APA Group's PI System

Presented by

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APA Group

Introduction

- About APA Group
- APA Group's OSI PI Journey and Roadmap
- PI Implementations
  - Meter Data Management System – APA Grid
  - NIMDS – Networks Interval Meter Data System
  - Data Challenges
- Solution Overview
- Summary

About APA Group

APA is Australia's largest gas infrastructure business

- **Gas transmission pipelines and storage**
  - Owning and operating two-thirds* of Australia's onshore transmission pipelines
  - Interconnected pipeline networks
  - Transporting approximately half the gas used domestically
  - Underground and LNG gas storage
- **Gas distribution networks**
  - Operating approximately a third* of the nation's gas distribution networks
  - Long-term agreement to operate Australian Gas Networks assets
  - Own the Central Ranges (Tamworth) network
  - Ownership interest in and operate the Allgas distribution network.
- **Other related energy infrastructure**
  - Developed and acquired complementary energy infrastructure, including gas-fired and wind-driven electricity generation, gas processing and electricity transmission

ASX Top 50

$9.8 B
MARKET CAP
AS AT 24 JUL 2015

Moody's: Baa2
(outlook Stable)
S&P: BBB
(outlook Stable)
CREDIT RATINGS

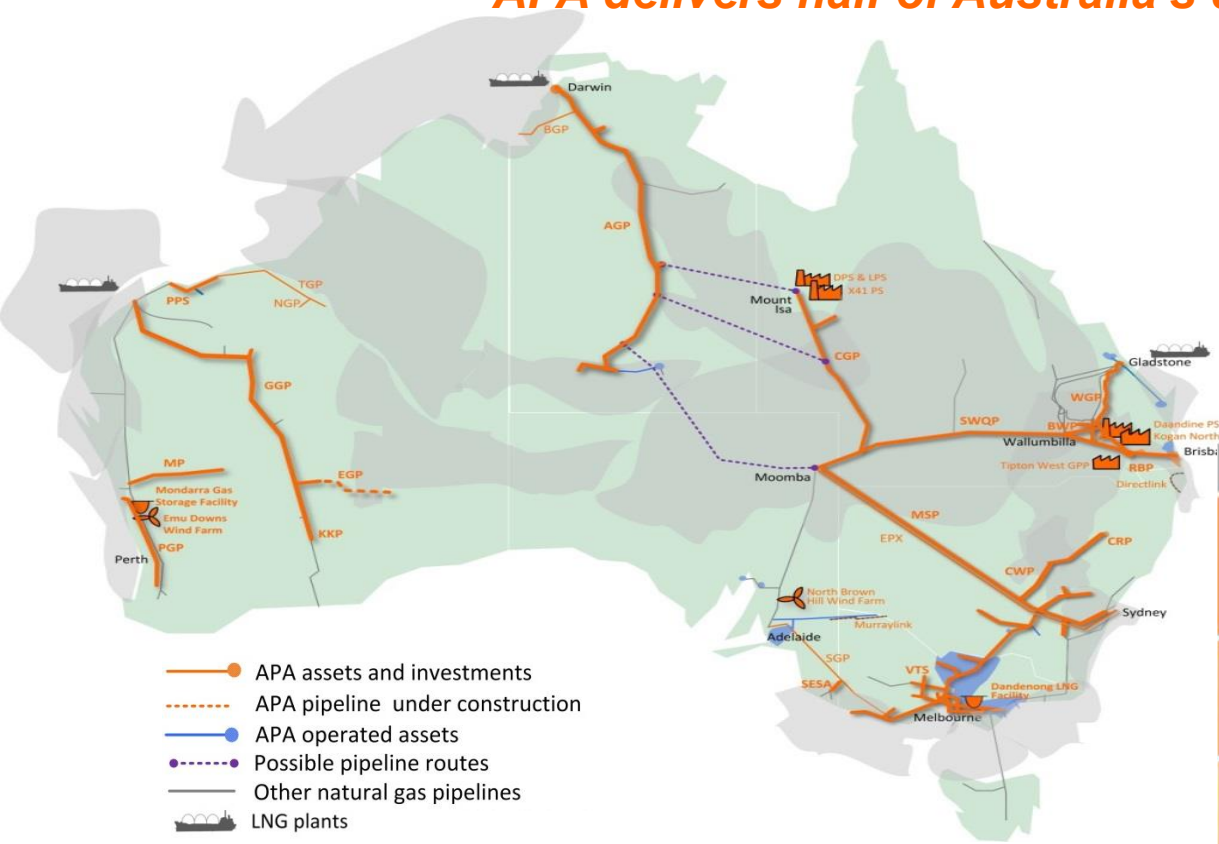
$19 Billion Assets

Employees More than 1,600

* By length

APA asset and investment portfolio

APA delivers half of Australia's domestic gas usage



Assets owned and/or operated

Gas transmission
14,744[(1)] km transmission pipelines
Underground & LNG gas storage

Gas distribution
27,100 km gas network pipelines
1.3 million gas consumers

Other energy infrastructure
585 MW power generation
244 km HV electricity transmission
Gas processing plants

Energy Infrastructure

Queensland
(1) Roma Brisbane Pipeline
(2) Carpentaria Gas Pipeline
(3) Berwyndale Wallumbilla Pipeline
(4) South West Queensland Pipeline

New South Wales
(5) Moomba Sydney Pipeline
(6) Central West Pipeline
(7) Central Ranges Pipeline

Victoria
(8) Victorian Transmission System
(9) Dandenong LNG facility

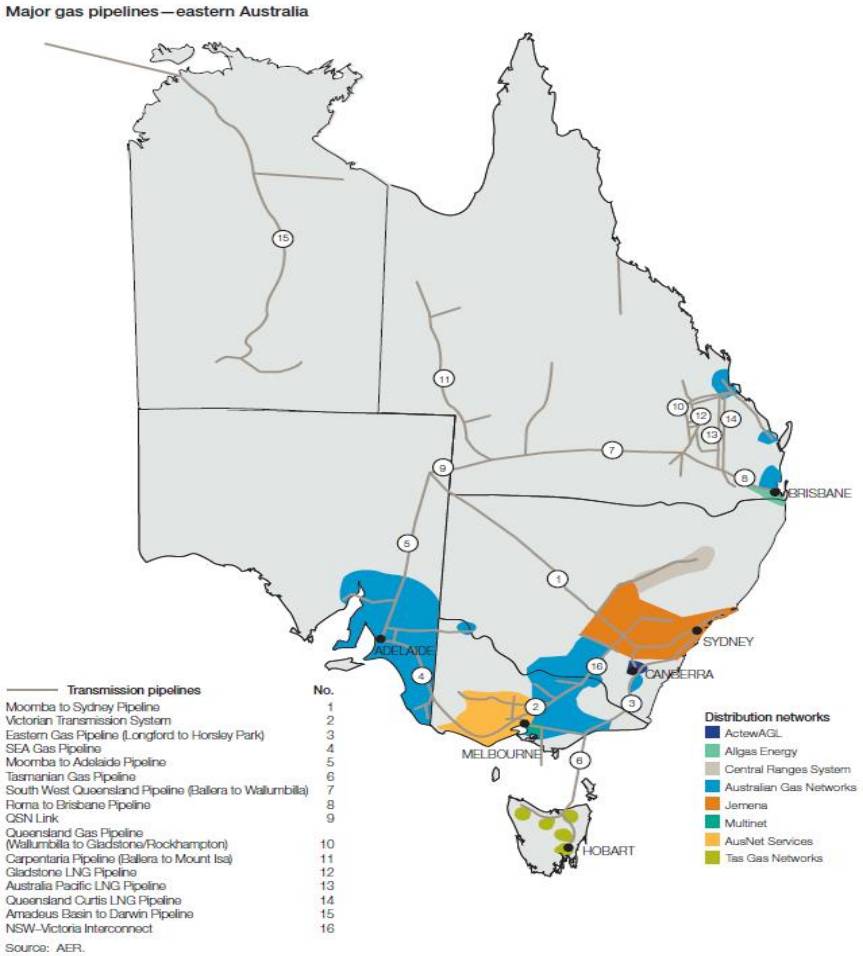
South Australia
(10) SESA Pipeline

Western Australia
(11) Pilbara Pipeline System
(12) Goldfields Gas Pipeline (88.2%)
(13) Eastern Goldfields Pipeline (under construction)
(14) Kalgoorlie Kambalda Pipeline
(15) Mid West Pipeline (50%)
(16) Parmelia Gas Pipeline
(17) Mondarra Gas Storage Facility
(18) Emu Downs wind farm

