



White Paper

NetApp Solutions for Service Providers

Gary Garcia, NetApp
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EXECUTIVE SUMMARY

This paper discusses a proven solution that accelerates the ability of service providers to develop and deliver IT as a service. NetApp® solutions for service providers include technology, best practices, and the know-how to rapidly bring IT services to market. The NetApp approach offers considerable advantages for those wanting to implement new service-based business models and delivers significant reductions in cost, complexity, and risk.

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1 INTRODUCTION

An opportunity has developed at the intersection of two trends. Economic imperatives are driving users of information technology to reconsider capital investment in infrastructure. This moment of inflection has occurred just as technology has matured to create a new delivery mechanism. The cloud, or more specifically the delivery of IT as a service, represents a rapid growth opportunity for service providers.

Capitalizing on this opportunity requires a thoughtful approach because delivering IT as a service requires the integration of diverse technologies. Success requires the ability to create a unified architecture in which the components disappear into one seamless solution. Since no one vendor can achieve this alone, a winning strategy might be to leverage the experience of partners who have worked together before.

Early entrants into the IT as a service market struggled to find balance in the design of service delivery architectures. Creating the right mix of function, resilience, availability, ease of management, agility, and efficient asset utilization was a challenging endeavor. NetApp was an early participant in the market and has been part of many cloud providers' success, honing our practice along the way.

This white paper discusses the key challenges of delivering IT as a service and explains how NetApp technology has been optimized to efficiently solve these challenges. It describes the elements of NetApp solutions for service providers that reduce the risk and improve time to market for the delivery of IT as a service. These solutions include a foundation service-oriented infrastructure (SOI) that utilizes standardized configurations; design guides for building services; a service management framework that centralizes all necessary management processes, resulting in the ability to deliver IT services from a service catalog; and a well-defined project delivery methodology that accelerates implementation.

2 MARKET OPPORTUNITY

Economic forces are driving enterprise IT to look for new ways to create financial agility. Fortunately, this moment of inflection has arrived as the technology is available to empower service providers to drive new levels of efficiency. This happy intersection of possibilities allows you an opportunity to deliver services to the market from infrastructure built at a scale. The efficiency of delivering information technology at scale provides not only a margin opportunity for you, but also a level of resiliency that enterprises rarely attain. But to succeed, you must understand why enterprises are driven to consume IT as a service.

FINANCIAL AGILITY

The capital cost of infrastructure represents a significant barrier to delivering an agile information technology service. Capital depreciation is an immobile component in the IT budget that can be reduced only through the passage of time or dramatic write-down events. In contrast, buying IT services allows businesses to consume what they need in increments that make sense, allowing a more dynamic investment model. Service providers who deliver services from a larger pool of resources enjoy an opportunity to drive greater efficiency and therefore earn margin not only on services, but also on efficiency.

NetApp solutions for service providers provide a framework for shared data storage architectures and reference architectures for storage, networks, and servers that maximize asset utilization efficiencies.

SPEED TO EXECUTION

Typical information technology infrastructures are custom-built silos of hardware, built to the specific needs of the application. These custom-built solutions take a long time to design, build, and optimize. The enterprise is beginning to understand that investing in these types of infrastructure silos represents a capital investment that is difficult to repurpose if the business changes.

There is another way: the service-oriented infrastructure. The service-oriented infrastructure is a shared pool of infrastructure that can be dynamically allocated on demand, thus avoiding the delays associated with custom builds. This gives you an opportunity to build at scale to drive efficiency and offer standardized builds far faster than enterprise IT can accomplish. Better still, since the infrastructure can be allocated and reallocated on demand, you can offer enterprises pay-as-you-go pricing.

NetApp solutions for service providers provide a foundation service-oriented infrastructure that is designed to scale. Our flexible reference architecture can be integrated into your existing network or implemented as a standalone service.

RISK MITIGATION

Enterprise IT must evolve and adopt new technologies. Frequently this involves significant risk in the form of large capital investment, technology readiness, and skills development. Enterprises enjoy benefits by moving some of these risks into a pay-as-you-go model by engaging with a service provider. Further, service providers can build at scale and deliver a higher level of service at a lower cost.

