Technical Report

Copy Data Management for a Hybrid Cloud

Driving Dramatic Capex and Opex Savings by Leveraging Hybrid Cloud for Disaster Recovery

Technology Players: Catalogic Software; NetApp; and SoftLayer, an IBM company

Authors:
Craig Thompson and Jack Ben-Bassat, NetApp
Carol B. Hernandez, PhD, IBM
Prashant Jagannathan, Catalogic Software

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Abstract

This document describes a design for a hybrid cloud solution leveraging NetApp® Private Storage (NPS) for SoftLayer (an IBM company), SoftLayer's cloud compute infrastructure as a service (IaaS), and Catalogic software's ECX copy data management platform to provide an elegant and cost-effective disaster recovery (DR) operation, including the automation of DR for dev/test and validation. This report includes a solution overview describing how copy data management enables simplification and automation of key DR processes and provides a sample total cost of ownership (TCO) calculation to illustrate the cost benefit that customers can expect.

Data Classification

Public

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1 Executive Summary

This technical validation report focuses on the applicability of a hybrid cloud architecture for automated disaster recovery (DR).The report is based on extensive testing of a simulated customer environment using the NetApp clustered Data ONTAP® technology, Catalogic software's ECX copy data management platform, and the SoftLayer (an IBM company) cloud infrastructure. The testing demonstrates the simplification and automation of key processes required for an enterprise DR operation and details the benefits of this new approach to the typical data center DR operations in use today. The report uses the data from the validation testing to exemplify how a customer can both significantly save capital expense (capex) and recapture a massive number of hours by leveraging this solution for running the daily DR operation, including testing and validation of DR processes, which also minimizes risks to the business.

The report shows the benefit of this solution across a range of IT functions. Given similarities in the use of copy data, the analysis is relevant for other critical IT functions, such as dev/test, as well as near real-time data access for business analytics workloads. As IT organizations look to the hybrid cloud to gain cost savings and improve operations, a typical adoption path would start with the deployment of a hybrid cloud environment, and DR is a good place to start. After the value is realized, the next progression is to extend the usage beyond DR. The IT organization will look to leverage the cloud-resident data copies for other functions that rely on access to such copy data. A client benefits from the established process to create application-consistent SnapMirror® copies in a hybrid cloud because each additional use case has the same set of requirements for cataloging, reporting, managing, and orchestrating the use of compute resources for effective data access.

2 Introduction

Industry trends indicate that a vast data center transformation toward a hybrid cloud paradigm is under way based on the overwhelming promise of reduced cost and increased business agility, yet IT organizations with traditional data center operations are reluctant to move their mission-critical application workloads to the cloud.

Functions that rely on copies of production data are ideal for a hybrid cloud model. Drilling into the use cases for copy data shows that there are a number of business operations that require access to copies of production data, most on a daily basis. In a traditional data center environment, managing how these copies are supplied to various constituents is an expensive and time-consuming job. IT constantly struggles to keep up with the data access requirements of the various lines of business (LoBs). These acute challenges of today's copy data management methodology, coupled with the great promise of the hybrid cloud, create the "perfect storm" to justify augmenting data center operations with hybrid cloud environments. IT organizations can start to address the challenges that exist in their on-premises local IT environments, move functions that use copy data such as DR to the cloud, and drive toward a more competitive business model.

This paper demonstrates how SoftLayer cloud services can be optimized in certain circumstances by leveraging customer-owned NetApp Private Storage (NPS) for SoftLayer, secured in an Equinix data center, and Catalogic's ECX copy data management platform.

Traditionally, finding and then using data copies for specific business uses have been a labor-intensive process that spans multiple storage silos managed by a number of system administrators. Scripts are typically written to move the data around the enterprise in an effort to try to automate the process, but the management of scripts has proven to be time-consuming and error prone.

In early 2015, Gigaom/Cazena conducted research on cloud adoption. Cost and agility were cited as the top two reasons to implement a cloud strategy. However, the study showed that 23% of respondents surveyed believed that the biggest barriers to adoption were complexity and data movement. These factors present barriers for IT to realize the value of the hybrid cloud.

By demonstrating the benefits derived from a single use case, DR testing, this technical validation report shows how the combined technologies from NetApp, SoftLayer, and Catalogic remove the operational barriers, and IT organizations can realize the benefits of DR in a hybrid cloud infrastructure.

3 Solution Overview

The testing for this validation report began with the deployment of a simulated customer production operation, including online production applications and datasets created using actual customer application data. By closely mimicking an actual customer environment, the extrapolated test results demonstrated the value of the solution in a range of real-world customer environments.
Note: Although testing could have been completed in a day, the testing ran over the course of 60 days to validate that the solution was consistent and reliable and provided an undeniable business value.

