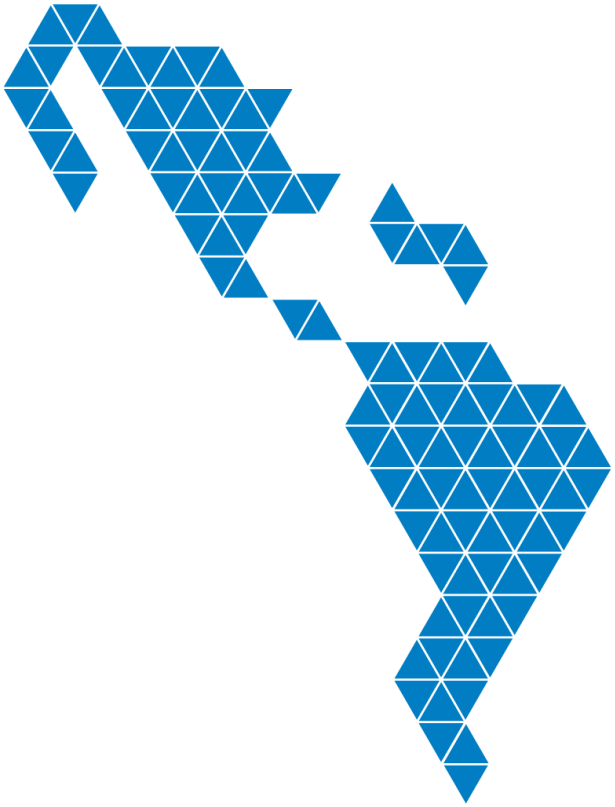


OSIsoft®

SEMINÁRIO REGIONAL 2011

LATAM SOUTH

The New Economy – Joining Utilities & Consumers

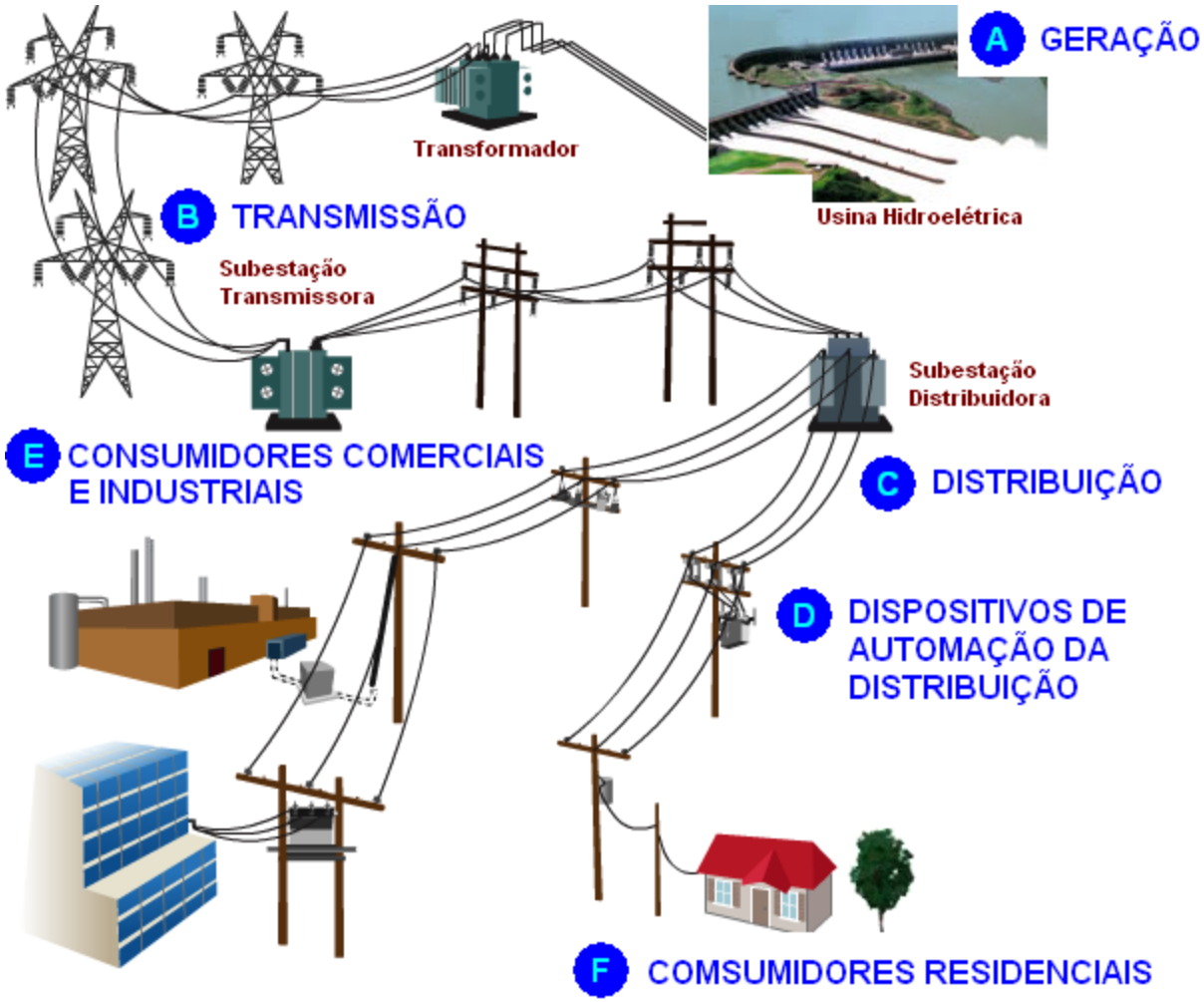
Presented by

Randy Maddern
Michelle Kuiee

Global Energy Industry Challenges

- Global ecc g
- Extreme e
- Impending house gas emissions
- Increasing
- Aging infra
- Demand fo
- Risk of en
- Power Ge assets
- Risk of po and
- Risk of po re of renewable

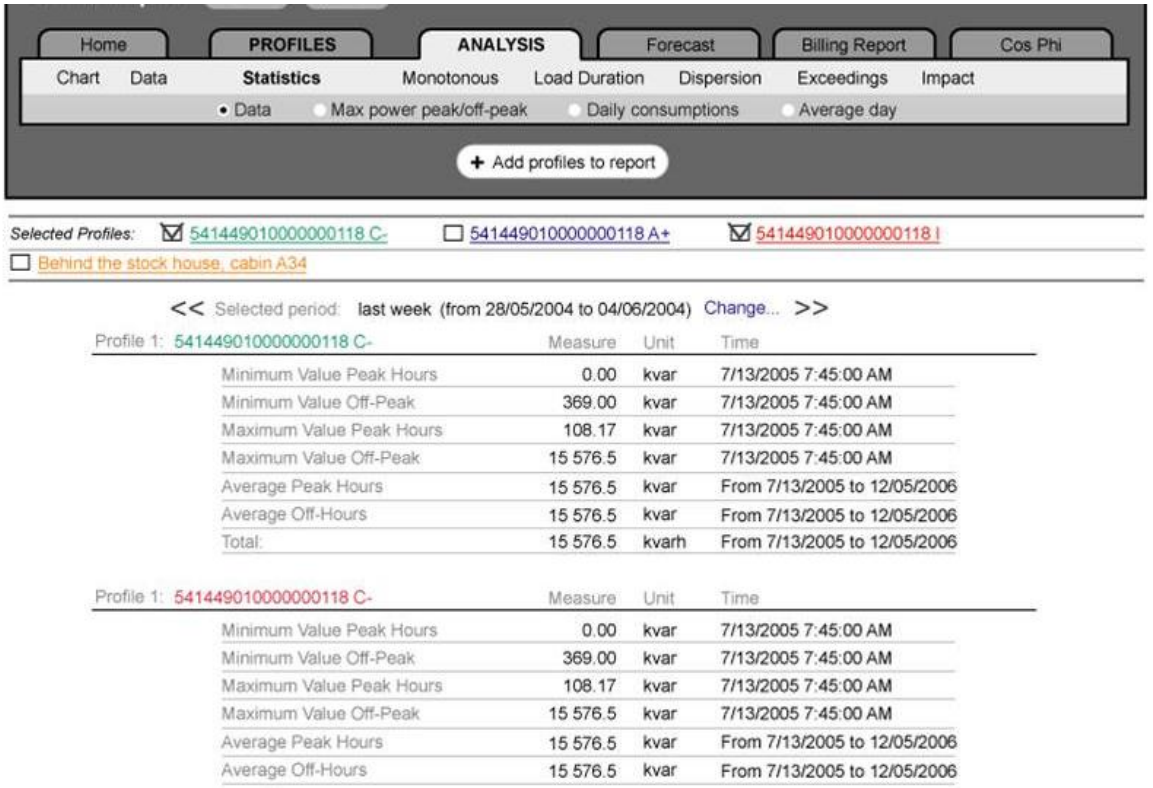
Energy Value Chain



http://www.redeinteligente.com/2009/08/11/rede-inteligente-por-que-como-quem-quando-onde/

In the beginning….