This represents a significant opportunity for service providers who can bring new services to market quickly. NetApp solutions for service providers provide not only a service-oriented infrastructure to build new services, for example, desktop as a service, but also proven partner relationships that take the risk out of bringing new services to market quickly and help shield the end customer from risk.

3 NETAPP SOLUTIONS FOR SERVICE PROVIDERS DESCRIPTION

NetApp solutions for service providers begin with a scalable service-oriented infrastructure (SOI). While our service-oriented infrastructure is described with carefully selected technologies from partners, it is also flexible enough to allow you the option to build in conformance with established practices.

The SOI includes a flexible reference architecture, service management framework, and management processes that enable a catalog of services.

On this framework NetApp offers design guides that streamline the implementation of services that can be brought to market. These design guides include management frameworks with convenient application programming interfaces. The management frameworks can be used as their own service catalogs or integrated with your larger service catalog.

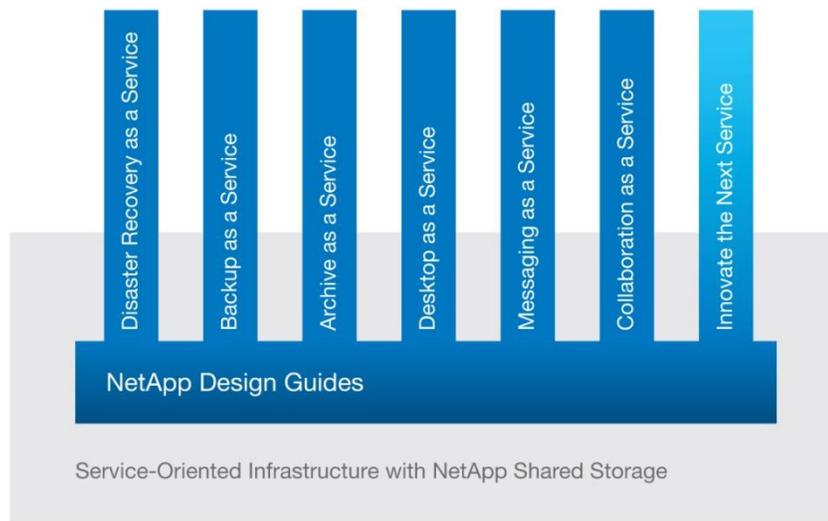


Figure 1) NetApp service-oriented infrastructure with design guides.

NetApp solutions for service providers also include a project delivery methodology that accelerates implementation, reducing the time between investment and revenue.

4 SERVICE-ORIENTED INFRASTRUCTURE

NetApp solutions for service providers take the complexity out of delivering IT as a service by leveraging proven reference architectures. These reference architectures describe best practices for creating an SOI from an ecosystem of partners proven to work well together in real-life environments.

The SOI can be thought of as layers of infrastructure that work together:

- The **management framework** includes a number of operating system standards called activation guides. These guides detail how you will consume storage to achieve real process efficiency.
- The **server layer** can include both physical and virtual servers. The goal is to provision, activate, protect, and recover your data quickly and cost effectively.
- The **storage and data protection layer** consists of a unified storage architecture. This tierless storage solution dramatically simplifies one of the most complex management tasks in the infrastructure.
- The **network layer** design goal is to build a single solution that can simultaneously meet the needs of both Ethernet and Fibre Channel storage traffic. This provides the ability to deliver a consistent set of features and performance.

The service-oriented infrastructure integrates these layers of infrastructure to deliver capabilities valuable to service providers, including:

- **Secure multi-tenancy** to cost-effectively and securely partition a single NetApp system to support multiple tenants, including applications, customers, workgroups, and security zones
- **Service automation and management** for near real-time visibility, monitoring, and proactive alerts of availability, performance, or policy problems
- **Data mobility** to easily and quickly migrate data across multiple storage systems while maintaining continuous access to your applications
- **Storage efficiency** through a single unified storage architecture and storage efficiency software, including deduplication, thin provisioning, and flexible cloning to reduce costs as well as NetApp FAS storage controllers with multiprotocol support (FCP, IP, iSCSI, NFS, CIFS, and FCOE)
- **Integrated data protection** to meet backup, disaster recovery, archiving, and compliance service-level agreements

5 DESIGN GUIDES

Rapid time to market is a great advantage, and it seems that the burgeoning “cloud” or IT as a service market might be an opportunity to take market share for first movers. NetApp solutions for service providers include a number of predefined service architectures designed to work with the NetApp SOI. These design guides can be rapidly built as specified or integrated into an existing practice and quickly brought to market.

