Interface Specification

LINKWARE IEC 61968

AD HOC

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Contents

1 Overview

The purpose of this Linkware interface is to allow external systems to perform ad hoc commands to devices via Aidon Gateware. The interface is implemented as a web service using the IEC 61968 standards.

References

Reference	Document
IEC 61968-100 ed.1 Implementation profiles	The document describes how message payloads defined by parts 3-9 of IEC 61968 are conveyed using web services and the Java Messaging System.
IEC 61968-9 ed.2 Interfaces for meter reading and control	The purpose of this document is to define a standard for the integration of metering systems (MS), which would include traditional (one or two-way) automated meter reading (AMR) systems, with other systems and business functions within the scope of IEC 61968.
Interface Specification - Linkware IEC 61968 Common v1.13	Common Linkware IEC 61968 interface specification. Contains general specifications, guidelines and restrictions, including i.e. message headers, error handling and security policies.

2 Interface

2.1 Common Message Envelope

The common structure for all messages can be found in document Interface Specification – Linkware IEC 61968 Common.

2.1.1 Header

The common header can be found in the document Interface Specification – Linkware IEC 61968 Common.

2.1.2 Reply

The common reply can be found in the document Interface Specification – Linkware IEC 61968 Common.

3 Interface specification

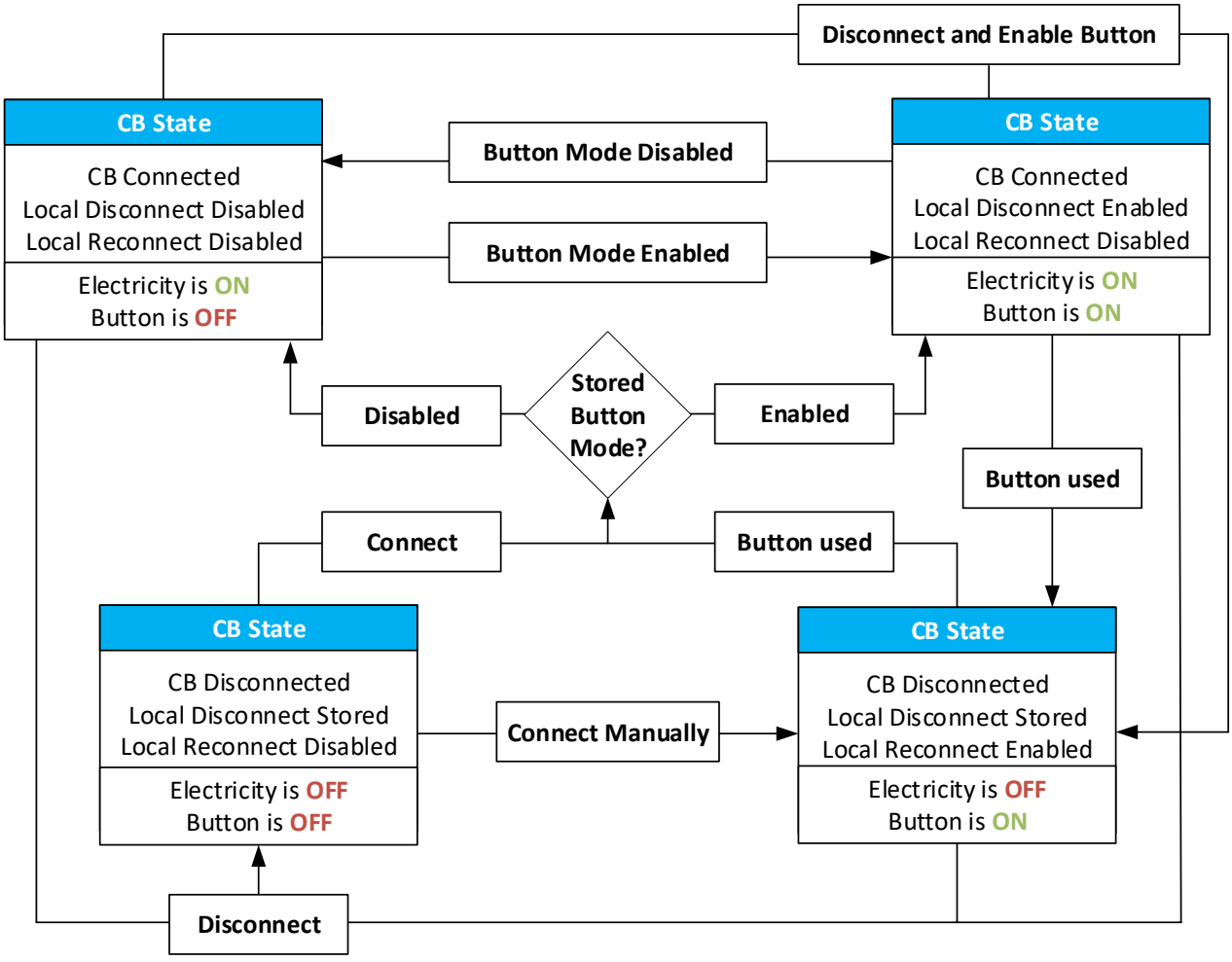
3.1 Control

3.1.1 ExecuteCircuitBreakerControl

ExecuteCircuitBreakerControl is used to control the circuit breaker and the circuit breaker button on the device.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

The following diagram shows the possible transitions between circuit breaker states.



3.1.1.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968

			Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "execute": execute circuit breaker control
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		0..1	If payload is not specified, only status is requested from the device and no action is taken.
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDeviceAction/command		1	Command to be executed: - "Connect": The circuit breaker is enabled, set to connected state and the button is enabled (if DisableButton command has been issued before, button mode stays disabled). This turns on electricity at the metering point. - "ConnectManually": The circuit breaker is enabled, but left to disconnected state and the button is enabled. The user must press the button to turn on electricity. - "Disconnect": The circuit breaker is disabled, set to disconnected state and the button is disabled. This turns off electricity at the metering point. In this state the "EnableButton" command cannot be used to enable the button, "ConnectManually" needs to be used instead. - "DisconnectAndEnableButton": The circuit breaker is enabled, but set to disconnected state and the button is enabled. The user can press the button to turn on electricity. - "EnableButton": The circuit breaker button will be enabled. Can only be used when the Circuit Breaker is in a connected state. Allows

			disconnecting the Circuit Breaker using the button. - "DisableButton": The circuit breaker button will be disabled. Prevents the disconnection of the Circuit Breaker using the button. Note: Changing the a Connect to another is not possible directly, but has to be done by first changing to "Disconnect". Note: Scheduling commands DisconnectAndEnableButton, EnableButton and DisableButton are not currently allowed.
./scheduledInterval		0..1	Allowed time window when scheduled circuit breaker command can be executed.
./scheduledInterval/start	xs:dateTime	1	Allowed start time. The command will be executed after the start time when possible.
./scheduledInterval/end	xs:dateTime	0..1	Expiration time for the scheduled command. The command will not be executed if the end time is reached before the command could be executed.

3.1.1.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.13	Usage point not linked to a device.	FATAL
2.46	Scheduling the specified command is not allowed	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.1.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload returns circuit breaker status on successful executions.
Payload/EndDeviceEvents		1	
Payload/EndDeviceEvents/EndDeviceEvent[1]		1	Circuit breaker status
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceEventType		1	
./EndDeviceEventType/domain	xs:string	1	Static "CircuitBreaker"
./EndDeviceEventType/eventOrAction	xs:string	1	Possible values: - Connected - Disconnected
Payload/EndDeviceEvents/EndDeviceEvent[2]		0..1	Circuit breaker button status
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceEventType		1	
./EndDeviceEventType/domain		1	Static "CircuitBreakerButton"

./EndDeviceEventType/eventOrAction		1	Possible values:
			- Enabled
			  ○ Circuit Breaker disconnection using button allowed
			- Disabled
			  ○ Circuit Breaker disconnection

			using button not allowed
Payload/EndDeviceEvents/EndDeviceEvent[3]		0..1	Circuit breaker local disconnection status
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceEventType		1	
./EndDeviceEventType/domain		1	Static "LocalDisconnect"

./EndDeviceEventType/eventOrAction		1	Possible values:
			- Enabled
			  ○ Circuit Breaker disconnection using button allowed
			- Disabled
			  ○ Circuit Breaker disconnection using button not allowed

Payload/EndDeviceEvents/EndDeviceEvent[4]		0..1	Circuit breaker local reconnection status
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceEventType		1	
./EndDeviceEventType/domain		1	Static "LocalReconnect"

./EndDeviceEventType/eventOrAction		1	Possible values:
			- Enabled
			  ○ Circuit Breaker reconnection using button allowed
			- Disabled
			  ○ Circuit Breaker reconnection using button not allowed

Result codes

Code	Description	Error level
0.0	Ok	
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL
5.3	Circuit breaker status couldn't be changed	FATAL
5.4	The scheduled command couldn't be executed successfully within the specified time window	FATAL

6.1	The scheduled command was cancelled	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.1.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.1.1.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
               xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message"
               xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
   <soap:Header />
   <soap:Body>
      <end:ExecuteCircuitBreakerControlRequest>
         <end:Header>
            <mes:Verb>execute</mes:Verb>
            <mes:Noun>EndDeviceControl</mes:Noun>
            <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
            <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
            <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
            <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
         </end:Header>
         <end:Request>
            <mes:ID objectType="UsagePoint">12345678</mes:ID>
         </end:Request>
         <end:Payload>
            <end:EndDeviceControl>
               <end1:EndDeviceAction>
                  <end1:command>DisconnectAndDisableButton</end1:command>
               </end1:EndDeviceAction>
            </end:EndDeviceControl>
         </end:Payload>
      </end:ExecuteCircuitBreakerControlRequest>
   </soap:Body>
</soap:Envelope>
```

Asynchronous response:

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceEvent#">
  <soap:Header />
  <soap:Body>
    <end:ReplyCircuitBreakerControlRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
```

```
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceEvents>
          <end1:EndDeviceEvent>
            <end1:EndDevice>
              <end1:mRID>987654321</end1:mRID>
            </end1:EndDevice>
            <end1:domain>CircuitBreaker</end1:domain>
            <end1:eventOrAction>Disconnected</end1:eventOrAction>
          </end1:EndDeviceEvent>
          <end1:EndDeviceEvent>
            <end1:domain>CircuitBreakerButton</end1:domain>
            <end1:eventOrAction>Disabled</end1:eventOrAction>
          </end1:EndDeviceEvent>
        </end:EndDeviceEvents>
      </end:Payload>
    </end:ReplyCircuitBreakerControlRequest>
  </soap:Body>
</soap:Envelope>
```

3.1.2 ExecuteContractUpload

ExecuteContractUpload is used to change metering point's standard contract and upload it immediately to the end device that is linked to the metering point. The previous contract will be overwritten by the specified contract.

3.1.2.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "execute" : contract upload
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		1	
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDeviceAction/command	xs:string	1	Static "UploadContract"

./Contract/mRID	xs:string	1	Standard contract identifier (mRID). Note: Linkware presents contract ids prefixed with STD_. Unique contracts are not currently supported. Note that standard contract identifier is currently STD_ prefix with the contract name.

3.1.2.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.8	Contract not found	FATAL
2.13	Usage point not linked to a device.	FATAL
2.21	Given contract must be a standard contract	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.2.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below

./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceControl		1	
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceAction		1	
./EndDeviceAction/command	xs:string	1	Static "UploadContract"
./Contract/mRID	xs:string	1	Standard contract identifier (mRID). Note: Linkware presents contract ids prefixed with STD_. Unique contracts are not currently supported. Note that standard contract identifier is currently STD_ prefix with the contract name.

Result codes

Code	Description	Error level
0.0	Ok	
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.2.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.1.2.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/ /EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soap:Header />
  <soap:Body>
    <end:ExecuteContractUploadRequest>
      <end:Header>
        <mes:Verb>execute</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
```

```
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Request>
      <end:Payload>
        <end:EndDeviceControl>
          <end1:EndDeviceAction>
            <end1:command>UploadContract</end1:command>
          </end1:EndDeviceAction>
          <end1:Contract>
            <com:mRID>STD_Hourly Standard</com:mRID>
          </end1:Contract>
        </end:EndDeviceControl>
      </end:Payload>
    </end:ExecuteContractUploadRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyContractUploadRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControl>
          <end1:EndDevice>
            <end1:mRID>987654321</end1:mRID>
          </end1:EndDevice>
          <end1:EndDeviceAction>
            <end1:command>UploadContract</end1:command>
          </end1:EndDeviceAction>
          <end1:Contract>
            <com:mRID>21</com:mRID>
          </end1:Contract>
        </end:EndDeviceControl>
      </end:Payload>
```

```
    </end:ReplyContractUploadRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.1.3 ExecuteConfigurationUpload

ExecuteConfigurationUpload is used to change metering point's standard configuration and upload it immediately to the device that is linked to the metering point. The previous configuration will be overwritten by the specified configuration.

3.1.3.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "execute" : configuration upload
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		1	
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDeviceAction/command	xs:string	1	Static "UploadConfiguration"
./Configuration/mRID	xs:string	1	Standard configuration identifier (mRID). Note: Linkware presents configuration ids prefixed with STD_. Unique configurations are not currently supported. Note that standard configuration identifier is currently STD_ prefix with the configuration name.

3.1.3.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL

1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.9	Configuration not found	FATAL
2.13	Usage point not linked to a device.	FATAL
2.22	Given configuration must be a standard configuration	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.3.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceControl		1	
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceAction		1	
./EndDeviceAction/command	xs:string	1	Static "UploadConfiguration"
./Configuration/mRID	xs:string	1	Standard configuration identifier (mRID). Note: Linkware presents configuration ids prefixed with STD_. Unique configurations are not currently supported. Note that standard configuration

			identifier is currently STD_ prefix with the configuration name.

Result codes

Code	Description	Error level
0.0	Ok	
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.3.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.1.3.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soap:Header />
  <soap:Body>
    <end:ExecuteConfigurationUploadRequest>
      <end:Header>
        <mes:Verb>execute</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>

<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Request>
      <end:Payload>
        <end:EndDeviceControl>
          <end1:EndDeviceAction>
            <end1:command>UploadConfiguration</end1:command>
          </end1:EndDeviceAction>
          <end1:Configuration>
            <com:mRID>STD_Quality Data</com:mRID>
          </end1:Configuration>
        </end:EndDeviceControl>
      </end:Payload>
```

```
    </end:ExecuteConfigurationUploadRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyConfigurationUploadRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControl>
          <end1:EndDevice>
            <end1:mRID>987654321</end1:mRID>
          </end1:EndDevice>
          <end1:EndDeviceAction>
            <end1:command>UploadConfiguration</end1:command>
          </end1:EndDeviceAction>
          <end1:Configuration>
            <com:mRID>13</com:mRID>
          </end1:Configuration>
        </end:EndDeviceControl>
      </end:Payload>
    </end:ReplyConfigurationUploadRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.1.4 ExecuteManualBillingBreak

ExecuteManualBillingBreak is used to manually end the current billing period and record current readings to the billing series. Executing manual billing break requires that the metering point has an active billing period product.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.1.4.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware

			IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "execute": execute manual billing break
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		1	
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDeviceAction/command		1	Static "ManualBillingBreak"

3.1.4.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.4.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"

Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of meter readings at the time of the billing break depending on metering point configuration
./UsagePoint/mRID	xs:string	1	Usage point
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the reading value
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description	Error level
0.0	Ok	
2.30	The billing period product is not part of the usage point configuration	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.4.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.1.4.5 Example messages

Request

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soapenv:Header />
  <soapenv:Body>
    <met:ExecuteManualBillingBreakRequest>
      <met:Header>
        <mes:Verb>execute</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Request>
    </met:ExecuteManualBillingBreakRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Asynchronous response:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"

xmlns:met="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
                  xmlns:mes="http://iec.ch/TC57/2011/schema/message"
                  xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyManualBillingBreakRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Reply>
      <met:Payload>
        <met1:MeterReadings>
          <met1:MeterReading>
            <met1:UsagePoint>
```

```
            <met1:mRID>123456789</met1:mRID>
          </met1:UsagePoint>
          <met1:EndDevice>
            <met1:mRID>987654321</met1:mRID>
          </met1:EndDevice>
          <met1:Readings>
            <met1:Reading>
              <met1:timeStamp>2015-01-05T12:15:32Z</met1:timeStamp>
              <met1:value>1234.56</met1:value>
              <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.72.0" />
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-01-05T12:15:32Z</met1:timeStamp>
              <met1:value>4321</met1:value>
              <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.73.0" />
            </met1:Reading>
          </met1:Readings>
        </met1:MeterReading>
      </met1:MeterReadings>
    </met:Payload>
  </met:ReplyManualBillingBreakRequest>
</soapenv:Body>
</soapenv:Envelope>
```

3.1.5 ExecuteProductChange

ExecuteProductChange is used to add or remove a configuration product to/from a metering point and upload the change immediately to the device that is linked to the metering point.

3.1.5.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: “execute” : product change
Header/Noun	xs:string	1	Static “EndDeviceControl”
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		1	
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDeviceAction/command	xs:string	1	Possible values: - AddProduct - RemoveProduct
./Product/mRID	xs:string	1	Product identifier (mRID)

3.1.5.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.7	Product not found	FATAL
2.13	Usage point not linked to a device.	FATAL
2.25	Incorrect product specified. Only configuration product changes are supported.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.5.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)

Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceControl		1	
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceAction		1	
./EndDeviceAction/command	xs:string	1	Possible values: - AddProduct - RemoveProduct
./Product/mRID	xs:string	1	Product identifier (mRID)

Result codes

Code	Description	Error level
0.0	Ok	
2.23	The product is already part of the usage point configuration	FATAL
2.24	The product is not part of the usage point configuration	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.5.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soap:Header />
  <soap:Body>
    <end:ExecuteProductChangeRequest>
      <end:Header>
        <mes:Verb>execute</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Request>
      <end:Payload>
```

```
        <end:EndDeviceControl>
          <end1:EndDeviceAction>
            <end1:command>AddProduct</end1:command>
          </end1:EndDeviceAction>
          <end1:Product>
            <com:mRID>32</com:mRID>
          </end1:Product>
        </end:EndDeviceControl>
      </end:Payload>
    </end:ExecuteProductChangeRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyProductChangeRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControl>
          <end1:EndDevice>
            <end1:mRID>987654321</end1:mRID>
          </end1:EndDevice>
          <end1:EndDeviceAction>
            <end1:command>AddProduct</end1:command>
          </end1:EndDeviceAction>
          <end1:Product>
            <com:mRID>32</com:mRID>
          </end1:Product>
        </end:EndDeviceControl>
      </end:Payload>
    </end:ReplyProductChangeRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.1.6 ExecuteSoftwareFuseControl

ExecuteSoftwareFuseControl is used to change software fuse limits in the metering device

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.1.6.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "execute": execute software fuse control
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		1	
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceAction/command		1	Command to be executed: "ChangeSoftwareFuseLimits"
phaseCurrentLimit		0..1	
phaseCurrentLimit/limit	xs:int	1	Current limit in Amperes for a single phase. Allowed values between 1-255.
phaseCurrentLimit/detectionTime	xs:int	0..1	Detection time in minutes. Allowed values between 2-510 in two minute intervals.
totalPowerLimit		0..1	
totalPowerLimit/limit	xs:int	1	Total power limit over all phases in Watts. Allowed values between 500-125000.
totalPowerLimit/detectionTime	xs:int	0..1	Detection time in seconds. Allowed values between 30-7650 in 30 seconds intervals.

3.1.6.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For	FATAL

	example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.6.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload returns software fuse limits on successful executions.
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
phaseCurrentLimit	xs:int	0..1	Current limit in Amperes for a single phase.
totalPowerLimit	xs:int	0..1	Total power limit over all phases in Watts.

Result codes

Code	Description	Error level

0.0	Ok	
2.30	The usage point does not have a suitable product configured	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.6.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.1.6.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
  <soap:Header />
  <soap:Body>
    <end:ExecuteSoftwareFuseControlRequest>
      <end:Header>
        <mes:Verb>execute</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Request>
      <end:Payload>
        <end:EndDeviceControl>
          <end1:EndDeviceAction>
            <end1:command>ChangeSoftwareFuseLimits</end1:command>
          </end1:EndDeviceAction>
          <end1:phaseCurrentLimit>
            <end1:limit>60</end1:limit>
            <end1:detectionTime>120</end1:detectionTime>
          </end1:phaseCurrentLimit>
          <end1:totalPowerLimit>
            <end1:limit>1000</end1:limit>
            <end1:detectionTime>60</end1:detectionTime>
          </end1:totalPowerLimit>
        </end:EndDeviceControl>
      </end:Payload>
    </end:ExecuteSoftwareFuseControlRequest>
  </soap:Body>
</soap:Envelope>
```

Response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplySoftwareFuseControlRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:UsagePoint>
          <met:mRID>12345678</met:mRID>
        </end:UsagePoint>
        <end:EndDevice>
          <end:mRID>987654321</end:mRID>
        </end:EndDevice>
        <end:phaseCurrentLimit>60</end:phaseCurrentLimit>
        <end:totalPowerLimit>1000</end:totalPowerLimit>
      </end:Payload>
    </end:ReplySoftwareFuseControlRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.1.7 ExecuteRelayControl

ExecuteRelayControl is used to control the loads attached to the relays on the device.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.1.7.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: “execute”: execute relay control
Header/Noun	xs:string	1	Static “EndDeviceControl”

Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		1	
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDeviceAction/command		1	Command to be executed: - "LoadOn": The load is turned on. - "LoadOff": The load is turned off.
./EndDeviceAction/duration	xs:int	0..1	The duration (seconds) the load is in the specified state. If not specified, the duration is infinite.
./EndDeviceAction/allowScheduleOverride	xs:boolean	1	True if existing relay schedule can override this at next scheduled change time.
./EndDeviceAction/startDateTime	xs:dateTime	0..1	Scheduled start time. The command will be executed on the device at the specified start time. If no start time is specified, command will be executed immediately.
Payload/EndDeviceFunction			
./name	xs:string	1	Load name, identifies the relay which should be controlled in the system.

