



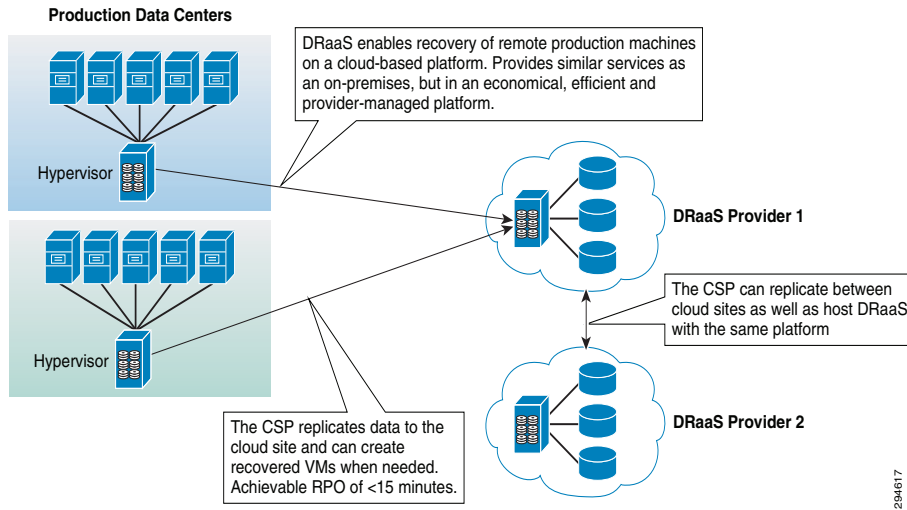
Technology Overview

The Cisco Disaster Recovery as a Service Solution (DRaaS) and In-Cloud Disaster Recovery architectures described in this document are designed to provide a new set of related capabilities allowing Virtualized Multiservice Data Center (VMDC)-based Cloud Service Provider (CSPs) to enhance their addressable market, financial performance, and differentiation vs. commodity cloud solutions (Figure 1-1). Many of Cisco's VMDC-based CSPs seek better monetization of their existing VMDC investments through layered services that are synergistic with the advanced networking capabilities delivered by VMDC. These CSPs demand new, easily deployable services both to keep pace with the innovation of commodity/public cloud providers such as Amazon Web Services (AWS) and to address portions of the market that are not well served by commodity cloud solutions.

The key end-user consumable services being enabled by this system architecture will enable a CSP to offer disaster recovery for both physical and virtual servers from a customer data center to a CSP virtual private cloud (VPC). The DRaaS to Cloud/ICDR system primarily targets SMBs and enterprises. The global DRaaS to Cloud/ICDR and cloud-based business continuity is expected to grow from \$640.84 million in 2013 to \$5.77 billion by 2018, at a CAGR of 55.20%.

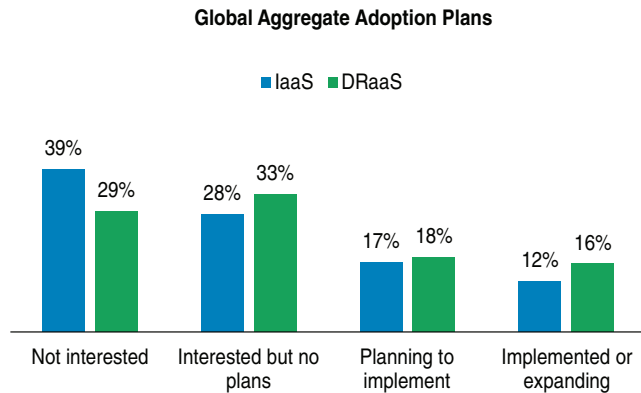
The traditional disaster recovery (DR) system constitutes a substantial portion of expenses annually. With the "pay as you go" model of the cloud-based DR system, the impact of downtime can be minimized through replication. DR can start up applications once the disaster is identified. In addition to recovery, cloud-based DR incorporates business continuity. Implementation of DRaaS to Cloud/ICDR with a virtualized cloud platform can be automated easily and is less expensive, since DR cost varies before and after a disaster occurs. The key requirements for DRaaS to Cloud/ICDR are Recovery Point Objective (RPO), Recovery Time Objective (RTO), performance, consistency, and geographic separation.

