Point of View

Cisco and The Applied Group Point of View

Plant-Floor Virtualization

A Transformative Technology

Increasing plant floor efficiency is a strategic goal of most manufacturing executives. Today's plant floor is highly inefficient, prone to failure, and vulnerable to cyberattack.

Virtualization is a powerful, mature technology that is delivering dramatic gains in plant floor production efficiency and security.

Cisco and The Applied Group are helping many world-class manufacturers virtualize their plant floors. By combining best-in-class technology with extensive manufacturing expertise and insight, we are helping our clients achieve these significant increases in profitability, risk avoidance, and security.

Increasing Net Operating Profit

As a manufacturing executive, you recognize the benefit of increasing your plant floor's production efficiency. It leads to increased operational profitability with two excellent outcomes: you can produce more at the same cost or produce the same quantity of products at lower cost.

Virtualization is a mature, tested technology that significantly increases plant floor efficiency. The results are compelling: On those floors that have virtualized, many are seeing increases in net operating profit ranging from .76 percent to 3.64 percent for each percentage point increase in production efficiency. Manufacturing operations of all sizes are achieving these results.

Manufacturers that have adopted it are also seeing advancements in risk mitigation as virtualization standardizes the production floor. Security updates are quick and virtually foolproof, and recovery from hardware failures is almost instantaneous.

Corporate IT has already recognized its value, and today has virtualized almost 40 percent of all enterprise servers, according to Veeam Software's quarterly index report. So while virtualization on the plant floor has trailed that of corporate IT, the benefits are so impressive that its adoption should increase rapidly in the coming years (Figure 1).

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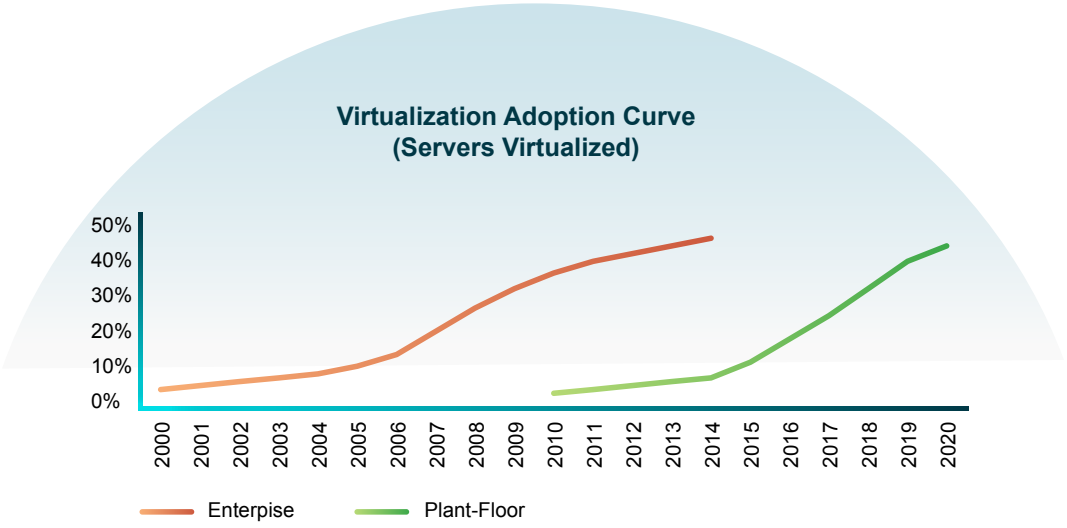
Figure 1. Enterprise IT Adoption of Virtualization Compared to Plant Floor



While plant floor virtualization has trailed enterprise IT's adoption, we anticipate plant floor virtualization increasing quickly in the next few years.

Your Plant Floor Today

Take a snapshot of your plant floor today. What does it look like?

You might be using a mix of PCs and plant floor equipment (human-machine interface, or HMI) from a variety of manufacturers, installed over many years. These PCs likely include software from numerous developers, created on different operating systems, and using different versions. Security has probably been applied with software from other vendors; some that are no longer even in business.

