

# White Paper

---

## **NetApp Brings Agility to Oracle Database Environments**

*By Brian Babineau, Vice President, Research and Analyst Services*

**September 2012**

---

This ESG White Paper was commissioned by NetApp and is distributed under license from ESG.

## Contents

Introduction .....	3
Oracle Environments and Infrastructure Changes Will Happen .....	4
The Effect of the Cloud Dynamic .....	4
Getting over the First Hurdle .....	4
Why Companies Should Consider NetApp .....	5
Leveraging Experience for Future Value .....	5
The “Three I’s” of an Agile Data Infrastructure .....	6
What “Agile” Could Mean to You .....	7
Better Availability and Resource Provisioning .....	7
Controllable and Predictable Costs .....	8
NetApp in Action .....	8
The Bigger Truth .....	9

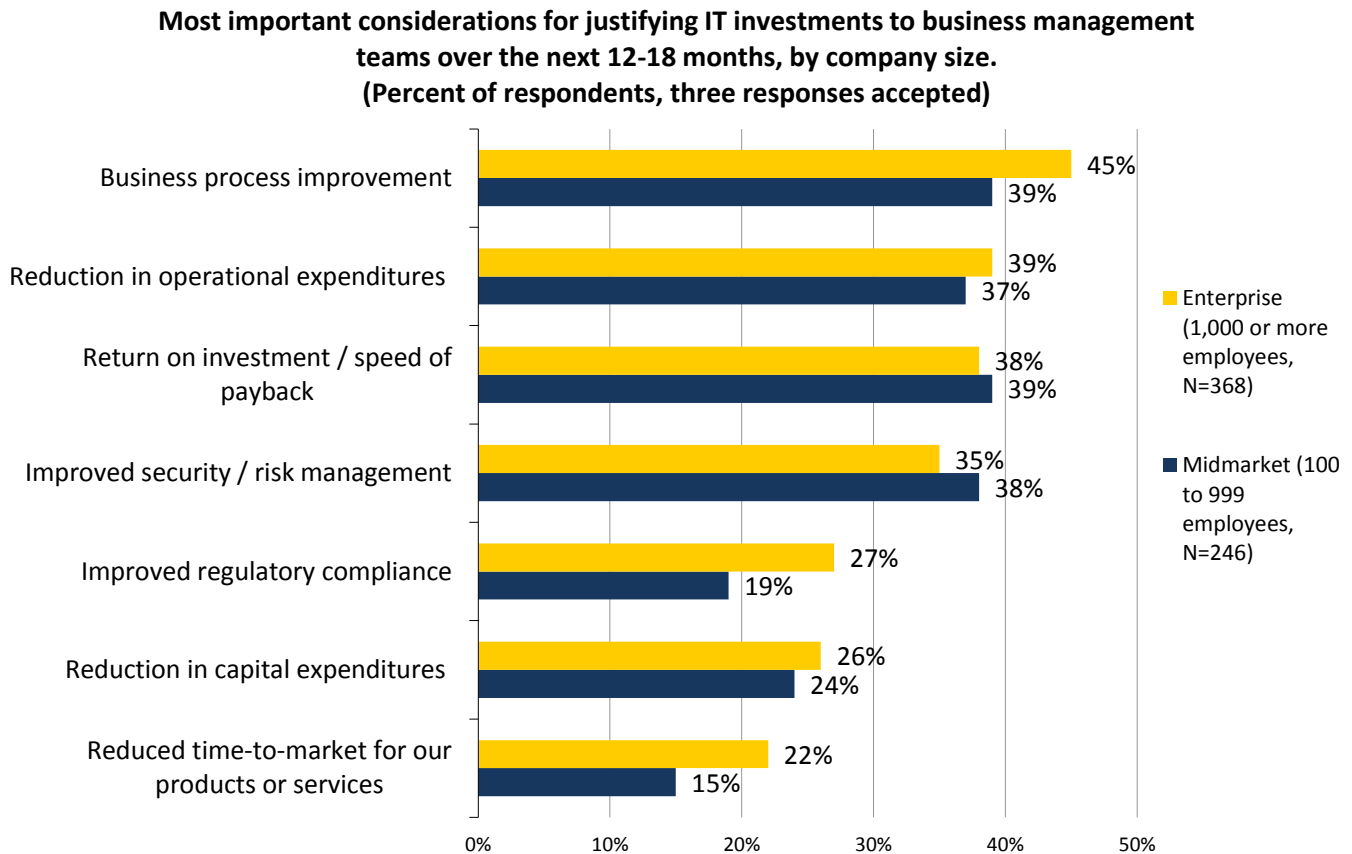
All trademark names are property of their respective companies. Information contained in this publication has been obtained by sources The Enterprise Strategy Group (ESG) considers to be reliable but is not warranted by ESG. This publication may contain opinions of ESG, which are subject to change from time to time. This publication is copyrighted by The Enterprise Strategy Group, Inc. Any reproduction or redistribution of this publication, in whole or in part, whether in hard-copy format, electronically, or otherwise to persons not authorized to receive it, without the express consent of The Enterprise Strategy Group, Inc., is in violation of U.S. copyright law and will be subject to an action for civil damages and, if applicable, criminal prosecution. Should you have any questions, please contact ESG Client Relations at 508.482.0188.

