# TABLE OF CONTENTS

1 EXECUTIVE SUMMARY ................................................................................................................3

2 INTRODUCTION .............................................................................................................................5

3 NETAPP SOLUTIONS FOR SOFTWARE DEVELOPMENT .........................................................6
   IMPROVING STORAGE UTILIZATION ............................................................................................6
   ACCELERATING LOCAL AND REMOTE DATA ACCESS ..............................................................7
   PROVIDING INTEROPERABILITY AND MULTIPLATFORM SUPPORT ........................................8
   ENSURING DATA PROTECTION AND DATA AVAILABILITY ......................................................9
   OPTIMIZING BUILD ENVIRONMENTS .....................................................................................10
   CREATING EFFICIENT TEST ENVIRONMENTS .....................................................................11
   ADDRESSING RELEASE ARCHIVING AND DELIVERY REQUIREMENTS ...............................13
   PROTECTING YOUR INTELLECTUAL PROPERTY ..................................................................13
   LOWERING TOTAL COST OF OWNERSHIP ...........................................................................14

4 CONCLUSION .............................................................................................................................. 14
1 EXECUTIVE SUMMARY

Software development organizations—whether creating in-house applications or commercial products—are increasingly global in nature. As a result, 24x7 availability is critical and many organizations are grappling with complex, heterogeneous development environments.

Your source code and associated designs are your crown jewels, representing years of work, so protecting this data is paramount. It can be a major challenge to back up this critical data frequently enough to provide protection without affecting the availability of your source code management system. Performing adequate testing to ensure product quality, while meeting time-to-market requirements and controlling the cost of testing infrastructure, is another significant challenge.

Failure to address the unique data storage challenges of software development environments can increase costs, decrease developer efficiency, and ultimately delay time to market or compromise product quality and functionality. NetApp provides a complete suite of hardware and software solutions that address the biggest storage challenges that developers face throughout the software development lifecycle.

With NetApp® solutions you can:

• Dramatically improve utilization to keep storage costs to a minimum
• Accelerate data access for both local and remote developers
• Create a single storage infrastructure that serves the needs of heterogeneous servers and clients, using both NAS and SAN protocols to decrease costs, enhance collaboration, and eliminate the data access complexity that can hamper productivity
• Radically shrink the backup windows that keep critical data offline and valuable developers idle, while providing full data protection and disaster recovery
• Decrease the time needed for builds and eliminate the storage contention that can hamper other work when builds are in progress
• Significantly reduce the storage needed for test environments while cutting the time needed to set up new tests (More efficient testing results in higher quality and faster time to market.)
• Securely share intellectual property with outsourcing partners and quickly deny access when a relationship is terminated
• Cut your total cost of ownership by up to 44%, while cutting rack space and power and cooling requirements in half compared to other leading storage solutions

