ION Tips and Tricks

Q&A Session

PowerLogic ION Users Conference 2009

Kevin Batycki

Schneider Electric

Services & Projects Business

Manager, Solutions Sales Engineering

Phone: +1-250-652-7126

Fax: +1-250-544-0217

Mobile: +1-250-704-6062

Email: kevin.batycki@ca.schneider-electric.com

Schneider Electric

Agenda

- Review:
  - The ION system architecture
    - meters, software
  - ION programming concepts
    - Modules, Linkages...
  - Your best ION friends
    - ION Reference, ION Template Document
    - Tech Support, (free, premium, priority)
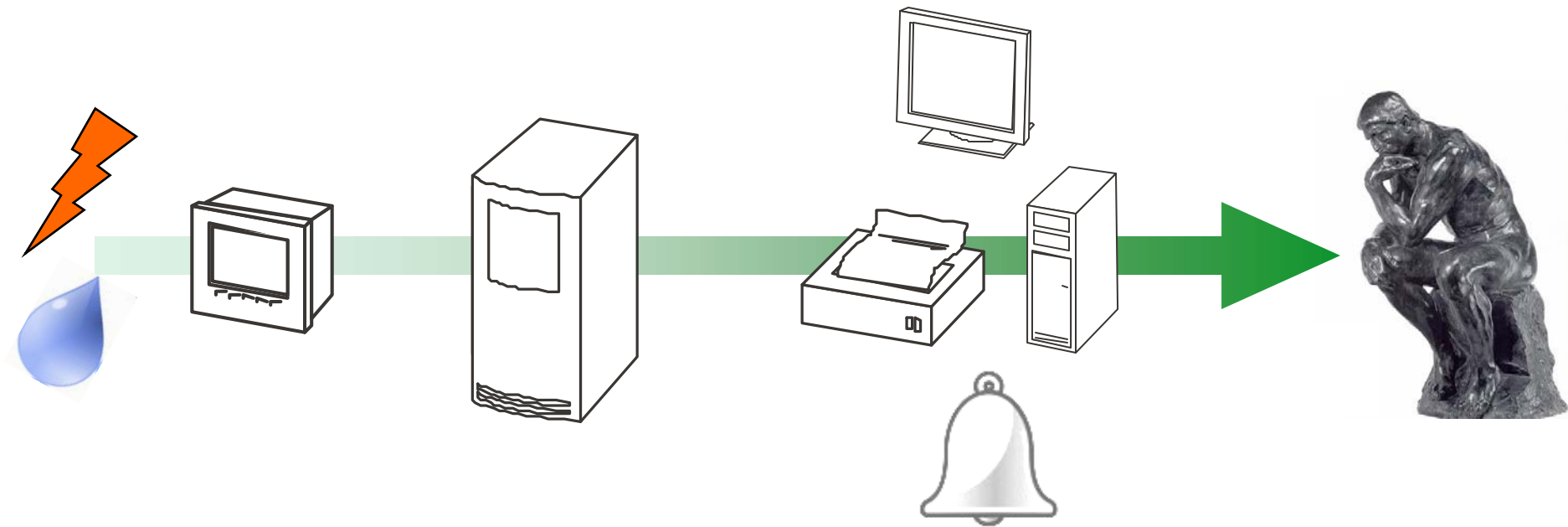   - Schneider Services
- Programming Tips
  - ION Setup vs ION Designer
  - Offline meters, VIP
- Sample Questions / Tips
  - Hopefully, some answers
  - Continue after lunch

ION System Architecture

Actionable Information
(Reports, HMI, control systems, alarms...)

The ION Architecture

- What drives all ION devices and software is the ION Architecture

- ION is the way our meters do what they do, and how they are programmed (by you!)

- For most meter installations, ION is invisible, as the meters typically do what you want OOB

- But ION can do so much more...

Review

- My favorite analogy...

When you have THIS...

