Life Is On | **Schneider** Electric

Optimizing automation infrastructure and return on capital employed

Schneider Electric industrial automation virtualization solutions

Solution at a glance

Implementing modern virtualization tools and techniques such as server virtualization and hosting multiple virtual machines on a single control processor has numerous advantages for industrial operations. The Foxboro Evo™ process automation system delivers this core functionality to provide the following benefits:

• Fast-track project implementation
• Maximum system availability
• Lower maintenance costs
• Improved system management
• Enhanced global collaboration

Modern architecture

Whether you are starting up a new facility or seeking to maximize return on existing assets, server virtualization is a new option worthy of consideration. In server virtualization, advanced software such as Microsoft Hyper-V and VMware, replicates the operation of a physical CPU, hard drive, and network controller, creating a virtual machine or virtual computer. Like its physical counterpart, each virtual machine runs its own operating system and applications. But there's a unique — and very useful — difference: multiple virtual machines can run simultaneously on a single physical computer. So Foxboro Evo users can consolidate multiple operating systems on the same device.

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Project implementation on the fast track

The benefits of server virtualization begin at project execution. The faster and more effectively you can get new projects online, the greater the return on them. Automation projects typically proceed in a fixed sequence of events: design; equipment procurement, staging, testing, validating, shipping, and ultimately, commissioning. When using physical servers, it is wise not to procure the hardware until the system is fully-designed, which unfortunately puts automation directly on the critical path. Adhering to this traditional sequence can contribute to extending project execution times.

But intervening business and technical events could require design changes after the design is frozen. On longer projects, by the time you are ready to go online, you could be starting out of the gate with hardware that that is already almost two years behind the technology curve.

By configuring automation on a virtual machine or machines, however, the Foxboro Evo control hardware that would normally have to be deployed on-site only after the system has been designed can instead be procured and delivered to the facility — independent of the engineering design. System engineering and hardware procurement phases can occur simultaneously and when the design is frozen, the process engineer simply configures the system in a virtual environment and copies the completed files to the appropriate workstations — within hours, not days or weeks.

Extending the freeze date means that virtual machines can accommodate late phase design changes and compress the delivery schedule by months. Furthermore, testing the design in the virtual environment reduces the overall testing time by flagging potential problems and correcting them prior to system configuration and the fact that this early testing can be done online means that it can be done from anywhere.

In addition to ensuring that the automation is online sooner and more closely aligned to the current business requirements, using virtual servers instead of multiple physical servers also cuts hardware costs significantly, along with any additional project engineering necessary to power, house, cool, silence and maintain it. Moreover, virtualized systems provide redundancy and back up recovery in the event of a major project disruption for maximum plant availability.

Enabling hardware procurement and system engineering to proceed simultaneously can reduce typical project implementation times from 18 to 12 months.

The Intelligent Marshalling connection

Deploying virtual servers with Foxboro® Intelligent Marshalling universal input/output (I/O) and intelligent enclosures can improve project execution efficiency even further.

Foxboro FBM 247 Intelligent Marshalling, however, decouples system engineering, design of cabinets and wired processes from the field device type. This further compresses the

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delivery schedule, by enabling creation of standard cabinets early in the process. They can be programmed later for their chosen field devices. Moreover, because FBM 247 modules are software-configurable, characterization can be done remotely, adding even greater flexibility and efficiency.

Software maintenance in a virtual environment

The benefits of virtualization don't end once your system is up and running. Virtualization makes it easier to focus expert attention on issues that may emerge after commissioning. They can be located and resolved more easily, using an offline shadow system that mirrors the live production system. And, in the project execution phases, engineers located anywhere in the world can collaborate on optimizing performance and maintaining systems.

Virtualization also allows software and operating systems to act independently of system hardware. So as your process automation system evolves, maintenance needs and troubleshooting can be quickly addressed within the virtual environment by Schneider Electric experts. Workstation and server hardware can be replaced independently, without affecting the software hosted by the virtual machine. From a cost and space savings perspective, you may drastically reduce the amount of servers and workstations needed — consolidating multiple applications into single virtual machines.

Additionally, virtual machines can be used to provide updates automatically using fault-tolerant configurations. Or they can be copied manually to a replacement server host. Foxboro Evo technology also allows system updates to take place on an offline virtual system. Those images can then be installed onto a production host server within minutes, instead of hours, days, or weeks.

High availability, fault tolerance, and disaster recovery

And that same redundancy and disaster recovery during project execution extends as well to the operating assets. By eliminating dependencies between physical hardware and software, virtualization provides end users with more capability to manage the availability of their applications, servers, and equipment. Because the CPU, operating system, and communications are relatively contained, it's much easier to move virtual machines between host computers. This enables a variety of fail-safe scenarios, each of which provides options for different levels of redundancy. Thus your process automation system becomes more resilient; less prone to equipment and site failures; and much easier to simpler to upgrade.

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In the event of a system failure in one plant location, operation can default to a backup disaster recovery system — mirrored locally, remotely or in the cloud. Such failover can take place in minutes or even seconds, to get a plant up and running with minimal service interruption. Not only are fewer machines required; in some cases, engineering can commence earlier using a common virtual machine.

Virtual system engineering. Real benefits.

Virtualization is fast becoming the architecture of choice for today's industrial automation environments. Regardless of your control platform, Schneider Electric provides the services and support to help you achieve benefits from project execution throughout the entire lifecycle of your automation system.

Bringing project in on-time, on-budget and on-strategy.

• Simultaneous system design and hardware configuration

• Schedule flexibility

• Virtual factory testing

• Software configurable I/O

• Lower equipment and infrastructure cost

• Streamlined engineering

• Redundancy and disaster recovery

Reduced lifecycle management cost

• Less hardware and software to maintain

• Easier hardware optimization and refresh

• Increased security through simplified upgrading and patching

• Extended system life

• Less need to train teams on multiple   process units

• Minimize risks of aging physical infrastructure

• Reduced impact of system support on operations

• Maximum system availability

• Reduced travel costs

Technical specifications

Control system
Foxboro Evo

Supported software
Microsoft Hyper-V
VMWare

I/O
Foxboro FBM 247 Intelligent Marshalling universal I/O
HART, FOUNDATION Fieldbus

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