The design guides are defined as follows:

- **Desktop as a service:** The ability to provision and manage desktop software and measure the use of Windows and Linux virtual desktop computers.
- **Backup and recovery as a service:** The ability to make a useful copy of a data set that represents the state of a data set at a point in time. Backup as a service can be implemented completely within your service-oriented infrastructure or from the customer premises to your service-oriented infrastructure.
- **Archive as a service:** The ability to move data from primary storage to tape on behalf of a customer.
- **Disaster recovery as a service:** The ability to recover computational services from one site to another. The key attributes of disaster recovery as a service are recovery time objective (RTO) and recovery point objective (RPO). Simply put, disaster recovery requires three components to be achieved:
 - Compute resources in two locations
 - Data replicated to two locations
 - A process (automated or manual) to start applications on command at the second site

NetApp solutions for service providers leverage infrastructure as a service and backup as a service in concert with management software to fulfill all three components.

- **Messaging as a service:** An ability to send and receive e-mail. This might be implemented privately within a contained system or externally through a gateway using the Internet as a transport.
- **Collaboration as a service:** The ability to share and revise documents in the form of document libraries, wikis, or forums.

6 PUTTING IT ALL TOGETHER

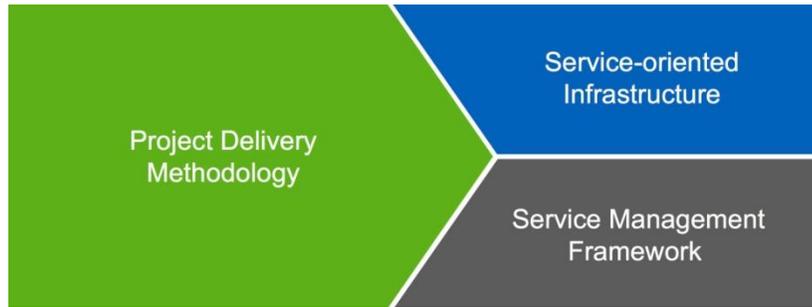


Figure 2) Putting it all together.

SERVICE MANAGEMENT FRAMEWORK

NetApp solutions for service providers enjoy management and provisioning through a flexible but robust management framework. The SOI and services described in the design guides can be managed within this framework or integrated into your existing tools.

In either case, the management framework achieves these functions:

- **Allocation of physical capacity:** Describes best practices for pooling resources and allocating capacity against requests. These best practices can be tuned to your preferences and instantiated as policy in a software management framework that automates provisioning.
- **Trend analysis and incident avoidance:** Describe best practices for capacity management and allow you to monitor asset utilization and alert when usage trends meet a threshold.
- **Scalable solution architecture:** Provides an architecture and management framework that can scale up as service delivery succeeds. With the availability of nondisruptive software and hardware upgrades for the infrastructure platform, you can manage rapid growth.
- **Operational management:** The purpose of the operational management process is to maintain the deployed infrastructure. This process is key to operational stability with interfaces to your problem management processes and the automated functionality provided by NetApp toolsets.

PROJECT DELIVERY METHODOLOGY

NetApp has worked with service providers to build IT as a service for years. Our experience has been codified into a well-defined implementation methodology.

Our Professional Services team and authorized professional service partners have the expertise to assess requirements and collaborate with your professional team to create and execute an implementation plan.

Our project delivery methodology is designed to mitigate risk. The methodology systematically creates a well-defined work breakdown structure. This work breakdown structure documents project management responsibilities. You will benefit from a clear division of labor between NetApp, NetApp partners, and your expert team.

We can lead or participate, depending on your preference and requirements. Our phased approach allows all parties to measure, manage, and control the implementation process.