3.1.7.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL

2.1	Usage point not found	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.7.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceControl	xs:string	1	
./EndDevice/mRID		1	Device identifier

Result codes

Code	Description	Error level
0.0	Ok	
2.9	Given load name is not configured for the device.	FATAL
2.30	The usage point does not have a suitable product configured.	FATAL
2.49	Load name not found	FATAL
2.50	Device linked to metering point is not mapped to load name.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL
5.4	The scheduled command couldn't be executed successfully within the specified time window	FATAL
6.1	The scheduled command was cancelled	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.7.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification – Linkware IEC 61968 Common v2 (draft).docx.

3.1.7.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
               xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message"
               xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
   <soap:Header />
   <soap:Body>
      <end:ExecuteRelayControlRequest>
         <end:Header>
            <mes:Verb>execute</mes:Verb>
            <mes:Noun>EndDeviceControl</mes:Noun>
            <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
            <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
            <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
            <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
         </end:Header>
         <end:Request>
            <mes:ID objectType="UsagePoint">12345678</mes:ID>
         </end:Request>
         <end:Payload>
            <end:EndDeviceControl>
               <end1:EndDeviceAction>
                  <end1:EndDevice>
                      <end1:mRID>987654321</end1:mRID>
                  </end1:EndDevice>
                  <end1:command>LoadOn</end1:command>
                  <end1:duration>120</end1:duration>
                  <end1:allowScheduleOverride>true</end1:allowScheduleOverride>
                  <end1:startDateTime>2015-01-02T12:30:00Z</end1:startDateTime>
               </end1:EndDeviceAction>
            </end:EndDeviceControl>
            <end:EndDeviceFuntion>
              <end:name>WaterHeater</end:name>
           </end:EndDeviceFunction>
         </end:Payload>
      </end:ExecuteRelayControlRequest>
   </soap:Body>
</soap:Envelope>
```

Asynchronous response:

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
```

```
  <soap:Header />
  <soap:Body>
    <end:ReplyRelayControlControlRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControl>
            <end1:EndDevice>
              <end1:mRID>987654321</end1:mRID>
            </end1:EndDevice>
        </end:EndDeviceControl>
      </end:Payload>
    </end:ReplyRelayControlRequest>
  </soap:Body>
</soap:Envelope>
```

3.1.8 ExecuteCommunicationRoleChange

ExecuteCommunicationRoleChange is used to set communication role to a device.

3.1.8.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "execute" : communication role
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		0..1	If payload is not specified, only status is requested from the device and no action is taken.
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDeviceAction/command	xs:string	1	Static: "ChangeCommunicationRole"

./CommunicationRole/mRID	xs:string	1	CommunicationRole possible values: - SlaveAutomatic - SlaveRouter - SlaveEndNode - MasterNoFallback - MasterWithFallback - P2P

3.1.8.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.8.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	

./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceControl		1	
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceAction		1	
./EndDeviceAction/command	xs:string	1	Static: "ChangeCommunicationRole"
./ConfiguredCommunicationRole/mRID	xs:string	0..1	Configured communication role to device
./ActualCommunicationRole/mRID	xs:string	0..1	Actual communication role in device

Result codes

Code	Description	Error level
0.0	Ok	
2.52	Communication role not supported for module type	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.8.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx Example messages

3.1.8.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soap:Header />
  <soap:Body>
    <end:ExecuteCommunicationRoleChangeRequest>
      <end:Header>
        <mes:Verb>execute</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
```

```
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Request>
      <end:Payload>
        <end:EndDeviceControl>
          <end1:EndDeviceAction>
            <end1:command>ChangeCommunicationRole</end1:command>
          </end1:EndDeviceAction>
          <end1:CommunicationRole>
            <com:mRID>Master</com:mRID>
          </end1:CommunicationRole>
        </end:EndDeviceControl>
      </end:Payload>
    </end:ExecuteCommunicationRoleChangeRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyCommunicationRoleChangeRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControl>
          <end1:EndDevice>
            <end1:mRID>987654321</end1:mRID>
          </end1:EndDevice>
          <end1:EndDeviceAction>
            <end1:command>ChangeCommunicationRole</end1:command>
          </end1:EndDeviceAction>
          <end1:ConfiguredCommunicationRole>
            <com:mRID>Master</com:mRID>
          </end1:ConfiguredCommunicationRole >
          <end1:ActualCommunicationRole>
            <com:mRID>Master</com:mRID>
          </end1:ActualCommunicationRole >
        </end:EndDeviceControl>
      </end:Payload>
    </end:ReplyCommunicationRoleChangeRequest>
```

```
  </soapenv:Body>
</soapenv:Envelope>
```

3.1.9 ExecuteHanControl

ExecuteHanControl is used to activate or deactivate HAN interface in device.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.1.9.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "execute": execute relay control
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Payload		1	
Payload/EndDeviceControl		1	
./EndDeviceAction		1	
./EndDeviceAction/command		1	Command to be executed: - "Activate": The HAN interface is activated - "Deactivate": The HAN interface is deactivated.

3.1.9.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For	FATAL

	example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.1.9.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceControl	xs:string	1	
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceAction			
./EndDeviceAction/command	xs:string	1	Status of the HAN interface: - "Activate": The HAN interface is activated - "Deactivate": The HAN interface is deactivated.

Result codes

Code	Description	Error level
0.0	Ok	
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.1.9.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification – Linkware IEC 61968 Common v2 (draft).docx.

3.1.9.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
               xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message"
               xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
   <soap:Header />
   <soap:Body>
      <end:ExecuteHanControlRequest>
         <end:Header>
            <mes:Verb>execute</mes:Verb>
            <mes:Noun>EndDeviceControl</mes:Noun>
            <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
            <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
            <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
            <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
         </end:Header>
         <end:Request>
            <mes:ID objectType="UsagePoint">12345678</mes:ID>
         </end:Request>
         <end:Payload>
            <end:EndDeviceControl>
               <end1:EndDeviceAction>
                  <end1:command>Activate</end1:command>
               </end1:EndDeviceAction>
            </end:EndDeviceControl>
         </end:Payload>
      </end: ExecuteHanControlRequest >
   </soap:Body>
</soap:Envelope>
```

Asynchronous response:

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
```

```
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
  <soap:Header />
  <soap:Body>
    <end:ReplyHanControlRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControl>
            <end1:EndDevice>
              <end1:mRID>987654321</end1:mRID>
            </end1:EndDevice>
           <end1:command>Activate</end1:command>
        </end:EndDeviceControl>
      </end:Payload>
    </end:ReplyHanControlRequest>
  </soap:Body>
</soap:Envelope>
```

3.2 Billing

3.2.1 GetEnergySeries

GetEnergySeries is used to retrieve energy series from the given time period. The requested energy series may be retrieved from the metering system and/or metering device depending on the request parameters.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.2.1.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"

Request/StartTime	xs:dateTime	1	Start of the energy series period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the energy series period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/Product		0..1	Product for which to retrieve the energy series. If product is not defined, then all readings are returned.
./mRID		1	Product identifier
Request/allowDeviceSource	xs:boolean	0..1	Can energy series be retrieved from the device when readings are not available in Meteringware. Defaults to true.

3.2.1.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification – Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.7	Product not found.	FATAL
2.13	Usage point not linked to a device.	FATAL
2.47	Incompatible product	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.2.1.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of energy series readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the reading value
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.
./ReadingQuality		0..1	
./ReadingQuality/category	xs:int	1	Quality of the reading value. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx. If ReadingQuality element is missing the value is Ok (0).

Result codes

Code	Description
0.0	Ok
2.1	Usage point not found
2.24	The product is not part of the usage point configuration
2.30	The usage point does not have a suitable product configured
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.2.1.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.2.1.5 Example messages

Retrieve energy series of the previous day for a single metering point.

Request:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soapenv:Header />
  <soapenv:Body>
    <met:GetEnergySeriesRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-01-05T00:00:00Z</mes:StartTime>
        <mes:EndTime>2015-02-05T00:00:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
        <mes:allowDeviceSource>true</mes:allowDeviceSource>
      </met:Request>
    </met:GetEnergySeriesRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Asynchronous response:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
```

```
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyEnergySeriesRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>123456789</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
              <met1:mRID>987654321</met1:mRID>
            </met1:EndDevice>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00Z</met1:timeStamp>
                <met1:value>1234.56</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.3.72.0" />
                <met1:ReadingQuality>
                  <met1:category>0</met1:category>
                </met1:ReadingQuality>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00Z</met1:timeStamp>
                <met1:value>4321</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.3.73.0" />
                <met1:ReadingQuality>
                  <met1:category>0</met1:category>
                </met1:ReadingQuality>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T01:00:00Z</met1:timeStamp>
                <met1:value>1235.90</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.3.72.0" />
                <met1:ReadingQuality>
                  <met1:category>0</met1:category>
                </met1:ReadingQuality>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T01:00:00Z</met1:timeStamp>
                <met1:value>4321.10</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.3.73.0" />
                <met1:ReadingQuality>
                  <met1:category>0</met1:category>
                </met1:ReadingQuality>
              </met1:Reading>
              <!-- ... other values removed from the example ... -->
```

```
            </met1:Readings>
          </met:MeterReading>
        </met:MeterReadings>
      </met:Payload>
    </met:ReplyEnergySeriesRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.2.2 GetMomentaryReadings

GetMomentaryReadings is used to retrieve momentary readings from the metering device. These may include indicating momentary values, latest average values or cumulative register values. See reading types paragraph below for details.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.2.2.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/ReadingTypes		0..1	
./ReadingType		0..n	Reading types to be retrieved. If reading types are not specified, following reading types are used: - 0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.72.0 - 0.0.0.1.19.1.12.0.0.0.0.0.0.0.0.3.72.0 - 0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.73.0 - 0.0.0.1.19.1.12.0.0.0.0.0.0.0.0.3.73.0
./ReadingType/@ref	xs:string	1..1	Meter reading type. Possible values are described in the table below.

3.2.2.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	

1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.12	Invalid reading type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.2.2.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1..1	
Payload/MeterReadings/MeterReading		0..n	List of energy series readings
./UsagePoint/mRID	xs:string	1..1	
./EndDevice/mRID	xs:string	1..1	
./Readings		0..1	
./Readings/Reading		0..n	

./timeStamp	xs:dateTime	1..1	Timestamp of the reading value
./value	xs:decimal	1..1	
./ReadingType/@ref	xs:string	1..1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.
./ReadingQuality		0..1	
./ReadingQuality/category	xs:int	1	Quality of the reading value. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx. If ReadingQuality element is missing the value is Ok (0).

Reading types

ReadingType	Description	Unit
0.0.0.1.1.1.12.0.0.0.0.0.0.0.3.72.0	Active positive (forward) register (A+).	kWh
0.0.0.1.19.1.12.0.0.0.0.0.0.0.3.72.0	Active negative (reverse) register (A-).	kWh
0.0.0.1.1.1.12.0.0.0.0.0.0.0.3.73.0	Reactive positive (forward) register (R+).	kVArh
0.0.0.1.19.1.12.0.0.0.0.0.0.0.3.73.0	Reactive negative (reverse) register (R-).	kVArh
0.0.0.1.1.1.12.0.0.0.0.1.0.0.3.72.0	Tariff register 1 (T1), A+.	kWh
0.0.0.1.1.1.12.0.0.0.0.2.0.0.3.72.0	Tariff register 2 (T2), A+.	kWh
0.0.0.1.1.1.12.0.0.0.0.3.0.0.3.72.0	Tariff register 3 (T3), A+.	kWh
0.0.0.1.1.1.12.0.0.0.0.4.0.0.3.72.0	Tariff register 4 (T4), A+.	kWh
0.0.0.6.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 momentary voltage.	V
0.0.0.6.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 momentary voltage.	V
0.0.0.6.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 momentary voltage.	V
0.0.0.6.0.1.4.0.0.0.0.0.0.0.128.0.5.0	Phase L1 momentary current.	A
0.0.0.6.0.1.4.0.0.0.0.0.0.0.64.0.5.0	Phase L2 momentary current.	A
0.0.0.6.0.1.4.0.0.0.0.0.0.0.32.0.5.0	Phase L3 momentary current.	A
0.0.0.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	Momentary earth fault current.	A
0.0.0.6.0.1.38.0.0.0.0.0.0.0.128.0.0.0	Momentary power factor L1	N/A
0.0.0.6.0.1.38.0.0.0.0.0.0.0.64.0.0.0	Momentary power factor L2	N/A
0.0.0.6.0.1.38.0.0.0.0.0.0.0.32.0.0.0	Momentary power factor L3	N/A
0.0.0.6.0.1.47.0.0.0.0.0.0.0.128.0.0.0	Momentary phase L1 THD%	%
0.0.0.6.0.1.47.0.0.0.0.0.0.0.64.0.0.0	Momentary phase L2 THD%	%
0.0.0.6.0.1.47.0.0.0.0.0.0.0.32.0.0.0	Momentary phase L3 THD%	%
0.0.0.1.15.1.12.0.0.0.0.0.0.0.3.73.0	Reactive energy Q1	kVArh
0.0.0.1.16.1.12.0.0.0.0.0.0.0.3.73.0	Reactive energy Q2	kVArh
0.0.0.1.17.1.12.0.0.0.0.0.0.0.3.73.0	Reactive energy Q3	kVArh

0.0.0.1.18.1.12.0.0.0.0.0.0.0.3.73.0	Reactive energy Q4	kVArh
0.0.0.6.0.1.37.0.0.0.0.0.0.0.224.0.61.0	Apparent total power L1+L2+L3	VA
0.0.0.6.0.1.37.0.0.0.0.0.0.0.128.3.38.0	Phase L1 active power	kW
0.0.0.6.0.1.37.0.0.0.0.0.0.0.64.3.38.0	Phase L2 active power	kW
0.0.0.6.0.1.37.0.0.0.0.0.0.0.32.3.38.0	Phase L3 active power	kW
0.0.0.6.0.1.37.0.0.0.0.0.0.0.128.3.63.0	Phase L1 reactive power	kVAr
0.0.0.6.0.1.37.0.0.0.0.0.0.0.64.3.63.0	Phase L2 reactive power	kVAr
0.0.0.6.0.1.37.0.0.0.0.0.0.0.32.3.63.0	Phase L3 reactive power	kVAr
0.0.0.6.1.1.37.0.0.0.0.0.0.0.224.3.38.0	A+ total power L1+L2+L3	kW
0.0.0.6.1.1.37.0.0.0.0.0.0.0.224.3.63.0	R+ total power L1+L2+L3	kVAr
0.0.0.6.19.1.37.0.0.0.0.0.0.0.224.3.38.0	A- total power L1+L2+L3	kW
0.0.0.6.19.1.37.0.0.0.0.0.0.0.224.3.63.0	R- total power L1+L2+L3	kVAr
0.0.0.6.0.1.15.0.0.0.0.0.0.0.0.33.0	Frequency	Hz
0.0.0.6.0.1.54.0.0.0.0.0.0.0.129.0.29.0	Voltage level L1-N	V
0.0.0.6.0.1.54.0.0.0.0.0.0.0.65.0.29.0	Voltage level L2-N	V
0.0.0.6.0.1.54.0.0.0.0.0.0.0.33.0.29.0	Voltage level L3-N	V
0.0.0.6.0.1.54.0.0.0.0.0.0.0.132.0.29.0	Voltage level L1-L2	V
0.0.0.6.0.1.54.0.0.0.0.0.0.0.66.0.29.0	Voltage level L2-L3	V
0.0.0.6.0.1.54.0.0.0.0.0.0.0.40.0.29.0	Voltage level L3-L1	V
0.0.0.1.0.7.58.0.0.0.0.0.0.0.0.42.0	Volume (Gas)	m^3
0.0.0.1.0.9.58.0.0.0.0.0.0.0.0.42.0	Volume (Potable water)	m^3
0.0.0.6.0.9.155.0.0.0.0.0.0.0.0.125.0	Flow (Potable water)	m^3/h
0.0.0.1.0.12.12.0.0.0.0.0.0.0.6.72.0	Thermal Energy E1 (heating)	Wh
0.0.0.1.0.12.58.0.0.0.0.0.0.0.0.42.0	Volume (heating)	m^3
0.0.0.6.1.12.46.0.0.0.0.0.0.0.0.23.0	Temperature in (heating)	°C
0.0.0.6.19.12.46.0.0.0.0.0.0.0.0.23.0	Temperature out (heating)	°C
0.0.0.4.0.12.46.0.0.0.0.0.0.0.0.23.0	Temperature delta (heating)	°C
0.0.0.6.0.12.155.0.0.0.0.0.0.0.0.125.0	Flow (heating)	m^3/h
0.0.0.1.0.13.12.0.0.0.0.0.0.0.6.72.0	Thermal Energy E1 (cooling)	Wh
0.0.0.1.0.13.58.0.0.0.0.0.0.0.0.42.0	Volume (cooling)	m^3
0.0.0.6.1.13.46.0.0.0.0.0.0.0.0.23.0	Temperature in (cooling)	°C
0.0.0.6.19.13.46.0.0.0.0.0.0.0.0.23.0	Temperature out (cooling)	°C
0.0.0.4.0.13.46.0.0.0.0.0.0.0.0.23.0	Temperature delta (cooling)	°C
0.0.0.6.0.13.155.0.0.0.0.0.0.0.0.125.0	Flow (cooling)	m^3/h
0.0.0.1.0.41.11.0.0.0.0.0.0.0.0.27.0	Operational time of the device	s
0.0.0.6.0.41.123.0.0.0.0.0.0.0.0.0.0	Device information	N/A

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.2.2.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.2.2.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
               xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message"
               xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
   <soap:Header />
   <soap:Body>
      <met:GetMomentaryReadingsRequest>
         <met:Header>
            <mes:Verb>get</mes:Verb>
            <mes:Noun>MeterReading</mes:Noun>
            <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
            <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
            <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
            <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
         </met:Header>
         <met:Request>
            <mes:ID objectType="UsagePoint">12345678</mes:ID>
            <mes:ReadingTypes>
               <mes:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.72.0" />
               <mes:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.73.0" />
            </mes:ReadingTypes>
         </met:Request>
      </met:GetMomentaryReadingsRequest>
   </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
```

```
    <met:ReplyEnergySeriesRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>12345678</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
              <met1:mRID>987654321</met1:mRID>
            </met1:EndDevice>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-01-02T12:14:30Z</met1:timeStamp>
                <met1:value>1234.56</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.72.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-02T12:14:30Z</met1:timeStamp>
                <met1:value>4321</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.73.0" />
              </met1:Reading>
            </met1:Readings>
          </met:MeterReading>
        </met:MeterReadings>
      </met:Payload>
    </met:ReplyEnergySeriesRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.2.3 GetBillingPeriod

GetBillingPeriod is used to retrieve billing period data from the given time period. The requested billing period may be retrieved from the metering system and/or metering device depending on the request parameters.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.2.3.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC

			61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/StartTime	xs:dateTime	1	Start of the billing period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the billing period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/Product		0..1	Product for which to retrieve the billing period. If product is not defined, then all billing period readings are returned.
./mRID		1	Product identifier
Request/allowDeviceSource	xs:boolean	0..1	Can billing period be retrieved from the device when readings are not available in Meteringware. Defaults to true.

3.2.3.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.7	Product not found.	FATAL
2.13	Usage point not linked to a device.	FATAL

2.47	Incompatible product	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.2.3.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of billing period readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the reading value
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.
./ReadingQuality		0..1	
./ReadingQuality/category	xs:int	1	Quality of the reading value. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx. If

			ReadingQuality element is missing the value is Ok (0).

Result codes

Code	Description
0.0	Ok
2.1	Usage point not found
2.24	The product is not part of the usage point configuration
2.30	The usage point does not have a suitable product configured
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.2.3.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.2.3.5 Example messages

Retrieve energy series of the previous day for a single metering point.

Request:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soapenv:Header />
  <soapenv:Body>
    <met:GetEnergySeriesRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-12T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-01-05T00:00:00Z</mes:StartTime>
        <mes:EndTime>2015-01-06T00:00:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
        <mes:allowDeviceSource>true</mes:allowDeviceSource>
      </met:Request>
    </met:GetEnergySeriesRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Asynchronous response:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyEnergySeriesRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-12T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>123456789</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
              <met1:mRID>987654321</met1:mRID>
            </met1:EndDevice>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00Z</met1:timeStamp>
                <met1:value>1234.56</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.72.0" />
                <met1:ReadingQuality>
                  <met1:category>0</met1:category>
                </met1:ReadingQuality>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00Z</met1:timeStamp>
                <met1:value>760.5</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.1.0.0.0.3.72.0" />
                <met1:ReadingQuality>
                  <met1:category>0</met1:category>
                </met1:ReadingQuality>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T01:00:00Z</met1:timeStamp>
                <met1:value>100.9</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.2.0.0.0.3.72.0" />
                <met1:ReadingQuality>
                  <met1:category>0</met1:category>
                </met1:ReadingQuality>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T01:00:00Z</met1:timeStamp>
                <met1:value>120.1</met1:value>
                <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.3.0.0.0.3.72.0" />
                <met1:ReadingQuality>
```

```
            <met1:category>0</met1:category>
          </met1:ReadingQuality>
        </met1:Reading>
        <met1:Reading>
          <met1:timeStamp>2015-01-05T01:00:00Z</met1:timeStamp>
          <met1:value>80.1</met1:value>
          <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.4.0.0.0.3.72.0" />
          <met1:ReadingQuality>
            <met1:category>0</met1:category>
          </met1:ReadingQuality>
        </met1:Reading>
        <met1:Reading>
          <met1:timeStamp>2015-01-06T00:00:00Z</met1:timeStamp>
          <met1:value>1254.58</met1:value>
          <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.0.0.0.0.3.72.0" />
          <met1:ReadingQuality>
            <met1:category>0</met1:category>
          </met1:ReadingQuality>
        </met1:Reading>
        <met1:Reading>
          <met1:timeStamp>2015-01-06T00:00:00Z</met1:timeStamp>
          <met1:value>780.52</met1:value>
          <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.1.0.0.0.3.72.0" />
          <met1:ReadingQuality>
            <met1:category>0</met1:category>
          </met1:ReadingQuality>
        </met1:Reading>
        <met1:Reading>
          <met1:timeStamp>2015-01-06T01:00:00Z</met1:timeStamp>
          <met1:value>100.9</met1:value>
          <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.2.0.0.0.3.72.0" />
          <met1:ReadingQuality>
            <met1:category>0</met1:category>
          </met1:ReadingQuality>
        </met1:Reading>
        <met1:Reading>
          <met1:timeStamp>2015-01-06T01:00:00Z</met1:timeStamp>
          <met1:value>120.1</met1:value>
          <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.3.0.0.0.3.72.0" />
          <met1:ReadingQuality>
            <met1:category>0</met1:category>
          </met1:ReadingQuality>
        </met1:Reading>
        <met1:Reading>
          <met1:timeStamp>2015-01-06T01:00:00Z</met1:timeStamp>
          <met1:value>80.1</met1:value>
          <met1:ReadingType ref="0.0.0.1.1.1.12.0.0.0.0.4.0.0.0.3.72.0" />
          <met1:ReadingQuality>
            <met1:category>0</met1:category>
          </met1:ReadingQuality>
        </met1:Reading>
      </met1:Readings>
    </met:MeterReading>
  </met:MeterReadings>
 </met:Payload>
</met:ReplyEnergySeriesRequest>
</soapenv:Body>
</soapenv:Envelope>
```

3.3 Events

3.3.1 GetEndDeviceEvent

GetEndDeviceEvents is used on-demand to retrieve current events from a device. The operation will return events from all available categories (see Interface Specification - Linkware IEC 61968 Event for event types and categories). Retrieving events from a device requires that the device has a product with profile "diagnostics" (for power grid monitoring events) or "substationmonitoring" (for substation monitoring events) configured. Also available categories may be restricted by the device model. Rest of the categories are omitted from the response message. Spontaneous events are only sent as outbound events and their statuses may not be retrieved in this operation.