But you NEED this...
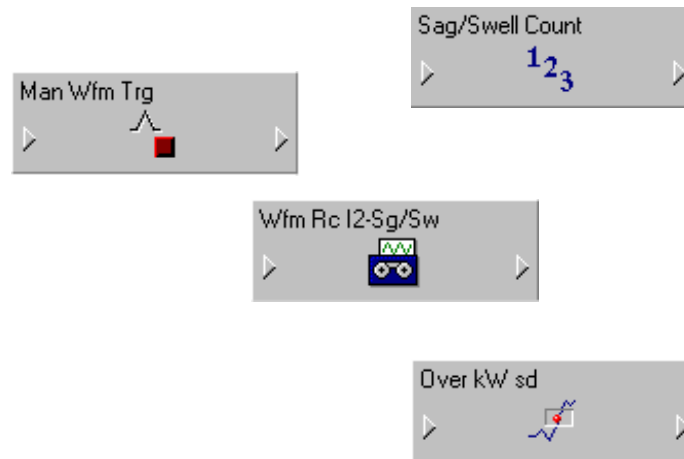
What do you do?

ION Module Primer

- Lego!
  - wheels, blocks...

- ION!
  - counters, data recorders...

Sag/Swell Count
1 2 3

Man Wfm Trg

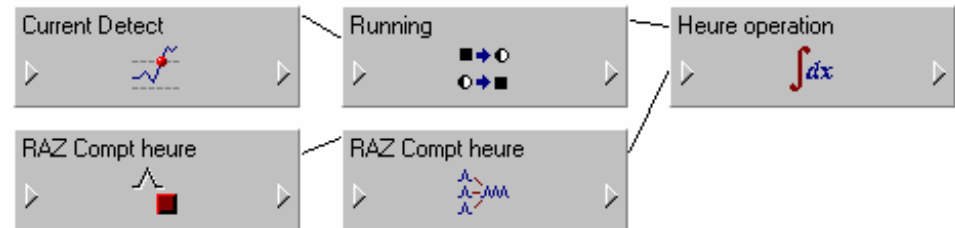Wfm Rc I2-Sg/Sw

Over kW sd

ION Module Primer

● Lego!

   ● put the blocks together to make a sports car...

● ION!

   ● link the modules together to make a...

ION Module Primer

- The only limitations are...
  - does my meter have the inputs and outputs necessary to do what I want?
    - volts, amps, contacts, analogs...
  - does my meter have the modules necessary to do what I want to do
    - type and quantity...

- Not all of it has to be done in the meter
  - ION software can talk to the meter and do this fun ION stuff too...
  - You can integrate non-ION stuff, like PLCs, into the mix...
    - ION meters and software can read and control third party devices using Modbus and other protocols, or hardwired connections...

Your Best ION Friends

- ION Reference
  - Detailed descriptions of every ION module type, and how they work
  - http://global.powerlogic.com/library/technical_documentation/protocol/ION_Reference.chm
- ION Template Document
  - Describes the ION implementation and capabilities of every meter
  - http://global.powerlogic.com/library/technical_documentation/ION_device_template_reference/IONDeviceTemplateReference.exe
- Online Knowledgebase
  - http://www.powerlogic.com/kblogin.cfm
- Tech Support
  - 1-866-466-7627
  - Free Basic Support
  - Priority Support
  - Premium Support
- Schneider Training
  - Fundamentals, Administrator, Programmer
- Schneider Canada Services Engineering

Programming: ION Setup vs ION Designer

- ION Setup
  - Stand-alone (and free!) configuration and viewing software
  - Download from Powerlogic.com
  - Non-graphical, but easier to use for basic setup
  - Supports advanced setup, but less intuitive
  - Supports copy and paste of complete meter frameworks
- ION Designer
  - Part of ION Enterprise suite
  - Graphical interface
  - Complete programming control of ION devices
  - Supports copy and paste of complete or partial meter frameworks

