

HP Business Continuity and Availability with VMware

Create a resilient IT foundation for better business outcomes.



Can you keep your business up and running?

Whether it's managing an unscheduled power blackout, deploying a major system upgrade or dealing with the aftermath of a natural disaster, business continuity planning is critical to the ongoing success of your business. You need to know that you have the people, processes and technology in place to enable constant business operations, with minimum downtime or performance impact. In other words, you need a business continuity plan.

At the core of your business continuity plan is your IT infrastructure. It's the technology foundation that enables your business continuity strategy, helping you reduce risk and keep your business up and running. It all begins with the right technology.

That sounds simple enough. In reality, though, a range of challenges can make it difficult to build a resilient, disaster-tolerant foundation. A few examples:

- Implementing a disaster-tolerant solution often requires that primary and secondary sites have compatible equipment, since your operating systems and applications demand it. This adds complexity to the business continuity strategy and supporting processes.
- Failover may often be a manual activity because your administrators have to verify that equipment and applications at the remote site are recovered in the right order. This process can be labor- and time-intensive—and cause costly business downtime.

- Each application has different recovery processes, and these require validation and testing. In addition, most disaster recovery solutions rely heavily on tape backup systems that also require rigorous design and regular testing. Testing is mandatory to verify that you meet business recovery goals and thus reduce your business risk—but testing requires time, people and budget, resources that are always in short supply.

Historically, challenges like these have proven to be obstacles in the path to business continuity. But today, growing numbers of companies are overcoming these inhibitors by adding an important new factor to the business continuity equation: virtualization.

Virtualization can reinforce your business continuity strategy.

Today, HP leverages virtualization technology to extend the foundation of your business continuity solutions. When you use HP servers and storage in conjunction with VMware Infrastructure software, you enjoy a wider range of cost-effective business continuity solutions that can meet the unique demands of your business—starting with affordable low-cost backup or virtual machine replication, through to advanced highly available multi-site solutions that facilitate ongoing operations in the event of a disaster. You'll benefit from highly available disaster-tolerant solutions that reduce your costs, mitigate risk and align your business continuity strategy with your business needs.



Virtualization can make it easier to manage variations in application workloads by creating virtual machines and application instances that can be automatically migrated across virtual machines. This automation can lower your risk of application downtime in the event of a system outage or other availability event, and brings with it the additional general benefits of lower operational overhead and improved service levels.

To build a comprehensive, credible business continuity and availability (BC&A) business case using virtualization technologies, it's important to understand how those technologies work both individually and in conjunction with the rest of your infrastructure.

How it works

VMware Infrastructure generates a uniform virtual machine image independent of your server platform. The operating system and applications run on top of this image inside virtual machines. Additional products within the VMware suite—such as VMotion, Distributed Resource Scheduler (DRS) and High Availability (HA)—manage the provisioning, movement, load balancing and failover of virtual machines. Then VMware VirtualCenter monitors the health of your virtual machines and helps manage the virtual infrastructure.

You can treat your physical infrastructure as a pool of virtual machine and storage resources that can quickly be allocated, de-allocated and most importantly replicated across sites as required. VMware DRS monitors utilization across resource pools and intelligently allocates available resources among the virtual machines based on predefined rules, while VMware HA can move an entire virtual machine image, including operating system and application, to another ESX server at a remote location.

With the ability to abstract the hardware from the operating system and application, VMware Virtual Infrastructure (VI) now lets you run different hardware at each site. Provided there are sufficient resources available, VMware and HP Storage Mirroring can failover applications to your remote site—with no impact to users of those applications. This significantly reduces (in some cases by up to 70 percent¹) costs associated with recovering applications in the event of a disaster situation.

When you add server-to-server replication using HP Storage Mirroring software, the benefits are even greater. HP Storage Mirroring software enables you to overcome the issues of having to maintain and manage duplicate servers at each site—managing software updates in a separate process, keeping all of the hardware and software at your remote site in synch with your primary site, and verifying that the applications at the remote site are started in the right order. In fact, it's clear that without mirroring, you face a costly, time-consuming and resource-intensive process that can take days to complete.

In contrast, HP Storage Mirroring is simple and automatic. It captures all data and replicates it in real time to a target server, which might be on a different floor, in a different building or even a different city. The target virtual machine, the one receiving the data, acts as the failover device if the production virtual machine goes offline—delivering a recovery time of minutes or hours instead of days. With HP Storage Mirroring managing the failover, the virtual environment will be intact and the target server can act as the production machine until the production environment is operating again.