## Introduction

The various constituents of the IT marketplace, ranging from senior business executives to systems administrators, constantly ask ESG to describe the most substantial technology trends that will affect the industry over the next few years. At present, the industry is being affected not just by trends that focus on specific technology, per se; rather, it is the mindset of the industry that is driving purchasing decisions.

In ESG’s most recent IT spending intentions survey, business-process improvement efforts and speed of payback both eclipsed capital-expenditure reduction as means of justifying an IT investment (see Figure 1).<sup>1</sup> Put another way, IT departments are beginning to seek out and implement technology solutions that deliver a business return, as opposed to deploying solutions that simply cut costs.

*Figure 1. Important Considerations in Justifying 2012 IT Investments*



Source: Enterprise Strategy Group, 2012.

This new reality presents IT organizations with plenty of opportunities, including the ability to have a direct material impact to the business. Conversely, this new reality also means that technology teams must move at the speed of business. Applications and the supporting infrastructure—inclusive of database, compute, networking, and storage resources—have to be provisioned quickly. When deployed, the applications—and more importantly, the information being transacted within them—should remain available because, as noted, if these systems were tied to business, any downtime could negatively affect revenue, supply chains, customer service, and other crucial processes.

This isn’t the first time IT has been tied to business success. Many IT pros can think back to Y2K and the seemingly never-ending upgrades done to ensure that businesses were not going to be disrupted. However, at this point, IT is being asked to deliver business value without having the benefit of a seemingly endless budget.

<sup>1</sup> Source: ESG Research Report, [2012 IT Spending Intentions Survey](#), January 2012.

Cost control may no longer be the primary technology purchasing driver, but it is also not an afterthought. As such, we are witnessing IT organizations examine all aspects of their operations, identifying areas where budget spending can deliver on the promise of supporting business innovation for the same or lower cost than what is used today. [NetApp](#), a leading information storage management solutions provider, has aligned with IT's thinking in this regard as it highlights its portfolio as having the proper underpinnings of an "Agile Data Infrastructure."

This paper provides a starting point for IT to apply the concepts of Agile Data Infrastructure (more commonly discussed in ESG's words as "IT moving at the speed of business with better service levels and lower costs") to Oracle database environments. Because of the known importance of database applications, especially those built on Oracle, this is a natural genesis-event for IT to begin its journey in achieving a positive business impact within increasingly strict budgetary constraints.

## Oracle Environments and Infrastructure Changes Will Happen

Examining how broader-level market trends affect Oracle also involves examining specific opportunities and challenges for IT. The biggest opportunity/challenge centers on the criticality of the environments that can evolve if IT is willing to take on the projects. Organizations build their application strategies on Oracle databases, leveraging premium functionality to deliver the best possible system for the business. This effort includes tinkering with the system, potentially introducing a bevy of risks. But it also means that these databases are usually the most expensive: They run on expensive hardware, receive substantial operational resources, etc.

