IBM

Understand IBM Cloud Manager V4.2 for IBM z Systems

Kershaw Mehta

kershaw@us.ibm.com

August 14, 2015

openstack
POWERED

Many organizations begin the cloud journey with a local cloud

Organizations are looking for benefits from local clouds

- Higher system and application availability

- Reduce labor costs and TCO

- Maximize existing hardware utilization

- Improve IT service quality

- Increase security by starting behind enterprise firewall

And are preparing infrastructure to build the foundation

- Highly virtualized infrastructure

- Standardized virtual workloads

- Web-based provisioning
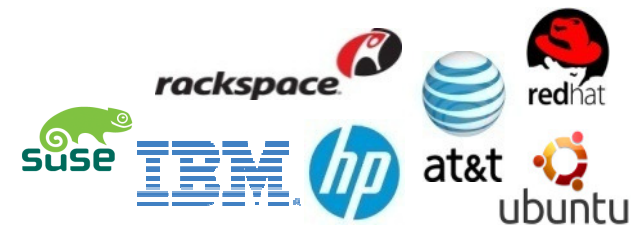
- Dynamic resource scaling

OpenStack leads the open cloud infrastructure movement

OpenStack is a global collaboration of developers and cloud computing technologists working to produce a ubiquitous Infrastructure as a Service (**IaaS**) open source cloud computing platform for public and private clouds.
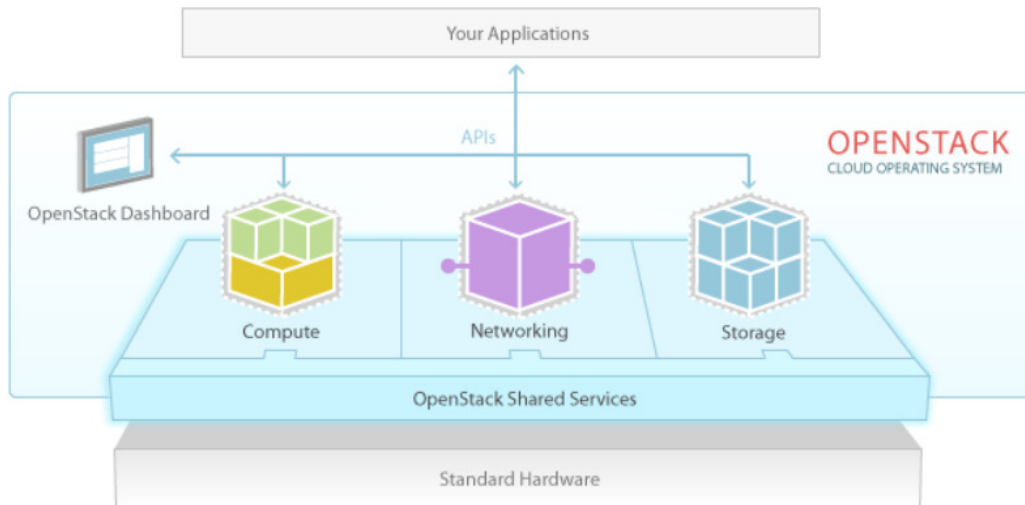
Platinum Sponsors

Gold Sponsors

Why OpenStack

- **Open, modular design –** flexible architecture and open APIs
- **Vendor interoperability –** protects clients' current investment with simple path to new technology
- **Rapid innovation –** largest active open source community (over 16,000) effort enables faster developmental effort

http://OpenStack.org

IBM

IBM uses open source software to deliver a vendor-neutral, open-by-design solution

Cloud business apps

Digital innovation platform

World class cloud infrastructure
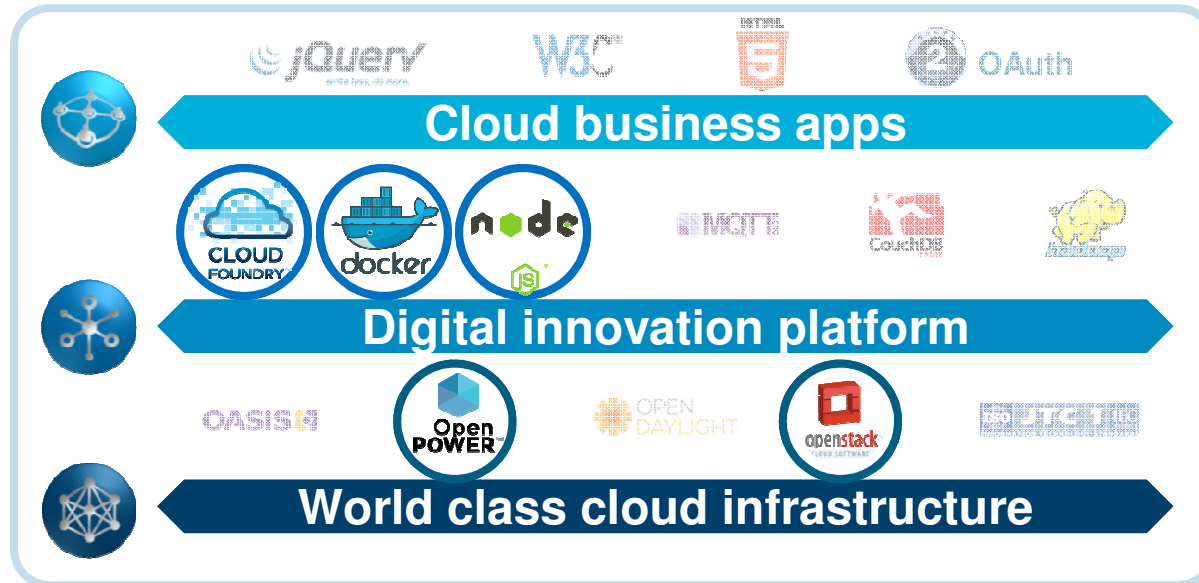
24 — IBM has 24 core contributors and 10% of the OpenStack leadership team

120+ — Active IBM developers in OpenStack projects

450+ — IBMers working on OpenStack, from formation of the Foundation to code quality and new functionality

Introducing IBM Cloud Manager with OpenStack

An easy to deploy and use cloud management software offering based on OpenStack with IBM enhancements and support

- Enables on-premise **rapid IT response** to changing business demands, via self-service provisioning of infrastructure services.

