



EMERSON EXCHANGE 2025

ACCELERATING INNOVATION



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INNOVATION

**Let Integrated Patch
Management help make you more
Cybersecure and Efficient**

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Agenda

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Matt Kane

About the site

IPM Journey and Challenges faced

IPM Overview

IPM Experience and Evolution of IPM usage

Results Achieved

References and Additional Information

Bayer / Muscatine, Iowa Site



We are committed to developing a diverse range of crop protection solutions, offering farmers more precise ways to apply the right protection at the right time. Our work in Muscatine helps bring these solutions to farmers.

Manufacture & Package Agricultural Products

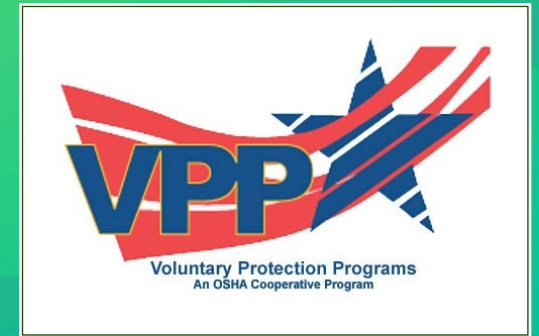
- 63 years of operations
- 150+ Acre Facility
- 425+ Employees
- 8 Operating Units – 4 Production DeltaV Systems, 4 TNG

Production

70% of North America's Roundup® Herbicide

100% of the Acetanilide Selective Chemical Products

100% of the Bayer Dicamba Formulations



Bayer Muscatine's Journey with Microsoft Patch Management

The Bayer Journey

DeltaV v10 and Before:

Microsoft Patching on Initial Installation
Microsoft Patching for **critical updates only**

DeltaV v11:

Microsoft Patching on Initial Installation
Manual Microsoft Patching as time allowed (maybe once/year)

DeltaV v13:

Microsoft Patching on Initial Installation
Installation of **Emerson's Automated Patch Management (APM)**

DeltaV v14:

Microsoft Patching on Initial Installation
Installation of Emerson's **Integrated Patch Management (IPM)**
Worked with Emerson on installing several new versions of IPM

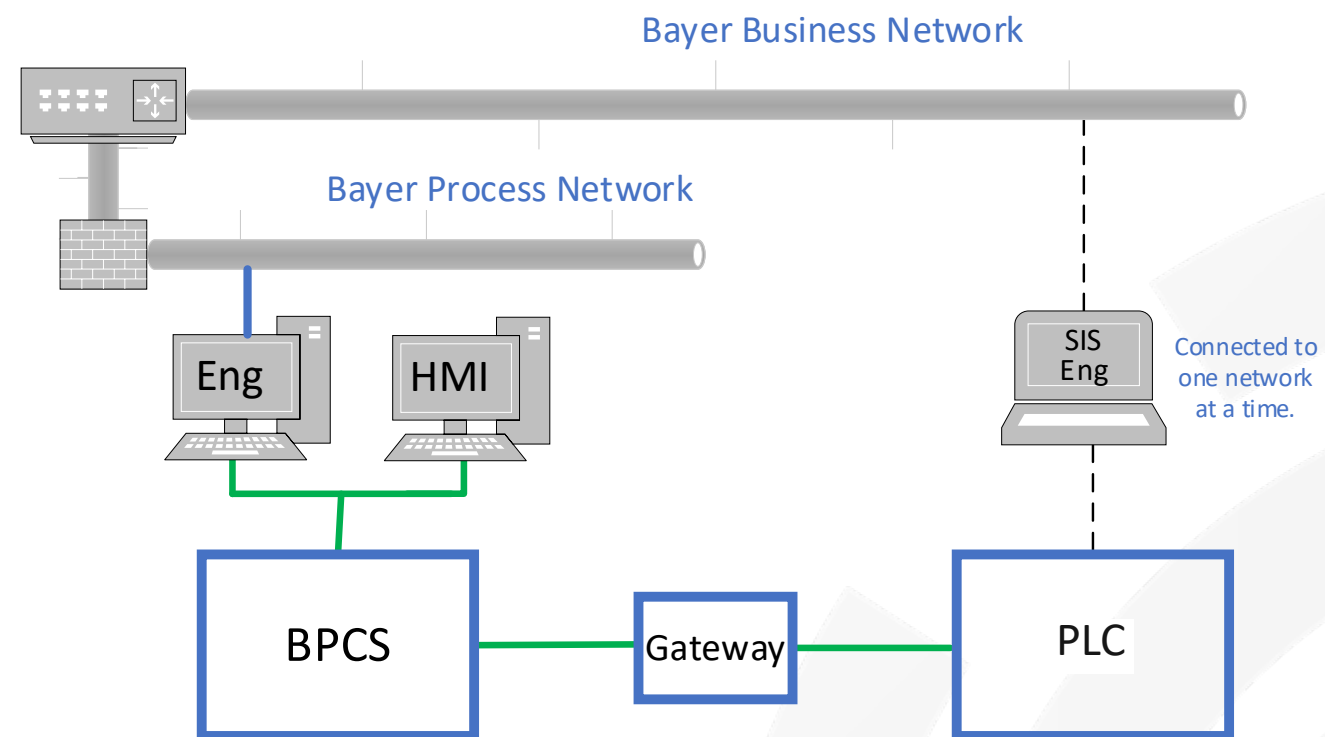


Functional Safety / Safety Interlocking

Historical:

Our critical safety systems (SIL 1-3) were implemented in an air-gapped design, so not directly connected to the DeltaV BPCS or plant networks.

Interlock PLC Design

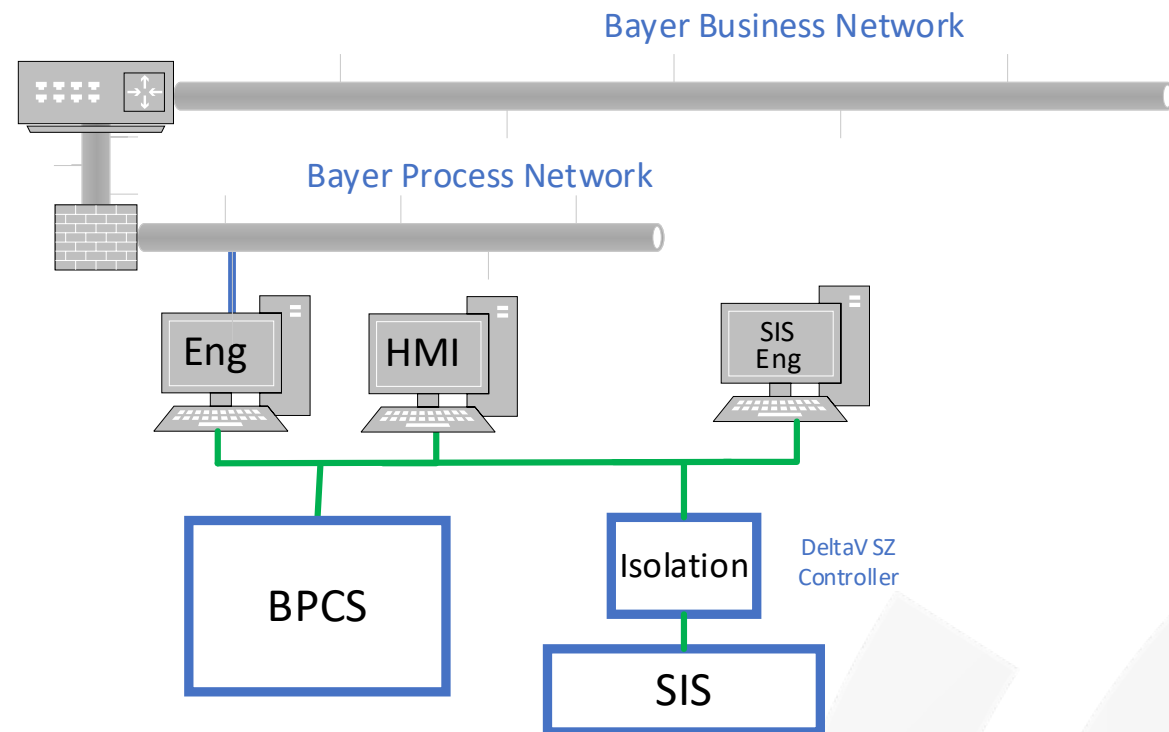


Functional Safety / Safety Interlocking

Current and Future Design:

Our critical safety systems (SIL 1-3) are being transitioned to an integrated DeltaV SIS design.

