Workload Portability

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## Evolving Technologies Blue Print for Cloud

### Compare and contrast Cloud deployment models
- Infrastructure, platform, and software services (XaaS)
- Performance and reliability
- Security and privacy
- Scalability and interoperability

### Describe Cloud implementations and operations
- Automation and orchestration
- **Workload Portability**
- Troubleshooting and management
- OpenStack components
AGENDA

Introduction – Workload Portability

Emergence of Hybrid Cloud

Application Evolution

Hybrid Cloud Solutions

Conclusion
Introduction – Workload Portability

Workload is an amount of work performed by an entity at a given time with the resources provided.

Ability to move an entity from one environment to another and back again is called portability.
Workloads can be referred as:

- Physical Machine
- Virtual Machine (VM)
- Container
- An Application + Data

Portability can be to and from:

- P→2→V (Physical to Virtual)
- V→2→C (Virtual to Cloud)
- C→2→V (Cloud to Virtual)
- C→2→C (Cloud to Cloud)
Emergence of Hybrid Cloud
Defining the Hybrid Cloud

Organizations are subscribing to multiple cloud services from different cloud service providers for different IT or business requirements; therefore, they believe they have a hybrid cloud.

Organizations believe that hybrid cloud is simply an IT environment that uses a mix of public cloud services and dedicated IT assets including virtualization and private cloud.
Defining the Hybrid Cloud

Hybrid cloud is a cloud computing environment which uses a mix of on-premises, private cloud and, public cloud services with orchestration between the two platforms. By allowing workloads to move between private and public clouds as computing needs and costs change, hybrid cloud gives businesses greater flexibility and more data deployment options.
Community Cloud
Hybrid Cloud
Evaluating or using public cloud: 85%

Taken steps towards a hybrid cloud strategy: 87%

Plan to use multiple clouds: 94%

Source: IDC Cloud View, April, 2017, n=8,293 worldwide respondents, weighted by country, company size and industry
Benefit of Hybrid Cloud

- Business Continuity
- Room for Innovation
- Scalability
- Speed to Market
- Risk Management
Challenges of Hybrid Cloud

- Cloud Management
- Operational Cost
- Security
- No Common Ground
- Lack of Expertise
A Widening Cloud Gap

Between what cloud applications require...

...and what IT is capable of reliably and confidently supporting today.
Application Evolution
Application Evolution

TRANSITION FROM TRADITIONAL TO CLOUD NATIVE APPS.

Traditional Applications

Based on a multi-tier application development approach

Users

Cloud Native Applications

Based on a micro-services application development approach
Application Evolution

CLOUD CONSUMPTION MODELS

Users

GUI

GUI, API

Cloud Native Applications

Based on a micro-services application development approach

Traditional Applications

Based on a multi-tier application development approach
Traditional Applications on a Scale Up, Vertical Architecture
Cloud Native Applications on a Scale Out, Horizontal Web-Scale Architecture

Single (Distributed) Application

Dynamic Scheduling and Management

Server  Server  Server  Server  Server  Server  Server  Server  Many Servers
Application Evolution

CLOUD CONSUMPTION MODELS

Traditional Applications

Based on a multi-tier application development approach

Cloud Native Applications

Based on a micro-services application development approach
Application Evolution

PORTABILITY WITH MICRO SERVICES EMPOWERS DEVOPS FURTHER

The Developer

WHAT

The App. Code

C++
Visual Studio
JAVA

WHERE

The Runtime Environment

UNIX
Windows
JRE

Any Dev. Language

Containers

The Ops within IT

IT Guy (Infrastructure Operations)
DevOps
Quality Assurance (Testing)
Software Engineers (Development)

It’s no longer dissociated as all dependencies are embedded, hence it’s fully portable across environments (on-prem or public cloud or SaaS)
Application Evolution

FROM POINTS OF INSERTION TO EMBEDDED AS IT SCALES OUT, INCLUSIVE TO PUBLIC CLOUD

Traditional Applications

Based on a multi-tier application development approach

Security and SLB Services Insertion

Perimeter Security

Users

Cloud Native Applications

Based on a micro-services application development approach
Application Evolution
FROM POINTS OF INSERTION TO EMBEDDED AS IT SCALES OUT, INCLUSIVE TO PUBLIC CLOUD

Traditional Applications
Based on a multi-tier application development approach

Cloud Native Applications
Based on a micro-services application development approach

Users

Perimeter Security
Scale-out, inclusive for services

FROM POINTS OF INSERTION TO EMBEDDED AS IT SCALES OUT, INCLUSIVE TO PUBLIC CLOUD
TRADITIONAL AND MICROSERVICES BASED APPLICATION ARE CONCEPTUALLY DIFFERENT FROM SERVICES, LOCALITY, SCALE, PORTABILITY ETC.