This simulated production environment was located in NetApp's large test lab facility located in Research Triangle Park (RTP), NC, where a number of VMware virtual machines (VMs) were connected to a NetApp FAS2520 storage controller running the clustered Data ONTAP 8.2 storage operating system. The total environment consisted of over 100 VMs connected to 20TB of production storage. The test consisted of the following:

- Copy data policies for the VMs were created within Catalogic's ECX application set.
- Daily replication of the VM data was performed using NetApp SnapMirror to a second NetApp array (the target), located in the Equinix San Jose data center.

Equinix is a NetApp and SoftLayer business partner that provides customers the ability to deploy their own infrastructure within Equinix data centers and connect to multiple cloud providers, including SoftLayer, using the Equinix Cloud Exchange.

The neighboring San Jose SoftLayer data center served as the location for the VMware ECX hybrid cloud environment that was used to instantiate the replicated VMs. Table 1 details the solution tested (setup and components), and Figure 1 provides a diagram of the solution's technologies depicting NetApp's FAS storage with clustered Data ONTAP, the NetApp replication technology, Catalogic Software's ECX copy data management platform, and SoftLayer's cloud compute infrastructure.

Table 1) Solution overview.

Solution Implementation	Solution Components

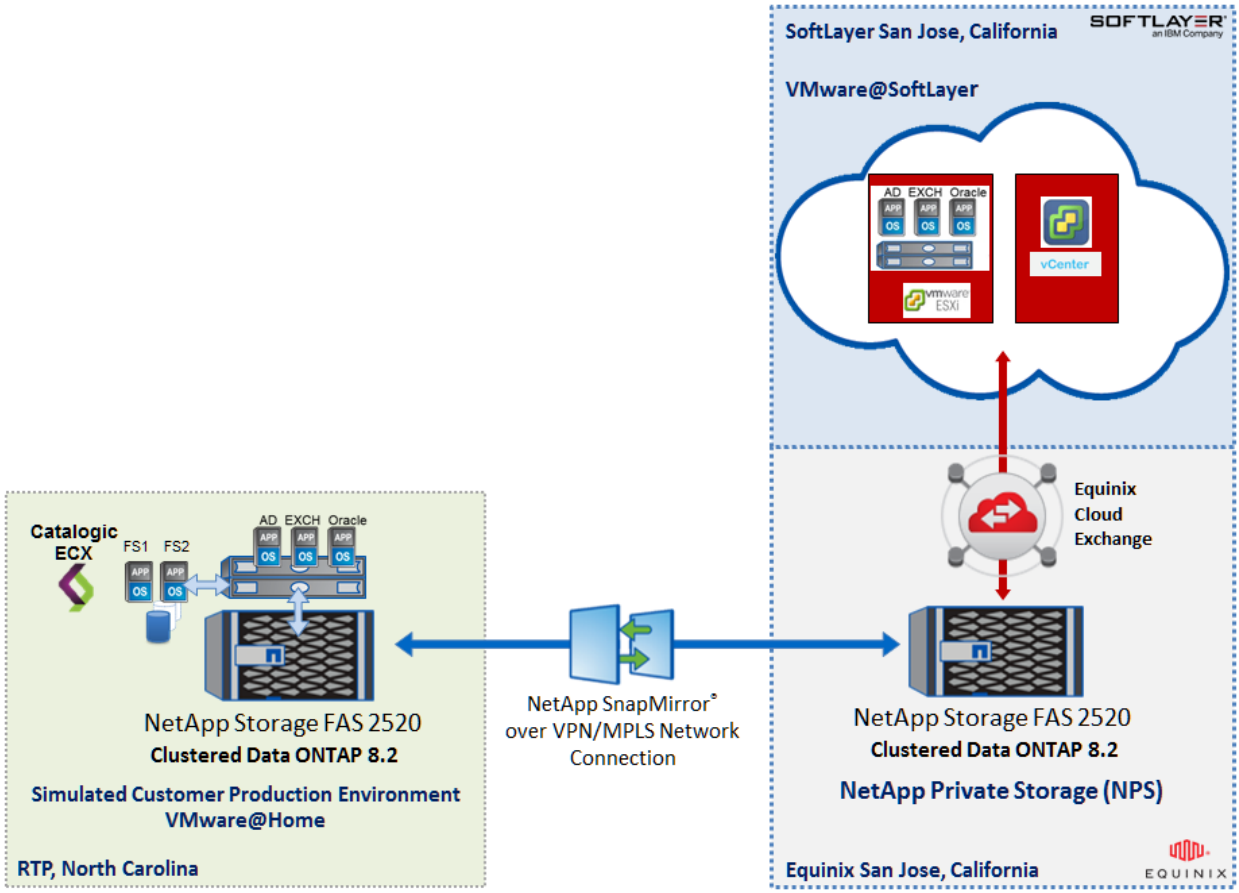
Simulated customer production environment,
Research Triangle Park, NC
	• ESX 5.5: 4 cores and 64GB of RAM
	• FAS2520 running clustered Data ONTAP 8.2
	• Virtual machines hosted on NetApp:
	  o Microsoft Exchange Server 2010
	  o Oracle database 11g RedHat Linux 6.0
	  o SQL database server 2008
	  o Microsoft Active Directory server 2008 R2
	• Virtual machines hosted on local datastore (third party):
	  o File server 1
	  o File server 2
	• Catalogic ECX deployed as a virtual appliance