3.3.1.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "get"
Header/Noun	xs:string	1	Static "EndDeviceEvent"
Request			The request element that contains the device identifiers.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/type	xs:string	0..1	Type of the events to be retrieved. Possible values: - powerGridMonitoring - substationMonitoring If type is not specified, powerGridMonitoring is used as default.

3.3.1.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL

1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.3.1.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceEvent"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceEvents		1	
Payload/EndDeviceEvents/EndDeviceEvent		1..n	List of configuration events
./createdDateTime	xs:dateTime	1	
./EndDeviceEventDetails		0..1	
./EndDeviceEventDetails/EndDeviceEventDetail		1..n	
./name	xs:string	1	
./value	xs:string	1	
./EndDeviceEventType		1	IEC specific event definition. See
./EndDeviceEventType/type	xs:string	1	Type of the device where event was created

./EndDeviceEventType/domain	xs:string	1	High-level nature of the event
./EndDeviceEventType/subdomain	xs:string	1	More specific nature of the event
./EndDeviceEventType/eventOrAction	xs:string	1	Specific event that occured
./MeterReadings		0..1	
./MeterReadings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the reading value
./value	xs:decimal	1	
./ReadingType		1	
./Reading/ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.
./UsagePoint		1	
./UsagePoint/mRID	xs:string	1	Metering point identifier (mRID)
./EndDevice		1	Device on which the event occurred
./EndDevice/mRID		1	Device identifier

Result codes

Code	Description	Error level
0.0	Ok	
2.30	The usage point does not have a suitable product configured	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device.	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.3.1.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.3.1.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
               xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceEventMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message">
```

```
   <soap:Header />
   <soap:Body>
      <end:GetEndDeviceEventRequest>
         <end:Header>
            <mes:Verb>get</mes:Verb>
            <mes:Noun>EndDeviceEvent</mes:Noun>
            <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
            <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
            <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
            <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
         </end:Header>
         <end:Request>
            <mes:ID>123456789</mes:ID>
         </end:Request>
      </end:GetEndDeviceEventRequest>
   </soap:Body>
</soap:Envelope>
```

Response

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceEventMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceEvent#"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:com="http://aidon.com/IEC/Management/v3/Common"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soap:Header />
  <soap:Body>
    <end:ReplyEndDeviceEventRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceEvent</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </end:Reply>
      <end:Payload>
        <end1:EndDeviceEvents>
          <end1:EndDeviceEvent>
            <end1:createdDateTime>2015-01-02T12:15:00Z</end1:createdDateTime>
            <end1:EndDeviceEventDetails>
              <end1:EndDeviceEventDetail>
                <end1:name>DetectionActive</end1:name>
                <end1:value>false</end1:value>
              </end1:EndDeviceEventDetail>
              <end1:EndDeviceEventDetail>
                <end1:name>RCDSwitchReason</end1:name>
                <end1:value>system</end1:value>
              </end1:EndDeviceEventDetail>
              <end1:EndDeviceEventDetail>
                <end1:name>RCDSwitchButtonEnabled</end1:name>
```

```
        <end1:value>true</end1:value>
      </end1:EndDeviceEventDetail>
    </end1:EndDeviceEventDetails>
    <end1:EndDeviceEventType>
      <end1:type>3</end1:type>
      <end1:domain>31</end1:domain>
      <end1:subdomain>17</end1:subdomain>
      <end1:eventOrAction>42</end1:eventOrAction>
    </end1:EndDeviceEventType>
    <end1:UsagePoint>
      <com:mRID>123456789</com:mRID>
    </end1:UsagePoint>
    <end1:EndDevice>
      <com:mRID>987654321</com:mRID>
    </end1:EndDevice>
  </end1:EndDeviceEvent>
  <end1:EndDeviceEvent>
    <end1:createdDateTime>2015-01-02T12:15:00Z</end1:createdDateTime>
    <end1:EndDeviceEventDetails>
      <end1:EndDeviceEventDetail>
        <end1:name>DetectionActive</end1:name>
        <end1:value>true</end1:value>
      </end1:EndDeviceEventDetail>
    </end1:EndDeviceEventDetails>
    <end1:EndDeviceEventType>
      <end1:type>3</end1:type>
      <end1:domain>26</end1:domain>
      <end1:subdomain>126</end1:subdomain>
      <end1:eventOrAction>216</end1:eventOrAction>
    </end1:EndDeviceEventType>
    <end1:UsagePoint>
      <com:mRID>123456789</com:mRID>
    </end1:UsagePoint>
    <end1:EndDevice>
      <com:mRID>987654321</com:mRID>
    </end1:EndDevice>
  </end1:EndDeviceEvent>
  <end1:EndDeviceEvent>
    <end1:createdDateTime>2015-01-02T12:15:00Z</end1:createdDateTime>
    <end1:EndDeviceEventDetails>
      <end1:EndDeviceEventDetail>
        <end1:name>DetectionActive</end1:name>
        <end1:value>true</end1:value>
      </end1:EndDeviceEventDetail>
    </end1:EndDeviceEventDetails>
    <end1:EndDeviceEventType>
      <end1:type>3</end1:type>
      <end1:domain>26</end1:domain>
      <end1:subdomain>134</end1:subdomain>
      <end1:eventOrAction>216</end1:eventOrAction>
    </end1:EndDeviceEventType>
    <end1:UsagePoint>
      <com:mRID>123456789</com:mRID>
    </end1:UsagePoint>
    <end1:EndDevice>
      <com:mRID>987654321</com:mRID>
    </end1:EndDevice>
  </end1:EndDeviceEvent>
  <end1:EndDeviceEvent>
```

```
            <end1:createdDateTime>2015-01-02T12:15:00Z</end1:createdDateTime>
            <end1:EndDeviceEventDetails>
              <end1:EndDeviceEventDetail>
                <end1:name>DetectionActive</end1:name>
                <end1:value>true</end1:value>
              </end1:EndDeviceEventDetail>
            </end1:EndDeviceEventDetails>
            <end1:EndDeviceEventType>
              <end1:type>3</end1:type>
              <end1:domain>26</end1:domain>
              <end1:subdomain>135</end1:subdomain>
              <end1:eventOrAction>216</end1:eventOrAction>
            </end1:EndDeviceEventType>
            <end1:UsagePoint>
              <com:mRID>123456789</com:mRID>
            </end1:UsagePoint>
            <end1:EndDevice>
              <com:mRID>987654321</com:mRID>
            </end1:EndDevice>
          </end1:EndDeviceEvent>
          <!-- .. other event types dropped from the example -->
        </end1:EndDeviceEvents>
      </end:Payload>
    </end:ReplyEndDeviceEventRequest>
  </soap:Body>
</soap:Envelope>
```

3.3.2 GetEndDeviceEventHistory

GetEndDeviceEventHistory is used to retrieve device event history for a Gateware metering point either from the system or the device.

3.3.2.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static “get”
Header/Noun	xs:string	1	Static “EndDeviceEvent”
Request			The request element that contains the device identifiers.
Request/StartTime	xs:dateTime	1	Start of the event period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the event period. Maximum time between start and end times may be one month. Start and end times are included in the retrieved time period.

Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/type	xs:string	0..1	Type of the events to be retrieved. Possible values: - powerGridMonitoring - substationMonitoring If type is not specified, powerGridMonitoring is used as default.
Request/allowDeviceSource	xs:boolean	0..1	Will events be retrieved from the device. Otherwise retrieved only from the system. Defaults to false.

3.3.2.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.3.2.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.

Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceEvent"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceEvents		1	
Payload/EndDeviceEvents/EndDeviceEvent		1..n	List of configuration events
./createdDateTime	xs:dateTime	1	
./EndDeviceEventDetails		0..1	Additional event information. See Interface Specification - Linkware IEC 61968 Event (draft).docx for possible event details.
./EndDeviceEventDetails/EndDeviceEventDetail		0..n	
./name			
./value			
./EndDeviceEventType		1	IEC specific event definition. See Interface Specification - Linkware IEC 61968 Event (draft).docx for possible event types.
./EndDeviceEventType/type		1	Type of the device where event was created
./EndDeviceEventType/domain		1	High-level nature of the event
./EndDeviceEventType/subdomain		1	More specific nature of the event
./EndDeviceEventType/eventOrAction		1	Specific event that occured
./MeterReadings		0..1	
./MeterReadings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the reading value
./value	xs:decimal	1	
./ReadingType		1	

./Reading/ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.
./UsagePoint		1	
./UsagePoint/mRID		1	
./EndDevice		1	Device on which the event occurred
./EndDevice/mRID		1	Device identifier

Result codes

Code	Description	Error level
0.0	Ok	
2.30	The usage point does not have a suitable product configured	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.3.2.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.3.2.5 Examples

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceEventMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <end:GetEndDeviceEventHistoryRequest>
      <end:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>EndDeviceEvent</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:StartTime>2015-01-05T00:00:00Z</mes:StartTime>
        <mes:EndTime>2015-02-05T00:00:00Z</mes:EndTime>
        <mes:ID>123456789</mes:ID>
      </end:Request>
    </end:GetEndDeviceEventHistoryRequest>
```

```
  </soap:Body>
</soap:Envelope>
```

Response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceEventMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceEvent#"
xmlns:met="http://iec.ch/TC57/2007/MeterReading#"
xmlns:com="http://aidon.com/IEC/Management/v3/Common">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyEndDeviceEventHistoryRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceEvent</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </end:Reply>
      <end:Payload>
        <end1:EndDeviceEvents>
          <end1:EndDeviceEvent>
            <end1:createdDateTime>2015-01-05T12:15:00Z</end1:createdDateTime>
            <end1:EndDeviceEventDetails>
              <end1:EndDeviceEventDetail>
                <end1:name>DetectionActive</end1:name>
                <end1:value>false</end1:value>
              </end1:EndDeviceEventDetail>
              <end1:EndDeviceEventDetail>
                <end1:name>RCDSwitchReason</end1:name>
                <end1:value>system</end1:value>
              </end1:EndDeviceEventDetail>
              <end1:EndDeviceEventDetail>
                <end1:name>RCDSwitchButtonEnabled</end1:name>
                <end1:value>true</end1:value>
              </end1:EndDeviceEventDetail>
            </end1:EndDeviceEventDetails>
            <end1:EndDeviceEventType>
              <end1:type>3</end1:type>
              <end1:domain>26</end1:domain>
              <end1:subdomain>132</end1:subdomain>
              <end1:eventOrAction>150</end1:eventOrAction>
            </end1:EndDeviceEventType>
            <end1:UsagePoint>
              <com:mRID>123456789</com:mRID>
            </end1:UsagePoint>
            <end1:EndDevice>
              <com:mRID>987654321</com:mRID>
             </end1:EndDevice>
           </end1:EndDeviceEvent>
           <end1:EndDeviceEvent>
             <end1:createdDateTime>2015-01-05T16:25:14Z</end1:createdDateTime>
```

```
    <end1:EndDeviceEventDetails>
      <end1:EndDeviceEventDetail>
        <end1:name>DetectionActive</end1:name>
        <end1:value>true</end1:value>
      </end1:EndDeviceEventDetail>
    </end1:EndDeviceEventDetails>
    <end1:EndDeviceEventType>
      <end1:type>3</end1:type>
      <end1:domain>26</end1:domain>
      <end1:subdomain>132</end1:subdomain>
      <end1:eventOrAction>292</end1:eventOrAction>
    </end1:EndDeviceEventType>
    <end1:UsagePoint>
      <com:mRID>123456789</com:mRID>
    </end1:UsagePoint>
    <end1:EndDevice>
      <com:mRID>987654321</com:mRID>
   </end1:EndDevice>
  </end1:EndDeviceEvent>
  <end1:EndDeviceEvent>
    <end1:createdDateTime>2015-01-05T17:54:01Z</end1:createdDateTime>
    <end1:EndDeviceEventDetails>
      <end1:EndDeviceEventDetail>
        <end1:name>DetectionActive</end1:name>
        <end1:value>true</end1:value>
      </end1:EndDeviceEventDetail>
    </end1:EndDeviceEventDetails>
    <end1:EndDeviceEventType>
      <end1:type>3</end1:type>
      <end1:domain>26</end1:domain>
      <end1:subdomain>133</end1:subdomain>
      <end1:eventOrAction>93</end1:eventOrAction>
    </end1:EndDeviceEventType>
    <end1:UsagePoint>
      <com:mRID>123456789</com:mRID>
    </end1:UsagePoint>
    <end1:EndDevice>
      <com:mRID>987654321</com:mRID>
   </end1:EndDevice>
  </end1:EndDeviceEvent>
  <end1:EndDeviceEvent>
    <end1:createdDateTime>2015-01-05T20:00:06Z</end1:createdDateTime>
    <end1:EndDeviceEventDetails>
      <end1:EndDeviceEventDetail>
        <end1:name>DetectionActive</end1:name>
        <end1:value>true</end1:value>
      </end1:EndDeviceEventDetail>
    </end1:EndDeviceEventDetails>
    <end1:EndDeviceEventType>
      <end1:type>3</end1:type>
      <end1:domain>26</end1:domain>
      <end1:subdomain>133</end1:subdomain>
      <end1:eventOrAction>293</end1:eventOrAction>
    </end1:EndDeviceEventType>
    <end1:UsagePoint>
      <com:mRID>123456789</com:mRID>
    </end1:UsagePoint>
    <end1:EndDevice>
      <com:mRID>987654321</com:mRID>
```

```
            </end1:EndDevice>
          </end1:EndDeviceEvent>
        </end1:EndDeviceEvents>
      </end:Payload>
    </end:ReplyEndDeviceEventHistoryRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.4 Scheduled jobs

3.4.1 GetScheduledEndDeviceControl

Operation is used to retrieve scheduled end device control jobs from the system

3.4.1.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve scheduled end device control jobs
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/StartTime	xs:dateTime	0..1	Retrieve jobs which have allowed start time and possible execution time later than specified start time. If the start time is unspecified, the current time is used as default.
Request/EndTime	xs:dateTime	0..1	Retrieve jobs which have expiration time and possible execution time before the specified end time.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint

3.4.1.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level

0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.4.1.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/EndDeviceControls		1	
Payload/EndDeviceControls/EndDeviceControl		0..n	
./mRID		1	Identifier of the scheduled job
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceAction		1	
./EndDeviceAction/command		1	Scheduled command

./EndDeviceAction/startDateTime		0..1	Execution time for the jobs that have already been executed successfully.
./scheduledInterval		0..1	
./scheduledInterval/start	xs:dateTime	1	
./scheduledInterval/end	xs:dateTime	0..1	

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.4.1.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.4.1.5 Example messages

Request

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soapenv:Header />
  <soapenv:Body>
    <end:GetScheduledEndDeviceControlRequest>
      <end:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2016-04-13T16:01:20Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>

<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:StartTime>2016-04-14T00:00:00Z</mes:StartTime>
        <mes:EndTime>2016-04-14T23:59:59Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Request>
    </end:GetScheduledEndDeviceControlRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyScheduledEndDeviceControlRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2016-04-13T16:01:28Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FF</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControls>
          <end1:EndDeviceControl>
            <end1:mRID>10011</end1:mRID>
            <end1:EndDevice>
              <end1:mRID>987654321</end1:mRID>
            </end1:EndDevice>
            <end1:EndDeviceAction>
              <end1:command>Disconnect</end1:command>
            </end1:EndDeviceAction>
            <end1:scheduledInterval>
              <end1:start>2016-04-14T10:00:00Z</end1:start>
              <end1:end>2016-04-14T11:00:00Z</end1:end>
            </end1:scheduledInterval>
          </end1:EndDeviceControl>
        </end:EndDeviceControls>
      </end:Payload>
    </end:ReplyScheduledEndDeviceControlRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.4.2 DeleteScheduledEndDeviceControl

Operation is used to cancel scheduled end device control jobs from the system

3.4.2.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: “delete”: cancel scheduled end device control job

Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - EndDeviceControl

3.4.2.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.4.2.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested identifier (mRID)
Payload		0..1	Payload is included on successful executions.

Payload/EndDeviceControls		1	
Payload/EndDeviceControls/EndDeviceControl		1	
./mRID		1	Identifier of the scheduled job
./UsagePoint/mRID	xs:string	1	Metering point identifier

Result codes

Code	Description	Error level
0.0	Ok	
2.39	Scheduled job not found	FATAL
2.40	Scheduled job cannot be cancelled, because it is already executed or currently being executed.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.4.2.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.4.2.5 Example messages

Request

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soapenv:Header />
  <soapenv:Body>
    <end:DeleteScheduledEndDeviceControlRequest>
      <end:Header>
        <mes:Verb>delete</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2016-04-13T16:04:02Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E5FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B966E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="EndDeviceControl">10011</mes:ID>
      </end:Request>
    </end:DeleteScheduledEndDeviceControlRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyScheduledEndDeviceControlDeletedRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2016-04-13T16:04:12Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E5FF</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B966E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="EndDeviceControl">10011</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControls>
          <end1:EndDeviceControl>
            <end1:mRID>10011</end1:mRID>
            <end1:UsagePoint>
              <end1:mRID>987654321</end1:mRID>
            </end1:UsagePoint>
          </end1:EndDeviceControl>
        </end:EndDeviceControls>
      </end:Payload>
    </end:ReplyScheduledEndDeviceControlDeletedRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5 Diagnostics and statistics

3.5.1 GetEndDeviceCommunicationStatus

Operation sends a ping request to the device to check the current communication status of the device.

3.5.1.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: “get”: retrieve metering point information
Header/Noun	xs:string	1	Static “ComFunction”
Request/ID	xs:string	1..10000	List of identifiers (mRID)

Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/count	xs:int	0..1	Number of ping requests. Allowed values 1-10. Default "1" used if unspecified.

3.5.1.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.1.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "ComFunction"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	

./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/ComFunctions		1..1	
Payload/ComFunctions/ComFunction		1..n	
./EndDevice/mRID	xs:string	1	
./timeStamp	xs:dateTime	1	Timestamp when the communication status was observed
./Readings/Reading		1..n	Round-trip time for each ping request
./value	xs:decimal	1	Round-trip time in milliseconds
./ReadingType/@ref	xs:string	1	Static value "0.0.0.0.0.3.9003.0.0.0.0.0.0.0.0.0.-3.27.0". See more detailed descrition in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.5.1.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx. Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
               xmlns:end="http://aidon.com/IEC/AdHoc/v3/ComFunctionMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <end:GetEndDeviceCommunicationStatusRequest>
      <end:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>ComFunction</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
```

```
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
        <mes:count>2</mes:count>
      </end:Request>
    </end:GetEndDeviceCommunicationStatusRequest>
  </soap:Body>
</soap:Envelope>
```

