Virtualizing disaster recovery using cloud computing

Transition your applications quickly to a resilient cloud
Virtualizing disaster recovery using cloud computing

Contents

2 Executive summary
3 Traditional disaster recovery—a choice between cost and speed
4 The pressure for continuous availability
4 Thinking in terms of interruptions and not disasters
5 Cloud-based business resilience—a welcome, new approach
6 Facilitating improved control with portal access
7 Helping to build confidence and refine disaster recovery plans with more frequent testing
8 Supporting optimized application recovery times with tiered service levels
9 More efficiently supporting mixed environments with virtualized disaster recovery
9 Enabling bandwidth savings with a local presence
10 Coexisting more effectively with traditional disaster recovery
10 Conclusion

Executive summary

Not long after the widespread adoption of computers, it became apparent that disaster recovery would become a necessary component of organizations' IT plans. Business data must be backed up, and key processes like billing, payroll and procurement need to continue even if an organization's data center is disabled due to a disaster. Over time, two distinct approaches to disaster recovery models emerged: dedicated and shared models. While effective, these approaches often forced organizations to choose between cost and speed.

Fast forward 50 years to today's “always-on” world. The flow of information and commerce in our global business environment never sleeps. With the demands of an around-the-clock world, organizations need to start thinking in terms of application continuity rather than infrequent disasters, and disaster recovery service providers need to enable more seamless, nearly instantaneous failover and failback of critical business applications. Yet given the reality that most IT budgets are flat or even reduced, these services must be provided without incurring significant upfront or ongoing expenditures.

Cloud-based business resilience can provide an attractive alternative to traditional disaster recovery, offering both the more-rapid recovery time associated with a dedicated infrastructure and the reduced costs that are consistent with a shared recovery model. With pay-as-you-go pricing and the ability to scale up as conditions change, cloud computing can help organizations meet the expectations of today's frenetic, fast paced environment where IT demands continue to increase but budgets do not.

This white paper discusses traditional approaches to disaster recovery and describes how organizations can use cloud computing to help plan for both the mundane interruptions to service—cut power lines, server hardware failures and security breaches—as well as more-infrequent disasters. The paper provides key considerations when planning for the transition to cloud-based business resilience and in selecting your cloud partner.
Traditional disaster recovery—a choice between cost and speed

When choosing a disaster recovery approach, organizations have traditionally relied on the level of service required, as measured by two recovery objectives:

- Recovery time objective (RTO)—the amount of time between an outage and the restoration of operations
- Recovery point objective (RPO)—the point in time where data is restored and reflects the amount of data that will be ultimately lost during the recovery process.

In traditional disaster recovery models—dedicated and shared—organizations are forced to make the tradeoff between cost and speed to recovery, as illustrated in Figure 2.

In a dedicated model, the infrastructure is dedicated to a single organization. This type of disaster recovery can offer a faster time to recovery compared to other traditional models because the IT infrastructure is mirrored at the disaster recovery site and is ready to be called upon in the event of a disaster. While this model can reduce RTO because the hardware and software are preconfigured, it does not eliminate all delays. The process is still dependent on receiving a current data image, which involves transporting physical tapes and a data restoration process. This approach is also costly because the hardware sits idle when not being used for disaster recovery. Some organizations use the backup infrastructure for development and test to mitigate the cost, but that introduces additional risk into the equation. Finally, the data restoration process adds variability into the process. As illustrated in Figure 3, data restoration can take up to 72 hours including the tape retrieval, travel and loading process.

In a shared disaster recovery model, the infrastructure is shared among multiple organizations. Shared disaster recovery is designed to be more cost effective, since the off-site backup infrastructure is shared between multiple organizations. After a disaster is declared, the hardware, operating system and application software at the disaster site must be configured from the ground up to match the IT site that has declared a disaster, and this process can take hours or even days. On top of that, the data restoration process must be completed as shown in Figure 4, resulting in an average of 48 to 72 hours to recovery.