NPS for SoftLayer (Equinix, San Jose, CA)	FAS2520 running clustered Data ONTAP 8.2
SoftLayer (San Jose, CA)	ESX 5.5: 4 cores and 64GB of RAM

In addition to establishing policies for automated replication on a per-VM basis, the testing also included the automated use of the replicated VM data in a simulated DR test scenario. The testing included full validation of instantiating the production applications within the SoftLayer/Equinix environment.

The testing and results document the ease with which an organization can deliver a consistent, automated DR process in a hybrid cloud environment. By using the results from the testing and contrasting them to a traditional DR approach (for example, one that would typically test off-site DR readiness twice a year), the tests have demonstrated that this DR scenario drives dramatic savings in both capex and opex.

Figure 1) Test solution implementation: simulated customer deployment.



4 Solution Technology Overview

The solution technology involved using NetApp clustered Data ONTAP and its integrated cloning and data protection technologies, Catalogic Software's ECX copy data management platform, and SoftLayer's cloud infrastructure.

4.1 SoftLayer

SoftLayer is one of the leading hyperscalar cloud service providers designed for hybrid enterprise companies and workloads. SoftLayer provides cloud infrastructure as a service for a growing number of data centers and network points of presence around the world. Its customers range from web startups to global enterprises.

Products and services offered by SoftLayer include bare metal and virtual servers, networking, a variety of storage options, turnkey big data analytics solutions, and more. One unique advantage includes the industry's first network-within-a-network topology for true out-of-band access, an easy-to-use customer portal, and a robust API for full remote access of all product and service management options, as well as transparent visibility of resource usage.

4.2 Catalogic Software

Catalogic has been a NetApp strategic partner for over 10 years. Catalogic Software is an independent software firm that delivers the first software-only copy data management platform. Catalogic's ECX is a software solution that provides an end-to-end actionable catalog of all hypervisor and storage assets across the enterprise, including private, hybrid, and public cloud environments. Leveraging the actionable catalog, ECX provides the needed automation and orchestration required to deliver automated DR, enhanced dev/test or devops, and near real-time data access for business analytic workloads.

Specifically relevant for this paper, ECX orchestrates a Volume Shadow Copy Service (VSS) snapshot for NetApp hosted VMs and coordinates them with a NetApp Snapshot® copy, which is by far the most efficient means of gaining an application-consistent SnapMirror copy for a DR use case. For VMs that do not have their production storage within a NetApp array, ECX orchestrates the creation of VM image copies and replicates them to the NetApp platform through the VMware vCenter API. This orchestration is a very efficient and lightweight process driven by VMware vStorage APIs for data protection (VADP). After the VM image copy is replicated to the NetApp system, ECX is able to provide the key functions of cataloging, orchestration, and analytics, just as it does with VMs whose production data is stored within a NetApp system.

4.3 NetApp

NetApp is the leader in data management hardware and software products leveraging its industry-leading clustered Data ONTAP data management system. NPS for SoftLayer is a hybrid cloud solution and the newest member of the NPS for Cloud family. The service combines the elasticity and savings of SoftLayer cloud compute with the performance, availability, and control of dedicated enterprise storage.

The customer-owned NPS solution extends SoftLayer cloud services with dedicated enterprise storage, housed at an Equinix data center connected using Equinix Cloud Exchange to SoftLayer cloud compute. NPS is designed for customers who must maintain complete secure control of their data near the cloud. This need for extreme data security is usually due to adhering to data sovereignty laws or meeting compliance regulations. This unique solution allows customers to take full advantage of SoftLayer cloud compute services, balance their capex/opex profile, and meet their dynamic business needs by changing their mix of infrastructure resources on demand.