Figure 1-1 What is Disaster Recovery as a Service?



The market presents a strong opportunity for the CSPs to take advantage of the demand for DRaaS services as illustrated by Figure 1-2.

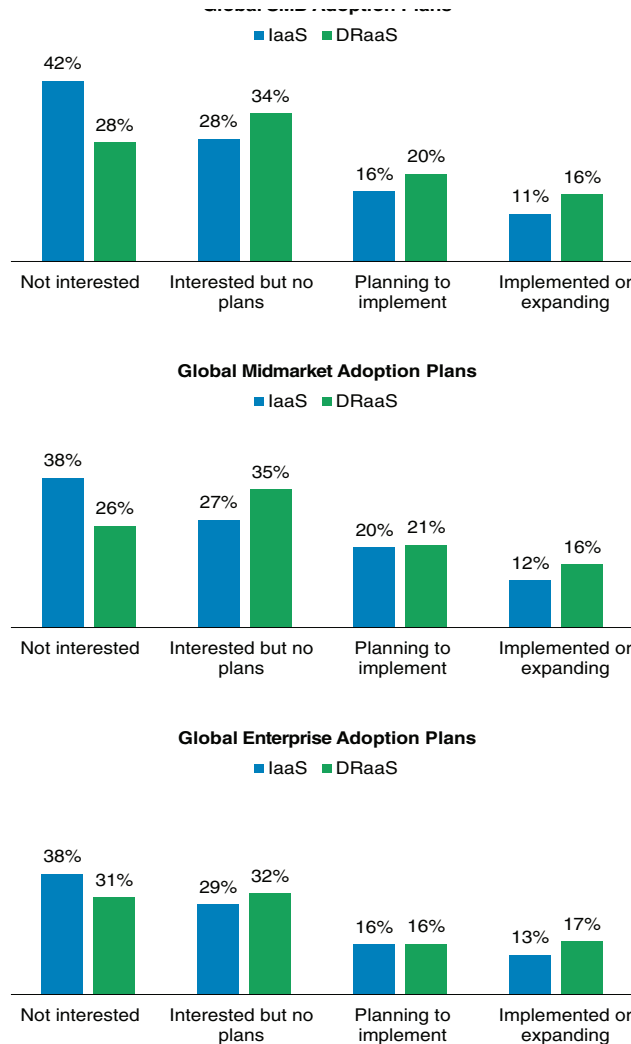
Figure 1-2 Strong Market Demand for DRaaS



• Source: Forrester Budgets and Priorities Tracker Survey Q4 2012

Further investigation of the global demand patterns for DRaaS indicates that the market opportunity and interest is equally spread across the enterprise, mid-market, and SMB segments as summarized in Figure 1-3.

Figure 1-3 Global DRaaS Demand by Segment



• Source: Forrester Budgets and Priorities Tracker Survey Q4 2012

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Value of Cisco DRaaS Architecture for Service Providers

DRaaS offers the following value to SPs:

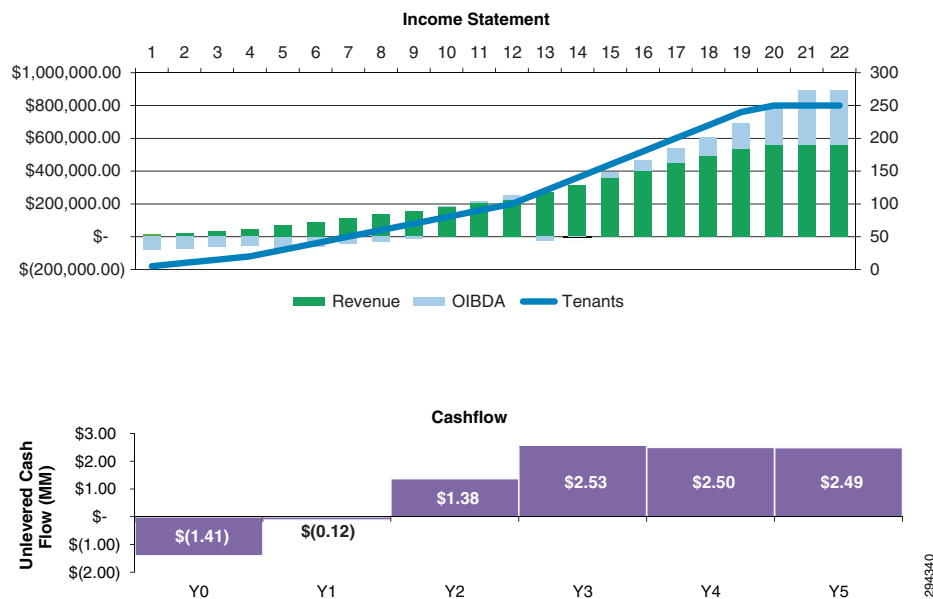
- **Increased Customer Relevance**—Not all of the customers requiring DR services want Infrastructure as a Service Offering (IaaS). Offering DRaaS provides better alignment with a typical IT buyer's focus. Leverage of DRaaS offerings by SPs provide them an opportunity to differentiate from commodity and over-the-top IaaS providers.
- **Bigger, More Profitable Deals**—DR instances command a premium and provide improved margins due to lack of commoditization. DR deals are typically larger compared to IaaS deals for SPs and generate higher margins. DRaaS offerings create reduced capital expenditures on computing resources and lower operating expenses on licensing due to oversubscription opportunities.

- **Strong Services Growth**—DRaaS offerings present a strong ability to attach additional services with the offerings and creates a pipeline of revenue from new and existing customers through new and improved monetization via services growth. Additional monetization opportunities present themselves through possibilities for hybrid services.

SP Monetization of Cisco DRaaS

Figure 1-4 is a financial model that presents the monetization opportunity for SPs associated with the deployment of the Cisco DRaaS system architecture.

Figure 1-4 Monetization Opportunity for SPs



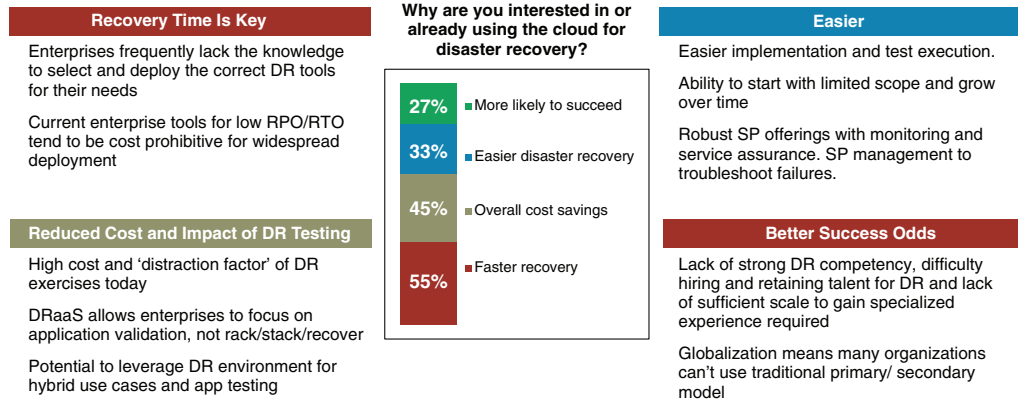
Value of Cisco DRaaS Architecture for Enterprises

DRaaS provides the following value for Enterprises:

- **Recovery Time Is Key**—Enterprises frequently lack the knowledge to select and deploy the optimal DR tools for their needs. Current enterprise tools for low RPO/RTO tend to be cost prohibitive for widespread deployment.
- **Reduced Cost and Impact of Disaster Recovery Testing**—DR exercises present a significantly high cost and are a "distraction factor" to the normal business operation. The use of DRaaS allows enterprises to focus on application validation without being distracted by rack, stack, and recover activities with their infrastructure and IT services. It also presents a potential opportunity to better leverage the DR environment
- **Accelerated Implementation**—The use of DRaaS presents an easier framework for implementation of business continuity plans and test execution and provides end customers with the ability to grow over time from a limited scope. For Enterprises to replace on their own an equivalent DRaaS solution that is provided and managed through an SP's robust offerings would be extremely time consuming. Such a solution would include self-service, monitoring, and service assurance capabilities, which would be part of a holistic DRaaS offering from the SP.