Early Adoption



- UFL Interface
- Custom Applications
  - ETL
  - Aggregation
  - Business Processes
  - Visualization

Advanced Metering Infrastructure (AMI) / Home Area Network/Smart Appliance (HAN)

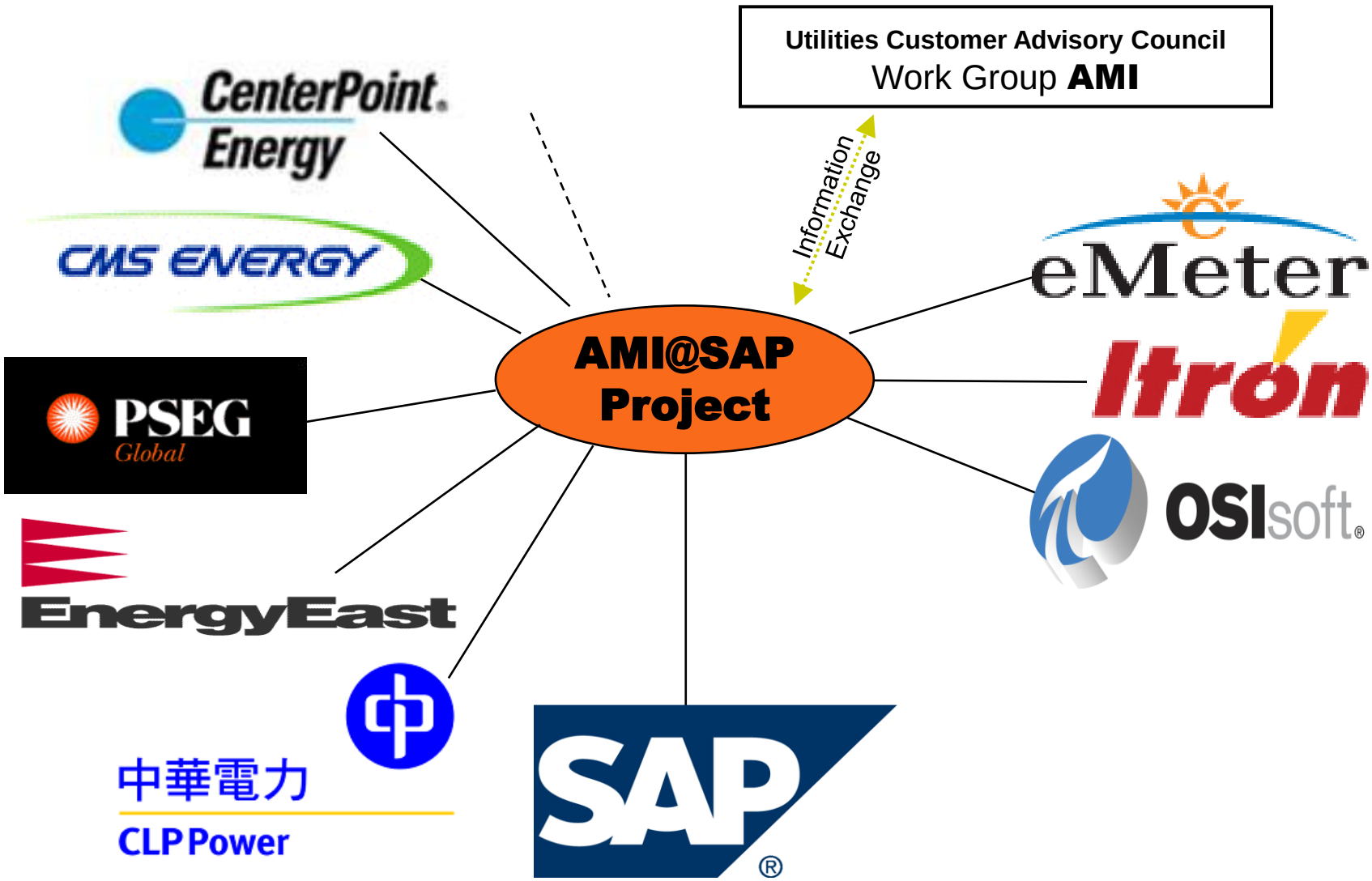
- Visibility in energy consumption
- Involve consumer
  - Energy efficiency
  - Conservation
  - Demand Response
- Metering approach
  - Promotes energy efficiency
  - Defers investment in generation
  - Defers investment in infrastructure
- Requirements
  - Higher resolution Data
  - Reduced Latency of meter data
  - Better methods to disseminate consumption Information
  - Shortened data acquisition sampling intervals

Intel® Intelligent Home Energy Management Proof of Concept

Enables new functions

- Meter data from meter to cash
  - Increase accuracy
  - Reduce Bill Complaints
  - Better Detection of Fraud
- New Enterprise functions
  - Asset management
  - Load Profile & Forecasting
  - CRM
    - variable pricing
    - Intelligent trouble shooting
    - Simplified Meter Connection & Disconnection
- Utility Company Reasons for MDM/ODMS (more later on ODMS)
  - Mergers and Acquisitions unifying layer for multiple metering systems
  - Implement Demand Response
  - Overall Smart Grid Initiatives
  - Competitive Service

SAP AMI Lighthouse Council (2008)



AMI Use Cases – Equal Upgraded SAP Business Processes

Billing & Customer Service	Customer Interface	Delivery	Energy Procurement	Field Services & System Recovery	Installation & Maintenance
B1 Multiple clients read demand and energy data	**C1** Customer reduces demand in response to pricing and/or grid event	**D1** Distribution operator curtails/limits customer load for grid management	**E1** Real-time operations curtails/limits load for economic dispatch	**S1** AMI system recovers after power outage, communications or equipment failure	**I1** Utility installs, provisions and configures AMI system
B2 Utility remotely limits or connects / disconnects customer	**C2** Customer has access to and reads recent energy usage and cost at his or her site	**D2** Distribution operators optimize network based on data collected by the AMI system	**E2** Utility procures energy and settles wholesale transactions using AMI system data		**I2** Utility manages end-to-end life-cycle of the meter system
B3 Utility detects tampering or theft at customer site	**C3** Customer uses prepayment services	**D3** Customer provides distributed generation			**I3** Utility upgrades AMI system to address future requirements
B4 Contract meter reading for other utilities	**C4** External clients use the AMI system to interact with customer devices	**D4** Distribution operator locates outage using AMI data and restores service			

Source: Southern California Edison

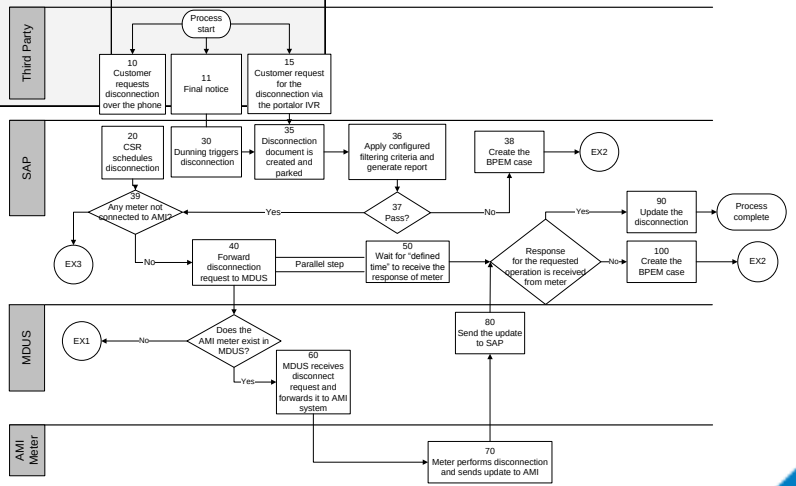
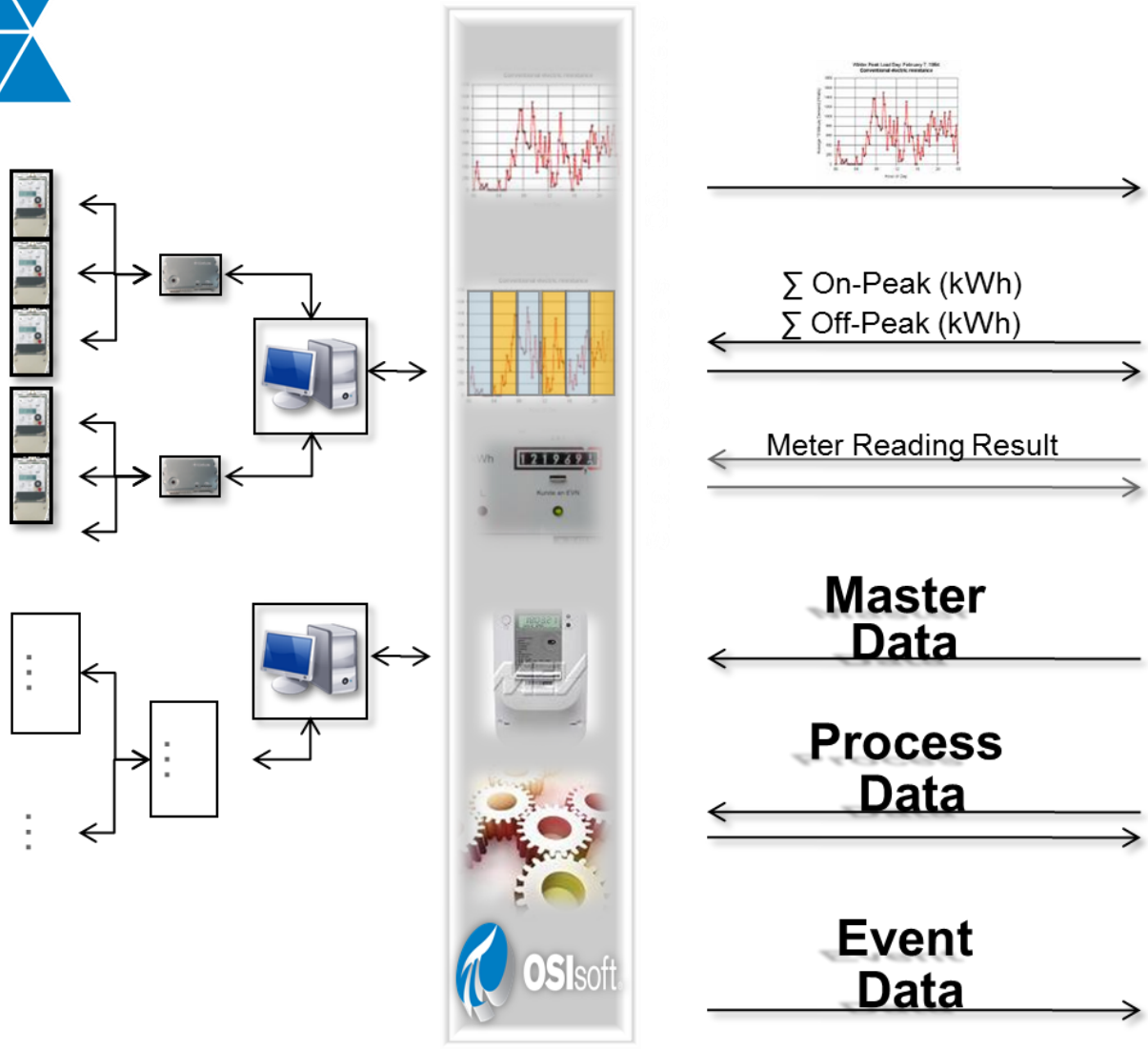