Response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:com="http://aidon.com/IEC/AdHoc/v3/ComFunctionMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:com1="http://iec.ch/TC57/2007/ComFunction#"
xmlns:end="http://iec.ch/TC57/2007/EndDevice#"
xmlns:met="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <com:ReplyEndDeviceCommunicationStatusRequest>
      <com:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>ComFunction</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </com:Header>
      <com:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </com:Reply>
      <com:Payload>
        <com:ComFunctions xmlns:com1="http://iec.ch/TC57/2007/ComFunction#">
          <com:ComFunction>
            <com1:EndDevice>
              <end2:mRID
xmlns:end2="http://iec.ch/TC57/2007/EndDevice#">100000012</end2:mRID>
            </com1:EndDevice>
            <com1:timeStamp>2015-01-02T12:01:12Z</com1:timeStamp>
            <com1:Readings>
              <com1:Reading>
                <met:value>8230</met:value>
                <met:ReadingType ref="0.0.0.0.0.3.9003.0.0.0.0.0.0.0.0.-3.27.0"
/>
              </com1:Reading>
              <com1:Reading>
                <met:value>13020</met:value>
                <met:ReadingType ref="0.0.0.0.0.3.9003.0.0.0.0.0.0.0.0.-3.27.0"
/>
              </com1:Reading>
            </com1:Readings>
          </com:ComFunction>
        </com:ComFunctions>
      </com:Payload>
    </com:ReplyEndDeviceCommunicationStatusRequest>
  </soapenv:Body>
```

```
</soapenv:Envelope>
```

3.5.2 GetDipAndSwellLog

GetDipAndSwellLog is used to retrieve dip and swell occurences from the metering device. Dips and swells are stored in the rolling device log and therefore if the logs are not read regularly the log might roll over and older logs on the device might be lost. Therefore it cannot be guaranteed that all the logs from the timeframe requested will be returned.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.2.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/StartTime	xs:dateTime	1	Start of the log period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the log period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint

3.5.2.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL

2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.2.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of dip and/or swell readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the reading value
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in the table below.
./length	xs:int	1	Length of the dip or swell event in milliseconds

Reading types

ReadingType	Description	Unit
0.0.0.6.0.1.41.0.0.0.0.0.0.128.0.29.0	Phase L1 dip	V
0.0.0.6.0.1.41.0.0.0.0.0.0.64.0.29.0	Phase L2 dip	V
0.0.0.6.0.1.41.0.0.0.0.0.0.32.0.29.0	Phase L3 dip	V
0.0.0.6.0.1.42.0.0.0.0.0.0.128.0.29.0	Phase L1 swell	V
0.0.0.6.0.1.42.0.0.0.0.0.0.64.0.29.0	Phase L2 swell	V
0.0.0.6.0.1.42.0.0.0.0.0.0.32.0.29.0	Phase L3 swell	V

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.5.2.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.2.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
               xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <met:GetDipAndSwellLogRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-01-01T12:00:00Z</mes:StartTime>
        <mes:EndTime>2015-01-02T12:00:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Request>
    </met:GetDipAndSwellLogRequest>
```

```
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyDipAndSwellLogRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>123456789</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
              <met1:mRID>987654321</met1:mRID>
            </met1:EndDevice>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-01-02T09:30:00Z</met1:timeStamp>
                <met1:value>275.1</met1:value>
                <met1:ReadingType ref="0.0.0.6.0.1.41.0.0.0.0.0.0.0.128.0.29.0"
/>
                <met1:length>1500</met1:length>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-02T09:43:10Z</met1:timeStamp>
                <met1:value>278.1</met1:value>
                <met1:ReadingType ref="0.0.0.6.0.1.41.0.0.0.0.0.0.0.128.0.29.0"
/>
                <met1:length>1000</met1:length>
              </met1:Reading>
            </met1:Readings>
          </met:MeterReading>
        </met:MeterReadings>
      </met:Payload>
    </met:ReplyDipAndSwellLogRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.3 GetPowerOutageLog

GetPowerOutageLog is used to retrieve power outage logs from the metering device.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.3.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "PowerOutage"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/StartTime	xs:dateTime	1	Start of the period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/type	xs:string	1	Possible values: - "Long": retrieve long outages - "Short": retrieve short outages - "Phase": retrieve phase outages Distinction between long and short outages is done in the product configuration.
Request/allowDeviceSource	xs:boolean	0..1	Can power outage log be retrieved from the device when readings are not available in Meteringware. Defaults to true.

3.5.3.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.3.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "PowerOutage"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/PowerOutages		1	
Payload/PowerOutages/PowerOutage		0..n	List of power outages
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./startTime	xs:dateTime	1	
./endTime	xs:dateTime	0..1	

./outageType	xs:string	1	Possible values: - Total - Total 90 Percent - Phase Rule 1 - Phase Rule 2 Description of values: - Total: total power outage - Total 90 Percent: all phases 90% U_N - Phase Rule 1: phase outage defined by configurable rule 1 - Phase Rule 2: phase outage defined by configurable rule 2
./phase	xs:string	1	Possible values: - All - Phase 1 - Phase 2 - Phase 3

Result codes

Code	Description	Error level
0.0	Ok	
2.30	The usage point does not have a suitable product configured	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.5.3.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.3.5 Example messages

Request

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:pow="http://aidon.com/IEC/AdHoc/v3/PowerOutageMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soapenv:Header />
  <soapenv:Body>
    <pow:GetPowerOutageLogRequest>
      <pow:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>PowerOutage</mes:Noun>
```

```
        <mes:Timestamp>2015-10-21T11:40:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>AAAAAAA123-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </pow:Header>
      <pow:Request>
        <mes:StartTime>2015-09-29T00:00:00Z</mes:StartTime>
        <mes:EndTime>2015-10-01T23:59:59Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
        <mes:type>Long</mes:type>
        <mes:allowDeviceSource>true</mes:allowDeviceSource>
      </pow:Request>
    </pow:GetPowerOutageLogRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:pow="http://aidon.com/IEC/AdHoc/v3/PowerOutageMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:pow1="http://iec.ch/TC57/2007/PowerOutage#"
xmlns:met="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <pow:ReplyPowerOutageLogRequest>
      <pow:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-10-01T11:40:20Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </pow:Header>
      <pow:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </pow:Reply>
      <pow:Payload>
        <pow1:PowerOutages>
          <pow1:PowerOutage>
            <pow1:UsagePoint>
              <met:mRID>12345678</met:mRID>
            </pow1:UsagePoint>
            <pow1:EndDevice>
              <pow1:mRID>987654321</pow1:mRID>
            </pow1:EndDevice>
            <pow1:startTime>2015-09-30T10:55:27Z</pow1:startTime>
            <pow1:endTime>2015-09-30T11:00:27Z</pow1:endTime>
            <pow1:outageType>Total</pow1:outageType>
            <pow1:phase>None</pow1:phase>
          </pow1:PowerOutage>
          <pow1:PowerOutage>
            <pow1:UsagePoint>
              <met:mRID>12345678</met:mRID>
            </pow1:UsagePoint>
            <pow1:startTime>2015-09-30T12:21:01Z</pow1:startTime>
```

```
            <pow1:outageType>Total</pow1:outageType>
            <pow1:phase>None</pow1:phase>
          </pow1:PowerOutage>
        </pow1:PowerOutages>
      </pow:Payload>
    </pow:ReplyPowerOutageLogRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.4 GetEarthFaultStatistics

GetEarthFaultStatistics is used to retrieve analysis data of earth fault voltage statistics from the metering device. The data is pushed from the device to the system and retrieving earth faults only returns data that is already in the system.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.4.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/StartTime	xs:dateTime	1	Start of the period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint

3.5.4.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	

1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.12	Invalid reading type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.4.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	

./timeStamp	xs:dateTime	1	Timestamp of the beginning of the period
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types

ReadingType	Description	Unit
0.8.4.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	Daily maximum earth fault current	A
0.2.1.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	10 minute average earth fault current	A
0.2.2.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	15 minute average earth fault current	A
0.2.5.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	30 minute average earth fault current	A
0.2.7.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	60 minute average earth fault current	A
0.8.1.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	Maximum earth fault current on 10 minute period	A
0.8.2.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	Maximum earth fault current on 15 minute period	A
0.8.5.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	Maximum earth fault current on 30 minute period	A
0.8.7.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0	Maximum earth fault current on 60 minute period	A

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

3.5.4.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.4.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <met:GetEarthFaultStatisticsRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-10T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-01-05T00:00:00Z</mes:StartTime>
        <mes:EndTime>2015-01-09T00:00:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Request>
    </met:GetEarthFaultStatisticsRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyEarthFaultStatisticsRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-10-01T11:01:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FF</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>123456789</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
              <met1:mRID>987654321</met1:mRID>
            </met1:EndDevice>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00+01:00</met1:timeStamp>
                <met1:value>2.4</met1:value>
```

```
            <met1:ReadingType ref="0.8.4.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0" />
          </met1:Reading>
          <met1:Reading>
            <met1:timeStamp>2015-01-06T00:00:00+01:00</met1:timeStamp>
            <met1:value>1.4</met1:value>
            <met1:ReadingType ref="0.8.4.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0" />
          </met1:Reading>
          <met1:Reading>
            <met1:timeStamp>2015-01-07T00:00:00+01:00</met1:timeStamp>
            <met1:value>0.8</met1:value>
            <met1:ReadingType ref="0.8.4.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0" />
          </met1:Reading>
          <met1:Reading>
            <met1:timeStamp>2015-01-08T00:00:00+01:00</met1:timeStamp>
            <met1:value>1.1</met1:value>
            <met1:ReadingType ref="0.8.4.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0" />
          </met1:Reading>
          <met1:Reading>
            <met1:timeStamp>2015-01-09T00:00:00+01:00</met1:timeStamp>
            <met1:value>2.2</met1:value>
            <met1:ReadingType ref="0.8.4.6.0.1.4.0.0.0.0.0.0.0.17.0.5.0" />
          </met1:Reading>
        </met1:Readings>
      </met:MeterReading>
    </met:MeterReadings>
  </met:Payload>
</met:ReplyEarthFaultStatisticsRequest>
</soapenv:Body>
</soapenv:Envelope>
```

3.5.5 GetVoltageHitTableStatistics

GetVoltageHitTableStatistics is used to retrieve analysis data of voltage statistics from the metering device. The data is pushed from the device to the system and retrieving earth faults only returns data that is already in the system.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.5.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: “get”: retrieve metering point information
Header/Noun	xs:string	1	Static “MeterReading”
Request/StartTime	xs:dateTime	1	Start of the period. Start time is included in the retrieved time period.

Request/EndTime	xs:dateTime	1	End of the period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint

3.5.5.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.12	Invalid reading type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.5.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL

Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the beginning of the period
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types

ReadingType	Description	Unit
9011.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	1 min peak active demand on 1h period	kW
9012.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	1 min peak active demand on 2h period	kW
9013.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	1 min peak active demand on 3h period	kW
9014.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	1 min peak active demand on 4h period	kW
0.26.7.9.0.1.9003.0.0.0.0.0.0.0.128.0.111.0	Phase L1 samples over 115%	pcs
0.26.7.9.0.1.9004.0.0.0.0.0.0.0.128.0.111.0	Phase L1 samples 110-115%	pcs
0.26.7.9.0.1.9005.0.0.0.0.0.0.0.128.0.111.0	Phase L1 samples 105-110%	pcs
0.26.7.9.0.1.9006.0.0.0.0.0.0.0.128.0.111.0	Phase L1 samples Un-105%	pcs
0.26.7.9.0.1.9007.0.0.0.0.0.0.0.128.0.111.0	Phase L1 samples 95%-Un	pcs

0.26.7.9.0.1.9008.0.0.0.0.0.0.128.0.111.0	Phase L1 samples 90-95%	pcs
0.26.7.9.0.1.9009.0.0.0.0.0.0.128.0.111.0	Phase L1 samples 85-90%	pcs
0.26.7.9.0.1.9010.0.0.0.0.0.0.128.0.111.0	Phase L1 samples phase missing limit - 85%	pcs
0.2.7.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 voltage over period (1h)	V
0.2.79.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 voltage over period (2h)	V
0.2.83.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 voltage over period (3h)	V
0.2.80.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 voltage over period (4h)	V
9011.9001.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 minimum 1 minute average voltage on 1h period	V
9012.9001.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 minimum 1 minute average voltage on 2h period	V
9013.9001.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 minimum 1 minute average voltage on 3h period	V
9014.9001.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 minimum 1 minute average voltage on 4h period	V
9011.9002.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 maximum 1 minute average voltage on 1h period	V
9012.9002.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 maximum 1 minute average voltage on 2h period	V
9013.9002.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 maximum 1 minute average voltage on 3h period	V
9014.9002.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 maximum 1 minute average voltage on 4h period	V
0.26.7.9.0.1.9003.0.0.0.0.0.0.64.0.111.0	Phase L2 samples over 115%	pcs
0.26.7.9.0.1.9004.0.0.0.0.0.0.64.0.111.0	Phase L2 samples 110-115%	pcs
0.26.7.9.0.1.9005.0.0.0.0.0.0.64.0.111.0	Phase L2 samples 105-110%	pcs
0.26.7.9.0.1.9006.0.0.0.0.0.0.64.0.111.0	Phase L2 samples Un-105%	pcs
0.26.7.9.0.1.9007.0.0.0.0.0.0.64.0.111.0	Phase L2 samples 95%-Un	pcs
0.26.7.9.0.1.9008.0.0.0.0.0.0.64.0.111.0	Phase L2 samples 90-95%	pcs
0.26.7.9.0.1.9009.0.0.0.0.0.0.64.0.111.0	Phase L2 samples 85-90%	pcs
0.26.7.9.0.1.9010.0.0.0.0.0.0.64.0.111.0	Phase L2 samples phase missing limit - 85%	pcs
0.2.7.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 voltage over period (1h)	V
0.2.79.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 voltage over period (2h)	V
0.2.83.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 voltage over period (3h)	V
0.2.80.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 voltage over period (4h)	V
9011.9001.3.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 minimum 1 minute average voltage on 1h period	V
9012.9001.3.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 minimum 1 minute average voltage on 2h period	V
9013.9001.3.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 minimum 1 minute average voltage on 3h period	V
9014.9001.3.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 minimum 1 minute average voltage on 4h period	V
9011.9002.3.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 maximum 1 minute average voltage on 1h period	V

9012.9002.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 maximum 1 minute average voltage on 2h period	V
9013.9002.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 maximum 1 minute average voltage on 3h period	V
9014.9002.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 maximum 1 minute average voltage on 4h period	V
0.26.7.9.0.1.9003.0.0.0.0.0.0.0.32.0.111.0	Phase L3 samples over 115%	pcs
0.26.7.9.0.1.9004.0.0.0.0.0.0.0.32.0.111.0	Phase L3 samples 110-115%	pcs
0.26.7.9.0.1.9005.0.0.0.0.0.0.0.32.0.111.0	Phase L3 samples 105-110%	pcs
0.26.7.9.0.1.9006.0.0.0.0.0.0.0.32.0.111.0	Phase L3 samples Un-105%	pcs
0.26.7.9.0.1.9007.0.0.0.0.0.0.0.32.0.111.0	Phase L3 samples 95%-Un	pcs
0.26.7.9.0.1.9008.0.0.0.0.0.0.0.32.0.111.0	Phase L3 samples 90-95%	pcs
0.26.7.9.0.1.9009.0.0.0.0.0.0.0.32.0.111.0	Phase L3 samples 85-90%	pcs
0.26.7.9.0.1.9010.0.0.0.0.0.0.0.32.0.111.0	Phase L3 samples phase missing limit - 85%	pcs
0.2.7.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 voltage over period (1h)	V
0.2.79.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 voltage over period (2h)	V
0.2.83.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 voltage over period (3h)	V
0.2.80.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 voltage over period (4h)	V
9011.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 minimum 1 minute average voltage on 1h period	V
9012.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 minimum 1 minute average voltage on 2h period	V
9013.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 minimum 1 minute average voltage on 3h period	V
9014.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 minimum 1 minute average voltage on 4h period	V
9011.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 maximum 1 minute average voltage on 1h period	V
9012.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 maximum 1 minute average voltage on 2h period	V
9013.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 maximum 1 minute average voltage on 3h period	V
9014.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 maximum 1 minute average voltage on 4h period	V
9012.9002.3.9.1.1.4.0.0.0.0.0.0.0.224.3.38.0	One minute maximum active demand total on 2h period	kW
9013.9002.3.9.1.1.4.0.0.0.0.0.0.0.224.3.38.0	One minute maximum active demand total on 3h period	kW
9014.9002.3.9.1.1.4.0.0.0.0.0.0.0.224.3.38.0	One minute maximum active demand total on 4h period	kW

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

3.5.5.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.5.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <met:GetVoltageHitTableStatisticsRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-01-05T00:00:00Z</mes:StartTime>
        <mes:EndTime>2015-01-06T00:00:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Request>
    </met:GetVoltageHitTableStatisticsRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyVoltageHitTableStatisticsRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-10-01T11:40:20Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>12345678</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
              <met1:mRID>987654321</met1:mRID>
```

```
            </met1:EndDevice>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00+02:00</met1:timeStamp>
                <met1:value>2335.0</met1:value>
                <met1:ReadingType
ref="9011.9002.3.9.1.1.8.0.0.0.0.0.0.224.3.38.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00+02:00</met1:timeStamp>
                <met1:value>0</met1:value>
                <met1:ReadingType
ref="0.26.7.9.0.1.9003.0.0.0.0.0.0.128.0.111.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00+02:00</met1:timeStamp>
                <met1:value>0</met1:value>
                <met1:ReadingType
ref="0.26.7.9.0.1.9004.0.0.0.0.0.0.128.0.111.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00+02:00</met1:timeStamp>
                <met1:value>10</met1:value>
                <met1:ReadingType
ref="0.26.7.9.0.1.9005.0.0.0.0.0.0.128.0.111.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00+02:00</met1:timeStamp>
                <met1:value>27</met1:value>
                <met1:ReadingType
ref="0.26.7.9.0.1.9006.0.0.0.0.0.0.128.0.111.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00+02:00</met1:timeStamp>
                <met1:value>23</met1:value>
                <met1:ReadingType
ref="0.26.7.9.0.1.9007.0.0.0.0.0.0.128.0.111.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-01-05T00:00:00+02:00</met1:timeStamp>
                <met1:value>0</met1:value>
                <met1:ReadingType
ref="0.26.7.9.0.1.9008.0.0.0.0.0.0.128.0.111.0" />
              </met1:Reading>
              <!-- Other values removed from the example -->
            </met1:Readings>
          </met:MeterReading>
        </met:MeterReadings>
      </met:Payload>
    </met:ReplyVoltageHitTableStatisticsRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.6 GetVoltageStatistics

GetVoltageStatistics is used to retrieve analysis data of voltages from the metering device for a short analysis periods (10min, 15min, 30min or 60min).

