

WHITE PAPER

Backup and Recovery Changes Drive IT Infrastructure and Business Transformation

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EXECUTIVE SUMMARY

This IDC White Paper provides an overview of the forces driving change within today's IT organizations and datacenters and specifically discusses how backup and recovery can enable or hinder broader IT infrastructure and business transformation. Through product innovation and vision, EMC is helping firms accelerate the transformation of legacy backup processes so that they can realize broader IT and business objectives sooner and position themselves for the future.

IT TRANSFORMATION AND THE CHANGING DATACENTER

Datacenters are undergoing significant transformation in the way IT is procured, managed, and delivered. IT executives and administrators are under pressure to respond to new sets of business requirements and expectations. They must reduce capital and operational expenditures and develop more predictable processes as well as deliver more and better services to an increasingly diverse set of users.

Business and IT Trends Impacting Backup and Recovery

A number of key trends are having a profound impact on infrastructure in today's datacenters and are influencing how firms handle backup and recovery as well as manage their data and information. These trends, which can be seen from both a business perspective and an IT infrastructure perspective, include:

- ☒ **IT as a service.** IT and business executives alike aspire to an end state of running IT as a service, where IT provides the highest business value at the lowest possible cost, leveraging all the benefits of a cloud infrastructure. With a highly automated, low-maintenance cloud infrastructure in place, IT can focus on delivering innovations that drive revenue growth, enhance the customer experience, and minimize business and compliance risk. With IT as a service, each IT service is fully defined in terms of its components, resources, and delivery guarantees. Business units can select and obtain resources through a standardized and automated self-service catalog or on demand. This reduces provisioning time to a fraction of what it once was. Lines of business are expensed for IT services via transparent chargeback and detailed reporting. Backup and recovery (both operational and disaster recovery) is embedded within the service catalog and presented in the context of recovery time objectives and recovery point objectives.

- ☒ **Big data.** Customers are adopting new approaches to Hadoop-style analytics when searching for patterns in transactional or unstructured data. The traditional IT organization needs to respond by applying the same level of reliability, protection, retention, and availability to Hadoop-style deployments as it has applied to traditional workloads. Firms are trying to develop policy-driven backup and recovery and archive strategies for both Hadoop inputs and results sets.
- ☒ **Converged infrastructure.** Today's IT professionals spend substantial time doing onsite systems integration work. The convergence of once separate technology components can aid in procurement, deployment, and ongoing management but must be integrated into datacenter operations. This includes backup and recovery, disaster recovery, and archiving.
- ☒ **Cloud computing.** Cloud computing is being leveraged for inside-the-enterprise private clouds — and for connections to public or "hybrid" clouds combining public and private cloud computing resources. However, cloud in all forms must ensure security, backup and recovery, and information management approaches that meet business-level SLAs while satisfying IT operational cost objectives.
- ☒ **Infrastructure consolidation.** Many large corporations, driven by economic factors, international expansion, and legacy datacenter constraints (e.g., power, cooling, space), have embarked on consolidation initiatives. Firms have consolidated and reduced datacenter numbers and leveraged server virtualization to increase efficiency, reduce footprint, and enable mobility. However, as virtual server environments grow, protecting virtual machines becomes a key consideration. Current backup environments can actually stall virtualization plans and limit benefits.
- ☒ **Social media and mobility.** IT organizations are being chartered with not only supporting internal projects to address and mine social media-generated data but also centrally controlling employee and corporate use of social tools. Increasingly, firms must have a strategy for how they protect, archive, and mine social data. The explosion of new client devices in the workplace, chiefly smartphones and tablets, is allowing widespread access to important business applications and data. IT organizations must respond to the "bring your own device" (BYOD) phenomenon by providing secure access to corporate data — and controlling actions that line-of-business users can take from these new corporate networked devices. Backup and recovery, as well as management, plays a huge role in how firms effectively enable employee productivity while mitigating corporate risk.

