

Navy Marine Corps Intranet

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KEY HIGHLIGHTS

Challenge

Reduce costs across the Navy and Marine Corps' vast intranet while improving the availability of mission-critical applications, including a very large Microsoft Exchange 2003 deployment

Solution

Deploy VMware technology to run more than 350,000 Exchange 2003 mailboxes and other key applications on VMware Infrastructure in production, significantly improving reliability and manageability while cutting costs

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The Navy Marine Corps Intranet (NMCI) is the second-largest network in the world; only the Internet is larger. The NMCI is not just massive, its mission is vital: more than 700,000 of the military and civilian employees of the Department of the Navy and Marine Corps receive IT services via the intranet. Its integrated operation enables secure off-site storage and rapid service and data restoration, even in the event of a disaster. Some that the NMCI has weathered so far include 9/11, Hurricane Katrina and the Indian Ocean tsunami. EDS is deploying VMware Infrastructure throughout the NMCI's vast network to improve application availability while cutting costs. Virtualization is still a work in progress, but the results thus far have been impressive.

EDS now runs most of the NMCI's Microsoft applications on VMware Infrastructure in production. Some applications—like Distributed File System (DFS), Windows Internet Name Service (WINS) and Microsoft Operations Manager (MOM—were virtualized because they're prime candidates for high consolidation ratios, and at the NMCI, those ratios turned out to be about 12:1. Other Microsoft applications—such as Exchange Server, Print Spooler, Internet Information Services (IIS) and SharePoint Server—were selected for virtualization because of the desire for high availability and maximum uptime.

Out of the long list of virtualized Microsoft applications, one stands out as the most vital. "Exchange Server is absolutely one of the NMCI's most mission-critical applications," says EDS's Jeff Smith, the platforms manager who heads the team in charge of the infrastructure and management of the intranet's VMware installation. "And since it impacts the military, it's especially critical."

To test how well Exchange Server would run on VMware Infrastructure, EDS teamed up with VMware to run a pilot in 2007. "Our engineers did some things to tweak the configuration for optimization before we put any live customers on," Smith reports. The project then went live in production in mid-2008, and a year later it's about 80 percent virtualized, with approximately 350,000 Exchange mailboxes housed on VMs. EDS expects that the implementation, which features Exchange Server 2003 running on Windows Server 2003, will soon be 100 percent virtualized. "We're working towards that right now," Smith says. "I hope we'll be there by August."

The NMCI is running about five virtual Exchange servers on each physical host, most of them with a quad-core boxes with 64 GB RAM. "Our hardware platforms are a mixed bag, so consolidation ratios vary, but our average ratio for Exchange is 5:1," explains Harvey Warren, an EDS infrastructure analyst working on the NMCI. "That means we end up with one RAID drive, as opposed to five. That doesn't just save on hardware, it reduces the number of hardware failures in that one spot by 80 percent.

"And the savings that come from keeping track of fewer boxes have been significant," he continues. "People have to look at that, and remember that every part of the physical box is something that can fail. The power supply, the chassis, the SCSI controllers, the

VMWARE AT WORK

VMware Infrastructure 3.5 Enterprise, featuring:

- VMware ESX 3.5 with VMFS
- VMware vCenter 2.02
- VMware VMotion
- VMware High Availability (HA)
- VMware Converter 3.0
- VMware Distributed Resource Scheduler (DRS)

hard drives—all of those pieces can fail. So cutting down the number of possible failure points is going to save money, time and paperwork. When you add it all up, it just makes sense to run applications like Exchange on VMware VMs instead of physical boxes.”

Despite the server consolidation, performance has held steady and reliability has improved. “I was surprised by how well VMware Infrastructure handles Exchange Server,” Smith observes. “We all know that Exchange is a CPU-intensive program, but our virtualized implementation has been very successful. I’ve been impressed—especially given the 350,000 mailboxes that we’ve been able to support, the redundancy we’ve built in, and all the other demands we’ve put on it.”

“The NMCI generates a very large number of client sessions, which might make people a little reluctant to virtualize Exchange, but it’s worked out well,” Warren adds. “Obviously there are learning curves that everybody goes through on an implementation of this scale—and we’re still going through a few of them—but Exchange runs better on ESX than we’d anticipated. The virtualized Exchange infrastructure handles up to 7,000 users on each VM, which is a significant workload.”

Tips on Virtualizing Exchange Server

Based on EDS’s experience virtualizing Exchange on the NMCI’s extensive international network, storage is a key factor in a successful implementation. “For me, the SAN piece of the puzzle is the most important, since everything is housed back there and all the traffic comes to and goes from the storage devices,” Smith says. “So before you start, you should make sure that your SAN configuration is healthy and functioning and tweaked to get the best performance. As you’re making your decisions about virtualization and doing your pre-work surveys, storage has to be a key consideration. If you don’t do that vital review to develop a deep understanding, storage and storage costs can sprawl, removing any of the savings that were intended.”

Warren also has advice for companies virtualizing Exchange with VMware Infrastructure. “Basically the thing to do with an Exchange server of any significant size is to give it every performance advantage you can,” he says. “Even if you don’t throw every available resource at it up front, with a significant deployment like this, you will probably eventually go back and re-engineer it.”

Since improving the availability of critical applications like Exchange was one of the primary reason EDS began virtualizing the NMCI, VMware High Availability (HA) and VMotion are popular with Smith and his team. “EDS is focused on providing uninterrupted service to our customer, and VMware tools like HA and VMotion help ensure that service,” he says. “Thanks to the redundancy we get from those tools, VMware Infrastructure offers a more reliable platform than a traditional environment.”

Another advantage of running Exchange on ESX is far greater manageability. “With vCenter, we can manage all our virtualized Exchange servers through one console,” Warren points out. “We can restart, reboot, do just about anything right from that console. That’s a lot better than relying on someone across the country or across the world to go to the trouble spot and push the right button.”

“There have been many occasions where an Exchange server is hung at a remote site at 3 a.m. and nobody is sitting there,” Smith adds. “Without VMware, by the time we spot the problem, get on the phone, get somebody out there, it could be a few hours. But with vCenter, we just log into a virtual console and do a restart.”

DEPLOYMENT ENVIRONMENT

- ESX 3.5 running on HP DL360, DL380, DL580, and DL580ESX with NetApp Storage FAS 3000 and 6000 series filers, as well as on and Dell 2950, 6950 and R900 servers attached to EMC Symmetrix DMX-2000 and DMX-3 storage
- Guest operating systems: Windows Server 2000 and 2003 (Enterprise and Standard)
- Mission-critical applications running in production in virtual machines: Microsoft Exchange 2003, Microsoft Internet Information Services (IIS), Microsoft Office SharePoint Server, print servers, Citrix, Domain Name System (DNS), Distributed File System (DFS), Symantec Antivirus

Results

- Average consolidation ratios of 5:1 on Microsoft Exchange Server, with higher ratios for less intensive applications
- Significant savings on hardware cost and overhead
- 350,000 Exchange mailboxes currently housed on VMs; a number that will be more than 400,000 by the time the Microsoft Exchange implementation is fully virtualized by the fall of 2009
- High Availability, VMotion, vCenter and other VMware tools improve availability and simplify management for Exchange and other key applications

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