Before technology decision-makers move too fast, it is best that they understand the source of business pressures including process acceleration, non-stop availability, and adaptability so that the appropriate success metrics can be put into place. They also must navigate the tough first decision—either leave the database environment alone or make a well-thought, risk-adverse modification.

### The Effect of the Cloud Dynamic

The cloud dynamic has changed what IT organizations need to consider when they embark on the effort to refresh and improve their Oracle database environments. External cost, performance, availability, and agility benchmarks all now exist. IT's internal customers, the business users, care more about the applications and the underlying infrastructure than ever before, and they are watching how IT executes in relation to outside metrics more closely than ever, too.

In today's cloud-centric world, the interlinked concepts of "moving fast," "provisioning fast," and "scaling fast" appeal to business-unit owners, application owners, and IT alike. They all want application cycle times for refreshes and upgrades to happen quickly and non-disruptively. They all want to deploy new versions and new features faster than ever. And they all want to add new users fast.

Those requirements represent the aggregated requirement of "moving at the speed of business." The additional necessity, also being driven by cloud, is availability. External providers offer a service level that promises users a particular level of uptime. Although these service levels may be mere "paper promises," they introduce a notion to application owners that patches, upgrades, hardware refreshes, and other infrastructure operations can be done with little to no downtime. This expectation puts an enormous amount of stress on internal database groups because they are the ones responsible for optimizing Oracle environment performance, creating development and testing environments, and architecting, along with storage teams, data protection schemes to maximize availability.

### Getting over the First Hurdle

Today, IT organizations can take two paths when evaluating what is next for their Oracle environments.

The first path involves bucking current trends and maintaining current service levels and operations while keeping costs flat or decreasing them. Because of consistent data growth and application modernization efforts (the shift to x86 architectures, mobile enablement, etc.), this approach is admirable but rarely sustainable. Current ad hoc optimization techniques, such as over-provisioning hardware to solve performance issues or copying/replicating full

database instances for development and testing purposes, will not scale and threaten the ability of IT to truly maintain or reduce costs. Unfortunately, these strategies rarely achieve the one metric IT is targeting, that is, keeping costs flat or lowering them. The primary expense that increases when companies just try to keep up is Oracle database license costs; they are tied to the number of database instances and the size of the hardware on which each instance runs.

The second path, conversely, has the potential to deliver better service levels at the same or lower cost. It involves IT figuring out where Oracle database infrastructure elements, inclusive of storage, can help. The reason that storage infrastructure can increase IT flexibility while improving efficiency centers on the innovations within the disk systems themselves. A multitude of innovations have arisen in:

- Optimal database data placement across media to deliver better performance at a lower cost
- Data-reduction techniques, including compression, which reduce database capacity consumption
- Capacity-efficient copying, cloning, and replication techniques enabling development and testing environments to be instantiated swiftly without adding substantial hardware
- Integration with Oracle Recovery Manager (RMAN) and Oracle Data Guard to deliver the highest levels of data protection and data availability across an entire database environment
- Management and monitoring of the database and storage from a centralized interface facilitating swift troubleshooting
- Support for Oracle in virtualized server environments, facilitating seamless movement of database elements across operating systems and physical server hardware

When IT acknowledges and implements some (if not all) of the aforementioned capabilities, line-of-business application owners quickly see that it is possible to improve service levels and control costs simultaneously. More specifically, because the functionality is executed within the storage layer, the business doesn't risk absorbing unanticipated Oracle license fees that are built around the number of instances and the size of the servers running them. For example, an Oracle RAC environment may not be dealing with a large query optimally. But with the right storage infrastructure, part of the database index and the newer tables can live on flash-based storage—deployed as cache or solid-state disk—to reduce latency. The alternative may be to distribute the query among more and/or bigger servers, which can drive up database licensing costs.

## Why Companies Should Consider NetApp

### Leveraging Experience for Future Value

Taking the second path requires IT management to find the right storage partner, and an abundance of options exist in the marketplace. NetApp is likely to make the short list—primarily because:

- NetApp has a history of delivering value in Oracle database environments. In short, NetApp has architected solutions in mission-critical Oracle database environments for many years, and it understands the intersection and relationship between storage and database solutions.
- NetApp has a forward-looking vision for an “Agile Data Infrastructure.” NetApp is neither trying to build the least expensive solution, nor is it trying to build the fastest solution for one discrete workload. Instead, the company has invested in a portfolio that enables IT to achieve “cloud like” business responsiveness and budget objectives. A great example of this investment commitment is completion of Oracle Validated Integration with Oracle Enterprise Manager 12c providing IT a single place to monitor their entire database cloud environments from the data files through the storage on which they are saved.

