

# **Are You Protected?**

## Virtualization and Business Continuity

September 2007



## Executive Summary

Virtualization continues to be a key IT strategy to enable new ways to solve old problems in the enterprise. As virtualization enables the enterprise to collapse its data center footprints globally, smart IT management has begun to ask, or better yet, demand that this key technology asset enables an enterprise's flexibility to address the truly tough missions of Business Continuity (BC), High Availability (HA), and Disaster Recovery (DR) globally.

These questions have led IT management to explore the roles that virtualization can play in addressing BC, HA, and DR requirements. This report provides some insights and clarifications into the practices adopted by Best-in-Class (BIC) companies that have begun to implement this next step in applying virtualization technology.

### Best-in-Class Performance

Aberdeen used three key performance indicators to distinguish Best-in-Class companies from the Industry Average and Laggards in the application of virtualization technology in BC, HA, and DR. Some important results include:

- Best-in-Class companies reduced the risk of unplanned downtime by an average of **53%** over the last 12 months
- Best-in-Class companies increased data and application availability by an average of **54%** over the last 12 months
- Best-in-Class companies reduced the time to recover data and files by an average of **47%** over the last 12 months

### Competitive Maturity Assessment

Survey results show that the firms with Best-in-Class performance shared several common characteristics such as:

- 54% use virtualization to support their disaster recovery plans, 48% use virtualization to support their high availability strategies, and 50% use virtualization to support their business continuity strategies
- 23% experienced a 30% to 50% improvement in Recovery Point Objectives (RPOs) performance attributed to **server virtualization deployments** and 35% experienced a 50% to 100% improvement in Recovery Time Objectives (RTOs)
- 48% experienced a 50% to 100% performance improvement in RPOs due to **storage virtualization implementations** and 48% had a 50% to 100% performance improvement in RTOs

#### What is Virtualization?

Virtualization allows multiple operating system instances to run concurrently on a single computer. It is a means of separating hardware from a single operating system. Each "guest" OS is managed by a Virtual Machine Monitor. Because the virtualization system sits between the guest and the hardware, it can control the guests' use of CPU, memory, and storage, and even allow a guest OS to migrate from one machine to another.

## Required Actions

Using virtualization for BC, HA, and DR presents some key challenges when considering the physical migration of your mission critical applications to a virtual world. Thus, there are some issues to bear in mind when considering its use:

- Develop operational procedures and implement industry best practices and frameworks, such as ITIL v3, to ensure service level agreement (SLA) alignment between the business and the IT department.
- Protect the physical hardware. A virtual machine still has ties to a physical machine so it is vital to protect against their failures.
- Deploy redundant systems throughout the environment and deploy a shared storage infrastructure with server virtualization implementations to support disaster recovery scenarios.
- Create a thorough assessment process that:
  - Assesses Stability – People, Process, Technology, Finance
  - Maps Application Inventory Business functions
  - Maps Application Dependency
  - Provides Core vs. Context distinction
  - Scores & Rates applications
  - Commits to the Business Case
  - Covers the Implementation Plan
  - Provides Team identification
  - Assesses Change Management
  - Covers Communication Protocol & Escalation Process
  - Enables Metrics based Review
  - Provides Readiness Assessment
  - Provides Application Portfolio Assessment
  - Enables Transition Planning
  - Supports a Governance Framework

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## Chapter One: Benchmarking the Best-in-Class

