

Smart Grid Overview

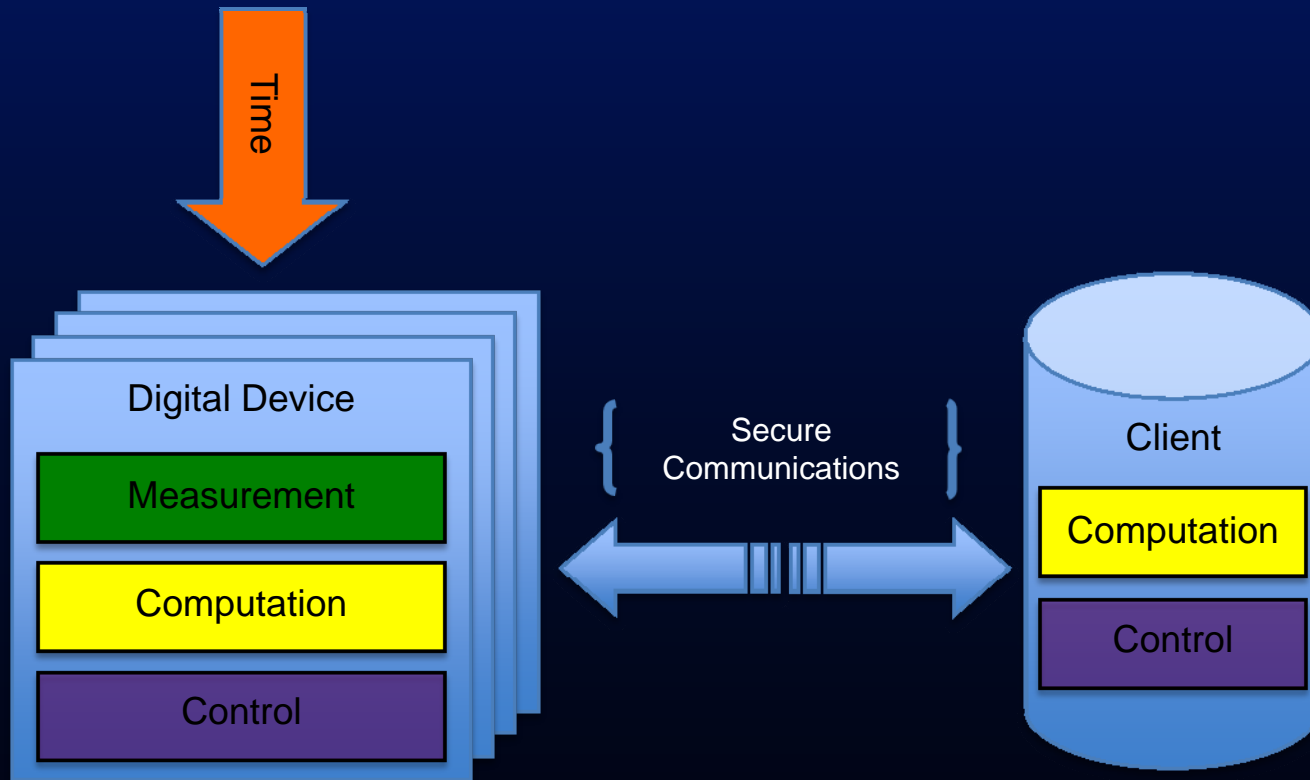
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What is a “Smart Grid?”

A smart grid uses information, computation, & communications to improve reliability, efficiency and meet customer needs

Example System



Example Digital Devices

- Protective Relays
- Recloser Controls
- Voltage Regulator Controls
- Faulted Circuit Indicators
- Sensors / Monitors
- Meters

Example Clients

- SCADA Master
- Synchrophasor Concentrator
- Regional Transmission Organization (RTO)
- Asset Management System
- Customers (Industrial & Residential)

Data

- Satellite Synchronized Time
- SCADA (Telemetry & Control)
- Synchrophasors
- Fault Indication/Location
- Asset Management
- Metering / Power Quality
- IEC 61850 / GOOSE

Communications (Substation)

- Hardwired
- EIA-232, EIA-485
- Ethernet LAN
- Communications Processor / RTU
- Secured WiFi

Communications (Wide Area)

- Ethernet WAN
- Fiber-Optic Multiplexed Network
- Radio
 - ◆ Digital Spread Spectrum
 - ◆ Microwave
 - ◆ AMI

Security

- Encryption
- Authentication
- Access Management
- Layers of Defense

Control

- Local
 - ◆ Manual
 - ◆ Automatic
- Remote
 - ◆ Manual
 - ◆ Automatic

Education

- Changing Skill Set
- Continuing Education
- Ethernet / IP Knowledge

The Grid Is Already Smart



Synchrophasors

Distribution Fault
Location

Communications

Integrated Metering

Asset Management

Go Digital!

Make your systems smarter

- Faster protection
- Automatic self-testing
- Fault locating
- Event recording
- Synchrophasors
- Metering & control
- Lower cost
- Improved safety



Smart Grid Philosophy

- A smart grid uses information, computation, & communications to improve reliability and meet customer needs
- The grid is already smart
- True smart solutions pay for themselves