The result: it is difficult and costly to maintain continuous security vigilance. Updating plant floor devices with the latest security patches can be risky. Often, it causes the PCs or devices to crash, which ultimately stops your production line. Yet your operations people have no way to quickly roll back these updates to an earlier state. Nor do they have a way to test the patches before they install them in the first place.

So how do they respond? They postpone regular updates rather than risk downtime, which only increases your plant floor's vulnerability and your exposure to risk.

This is one reason why the Manufacturing Leadership Council, in its 2013–2014 Critical Issues Agenda, listed cyber security as the second of its nine critical issues. It notes in the report: "Protecting a manufacturing company's most valuable physical, digital and intellectual assets from cyber disruption is now essential to operational continuity and corporate security in today's digital business world."

What if your plant operators could configure and test security patches in the background using a robust standardized architecture, before they upload it to the production equipment? And they could repair hardware failures in minutes with a quick swap of a new thin-client PC and downloading of a new software image from the server?

Modern Plant Floor

Here is how plant floor virtualization can help.

Virtualization separates the computing function, applications, and data from the physical computers on your plant floor. The computing function relocates to a central data center, which can be located either onsite or remotely. And it stays there, where it remains secure with the necessary redundancy applied.

If you run desktops as virtual machines on a server, you can manage and secure all those desktop user environments in one central location. Your operations managers can handle patches and other security measures, along with hardware or software upgrades, much more quickly and simply. The risk of users creating problems or making mistakes that breach security drops dramatically.

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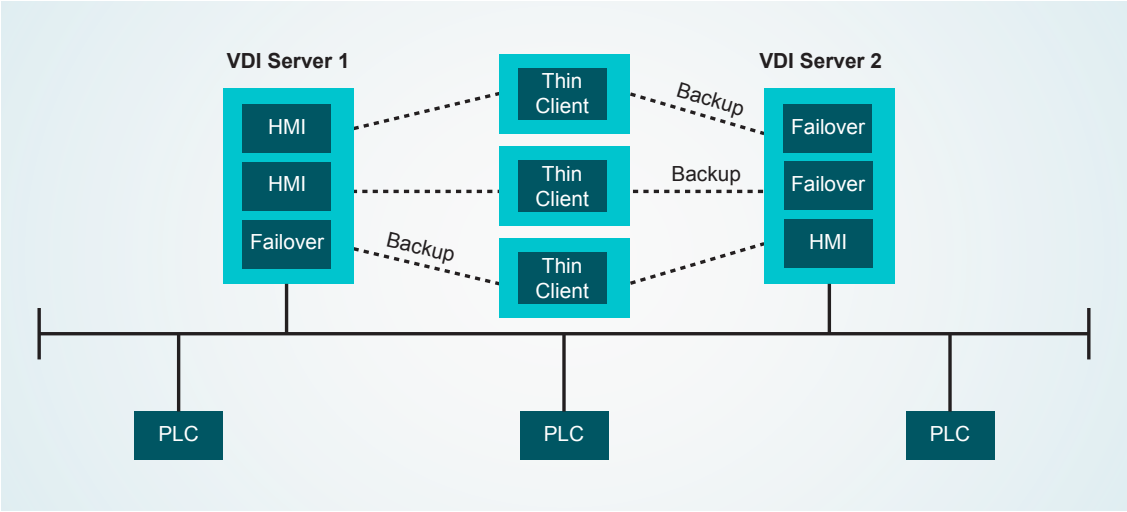
Figure 2. Virtualized Plant Floor Recovers from Failure in Seconds



A virtualized plant uses low-cost thin clients on the floor and the HMI runs as software on virtual servers in the data center. Instant failover means that a virtual HMI can instantly failover to another server if a hardware failure or software incompatibility occurs on the plant floor. The result: dramatically reduced downtime.

