



## VMware Virtual Infrastructure Keeps Production Line Going at Subaru of Indiana Automotive

### Subaru of Indiana Automotive Cuts Downtime 40 Percent with VMware Virtual Infrastructure

#### RESULTS

- Consolidated 45-50 servers to 15
- Saved \$20,000-30,000 in hardware costs
- Server procurement and setup reduced from weeks or months to under an hour
- Reduced space and power requirements for datacenter
- Reduced system downtime, increasing employee productivity
- Increased application availability
- Improved disaster recovery strategy

#### High Efficiency Ratings

Subaru of Indiana Automotive, Inc. (SIA), is an automotive manufacturing company that builds Subaru models for the global market. With the capacity to produce 200,000 cars in a year, SIA is committed to eliminating environmental risks of its operations, boasting a number of environmental firsts for auto plants. For example, in 1995 it was the first ISO 9000 certified auto plant and in 2004, it was the first auto assembly plant to reach a zero landfill status.

In the summer of 2003, SIA began an initiative to maximize efficiency in its data center. Growing in tandem with increasing car production, the data-center was becoming overcrowded with servers. "We couldn't keep up with them," says Jamey Vester, a member of the professional staff at SIA. "We did a power study on our data center and found we didn't have enough power to run the servers we had. We couldn't replace the servers because most newer servers use even more power. If we didn't do something different, we would need to rewire everything."

The company also needed to minimize downtime. "If our SQL server or inventory tracking systems go down, we lose money," Vester says. "We have hundreds of people working on the production floor. If there is an hour of downtime, we lose about \$20,000 in salaries, plus we miss deadlines and need to pay overtime to make it up."

#### Performance Testing

To address these challenges, IBM representatives suggested software from VMware. "We ordered an evaluation copy and tested it out," Vester says. "We realized that in addition to addressing our server consolidation needs, we'd be able to copy a machine and provision a server in a couple of hours instead of the weeks, or even months it usually took if we needed physical hardware. It would also save us from having to rewire our datacenter." The VMware software, along with IBM servers and a new SAN, would also be key to reducing downtime and creating a viable disaster recovery strategy.

Vester attended a VMware® ESX Server training class and took about six months to evaluate the solution. "We did a trial with our IBM vendor and learned how to use the VMware software," Vester says. "We set up an evaluation environment by moving some nonessential servers into ESX Server, then installed some production applications into the virtual machines and played with it. We found that for all intents and purposes, virtual machines were no different than physical servers."

**"Our downtime number last year was under three hours. The year before, when we didn't have VMware software, it was 28 hours. We made other improvements to reduce the number, but I would say 40 percent is attributable to VMware software."**

*Jamey Vester  
Member of Professional Staff, Subaru of Indiana*



## VMWARE VIRTUAL INFRASTRUCTURE AT WORK

- VirtualCenter 3.20 GHz dual Xeon IBM x346, with 1GB RAM
- ESX Server on two 4-CPU Xeon IBM x440s, with 4GB RAM, one 8-CPU IBM x445, with 16 GB RAM
- Workstation on Dell workstations and laptops
- IBM DS4300 SAN, with servers connected to large VMFS partition, plus several smaller VMFS partitions for clustering
- Guest operating systems on ESX Server include: Microsoft® Windows® 2000 (Pro, Server and AS), Windows NT, Windows Server 2003, Windows XP and Linux
- Applications in virtual machines in test and production include: custom applications (plant control, tracking, reporting), GEFanuc Intellution Plant Control Suite, SQL 2000, Active Directory, MSMQ Server

## Assembling a Virtual Infrastructure

At the end of 2003, SIA began building a virtual infrastructure with ESX Server. "After the first implementation, we decided we wanted another ESX Server, and we pushed our management to let us put production apps into virtual machines," Vester says.

