TOWARDS THE ULTIMATE GOAL OF IT RESILIENCE

A LOOK AT THE ZERTO CLOUD CONTINUITY PLATFORM

SEPTEMBER 2016

THE NET NET

We live in a digital world where online services, applications and data must always be available. Yet the modern data center remains very susceptible to interruptions. These opposing realities are challenging traditional backup applications and disaster recovery solutions and causing companies to rethink what is needed to ensure 100% uptime of their IT environments.

The need for availability goes well beyond recovering from disasters. Companies must be able to rapidly recover from many real world disruptions such as ransomware, device failures and power outages as well as natural disasters. Add to this the dynamic nature of virtualization and cloud computing, and it's not hard to see the difficulty of providing continuous availability while managing a highly variable IT environment that is susceptible to trouble.

Some companies feel their backup devices will give them adequate data protection and others believe their disaster recovery solutions will help them restore normal business operations if an incident occurs. Regrettably, far too often these solutions fall short of meeting user expectations because they don't provide the rapid recovery and agility needed for full business continuance.

Fortunately, there is a way to ensure a consistent experience in an inconsistent world. It's called IT resilience. IT resilience is the ability to ensure business services are always on, applications are available and data is accessible no matter what human errors, events, failures or disasters occur. And true IT resilience goes a step further to provide continuous data protection (CDP), end-to-end recovery automation irrespective of the makeup of a company's IT environment and the flexibility to evolve IT strategies and incorporate new technology.

Intrigued by the promise of IT resilience, companies are seeking data protection solutions that can withstand any disaster to enable a reliable online experience and excellent business performance. In a recent Taneja Group survey, nearly half the companies selected "high availability and resilient infrastructure" as one of their top two IT priorities. In the same survey, 67% of respondents also indicated that unplanned application downtime compromised their ability to satisfy customer needs, meet partner and supplier commitments and close new business.

This strong customer interest in IT resilience has many data protection vendors talking about "resilience." Unfortunately, many backup and disaster recovery solutions don't provide continuous data protection plus hardware independence, strong virtualization support and tight cloud integration. This is a tough combination and presents a big challenge for data protection vendors striving to provide enterprise-grade IT resilience.

There is however one data protection vendor that has replication and disaster recovery technologies designed from the ground up for IT resilience. The Zerto Cloud Continuity Platform built on Zerto Virtual Replication offers CDP, failover (for higher availability), end-to-end process automation, heterogeneous hypervisor support and native cloud integration. As a result, IT resilience with

continuous availability, rapid recovery and agility is a core strength of the Zerto Cloud Continuity Platform.

This paper will explore the functionality needed to tackle modern data protection requirements. We will also discuss the challenges of traditional backup and disaster recovery solutions, outline the key aspects of IT resilience and provide an overview of the Zerto Cloud Continuity Platform as well as the hypervisor-based replication that Zerto pioneered.

BACKUPS WITH MANUAL RECOVERY DOES NOT DELIVER DISASTER RECOVERY

Data backup occurs when data is copied from one device to another device. Tape drives, backup appliances and even USB drives provide data backup. Backup satisfies the requirement to have a copy of your data in another place – but that's about it.

The mistake many companies make is not fully understanding how Recovery Point Objectives (RPOs) and Recovery Time Objectives (RTOs) can impact a recovery scenario. RPO is the point in time you can recover to in the event of an incident. RTO is the duration of time within which a service level or business process must be restored after an incident occurs in order to achieve an acceptable break in business continuity.

Most companies have snapshots and disk-based backups to reduce RPOs. However, the real impact to a company's business is RTO since a company can't return to normal business operations until data is completely restored and systems are fully operational.

If a company lacks a DR solution, and therefore relies on manual recovery methods, their RTOs are not surprisingly almost always intolerable in today's world where people have little patience and real-time expectations. For example, if a company rebuilds their environment from tape, this process could take days or weeks. This is not a valid DR strategy – the company will be out of business and most likely, the IT manager will be out of a job.

TRADITIONAL DR SOLUTIONS FALL SHORT OF TRUE BUSINESS CONTINUANCE

DR as function goes beyond backup to provide the ability to recover servers, applications and files and maintain data consistency in the event an incident such as an accident, failure or disaster occurs. Disaster recovery as a process is well understood, but traditional DR solutions often fall short of recovery expectations because they lack CDP and recovery automation designed for virtual environments. Shortcomings that have the greatest impact are below.

DR technologies designed to protect physical servers use storage based replication, which means replication is configured on a disk/LUN basis requiring matching storage and LUN configurations. This approach often means no VM-level granularity and poor virtual awareness, so VM shifts and IP changes can interfere with automated recovery processes.