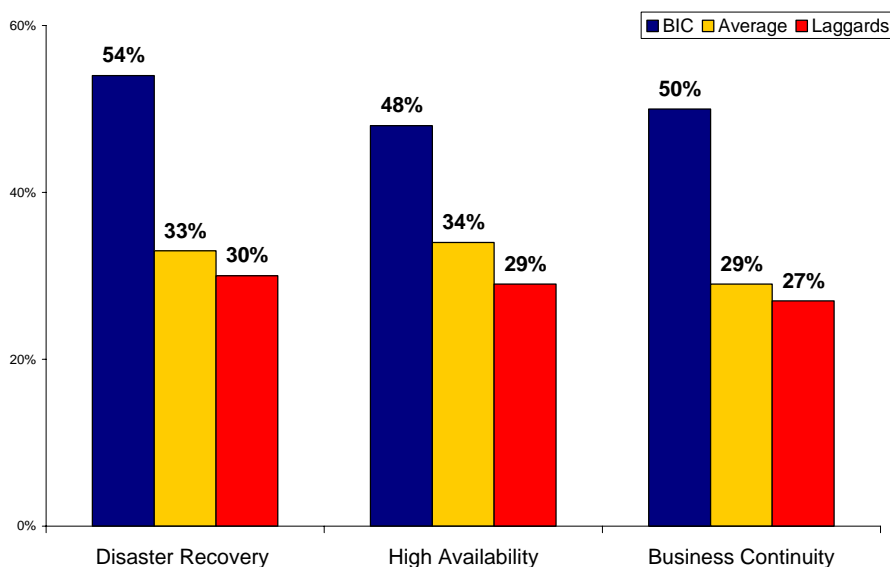
In the April 2007 benchmark report, *Justifying the Cost of Uptime: Server and Storage Virtualization Strategies*, Aberdeen Group reported that server and storage virtualization deployments are moving into a parallel adoption course. Our most recent virtualization survey, conducted in August and September 2007, found that 53% of respondents have deployed server virtualization, while another 24% plan to implement it within 12 months. At least 38% have deployed storage virtualization, with another 25% planning to adopt it within 12 months.

Furthermore, our more recent survey data shows that virtualization users also have moved on to the next step: using the technology to help ensure the business is up-and-running 24x7. As Figure 1 illustrates, a significant percentage of Best-in-Class, Industry Average, and Laggards are using virtualization to support their Business Continuity (BC), High Availability (HA), and Disaster Recovery (DR) strategies.

### Fast Facts

- √ Best-in-Class companies are 65% more likely to be using virtualization to support their BC, HA, and DR strategies
- √ Best-in-Class, Industry Average, and Laggard companies identify the same top three strategic actions for improving their business continuity plans

**Figure 1: Respondents Using Virtualization to Support Business Continuity, High Availability, and Disaster Recovery**



Source: Aberdeen Group, September 2007

“For us, virtualization is a given. Our system utilization was low and if there was a peak, it only happened for an hour. The rest of the time our systems are idle. Our application servers are just not using enough of the physical resources.”

~ Manager of Portal Operations, for a Consumer and Applications Portal Company, which plans to deploy an estimated 120 virtualization licenses on roughly 60 physical servers in its data center in the next few months.

## The Maturity Class Framework

Aberdeen used three key performance indicators to distinguish Best-in-Class companies from the Industry Average and Laggards in areas that illustrate an organization’s resiliency to disaster and unplanned downtime:

- Whether risk of unplanned downtime has been reduced within the last 12 months
- How data and application availability has changed over the last 12 months
- How file and data recovery time has changed within the last 12 months.

**Table 1: Companies with Top Performance Earn Best-in-Class Status**

Definition of Maturity Class	Mean Class Performance
<p><b>Best-in-Class:</b> Top 20% of aggregate performance scorers</p>	<ul style="list-style-type: none"> <li>• Have reduced the risk of unplanned downtime over the last 12 months by an average of <b>53%</b></li> <li>• Have increased data and application availability over the last 12 months by an average of <b>54%</b></li> <li>• Have reduced file and data recovery time over the last 12 months by an average of <b>47%</b></li> </ul>
<p><b>Industry Average:</b> Middle 50% of aggregate performance scorers</p>	<ul style="list-style-type: none"> <li>• Have reduced the risk of unplanned downtime over the last 12 months by an average of <b>6%</b></li> <li>• Have increased data and application availability over the last 12 months by an average of <b>8%</b></li> <li>• Have reduced file and data recovery time over the last 12 months by an average of <b>7%</b></li> </ul>
<p><b>Laggard:</b> Bottom 30% of aggregate performance scorers</p>	<ul style="list-style-type: none"> <li>• The risk of unplanned downtime has <b>increased</b> over the last 12 months on average by <b>2%</b></li> <li>• Data and application availability have <b>declined</b> over the past 12 months on average by <b>7%</b></li> <li>• Data and file recovery time has <b>increased</b> on average by <b>1%</b> over the last 12 months</li> </ul>