- **Better Odds of Success**—Using specialized SP offerings eliminates the need for a strong DR competency and addressed the difficulty associated with hiring and retaining talent for DR. The DRaaS is a niche technology that requires a significantly large scale to gain the required specialized experience. Globalization means many organizations cannot use traditional primary and secondary model of dedicated infrastructures for DR and business continuity operations.

Figure 1-5 Why Enterprises Choose DRaaS

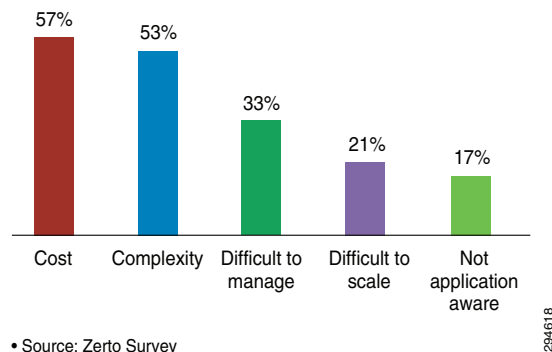


Adoption Challenges to DR and DRaaS

Looking at the Forrester results, the majority of the respondents are either not interested or have no plans for implementing a disaster recovery solution.

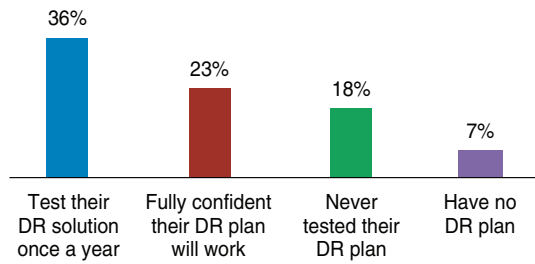
Zerto conducted a survey to gain a better understanding of why organizations are hesitant to implement a disaster recovery solution. To allow for more insightful results, Zerto allowed the respondents to check more than one box and found that cost and complexity overwhelmingly are the biggest obstacles to adopting disaster recovery.

Figure 1-6 Biggest Challenges of Disaster Recovery



• Source: Zerto Survey

To gauge the level of satisfaction with those that have implemented a disaster recovery solution, Zerto asked questions that would provide insight to the actual effectiveness of the disaster recovery solution in place (Figure 1-7).

Figure 1-7 Customer Confidence in Current Disaster Recovery Plans

• Source: Zerto Survey

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Cisco/Zerto DRaaS Solution Changes Traditional Capability

Both the Forrester and the Zerto studies indicate that there are barriers that need to be addressed to achieve wide-scale adoption of disaster recovery at the enterprise level and also from a service provider level.

Disparate Hardware Increases Costs

Traditional DR solutions require matching hardware at both the source site in the target site with the replication being performed by a hardware device, usually the storage array. For survey respondents, this created a capital cost barrier for the equipment purchased and significantly increased the administrative overhead to the point that the Forrester survey shows the majority of the respondents had no plan of implementing disaster recovery.

From an SP perspective, not having similar equipment at each customer site made offering a DRaaS solution so expensive that it was not pursued as a feasible service offering.

Complexity

Even if the hardware cost barrier can be overcome, traditional disaster recovery solutions requires a great deal of administrative effort to implement. Implementation usually involves an extended professional services engagement and a significant learning curve for the administrators.

For the service provider, building the core DR infrastructure is only part of the challenge. Creating a multi-tenant capable service offering has traditionally required a significant application development and programming effort.

Zerto Virtual Replication

Zerto Virtual Replication (ZVR) is a hypervisor-based replication and workflow orchestration product. Zerto developed ZVR to specifically address the major barriers to adoption.