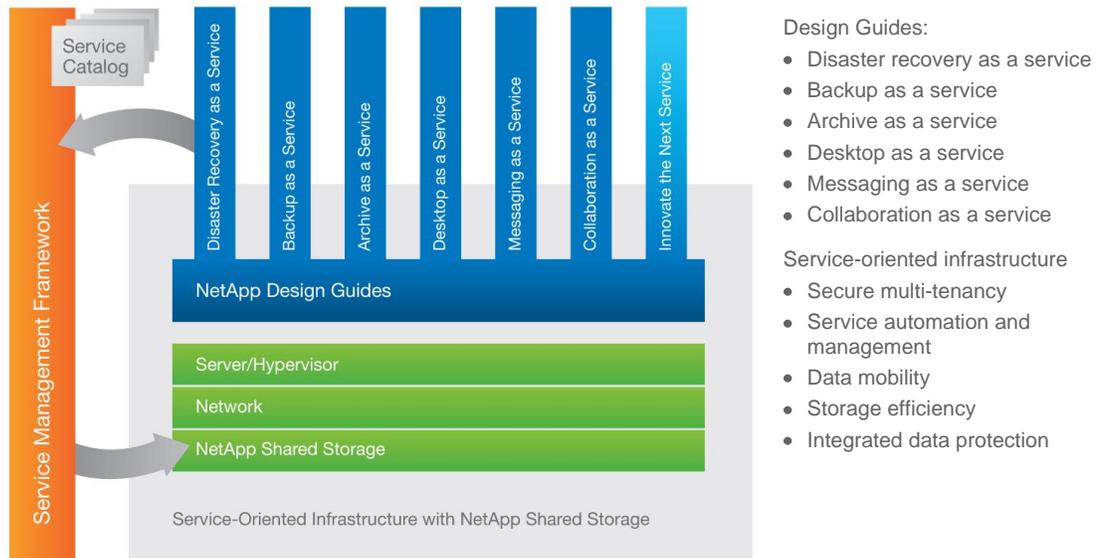


Figure 3) NetApp solutions for service providers.

7 BENEFITS

- Speed time to market and revenue
- Enable differentiation through unique technologies
- Minimize infrastructure costs
- Optimize operations
- Enable predictable enterprise-class service levels

NetApp solutions for service providers can help get your business off on the right foot and enable you to rapidly build a profitable portfolio of services.

RAPIDLY DEPLOY DIFFERENTIATED ENTERPRISE SERVICES

Speed is critical in the race to stake a claim in the evolving cloud services market. NetApp offers experience and expertise to accelerate your time to market and unique capabilities that establish service differentiation.

For two decades, NetApp has helped leading companies design enterprise IT solutions. We've listened to our service provider partners describe their cloud service requirements, and we've encapsulated that knowledge in design guides that can help you more quickly design your solution. Long-standing partnerships and integration with technology leaders such as VMware, Microsoft, Citrix, Cisco, Oracle, and others have resulted in technologies that are critical to enabling virtualized service-based infrastructures to function seamlessly, saving development time. And our deployment and training best practices, developed through numerous customer engagements, can shave months from your deployment schedule.

You also need to deploy services that give you an edge. Building NetApp into your service offers you the opportunity to differentiate your services in ways that you can monetize. How much could you charge to activate servers in minutes and whole infrastructures in hours instead of days? Would customers pay extra for riskless disaster recovery testing? How about self-service backups and restores, on demand, within minutes? Service providers today use NetApp technology to drive revenue from these differentiated service features. Our APIs allow service providers to further leverage core NetApp technology to build derivative products to drive more revenue.

OPERATE WITH LOW COST AND PREDICTABLE SERVICE LEVELS

Running a profitable business depends on predictable costs and service levels. NetApp can help you attain both. Our customers routinely use at least 50% less storage, space, and power for a particular workload than they would use with competitive solutions. Also, you can run your service with fewer people. NetApp has documented cases in which customers manage up to 2,000TB per storage administrator. Industry-leading storage efficiency capabilities, secure multi-tenancy, and a unified storage platform are just some of the important technology differentiators that can minimize your infrastructure and operational cost base.

