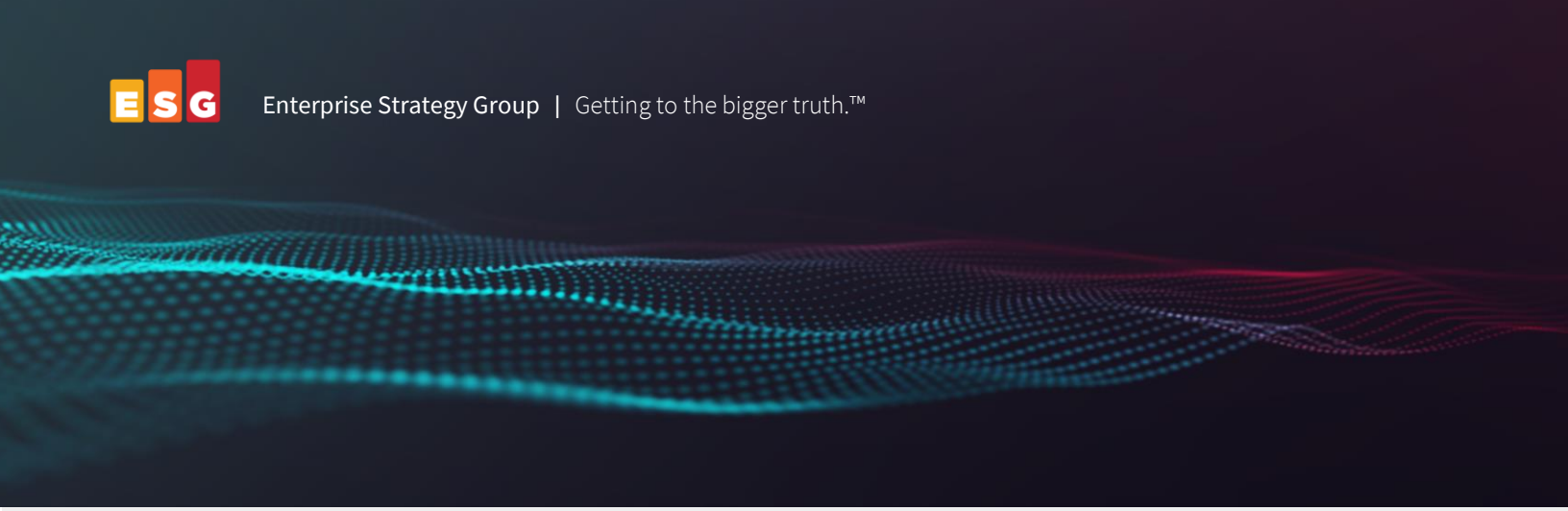

ESG WHITE PAPER

Amazon FSx for NetApp ONTAP: Tailored for the Demands of Enterprise Applications

A Native AWS Fully Managed Service Built on NetApp ONTAP Delivers the Five Essentials for Business-critical Application Environments

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Contents

Introduction

Public cloud services provide the backbone for modern IT. Organizations with a "cloud-first" strategy for new application deployment significantly outnumber those with a "data-center-first" approach. What started years ago, often to support DevOps activities or for offsite data protection, has grown significantly and businesses are reaping the rewards.

As organizations expand their cloud strategies to the full breadth of their application portfolios, however, they require a wider and richer variety of cloud technology options. A common requirement is for enterprise-level file and block data management services. The lack of these enterprise-level data services often hinders, and can sometimes even prevent, an organization from fully realizing their cloud goals.

For business-critical workloads, IT organizations need services that can deliver high performance and highly available cloud storage—while accelerating the migration of applications and workloads to the cloud and simplifying how they're run and managed. In other words, businesses need a solution that can not only exceed the benefits offered by the data center, but also surpass the benefits of traditional, cloud-native options.

Enter Amazon FSx for NetApp ONTAP. This AWS managed storage service integrates NetApp technology into the native AWS infrastructure to provide shared file and block with support for both AWS and NetApp APIs.