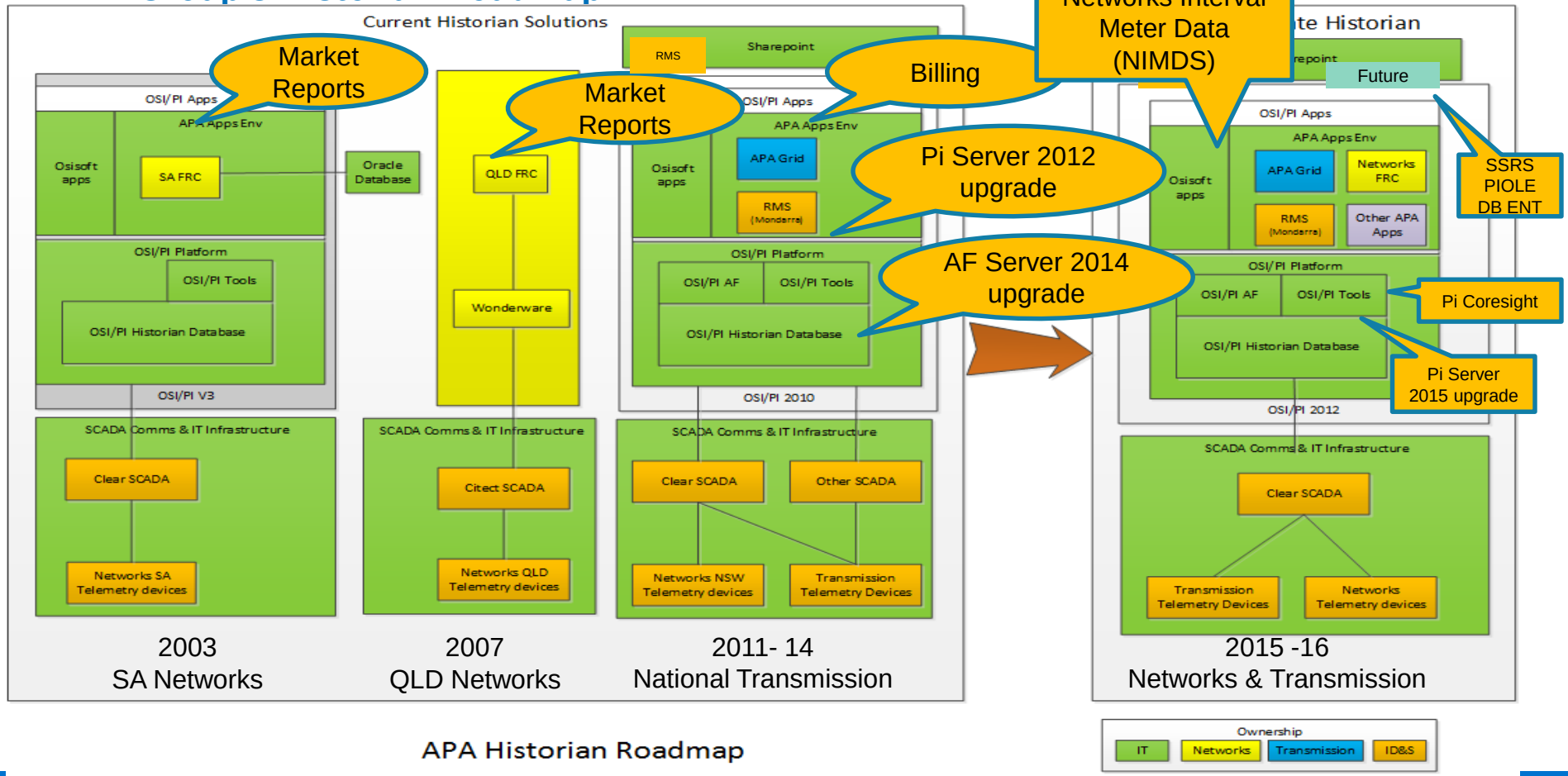
Northern Territory
(19) Amadeus Gas Pipeline

Gas Networks Operations

- Delivering gas to domestic and commercial use customers
- Daily consumption reporting to regulators (AEMO) and retailers for high demand customers
- Require Daily/Hourly telemetered reads of high gas demand customers