Some storage vendors integrate with APIs, (such as VMware Virtual Volumes (VVols)) to provide more VM-level granularity, however these APIs introduce complexity and still mask limitations that can break automation in virtual environments. Alternatively, DR solutions may provide separate software for VM orchestration, but this can add complexity as well. Other vendors provide VM-based replication, but look closely, they may require an agent inside the guest OS of each VM, which uses OS and VM resources.

Snapshots are commonly used for replication, but this method of copying data can impact application performance. RPOs are typically measured in minutes or hours (versus seconds) and RTOs are often measured in hours or even a day due to manual procedures and complex recovery processes.

Finally, enterprises are often locked into proprietary backup appliances or storage hardware that constrains their ability to evolve IT operations and optimize costs. The business impact of an inadequate DR solution can be very significant. A gap of 4-8 hours can result in 10s of thousands of dollars in lost productivity and several 100 thousand or millions of dollars in lost revenue if the interruption leads to a lost partner or customer.

KEY ASPECTS OF IT RESILIENCE

The main goal of IT resilience is delivering a consistent brand (employee, partner, customer) experience. Online services must be always on, applications available and data accessible no matter what type of incident occurs, including human error, ransomware, power outages, system failures, building damage and natural disasters. For example, if banking customers need to access online accounts and the website isn't available do to a system failure, there is an immediate impact on customer convenience and a lasting impact to the company's reputation, which impacts the company's brand, customer satisfaction and ultimately customer retention and revenue.

Moreover, the most effective backup and disaster recovery solutions provide CDP and end-to-end recovery automation irrespective of the makeup of a company's IT environment. This means a secondary and equally important goal of IT resilience is delivering a consistent brand experience "in an inconsistent environment," which requires continuous uptime no matter what changes occur to hardware and/or what variability takes place within virtual domains and/or cloud services. Below we have summarized the main aspects, capabilities and benefits of IT resilience.

Aspects	Main Capabilities	Benefits
Availability	• Continuous Data Protection • RPOs measured in seconds • RTOs measured in minutes	• Avoid data loss • Rapidly restore operations • Maintain brand reputation
Awareness	• VM-centric replication • Real-time virtual domain monitoring • Native public cloud support – Amazon Web Services(AWS) and Microsoft Azure as a minimum	• Easier management and consistent application performance • Adjust to variability and self-healing process automation • Seamlessly migrate workloads
Automation	• Selectable recovery objectives • Prioritization based on the tiers and Service Level Agreements (SLAs) • DR testing based on automated, non-disruptive workflows	• Automated replication of multiple data tiers • Accommodate extensive data change and avoid lengthy scheduled replication on evenings/weekends
Agility	• Hardware independence • Heterogeneous hypervisor support • Multi-cloud support	• Incorporate new technologies • Evolve IT strategies • Optimize costs
Extensibility	• RESTful APIs • Integration with directories (AD and LDAP) for authentication • Pre-packaged integrations	• Enable automation across platforms • Ensure compliance and secure authentication • Build seamless workflows

ENTERPRISE-GRADE IT RESILIENCE WITH ZERTO CLOUD CONTINUITY PLATFORM^{TM}

In today's modern virtualized data centers, IT must ensure continuous availability across their entire IT infrastructure. IT groups need continuous data protection and end-to-end recovery automation irrespective of the makeup of a company's IT environment. Providing this versatile data protection necessitates enterprise-grade IT resilience powered by CDP, strong virtual awareness, high availability, clustering support, and the ability to locate and replicate volumes in motion as well as tight cloud integration and hardware independence.

IT resilience also requires policy-based automation, consistency groups, journal support, granular file recovery, role-based access controls and a robust API. The Zerto Cloud Continuity Platform offers all these features. We have highlighted the crucial capabilities below.

The core strength of the Zerto Cloud Continuity Platform is Zerto Virtual Replication described in the adjacent sidebar. This heterogeneous hypervisor replication approach is "environment agnostic," which avoids lock-in and enables evolution of IT strategies that support any combination of private, public or managed clouds that meet SLAs. This independence also removes barrier to innovation by facilitating the adoption of new technologies, but most importantly it enables easy workload migration in enterprise data centers that utilize different hypervisors and multiple cloud services. Imagine seamlessly moving workloads between vSphere and AWS. This has always been possible in one off scenarios that are cumbersome, but Zerto now offers the real possibility to have all the "goodness" of AWS as well as private cloud security and control when it's needed.