- Tracks and correlates infrastructure cost to departments via usage metering, so **expenses can be aligned to services.**

- Empowers **production-grade operations and provides interoperability at scale** via full OpenStack API compatibility.

- **Supports single point management across numerous systems** including x86, Power and z Systems and hypervisors (KVM, Hyper-V, VMware, Power VM, and z/VM).

- **Reduce on-premise infrastructure costs and improve application performance** through intelligent VM placement and automated optimization.

- On-premise, open computing alternative to proprietary vendors, with **IBM's world-class support**

© 2015 IBM Corporation

Why IBM Cloud Manager with OpenStack?

It provides virtualization for improved resource utilization while enabling hybrid management across on- and off-premises clouds. Because of this, it can help you:

- **Lower costs** using a simplified starter cloud experience that provides a single point of management across compute environments including x/86, IBM Power® and IBM z Systems™ as well as hypervisors (KVM, Hyper-V, VMware, Power VM and more).

- **Accelerate infrastructure delivery** and **improve operational quality** through standardization and automation.

- **Improve manageability** with a function-rich solution that supplies insight into resource utilization with metering and reporting.

- **Reduce administrative workload** with simple and intuitive self-service provisioning of infrastructure services.

- **Provide open technology choices** thanks to OpenStack alignment

IBM is ranked as the #1 hybrid and private cloud provider for the enterprise.
— Synergy Research Group, February 2015

IBM systems management offerings support multiple user roles

IBM Cloud Manager with OpenStack supports these user types

Maureen, end user

Self-service IT requests through mobile and web clients	Manage cloud workloads, users and environment
Manage physical resources such as servers, storage and networking	Manage virtualized resources such as servers, storage and networking

Michael, cloud manager

Platform manager

Virtualization manager

IBM Cloud Manager with OpenStack empowers end users

Maureen, end user
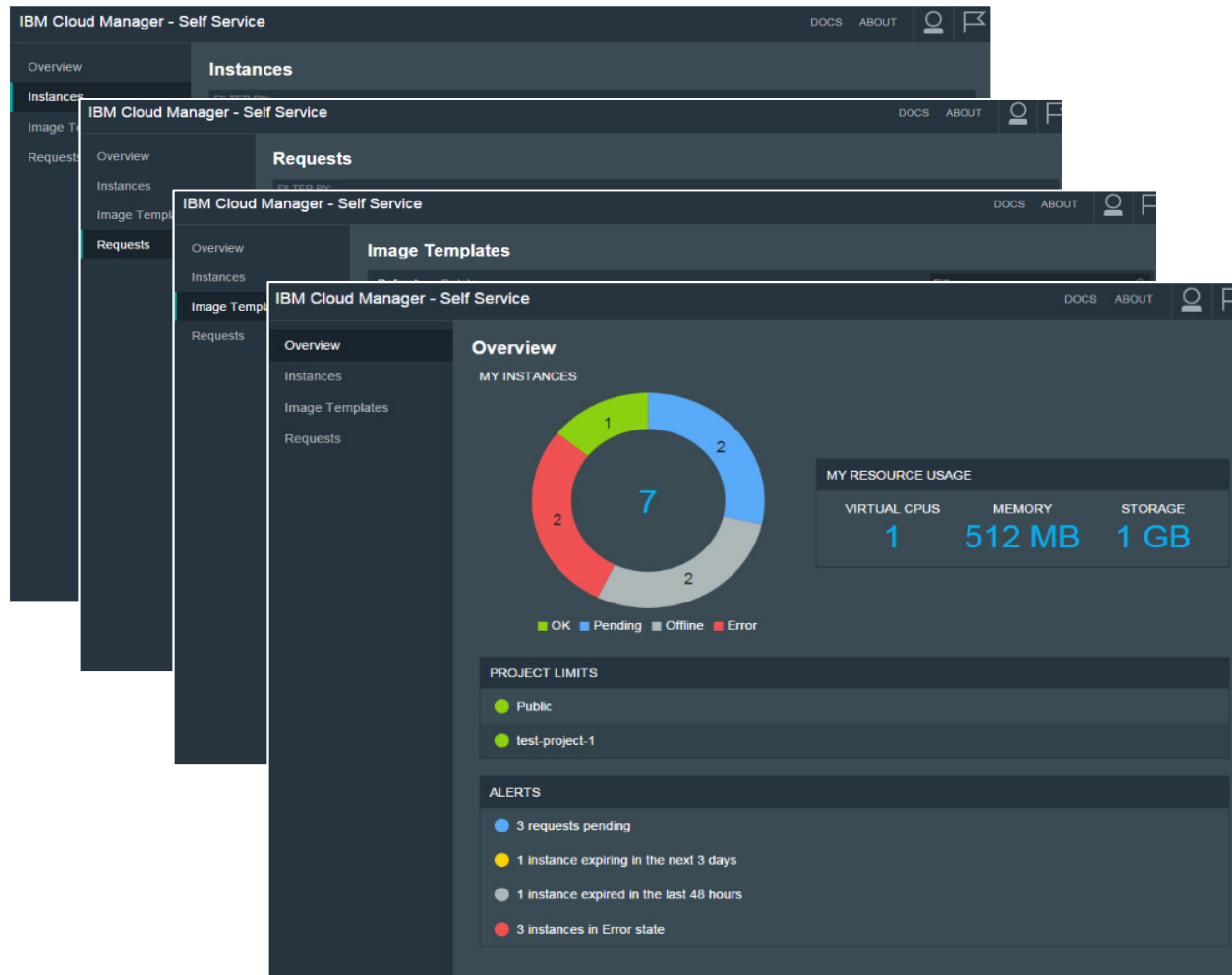
- Provides easy access and ease of use