¹ "Making Your Business Disaster Ready with Virtual Infrastructure." VMware white paper www.vmware.com/pdf/disaster_recovery.pdf

Of course, HP Storage Mirroring software is fully supported and certified with VMware VI environments. What's more, because it replicates data over your existing local-area network (LAN) or wide-area network (WAN) infrastructure, you won't need to recruit additional specialized storage administrators to manage an additional environment, and your existing storage team members can turn their attention to projects with strategic business impact.

Disaster-tolerant solutions

Server clustering

One of the simplest methods of protecting business and mission-critical applications is by clustering server resources across a virtualized server infrastructure.

Start with your HP StorageWorks SAN, which allows you to centrally manage all your storage requirements, quickly provisioning storage to virtual machines and introducing flexibility with either iSCSI or Fibre Channel connectivity. This means you can consolidate your storage resources, increase overall storage utilization, lower risk and increase efficiency. Then, using VMware's VirtualCenter resource monitoring tool, and VMotion, both part of the VMware software suite, you can automatically migrate a virtual machine image onto another VMware server with zero downtime. VMware's VirtualCenter makes it easy to identify hosts with adequate resources to receive migrated virtual machines and provide committed service levels, while VMotion preserves your virtual machine resource allocations.

Clustering provides the highest level of disaster tolerance, allowing an application hosted on the cluster to keep running even in the event of a virtual machine or storage component failure. Deploying VMware Infrastructure with an HP StorageWorks storage area network (SAN) offers a very high level of availability, especially if the cluster

can be stretched across distance, geographically dispersing your data centers to enable even higher levels of disaster tolerance and business continuity.

HP BladeSystem and SANs

Virtualized environments can deliver additional benefits when a SAN is incorporated into your infrastructure. In fact, a SAN-enabled virtual environment protects your business from virtual machine hardware failures. For example, if a disaster happens and all of your critical information is stored on the SAN, you can recover very quickly by bringing a replacement virtual machine online and booting that virtual machine from the SAN. If, however, all your information is stored on disk embedded in a server, you have to wait until that server is back online in order to begin your recovery process.

Add in the HP StorageWorks Enterprise Virtual Array (EVA) and StorageWorks XP array-based replication and snapshot software and you can increase application availability. A snapshot is a point-in-time picture of a storage volume. Besides taking an image of the information on the array volume, the VMware configuration for that virtual machine and the BIOS configuration are also saved. Snapshots speed recovery because they provide the most recent recovery point, enabling faster and more complete application recovery and reducing data loss.

HP StorageWorks Continuous Access software, in turn, enables full site-to-site replication. The software runs on HP StorageWorks EVA and XP array families so critical data replication is managed outside of the server environment, providing greater reliability and faster recovery. HP Continuous Access software is fully tested with and supported on both VMware Virtual Infrastructure and HP BladeSystems, giving you the assurance that your information is fully protected in the event of a disaster or other business interruption.

HP also delivers cluster configurations across a range of HP servers, including HP BladeSystems. Combine HP EVAs with HP BladeSystems and you have an excellent platform for virtualization, as they offer an integrated, easy-to-manage infrastructure that responds readily to change and can save you money on management as well as power and cooling.

Traditional backup and recovery

While disk technology has advanced and communications costs have declined, a replicated environment cannot protect against all disasters, especially man-made problems such as the accidental or malicious deletion of information. That's why tape backup remains the core of any disaster recovery solution. Tape solutions continue to offer the lowest cost for disaster recovery, and they offer flexibility that replicated array systems cannot. One of tape's unique features is that it offers portability—backup tapes can be shipped anywhere to facilitate site recovery.

VMware Virtual Infrastructure integrates with many leading backup solutions, including HP Data Protector Software. Together, HP Data Protector Software and VMware's Consolidated Backup software provide an automated high-performance backup and recovery solution for a LAN-free backup environment.

Here's how it works: A dedicated HP Data Protector backup server offloads the backup workload from the virtual machines. This means that all backup traffic flows via the SAN, not the LAN. As a result, applications running on the virtual machines are not adversely impacted during backup runs.

Snapshot-based backup software, such as HP Business Copy Software, takes a copy of each individual virtual machine (VM) and verifies that in the event of a server crash, there is a consistent file system backup for each virtual machine. Tight integration with VMware software simplifies and centralizes operations, providing fast and easy backup as well as simplifying virtual machine recovery. This approach delivers workload optimization and increased availability of critical applications in VMware environments.