5 Using Copy Data Management and Snapshot Copies for the Hybrid Cloud

The results from this solution validation testing (provided in detail in section 8) exemplify the power of a copy data management platform, in conjunction with NetApp Snapshot copies in a hybrid cloud configuration, to create a much better disaster recovery solution. Given these extraordinary benefits in terms of overall costs and improved DR readiness, it is important to understand the details of how copy

data management affects the overall operation. This section provides additional insights into how the combined solution delivers the results that the testing achieved.

A key challenge when implementing a hybrid cloud solution involves human resource allocation. If the cloud environment requires multiple administration and compliance teams for each individual department within an organization, then the very silos that the IT team is trying to eliminate with the hybrid cloud remain intact, and the potential cost savings are minimized. However, if a comprehensive catalog of metadata and Snapshot automation is deployed across the infrastructure of the hybrid cloud, then the human resource challenge can be overcome.

NetApp Snapshot capabilities are the most efficient data copy tool in the market. Snapshot copies can be leveraged for a number of use cases and combined with NetApp FlexClone® and SnapMirror technologies. Data can be moved quickly and easily in and out of different on-premises, private, and public cloud locations. This agility positions IT one step closer to being able to extract greater value from a hybrid cloud strategy.

Catalogic's ECX copy data management platform helps administrators make better use of the Snapshot copies. With the ECX actionable catalog of the environment in place, IT gains visibility and insight into all of the Snapshot copies available across the organization, any of which may be leveraged for various use cases and accessed from various locations. This powerful, yet easy-to-use system replaces the need for scripting or a mixture of various tools that are currently required to make use of the hybrid cloud. With a few clicks, ECX enables policy-driven workflows to be built on top of the copies that have been created in the hybrid cloud. The workflows define which copies are used, where they are located, how often they are refreshed, who has access to them, and how long they have been left in place. In addition, a provision exists to promote the solution from dev/test to production or properly tear it down to minimize any orphaned or forgotten resources used for the project, helping to minimize operational costs and prevent Snapshot duplication. The benefits of this provision in the workflow reduce hybrid cloud complexity and management.

Finally, full compliance is achieved because ECX maintains a record of all Snapshot copies taken in its catalog and identifies which Snapshot copies are deployed against which applications and who has accessed those Snapshot copies. With this solution, the IT organization has a common hybrid cloud platform that all system administrators can access to generate the same automated, repeatable, and auditable methods to leverage the copies of data for different business purposes.

6 Testing Disaster Recovery in the Cloud

In a 2015 study by the Business Continuity Institute, the following statements are made:

> "Less than 50% of companies test their DR solution more than once a year, and of these, half aren't complete tests." Further on, "Even outsourced providers only generally carry these out once a year." Business Continuity Institute also found in its survey that "One in every five recoveries fail." It also points out, "Would you invest in a solution that is only successful 80% of the time?"[1]

[1] "Do you have a disaster recovery solution that's 80% successful? How to improve your odds." Retrieved February 23, 2015, 14:33 GMT, from The Business Continuity Institute: http://www.thebci.org/index.php/about/news-room#/blog_posts/do-you-have-a-disaster-recovery-solution-that-s-80-successful-how-to-improve-your-odds-33077.

Understanding why systems fail is important. The following excerpt from the report exemplifies the challenges of maintaining DR-ready environments:

> "The problem is, every time something is changed on your live system – a new application installed, or server architectures are changed, your disaster recovery solution will encounter errors when you come to failover, unless this is taken into account. With the high frequency of change of IT systems (typically around every 3 months) then if you're testing recoveries any less frequently than quarterly, the likelihood is your recovery won't run smoothly. We encounter tens to hundreds of errors when we carry out our first tests – these take a few hours to work through and put right. This should all be done proactively in advance, to reduce errors and therefore the recovery time."

The cost a business incurs when its DR solution is not adaptable and consistently reliable is an important factor that must not be ignored: "The average hourly cost of an infrastructure failure is $100,000 per hour.[2]

To put a typical DR workflow into more perspective, the following is a more granular breakdown of the steps involved (as outlined in the *VMware@SoftLayer Cookbook – DR2*):

- Presynchronize storage resources between protected and recovery sites.
- Shut down the virtual machines at the protected site and prepare them for migration to the recovery site.
- Synchronize storage resources between protected and recovery sites.
- Suspend noncritical virtual machines at recovery site to make room for migrated virtual machines from the protected site.
- Change storage at recovery site to writable. Power on the virtual machines at recovery sites. If necessary, these virtual machines can be powered on based on a predetermined priority order.

