



# The 3-2-1 Data Protection Rule and Hybrid Cloud Backup

*IT teams are under extreme pressure to improve backup, disaster recovery and data protection to eliminate downtime and facilitate digital transformation. Many IT leaders are embracing modern Availability solutions to implement the 3-2-1 data protection rule as a best practice. This article describes how organizations can leverage the combination of storage snapshots, Availability software and hybrid cloud to cost-efficiently modernize data protection and recovery to enable the Always-On Enterprise™.*

## Introduction

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As organizations of all sizes continue to embrace digital transformation, the cost of downtime is becoming more critical than ever. The average cost of unplanned downtime reached \$8,851 per minute in 2016 and the average data center outage now costs more than \$730,000, according to research from the Ponemon Institute, which has been tracking downtime costs since 2010. The cost of downtime has increased by 38% in that time period, with the maximum downtime costs growing by a staggering 81%—to the point where costs now exceed more than \$2.4 million per event, according to the 2016 study.<sup>1</sup>

Dollar costs and lost revenue tell only part of the Availability story in today's era of the Always-On Enterprise™. When applications and business services are not available, the entire business suffers. Downtime has a negative impact on customer goodwill, brand reputation, credibility, trust and employee morale. Nearly 70% of IT decision makers say that confidence in the organization suffers with unplanned downtime, and 62% say brand reputation suffers, according to the 2016 Veeam Availability Report.<sup>2</sup>

IT teams need ways to ensure that they can deliver maximum data protection and application Availability. Many organizations are still struggling to accomplish these goals: 84% of IT decision makers say they suffer from an Availability Gap, according to the Veeam study, meaning they would like to improve backup and recovery times and do a better job of mitigating the costs and risks of unplanned downtime and the potential loss of critical business data.<sup>3</sup>

## Best Practices: The 3-2-1 Data Protection Rule

For many organizations, the answer to closing the Availability Gap is to embrace the 3-2-1 data protection rule, which is:

- 3: Maintain at least three copies of your data and applications.** This would be your production copy and two backups. If your production copy and primary backup copy become unavailable, you can still recover from your third copy.
- 2: Store your data on at least two different types of storage media. Each media type has its own vulnerabilities.** By using two different types of storage, such as disk and tape, you can reduce your exposure to a single incident, such as ransomware, preventing access to your critical data.
- 1: Keep one of the backups in an off-site location.** If all of your copies are in the same location, they can all be affected by a major event such as a fire or other natural disaster.

<sup>1</sup> ["Emerson Network Power Study Says Unplanned Data Center Outages Cost Companies Nearly \\$9,000 Per Minute"](#) Emerson Network Power and Ponemon Institute, Jan. 16, 2016

<sup>2</sup> ["2016 Veeam Availability Report: How to close a widening Availability Gap,"](#) Veeam, Feb. 17, 2016

<sup>3</sup> Ibid, footnote #2

For IT decision makers, the challenge is not a lack of awareness of the 3-2-1 data protection rule, but how to implement it without creating additional IT costs and complexity. This challenge can be mitigated by two important factors:

- **Leveraging the cloud as a low-cost option for protecting data off-site.** The relatively low cost of cloud storage and the simplicity of consuming resources in the public cloud make hybrid cloud an attractive option for backup and recovery.
- **Leveraging existing investments in modern storage.** By using technologies that are integrated within the existing storage infrastructure, IT teams can reduce risk, lower costs and simplify IT operational management.

## Modern Storage and Integrated Application Availability

One of the critical aspects of leveraging existing investments to improve Availability is the growing use of all-flash storage for virtualized application workloads. The all-flash storage market is growing at a compound annual rate of more than 24% a year, according to IDC, and will account for more than 70% of all primary storage spending by the end of the decade.

In addition to delivering performance gains, one of the advantages of certain flash storage arrays, such as those from NetApp, is the ability to provide point-in-time storage snapshots to improve Availability. With snapshots, an organization can rapidly, non-disruptively and very efficiently create a secondary image of data to facilitate fast recoveries of virtual machines, application images and files.

However, it is important to remember that even though snapshots can provide for very low recovery point objectives (RPOs) and recovery time objectives (RTOs), their use does not eliminate the need to follow the 3-2-1 data protection rule. Even with snapshots, you have to make sure that the data is also stored on a secondary storage resource to protect against an array-based failure. In addition, the data needs to be copied to an off-site data center or the cloud to protect against a site failure.

There are additional challenges involved in leveraging snapshots to strengthen Availability. Legacy data protection technologies are often not well suited to address the Availability needs of highly virtualized modern data centers. These data protection solutions are typically agent-based, which requires deploying an agent on the hypervisor or guest operating system. This can be problematic on two levels:

- It creates additional management complexity and overhead.
- It increases risk because agent patches and updates can contain bugs that prevent backups from taking place.

In addition, some legacy solutions do not provide direct integration with the storage vendor's snapshot tools. This adds complexity and risk because it requires that administrators perform manual tasks, including writing or managing scripts, to orchestrate the movement of snapshot copies to backup storage resources.