Business continuity and virtualization

Information is critical to the ongoing success of your business—that's what business continuity is all about—and your ability to verify the availability of that information can be enhanced by deploying virtualization. Combining reliable, field-proven replication and storage technology from HP StorageWorks with HP servers and adding virtualization software such as VMware Virtual Infrastructure can help you significantly reduce your recovery times. You'll see other benefits, too. For example, the ability to pool and centrally manage server and hardware resources results in lower overall IT costs and reduced power and cooling requirements—making it easier to build your business case for business continuity and availability.

Building a business case for business continuity and availability solutions

The cost of downtime and data loss goes far beyond the loss of immediate revenue. Cost factors also include lost productivity and, if you have no mitigating measures in place, lost data. You may experience more severe damages, including loss of goodwill, resulting in the loss of customers and future revenues.

In a worst case scenario, data loss can put a company out of business. Studies have shown that 93 percent of companies that suffer a significant data loss are out of business within five years.² Two out of five companies that experience a catastrophe or an extended system outage do not resume operations, and of those that do, one-third go out of business within two years. Ironically, more than 60 percent of businesses in the United States do not have a basic plan to mediate the effects of a disaster, and 90 percent of European companies with global revenues in excess of €100 million have no formal business continuity plan in place.

Sobering statistics. That's why it is imperative to find a solution that not only keeps your data protected, but also keeps your business up and running, even under extreme circumstances.

² Ninety-three percent of companies that lost their data center for ten days or more due to a disaster filed for bankruptcy within one year of the disaster. Fifty percent of businesses that found themselves without data management for this same time period filed for bankruptcy immediately. (Source: National Archives and Records Administration in Washington.)



Assessing your needs

While each organization's circumstances will be different, there are some common steps that any company can take to gain a better understanding of its business continuity and availability needs. In general terms, areas for assessment include, governance, including, understanding the cost of downtime, and identifying the critical applications and processes that support the business, service delivery, service support and technology. Finally regular testing is required to verify that the BC&A plan aligns with your business needs.

Some of these assessments yield quantifiable information on the potential costs of IT downtime and the loss of critical IT services. Other areas shed light on gaps in your business continuity and availability safety net. While it is hard to put a price tag on the potential costs of these deficiencies, any of them can threaten the health and well-being of your business. For this reason, any recognized deficiencies become part of the business case for business continuity and availability investments.

Governance

To establish a plan of action for business continuity and availability, it is important to first identify the specific business processes and IT resources that are most important to the health of your business. It may be helpful to compare your company's circumstances against benchmarks and IT optimization recommendations that can be found in the IT Service Management (ITSM) best practices at www.hp.com/go/itsm.

After you've identified your critical business processes and IT resources, the next step is to analyze your potential risks, including quantifying the potential costs of IT downtime, particularly downtime of critical IT services, and reviewing security breaches that may threaten business continuity and availability. The impact can

be direct, such as lost orders and unproductive staff, or indirect, such as impact on share price or brand image in the marketplace.

A frequent challenge for many IT organizations is to demonstrate the value of a BC&A plan to the business. There is, however, a simple principal that can be applied that may help you gain the buy-in of the organization. This involves estimating the potential cost of downtime and the financial impact to the business. Because every organization is different, this estimate needs to be relevant to the business, and so should be calculated based on the costs to the business, as opposed to using an industry average. To make this simple calculation, you need to know the costs for your employees, suppliers and customers being unable to access critical information. A simple calculation that will enable you to estimate the financial impact of potential downtime is:

User impact + Business impact = Downtime estimate

- User impact can be calculated on the basis of the average employee salary multiplied by the number of business hours the user productivity would be impacted if users could not access key business applications and data.
- Business impact can be calculated based on the average monthly gross revenue for the critical application multiplied by the number of business hours that the application is unavailable.
- The estimated cost of downtime is derived by adding results from the user impact and business impact calculations.

Other governance issues to consider include your targeted recovery time objectives (RTOs) and recovery point objectives (RPOs), or the time needed to recover your systems and storage and how much data you can afford to lose following an event. You also need to identify

your availability targets. Establishing clear RTO, RPO and availability objectives will help you set expectations for your recovery and availability requirements and the need for solutions that are designed and tested to meet those requirements.