ION Setup Tips

- **Basic Mode**
  - Designed primarily for Utility meter shop use, allows you to quickly and easily set up the meters' default settings
    - Scaling
    - Communications
    - Basic Logs
    - PQ
    - Displays
  - "Self documented" Setup Assistants automatically selected for each meter type and firmware version
  - Does not allow you to get to all the meters' internal programming, or add new capabilities
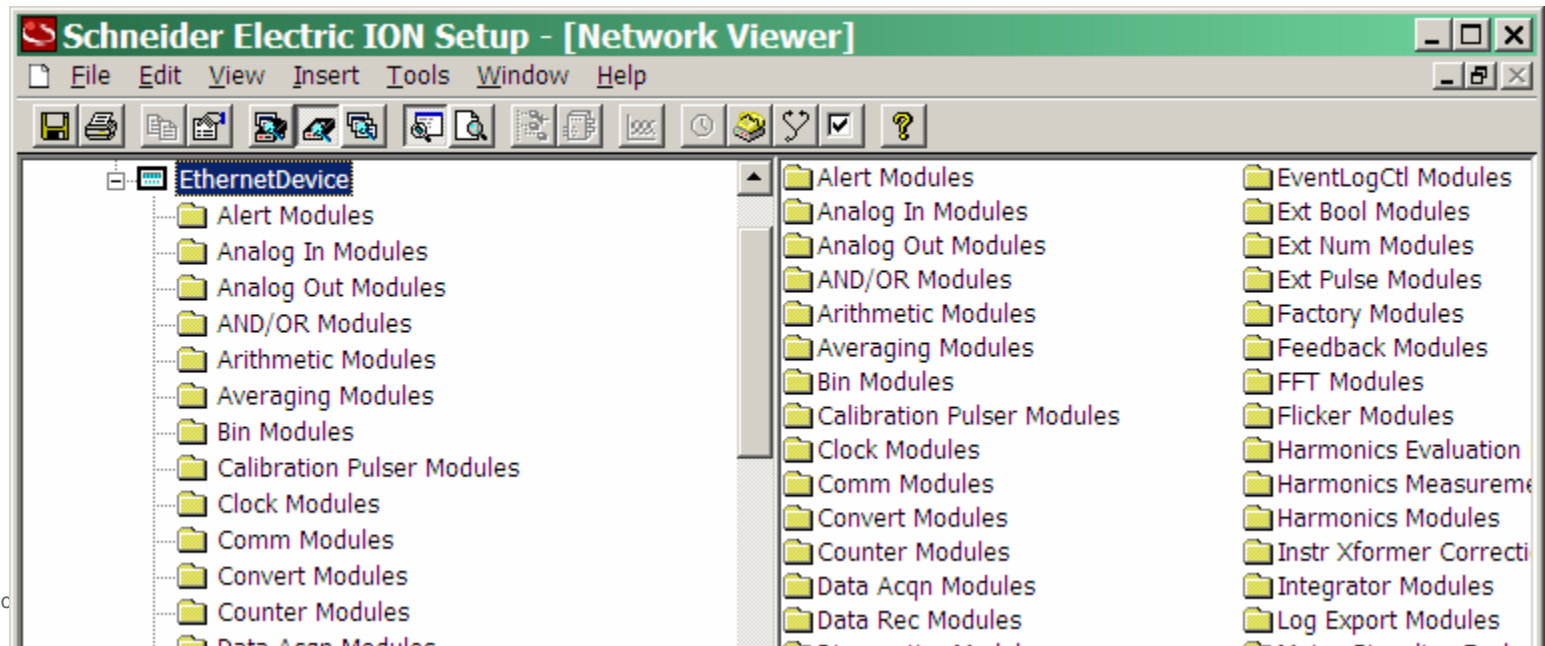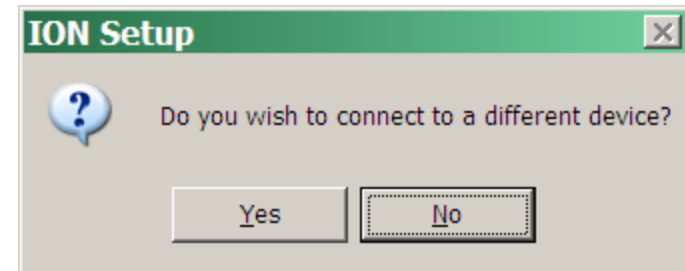
ION Setup Tips

- Advanced Mode
  - Gives you almost complete access to the meter's capabilities
- Access:
  - Exit the Setup Assistant
  - Choose 'No" when prompted if you want to connect to a new device
  - ctrl-click the meter icon

ION Setup

? Do you wish to connect to a different device?

