



# CHAPTER 1

## Introduction

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This document is written for IT decision makers, architects, engineers, and application owners who make architectural decisions for hybrid deployments. The architecture described in this document is for large and medium-sized businesses that are considering hybrid cloud solutions. This document is also useful for service providers that deliver hybrid cloud services to businesses.

## Hybrid Cloud with Cisco InterCloud

In December 2012, Cisco commissioned Forrester Consulting to investigate the growing interest in infrastructure as a service (IaaS), and more specifically in the hybrid cloud model. According to Forrester, about half of U.S. and European enterprise IT decision makers report that their companies use cloud IaaS, and Forrester expects enterprises to increasingly adopt IaaS. In many enterprises that are adopting private clouds, on-premises infrastructure cannot always provide the resources needed to address unplanned growth. The hybrid cloud architecture combines private cloud infrastructure with cloud service provider infrastructure to provide users with essentially unlimited resources in the public cloud, with security and control managed in the private cloud.

IT decision makers report that their greatest interest in IaaS in a hybrid cloud is as a complement, rather than a replacement, for on-premises capacity. These decision makers are planning for the resulting impact on network operations and spending. Although a hybrid approach promises cost savings and significant gains in IT and business flexibility, some concerns remain about management and integration of on-premises infrastructure with cloud services in a hybrid cloud architecture.

Forrester asked 69 IT decision makers in the United States, United Kingdom, France, and Germany about their cloud strategies. These decision makers were interested in using, or were already using, a service provider for cloud IaaS. A large majority (76 percent) plan to implement hybrid clouds. In addition, the 2012 Gartner Data Center Summit survey suggests that 70 percent of enterprises will pursue hybrid cloud strategies by 2015. Most hybrid cloud adopters plan to use IaaS as a complement to on-premises servers and storage, but a significant number also look to service providers for peak workload and other use cases.

Forrester also reports that in firms using IaaS, decision makers state that the most valuable benefits of a hybrid cloud strategy are IT flexibility, reduced costs, and faster, more flexible responses to market and business needs. IT decision makers are also clear about their views of the potential challenges associated with a hybrid cloud strategy. Many want consistent security policies and highly secure communications that span the data center and the cloud service provider, and they want to learn how to make existing applications work in both locations. Other important needs include transparent integration with cloud service providers for movement of virtual machines, shared networks with cloud service providers, and consistent application management across the hybrid cloud architecture.

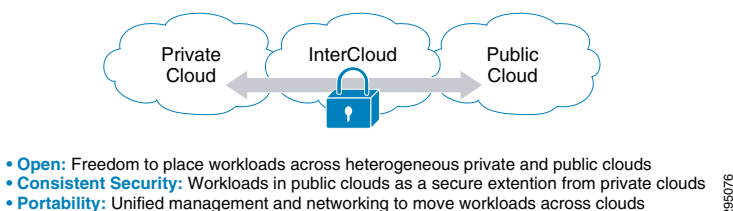
IT decision makers will seek solutions to these challenges using existing tools and skills, or they will explore new offerings that make it easier to address the challenges of hybrid cloud strategies. Evolving solutions that address the most immediate hybrid cloud challenges include:

- Consistent policy enforcement and capabilities for firewalls, security, and application delivery
- Highly secure network connectivity for virtual machine migration
- A common view of workloads and resources across data centers and cloud service providers
- Support for heterogeneous hypervisor environments and infrastructure software

The Cisco® InterCloud solution provides a faster, more flexible response to business needs and addresses the potential challenges of hybrid clouds (Figure 1-1).

- Cisco InterCloud is an open solution that supports multiple hypervisors and multiple clouds with the freedom to place workloads in both private and service provider clouds across heterogeneous environments.
- To protect critical business assets and meet compliance requirements, Cisco InterCloud provides highly secure, scalable connectivity to extend private clouds to service provider clouds.
- Cisco InterCloud provides workload security throughout the resulting hybrid clouds.
- Cisco InterCloud enforces consistent network and workload policies throughout the hybrid cloud.
- To provide consistent operations and workload portability across clouds, Cisco InterCloud delivers unified hybrid cloud management for end users and IT administrators, enabling workload mobility to and from service provider clouds for physical and virtual workloads.