Diagram: Utility disconnects or load-limits customer

Source: SAP AG

Meter Data Unification & Synchronization (MDUS)



∑ On-Peak (kWh)
∑ Off-Peak (kWh)

Meter Reading Result

Master Data

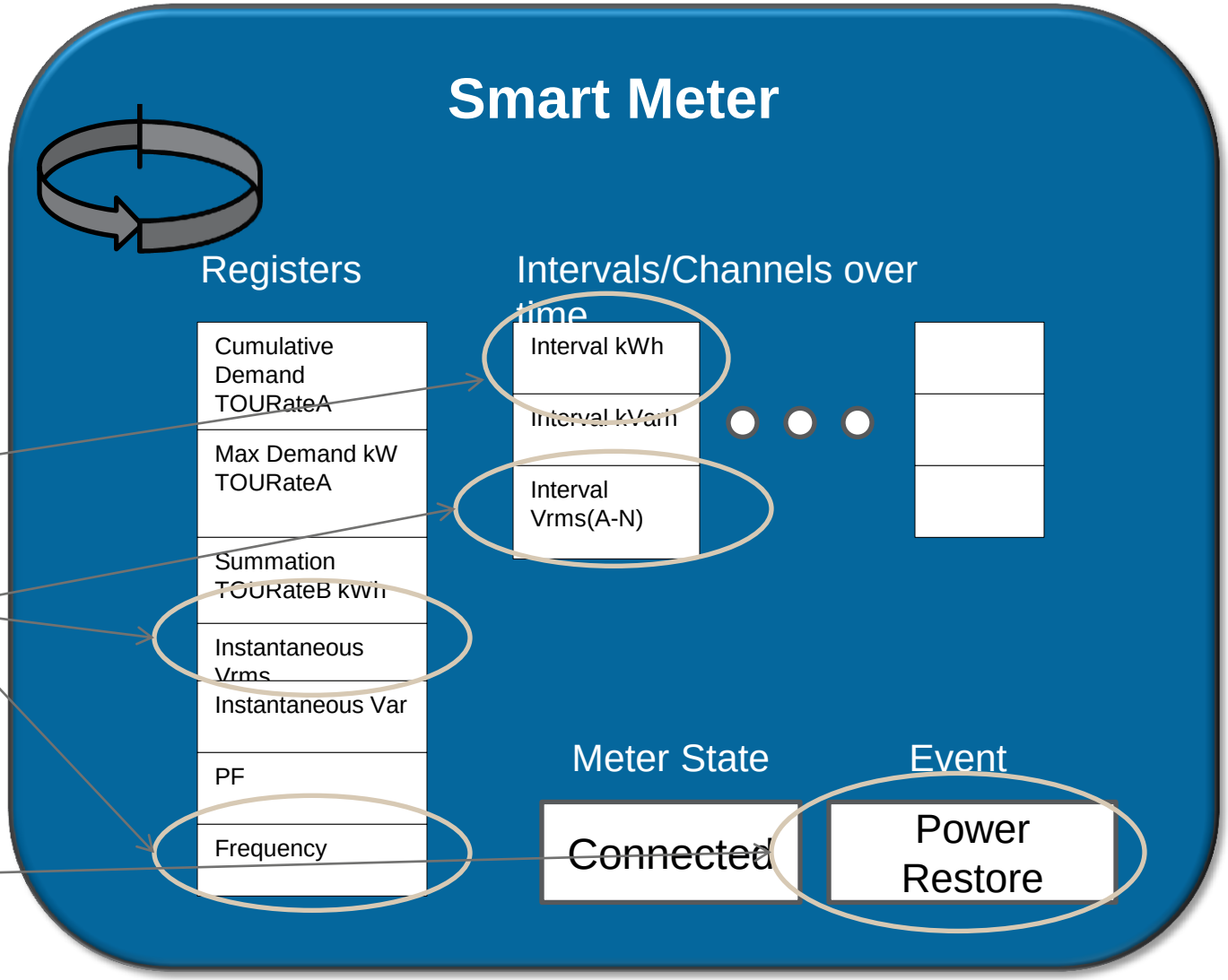
Process Data

Event Data

- SAP Energy Data Management for Utilities
- SAP Customer Relationship Management and Billing for Utilities
- SAP AMI Integration for Utilities
- SAP Customer Financials Management for Utilities
- SAP Collaborative Service Management for Utilities
- SAP Resource and Supplier Management for Utilities
- SAP ERP

SAP for Utilities

INPUT



Billing says this is what we need

Engineering says this is what we need

Outage Management says this is what we need

What do you keep? Answer?