Source: Aberdeen Group, September 2007

### The Best-in-Class PACE Model

To understand more clearly how Best-in-Class organizations achieve the performance reported in Table 1, it is necessary to look at the reasons they place a high priority on availability and recovery, the strategies used to achieve these results, the organizational capabilities leveraged to insure success, and the technologies employed to get the job done.

Best-in-Class organizations use a combination of strategic actions, organizational capabilities, and enabling technologies to achieve these superior results (Table 2).

**Table 2: The Best-in-Class PACE Framework**

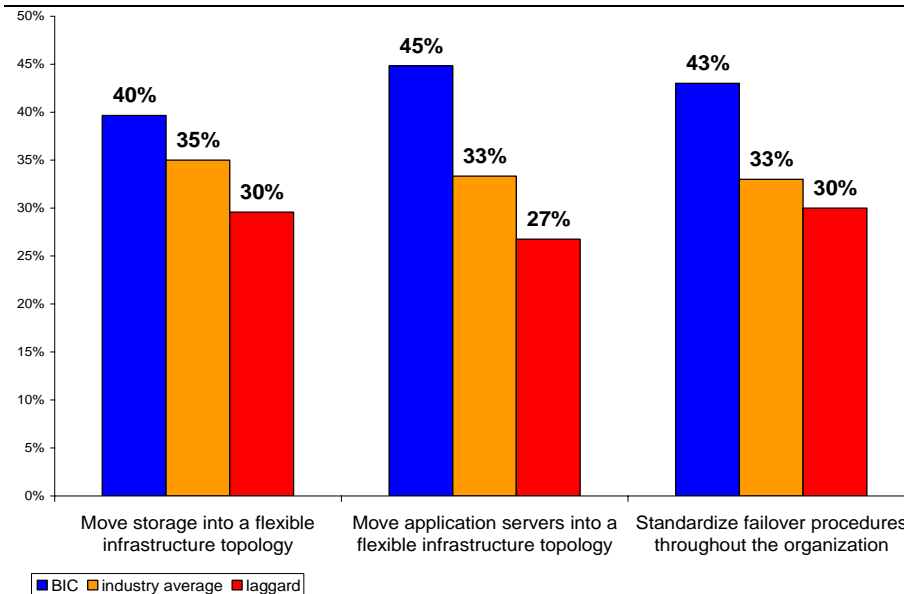
Pressures	Actions	Capabilities	Enablers
<ul style="list-style-type: none"> <li>• Need for guaranteed data recoverability</li> <li>• Provide better service levels for mission-critical applications</li> </ul>	<ul style="list-style-type: none"> <li>• Move application servers and storage into a flexible topology</li> <li>• Deploy redundant systems</li> <li>• Standardize failover procedures throughout the organization</li> </ul>	<ul style="list-style-type: none"> <li>• Have dedicated IT personnel for business continuity plan</li> <li>• Have a detailed disaster recovery scenario plan</li> <li>• Measure uptime in real-time</li> <li>• Measure Service Level Agreements (SLAs) in real-time</li> <li>• Do an inventory of critical systems and data</li> </ul>	<ul style="list-style-type: none"> <li>• Deploy application server clustering technology</li> <li>• Deploy a shared-nothing, replication architecture specifically for a virtualized environment</li> <li>• Deploy a shared-disk, fault tolerant architecture specifically for a virtualized environment</li> <li>• Deploy a network attached storage and / or a storage area network with virtualization</li> <li>• Consider disk-based multi-tiered storage</li> </ul>

Source: Aberdeen Group, September 2007

## Strategies

Our research demonstrates that Best-in-Class, Industry Average, and Laggard companies identify the same three strategic actions for improving their business continuity plans. Specifically, they find that moving physical systems into a logical environment aids IT administrators and managers to build a more flexible storage and server infrastructure topology, which then helps reduce management costs and streamlines the data recovery process.