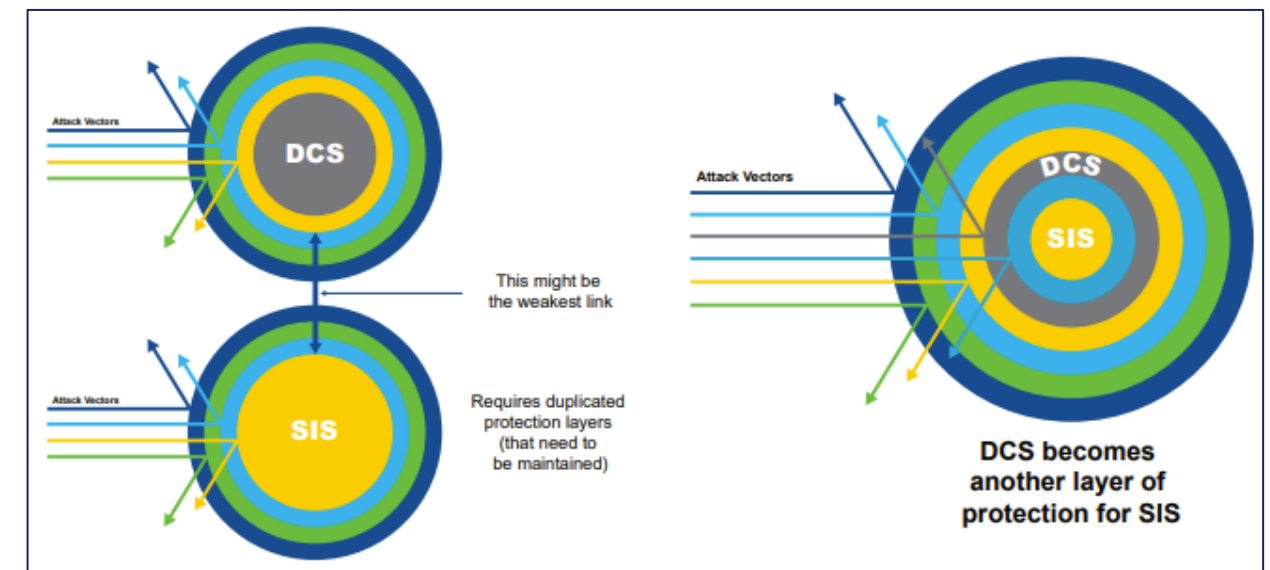
DeltaV SIS Design



- Integrated, but Separate Design

Bayer's Security for Safety

- Creation of a new Bayer 'Security for Safety' Knowledge Document, outlining the requirements for installing an "Integrated" Safety System
 - Allows for more designs than just an air-gapped safety system design
 - Air-gapped safety systems have vulnerabilities also, just different
- Introduction of new Cybersecurity protection applications
 - Two Factor Authentication (2FA) when making DeltaV SIS changes
 - Application Whitelisting
 - Zone Firewall
 - Cyber-Independent Shutdown
 - **Integrated Patch Management (IPM)**
 - **Microsoft Patching**, Trellix Anti-Virus, DeltaV Hotfixes
- Integrated Patch Management (IPM) is one protection layer that requires routine resources, not just an install, schedule, and monitor.
 - Need to optimize these efforts for the limited site process control resources.



Challenges

Control System Support Challenges:



High workload to support and maintain DeltaV and related systems



Mostly Manual Microsoft Patching Process system in place



Difficult and time consuming to maintain IT and Security compliance



Microsoft Patching updates was individual based, rather than process based.

Objective:



Streamline the Microsoft Patching process and increase Microsoft Patching frequency utilizing DeltaV Integrated Patch Management (IPM).



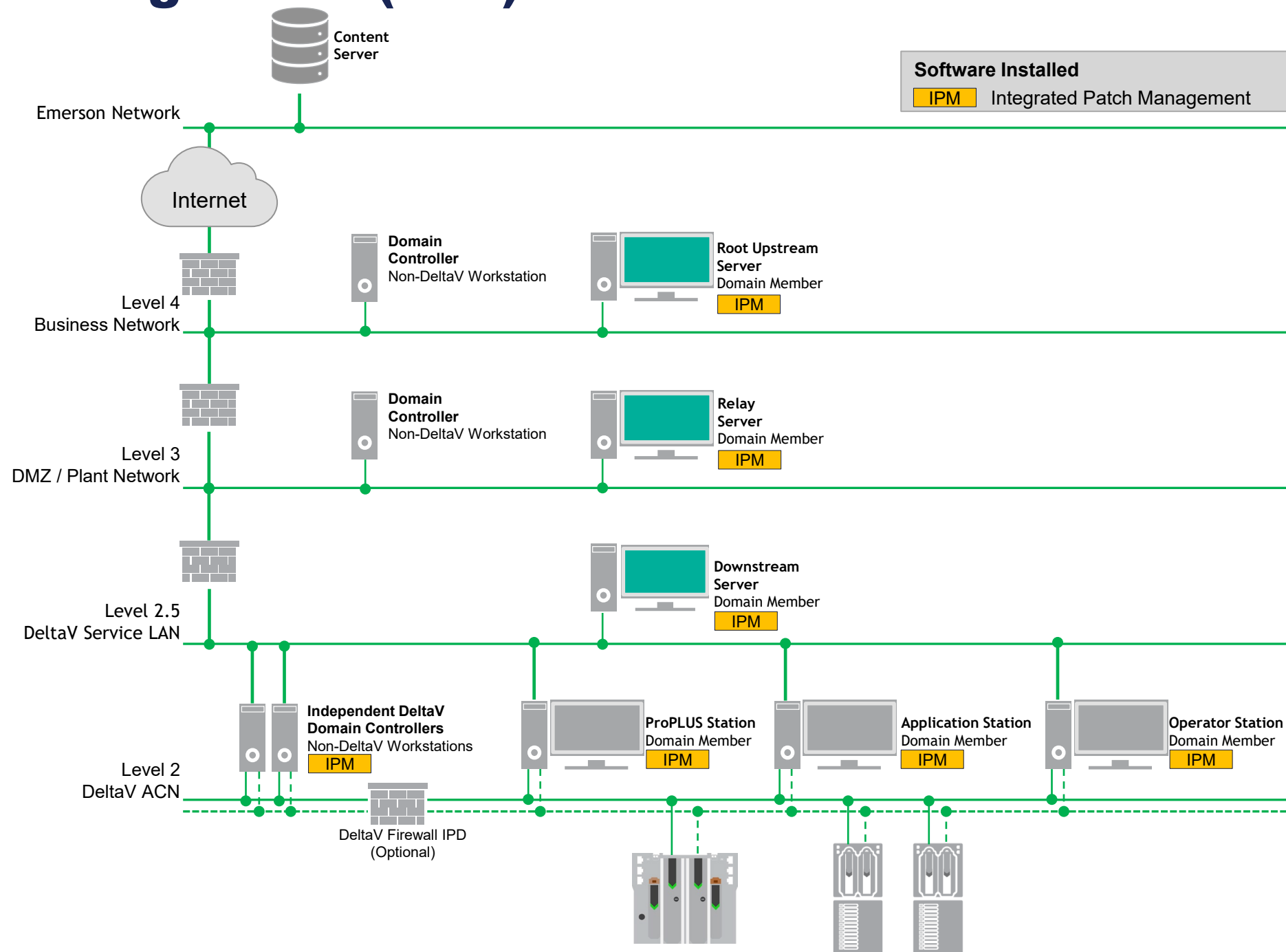
Integrated Patch Management (IPM) Product Overview

DeltaV Integrated Patch Management (IPM)

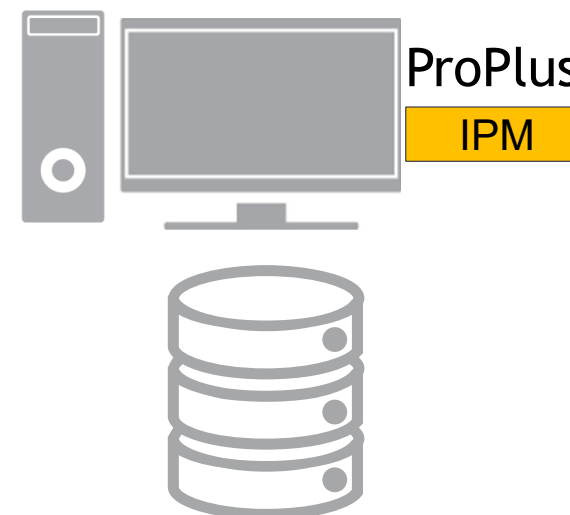
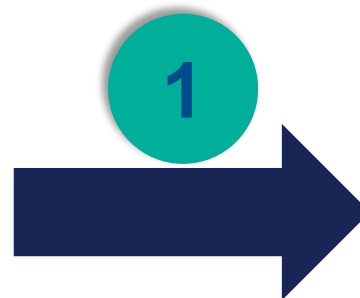
THE NEXT-GENERATION
PATCH MANAGEMENT
SOLUTION FOR DELTAV.