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.6.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/StartTime	xs:dateTime	1	Start of the period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/period	xs:string	1	Possible values: - 10min - 15min - 30min - 60min

3.5.6.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL

2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.12	Invalid reading type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.6.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the beginning of the period
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification -

			Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types

ReadingType	Description	Unit
0.2.1.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0	10 minute average active demand (total)	kW
0.2.1.0.1.1.8.0.0.0.0.0.0.0.224.3.63.0	10 minute average reactive (inductive) demand (total)	kVAr
0.2.1.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 10 minute average voltage	V
0.2.1.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 10 minute average voltage	V
0.2.1.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 10 minute average voltage	V
0.2.2.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0	15 minute average active demand (total)	kW
0.2.2.0.1.1.8.0.0.0.0.0.0.0.224.3.63.0	15 minute average reactive (inductive) demand (total)	kVAr
0.2.2.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 15 minute average voltage	V
0.2.2.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 15 minute average voltage	V
0.2.2.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 15 minute average voltage	V
0.2.5.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0	30 minute average active demand (total)	kW
0.2.5.0.1.1.8.0.0.0.0.0.0.0.224.3.63.0	30 minute average reactive (inductive) demand (total)	kVAr
0.2.5.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 30 minute average voltage	V
0.2.5.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 30 minute average voltage	V
0.2.5.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 30 minute average voltage	V
0.2.7.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0	60 minute average active demand (total)	kW
0.2.7.0.1.1.8.0.0.0.0.0.0.0.224.3.63.0	60 minute average reactive (inductive) demand (total)	kVAr
0.2.7.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 60 minute average voltage	V
0.2.7.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 60 minute average voltage	V
0.2.7.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 60 minute average voltage	V
9015.9001.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 minimum 1 minute average voltage on 10min period	V
9015.9001.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 minimum 1 minute average voltage on 10min period	V
9015.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 minimum 1 minute average voltage on 10min period	V

9015.9002.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 maximum 1 minute average voltage on 10min period	V
9015.9002.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 maximum 1 minute average voltage on 10min period	V
9015.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 maximum 1 minute average voltage on 10min period	V
9016.9001.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 minimum 1 minute average voltage on 15min period	V
9016.9001.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 minimum 1 minute average voltage on 15min period	V
9016.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 minimum 1 minute average voltage on 15min period	V
9016.9002.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 maximum 1 minute average voltage on 15min period	V
9016.9002.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 maximum 1 minute average voltage on 15min period	V
9016.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 maximum 1 minute average voltage on 15min period	V
9017.9001.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 minimum 1 minute average voltage on 30min period	V
9017.9001.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 minimum 1 minute average voltage on 30min period	V
9017.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 minimum 1 minute average voltage on 30min period	V
9017.9002.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 maximum 1 minute average voltage on 30min period	V
9017.9002.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 maximum 1 minute average voltage on 30min period	V
9017.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 maximum 1 minute average voltage on 30min period	V
9011.9001.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 minimum 1 minute average voltage on 1h period	V
9011.9001.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 minimum 1 minute average voltage on 1h period	V
9011.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 minimum 1 minute average voltage on 1h period	V
9011.9002.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0	Phase L1 maximum 1 minute average voltage on 1h period	V
9011.9002.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0	Phase L2 maximum 1 minute average voltage on 1h period	V
9011.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0	Phase L3 maximum 1 minute average voltage on 1h period	V

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

3.5.6.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.6.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <met:GetVoltageStatisticsRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-10-01T11:00:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-10-01T08:00:00Z</mes:StartTime>
        <mes:EndTime>2015-10-01T10:00:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
        <mes:period>15min</mes:period>
      </met:Request>
    </met:GetVoltageStatisticsRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyVoltageStatisticsRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-10-01T11:01:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FF</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>123456789</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
```

```
            <met1:mRID>987654321</met1:mRID>
          </met1:EndDevice>
          <met1:Readings>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
              <met1:value>231.6</met1:value>
              <met1:ReadingType ref="0.2.2.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0"
/>
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
              <met1:value>232.3</met1:value>
              <met1:ReadingType ref="0.2.2.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0"
/>
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
              <met1:value>232.2</met1:value>
              <met1:ReadingType ref="0.2.2.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0"
/>
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:03:00+02:00</met1:timeStamp>
              <met1:value>231.1</met1:value>
              <met1:ReadingType
ref="9016.9001.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0" />
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:04:00+02:00</met1:timeStamp>
              <met1:value>230.8</met1:value>
              <met1:ReadingType
ref="9016.9001.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0" />
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:02:00+02:00</met1:timeStamp>
              <met1:value>230.2</met1:value>
              <met1:ReadingType
ref="9016.9001.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0" />
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:07:00+02:00</met1:timeStamp>
              <met1:value>232.6</met1:value>
              <met1:ReadingType
ref="9016.9002.3.9.0.1.54.0.0.0.0.0.0.0.128.0.29.0" />
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:06:00+02:00</met1:timeStamp>
              <met1:value>235.1</met1:value>
              <met1:ReadingType
ref="9016.9002.3.9.0.1.54.0.0.0.0.0.0.0.64.0.29.0" />
            </met1:Reading>
            <met1:Reading>
              <met1:timeStamp>2015-10-01T08:07:00+02:00</met1:timeStamp>
              <met1:value>233.6</met1:value>
              <met1:ReadingType
ref="9016.9002.3.9.0.1.54.0.0.0.0.0.0.0.32.0.29.0" />
            </met1:Reading>
            <!-- Removed readings for other 15 minute periods. -->
          </met1:Readings>
```

```
          </met:MeterReading>
        </met:MeterReadings>
      </met:Payload>
    </met:ReplyVoltageStatisticsRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.7 GetVoltageRecord

GetVoltageRecord is used to retrieve smallest available samples of voltage diagnostics data. Supported sampling period is one minute.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.7.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/StartTime	xs:dateTime	1	Start of the period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint

3.5.7.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For	FATAL

	example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.12	Invalid reading type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.7.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the beginning of the period

./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types

ReadingType	Description	Unit
0.0.3.1.1.1.8.0.0.0.0.0.0.224.3.38.0	1 minute active demand (total)	kW
0.0.3.1.1.1.8.0.0.0.0.0.0.224.3.63.0	1 minute reactive (inductive) demand (total)	kVAr
0.2.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 1 minute average voltage	V
0.2.3.9.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 1 minute average voltage	V
0.2.3.9.0.1.54.0.0.0.0.0.0.32.0.29.0	Phase L3 1 minute average voltage	V
0.9.3.12.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 voltage sample min	V
0.9.3.12.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 voltage sample min	V
0.9.3.12.0.1.54.0.0.0.0.0.0.32.0.29.0	Phase L3 voltage sample min	V
0.8.3.12.0.1.54.0.0.0.0.0.0.128.0.29.0	Phase L1 voltage sample max	V
0.8.3.12.0.1.54.0.0.0.0.0.0.64.0.29.0	Phase L2 voltage sample max	V
0.8.3.12.0.1.54.0.0.0.0.0.0.32.0.29.0	Phase L3 voltage sample max	V

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

3.5.7.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.7.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <met:GetVoltageRecordRequest>
```

```
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-10-01T11:00:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-10-01T08:00:00Z</mes:StartTime>
        <mes:EndTime>2015-10-01T10:00:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Request>
    </met:GetVoltageRecordRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyVoltageRecordRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-10-01T11:01:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FF</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>123456789</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
              <met1:mRID>987654321</met1:mRID>
            </met1:EndDevice>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>1820.0</met1:value>
                <met1:ReadingType ref="0.0.3.1.1.1.8.0.0.0.0.0.0.0.224.3.38.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>80.5</met1:value>
```

```
                <met1:ReadingType ref="0.0.3.1.1.1.8.0.0.0.0.0.0.224.3.63.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>231.2</met1:value>
                <met1:ReadingType ref="0.2.3.9.0.1.54.0.0.0.0.0.0.128.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>230.8</met1:value>
                <met1:ReadingType ref="0.2.3.9.0.1.54.0.0.0.0.0.0.64.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>231.5</met1:value>
                <met1:ReadingType ref="0.2.3.9.0.1.54.0.0.0.0.0.0.32.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>230.7</met1:value>
                <met1:ReadingType ref="0.9.3.12.0.1.54.0.0.0.0.0.0.128.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>230.3</met1:value>
                <met1:ReadingType ref="0.9.3.12.0.1.54.0.0.0.0.0.0.64.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>231.2</met1:value>
                <met1:ReadingType ref="0.9.3.12.0.1.54.0.0.0.0.0.0.32.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>231.6</met1:value>
                <met1:ReadingType ref="0.8.3.12.0.1.54.0.0.0.0.0.0.128.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>231.0</met1:value>
                <met1:ReadingType ref="0.8.3.12.0.1.54.0.0.0.0.0.0.64.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>231.9</met1:value>
                <met1:ReadingType ref="0.8.3.12.0.1.54.0.0.0.0.0.0.32.0.29.0"
/>
              </met1:Reading>
            </met1:Readings>
          </met:MeterReading>
```

```
        </met:MeterReadings>
      </met:Payload>
    </met:ReplyVoltageRecordRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.8 GetHarmonicsAndFrequencyStatistics

GetHarmonicsAndFrequencyStatistics is used to retrieve analysis data of harmonics and frequency from the metering device for a short analysis period (10min).

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.8.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/StartTime	xs:dateTime	1	Start of the period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/period	xs:string	1	Analysis period length to be retrieved. Possible values: - 10min - 24h Daily (24h) statistics is only available if the device is configured to export statistics to the system and this operation returns the data existing in the system. 10 min period is retrieved from the device.

3.5.8.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.12	Invalid reading type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.8.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.

Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the beginning of the period
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types

ReadingType	Description	Period	Unit
0.2.1.9.0.1.47.0.0.0.0.0.0.128.0.0.0	Phase L1 10 minute average THD%	10 min	%
0.2.1.9.0.1.47.0.0.0.0.0.0.64.0.0.0	Phase L2 10 minute average THD%	10 min	%
0.2.1.9.0.1.47.0.0.0.0.0.0.32.0.0.0	Phase L3 10 minute average THD%	10 min	%
0.2.1.9.0.1.47.3.1.0.0.0.0.128.0.29.0	Phase L1 3. harmonics 10 minutes voltage average	10 min	V
0.2.1.9.0.1.47.5.1.0.0.0.0.128.0.29.0	Phase L1 5. harmonics 10 minutes voltage average	10 min	V
0.2.1.9.0.1.47.7.1.0.0.0.0.128.0.29.0	Phase L1 7. harmonics 10 minutes voltage average	10 min	V
0.2.1.9.0.1.47.3.1.0.0.0.0.64.0.29.0	Phase L2 3. harmonics 10 minutes voltage average	10 min	V
0.2.1.9.0.1.47.5.1.0.0.0.0.64.0.29.0	Phase L2 5. harmonics 10 minutes voltage average	10 min	V
0.2.1.9.0.1.47.7.1.0.0.0.0.64.0.29.0	Phase L2 7. harmonics 10 minutes voltage average	10 min	V
0.2.1.9.0.1.47.3.1.0.0.0.0.32.0.29.0	Phase L3 3. harmonics 10 minutes voltage average	10 min	V
0.2.1.9.0.1.47.5.1.0.0.0.0.32.0.29.0	Phase L3 5. harmonics 10 minutes voltage average	10 min	V

0.2.1.9.0.1.47.7.1.0.0.0.0.0.32.0.29.0	Phase L3 7. harmonics 10 minutes voltage average	10 min	V
0.2.1.9.0.1.15.0.0.0.0.0.0.0.0.33.0	10 minute frequency average	10 min	Hz
0.2.4.9.0.1.47.0.0.0.0.0.0.0.128.0.0.0	Phase L1 average THD%	24 h	%
11.9.54.9.0.1.47.0.0.0.0.0.0.0.128.0.0.0	Phase L1 minimum 10 minute average THD%	24 h	%
11.8.54.9.0.1.47.0.0.0.0.0.0.0.128.0.0.0	Phase L1 maximum 10 minute average THD%	24 h	%
11.9.54.9.0.1.47.3.1.0.0.0.0.0.128.0.29.0	Phase L1 minimum 3. harmonics 10 minutes voltage average	24 h	V
11.9.54.9.0.1.47.5.1.0.0.0.0.0.128.0.29.0	Phase L1 minimum 5. harmonics 10 minutes voltage average	24 h	V
11.9.54.9.0.1.47.7.1.0.0.0.0.0.128.0.29.0	Phase L1 minimum 7. harmonics 10 minutes voltage average	24 h	V
11.8.54.9.0.1.47.3.1.0.0.0.0.0.128.0.29.0	Phase L1 maximum 3. harmonics 10 minutes voltage average	24 h	V
11.8.54.9.0.1.47.5.1.0.0.0.0.0.128.0.29.0	Phase L1 maximum 5. harmonics 10 minutes voltage average	24 h	V
11.8.54.9.0.1.47.7.1.0.0.0.0.0.128.0.29.0	Phase L1 maximum 7. harmonics 10 minutes voltage average	24 h	V
0.2.4.9.0.1.47.0.0.0.0.0.0.0.64.0.0.0	Phase L2 average THD%	24 h	%
11.9.54.9.0.1.47.0.0.0.0.0.0.0.64.0.0.0	Phase L2 minimum 10 minute average THD%	24 h	%
11.8.54.9.0.1.47.0.0.0.0.0.0.0.64.0.0.0	Phase L2 maximum 10 minute average THD%	24 h	%
11.9.54.9.0.1.47.3.1.0.0.0.0.0.64.0.29.0	Phase L2 minimum 3. harmonics 10 minutes voltage average	24 h	V
11.9.54.9.0.1.47.5.1.0.0.0.0.0.64.0.29.0	Phase L2 minimum 5. harmonics 10 minutes voltage average	24 h	V
11.9.54.9.0.1.47.7.1.0.0.0.0.0.64.0.29.0	Phase L2 minimum 7. harmonics 10 minutes voltage average	24 h	V
11.8.54.9.0.1.47.3.1.0.0.0.0.0.64.0.29.0	Phase L2 maximum 3. harmonics 10 minutes voltage average	24 h	V
11.8.54.9.0.1.47.5.1.0.0.0.0.0.64.0.29.0	Phase L2 maximum 5. harmonics 10 minutes voltage average	24 h	V
11.8.54.9.0.1.47.7.1.0.0.0.0.0.64.0.29.0	Phase L2 maximum 7. harmonics 10 minutes voltage average	24 h	V
0.2.4.9.0.1.47.0.0.0.0.0.0.0.32.0.0.0	Phase L3 average THD%	24 h	%
11.9.54.9.0.1.47.0.0.0.0.0.0.0.32.0.0.0	Phase L3 minimum 10 minute average THD%	24 h	%
11.8.54.9.0.1.47.0.0.0.0.0.0.0.32.0.0.0	Phase L3 maximum 10 minute average THD%	24 h	%
11.9.54.9.0.1.47.3.1.0.0.0.0.0.32.0.29.0	Phase L3 minimum 3. harmonics 10 minutes voltage average	24 h	V
11.9.54.9.0.1.47.5.1.0.0.0.0.0.32.0.29.0	Phase L3 minimum 5. harmonics 10 minutes voltage average	24 h	V
11.9.54.9.0.1.47.7.1.0.0.0.0.0.32.0.29.0	Phase L3 minimum 7. harmonics 10 minutes voltage average	24 h	V
11.8.54.9.0.1.47.3.1.0.0.0.0.0.32.0.29.0	Phase L3 maximum 3. harmonics 10 minutes voltage average	24 h	V
11.8.54.9.0.1.47.5.1.0.0.0.0.0.32.0.29.0	Phase L3 maximum 5. harmonics 10 minutes voltage average	24 h	V

11.8.54.9.0.1.47.7.1.0.0.0.0.0.32.0.29.0	Phase L3 maximum 7. harmonics 10 minutes voltage average	24 h	V
11.9.54.9.0.1.47.0.0.0.0.0.0.0.128.0.33.0	Minimum 10 minute frequency average	24 h	Hz
11.8.54.9.0.1.47.0.0.0.0.0.0.0.128.0.33.0	Maximum 10 minute frequency average	24 h	Hz

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the Interface Specification - Linkware IEC 61968 Common v2 (draft).docx document.

3.5.8.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.8.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <met:GetHarmonicsAndFrequencyStatisticsRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-10-01T11:00:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>

<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-10-01T08:00:00Z</mes:StartTime>
        <mes:EndTime>2015-10-01T08:10:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
        <mes:period>10min</mes:period>
      </met:Request>
    </met:GetHarmonicsAndFrequencyStatisticsRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyHarmonicsAndFrequencyStatisticsRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
```

```
        <mes:Timestamp>2015-10-01T11:01:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FF</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>123456789</met1:mRID>
            </met1:UsagePoint>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>1.2</met1:value>
                <met1:ReadingType ref="0.2.1.9.0.1.47.0.0.0.0.0.0.0.128.0.0.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>2.3</met1:value>
                <met1:ReadingType ref="0.2.1.9.0.1.47.0.0.0.0.0.0.0.64.0.0.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>2.2</met1:value>
                <met1:ReadingType ref="0.2.1.9.0.1.47.0.0.0.0.0.0.0.32.0.0.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>2.1</met1:value>
                <met1:ReadingType ref="0.2.1.9.0.1.47.3.1.0.0.0.0.0.128.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>1.1</met1:value>
                <met1:ReadingType ref="0.2.1.9.0.1.47.5.1.0.0.0.0.0.128.0.29.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>3.1</met1:value>
                <met1:ReadingType ref="0.2.1.9.0.1.47.7.1.0.0.0.0.0.128.0.29.0"
/>
              </met1:Reading>
              <!-- Other values removed from the example -->
            </met1:Readings>
          </met:MeterReading>
        </met:MeterReadings>
      </met:Payload>
    </met:ReplyHarmonicsAndFrequencyStatisticsRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.9 GetCurrentStatistics

GetCurrentStatistics is used to retrieve analysis data of voltages from the metering device for a short analysis periods (10min, 15min, 30min or 60min).

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.9.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/StartTime	xs:dateTime	1	Start of the period. Start time is included in the retrieved time period.
Request/EndTime	xs:dateTime	1	End of the period. Maximum time between start and end times may be one month. End time is included in the retrieved time period.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/period	xs:string	1	Possible values: - 10min - 15min - 30min - 60min

3.5.9.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For	FATAL

	example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.12	Invalid reading type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.9.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the beginning of the period

./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types

ReadingType	Description	Unit
0.2.1.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0	10 minute average active demand (total)	kW
0.2.2.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0	15 minute average active demand (total)	kW
0.2.5.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0	30 minute average active demand (total)	kW
0.2.7.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0	60 minute average active demand (total)	kW
9015.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	Maximum 1 minute average active demand (total) on 10 min period	kW
9016.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	Maximum 1 minute average active demand (total) on 15 min period	kW
9017.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	Maximum 1 minute average active demand (total) on 30 min period	kW
9011.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	Maximum 1 minute average active demand (total) on 60 min period	kW
9015.9001.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	Minimum 1 minute average active demand (total) on 10 min period	kW
9016.9001.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	Minimum 1 minute average active demand (total) on 15 min period	kW
9017.9001.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	Minimum 1 minute average active demand (total) on 30 min period	kW
9011.9001.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0	Minimum 1 minute average active demand (total) on 60 min period	kW
9015.9001.3.9.0.1.4.0.0.0.0.0.0.0.128.0.5.0	Phase L1 minimum 1 minute average current on 10 min period	A
9016.9001.3.9.0.1.4.0.0.0.0.0.0.0.128.0.5.0	Phase L1 minimum 1 minute average current on 15 min period	A
9017.9001.3.9.0.1.4.0.0.0.0.0.0.0.128.0.5.0	Phase L1 minimum 1 minute average current on 30 min period	A
9011.9001.3.9.0.1.4.0.0.0.0.0.0.0.128.0.5.0	Phase L1 minimum 1 minute average current on 60 min period	A

9015.9001.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 minimum 1 minute average current on 10 min period	A
9016.9001.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 minimum 1 minute average current on 15 min period	A
9017.9001.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 minimum 1 minute average current on 30 min period	A
9011.9001.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 minimum 1 minute average current on 60 min period	A
9015.9001.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 minimum 1 minute average current on 10 min period	A
9016.9001.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 minimum 1 minute average current on 15 min period	A
9017.9001.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 minimum 1 minute average current on 30 min period	A
9011.9001.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 minimum 1 minute average current on 60 min period	A
9015.9002.3.9.0.1.4.0.0.0.0.0.0.128.0.5.0	Phase L1 maximum 1 minute average current on 10 min period	A
9016.9002.3.9.0.1.4.0.0.0.0.0.0.128.0.5.0	Phase L1 maximum 1 minute average current on 15 min period	A
9017.9002.3.9.0.1.4.0.0.0.0.0.0.128.0.5.0	Phase L1 maximum 1 minute average current on 30 min period	A
9011.9002.3.9.0.1.4.0.0.0.0.0.0.128.0.5.0	Phase L1 maximum 1 minute average current on 60 min period	A
9015.9002.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 maximum 1 minute average current on 10 min period	A
9016.9002.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 maximum 1 minute average current on 15 min period	A
9017.9002.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 maximum 1 minute average current on 30 min period	A
9011.9002.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 maximum 1 minute average current on 60 min period	A
9015.9002.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 maximum 1 minute average current on 10 min period	A
9016.9002.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 maximum 1 minute average current on 15 min period	A
9017.9002.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 maximum 1 minute average current on 30 min period	A
9011.9002.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 maximum 1 minute average current on 60 min period	A
0.2.3.9.0.1.4.0.0.0.0.0.0.128.0.5.0	Phase L1 1 minute average current (when maximum active demand)	A
0.2.3.9.0.1.4.0.0.0.0.0.0.64.0.5.0	Phase L2 1 minute average current (when maximum active demand)	A
0.2.3.9.0.1.4.0.0.0.0.0.0.32.0.5.0	Phase L3 1 minute average current (when maximum active demand)	A

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

3.5.9.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.9.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <met:GetCurrentStatisticsRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-10-01T11:00:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:StartTime>2015-10-01T08:00:00Z</mes:StartTime>
        <mes:EndTime>2015-10-01T08:10:00Z</mes:EndTime>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
        <mes:period>10min</mes:period>
      </met:Request>
    </met:GetCurrentStatisticsRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyCurrentStatisticsRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-10-01T11:01:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FF</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
```

```
      </met:Reply>
      <met:Payload>
        <met:MeterReadings>
          <met:MeterReading>
            <met1:UsagePoint>
              <met1:mRID>123456789</met1:mRID>
            </met1:UsagePoint>
            <met1:EndDevice>
              <met1:mRID>987654321</met1:mRID>
            </met1:EndDevice>
            <met1:Readings>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>1250.0</met1:value>
                <met1:ReadingType ref="0.2.1.0.1.1.8.0.0.0.0.0.0.0.224.3.38.0"
/>
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>1375.0</met1:value>
                <met1:ReadingType
ref="9015.9002.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>987.0</met1:value>
                <met1:ReadingType
ref="9015.9001.3.9.1.1.8.0.0.0.0.0.0.0.224.3.38.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>8.2</met1:value>
                <met1:ReadingType
ref="9015.9001.3.9.0.1.4.0.0.0.0.0.0.0.128.0.5.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>3.1</met1:value>
                <met1:ReadingType
ref="9015.9001.3.9.0.1.4.0.0.0.0.0.0.0.64.0.5.0" />
              </met1:Reading>
              <met1:Reading>
                <met1:timeStamp>2015-10-01T08:00:00+02:00</met1:timeStamp>
                <met1:value>3.6</met1:value>
                <met1:ReadingType
ref="9015.9001.3.9.0.1.4.0.0.0.0.0.0.0.32.0.5.0" />
              </met1:Reading>
              <!-- Other values removed from the example -->
            </met1:Readings>
          </met:MeterReading>
        </met:MeterReadings>
      </met:Payload>
    </met:ReplyCurrentStatisticsRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.10 GetEndDeviceTopology

GetEndDeviceTopology is used to retrieve a last known network topology for a metering point or a device. The topology is updated to the system through route change messages and the topology and quality attributes on last route change are returned from the system.

3.5.10.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "ComFunction"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint - EndDevice
Request/topologyType	xs:string	1	Possible values: - Path - MasterTopology Path option retrieves communication path to master from the given device. MasterTopology returns the whole communication topology of a master of the given device.

