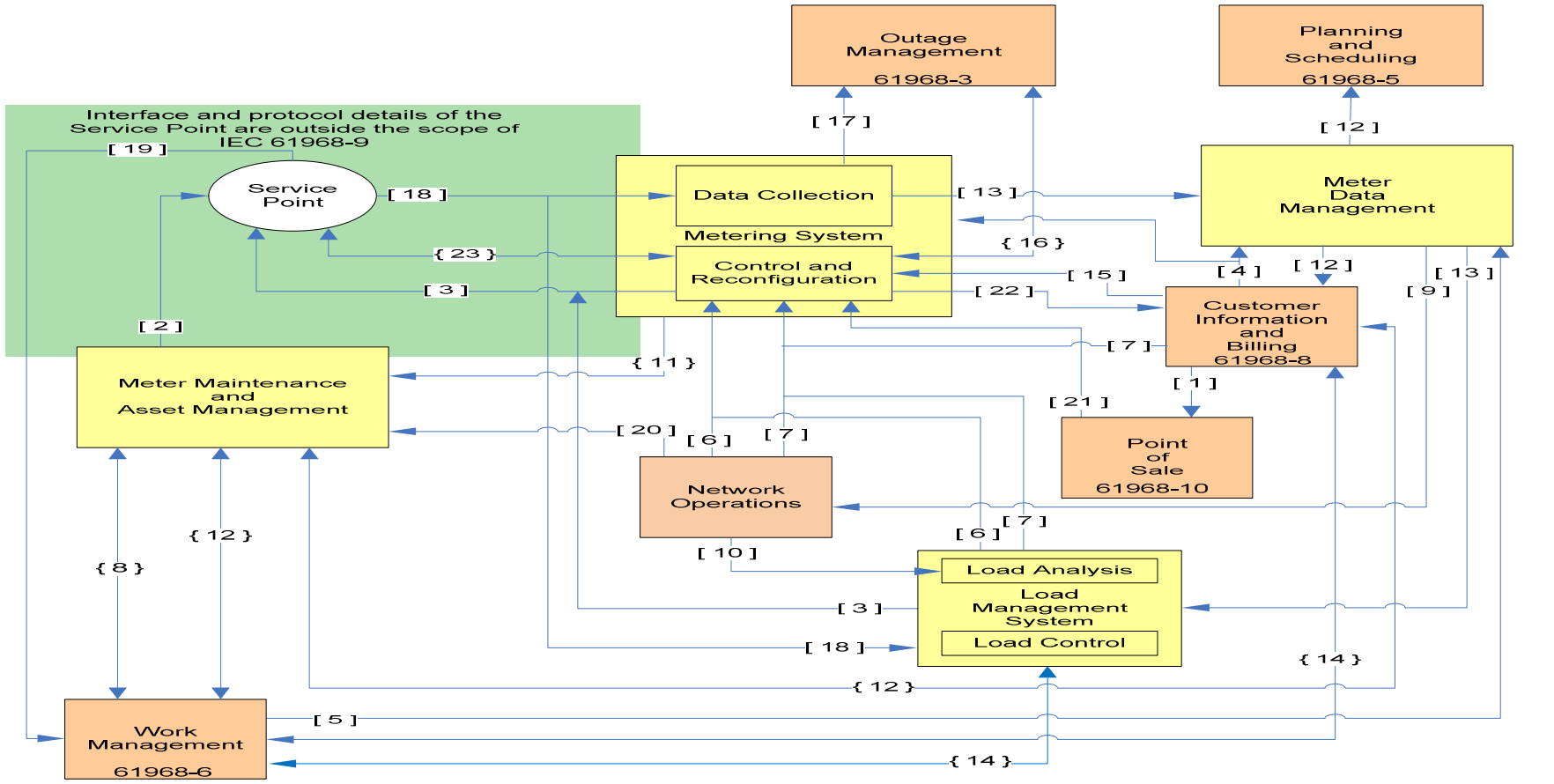
  - Reference Model
  - Work Management System (WMS) Messages
- Part 8
  - Scope
  - Reference Model
  - Customer Interface System (CIS) Work Flows
- Part 9 Meter Reading and Control
  - Scope
  - Reference Model
  - Metering Messages

Information Model for all Parts

- Classes for all Parts in the 61968 standard series are contained in IEC61968-Part 11 and IEC61970-301
- The classes and attributes may come from one or more of the packages contained in these documents.

WG14 Messaging Reference Model - Full



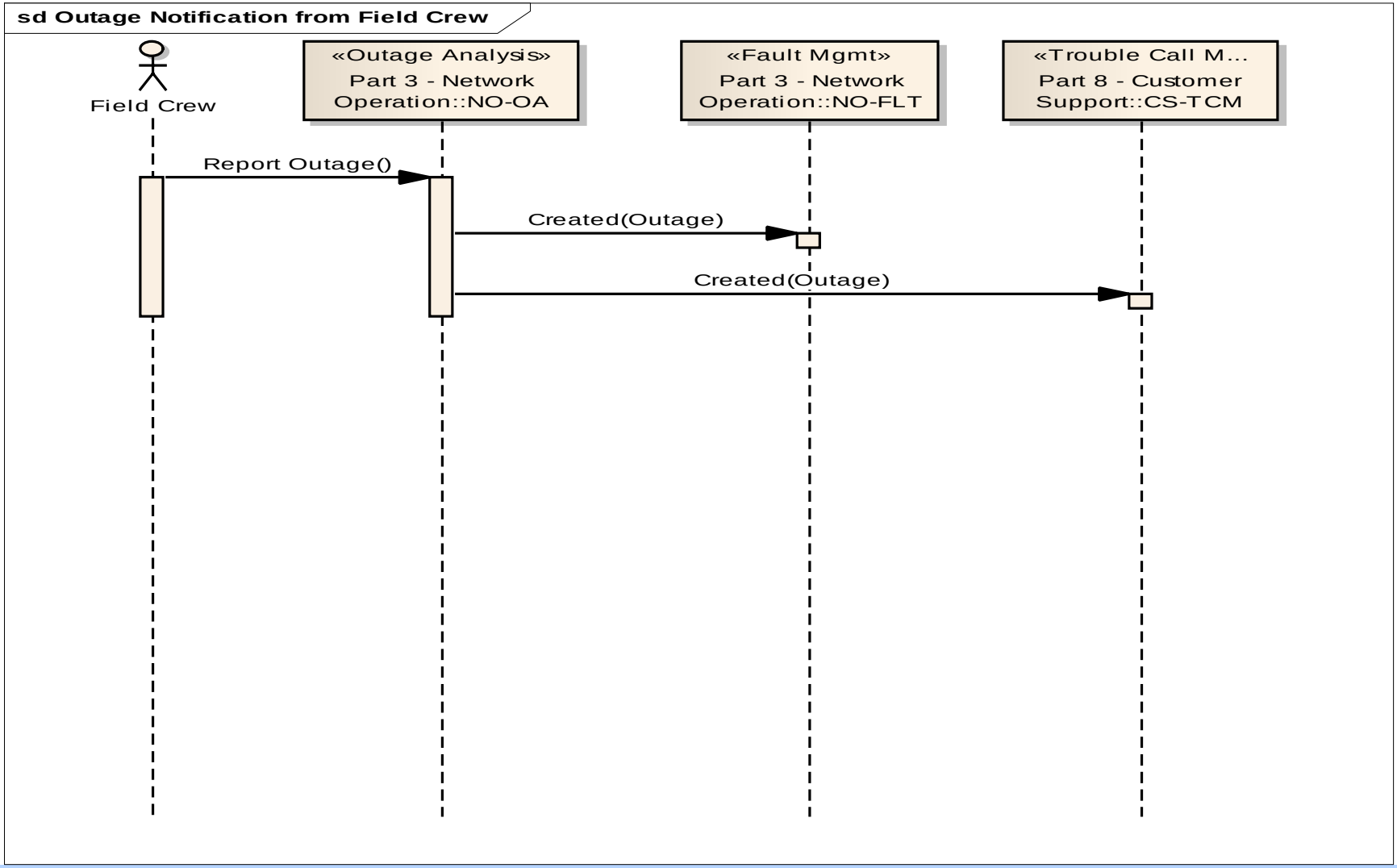
[1] Account information
[2] Configuration, installation etc.
[3] Controls and signals
[4] Customer data set
[5] Data obtained by special read
[6] Demand response signals
[7] Disconnect/reconnect, demand reset
{ 8 } Install, remove, repair, disconnect, reconnect
[9] Load curves, Measurement history, etc.
[10] Load scenarios
{ 11 } Meter health and tamper detection
{ 12 } Meter history
[13] Meter readings
{ 14 } Meter service request
[15] On request read
[16] Outage and restoration verification
[17] Power reliability and quality events
[18] Readings, events and status
[19] Special read
[20] Tariffs, parameters
[21] Transaction information
[22] Transaction records
{ 23 } Tokens

Key
61968 Part 9
Defined by other 61968 Parts
Outside the scope of 61968

Part 3 Scope

- An outage can be detected by:
  - AMI
  - Customer Call
  - Field Crew
  - SCADA
- An outage must be communicated between network operations systems, including trouble location, devices in abnormal state, and customers affected.
- Other Network Operations Fault Location, Isolation, and Supply Restoration (FLISR).
  - Fault location refers to the observations, signals, and analysis necessary to identify the true cause of the outage.
  - Isolation is the process of switching and cutting that allows the fault location to be safely isolated for repairs.
  - The process of restoring power to healthy islands of network around the isolated area is referred to as supply restoration.
- Other areas will be added to Part 3 as Use Cases are defined.

