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## VMware and SAP have great chemistry with Dow Chemical

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**Dow Chemical**, the world's second-largest manufacturer of plastics, chemicals and agricultural products, is in the midst of transforming its IT infrastructure. Under the Next Enterprise Architecture (NEA) program launched in 2006, the company hopes to create a platform that will support its activities for the next two decades.

### Early Adopter Snapshot

Dow, a giant, century-old manufacturing company with disparate product lines, hundreds of manufacturing plants and a single datacenter, is working to replace the majority of its enterprise business applications.

**Challenges to adoption:** The catch is that the new platform and applications need to last for the next 20 years. For the virtualization push, some server owners were reluctant to give up their physical machines until the IT organization came up with a clever incentive. Applications are just beginning initial production implementation; as virtualization goes into production and hits bigger workloads, plans could change if necessary. Not all applications are certified to run on VMware, which can cause internal pushback.

**The 451 take:** The combination of virtualization with commercial off-the-shelf software has transformed Dow's IT infrastructure from a diverse set of legacy applications to a sleek modern virtual environment. This bold makeover saves Dow money on hardware, labor, power and cooling – even though it's not clear quite how much. Virtualization deployment has grown from 0 to nearly 500 virtual machines (VMs) in 18 months. The NEA program is a perfect example of how rebuilding the plumbing creates new opportunities around lightweight application deployment.

## Context

Dow was founded in 1897 and manufactures 70,000 products, in markets as diverse as personal care, transportation, electronics, food, water, health, building and construction. Based in Midland, Michigan, it serves around 160 countries from 156 manufacturing sites in 37 locations. There are 46,000 employees. Annual sales exceed $58bn; R&D spend is over $1.3bn.

Dow's IT organization is highly centralized: There's only one datacenter that runs the enterprise business applications, and these resources are shared by divisions all over the world. The IT shop aims to apply uniform standards to these global enterprise systems. It manages the proliferation of work through strategic partnerships with **Accenture** (for applications) and **IBM** and **Cisco** (for networking and infrastructure).

Company name
**Dow Chemical**

Project goal
**To create a platform that will support Dow's activities for the next two decades**

Start
**2006**

Foundational elements
**Virtualization and mySAP/NetWeaver
Key suppliers
IBM, SAP, VMware**

## Strategic vision and business drivers

NEA is a major corporate initiative launched in 2006 to replace a variety of legacy enterprise applications with a suite built largely on NetWeaver and mySAP. Devised as the foundation of new enterprise IT capabilities, NEA is designed to support Dow for decades to come. The problem is, NEA will require hundreds of Windows images. Take core Dow, for example. With one manufacturing unit and three joint venture partners, the organization requires 212 systems to do its work. And that's just one piece of the global infrastructure.

## Deployment summary

The trick, of course, is not to provision all of those servers on physical machines – it's to harness the power of virtualization. **VMware** ESX Server is the standard platform for all application and Web server images. It's deployed across IBM xSeries hardware. Each host is a four-way, quad-core machine with 96Gb of RAM. Inside each guest virtual VM, Dow runs Windows 2003 Enterprise Edition supporting the mySAP or NetWeaver applications. As of early 2009, there were 42 hosts and nearly 425 VMs. Longer term, the number of VMs could exceed 1,000.

Right now, the production workload is limited. Going forward, the company plans to run all applications, production and non-production, inside VMs. A formal exception is required for an application to get a physical server. Very few exceptions are allowed. When an exception is granted, it's for a very large workload requiring a full server, an operational tool (VirtualCenter, for example) or an application that has demonstrated the inability to function well inside a VM. Databases are not virtualized and instead use a database server farm for SQL and **Oracle**. The **SAP**/NetWeaver databases run mostly on IBM DB2 on z/OS. A shared storage infrastructure uses both disk and tape.

The model is already conferring substantial benefits. Capital spending on hardware is down, even when the costs of VMware licensing and maintenance are factored in. Dow needs

fewer SAN switch ports. The company estimates that it has saved 1,000+ labor hours in racking, stacking and cabling. It also estimates that it saved 40-50% on the initial investment cost to build the platform. New environments can be provisioned in hours, rather than weeks. Buying is simpler now that database servers, VM hosts and large physical application servers all use exactly the same xSeries hardware model. Hardware-related outages have been reduced, thanks to the use of VMotion for live migration of running applications. It's easier to allocate processing power according to business priorities.

## Challenges and obstacles

Like so many virtualization deployments, Dow's legacy re-hosting project ran into problems with server owners. Instead of trying to convince nontechnical people of the benefits of the approach, the IT organization opted for a very simple incentive program. Dow charges a lot less for a VM than for a physical server. This differential pricing appears to have allayed many of the concerns that the target audience might otherwise have had.

While not actually part of NEA, this first foray into virtualization turned out to be a key learning experience. Today, the default across both NEA and legacy infrastructure is to offer a virtual, rather than a physical, server. There are a few exceptions: IBM Essentials, an ETL tool, doesn't run well on virtualized Windows, Dow has found. But lines of business appreciate the cost and speed advantages of being provisioned VMs.

## Innovation and roadmap

With more than 250 single servers physically located in Dow plants, the IT shop is exploring the benefits of deploying virtualization solely to provide hardware and software isolation, so that the physical machine and its applications can be upgraded independently.

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