Key Features

- Most secure patching solution available
- Easy to use interface for both locally or remotely maintaining your assets
- Flexible & scalable architecture to accommodate customer requirements
- Save hours of effort through automation

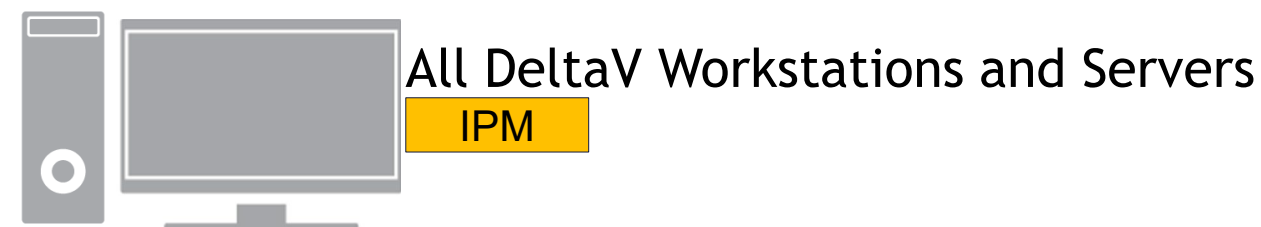


How IPM Works



DeltaV Database

Populate IPM database with all workstation and device data



DeltaV workstations and servers provide current patch and hotfix levels (included embedded nodes) to the Downstream Server

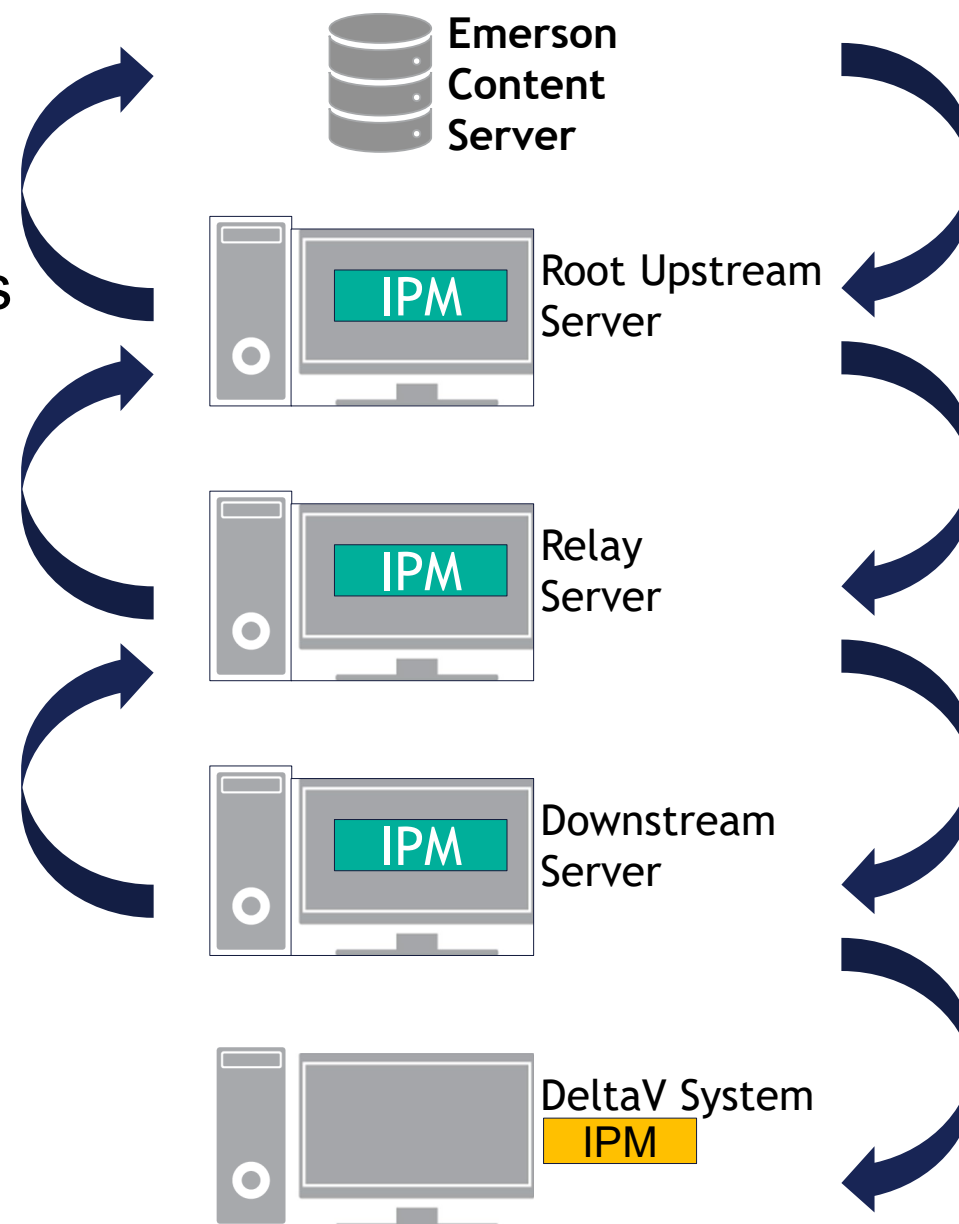
How IPM Works (continued)

4

The Root Upstream server passes information onto the Emerson content server for processing.

3

Information about current patch levels are passed up to the Root Upstream Server.



5

The content server determines what patches/hotfixes are required for each node. The Root Upstream downloads this information along with the required updates.

6

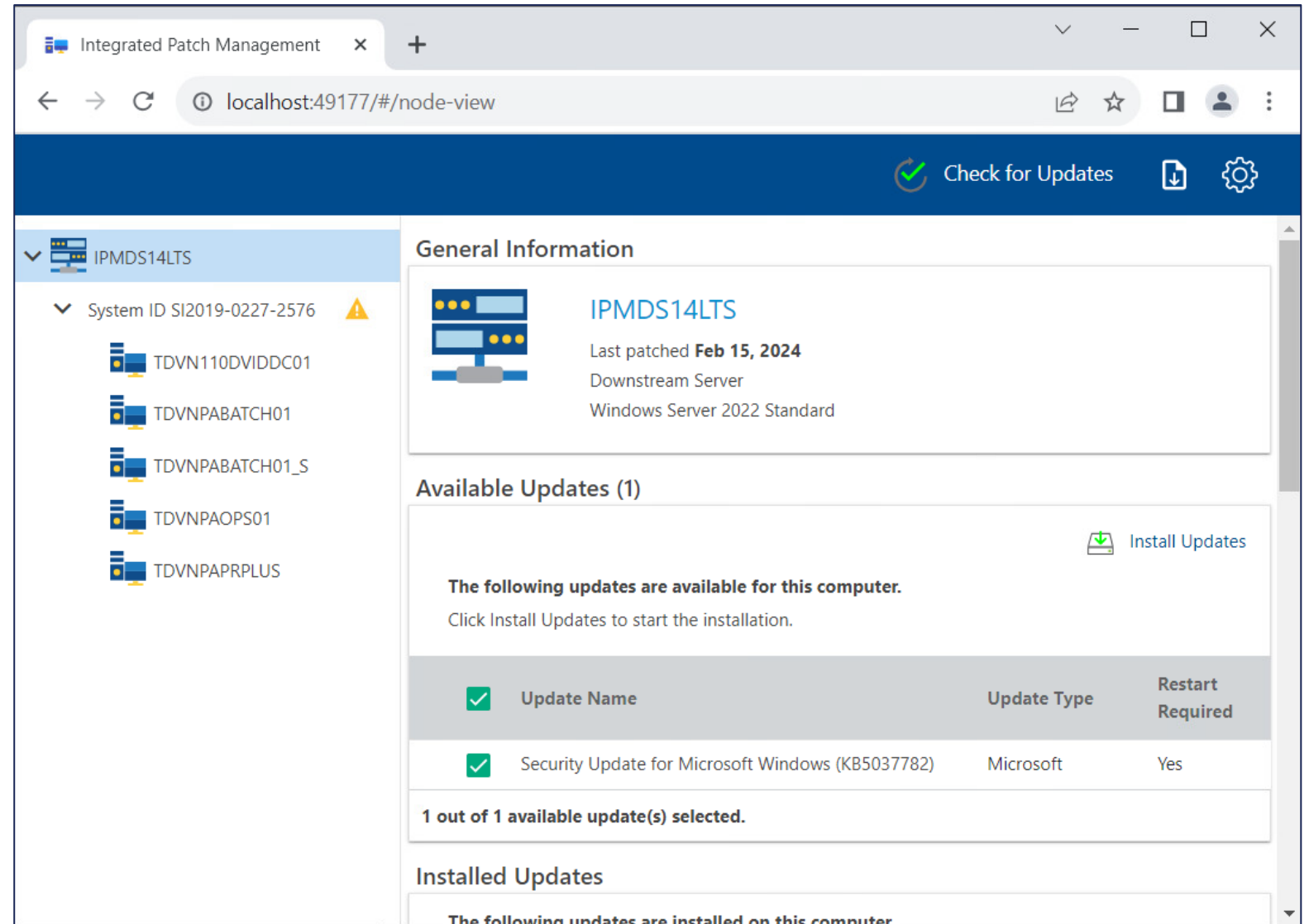
Downstream Server delivers patches to the DeltaV stations, waiting for installation.