## The “Three I’s” of an Agile Data Infrastructure

With a history of successfully supporting Oracle database environments and a vision of how to continually optimize them for the future, NetApp has educated the market to think and solve challenges differently. This achievement is best exemplified by how NetApp describes the characteristics of its Agile Data Infrastructure.

Here, ESG summarizes NetApp’s major points while analyzing solution applicability for Oracle environments.

### ***Intelligent Management***

Intelligent management stems from NetApp’s keen understanding of issues related to storage management for databases, especially concerning provisioning of incremental capacity whenever data files, log files, and other components push existing allocation limits. All NetApp systems, regardless of how they are configured (host interface, media type, etc.), run the same operating system. That consistent approach allows administration teams to learn basic functions such as capacity provisioning once, then continue to use that knowledge as needed across any NetApp device. And when the time comes to allocate more capacity, the task can be done online with a few mouse clicks.

NetApp systems remove the risk of downtime from Oracle database environments that are growing along with a business. Another intelligent management-specific benefit that IT will find useful is automated storage tiering, which moves data to the specific storage medium that will deliver optimal application response time. This exercise, done transparently at the database and application layer, helps customers leverage a mixture of flash storage and cost-effective SAS and SATA drives. In Oracle OLTP environments, customers are capitalizing on NetApp’s Flash Cache to extend buffer cache configurations to boost response times. Ultimately, this level of performance management intelligence is an advantage because it means IT doesn’t have to buy as many servers or as many Oracle licenses, nor does it have to waste storage capacity by using only a portion of a system in a quest to reduce response times.

### ***Infinite Scale***

NetApp Data OnTap, the core operating system for all storage controllers, enables customers to extend logical data stores across physical systems. At the centerpiece of this offering, clustering capabilities enable IT to add storage capacity and compute power linearly, so an environment can achieve seamless, multi-dimensional scale with few or no trade-offs. In contrast, a conventional storage architecture enables a user to add capacity at the expense of performance, or vice versa. In an Oracle environment, the true value of this capability relates to flexibility in scaling a particular Oracle database environment based on its requirements. Some environments may be capacity intensive but not performance sensitive. Others need fast resources but are lean in terms of density. More importantly, when scale-related flexibility combines with intelligent management, IT can quickly allocate or de-provision resources as needed.

NetApp’s multi-dimensional scale is extremely valuable when IT consolidates a mix of Oracle workloads on a storage cluster. Because capacity and performance can scale without comprising the other, NetApp customers can drive up capacity utilization by consolidating multiple Oracle databases on a single storage cluster. This approach makes management and protection of the environment much easier than is the case when IT implements separate performance-centric and capacity-centric storage devices to achieve a single objective (better response time or a cost target).

### ***Immortal Operations***

Keeping data available forever is not that simple in a hardware environment. Yet NetApp has extended its innovation efforts to do just that. Its systems—including clustering and data protection software incorporating snapshot and replication technologies—are designed to keep an Oracle environment online, all the time. This means being able to seamlessly add new systems to a storage cluster, moving data to new resources easily, and replacing older physical devices as needed.

Immortality in Oracle environments is typically tied to native database tools such as Oracle RAC, RMAN, and Data Guard to achieve a combination of high availability, data protection, and disaster recovery. These tools provide tremendous value for the database component. And in many environments, NetApp is not going to replace them.

