

U.S. AIR FORCE AIR COMBAT COMMAND

Virtualization simplifies Continuity of Operations (COOP) for mission-critical collaboration



ESSENTIALS

Challenges

- 80,000 users depend on the Microsoft SharePoint 2007 intranet site for mission-critical collaboration
- Experiencing performance and stability issues
- Hosted on seven physical servers in one site
- Data backed up on site to disk, then tape for offsite vaulting
- In the event of disaster, recovery could take days or even weeks

Solutions

- Redesigned Microsoft SharePoint environment to improve stability and performance as well as for compatibility with government-issued Microsoft Windows 2008 R2 operating system and tools
- Virtualized new Microsoft SharePoint environment on VMware ESX virtual infrastructure at production and secondary sites, with VMware ESX server hardening to comply with government Information Assurance (IA) and other security requirements
- Implemented VMware vCenter with VMware High Availability (HA) and Dynamic Resource Scheduling to automate workload balancing and virtual machine failover in the local environment
- Designed and implemented dual-site DR/COOP using WAN-optimized, SAN-based data replication with EMC RecoverPoint, and integrated automated virtual environment recovery with VMware Site Recovery Manager (SRM)

Air Combat Command (ACC) is a major command and primary force provider of the United States Air Force. It trains, equips, and maintains combat-ready forces for rapid deployment, and operates fighter, bomber, reconnaissance, battle-management, and electronic-combat aircraft. Its command, control, communications, and intelligence systems are used to conduct global information operations.

In line with Department of Defense (DoD) initiatives, ACC is working to consolidate IT infrastructure and strengthen disaster recovery and continuity of operations (DR/COOP). Recently, ACC leveraged proven virtual solutions and expertise to dramatically improve the performance and resiliency of its Command-wide Microsoft® SharePoint® Server collaboration site—while also cutting costs.

COMMAND-WIDE COLLABORATION

At first glance, a SharePoint intranet site running on an unclassified network may not seem mission-critical. However, for nearly 80,000 users, the application has evolved to become a centralized repository for information and tools essential to performing ACC's mission.

Whether it is the ability of a flight-line maintainer to read a technical order and access documents for an upgrade to an F-22, funding process workflows, or security force training—teams across ACC depend on the SharePoint application to perform administrative and operational tasks.

“If the site went down, the entire Command used to be affected,” says Bill Marion, CTO, U.S. Air Force Air Combat Command.

The Microsoft SharePoint 2007 application, which had originally been configured for far fewer users and had grown to run on seven physical servers, had begun to suffer stability issues. In addition to slowed performance, latency issues such as long-haul network drops even made the site inaccessible for varying periods of time.

Microsoft SharePoint data was backed up to disk on site, then to tape for offsite vaulting. In the event of a data center disaster, recovery would require building or finding infrastructure in another location and restoring data from tape. This scenario, in which recovery could take many days or even weeks, was clearly unacceptable.

PROVEN SOLUTIONS AND EXPERTISE

To improve performance and satisfy DR/COOP requirements, Marion and his team researched various approaches.

“My philosophy is why reinvent the wheel?” If there's a solution that fits our needs and already exists, it reduces our costs, risks, and timeframes—but we always do our own research,” explains Marion.

CUSTOMER PROFILE

EMC²

- Documented the new configuration, virtual infrastructure maintenance plan, and failover and failback procedures
- Provided hands-on knowledge transfer for virtual workload-balancing and cross-site recovery

Key benefits

- High-availability virtual infrastructure with cross-site DR/COOP greatly reduces risk of impact to mission-critical SharePoint applications, data, and operations
 - Near realtime replication of data
 - Dual-site DR/COOP between redundant infrastructure in sites separated by 1,000+ miles
 - Demonstrated ability to return to operations within four hours or less, with data loss limited to 30 minutes or less
- Improved user satisfaction and collaboration which contributes to information and decision superiority
- Virtual infrastructure reduces data center energy, footprint, maintenance, and administration costs

ACC engaged independent research analysts to confirm their own estimates of the level of operational resiliency needed for the collaboration and data-sharing site.

“Because the price goes up exponentially for guaranteed resiliency, the analysts helped us validate the “sweet spot” in terms of the price paid for a contractual commitment to recovery point and recovery time objectives (RPO/RTO),” says Marion. “We identified a point at which the guaranteed RPO/RTO was adequate, while knowing that the actual responsiveness would typically be faster.”

Marion and his team also looked for a knowledgeable partner to help them design the existing SharePoint application on a high-availability virtual infrastructure, and plan, design, and implement a DR/COOP solution. After performing market research, reviewing requirements with third-party analysts, and analyzing costs through the acquisition process, EMC® Consulting won the competitive selection.

“EMC has consulting and technical solution expertise that spans Microsoft technologies, virtual environments, data replication, and disaster recovery,” says Marion. “They had proven their methodologies and solutions in enterprise-scale installations.”

VIRTUALIZATION FOR DR/COOP

EMC consultants began with an EMC Virtualization Methodology assessment of the Command’s existing Microsoft SharePoint infrastructure and operating environment including power/cooling, server, storage, software, LAN/WAN, access, security, change control, portal sizing, workload capacity, and resource utilization.

