

# Data Storage Consolidation in a Windows® Environment: Network Appliance™ Solution Benefits

## A

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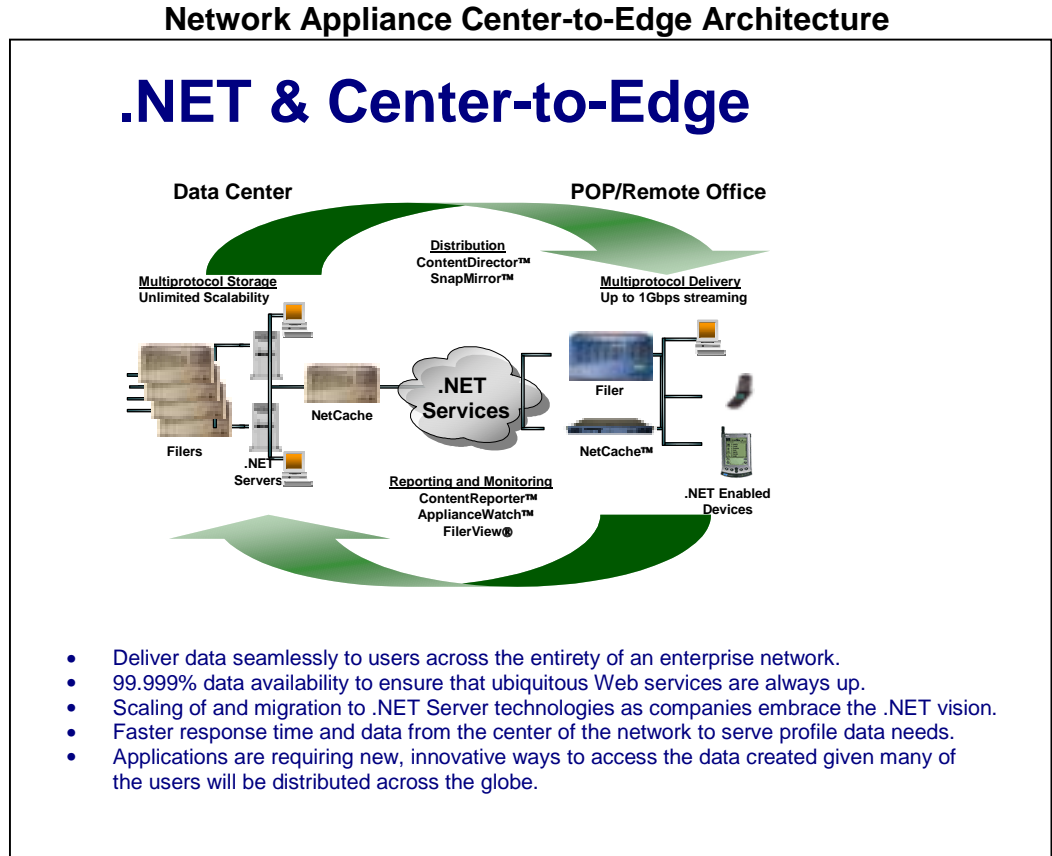
### Introduction

Organizations today face dynamic IT environments that require terabytes of data storage to multiply rapidly. This rapid growth commonly requires network systems engineers to address the challenge of adding and administering blocks of data in excess of 100 gigabytes. Such organizations and administrators can benefit from the performance, reliability, and management ease provided by Network Appliance filers.

The heart of a network-attached storage (NAS) solution offers cost-effective, flexible, and scalable increases in capacity, while simultaneously allowing for reliable server migration and data storage consolidation. Network Appliance filers provide this streamlined storage administration and management, along with secure data backup and recovery. The combination of these features and benefits makes Windows data storage consolidation using Network Appliance NAS filers a premium pick for optimizing data storage and high data availability across an entire IT enterprise.

The Network Appliance solution emphasizes seamless Windows NT® and Windows 2000 compatibility and significantly simplifies migration to Windows from UNIX® platforms. Akin to any other Windows file server in a Windows environment, Network Appliance filers rely exclusively on the Windows Domain Controller for authentication of Windows clients. This native support reduces security administration concerns and application server processor I/O burden. Additionally, native Windows protocol support allows Windows-based applications to scale significantly. Diagram 1 highlights Network Appliance's Center-to-Edge™ vision for the enterprise seamlessly layered over Microsoft's .NET vision.