3.5.10.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL

2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.2	Device not found	FATAL
2.11	Invalid object type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.10.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "ComFunction"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/ComFunctions		1	
Payload/ComFunctions/ComFunction		1..n	
./EndDevice/mRID	xs:string	1	
./EndDevice/configuredUsageKind	xs:string	0..1	Configured usage kind to device. Possible values: - master - slave
./EndDevice/usageKind	xs:string	0..1	Actual usage kind in device. Possible values: - master - slave
./UsagePoint/mRID	xs:string	0..1	Metering point identifier (mRID) if the device is linked to a metering point

./amrRouter	xs:string	0..1	Parent device identifier (mRID)
./technology	xs:string	1	Possible values: - cellular - ethernet - rfMesh
./timeStamp	xs:dateTime	1	Timestamp when the topology status was observed
./lastCommunicationTimestamp	xs:dateTime	0..1	Timestamp when the device was last seen communicating with the system.
./Readings/Reading		0..n	List of quality attributes for slave devices
./value	xs:string	1	Value of the quality attribute
./ReadingType/@ref	xs:string	1	Reading type for the quality attribute. See possible values in the table below.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types

ReadingType	Description	Unit
0.0.0.12.0.3.9018.0.0.0.0.0.0.0.-1.113.0	Transmission power with the current cluster head	dBm
0.0.0.12.0.3.9019.0.0.0.0.0.0.0.0.114.0	Route cost	None
0.0.0.12.0.3.9028.0.0.0.0.0.0.0.0.0.0	Communication channel with the current cluster head	None
0.0.0.12.0.3.9030.0.0.0.0.0.0.0.0.0.0	Antenna type (internal or external)	None

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

3.5.10.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.10.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceTopologyMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message">
```

```
  <soap:Header />
  <soap:Body>
    <end:GetEndDeviceTopologyRequest>
      <end:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>ComFunction</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00+01:00</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">123456789</mes:ID>
        <mes:topologyType>Path</mes:topologyType>
      </end:Request>
    </end:GetEndDeviceTopologyRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceTopologyMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:com="http://aidon.com/IEC/Management/v3/Common"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceEvent#"
xmlns:met="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyEndDeviceTopologyRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>ComFunction</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00+01:00</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
      </end:Reply>
      <end:Payload>
        <com1:ComFunctions xmlns:com1="http://iec.ch/TC57/2007/ComFunction#">
          <com1:ComFunction>
            <com1:EndDevice>
              <end2:mRID
xmlns:end2="http://iec.ch/TC57/2007/EndDevice#">100000012</end2:mRID>
              <end2:usageKind
xmlns:end2="http://iec.ch/TC57/2007/EndDevice#">master</end2:usageKind>
            </com1:EndDevice>
            <com1:UsagePoint>
              <met:mRID>123456700</met:mRID>
            </com1:UsagePoint>
            <com1:technology>cellular</com1:technology>
            <com1:timeStamp>2015-01-02T12:01:12+01:00</com1:timeStamp>
            <com1:lastCommunicationTimestamp>2015-01-
02T12:01:12+01:00</com1:lastCommunicationTimestamp>
```

```
          </com1:ComFunction>
          <com1:ComFunction>
            <com1:EndDevice>
              <end2:mRID
xmlns:end2="http://iec.ch/TC57/2007/EndDevice#">100000011</end2:mRID>
              <end2:usageKind
xmlns:end2="http://iec.ch/TC57/2007/EndDevice#">slave</end2:usageKind>
            </com1:EndDevice>
            <com1:UsagePoint>
              <met:mRID>123456780</met:mRID>
            </com1:UsagePoint>
            <com1:technology>rfMesh</com1:technology>
            <com1:timeStamp>2015-01-02T12:02:31+01:00</com1:timeStamp>
            <com1:lastCommunicationTimestamp>2015-01-
02T12:04:22+01:00</com1:lastCommunicationTimestamp>
            <com1:Readings>
              <!-- Transmission power, dBm -->
              <com1:Reading>
                <met:value>92</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9018.0.0.0.0.0.0.0.0.-
1.113.0" />
              </com1:Reading>
              <!-- Route cost -->
              <com1:Reading>
                <met:value>58</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9019.0.0.0.0.0.0.0.0.0.114.0"
/>
              </com1:Reading>
              <!-- RF channel -->
              <com1:Reading>
                <met:value>8</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9028.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com1:Reading>
              <!-- Antenna type -->
              <com1:Reading>
                <met:value>internal</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9030.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com1:Reading>
            </com1:Readings>
          </com1:ComFunction>
          <com1:ComFunction>
            <com1:EndDevice>
              <end2:mRID
xmlns:end2="http://iec.ch/TC57/2007/EndDevice#">100000011</end2:mRID>
              <end2:usageKind
xmlns:end2="http://iec.ch/TC57/2007/EndDevice#">slave</end2:usageKind>
            </com1:EndDevice>
            <com1:UsagePoint>
              <met:mRID>123456789</met:mRID>
            </com1:UsagePoint>
            <com1:technology>rfMesh</com1:technology>
            <com1:timeStamp>2015-01-02T12:02:31+01:00</com1:timeStamp>
            <com1:lastCommunicationTimestamp>2015-01-
02T12:12:56+01:00</com1:lastCommunicationTimestamp>
            <com1:Readings>
              <!-- Transmission power, dBm -->
              <com1:Reading>
```

```
                <met:value>90</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9018.0.0.0.0.0.0.0.0.-
1.113.0" />
              </com1:Reading>
              <!-- Route cost -->
              <com1:Reading>
                <met:value>44</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9019.0.0.0.0.0.0.0.0.0.114.0"
/>
              </com1:Reading>
              <!-- RF channel -->
              <com1:Reading>
                <met:value>13</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9028.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com1:Reading>
              <!-- Antenna type -->
              <com1:Reading>
                <met:value>internal</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9030.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com1:Reading>
            </com1:Readings>
          </com1:ComFunction>
        </com1:ComFunctions>
      </end:Payload>
    </end:ReplyEndDeviceTopologyRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.11 GetEndDeviceNANDiagnostics

GetEndDeviceNANDiagnostics is used to retrieve NAN diagnostics from a device or the system. The system gathers statistical NAN diagnostics data usually once per day and they may be queried from the system. In addition it is possible to retrieve diagnostics data from a device for the current day or the previous day. Retrieving NAN diagnostics from a device may be long-lasting operation and it isn't encouraged to retrieve multiple days from the device. The NAN diagnostical statistics are calculated from the beginning of the given day.

3.5.11.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "ComFunction"
Request/StartTime	xs:dateTime	0..1	Start of the period. Start time is included in the retrieved time period. Both start and end

			of the period must be specified, or optionally current NAN diagnostics is retrieved from the device when both are unspecified.
Request/EndTime	xs:dateTime	0..1	End of the period. Maximum time between start and end times may be one month. End time is included in the retrieved time period. Both start and end of the period must be specified, or optionally current NAN diagnostics is retrieved from the device when both are unspecified.
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint - EndDevice Note that NAN diagnostics cannot be retrieved from the device with EndDevice identifier if the device isn't linked to a metering point.
Request/allowDeviceSource	xs:boolean	0..1	Can NAN statistics be retrieved from the device when readings are not available in Meteringware. Defaults to true.

3.5.11.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.2	Device not found	FATAL
2.11	Invalid object type.	FATAL
2.13	Usage point not linked to a device.	FATAL

5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.11.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information aabout the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "ComFunction"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/ComFunctions		1	
Payload/ComFunctions/ComFunction		1..n	
./EndDevice/mRID	xs:string	1	
./EndDevice/configuredUsageKind	xs:string	0..1	Configured usage kind to device. Possible values: - master - slave
./EndDevice/usageKind	xs:string	0..1	Possible values: - master - slave
./EndDevice/durationOfNetworkParticipation	xs:string	0..1	Time the device has been member of NAN (or trying to be) during the period. Range 0…100%, resolution of 0.5%
./UsagePoint/mRID	xs:string	0..1	Metering point identifier (mRID) if the device is linked to a metering point
./amrRouter	xs:string	0..1	Parent device identifier (mRID). Also referred as cluster head in RF communication.
./technology	xs:string	1	Possible values: - cellular

			- ethernet - rfMesh
./TimePeriod		0..1	Time period of statistical diagnostics data
./TimePeriod/start	xs:dateTime	1	Start time of the period
./TimePeriod/end	xs:dateTime	1	End time of the period
./Readings/Reading		0..n	List of quality attributes
./value	xs:string	1	Value of the quality attribute
./ReadingType/@ref	xs:string	1	Reading type for the quality attribute. See possible values in the table below.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types used for masters

ReadingType	Description	Unit
0.0.0.12.0.3.9029.0.0.0.0.0.0.0.0.0.0	Channel with the cluster members at the end of the statistical period	None
11.26.0.9.0.3.9022.0.0.0.0.0.0.0.0.111.0	Number of channel changes	pcs
0.0.0.12.0.3.9030.0.0.0.0.0.0.0.0.0.0	Antenna type (internal or external) at the end of the statistical period	None

Reading types used for slaves

ReadingType	Description	Unit
0.0.0.12.0.3.9018.0.0.0.0.0.0.0.-1.113.0	Transmission power with the cluster head at the end of the statistical period	dBm
0.0.0.12.0.3.9019.0.0.0.0.0.0.0.0.114.0	Route cost at the end of the statistical period	None
0.0.0.12.0.3.9028.0.0.0.0.0.0.0.0.0.0	Communication channel with the current cluster head at the end of the statistical period	None
0.0.0.12.0.3.9030.0.0.0.0.0.0.0.0.0.0	Antenna type (internal or external) at the end of the statistical period	None
11.2.0.9.0.3.115.0.0.0.0.0.0.0.-1.113.0	Average signal strength with cluster heads on the period	dBm
11.9.0.9.0.3.115.0.0.0.0.0.0.0.-1.113.0	Minimum signal strength with cluster head on the period	dBm
11.8.0.9.0.3.115.0.0.0.0.0.0.0.-1.113.0	Maximum signal strength with cluster head on the period	dBm
0.2.0.9.0.3.9020.0.0.0.0.0.0.0.-1.113.0	Average signal strength with the current cluster head	dBm

0.9.0.9.0.3.9020.0.0.0.0.0.0.0.0.-1.113.0	Minimum signal strength with the current cluster head	dBm
0.8.0.9.0.3.9020.0.0.0.0.0.0.0.0.-1.113.0	Maximum signal strength with the current cluster head	dBm
11.2.0.9.0.3.9019.0.0.0.0.0.0.0.0.114.0	Average route cost	None
11.9.0.9.0.3.9019.0.0.0.0.0.0.0.0.114.0	Minimum route cost	None
11.8.0.9.0.3.9019.0.0.0.0.0.0.0.0.114.0	Maximum route cost	None
11.26.0.9.0.3.9021.0.0.0.0.0.0.0.0.111.0	Number of route changes	pcs
11.26.0.9.0.3.9022.0.0.0.0.0.0.0.0.111.0	Number of channel changes with cluster members	pcs
0.26.0.9.0.3.9023.0.0.0.0.0.0.0.0.111.0	Number of neighbours at the end of the statistical period	pcs
11.2.0.9.0.3.9023.0.0.0.0.0.0.0.0.111.0	Average number of neighbours	pcs
11.9.0.9.0.3.9023.0.0.0.0.0.0.0.0.111.0	Minimum number of neighbours	pcs
11.8.0.9.0.3.9023.0.0.0.0.0.0.0.0.111.0	Maximum number of neighbours	pcs
11.26.0.9.0.3.9024.0.0.0.0.0.0.0.0.0.0	Duration of no route	%
11.26.0.9.0.3.9025.0.0.0.0.0.0.0.0.0.0	Duration of no neighbours	%
11.8.0.9.0.3.9026.0.0.0.0.0.0.0.0.0.0	Maximum duty cycle	%
11.26.0.9.0.3.9027.0.0.0.0.0.0.0.0.111.0	Duty cycle alarm count	pcs
11.26.0.9.0.3.9031.0.0.0.0.0.0.0.0.0.0	Duration of participating in NAN	%

This table describes reading types that are possibly returned from the described service. Reading types are listed and maintained in the References document.

3.5.11.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.11.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceNANDiagnosticsMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <end:GetEndDeviceNANDiagnosticsRequest>
      <end:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>ComFunction</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">123456787</mes:ID>
      </end:Request>
```

```
    </end:GetEndDeviceNANDiagnosticsRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceNANDiagnosticsMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:com="http://iec.ch/TC57/2007/ComFunction#"
xmlns:end1="http://iec.ch/TC57/2007/EndDevice#"
xmlns:met="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <end:ReplyEndDeviceNANDiagnosticsRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>ComFunction</mes:Noun>
        <mes:Timestamp>2015-10-28T16:25:12+01:00</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
      </end:Reply>
      <end:Payload>
        <end:ComFunctions>
          <end:ComFunction>
            <com:EndDevice>
              <end1:mRID>100000002</end1:mRID>
              <end1:usageKind>slave</end1:usageKind>
            </com:EndDevice>
            <com:UsagePoint>
              <met:mRID>123456787</met:mRID>
            </com:UsagePoint>
            <com:amrRouter>100000011</com:amrRouter>
            <com:technology>rfMesh</com:technology>
            <com:TimePeriod>
              <com:start>2015-10-28T00:00:00+01:00</com:start>
              <com:end>2015-10-28T16:20:12+01:00</com:end>
            </com:TimePeriod>
            <com:Readings>
              <!-- Transmission power, dBm -->
              <com:Reading>
                <met:value>86</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9018.0.0.0.0.0.0.0.0.-
1.113.0" />
              </com:Reading>
              <!-- Route cost -->
              <com:Reading>
                <met:value>48</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9019.0.0.0.0.0.0.0.0.0.114.0"
/>
              </com:Reading>
              <!-- Communication channel -->
              <com:Reading>
                <met:value>13</met:value>
```

```
                <met:ReadingType ref="0.0.0.12.0.3.9028.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com:Reading>
              <!-- Antenna type -->
              <com:Reading>
                <met:value>internal</met:value>
                <met:ReadingType ref="0.0.0.12.0.3.9030.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com:Reading>
              <!-- Average signal strength -->
              <com:Reading>
                <met:value>83</met:value>
                <met:ReadingType ref="11.2.0.9.0.3.115.0.0.0.0.0.0.0.0.-1.113.0"
/>
              </com:Reading>
              <!-- Minimum signal strength -->
              <com:Reading>
                <met:value>74</met:value>
                <met:ReadingType ref="11.9.0.9.0.3.115.0.0.0.0.0.0.0.0.-1.113.0"
/>
              </com:Reading>
              <!-- Maximum signal strength -->
              <com:Reading>
                <met:value>88</met:value>
                <met:ReadingType ref="11.8.0.9.0.3.115.0.0.0.0.0.0.0.0.-1.113.0"
/>
              </com:Reading>
              <!-- Average signal strength with the current cluster head -->
              <com:Reading>
                <met:value></met:value>
                <met:ReadingType ref="0.2.0.9.0.3.9020.0.0.0.0.0.0.0.0.-1.113.0"
/>
              </com:Reading>
              <!-- Minimum signal strength with the current cluster head -->
              <com:Reading>
                <met:value></met:value>
                <met:ReadingType ref="0.9.0.9.0.3.9020.0.0.0.0.0.0.0.0.-1.113.0"
/>
              </com:Reading>
              <!-- Maximum signal strength with the current cluster head -->
              <com:Reading>
                <met:value></met:value>
                <met:ReadingType ref="0.8.0.9.0.3.9020.0.0.0.0.0.0.0.0.-1.113.0"
/>
              </com:Reading>
              <!-- Average route cost -->
              <com:Reading>
                <met:value>51</met:value>
                <met:ReadingType ref="11.2.0.9.0.3.9019.0.0.0.0.0.0.0.0.0.114.0"
/>
              </com:Reading>
              <!-- Minimum route cost -->
              <com:Reading>
                <met:value>39</met:value>
                <met:ReadingType ref="11.9.0.9.0.3.9019.0.0.0.0.0.0.0.0.0.114.0"
/>
              </com:Reading>
              <!-- Maximum route cost -->
              <com:Reading>
```

```
                <met:value>65</met:value>
                <met:ReadingType ref="11.8.0.9.0.3.9019.0.0.0.0.0.0.0.0.0.114.0"
/>
              </com:Reading>
              <!-- Number of route changes -->
              <com:Reading>
                <met:value>8</met:value>
                <met:ReadingType
ref="11.26.0.9.0.3.9021.0.0.0.0.0.0.0.0.0.111.0" />
              </com:Reading>
              <!-- Number of channel changes -->
              <com:Reading>
                <met:value>3</met:value>
                <met:ReadingType
ref="11.26.0.9.0.3.9022.0.0.0.0.0.0.0.0.0.111.0" />
              </com:Reading>
              <!-- Average number of neighbours -->
              <com:Reading>
                <met:value>4</met:value>
                <met:ReadingType ref="11.2.0.9.0.3.9023.0.0.0.0.0.0.0.0.0.111.0"
/>
              </com:Reading>
              <!-- Minimum number of neighbours -->
              <com:Reading>
                <met:value>3</met:value>
                <met:ReadingType ref="11.9.0.9.0.3.9023.0.0.0.0.0.0.0.0.0.111.0"
/>
              </com:Reading>
              <!-- Maximum number of neighbours -->
              <com:Reading>
                <met:value>5</met:value>
                <met:ReadingType ref="11.8.0.9.0.3.9023.0.0.0.0.0.0.0.0.0.111.0"
/>
              </com:Reading>
              <!-- Duration of no route -->
              <com:Reading>
                <met:value>0.0</met:value>
                <met:ReadingType ref="11.26.0.9.0.3.9024.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com:Reading>
              <!-- Duration of no neighbours -->
              <com:Reading>
                <met:value>0.0</met:value>
                <met:ReadingType ref="11.26.0.9.0.3.9025.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com:Reading>
              <!-- Maximum duty cycle -->
              <com:Reading>
                <met:value>1.0</met:value>
                <met:ReadingType ref="11.8.0.9.0.3.9026.0.0.0.0.0.0.0.0.0.0.0"
/>
              </com:Reading>
              <!-- Duty cycle alarm count -->
              <com:Reading>
                <met:value>0</met:value>
                <met:ReadingType
ref="11.26.0.9.0.3.9027.0.0.0.0.0.0.0.0.0.111.0" />
              </com:Reading>
            </com:Readings>
```

```
          </end:ComFunction>
        </end:ComFunctions>
      </end:Payload>
    </end:ReplyEndDeviceNANDiagnosticsRequest>
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.12 GetEndDeviceRelay

GetEndDeviceRelay is used to read the status of the relay in device.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.12.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": get status of relay
Header/Noun	xs:string	1	Static "EndDeviceControl"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint
Request/EndDeviceFunction		1	
./name	xs:string	1	Load name, identifies the relay which should be read in the system.

3.5.12.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL

2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.12.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "EndDeviceControl"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payloads returns load status on successful executions.
Payload/EndDeviceControl	xs:string	1	
./reason	xs:string	1	Information on how the relay state was last changed. Possible values: - Schedule - Dynamic - AdHoc
./EndDevice/mRID	xs:string	1	Device identifier
./EndDeviceAction			
./EndDeviceAction/command	xs:string	1	State of the relay "LoadOn" or "LoadOff"
Payload/EndDeviceFunction			
./name	xs:string	1	Load name

Result codes

Code	Description	Error level
0.0	Ok	
2.30	The usage point does not have a suitable product configured.	FATAL
2.49	Load name not found	FATAL
2.50	Device linked to metering point is not mapped to load name.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL
5.1	Failed to connect the device	FATAL

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.5.12.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.12.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
               xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
               xmlns:mes="”http://iec.ch/TC57/2011/schema/message”">
   <soap:Header />
   <soap:Body>
      <end:GetEndDeviceRelayRequest>
         <end:Header>
            <mes:Verb>get</mes:Verb>
            <mes:Noun>EndDeviceControl</mes:Noun>
            <mes:Timestamp>2015-01-02T12:15:00Z</mes:Timestamp>
            <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
            <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
            <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
         </end:Header>
         <end:Request>
            <mes:ID objectType="UsagePoint">12345678</mes:ID>
            <end:EndDeviceFunction>
              <end:name>WaterHeater</end:name>
           </end:EndDeviceFunction>
         </end:Request>
      </end:GetEndDeviceRelayRequest>
   </soap:Body>
</soap:Envelope>
```

Asynchronous response:

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/EndDeviceControlMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:end1="http://iec.ch/TC57/2007/EndDeviceControl#">
```

```
  <soap:Header />
  <soap:Body>
    <end:ReplyEndDeviceRelayRequest>
      <end:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>EndDeviceControl</mes:Noun>
        <mes:Timestamp>2015-01-02T12:16:00Z</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Reply>
        <mes:Result>PARTIAL</mes:Result>
        <mes:ID objectType="UsagePoint">12345678</mes:ID>
      </end:Reply>
      <end:Payload>
        <end:EndDeviceControl>
           <end1:EndDeviceAction>
             <end1:EndDevice>
               <end1:mRID>987654321</end1:mRID>
             </end1:EndDevice>
               <end1:command>LoadOn</end1:command>
           </end1:EndDeviceAction>
        </end:EndDeviceControl>
        <end:EndDeviceFuntion>
          <end:name>WaterHeater</end:name>
        </end:EndDeviceFunction>
      </end:Payload>
    </end:ReplyEndDeviceRelayRequest>
  </soap:Body>
</soap:Envelope>
```

3.5.13 GetEndDeviceWANCommunicationStatus

GetEndDeviceWANCommunicationStatus is used to retrieve the current signal strength and communication network type from the master metering devices.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.13.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: “get”: retrieve metering point information
Header/Noun	xs:string	1	Static “ComFunction”
Request/ID	xs:string	1..10000	List of identifiers (mRID)

Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint

3.5.13.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.13	Usage point not linked to a device.	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.13.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "ComFunction"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)

Payload		0..1	Payloads returns load status on successful executions.
Payload/ComFunction		1	
./EndDevice/mRID	xs:string	1	Device identifier
./technology	xs:string	1	Possible values: - Unknown - 2G - 3G - 4G
./timeStamp	xs:dateTime	1	Timestamp when the WAN communication status was received.
./Readings/Reading		0..1	Signal strength of the communication channel when available.
./value	xs:decimal	1	Signal strength as dBm.
./ReadingType/@ref	xs:string	1	Static value "0.0.0.12.0.3.115.0.0.0.0.0.0.0.0.-1.113.0". See more detailed descrition in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

Result codes

Code	Description
0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

3.5.13.4 Response acknowledgement

Asynchronous response should be acknowledged as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.

