



UNIVERSITY *of* HAWAI'I *at* MĀNOA

COLLEGE OF EDUCATION

OpenStack at the College of Education

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What is OpenStack?

- Open Source Infrastructure-as-a-Service (IaaS) ecosystem
- “Cloud OS”
- Support from more than 150 companies
AMD, Intel, Cisco, Red Hat, DELL, HP, VMWare, ...
- Users include NASA, Rackspace, Wikimedia Labs, Deutsche Telekom...

and now the College of Education! :-)

Why Cloud?

- Quick turnaround from development to production
- Increased reliability
- Increased flexibility
- Encouraging industry best practices
- **Enabling service orchestration**
- Standardization of instances

Why Cloud at COE?

- Private Cloud as means of increasing value of existing infrastructure
- Maximum utilization of hardware with greatest flexibility
 - Compatibility with Amazon EC2 or Rackspace
- Compartmentalization of IT services into instances

Why OpenStack?

- “project” vs “product”
- maintain value of investment
 - licensing and support, **OR**
 - support and *training of our staff*
- no vendor-lock
- upgrade path w/o added costs
- interoperability “guaranteed” / more likely
 - adherence to standards
 - open source

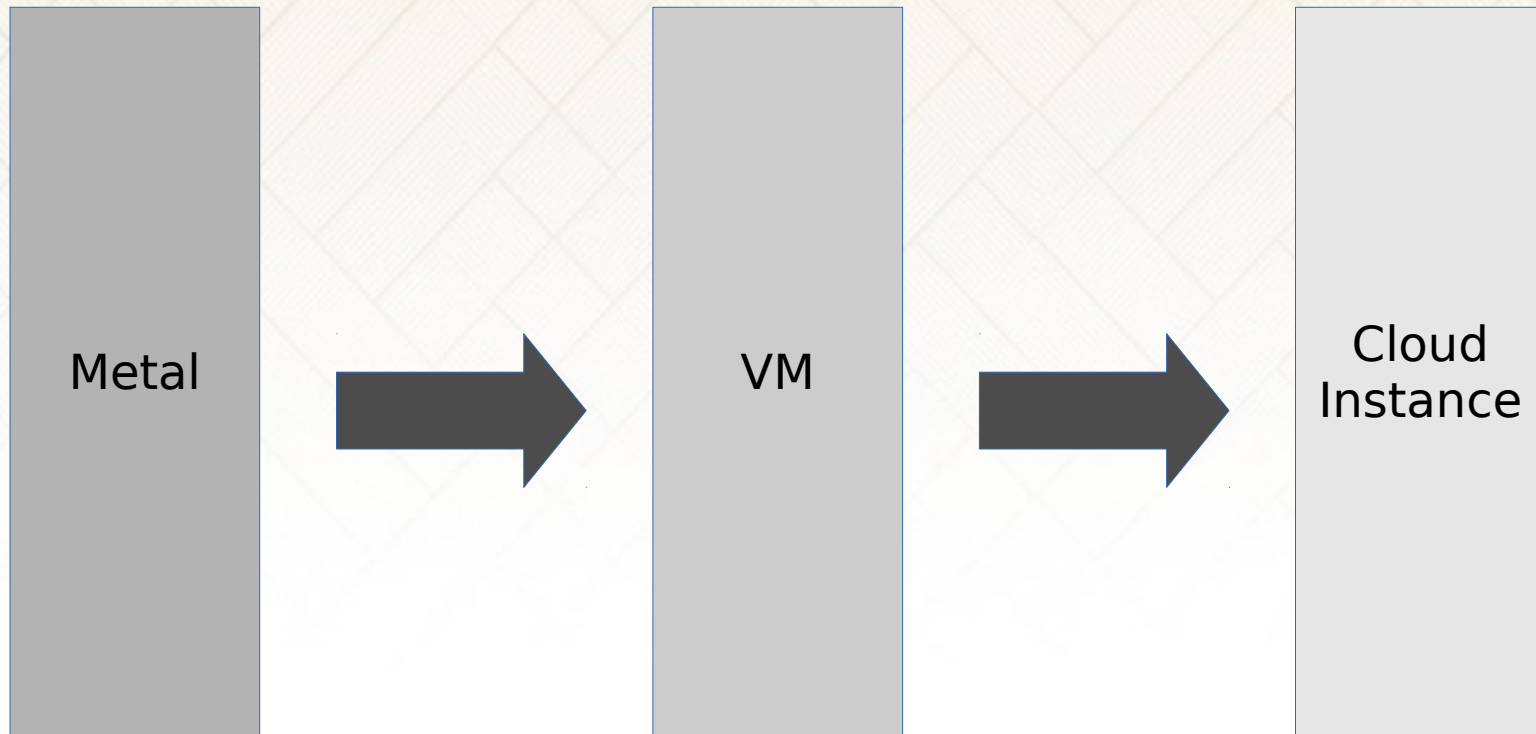
Components of OpenStack

- Nova – Cloud Computing
- Cinder – Block Storage
- Swift – Object Storage
- Quantum – Networking
- Keystone – Identity Management
- Glance – Imaging Service
- Horizon – Web Based Dashboard

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From Metal to Cloud



- Step 1** virtualize existing bare metal services
- Step 2** abstract VMs into cloud instances
- Step 3** utilize service orchestration for standardized rollout

Service Orchestration

- Another layer of abstraction above virtualization of servers and configuration management
- Cloud emphasizes standardized instances, not “golden images”
- Goal is to automatically roll out services *right after you instantiate them*
- Example using OpenStack: Juju

Juju

- Juju is to virtualization what package managers are to software
- “packages” are called “charms”
- Using short commands, services can be deployed and interactions described
- Generally one instance per service (i.e. one per MySQL, NFS, Wordpress, etc.)
- Uses Zookeeper database instance to store state of service orchestration

Juju Demo

- Objective:
 - Roll out a load-balanced LAMP stack with NFS mounted data directories
- If we're out of time, I'm happy to continue offline after this presentation
- If you want to meet, feel free to contact me at sfabel@hawaii.edu



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