Integrated Architecture
Midrange System – AUP04

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PUBLIC INFORMATION
Midrange Architecture System
Transforming Your Business

Today’s marketplace demands innovative strategies and technologies to increase:

- Productivity
- Business agility
- Sustainability
- Time to Market
- Security

That’s Smart, Safe Sustainable Production
Disparate Control Systems

Today’s reality in many plants

- Inaccessible Real-time Information
- Disconnected or Proprietary Networks
- Inflexible System Deployment
- High Operational Costs
- Challenging to Maintain
- High Total Cost of Ownership

*Disparate control system translate into HIGH INTEGRATION COSTS!*
Integrated Architecture
Multiple Automation Disciplines
Functionality for a Full Range of Automation Applications

Architecture Simplification
Elimination of separate controllers and systems

Greater Information Access
Real-time information on the plant floor, remotely, or throughout the enterprise

Faster Startups
Reduction in your development and commissioning time

Lower Maintenance
Reduced costs for maintenance, spare parts and training

Optimized Productivity
Reuse to help you react quickly to market and business changes
Scalable Architecture
Right-sized Offerings for Your Varied Needs

Save Time and Money During Your Development Cycle
Reuse control and visualization designs and practices

Scale Your Architecture at Any Time
Using common components and tools

Reduce Maintenance Costs and Downtime
Common system components for any size architecture
Converged Plant-wide EtherNet
Integrating industrial and enterprise environments

Information Access in an “IT-Ready” Format
Share secure, actionable information between plant floor devices and enterprise

Expandability
Add safety, motion, wireless and security to your enterprise as needed

Compatibility
Use any of the 800+ products available on EtherNet/IP today

Take advantage of Rockwell Automation / CISCO partnership on technology and reference architectures

Architecture Simplification
Eliminate gateways and bridges while maintaining security

- Single version of Ethernet – the standard for IT and industrial applications
- Real-time access to power and control system data without hardware or software gateways
- The global standard adopted by leading automation vendors
The Stratix Portfolio
Integrating Industrial and Enterprise Environments

Products that offer

- Layer 2 and Layer 2 switching for simple to complex networks applications
- Advanced security services
- Plant-floor and Enterprise integration

Technology that offers

- Advanced switching, routing & security features
- Common tools for Controls & IT
- Improved Maintainability

Addressing the needs of Automation... as well as Operations and IT

Stratix 8000/8300
Layer 2, Layer 3
Stratix 5900
Services Router
Stratix 2000 Unmanaged
Stratix 5700
Layer 2
Stratix 6000
Layer 2
Stratix ETAPs
Converged Plant-wide EtherNet
Logix Interface for Stratix

**Studio 5000®**
- Configuration (stored as part of project)
- Status
  - Product identification
  - I/O connection
  - Port Status
  - Alarms
- Maintenance - Save and restore

**Logix Predefined Tags**
- Link Status
- Unauthorized device
- Threshold exceeded
- Bandwidth utilization
- Alarm relays
- Port Control

**Full CISCO IOS support.**
- Operating on millions of active systems, ranging from the small home office router to the core systems of the world's largest service provider networks
Reduce risks to safe and reliable operation
...Control system architecture with layered security to help maintain operational integrity under threat

Protect assets & information
...Product and system features to help control access, tamper-proof and limit information exposure

Government and Standards Alignment
...Responsible disclosure with control system solutions that follow global standards and help fulfill independent & regulatory security requirements

Address risk to help protect people, assets and information from accidental and malicious threats.
Logix Designer
Automation Productivity

- Multi-discipline system development unlocks the expanding Logix core… embedded components, extended tag properties, historical data, etc.

Automation Productivity is key to reducing Cost, Risk and Time to Market.
## FBD Process and Drives Control

### An example of Functions native in the Logix Instruction Set

<table>
<thead>
<tr>
<th>Process Instructions</th>
<th>Drives Instructions</th>
<th>Filter Instructions</th>
<th>Logical Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Alarm</td>
<td>• Pulse Multiplier</td>
<td>• High-Pass Filter</td>
<td>• Boolean And</td>
</tr>
<tr>
<td>• Enhanced PID</td>
<td>• S-Curve</td>
<td>• Low-Pass Filter</td>
<td>• Boolean Or</td>
</tr>
<tr>
<td>• Ramp/Soak</td>
<td>• PI</td>
<td>• Notch Filter</td>
<td>• Boolean Exclusive Or</td>
</tr>
<tr>
<td>• Scale</td>
<td>• Integrator</td>
<td>• Second-Order Lead-Lag</td>
<td>• Boolean NOT</td>
</tr>
<tr>
<td>• Position Proportional</td>
<td>• Second-Order Controller</td>
<td>• Derivative</td>
<td>• D Flip Flop</td>
</tr>
<tr>
<td>• Split Range Time Proportional</td>
<td>• Up/Down Accumulator</td>
<td></td>
<td>• JK Flip Flop</td>
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<tr>
<td>• Lead-Lag</td>
<td></td>
<td></td>
<td>• Set Dominant</td>
</tr>
<tr>
<td>• Function Generator</td>
<td></td>
<td></td>
<td>• Reset Dominant</td>
</tr>
<tr>
<td>• Totalizer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Deadtime</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Discrete 2-State Device</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Discrete 3-State Device</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Select/Limit Instructions