BUSINESS BENEFITS OF BACKUP AND RECOVERY TRANSFORMATION

Today's business trends are driving a series of evolutionary changes in the way firms back up and recover data. Firms that continue to rely on tape or traditional client/server backup infrastructures can expect to see longer backup windows and recovery times, higher infrastructure costs and operational overhead, as well as the potential for data loss. For these firms, backup can become a bottleneck, hindering

business initiatives. Leveraging the wrong backup and recovery approach can cause firms to put off application and OS upgrades, infrastructure upgrades, or virtualization plans because of concerns about meeting backup windows or providing acceptable recovery SLAs.

However, with the right backup and recovery approach, firms not only can improve backup and recovery speeds but also can accelerate and improve important IT initiatives, which have clear business value. For example, they can:

- ☒ **Expand virtualization across the datacenter.** Because of technology and scale limitations, legacy backup and recovery approaches may stymie the number of virtual machines that can be protected in parallel. However, new backup and recovery approaches can help firms accelerate and virtualize more workloads, including tier 1 applications, while providing highly efficient backup and comprehensive recovery. This not only can translate into greater IT efficiency but also can help firms extend virtualization across their business environments.
- ☒ **Create a central backup repository and scale efficiently.** Firms face, on average, a doubling of data annually. With such data growth, traditional backup and recovery clearly is running up against the laws of physics. Newer approaches that include deduplication, changed block tracking, and faster mechanisms for moving data to secondary storage targets, for example, help minimize business interruption in the event of data loss and improve overall productivity.
- ☒ **Integrate backup and recovery products and approaches.** Most firms have a myriad of front- and back-end backup and recovery approaches in place in the datacenter, as well as a multitude of solutions in remote offices or endpoints. This can create enormous management and efficiency issues, which can derail business initiatives. Consolidating the front end and the back end can reduce capital and operational costs by helping firms "rightsize" IT budgets and project bandwidth, scale storage resources more efficiently, and minimize business interruptions. Backup and recovery solutions that tightly integrate software and storage (e.g., purpose-built backup appliances) not only improve performance but also simplify day-to-day management and support. Enabling secondary storage consolidation also requires functions such as federated management, storage virtualization, and API integration.
- ☒ **Provide a foundation for delivering IT as a service.** IT organizations are trying to move to a services model whereby customers choose IT services from a catalog of services via self-service portals. To do this, IT needs a platform on which to build these services and backup and recovery processes to support business demands (e.g., SLAs). IT organizations must also offer dashboards for reporting on service-level metrics as well as chargeback or showback capabilities.

TRANSFORMATION OF DATA BACKUP AND RECOVERY INFRASTRUCTURE, PROCESSES, AND PEOPLE

Trends impacting today's datacenters are driving the opportunity for firms to transform their backup and recovery environments. This type of transformation spans data protection infrastructure, people, and processes — with the objective of increasing IT agility and competitive advantage while lowering costs.

Infrastructure Transformation

Traditional tape-based data protection infrastructures simply cannot keep up with organizational demands — IT or business. The majority of datacenters either currently use or plan to use some type of disk-based backup appliance and data movement technologies to streamline backup and recovery processes to enable business initiatives. Tape use continues to decline steadily, and integrated backup approaches continue to gain momentum with firms.

IDC research on backup and recovery highlights the following trends:

- ☒ The use of disk for backup and, specifically, backup appliances (what IDC calls purpose-built backup appliances [PBBAs]) is increasing. These systems are being deployed because of features such as NFS/CIFS, deduplication, compression, tape emulation, and native remote replication and encryption, which can dramatically improve backup and restore times while reducing operating and capital costs.
- ☒ Replication, snapshot, and mirroring are being used to improve availability and to improve recovery from physical and logical errors. The ability to create snapshots more frequently than a nightly backup has also provided a more granular recovery point. Lastly, snapshots are often repurposed for other cases, including reporting, analytics, archive, etc.
- ☒ Cloud-based backup is being leveraged by firms as a more secure mechanism for offsite disaster recovery as well as a way to protect distributed data on endpoints, on PCs, and in remote and branch offices. Increasingly, more firms are looking to leverage cloud storage and/or object-based storage architectures as a longer-term backup tier.

