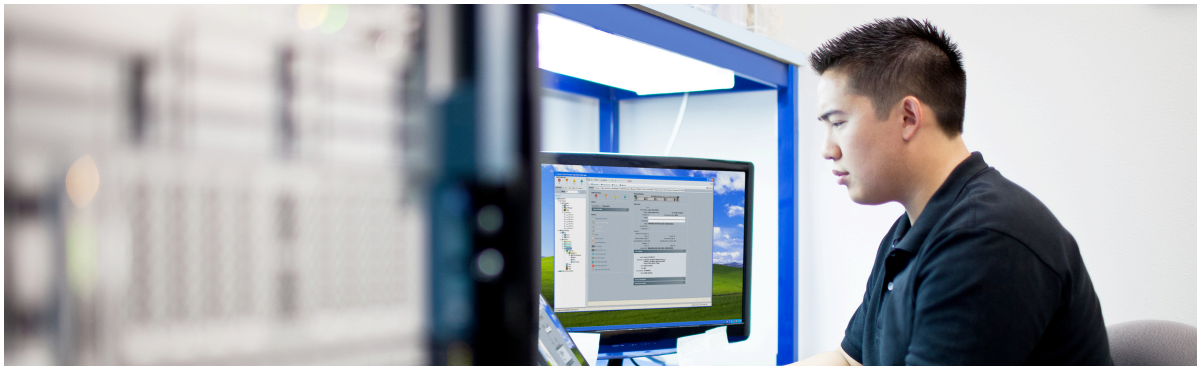
White Paper

When (and how) to move applications from VMware to Cisco Metacloud™



What You Will Learn

This white paper will explain when to migrate various applications running in VMware virtual machines to Cisco Metacloud, as well how to migrate existing application stacks.

The following content is intended to build a baseline understanding of the differences between “cloud native” and traditional application architectures, and outline a strategic approach that will allow you to take advantage of both. Topics covered include:

- Bimodal IT
- Traditional applications
- Cloud native applications
- Why to move applications from VMware to OpenStack
- How to move applications from VMware to OpenStack

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Introduction

Cisco Metacloud is a production-ready, OpenStack-based, on-premises cloud that Cisco engineers, deploys, upgrades, and remotely operates on the customer's behalf, 24 hours a day, 365 days a year. This managed solution allows our customers to deliver IT as a service to their lines of business as if the IT department were their own public cloud provider. It truly is the OpenStack easy button!

After Cisco deploys the new managed OpenStack cloud, the customer is provided with an enhanced Horizon dashboard that includes administrative tools, wizards, and dashboards to ease the onboarding of VMware virtual machines.

For customers who are interested in migrating existing virtual machines with Windows or Linux guest operating systems from brownfield virtualized data centers or public cloud, Metacloud offers an alternative OpenStack-based platform. In other words, migration to Metacloud is an option for any workload supported in OpenStack. In those regards, Cisco cloud migration services or ecosystem partners can provide professional services for the purpose of large-scale onboarding. However, in many cases the customer can easily export suitable virtual machine workloads from either VMware or AWS to Metacloud themselves by simply using the included export/import toolsets.

Please refer to the *Cisco Metacloud: Onboarding VMs* white paper for step-by-step guidance.

Bimodal IT

In 2014, Gartner introduced a prescriptive organizational model for enterprise IT called "Bimodal IT." It posits that IT organizations of the future will have two separate flavors, if you will: Type 1 is traditional IT, focused on stability and efficiency, while Type 2 is experimental, agile, and focused on time-to-market, rapid application evolution, and in particular, tight alignment with business units.

The bottom line of the "Bimodal IT" theory is that you do not need to move everything to either public or private cloud if your organization is considering a move in that direction. Some applications will always be better suited to a traditional IT environment, while others are absolutely going to deliver greater value to the company if they are hosted in the cloud. Your job—before anything is migrated anywhere is to figure out which is which.