**Figure 2: Top Strategic Actions to Improve Business Continuity Plans**



Source: Aberdeen Group, September 2007

### Aberdeen Insights – Strategy

One of the challenges companies face in testing systems that use virtualization for BC, HA, and DR is the lack of coordination among the various IT staff and management overseeing each of these plans. Multiple factors such as company size, geographies, operational dependencies, organizational structures and experience affect proper system testing. Oftentimes, there are separate IT managers in charge of BC, HA, and DR and there is no guarantee that these individuals are engaged in a coordinated, ongoing communication. This could hinder the effort of leveraging virtualization throughout the organization.

Since the use of virtualization for BC, HA, and DR purposes is still emerging, it is imperative that companies make sure it is implemented with the careful planning and testing of systems. This also will help insure there are no unnecessary redundancies and more efficient process in data recovery management. This latter issue, which is just starting to take hold within the physical world, is certainly going to be the next big issue as more companies use virtualization to support BC, HA, and DR processes. Recovering data generated from virtualized systems will become a crucial discussion in the coming months.

In this study it became clear that the Best in Class companies (top 20%) were able to demonstrate clear KPI success and improvements in key areas such as unplanned downtime, data and application availability and time to recover data and files. Yet, the majority of organizations surveyed and interviewed (80%) had no noticeable improvements and lots of unmet promises. Our research data showed how critical it was to have the right virtualization tools that focused on application level availability to manage these mission critical functions.

## Chapter Two: Benchmarking Requirements for Success

BC, HA, and DR are practices that organizations use to ensure they are protected against catastrophic failures that can hurt profits and threaten their survival.

Our research shows that end users are looking at using virtualization to support their BC, HA, and DR plans. Virtualization is clearly helping customers to move their server and storage infrastructures into a more flexible environment which enables high availability and disaster recovery. Furthermore, given that virtualization is emerging as a *disruptive technology*, companies must now take appropriate steps to ensure their newly virtualized environments are just as protected as their physical environments.

The following case study illustrates the extent to which some organizations deploy virtualization prior to leveraging the technology for BC, HA, and DR strategies.

### Case Study – A Global Engineering Company

Arup is a global engineering consultancy that regularly undertakes high profile development work. The company oversees an average of more than 10,000 projects at a time; with current projects including London Heathrow Terminal 5, as well as the 2008 Olympic Games sites in Beijing, China. Because of the nature of Arup's work, access to the latest information and documents is critical to meeting client expectations, and to insuring the company's success.

With projects operating in more than 160 countries, Arup's staff has to be very flexible in how and where they work. They are often out of the office for long periods, and most will not have access to the Internet while off-site, either due to lack of coverage or remoteness of location.

To meet this need for information availability, the company has recently equipped 800 of its senior employees with BlackBerry mobile email devices. Protecting the BlackBerry server against downtime or interruption is essential as Arup realizes service interruption could lead to missed deadlines or broken service level agreements (SLA).

#### The Evaluation Process

Nizam Ali, IT consultant at Arup, was asked by the senior management team to look for a business continuity system for BlackBerry. The company wanted a system that was easy to manage and maintain and, most importantly, provided continuous email service or, in the event of any type of failure, got users back online quickly.

Ali began researching other solutions on the market but none lived up to his expectations. "The other products that I looked at were simple

### Fast Facts

- ✓ **52%** of respondents cited the need for staff with virtualization expertise as a major challenge in developing a business continuity strategy
- ✓ **53%** of respondents have experienced an improvement in the success rate of their test-time performance (i.e. time it takes to test failover on disaster recovery plans) in the last 12 months
- ✓ **37%** of respondents cited their RPOs and RTOs goals have stayed the same over the past 12 months since virtualizing their environments, while **34%** have raised their RPO and RTO goals over the last 12 months

## Case Study – A Global Engineering Company

monitoring tools, and they did not deliver the level of protection that was required. In fact, the team could have written its own script to get the same levels of notification,” said Ali.