For a customer whose infrastructure is similar in size to our test environment, based on the number of terabytes of storage under management, the testing of the DR operation is a process that typically takes a full weekend and is driven by many scripts. As exemplified by the cited Business Continuity Institute, very often many of the tests fail and require significant IT work to diagnose and correct the problem. IT teams know that testing more frequently is advantageous to make sure of success. Because traditional DR testing takes such a monumental effort, identifying the best way to tackle how to make that happen has been an almost insurmountable challenge. Moreover, the overall DR operation can be one of the most costly responsibilities for IT, typically requiring a second data center. With IT budgets constantly under pressure, painful tradeoffs are often made that negatively affect the overall effectiveness of the DR operation.

By taking advantage of a copy data management solution on top of NPS for SoftLayer, clients can streamline the DR testing process and perform it daily. When this solution is set up correctly, it becomes simple to organize DR testing in SoftLayer, thereby controlling costs and providing IT the ability to quickly iterate through challenges as they present themselves. By leveraging different SoftLayer cloud infrastructure locations, workflows can be pushed to the appropriate location to avoid being affected by the same disaster in both places.

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[2] "The real cost of downtime": http://devops.com/2015/02/11/real-cost-downtime/. Read the full report at Analyst Report: IDC: "DevOps and the Cost of Downtime: Fortune 1000 Best Practice Metrics Quantified," Octover/November 2014.

7 Results Summary

The test results summarized in this report show how Catalogic's ECX was used to automate and orchestrate an exemplification of application-consistent SnapMirror copies in the SoftLayer cloud. By taking full advantage of NetApp clustered Data ONTAP and FlexClone technology, we optimized the automated DR use case. For the extensive DR testing, we used a subset of the simulated client environment. We focused this testing on seven VMs across a range of applications:

- Five VMs had their data stored on the NetApp system:
  - Three application servers: Exchange, Oracle and SQL Server
  - Two IT administrator servers: Active Directory and a web server
- Two additional VMs were IT administrator servers that stored their data on third-party storage. For these two VMs, ECX orchestrated the creation of VM image copies and replicated them to the NetApp platform through the VMware vCenter API (as described in section 4).

With the simulated production environment up and running, establishing DR connectivity to the Equinix and SoftLayer environments was quick and easy. The first VM replication jobs began running within two hours of the beginning of our effort to establish the hybrid cloud environment. The more significant time saving came from ECX's automated process of instantiating VMs at the DR site and validating their readiness. When compared to the traditional "brute force" method (planning, script writing, troubleshooting, and so on) of testing DR, we determined that the operational savings were quite significant. It is not unusual for IT to spend multiple weekends with the entire0000000 IT staff to administer the traditional process of testing DR, which would typically require upward of hundreds of staff hours per year. This scenario assumes a DR test effort twice per year, with multiple people spending the prior weekend planning and executing each DR test.

In contrast, with the Catalogic ECX-powered hybrid cloud solution, it took one person less than half an hour to complete the DR testing. Our tests validated DR readiness on a daily basis over the course of our 60-day test project. This approach required only minutes per day for our testers to verify the application readiness and clean up the DR environment to prepare it for the next day's activities. Extrapolating these results over the course of a year, customers performing daily DR validation testing showed significant savings in personnel hours required for planning and executing the DR process in the traditional way.

8 Detailed Results

This section shows the detailed results that were observed in conducting these validation tests using ECX in conjunction with IBM SoftLayer and NetApp NPS.

8.1 Creating an ECX Copy Data Workflow to SoftLayer Cloud

The tables in this section detail the results of the NetApp copy workflow and the third-party workflow.

Table 2 reflects the Snapshot and replication statistics for the five VMs whose production data was stored on NetApp storage. The table shows the time to create the Snapshot copy, time to complete the replication of the SnapMirror copy from the primary site to the SoftLayer cloud, and amount of data sent for the initial Snapshot copy and the five subsequent Snapshot copies of those VMs.

Table 2) NetApp copy workflow.

Snapshot Copy	VM Count	Total Data (GB)	Snapshot Time (min:sec)	Replication (GB)	Replication Time (sec)
Initial Snapshot copy	5	230	1:20	230	2,872
Snapshot copy 1	5	230	1:10	0.225	65
Snapshot copy 2	5	230	1:33	0.205	65
Snapshot copy 3	5	230	1:33	0.176	64
Snapshot copy 4	5	230	1:46	0.184	65
Snapshot copy 5	5	230	1:52	0.190	65
Average (minus initial)	5	230	1:35	0.196	65

Table 3 shows the same data for the two VMs that were hosted on third-party storage. For these two VMs, ECX orchestrated the creation of VM image copies and replicated them to the NetApp platform using VMware VADP, as described in section 4. The testing showed this process to be very efficient and demonstrated that after the VM image copy had been replicated to the NetApp system, ECX was able to provide the key functions of cataloging, orchestration, and analytics.