Table 1 maps individual data storage challenges to the NetApp solutions that address them.
<table>
<thead>
<tr>
<th>Data Storage Challenge</th>
<th>NetApp Solutions</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve storage utilization</td>
<td>• FlexVol®</td>
<td>• Reduce storage costs by increasing storage utilization to 70% or more</td>
</tr>
<tr>
<td></td>
<td>• Thin provisioning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Deduplication</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• RAID-DP®</td>
<td></td>
</tr>
<tr>
<td>Accelerate local and remote access</td>
<td>• FlexVol</td>
<td>• Eliminate disk “hot spots” for improved performance</td>
</tr>
<tr>
<td></td>
<td>• FlexCache™</td>
<td>• Accelerate remote access</td>
</tr>
<tr>
<td></td>
<td>• SnapMirror®</td>
<td>• Replicate data with minimum net bandwidth</td>
</tr>
<tr>
<td>Interoperability and multiplatform support</td>
<td>• NetApp unified storage</td>
<td>• All platforms access the same files directly without requiring additional software</td>
</tr>
<tr>
<td>Ensure data protection and availability</td>
<td>• Clustered storage with RAID-DP</td>
<td>• Reliable hardware with resilience to disk failure</td>
</tr>
<tr>
<td></td>
<td>• Snapshot™</td>
<td>• Reduce backup windows from hours to minutes</td>
</tr>
<tr>
<td></td>
<td>• SnapRestore®</td>
<td>• Restore entire volumes in seconds</td>
</tr>
<tr>
<td></td>
<td>• SnapVault®</td>
<td>• Disk-to-disk backups</td>
</tr>
<tr>
<td></td>
<td>• SnapMirror</td>
<td>• Disaster recovery</td>
</tr>
<tr>
<td>Optimize build environments</td>
<td>• FlexCache</td>
<td>• Builds proceed without bottlenecks</td>
</tr>
<tr>
<td></td>
<td>• Data ONTAP® GX</td>
<td>• Distribute volumes across multiple storage systems</td>
</tr>
<tr>
<td></td>
<td>• FlexClone®</td>
<td>• Accelerate copying of build data</td>
</tr>
<tr>
<td>Create efficient test environments</td>
<td>• SnapManager® for Virtualized Infrastructure</td>
<td>• Reduce test deployment time from hours to seconds</td>
</tr>
<tr>
<td></td>
<td>• FlexClone®</td>
<td>• Reduce total QA time by 30% to 50%</td>
</tr>
<tr>
<td></td>
<td>• Deduplication</td>
<td>• Cut storage acquisition costs</td>
</tr>
<tr>
<td>Data retention and distribution</td>
<td>• FlexCache</td>
<td>• Keep data at remote sites synchronized</td>
</tr>
<tr>
<td></td>
<td>• SnapMirror</td>
<td>• Replicate data with minimum net bandwidth</td>
</tr>
<tr>
<td></td>
<td>• SnapLock®</td>
<td>• Meet corporate governance and regulatory requirements with WORM volumes</td>
</tr>
<tr>
<td></td>
<td>• IS 1200</td>
<td></td>
</tr>
<tr>
<td>Protect intellectual property</td>
<td>• NetApp DataFort</td>
<td>• Securely share IP, while controlling access</td>
</tr>
</tbody>
</table>
2 INTRODUCTION

Whether you are a commercial software developer, produce embedded software and tools for electronic devices, or create software applications for in-house use, your software development operations represent a substantial investment in infrastructure and human capital. Naturally, you want to get the most from that investment by increasing productivity, accelerating time to market, and keeping costs to a minimum.

Storage infrastructure and data management are a critical part of your software development effort. Choosing a storage solution with the right performance, reliability, and availability—while ensuring that your data is well protected—can be crucial to fostering innovation and ensuring success.

NetApp has long experience working with many of the world's top software development organizations. The unique features of NetApp storage solutions work in concert with leading software configuration management (SCM) packages such as IBM Rational ClearCase and Perforce to help you:

- Share data reliably and securely across globally distributed development sites
- Create a storage environment that is flexible enough to adapt to your changing needs
- Reduce backup windows and back up more often while simplifying and accelerating recovery

This white paper examines the unique business and data storage challenges presented by the software development lifecycle and describes how NetApp data management solutions help you overcome challenges in all lifecycle phases and simplify your operations for reduced cost, faster time to market, and competitive advantage.

Figure 1) The software development lifecycle.

Economic pressures have dramatically driven down information technology spending and budgets, but the demands on development organizations continue to rise. Your software developers must leverage the latest technology innovations to help them develop better software more quickly at lower overall cost without sacrificing quality. As the costs of data storage and management become an increasingly large part of your budget, you've probably already begun to recognize a number of data storage issues. This paper examines the following data management challenges in the context of the software development lifecycle:

- Improving storage utilization
- Accelerating local and remote data access
- Providing interoperability and multiplatform support
- Ensuring data protection and data availability
3 Optimizing Data Storage for Software Development

- Optimizing build environments
- Creating efficient test environments
- Addressing archiving and reference data requirements
- Protecting your intellectual property
- Lowering total cost of ownership

Solutions for each challenge are presented that apply to the phase or phases of the product lifecycle in which the challenge is most critical.

3.1 NetApp Solutions for Software Development

NetApp offers a full range of hardware and software to help you address the data storage challenges that are unique to software development. You choose the products and technologies that you need to tailor a data storage solution to meet the specific requirements of your operations. This section examines these challenges and describes the NetApp solutions that address them.