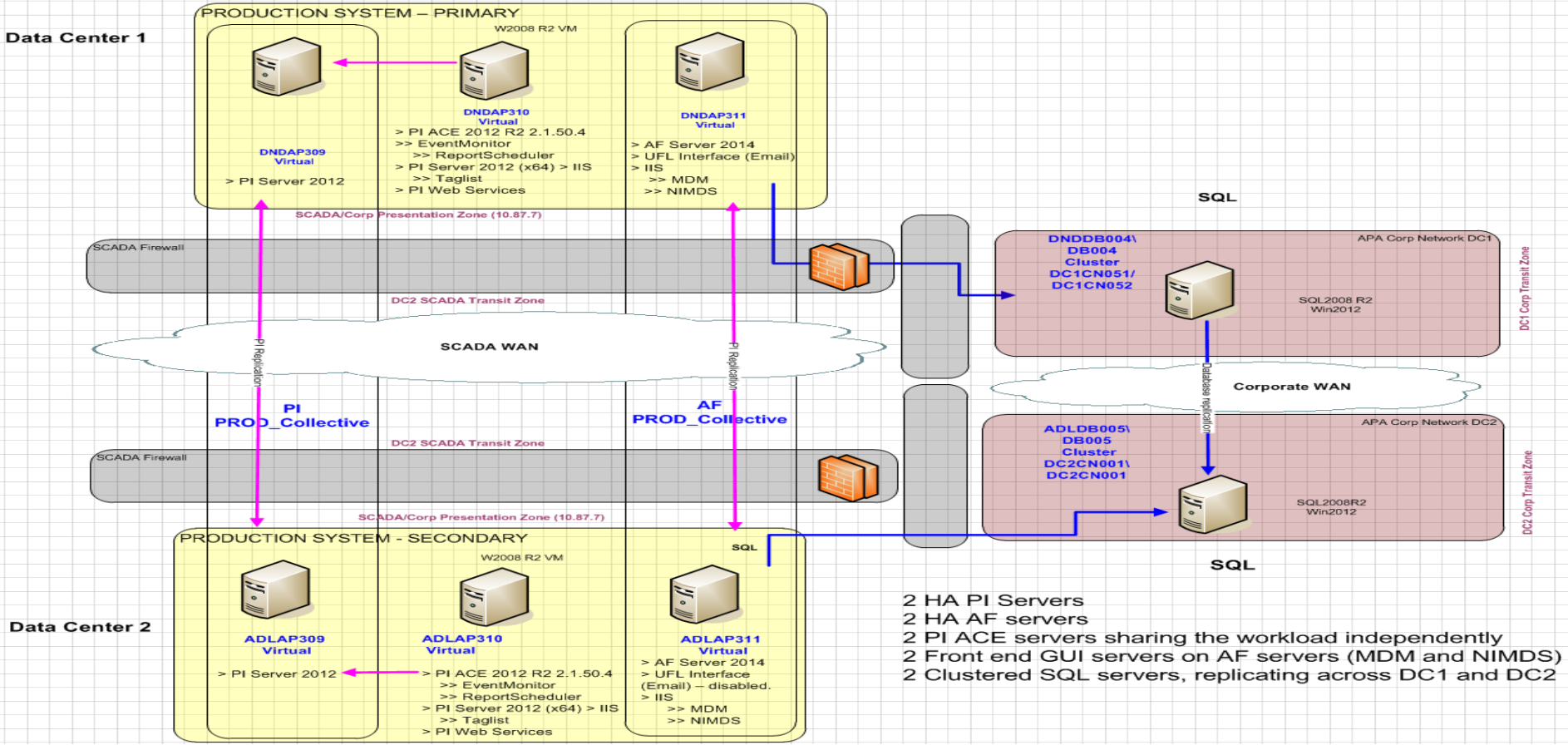


APA Group's Historian Roadmap

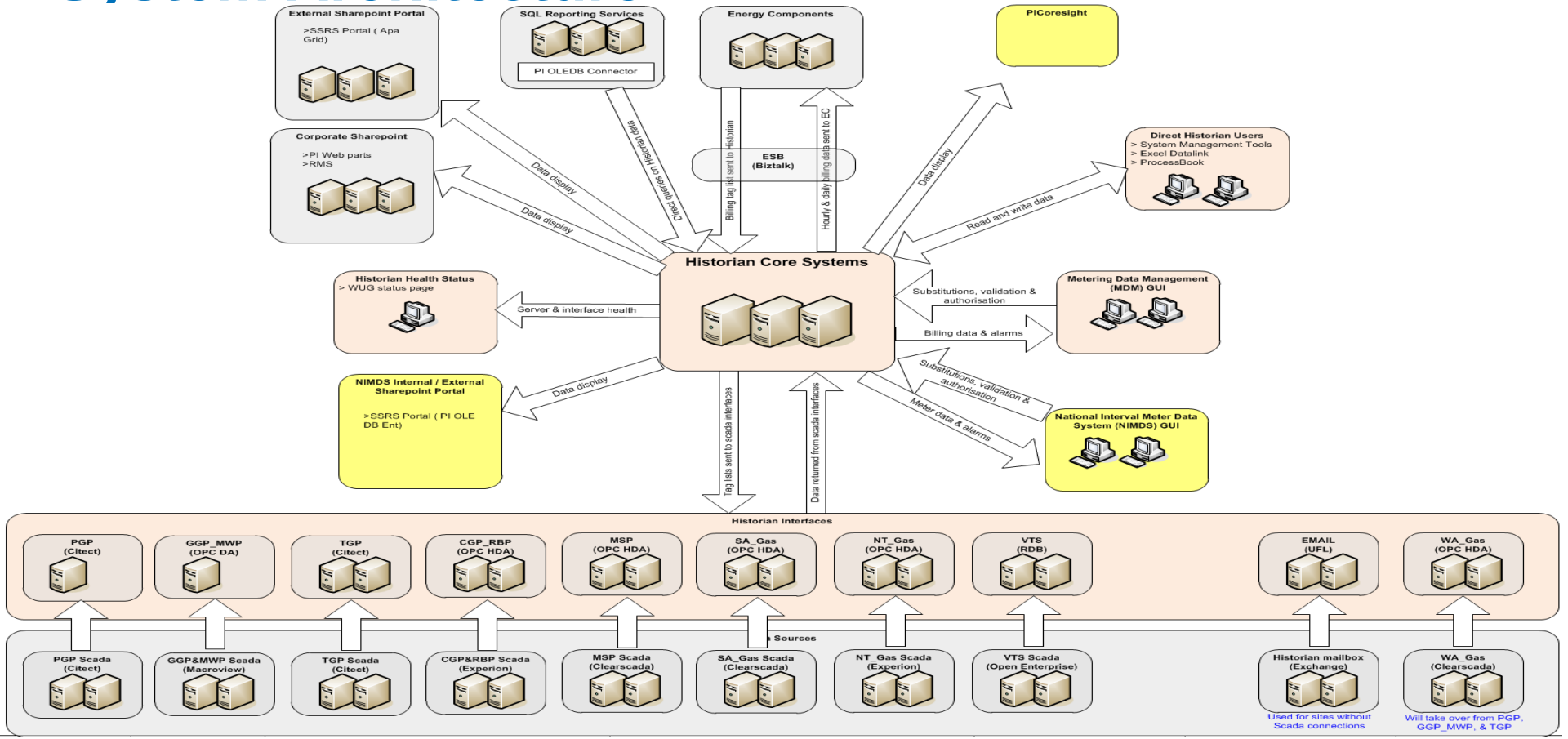


APA Historian Roadmap

System Architecture



System Architecture



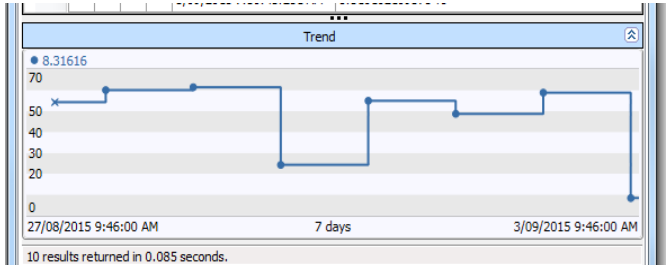
Challenges for Gas Meters

1. Selecting correct end of gas day value for a Meter
    - Reporting to regulator and retailers

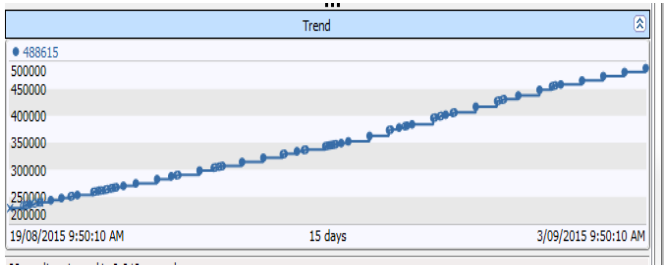
2. No End Gas day value available or data missing
    - Estimating
    - Substituting