Traditional Applications

Traditional applications are normally three-tiered and transactional. Transactional applications follow a fairly predictable format: The user requests information, performs an update, and then views an output. This architecture breaks applications into three logical pieces: web client, application process, and database.

In some cases, this entire stack is virtualized or a subset of the application remains bare metal, such as a high performance database. For the most part, albeit with some exceptions (see below: *When to move Applications from VMware to OpenStack)* these types of workloads can be moved in their entirety (lift and shift) or partially migrated (i.e., Web presentation tier) to OpenStack.

Keep in mind, OpenStack will provide bare-metal support with the Ironic service available in the Kilo release. Ironic is an OpenStack project which provisions bare metal as opposed to virtual machines by leveraging common technologies such as PXE boot and IPMI to cover a wide range of hardware, while supporting pluggable drivers to allow vendor-specific functionality to be added.

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Traditional Applications	Attributes
Customer relationship management (CRM)	Scale
Supply chain management	Business-oriented
Enterprise resource planning (ERP)	Mission-critical
Executive support systems	Secure
Management information systems (MIS)	Available
Knowledge worker systems	Compliant
Transaction processing systems	

Figure 1. Examples of traditional applications in the enterprise

Cloud Native Applications

Cloud native application architectures require cloud operating environments in which computing, networking, and storage resources can be provisioned and released elastically in an on-demand, self-service manner.

Suitable cloud-operating environments are provided in both public cloud infrastructure (such as Amazon Web Services, Google Cloud, or Microsoft Azure), and private cloud infrastructure (such as OpenStack). The benefits of using Cisco Metacloud behind the customer's own firewall to enable cloud-native include:

- **Speed:** The ability to innovate, experiment, and continuously deliver updates and value more quickly than competitors.
- **Safety:** The ability to integrate code rapidly while maintaining stability, availability, and durability by failing small in frequent increments.
- **Resiliency:** Metacloud provides hardware redundancy in Availability Zones (AZs) that constitute a self-contained managed set of resources comprised of computing, storage, network, and identity. Within an AZ a 3-node controller with high availability provides clustered databases and clustered message busses. All services are stateless and active on each of the servers. In the event of a failure of one of the three servers, the other two servers are able to carry on with the private cloud workloads uninterrupted.
- **Scalability:** Giving applications the ability to leverage policies and APIs to elastically respond to changes in demand and load.
- **Microservices**: An architecture pattern that decouples multiple functions from consolidated virtual machines into more modular workloads that help align functional units of deployment to business capabilities. By decoupling and distributing application modules, this granularity allows each capability to move independently and autonomously, and in turn faster and with more resiliency.
- **Self-service Agile Infrastructure:** An enhanced dashboard and open APIs enable development teams to operate at an application and service abstraction level, while rapidly provisioning infrastructure-level compute, network, and storage.
- **API-Based Collaboration:** Defines service-to-service interaction as well as application-to-OpenStack services.

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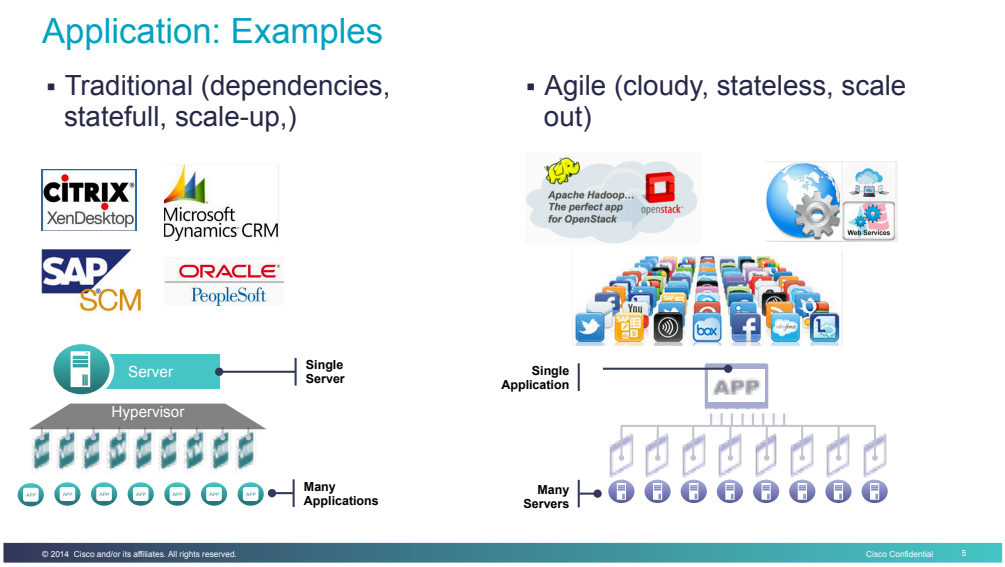