3.2 Improving Storage Utilization

LIFECYCLE PHASES: CONTENT CREATION, SOFTWARE BUILD, QA TESTING

Rapid data storage growth that can stymie your software development team and consume your budget may result from any of the following factors:

- Increases in the size of each software release
- Increase in the number of products you provide
- Accelerated rate of product releases
- Increasing numbers of developers and associated workspaces
- Increasing use of distributed development and outsourcing
- Larger file sizes (for example, HD images in gaming software, larger VHDL models in chip development)
- More frequent or continuous builds
- Space required for test environments

The challenge is to keep costs down by improving storage utilization, without losing the flexibility to grow your storage infrastructure as needed. Increasing use of server virtualization in particular is driving a need for flexible, networked storage. NetApp helps you achieve maximum storage utilization through a number of core technologies built into the Data ONTAP operating environment that runs on every NetApp storage platform.

**FlexVol technology.** Rather than forcing you to deal directly with physical disks and partitions, NetApp introduced a new building block, the flexible volume, a logical data container that can be managed and moved independently from underlying physical storage. NetApp FlexVol technology decouples the direct connection between volumes and their associated physical disks to vastly increase flexibility and storage efficiency. By making all disks available to all data sets through a common pool of storage, storage utilization improvements of up to 2X are possible.
As project requirements become defined, flexible volumes can be dynamically resized to ensure that disk space allocations reflect what is truly needed. When disk space is no longer needed by a particular project, server, or developer, it can be returned to the “free pool” and made immediately available elsewhere. Improved utilization means that you buy significantly less storage.

**Thin provisioning.** NetApp FlexVol technology makes it possible to oversubscribe free space to adapt rapidly to the changing needs of your development organization. Traditional disk arrays force you to allocate and dedicate all the storage space you might need to a particular volume or LUN at creation time. Early in a development project, space requirements may not be clear. This forces you to overprovision storage and results in higher costs. NetApp thin provisioning presents more storage space to the systems connecting to the storage system than is actually available on the storage system.

Consider how this might work in your development environment. Typically, you have to allocate a certain amount of working space, or scratch space, for use by each developer. If you look at the utilization of that space at any given time, you’ll probably find that only a subset of developers is actually fully using the space assigned to them. For others, that space is largely unused. In the traditional approach to space allocation, you allocate that space up front and it sits idle. With thin provisioning, your developers share storage from a pool; they receive physical (or additional) storage space only when they actually need it.

For example, suppose that 100 developers are each assigned 50GB of space. With standard provisioning, that's 5TB of storage. With thin provisioning, those 100 developers could accomplish the same work using half the storage or less without problems.

**NetApp deduplication.** Another core DATA ONTAP technology that can help you dramatically improve storage utilization is NetApp deduplication. Suppose that 50 developers have the same set of design documents or reference binaries in their home directories. Deduplication identifies and eliminates the duplication without affecting access. Each user continues to have his or her own “private” copy and can make changes without affecting other users.

By leveraging NetApp FlexVol technology, thin provisioning, and deduplication—individually or in tandem—you can significantly increase your overall storage utilization and delay new storage acquisition to keep costs down. By making more efficient use of the resources you already have, requirements for physical space, power, and cooling are also reduced. By alleviating pressure on scarce storage resources, you can increase the efficiency of your development staff, decreasing time to market.

**ACCELERATING LOCAL AND REMOTE DATA ACCESS**

**LIFECYCLE PHASES: CONTENT DEVELOPMENT, SOFTWARE BUILD**

As software development projects grow in complexity, storage performance and storage access speed must keep pace. It’s difficult enough to deliver high-speed data access for local developers, but remote development sites pose much bigger problems. Developers who are waiting for data are not being productive.
**Local access.** For local access (where data access is dictated largely by storage performance and not by intervening networks), NetApp FlexVol volumes ensure that each storage volume delivers optimal performance without requiring a lot of upfront planning. Every flexible volume that you create is automatically spread across all disks in the underlying aggregate. (See Figure 2.) Your storage admins don’t have to spend time figuring out how many disks are needed to get performance from a given storage volume. Using all available disk spindles for each volume makes it possible to immediately tap unused I/O capacity, yielding as much as a 2X performance improvement versus traditional volumes.