- Hides underlying infrastructure from user and shifts focus to services delivered

- Enables the system to provide standardized and lower cost services

- Supports services metering and billing at a granular level

- Eases complexity with workload standardization

IBM Cloud Manager with OpenStack end-user functionalities

Projects

- Request access from login panel
- Request access to a project

Images

- Request image deploy
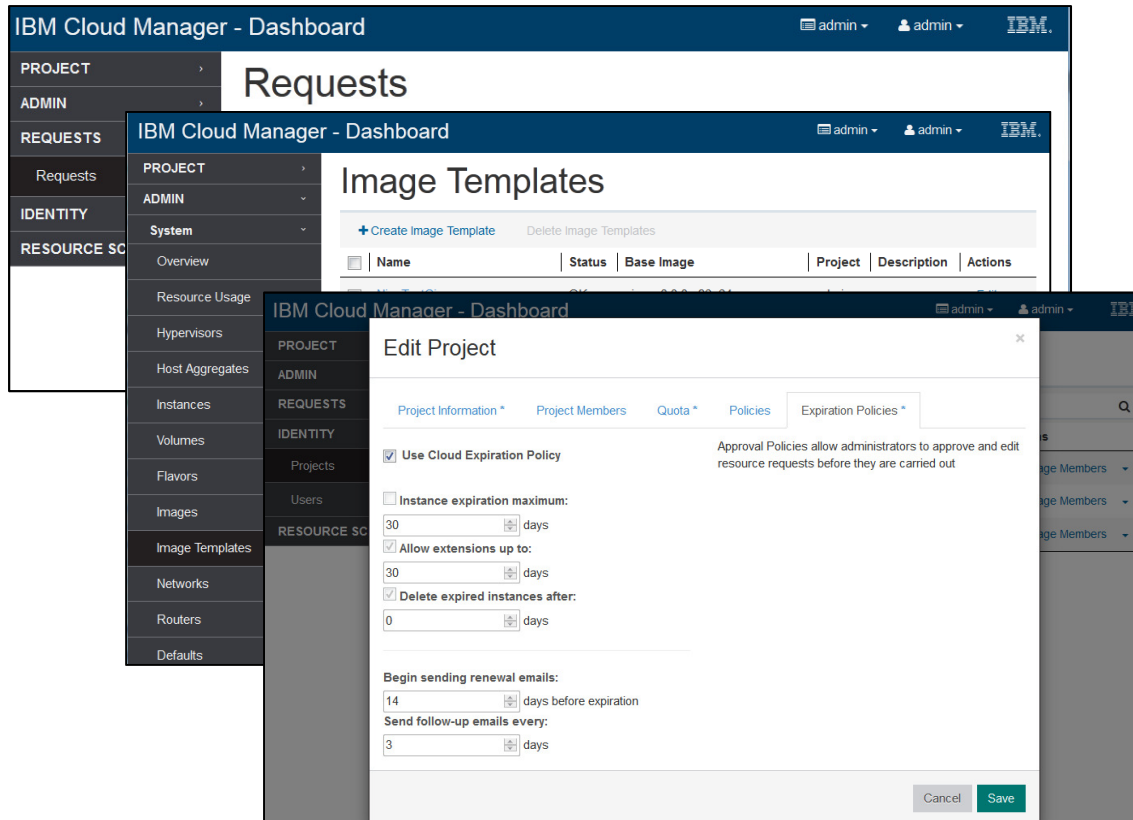- Set user VM parameters (flavors)

Instances

- Start/resume/stop an instance
- Review instance properties
- View CPU, Memory & Disk usage of an instance
- View Instance console logs
- Resize running instances
- Delete an instance
- Clone an instance
- Capture an instance

IBM Cloud Manager with OpenStack empowers cloud managers


**Michael,
cloud manager**

- Tailors workload options for users and groups

- Provides independent volume lifecycle

- Monitors use with workload metering

- Supplies project level expiration and approval policy customization

- Provides single pane of glass using Horizon to manage multi-hypervisor, multi-region as well as hybrid clouds

IBM Cloud Manager with OpenStack cloud manager functionalities

- **Configuration**
  — Configure networks
  — Configure LDAP environment
  — Configure Initial and runtime workload placement policies for the Platform Resource Scheduler
  — Configure Node level HA policies for the Platform Resource Scheduler

- **Images**
  — Import and manage images
  — Configure images for user deployments
  — Create and manage flavors
  — Present users with simplified options

- **Volumes**
  — Create, delete, capture, attach and detach volumes

- **Initiate live migrations to manage outages**

- **Approvals and Expiration Policies**
  — Configure approval and expiration policies at the cloud and project levels
  — Approve or reject new workload requests
  — Approve or reject workload resize requests

- **Utilization**
  — Configure to generate metering records
  — View capacity utilization

- **Review event logs and failures**

- **User or project management**
  — Create users and roles
  — Create and manage projects
 — Add users to projects as "owner," "user" and "viewer"

IBM

IBM Cloud Manager with OpenStack helps avoid sub-optimal allocation caused by static, simple scheduling