IPM User Experience – Management Console

The **Management Console** is the main user interface for the Integrated Patch Management System.

Functions within the Management Console:

- Download Microsoft patches
- Install patches to DeltaV workstations
- Monitor installation results
- Audit installed patches
- Set preferences for Integrated Patch Management operations



The screenshot displays the IPM Management Console interface. The browser address bar shows 'localhost:49177/#/node-view'. The interface includes a 'Check for Updates' button and a settings icon. The left sidebar shows a tree view with 'IPMDS14LTS' expanded, listing system components: 'System ID SI2019-0227-2576', 'TDVN110DVIDDC01', 'TDVNPABATCH01', 'TDVNPABATCH01_S', 'TDVNPAOPS01', and 'TDVNPAPRPLUS'. The main content area is divided into 'General Information' and 'Available Updates (1)'. The 'General Information' section shows 'IPMDS14LTS' with a last patch date of 'Feb 15, 2024', identified as a 'Downstream Server' running 'Windows Server 2022 Standard'. The 'Available Updates' section features an 'Install Updates' button and a message: 'The following updates are available for this computer. Click Install Updates to start the installation.' Below this is a table of available updates:

Update Name	Update Type	Restart Required
Security Update for Microsoft Windows (KB5037782)	Microsoft	Yes

Below the table, it states '1 out of 1 available update(s) selected.' The 'Installed Updates' section is partially visible at the bottom, with the text 'The following updates are installed on this computer.'

Experience with Integrated Patch Management (IPM)

Bayer IPM Network (IPM v1.4.0.0)



- Network Architecture

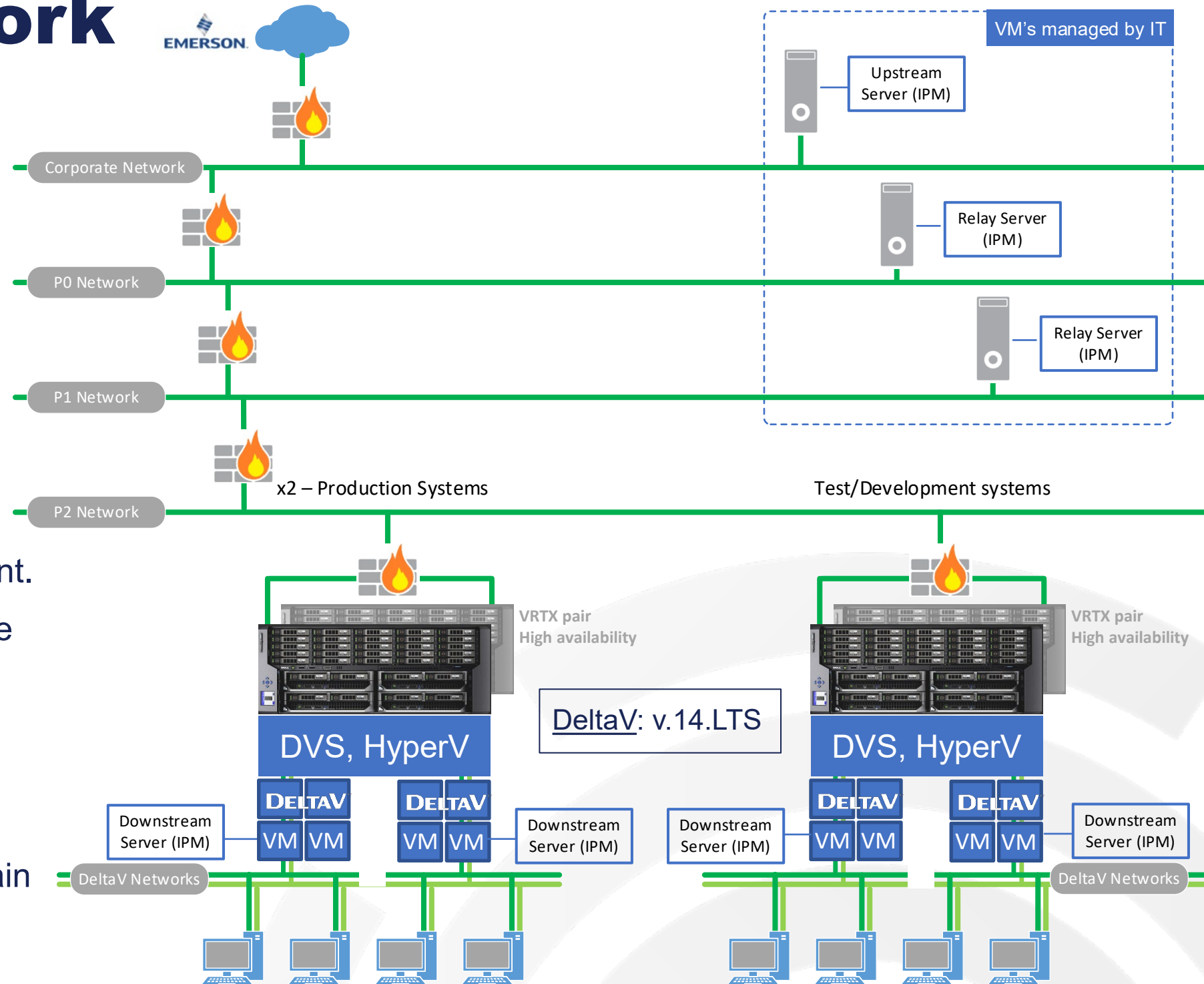
- 4 Network Levels
 - CNB / P0 / P1 / P2
- North/South Firewalls
- East/West Firewalls

- Root Upstream and Relay servers are virtual and in a Bayer domain environment.

- Downstream and DeltaV workstations are in a DV domain environment.

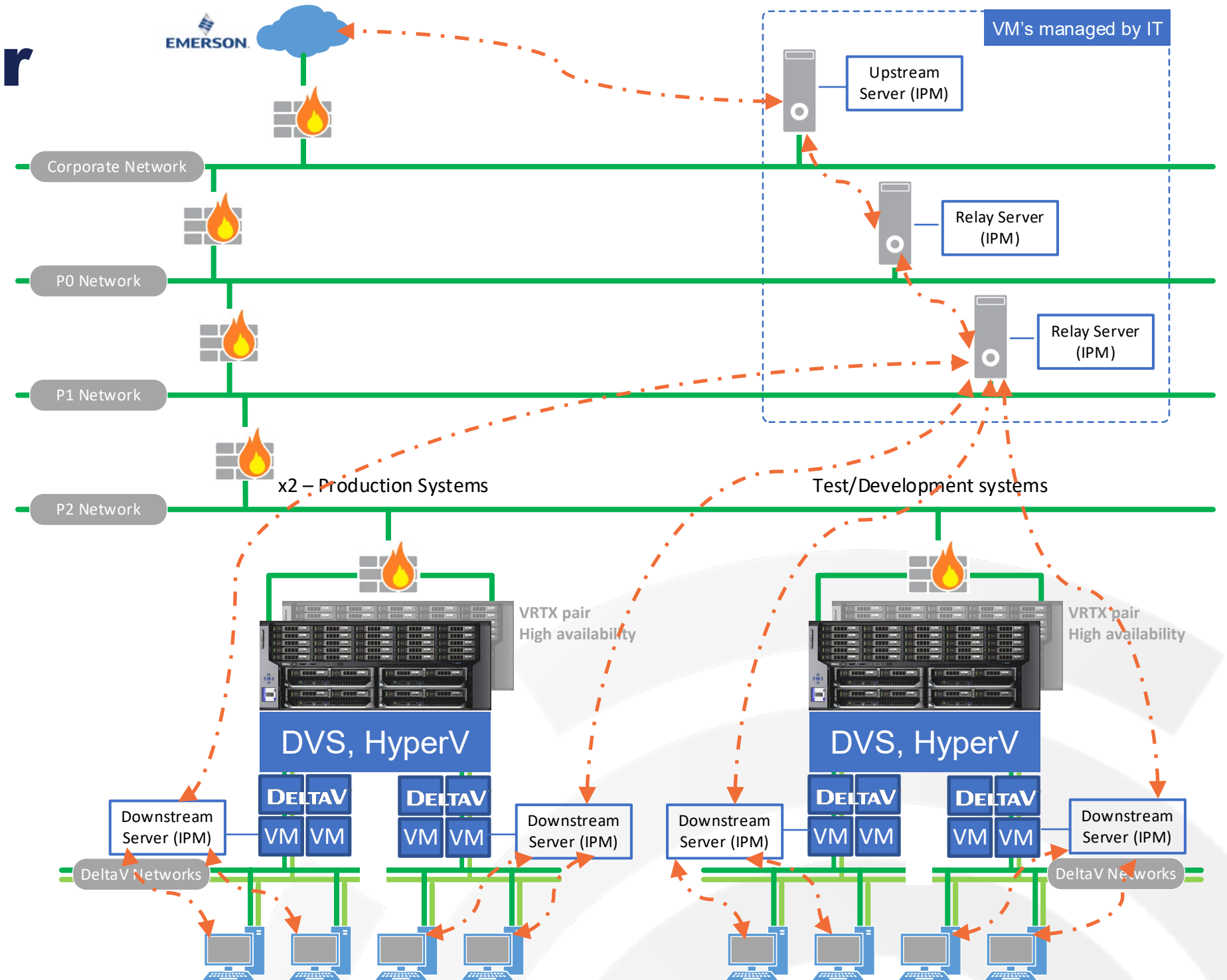
- Root Upstream Server is also a Trellix EPO server (AV and Whitelisting).