Figure 1: Measuring level of service required by RPO and RTO

Figure 2: Traditional disaster recovery approaches include shared and dedicated models

Figure 3: Time to recovery using a dedicated infrastructure

Figure 4: Disruption process flow for shared disaster recovery
Virtualizing disaster recovery using cloud computing

The pressure for continuous availability

According to the IBM 2011 CIO study, organizations are being challenged to keep up with the growing demands on their IT departments while keeping their operations up and running and making them as efficient as possible. Their users and customers are becoming more sophisticated users of technology. Research shows that usage of Internet-connected devices is growing about 42 percent annually, giving clients and employees the ability to quickly access huge amounts of storage. In spite of the pressure to do more, they are spending a large percentage of their funds to maintain the infrastructure that they have today. They are also not getting many significant budget increases; budgets are essentially flat.1

With dedicated and shared disaster recovery models, organizations have traditionally been forced to make tradeoffs between cost and speed. As the pressure to achieve continuous availability and reduce costs continues to increase, organizations can no longer accept tradeoffs. While disaster recovery was originally intended for critical batch “back-office” processes, many organizations are now dependent on real-time applications and their online presence as the primary interface to their customers. Any downtime reflects directly on their brand image and interruption of key applications such as e-commerce, online banking and customer self service is viewed as unacceptable by customers. The cost of a minute of downtime may be thousands of dollars.

Thinking in terms of interruptions and not disasters

Traditional disaster recovery methods also rely on “declaring a disaster” in order to leverage the backup infrastructure during events such as hurricanes, tsunamis, floods or fires. However, most application availability interruptions are due to more mundane everyday occurrences. While organizations need to plan for the worst, they also must plan for the more likely—cut power lines, server hardware failures and security breaches.

Figure 5 shows the kinds of disruptions IBM has helped its customers respond to over the past few years. While weather is the root cause of just over half of the disasters declared, note that almost 50 percent of the declarations are due to other causes.

These statistics are from IBM clients who actually declared a disaster. Think about all of the interruptions where a disaster was not declared. In an around-the-clock world, organizations must move beyond disaster recovery and think in terms of application continuity. You must plan for the recovery of critical business applications rather than infrequent, momentous disasters, and build resiliency plans accordingly.

Figure 4: Time to recovery using a shared infrastructure

Figure 5: Types of business interruptions
Cloud-based business resilience—a welcome, new approach

Cloud computing offers an attractive alternative to traditional disaster recovery. “The Cloud” is inherently a shared infrastructure: a pooled set of resources with the infrastructure cost distributed across everyone who contracts for the cloud service. This shared nature makes cloud an ideal model for disaster recovery. Even when we broaden the definition of disaster recovery to include more mundane service interruptions, the need for disaster recovery resources is sporadic. Since all of the organizations relying on the cloud for backup and recovery are very unlikely to need the infrastructure at the same time, costs can be reduced and the cloud can speed recovery time.

Cloud-based business resilience offers several other benefits over traditional disaster recovery models:

- More predictable monthly operating expenses can help you avoid the unexpected and hidden costs of do-it-yourself approaches.
- Reduced up-front capital expenditure requirements, because the disaster recovery infrastructure exists in the cloud.
- Cloud-based business resilience managed services can more easily scale up based on changing conditions.
- Portal access reduces the need to travel to the recovery site which can help save time and money.
While the cloud offers multiple benefits as a disaster recovery platform, there are several key considerations when planning for the transition to cloud-based business resilience and in selecting your cloud partner. These include:

- Portal access with failover and failback capability
- Support for disaster recovery testing
- Tiered service levels
- Support for mixed and virtualized server environments
- Global reach and local presence
- Migration from and coexistence with traditional disaster recovery

The next few sections describe these considerations in greater detail.

Facilitating improved control with portal access
Disaster recovery has traditionally been an insurance policy that organizations hope not to use. In contrast, cloud-based business resilience can actually increase IT’s ability to provide service continuity for key business applications. Since the cloud-based business resilience service can be accessed through a web portal, IT management and administrators gain a dashboard view to their organization’s infrastructure.