Some hypervisors underused
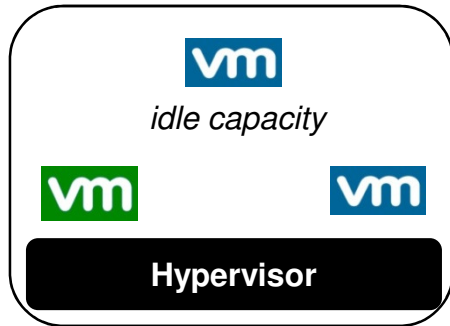
- Wasted resources
- Overprovisioned infrastructure
- Excess power, cooling and facilities costs
- Requires administrator attention
- Risk of human error and further issues

Other hypervisors overloaded
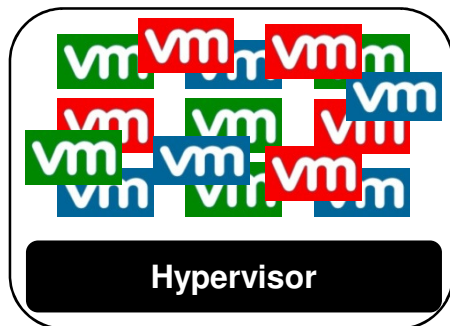
- Poor application performance
- Application outages and downtime
- Increased support costs
- Requires administrator attention
- Risk of human error and further issues

IBM Platform Resource Scheduler
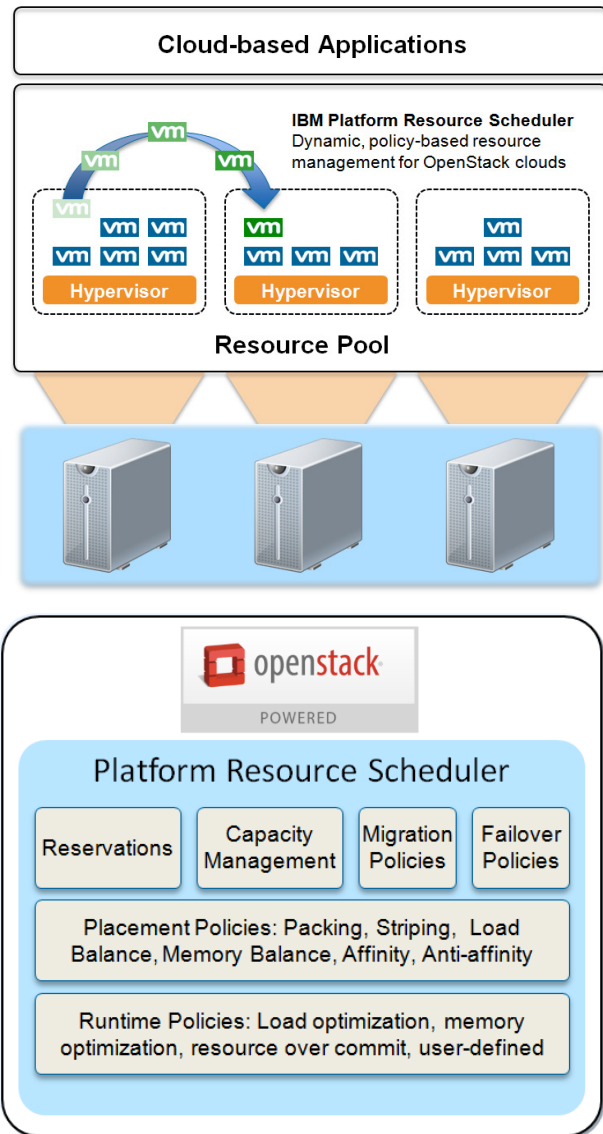
- Provides dynamic resource management for IBM OpenStack clouds
  - Higher quality of service
  - Improved application performance
  - Expanded resource selection flexibility
  - Increased management automation
  - Reduced infrastructure costs

- Intelligent VM placement

- Automated runtime resource optimization

- 100% compatibility with community scheduler

- Enterprise level features and qualities
  - Placement policy for aggregate (packing, striping, CPU and memory load balance, user defined) **to reduce infrastructure cost and improve resource utilization**
  - Placement policy for HEAT (topology-aware affinity/anti-affinity, maximum loss-per-node failure) for **optimal QoS of application**

- Field tested for over 20 years – stable, fast and scalable

Scheduler Details

© 2015 IBM Corporation

Deployment Overview

- Includes chef-server

- Automated install

- Flexible topologies
  — Including High Availability

- Role based
  — Utilizes Chef Cookbooks/recipes
  — Allows for entry Proof of Concept
  — Allows for large, distributed cloud configurations
  — Allows for multi-region OpenStack configurations
  — Hybrid configurations to IBM Cloud OpenStack Services

- Deployment Flow
  1. Install IBM Cloud Manager with OpenStack to create a "deployment server".
  2. Deploy one or more cloud environments using the "deployment server".
  3. Maintain, update and configure your cloud environments (as needed) …

