

GE Energy Digital Energy

Introduction to ELSSI and SA

Smart Grid Tutorial

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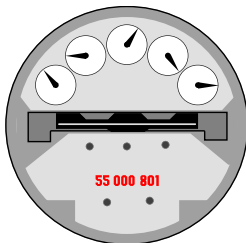


imagination at work



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.

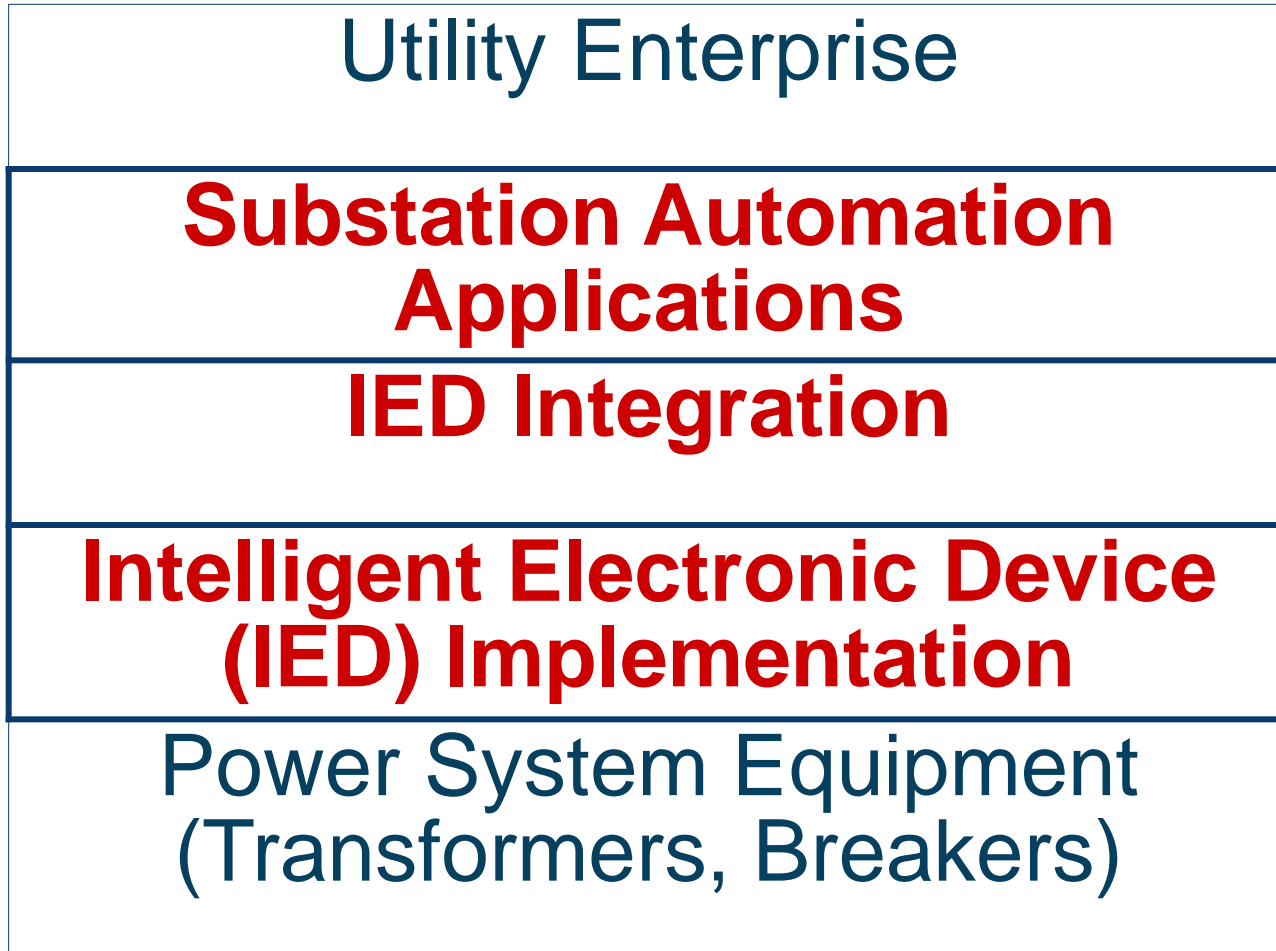
WHAT: A concept and framework, workshops, evaluation, design, planning, consultation, documentation and implementation assistance.