- Select
- Enhanced Select
- Selected Summer
- Selectable Negate
- Multiplexer
- H/L Limit
- Rate Limiter

### Statistical Instructions

- Moving Average
- Moving Standard Deviation
- Minimum Capture
- Maximum Capture

There are also extensive sets of Add-On Instructions in the PlantPAx Process Library and others like Power Programming and RAPID.
Automation Productivity
Studio 5000 Enhanced Capabilities (V24)

**System Organization**
Logical Organizer

**Modular Automation**
Program Parameters

**Library Management**
Simplified workflows to reuse content

**Actionable Information**
ISA18.2 Standard support, FTAE instruction support

**System Security & IP Management**
Resiliency Enhancements

**Motion Device Management**
Support for multiple update rates
Safe & Standard Connections, safe torque off (STO)
New Kinetix 5500 / PowerFlex 527

**Collaborative Engineering**
Compare and Merge capabilities

**Virtual Design & Engineering**
Emulate
Premier Integration
Device & System Integration

Device Configuration
Configure both the controller and device simultaneously using one software package

Automatically create data types and descriptive device tag names with proper data types

Control, Status and Diagnostic Tasks
Faceplates/AOI sets automatically create tags to provide code for your controller and graphics for your HMI when you add a device

Ease-of-Use
Take advantage of ready-made reference architectures

• Enhanced product configuration environment
• Easy access to native device intelligence
• Pre-configured profiles, wizards, faceplates and fully integrated tools
Operations Productivity
Operator Effectiveness

Effective Displays
… Library of contextual display objects to drive productivity

Procedural Control
… PlantPAx Sequencer automates procedures to free operator to focus on process

Standards-based Alarming
… effectively direct the operator’s attention with alarms to improve the productivity, safety, and environment of your plant

Operators should spend their time controlling the plant, not being distracted by the control system
Operations Productivity

Actionable Information

Scalable Data Collection
… Chassis-based, plant-wide or enterprise-wide historian

Decision Support Tools
…Trends, dashboards, and reports allow users to collaborate and make actionable decisions

Actionable information in the hands of decision makers for better business performance
Operations Productivity
Batch Management

Scalable Platform
… From simple, single unit scale to highly complex, integrated batch solutions

Integrated Analysis Tools
… Batch reports, material usage, genealogy, and solutions to optimize batch production

Native ISA-88 Structure
… Simplify change management and regulatory compliance

Flexibility to respond to external pressures - regulatory compliance, yield optimization, production agility

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Power Control Convergence
For all your motor management needs

Common Technologies
- Power control on EtherNet/IP
  - Energy, safety, motion, security

User Experience
- Ease of use
- Optimal integration
- Motor control profile
- Device management

System Attributes
- Engineering productivity
- Energy reporting & management
- Alarms & diagnostics
- Auto Device Configuration

Integration of power devices, control and visualization.
Integrated Architecture
Controllers and I/O Portfolio

Plant-wide Control
… Multi-disciplined platform
… From 10 loops to hundreds per controller

Robust Network Infrastructure
… CISCO technology and EtherNet/IP with redundancy options at every level

Broad Range of I/O
… Chassis based to small distributed I/O
… Redundant I/O
… Integrated of drives and field networks

A scalable controller platform that is utilized plant-wide and provides a unified system experience
Programmable Automation Controllers

ControlLogix® 5570

Armor™ (Guard)Logix®

GuardLogix® & Compact GuardLogix®

CompactLogix 5370

ControlLogix-XT™
Integrated Architecture Solutions

Discrete

Process

Motion

Safety

Information

Drives
Midrange Architecture System

Lowest Total Cost to Design, Operate and Maintain Machines
Midrange Architecture System
Recent Enhancements

- Smallest Logix System
- EtherNet/IP integrated motion
- Device integration

- Integrated visualization
- Engineering collaboration
- Network segmentation
Providing the most options for machine design