Diagram 1



*Source: Network Appliance*

The next section provides an executive summary of survey findings. Subsequent sections contain discussions of server environment, drivers and benefits, alternatives and comparative advantages, and overall conclusions.

**B**

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**Executive Summary**

INPUT is a Web-based IT market research and marketing services firm. Since its inception, the company has offered full-service market research capabilities to IT buyers and vendors through subscription and custom projects. IT users and vendors rely on INPUT for data, research, objective analysis, and insightful opinion to prepare their plans, market assessments, and business directions. Through its ongoing research in the storage market, INPUT has developed knowledge and expertise concerning Network Appliance product offerings. Based on these capabilities, Network Appliance has contracted with INPUT to perform targeted research related to data storage consolidation.

In this first stage of ongoing research on data storage consolidation,<sup>1</sup> INPUT surveyed five data-intensive companies to assess the cost and performance benefits of a Network Appliance data storage consolidation solution in a Windows environment. Each of the five companies surveyed for this preliminary study are identified by industry vertical:

- Government – a government entity with growing military operation data needs.
- Healthcare – a healthcare organization with abundant patient, provider, and claim record data.
- Transportation – a transportation company with huge amounts of equipment and manufacturing tracking data.
- Telecommunications – a telecommunications provider with massive calling, work order, and billing data requirements.
- Financial Services – a financial services firm with broad and complex account and transaction data.

All five of the companies surveyed by INPUT consistently require large quantities of data storage space for Web servers, home directories, network files, user data files, and file sharing. The survey results show that each of the five companies reported consistent cost and performance advantages of a Network Appliance Windows data storage consolidation solution.<sup>2</sup>

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<sup>1</sup> This is a preliminary effort. Additional customer feedback will be added at a future date to reveal TCO benefits.

<sup>2</sup> One of the five companies interviewed has elected but not yet implemented the solution. As a result, only data related to the company's perceived benefits and estimated advantages are included in the survey statistics.

Cost benefits accounted for one third of the overall impetus behind a Windows data storage consolidation. Total cost of ownership and ongoing capital costs ranked highest in importance on the cost side – primarily due to user cost avoidance. However, performance benefits accounted for the majority (two-thirds) of the overall reason to consolidate data storage. Efficiency, availability, and backup/recovery ranked highest in importance on the performance side.

Except for one request for an added feature, the Network Appliance solution satisfaction rating actually surpassed every one of the customers' importance ratings. Based on the survey, a Windows data storage consolidation using a Network Appliance NAS solution actually delivers more value than customers expect.

Every customer voluntarily referenced the unique benefits of Snapshot™ and SnapManager™ for instant data backup and recovery. Customers also mentioned Network Appliance's product pioneering and operating stability as additional assurance factors.

**C****Server Environment**

Of the five customers surveyed, one customer, the financial services customer had not yet implemented a Network Appliance data storage consolidation solution. As a result, as depicted in Exhibit 1, of the four customers surveyed that have implemented a Network Appliance Windows data storage consolidation solution, only one customer experienced a reduction in the number of data sites (a reduction that was unrelated to the data storage consolidation solution).<sup>3</sup> The remaining customers experienced no data site changes.

Exhibit 1

**Network Appliance Windows Data Storage Consolidation  
Data Sites – Change in Number**

Customer by Vertical	Number of Sites		
	Pre Windows Data Consolidation	Post Windows Data Consolidation	Net Change
Government	1	1	0
Healthcare	30	1	-29
Transportation	1	1	0
Telecommunications	50	50	0
Financial Services	NA	NA	NA

*Source: INPUT*

Three of the customers implementing a Network Appliance Windows data storage consolidation solution due to home directory, file, and print server needs experienced a relative shift from Windows NT servers to IIS servers. As stated by the transportation customer, “It’s really more of a [license] redeployment issue.” The transportation customer continued, “By consolidating data storage on NetApp filers, we freed up NT licenses and expanded IIS licenses...Where we had the chance to rebuild servers, we used Windows 2000 instead of NT.” As evidenced in Exhibit 2, on the following page, overall, there was no significant evidence of a negative impact on Microsoft products.

<sup>3</sup> The significant site reduction experienced by the healthcare customer can be attributed directly to a redesign of their Exchange environment and not a data storage consolidation.

Again, a relative shift in Microsoft products was experienced as a result of data storage consolidation.