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*.**



Substation Integration and Automation Levels



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

Utility Enterprise

Substation Automation

IED Integration

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

Utility Enterprise

Substation Automation

IED Integration

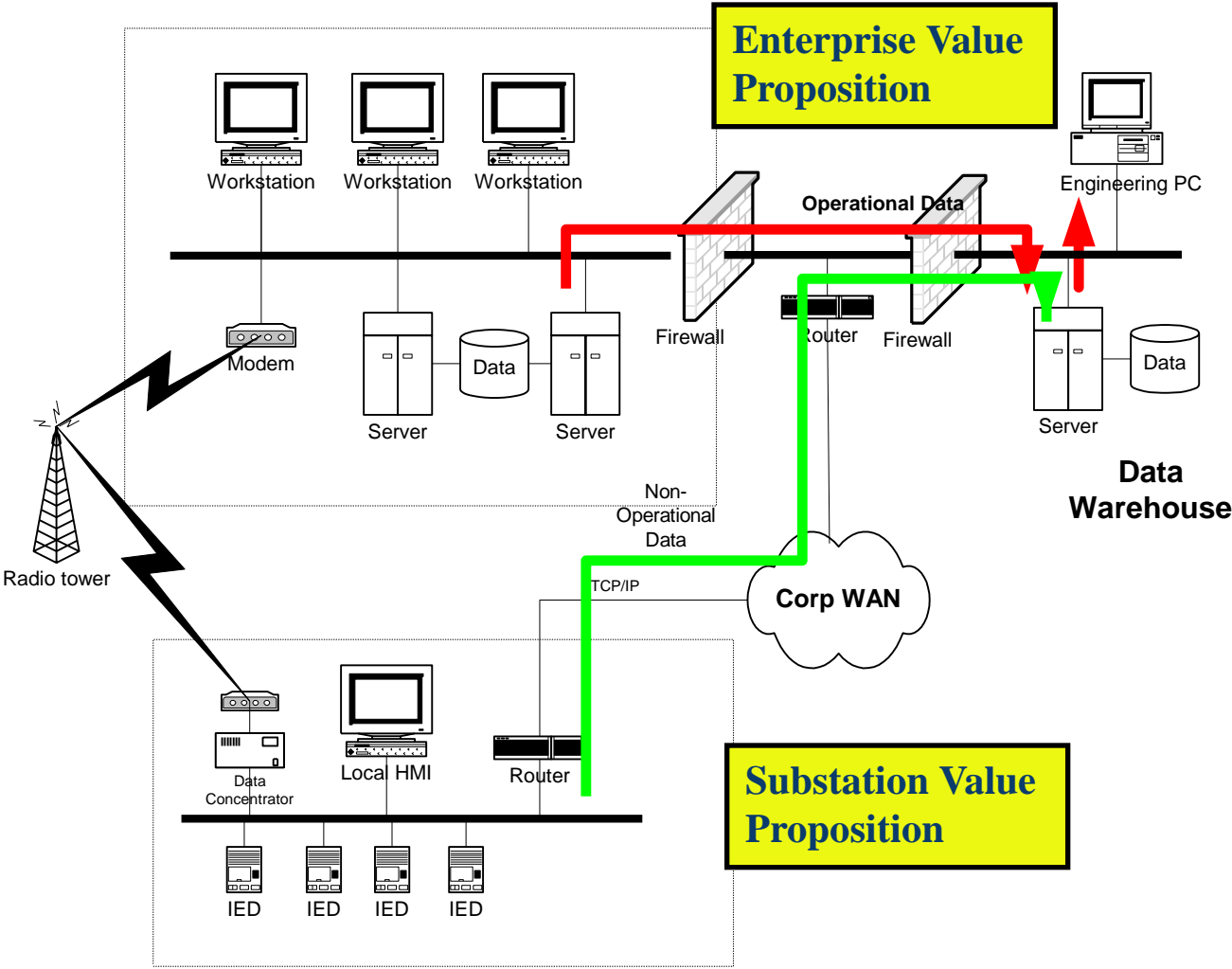
Communication Paths From Substation

- 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)		

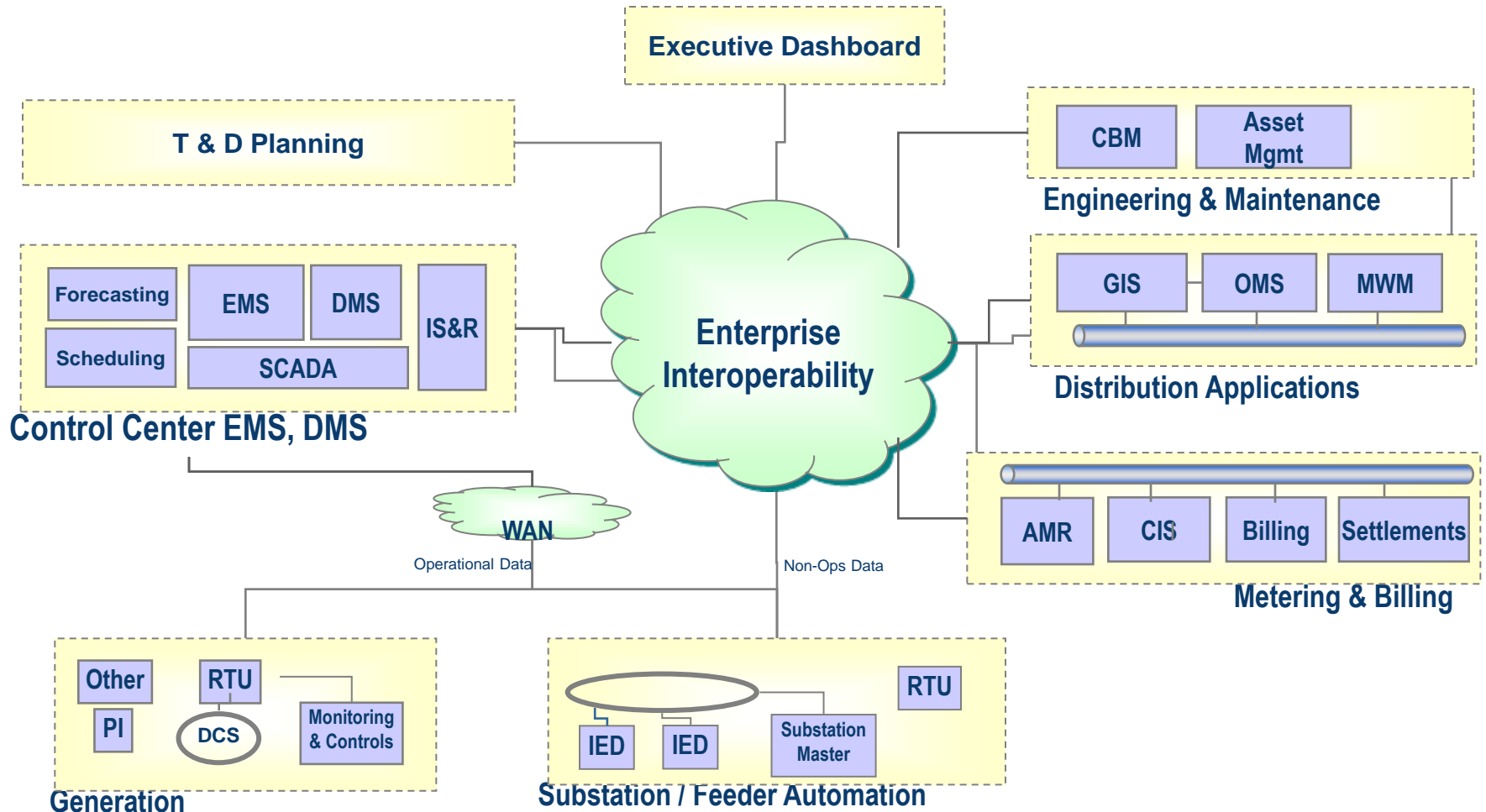
Operational and Non-Operational Data Paths



