

DevOps Tomorrow: Interfacing a Robot with an IBM Z Server

Sébastien LLaurency

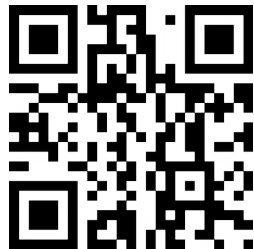
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November 2018

Session CB



Agenda

Digital Transformation Challenges

Cloud integration of Linux on IBM Z/LinuxONE Systems

Live Demonstration of « Cognitive Hybrid Cloud Provisioning »

How it works behind the scene ?

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Digital Transformation Challenges

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How it works behind the scene ?

The world of business is undergoing **rapid digital transformation**



45x

Growth in data flows over last decade*

95%

Of surveyed enterprises are using some form of cloud

To stay ahead of competitors, Leaders are rethinking business as usual in three fundamental ways

More compelling customer experiences

81%

of companies place the personalized customer experience in their top three priorities, with 39 percent reporting it as their top priority¹

Innovative new business models

80%

of CxOs are experimenting with different business models or thinking of doing so²

Fast and flexible operational processes

100+

Global enterprises have launched internal incubators in the last 3 years, including Airbus, Barclays, Telstra and Target³

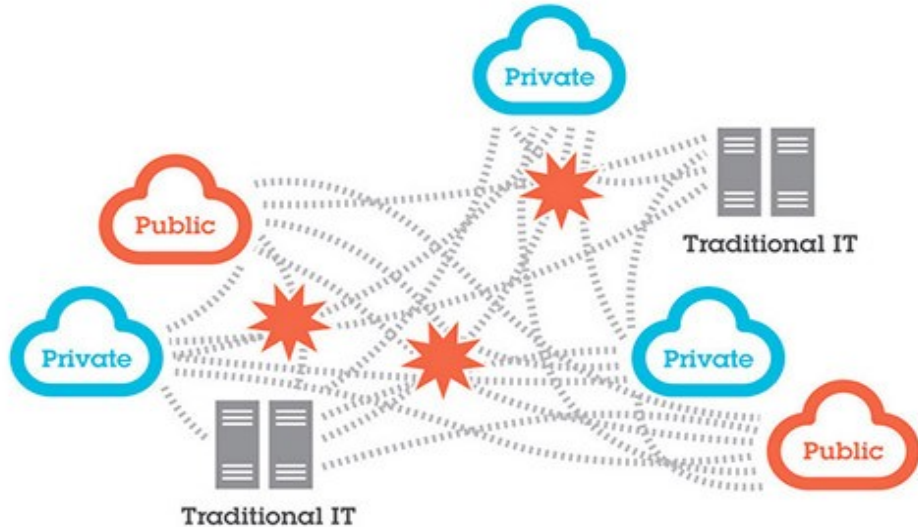
Sources:

1. Accenture, "Digital Business Era: Stretch Your Boundaries", 2015
2. Redefining Boundaries, Insights from the Global C-suite Study, IBM Institute for Business Value, 2015
3. Deloitte, "Corporate accelerators: Spurring digital innovation with a page from the Silicon Valley playbook", 2016

Hybrid Cloud as a Goal



IBM defines hybrid cloud as the secure consumption of services for two or more sources, including **private cloud**, **public cloud**, or **traditional IT**.



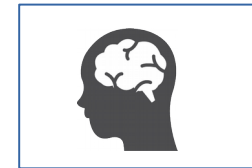
Standard configuration and provisioning templates