Projecting forward, you can look to cost reductions from that initial base because of the efficiency of our R&D mission. That efficiency means that you typically buy less storage from NetApp than you would from

other vendors. Breakthrough efficiency technologies such as RAID-DP® and deduplication are part of our history AND our future, and we look forward to sharing our future roadmap with you in detail.

NetApp solutions also minimize the risk of financial penalties by offering consistent enterprise-class service levels. NetApp technologies enable you to perform service upgrades and migrations with zero downtime, a critical functionality for multi-tenant environments. The NetApp suite of data protection products lets you consistently meet the highest recovery point and recovery time objectives. As an example, using NetApp, T-Systems Dynamic Services has virtually a 100% success rate in meeting its backup and recovery SLAs.

NetApp solutions for service providers take the complexity out of provisioning, yielding a major reduction in the time it takes to deploy and activate services. With the service management framework, provisioning tasks is clearly defined in advance, so there are no delays, and the operation is predictable. Provisioning is automated by policy, which avoids human error and optimizes service delivery time.

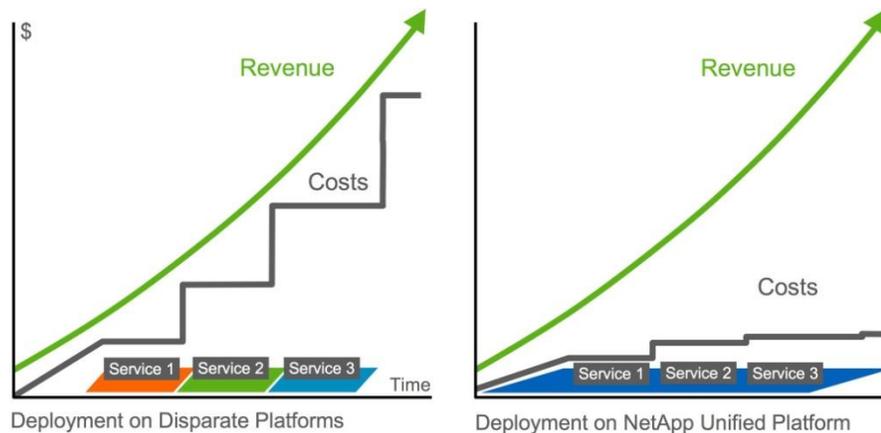


Figure 4) One infrastructure, multiple services, higher returns.

8 CUSTOMER EXPERIENCE

INDUSTRY: IT SERVICES

CHALLENGE

Organizations today face increasing disaster recovery (DR) pressures caused by soaring downtime costs and more stringent IT service-level requirements. The cost and resources required to implement all of the services required for successful DR can be daunting. As a global provider of comprehensive managed solutions, a leading IT infrastructure services company needed to develop robust, secure cloud-based DR services that would be cost-effective for the company and its customers.

SOLUTION: DISASTER RECOVERY AS A SERVICE

The company worked with NetApp to build a cloud-based DR solution on a NetApp storage infrastructure, including NetApp FAS6040 and NetApp FAS3020 storage systems running the Data ONTAP® operating system.

The cloud-based DR services are elastic and easily scale as customer needs change with a capacity-on-demand pricing model for all of the associated enterprise DR services: replication, failover, security, backup, and restoration.

Other key components of the solution include NetApp SnapManager®, which works with VMware® vCenter to automate and simplify backup and restore operations, increase productivity, and keep costs and administrative overhead low. NetApp's core storage system and data reduction technologies, including NetApp deduplication, successfully support the company's VMware environment as well as help reduce the company and its customers' physical storage footprints by 50% or more. Another crucial tool is NetApp MultiStore® software, which provides secure partitioning of shared storage and network resources so multiple domains and servers can be consolidated on a single storage system without risk.

BENEFITS

- Reduced data storage capacity needed for virtual machines by at least 50%
- Reduced administrative time and costs twofold to threefold
- Reduced customer RPO and RTO from days to hours or minutes
- Highly scalable and easy to manage

INDUSTRY: TELECOMMUNICATIONS

CHALLENGE

A global telecommunications provider needed to develop an infrastructure to support the delivery of cost-effective and agile business applications, specifically SAP®, to large enterprises that could use capacity on demand to scale up or down in a pay-as-you-go model.