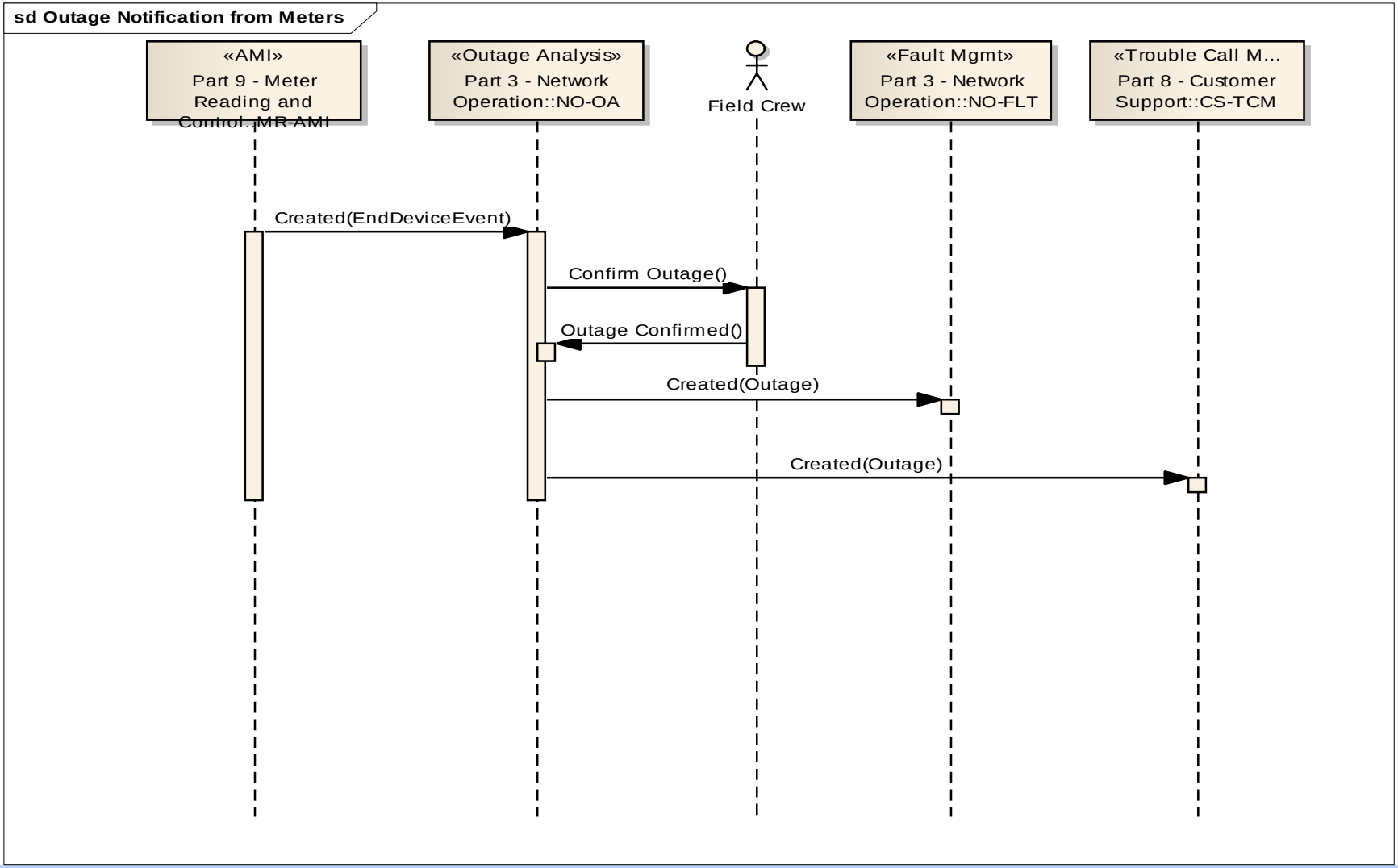
Outage Notification from a Field Crew



Outage Notification from a Field Crew

from	to	message	description/payload
Field Crew	NO-OA	Report Outage	Field crew reports confirmed outage at known location.
NO-OA	NO-FLT	Created Outage	Notification of predicted outage at a specific protective device in the network. This is a confirmed protective device outage because it is reported by a crew. Payload: - Protective Device ID - Time of outage - Status of device (phases on)
NO-OA	CS-TCM	Created Outage	Notification of the customers out due to an outage. Payload: - Customer ID and time of outage for each customer out. - Estimated time of restoration of the outage.

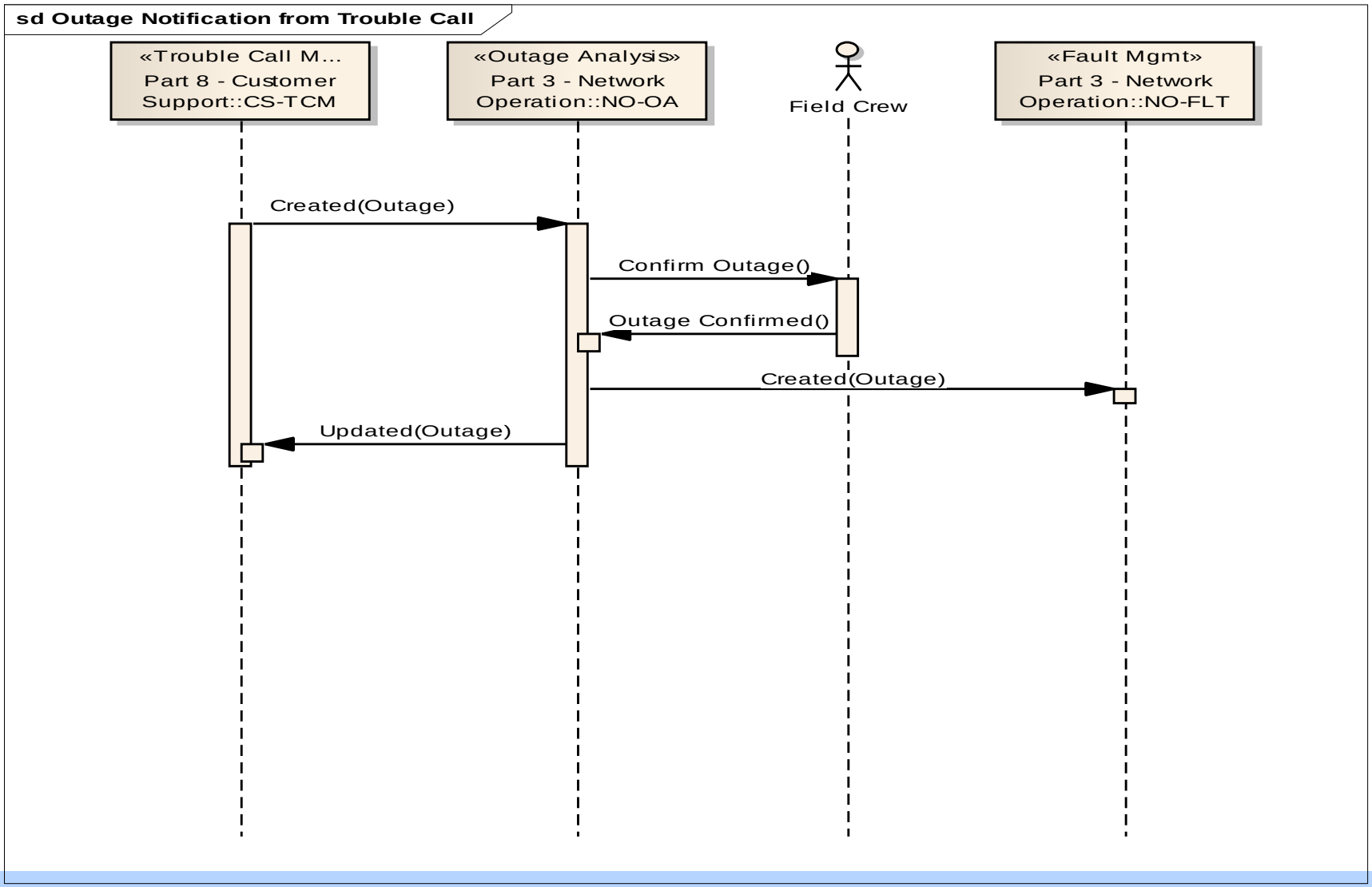
Outage Notification from an AMI



Outage Notification from an AMI

from	to	message	description/payload
MR-AMI	NO-OA	Created EndDeviceEvent	AMI notifies of power off event at meter. Payload: Meter ID, new meter status, and timestamp for change in meter status.
NO-OA	Field Crew	Confirm Outage	Request field crew to confirm outage location.
Field Crew	NO-OA	Outage Confirmed	Field crew confirms outage location.
NO-OA	NO-FLT	Created Outage	Notification of a confirmed outage at a specific protective device in the network. Payload: - Protective Device ID - Time of outage - Status of device (phases on) - Confirmed status (yes in this case)
NO-OA	CS-TCM	Created Outage	Notification of the customers out due to an outage. Payload: - Customer ID and time of outage for each customer out. - Estimated time of restoration of the outage.

Outage Notification from a Customer



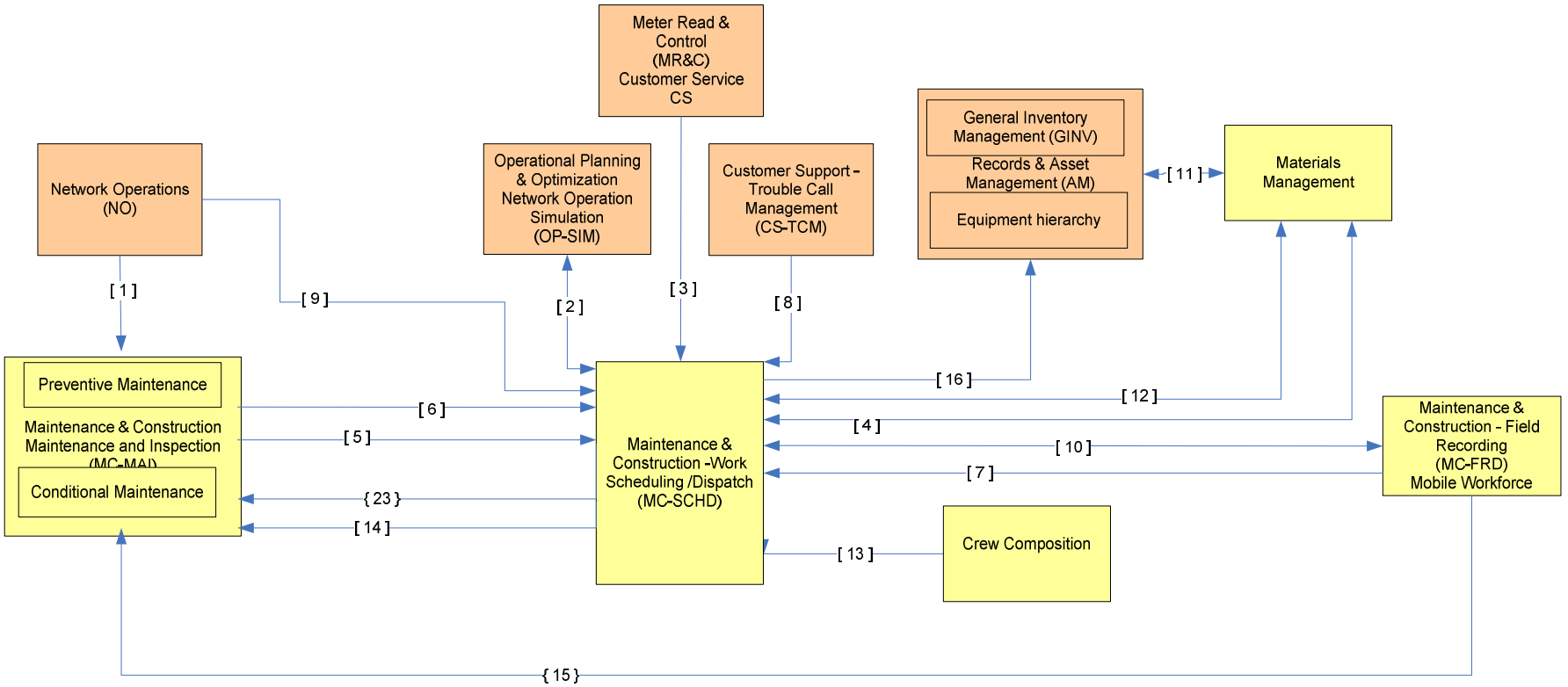
Outage Notification from a Customer

from	to	message	description/payload
CS-TCM	NO-OA	Created Outage	Notification of customer-reported outage. Payload: - ID and time of outage for each customer.
NO-OA	Field Crew	Confirm Outage	Request field crew to confirm outage location.
Field Crew	NO-OA	Outage Confirmed	Field crew confirms outage location.
NO-OA	NO-FLT	Created Outage	Notification of a confirmed outage at a specific protective device in the network. Payload: - Protective Device ID - Time of outage - Status of device (phases on) - Confirmed status (yes in this case)
NO-OA	CS-TCM	Updated Outage	Notification of the customers out due to an outage. Payload: - Customer ID and time of outage for each customer out. - Estimated time of restoration of the outage.