## Leveraging Integrated 3-2-1 Protection for the Modern Data Center

The answer to overcoming these challenges is to upgrade your data protection infrastructure when investing in modern storage solutions. If you continue to use agent-based legacy data protection tools that don't integrate with virtualized servers and storage snapshot infrastructure, it will be much more difficult to implement and adhere to the 3-2-1 data protection best practices.

The key is to use application Availability software that has been designed to integrate with server hypervisors such as VMware vSphere and Microsoft Hyper-V and directly integrates with modern storage snapshot tools, such as those available on the NetApp ONTAP operating system.

With the right Availability software, organizations can lower IT costs, simplify IT operational management and enhance application RPOs and RTOs in the following ways:

- **Orchestrate the movement of storage snapshots to lower-cost secondary backup storage resources** (disk and tape) on premises, in a secondary data center or the cloud. This allows organizations to leverage multiple storage tiers for improved efficiencies, better performance and enhanced data Availability—while also attaining 3-2-1 data protection.
- **Leverage existing investments in flash-based storage snapshots for instant VM recoveries without disrupting any other virtualized workloads.** Your Availability software should allow you to perform instant VM recoveries on primary or secondary storage resources in any location, on physical flash-based storage appliances or on software-defined storage platforms utilizing cloud-based infrastructure.
- **Achieve granular file- or item-level recoveries** directly from storage snapshots, including the ability to rapidly recover application images or files directly from flash-based or disk-based snapshots.
- **Improve backup and recovery operations and performance** by combining the very low RPO capabilities of storage snapshots with the very low RTO enablement capabilities of Availability solutions that automate application data recovery.

## Deploying the right solution

IT teams can deploy a simple and cost-efficient solution to leverage point-in-time storage snapshots and facilitate 3-2-1 backup and disaster recovery best practices in hybrid cloud environments. The solution is to use NetApp enterprise storage solutions in conjunction with the Veeam Availability Suite.

The Veeam Availability Suite directly integrates with the NetApp ONTAP operating system and works hand-in-glove with NetApp storage snapshots to give IT teams a simple and efficient way to orchestrate and manage the Availability of critical business workloads across hybrid cloud environments.

Veeam helps simplify the management of NetApp storage snapshots by orchestrating the movement of snapshot copies to backup repositories on premises and in the cloud. As the backup orchestration engine, the Veeam backup server facilitates the movement of storage snapshot copy data from primary NetApp storage to secondary backup storage resources and/or cloud-based backup resources.

Importantly, through Veeam's tight integration with ONTAP, NetApp snapshots can be quickly cloned and migrated to on-premises and cloud-based backup storage without any impact on production applications. This gives IT teams a simplified, centralized way to orchestrate the movement and management of NetApp snapshots so they can easily follow the 3-2-1 rule for data protection.

In addition to enabling best practices in data protection, the combination of NetApp enterprise storage and the Veeam Availability Suite enables customers to:

- Achieve RPOs and RTOs of less than 15 minutes across physical and virtual workloads on premises and in the cloud.
- Significantly reduce the time it takes to complete backups.
- Centralize the management and movement of NetApp snapshots on premises and in the cloud.
- Leverage NetApp storage snapshots to create on-demand sandboxes to nondisruptively test application recovery to prove compliance with business RPO and RTO objectives.
- Create sandboxes for administrators and developers to test new code changes and patches without impacting production systems.

## Conclusion

Businesses need to constantly innovate and create more application services to meet the needs of their employees, customers and partners. In today's era of digital transformation, users' expectations for Availability are increasingly being shaped by their experiences with consumer applications.

Just as consumers won't tolerate downtime from the mobile applications they use every day in their personal lives, they won't tolerate it in their business interactions. This business imperative, often referred to as "IT consumerization," puts enormous pressure on corporate IT teams.

Application Availability providers such as Veeam, in partnership with modern storage vendors such as NetApp, provide sustainable ways for businesses to drive very high levels of application Availability across all of their applications in several critical ways:

- Veeam's integration with NetApp Data ONTAP enables businesses to leverage NetApp storage snapshots with the Veeam Availability Suite to attain RPOs and RTOs of less than 15 minutes for all applications and data.
- Veeam orchestrates the movement of NetApp storage snapshots and SnapMirror/SnapVault replicas to secondary storage resources on premises, in secondary data centers and/or in the cloud to allow businesses to simply and easily adopt the 3-2-1 data protection rule.
- The NetApp Data Fabric provides businesses with the ability to leverage data across hybrid cloud environments and appliances, pre-integrated solutions and software-defined infrastructure. Veeam's direct integration with ONTAP enables IT organizations to enhance physical and virtual workload Availability anywhere in the Data Fabric.

By leveraging the Veeam Availability Suite in partnership with NetApp ONTAP storage solutions, IT teams can lower costs, improve RTOs and RPOs, reduce complexity and adhere to 3-2-1 best practices in data protection to meet modern Availability challenges.

**Please visit [Veeam](#) for more information on how Veeam and NetApp can help your organization leverage storage snapshots and the hybrid cloud to drive major improvements in Availability.**