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 Exhibit 2

### Network Appliance Windows Data Storage Consolidation Microsoft Products – Change in Number

Microsoft Product	Overall Change
Total Windows Servers	-3
Total IIS Servers	2
Total SQL Servers	0
Total Exchange Servers	0

*Source: INPUT*

In addition, as witnessed in Exhibit 3, below, none of the customers reported Windows upgrades (i.e., from Windows NT to Windows 2000) as part of the impetus for a data storage consolidation solution. However, all four customers who have implemented a Network Appliance data storage consolidation solution considered such an upgrade a residual opportunity (i.e., a value-added opportunity).

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 Exhibit 3

### Network Appliance Windows Data Storage Consolidation Windows Upgrade (NT to 2000) – Reason & Status

Customer by Vertical	Reason	Status
Government	Residual Benefit	Not Yet Upgraded
Healthcare	Residual Benefit	Not Yet Upgraded
Transportation	Residual Benefit	Upgraded
Telecommunications	Residual Benefit	Not Yet Upgraded
Financial Services	NA	NA

*Source: INPUT*

**D**

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**Drivers and Benefits**

INPUT surveyed the five customers concerning why they were driven toward a Windows data storage consolidation solution (the solution “drivers”). INPUT also surveyed the customers about the benefits they expected to achieve from such a consolidation effort (the “benefits importance rating”), and, where possible, whether or not those benefits actually had been realized (the benefits “satisfaction rating”). In doing so, INPUT obtained quality cost and performance information related to a Network Appliance Windows data storage consolidation solution. In all cases, cost and performance issues were the main drivers. Cost and performance improvements were the most important benefits expected as well. Finally, where a solution was implemented, cost and performance benefits were realized.

***Cost and Performance***

Exhibit 4, on the following page, illustrates the two most important benefits each customer expected to achieve from a Windows data storage consolidation effort. Each customer surveyed by INPUT proffered these top two benefits (i.e., the particular survey query was left open to collect undirected responses). Each customer voluntarily responded with a cost and a performance benefit. And, in virtually all instances, the surveyed customers’ satisfaction ratings were higher than expected.<sup>4</sup> As the healthcare customer explained, “A consolidation effort is about cost reduction and increasing system availability and performance.”

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<sup>4</sup> The one instance where customer satisfaction was not at least equal to the benefit importance occurred in relation to the government customer surveyed. The customer indicated total satisfaction with the solution. However, the customer would like to see a new feature in the Network Appliance solution. The customer requested that Network Appliance’s solution soon permit dynamic shrinking (e.g., “contraction” or “reduction”). In other words, the customer would like the ability to make easy storage volume reductions of an existing large block of storage (as opposed to discarding the block and recreating a smaller block), much as the solution already permits easy storage volume increases of an existing large block of storage (dynamic expansion).

Exhibit 4 illustrates proffered cost and performance benefits

Exhibit 4

### Network Appliance Windows Data Storage Consolidation Proffered Benefits – Importance vs. Satisfaction

Customer by Vertical Industry Segment	Proffered Primary Benefit	Importance Rating (5=high) (1=low)	Satisfaction Rating (5=high) (1=low)
Government	Cost – Reduce Administrative Overhead	5	5
	Performance – Operational Flexibility	4	3
Healthcare	Cost – Administrative Burden/Efficiency	5	5
	Performance – Security/Virus Control	5	5
Transportation	Cost – Reduce Management Cost	4	4
	Performance – Increase Data Availability	4	5
Telecommunications	Cost – Reduce Need Additional File Servers	4	4
	Performance – Switch Vendors	5	5
Financial Services	Cost – Reduce Need Additional File Servers	4	NA
	Performance – Switch Vendors	5	NA

Source: INPUT

With regard to the open-ended benefits question, according to the customers surveyed, the most important cost benefit is cost avoidance through improved data storage administration and management. The telecommunications and the financial services customers also voluntarily cited avoidance of the need for new server additions as crucial. The telecommunications customer stated, “By utilizing NetApp® filers, we have reduced the need for additional file servers required around the country...and centralized the management of them...We’re real happy with the [NetApp] filers.” The same customer also conveyed that, in order to realize overall system performance benefits, it was necessary to change storage vendors.<sup>5</sup>