For example, clients can access the SmartCloud Virtualized Server Recovery portal via the Internet and identify their servers to be protected and replicated. Through this portal, customers can download the SmartCloud Virtualized Server Recovery client software to install on their covered servers. Once the environment is defined through the portal, the client can view the protection status of their servers, generate reports and conduct other administrative tasks.

While this administrative view through the portal is useful, it is critical to evaluate cloud-based business resilience services to help ensure that the portal is not merely an administrative configuration tool but that it also provides the opportunity to initiate a failover and failback. With SmartCloud Virtualized Server Recovery, clients can use the portal to failover in near real time (for the “Always Available” service-level protected servers described later), reducing the need to contact the cloud service.
provider (IBM in this case) to “declare as disaster” or to initiate the failover. Without the need for a formal declaration and the ability to fail over from the portal, IT can be much more responsive to the more mundane outages and interruptions described above.

**Building confidence and refining disaster recovery plans with more frequent testing**

One traditional challenge of disaster recovery is the lack of certainty that the planned solution will work when the time comes. Typically, organizations only test their failover and recovery on average once or twice per year, which is hardly sufficient, given the pace of change experienced by most IT departments. This lost sense of control has caused some organizations to bring disaster recovery “in house,” diverting critical IT focus for mainline application development.

Cloud-based business resilience provides the opportunity for more control and more frequent and granular testing of disaster recovery plans, even at the server or application level. SmartCloud Virtualized Server recovery provides a DR Testing view in the portal so that IT can test the failover and failback process more frequently.
Clients can generally tailor testing to their schedule. For example, a critical e-Commerce application can be tested prior to a peak online shopping period such as Cyber Monday. Or an online banking system can be tested after a version upgrade in order to ensure that the failover and failback process still works seamlessly.

**Supporting optimized application recovery times with tiered service levels**

Cloud-based business resilience offers the opportunity for tiered service levels that enable you to differentiate applications based on their importance to the organization and the associated tolerance for downtime. For example, SmartCloud Virtualized Server Recovery provides three service level options: Gold, Silver and Bronze. These tiers enable organizations to optimize their budget, paying more for their mission-critical applications to have nearly continuous availability and paying less for non-critical applications.

With SmartCloud Virtualized Server Recovery, the frequency of the data replication and the resulting RPO/RTO is based upon the service level assigned to the server. Multiple servers supporting the same application and business process can be collectively assigned the same group and service level to help ensure consistency and synchronization for failover and failback operations.

<table>
<thead>
<tr>
<th>SmartCloud Virtualized Server Recovery Service Level</th>
<th>Recovery Time Objective (until system boot start)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold Always Available Virtual Machine</td>
<td>1 minute failover</td>
<td>For mission-critical applications that require near-zero RTO/RPO and that need a recovery infrastructure with near-continuous availability for use beyond recovery services</td>
</tr>
<tr>
<td>Silver Disaster and Test Virtual Machine</td>
<td>30 minutes failover</td>
<td>For applications that need rapid recovery in minutes and that need a cloud recovery infrastructure that is remotely accessible at the time of disaster</td>
</tr>
<tr>
<td>Bronze Imported Media Virtual Machine</td>
<td>6 to 24 hours or best effort basis, assisted failover, and assisted failback</td>
<td>For clients that want to import server images and data from tape/disk/NAS into our cloud infrastructure at time of disaster for failover and failback. Provides migration path for Infrastructure Recovery Service clients to cloud recovery services</td>
</tr>
</tbody>
</table>
Efficiently supporting mixed environments with virtualized disaster recovery

The notion of a “server image” is an important part of traditional disaster recovery. As the complexity of IT departments has increased, including multiple server farms with possibly different operating systems and operating system (OS) levels, the ability to respond to a disaster or outage becomes more complex. Organizations are often forced to recover on different hardware, which can take longer and increase the possibility for errors and data loss.

Organizations are implementing virtualization technologies in their data centers to help remove some of the underlying complexity and optimize infrastructure utilization. The number of virtual machines installed has been growing exponentially over the past several years. According to a recent IBM survey of Chief Information Officers, 98 percent of respondents either had already implemented virtualization or had plans to implement it within the next 12 months.