[Yes] [No]

Schneider Electric ION Setup - [Network Viewer]

File Edit View Insert Tools Window Help

EthernetDevice
- Alert Modules
- Analog In Modules
- Analog Out Modules
- AND/OR Modules
- Arithmetic Modules
- Averaging Modules
- Bin Modules
- Calibration Pulser Modules
- Clock Modules
- Comm Modules
- Convert Modules
- Counter Modules
- Data Acqn Modules

Alert Modules	EventLogCtl Modules
Analog In Modules	Ext Bool Modules
Analog Out Modules	Ext Num Modules
AND/OR Modules	Ext Pulse Modules
Arithmetic Modules	Factory Modules
Averaging Modules	Feedback Modules
Bin Modules	FFT Modules
Calibration Pulser Modules	Flicker Modules
Clock Modules	Harmonics Evaluation
Comm Modules	Harmonics Measureme
Convert Modules	Harmonics Modules
Counter Modules	Instr Xformer Correcti
Data Acqn Modules	Integrator Modules
Data Rec Modules	Log Export Modules

ION Setup Programming Pros and Cons

- Pro:
    - Basic mode is extremely easy to use
    - Advanced mode:
        - All modules can be viewed individually
        - You can view, modify, create or delete any module, setup register, etc
        - You can see input and output register values by holding SHIFT when switching tabs
- Con:
    - You cannot view the framework graphically like you can in ION Designer
    - You cannot add comments like you can in ION Designer
    - You cannot (easily) build controls for new functions
        - Accomplished through customizing a text file for that meter
        - Way beyond the scope of this seminar...
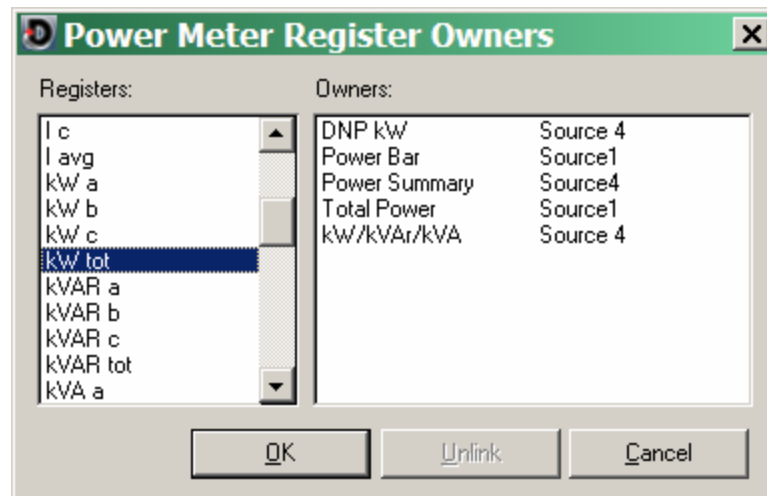
ION Designer Tips – Module Navigation

- You can see register values
 - Shift-click on the input or output triangle to get a one-shot read of the register values

- Find "register owners"
  - Right-click on the output triangle to find out 'who is using this value'