Management and Automation



Self-service and Orchestration tools

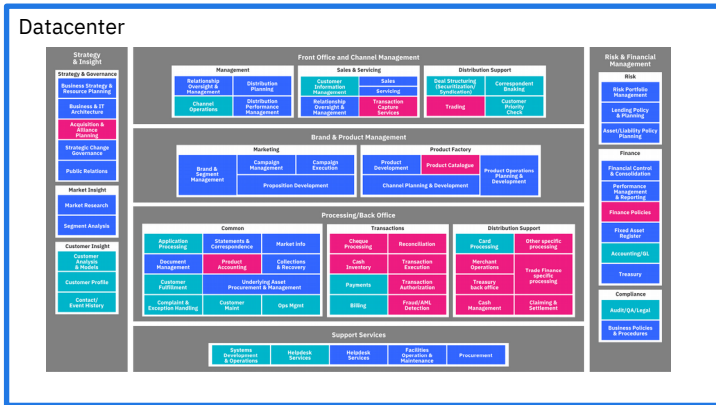


IT staff skills

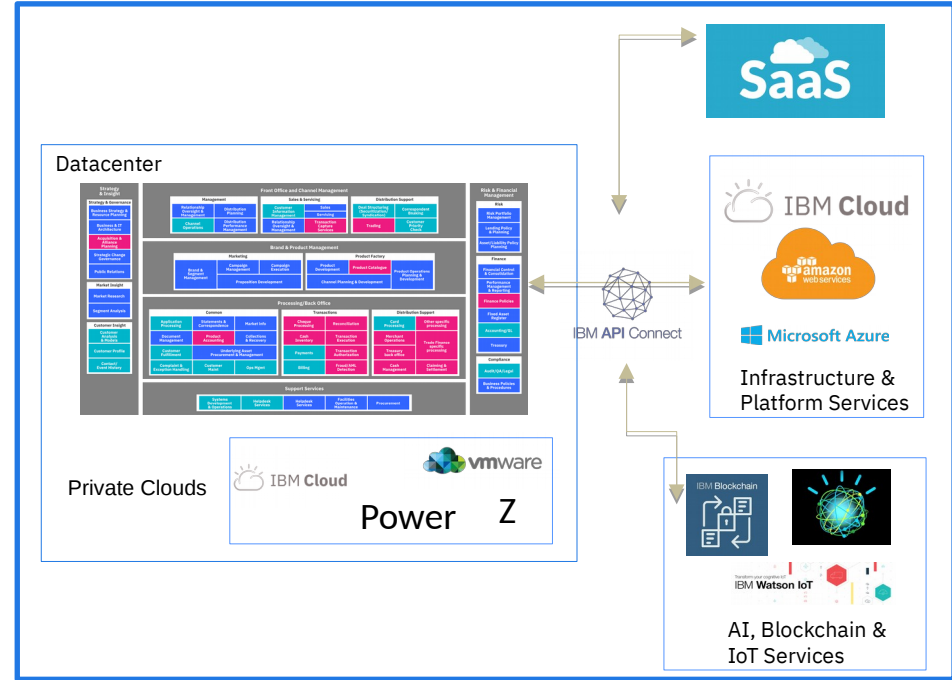
To accelerate digital transformation, enterprises are extending their applications and data to “clouds “...

