GE
Energy

Introduction to Enterprise Data Management

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POWERING POTENTIAL

The Smart Grid

imagination at work

Intelligent Electronic Device (IED)

- **Any device incorporating one or more processors with the capability to receive or send data/control from or to an external source (e.g., electronic multifunction meters, digital relays, controllers)**

Enterprise Level Substation System Integration (ELSSI)

MISSION: "Integrate substation IEDs and Data Mart concepts so your company can leverage information to maximize the *business* value you get from equipment and its operation.

WHAT: A concept and framework, workshops, evaluation, design, planning, consultation, documentation and implementation assistance.

PRODUCTS:

1) **Improved ability to leverage information.**
2) **Comprehensive plan for use in the future.**
2) **Business case maximized for VALUE: *Quick* start in the *right* direction toward *achievable business* goals.**

imagination at work

Substation Integration and Automation Levels

Utility Enterprise
Substation Automation Applications
IED Integration
Intelligent Electronic Device (IED) Implementation
Power System Equipment (Transformers, Breakers)

imagination at work

Integration

- Integration of protection, control and data acquisition functions into a minimal number of platforms to reduce capital and operating costs, reduce panel and control room space, and eliminate redundant equipment and databases

Automation

- Deployment of substation and feeder operating functions and applications ranging from SCADA and alarm processing to integrated volt/Var control in order to optimize the management of capital assets and enhance operation and maintenance (O&M) efficiencies with minimal human intervention

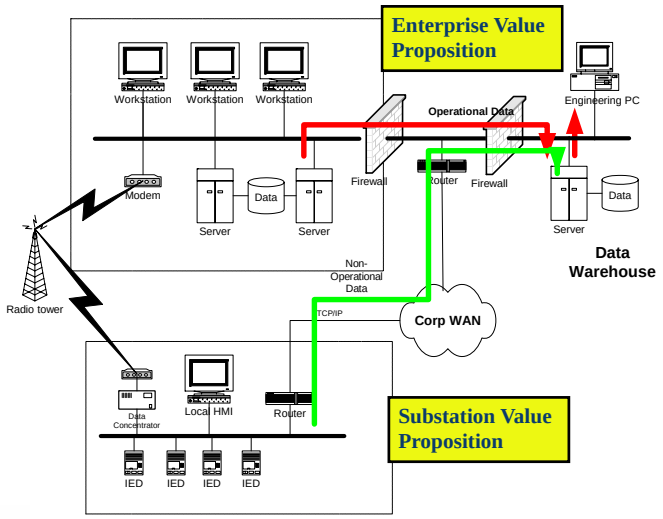
Communication Paths From Substation

- Two second data to SCADA system (operational data – extracted using industry standard protocol such as DNP3)
- On demand data to utility information server or data warehouse (non-operational data – extracted using IED vendor's proprietary ASCII commands)
- Remote access from remote site to isolate a particular IED (also called "pass through" or "loop through")

Communication Paths From Substation (continued)

Utility Enterprise Connection		
SCADA Data to MCC	Historical Data to Data Warehouse	Remote Dial-In to IED
Substation Automation Applications		
IED Integration Via Data Concentrator/Substation Host Processor		
IED Implementation		
Power System Equipment (Transformers, Breakers)		

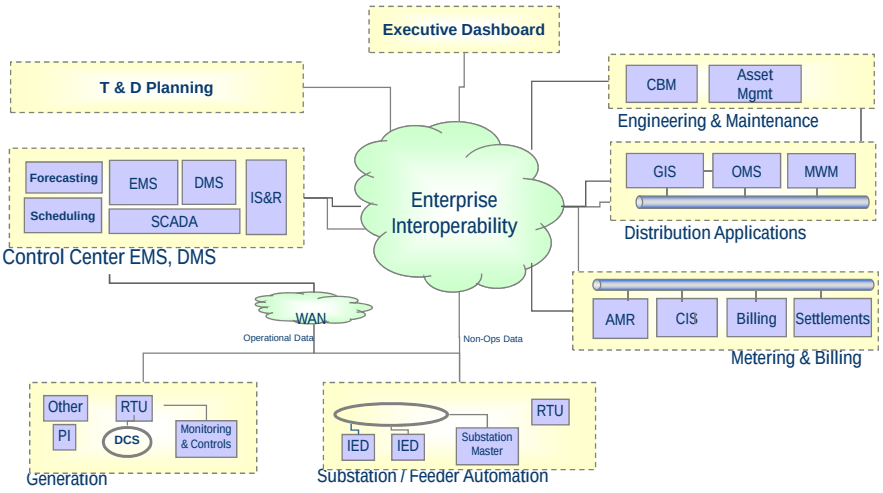
Operational and Non-Operational Data Paths