- DeltaV systems have Independent Domain Controllers (IDCs).



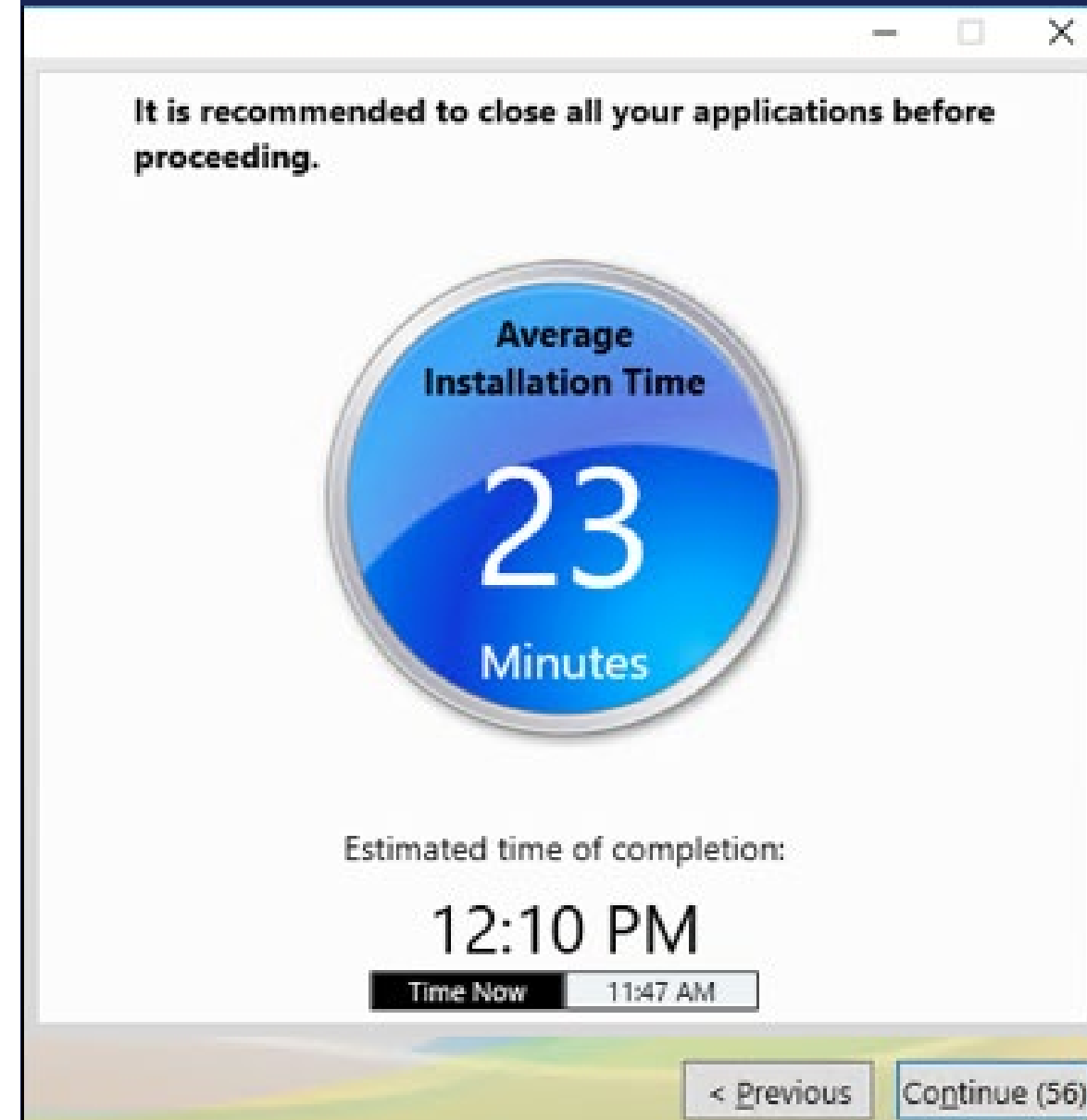
IPM Relay Server

- Site needed to install 2 IPM Upstream Relay Servers to navigate the Bayer Network Blueprint.
- Bayer network traffic can only communicate with their neighboring networks.



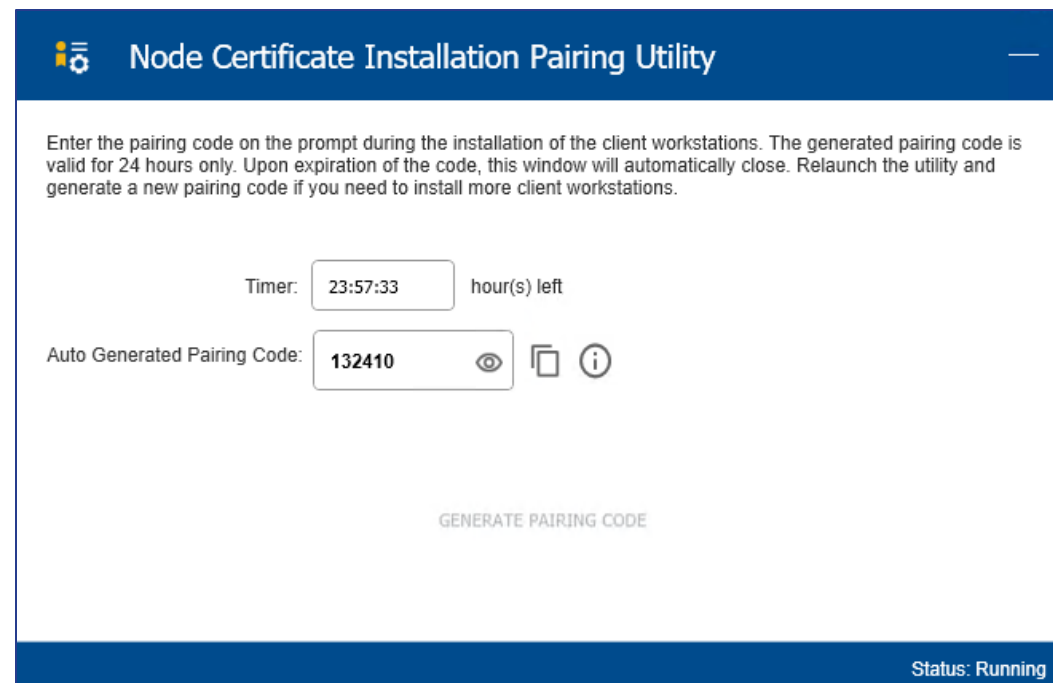
IPM Installation at Bayer

- 1 Root Upstream Server
- 2 Relay Upstream Servers
- 8 Downstream Servers (1/DeltaV System)
 - 4 DeltaV Production Systems
 - 4 DeltaV Training/Development Systems
- 75 DeltaV Workstations; 24 Non-DeltaV Workstations
- IPM Installation is Simple; Easy to follow instructions
 - IPM Installation and User Guide (v1.4)
 - KBA NK-2000-0559: IPM Troubleshooting Guide