Arup ended up choosing a solution that had a sophisticated degree of integration with the BlackBerry mail server and the ability to have the service failover between two sites. They now have a complete business continuity suite in place and can bring up the failover server quickly in the event of any problem.

### The Solution

To protect and ensure seamless failover for its four servers located in London and New York, the two data centers were connected by a WAN link – a physical machine in each location backed up by a virtual server. If a physical or network problem affects the primary server their solution automatically and seamlessly switches to Arup’s secondary server located in the other data center. Users can continue to send email without any impact.

“Our London data center supports users in Europe, the Middle East, Africa, Asia and Australia, while the New York site provides service to staff in the Americas. Any incident of downtime would therefore have a significant impact,” said Ali. “In the event of any problem with the London-based server, we can now simply shift these users over to the server in New York and vice versa without any effect on service levels.”

### The Results

Following the installation, Arup’s email service is now protected against network downtime and server failure. This approach has already proven its value: one of the New York databases became corrupted and Ali was faced with having to individually resynchronize each BlackBerry to regain the lost information. “Using a smart high-availability disaster recovery solution, we were able to take an uncorrupted copy of the database that was stored within the London failover site, and we were up and running again within an hour,” said Ali. “Previously we would have to take data from each BlackBerry to restore the information. This would have taken us months considering we would have to wait for staff to come back into the office to get access to their devices.”

By protecting its email systems against downtime, Arup can offer clients a better level of service and be more flexible in responding to requests. Preventing downtime also has led to a quick return on investment. “I’ve seen the impact that downtime can have on the supply of information first-hand, and I am well aware of the cost implications of any interruption to service,” said Ali. “Removing the overhead costs of keeping a system available to our users means that the software installation has already paid for itself.

## Competitive Assessment

The aggregated performance of surveyed companies determined whether they ranked as Best-in-Class, Industry Average, or Laggard. In addition to having common performance levels, each class also shared characteristics in five key categories: (1) process (the ability to detect and respond to changing conditions without placing additional burdens on the organization); (2) organization (corporate focus and collaboration among stakeholders); (3) knowledge management (contextualizing data and exposing it to key stakeholders); (4) technology (the selection of appropriate tools and the intelligent deployment of those tools); and (5) performance measurement (the ability of the organization to measure the benefits of technology deployment and use the results to improve key processes further). These characteristics (identified in Table 3) serve as a guideline for best practices and correlate directly with Best-in-Class performance across the key metrics.

**Table 3: The Competitive Framework**

	Best-in-Class	Average	Laggards
<b>Process</b>	Have a detailed disaster recovery plan in place		
	<b>49%</b>	<b>48%</b>	<b>30%</b>
<b>Organization</b>	Have dedicated IT personnel responsible for overseeing business continuity		
	<b>74%</b>	<b>64%</b>	<b>58%</b>
<b>Knowledge</b>	Companies leverage the measurement of unplanned downtime for strategic purposes		
	<b>100%</b>	<b>99%</b>	<b>63%</b>
	Companies leverage the measurement of data and application availability for strategic planning		
	<b>100%</b>	<b>99%</b>	<b>72%</b>
<b>Technology</b>	Companies use the following technology to support the business continuity strategy		
	<ul style="list-style-type: none"> <li>• <b>44%</b> use dynamic resource allocation</li> <li>• <b>60%</b> use resource measurement and monitoring tools</li> <li>• <b>50%</b> use virtualization to support the business continuity strategy</li> <li>• <b>54%</b> use virtualization to support disaster recovery</li> </ul>	<ul style="list-style-type: none"> <li>• <b>35%</b> use dynamic resource allocation</li> <li>• <b>56%</b> use resource measurement and monitoring tools</li> <li>• <b>29%</b> use virtualization to support the business continuity strategy</li> <li>• <b>33%</b> use virtualization to support disaster recovery</li> </ul>	<ul style="list-style-type: none"> <li>• <b>32%</b> use dynamic resource allocation</li> <li>• <b>44%</b> use resource measurement and monitoring tools</li> <li>• <b>27%</b> use virtualization to support the business continuity strategy</li> <li>• <b>30%</b> use virtualization to support disaster recovery</li> </ul>