IBM
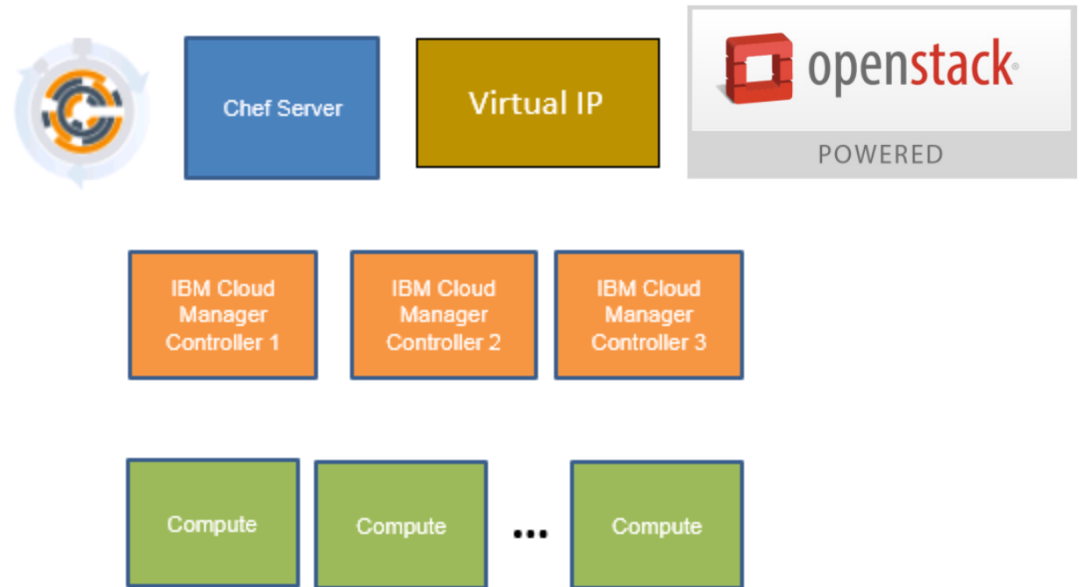
IBM Cloud Manager with OpenStack - Pricing / Licensing

Product offering	PID #	License with Subscription & Support	S&S Renewals
Cloud Manager with OpenStack	5725-R05	$1200 per Socket w/1 Yr S&S	$240 per Socket
Cloud Manager with OpenStack for Power*	5765-CMO	$1200 per Socket w/ 1 Yr S&S	$240 per Socket
Cloud Manager with OpenStack z Systems	5648-OSZ	$1280 per IFL w/ 1 Yr S&S	$256 per Engine

* Cloud Manager with OpenStack for Power is also bundled with AIX Enterprise Edition

IBM Cloud Manager with OpenStack must be licensed for the platform it is installed on and for all the platforms it is managing

- **Example:** You have installed Cloud Manager with OpenStack (on x86) and you want to manage both your x86 and z/VM environments.

- Therefore you must license for all sockets on x86 that you want to manage **and** for all IFLs on your z/VM environment that you want to manage with ICM

IBM Cloud Manager with OpenStack – Product Selection

If a customer is interested on having IBM Cloud Manager with OpenStack running on z Systems, then they will need to order the <u>IBM Cloud Manager with OpenStack for z Systems</u> product (5648-OSZ)

- This product is at the V4.2 level (which contains the Juno release of OpenStack)

If a customer does **NOT** have a need to have IBM Cloud Manager with OpenStack running on z Systems but still wants to manage a z Systems environment, then they order the <u>IBM Cloud Manager with OpenStack</u> (the x86 product - 5725-R05) or the <u>IBM Cloud Manager with OpenStack for Power Systems</u> product (5765-CMO)

- This product is at the V4.3 level (which contains the Kilo release of OpenStack)

- Of course you will need to order the <u>IBM Cloud Manager with OpenStack for z Systems</u> product for licensing purposes.

IBM

Private, on-premises platform interoperability

Controller node (manage-from)

Cloud manager (application)	Host OS
x86	RHEL 7.1
Power	RHEL 7.1
z Systems	Virtual Linux Appliance
OpenStack controller node	**Host OS**
x86	RHEL 7.1 x86_64
Power	RHEL 7.1 ppc_64 BE
z Systems	Virtual Linux Appliance

Compute node (manage-to)

Hypervisor / compute node	x86			Power		z Systems
	VMware vSphere	**Hyper-V (2012R2)**	**KVM (RHEL 7.1)**	**PowerVM® via PowerVC**	**PowerKVM**	**z/VM®**
Guest OS	• Windows • SLES • RHEL • Ubuntu • Other Linux	• Windows • SLES • RHEL • Ubuntu • Other Linux	• Windows • SLES • RHEL • Ubuntu • Other Linux	• AIX® • SLES BE • RHEL BE • IBM i	• RHEL BE, LE • SLES BE, LE • Ubuntu LE	• SLES • RHEL

What's new in IBM Cloud Manager with OpenStack V4R3

- OpenStack Kilo APIs, backed with IBM support

- Hybrid support for IBM Cloud OpenStack Services with the flexibility to deploy a private cloud and establish extra capacity in a hybrid cloud

- Docker Container enablement throughNova-Docker

- Bare metal deployment support through OpenStack Ironic

- High availability with multiple Cloud Manager with OpenStack controllers on x86 platforms

- Enhanced self-service portal user interface for end-user capabilities and enhanced Horizon Dashboard for administrator capabilities

- Improved and intuitive deployment capability using graphical user interface and command-line interface

Open.

Simple.

Innovative.

IBM cloud software is highly OpenStack compatible

- **IBM Cloud Orchestrator**
  - **Manage, orchestrate and automate service delivery** across all environments
  - Leverage numerous OpenStack services to support customer needs for patterns, network management, identity, block storage and more

- **Cloud Foundation Services**
  - **Build, integrate and manage hybrid applications** using Bluemix to provide a common, integrated set of foundational services
  - All services and runtimes are built upon OpenStack

- **Urbancode Deploy with Patterns**
  - **Provide a fully automated application delivery pipeline** as a part of the application delivery process for development, test and production
  - Supports deployment to OpenStack environments

- **IBM Bluemix**
  - **Build, deploy and manage applications** to your choice of local, dedicated and public OpenStack environments from Bluemix

IBM software solutions such as Cloud Orchestrator, PureApp and UrbanCode Deploy are interoperable with both OpenStack and VMware, providing pathways to environment coexistence and integration.