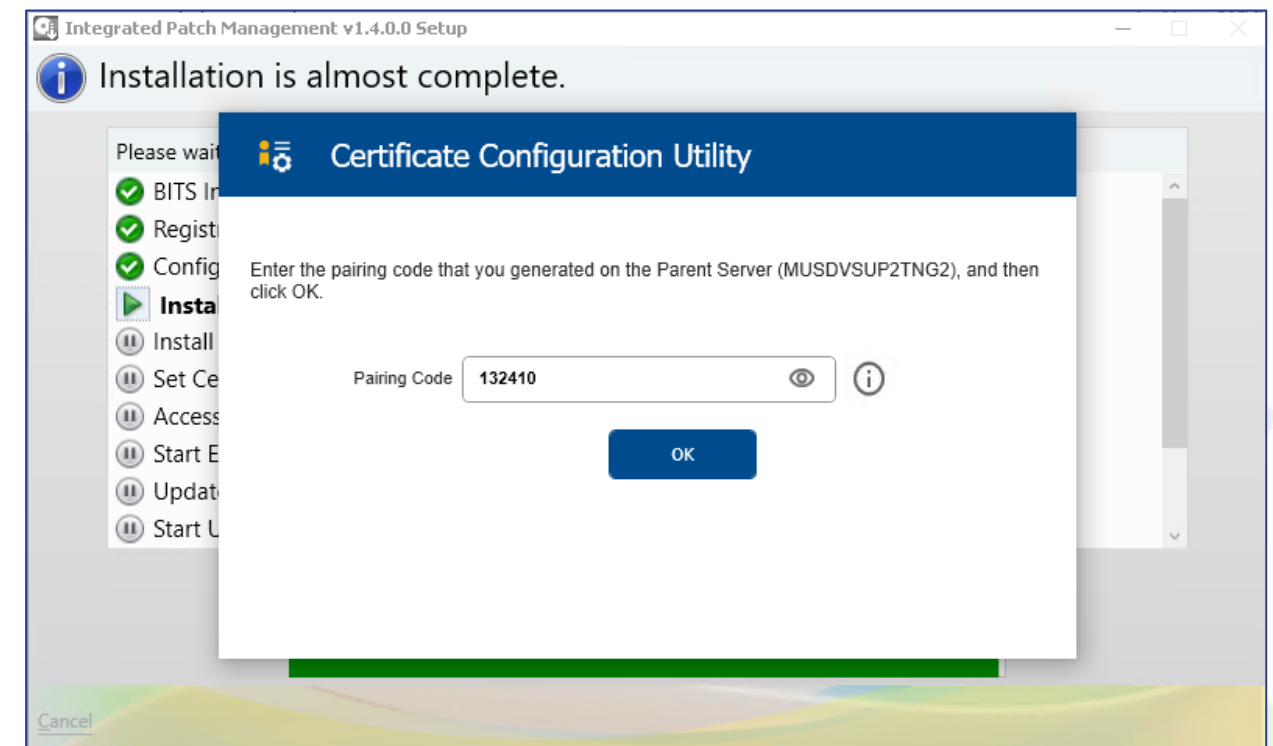


Security Feature

- Usage of Web Certificates
 - Upstream Server



Downstream Server



- Easier than Passing Web Certificates around manually, etc.
- Maximum Certificate Validity is 365 days.

Proxy Server Connections

- Historical Challenges
 - Proxy server connections of other applications have been a challenge working with corporate IT to gain/setup access.
 - Historically, port redirection or a 1:1 NAT setup was required to allow access to the Bayer Proxy Server. Matching configuration was required on both the Proxy Server and application server.
- IPM Application
 - IPM is Proxy Aware and makes the implementation much easier
 - On the Upstream IPM server, we just had to provide the necessary Bayer user credentials and Bayer web traffic is allowed to the Emerson IPM Content Server.

Proxy Settings

Please enter details below to allow the Root Upstream Server to communicate with Emerson Content Server.

Enable Proxy Server for Integrated Patch Management

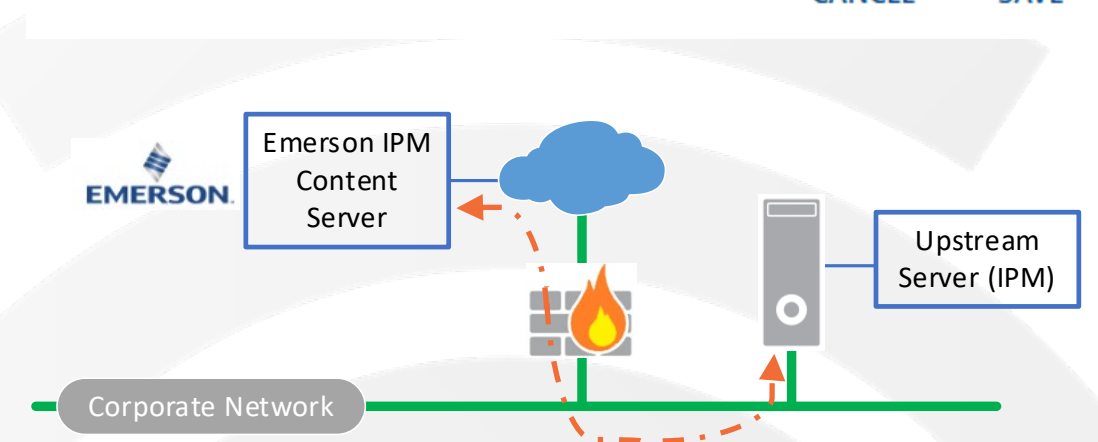
Address (Domain or IP)	Port
XXX.XXX.XXX.XXX	XXXX

Enable Proxy Credentials

Username
XXXXX

Password 

CANCEL SAVE



IPM User Interface

- Available Microsoft Updates
- DeltaV Hotfixes
- Antivirus Definitions
- Installed Microsoft Updates

The screenshot displays the IPM User Interface for a system named MUSDVDC2CAMP. The interface is organized into several sections:

- General Information:** Shows the system name (MUSDVDC2CAMP), its role (Independent DeltaV Domain Controller), operating system (Windows Server 2016 Standard), and system ID (0001-0003-8055). It also indicates the last patch date as Aug 28, 2024.
- Available Updates (5):** A list of five Microsoft security updates is shown, all of which are selected. Each update entry includes a checkmark, the update name, the update type (Microsoft), and whether a restart is required (Yes).
- DeltaV Hotfixes:** A message states that the computer is up to date, with the last check performed on Jan 22, 2025.
- Antivirus Definitions (1):** A message indicates that one Trellix Antivirus Definition was delivered, with files saved in the c:\anm\downloads\AV\ directory.

The left sidebar shows a tree view of the system hierarchy, with the selected system (MUSDVDC2CAMP) highlighted. The top right corner features a 'Check for Updates' button and a settings icon.

IPM Management Console

- IPM User Interface

- Set User Preferences for IPM operations
- Trigger the updating of IPM data

- Monitor Installation Results
- Audit Installed Patches

- Install updates
- Restart Workstations

- Export Basic Data

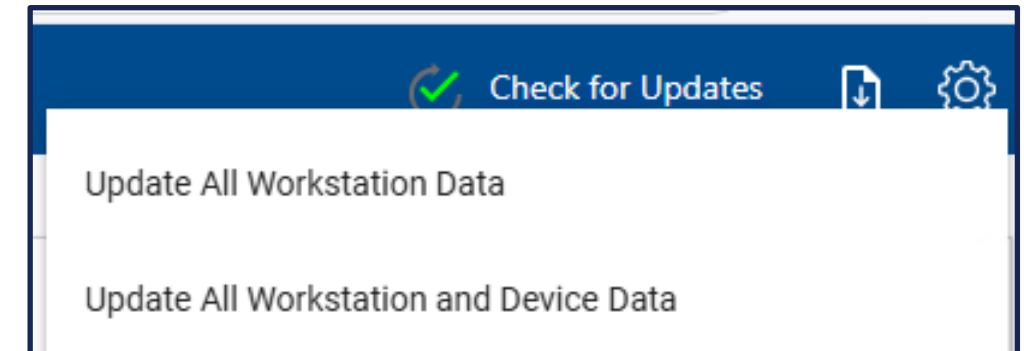
The screenshot displays the IPM Management Console interface. On the left, a tree view shows a hierarchy of systems under the 'BY12PX' parent. The selected system, 'BY12PX', is detailed on the right. The 'General Information' section shows the system name 'BY12PX', last patched on 'Sep 27, 2024', and identifies it as a 'Root Upstream Server' running 'Windows Server 2016 Standard'. Below this, the 'Available Updates (7)' section lists seven updates, all marked with a green checkmark. A table summarizes these updates with columns for 'Update Name', 'Update Type', and 'Restart Required'. The 'Installed Updates' section at the bottom lists updates already installed on the system, also with a table showing 'Update Name' and 'Update Type'.