Process and People Transformation

Today, database, virtual infrastructure, application, storage, and traditional backup administrators have the ability to run their own backups. Database administrators, for example, can do their own backups and recoveries using Oracle Recovery Manager (RMAN) without involving backup teams. In addition, virtual server administrators can initiate self-service file-level recovery for objects within an image-based backup.

While distributed backup and recovery environments give data owners considerable flexibility and can even reduce the workloads of backup administrators, adoption is often limited because of tape-based infrastructures and conflicts between IT and backup teams. Essential to this approach are centralized control and policy for distributed backup and recovery processes. When the backup team works with other

IT teams, data owners gain visibility into and control of backup and recovery, and users gain confidence that their data is being protected. Firms can roll out new applications, provision more virtual machines, or start new projects safely and easily. This flexibility elevates the discussion of backup and recovery within organizations and can translate into competitive advantage and faster time to service.

With the next stage of evolution of backup and recovery, firms must ensure that they have adequate levels of centralized storage control for distributed backup and recovery tasks. These controls should include role-based access, reporting visibility, monitoring, centralized policy control through service catalogs, and SLA assurance. Increasingly, leading IT organizations must seek to improve workflows when provisioning new applications and virtual machines or managing applications while mitigating unnecessary risk and ensuring compliance with datacenter and IT standards.

The new backup and recovery model lays the foundation for organizations to deliver backup as a service, providing value-added services such as chargeback, security, compliance, etc. This type of catalog of services provides real benefits and turns backup and recovery into a true business enabler.

GUIDANCE ON DATA BACKUP AND RECOVERY TRANSFORMATION

This is not to suggest that backup and recovery must always be performed from a centralized environment. Indeed, the ability to allow data or application owners to perform their own backup and recovery-related tasks can be very valuable for many organizations because the application may be an excellent source for tracking data changes. Some applications, for example, are offering built-in capabilities such as changed block tracking for both backup and recovery (e.g., VMware) and RMAN block change tracking (e.g., Oracle databases) to expose data changes to the backup software.

Clearly, there are benefits to allowing data or application owners to perform some backup and recovery tasks. However, organizing backup and recovery at this level without losing control or visibility within the datacenter is essential. With this in mind, backup administrators should:

- ☒ Get ahead of rapid changes within the organization by understanding what new applications are coming online and which systems are in the queue to be virtualized.
- ☒ Identify backup and recovery stakeholders across the organization or even within lines of business.
- ☒ Stay flexible. Work with stakeholders to understand their current data protection needs while helping them understand the benefits of transforming backup. Taking control can be an important way to transform your environment, but don't forget that data owners and application administrators are accustomed to being the masters of their domains. Ultimately, helping lead transformation within an organization can also help individuals improve their own environments.
- ☒ Think beyond backup and recovery. The benefits of transformation extend well beyond the datacenter — enabling your organization to quickly adapt to new business models and providing new value to the business.

EMC'S APPROACH TO BACKUP AND RECOVERY TRANSFORMATION

EMC understands the importance of backup and recovery transformation to an organization's future and has been vocal about the people *and* process changes that must accompany physical infrastructure changes. EMC has illustrated its thought leadership within the backup and recovery domain through its dominance and market position with PBBA systems, its breadth of intellectual property for deduplicating backup and archive data, and its tight integration with virtual machine hypervisors for image-level data protection.