What NetApp does offer is the ability to execute data protection functions across the entire database environment—including application binaries and file system data that may be saved on the same storage system as the actual database tables. As an example, NetApp can execute a snapshot of file data that has changed since the last copy and replicate it to a remote system via its SnapMirror solution. This extremely efficient method of replicating data can be connected to a Data Guard implementation (which is replicating the database by sending log file updates to a standby database) to achieve full availability of the entire environment (file data plus the database) without consuming substantial network resources. The alternative method is to send a full copy of the file data and the database using local mirroring, then shipping the copies to a second site, which requires substantial bandwidth between two locations and far more capacity on both the source and target devices. When it comes down to it, if companies only care about replicating the database, they can use Oracle Data Guard or NetApp SnapMirror. For organizations that want a complete disaster recovery solution for the entire database environment, DataGuard and SnapMirror can be used in tandem, or, SnapMirror can be used to cover a preponderance of the needs on its own.

## What “Agile” Could Mean to You

At a minimum, NetApp’s “three I’s” of an Agile Data Infrastructure should provide a new lens to business and IT leaders who want to march down the path toward improving Oracle environment operations at the same or lower costs. From ESG’s perspective, companies can (and should) categorize the benefits according to the benchmarks currently driving technology decisions. A few examples follow. (This list is not exhaustive by any means.)

### Better Availability and Resource Provisioning

The benefits include being able to:

- **Cut secondary database provisioning times** using NetApp FlexClone, which creates a near-instant, writable, space-efficient (meaning it looks like a full copy but doesn’t consume nearly the amount of storage) snapshot. Application developers benefit by not having to wait for large quantities of storage to be provisioned, and those capacity savings also add a cost-saving element to this benefit. Overall, cycle times will speed up, and IT can perform refreshes and upgrades, and incorporate new Oracle versions and features faster.
- **Lower risk of data loss** via the integration of NetApp snapshot with Oracle RMAN Media Management Library. Customers can create storage based snapshots that can be completed nearly instantaneously, regardless of how big the database is. These copies can then be replicated to another NetApp system via SnapMirror or sent to tape. Support for RMAN Proxy Copy enables Oracle Database administrators to execute granular or complete recoveries much faster without altering existing backup processes. And, one of the biggest benefits of using NetApp’s Snapshot and SnapRestore for Oracle is the flexibility to recover the database to a virtual or physical (“bare-metal”) server. Customers can use resources that they have available to improve overall database recovery time objectives.
- **Eliminate Oracle Virtual Machine provisioning for database environments** via FlexClone. Using a pre-built template to create a gold image of an Oracle Virtual Machine (OVM) or the OVM plus the database, customers clone the file then rename it so it can run on the newest virtualized server environment. This approach is extremely useful for customers who want to scale compute resources as a database grows. After assigning and configuring the virtual machine with the necessary resources, customers can move an existing database to it for more “horsepower” and capacity.
- **Centralize management of virtualized database environments.** NetApp Storage Connect, a storage management plug-in for Oracle Virtual-machine Manager (OVMM), simplifies resource monitoring for

database administrators by providing insight to the storage environment from a single location. From provisioning through ongoing administration, NetApp optimizes Oracle databases in a virtualized environment by integrating into common Oracle management tools.

## Controllable and Predictable Costs

From a cost-savings standpoint, NetApp storage solutions can help:

- **Minimize performance-related hardware purchases** and associated Oracle licensing increases via NetApp quality of service (QoS) and storage tiering functionality. Probably the worst financial situation in IT occurs when material, unexpected, required purchases must be made. A frequent offender is hardware needed to boost application response times. Compute resources and even commodity storage are relatively cheap, but the associated Oracle licensing can exhaust budgets. With NetApp storage tiering inclusive of various implementations of flash storage media (service side, storage controller cache, and SSDs) and automated QoS tuning, customers can align database components (tables, indexes, binaries, etc.) optimally with the appropriate-performing media. Doing so can boost performance with existing resources, mitigating the need to purchase excess storage capacity, compute resources, or both to boost database response times.
- **Delay incremental storage capacity savings.** NetApp delivers multiple data reduction capabilities including compression and deduplication. Compression optimizes space within an Oracle database environment while deduplication helps reduce capacity consumed by virtual machine configuration files. These capacity-saving techniques coupled with space-efficient snapshots, clones, and replications can shrink and control Oracle database environments from a storage footprint perspective.
- **Streamline storage operations.** The technology integration between NetApp and Oracle databases certainly delivers faster provisioning time and higher availability. However, the most material aspect of this integration is the simplicity in which these functions can be performed. Whether it involves adding capacity to a database, provisioning a new virtual server or another instance, monitoring the database and storage from a single location, recovering from a corruption, or some other task, there does not need to be an arduous workflow between the database and storage layers. NetApp has built the integration, validated the architectures, and worked with numerous implementations to ensure the storage layer speeds up Oracle data management efforts. Because every NetApp storage controller (whether deployed with NetApp's own disk systems or in front of a non-NetApp array using the company's V-Series model) runs the same operating system—Data OnTAP—and offers the same software functionality (snapshots, cloning, etc.), IT does not need to assemble a variety of experts in different system architectures to build a robust Oracle database storage environment.