3. What if the EOGD value is incorrect
    - Validation tests
    - Manual overrides

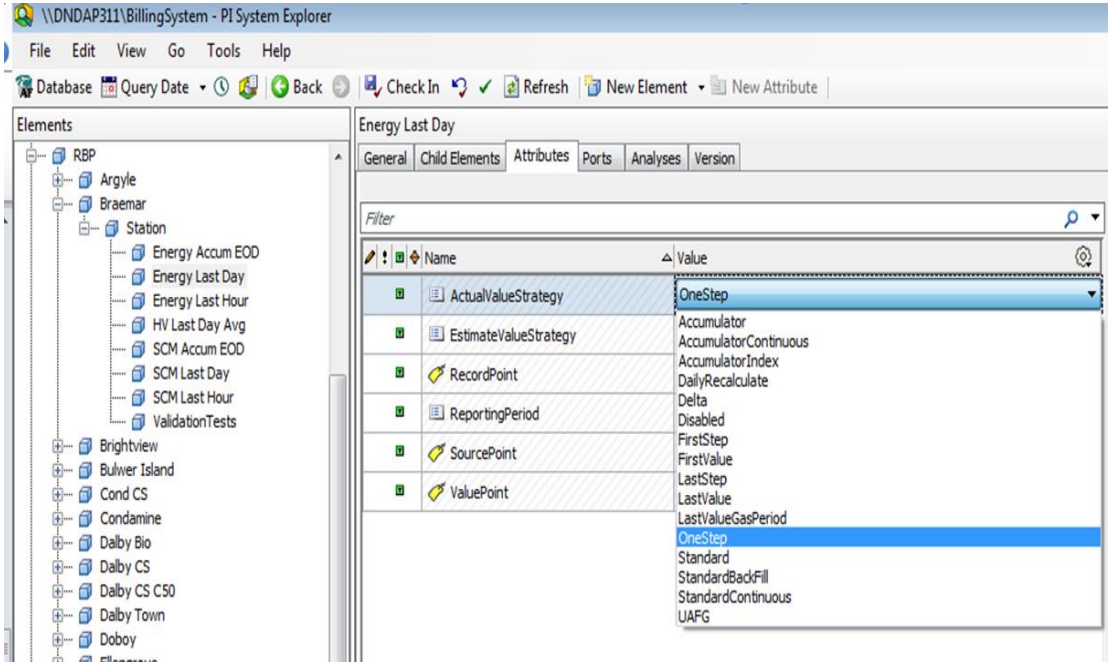
Selecting Correct EOGD Value



Step Change

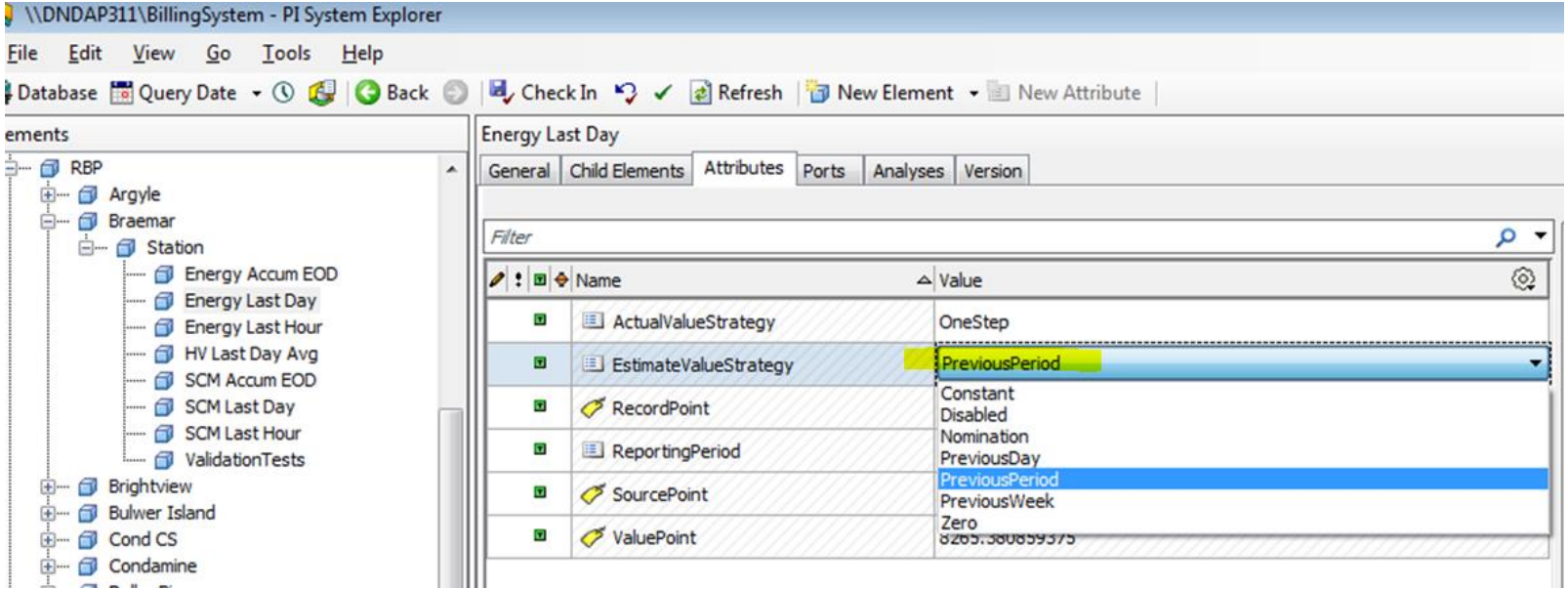


Accumulator Change



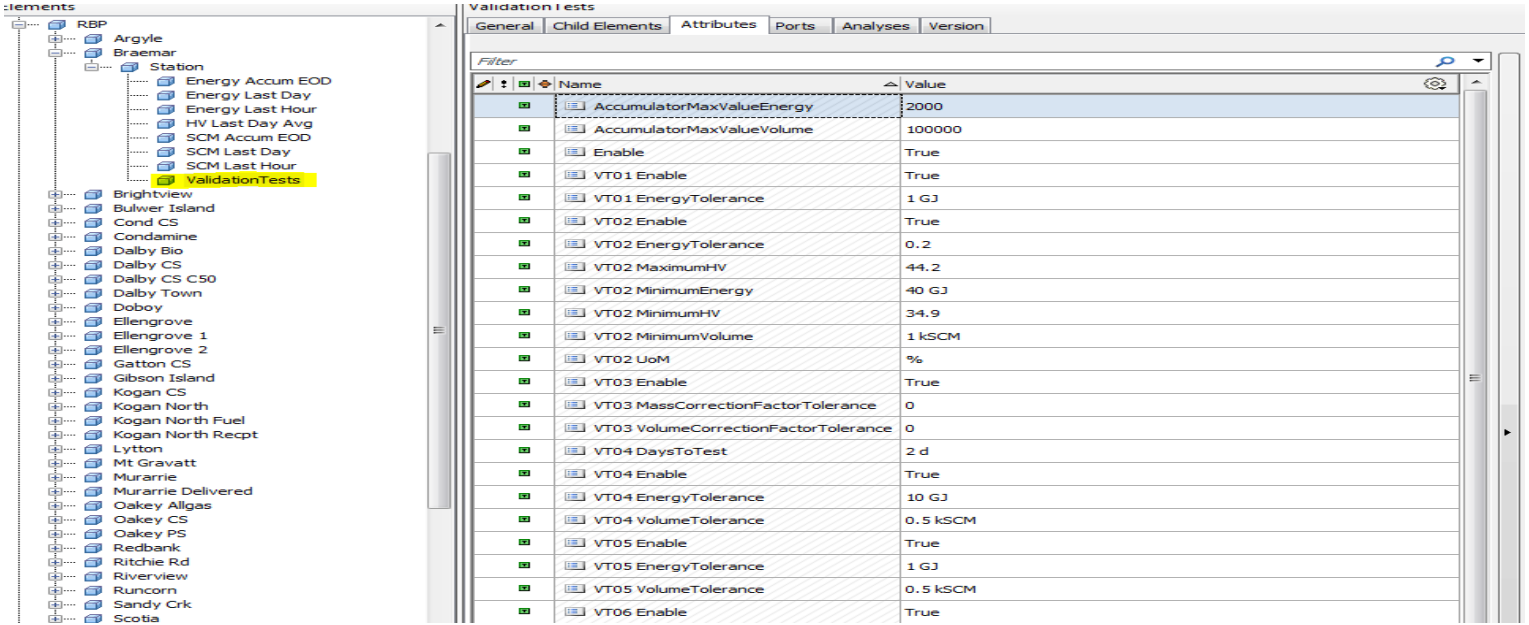
- Building Strategies using the PI SDK and PI ACE jobs, Eg One step , First step, Last Value
- Selecting strategies within the AF meter configuration

Missing Data



- Building Estimation Strategies using the PI SDK and PI ACE jobs, Eg Previous Period , Previous Day
- Selecting Estimation strategies within the AF meter configuration

Invalid Data



- Building Validation tests using the PI SDK and PI ACE jobs, Switch Validations on/off within AF
- Providing a Front end GUI for controllers to Acknowledge validation failures, override and correct data

3-Point Auditing System

1. Source Point Tag
   - Unchanged Raw Data

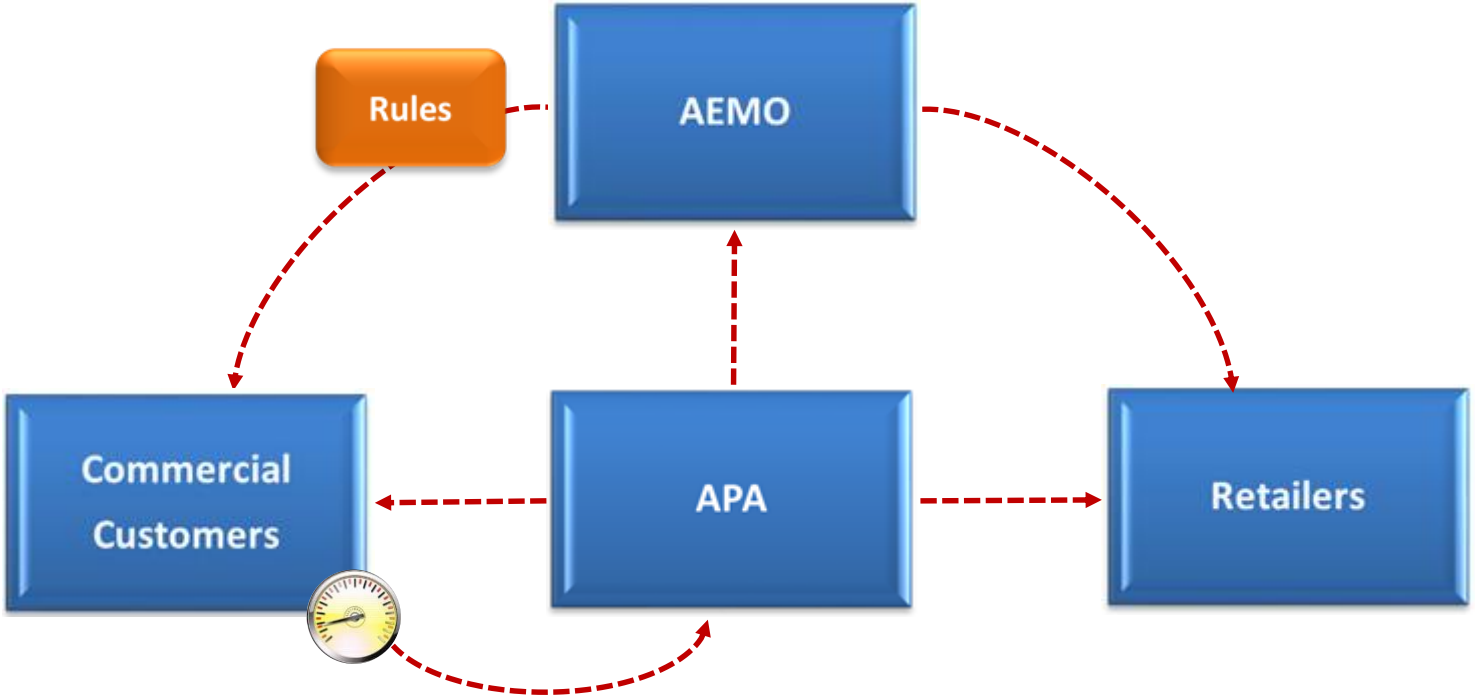
2. Audited Value Value Point Tag (AVVP)
   - Value selected to be reported
   - Edited data
     eg NTY.GT.BGP.WOT.GC.HV Last Day Avg.AVVP

3. Audited Value Record Point Tag (AVRP)
   - Audit trail of who changed what and when
     eg NTY.GT.BGP.WOT.GC.HV Last Day Avg.AVRP

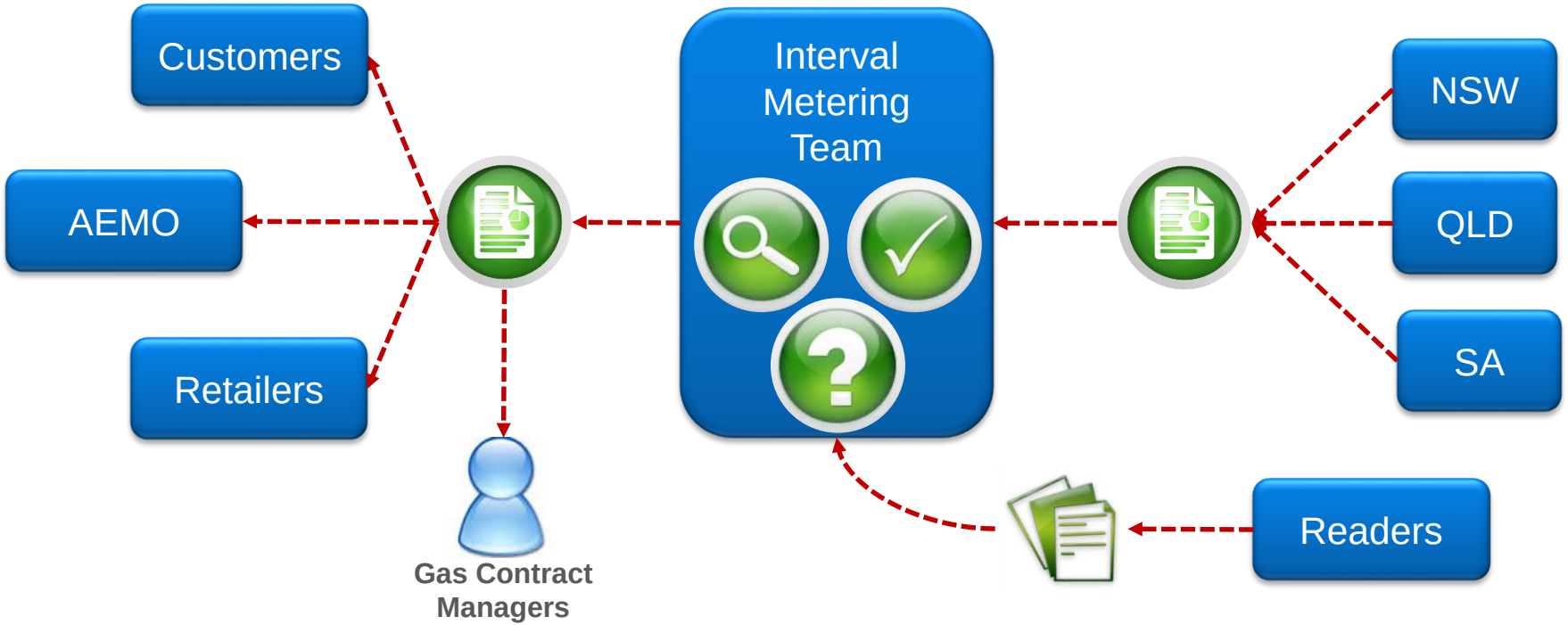
Value	Event Time
2015-08-26 07:32:18,37,2015-08-25 22:30:00,S,-,Reason Code: Other. Comment: test,PIPELINETRUST\thegia,	26/08/2015 8:00:00 AM

