



Course 161
Engineer Role:
MDUS
Troubleshooting

2015-10-22

Prerequisite

- **Course 160**
- **Experience with SAP (<http://go.sap.com/>)**
- **Experience with AMR**

Helps you with:

- **Knowing how to analyse the SOAP logs**
- **Knowing how to analyse the Meter Read Requests**
- **Understanding and troubleshooting the Meter Model as mirrored from SAP to MDUS**
- **Understand when Meter Reading Requests are honored**

Once you are done with this Course, you should be able to:

- Check why a meter reading is not updating to SAP
- Check if a Meter definition exists properly on MDUS
- Check if a Meter multiplier and data is consistent
- Resend a Meter Reading to SAP
- Resend a SAP Message to MDUS
- Create Virtual MDUS reading

HOWTO Analyse SOAP logs

1. General SOAP mode

All SOAP between SAP and MDUS, in both directions, is in the form of Messages that are sent. There are no RPC kind of SOAP, where the same SOAP message waits for a reply from the implemented function on the server. This makes the SOAP a lot more robust. The SOAP messages can be envisaged as a single XML structure, which is essentially a single nested structure of values.

2. How to choose message logs to view

Log in; Go to the Overview Screen (Home); Select the relevant MDUS entity (e.g. Production)

Go View → MDUS log

This is a Selection Screen, where you can choose which messages to see:

- **The Start and End Date & Time is self explanatory and should be entered in the SQL format
YYYY-MM-DD hh:mm:ss**
- **The MDUS Msg ID is a number unique per message per PNPSCADA server over all MDUS entities on that server. A comma separated list may be specified.**
- **The UUID is essentially a GUID (unique in the universe) assigned in SAP per message**
- **The ReferenceUUID is typically set for messages that is sent as a Reply or an Acknowledgement on another message. It would then contain the UUID of the original message**
- **The Function is the specific function called by SAP or MDUS – easiest way to know what to select here is to first select a lot of messages, and**

then take the specific one you want from the column in the report. This loosely corresponds to the drop list of functions in the MDUS Edit screen.

- Detail is the value of any field in the message. If any of the values match this value, the message would be selected.**
- Result Message is whether it was successful or whether there was some error. The easiest is also to run the report first for all values, and then specify the value as seen in the appropriate column for the specific kind of row required.**
- Double UUIDs can happen, for example in cases where you retry the same message from SAP to MDUS. If you want to avoid showing the same retried message twice or more times, you should check 'Do not list Double UUIDs'.**

When you have entered which messages

you want to see, push the Submit button to see the report.

This is the log of all XML messages sent between SAP and MDUS.

SAP will for instance send messages to 'create' meters, and to 'create' registers to read, and to create meter reading requests.

MDUS will for instance send messages back to send readings for previous meter reading requests that was created from SAP.

3. MDUS Log Report view

Here is shown the messages that was sent and received, one line per message, with various general fields.

You can view message details by clicking the value under the UUID column heading.

You can resent ALL the messages listed

to MDUS as though it was just sent from SAP, by clicking the link at the bottom of the report. Of course that would only apply to messages where the DIRECTION column's value is 'SAP->MDUS'

This can sometimes be handy if Meter Entities was not properly created, or meter register formats no properly created, or meter readings not properly created, for some reason. However it should not be necessary under normal circumstances.

4. MDUS Log Detail view

Here is shown all the Detail fields of the XML message, with the nested field name, and the value that was specified.

You can click the 'resend to myself' link to re-submit the message to MDUS as though it was just sent from SAP.

HOWTO Analyse Meter Read Requests

1. General Read Method

When SAP wants to read a meter register, it creates a Meter Reading document through one or more messages, which are recorded in a Meter Readings table in MDUS.

Typically, there would be multiple registers read per meter per date. Each one is a separate Meter Reading Document.

When a meter is read in, MDUS will check against the existing but outstanding Meter Reading Documents to see if there is any that can be honored, and if there is, it will send Messages of its own to SAP to report the register reading.

**2. How to choose readings to view:
Log in; Go to the Overview Screen
(Home); Select the relevant MDUS entity
(e.g. Production)**

Go View → MDUS reading docs

**This is a Selection Screen, where you
can choose which reading docs to see:**

- **The Start and End Date & Time is self explanatory and should be entered in the SQL format
YYYY-MM-DD hh:mm:ss**
- **The Meter Serial Number is the number of the meter, or the SAP device ID, of the meter read**
- **The Reading Document Number is the unique number assigned by SAP to a meter reading doc.**
- **The checkboxes are self explanatory**

**When you have entered which
messages you want to see, push the
Submit button to see the report.**

There is also a link at the bottom of this selection screen, to download a spreadsheet of all the defined MDUS meters, with their SAP device IDs.

3. Meter Reading Document Report

This is a table view, with one row per Meter Reading Document, of all the readings that SAP has requested that satisfies the Selection Criteria.

When a value is read, the SAP Value column gets filled in, and also the Date Fulfilled column. SAP is then supposed to Acknowledge receipt of this reading.

If MDUS has tried 5 times to send a value, it will give up. If you want MDUS to try again, select 'rollback update'.