## NetApp in Action

To prove that boosting IT service levels while mitigating costs is a legitimately achievable outcome in a real-world environment, ESG inspected a few of NetApp's customers.

Any vendor can produce a case study. We were looking specifically for an organization that is using NetApp to move its IT operations in line with objectives promised by "cloud computing" while maintaining cost discipline. And, we wanted to see how that effort unfolds in the context of an Oracle database environment.

In Switzerland, the scientific agency CERN, operator of the Large Hadron Collider (LHC), has standardized the database infrastructure for its accelerators, mass storage, and administrative applications onto NetApp/Oracle. CERN's IT organization relies on a gigantic and still-growing table that the NetApp/Oracle storage infrastructure has, so far, been able to accommodate easily. (The LHC can generate 293GB of data per second and amass 15PB of new data per year. By early 2011, CERN's biggest database contained 2,259,000,000,000 rows.)

At CERN, NetApp's Data ONTAP operating system enables striping over large numbers of disks, providing much-needed scalability—important because without sufficient scalability, data unavailability would occur, which might require researchers to cease accelerator operations (resulting, naturally, in huge losses of time, money, and



scientific insight). CERN's IT department has gone on record stating that Oracle on NetApp is "a rock-solid combination providing performance and scalability," and that it offers "impressive stability" and "cluster failover that just works."<sup>2</sup>

## The Bigger Truth

In recent years, many IT organizations were forced to devote the majority of their budgets to "keeping the lights on," leaving less money to spend on new projects that would help their company outpace competitors and grow. Earlier this year, ESG surveyed IT professionals about their 2012 IT budgets, asking them to assign a percentage breakdown of spending that would go toward maintaining existing infrastructure as opposed to spending on net-new technology projects. Respondents indicated that, on average, 63% of the typical 2012 IT budget would be earmarked for the upkeep of existing infrastructure.<sup>3</sup> On the other hand, organizations that are devoting at least 40% of their 2012 budgets to new projects are significantly more likely to have plans to deploy or upgrade applications and databases, as well as initiatives to change their application deployment and development models.<sup>4</sup> If businesses want to improve business processes, they will need to change this equation to a more balanced (50/50) resource allocation.

A good place to start is within Oracle database application environments where the business impact is meaningful and the cost substantial. NetApp, via its Agile Data Infrastructure strategy, is building a compelling argument as to why the right storage environment can deliver material impacts in terms of better service levels at equal or better costs. There are very specific metrics related to resource provisioning time, application and database availability, and capacity savings that NetApp believes it can deliver. And, this faith is based on real-world dialog with its existing clients.

ESG believes that organizations have to change in order to see different results and make IT a business process enabler, as opposed to a cost center that is always looking for the least expensive technology alternative. At the very least, NetApp has built a portfolio that has exhaustive integrations with, and nicely complements, Oracle database functionality that is capable of making this change worthwhile.

---

<sup>2</sup> Source: <http://openlab.web.cern.ch/sites/openlab.web.cern.ch/files/presentations/2010OOW-08.pdf>.

<sup>3</sup> Source: ESG Research Report, *2012 IT Spending Intentions Survey*, January 2012. (Figure 24).

<sup>4</sup> Source: *Ibid* (p. 28).



Enterprise Strategy Group | **Getting to the bigger truth.**

20 Asylum Street | Milford, MA 01757 | Tel: 508.482.0188 Fax: 508.482.0218 | [www.esg-global.com](http://www.esg-global.com)