Design principle on PI AMI Interfaces

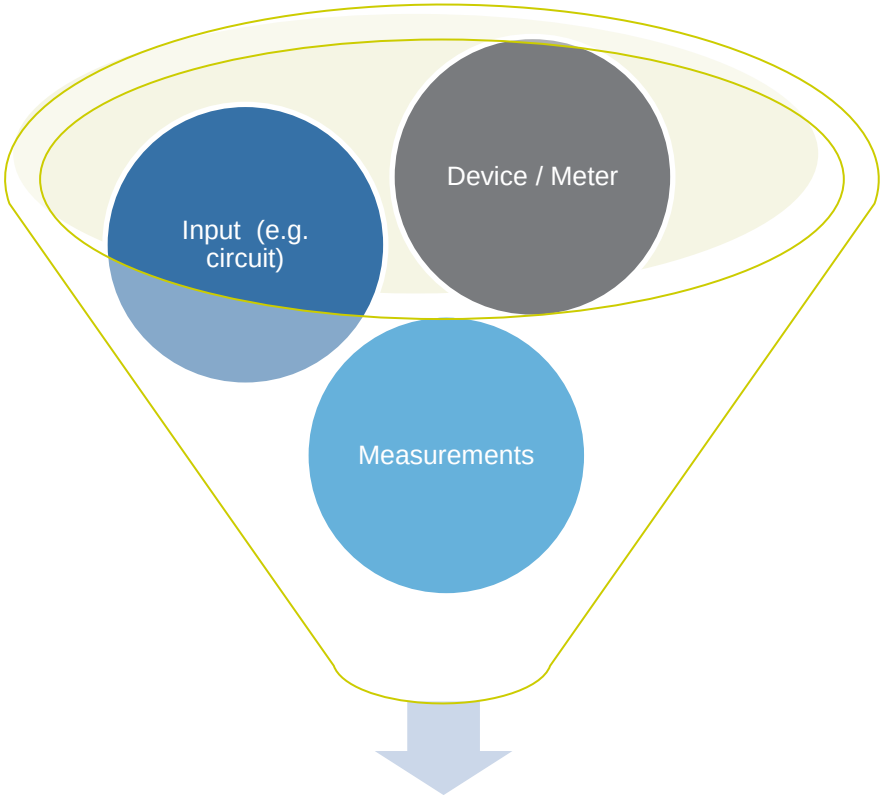
Bi-directional

Command/Control

Secure

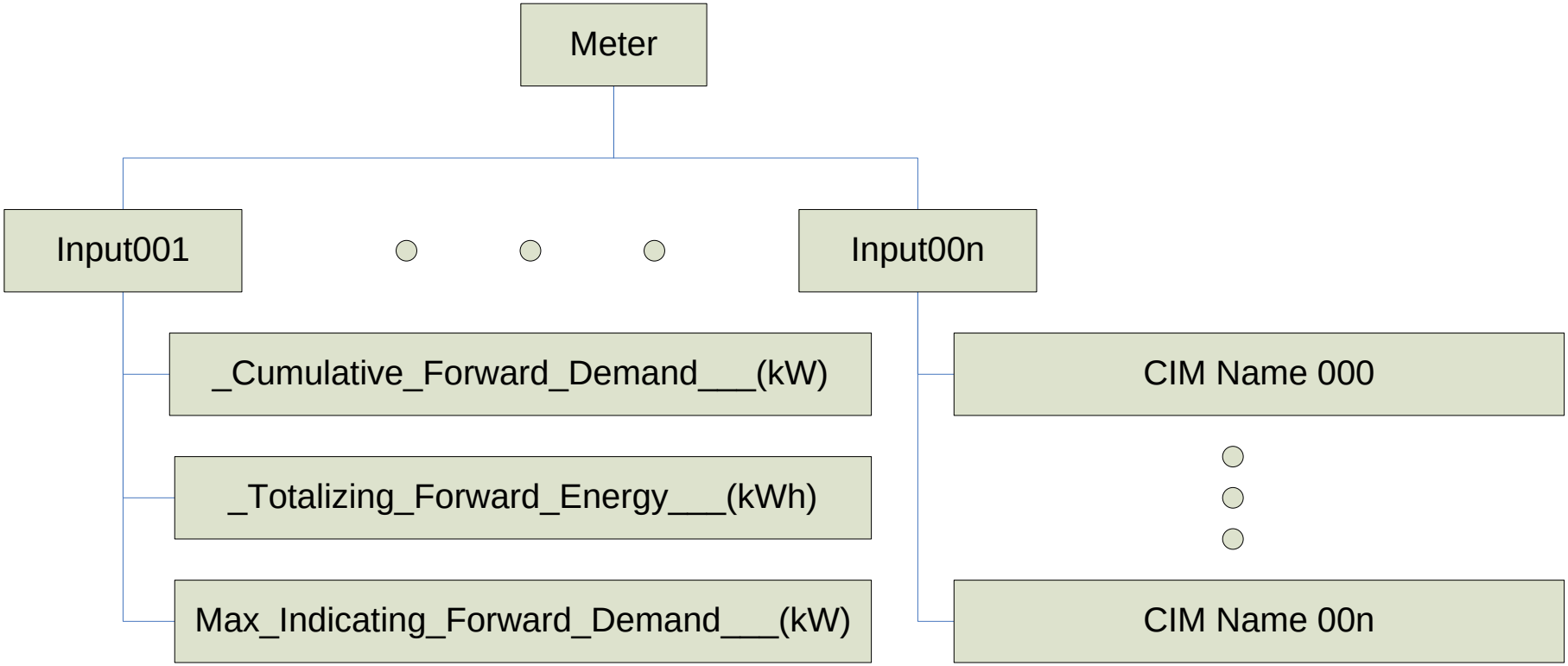
Asset based

And above all…

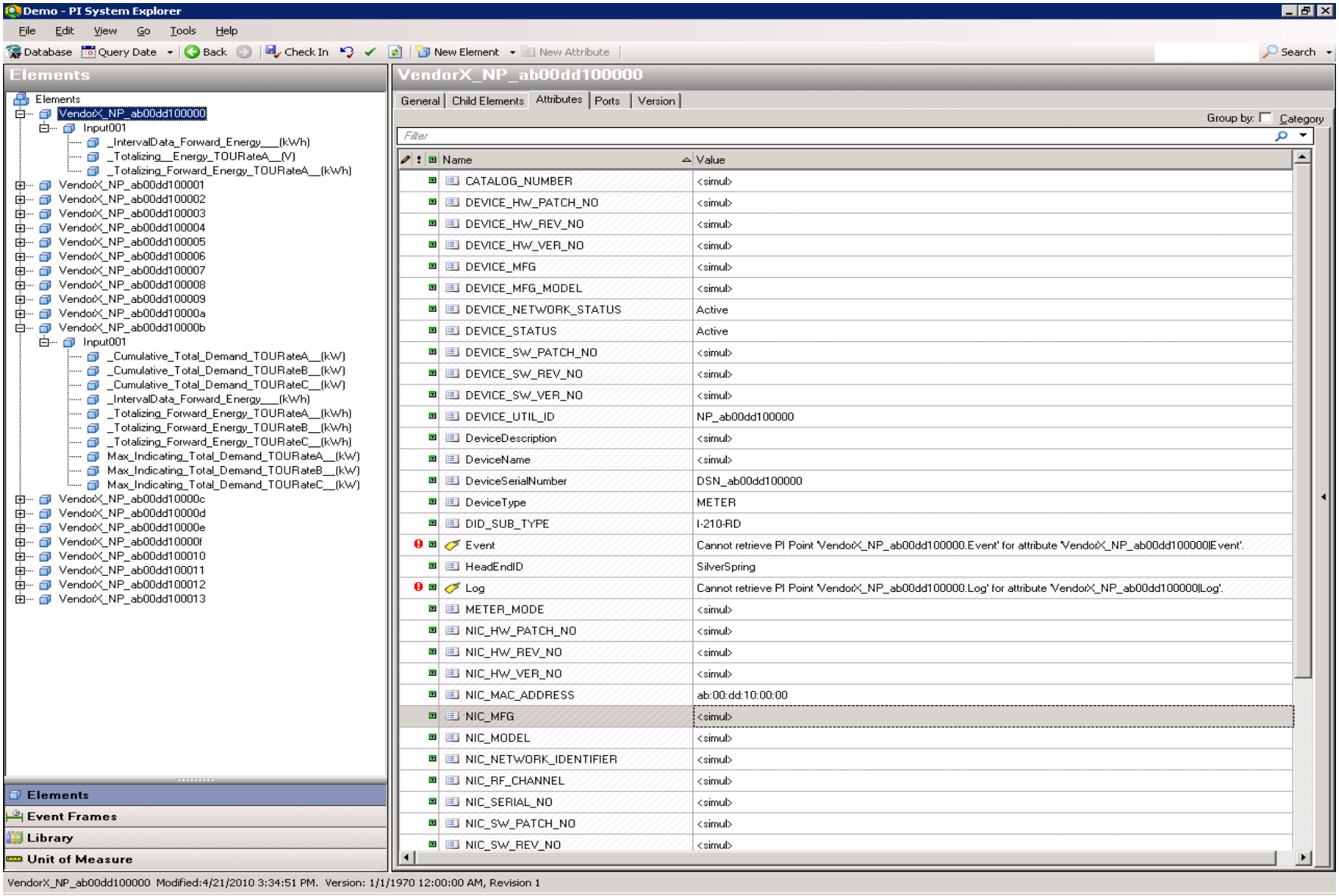


Self Configuring & Maintaining

Asset in Parent Child Relationship

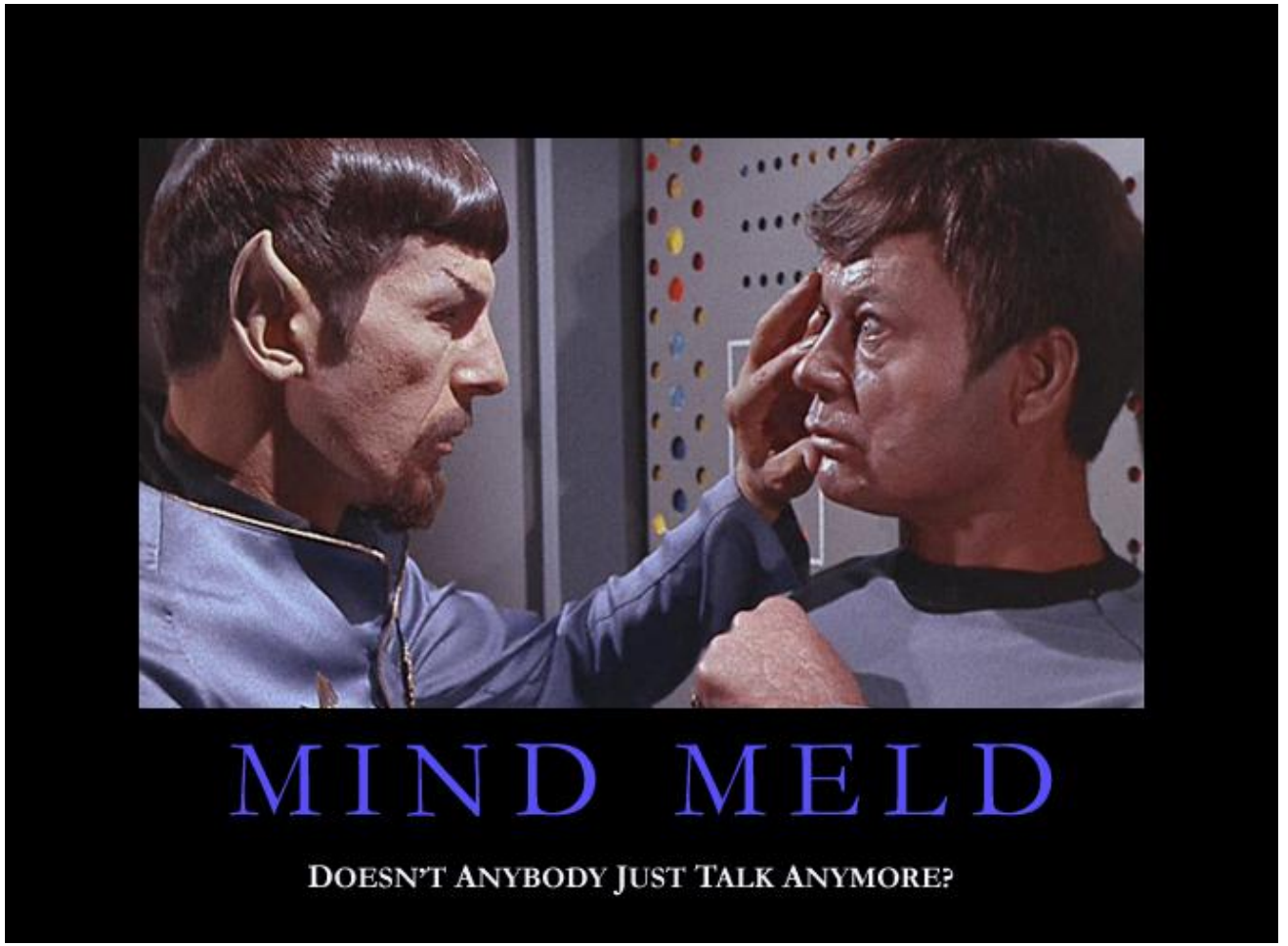


And the end result is…



OSIsoft Interfaces (Next Generation)

They're like a

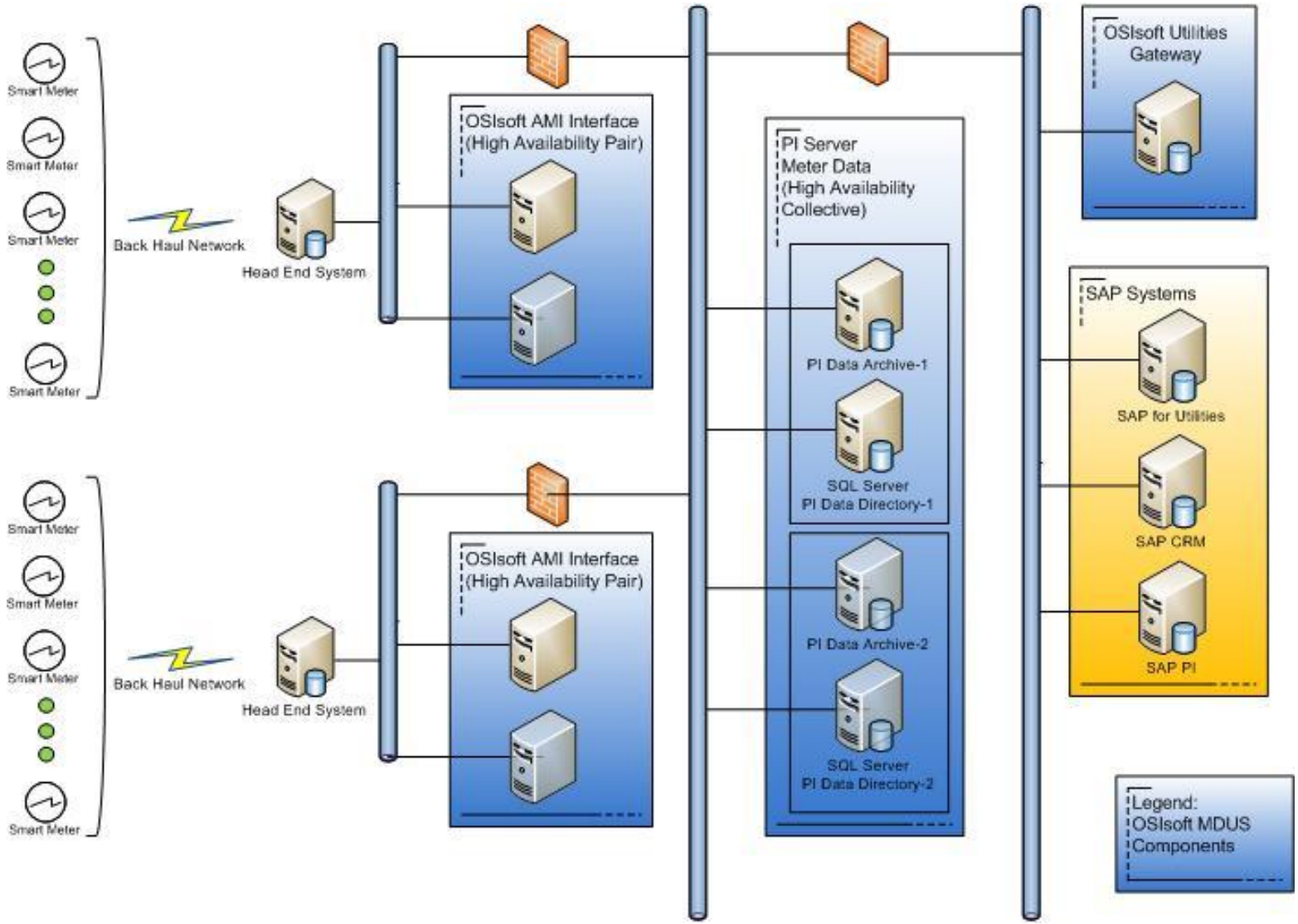


http://echosphere.net/star_trek_insp/star_trek_insp.html

PI AMI Interfaces in Production

Feature	Silver Spring	Grid Net	Trilliant	Elster	MultiSpeak	NEM (AEMO)
Synchronize Meter Asset	✓	✓	✓	✓	✓	✓
Interval Reads	✓	✓	✓	✓	✓	✓
Register Reads	✓	✓	✓	✓	✓	✓
Event Data	✓	✓	TBD	✓	✓	✓
Remote Ping	✓			✓	✓	
Remote (Dis)Connect	✓	✓	✓	✓	✓	
On-Demand Read	✓	✓	✓	✓	✓	
Outage Notification	✓	✓	(s)	✓	✓	
Meter Health	✓	✓	TBD	✓	✓	
Demand Response	TBD	TBD		TBD	TBD	
HAN (Home Area Network)	(s)	TBD	TBD	(s)	TBD	
Text Message	TBD	TBD		(s)		

OSIsoft MDUS Functional Architecture



OSIsoft views on AMI/HAN

- Real-time challenge
- Keep everything
- Make data available to the experts

Operational Data Management System (ODMS)

- Extremely large volumes of data
- Disparate data sources
- Multiple data frequencies and latency
- Timely reconciliation of
  - SCADA
  - Distribution Automation Systems
  - Metering (Distribution and Consumers)
- SAP Integration
  - Meter Data Unification & Synchronization (MDUS)
  - Smart Meter Analytics

Wind Farm/Renewables

PI Data Collection Nodes

DMZ PI Server
PI-to-PI Interface

Com Ops PI Server
PI-to-PI Interface

EMS PI Server
PI-to-PI Interface

EMS

Corporate

Primary PI

Secondary PI

IT Monitoring

Advanced Computing Engine

Test Environment PI Server

PI Server Collective

Operations data
Non-Operations Data
Waveform Data

Substation 1

PI Server
PI to PI Interface

3rd Party Analytics Application

SEL OPC Server
PI OPC Interface

Substation 2

PI Server
PI to PI Interface

3rd Party Analytics Application

SEL OPC Server
PI OPC Interface

AMI Head End System(s)

C&I Head End System(s)