Part 6 Scope

- Specifies the information content for messages used to support business functions related to Maintenance and Construction.
- Typical uses of Part 6 messages include:
  - Planned Maintenance
  - Work Management
  - New Service Requests
- Message types defined in other Parts of IEC61968 may also be relevant to these use cases.

Part 6 Reference Model



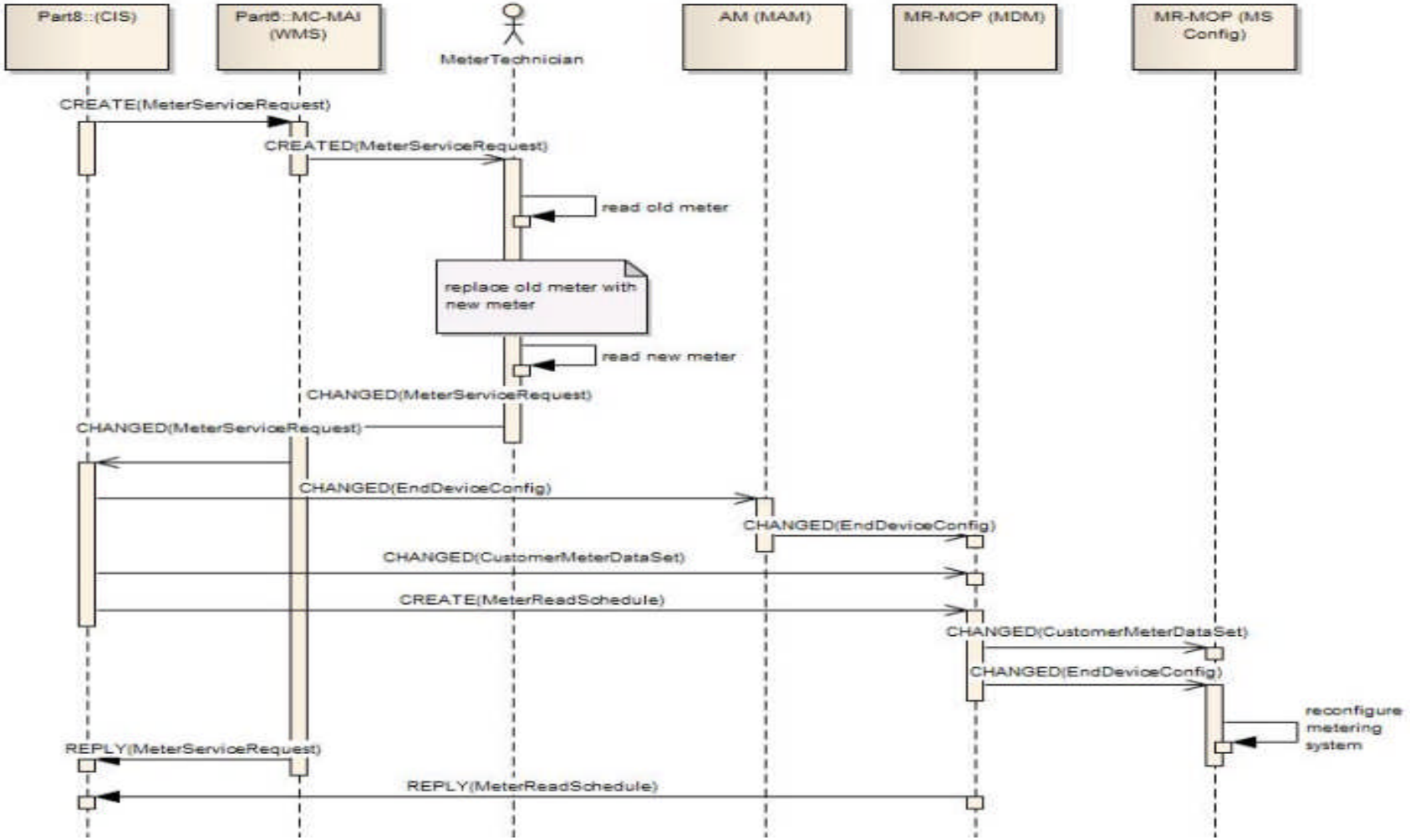
Service Request Message

- May include one or more Meter Service Work items
- Each item may refer to a max of two meters to provide a means to replace a meter.
- Meter readings can be obtained as a part of the work.
- A Meter Service Request occurs due to:
  - Change out a Meter due to a Problem (Alarm, Complaint or other event)
  - Change out a Meter for Recalibration

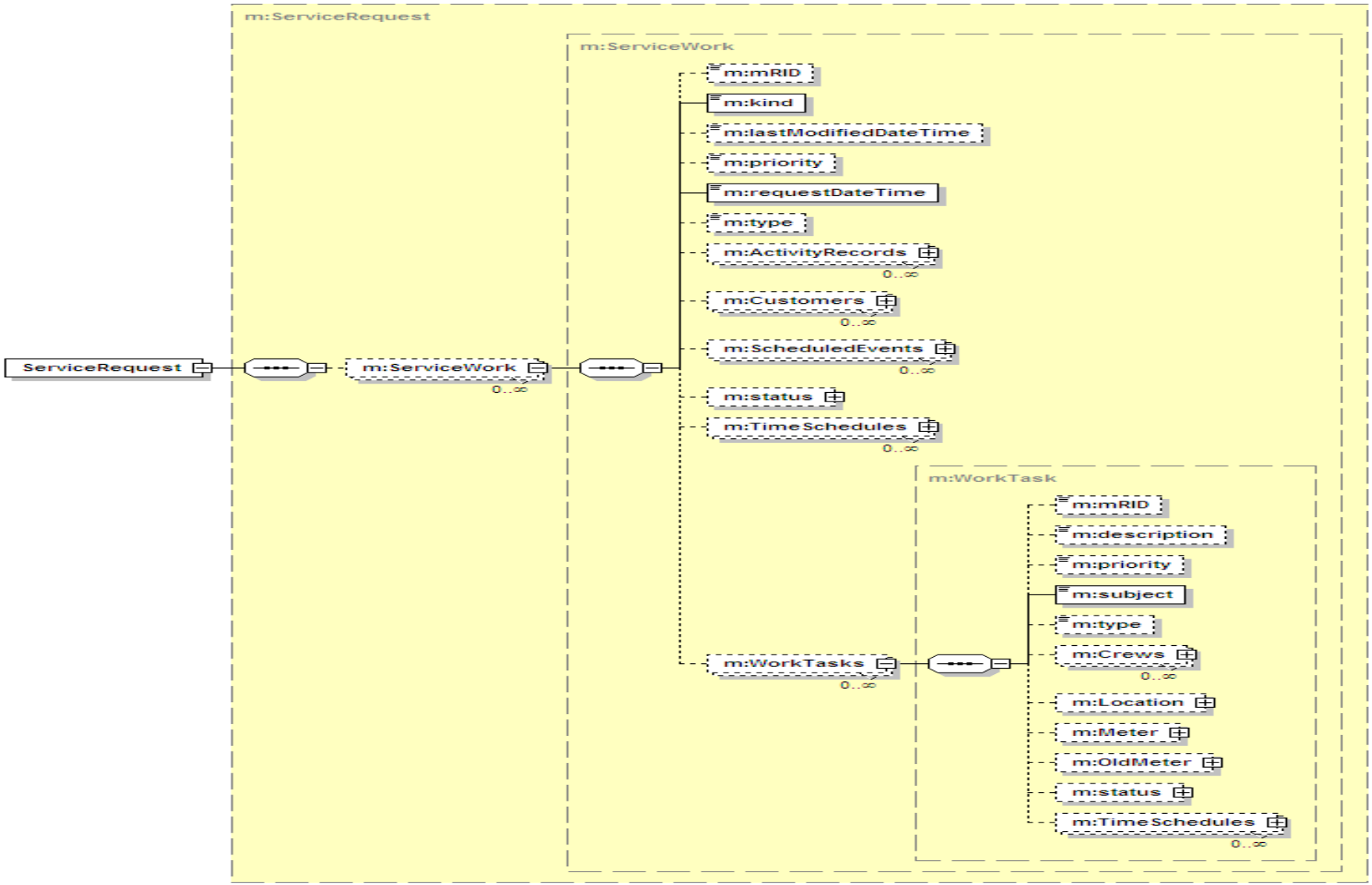
Service Request Message

- When a Meter Change-Out is performed the following steps must occur:
  - Send a MeterServiceRequest to the WMS
  - Send a Meter Technician to:
    - Take the final Meter Reading
    - Remove the old Meter
    - Install the new Meter
    - Take the new Meter Reading
  - The following messages are sent/received to Configure the Meter:
    - EndDeviceConfig
    - CustomerMeterDataSet
    - MeterConfig
    - MeterReadSchedule

