

SCADA Upgrade-O-Rama

A REVIEW OF KEY COMPONENTS AND OPTIONS
FOR SCADA SYSTEM UPGRADES



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SCADA Upgrade-O-Rama

Order of Presentation

- Programmable Logic Controllers (PLCs)
- Human-Machine Interfaces (HMIs)
- Computer Hardware
- Computer Software
- Remote Access Capabilities

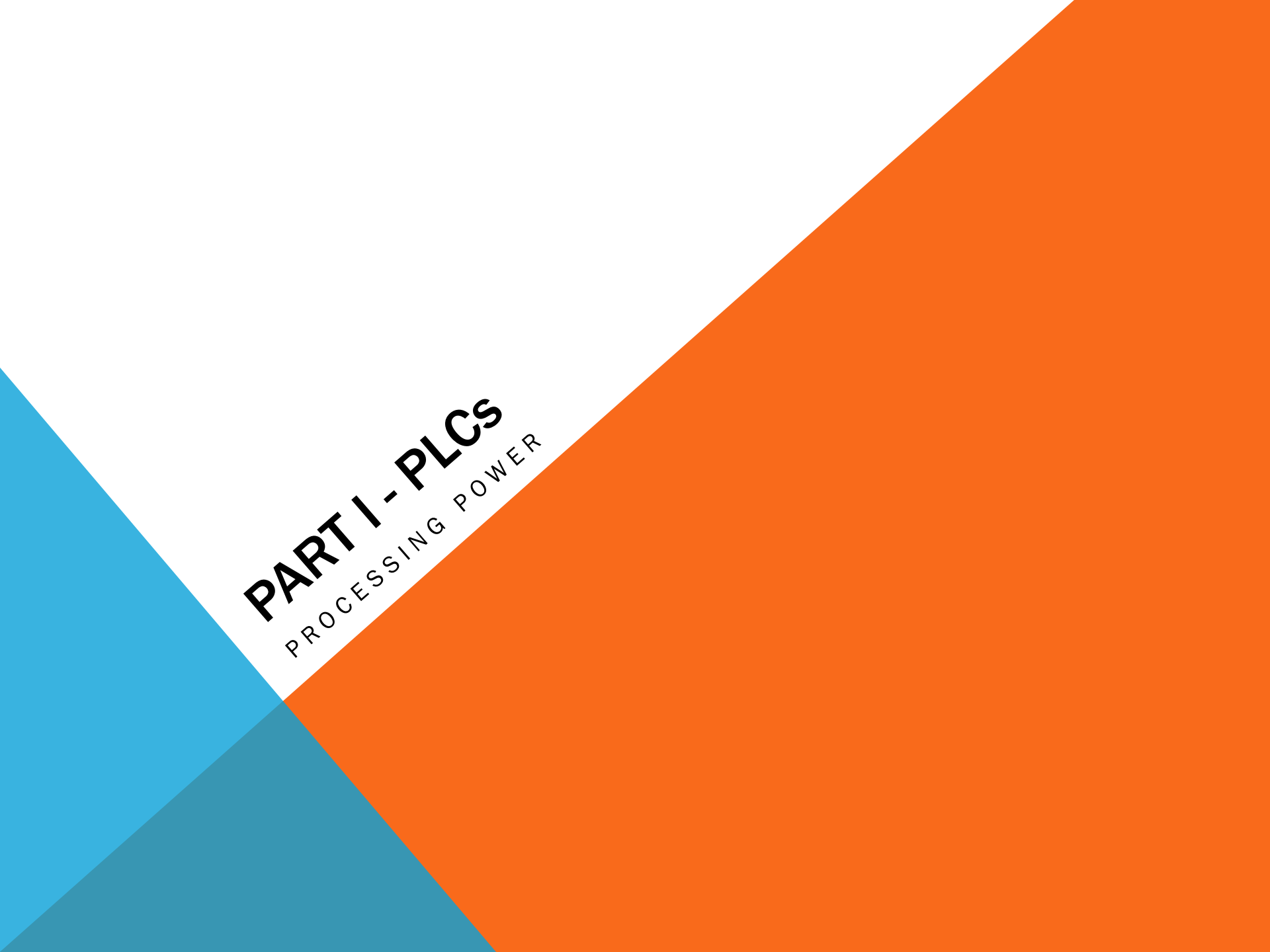


SCADA Upgrade-O-Rama

PURPOSE

- Provide overview of existing and new technologies
- Equip operators, administrators and supervisory staff with a knowledge of options so they can provide input and ask the right questions when facing a SCADA upgrade project.





PART I - PLCs

PROCESSING POWER

Manufacturers

It's all about

- Reliability
- Service and Serviceability
- Support
- Longevity
- Installation base

*Allen-Bradley
is most
common in
this area.*

*There are others,
but they may not
meet all these
considerations.*



Design Considerations

- Although they have a long service life, models are updated and replaced from time to time.
 - Small Logic Controller - SLC
 - Older platform that is on the “Legacy” path.
 - MicroLogix
 - Ethernet Communications
 - 1100 remains applicable for small applications
 - 1400 was introduced a few years ago, often replacing other MicroLogix models



Design Considerations

- CompactLogix Family
 - Utilizes a different programming logic than the MicroLogix PLCs, and used to be best for larger applications.
 - A new, smaller CompactLogix is now available, the most recent with on-board Input and Output (I/O) capability, making it an affordable way to have all plant PLCs of same platform.
- ControlLogix Family
 - For large-scale applications



Design Considerations

- Communication to Field Devices and Motor Control (Traditional)
 - Wired directly to I/O cards in PLC
 - Good application for communication within a building
 - Requires more field labor for new installations
 - Possibility of installation error, damage or degradation over time.