With regard to the open-ended benefits question, according to the customers surveyed, the most important performance benefits are operational flexibility, high data availability, and security. The transportation customer offered, “The consolidation of the NT file servers to Network Appliance filers has given us greater uptime for our applications dependent on those file resources and freed up servers [and space] for us to use in other ways. I would highly recommend a [Windows 2000]/NetApp mixed environment. The

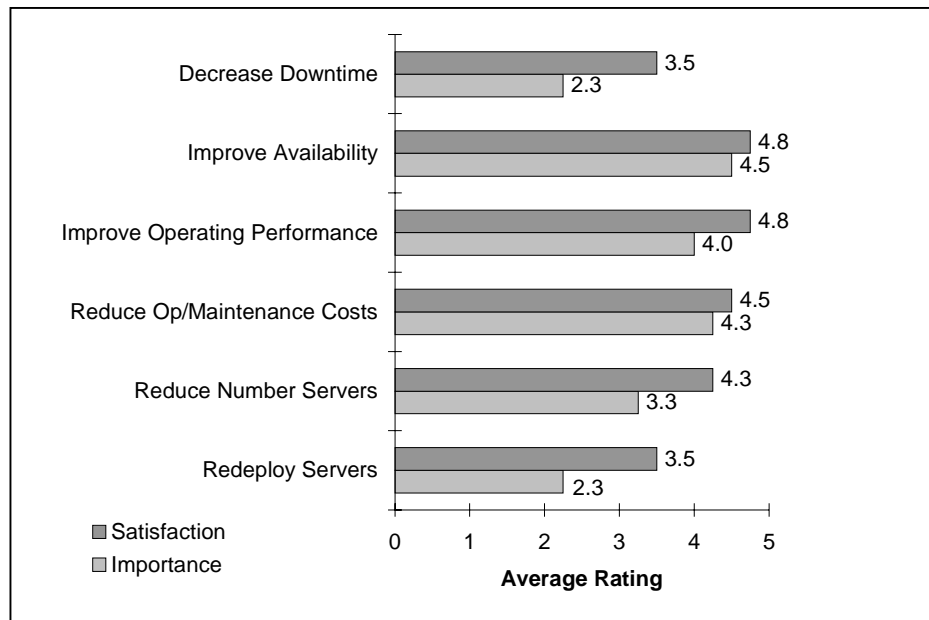
<sup>5</sup> The telecommunications customer abandoned all Banyan servers based on continuing interoperability issues and the fact that, as an operating system, it is no longer being supported.

[Windows 2000] products are very solid and we are happy with their performance” in combination with NetApp.<sup>6</sup>

INPUT also surveyed the customers on particular cost and performance benefits related to a Windows data storage consolidation. The results are shown in Exhibit 5.

Exhibit 5

**Network Appliance Windows Data Storage Consolidation  
Surveyed Benefits – Importance vs. Satisfaction**



Source: INPUT

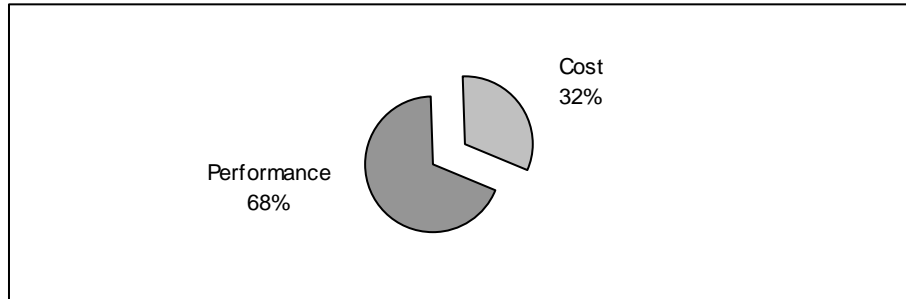
According to the customers surveyed, the most important overall benefit of a Network Appliance Windows data storage consolidation is improved data availability. Following closely behind are the benefits of reduced operating and maintenance costs as well as improvement in operating performance. Reduction in the number of servers ranked fourth in overall cost and performance benefits, while the reduction in downtime and redeployment of servers were ranked as comparatively medium in importance. Again, as with the proffered benefits, all customers ranked satisfaction with the Network Appliance Windows data storage consolidation solution above each benefit’s importance.

<sup>6</sup> Note that “Windows 2000” was inserted where the customer used the term “W2K.”