Figure 2. Traditional application architecture vs. Agile

When to Move Applications from VMware to OpenStack

The obvious answer is “it depends” based on the discussion of Bimodal IT and the very different needs of your different applications. The next section will unpack the actual process in more detail but at a high level “cloudy” is accomplished by slicing the application stack into neat vertical components that can be migrated off from VMware hypervisors to the new “island” of OpenStack private cloud. Once the virtualized workloads are exported to Cisco Metacloud, only the non-supported applications continue to run in the legacy DC. The following figures will provide some examples of the types of applications that should or should not be migrated to OpenStack.

A Fit for OpenStack	Attributes
Web applications (Websphere, Tomcat, IIS)	No vendor restrictions to virtualize
Virtualized database platforms (Oracle, SQL Server, MySQL)	If the application can run in a standard virtual machine, it can run in Cisco Metacloud
Collaboration (Sharepoint)	
Homegrown applications (.NET, Java, PHP, C)	

Figure 3. A good fit for migrating to OpenStack

From a feature parity perspective, Metacloud offers virtual instances of traditional applications similar to those in the current VMware suites.

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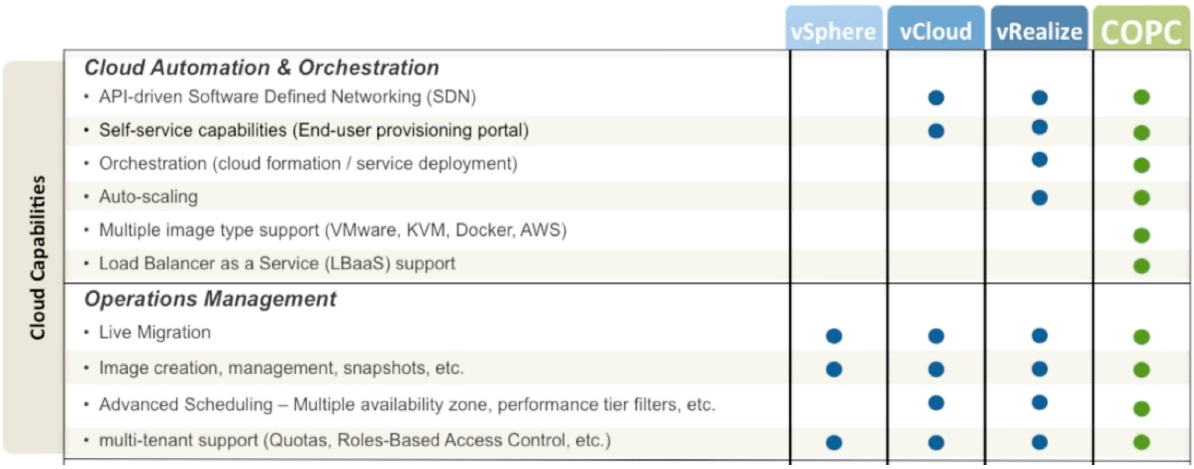

Figure 4. Feature function comparison

As the following list continues to wither, these remaining applications either have a specific dependency on the VMware hypervisor or some other non-supported vendor virtualization restriction.