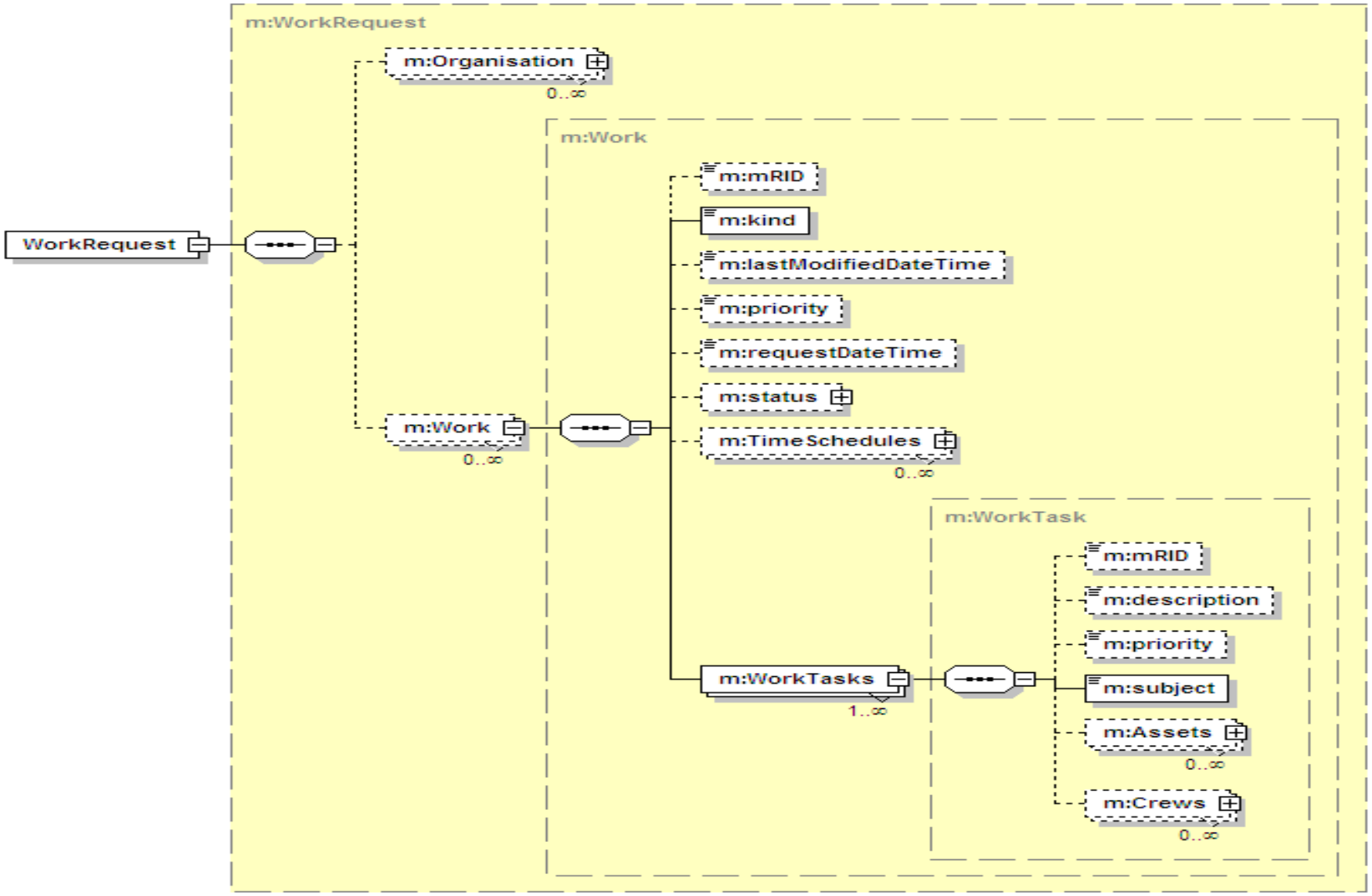
Change-Out Meter Work Flow



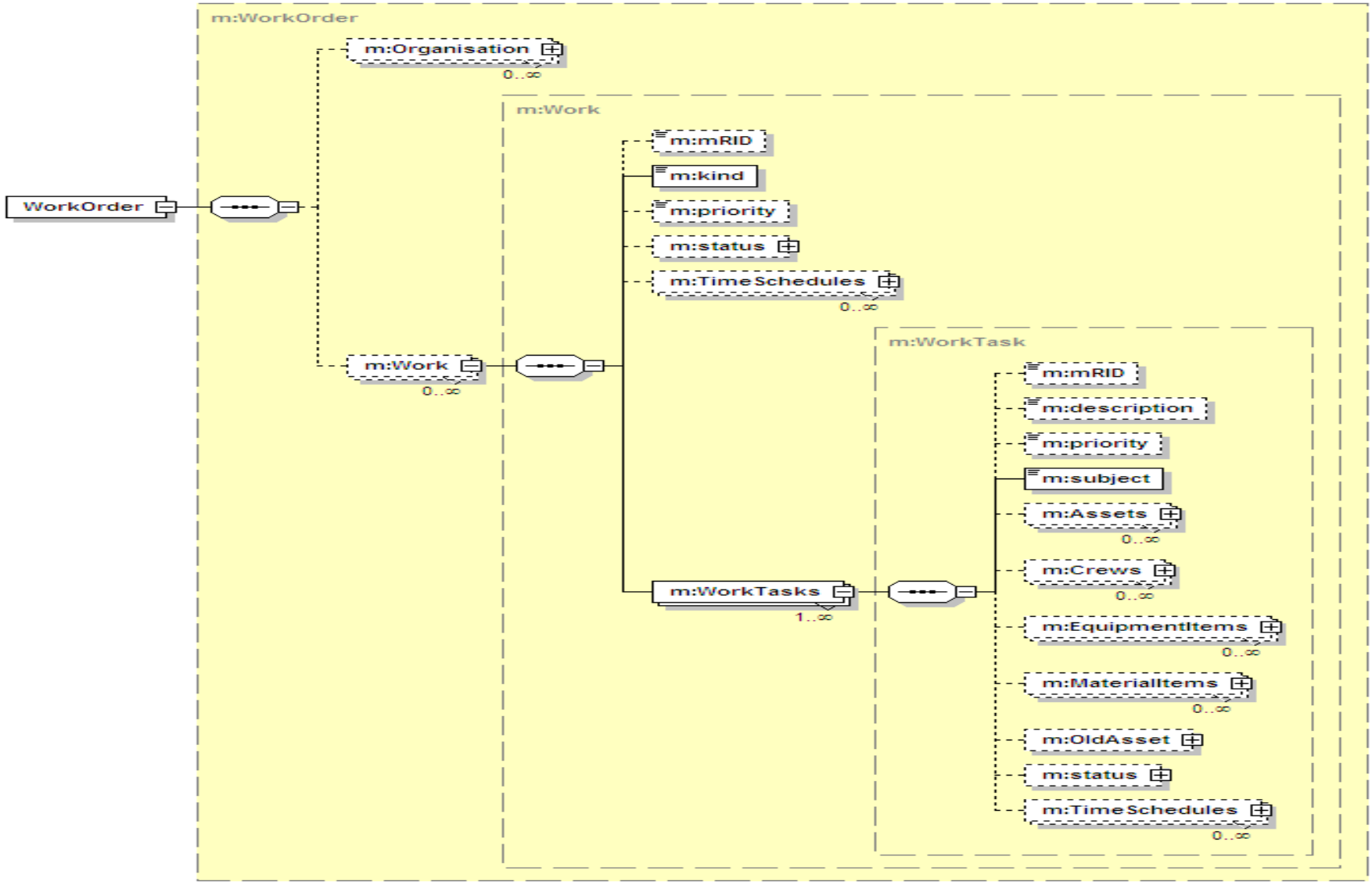
Service Request Message



Work Request Message



Work Order Message



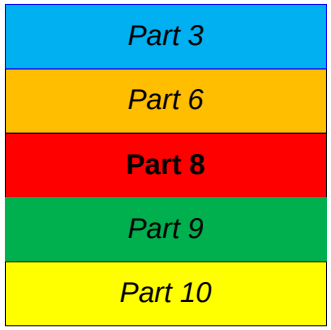
Part 8 Scope

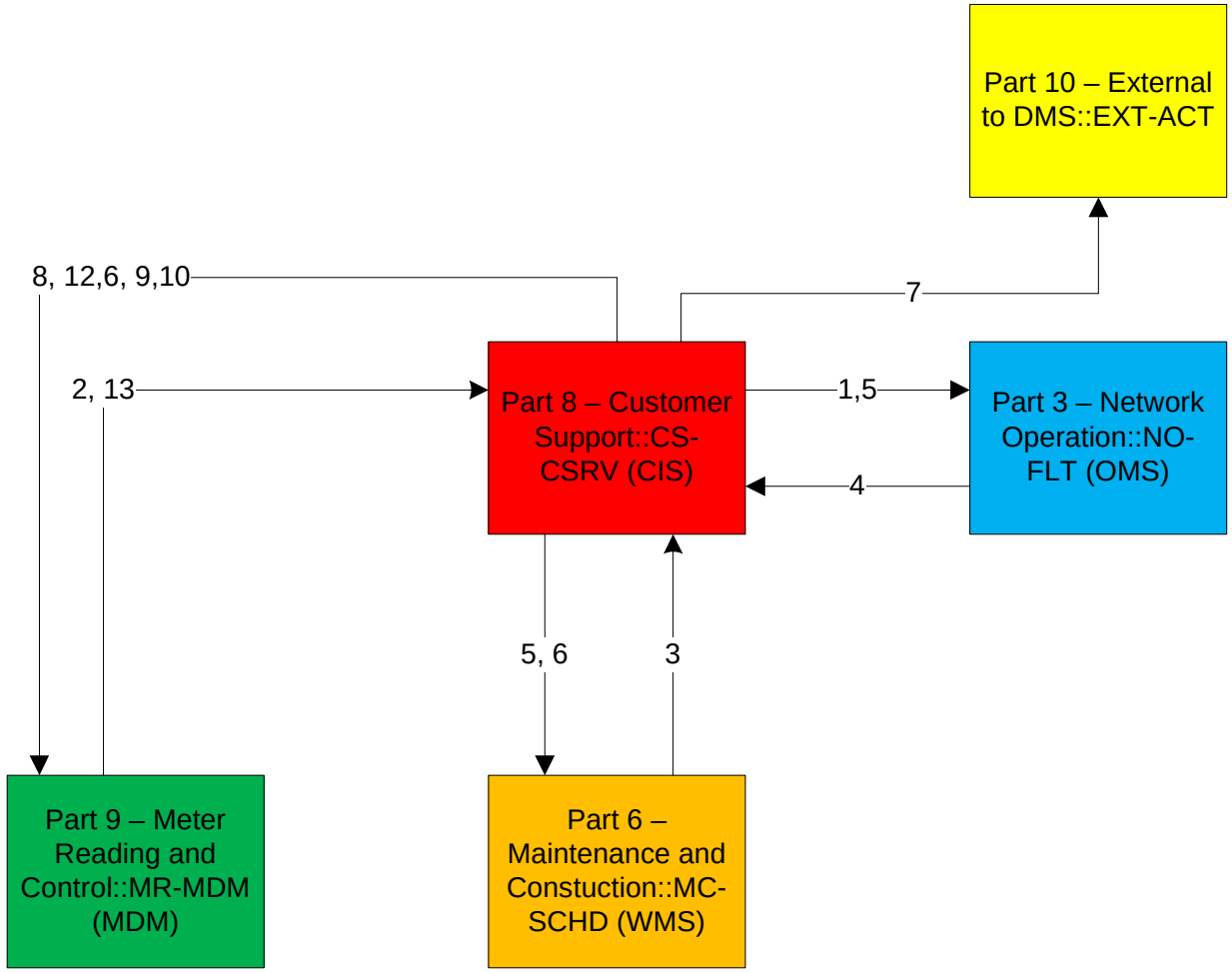
- Specifies the information content for messages used to support business functions related to Customer Service and Trouble Call Management.
- Typical uses of Part 8 messages include:
  - Trouble Ticket
  - Call Back
  - Customer Agreement
  - Billing Determinant
- Message types defined in other Parts of IEC61968 may also be relevant to these use cases.