Substation 3

PI Server
PI to PI Interface

3rd party Analytics Application

SEL 3351
SEL OPC Server
PI OPC Interface
PI DNP3 Interface

Substation n

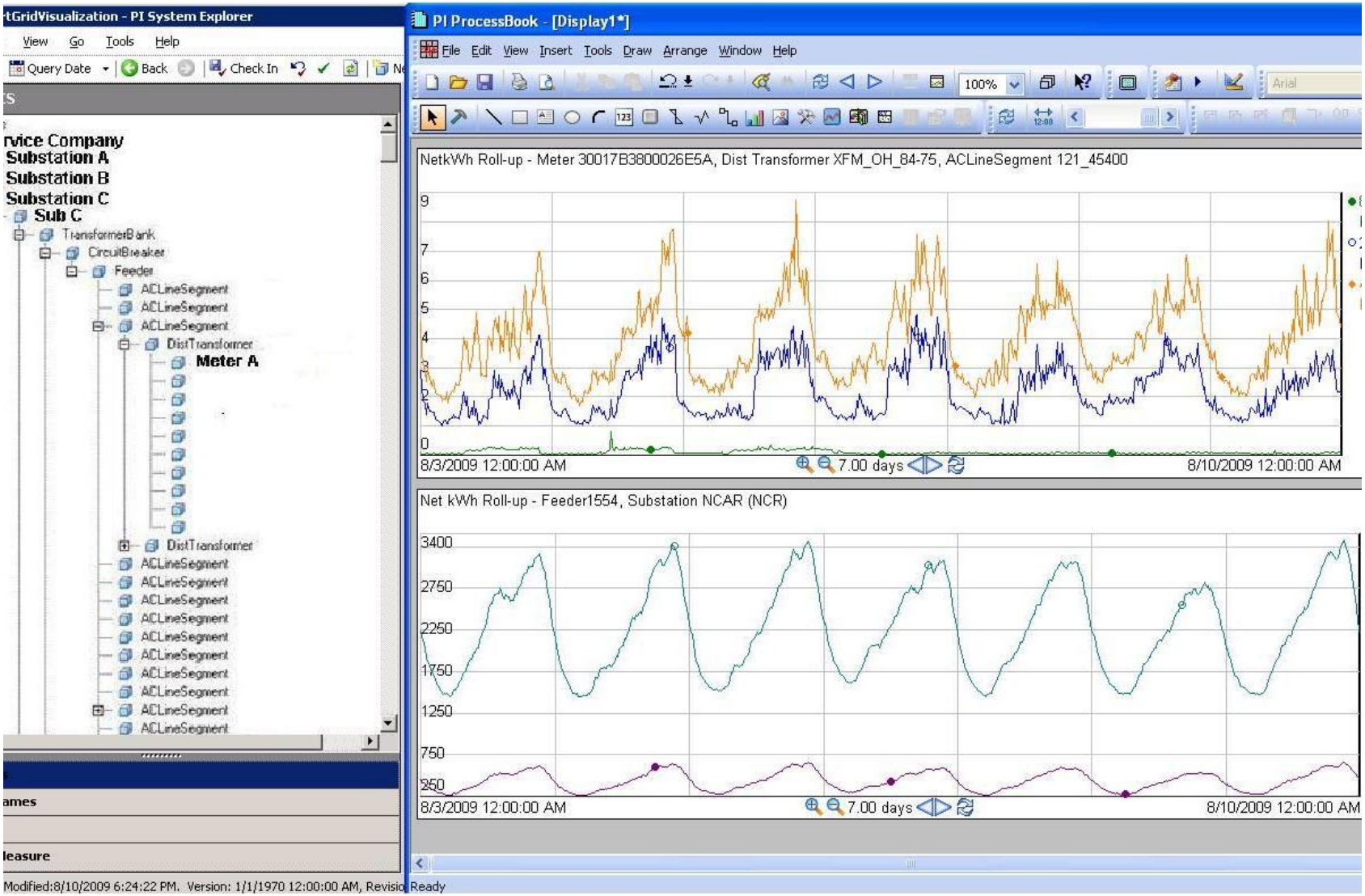
PI Server
PI to PI Interface

3rd Party Analytics Application

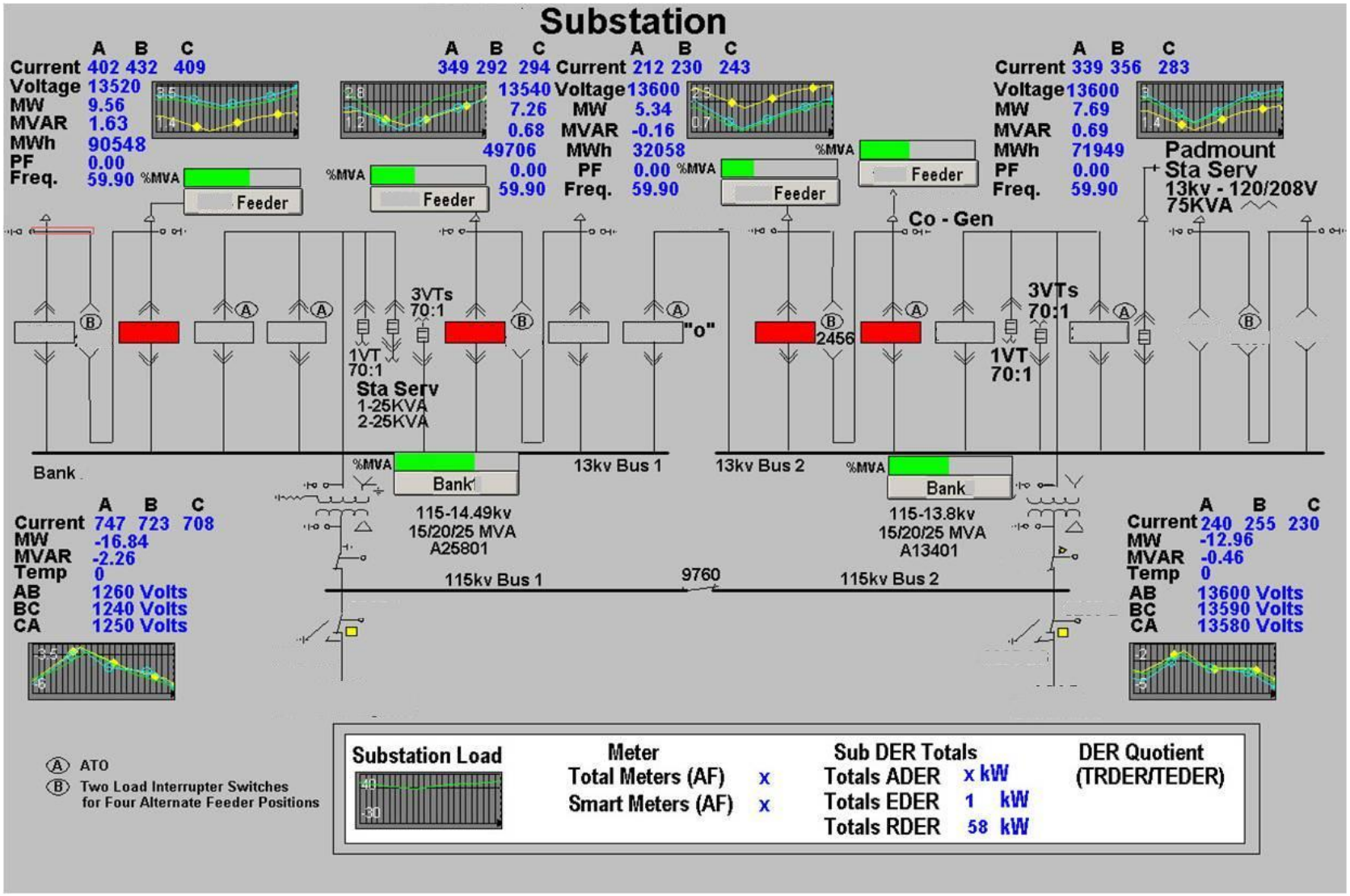
SEL OPC Server
PI OPC Interface

SEL DNP3 Slave
PI DNP3 Interface

Net KWh Roll-Up

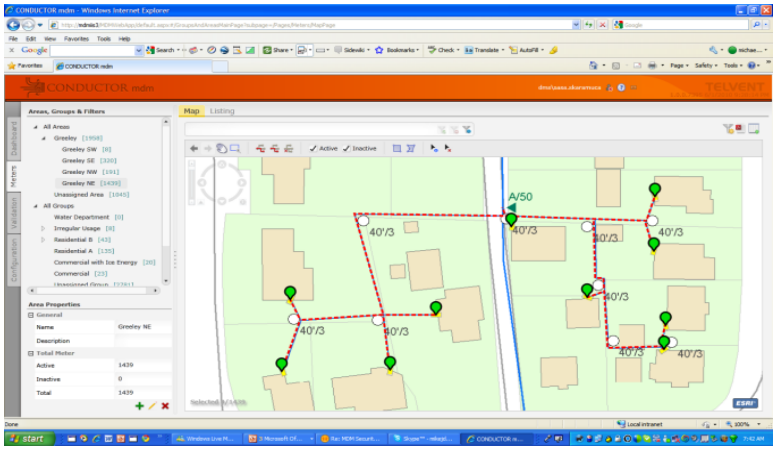


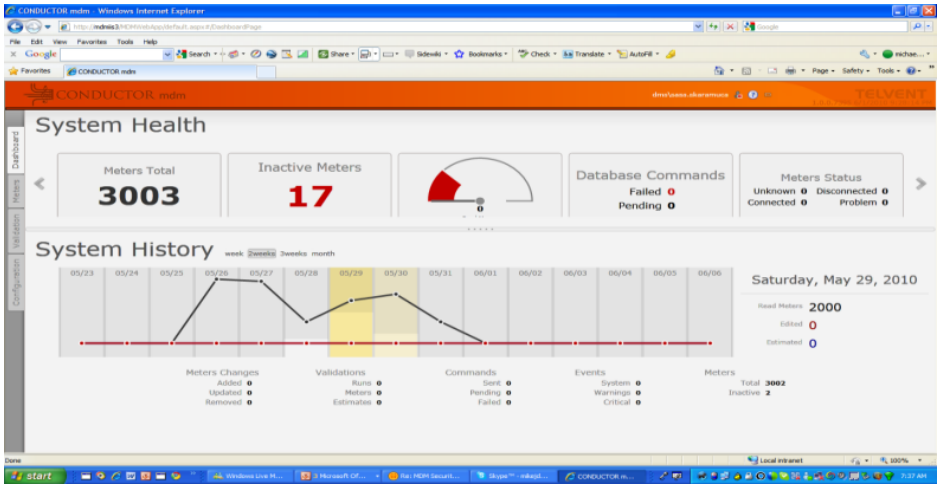
Substation One Line:
The “Roll Up” Report Card