NIMDS

Full Retail Contestability

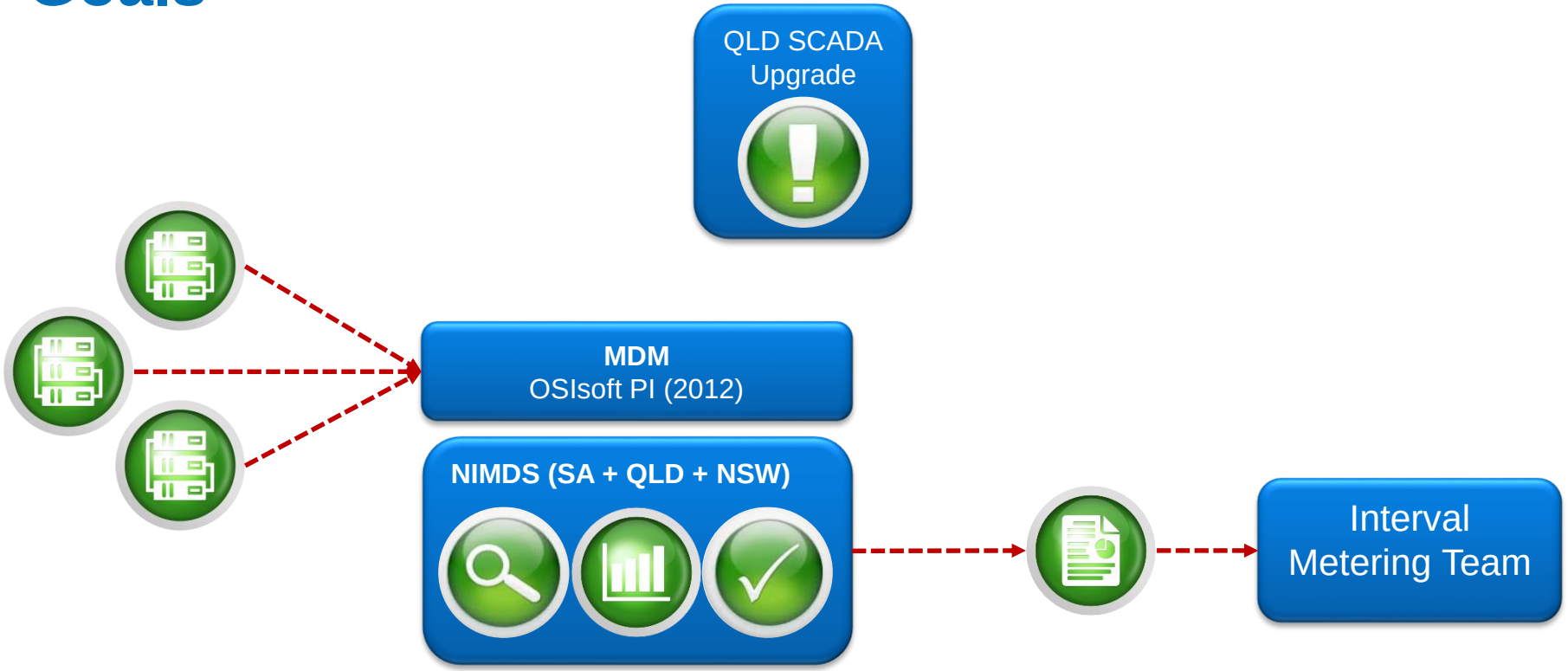


Managing FRC Data



Current State

Goals

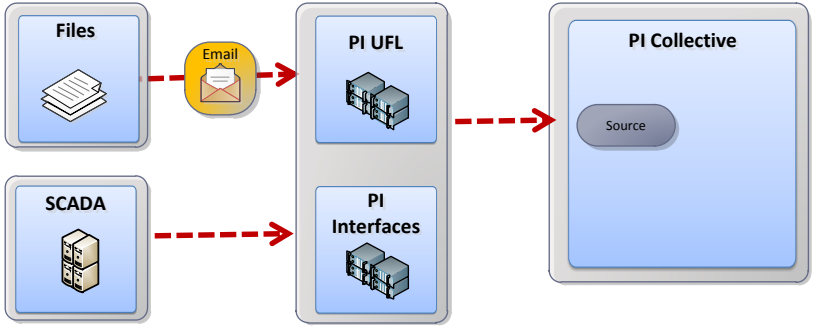


High-Level Requirements

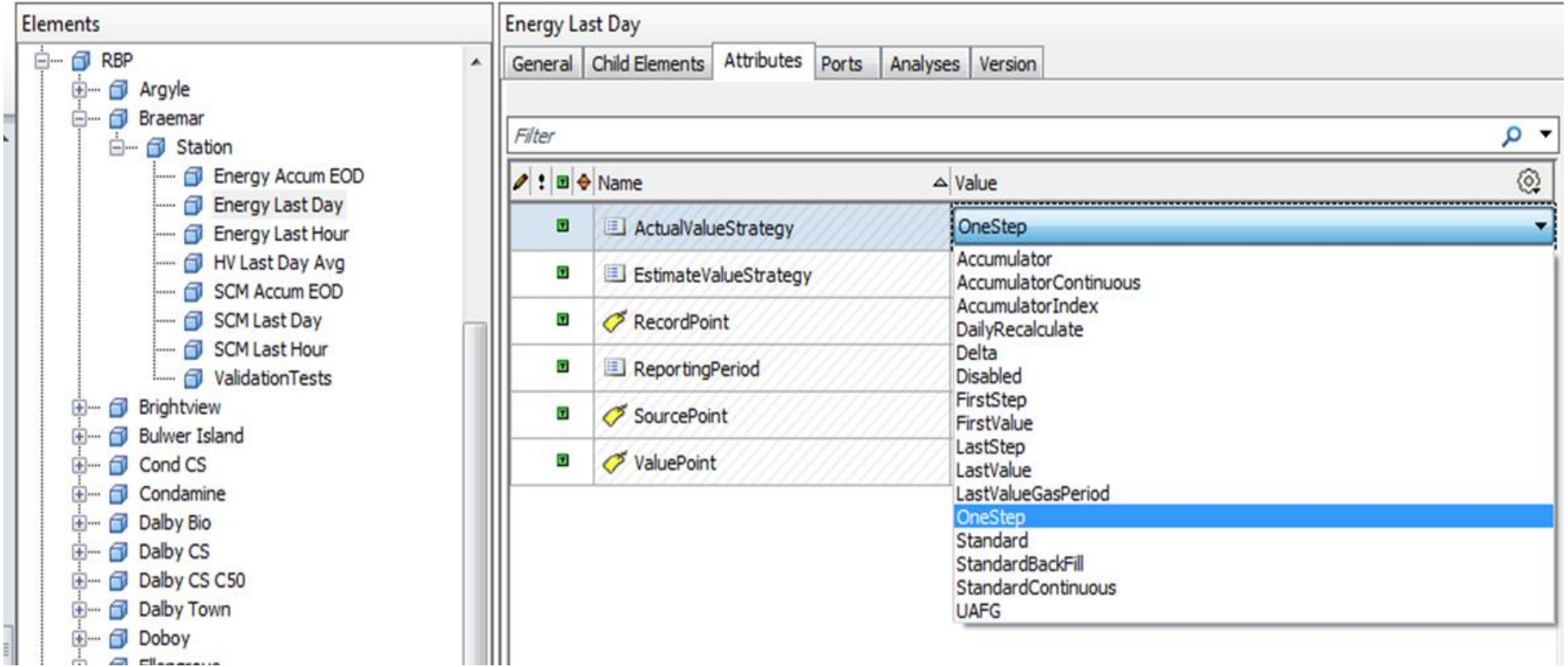
- Real-time and file-based data collection
- Selection of data events
- Implement FRC estimation ‘rules’
- Data validation
- System health
- Reporting & data delivery
- Data management interface
- Support EOM Reconciliation process

Walkthrough

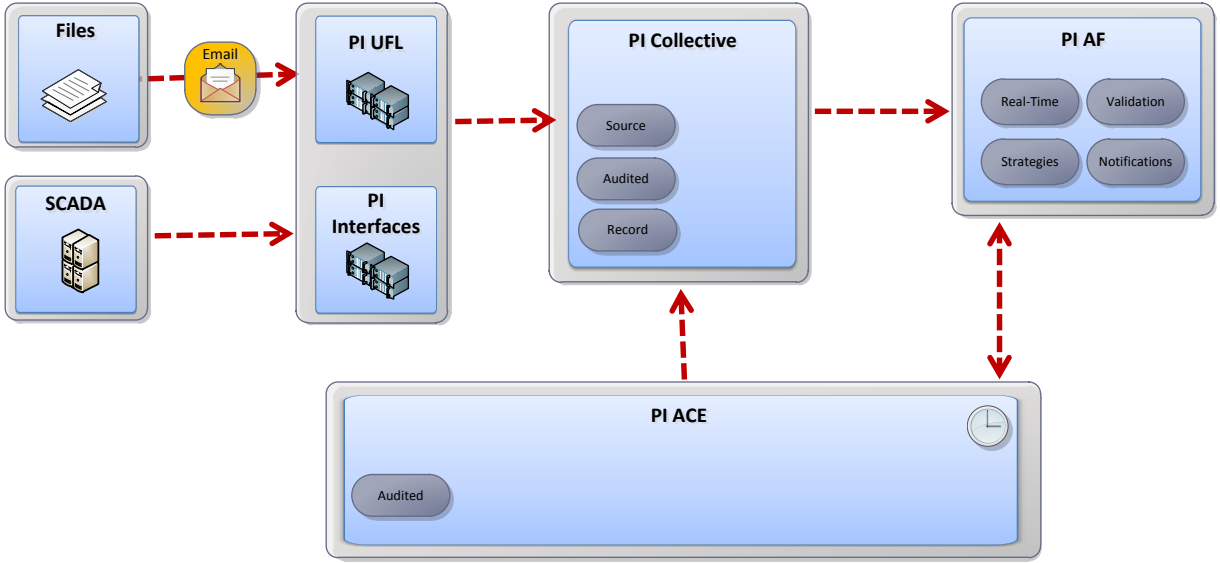
Component Overview



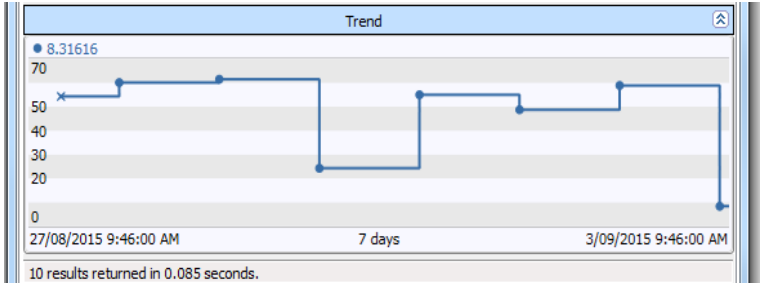
AF Contains the Blueprint for Data Processing



Component Overview



Value Strategy Example



What gas period is the value in?