CompactLogix 5370

SMATER SCALABILITY
5370 Controller details

- EtherNet/IP embedded in all controllers, with DLR

- Multiple I/O platform support, with embedded I/Os optional

- Logix engine with same attributes as the rest of the Logix platforms

- Integrated motion with up to 16 axis in scalable options, with Kinematics
Cisco and Logix integration create one optimal network environment
Machine Network Segmentation
Connecting to the Plant Network

CompactLogix™ L36ERM
ArmorBlock® I/O
PanelView™ Plus EOI
POINT I/O™
PowerFlex® 525 / 527

Instrumentation

Cisco 3750 or Stratix 8300™
Stratix 5700™ (Optional NAT)

Plant Network
NAT Routing
1783-NATR Overview

Table Example

<table>
<thead>
<tr>
<th>Table</th>
<th>1783-NATR</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.1.2</td>
<td>10.10.10.2</td>
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<tr>
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<td>192.168.1.8</td>
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</tr>
<tr>
<td>192.168.1.9</td>
<td>10.10.10.9</td>
</tr>
</tbody>
</table>

- One EtherNet/IP machine network and Plant connection for the machine
- Provides isolation between machine network and plant network, while allowing connectivity
- Allows for a ring topology (DLR) and a “switchless” architecture at the machine level

Target AFC: Early 2015
PanelView Plus 7

- Increases scalability
  - **PanelView Plus 7 standard family**: optimized for midrange applications
  - PanelView Plus 7 performance family: complex HMI needs

- New Display design
  - Increased screen resolution
  - Wide screens & traditional 4:3
  - More sizes: 4” wide up to 19”

- More Certifications
  - ATEX, zone 2 and 22: powder&solvent filling, grinding,…
  - Marine: ships, off-shore…

- Based on FactoryTalk View Machine Edition

**SMARTER VISUALIZATION**
5370 Compact GuardLogix

- New Compact GuardLogix safety controller featuring a 1oo2 safety architecture for SIL 3, PL(e) Category 4 safety applications
- Same functionality as equivalent “standard” catalog numbers
  - Will add 50% extra memory for safety applications
- Three Catalog Numbers Planned:
  - L30ERMS (+0.50MB Safety Memory)
  - L33ERMS (+1.0 MB Safety Memory)
  - L36ERMS (+1.5 MB Safety Memory)

Target AFC: Summer 2015
PowerFlex 525, PowerFlex 527

- Power Ratings
  - Up to 22 kW: 220V 1ph, 380-480V 3ph, 500-600V 3ph

- Common Features
  - Modular Design, Removable control module
  - Conformal Coating on all boards
  - Optional fan kit allows up to 70°C ambient temperature
  - Safe Torque-Off SIL2/PLd, Encoder Feedback
  - CustomView™ allows you to create custom parameter groups

PF525
- Single Ethernet
- SafeTorqueOff
- CIP Energy

PF527
- Dual Ethernet
- CIP Motion
- CIP Safety
- CIP Energy

Target AFC: Fall 2014
System Architectures and Midrange
OEM, Skid and Process Equipment Solutions

Scalable Solutions
… A system that can scale from equipment to control room, enabling OEMs to use the same technology on skids as end users utilize with their plant-wide DCS

Partnerships with OEM’s and Process Skid Builders
… Drive consistency in automation designs despite the shift toward modular-design plants

Reduce Integration Cost and Risk
… Ensure OEM automation scope is easily integrated into your Automation System following best practices and proven methodologies

Engaging suppliers to help end users respond to changing business demands & reduce integration costs
PlantPAx process Skid
Example Application
P_Seq: Operating and Detail Displays

- Detail – scrolls steps
- Shows Input, Output states, Real Out values
- Has Manual Prompt capability

- Shows “Waiting For” conditions
Midrange Architecture System
The Compact Control Platform…

...that has it all.

For additional information, follow these hyperlinks

Integrated Architecture
The Convergence of Control and Information for Plant-Wide Optimization and Machine Builder Performance

Midrange Architecture System
Small Controller Platform
Additional information at this event:

- **On the Showfloor**
  - Midrange
  - Integrated Architecture
  - PlantPAx
  - Information Software

- **Hands-On Lab sessions**
  - AUL04 Integrated Architecture: Putting the Pieces Together
  - AUL05 Fundamentals of Logix
  - AUL21 PanelView Plus - Discover key benefits of an integrated HMI solution
  - AUP28 Implementing Security and IP Protection features in Integrated Architecture
  - AUL35 Introduction to PowerFlex 525 Compact AC Drives
  - AUP38 Industrial Network Infrastructures, Virtualization and Cyber Security Matters!
  - AUL 38 Exploring the functionality of the PlantPAx System
  - AUL40 Integrated Architecture Builder: build and select the right architecture
Integrated Architecture
Midrange System