Table 3) Third-party workflow.

Snapshot Copy	VM Count	Total Data (GB)	VM Copy Time (min:sec)	Replication (GB)	Replication Time (sec)
Initial copy	2	37	19:08	37	339
Snapshot copy 1	2	0.016	0:48	0.016	64
Snapshot copy 2	2	0.026	0:57	0.026	64
Snapshot copy 3	2	0.018	0:57	0.018	64
Snapshot copy 4	2	0.018	0:46	0.018	64
Snapshot copy 5	2	0.023	1:03	0.023	64
Average (minus initial)	2	0.0202	0:54	0.0202	64

For the five VMs whose storage was on NetApp, the initial Snapshot copy took 80 seconds to create and approximately 48 minutes to replicate into SoftLayer. The two VMs on third-party storage took just over 19 minutes to create and 5 1/2 minutes to replicate.

After the initial Snapshot copy and SnapMirror copies were created, it took approximately two minutes to take the next set of Snapshot copies and just over one minute to process the SnapMirror changes. Note: This time is total time as the two VMware VADP snaps were done within this same time frame. This test is a true testament to the NetApp Snapshot and SnapMirror capabilities, which enable quick and easy data movement to the hybrid cloud.

Additionally, in order to further simulate a real-world environment, the copy data workflow was scheduled to take a Snapshot copy and the five VMs copied using SnapMirror every day during the 60-day period of testing to make sure that the best practices of the DR process were automated and could be executed daily, regardless of how the applications may change.

8.2 Leveraging the Copy Data with a Use Data Workflow

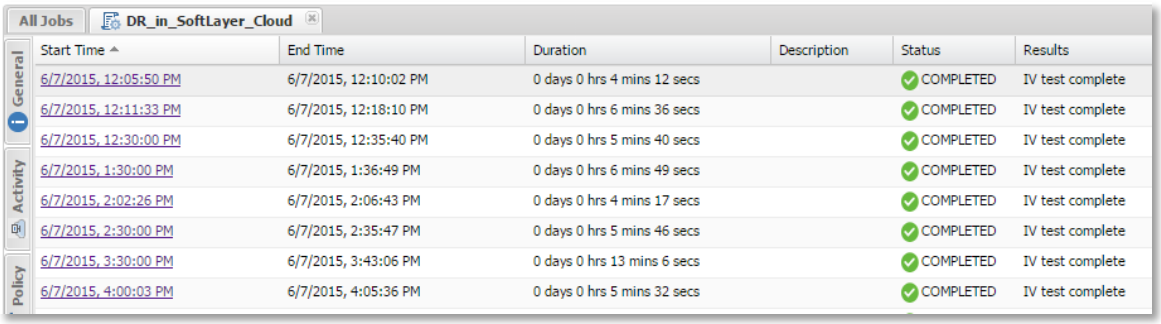
In order to take advantage of the application-consistent Snapshot copies created in the copy data workflow, we created a use data workflow to enable the automation of DR testing. Table 4 shows the average time it took to spin up the five VMs leveraging the NetApp FlexClone technology in the hybrid cloud to test the automated DR process (at the DR site) and make sure the applications came up and were available. The average time was 3 minutes, 49 seconds. Additionally, the table reflects an average time of 39 seconds to automatically tear down the environment when testing was completed. This approach helps avoid data sprawl and orphaned VMs resulting in unnecessary costs associated with leaving stale data in the cloud.

Table 4) Time to spin up a DR instance in the hybrid cloud.

Server Count	Total Data (GB)	Time to Spin Up (mm:sec)	Time for Cleanup (mm:sec)
5	230	3:34	0:36
5	230	3:33	0:37
5	230	3:54	0:24
5	230	3:23	0:33
7	267	4:01	0:51
7	267	4:10	0:55
Average	242	3:49	0:39

Figure 2 shows the ECX monitor screen demonstrating the success of a series of DR policy runs in SoftLayer. Each row represents an ECX use data workflow. In this case, the group of five VMs is instantiated to verify DR readiness every hour, and the copies are refreshed with the updated data.

Figure 2) ECX screenshot: successful completion of several daily DR test runs.



A key part of the testing was validation that the replicated VMs were application consistent and that the application could be instantiated correctly in the event of a disaster. First, the VMs were brought online and verified through vCenter. Next, the testing team would access the data through the application interface to make sure of proper functionality.