Design Considerations

- Ethernet, Wired (Copper, CAT 6 cabling)
 - Ideal for communications between panels, MCCs, and instruments.
- Ethernet, Fiber Optic cabling
 - Ideal for communications between buildings
 - Not subject to lightning damage



Design Considerations

- OEM-type Equipment – “Brand X”
 - Evaluate for long-term suitability
 - Designed for specific purpose, inexpensive deployment
 - Consider if savings on equipment is worth less flexibility, longevity, and upgradability
 - Future upgrades may require replacement rather than re-programming.



PART II – OPERATOR INTERFACE

WINDOW TO YOUR PLANT

Human-Machine Interface

- Not just a touchscreen. Models now have
 - Built-In PLC Functionality
 - Data Logger
 - Alarm Logger
 - Built-In PC Functionality
 - Web Server for remote access
 - Print Server for daily report printing
 - Data Logger
 - Can download data to a memory stick
 - Video, Graphics



Human-Machine Interface

- High Brightness Screens are visible in sunlight



Human-Machine Interface

- Manufacturers include:
 - Allen-Bradley
 - Pro-Face
 - Maple Systems
- Each has different features available, and different price points.
- Selection depends on application



Human-Machine Interface

- Design Considerations
 - Reliability
 - PLC-type vs. PC-type
 - PLCs are designed for industrial use and reliability
 - PCs have flexibility, but may be more subject to damage, viruses, hardware failure.
 - Where and how many?
 - HMI could replaced with portable tablet.
 - Lowers installation cost
 - Provides operator versatility

Remote access available directly to screen over Internet.



PART III – Computer Hardware

THERE'S ALWAYS SOMETHING NEW

Computer Hardware

- Desktops
- Laptops
- Tablets
- Phones



COMPUTER HARDWARE

- Desktops and Servers are still the workhorse of the industry
 - Data and software reside on local equipment.
- Laptops
 - Computing capability resides on computer, or can host session on server.
 - Still have a role, but are becoming replaced by other equipment (tablets, phones).
 - Subject to loss or damage
 - Expensive to replace.

Desktops and laptops have limited service life and will require replacement within 5 -8 years.



COMPUTER HARDWARE

- Tablets
 - Can provide window to your SCADA and even take the place of a traditional HMI
 - Software and Data reside on Server, usually at plant, but offered more and more “in the Cloud.”
 - Easily upgraded or replaced
 - Subject to loss or damage
 - Inexpensive
- Phones – Handheld Computers





Computer Software

THE BRAINS OF YOUR SCADA

SOFTWARE

- “Owner-hosted,” which is typical
 - Software and data reside on local server
 - Locally maintained and backed up
 - Software maintenance
 - Annual support subscription
 - Upgrade as required
 - Can have off-site back-up of files



SOFTWARE

- “Cloud-hosted”
 - Software and/or data can reside on remote server
 - Not really in the clouds, just on another computer off-site that is maintained and backed up by a service company
 - Typically requires subscription service that includes updates



Software Types

- Visualization
- Plant Management
 - Process Reporting and Performance Analysis
 - Historical Data Management
- Commercial
 - Hach WIMS / OPS
 - AllMax Operator10
- “Home-Grown” Excel or Access-based
 - Often Simpler, but not necessarily upgradable



Software Types

- Maintenance Management
 - Limited equipment tracking
 - Generates work orders
 - Hach JobCal
 - AllMax Antero



Software Types

- Asset Management
 - Linked to GIS mapping
 - Can be used by multiple municipal departments
 - Lucity
 - City Works
 - eRPortal
 - Can be utilized to create information database to protect knowledge and management priorities of long-time personnel



Remote Access

GETTING TO YOUR SCADA WHEN YOU'RE NOT THERE

Remote Access

- Cell Connection
 - Suitable for remote areas where broadband isn't available
 - Small data usage packages are not expensive
 - Good application for lift station
- Broadband
 - DSL, Cable
- Network Design - Security
 - Hardware firewall essential to protect system, and isolate from business network



Remote Access

- CHANGE YOUR PASSWORD
 - “Admin”
 - “SCADA”
 - “Operator,”
 - “1234”
 - “User”
 - “Default”
 - “Your Name Here”
- It’s easy to steal a default password.
 - Target hack was through an HVAC contractor’s *“stolen credentials.”*



Summary

SCADA - O - RAMA

SUMMARY

- Technology changes continually
 - Hardware
 - Software
 - Access and Security
- You don't have to know it all, but it's helpful to be familiar with options, terminology when you have a SCADA upgrade project on the horizon.



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WRAP-UP

Questions?



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A REVIEW OF KEY COMPONENTS AND OPTIONS

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