Local vs. Enterprise Data Marts

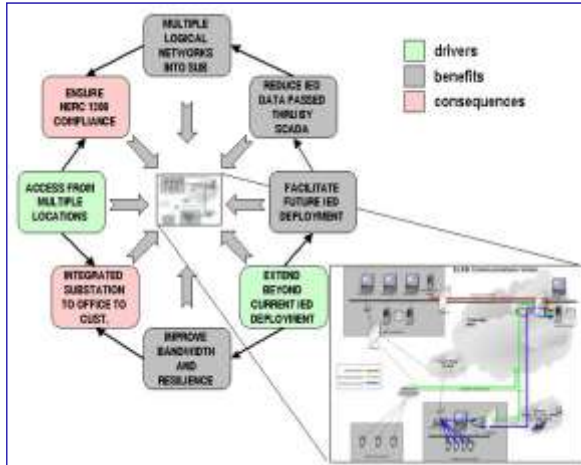
- Local historian at substation level is a component of the Substation Automation System (e.g., PC with local substation HMI and historical data archiving) and **is designed for** Data Mart integration
 - Ability to **push** data From substation to enterprise Data Mart based on time, demand or event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

Enterprise Interoperability

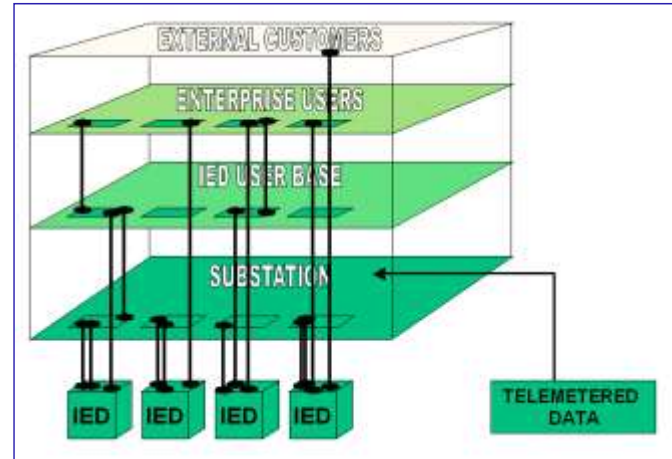


ELSSI Vision

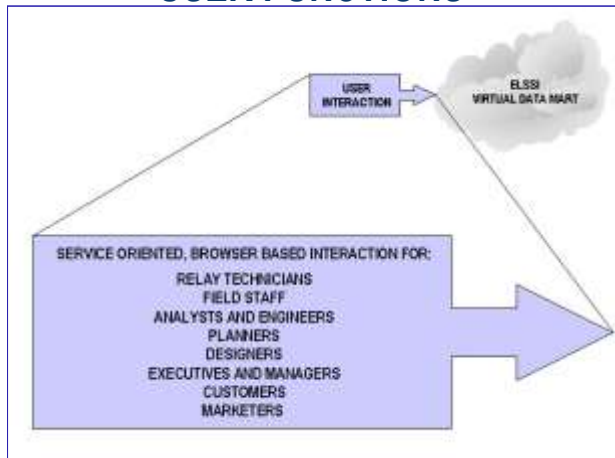