Do we already have a value/should we update?

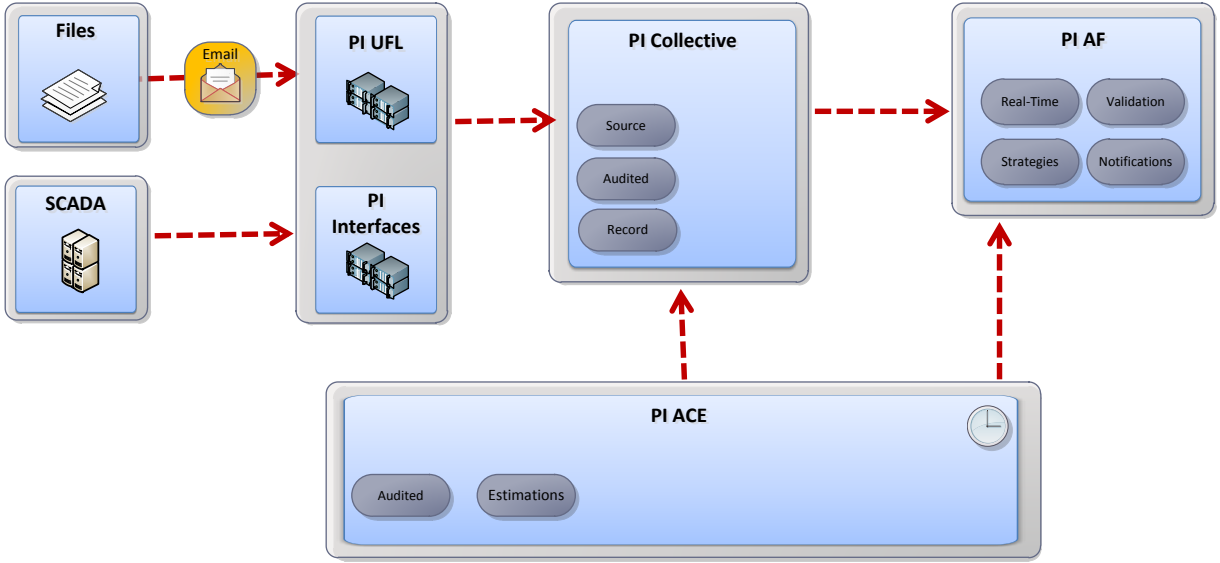
Fetch all values within a ‘window’ around the gas period

Starting from the first value

(and only looking at ‘good’ and >0)

Find first value different than the preceding one

Component Overview



Estimation Strategy Example

Is it x minutes past the gas period?

Do we have a value for the period?

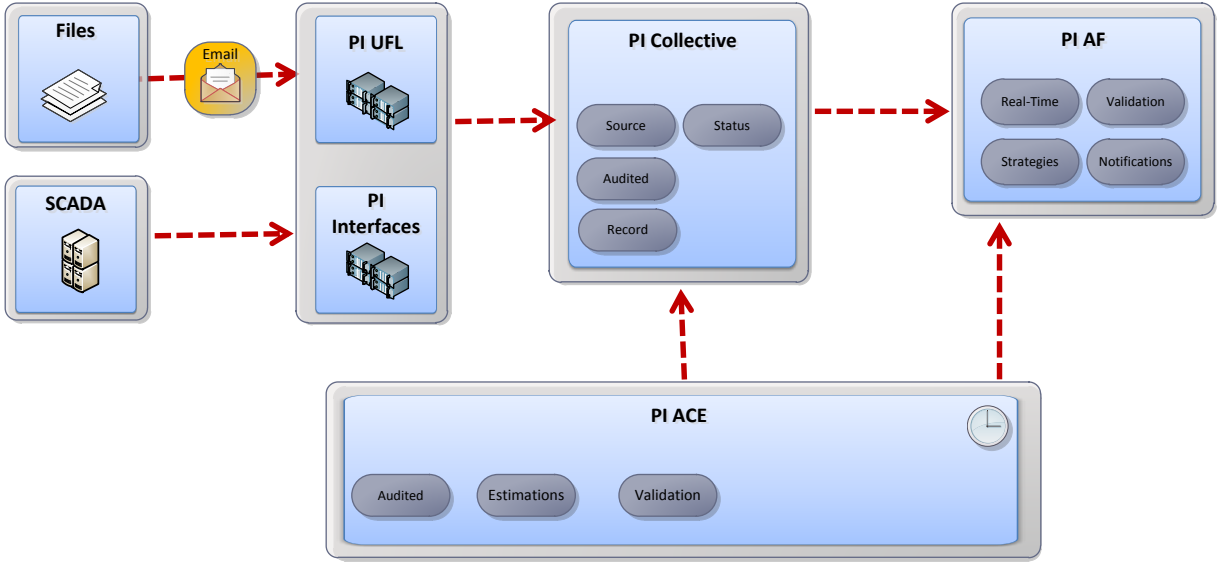
If not, provide a value using the method configured in AF

Write the estimate to the audited value

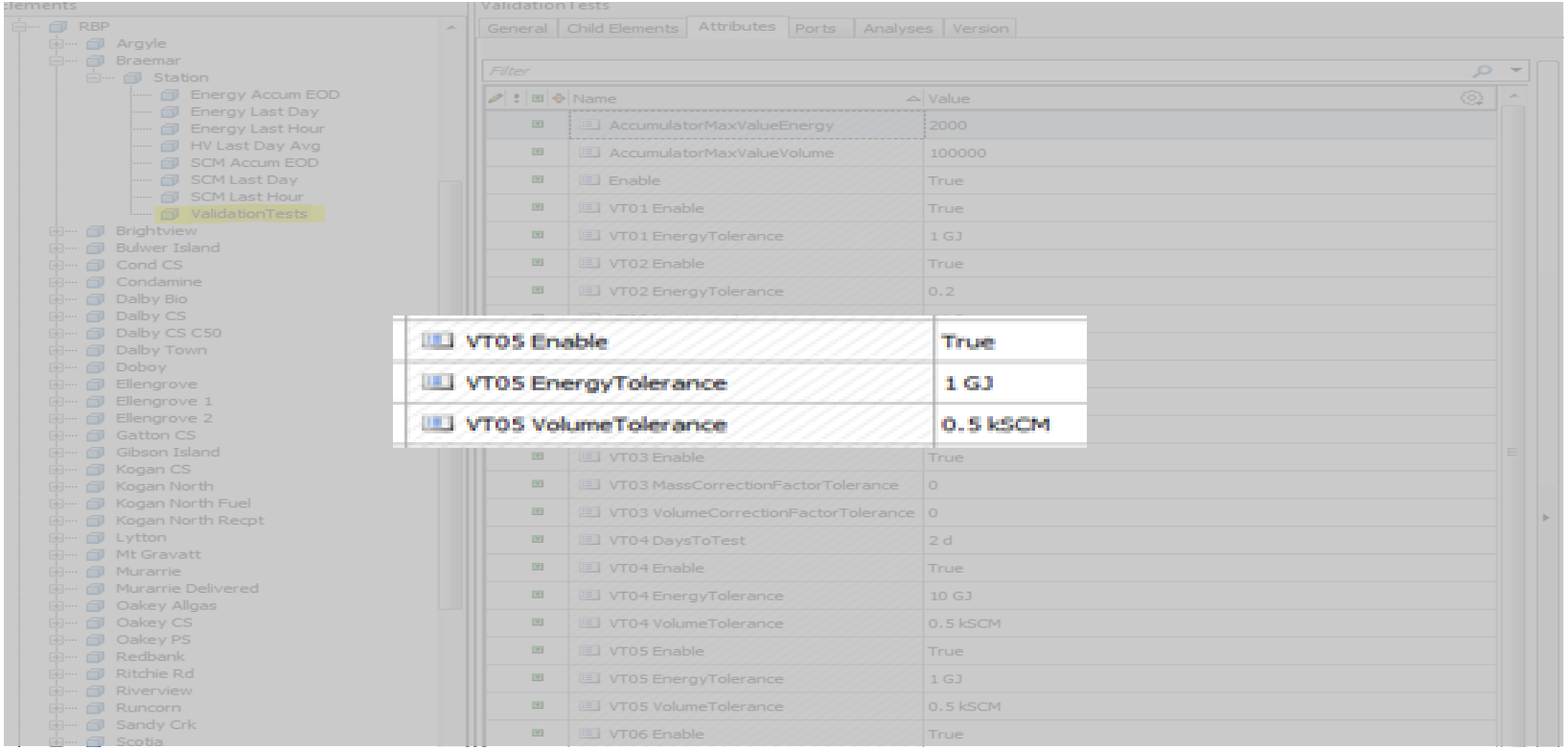
Record the method in the audit record

23/08/2015 1:00:00 PM	2015-08-23 03:20:12,107,2015-08-23 02:00:00,E,Unreconciled,Previous Value [3600],,
23/08/2015 12:00:00 PM	2015-08-23 22:30:11,96,2015-08-23 02:00:00,E,Unreconciled,Hourly ReEstimate,,