Figure 3 is a screenshot from the testing process and shows the following:

- Left side is the ECX graphical user interface showing a use data policy running.
- Right side is vCenter showing the VMs loading.

Figure 3) ECX use policy running and VMs loading in vCenter.

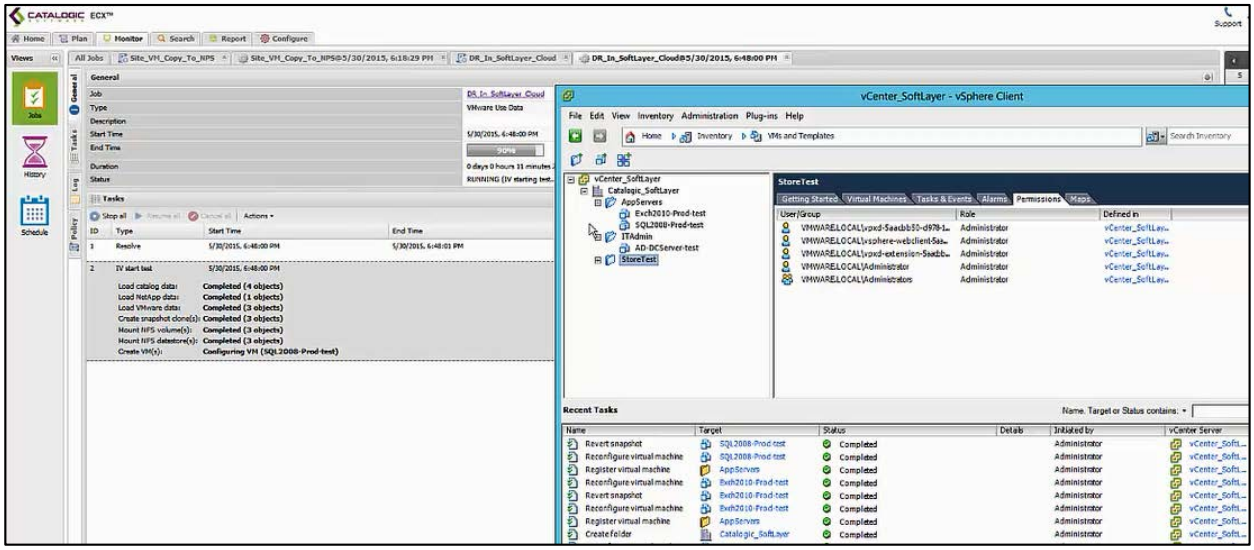
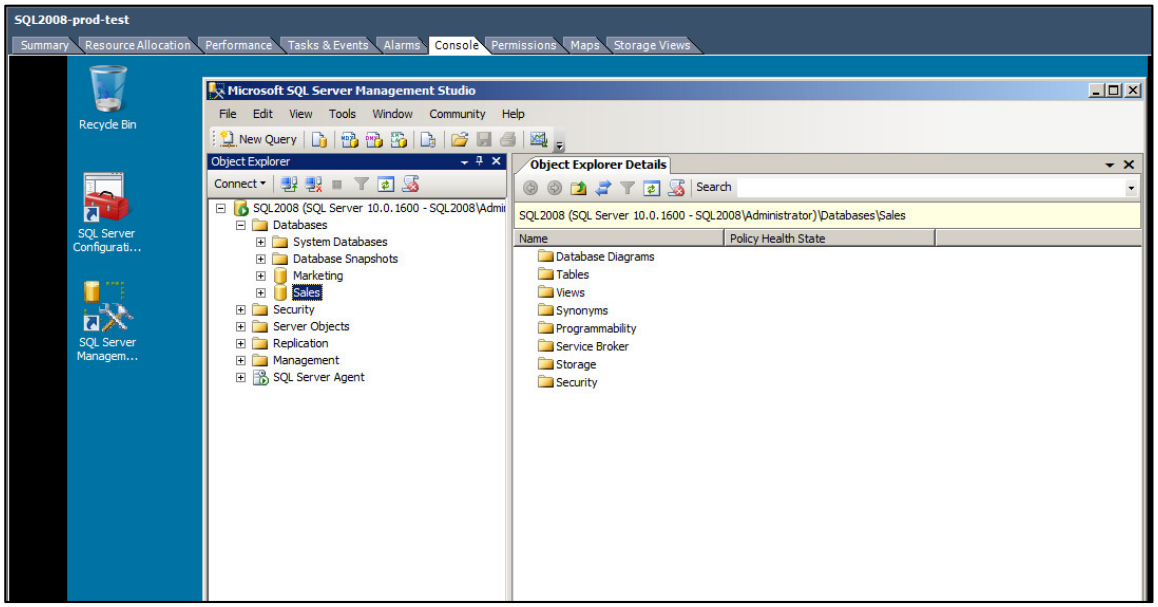


Figure 4 is a screenshot of a SQL interface showing the databases up and running in the DR environment in SoftLayer.