**Figure 1-1** *Cisco InterCloud Solution*



## Cisco InterCloud Use Cases

Cisco's industry research shows that the most common use cases for hybrid cloud designs are development and testing, capacity augmentation, and shadow (rogue) IT control. The Cisco InterCloud roadmap adds support for disaster recovery.

### Development and Testing

In the development and testing use case, enterprise customers develop workloads in service provider clouds and bring the workload back to their private clouds after the workload is promoted to the production environment. To achieve the economic benefits of the cloud and support faster development, many application developers use service provider clouds for the development and testing environment. However, deployment of production applications in service provider clouds raises critical security and compliance concerns for IT departments. IT decision makers want to provide flexibility to application developers and enable them to use cloud service providers, but they require production workloads to be deployed in private clouds with security and controls to meet compliance requirements such as Payment

Card Industry (PCI), Health Insurance Portability and Accountability Act (HIPAA), and Sarbanes-Oxley mandates. Cisco InterCloud provides this flexibility with its capability both to move workloads into service provider clouds and to bring workloads back into the customers' private clouds and on-premises infrastructure.

## Capacity Augmentation

The capacity augmentation use case addresses the need for temporary resources. For example, to meet seasonal demands, an enterprise can rely on the service provider cloud to provide temporary resources; when high-demand processing finishes, the resources are decommissioned. For example, during peak shopping seasons for retailers or tax season for financial services, there are planned and unplanned demands for additional cloud resources for short and long durations. To achieve the economic benefits of a hybrid cloud, customers can flexibly extend to service provider clouds to meet peak demands while benefiting from the security and control of the private cloud. The Cisco InterCloud solution transparently delivers required capacity while providing the security and control of a private cloud.

## Shadow IT Control

Many enterprises prefer to deploy development workloads in the public cloud, primarily for convenience and faster deployment. This approach can cause concern for IT administrators, who must control the flow of IT traffic and spending and help ensure the security of data and intellectual property. Without the proper controls, data and intellectual property can escape this oversight. The Cisco InterCloud solution helps control this shadow IT, discovering resources deployed in the public cloud outside IT control and placing these resources under Cisco InterCloud control.

## Disaster Recovery

To meet growing IT infrastructure needs and to help ensure enterprise continuity during a site-level disaster, enterprises must have live mobility and fully automated, efficient disaster-recovery processes for applications across data centers. Failure to have robust, efficient mobility and fully automated disaster-recovery solutions can result in millions of dollars of lost revenue and employee productivity. The task of establishing efficient disaster-recovery processes and building a disaster-recovery site is both time consuming and costly.

With the emergence of hybrid clouds, enterprises can consider running their production environments in private clouds and their disaster-recovery environments in service provider clouds. The enterprise can replicate data to the service provider cloud while resources in the service provider cloud remain nonoperational until disaster recovery is needed. If a disaster strikes, IT administrators can quickly bring up the applications in the service provider cloud without affecting business needs because the data already resides in the service provider cloud.

This approach results in significant IT cost savings because there is no longer any need to build another data center for disaster recovery. This approach also presents new opportunities for service providers to take advantage of their multitenant clouds to provide disaster recovery as a service (DRaaS).

## Greenfield Deployment

The Cisco InterCloud solution can greatly benefit organizations that are in the early stages of adopting the public cloud but have not yet taken that step. The Cisco InterCloud solution can more securely manage workload migration between private and public clouds and support cross-cloud policy consistency.

## Brownfield Deployment

Organizations in which developers have already circumvented IT and deployed public cloud solutions can use Cisco Cloud Consumption services to identify public cloud use and restore cooperation between IT and developers. Such organizations can consider the following approach:

- Use Cisco Cloud Onboarding services to migrate workloads to a service provider that can meet the organization's compliance requirements. These services provide the benefits of bulk purchasing, bringing all IT costs under a common authority, and meet availability and business-continuity requirements.
- Return the workloads to IT management by deploying Cisco InterCloud and integrate the solution with the organization's existing infrastructure and tools; this approach supports a simple, highly secure hybrid cloud integration plan.
- Continue using Cisco Cloud Consumption services to track public cloud use.