	Best-in-Class	Average	Laggards
<b>Performance</b>	Measuring infrastructure health and performance		
	<ul style="list-style-type: none"> <li>• <b>48%</b> measure uptime performance in real-time</li> </ul>	<ul style="list-style-type: none"> <li>• <b>40%</b> measure uptime performance in real-time</li> </ul>	<ul style="list-style-type: none"> <li>• <b>30%</b> measure uptime performance in real-time</li> </ul>

Source: Aberdeen Group, September 2007

## Organizational Capabilities and Technology Enablers

There are several organizational capabilities and enablers that companies must leverage when using virtualization to support BC, HA, and DR. These include having dedicated IT personnel oversee business continuity plans; measuring Service Level Agreements (SLAs); outlining a detailed disaster recovery plan; and taking inventory of all the critical systems within the organization. Furthermore, it is critical to measure improvements in RTOs and RPOs.

Our survey results showed that a strong percentage of the overall respondents (59%) have made business continuity a company-wide objective. Thirty-two percent (32%) of respondents plan to leverage a dedicated IT staff for business continuity within the next 12 months. However, Best-in-Class organizations (74%) were more likely than the Industry Average (64%) or Laggards (58%) to have IT personnel dedicated to overseeing the business continuity plan. This helps ensure that business continuity is a C-Level executive priority and that, on some level, the policy is managed in a centralized manner rather than an ad hoc basis.

Best-in-Class companies also were more likely to leverage virtualization technology for business continuity and disaster recovery, compared to the Industry Average and Laggards. One of the prime benefits of virtualization is it enables resources to be more flexible, which is a key need when a disaster disables a business and resources have to be moved on-the-fly.

Overall, the use of resource measurement is strongly used among Best-in-Class, Industry Average, and Laggard companies. However, the Best-in-Class (60%) are more likely to use these tools, compared to the Industry Average (56%) and Laggards (44%).

### Aberdeen Insights — Technology

As virtualization disentangles the operating system from the hardware, a number of very useful new tools become available. Virtualization allows an operator to control a guest operating system's use of CPU, memory, storage, and other resources, so each guest receives only the resources that it needs. This distribution eliminates the danger of a single runaway process consuming all available memory or CPU. It also helps IT staff to satisfy service level requirements for specific applications. Since the guest is not bound to the hardware, it also becomes possible to dynamically move an operating system from one physical machine to another. As a

## Aberdeen Insights — Technology

particular guest OS begins to consume more resources during peak periods, administrators can move the offending guest to another server with less demand. This kind of flexibility changes traditional notions of server provisioning and capacity planning. With virtualized deployments, it is possible to treat computing resources like CPU, memory, and storage as a hangar of resources and applications that can easily be relocated to receive the resources they need at that time.

The idea behind virtualization is to have numerous virtual machines working on one physical device so that resources are being used more efficiently. A virtual machine can be moved around a company's network to better use the existing physical resources. Virtualization alone will not ensure a business is protected against unplanned downtime and disasters.

Along with various mature data protection technologies, there are several technology solutions emerging specifically for virtualized environments. For instance, 44% of respondents currently use a shared-disk, fault-tolerant architecture specifically for their virtualized environments, while another 28% plan to deploy that architecture within 12 months. Twenty-two percent (22%) currently use a shared-nothing, replication architecture specifically for a virtualized environment, with another 27% are planning to implement it within 12 months.

Furthermore, 44% use a disk-based tiered storage system, while another 19% plan to deploy it within 12 months. Virtualization is clearly bringing the server and storage worlds together, a major shift from what has happened during the last 10 years.