**Remote development.** When it comes to remote developers, software configuration management systems provide remote access either by maintaining synchronization between remote SCM systems and the central SCM system or by using proxy servers that cache a subset of the data at the remote site.

NetApp complements these solutions with both caching and replication solutions that can be used to distribute to remote sites developer tools and other data that are not part of the SCM repository.

**NetApp FlexCache.** NetApp FlexCache accelerates access for remote users. FlexCache creates a flexible caching layer in your storage infrastructure that automatically adapts to changing usage patterns to eliminate bottlenecks created by slow or congested WANs.

FlexCache works particularly well for software development and test environments where read performance is critical. When you use FlexCache for remote caching, there’s no replication to manage, bandwidth costs are reduced because only the data that is actually needed gets transferred, and the latest version of data is always accessible.

**NetApp SnapMirror.** If replication is the preferred solution for your needs, NetApp SnapMirror software provides an easy-to-administer replication solution that makes efficient use of available network bandwidth by transferring only changed blocks.

NetApp technologies can accelerate both local and remote data access, reducing bandwidth costs, eliminating bottlenecks, and moving data to where it needs to be so that developers can focus on creating innovative software rather than waiting to access the data they need.

**PROVIDING INTEROPERABILITY AND MULTIPLATFORM SUPPORT**

**LIFECYCLE PHASES: ALL**

You probably have developers who use a variety of desktop platforms, while your source code management system typically runs on UNIX® or Linux® servers. Your need to support a mix of UNIX, Windows®, and Linux clients may also be driven by a requirement for your software to be built and tested for a variety of operating environments.

To support different client platforms, you may be using protocol emulation products such as SAMBA, NFS Maestro, or PC-NFS, which increase complexity and maintenance overhead. By introducing another layer of software into the data path, these emulation products may also significantly decrease performance, slowing the flow of critical data to developers and reducing productivity.

**Unified storage.** NetApp unified storage can simplify complex, heterogeneous environments. Unlike other storage systems, NetApp systems support all the common NAS and SAN protocols from a single platform, so all your clients can access storage directly. Windows network clients access network storage by using CIFS, while Linux and UNIX clients use NFS to access the same files. You no longer need emulation products such as SAMBA or PC-NFS to allow different platforms to share network files, so management of client systems is simpler and performance is improved.

Because the same storage system can also support a Fibre Channel or iSCSI SAN in addition to NAS protocols, your overall environment is simple and fast. For example, your SCM system can access I/O intensive metadata (database) by using a SAN, while your data repository (version, archive, or source files) and user workspaces are stored in volumes accessible by CIFS and NFS—all on the same storage system. Because NetApp storage is flexible, you need fewer storage systems and you get more from each system deployed.

NetApp unified storage eliminates the complexity and data bottlenecks in heterogeneous environments to improve collaboration between developers while saving the capital and management costs that result from maintaining multiple separate storage environments.
ENSURING DATA PROTECTION AND DATA AVAILABILITY

LIFECYCLE PHASES: CONTENT DEVELOPMENT, SOFTWARE BUILD, RELEASE ARCHIVING AND DELIVERY

Comprehensive data protection is imperative to ensure that critical development data is never lost and that it remains accessible around the clock. Time lost due to unplanned system outages, interoperability conflicts, or developer error—as well as planned downtime for backups or upgrades—can cause delays that decrease profitability. You must protect not just the data stored in your SCM, but also individual user workspaces, because users may check out modules and work on them for days or weeks. Replicating your data repository to a remote facility may also be necessary to protect against site or regional disasters.

The biggest data protection challenges include:

- Long backup windows for tape backups (If your operation is global, there may be no good time to perform backups.)
- Productivity losses that result from the locking of SCM repositories during backup
- Ensuring adequate data protection for remote locations
- Increased complexity due to heterogeneous environments
- Long recovery times
- Slow restore from tape

The NetApp approach to protecting data begins with robust and highly reliable hardware and software. NetApp storage systems in high-availability (HA) configurations deliver up to 99.999% proven uptime, as measured across our installed base of storage systems.