Update Name	Update Type	Restart Required
Security Update for Microsoft Windows (KB5037016)	Microsoft	Yes
Security Update for Microsoft Windows (KB5037763)	Microsoft	Yes
Security Update for Microsoft Windows (KB5043124)	Microsoft	Yes
Security Update for Microsoft Windows (KB5044293)	Microsoft	Yes
Security Update for Microsoft Windows (KB5046612)	Microsoft	Yes
Security Update for Microsoft Windows (KB5048671)	Microsoft	Yes
Update for Microsoft Windows (KB4494175)	Microsoft	Yes

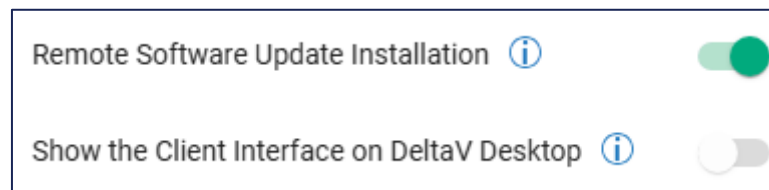
Update Name	Update Type
KB2504637	Microsoft
KB2565063	Microsoft
KB3095681	Microsoft
Security Update for Microsoft Windows (KB4509091)	Microsoft
Security Update for Microsoft Windows (KB4512574)	Microsoft

Emerson Interface

- Different IPM Data Triggers:
 - Request down to workstations and devices
 - **Update All Workstation and Device Data (UAWDD)**: Collect all Workstation data and devices that are connected to the server (devices include all DeltaV hardware, such as CHARMS, DV controllers, etc.).
 - **Update All Workstation Data (UAWD)**: Collect only workstation data of all clients that are connected to the server.
 - Request up to Emerson and then transfers identified updates to each workstation
 - **Check for Updates**: Identify the available updates for each workstation in the IPM system tree. This action also deploys the software updates to each workstation (transfers files).



Method of Installing the Microsoft Patches



Shane
PC System Lead

- 'Update All Workstation Data' (UAWD)
- 'Check For Updates'



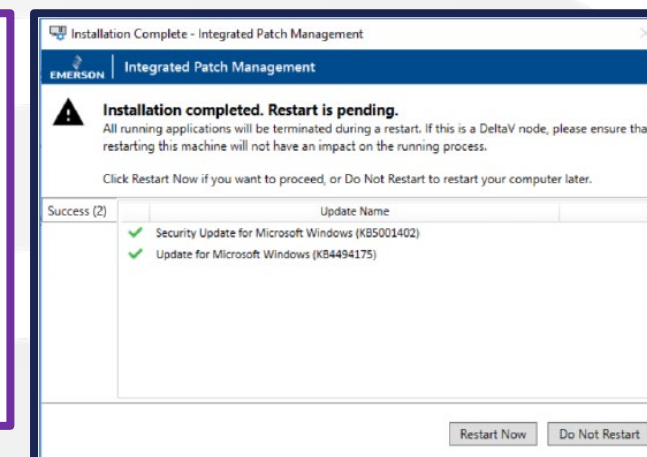
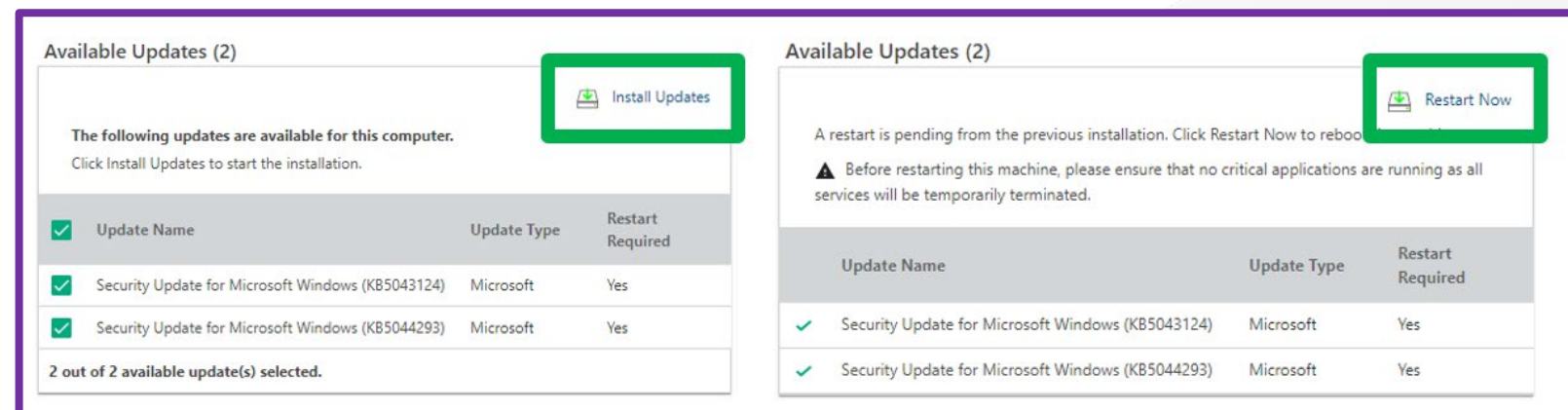
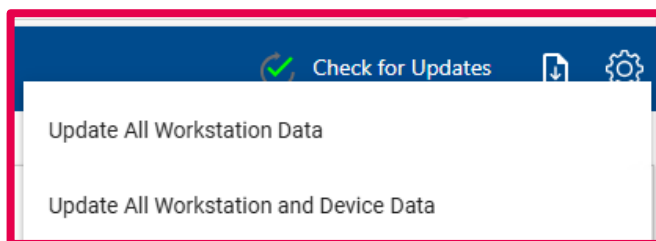
Josh
Process Control

- 'Install Updates'
- 'Restart Now'



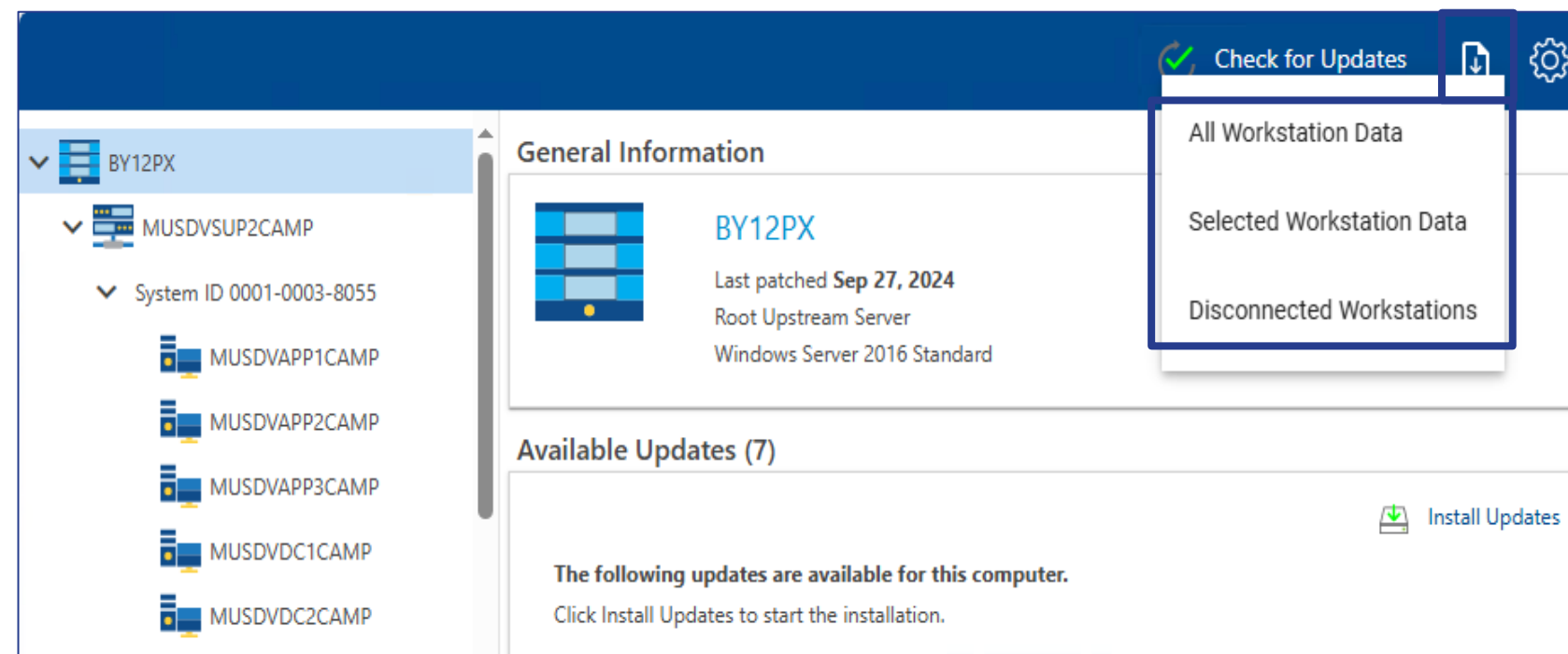
Mike
Operator

- Acknowledges Good Time to Restart
- Logs into Workstation after restart



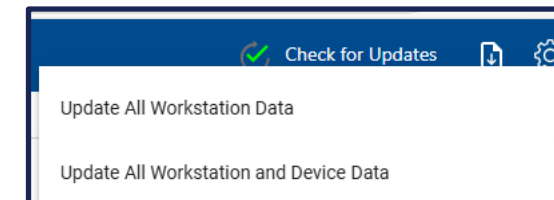
Exporting Basic Reports

- IPM Export Report Options:
 - All Workstation Data:
 - Selected Workstation Data
 - Disconnected Workstations



- Note: *Future Enhancement could be to create KPI reports of the patching status.*

IPM Configuration Files



- Depending upon the size of the IPM system, data collection timeouts will need to be set in order to collect all of the Workstation and Device Data.
- Information from Emerson’s IPM Installation and User Guide v.1.4 (D800139X112 – July 2024)

– Device and Data Collection:

During Emerson test simulations, the average time for data collection for the following devices were as follows:

- CHARMs: ~ 1.3 seconds
- CIOC: ~3 seconds
- Controllers: ~1 second
- Traditional IO Card: 4 seconds
- PK Controller I/O Card: ~2 seconds
- DeltaV Stations: ~8 seconds

The guides for adjusting the timeouts for an IPM system in the User Guide were for a test system that contained 40 workstations, 10,000 CHARMs modules, and 20 controllers.