3.5.13.5 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:end="http://aidon.com/IEC/AdHoc/v3/ComFunctionMessage"
               xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <end:GetEndDeviceWANCommunicationStatusRequest>
      <end:Header>
        <mes:Verb>get</mes:Verb>
```

```
        <mes:Noun>ComFunction</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00+01:00</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </end:Header>
      <end:Request>
        <mes:ID objectType="UsagePoint">123456700</mes:ID>
      </end:Request>
    </end:GetEndDeviceWANCommunicationStatusRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
xmlns:mes="http://iec.ch/TC57/2011/schema/message"
xmlns:com="http://aidon.com/IEC/AdHoc/v3/ComFunctionMessage"
xmlns:com1="http://iec.ch/TC57/2007/ComFunction#"
xmlns:end="http://iec.ch/TC57/2007/EndDevice#"
xmlns:met1="http://iec.ch/TC57/2007/MeterReading#">
  <soapenv:Header />
  <soapenv:Body>
    <met:ReplyEndDeviceWANCommunicationStatusRequest>
      <met:Header>
        <mes:Verb>reply</mes:Verb>
        <mes:Noun>ComFunction</mes:Noun>
        <mes:Timestamp>2017-01-02T12:16:00+01:00</mes:Timestamp>
        <mes:Source>Aidon Linkware</mes:Source>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E222</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Reply>
        <mes:Result>PARTIAL</mes:Result>
      </met:Reply>
      <met:Payload>
          <com:ComFunction>
            <com1:EndDevice>
              <end1:mRID>100000012</end1:mRID>
            </com1:EndDevice>
            <com1:technology>4G</com1:technology>
            <com1:timeStamp>2015-01-02T12:01:12+01:00</com1:timeStamp>
            <com1:Readings>
              <!-- Signal strength, dBm -->
              <com1:Reading>
                <met1:value>-85</met1:value>
                <met1:ReadingType ref="0.0.0.12.0.3.115.0.0.0.0.0.0.0.0.-
1.113.0" />
              </com1:Reading>
            </com1:Readings>
          </com:ComFunction>
      </met:Payload>
    </met:ReplyEndDeviceWANCommunicationStatusRequest >
  </soapenv:Body>
</soapenv:Envelope>
```

3.5.14 GetExtendedHarmonics

GetExtendedHarmonicsStatistics is used to get current momentary extended harmonics data from devices.

The operation is executed asynchronously where the request is acknowledged synchronously and responses are returned asynchronously as they are available from the backend system and/or devices.

3.5.14.1 Request

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Possible values: "get": retrieve metering point information
Header/Noun	xs:string	1	Static "MeterReading"
Request/ID	xs:string	1..10000	List of identifiers (mRID)
Request/ID/@objectType	xs:string	1	Type of the identifier. Currently possible values: - UsagePoint

3.5.14.2 Response

Response to the request is a generic acknowledgement as described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx

Result codes

Code	Description	Error level
0.0	Ok	
1.0	Request message is invalid or incomplete. This code is used when the request is invalid i.e. some required element is missing or invalid. For example when ChangeEndDevices message header's verb is not change or header's correlation id is missing.	FATAL
1.1	The message contains incorrect time specification. Only UTC times are supported.	FATAL
2.0	Invalid request. For example when the specified request would result in an configuration that is not allowed. For example setting a parent device that has a type that does not allow child devices.	FATAL
2.1	Usage point not found.	FATAL
2.11	Invalid object type.	FATAL
2.13	Usage point not linked to a device.	FATAL
2.51	Auxiliary meter not linked to a device	FATAL
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.	FATAL

3.5.14.3 Asynchronous Response

Element	Data type	Cardinality	Description and usage
Header		1	The header that contains information about the message. See Interface Specification – Linkware IEC 61968 Common for generic Header elements.
Header/Verb	xs:string	1	Static "reply"
Header/Noun	xs:string	1	Static "MeterReading"
Reply		1	
Reply/Result		1	PARTIAL
Reply/Error		0..n	If Result=Failed, return Error for each metering point
./code	xs:string	1	Error code, see table below
./level	xs:string	1	
./reason	xs:string	0..1	Description of the error
Reply/ID	xs:string	1	Requested metering point identifier (mRID)
Payload		0..1	Payload is included on successful executions.
Payload/MeterReadings		1	
Payload/MeterReadings/MeterReading		0..n	List of readings
./UsagePoint/mRID	xs:string	1	Metering point identifier
./EndDevice/mRID	xs:string	1	Device identifier
./Readings		0..1	
./Readings/Reading		0..n	
./timeStamp	xs:dateTime	1	Timestamp of the reading
./value	xs:decimal	1	
./ReadingType/@ref	xs:string	1	Meter reading type. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx.
./ReadingQuality		0..1	
./ReadingQuality/category	xs:int	1	Quality of the reading value. Possible values are described in Interface Specification - Linkware IEC 61968 Common v2 (draft).docx. If ReadingQuality element is missing the value is Ok (0).

Result codes

Code	Description

0.0	Ok
5.0	Operation failed. This code is used when the request cannot be completed because an exception has occurred.
5.1	Failed to connect the device.

This table describes result codes that are possibly returned from the described service. Result codes are listed and maintained in the References document.

Reading types

ReadingType	Description	Period	Unit
0.0.0.12.0.1.47.2.1.0.0.0.0.0.128.0.0.0	Phase L1 2. momentary harmonics	momentary	%
0.0.0.12.0.1.47.3.1.0.0.0.0.0.128.0.0.0	Phase L1 3. momentary harmonics	momentary	%
0.0.0.12.0.1.47.4.1.0.0.0.0.0.128.0.0.0	Phase L1 4. momentary harmonics	momentary	%
0.0.0.12.0.1.47.5.1.0.0.0.0.0.128.0.0.0	Phase L1 5. momentary harmonics	momentary	%
0.0.0.12.0.1.47.6.1.0.0.0.0.0.128.0.0.0	Phase L1 6. momentary harmonics	momentary	%
0.0.0.12.0.1.47.7.1.0.0.0.0.0.128.0.0.0	Phase L1 7. momentary harmonics	momentary	%
0.0.0.12.0.1.47.8.1.0.0.0.0.0.128.0.0.0	Phase L1 8. momentary harmonics	momentary	%
0.0.0.12.0.1.47.9.1.0.0.0.0.0.128.0.0.0	Phase L1 9. momentary harmonics	momentary	%
0.0.0.12.0.1.47.10.1.0.0.0.0.0.128.0.0.0	Phase L1 10. momentary harmonics	momentary	%
0.0.0.12.0.1.47.11.1.0.0.0.0.0.128.0.0.0	Phase L1 11. momentary harmonics	momentary	%
0.0.0.12.0.1.47.12.1.0.0.0.0.0.128.0.0.0	Phase L1 12. momentary harmonics	momentary	%
0.0.0.12.0.1.47.13.1.0.0.0.0.0.128.0.0.0	Phase L1 13. momentary harmonics	momentary	%
0.0.0.12.0.1.47.14.1.0.0.0.0.0.128.0.0.0	Phase L1 14. momentary harmonics	momentary	%
0.0.0.12.0.1.47.15.1.0.0.0.0.0.128.0.0.0	Phase L1 15. momentary harmonics	momentary	%
0.0.0.12.0.1.47.16.1.0.0.0.0.0.128.0.0.0	Phase L1 16. momentary harmonics	momentary	%
0.0.0.12.0.1.47.17.1.0.0.0.0.0.128.0.0.0	Phase L1 17. momentary harmonics	momentary	%
0.0.0.12.0.1.47.18.1.0.0.0.0.0.128.0.0.0	Phase L1 18. momentary harmonics	momentary	%
0.0.0.12.0.1.47.19.1.0.0.0.0.0.128.0.0.0	Phase L1 19. momentary harmonics	momentary	%
0.0.0.12.0.1.47.20.1.0.0.0.0.0.128.0.0.0	Phase L1 20. momentary harmonics	momentary	%
0.0.0.12.0.1.47.21.1.0.0.0.0.0.128.0.0.0	Phase L1 21. momentary harmonics	momentary	%
0.0.0.12.0.1.47.22.1.0.0.0.0.0.128.0.0.0	Phase L1 22. momentary harmonics	momentary	%
0.0.0.12.0.1.47.23.1.0.0.0.0.0.128.0.0.0	Phase L1 23. momentary harmonics	momentary	%
0.0.0.12.0.1.47.24.1.0.0.0.0.0.128.0.0.0	Phase L1 24. momentary harmonics	momentary	%
0.0.0.12.0.1.47.25.1.0.0.0.0.0.128.0.0.0	Phase L1 25. momentary harmonics	momentary	%
0.0.0.12.0.1.47.26.1.0.0.0.0.0.128.0.0.0	Phase L1 26. momentary harmonics	momentary	%
0.0.0.12.0.1.47.27.1.0.0.0.0.0.128.0.0.0	Phase L1 27. momentary harmonics	momentary	%
0.0.0.12.0.1.47.28.1.0.0.0.0.0.128.0.0.0	Phase L1 28. momentary harmonics	momentary	%
0.0.0.12.0.1.47.29.1.0.0.0.0.0.128.0.0.0	Phase L1 29. momentary harmonics	momentary	%
0.0.0.12.0.1.47.30.1.0.0.0.0.0.128.0.0.0	Phase L1 30. momentary harmonics	momentary	%
0.0.0.12.0.1.47.31.1.0.0.0.0.0.128.0.0.0	Phase L1 31. momentary harmonics	momentary	%
0.0.0.12.0.1.47.32.1.0.0.0.0.0.128.0.0.0	Phase L1 32. momentary harmonics	momentary	%
0.0.0.12.0.1.47.33.1.0.0.0.0.0.128.0.0.0	Phase L1 33. momentary harmonics	momentary	%
0.0.0.12.0.1.47.34.1.0.0.0.0.0.128.0.0.0	Phase L1 34. momentary harmonics	momentary	%
0.0.0.12.0.1.47.35.1.0.0.0.0.0.128.0.0.0	Phase L1 35. momentary harmonics	momentary	%

0.0.0.12.0.1.47.36.1.0.0.0.0.0.128.0.0.0	Phase L1 36. momentary harmonics	momentary	%
0.0.0.12.0.1.47.37.1.0.0.0.0.0.128.0.0.0	Phase L1 37. momentary harmonics	momentary	%
0.0.0.12.0.1.47.38.1.0.0.0.0.0.128.0.0.0	Phase L1 38. momentary harmonics	momentary	%
0.0.0.12.0.1.47.39.1.0.0.0.0.0.128.0.0.0	Phase L1 39. momentary harmonics	momentary	%
0.0.0.12.0.1.47.40.1.0.0.0.0.0.128.0.0.0	Phase L1 40. momentary harmonics	momentary	%
0.0.0.12.0.1.47.2.1.0.0.0.0.0.64.0.0.0	Phase L2 2. momentary harmonics	momentary	%
0.0.0.12.0.1.47.3.1.0.0.0.0.0. 64.0.0.0	Phase L2 3. momentary harmonics	momentary	%
0.0.0.12.0.1.47.4.1.0.0.0.0.0. 64.0.0.0	Phase L2 4. momentary harmonics	momentary	%
0.0.0.12.0.1.47.5.1.0.0.0.0.0. 64.0.0.0	Phase L2 5. momentary harmonics	momentary	%
0.0.0.12.0.1.47.6.1.0.0.0.0.0. 64.0.0.0	Phase L2 6. momentary harmonics	momentary	%
0.0.0.12.0.1.47.7.1.0.0.0.0.0. 64.0.0.0	Phase L2 7. momentary harmonics	momentary	%
0.0.0.12.0.1.47.8.1.0.0.0.0.0. 64.0.0.0	Phase L2 8. momentary harmonics	momentary	%
0.0.0.12.0.1.47.9.1.0.0.0.0.0. 64.0.0.0	Phase L2 9. momentary harmonics	momentary	%
0.0.0.12.0.1.47.10.1.0.0.0.0.0. 64.0.0.0	Phase L2 10. momentary harmonics	momentary	%
0.0.0.12.0.1.47.11.1.0.0.0.0.0. 64.0.0.0	Phase L2 11. momentary harmonics	momentary	%
0.0.0.12.0.1.47.12.1.0.0.0.0.0. 64.0.0.0	Phase L2 12. momentary harmonics	momentary	%
0.0.0.12.0.1.47.13.1.0.0.0.0.0. 64.0.0.0	Phase L2 13. momentary harmonics	momentary	%
0.0.0.12.0.1.47.14.1.0.0.0.0.0. 64.0.0.0	Phase L2 14. momentary harmonics	momentary	%
0.0.0.12.0.1.47.15.1.0.0.0.0.0. 64.0.0.0	Phase L2 15. momentary harmonics	momentary	%
0.0.0.12.0.1.47.16.1.0.0.0.0.0. 64.0.0.0	Phase L2 16. momentary harmonics	momentary	%
0.0.0.12.0.1.47.17.1.0.0.0.0.0. 64.0.0.0	Phase L2 17. momentary harmonics	momentary	%
0.0.0.12.0.1.47.18.1.0.0.0.0.0. 64.0.0.0	Phase L2 18. momentary harmonics	momentary	%
0.0.0.12.0.1.47.19.1.0.0.0.0.0. 64.0.0.0	Phase L2 19. momentary harmonics	momentary	%
0.0.0.12.0.1.47.20.1.0.0.0.0.0. 64.0.0.0	Phase L2 20. momentary harmonics	momentary	%
0.0.0.12.0.1.47.21.1.0.0.0.0.0. 64.0.0.0	Phase L2 21. momentary harmonics	momentary	%
0.0.0.12.0.1.47.22.1.0.0.0.0.0. 64.0.0.0	Phase L2 22. momentary harmonics	momentary	%
0.0.0.12.0.1.47.23.1.0.0.0.0.0. 64.0.0.0	Phase L2 23. momentary harmonics	momentary	%
0.0.0.12.0.1.47.24.1.0.0.0.0.0. 64.0.0.0	Phase L2 24. momentary harmonics	momentary	%
0.0.0.12.0.1.47.25.1.0.0.0.0.0. 64.0.0.0	Phase L2 25. momentary harmonics	momentary	%
0.0.0.12.0.1.47.26.1.0.0.0.0.0. 64.0.0.0	Phase L2 26. momentary harmonics	momentary	%
0.0.0.12.0.1.47.27.1.0.0.0.0.0. 64.0.0.0	Phase L2 27. momentary harmonics	momentary	%
0.0.0.12.0.1.47.28.1.0.0.0.0.0. 64.0.0.0	Phase L2 28. momentary harmonics	momentary	%
0.0.0.12.0.1.47.29.1.0.0.0.0.0. 64.0.0.0	Phase L2 29. momentary harmonics	momentary	%
0.0.0.12.0.1.47.30.1.0.0.0.0.0. 64.0.0.0	Phase L2 30. momentary harmonics	momentary	%
0.0.0.12.0.1.47.31.1.0.0.0.0.0. 64.0.0.0	Phase L2 31. momentary harmonics	momentary	%
0.0.0.12.0.1.47.32.1.0.0.0.0.0. 64.0.0.0	Phase L2 32. momentary harmonics	momentary	%
0.0.0.12.0.1.47.33.1.0.0.0.0.0. 64.0.0.0	Phase L2 33. momentary harmonics	momentary	%
0.0.0.12.0.1.47.34.1.0.0.0.0.0. 64.0.0.0	Phase L2 34. momentary harmonics	momentary	%
0.0.0.12.0.1.47.35.1.0.0.0.0.0. 64.0.0.0	Phase L2 35. momentary harmonics	momentary	%
0.0.0.12.0.1.47.36.1.0.0.0.0.0. 64.0.0.0	Phase L2 36. momentary harmonics	momentary	%
0.0.0.12.0.1.47.37.1.0.0.0.0.0. 64.0.0.0	Phase L2 37. momentary harmonics	momentary	%
0.0.0.12.0.1.47.38.1.0.0.0.0.0. 64.0.0.0	Phase L2 38. momentary harmonics	momentary	%
0.0.0.12.0.1.47.39.1.0.0.0.0.0. 64.0.0.0	Phase L2 39. momentary harmonics	momentary	%

0.0.0.12.0.1.47.40.1.0.0.0.0.0. 64.0.0.0	Phase L2 40. momentary harmonics	momentary	%
0.0.0.12.0.1.47.2.1.0.0.0.0.0.32.0.0.0	Phase L3 2. momentary harmonics	momentary	%
0.0.0.12.0.1.47.3.1.0.0.0.0.0. 32.0.0.0	Phase L3 3. momentary harmonics	momentary	%
0.0.0.12.0.1.47.4.1.0.0.0.0.0. 32.0.0.0	Phase L3 4. momentary harmonics	momentary	%
0.0.0.12.0.1.47.5.1.0.0.0.0.0. 32.0.0.0	Phase L3 5. momentary harmonics	momentary	%
0.0.0.12.0.1.47.6.1.0.0.0.0.0. 32.0.0.0	Phase L3 6. momentary harmonics	momentary	%
0.0.0.12.0.1.47.7.1.0.0.0.0.0. 32.0.0.0	Phase L3 7. momentary harmonics	momentary	%
0.0.0.12.0.1.47.8.1.0.0.0.0.0. 32.0.0.0	Phase L3 8. momentary harmonics	momentary	%
0.0.0.12.0.1.47.9.1.0.0.0.0.0. 32.0.0.0	Phase L3 9. momentary harmonics	momentary	%
0.0.0.12.0.1.47.10.1.0.0.0.0.0. 32.0.0.0	Phase L3 10. momentary harmonics	momentary	%
0.0.0.12.0.1.47.11.1.0.0.0.0.0. 32.0.0.0	Phase L3 11. momentary harmonics	momentary	%
0.0.0.12.0.1.47.12.1.0.0.0.0.0. 32.0.0.0	Phase L3 12. momentary harmonics	momentary	%
0.0.0.12.0.1.47.13.1.0.0.0.0.0. 32.0.0.0	Phase L3 13. momentary harmonics	momentary	%
0.0.0.12.0.1.47.14.1.0.0.0.0.0. 32.0.0.0	Phase L3 14. momentary harmonics	momentary	%
0.0.0.12.0.1.47.15.1.0.0.0.0.0. 32.0.0.0	Phase L3 15. momentary harmonics	momentary	%
0.0.0.12.0.1.47.16.1.0.0.0.0.0. 32.0.0.0	Phase L3 16. momentary harmonics	momentary	%
0.0.0.12.0.1.47.17.1.0.0.0.0.0. 32.0.0.0	Phase L3 17. momentary harmonics	momentary	%
0.0.0.12.0.1.47.18.1.0.0.0.0.0. 32.0.0.0	Phase L3 18. momentary harmonics	momentary	%
0.0.0.12.0.1.47.19.1.0.0.0.0.0. 32.0.0.0	Phase L3 19. momentary harmonics	momentary	%
0.0.0.12.0.1.47.20.1.0.0.0.0.0. 32.0.0.0	Phase L3 20. momentary harmonics	momentary	%
0.0.0.12.0.1.47.21.1.0.0.0.0.0. 32.0.0.0	Phase L3 21. momentary harmonics	momentary	%
0.0.0.12.0.1.47.22.1.0.0.0.0.0. 32.0.0.0	Phase L3 22. momentary harmonics	momentary	%
0.0.0.12.0.1.47.23.1.0.0.0.0.0. 32.0.0.0	Phase L3 23. momentary harmonics	momentary	%
0.0.0.12.0.1.47.24.1.0.0.0.0.0. 32.0.0.0	Phase L3 24. momentary harmonics	momentary	%
0.0.0.12.0.1.47.25.1.0.0.0.0.0. 32.0.0.0	Phase L3 25. momentary harmonics	momentary	%
0.0.0.12.0.1.47.26.1.0.0.0.0.0. 32.0.0.0	Phase L3 26. momentary harmonics	momentary	%
0.0.0.12.0.1.47.27.1.0.0.0.0.0. 32.0.0.0	Phase L3 27. momentary harmonics	momentary	%
0.0.0.12.0.1.47.28.1.0.0.0.0.0. 32.0.0.0	Phase L3 28. momentary harmonics	momentary	%
0.0.0.12.0.1.47.29.1.0.0.0.0.0. 32.0.0.0	Phase L3 29. momentary harmonics	momentary	%
0.0.0.12.0.1.47.30.1.0.0.0.0.0. 32.0.0.0	Phase L3 30. momentary harmonics	momentary	%
0.0.0.12.0.1.47.31.1.0.0.0.0.0. 32.0.0.0	Phase L3 31. momentary harmonics	momentary	%
0.0.0.12.0.1.47.32.1.0.0.0.0.0. 32.0.0.0	Phase L3 32. momentary harmonics	momentary	%
0.0.0.12.0.1.47.33.1.0.0.0.0.0. 32.0.0.0	Phase L3 33. momentary harmonics	momentary	%
0.0.0.12.0.1.47.34.1.0.0.0.0.0. 32.0.0.0	Phase L3 34. momentary harmonics	momentary	%
0.0.0.12.0.1.47.35.1.0.0.0.0.0. 32.0.0.0	Phase L3 35. momentary harmonics	momentary	%
0.0.0.12.0.1.47.36.1.0.0.0.0.0. 32.0.0.0	Phase L3 36. momentary harmonics	momentary	%
0.0.0.12.0.1.47.37.1.0.0.0.0.0. 32.0.0.0	Phase L3 37. momentary harmonics	momentary	%
0.0.0.12.0.1.47.38.1.0.0.0.0.0. 32.0.0.0	Phase L3 38. momentary harmonics	momentary	%
0.0.0.12.0.1.47.39.1.0.0.0.0.0. 32.0.0.0	Phase L3 39. momentary harmonics	momentary	%
0.0.0.12.0.1.47.40.1.0.0.0.0.0. 32.0.0.0	Phase L3 40. momentary harmonics	momentary	%

3.5.14.4 Example messages

Request

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
xmlns:met="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessage"
                xmlns:mes="http://iec.ch/TC57/2011/schema/message">
  <soap:Header />
  <soap:Body>
    <met:GetExtentedHarmonicsRequest>
      <met:Header>
        <mes:Verb>get</mes:Verb>
        <mes:Noun>MeterReading</mes:Noun>
        <mes:Timestamp>2015-01-02T12:15:00+01:00</mes:Timestamp>
        <mes:Source>Client System</mes:Source>
<mes:ReplyAddress>https://ws.example.tld/IECAdHocReceiveReply</mes:ReplyAddress>
        <mes:MessageID>795931F9-3DF3-4D2C-A743-AF139041E3FD</mes:MessageID>
        <mes:CorrelationID>6E4496DD-E2F8-4775-A332-
D3DE25B961E9</mes:CorrelationID>
      </met:Header>
      <met:Request>
        <mes:ID objectType="UsagePoint">123456700</mes:ID>
      </met:Request>
    </met:GetExtentedHarmonicsRequest>
  </soap:Body>
</soap:Envelope>
```