Exhibit 6 depicts surveyed customers' heavier weighting of expected performance benefits (over cost benefits) as a result of a NetApp Windows data storage consolidation. While surveyed customers consistently cited expected cost benefits as important, they cited expected performance benefits as being the more important. Expected performance benefits account for two-thirds of the overall drivers behind Windows data storage consolidation efforts.

Exhibit 6

**Network Appliance Windows Data Storage Consolidation  
Overall Surveyed Drivers – Cost vs. Performance**



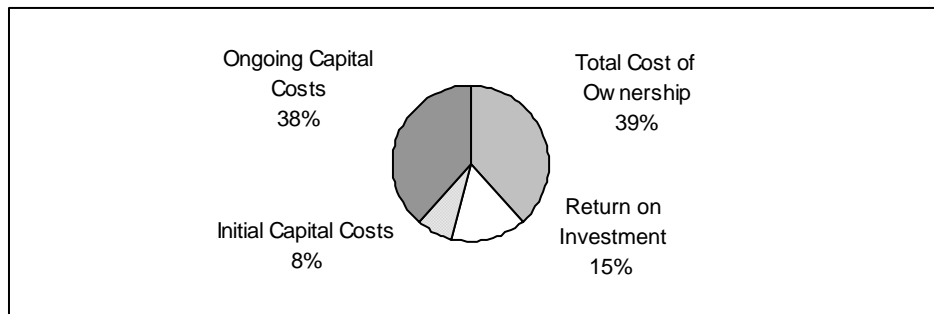
Source: INPUT

**Specific Cost Benefits**

Concerning specific cost benefits expected from NetApp Windows data storage consolidation, Exhibit 7 illustrates that customers view total cost of ownership and ongoing capital costs as the most important cost-benefit considerations. Return on investment followed next in importance, and initial capital costs ranked the least important of all cost-related issues in the opinions of the surveyed customers.

Exhibit 7

**Network Appliance Windows Data Storage Consolidation  
Specific Surveyed Drivers – Cost**



Source: INPUT

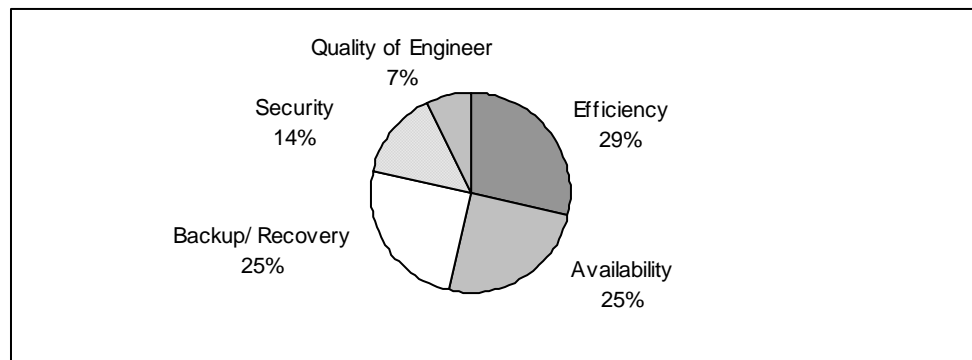
The transportation customer explained, “Corporate-wide, we had a freeze on server growth. [As a result], we were a prime candidate for file data storage consolidation.” The healthcare customer noted, “While solutions can be cost-effective to millions of dollars, overall uptime and a reduced number of engineers required to manage [a system are] just as valuable.”

### **Specific Performance Benefits**

Concerning specific performance benefits expected from a NetApp Windows data storage consolidation, Exhibit 8, below, illustrates the relative equality in customer-perceived importance among efficiency, availability, and backup/recovery capability (note that efficiency ranks just slightly ahead of the other two performance-related benefits). Security appears to be less of a concern related to a Windows data storage consolidation.

Exhibit 8

#### **Network Appliance Windows Data Storage Consolidation Specific Surveyed Drivers – Performance**



Source: INPUT

The government customer responded, with the Network Appliance filers, “We can readjust storage space in a different way. ...The unused storage space was so fragmented [before we purchased NetApp filers], it couldn’t be used. ...Now we can use the freed storage [resulting from consolidation] for something different. Storage administration as a whole is much easier.”