IBM Services Teams offer deep OpenStack expertise

- **IBM Cloud Advisory Services (pre-sales)**
  — Helps clients develop a customized, holistic strategy for cloud use, including cost savings, revenue growth, and other business advantage.

- **IBM Systems Lab Services & Training: *CloudCare***
  — Program that supports cloud engagements around the world to drive early cloud adoption, acceptance and references
  — IBM seller engages local <u>Lab Services Opportunity Manager</u> to size and scope requested services

- **IBM Cloud Builder Professional Services (post sales)**
  — Delivers customized services to build and deploy highly automated, rapidly deployed private and hybrid cloud solutions.

- **Integrated Managed Infrastructure (post sales)**
  — Manages traditional IT, private, public, and hybrid clouds for clients.
  — Offers a flexible, modular catalog of plug-and-play bundled services, to allow clients to focus on core business needs.

Each provides expertise on open standards environments, allowing clients to quickly and effectively plan, deploy, and manage seamless hybrid OpenStack clouds.

IBM

Thank you for your time!

For more information:

IBM Cloud Manager with OpenStack home page
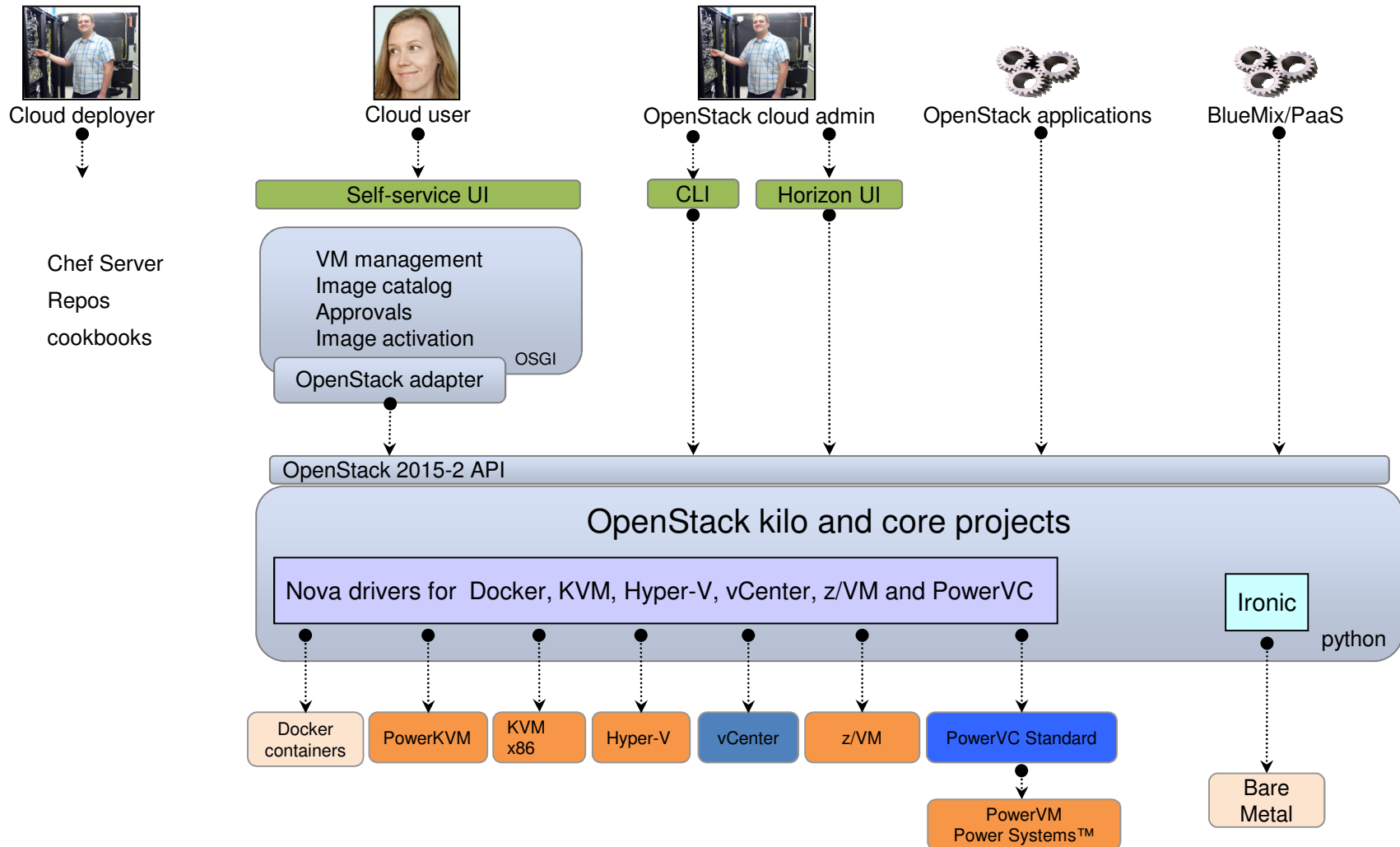ibm.biz/BdXMaZ

Additional resources:

OpenStack Kilo
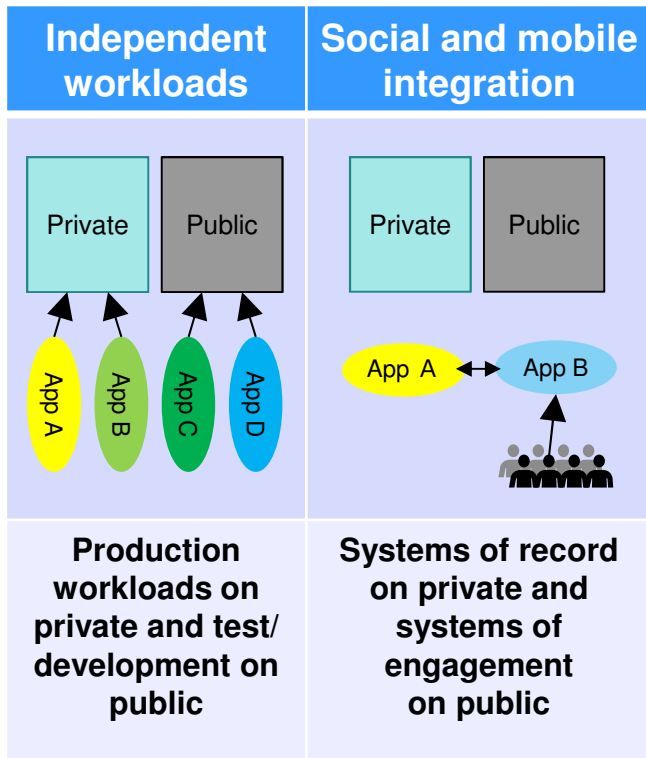http://www.openstack.org/software/kilo/

4.3 Admin Guide
https://www-01.ibm.com/support/knowledgecenter/SST55W/welcome

Contact:

Kershaw Mehta

kershaw@us.ibm.com

Backup

IBM

IBM Cloud Manager with OpenStack – Architecture

Cloud deployer

Cloud user

OpenStack cloud admin

OpenStack applications

BlueMix/PaaS

Chef Server

Repos

cookbooks

Self-service UI

CLI

Horizon UI

VM management
Image catalog
Approvals
Image activation

OSGI

OpenStack adapter

OpenStack 2015-2 API

OpenStack kilo and core projects

Nova drivers for Docker, KVM, Hyper-V, vCenter, z/VM and PowerVC

Ironic

python

Docker containers

PowerKVM

KVM x86

Hyper-V

vCenter

z/VM

PowerVC Standard

Bare Metal

PowerVM Power Systems™

New for V4R3: hybrid capabilities

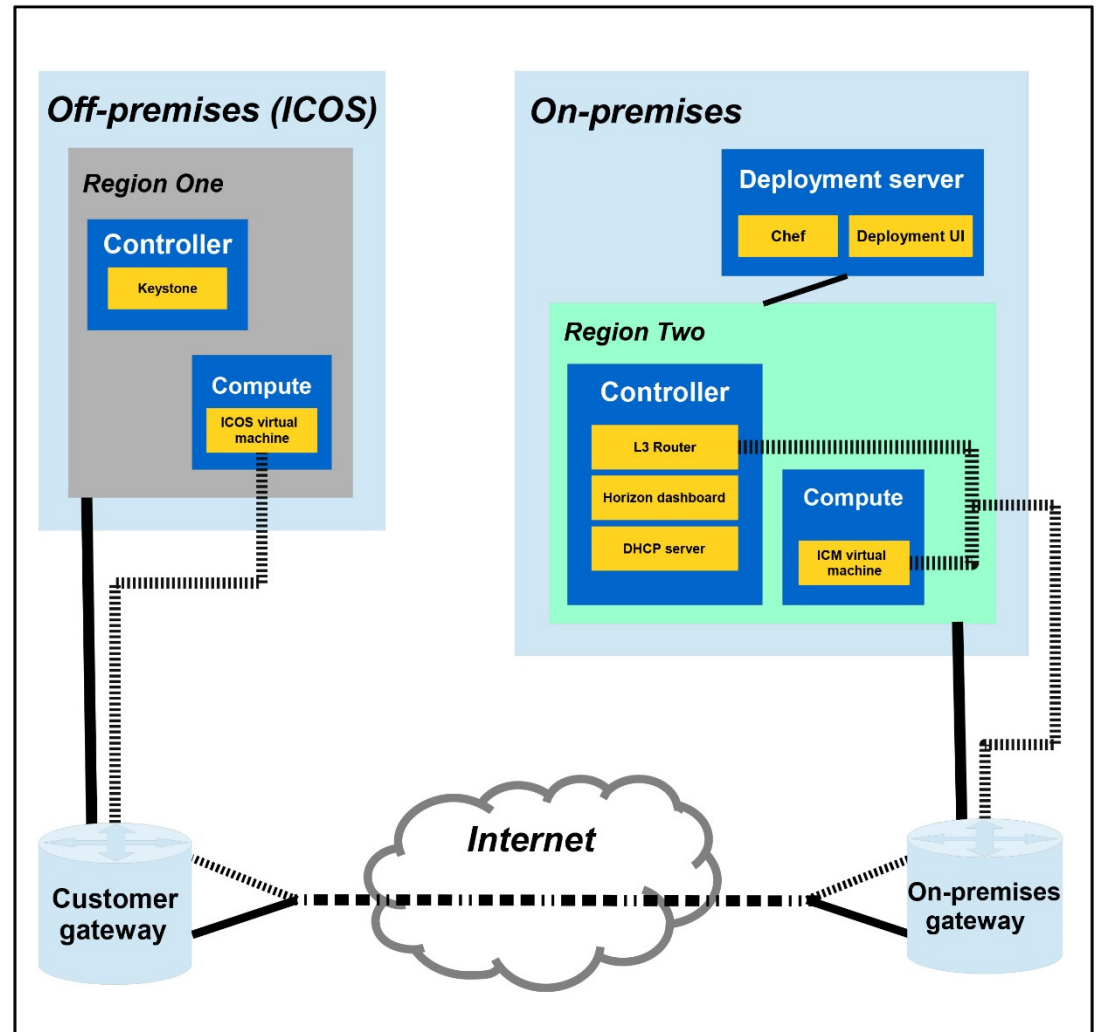| Independent workloads	Social and mobile integration
Private	Public	Private	Public
App A App B App C App D	App A ↔ App B
Production workloads on private and test/ development on public	**Systems of record on private and systems of engagement on public**
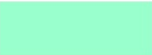
Combine **IBM Cloud Manager with OpenStack** with **SoftLayer** and **Infrastructure Services** to enable hybrid clouds right now.