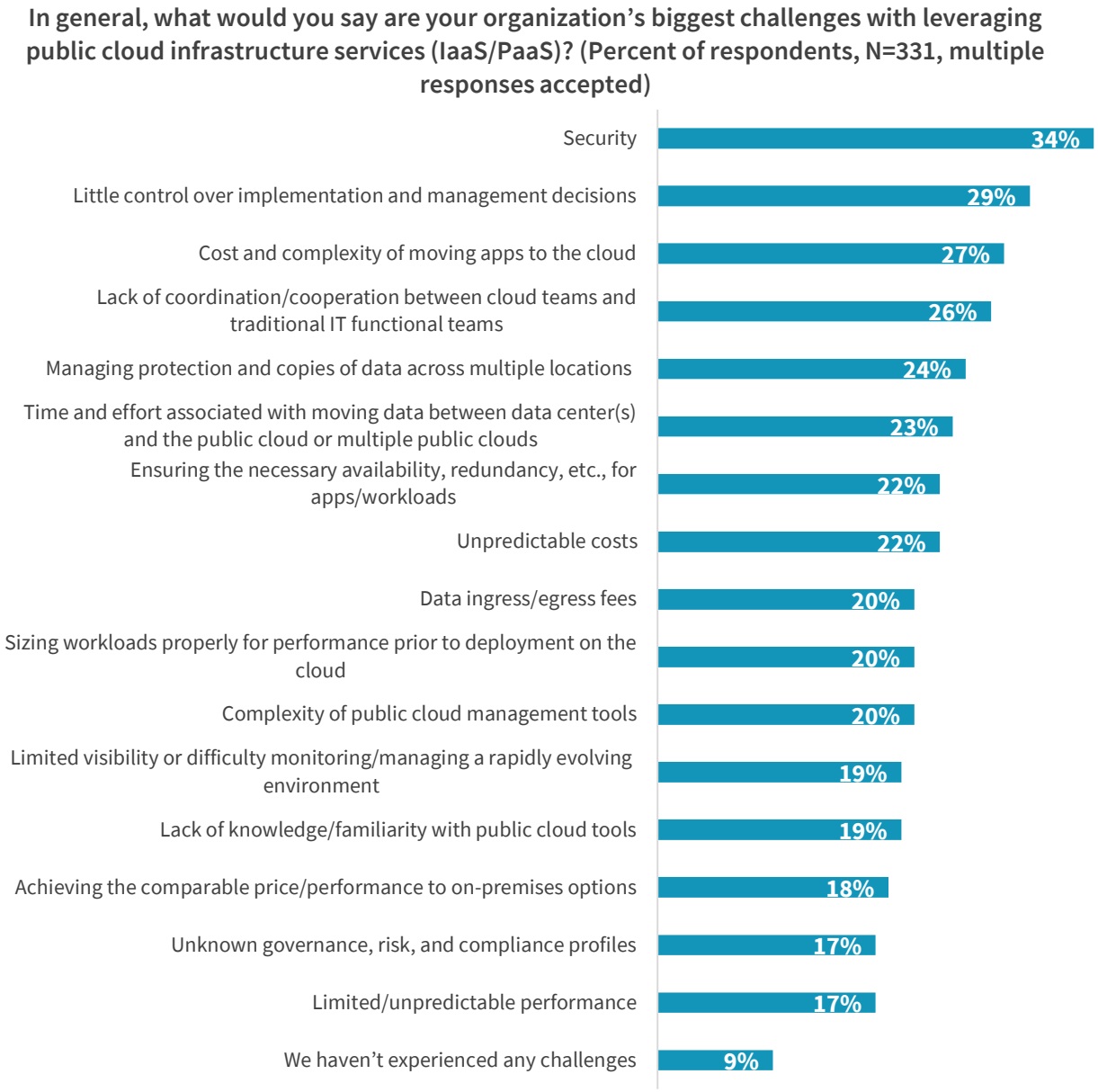
Cloud-first IT Requires Business-critical Storage Technology

The public cloud plays a vital part in modern IT. In fact, ESG research shows that nearly all organizations (97%) are using public cloud infrastructure to run some of their workloads.[1] Consequently, with a growing focus on hybrid cloud, organizations require enterprise-grade cloud services to ensure that performance is indistinguishable between on-premises and cloud environments. In addition, those organizations employing a cloud-first approach to workload placement outnumber those with an on-premises-first approach by 2:1 (43% versus 21%).

It should come as no surprise that organizations are experiencing various challenges—from security and control, to cost and complexity, to availability and performance—when using more traditional cloud storage environments. When IT decision makers were asked about their biggest challenges leveraging public cloud infrastructure services, more than one-third (34%) cited security, while 29% cited little control over implementation and management decisions, and 27% answered cost and complexity of moving apps to the cloud. In addition, 22% answered availability, and 20% cited sizing workloads properly for performance. Moreover, 17% stated that limited/unpredictable performance is one of their biggest challenges (see Figure 1).[2]

[1] Source, ESG Research Insights Report commissioned by NetApp, *How Hybrid Cloud Environments are Changing IT Architecture Priorities*, April 2021. All ESG research references and charts in this white paper have been taken from this research insights report, unless otherwise noted.
[2] Source, ESG Research Master Survey Results, *2021 Data Infrastructure Trends*, August 2021.