HOWTO See Why Meter Readings are not Updating

1. Did SAP ask for the reading from MDUS?

Sometimes it happens that a meter has not been correctly configured as an AMI meter in SAP, and SAP doesn't even ask MDUS for a reading.

Therefore go to the Meter Reading doc report and search for the Meter Reading document number as it exists in SAP. If you do not find it, MDUS doesn't know about it, and the meter has probably been created as a non AMI meter. This is why your readings are not automatically updated.

You can also search for the Meter Reading document number in the MDUS log as a Detail value field. It is possible that MDUS for some reason did not mark the reading, so if you find it in the log

but not the reading docs, you can try to resend the message to MDUS.

However, if you also can't find it in the log, and the SAP consultants swear the readings were created ok, perhaps the PI guys can resend the messages? MDUS can not fabricate the reading documents from scratch, it needs the messages to be sent from SAP, and if it has no record of them, they need to be resent.

2. Did SAP 'create' the MDUS meter record (associating the SAP device ID with the actual entity on PNPSCADA)

When you download the spreadsheet on the Meter Reading docs selection screen, the Meter will not be listed there if SAP did not create the Smart meter record in MDUS by sending it the appropriate messages. If you download the csv and it is not there, this is why

your readings are not updating.

3. Did SAP create the appropriate Registers on the MDUS meter record.

If the row in the csv downloaded in step 2 has a 0 in the last column, no registers has been defined by SAP for this meter. That is why the readings are not updated.

If, on the Meter Reading Document report, the SAP Register column is a long number with a lot of zeroes in front, instead of an intelligible register description, SAP has not defined the same registers for this meter than it has asked for in the reading document. That is why the readings are not updated. (The long number is the unique register ID in SAP, and for resolvable registers, you can see the long number as a tool tip if you hover your pointer over the register descriptor)

If the appropriate registers does not exist, MDUS cannot fabricate them. Those messages that creates the registers needs to be resent to MDUS.

4. Does the meter entity exist on MDUS?

Try to select the meter entity in the Overview screen. Sometimes, a 13 digit number would map to an 8 digit number, e.g. 3201550644737 is the same meter as 55064473. If you can't find the meter, it has not been created in PNPSCADA yet (typically done by the Technician), and that is why you're not getting a reading.

5. If you do find it, Has the meter been read in?

If you do find it, but it is red in Overview when you select it, the meter has never

called in. That is why you're not getting a reading.

Go to the Edit → Meter Details of the meter. If the MAXDATE (last read up to date) of the meter is less than the 'Date asked for' on the meter reading doc report, the reading does not update because the meter has not been called in.

If the meter is called in, but still does not update, it might be that the profile is read in but there are no TOU register readings for the meter on a half hour boundary yet. Go Edit → TOU Billing Register Values. If there are no values listed, that is why your readings does not update.

You probably need to read the meter after a Bill Reset event on the meter, before the readings would be sent through.

(in some cases, where the reading does

not advance at all, zero values can be put in as initial values. Other algorithms might also slow this down in future, e.g. on season change, but that is still to be determined)

- 6. It is possible that you have enabled the Validation sub-system on your MDUS entity, and that the meter has been invalidated. If you go to the Meter Validation screen and find your Meter there, with an invalid from date of before the reading date, that would be why your meter is not updating. Fix the fault on the meter or meter data, and then Validate the meter. After that, on subsequent reads, the readings should go through.**

HOWTO See Why Meter Readings are Wrong

Sometimes you will get queries about some of the readings, that it looks wrong, for various reasons e.g. that the reading went in reverse, or that the reading is too high.

When this happens, the first step is always to view your Meter Event Log for the month surrounding the reading, and see if there were any Audit events. There would usually be some events at the time of the wrong reading that should have alerted you to the wrong data.

If you use the Validation sub system of PNPSCADA, you can set such events to Invalidate data on a meter, and in the MDUS edit screen, you can set the MDUS not to return such values.

However, if this is not the case, go to your Profile Graph adjoining the reading, and see if you can see any obvious disruptions to the normal usage pattern.

Although the full scope of troubleshooting the underlying problem is beyond the scope of this course, some examples of problems are that it could be that a VT fuse has blown, or that there was some other thing on site that went wrong. In some rare cases there might even have been a data corruption due to communication corruption, or the Billing ratio might also have been applied wrong: usually in such a case, if the bad data is younger than 3 months, you can 'fix' the data by setting the MAXDATE back to before the problem, and reading in the meter again.

If that doesn't work, you'll have to fix the data manually, or call technical PNPSCADA support.

However, if the data looks right, and the reading sent to SAP is still wrong, you can try to do a Virtual MDUS Reading (Tools → Create Virtual MDUS Reading)

This is not to be confused with a normal Status 9 reading that is initiated from SAP side. It is a reading initiated on MDUS side, and it will create the meter reading document on MDUS side, as though SAP requested it, so that you can go and look at it and attempt to find the point at which the problem occurs. If the SAP Value for the virtual reading is correct, then the problem must have happened somewhere beyond PNPSCADA. However, if the SAP Value in the Meter Read log of the Virtual Reading is also wrong, then the problem still exists on PNPSCADA.

This functionality can also be used as a 'dry run', after data was fixed, to make sure the readings to SAP will go through

fine if they are re-issued.