NetApp also pioneered the use of dual-parity RAID (RAID 6) on general-purpose production storage. Before the introduction of NetApp RAID-DP, protection against multiple disk failures (without incurring a severe performance penalty) required disk mirroring (RAID 1), which provides protection but doubles your disk costs. Most other forms of RAID 6 have proven unpopular because they significantly slow down write performance, while NetApp RAID-DP does not.

The proven capabilities of NetApp hardware are complemented by a unique set of data protection and data availability tools:

- **Snapshot.** For backup, Data ONTAP includes Snapshot as one of its core technologies. With NetApp Snapshot, you can create and save up to 255 instantaneous, point-in-time versions of each data volume. Snapshot consumes additional storage space only when changes are made to a volume, so it is highly space efficient. End users can access Snapshots to recover files they have accidentally deleted or erroneously modified without involving IT or engineering support personnel.

- **SnapRestore.** With optional NetApp SnapRestore software, you can revert an entire volume to any previously saved Snapshot copy, enabling you to restore gigabytes or terabytes of data in a few minutes.

- **SnapVault.** NetApp SnapVault software leverages Snapshot core technology for efficient disk-to-disk backup to a local or remote secondary storage system. SnapVault uses network bandwidth very efficiently, because it transfers only the blocks that have changed since the last Snapshot copy (rather than whole files), and it automatically eliminates the duplication that results from other backup methodologies such as tape. An open systems version (Open Systems SnapVault) performs the same efficient disk-to-disk backup for non-NetApp primary storage.

- **SnapMirror.** NetApp SnapMirror technology also leverages the core Snapshot capability to efficiently mirror designated data volumes to a remote location to meet replication needs or for disaster recovery.

These tools provide flexible and effective protection for software development environments. Using NetApp Snapshot, you can capture a consistent backup of your SCM environment in a matter of minutes, eliminating the long backup windows that reduce productivity. Because Snapshot backup is fast, you can perform more frequent backups for greater protection. Because it’s efficient and doesn’t affect performance, you can capture and save more snapshots with NetApp than with competing products. If your environment becomes corrupted, you can recover quickly by copying individual files or repositories from a recent Snapshot or by reverting the entire storage volume to an earlier point in time.
You can back up some Snapshot copies to tape for longer term retention, or use SnapVault for disk-to-disk backup. The efficient bandwidth utilization of SnapVault makes it an ideal platform for centralized backup of remote locations, even locations with non NetApp storage.

For disaster protection, SnapMirror provides bandwidth-efficient, asynchronous replication of critical data stores to a remote site and can also be configured to synchronize data with remote sites for global operations.

![Diagram showing application of various NetApp data protection and other technologies in a global software development operation.](image)

An area that is often overlooked is protection of developer workspaces. Significant risks exist when these workspaces go unprotected, because developers may check out source modules and work on them for long periods of time before checking them back in. Allocating these workspaces on NetApp storage delivers the same or better performance as local storage, and you can provide frequent points of protection by using Snapshot. If the need arises, developers can easily restore or roll back to an earlier version of a file they are working on, even if they haven’t checked it back into the SCM system.

NetApp provides a complete suite of cost-effective tools that enable you to protect every aspect of your software development operation. Data is always available, so developers can work around the clock to meet time-to-market objectives.

**OPTIMIZING BUILD ENVIRONMENTS**

**LIFECYCLE PHASE: SOFTWARE BUILD**

Optimizing your build environment presents the following challenges:

- You need sufficient scratch space in your storage infrastructure to accommodate your builds, but you don’t want so much space set aside that it is underused.
- Smaller or component builds must proceed rapidly so that developers aren’t kept waiting, while larger overnight builds must finish before the developers return in the morning.
- Build activity must not affect storage performance for ongoing development.