Local vs. Enterprise Data Marts

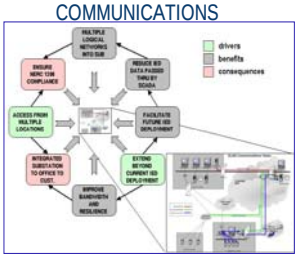
- Local historian at substation level is a component of the Substation Automation System (e.g., PC with local substation HMI and historical data archiving) and is designed for Data Mart integration
  - Ability to push data From substation to enterprise Data Mart based on time, demand or event triggered
  - Enterprise Data Mart can pull data from local Data Mart in substation

Enterprise Interoperability

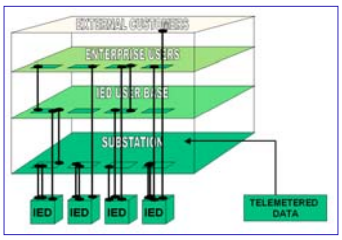


ELSSI Vision

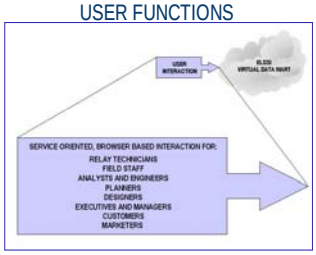
COMMUNICATIONS



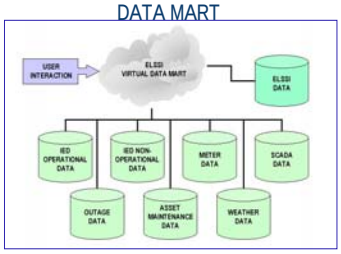
USER LEVELS



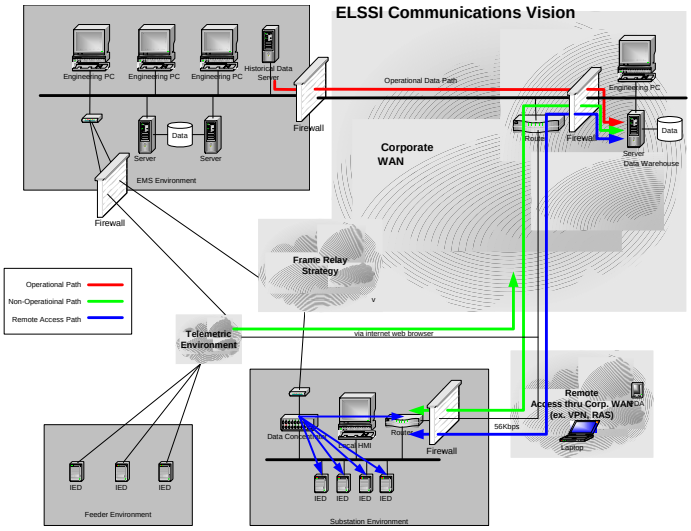
USER FUNCTIONS



DATA MART

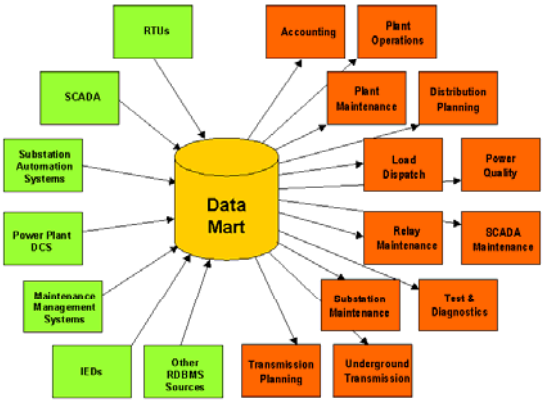


ELSSI Communications Vision



Data Mart Vision

The *Virtual* Data Mart Links Users and Applications to Data from Multiple Sources of Record



IEC 61850

- International standard for communications in substations
- Ability for utility to implement depends on:
  - Which IEDs the utility uses
  - Which IED suppliers have incorporated IEC 61850 into their products
  - Commercial implementation that is field proven by suppliers
- Industry interest level different globally
  - Little interest to date in North America
  - Much more interest in Europe with utilities and suppliers