The New Application Landscape

Current Application Landscape



NOTE: The above is a representative example only



The new landscape will be multi-cluster & multi-cloud

Creating the world's leading hybrid cloud provider



redhat

Leading provider of
enterprise cloud & AI
solutions

Leading provider of
open source
solutions

Completely changing the cloud landscape

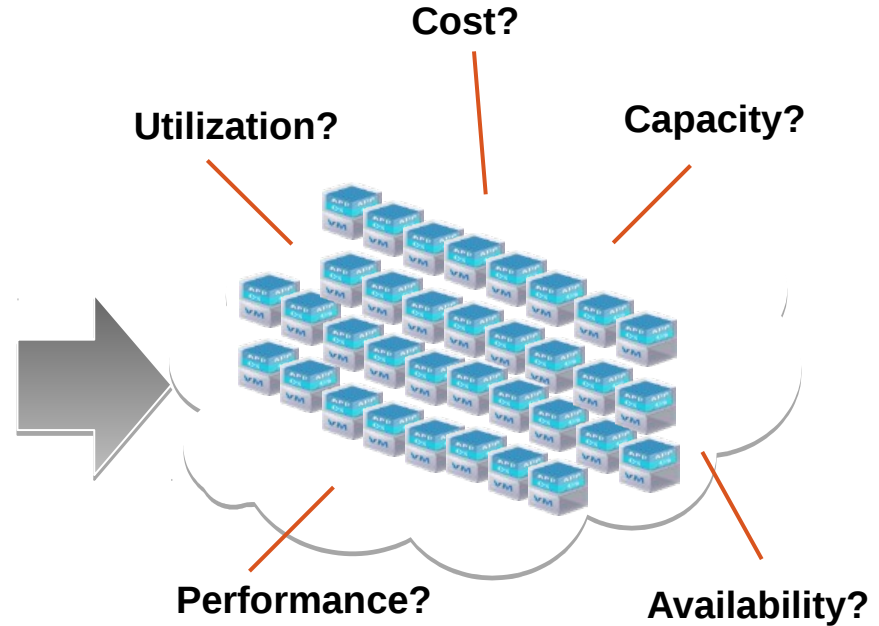
Announced 28th of October 2018

<https://www.redhat.com/en/about/press-releases/ibm-acquire-red-hat-completely-changing-cloud-landscape-and-becoming-worlds-1-hybrid-cloud-provider>

The Challenge for IT : Agility in Operations



Day 1 Provisioning



Day 2 Operations

Agenda

Digital Transformation Challenges

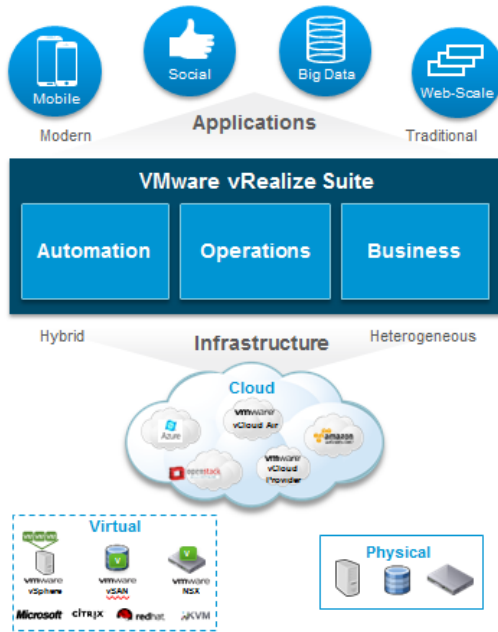
Cloud integration of Linux on IBM Z/LinuxONE Systems

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How it works behind the scene ?

The Control Plane for the Software-Defined Data Center and Hybrid Cloud

Integration using VMware vRealize Cloud Management



Agility Through Automation

Automate the end-to-end delivery and management of infrastructure, and accelerate application deployment and releases.



Choice Through Flexibility

Provision and manage multivendor, multi-cloud infrastructure and applications by leveraging existing infrastructure, tools and processes.



Personalization Through Governance Policies

Ensure that users receive the right size resource or application at the appropriate service level for the jobs they need to perform.