Asynchronous response

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/">
 <s:Header>
  <To s:mustUnderstand="1" xmlns="http://schemas.microsoft.com/ws/2005/05/addressing/no
ne">http://linkware-
1:50201/IECAdHocTestingSubscriber/IECAdHocTestingSubscriber.svc</To>
  <Action s:mustUnderstand="1" xmlns="http://schemas.microsoft.com/ws/2005/05/addressin
g/none">http://aidon.com/IEC/AdHoc/v3/ReceiveReply/IECAdHocReceiveReplyPortType/ReplyEx
tendedHarmonicsRequest</Action>
 </s:Header>
 <s:Body xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <ReplyExtendedHarmonicsRequest xmlns="http://aidon.com/IEC/AdHoc/v3/MeterReadingMessa
ge">
   <Header>
    <Verb xmlns="http://iec.ch/TC57/2011/schema/message">reply</Verb>
    <Noun xmlns="http://iec.ch/TC57/2011/schema/message">MeterReading</Noun>
    <Timestamp xmlns="http://iec.ch/TC57/2011/schema/message">2017-12-
07T04:41:29.7630215Z</Timestamp>
    <Source xmlns="http://iec.ch/TC57/2011/schema/message">Aidon Linkware</Source>
    <MessageID xmlns="http://iec.ch/TC57/2011/schema/message">f629a3e3-38e2-4f15-aac4-
5705371a41d6</MessageID>
    <CorrelationID xmlns="http://iec.ch/TC57/2011/schema/message">CORRELATION-
151262167861</CorrelationID>
    <AccessToken xmlns="http://iec.ch/TC57/2011/schema/message">****</AccessToken>
    <OrganisationID xmlns="http://iec.ch/TC57/2011/schema/message">2E8C6E20-24B1-43D5-
BBF0-F31E4BF14A83</OrganisationID>
    <UseGuaranteedDelivery xmlns="http://iec.ch/TC57/2011/schema/message">true</UseGuar
anteedDelivery>
   </Header>
```

```
    <Reply>
     <Result xmlns="http://iec.ch/TC57/2011/schema/message">PARTIAL</Result>
     <Error xmlns="http://iec.ch/TC57/2011/schema/message">
      <code>0.0</code>
      <level>INFORM</level>
      <details>Ok</details>
     </Error>
     <ID objectType="UsagePoint" xmlns="http://iec.ch/TC57/2011/schema/message">TW_82011
00000000001</ID>
    </Reply>
    <Payload>
     <MeterReadings>
      <MeterReading>
       <UsagePoint xmlns="http://iec.ch/TC57/2007/MeterReading#">
        <mRID>TW_8201100000000001</mRID>
       </UsagePoint>
       <EndDevice xmlns="http://iec.ch/TC57/2007/MeterReading#">
        <mRID>8201100000000001</mRID>
       </EndDevice>
       <Readings xmlns="http://iec.ch/TC57/2007/MeterReading#">
        <Reading>
         <timeStamp>2017-12-07T04:41:23Z</timeStamp>
         <value>2.0000</value>
         <ReadingType ref="0.0.0.12.0.1.47.2.1.0.0.0.0.0.128.0.0.0"></ReadingType>
        </Reading>
        <Reading>
         <timeStamp>2017-12-07T04:41:23Z</timeStamp>
         <value>2.1000</value>
         <ReadingType ref="0.0.0.12.0.1.47.2.1.0.0.0.0.0.64.0.0.0"></ReadingType>
        </Reading>
        <Reading>
         <timeStamp>2017-12-07T04:41:23Z</timeStamp>
         <value>2.2000</value>
         <ReadingType ref="0.0.0.12.0.1.47.2.1.0.0.0.0.0.32.0.0.0"></ReadingType>
        </Reading>
        <Reading>
         <timeStamp>2017-12-07T04:41:23Z</timeStamp>
         <value>3.0000</value>
         <ReadingType ref="0.0.0.12.0.1.47.3.1.0.0.0.0.0.128.0.0.0"></ReadingType>
        </Reading>
        <Reading>
         <timeStamp>2017-12-07T04:41:23Z</timeStamp>
         <value>3.1000</value>
         <ReadingType ref="0.0.0.12.0.1.47.3.1.0.0.0.0.0.64.0.0.0"></ReadingType>
        </Reading>
        <Reading>
         <timeStamp>2017-12-07T04:41:23Z</timeStamp>
         <value>3.2000</value>
         <ReadingType ref="0.0.0.12.0.1.47.3.1.0.0.0.0.0.32.0.0.0"></ReadingType>
        </Reading>
        <Reading>
         <timeStamp>2017-12-07T04:41:23Z</timeStamp>
         <value>4.0000</value>
         <ReadingType ref="0.0.0.12.0.1.47.4.1.0.0.0.0.0.128.0.0.0"></ReadingType>
        </Reading>
        <Reading>
         <timeStamp>2017-12-07T04:41:23Z</timeStamp>
```

```
 <value>4.1000</value>
 <ReadingType ref="0.0.0.12.0.1.47.4.1.0.0.0.0.0.64.0.0.0"></ReadingType>
</Reading>
<Reading>
 <timeStamp>2017-12-07T04:41:23Z</timeStamp>
 <value>4.2000</value>
 <ReadingType ref="0.0.0.12.0.1.47.4.1.0.0.0.0.0.32.0.0.0"></ReadingType>
</Reading>
<Reading>
 <timeStamp>2017-12-07T04:41:23Z</timeStamp>
 <value>5.0000</value>
 <ReadingType ref="0.0.0.12.0.1.47.5.1.0.0.0.0.0.128.0.0.0"></ReadingType>
</Reading>
<Reading>
 <timeStamp>2017-12-07T04:41:23Z</timeStamp>
 <value>5.1000</value>
 <ReadingType ref="0.0.0.12.0.1.47.5.1.0.0.0.0.0.64.0.0.0"></ReadingType>
</Reading>
<Reading>
 <timeStamp>2017-12-07T04:41:23Z</timeStamp>
 <value>5.2000</value>
 <ReadingType ref="0.0.0.12.0.1.47.5.1.0.0.0.0.0.32.0.0.0"></ReadingType>
</Reading>
<Reading>
 <timeStamp>2017-12-07T04:41:23Z</timeStamp>
 <value>6.0000</value>
 <ReadingType ref="0.0.0.12.0.1.47.6.1.0.0.0.0.0.128.0.0.0"></ReadingType>
</Reading>
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 </s:Envelope>
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4 Appendix: Change history

Version	Author	Date	Changes
2.26D	HKI	16.10.2015	Added examples to GetVoltageStatistics
2.27D	HKI	20.10.2015	Fix endTime data type to xs:dateTime in GetPowerOutageLog
2.28D	HKI	21.10.2015	Added examples to GetPowerOutageLog, fixes to harmonics and frequency reading types, added error 2.32 to ExecuteConfigurationUpload, added draft of GetEarthFaultStatistics
2.29D	HKI	22.10.2015	Checked and fixed ID in request parameters for all operations to be list of IDs specified with objectType attribute
2.30D	HKI	23.10.2015	Remove reading quality from voltage packet related operations
2.31D	HKI	26.10.2015	Add draft for GetVoltageHitTableStatistics
2.32D	HKI	28.10.2015	Updated draft for GetEndDeviceTopology
2.33D	HKI	29.10.2015	Updated GetEndDeviceEventHistory to asynchronous format with updated payload, added 2.13 as possible result in GetPowerOutageLog
2.34D	HKI	29.10.2015	Updated draft for GetEndDeviceTopology
2.35D	HKI	2.11.2015	Updated NAN diagnostics data
2.36D	HKI	3.11.2015	Updated example messages
2.37D	HKI	3.11.2015	Removed incorrect result code 5.3 from ExecuteManualBillingBreak and ExecuteSoftwareFuseControl
2.38D	HKI	5.11.2015	Fixed GetEndDeviceEventHistory to contain meter readings, removed reading quality from momentary values
2.39D	HKI	5.11.2015	Add missing period parameter to GetHarmonicsAndFrequencyStatistics
2.40D	HKI	5.11.2015	Added last seen alive timestamp to GetEndDeviceTopology
2.41D	HKI	9.11.2015	Updates based on review comments for GetEndDeviceTopology and GetEndDeviceNANDiagnostics
2.42D	HKI	10.11.2015	Fixed example messages
2.43D	HKI	17.11.2015	Added final reading type enumerations for voltage packets related operations
2.44D	HKI	18.11.2015	Changed updated service version to examples, added reading type enumerations for GetEndDeviceTopology and GetEndDeviceNANDiagnostics operations
2.45	HKI	18.11.2015	Published Linkware 1.8 release version
2.46D	HKI	20.11.2015	Fixed descriptions and examples for ExecuteContractUpload and

			ExecuteConfigurationUpload to include note about using the name as id for now
2.47	HKl	20.11.2015	Published updated Linkware 1.8 release version
2.48D	HKl	23.11.2015	Changed GetMomentaryReadings description more descriptive
2.49D	HKl	1.12.2015	Added description to Request/Product/mRID element in GetEnergySeries operation
2.50D	HKl	3.12.2015	Removed average current and average voltage reading types from GetMomentaryReadings
2.51D	HKl	4.12.2015	Fixed Result element to contain static PARTIAL in asynchronous replies, added missing result codes 2.1 and 5.2 to GetEndDeviceEvent
2.52D	HKl	8.12.2015	Added missing result code 2.30 to GetPowerOutageLog, and ExecuteSoftwareFuseControl, added allowed values for software fuse limits
2.53D	HKl	9.12.2015	Removed result codes 5.1 and 5.2 from GetEndDeviceTopology, changed GetHarmonicsAndFrequenceStatistics to describe values retrieved from the system and the device and fixed voltage packets related example messages to include correct reading types.
2.54D	HKl	9.12.2015	Removed result codes 5.1 and 5.2 from GetEndDeviceEventHistory, GetEarthFaultStatistics and GetVoltageHitTableStatistics
2.55	HKl	9.12.2015	Published updated Linkware 1.8 release version
2.56D	HKl	11.12.2015	Added result code 2.13 to control operations and GetEndDeviceEvent
2.57D	HKl	16.12.2015	Added result code 2.36 and clarifying description to GetEndDeviceNANDiagnostics
2.58D	HKl	17.12.2015	Moved result code 2.30 to async side reply in ExecuteSoftwareFuseControl and GetPowerOutageLog
2.59D	HKl	17.12.2015	Changed result code 5.2 description to include device as well
2.60	HKl	17.12.2015	Published updated Linkware 1.8 release version
2.61D	HKl	4.1.2016	Added more details to start and end of the period in GetEndDeviceNANDiagnostics
2.62D	HKl	25.1.2016	Fixed Reply/Error/ID element to Reply/ID in operation descriptions
2.63D	HKl	26.1.2016	Changed GetScheduledEndDeviceControl to include parameters to define scheduled job time period and added execution time to the response
2.64D	HKl	2.2.2016	Fixed descriptions for GetScheduledEndDeviceControl and DeleteScheduledEndDeviceControl, added scheduledInterval description to ExecuteCircuitBreakerControl
2.65D	HKl	9.2.2016	Removed erroneous namespace from GetDipAndSwellLog example message

2.66D	HKl	18.2.2016	Fixed ExecuteProductChange example message, added result codes 2.39 and 2.40 to DeleteScheduledEndDeviceControl
2.67D	HKl	25.2.2016	Added note about product configuration to GetEndDeviceEvent
2.68D	HKl	4.3.2016	Fixed ExecuteCircuitBreakerControl scheduling specification to prevent scheduling DisconnectAndEnableButton command
2.69D	HKl	7.3.2016	Fixed Header/Verb in control operations
2.70D	HKl	12.3.2016	Added support for substation monitoring events in GetEndDeviceEvent and GetEndDeviceEventHistory. In addition the history can be retrieved from the device.
2.71D	HKl	4.4.2016	Added result codes 2.30 to GetEndDeviceEvent and GetEndDeviceEventHistory
2.72D	HKl	12.4.2016	Fixed example messages for ExecuteProductChange, GetEndDeviceEvent and GetEndDeviceEventHistory
2.73D	HKl	13.4.2016	Added result code 5.4 to ExecuteCircuitBreakerControl, added result code 1.1 to all operations, added example messages to GetScheduledEndDeviceControl and DeleteScheduledEndDeviceControl
2.74D	HKl	18.4.2016	Moved result code 2.39 to async response in DeleteScheduledEndDeviceControl
2.75D	HKl	25.4.2016	Added result code 6.1 to ExecuteCircuitBreakerControl
2.76D	HKl	10.5.2016	Fixed description for result code 6.1
2.77	HKl	31.5.2016	Published Linkware 1.9 release version
2.78D	HKl	15.6.2016	Fixed 5.1 and 5.2 result codes
2.79D	HKl	15.7.2016	Added EndDevice identifier to response payloads where missing, added payload to ExecuteExecuteContractUpload, ExecuteConfigurationUpload, ExecuteProductChange and DeleteScheduledEndDeviceControl asynchronous responses.
2.80D	HKl	19.7.2016	Added draft for GetBillingPeriod, minor changes to updated response payloads related to device identifier based on review, updated example messages of asynchronous responses related to device identifier changes
2.81D	HKl	10.10.2016	Added result code 2.47 to GetEnergySeries and GetBillingPeriod
2.82D	HKl	17.10.2016	Added new substation monitoring reading types to GetMomentaryReadings
2.83D	PSa	21.10.2016	Renamed the IEC interface's contents to use "usage point" as terminology, rather than "metering point". Both terms are valid in their respective domains. Therefore this document continues to use both terms. E.x. the "metering

			point" term is used in description texts and remarks sections since those sections use the internal system terminology.
2.84D	TPa	3.11.2016	Added new substation monitoring reading types to GetMomentaryReadings
2.85D	PVa	14.11.2016	Added EndDevice to GetMomentaryReadings response and UsagePoint to ExecuteManualBillingBreak response
2.86	TPa	15.11.2016	Published Linkware 1.10 release version
2.87D	TPa	7.12.2016	Added ReadingQuality to GetMomentaryReadings asynchronous response.
2.88D	PVa	18.1.2017	Added draft for ExecuteRelayControl and GetRelayStatus
2.89D	TPa	6.2.2017	Added draft for GetVoltageQuality
2.90D	PVa	15.2.2017	Fixed Names tag in GetEndDeviceRelay and ExecuteRelayControl
3.00D	MMa	27.3.2017	Renamed timestamp as timeStamp in the following async responses: ExecuteManualBillingBreak, GetEnergySeries, GetMomentaryReadings, GetBillingPeriod, GetEndDeviceCommunicationStatus, GetDipAndSwellLog*, GetEarthFaultStatistics, GetVoltageHitTableStatistics, GetVoltageStatistics, GetVoltageRecord, GetHarmonicsAndFrequencyStatistics, GetCurrentStatistics, and GetEndDeviceTopology* *Changed example message also.
3.01D	TPa	5.4.2017	Made Payload element optional in asynchronous replies. Payload is only included in successful responses.
3.02D	TPa	5.4.2017	ExecuteCircuitBreakerControl operation now supports two new commands: EnableButton and DisableButton to control button mode of the circuit breaker.
3.03D	PVa	11.4.2017	Added exceptions to GetEndDeviceRelay and ExecuteRelayControl.
3.04D	PVa	18.4.2017	Fixed GetEndDeviceRelay and ExecuteRelayControl examplemessages.
3.05D	TPa	20.4.2017	Added GetEndDeviceWANCommunicationStatus operation. Removed GetVoltageQuality operation.
3.06D	PVa	26.4.2017	Moved errors 2.30, 2.49 and 2.50 in ExecuteRelayControl and GetEndDeviceRelay to async response.
3.07D	PVa	4.5.2017	Added reason field to GetEndDeviceRelay.
3.08D	HKl	4.5.2017	Fixed relay duration to seconds instead of minutes.
3.09D	HKl	8.5.2017	Removed ethernet type from GetEndDeviceWANCommunicationStatus

3.10D	PVa	10.5.2017	Changed correct namespaces in GetEndDeviceWANCommunicationStatus examples
3.11D	PVa	10.5.2017	Fixed example response in GetEndDeviceRelay
3.12	Pva	11.5.2017	Published Linkware 1.11 release version
3.13D	MUu	15.5.2017	Fixed wrong response codes in GetDipAndSwell example
3.14	MUu	15.5.2017	Published updated Linkware 1.11 release version
3.15D	PVa	25.7.2017	Added new reading types to momentary readings
3.16D	PVa	1.8.2017	Added GetExtendedHarmonics
3.17D	PVa	8.9.2017	Added ExecuteCommunicationRoleUpload
3.18D	PVa	25.9.2017	Added configuredUsageKind to GetEndDeviceNANDiagnostics and GetEndDeviceTopology.
3.19D	MUu	29.9.2017	Added 10000 limit ot all 1..n ids requirements
3.20D	MUu	16.10.2017	Changed GetPowerOutageLog “None” to “All”
3.21D	PVa	25.10.2017	Removed UsagePoint and fixed examples in GetEndDeviceWANCommunicationStatus
3.22D	PVa	6.11.2017	Renamed ExecuteCommunicationRoleUpload to ExecuteCommunicationRoleChange
3.23	PVa	7.11.2017	Published Linkware 1.12 release version
3.24D	PVa	16.2.2018	Added reading quality to GetExtentedHarmonics
3.25	PVa	28.3.2018	Published Linkware 1.13 release version
3.26D	PVa	19.4.2018	Updated Linware Common document version
3.27D	PVa	19.4.2018	Published Linkware 1.13.1 release version
3.28D	MUu	7.5.2018	Removed 5.2 error status from synchronous responses
3.29D	AJo	18.6.2018	Added new Reading Types for Multi-utility registers
3.30D	PVa	28.6.2018	Fixed typo in software fuse control, upper limit for totalPowerLimit is 125000 instead of 12500
3.31D	PVa	23.8.2018	Removed 5.2 error status from async responses
3.32D	PVa	6.9.2018	Removed warning codes 2.26 and 2.32
3.33D	PVa	12.9.2018	Removed error 2.36 from GetEndDeviceNANDiagnostics
3.34D	VLa	12.9.2018	Clarified how the button mode works in ExecuteCircuitBreakerControl and added a diagram of state transitions.
3.35	PVa	12.9.2018	Published Linkware 1.14 release version
3.36D	PVa	18.9.2018	Added ExecuteHanControl method.
3.37D	PSa	9.10.2018	Altered ExecuteSoftwareFuse totalPowerLimit to be allowed from 500 wats upwards, as is in Gateware Job Management API. Updated the example request and response to contain a valid value 1000 instead of previously mistyped 100.
3.38	PVa	31.10.2018	Published Linkware 1.15 release version

3.39	PVa	5.12.2018	Published Linkware 1.15.2 release version
3.40	VLa	25.1.2019	Updated chapter 3.1.1 with new figure of circuit breaker statuses and added LocalDisconnect and LocalReconnect information to the async reply.
3.41	Pva	4.3.2019	Published Linkware 1.15.5 release version
3.42	Pva	5.3.2019	Clarified circuit breaker command explanations.