Part 8 Reference Model

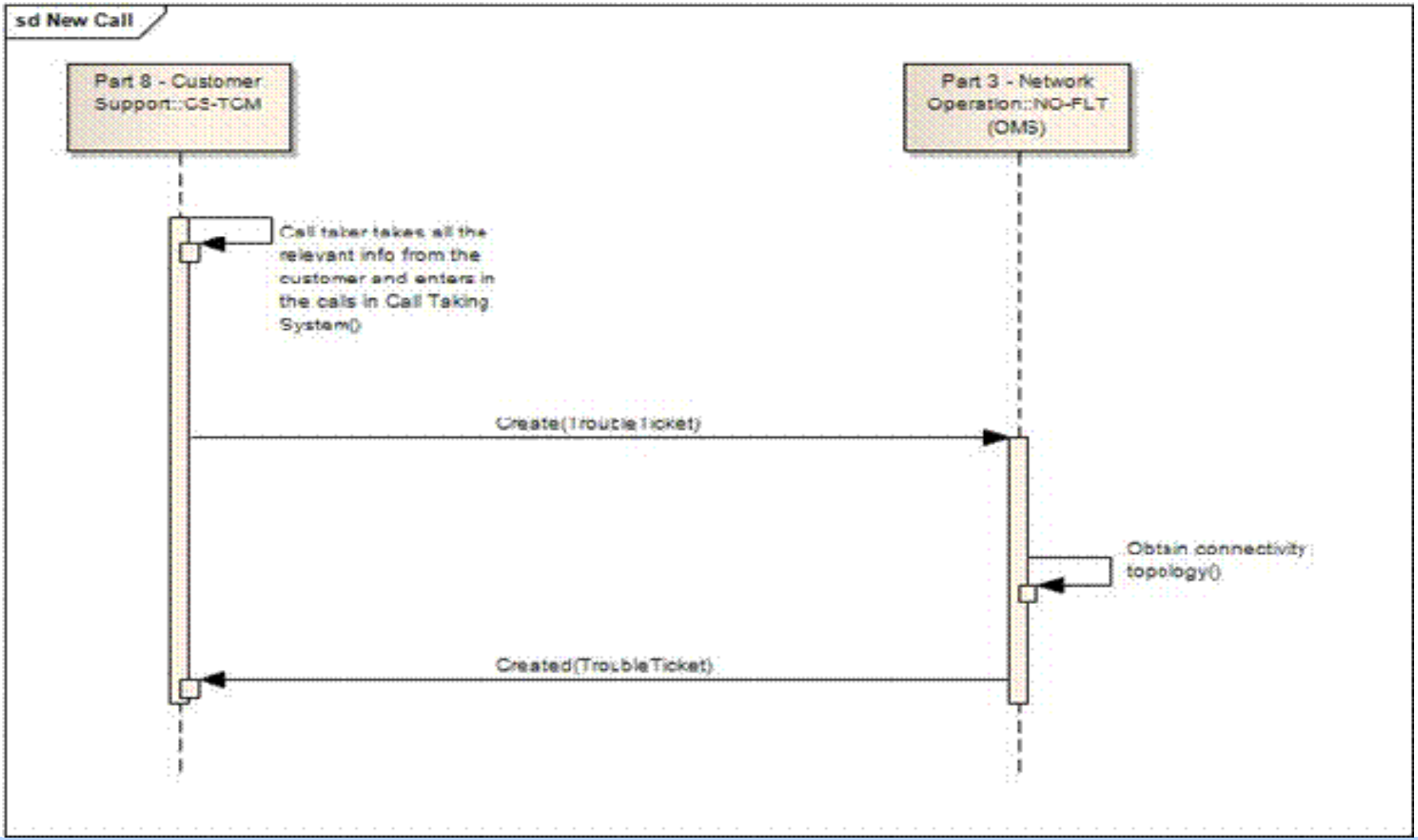
Interfaces

1. **TroubleTicket**
2. **CallBack**
3. *EndDeviceEvent*
4. *ScheduledEvent*
5. *OutageRecord*
6. **ComplianceEvent**
7. **ServiceRequest**
8. **MeterServiceOrder**
9. **CustomerAgreement**
10. **BillingDeterminant**
11. *EndDeviceControl*
12. *PanDeviceAsset*
13. *EndDeviceAsset*
14. *MeterReading*