From a product standpoint, EMC has focused on continued innovation in several areas:

- ☒ **Deduplication.** Data Domain and Avamar appliances enable deduplication to occur at multiple points within the backup path, reducing network traffic and infrastructure costs as well as power, cooling, and floor space requirements. Further, Data Domain Boost technology allows users to spread the deduplication process across the data path to enable performance improvements beyond the inherent I/O gains achieved when moving to disk-based data protection appliances. This integration streamlines backup and recovery processes and optimizes tasks across the backup path. Also, Data Domain Boost for Oracle RMAN allows for more efficient backup and recovery of Oracle databases by giving Oracle administrators direct control of Oracle backup and disaster recovery processes.
- ☒ **Management and orchestration.** Improving visibility and role-based control of backup and recovery tasks by application owners and virtual machine administrators helps improve business agility and enables firms to better support IT as a service, converged infrastructure, and private cloud initiatives. This includes integration of these tasks directly from within the application or unified management interfaces.
- ☒ **Integration.** Integration is key to assured application consistency. Application integration ensures an application-consistent (versus crash consistent) recovery of a specific workload and also allows backup and recovery functions to be performed directly from a given application management framework. Avamar and NetWorker integrate with all leading applications and databases to address these requirements. Additionally, these EMC applications integrate with VMware vStorage API for Data Protection, Microsoft VSS, Oracle RMAN, and SAP BR*Tools.

EMC's approach helps firms address not only current infrastructure sprawl but also further splintering of the backup landscape caused by a shifting infrastructure. EMC's investment in each of the previously mentioned areas — as well as the company's efforts in consolidating storage infrastructures to a common platform; providing optimal connections across applications, hypervisors, and storage; and delivering unified management through backup applications and other management consoles — is key to building the flexible foundation firms need to support, adapt to, and maximize business initiatives.

EMC commands the open systems PBBA segment, holding 71% market share for the period 1Q12.¹ The total PBBA market achieved \$2.8 billion in spending in 2011 and is forecast to grow at a compound annual growth rate of 19.4% from 2011 to 2016. With EMC's breadth of offerings in the data protection and recovery software market, EMC enjoys a 13.6% market share with software alone and has gained market share over the past several years. From a thought leadership position, EMC continues to differentiate itself not only in its message ("Accelerating Transformation with Smarter Backup") but also in its thought leadership around the IT process changes that must accompany any product deployment. Further, the company has been much more vocal about its portfolio strategy than it used to be and is making good strides in integrating its product families and improving management capabilities while continuing to provide advanced functionalities.

CHALLENGES

The single biggest challenge that both the industry at large and EMC face is dealing with infrastructure sprawl. On average, firms are using four to five different backup and recovery tools (e.g., snapshot, native application tools, replication software, backup software, archiving software) independent of each other, even though they may leverage the same source data. Thus, many different types of copies of the same data exist. This creates inefficiencies across infrastructure, people, and processes.

To address this challenge, EMC is offering a new and transformative backup and recovery model that lays the foundation for organizations to eliminate this cost and process inefficiency as well as deliver value-added services, such as chargeback, security, and compliance, for real business benefit.

At the heart of the model are EMC's deduplication storage systems and software (e.g., Data Domain, Avamar, and NetWorker). However, because process and people changes are also integral to its approach, EMC continues to advance integration (within its own product families and with business applications and the infrastructure layer) and educate users about the importance of backup teams working closely with storage, application, and virtualization owners.

CONCLUSION

Backup and recovery transformation — across infrastructure, people, and processes — has material business and operational impacts on how data is protected, made available, and recovered. This transformation at the backup and recovery level is driving broader IT infrastructure and business transformation.

EMC is the leader in the backup appliance (or PBBA) market segment, which encompasses deduplication, backup software integration, tape emulation, and remote replication. By helping firms accelerate the transformation of legacy backup processes, the company is effectively enabling IT organizations to adopt broader IT objectives, including expanding virtualization efforts, supporting structured data

¹ IDC's Worldwide PBBA Tracker 1Q12

growth, facilitating data analytics, and providing a foundation for running IT as a service as well as other strategic corporate plans.

EMC's success in backup and recovery is due in large part to the company's early recognition of key industry trends and willingness to embrace these trends by aggressively evolving its offerings through a combination of organic innovation and strategic acquisitions. This approach — combined with EMC's strong position in the market (storage, virtualization, alliances), PBBA leadership position, and product vision — has allowed EMC to emerge as a leader in accelerating backup and IT transformation.

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