Zerto's end-to-end process automation, exemplified by policy-based orchestration, is also important given the need for rapid data recovery. Companies can operationalize DR with protection groups that use common policies across the entire data lifecycle to fully automate replication, failover and recovery. Selectable recovery objectives and prioritization allows automated replication of multiple data tiers to accommodate extensive data change and avoid lengthy scheduled replication on evenings and

ZERTO VIRTUAL REPLICATION

Zerto's pioneered a patent-pending hypervisor-based replication approach to transform replication and recovery in virtual environments. This approach moves replication up the stack from the storage layer into the hypervisor to provide hardware agnostic replication with deep virtual domain awareness.

Zerto Virtual Manager plugs directly into the virtual management console (vCenter and System Center Virtual Machine Manager) to provide centralized management and keep track of all changes in the virtual domain (such as vSphere) – this is the only replication approach that allows virtual machine movement from one physical server or array logical unit (data store) to another, while maintaining full replication.

Zerto's Virtual Replication Appliance is installed directly inside the virtual infrastructure and taps into a virtual machine's IO stream to provide continuous data protection (CDP) that tracks block level changes with no latency and zero impact on application performance, which enables RPOs in seconds. This fully automated and orchestrated process also delivers RTOs in minutes.

Replication supports every virtual entity (single virtual machine, a group of virtual machines, and consistency groups for multi-tier applications such as CRM solutions.

weekends as well as enabling unobtrusive DR testing so companies can routinely run DR tests during business hours to increase confidence in DR processes. The importance of operationalizing DR processes should be emphasized. In a recent Taneja Group survey, 40% of companies indicated that manual, error-prone DR processes and the inability to test DR plans often jeopardize a company's

ability to rapidly and reliably recover from extended outages resulting from disasters or other major disruptions.

A key Zerto capability is Zerto's Journal. The Journal supports granular file level recovery and supports compression (for both data in transit and at rest) and most importantly with the Journal IT administrators can easily rewind to any point in time as far back as 30 days. For some companies, a one-month time period probably meets their backup needs. For other companies that want longer retention periods, Zerto offers Zerto Virtual Replication offsite backups and Windows Server 2012 deduplication for a software-only data archival solution.

Finally, adding to Zerto's versatility is the fact that customers of the Zerto Cloud Continuity Platform have multiple deployment options. Zerto provides cost-effective cloud-based replication for productivity-centric apps and an appliance plus cloud replication for business critical workloads.

TANEJA GROUP OPINION

For decades as an industry we have been working on improving backup methods for data protection. We went from tapes to disk, we introduced virtualization, we added analytics and a variety of other technologies to make backup faster and more reliable. Then we shifted our emphasis to recovery. How fast can we recover after a failure occurs? How can we improve RTO and RPO? In parallel we looked at the way we conducted disaster recovery. Can we reduce costs and thereby enable more than the top 10% of the applications to be protected in case of a disaster? Can we make DR more reliable so we know it will work exactly when we need it? Then with the advent of the cloud we started wondering if a second location may not be necessary for DR at all? And so on. To be fair, we have made significant advances in all these areas in the past decade.

But the ultimate dream is not fast back and better DR—the ultimate dream is IT resilience. That means doing everything possible to keep applications running and data available so the business never stops. That is what matters. Who cares how we achieve it? Backup and DR are negative concepts where IT resilience conjures up images of business enhancement, mobility, agility and improved customer service. Instead of being an expensive insurance policy, it becomes a business improvement concept.

IT resilience is the vision that Zerto has had since its inception. It focuses on ensuring systems and data don't fail in the first place but if they do then they return to the recovered state in seconds and minutes, rather than hours and days, or worse. To be sure, keeping applications up and running, regardless of component failures or human error or application hiccups requires technologies on the primary side that Zerto has to rely on (clustering, virtualization, encryption, etc.) and it works with all the major technologies in the industry. Their focus has been microscopically on the secondary storage side. By using concepts of CDP, performing replication at the hypervisor level for VM awareness and sub-VM granularity, and a variety of other technologies, Zerto has enabled one of industry's finest solution that brings us closer to the ultimate aim for 100% IT resilience, where systems and data never fail. It uses the public or private cloud as a partner in crime to enable such IT resilience, while reducing costs. Of course, IT resilience is the ultimate goal. Zerto comes closer to achieving it today than any other vendor in the industry.

So we encourage the reader to ask what is important to them. Is it backup? Or is it recovery? Or is it DR? Or is it IT resilience at the end of the day? If it is indeed IT resilience, then we encourage the reader to flip their thinking upside down and start looking at all technologies presented to them through this lens. We venture to say Zerto will be a candidate for major consideration in that quest for IT resilience.