ION Designer Tips – Linking

- Control-clicking when selecting an input allows you to link to setup registers as well as output registers
- Example:
  - Create a standard framework to alarm on current, but based on the CT Primary reading
  - This framework could be loaded in any meter, regardless of the buss sizing
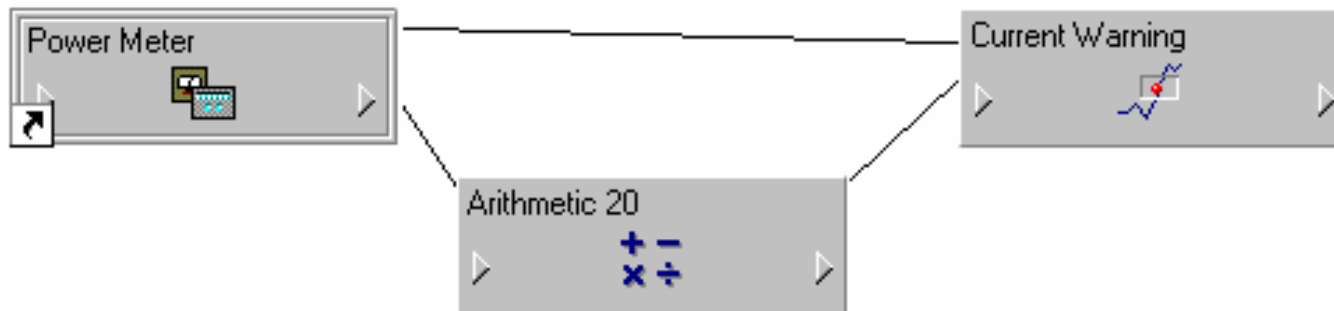
ION Designer Programming Pros and Cons
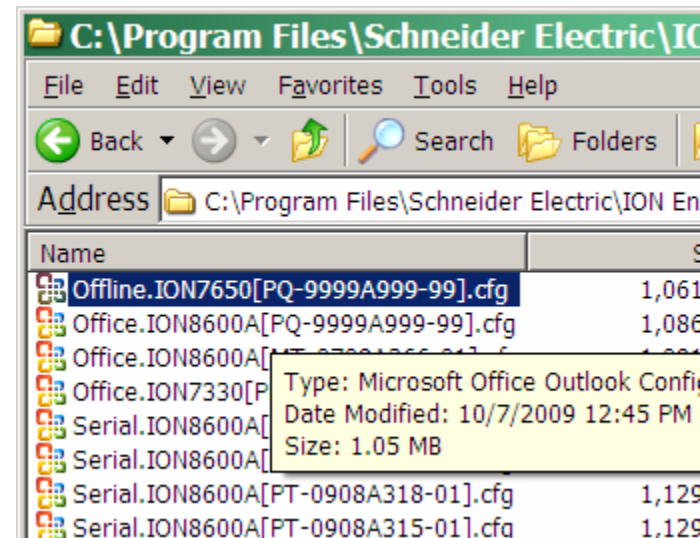
- Pro:
  - Graphical view of meter configuration
  - All modules can be viewed individually
  - You can view, modify, create or delete any module, setup register, etc
  - You can see input and output register values by holding SHIFT when switching tabs
  - Can use Vista alongside to view/control meter during programming
- Con:
  - Not as good as ION Setup for copying/pasting entire meter images

ION Setup / Designer Tips

- Use Designer for complex functions
- Depending on how complex, use ION Designer to paste the smaller frameworks into another meter if this is necessary
- If too complex, use ION Setup to save the entire meter setup then push into another meter
  - If you do this, ION Designer won't know how to arrange the new modules

Newly Created Modules

  - You can fix this manually in Designer (tedious), or replace the meter's CFG file (in ION Enterprise's \config\diagrams\nd folder) with a copy of the original meter's CFG file
    - Copy the name of the new meter CFG file
    - Delete that CFG file
    - Duplicate the original CFG file
    - Paste the name of the new meter CFG file

C:\Program Files\Schneider Electric\IO

File   Edit   View   Favorites   Tools   Help

Back ▼ ⬤ ▼ 🗁   🔍 Search 📁 Folders

Address 🗁 C:\Program Files\Schneider Electric\ION En

Name	
Offline.ION7650[PQ-9999A999-99].cfg	1,061
Office.ION8600A[PQ-9999A999-99].cfg	1,086
Office.ION8600A[...	
Office.ION7330[P... Type: Microsoft Office Outlook Confi	
Serial.ION8600A[Date Modified: 10/7/2009 12:45 PM	
Serial.ION8600A[Size: 1.05 MB	
Serial.ION8600A[PT-0908A318-01].cfg	1,129
Serial.ION8600A[PT-0908A315-01].cfg	1,129