Telvent Conductor MDM - Powered by OSIsoft PI System

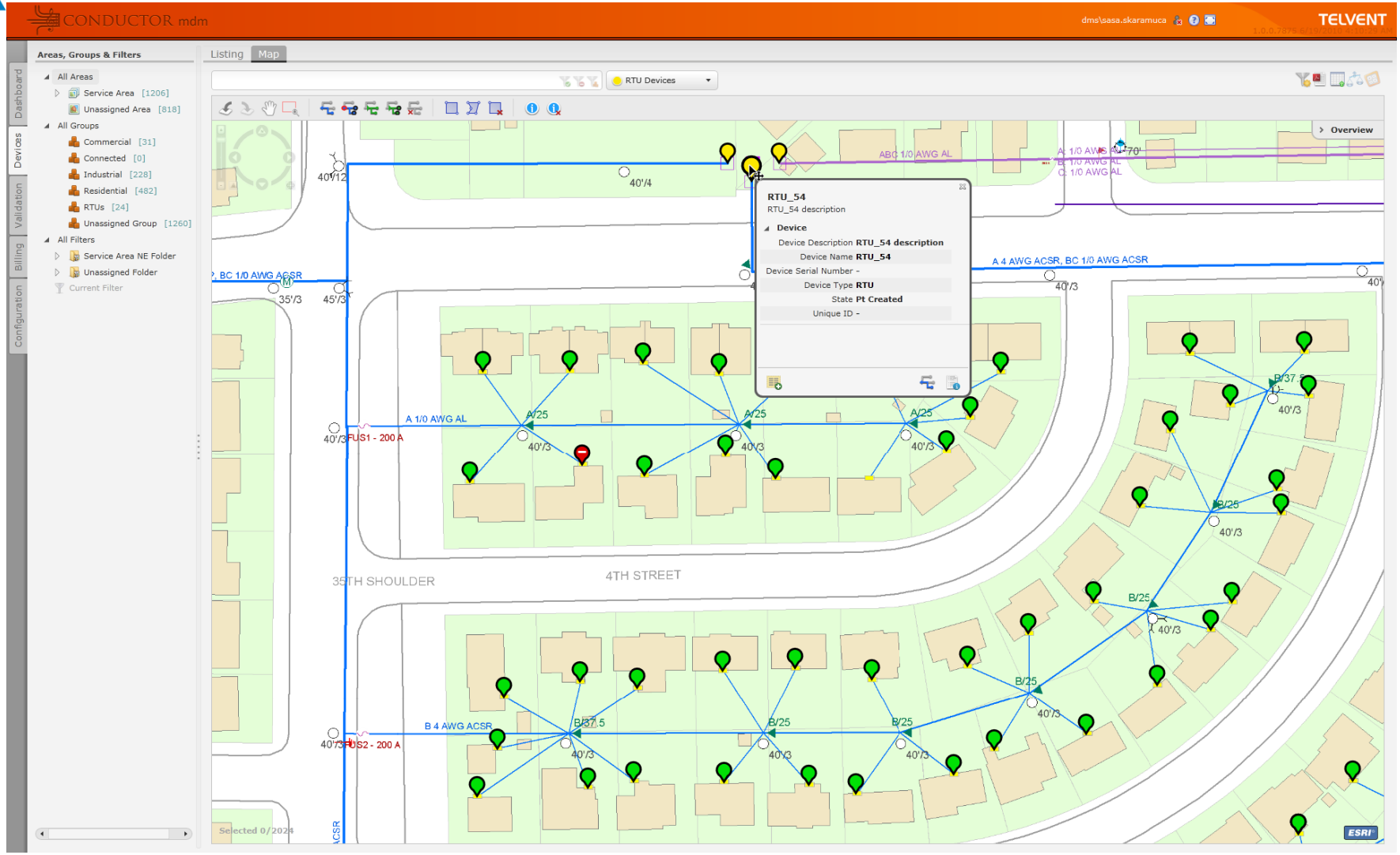
- Validation, estimation, query, analysis, visualization, and reporting
- Integration:
  - GIS
  - CIS and CRM
  - DMS and OMS
  - SCADA
  - AMI
  - Analytics engine





Telvent Conductor - Powered by OSIsoft PI System

Visualize and Manage Distribution Devices



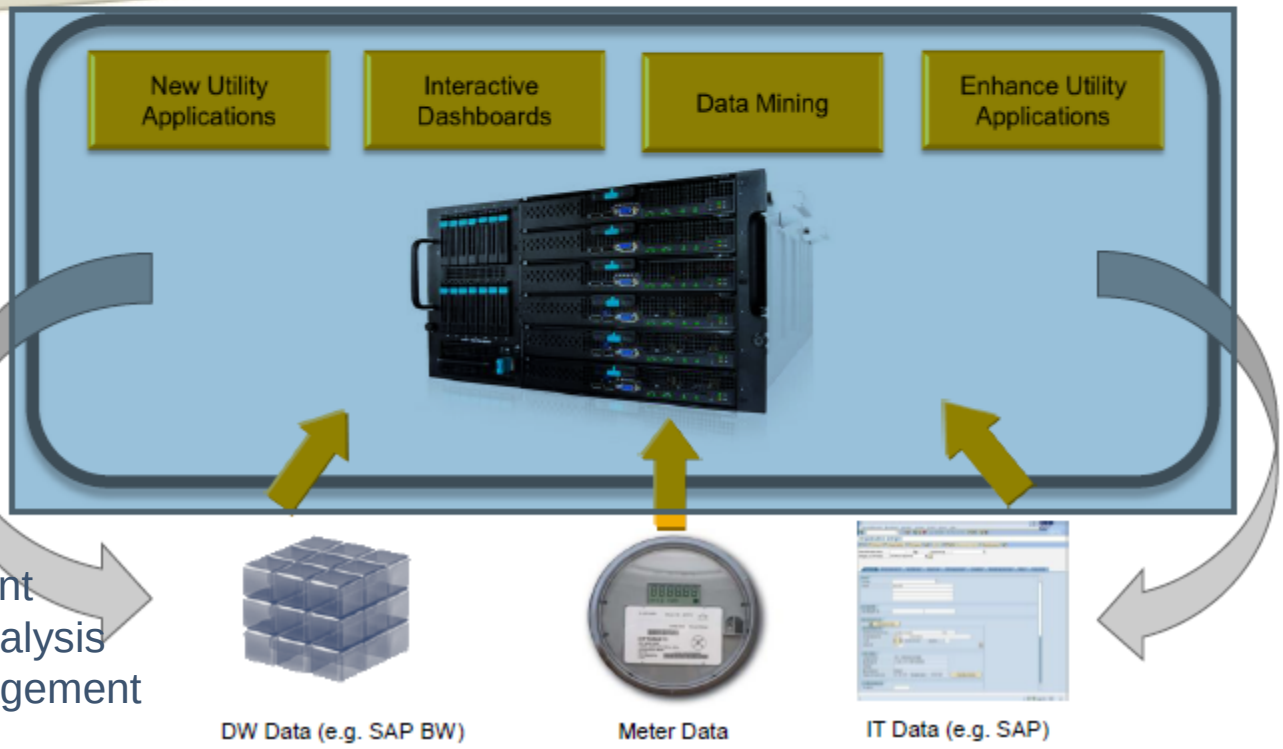
Meter-to-Back Office Value Chain

In-Home Device		Multi-vendor Communication Architecture					OSIsoft MDUS	Back-Office	Customer Interaction
								
Endpoint Devices	**Home Area Network**	**Smart Meter**	**Local Area Network (LAN)**	**Collector**	**Wide Area Network (WAN)**	**AMI Head End**	**Data collection & storing**	**CRM / Billing / Asset Mgmt**	**Internet / IVR / Call Center**
Devices in the home that can be remotely updated and controlled by the utility.	Network connecting consumer products and endpoint devices	Measures, collects, transmits and stores energy and event data. Configured remotely.	Transmits data between meters and a collector.	Collects, stores and transmits messages to and from multiple meter points.	Transmits data between collector and AMI head end.	Controls meters & comms network.	Central repository for meter & event data collected from all AMI Head Ends. Dispatches AMI Head Ends.	System of record for all customer and commercial data and the related processes that leverage AMI.	Most processes are directly or indirectly initiated by the customer and are the consequence of or result in customer services and have an impact on the customers bill.