“Our decision to virtualize the Microsoft SharePoint environment was driven first and foremost by the need for operational resiliency,” says Marion. “The data center savings realized from having fewer physical boxes to power and maintain was seen as an added benefit.”

Virtualization, he explains, helps reduce DR/COOP complexity and costs because it uses images, which can be easily manipulated and recreated.

“Virtualization facilitates the restoration of corrupted files or systems as well as DR,” says Marion. “It makes it easy to logically group and regroup images, test recovery plans, and make changes in a granular way, without impacting the production environment. In many ways, the recovery process is similar to the way setting a restore point works on Windows systems. If something goes wrong, it’s possible to recreate an image off a last known image very quickly.”

Before virtualizing the Microsoft SharePoint application, EMC application architects addressed stability and performance issues. They rebuilt the Microsoft SharePoint application infrastructure, rearchitected the Microsoft SQL Server® cluster, and made modifications to the government-provided Microsoft Windows Server® 2008 R2 image to support the new Microsoft SharePoint and Microsoft SQL Server installs. They also worked with ACC to make changes to Active Directory® Group Policies to support the new Microsoft Windows Server 2008 R2 architecture.

EMC deployed the new Microsoft SharePoint and Microsoft SQL Server cluster solution in a high-availability VMware® virtual infrastructure production environment and built a virtual server hosted recovery farm in a secondary ACC site located more than a thousand miles away. The new Microsoft SharePoint environment is implemented on a VMware ESX® virtual host platform in the production and secondary sites with VMware ESX server hardening to comply with government Information Assurance (IA) and other security requirements. VMware vCenter™ with VMware High Availability (HA) and Dynamic Resource Scheduling

(DRS) automate workload balancing and virtual machine level failover in the local environment.

For DR/COOP, EMC consultants designed a WAN-optimized, SAN-based data replication solution with EMC RecoverPoint software and automated virtual environment failover and recovery between the two sites with VMware Site Recovery Manager (SRM). EMC consultants also worked with ACC's team to guide changes to Ethernet and SANs in both sites to support virtual infrastructure deployment.

MEETING RECOVERY OBJECTIVES

Today, the geographically diverse, cross-site, DR/COOP fail-over and failback capability for the virtual SharePoint environments enables ACC to meet a guaranteed recovery time objective (RTO) of four hours or less, and recovery point objective (RPO) of 30 minutes or less.

The DR/COOP solution uses EMC RecoverPoint software to replicate data between an EMC Symmetrix® DMX™-4 based SAN at each site. Near realtime replication of data and services over the existing WAN are enabled through data compression and alternating full (after-hours) and incremental level (constant) backups. VMware SRM automates failover (and facilitates non-disruptive DR testing) of the virtual infrastructure, bringing secondary site virtual machines online and restoring services through integration with the EMC RecoverPoint software.

EMC consultants documented the new Microsoft SharePoint technical solution and configuration; developed and documented a plan for the maintenance of the virtual infrastructure (including recommendations for changes to internal IT processes commonly affected by virtualization, such as anti-virus and backup); and fully documented the DR/COOP failover and failback procedures for both sites. Consultants also performed a DR test demonstrating RTO and RPO capability, and worked with ACC staff to provide hands-on knowledge transfer for local virtual environment workload-balancing and cross-site recovery.

INFORMATION AND DECISION SUPERIORITY

The rebuild of the Microsoft SharePoint application infrastructure and back-end Microsoft SQL Server cluster dramatically improved performance and availability.

“The Command is now experiencing near 99.99 percent uptime, with significantly less latency,” says Marion. “The difference in performance is like night and day.”

“Moving our SharePoint environment to a high-availability virtual infrastructure with redundancy in two sites separated by more than a thousand miles helps us meet demanding recovery time and recovery point objectives cost-effectively,” says Marion. “In the event of a failure, automated virtual failover software and data replication technologies work together to speed and simplify DR/COOP. As a result, we are able to return to operations in a few hours—rather than many days, or even weeks.”

Improved performance and briefings to the user community about the dual-cross-site operational resiliency for continuity of data access and services has led to a renewed confidence in the site.

“Data sharing requires trust,” notes Marion. “People are reluctant to put information and documents on centralized collaboration sites, and rightly so, if they aren't confident that they can quickly and easily access and use their assets whenever they need them.”

Without that confidence, users begin keeping documents and information on their local drive and useful information becomes unavailable to others, undermining the whole point of the collaboration site.

“Our information and decision superiority depends on our ability to store and share data and documents at the enterprise level,” says Marion. “As we continue to consolidate infrastructure, centralize operations, and make the transition to cloud computing, the requirements for security, operational resiliency, and recovery will continue to grow.”

Disclaimer: Mention of particular vendors and technologies does not signify endorsement by the DoD.

“EMC consultants helped us take advantage of proven, best-of-breed approaches to optimize, virtualize, and achieve enterprise-level operational resiliency for our 80,000-user SharePoint application on time and within budget. We were able to cut costs by a third over external DR/COOP solutions—and streamline implementation from more than a year to approximately four months.”

BILL MARION, CTO
U.S. AIR FORCE AIR COMBAT COMMAND

CONTACT US

To learn more about how EMC products, services, and solutions can help solve your business and IT challenges, contact your local representative or authorized reseller—or visit us at www.EMC.com.

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