SOLUTION: BUSINESS APPLICATIONS AS A SERVICE

To meet their objectives, this telecommunications company standardized and automated virtualized servers and NetApp storage, using clustered NetApp FAS6080 systems as the workhorse of the shared storage infrastructure.

NetApp SnapMirror® and NetApp MetroCluster are used for synchronous mirroring between data centers. This enables a recovery time objective (RTO) of 15 minutes and a recovery point objective (RPO) of zero. NetApp MultiStore software provides secure partitioning of shared storage and network resources so multiple domains and servers can be consolidated on a single storage system without risk. And NetApp Snapshot™ technology has eliminated the need for tape backups. Recoveries take minutes rather than hours and have a success rate of virtually 100% compared to 75% from legacy tape.

BENEFITS

- Offers customers a minimum of 30% lower costs compared to traditional in-house application hosting
- Enables configuration of new customized SAP systems in eight hours compared to six to nine weeks
- Higher SLAs: backup and recovery take minutes and have a success rate of virtually 100%
- Nondisruptive 24x7 upgrades eliminate downtime

INDUSTRY: IT SERVICES

CHALLENGE

A leading technology provider for the legal industry wanted to offer secure, multi-tenant virtual data centers and cloud-based managed services to law firm customers, providing easy, reliable access to the IT services they need to run their businesses as efficiently and securely as possible.

SOLUTION: IT AS A SERVICE

The cloud-based solution is a unique service-oriented infrastructure based on NetApp, Cisco, and VMware that includes all the server, storage, and networking hardware and software to facilitate sharing, reuse, and dynamic resource allocation. NetApp systems support a virtualized environment with Cisco network switches and VMware vCenter Server to provision, monitor, and manage the company's virtual data centers. Several NetApp technologies are crucial to the solution, such as NetApp MultiStore for secure partitioning of shared storage and network resources, and NetApp Snapshot and SnapMirror technology for flexible, reliable, protocol-agnostic replication over standard IP.

BENEFITS

- Decreased customers' data management costs as much as 30% while making a profit
- Controlled own administrative costs by managing up to 1 petabyte of storage with one full-time employee
- Controlled own infrastructure costs by reducing physical storage footprints by 50% or more
- Reduced customer risk through data management automation
- Restored customer data in minutes versus days

9 CONCLUSION

NetApp solutions for service providers offer an opportunity to quickly execute new service offerings. The service-oriented infrastructure provides an excellent foundation to efficiently build new services. Our design guides reduce the risk of developing new services and offer a means of quickly getting innovative services to market. Our service management framework makes sure that service delivery is consistent and maintained at an optimal operational cost.

NetApp helps make sure of your success by either working within your existing governance practice or collaborating with you.

For further information about technologies supporting key service-oriented infrastructure capabilities, please refer to the following documents.

SECURE MULTI-TENANCY

- [*Designing Secure Multi-Tenancy into Virtualized Data Centers*](#)
- [*Storage Virtualization and DR Using MultiStore®*](#)
- [*FlexShare™ Design and Implementation Guide*](#)

STORAGE EFFICIENCY

- [*RAID-DP™*](#)
- [*NetApp Thin Provisioning*](#)
- [*NetApp Deduplication for FAS and V-Series Deployment and Implementation Guide*](#)
- [*A Thorough Introduction to FlexClone™ Volumes*](#)

SERVICE AUTOMATION

- [*Provisioning Manager and Protection Manager*](#)
- [*Managing Performance Advisor Data*](#)
- [*Operations Manager and Protection Manager Sizing Guide*](#)

DATA MOBILITY

- [*Storage Virtualization and DR Using MultiStore®*](#)
- [*SnapMirror Sync and SnapMirror Semi-Sync Overview and Design Considerations*](#)
- [*SnapMirror Async Overview and Best Practices Guide*](#)

INTEGRATED DATA PROTECTION

- [*Best Practices Guide for Data Protection for Controllers Running FCP*](#)
- [*SnapManager 2.0 for Virtual Infrastructure Best Practices*](#)
- [*SnapMirror Async Overview and Best Practices Guide*](#)
- [*SnapVault Best Practices Guide*](#)
- [*RAID-DP™*](#)

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