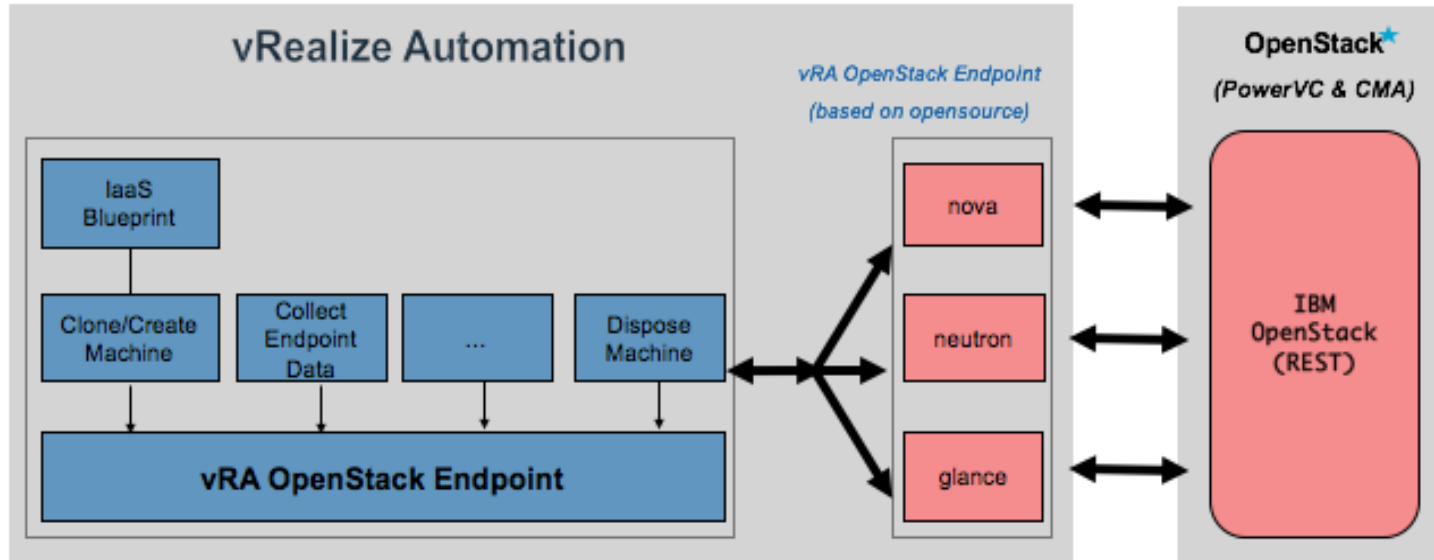


Efficiency Through Cost Containment

Provide consistent, automated delivery and management of IT services and reduce time-consuming, manual processes. Reclaim inactive resources for reuse with automated reclamation, providing cost savings.

Logical Architecture of vRA integration to IBM Power, LinuxONE & IBM Z via OpenStack endpoint from vRA

vRA consumes northbound OpenStack APIs via REST



For IBM Power Systems: IBM PowerVC provides the OpenStack API's for PowerVM Ubuntu OpenStack provides the OpenStack API's for KVM on Power



For IBM z Systems, there are several OpenStack options: IBM Cloud Manager Appliance (CMA) or a Linux Distributor OpenStack.

vRA Hybrid Cloud Use Cases leveraging IBM Systems

DevOps



“Rapid deployment of AIX, IBM i, Linux on Power, and Linux on IBM Z VMs on a consistent platform as production with seamless roll out.”

Capacity Expansion



“Leveraging current Power Systems & IBM Z on-Premise capacity for deploying Linux Workloads.”