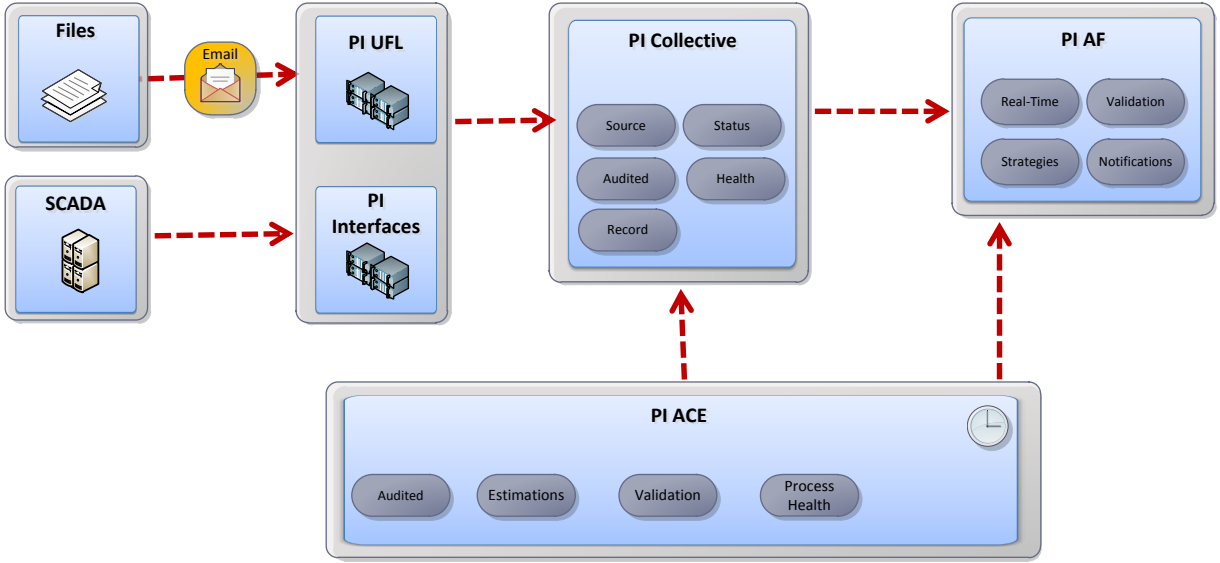
Component Overview



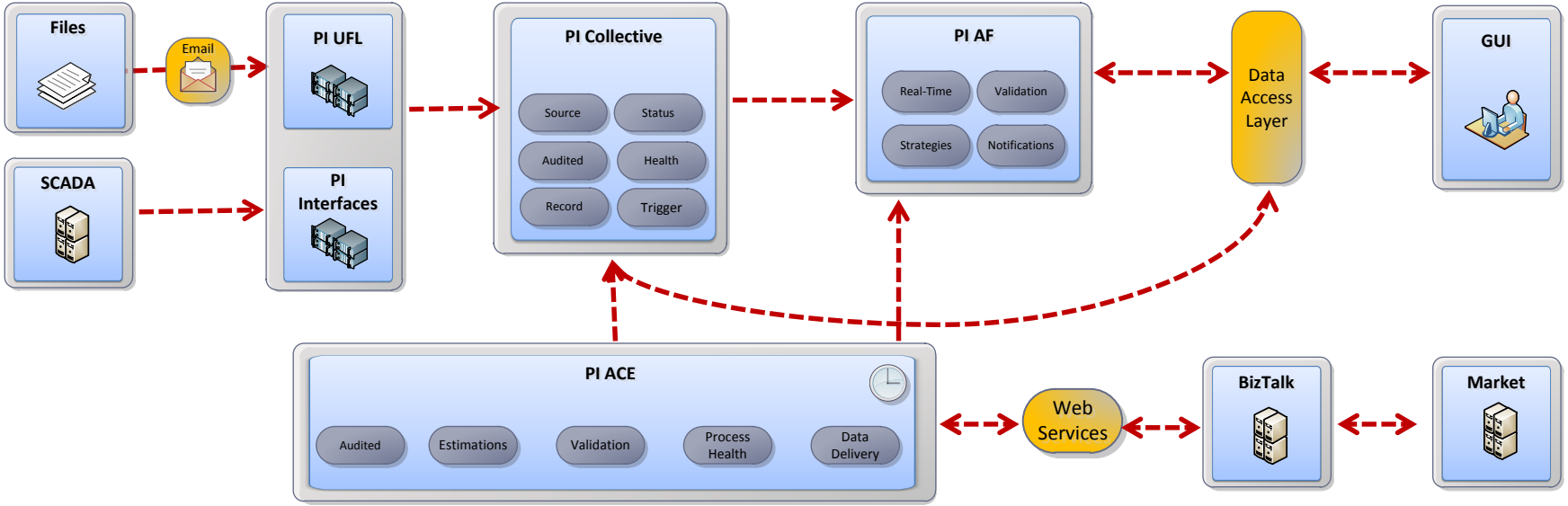
Validation Structure

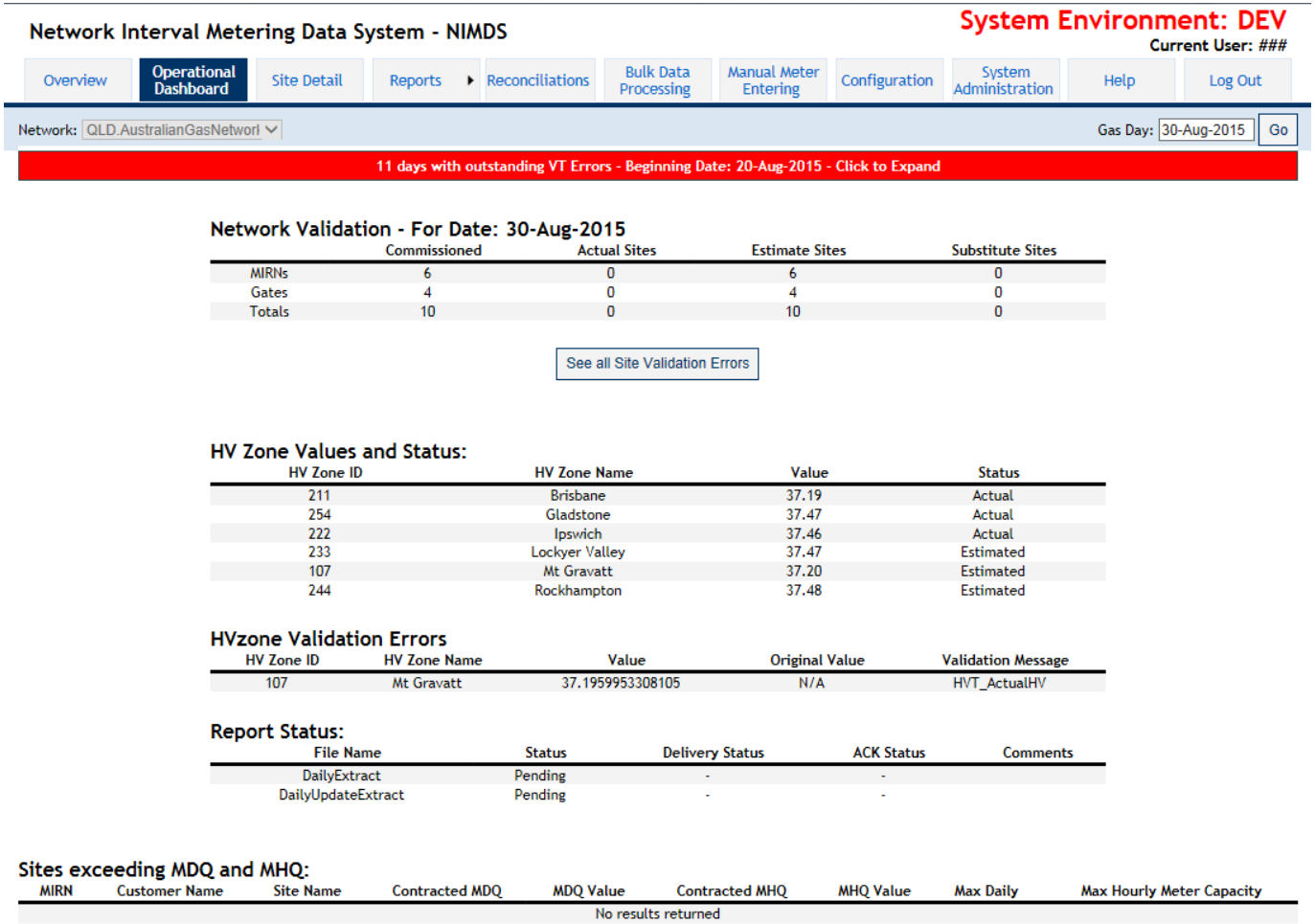


Component Overview



Component Overview





Network Interval Metering Data System - NIMDS

System Environment: DEV

Current User: ###

Overview | Operational Dashboard | Site Detail | Reports | Reconciliations | Bulk Data Processing | Manual Meter Entering | Configuration | System Administration | Help | Log Out