COMMUNICATIONS



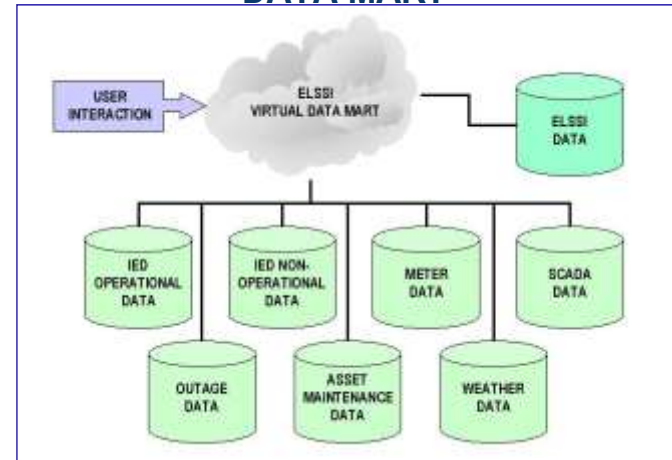
USER LEVELS



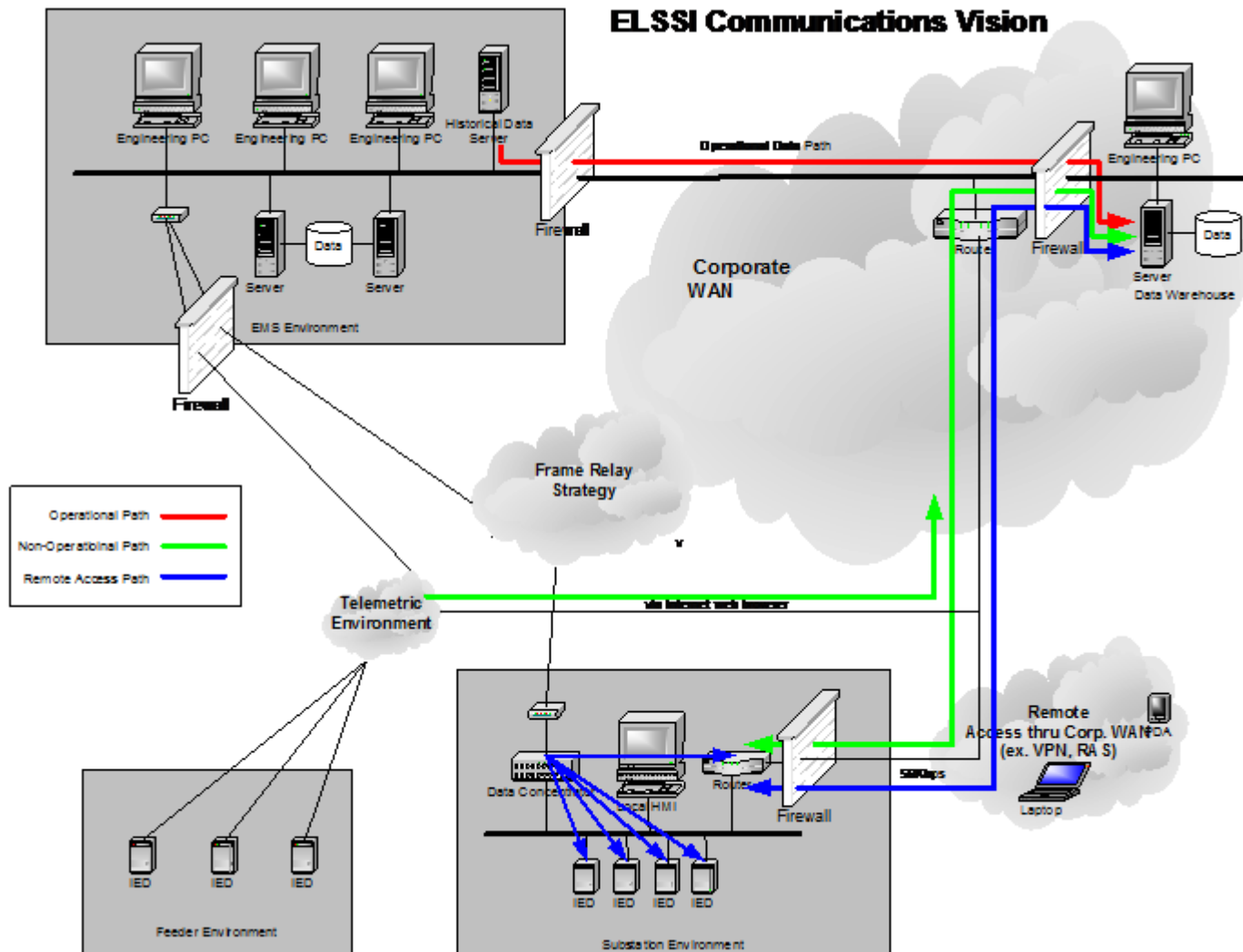
USER FUNCTIONS



DATA MART

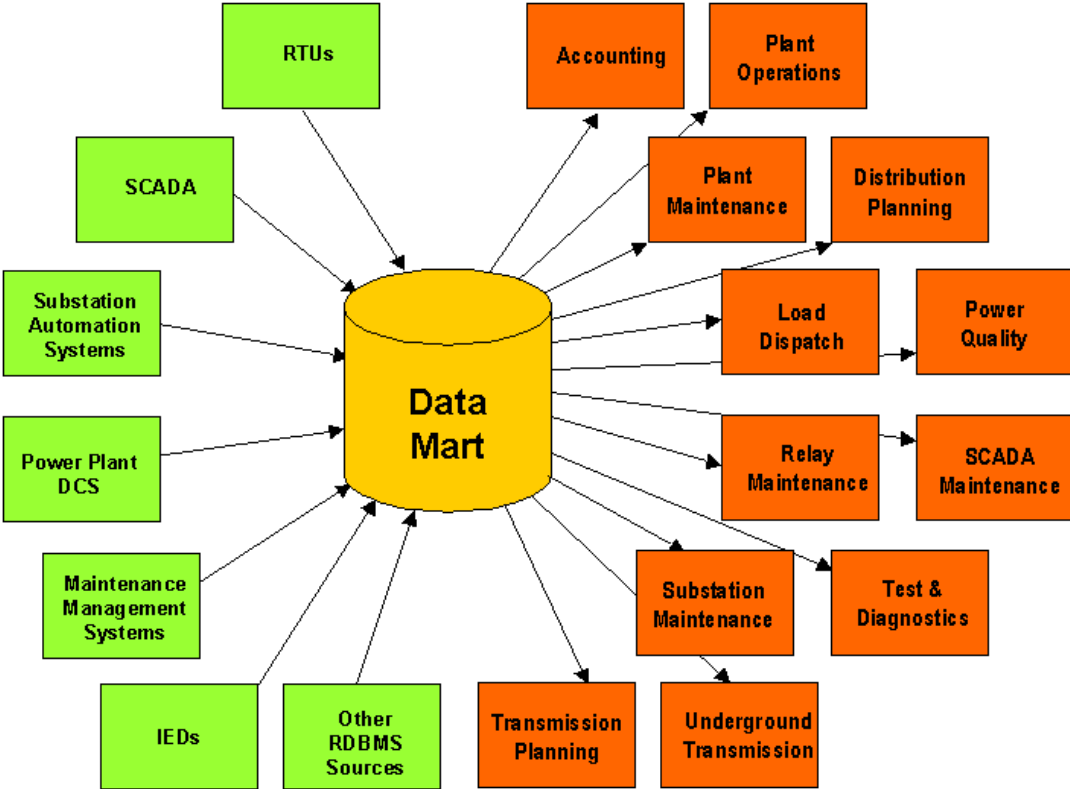


ELSSI Communications Vision



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