Data Center Consolidation

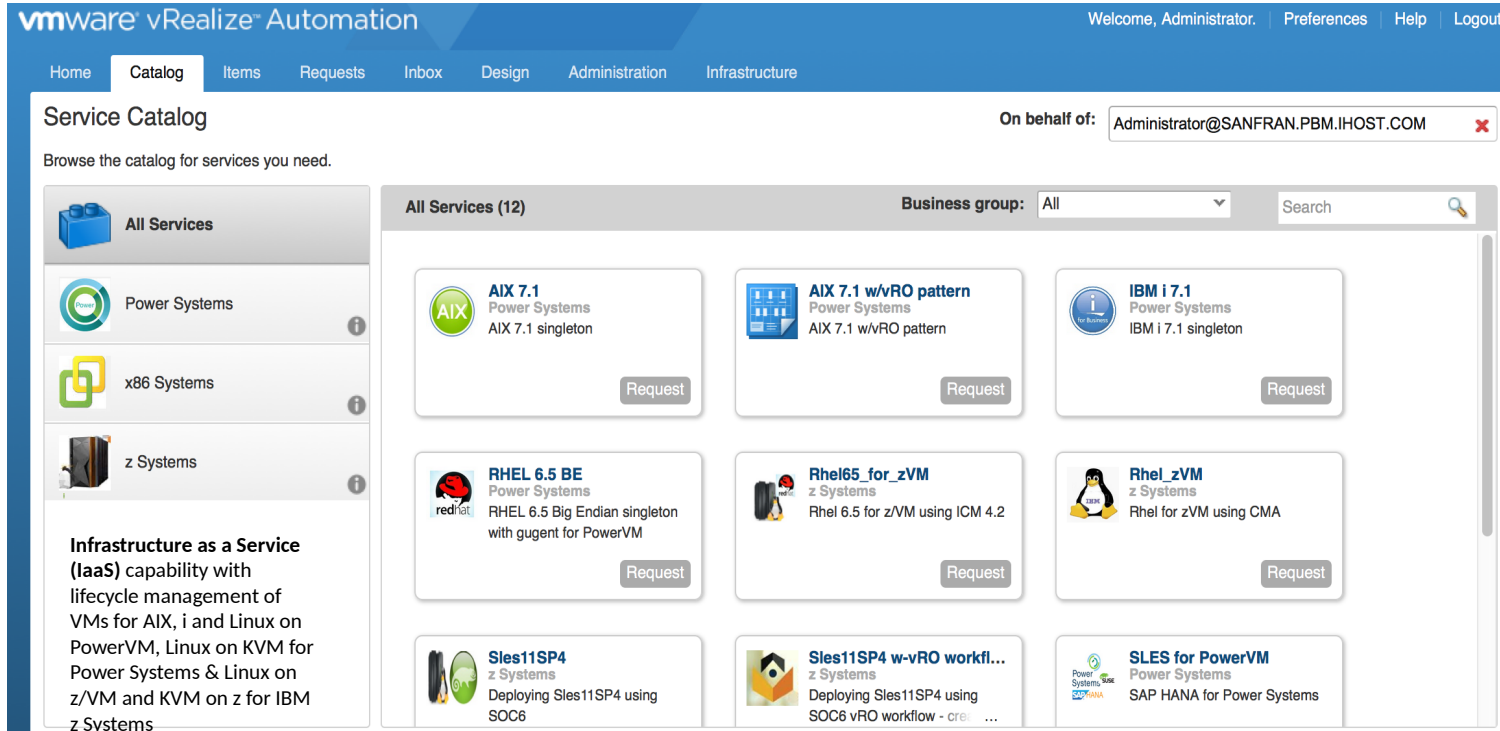
“Reduce overhead/licensing costs for workloads that benefits by running on Power & IBM Z Systems.”

Cloud Management



“Simple deployment (*patterns*)* and lifecycle management of VM’s via a single glass pane.”

vRA via OpenStack API's enables a single point of control for IT organizations to manage multiple platforms