Your plant operators interact with a virtual desktop in the same way they would a physical desktop. They access applications and information through a thin client (PC running virtualization software). They can even monitor plant floor activity with special software on their smartphone or other device. Since computing is not taking place on the PC, they can test updates and patches for compatibility behind the scenes. Only after being fully tested and certified do they make updates to production machines. Result: production is uninterrupted by either updates or incompatibilities between updates and applications.

Benefits of the Virtualized Plant Floor

A virtualized plant floor provides:

- Risk avoidance and strengthened security as updates and security patches are handled centrally, helping to ensure consistent updates with minimal downtime
- Greater flexibility to add or expand production lines or new plants, even integrating mergers and acquisitions, because all devices run a standard software image that can be easily downloaded
- Better control of IT costs by taking advantage of server consolidation and lowered licensing costs, plus less overhead
- Deployment of thin clients that are less costly than thick PC clients
- Preserving your existing PC investment by turning them into thin clients as part of the virtualized floor

Case Study: Large Consumer Packaged Goods Company

Challenge: Incompatible software on the company's industrial PCs used for plant floor equipment (HMI) meant a constant struggle to keep the PCs updated with critical security patches. Plant floor operators had little knowledge of how to maintain and manage the PCs. With a lack of standards across plants, staff wasn't able to apply PC patches or, if they did, they applied them inconsistently.

Solution: The customer deployed a virtualized HMI architecture based on Cisco UCS. The solution provides a standardized architecture across the plant. This enables the plant operators to provide consistent and up-to-date images, even with diverse requirements across the plant floor.

Results: Plant downtime has dropped considerably because the standardized architecture means patches are handled more consistently across a compatible environment. Software testing cycles and disaster recovery testing time have gone from days and weeks to hours. Because line workers are using retrofitted touchscreens on similar PCs, they experience the same physical environment. Finally, greater efficiencies mean the company is able to reduce the number of data centers in the plant from three to two.

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Cisco and The Applied Group

The key for successful plant floor virtualization is the partnership between Cisco and The Applied Group. Cisco Unified Computing System™ (Cisco UCS®), a critical element for successful virtualization, provides an open, end-to-end, service-optimized infrastructure for next-generation virtual workspaces, delivered jointly with industry partners such as The Applied Group. The Applied Group brings three decades of industrial automation experience with a wide range of control systems. The Applied Group has the real-world savvy and the skilled engineers to support your transformation.

Cisco UCS simplifies traditional computing architectures, dramatically reducing the number of devices organizations must purchase, deploy, and maintain. Cisco UCS delivers end-to-end optimization for virtualized environments. It also can support traditional operating systems and applications in physical environments. With Cisco UCS, you can accelerate time to productivity while also working more securely with greater protection of data center infrastructure and assets.

Virtualization solutions from Cisco and The Applied Group give you a path to productivity and security for your plant floor. Our innovative solutions address your evolving business and IT environment, including lean manufacturing efforts; overall equipment effectiveness (OEE) initiatives; control system upgrades; Microsoft Windows 7 migration, security and compliance initiatives; plant expansion; new plant build-outs; and manufacturing execution system (MES) upgrades.

Working with Cisco® technologies and the best of third-party technology, The Applied Group and Cisco bring a new architecture to your plant floor.

Customized Virtualization to Meet Your Business Goals

Every manufacturing environment is unique. Cisco and The Applied Group have the experience and the expertise, and you can take advantage of what we've learned from helping dozens of customers move to virtualization and provide the plan, processes, platform, and people to support your solution.

Find out how Cisco and The Applied Group can help your plant be more secure and more productive. For more information, contact:

- The Applied Group: Visit the company website, or contact either sales@thinkapplied.com or VP of Sales and Marketing, Steve Busselman, at sbusselman@thinkapplied.com, 636-728-5937
- Cisco: Visit the Cisco Data Center and Virtualization website, or contact your local Cisco account manager or Randal Kenworthy at rkenwort@cisco.com

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