ION Setup and Designer Files

- **ION Setup:**
  - Uses DCF (Device Configuration File) files to store a meter's entire configuration except for:
    - Comms, Security, Log Mail, Modbus Master
  - You can also choose to not overwrite an existing meter's
    - Scaling, Clock, Nameplate, Energy, ITC
- **ION Designer:**
  - Uses FWN (FrameWork Node) files to store a collection of elements representing ION modules, as well as additional ION Designer information
    - Text blocks (for documentation)
    - Layout of modules within the ION Designer window
    - Colours, etc
  - Can handle potential conflicts when pasting
  - Can represent the entire meter if desired, but ION Setup is better and faster at dealing with entire meter frameworks
- **ION Setup and Designer files are not interchangeable!!!**

Programming Tips: Offline Meters

- Offline Meters:
    - ION meter images, compiled to run on your PC
    - Built in to ION Setup
        - Can be run independently however
        - Thus can be used with ION Enterprise as well
        - 'Pretends' to be an ION meter using your PC's IP address
    - Look in your ION Setup "Offline" folder for examples
    - See your Schneider contact for more examples
        - ION 7550, 7650
        - ION 8300, 8400, 8500, 8600
        - Virtual displays

```
C:\Documents and Settings\kevinb.MAIN_PML\Deskto
Installing default framework...

************************************************
*              ION Offline Programming
*            Alpha Version -- September 30, 2003
*            Copyright 2003    Power Measurement
************************************************


----------------------- DISCLAIMER --------------------
-- This program is a trial effort.  There are no official
-- plans to make this program a production product
----------------------- DISCLAIMER --------------------

Meter Type:          7650
Firmware Version:    B0014_7650

Type "?" for help

>
**** Client connected ****
```

Programming Tips

- Command line options:
    - -p <tcp port>
        - use <tcp port> instead of default 7700 port
        - useful if you want to run more than one offline meter at one time
    - -n
        - do not install default framework on startup
        - useful if you want to start with a 'blank slate'
        - meter will only have core and persistent modules initialy
    - -c <number>
        - allow <number> of TCP connections
        - default is one connection
        - useful to bump up if you want to test/access with more than one program at the same time (i.e. ION Setup and ION Enterprise)
    - -m
        - use Modbus RTU protocol instead of ION
    - -t
        - use Modbus TCP protocol instead of ION

Offline Meter Displays

- Mimic the actual meter front panel
- Shows exactly what the meter would
- You can control the meter, too
- ION 75/7650, ION 8x00
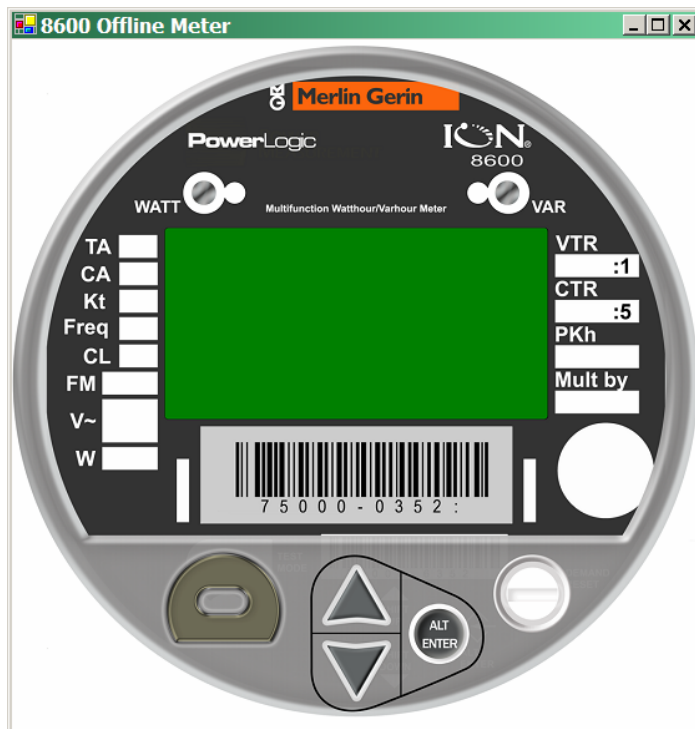
Saving Offline Meter Configurations

- When you shut down an offline meter, your changes are not saved
- Use ION Designer or ION Setup (I recommend ION Setup) to save the configuration
- This can be loaded back into the offline meter the next time you want to play with it
- The DCF can also be loaded into a real meter!