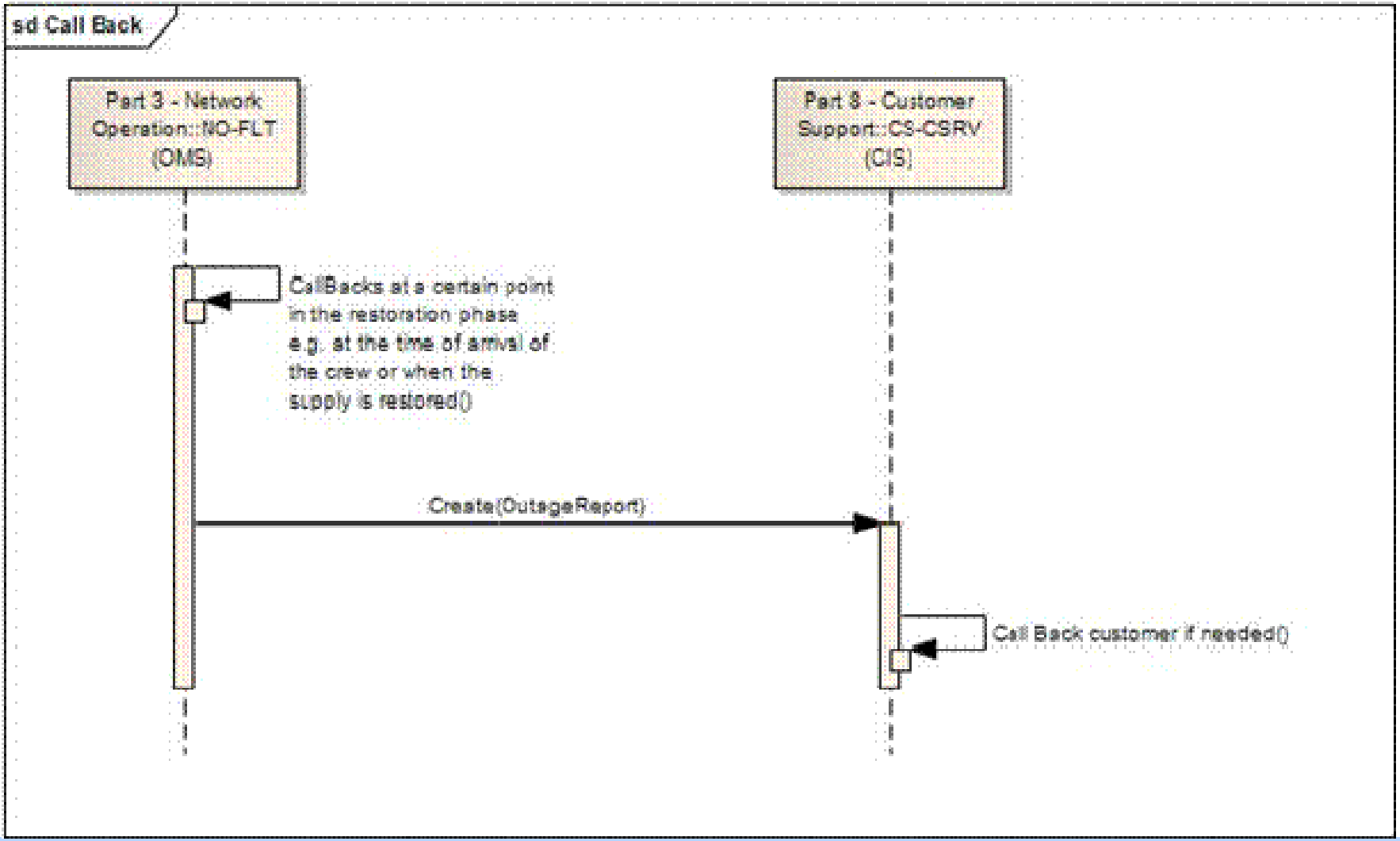




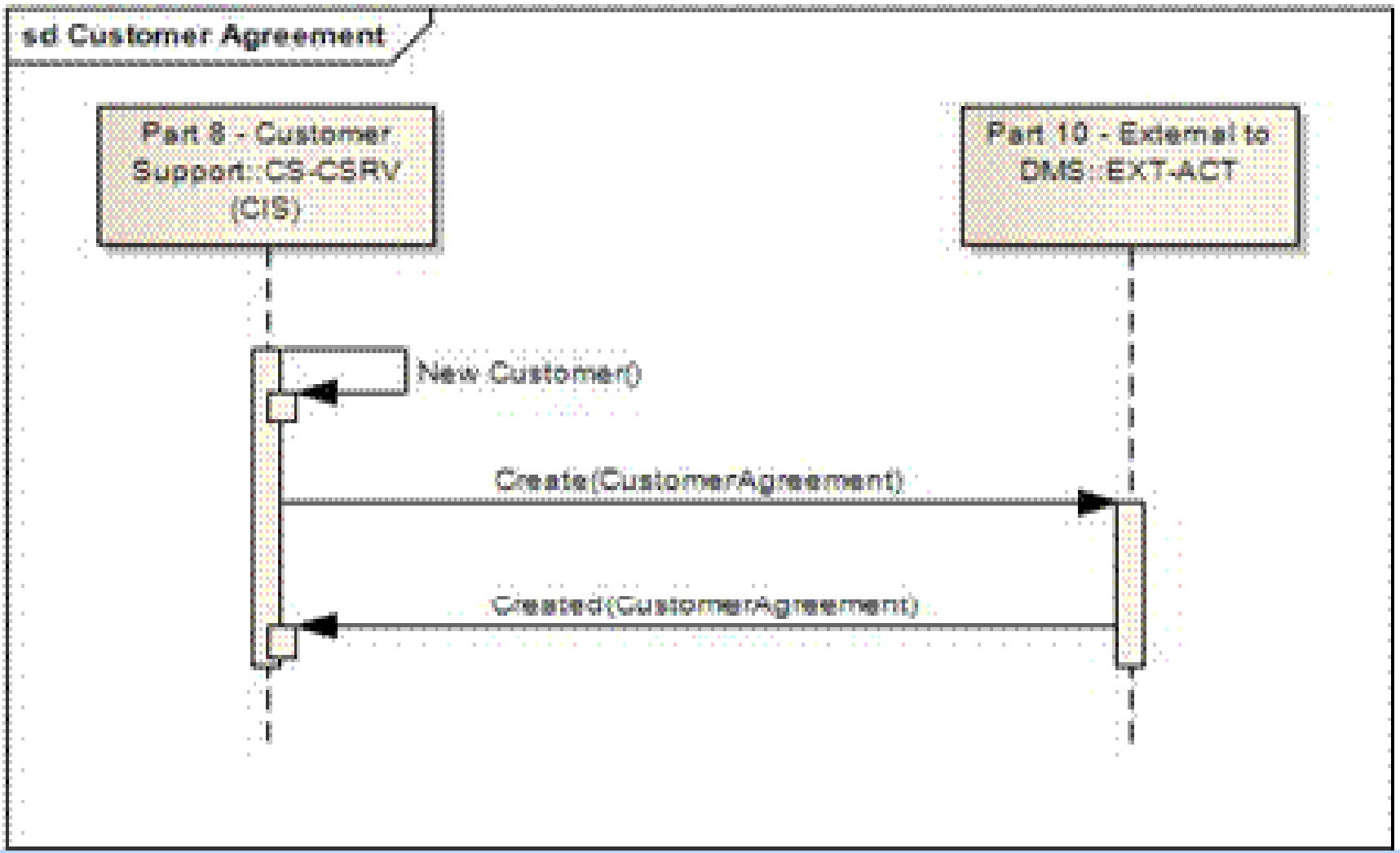
Trouble Ticket Work Flow



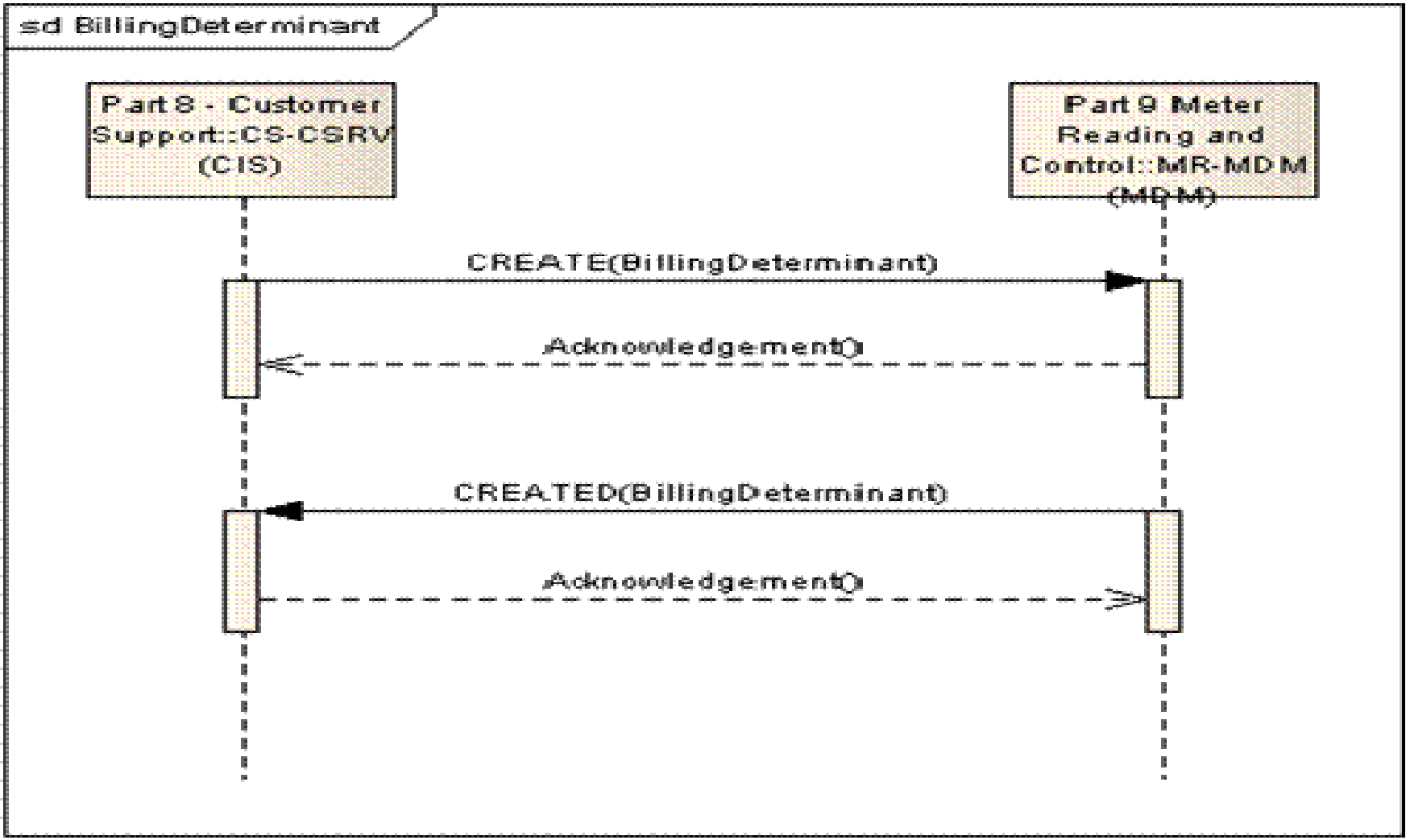
Call Back Work Flow



Customer Agreement Work Flow



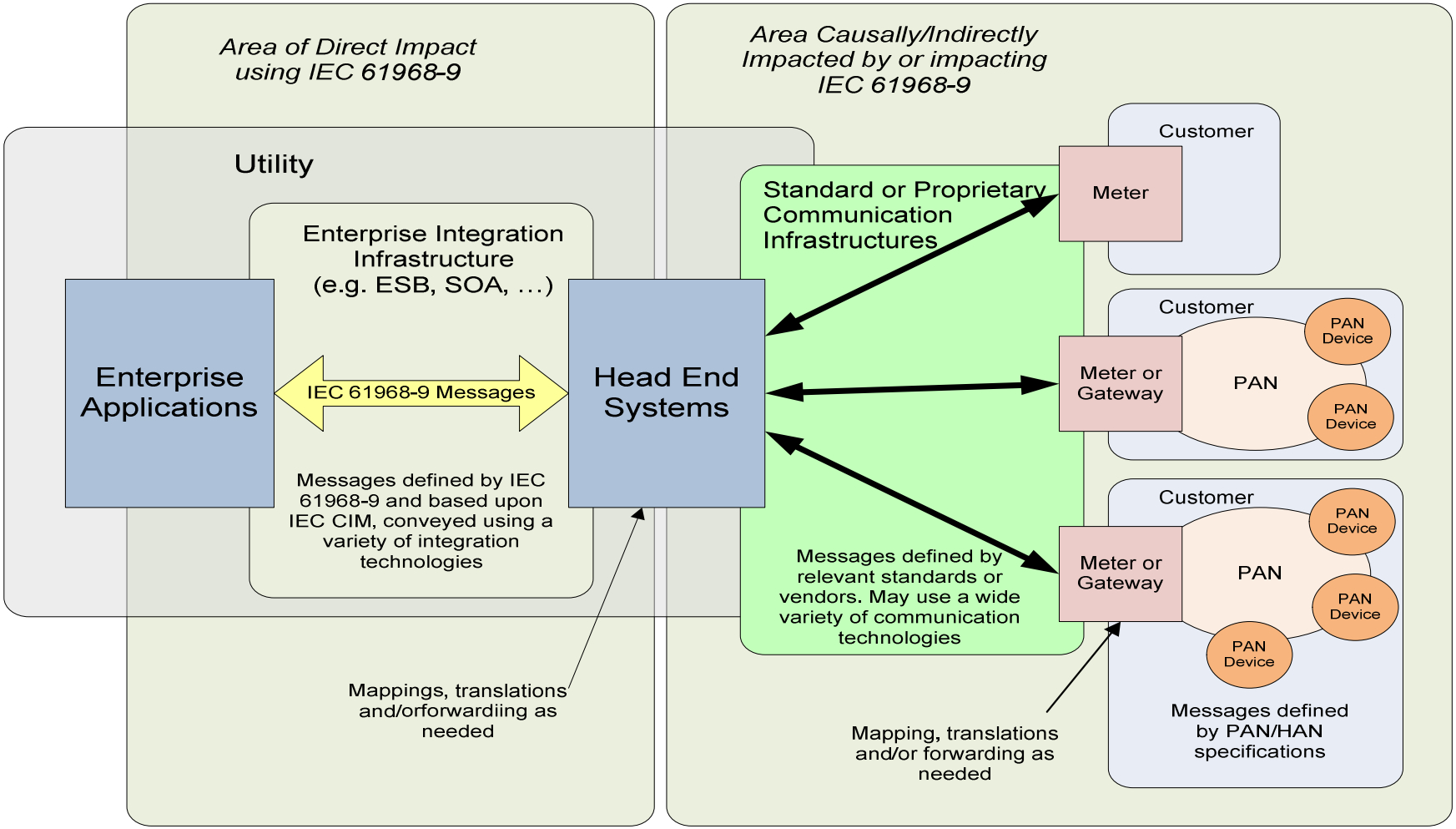
Billing Determinate Work Flow



Part 9 Scope

- To Define the exchange of information between a Metering System and other systems within the Utility enterprise
- Specifies the information content of a set of message types that can be used to support many of the business functions related to Meter Reading and Control.
- Typical uses of the message types include:
  - Meter Event Messages
  - Meter Control Messages
  - Meter Reading Messages