Figure 1. Storage Challenges in the Cloud



Source: Enterprise Strategy Group

As illustrated by ESG research, enterprises need further options for cloud storage environments to meet the organizational requirements of business-critical applications, to help reduce the cost and complexity of cloud adoption, and to enjoy all the benefits of agility and flexibility.

The Essentials of the Enterprise Cloud-first Infrastructure Environment

To be truly cloud-first, organizations must be able to harness the appropriate cloud technology to meet the needs of their specific application environment. This means simplifying cloud migration and the management of cloud applications to garner the benefits of cloud consolidation, while leveraging cloud services.

To effectively support business-critical, cloud-first environments, organizations must:

- Economize. Organizations must unify siloed storage environments by achieving workload flexibility along with a single-pane console to economize both capital and operational costs.
- Simplify. Organizations must not only simplify management, they must also simplify technology to reduce business risk (ensuring that GDPR and other essential regulations are being met) and prevent or mitigate ransomware and other external threats.
- Optimize. To optimize capacity resources, organizations must be able to quickly and automatically move applications and data to the correct tier and location.
- Protect. Organizations must seek out simple backup strategies and consolidated disaster recovery approaches for on-premises and cloud data, while also automating data synchronization, with an eye on compliance.
- Accelerate. Organizations must make it simple for DevOps and DataOps teams to harness their data and applications, helping to accelerate the data pipeline, analytics, and artificial intelligence (AI) and machine learning (ML) initiatives.

Addressing these five essential characteristics is vital to achieving the flexibility to "get out of the data center business," if the organization so chooses, by being able to consistently meet the performance, cost, and SLA expectations for all application types. Workload placement flexibility is identified as a top-5 technology priority by 85% of IT organizations, and nearly all (99%) say that it is a top-10 priority.

Businesses need a full complement of hybrid-cloud and cloud-native options. Comparable cloud options should exist for those on-premises options, and enterprise-grade services should be available so that performance and all features are indistinguishable between on-premises and the cloud. This also means eliminating the risk of having drag and lower-grade storage capabilities in the cloud.

Amazon FSx for NetApp ONTAP

NetApp, a recognized leader in enterprise-grade storage, and Amazon Web Services, a leader in public cloud services, have joined forces to deliver a native AWS service for organizations across industries. Powered by NetApp ONTAP, this fully managed service is part of the Amazon FSx storage family.

FSx for ONTAP combines the rich data management capabilities, proven enterprise-grade features, performance, and data protection of ONTAP with AWS' native service agility, scalability, security, and simplicity. Built on the latest AWS compute, disk, and networking technologies, it provides maximum performance. FSx for ONTAP is fully integrated into AWS and supports ONTAP's popular features, capabilities, and APIs, allowing access to the complete NetApp cloud portfolio. FSx for ONTAP is easily managed through AWS Console, CLI, and SDK and is accessible to AWS services.

FSx for ONTAP offers integrated capabilities to help control storage costs via:

- Automatic tiering to lower-cost, elastic storage.
- Space-efficient, zero-impact NetApp Snapshot copies.
- Utilization of all ONTAP storage efficiency features, including deduplication, compression, compaction, and thin provisioning.

Benefits of Amazon FSx for NetApp ONTAP for Cloud-first Enterprises

By combining technologies and expertise from enterprise data center environments and public cloud services, FSx for ONTAP is designed to serve business-critical, cloud-first application environments.

Economize — Amazon FSx for NetApp ONTAP Helps to Further Reduce the Data Center Footprint

Organizations are taking progressive steps to reduce their data center footprints: in order to help shrink operational costs, increase flexibility, achieve faster data center deployments, leverage existing data center technology investments, and simplify disaster recovery. But it isn't all that simple. Organizations are especially challenged with meeting availability and performance requirements when working with traditional, native cloud services (refer to Figure 1). Given these scenarios, growing numbers of businesses find themselves repatriating workloads due to unforeseen issues (e.g., rapidly escalating expenses, inconsistent performance or availability, inadequate functionality, and insufficient security).