- Support a hybrid cloud environment with IBM Cloud Manager with OpenStack as the on-premises cloud and IBM Cloud OpenStack Services (ICOS) as the off-premises cloud.

- Establish connectivity between on- and off-premises.

- Deploy (through command line or GUI) an on-premises cloud with IBM Cloud Manager with OpenStack v4.3 with a shared Keystone off-premises.

- Manage the on- and off-premises clouds using a single pane of glass with Horizon.

- Deploy VMs with visibility and communication across the enterprise – on and off premises.

On-premises Private openstack

Off-premises Dedicated Public **SOFTLAYER**®

New for V4R3:
hybrid cloud architecture

Legend:

- Notable resource that lives on a particular environment
- Region Two created through ICM
- Region One, created by ICOS
- Management network
- VM-to-VM connectivity
- IPSec site-to-site VPN tunnel
  Note: The management and VM networks go through this tunnel

Off-premises (ICOS)

Region One

Controller
Keystone

Compute
ICOS virtual machine

On-premises

Deployment server
Chef | Deployment UI

Region Two

Controller
L3 Router
Horizon dashboard
DHCP server

Compute
ICM virtual machine

Internet

Customer gateway

On-premises gateway

New for V4R3: hybrid support for IBM Cloud OpenStack Services

- Client with an IBM Cloud OpenStack Services (ICOS) cloud deployment off premises.
- Establish control plane site-to-site VPN between a VPN client on premises and the ICOS customer Vyatta.
- Deploy on-premises IBM Cloud Manager with OpenStack as a remote region to ICOS.
- Create network routes between on- and off-premises VM Neutron networks.

On-premises IBM Cloud Manager with OpenStack

Off-premises IBM Cloud OpenStack Services - dedicated
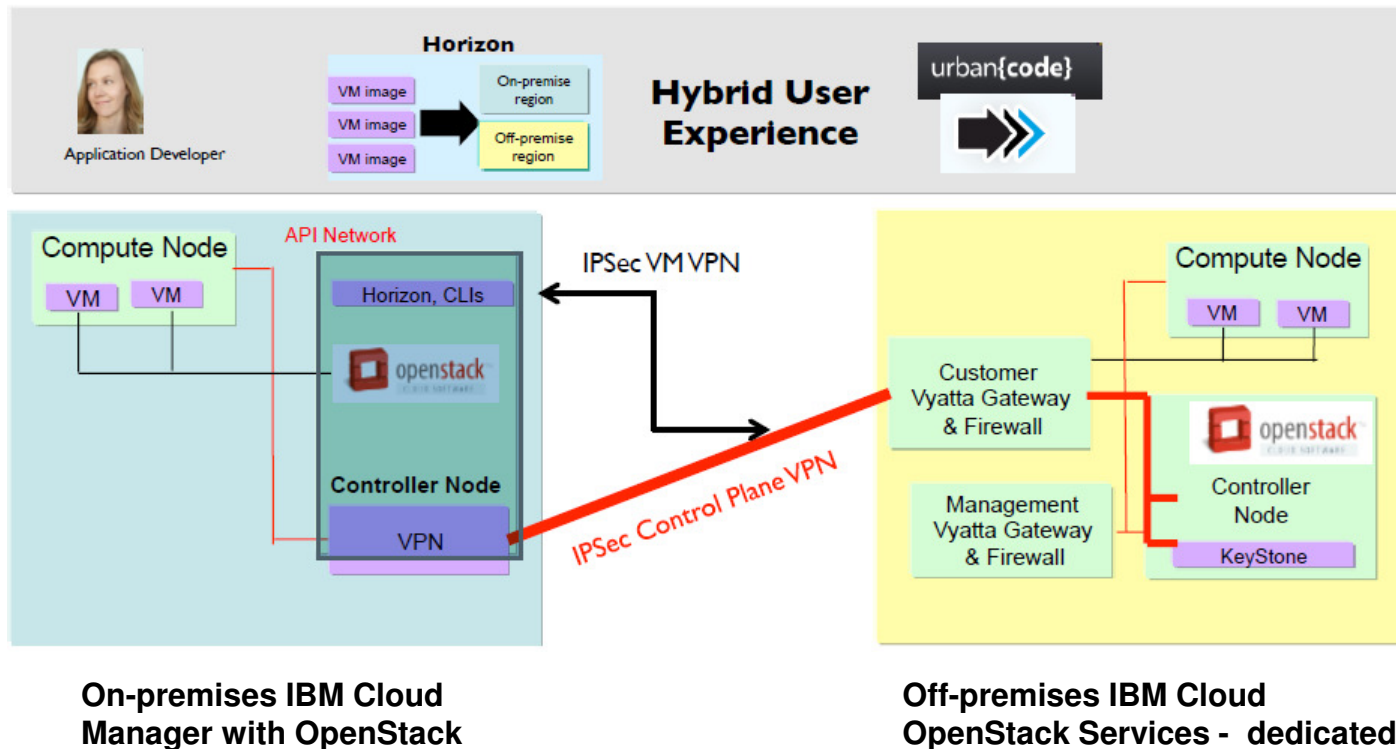
New with V4R3: self-service UI

- New self-service UI aligned with Bluemix style

- Cloud admin operations move to Horizon

- Federated region view for instances

- Federated region view for images

- End user approval view