The transportation customer explained, “The thing that is most attractive about the NetApp solution is the ability to add storage cells and grow volumes of storage without having to recreate volumes. The

NetApp solution also has lived up to its advertised uptime benefits (data availability).” The customer continued, “Once we put the NetApp filers in, I haven’t had to touch it at all. My time has been saved. ...The most difficult thing to deal with [concerning storage] is the management cost. Every three to four months someone is running out of space. With NetApp, we have blocks of disks that we can hand out, as we need, with a single command requirement. With 800 engineers earning \$50 per hour, we figure we’ve saved hundreds of thousands in [terms of] cost avoidance.”

In two instances, customers actually credited Network Appliance filers with providing greater flexibility to their Windows NT environments. The government customer remarked, “The Windows NT file server does not handle large programs well; it is not flexible [for data storage management]. In order to enlarge [a] volume, one must copy the data off, add drives, and copy the data back on. We are getting around that [limitation] by doing the NetApp solution.” The financial services customer explained, “Our first goal is to use NetApp [filers] to mend a problem with a solution we already have. We basically are looking to cluster file structures for NT systems because our existing hardware (Compaq) does not allow us timely updates...it’s giving us problems with NT.”

All of the customers surveyed mentioned the unique security-related benefits of Network Appliance’s Snapshot and SnapManager features. The healthcare customer remarked, “SnapManager added functionality was a consideration that far outweighed cost. ... The ability to take ‘Snapshots’ with integrity checks” clinched the Network Appliance decision. The telecommunications customer noted, “Snapshots are the key; they have saved us [from data loss]. ... Backup/recovery is so much easier with Snapshot.” The transportation customer remarked, “The backup and recovery benefits from Snapshot were an added bonus. We don’t have to go to tape. One can’t ask for more.”

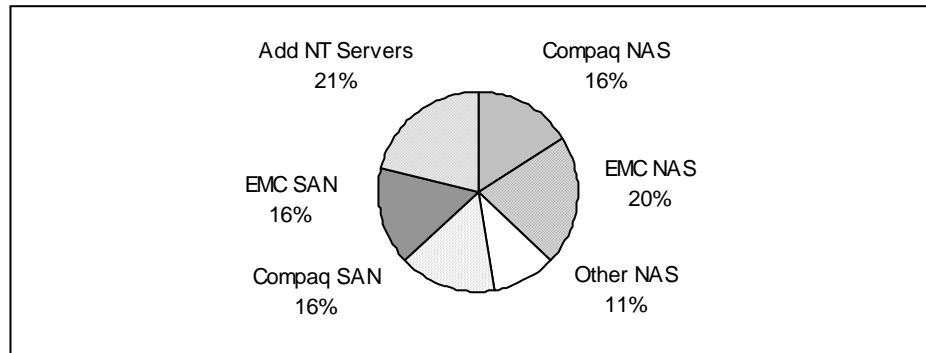
Finally, all of the customers surveyed agreed with the cost- and performance-based benefits of “fewer but more able” engineers (resulting partly from streamlined storage administration and management requirements following a Windows data storage consolidation). The government customer responded, “In our particular environment, we are very short on administrative time. Anything we can do to save time is very important. We cannot add more people, regardless of how busy we are.”

**E****Alternatives and Comparative Advantages**

Exhibit 9, below, depicts the solutions surveyed customers considered as alternatives prior to selection of a Network Appliance Windows data storage consolidation solution. Not surprisingly, most customers surveyed considered the status quo (i.e., continued addition of new discrete file servers) as a possible solution to growing storage space requirements. However, based on operational proof and experience, each customer noted that performance restrictions are an inevitable companion of server add-ons. Therefore, it made sense to evaluate NAS and SAN solutions. The majority of customers surveyed considered EMC or Compaq solutions as alternatives to a Network Appliance solution. Other solution vendors mentioned as alternatives include Auspex, Veritas, and CrossStor.

Exhibit 9

**Network Appliance Windows Data Storage Consolidation  
Alternatives – Other Solutions Considered**



*Source: INPUT*

However, as captured in Exhibit 10, on the following page, the customers surveyed evaluated the Network Appliance Windows data storage consolidation solution as the better overall solution—both for cost and performance reasons—for their particular server environments and high-volume data storage needs.

Exhibit 10 summarizes advantages of the Network Appliance Windows data consolidation solution.