Cloud-based business resilience solutions must offer both physical-to-virtual (P2V) and virtual-to-virtual (V2V) recovery in order to support these types of environments. SmartCloud Virtualized Server Recovery supports virtualized, nonvirtualized and mixed environments, including those with multiple operating systems.

Enabling bandwidth savings with a local presence

Cloud-based business resilience requires ongoing server replication, making network bandwidth an important consideration when adopting this approach. A global provider like IBM offers the opportunity for a local presence, thereby reducing the distance that data must travel across the network. With SmartCloud Virtualized Server Recovery, the client's server configuration, operating system, application software and associated data are replicated to the IBM Resiliency Center across the Internet or designated network connection. While data will be replicated to the closet IBM Resiliency Center running SmartCloud Virtualized Server Recovery, added resiliency and backup is provided within the IBM network of secure centers.

IBM offers a SmartCloud Virtualized Server Recovery Synchronization and Bandwidth Estimator to assist with the assessment of network bandwidth requirements. While many of our clients will not need to increase capacity, the Estimator can confirm your capacity needs.
Clients should identify all servers that support a single business application and include those servers in a single Virtualized Server Recovery plan. The solution assures cross-server consistency across those servers for failover and failback, helping to enhance security and reduce risk.

Coexisting more effectively with traditional disaster recovery
While cloud-based business resilience offers many advantages for mission-critical and customer-facing applications, an efficient enterprise-wide disaster recovery plan will likely include a blend of traditional and cloud-based approaches. The Bronze level service of SmartCloud Virtualized Server Recovery can help ease the transition from traditional methods. Clients can also use this approach when integrating their cloud-based business resilience with data back-up solutions like IBM SmartCloud Managed Backup.

In a recent study, respondents indicated that minimizing data loss was the most important objective of a successful disaster recovery solution. With coordinated disaster recovery and data back-up, data loss can be reduced and reliability of data integrity improved.

Conclusion
Cloud computing offers a compelling opportunity to realize the recovery time of dedicated disaster recovery with the cost structure of shared disaster recovery. However, disaster recovery planning is not something that is taken lightly; security and resiliency of the cloud are critical considerations. SmartCloud Virtualized Server Recovery is hosted within the IBM network of Resiliency Centers—so clients can feel confident that IBM is helping to protect their sensitive data. Second, there is no need to rush in—clients can start to work with SmartCloud Virtualized Server Recovery with as few as five virtual machines under managed contract—so getting started is easier and relatively risk free.

With more than 1,800 dedicated business continuity professionals and more than 160 business resilience centers located around the world, respected industry analysts recognize IBM as a leader in business continuity and resilience. Our virtually unparalleled experience is based on more than 50 years of business resilience and disaster recovery experience and more than 9,000 disaster recovery clients. Further, IBM has been in the systems business for 60 years, and just about no other company understands systems like IBM does. Using our vast business process and technology expertise, we can help you design and implement a business resilience solution that meets your organization’s needs.
For more information
To learn more about virtualizing disaster recovery and managing business resiliency, please contact your IBM marketing representative or IBM Business Partner, or visit the following website:
ibm.com/services/continuity

Additionally, IBM Global Financing can help you acquire the IT solutions that your business needs in the most cost-effective and strategic way possible. We’ll partner with credit-qualified clients to customize an IT financing solution to suit your business goals, enable effective cash management, and improve your total cost of ownership. IBM Global Financing is your smartest choice to fund critical IT investments and propel your business forward. For more information, visit: ibm.com/financing

© Copyright IBM Corporation 2012
IBM Global Services
Route 100
Somers, NY 10589
U.S.A.

Produced in the United States of America
January 2012

IBM, the IBM logo, ibm.com, and SmartCloud are trademarks of International Business Machines Corporation in the United States, other countries or both. If these and other IBM trademarked terms are marked on their first occurrence in this information with a trademark symbol (® or ™), these symbols indicate U.S. registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the web at “Copyright and trademark information” at ibm.com/legal/copytrade.shtml

Other company, product or service names may be trademarks or service marks of others.

1 IBM 2011 CIO study

Please Recycle