## Chapter Three: Required Actions

Companies are virtualizing data centers to consolidate resources, reduce costs and improve utilization rates. Companies that have gained experience with virtualization recognize that the inherent flexibility it provides can also benefit their business continuity, high availability and disaster recovery objectives. Virtual machines can be moved around the company's network with greater flexibility.

Furthermore, multiple copies/sessions of these virtual machines can be saved at different locations to protect against disasters. However, careful planning and regular testing of the organization's IT system will be required to ensure that the new deployment delivers what is required. For companies trying to improve its BC, HA, and DR performance from Laggard to Industry Average, or Industry Average to Best-in-Class, the following actions will help spur the necessary performance improvements:

### Laggard Steps to Success

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- Move application servers into a flexible environment through the use of virtualization
- Deploy high availability and disaster recovery tools specific for virtualized server environments. Organizations with run-a-way mission critical applications may benefit from additional application level protection. Mission critical applications need special support and management
- Test the entire system regularly to ensure that the high availability and disaster recovery monitoring tools are functioning according to the company's SLAs, RPOs and RTOs

### Industry Average Steps to Success

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- Deploy a centrally-managed storage infrastructure with server and storage virtualization deployments to aid disaster recovery readiness and application performance
- Test data recovery and high availability solutions on regular basis to ensure that virtualized systems, DR, and HA processes are working properly
- Monitor and measure progress of SLAs, RPOs and RTOs to ensure that recovery goals for data and applications, business critical and others, will be achieved in the event of unplanned downtime or a disaster

#### Fast Facts

- √ **34%** of the overall survey respondents plan to use virtualization technology to support DR within the next 12 months
- √ **36%** plan to use virtualization to support a high availability strategy within the next 12 months
- √ **36%** plan to use virtualization to support a business continuity strategy within the next 12 months

## Best-in-Class Steps to Success

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- Establish a centralized managed group of IT personnel responsible for overseeing BC, HA and DR strategies in a more holistic manner to reduce redundancies and overlaps within the respective plans
- Test SLAs regularly to monitor RPOs and RTOs for various applications
- Take advantage of the organization's virtualized environment and regularly test and monitor the health and performance of the company's business continuity implementation

### Aberdeen Insights – Summary

Aggressive adoption of virtualization, particularly for server infrastructures, is making it one of the most disruptive technologies to hit the distributed systems market in recent years. Virtualization technology clearly has a lot to offer in helping business continuity: the ability to move resources in a more flexible manner is a key benefit in helping to cushion the blow of a disaster.

However, end users also must recognize that placing numerous virtual machines on one physical device also increases the chances of a single-point-of-failure, since the virtual machines still are tied to the physical device. That means HA and DR tools are just as important in the logical world as they are in the physical.

The adoption of various HA and DR tools for virtualized environments is certainly the next step for end users that have adopted virtualization. The area of HA and DR for virtualized infrastructures still is emerging and the tools for this area will be going through a maturation process in the coming months.

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## Appendix A: Research Methodology

In August and September 2007, Aberdeen Group examined the use of business continuity and virtualization in various industries. The survey attracted more than 300 respondents that have deployed virtualization for business continuity, high availability, and disaster recovery – or they are considering implementing the technology to support those plans. Responding executives and IT managers completed an online survey that included questions designed to determine the following:

- Identify companies that are using virtualization to support business continuity, high availability, and disaster recovery
- The business drivers behind server and storage virtualization deployments
- The structure and effectiveness of virtualization within server and storage environments
- Measure the benefits, if any, that have been derived from virtualization / business continuity initiatives

Aberdeen supplemented this online survey effort with telephone interviews with select survey respondents, gathering additional information on business continuity and virtualization strategies, experiences, and results. The study aimed to identify emerging best practices for business continuity and virtualization use, and to provide a framework by which readers could assess their own capabilities. Responding enterprises included the following:

- **Job title/function:** The research sample included respondents with the following job titles: senior management (CEOs, COOs, presidents) 13%; CIOs 7%; CFOs 2%; vice presidents 5%; directors 17%; managers 28%; staff 9%; consultants 13%; other 6%.
- **Industry:** The research sample included respondents from high technology / software 30%; telecommunications services 13%; computer equipment and peripherals 16%; finance / banking / accounting 13%; insurance / real estate / legal services 6%; transportation / logistics 5%; travel / hospitality / restaurant 3%; pharmaceutical manufacturing 3% and utilities 2%.
- **Geography:** The majority of respondents were from North America (45%). Remaining respondents were from Europe (28%); Asia / Pacific (17%); South / Central America and Caribbean (5%); and Middle East / Africa (4%).
- **Company size:** Small companies represented 40% of respondents (annual revenues under \$50 million); 11% of respondents are from firms with annual revenues between \$50 million to \$100 million; 8% have revenues of \$100 million to \$250 million; 9% have revenues of \$250 million to \$500 million; 8% have revenues of \$500 million to

\$1 billion; 8% have revenues of \$1 billion to \$2.5 billion; and 5% have revenues of \$2.5 billion to \$5 billion.

Solution providers recognized as sponsors of this report were solicited after the fact and had no substantive influence on the direction of this benchmark report. Their sponsorship has made it possible for Aberdeen Group to make these findings available to readers at no charge.

**Table 4: The PACE Framework Key**

### Overview

Aberdeen applies a methodology to benchmark research that evaluates the business pressures, actions, capabilities, and enablers (PACE) that indicate corporate behavior in specific business processes. These terms are defined as follows:

**Pressures** — external forces that impact an organization's market position, competitiveness, or business operations (e.g., economic, political and regulatory, technology, changing customer preferences, competitive)

**Actions** — the strategic approaches that an organization takes in response to industry pressures (e.g., align the corporate business model to leverage industry opportunities, such as product/service strategy, target markets, financial strategy, go-to-market, and sales strategy)

**Capabilities** — the business process competencies required to execute corporate strategy (e.g., skilled people, brand, market positioning, viable products/services, ecosystem partners, financing)

**Enablers** — the key functionality of technology solutions required to support the organization's enabling business practices (e.g., development platform, applications, network connectivity, user interface, training and support, partner interfaces, data cleansing, and management)

Source: Aberdeen Group, September 2007

**Table 5: The Competitive Framework Key**

### Overview

The Aberdeen Competitive Framework defines enterprises as falling into one of the following three levels of practices and performance:

**Best-in-Class (20%)** — Practices that are the best currently being employed and significantly superior to the Industry Average, and result in the top industry performance.

**Industry Average (50%)** — Practices that represent the average or norm, and result in average industry performance.

**Laggards (30%)** — Practices that are significantly behind the average of the industry, and result in below average performance

In the following categories:

**Process** — What is the scope of process standardization?

What is the efficiency and effectiveness of this process?

**Organization** — How is your company currently

organized to manage and optimize this particular process?

**Knowledge** — What visibility do you have into key data

and intelligence required to manage this process?

**Technology** — What level of automation have you used to

support this process? How is this automation integrated

and aligned?

**Performance** — What do you measure? How frequently?

What's your actual performance?

Source: Aberdeen Group, September 2007

**Table 6: The Relationship Between PACE and the Competitive Framework**

### PACE and Competitive Framework How They Interact

Aberdeen research indicates that companies that identify the most impactful pressures and take the most transformational and effective actions are most likely to achieve superior performance. The level of competitive performance that a company achieves is strongly determined by the PACE choices that they make and how well they execute.

Source: Aberdeen Group, September 2007

## Appendix B: Related Aberdeen Research

Related Aberdeen research that forms a companion or reference to this report include:

- [Data Recovery Management: Are You Ready? August 2007](#)
- [Justifying the Cost of Uptime: Server and Storage Virtualization March 2007](#)

Information on these and any other Aberdeen publications can be found at [www.Aberdeen.com](http://www.Aberdeen.com).

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