Sample Questions / Tips

- How–to's:
  - [How to get my meter to send me an e-mail](#)?
  - [How can I change my meters' web pages](#)?
  - [How to configure my front display on the ION7650](#).
    - ie: my meter is being used to monitor breaker information and I want to see that on one of the first displays.
  - Electricity isn't my only energy source. [How do I monitor water, steam, natural gas in the meter](#)?
  - [Can I work on ION programming without having an actual meter to talk to](#)?
- Tell me...
  - [I like to leverage Ethernet, even on my RS-485 meters. What's all this about Ethergate and the EGX300 / EGX100](#)?

How to get my meter to send me an e-mail?

- Alarms and notifications:
  - Alert Module
    - Sends out emails to a single address when triggered by any desired meter event
      - setpoints, pq events
      - status inputs
      - logic results
    - Message includes configurable message
    - You can link in up to four meter values and include these in the message

Low Voltage (573 VAC) at service entrance!!!

How to get my meter to send me an e-mail?
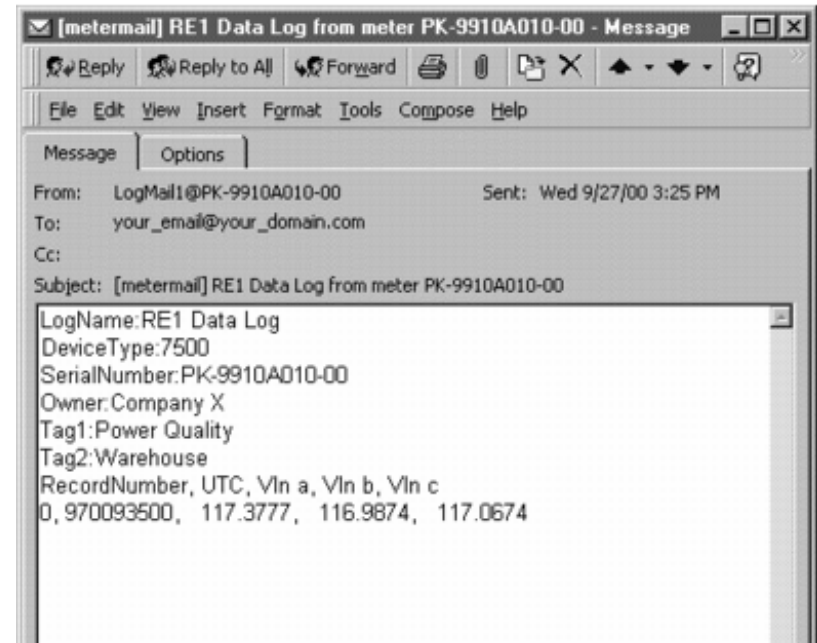
- Data Records:
  - Log Mail Module:
    - Sends out emails to a single address when triggered by any desired meter event
      - typically time based
        » daily, etc
    - Module links to any desired data recorder in the meter
    - Sends the contents of the data recorder in CSV or XML format


```
[metermail] RE1 Data Log from meter PK-9910A010-00 - Message

Reply   Reply to All   Forward

File  Edit  View  Insert  Format  Tools  Compose  Help

Message | Options

From:    LogMail1@PK-9910A010-00          Sent: Wed 9/27/00 3:25 PM
To:      your_email@your_domain.com
Cc:
Subject: [metermail] RE1 Data Log from meter PK-9910A010-00

LogName:RE1 Data Log
DeviceType:7500
SerialNumber:PK-9910A010-00
Owner:Company X
Tag1:Power Quality
Tag2:Warehouse
RecordNumber, UTC, Vln a, Vln b, Vln c
0, 970093500,  117.3777,  116.9874,  117.0674
```

How to get my meter to send me an e-mail?