Exhibit 10

### Network Appliance Windows Data Storage Consolidation Proffered Comparisons – Advantages and Disadvantages

Common Disadvantages Other Storage Solutions	Comparative Advantages Network Appliance	Bonus Advantages Network Appliance
Compaq NAS - unproven product	√ Proven flexibility	√ SnapManager application and Snapshot capability
Compaq SAN - limited performance	√ Better performance	
EMC NAS - less functionality	√ Higher functionality	√ Vendor track record and responsibility
EMC SAN - prohibitive cost	√ Cost avoidance	

Source: INPUT

Compaq's NAS solution was considered by customers as too new on the market and, as a result, somewhat untested. Companies that considered Compaq's SAN solution deemed it had limited performance parameters (particularly in relation to Windows).

When EMC's NAS solution was evaluated, it was considered less functional. EMC's SAN solution was noted as being "overkill" and much more expensive. Overall, most customers deemed EMC too expensive for their needs. In fact, one customer went so far as to say, "An EMC solution, no matter which solution, is overkill."

Three customers cited problems with Compaq's storage solutions. The government customer noted, "Typically, in the past, we would have decided to add more Compaq servers. ... We have been a Compaq shop for a long time. ... However, we looked at Compaq based on Windows 2000 and were afraid we would have some of the same limitations as we had with Windows NT. We thought the Compaq solution was more limited than NetApp's." As mentioned earlier, the financial services customer echoed the same troubling mix between Compaq and Windows NT.

The transportation customer went to further lengths to illustrate its difficulties. Said the customer, "We had Compaq storage solutions before, but we kept hitting hard limits. We could not grow our storage easily. We had to set up a new NT server, additional fiber-attached storage, and an additional backup client. Then, additional problems arose—again, due to the limitations of Compaq in a Windows environment. It was an endless chain...every couple of months.

Compaq was proposing a SAN infrastructure and software to manage, but it was way out of our price range.”<sup>7</sup>

In addition, the financial services customer considered further movement toward a UNIX platform through addition of more Linux servers, as opposed to continued growth on Windows. However, the customer concluded that remaining with Windows, combined with a NetApp solution, was the better alternative. Upon evaluating EMC’s solution, the financial services customer remarked, “From a technological perspective, we were not all that happy with it and price-wise it didn’t compare at all.”

Customers also clearly like the fact Network Appliance has “been around” for a while. According to the financial services customer, other solutions do not offer the same product stability. Said the customer, “NetApp is willing to take responsibility for its product and operations.” According to another customer, the telecommunications customer, “One of the key reasons we decided to go with NetApp is because it is established; its solutions are established. ...We are a Compaq shop when it comes to servers, and their reliability has been high. However, there have been a couple of things in the [Compaq] solution we have not been happy about (regarding the way certain features were presented in the solution), so we were even less sure about the reliability of a new Compaq [NAS] solution.”<sup>8</sup>

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<sup>7</sup> The transportation customer elaborated on the Compaq-Windows trouble. “For example,” said the customer, “with file browsing, using Explorer, due to the number of CAD files, we couldn’t even open a window with Compaq. We had reached, gone beyond, the reasonable limits of the Compaq storage. With the NetApp solution, related to directories with a large number of files, we’ve experienced at least a ten-fold improvement in performance. In terms of the actual storage efficiency with CAD apps, we’ve experienced a performance improvement of two to three times.”

<sup>8</sup> Concerning difficulties with Compaq, the telecommunications customer explained, “Compaq used a modified Windows 2000 operating system [in its servers]. It used full redundancy on its servers, but it appeared [due to the way Compaq configured the operating system] the cost associated with [dealing with the modified operating system] would have been more than if we did without the NAS solution” (i.e., it would have been more expensive to go with a Compaq NAS solution than to accrue costs associated with simply continuing to add servers and not opting for a Compaq NAS at all).

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**Conclusion**

Across the board, based on the experiences and opinions of the customers surveyed, Network Appliance's Windows data storage consolidation solution was determined to be the most cost-effective solution for optimizing data storage and high data availability over an entire IT enterprise.

For companies requiring large amounts of data storage space for Web servers, home directories, network files, user data files, and file sharing, the cost and performance advantages of a Network Appliance Windows data storage consolidation solution are easily evident. Based on INPUT's research, total cost of ownership and ongoing capital cost advantages, as well as efficiency, availability, and backup/recovery benefits virtually are guaranteed in every implementation. The unique benefits of Snapshot and SnapManager shone through without solicitation in each customer instance as well. A Windows data storage consolidation using a Network Appliance NAS solution actually delivers even more value than customers expect. Finally, the valuable solution is delivered by a company customers believe is both stable and dependable.

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