Update All Workstation Data between the Downstream Server and the ProfessionalPLUS Station took around **3 hours** to complete.

If you have multiple Downstream Servers, calculate the timeout per Downstream Server. Use the largest timeout to configure the data collection timeout setting for your entire Integrated Patch Management system. All other Downstream Servers with lower timeout should be able to complete data collection within the largest calculated timeout.

– Downloading of Software Updates: (Default = 2 minutes)

- Bayer Muscatine’s Timeout Values are the following: (Note: Muscatine has 99 Workstations, >15,000 CHARMS, >70 Controllers)

– Bayer Muscatine Device and Data Collection: Timeout > 16.5 hours Typical Time ~ 15 hours

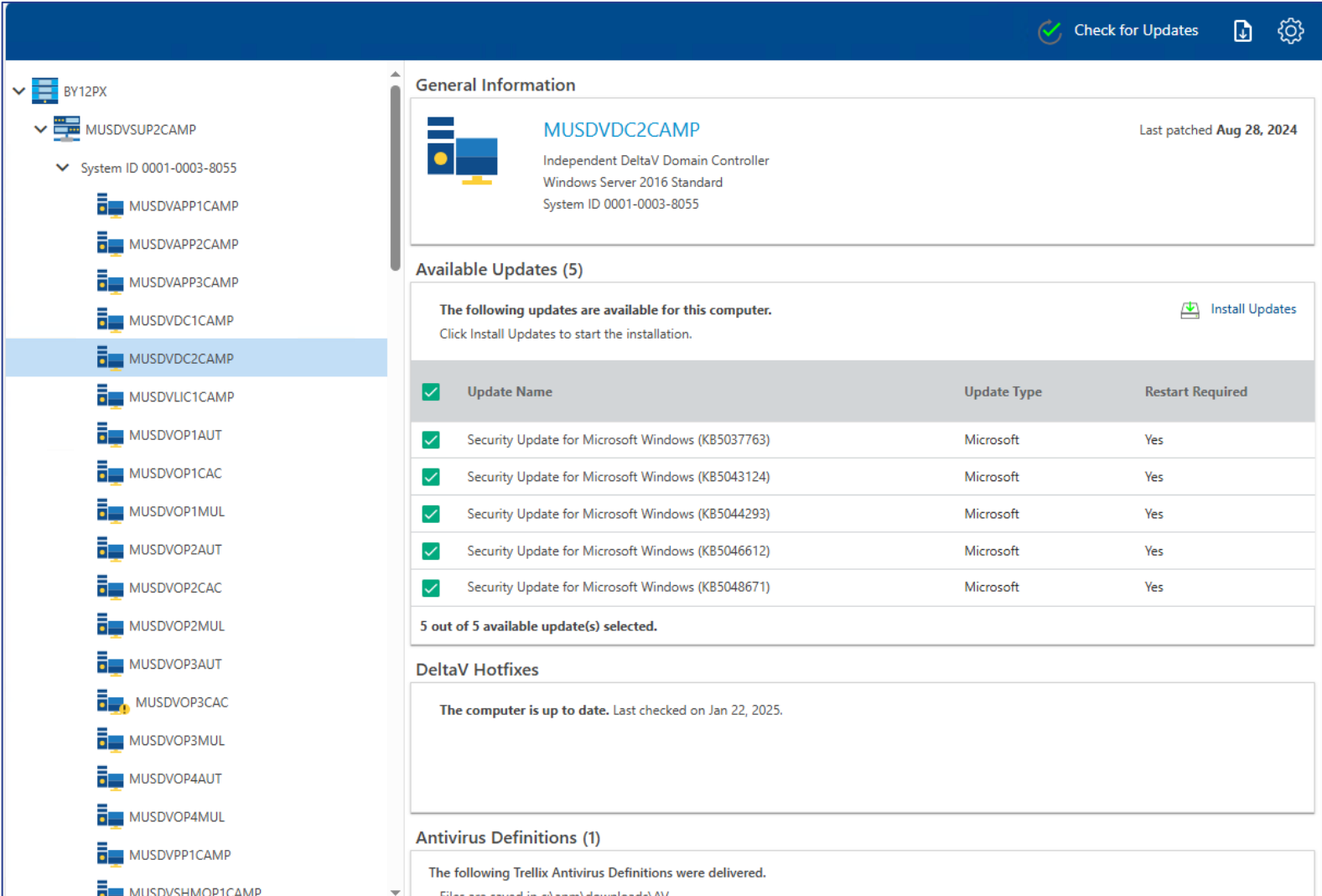
– Bayer Muscatine Downloading of Software Updates: Timeout > 6.5 hours Typical Time ~ 6 hours

- Note: Previous versions had issues with Large Systems. IPM v.1.4 enabled simultaneous Downstream Server collection.

Results Achieved with Integrated Patch Management (IPM)

IPM Enhancement Ideas

- Ability to trigger a remote reboot without the logged in user of the workstation having Admin Privilege
- Automation of the annual web certificate updates
- Creation of KPI reports on overall install status
- Improvements around the handling of superseded Microsoft patches for non-DeltaV node workstations
- Note: Attend the IPM roadmap presentation or visit the IPM exhibit booth for more details on the direction of IPM and planned IPM enhancements.



The screenshot displays the IPM console interface. On the left, a tree view shows a hierarchy of systems under 'BY12PX', with 'MUSDVDC2CAMP' selected. The right pane shows details for 'MUSDVDC2CAMP', including its role as an Independent DeltaV Domain Controller, OS version (Windows Server 2016 Standard), and last patch date (Aug 28, 2024). Below this, a table lists five available Microsoft security updates, all of which are selected. The 'DeltaV Hotfixes' section indicates the system is up to date, and the 'Antivirus Definitions' section shows one definition was delivered.

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Security Update for Microsoft Windows (KB5043124)	Microsoft	Yes
Security Update for Microsoft Windows (KB5044293)	Microsoft	Yes
Security Update for Microsoft Windows (KB5046612)	Microsoft	Yes
Security Update for Microsoft Windows (KB5048671)	Microsoft	Yes

Business Results Achieved

Control System Support Benefits Realized:



Improved DeltaV System **Reliability**:

Provides **centralized location** to determine what patches, AV, and DV hotfixes are installed and what are still needed. Easy access to Windows Operating System Information.



Improved IT and Security **Compliance**:

Makes compliance manageable and reduces vulnerability risks. Patches are now routinely and securely identified, distributed, and installed. Can easily demonstrate compliance during audits with IPM



Improved **Productivity** of Process Control Members:

Saving > 500 Hours/Year



Improved **Sharing** of Information:

Microsoft Patching became **system based**, since entire Process Control Team has access and visibility to site DeltaV patching status.

Results:



Microsoft Patching process is streamlined, installation frequency is higher, systems are more secure, and team efficiency is higher when utilizing DeltaV Integrated Patch Management (IPM).



Exhibit #229 Guardian Software & Solutions / IPM

Find More Information

6-1600 Let Integrated Patch Management Help Make You More Cybersecure and Efficient

– Wednesday 10:15-11:00 AM

5-1703 Streamlining Cybersecurity: Air Liquide and DeltaV Integrated Patch Management

– Thursday 2:15-3:00 PM

3-1868 Patch in a Flash! Use DeltaV Integrated Patch Management to Quickly and Securely Patch Your System

– Tuesday 1:15-2:00 PM, Wednesday 1:15-2:00 PM

MTE-1907 Are you Ready for the Future of Industrial Cybersecurity?

– Wednesday 9:15-10:00 AM, Thursday 3:15-4:00 PM

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Thank You