Figure 4) SQL Server in DR with databases running.



The copy data with a use data workflow test results demonstrate that the hybrid cloud solution helps make sure that the right data is in the right place when it is needed. It also illustrates that in the event of a disaster, the environment can be brought up easily and repeatedly to mitigate the amount of downtime.

The testing demonstrated that NetApp Private Storage for SoftLayer also enables the utilization of FlexClone copies as a key benefit to having full control over the storage system, and that together with Catalogic ECX and SoftLayer cloud compute, IT can automate the DR testing process and perform daily testing. Automating the DR process saves a tremendous amount of time versus traditional DR testing.

With this solution, an IT team quickly and efficiently gets data into a hybrid cloud without having to use complex scripting. Because scripts have no understanding or correlation of the underlying infrastructure, they often break. This new IT process enables a significant reduction in opex costs by freeing up costly IT resources for more productive activities.

It is also important to understand that using the storage FlexClone copies for testing does not affect existing SnapMirror replications, which can continue as scheduled. This approach minimizes the risks of not having current data in case of a DR scenario.

8.3 Extrapolating the Test Results

Testing demonstrated that leveraging application-consistent Snapshot copies, FlexClone copies, and SnapMirror copies and removing burdensome, brittle scripts, IT teams save a great deal of time and effort in testing to make sure the environment can be recovered in the event of a disaster. Additionally, if something in the environment changes enough to make the DR test fail, ECX lets administrators know exactly what failed, and why, by using exception-based reporting. IT help desk members can get to the bottom of any issues in the environment quickly and bring the environment back into compliance. After the problems in the environment are fixed, the automated DR workflow can be run again, with the push of a button, to make sure that all the issues in the environment are resolved and the DR tests execute properly.

This automated solution provides IT staff the confidence to know that their data recovery or DR plan is solid, making sure of maximum data availability and uptime and increasing the storage asset utilization. Using this methodology, we can increase the capability to 260 DR tests annually, compared to two times a year using traditional DR methodology.

9 Conclusion

This validation report demonstrates that by utilizing the combination of NetApp, Catalogic, and SoftLayer. IT has a new, more powerful way of harnessing the value of hybrid cloud without adding complexity or requiring additional expertise. The solution dramatically simplifies operations, minimizes risks, and reduces the required labor to manage the flow of data to and from the cloud. The ECX copy data management software platform, in conjunction with NPS for SoftLayer and SoftLayer cloud infrastructure, can automate and orchestrate all of the IT organization's key operations that rely on copy data. Automated DR, dev/test or devops, and business analytics are all possible additional use cases for the same copy data management. The tests were conclusive and showed that the automation of this DR solution provides clients with the following benefits:

- The ability to take advantage of flexible hybrid cloud resources to significantly lower total costs
- Automation of the process for getting the right data into the cloud, potentially saving hundreds of IT hours per year in DR validation testing
- The ability to move data into the cloud quickly, overcoming one of the primary obstacles of cloud adoption today
- The orchestration of data copies in the cloud for multiple use cases beyond just automated DR testing
- Visibility into what data is in the cloud, where it is located, and who has accessed it

- The operational control of copy data across the organization, including the hybrid cloud, making sure that the IT team is utilizing (and paying for) only the resources needed

The impact of copy data management and a robust and common storage OS with hybrid cloud is transformational, and as this validation report shows, implementation is really quite simple. Having a copy data management solution such as ECX with NPS is the best way for IT to utilize the same processes that they use today on premises, locally, to create a seamless, secure process for leveraging data into the cloud. SoftLayer provides on-demand ECX compute resources and eliminates the need for the client to own a separate physical DR environment.

Additionally, other business functions that rely on copy data become simplified and less expensive to manage. The data can automatically be refreshed as often as a Snapshot copy is taken. Catalogic's ECX, enables greater data access for use cases such as dev/test, dev/ops, or business analytics. It reduces the burden on IT to keep these environments agile through automation policies.

As IT looks for solutions to reduce capital and operational costs, while improving its ability to deliver mission-critical services to the lines of business, hybrid cloud implementations hold tremendous potential. This paper demonstrates that this combined hybrid cloud service overcomes many of today's barriers to cloud adoption. Simplified access to copy data for multiple business operations provides significant financial and resource savings, while delivering superior value to the business.

Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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