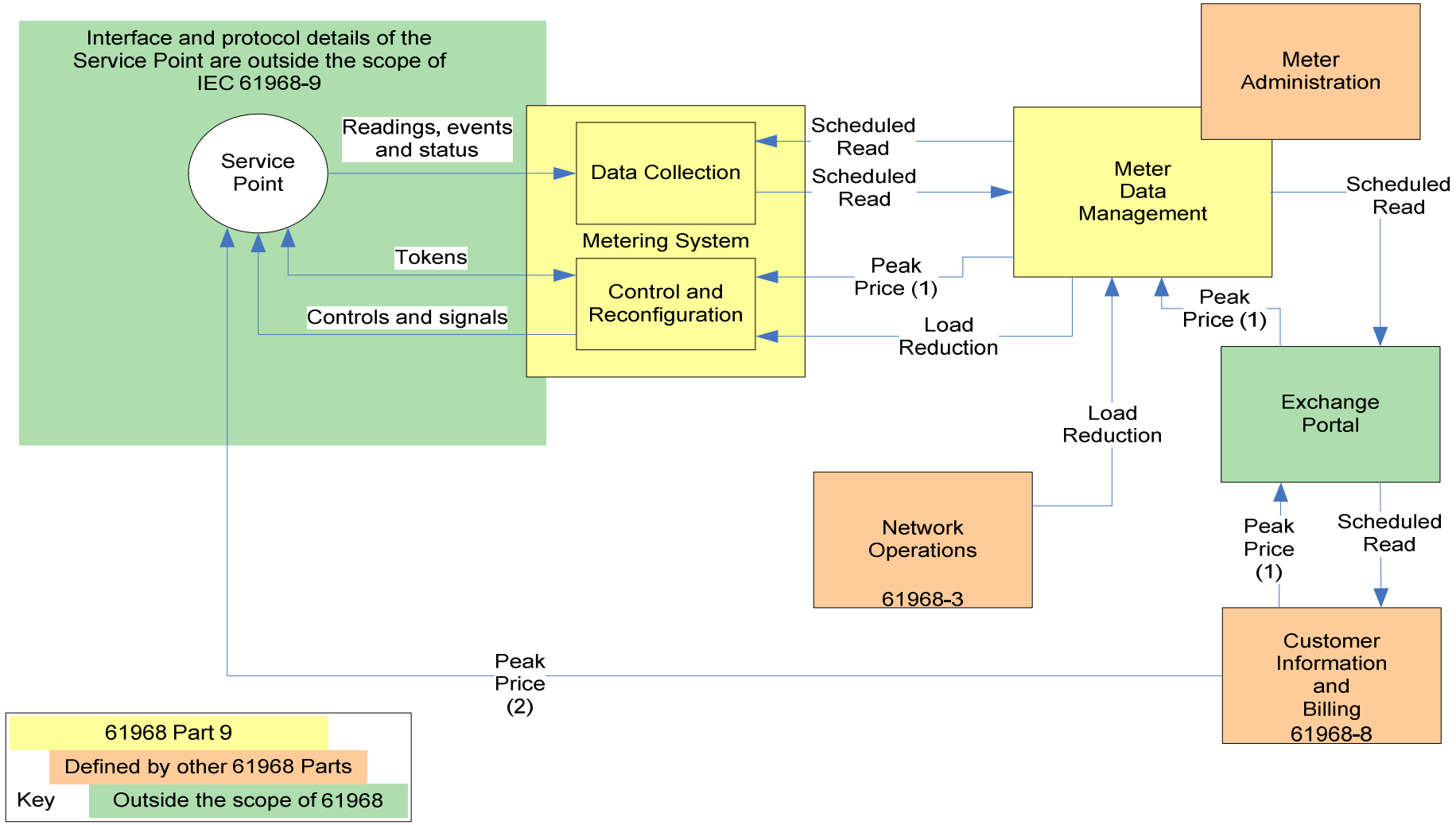
Part 9 Scope



Part 9 Reference Model

- The Reference Model provides examples of the logical components and data flows related to this standard.
- The Meter is treated as an “end device”
- An End Device:
  - Has a unique identity
  - Is managed as a physical asset
  - May issue events
  - May receive control requests
  - May collect and report measured values
  - May participate in utility business processes
- The Reference Model describes the flows between the components.

Part 9 Reference Model - Partial



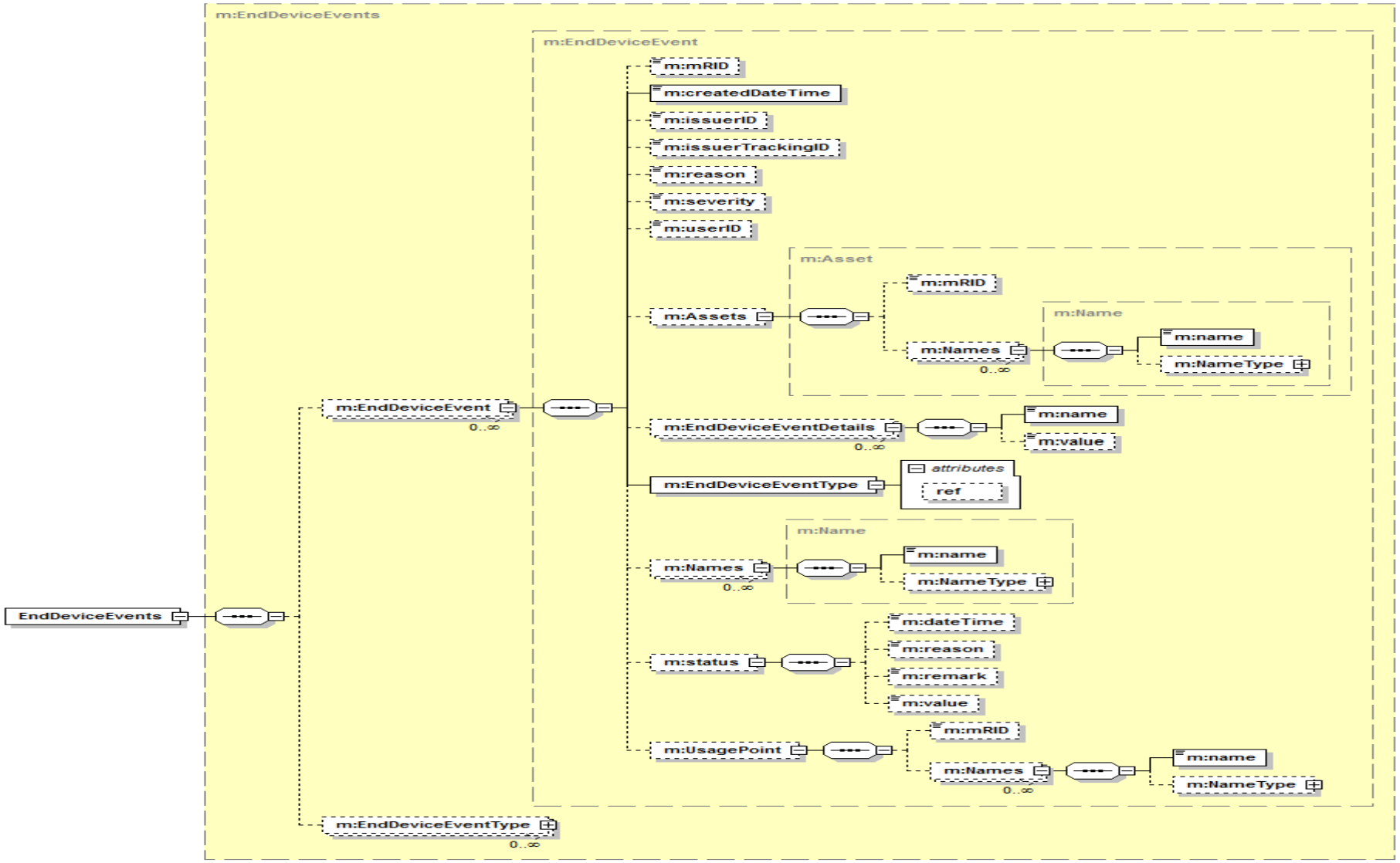
Part 9 Metering Messages

- End Device Event Messages (includes PAN Messages)
- End Device Control Messages (includes PAN Messages)
- Meter Reading Messages
- Meter Configuration Messages

EndDeviceEvent Messages

- EndDeviceEvent Messages Convey events related to:
  - Sustained and Momentary Outage Detection
  - Low and High Voltage Threshold Detection
  - Meter Health
  - Tamper Detection
  - Revenue Event

EndDeviceEvent Message



EndDeviceEventType Enumerations

- EndDeviceEventType enumerations defines the event using four parts:

  EndDeviceEventType := *<EndDeviceType>.<EndDeviceDomain>.<EndDeviceSubdomain>.<EndDeviceEventorAction>*

  Where:

  <EndDeviceType> = a numeric value from the EndDeviceType enumeration. Example: 3 is Electric Meter, 5 is a Gateway, 12 is a PAN Device, etc.

  <EndDeviceDomain> = a numeric value from the EndDeviceDomain enumeration. Example: 26 is Power, 15 is Load Control, etc.

  <EndDeviceSubdomain> = a numeric value from the EndDeviceSubdomain enumeration. Example: 0 is N/A, 28 is Power Quality, etc.

  <EndDeviceEventorAction> = a numeric value from the EndDeviceEventorAction enumeration. Example: 85 is Failed, 81 is Opted-Out, etc.

Message Organization – Event Type Enumerations

EndDeviceEventType	Description
*.26.0.85	Power off alarm
*.26.0.216	Power on
*.26.38.150	Low voltage
*.26.38.93	High voltage
*.26.38.37	Voltage Imbalance Cleared
*.12.1.38	Unauthorized Access attempt
*.12.0.257	Tamper detection
*.8.0.215	Demand reset occured
*.31.0.68	Disconnected
*.31.0.42	Connected