High Performance Analytical Applications for Utilities

- Difficult to process large volumes of data quickly
- Meter data alone cannot answer the questions utilities want to ask
- Classical approaches are expensive and have low response times

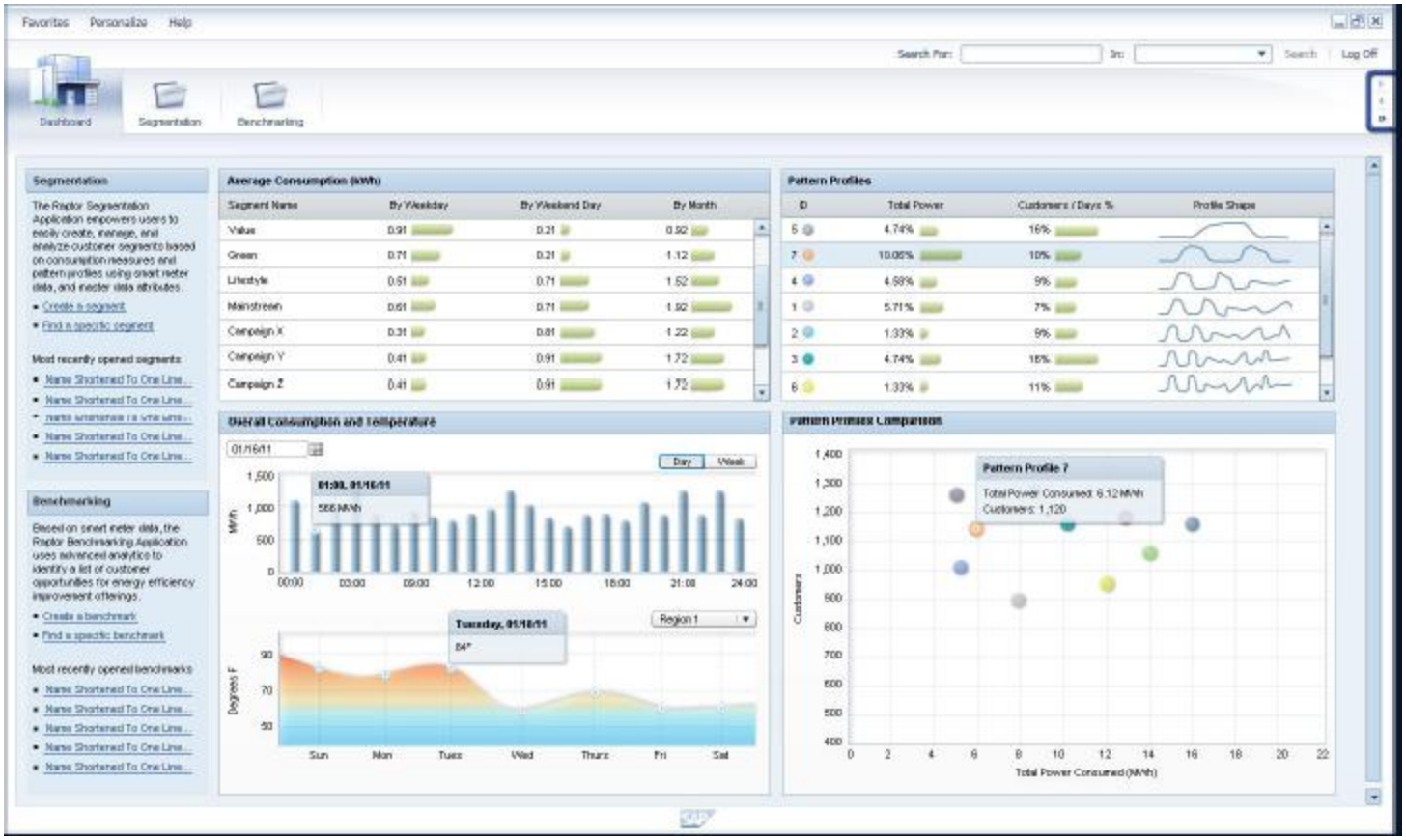
In-memory technology.



Application Areas:

- Balance Analysis
- Profitability Analysis
- Product Development
- Flexible Portfolio Analysis
- Demand Side Management
- Energy Settlement
- Unbilled Revenue

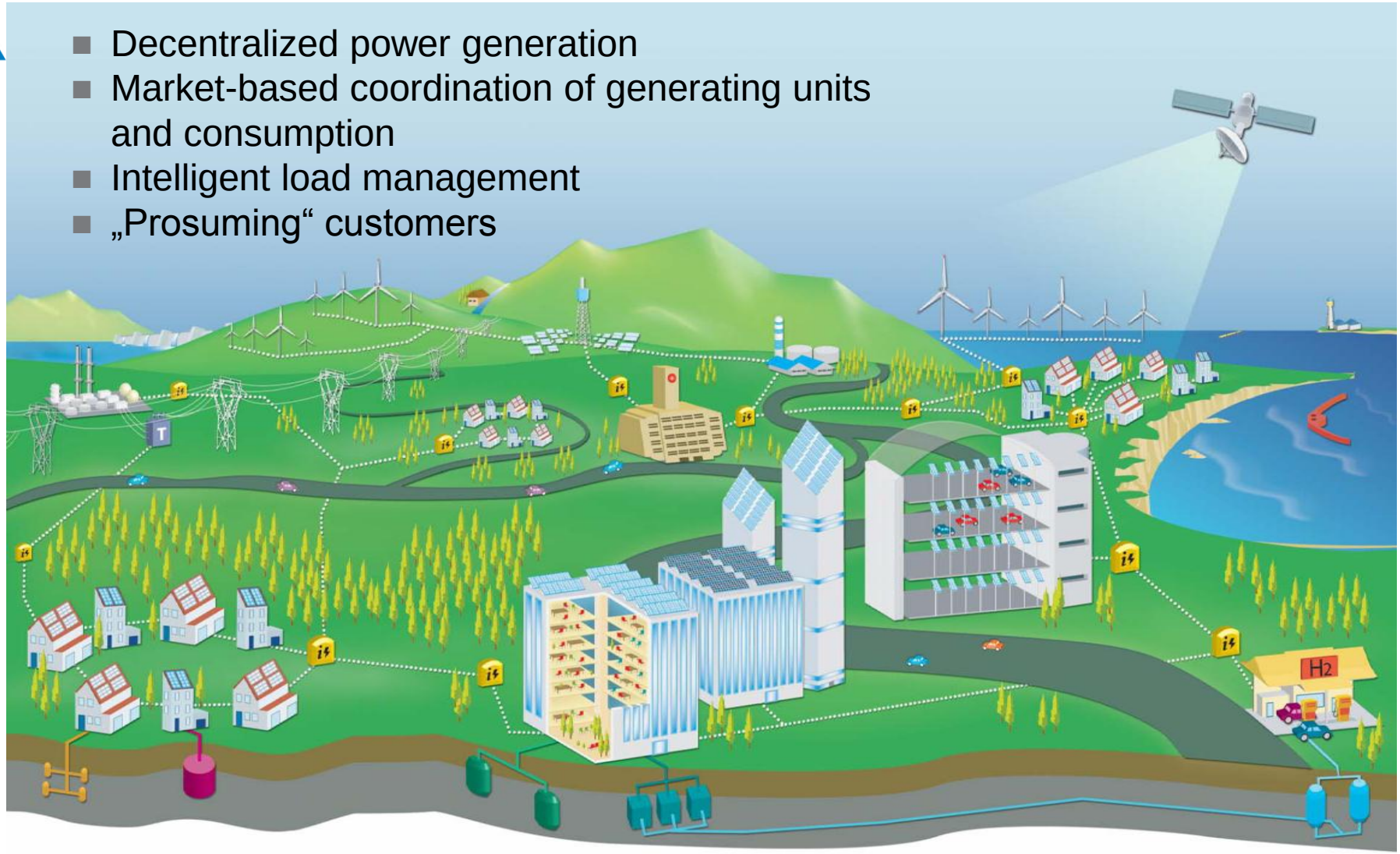
SAP Smart Meter Analytics Demo



http://technology.news-sap.com/2011/03/09/early-prototype-smart-meter-analytics-for-utilities/

The “Brave New World” of 2020 …

- Decentralized power generation
- Market-based coordination of generating units and consumption
- Intelligent load management
- „Prosuming“ customers



Wrap Up – New Energy Economy

- Improved functionality
  - Better/more timely detection of theft & fraud
  - Better visibility to Distribution Operations
  - More timely Load Profile & Forecasting Analysis
- PI System for AMI
  - Automatic configuration and maintenance
    - Asset Data (Contextual Layer)
    - Time Series Data (Data Layer)
    - SAP Utilities Gateway
- Various Integration Methods
  - Traditional
  - Native by partners
  - Back Office with SAP

Thank you