SCADA and MEASUREMENT DATA ACQUISITION

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   - SCADA is for near time processing for time sensitive or operational decisions
   - Measurement is for Daily or Hourly data for financial and management decisions.
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   - How does it impact finance and accounting
   - How does the data get transferred to the F&A systems?
   - What are some of the key F&A systems used in the O&G business sector?

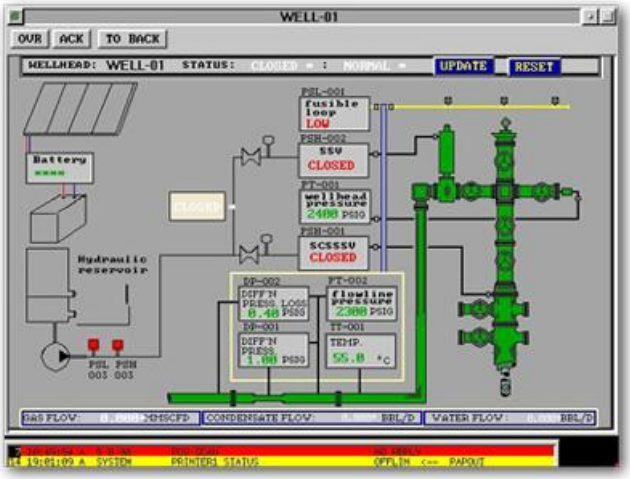
SCADA
Definition "Supervisory Control and Data Acquisition"

SCADA information in the energy sector is typically used for near real time decision making for well, pipeline or compressor station operation. It is also key information for displaying to SCADA screens for providing visual acuity in a concentrated view of the operation, such as a tank levels for a field, manage plunger systems, view alarms for an area, monitor communications and much more. You can visualize any aspect of a business from well, pipeline, communications performance, data storage, network performance, system performance and much more.
Think about the data used to urgent decisions and what data it requires, this fits the general SCADA description profile.

SCADA Data Screen Example
Master Screen of Single Well Control Panel, Integrated RTU & Telemetry System

Data Screen Example

Data Screen Example



By providing this data on screen and in near real time operators get a snap shot view that allows them to field technicians, prevent disasters, monitor security and improve productivity.

Collecting SCADA data points
Since SCADA data points are required very close to real time and every SCADA / Data collection system uses different methods of building lists for collecting data points. Essentially you build data lists through templates and schedules.

Remember that SCADA may be have real time requirements however SCADA is not the only reason for polling a device. The schedules and amounts of data should allow for openings in communication for measurement data collection as well as adhoc and control data acquisition. Or it should incorporate these requirements into the polling schedule and share that data via OPC, DDE or some other communications method between required clients. It should also save it to a database. This data should remain available to all clients as well providing daily hourly or log period data reporting.

EFM a.k.a. Flow Measurement Data
EFM Definition "Electronic Flow Measurement",
sometimes referred to as an historical data collection.

Virtually all flow measurement devices have protocols that are designed for the easiest and most efficient collection of Hourly, Log Period, Event, Alarm and Flow Measurement Data.

All of these components make up the entirety of measurement data.

Each SCADA / Measurement System will collect historical measurement data based on a schedule. These collections will store the data to a long term database. The long term database provides access for historical reporting from Back Office, Accounting and Reporting systems.

Due to the size of historical measurement collection data it should be scheduled such that it does not take SCADA and Operation off line for an extended amount of time.

A three day standard historical collection should take between 2 and 3 seconds from transmitted to receive at 9600 baud.

Typical Flow Data is received as a preformatted record,
As you can see in the example below.

EXAMPLE of a data record format

Daily Record Portion Day #1

Variable	Type	Data
Date	uint32	4CBF 5D4B
Sequence Number	uint16	EA00
Last Event Sequence Number	uint16	1C02
First Log	uint16	AB07
Last Log	uint16	BC07
Contract Hour	uchar	09
Extension	float	69AB 9844
Volume	float	1A01 A243
BTU	float	1B01 A243
Flowtime	uint32	C4EF 0000
Back Flow Time	uint32	0000 0000
Period Time	uint32	C4EF 0000
Alarms[3]	uchar	1400 00
Avg. SP	float	88A4 C442
Minimum SP	float	8EA4 C442
Maximum SP	float	8EA4 C442
SP Low %	float	0000 0000
SP High %	float	0000 0000
Avg. DP	float	7DC2 5042
Minimum DP	float	8FC2 5042
Maximum DP	float	8FC2 5042
DP Low %	float	0000 0000
DP High %	float	0000 0000
Tf	float	C4F4 BD42
Minimum Tf	float	BDF4 BD42
Maximum Tf	float	BDF4 BD42
Tf Low %	float	0000 0000
Tf High %	float	0000 0000
Verification Code	uchar	FF

A record like this might translate to a screen similar to this EFM example.

EFM screen example for Daily Flow Data in MCF

Client Number	MID	Meter Name	DateOn	DateOff	Tube/Plate	Hours	MCF
[redacted]	430	[redacted]	10/1/2006	10/2/2006	2.067 x 1.13	24	507
[redacted]	430	[redacted]	10/2/2006	10/3/2006	2.067 x 1.125	24	476
[redacted]	430	[redacted]	10/3/2006	10/4/2006	2.067 x 1.125	24	432
[redacted]	430	[redacted]	10/4/2006	10/5/2006	2.067 x 1.125	24	428
[redacted]	430	[redacted]	10/5/2006	10/6/2006	2.067 x 1.125	24	432
[redacted]	430	[redacted]	10/6/2006	10/7/2006	2.067 x 1.125	24	432
[redacted]	430	[redacted]	10/7/2006	10/8/2006	2.067 x 1.125	24	552
[redacted]	430	[redacted]	10/8/2006	10/9/2006	2.067 x 1.125	24	519
[redacted]	430	[redacted]	10/9/2006	10/10/2006	2.067 x 1.125	24	462
[redacted]	430	[redacted]	10/10/2006	10/11/2006	2.067 x 1.125	24	434

What are your integration hurdles?

1) SCADA vs EFM Request collisions from overlapping request schedules
2) SCADA and Measurement requests configured on multiple systems with the same schedule.
3) No time separation between SCADA and Measurement data requests.
4) Ill configured devices for the types of requests required.
5) No upfront consideration of what type of requests and their overhead is required for the communications backbone.
6) Polling schedules and template development should be driven by business needs.
7) Templates and requested data should be managed and reviewed periodically to maintain efficiency and not allowed to grow outside the bounds of efficiency for the backbone.
8) Business requirements for SCADA and Measurement data should be reviewed periodically and data collection adjusted for new business needs or changes in output formats for PGAS, Flowcal TOW etc…