Hardware Agnostic

ZVR has no hardware dependencies and enables continuous data protection (CDP) designed to produce production RPOs that are usually in the range of seconds and RTOs that are measured in minutes. ZVR can even support different versions of VMware vSphere and VMware vCloud.

Being hardware agnostic introduces attractive options for enterprises. They may choose to repurpose older hardware and create their own recovery site, but now they can also look at a hybrid cloud solution and choose an SP provider that is running ZVR.

Simplicity

While the underlying components manage a great deal of complexity ensuring replication and workflow orchestration is absolutely correct, the ZVR administrative level of effort is greatly simplified. The user interface is intuitive to an enterprise administrator who can usually learn to manage ZVR in about an hour. The journal in ZVR provides point-in-time recovery for testing and live failovers. The journal history can be as little as one hour, or up to five days' worth of data, with recovery points available every few seconds.

Built for Service Providers

ZVR can be adopted rapidly as a service offering because it has native multi-tenancy capabilities and an out-of-the-box self-service portal that allows customers to perform DR-related activities that are controlled by roles and permissions set by the SP. These built-in features greatly reduce the level of administrative complexity, development time, and time-to-market.

Connect Customers Regardless of their Equipment

A major barrier to DRaaS adoption has been the challenge of the customer equipment being completely different than that of their SP. When the replication between sites is completely dependent upon hardware devices, the devices must match vendor, firmware, and software. Further, all of these must be planned and upgraded at the same time. Hardware-based replication has traditionally been very unforgiving to different versions when site-to-site replication is involved. With ZVR, VMware vSphere is the only requirement, and replication is possible between different versions of VMware vSphere. Replication is possible between vSphere and vCloud environments. This is very important to a service provider because customers update their infrastructure versions on different schedules.

Efficient and Rapid Customer Onboarding

With a hypervisor-based replication solution, customers can be added very quickly. Only VMs and VMDKs are replicated, not LUNs. Regardless of the location of the host or storage, the source VM or group of VMs can be replicated to the CSP data center. This results in reduced customer onboarding time while offering a solution that fully supports the critical VMware features such as DRS, vCloud Director, VMotion, Storage VMotion.

Centralized Management and Reporting

The Zerto Cloud Manager (ZCM) centralizes management of the entire infrastructure. The SP is given a single “pane of glass” from which to view and manage all customers leveraging cloud resources. For example, reports are automatically created showing the usage of customer assets across sites. This dramatically simplifies the relationship between the customer and the CSP. These detailed resource usage reports can be used to generate invoices and can be imported into the SP’s billing system.

Standardization of the Service Provider Infrastructure

Cisco’s DRaaS system architecture is based on the Cisco VMDC cloud architecture and the Cisco Unified Computing System (UCS). VMDC is a reference architecture for building a fabric-based infrastructure that provides design guidelines demonstrating how customers can integrate key Cisco and partner technologies, such as networking, computing, integrated compute stacks, security, load balancing, and system management. Cisco UCS is a next-generation data center platform that unites compute, network, storage access, and virtualization into a cohesive system designed to reduce total cost of ownership (TCO) and increase business agility. By standardizing an infrastructure around these systems, a CSP can realize a number of benefits to reduce costs and complexity, while improving agility.

Reduced Costs

Together, Cisco VMDC and UCS reduce infrastructure expenditures (CAPEX) and operational expenses (OPEX) to increase profitability by reducing the number of devices that must be purchased, cabled, configured, powered, cooled, and secured. The unified architecture uses industry-standard technologies to provide interoperability and investment protection.

Business Agility

Together, Cisco VMDC and UCS enable business agility through faster provisioning of IT infrastructure and delivery of IT-as-a-service (ITaaS). Deployment time and cost is more predictable through the use of an end-to-end validated, scalable, and modular architecture. The unified architecture supports multiple applications, services, and tenants.

Simplification

Cisco VMDC and UCS simplify IT management to support scalability, further control costs, and facilitate automation—keys to delivering ITaaS and cloud applications. The architecture enhances the portability of both physical and virtual machines with server identity, LAN and SAN addressing, I/O configurations, firmware, and network connectivity profiles that dynamically provision and integrate server and network resources.