Increasingly, organizations are building dedicated build farms, leveraging underused desktops, and parallelizing the build process to get builds done as quickly as possible. Your storage infrastructure has to be flexible enough to meet dynamically changing space requirements, while providing fast access for builds.
NetApp offers three methods for increasing storage performance to support builds.

**FlexCache.** With NetApp FlexCache, you can deploy caching storage systems between your primary storage repository and your build servers to relieve the load on central storage and to accelerate read performance efficiently and automatically without risky duplication.

By distributing file access loads, FlexCache scales the overall performance of your build without adding management complexity. Hot data sets are automatically replicated from the origin volume to FlexCache volumes. Additional caching systems can be added to scale performance as your needs grow.

FlexCache is optimally efficient because it transfers only the data that is needed to the cache. As a result, the caching system uses storage very efficiently. Less storage is required, providing significant cost savings versus alternatives that use data copies to relieve storage bottlenecks.

**Data ONTAP GX.** For those who want the ultimate in dedicated build farm storage performance, Data ONTAP GX clusters multiple storage systems together into a single, scalable system with a global namespace that supports both UNIX/Linux and Windows environments. Using the FlexVol High Performance Option, you can create striped volume sets that stripe files and volumes across multiple storage systems for read and write performance that far exceeds what is possible from a single storage system.

**FlexClone.** Another factor that affects software engineers productivity is the speed with which they can create a workspace and then start editing source files and compiling and debugging the code. Using FlexClone technology, software engineers can get a fully populated, prebuilt workspace in a matter of seconds. The engineer can modify files and recompile only the changed source code (perform an incremental build rather than a time-consuming full build) before beginning to debug. This dramatically reduces the time it takes to find and fix bugs, so engineers can be more productive.

Using NetApp FlexCache or Data ONTAP GX, you can make certain that even the most intense build activity won’t become a bottleneck due to storage performance or affect other ongoing development activities. FlexClone can be used to speed up local builds. Faster builds result in more work getting done in less time, decreasing your development costs and improving time to market.

**CREATING EFFICIENT TEST ENVIRONMENTS**

**LIFECYCLE PHASE: QA TESTING**

Software testing is time and storage space intensive. To be efficient, you need to minimize the setup time and space consumed by each test, but you don’t want to underprovision storage and run out of space or overprovision and waste valuable space.

- Each test requires a separate copy of the latest version of the software, as well as the appropriate test environment, including test data set and so on. This adds up quickly when you are running tests in parallel.
- You may need to test many different versions of your product running on different databases, server operating systems, and desktop environments.
- Setting up each test environment can take hours.

In the traditional approach to provisioning test environments, you have to make time-consuming physical copies of your software and test data. This slow manual process can consume vast amounts of storage and is not suited for provisioning the virtual machines (VMs) that are now common in test environments.

By comparison, NetApp FlexClone is nearly instantaneous, simple to configure, and ideal for dynamic virtual server environments. Provisioning a typical test environment using FlexClone takes about 3 seconds versus 27 minutes using the traditional approach. If a problem or error occurs during the test, it’s easy to roll back and start again.
Instead of making a physical copy of the necessary data, FlexClone simply clones the volume by using a process in which clones share the same storage and consume additional storage space only as changes occur. For example, in-house application developers frequently make copies of their production database for application testing and other purposes, with some sites maintaining up to 50 copies of large production databases. In other words, they have 50 times the storage they use in production to meet other needs. Using FlexClone technology you simply take a Snapshot copy of the production data volume and then create as many clones of that Snapshot copy volume as needed, as illustrated in Figure 6.

If you use virtual servers in your test environment, NetApp FlexClone provides an easy and efficient means of replicating VMs, again with only incremental storage required, dramatically reducing the storage needed to support your virtual environment while accelerating VM provisioning.

Your virtualization environment may also benefit from NetApp deduplication. Because each virtual machine requires dedicated storage for its operating system, there is an intrinsically high level of redundancy. You probably have numerous VMs that are all installed with more or less the same operating system and applications.