SIA also deployed VMware VirtualCenter and VMotion™ technology for optimal server management and control in its production environment. In December 2004, it added a third ESX Server. "We were able to get the new machine and migrate the servers in about two weeks," says Vester. "We worked during the holidays and got another 10 or 11 virtual machines done by January 3."

## Turbocharged Servers

Now, with VMware software, SIA has a scalable virtual infrastructure, achieving benefits that include:

- **Server consolidation.** SIA has consolidated 50 physical servers on 10 42U racks onto four racks and just 15 physical servers.
- **Server containment.** The efficiency of VMware virtual infrastructure saved SIA from purchasing an additional 5-10 servers. "We've saved \$20-30,000 in hardware by not having to buy new servers," says Vester.
- **Faster server provisioning.** When a new server is needed, SIA does not need to order and set up new hardware because it can just provision a new virtual machine. "We can make a machine in a matter of minutes," explains Vester. "It used to take us a couple of weeks, or even months, to order and deploy the hardware."

- **Reduced server and application development times.** VMware software also saves SIA hours each time they need to set up a new server. "We can have a new server fully gassed up and ready to go in under an hour," Vester says. "Before, even if we had the hardware, we'd have to load the operating system and then apply the patches, which could take all day."
- **Reduced downtime.** Since deploying VMware software, SIA has dramatically reduced downtime. "Our downtime number last year was under three hours," says Vester. "The year before, when we didn't have VMware software, it was 28 hours. We made other improvements to reduce the number, but I would say 40 percent is attributable to VMware software."
- **Reduced resource use.** The move to VMware software allows SIA to conserve power and space in the data center. "We saved space, we didn't need to upgrade our cooling system and we had minimal power rerouting," Vester says. "With physical servers, we would have had to rewire everything."
- **High availability.** With VirtualCenter and VMotion, Vester is able to manage servers for maximum uptime. Vester explains: "We've implemented a system with our plant control so we have ISX applications that run our physical machines. Virtual machines can take over the work of a physical machine if it fails. We can also reboot problem applications. We also use VMotion, so if there is a problem with a server, we can move a virtual machine to another physical server, apply a patch, and move it back without any service interruption. It's something I would never be able to do before."



- Improved disaster recovery.** SIA used to use Ghost images for server backup. "The big issue was having 50 servers that weren't all the same," he says. "We had 10 of one kind, 10 of another. It is difficult to restore a Ghost image on different hardware, so it made our job difficult if something failed. Now, with virtual machines, we're not dependent on hardware. We can copy DSK files once a month onto a separate partition of our SAN and that's our backup image. We've also been able to create a separate disaster recovery site, so in the event of a major disaster, we can bring everything back up with no problem."

### A Smooth Ride, Plus Faster Response

While the VMware virtual infrastructure has increased the capabilities of the Production Control Team, it has greatly eased the administrative burden of server management. "Two people have left our group since we've implemented VMware software, but we haven't increased our workload because now the administration of the machines takes a lot less time. If we had gotten more physical machines, it would have been out of control and I don't think we could have kept up with our growth levels."

With VirtualCenter, Vester and his team can view server resource use and performance data from a central view. "Because our operators can view all of the servers at one time and we have immediate access to all of the machines with remote access, we can respond much more quickly if there is a problem," says Vester. "The fact that I can immediately supply other departments with servers without any work impresses them."

### Crash Tests

SIA has also found that it is easier to test a system in virtual machines before pushing it into production. For example, when Vester was moving from mixed mode of Active Directory into full Active Directory for more functionality, he was able to use an extra ESX Server license on an old server, copy DSK files to the server and create a mini network, migrate the data out of mixed mode, and check if there were any problems. "I was able to duplicate our network so we could fully test it before I did the migration."

### Built to Last

With its virtual infrastructure in place, Vester says he has a scalable platform that will accommodate the company's growth. "We can maintain what we have now, continuing to move everything onto ESX Server," he says. "We have a good-sized SAN, and our virtual infrastructure in place, so we can keep adding to it without interruption."

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