Network: QLD.AustralianGasNetwork

Gas Day: 30-Aug-2015 Go

11 days with outstanding VT Errors - Beginning Date: 20-Aug-2015 - Click to Expand

Network Validation - For Date: 30-Aug-2015

	Commissioned	Actual Sites	Estimate Sites	Substitute Sites
MIRNs	6	0	6	0
Gates	4	0	4	0
Totals	10	0	10	0

See all Site Validation Errors

HV Zone Values and Status:

HV Zone ID	HV Zone Name	Value	Status
211	Brisbane	37.19	Actual
254	Gladstone	37.47	Actual
222	Ipswich	37.46	Actual
233	Lockyer Valley	37.47	Estimated
107	Mt Gravatt	37.20	Estimated
244	Rockhampton	37.48	Estimated

HVzone Validation Errors

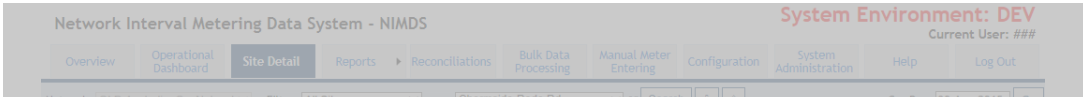
HV Zone ID	HV Zone Name	Value	Original Value	Validation Message
107	Mt Gravatt	37.1959953308105	N/A	HVT_ActualHV

Report Status:

File Name	Status	Delivery Status	ACK Status	Comments
DailyExtract	Pending	-	-	
DailyUpdateExtract	Pending	-	-	

Sites exceeding MDQ and MHQ:

MIRN	Customer Name	Site Name	Contracted MDQ	MDQ Value	Contracted MHQ	MHQ Value	Max Daily	Max Hourly Meter Capacity
No results returned								



Network Interval Metering Data System - NIMDS

System Environment: DEV

Current User: ###

Overview | Operational Dashboard | Site Detail | Reports | Reconciliations | Bulk Data Processing | Manual Meter Entering | Configuration | System Administration | Help | Log Out

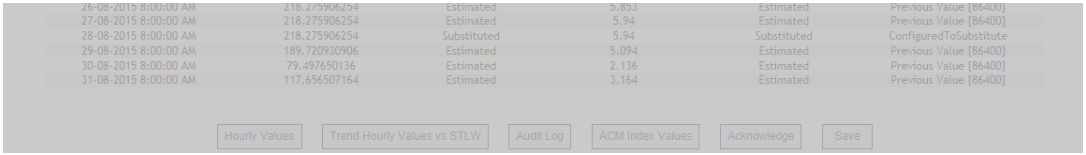
Network: QLD.AustralianGasNetworl | Filter: All Sites | Chermside-Rode Rd | or | Search | Gas Day: 30-Aug-2015 | Go

Site Daily Values - For date: 30-Aug-2015

SCADA Type	Run 1	Run 2	Station	Quality	UOM
ACM Last Day	0.202	N/A	N/A	Actual	ksm3
SCM Last Day	2.136	N/A	2.136	Estimated	ksm3
Energy Last Day	N/A	N/A	79.497650136	Estimated	GJ
HV Last Day Average	N/A	N/A	37.218001	Actual	MJ/m3
PCF Last Day Average	N/A	N/A	10.764	Actual	N/A
Update SCM Last Day	N/A	N/A		N/A	N/A
Update Energy Last Day	N/A	N/A		N/A	N/A
Active Run	False	False	N/A	N/A	N/A

Site Visits and Activity

Timestamp	Comment
No results returned	



Hourly Values | Trend Hourly Values vs STLW | Audit Log | ACM Index Values | Acknowledge | Save

Network Interval Metering Data System - NIMDS

System Environment: DEV

Current User: ###

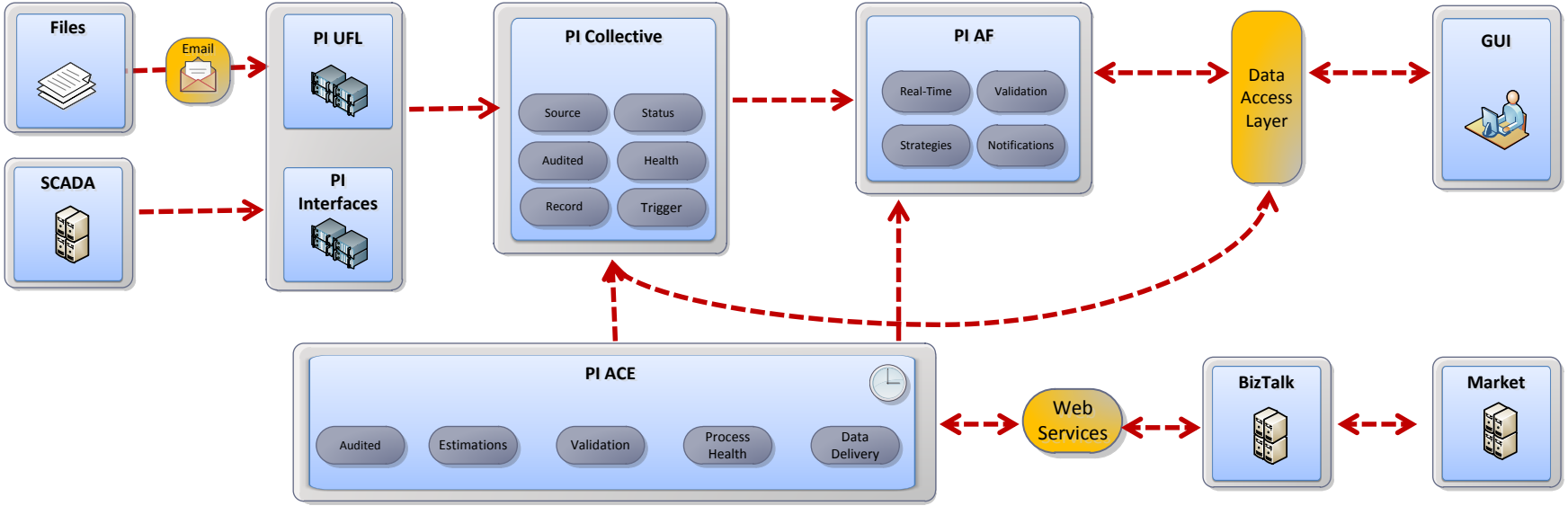
Overview | Operational Dashboard | Site Detail | Reports | **Reconciliations** | Bulk Data Processing | Manual Meter Entering | Configuration | System Administration | Help | Log Out

Network: QLD.AustralianGasNetworl Filter: All Sites Selected Gas Month: Jul-2015 Go

MIRN	Site Name	Customer Name	Reconciled Status	Meter Head Index	ACM Accumulator	Percentage Difference	Comments from Manual Meter Reads
5420098926	Brisbane-Albert St		Unreconciled	?	?	?	Textbox
5420100586	Brisbane-Eagle St		Unreconciled	?	?	?	Textbox
5420100205	Brisbane-George St-2A		Unreconciled	?	?	?	Textbox
5420000001	Chermside-Rode Rd		Unreconciled	?	245889	?	Textbox
5420096135	Fortitude Valley-Wickham Tce		Unreconciled	?	?	?	Textbox
5420000024	Virginia-Ferric St		Unreconciled	?	257609.992676	?	Textbox
40000017PC	Gladstone-GS		Unreconciled	N/A	0	N/A	Textbox
40000018PC	Rockhampton-GS-North		Unreconciled	N/A	5374050	N/A	Textbox
40000019PC	Rockhampton-GS-South		Unreconciled	N/A	90736.001587	N/A	Textbox
40000023PC	Sandy Creek-GS		Unreconciled	N/A	N/A	N/A	Textbox

Site Reconciliation | Shared Sites Reconciliation | Print

Component Overview



Summary

NIMDS will deliver a single, national platform that will bring efficiency and standardization to interval metering data management.

BUSINESS CHALLENGES

A. Provide a single application able to support the requirements of all states

B. Maximise the value of investment in existing systems

C. Retire legacy FRC systems

D. Reduce dependency on spreadsheets

SOLUTION

A. Follow the technical approach developed in previous MDM system built on OSIsoft PI

B. PI ACE managing data processing, PI AF providing structure and configuration instructions

C. User interface developed in .NET using PI SDK

RESULTS AND BENEFITS

A. Single scalable FRC application will transform and bring great efficiency to the interval metering business process

B. Legacy systems will be retired

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Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

Please don't forget to…

Complete the Survey for this session

The Power of Data
DECISION READY IN REAL-TIME

Evaluation Form (Seminar Location - Date)

Name:_____ Company: _____

Email:_____

Quality and content of the presentations	Poor	Good	Excellent	N/A
Welcome	○	○	○	○
The Journey To Real-Time Operational Intelligence	○	○	○	○
The Power of Connection	○	○	○	○
Tank Level Management System	○	○	○	○
Using the PI System to Aid in Troubleshooting Operational Aspects of Oil and Gas Well Drilling and Completion	○	○	○	○
Unleash your Infrastructure	○	○	○	○
Information on the Spot	○	○	○	○
Wrap-up/Seminar Conclusion	○	○	○	○

Quality and organization of the seminar				
Choice of date	○	○	○	○
Time allowed for lunch/breaks	○	○	○	○
Choice of presentations	○	○	○	○
Pace and time allowed for the presentations	○	○	○	○

감사합니다

谢谢

Danke

Gracias

Merci

Thank You

ありがとう

Спасибо

Obrigado