A solid understanding of the impact of downtime or IT disruption is necessary to ensure that your plan focuses on the most important business areas and that your RTOs and RPOs meet business needs. This, in turn, will help you make useful cost versus benefit comparisons.

Similarly, security risk assessment is another area of focus. In particular, in a virtualized environment it's important to perform regular security audits and then address any identified risks or gaps. Do you have processes and tools in place to verify that technical configurations conform to security policies? Do you have formal mechanisms in place for logging, correlating and analyzing security incidents? And what about solutions that enable early warning of network attacks and intrusions? These are the types of issues addressed in the security assessment process.

In addition, assessments in the governance area should also consider emergency plans for crisis situations, rehearsals of emergency plans, staffing policies and processes that enable ongoing management oversight.

Service delivery

In the service delivery arena, areas of assessment include IT service continuity plans, third-party support agreements, service level agreements (SLAs), and security risks and processes.

Service delivery assessment begins with a look at your IT service continuity plans. These plans define how your IT services will be recovered and the service levels that will be provided in the recovery environment. These should be spelled out in SLAs with any third parties under contract to provide critical support at your recovery site.

Service support

Other areas of focus in the service support assessment process include periodic reviews of service continuity plans. These reviews should identify any recent upgrades or changes to IT systems and services that could affect your business continuity plans, including previously defined and agreed upon SLAs. In addition, it's important to define help desk processes and tools and support escalation procedures for incidents that affect critical IT infrastructure.

Technology

Whether they are physical or virtual, the IT systems that are critical to business success should operate in a well-protected, controlled environment. Without appropriate controls, technical or environmental problems—such as water damage, power failure or cooling system problems—could lead to substantial damage and business downtime. The use of automated, central monitoring systems should help you identify and address problems as they develop—and before they impact your business.

Other technical areas for assessment include virtualization, replication and mirroring of data storage systems, automation of management tools that detect abnormal conditions and security threats, and backup of critical communications systems. In all cases, it's important to define standards for network components, firewalls, security and related configurations. A thorough assessment of your business continuity and availability needs will take these and other technical issues into account.

Put it to the test

Examination and regular testing of backup and restore capabilities are critical steps in the process of assessing your business continuity and available needs. To know that you can recover all of your business-critical data, even under the most extreme circumstances, you need to be certain that all of your critical systems are backed up fully and that critical data is stored offsite, away from your primary data center.

It's important to test your backup systems and data restore capabilities on a scheduled basis. Successful test restores give you the confidence that you will be able to recover business-critical data in the event of a disaster or major outage in your data center. Unsuccessful test restores, on the other hand, give you a chance to address problems proactively—when you are not under the stress and time constraints of a real-life system restoration effort.

A guided assessment tool can simplify your assessment project

To help you better understand your business continuity and availability needs, HP offers a free online business continuity and assessment tool. This tool has been designed specifically to help you understand how well your business is prepared for unexpected IT failure.

When you use the tool, you simply answer a series of questions as accurately as you can. HP then provides you with a personalized report that documents where your IT continuity plans are appropriate and where additional focus may be required. Recommended courses of action are designed explicitly to reduce the cost and impact of IT downtime to your business.

To access the HP Business Continuity and Availability Assessment Tool, visit

<https://h30328.www3.hp.com/ui/forms/questionnaire/Default.aspx?lc=en&cc=us&cid=1>.

Start your BC&A planning with HP and VMware as your partners.

When considering disaster recovery or disaster tolerance as elements of an overall business continuity and availability strategy, it's essential to plan. You need to evaluate:

- The information needs of your business as well as that of each application

- The design of your infrastructure, including your virtual infrastructure, to verify that computing systems, applications and network services are as robust as possible to enable business continuity in the event of a disaster
- What needs to be recovered, in what time frame, and how much, if any, data loss can be accommodated

Each company has unique and specific requirements—there is no “one size fits all” solution. But one can be designed to meet your needs. HP Services, in conjunction with VMware and our HP partners, can help you find an appropriate solution. In these efforts, we leverage our extensive experience with thousands of customers to define, design and deploy a business continuity solution that is right for your VMware infrastructure.

Working with your team, our professionals can help you assess your organizational requirements, calculate the risks of downtime, determine your recovery point and recovery time objectives, and more. Incorporating proven virtualization, business continuity and availability and consolidation strategies, we help you improve your ability to survive disasters—and keep your company productive.

For more information, visit

www.hp.com/go/storage/vmware.

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