- Meter Requirements
  - Ethernet port!
    - The meter must have an Ethernet port built in.
  - Communications Settings
    - The Ethernet port's Communications Module needs to be correctly configured with:
      - IP Address and Subnet Mask
      - Default Gateway (if meter on different subnet from mail server)
      - SMTP Server address (IP address or domain name of email server)
      - Primary, Secondary DNS Server (if DNS used for SMTP)
      - SMTP Timeout

How can I change my meters' web pages?

- All meters with Ethernet have default web pages embedded
- For advanced meters with Ethernet (ION 75/76/8x), you can define your own web pages
- ION Web Page Module
  - You can link up to 50 (50!) values into each Web Page Module
  - You set the 'location' of the web page under the meter's IP address
  - You can configure a title for the web page
  - You can adjust the refresh rate of the web page
  - You can apply a style sheet to the page to over-ride the default look and feel
- Accessing the Web Page
  - All you need is a browser to access the ".html" page
  - The meter also presents the page in ".xml" format
    - can be accessed by any xml reader or application

How to configure my front display?

- The meter screens are (surprise!) controlled by ION modules
- Display Module
  - Can display
    - Numeric values with or without timestamps
    - Status values
    - Phasor diagrams
    - Event Logs
    - Data Logs (first four parameters of any log)
    - Harmonic Histograms
  - Can configure how to display
    - Custom Labels

How to monitor other utilities?

- Water, steam, gas etc typically will come from basic meters that provide pulse or analog signals
- Happily, almost all ION meters have analog and/or status inputs
- ION Modules are used to convert these real-world signals into ION registers inside the meter
  - Digital Inputs
    - Input status, triggers when status changes
    - Can be combined with scaleable Counters to represent accumulated values
  - Analog Inputs
    - Scales the voltage or current input to represent the actual value
- These registers can be named anything you want ("LB Steam")
- These registers can be used like any other register
  - setpoints, data recorders, displays...
- Recorded data can be configured to appear as 'part of' the meter's own data, or as a unique 'downstream device' in ION Enterprise's database
  - See the Downstream Device application note on Powerlogic.com/support for details on this

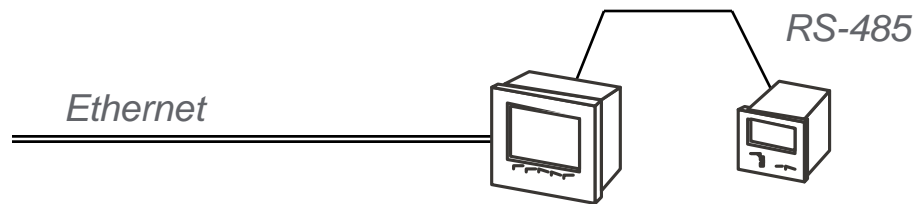# Can I work on ION programming without an actual meter?

- Yes!

- Offline meters...

Leveraging Ethernet?

- ION Meters with on-board Ethernet can also be used as access serially-connected meters

Ethernet *RS-485*

- This is "Ethergate"; it embeds the serial packet in IP
  - Works for any serial protocol
    - ION (ION over Ethernet)
    - Modbus RTU (Modbus over IP, *not* Modbus TCP)
  - This is equivalent to third-party converters like Lantronics, RuggedCom
- Support for this built in to ION Enterprise

What's this EGX thingy?

- Schneider Electric's EGX-100, EGX-300 and EGX-400 are external Ethernet to serial converters
  - Specifically designed for Modbus conversion
  - Also supports legacy Square D / Symax protocol conversion
  - Also provides internal web pages, data recorders similar to ION meter's internal capabilities
- Modbus Conversion
  - Serial Modbus RTU is converted to true Modbus TCP (a more commonly supported standard than Modbus over IP)
  - Legacy Square D / Symax protocols are also converted to Modbus TCP
    - Older meters like the Square D CM2's can be integrated into ION Enterprise or other software
- ION Support?
  - NO!!!
  - Don't try to use this with ION meters, unless you have the meter configured to speak Modbus RTU (ok for low end meters i.e. ION 6200)

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