Not a Current Fit for OpenStack	Challenges
SAP Hana (prod)	Bare metal
Citrix XenDesktop	VMware hypervisor dependency and features
High performance relational DB	Not validated/supported by software vendor on OpenStack
Systems unable to virtualize	Workload not suitable for KVM libvirt
	Scale-up

Figure 5. Not a current fit for OpenStack

How to Move Applications from VMware to OpenStack

The first recommended step to move the application is to profile your application stack in VMware to understand the architecture and dependencies. By profiling your application, you might be able to reduce costs through consolidation, modernization, or other alternatives before migrating to Cisco OpenStack Private Cloud. Application profiling typically involves creating a data flow model or diagram that highlights all the components and processes of your application.

The purpose of the application profiling process is to understand the components of your applications and the dependencies within those components. This information will reduce the risk of cutting over the application stack in its entirety or partially when certain restrictions prevent a full lift and shift. The main point is to first understand the complexity and dependencies before migrating.

The next recommended step is to slice the application stack into neat vertical components that can be migrated from VMware to Cisco OpenStack Private Cloud as elastic workloads. This second step allows the customer to optimize the benefits of OpenStack when migrating applications from VMware to Cisco OpenStack Private Cloud.

Once the virtualized application workloads are exported to Cisco OpenStack Private Cloud, only the non-supported or difficult components of the application stack would continue to run in the legacy Data Center. Most modern applications are designed with a Web front-end process that uses a browser or a series of RESTful APIs to present information to users and obtain updates. This model makes it easier to accommodate changes in mobile devices or changes to the language.

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Having taken advantage of decoupling the web tier, load balancing techniques can allow application workloads to become loosely coupled as well by virtualizing the IP addressing or name search spaces. In this way, copies of the application workloads can become elastic by implementing auto scaling policies in OpenStack that are distributed to client connections based on load balancing algorithms.

Lastly the database, if virtualized, can easily migrate as-is to OpenStack, even if required to export multiple VMDK files. However, if the database is installed as bare metal, currently it would need to be replicated to a virtualized database first or would need to continue to run in the current bare-metal server until Ironic “bare-metal” support is available in the Kilo release of OpenStack.

Export VMware to Cisco OpenStack Private Cloud

Once the specific virtual machines and dependencies of an application stack have been identified to move to OpenStack, several options can be considered for the actual porting of the virtual machines. The process of migrating a virtual machine running Microsoft Windows or Linux guest operating systems from VMware to Cisco OpenStack Private Cloud is a straightforward process. Both vSphere client to an ESXi host and vCenter can be used to export OVF templates of the VM instance from VMware to Cisco OpenStack Private Cloud using the VMDK format.

The Cisco OpenStack Private Cloud enhanced dashboard allows for importing OVF templates with VMDK disk files as images to launch within an OpenStack project. Please refer to the Cisco OpenStack Private Cloud Onboarding VMs: Whitepaper for the detailed steps and screen shots of VMware export to Cisco OpenStack Private Cloud import process.

Conclusion

The intention of this whitepaper is to answer the questions: When (and how) to move applications from VMware to Cisco OpenStack Private Cloud. Whenever customers are implementing a Cisco OpenStack Private Cloud for net new cloud native applications they should also consider migrating the appropriate brownfield virtual machines to OpenStack as well.

To summarize the “How” portion of the whitepaper: Prior to migrating virtual machines to OpenStack, it is important to profile the application stack for dependencies or opportunities for optimization “elasticity” to benefit from the agile behavior of OpenStack, while managing the risk of failures. With the proper planning, applications and guest operating systems supported in VMware will successfully export to Cisco OpenStack Private Cloud.

For More Information

Read more about Cisco OpenStack Private cloud on our Community page.

Request a quote.

Schedule a demo.

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