ESG research reveals that when organizations that repatriated workloads were asked which of the following actions their organization could have taken to mitigate unforeseen challenges of satisfaction issues with cloud hosted applications, the three most common responses were:

- Executing more analysis on the cloud's capabilities (performance, availability, security) (49%).
- Executing more analysis on their applications' performance requirements (47%).
- Executing more analysis on their applications' availability requirements (47%).

Amazon FSx for NetApp ONTAP can help accelerate the movement of business-critical applications to the cloud, with support for performance, availability, and security and compliance, in the following ways:

- Enterprise Performance.
  - Offers sub-ms latencies, multiple GB/s of throughput, and 100,000+ IOPS per deployment.
  - Provides multiple GB/s of throughput per deployment.
- Enterprise Availability.
  - Offers high availability and durability across multiple Availability Zones.
  - Support for data replication across AWS regions or ONTAP systems (using NetApp SnapMirror replication software technology).
- Enterprise Security and Compliance.
  - Integrated with AWS Key Management Service (KMS).
  - Offers automatic encryption at-rest and in-transit (complies with FIPS 140-2).
  - Supports Microsoft Active Directory (AD) (with SMB and NFS access).

- Supports file access auditing, ransomware protection, and antivirus scanning, including support for leading security software solutions.

With Amazon FSx for NetApp ONTAP, organizations can manage their hybrid, multi-cloud environment from NetApp Cloud Manager to unify siloed storage systems on a single-pane console. Integration with NetApp Cloud Insights allows organizations to control the performance, monitor utilization of cloud workloads, and analyze to reduce cloud waste.

Simplify — ONTAP Technology Simplifies Hybrid Cloud Data Movement, Migration, and Compliance

Workload placement in the cloud can be challenging. ESG research indicates that 42% of IT professionals find that workload placement in the cloud is not easy, with 40% of respondents citing difficulty in assessing a cloud provider's compliance capabilities as a challenge that their organization has encountered when trying to place workloads in the optimal cloud platform. To mitigate this potentially daunting, albeit costly, challenge, NetApp Cloud Data Sense provides automated controls and reporting so that you can always stay on top of your data.

FSx for ONTAP provides enterprise file shares for Linux, Windows, and macOS file-based applications, not to mention block services. Data ubiquity, management simplicity, and digital continuity of enterprise-grade data services are readily available in the data center—and now they are available as a fully managed, cloud-native solution. Organizations can now benefit from a common management heartbeat with features and capabilities across the ONTAP ecosystem, across the data center, and across AWS regions.

FSx for ONTAP supports data access over all versions of the NFS and SMB protocol and can also be used as shared block storage over the iSCSI protocol. This unified storage capability allows organizations to fulfill both file and block access required by their various workloads. For workloads that are accessing file data sets simultaneously from different operating systems, Amazon FSx for ONTAP also supports dual access (i.e., concurrent NFS and SMB access) to the same data. With iSCSI support for FSx for ONTAP, the storage service helps simplify cloud environments by increasing the types of workloads supported for greater flexibility.

Optimize — Accelerate Enterprise Application Migration Practices

The cloud is crucial to an organization's success, offering a viable means to efficiently scale and optimize, increase flexibility and agility, and provide greater efficiencies and higher productivity. In response, organizations are focusing on accelerating their application cloud migration practices—but migrations can be arduous and time consuming. In fact, ESG research shows that 3.6 is the average number of over budget and over timeline application re-architecture projects in the last 12 months. Additionally, 79% of IT professionals have repatriated workloads from the cloud due to unforeseen issues, while 93% have cited that cloud migration processes at their organizations can be meaningfully improved.

With FSx for ONTAP, organizations can simplify and accelerate their migration practices of enterprise applications. ERP, CRM, VMware Cloud on AWS, SAP, Oracle, and SQL are examples of workloads that can gain the freedom from refactoring or rearchitecting tier-1 applications on AWS. Organizations can easily accelerate on-premises workloads by bursting into AWS using FlexCache to accelerate read performance. FSX for ONTAP unlocks a broad set of use cases, and is certified and integrated with market-leading ISV solutions in various verticals, including healthcare & life sciences, media & entertainment, advertising & marketing, financial services, oil & gas, manufacturing, EDA, the public sector, etc.

With NetApp storage tiering capabilities, organizations can automatically move infrequently used cold data to Amazon FSx's lower-cost capacity pool storage. And with Spot by NetApp, businesses can also reduce the complexity of provisioning compute resources automatically to reduce costs by up to 90%.