Traditional Applications

Based on a multi-tier application development approach

Cloud Native Applications

Based on a micro-services application development approach (on premise & public-cloud)

Perimeter Security

Security and SLB Services Insertion

Users

Perimeter Security

Scale-out, inclusive for services

DISCONNECT!
Hybrid Cloud Solutions
Hybrid Cloud Solutions

There are many Hybrid Cloud Solutions available today from various vendors with differentiating capabilities as shown below:

- **PAAS**
  - IBM Bluemix
  - CLOUD FOUNDRY
  - APPREnda

- **Application Centric Management**
  - Cisco CloudCenter
  - CSC

- **Orchestrator**
  - SCALR
  - CloudFormation

- **Infrastructure Centric Management**
  - VMware
  - RIGHT SCALE
  - HPE Helion
CloudCenter Unique Value
Model Once. Deploy and Manage Anywhere.

One Integrated Platform
Lifecycle Management
New and Existing Applications
What Does "Model Once" Mean?

Infrastructure-Centric
Cloud-Specific workflows and Scripts
Labor /Services Intensive

Script-Based

Application Profile-Based

Application-Centric
Cloud-Agnostic
Low TCO
Hybrid Cloud Management

One Platform

Manager

Profile

Orchestrator
Unique Technology Advantage

One Profile, One Platform

Application topology
Infrastructure resources
Deployable Artifacts
Orchestration
Policies

Single Profile
Includes Both Infrastructure and Application

Manager
Profile

Native deployment
Run-time policy
Resources
Best practices

Orchestrator

One Platform
Visibility and Control Across Applications, Clouds and Users

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Hybrid Cloud Management

One Platform
Application Profile

Representing as a cube
Extendable

- Docker
- Puppet, Chef
- Components
- User Content
- Vendor Content

Hooks
- Scripts
- Events

Security
- SSO
- HSM

Infrastructure
- IPAM
- DNS

ITSM | Build Automation (Jenkins)

Secure
Scalable
Extendable
Multi-tenant
Conclusion
Conclusion

- **Workload Portability:** Ability to move workload from one environment to another and back again.

- **Hybrid Cloud:** Cloud computing environment which uses a mix of on-premises, private cloud and, public cloud services with orchestration between the two platforms.

- **Application Evolution:** Cloud native applications are new normal, and their adoption is driving the momentum.

- **Hybrid Cloud Solutions:** Adoption of hybrid cloud has enhanced the development of hybrid cloud solution.
Learning Matrix for Cloud

Cisco Press books & Videos | Suggested reading
Designing Networks and Services for the Cloud: Delivering business-grade cloud applications and services – Chapter 1 (ISBN-10: 1-58714-294-5)

Cisco Live presentations
TNKCLD-1004 - From Convergence to Cloud
BSOGEN-1002 – Cloud Security Lessons Learned
BRKRCT-2603 - Cloudy with a chance of SDN
BRKSEC-2404 - Effective Cloud Security Made Simple – Cloud Security Re-imagined with CloudLock
BRKCLD-2000 - Cloud Types and Security – What they Mean to You and Your Company
BRKCLD-2008 - Multi-Cloud and Application Centric Modeling, Deployment and Management with Cisco CloudCenter
BRKDCN-2367 – OpenStack Deployment in the Enterprise and Service Provider

Recommended Courses and Videos
Automating the Cisco Enterprise Cloud (CLDAUT)
Cisco Cloud Infrastructure (CLDINF)
Designing the Cisco Cloud (CLDDES)

Reference URLs, Videos & Blogs
Cisco Cloud Overview
Cisco Cloud Blogs
What is OpenStack
OpenStack 101 Video
OpenStack Documentation
Cloud Tutorial
Cloud Security Alliance

CCIE Community Events
CCIE Technical webinars

Cisco DevNet
Cloud Dev Center