CHAPTER 1

Introduction

Cisco's BaaS architecture offering enables service providers (SP) to offer backup and recovery services to workloads outside of the SP's management domain that are either customer premises environments or collocated environments. In addition, SPs can offer data protection and data survivability services on workloads within the cloud provider's VPC environment and management domain. The Backup & Recovery solutions described in this document are designed to provide a new set of related capabilities allowing Cisco data center-based providers to enhance their addressable market, financial performance, and differentiation versus commodity cloud solutions.

BaaS Solution Use Case Overview

The key end-user consumable services enabled by this development effort, offered by an SP on an aaS (as-a-service) basis, are:

- **Remote BaaS—**Backup & Recovery for both physical and virtual servers from a customer data center to a cloud service provider's VPC. Targeted at mid-market end-customers with 250-1000 employees, this includes Enterprise data center to SP cloud backup and recovery, where the Enterprise customer has servers and applications deployed on-premises. The SP deploys the Actifio Sky virtual appliance at the customer site. Backups occur between the Sky appliance and either another Sky appliance (Sky-to-Sky) or a CDS appliance (Sky-to-CDS) at the Cisco VMDC-based SP's site.
- **Cloud BaaS**—Backup & Recovery for selected virtual servers in a VPC environment. Targeted at any VPC customers (IaaS) requiring Backup & Recovery services, this includes in-cloud (SP-to-SP) backup and restoration of IaaS workloads. Here, the Enterprise customer has servers deployed at the VMDC SP's site (hosted). The BaaS is provided between redundant SP sites. The Actifio CDS appliances are deployed at each VMDC SP site for replication, providing local backup/restore and site survivability.
- **Advanced BaaS Use Cases**—Backup copy for devops and analytics capabilities running in the cloud environment are just a couple of the advanced BaaS use cases. For example, the Actifio CDS provides virtual data management to enable Test/Dev functionality for the Enterprise customer. These advanced use cases are applicable in either the Cloud BaaS or Remote BaaS deployments described above.

VMDC Overview

VMDC, Cisco's reference architecture for cloud deployment, has been widely adopted by numerous SPs and Enterprises worldwide. VMDC has provided design guidance for scalable, secure, resilient, public and private cloud infrastructures serving multiple consumers or tenants. The VMDC architectures include:

- **VMDC 2.X**—In the 2.X system releases, the data center portion of the architecture designs were centered on traditional hierarchical infrastructure models incorporating leading Cisco platforms and L2 resilience technologies such as Virtual Port Channel (vPC), providing network containers or tenancy models of different sizes and service profiles, with necessary network-based services and orchestration and automation capabilities to accommodate the various needs of cloud providers and consumers.
- **VMDC 3.X**—The 3.X system releases introduced Cisco FabricPath for intra-DC networks as an L2 alternative to a hierarchical vPC-based design. FabricPath removes the complexities and disadvantages of traditional Spanning Tree Protocol (STP) to enable more extensive, flexible, and scalable L2 designs. Customers leveraging VMDC reference architecture models can choose between vPC-based and FabricPath-based designs to meet their particular requirements.
- **VMDC VSA 1.0**—The VSA 1.0 system release is the first VMDC release dealing specifically with the transition to Network Function Virtualization (NFV) of IaaS network services in the data center. Such services comprise virtual routers, virtual firewalls, load balancers, network analysis, and WAN optimization virtual appliances.

The BaaS solution described in this document is based on the VMDC VSA 1.0 architecture, in which the main focus is on public provider use cases, building a new logical topology model around the creation of virtual private cloud tenant containers in the shared data center infrastructure. Future releases will incorporate additional cloud consumer models specific to enterprise and private cloud use cases.

Actifio Overview

The traditional data management approach of the last 20 years has been compartmentalized, dependent on various business requirements resulting in multiple silos of duplicate data. Across applications, there are multiple data services such as mirroring, cloning, replication, thin provisioning, and snapshot technology, as well as data efficiency services such as deduplication and compression. The challenge is that these data services drive tremendous amounts of redundant data copies that consume valuable storage capacity and a tremendous amount of storage and data management resources.

Actifio's Copy Data Virtualization platform consolidates disparate storage service applications (such as backup, recovery, replication and deduplication), and provides a data management platform that allows IT to deliver true application-centric data services.

At the heart of the Actifio Copy Data Virtualization platform is the Actifio Virtual Data Pipeline (VDP). Actifio VDP virtualizes production data, allowing IT to provide data protection, test and development, analytics, as well as disaster recovery and business continuity all through a single storage platform, from only one golden copy of production data. Actifio allows IT to access a single, any-point-in-time copy of primary data through a mount, clone, LiveClone, or restore operation.