Protect — Support Backup and Data Protection Requirements Regardless of Where the Application Resides

There's no question that data protection is fundamental for organizations across industries—but achieving protection isn't always easy. When asked about their organization's biggest challenges with leveraging public cloud infrastructure services, 24% of IT professionals cited managing protection and copies of data across multiple locations (refer to Figure 1). With this in mind, it is crucial to simplify backup and data protection. And that's where Amazon FSx for NetApp ONTAP comes in.

A number of NetApp and AWS features work together with FSx to provide organizations with enhanced backup and protection in the cloud. These services include:

- AWS FSx Backups. Delivers incremental forever, block-based backups, making it a perfect solution for large NAS data sets.
- Snapshots. Easily undo changes and compare file versions by restoring individual files and folders to previous versions.
- SnapMirror. Offers integrated remote backup and disaster recovery with incremental, asynchronous data replication.
- SnapCenter. Provides application-aware backup and clone management. It automates error-free data and restores host-based data management of NetApp storage for databases and business. For applications and databases, crash-consistency Snapshot copies that span multiple volumes are powered by SnapCenter.
- FlexClone. Offers quick, space-efficient copies that don't require additional storage. FlexClones can be used to seamlessly test your disaster recovery environment without interrupting ongoing replications.

Accelerate — Support and Accelerate Interactions with Line-of-business Teams (DevOps or Data Operations) Supporting Data Pipeline, Analytics, and AI/ML

To maintain success and grow the bottom line, it's important for organizations to support DevOps and DataOps teams, giving them the ability to accelerate the data pipeline, analytics, and AI/ML initiatives. Just how important? A recent ESG research study found that 37% of IT professionals believe that improving analytics for business intelligence and customer insight are among the top business initiatives that will drive the most technology spending in their organizations over the next 12 months, while 63% of AI/ML users expect their organizations to accelerate investments this year. Furthermore, 44% of organizations employing app development and DevOps teams expect to accelerate their investments this year.[3]

AWS offers a wide range of services that are tightly integrated with FSx for ONTAP to support an organization's data pipeline, analytics, and AI/ML initiatives, including:

- Accessible from AWS (e.g., EC2, ECS, EKS, ROSA, VMware Cloud, Workspaces, and Amazon AppStream) and on-premises. Also available via Amazon virtual private cloud (VPC) peering (a networking connection between two VPCs that enables traffic routing between them as if they're in the same network).
- AWS IAM and CloudTrail to monitor and protect your resources.
- FSx for ONTAP is tightly integrated with NetApp's ecosystem of cloud services offering a wealth of optional service capabilities, including:

[3] Source: ESG Research Report, *2021 Technology Spending Intentions Survey*, January 2021.

- Spot Ocean automates cloud infrastructure for containers and continuously analyzes to maximize utilization and availability using the optimal blend of spot, reserved, and on-demand compute instances.
- Cloud Insights provides monitoring tools for visibility into both applications and infrastructure in the data center and the cloud. This technology can provide early detection of ransomware.
- Cloud Data Sense leverages advanced algorithms to deliver automated controls for data privacy regulations such as GDPR and CCPA.
- Global File Cache helps organizations simplify and reduce the cost of their branch office server and storage assets by leveraging the cloud to consolidate data storage and then using software to create a file cache layer for active or hot data sets, optimizing performance across globally distributed offices.
- Cloud Sync provides cloud replication and synchronization services to rapidly transfer files between on-premises (yes, even non-NetApp) NFS or SMB file shares and AWS cloud data stores.

The Bigger Truth

There is little doubt that the cloud is the center of modern IT environments. However, when it comes to enterprise applications, organizations need block and file cloud storage with advanced data management capabilities. When organizations adopt cloud services, the goal should not be simply to achieve some slight incremental benefit. Organizations should seek to leverage services that can help transform operations and deliver benefits in orders of magnitude beyond what was possible with traditional technology.

This desire for transformational benefits fuels the need to employ cloud services that will economize, simplify, optimize, protect, and accelerate the use of enterprise applications. By addressing all of these capabilities, organizations can ensure their enterprise applications will enjoy the performance, availability, and protection they need; can reduce the cost of infrastructure; and can accelerate both IT operations and digital business initiatives. Amazon FSx for NetApp ONTAP addresses all of these cloud mandate requirements by leveraging NetApp's enterprise-grade data management technology—while offering the best of cloud capabilities.

Don't just use the cloud—do more with your data and ensure that your organization's cloud initiatives deliver the transformational benefits that your business demands.

Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides market intelligence and actionable insight to the global IT community.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