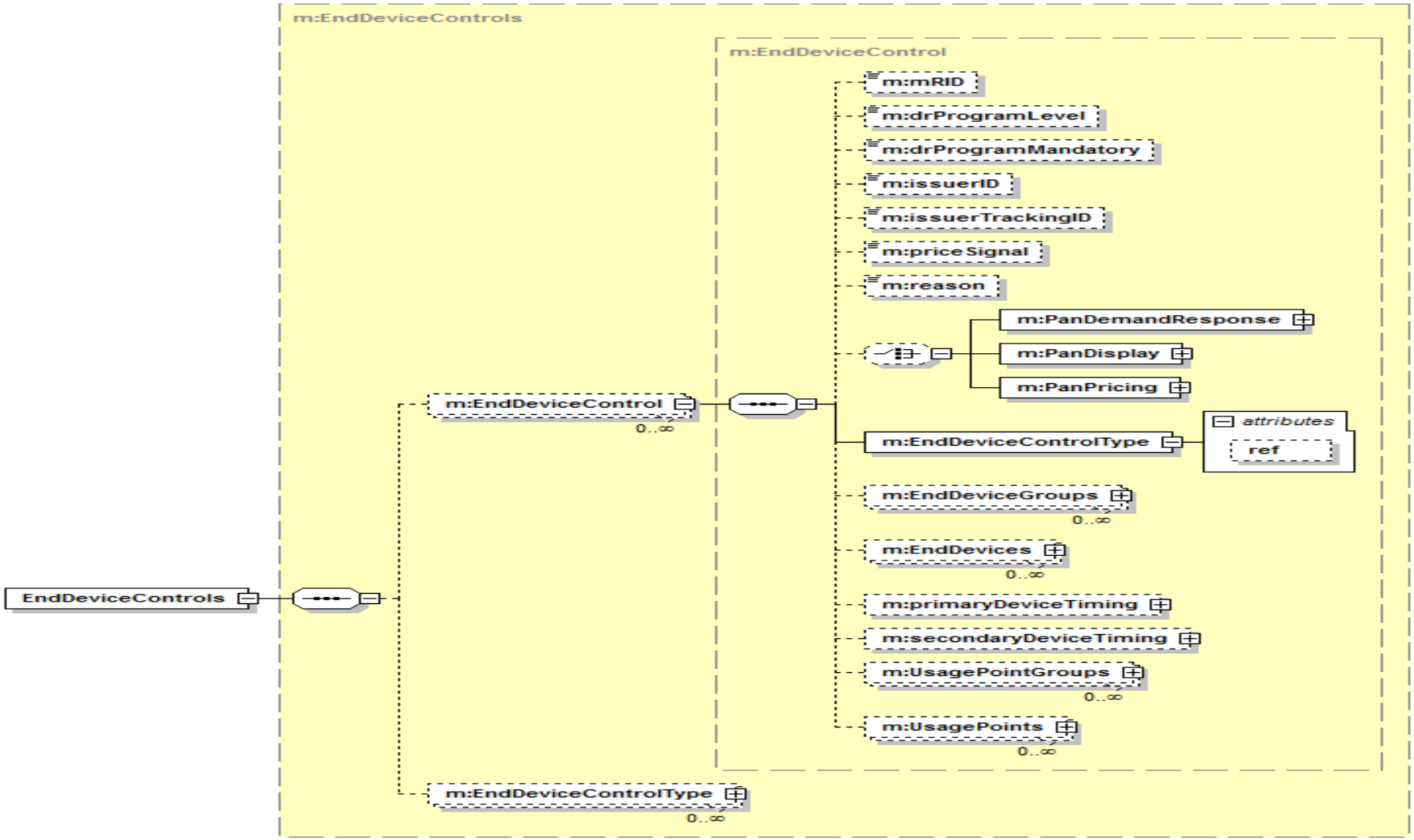
EndDeviceEvent XML Message Example
Meter Power Off Event: Electric, Power, N/A, Failed

```
<ns1:EndDeviceEvents
xmlns:ns1="http://iec.ch/TC57/2011/EndDeviceEvents#">
        <ns1:EndDeviceEvent>
                <ns1:createdDateTime>2009-11-04T18:52:50.001-
05:00</ns1:createdDateTime>
                <ns1:EndDeviceEventType ref="3.26.0.85"/>
          <ns1:description>Power off alarm</ns1:description>
                <ns1:Assets>
                <ns1:mRID>3dc53ee5-777e-50b4-8699-
a1c224f45f3d</ns1:mRID>
                        <ns1:Names>
                                <ns1:name>Meter23253</ns1:name>
                        </ns1:Names>
                </ns1:Assets>
        </ns1:EndDeviceEvent>
</ns1:EndDeviceEvents>
```

End Device Control Messages

- The EndDeviceControl message issues control commands related to:
  - Load Control
  - Demand Reset
  - Connect/Disconnect
  - Real-Time Pricing

EndDeviceControls Message



EndDeviceControlType Enumerations

- EndDeviceControlType enumerations defines the event using four parts:

  EndDeviceControlType := *<EndDeviceType>.<EndDeviceDomain>.<EndDeviceSubdomain>.<EndDeviceEventorAction>*

  Where:

  <EndDeviceType> = a numeric value from the EndDeviceType enumeration. Example: 3 is Electric Meter, 5 is a Gateway, 12 is a PAN Device, etc.

  <EndDeviceDomain> = a numeric value from the EndDeviceDomain enumeration. Example: 31 is RCDSwitch, 26 is Power, 15 is Load Control, etc.

  <EndDeviceSubdomain> = a numeric value from the EndDeviceSubdomain enumeration. Example: 0 is N/A, 28 is Power Quality, etc.

  <EndDeviceEventorAction> = a numeric value from the EndDeviceEventorAction enumeration. Example: 23 is Disconnect, 85 is Failed, 81 is Opted-Out, etc.

Message Organization – Control Type Enumerations

EndDeviceControlType	Description
3.8.0.214	Demand reset
3.15.6.242.0	Load control started
3.15.6.243.1	Load control stopped
3.31.0.18	Close remote connect/disconnect switch
3.31.0.22	Disable RCD Switch
3.31.0.23	Open remote connect/disconnect switch
3.31.0.26	Enable RCD switch
3.20.9.82	Price signal

EndDeviceControl XML Message Example - Meter Disconnect by Group: Electric, RCD Switch, N/A, Disconnect

```
<?xml version="1.0" encoding="UTF-8"?>
<!--Scheduled Disconnect on an End Device Group-->
<m:EndDeviceControls
xsi:schemaLocation="http://iec.ch/TC57/2010/EndDeviceControls#
EndDeviceControls.xsd" xmlns:m="http://iec.ch/TC57/2010/EndDeviceControls#"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
        <m:EndDeviceControl>
                <m:type>3.31.0.23</m:type>
                <m:EndDeviceGroup>
                        <m:mRID>3dc53ee5-777e-50b4-8699-
a1c224f45f3d</m:mRID>
                </m:EndDeviceGroup>
                <m:scheduledInterval>
                        <m:start>2011-05-05T09:30:00.0Z</m:start>
                </m:scheduledInterval>
        </m:EndDeviceControl>
</m:EndDeviceControls>
```

Meter Reading Messages

- Examples of these types of Messages are:
  - MeterReadSchedule
  - MeterReading Message for the following types of requests:
    - Manual MeterRead
    - On-Request/On-Demand Meter Read
    - Historical Meter Data Access
    - Billing Inquiry
    - Bulk Readings

MeterReadings Message

- MeterReadings message allows for:
  - Readings from one or more meters
  - Reading values each have an associated reading type, timestamp and value
  - Many Quality values can be associated with each reading value
  - Readings can be supplied in the form of interval blocks if the common reading types are grouped together.
  - Event Histories are returned with meter readings.

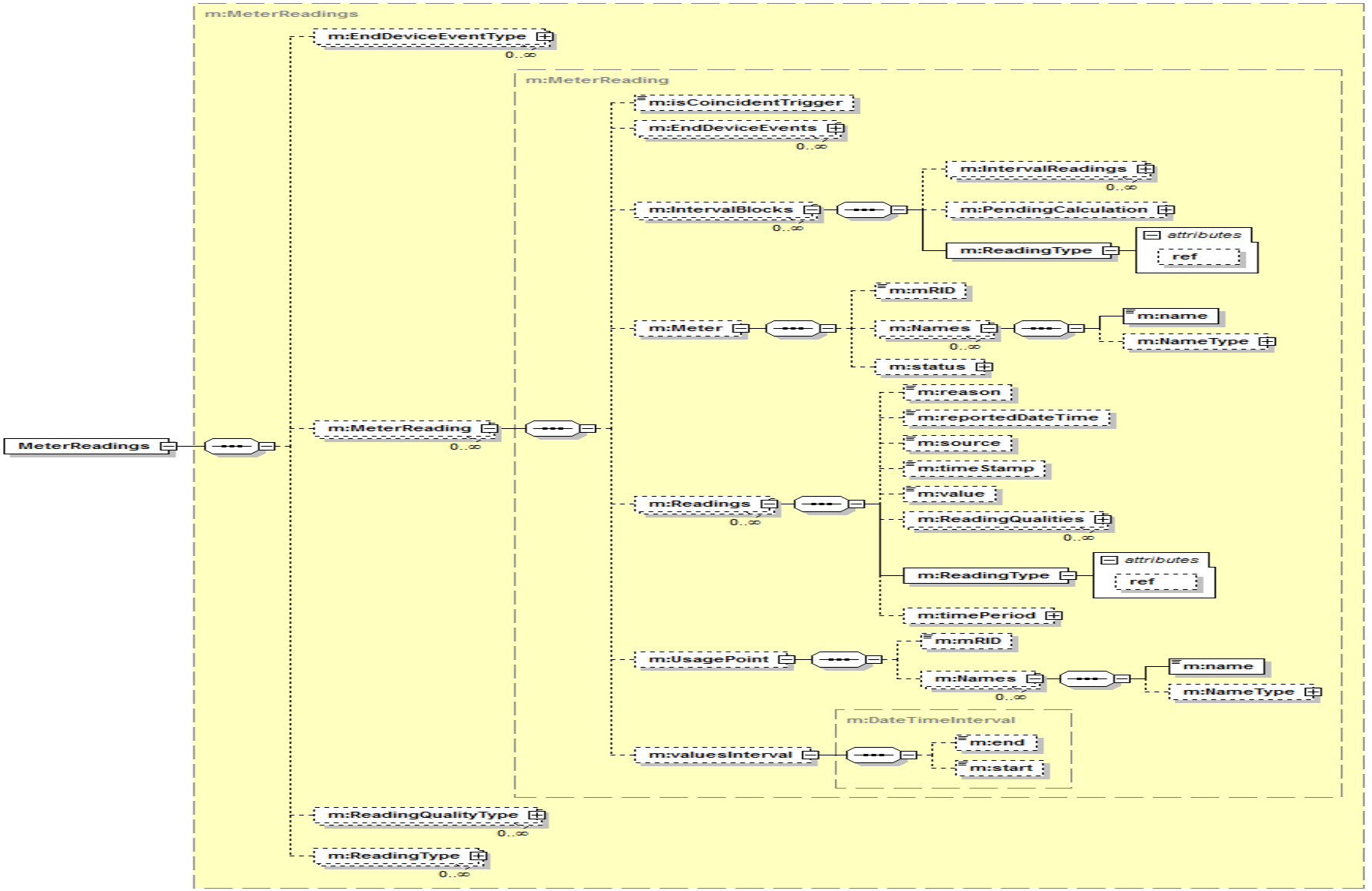
MeterReadings Message

- The request for meter reading should specify:
  - A meter or group of meters
  - A type of reading to collect
  - A frequency
  - A Duration of interest
- The scheduled frequency may consist of regular or irregular periods.

MeterReadings Message

- The MeterReadings request may be initiated by any of the following:
  - The CIS (in an effort to collect billing determinants).
  - A Planning and Scheduling application (in an effort to acquire engineering data about the distribution network).
  - An OMS (in order to verify if a customer is affected by an outage or has been restored)
  - An MDM system (in an effort to broker data for any or all of the above applications).
  - The MS itself may also directly initiate a meter read

MeterReadings Message



Questions & Contacts

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