If you have 100 VMs in your test environment running the same OS, and each virtual machine requires 10 to 20GB of storage, that’s 1 to 2TB of storage dedicated to almost identical copies of the same data. Most users of deduplication find that they can recover 50% or more of the storage used in VMware® environments with virtually no performance impact, and some obtain space saving as high as 90%.
In some cases, your test environment may reach the point where you are no longer sure what you have, where it is, or who has (or hasn’t) been using it. In those situations, the NetApp Information Server 1200 (IS1200) can help you analyze your data to eliminate duplication, free up storage, and reduce your overall management costs.

By choosing the right tools for your test environment, you can significantly cut storage costs, and instead of spending time configuring test infrastructure, your test engineers can spend more time running tests for higher quality and reduced time to market.

ADDRESSING RELEASE ARCHIVING AND DELIVERY REQUIREMENTS

LIFECYCLE PHASES: RELEASE ARCHIVING AND DELIVERY
Corporate governance and regulatory compliance requirements are increasing the demands for data archiving in software development environments. You may also want or need to keep historical development, build, or testing data online for ease of access or ongoing maintenance activities. Once again, NetApp hardware and software provide the tools you need.

To ensure that archival data cannot be modified or deleted, you can use NetApp SnapLock software to create write once, read many (WORM) volumes on inexpensive SATA storage. You can use either SnapLock Compliance to meet stringent government requirements or SnapLock Enterprise for adherence to your organizational best practices. NetApp storage systems enable you to deliver different tiers of storage (Fibre Channel for performance, SATA for economy and capacity, WORM volumes) on a single storage platform, saving you money and complexity.

NetApp gives you archiving, compliance, and tiered storage in a single storage system for simplified management and reduced costs. Great space-saving features such as FlexVol, FlexClone, and deduplication can be used to increase the space efficiency of your archive far above that of other solutions. It's fast and easy to restore data from an archive, and you can use SnapMirror to distribute archived releases to various sites for support and maintenance.

PROTECTING YOUR INTELLECTUAL PROPERTY

LIFECYCLE PHASES: ALL
In today's global, fast-paced, and highly competitive market, you must protect your intellectual property (IP), even while you share it with outsourcing partners. NetApp storage security solutions use advanced encryption to ensure that only authorized users have access to data, while minimizing performance impact and management overhead. Our key management technology gives you the ability to quickly render IP data at a partner's facility unreadable when a partnership is terminated.
LOWERING TOTAL COST OF OWNERSHIP

LIFECYCLE PHASES: ALL

NetApp has worked closely with development organizations of all sizes for many years to understand and address the unique data storage problems you face. NetApp hardware and software technologies help you accelerate your development environment while simplifying management and reducing overall costs. Recent studies by Oliver Wyman (formerly Mercer Management Consulting) demonstrate that NetApp solutions reduce the total cost of ownership by 44% for file services\(^1\), 39% for VMware\(^2\), and 35% for archive\(^3\) in comparison to another leading vendor. These same studies show that NetApp also uses 50% less rack space and 52% less power, and produces 51% less heat\(^4\) than competing solutions.


4 CONCLUSION

Whether your problem is low storage utilization, performance, remote access, heterogeneous support, data protection, testing, or compliance, NetApp offers solutions that can address the issue without breaking your budget. (See Table 1 for a solution summary.) NetApp can help you deliver:

- **Breakthrough performance and scalability.** Enable nondisruptive capacity expansion and quick performance upgrades from entry-level to high-end configurations.
- **Ultimate collaboration for software development.** Development teams can maximize file sharing across heterogeneous platforms through native NAS (NFS and CIFS), SAN, and iSCSI support.
- **Highest availability.** Continuous data availability meets the needs of software development environments.
- **Unrivaled productivity.** Manage increasing storage needs and growing development teams with ease, enabling software developers to focus on their core competencies—designing and developing next-generation software solutions.
- **Maximum asset utilization.** NetApp FlexVol technology pools storage resources automatically and enables developers to allocate storage on demand.
- **More flexibility.** The Data ONTAP operating system combines the "just-in-time" storage advantages of thin provisioning with policy-based control for optimal application-level flexibility.

At NetApp, we help you succeed with the solutions that free your developers to focus on innovation, decreasing time to market and enhancing competitiveness while significantly lowering total storage costs.