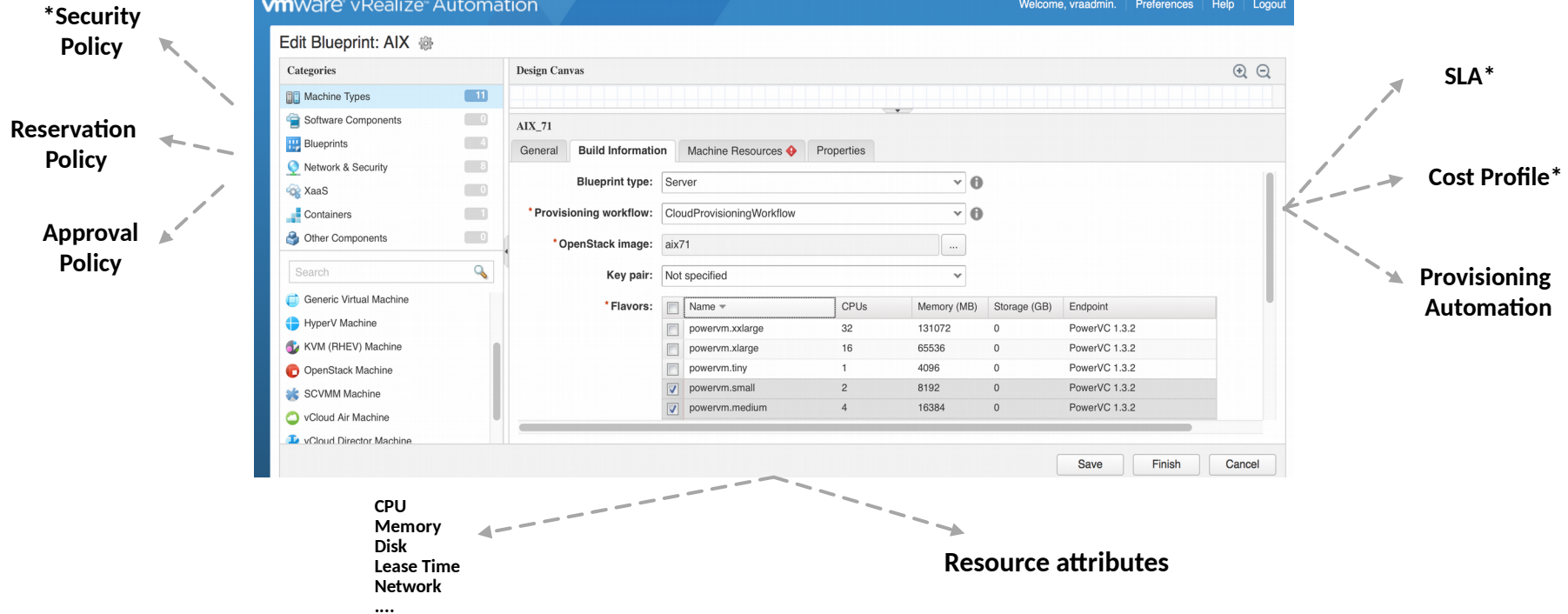


The screenshot shows the VMware vRealize Automation Service Catalog interface. The top navigation bar includes 'Home', 'Catalog', 'Items', 'Requests', 'Inbox', 'Design', 'Administration', and 'Infrastructure'. The main content area is titled 'Service Catalog' and shows a list of services under the heading 'All Services (12)'. A sidebar on the left lists categories: 'All Services', 'Power Systems', 'x86 Systems', and 'z Systems'. Below the sidebar, there is a section for 'Infrastructure as a Service (IaaS) capability with lifecycle management of VMs for AIX, i and Linux on PowerVM, Linux on KVM for Power Systems & Linux on z/VM and KVM on z for IBM z Systems'. The main catalog area displays 12 service cards, each with an icon, title, description, and a 'Request' button. The services include:

- AIX 7.1** (Power Systems): AIX 7.1 singleton
- AIX 7.1 w/vRO pattern** (Power Systems): AIX 7.1 w/vRO pattern
- IBM i 7.1** (Power Systems): IBM i 7.1 singleton
- RHEL 6.5 BE** (Power Systems): RHEL 6.5 Big Endian singleton with gugent for PowerVM
- Rhel65_for_zVM** (z Systems): Rhel 6.5 for z/VM using ICM 4.2
- Rhel_zVM** (z Systems): Rhel for z/VM using CMA
- Sles11SP4** (z Systems): Deploying Sles11SP4 using SOC6
- Sles11SP4 w-vRO workfl...** (z Systems): Deploying Sles11SP4 using SOC6 vRO workflow - cre...
- SLES for PowerVM** (Power Systems): SAP HANA for Power Systems

Platform as a Service (PaaS) capability extended with **IBM GTS** patterns for implementing IBM and non-IBM application software

Standardized Configuration and Templates: Blueprints Embed Automation and Policies



Day 2 Actions on Provisioned Resources

View in vRA requests

2804 Redhat 7.3 Deployed from Application AWAP Not Applicable Not Applicable Successful Sebastien@icmpl.dem 9/7/17, 4:38 PM 9/7/17, 4:43 PM

View in OpenStack (Cloud Manager Appliance z/VM)

admin sandbox1 **1664-67** Redhat 7.3 • 10.3.57.95 smallvm Active None Running 4 days, 20 hours [Edit Instance](#)

View in vRA request details & Actions on VM

VMware vRealize Automation Demo for IBM Systems & IBM Cloud

Welcome, Sebastien. Preferences Help Logout

Home Catalog **Items** Requests Inbox Design Administration Infrastructure Containers

Item Details



1664-67
Redhat 7.3 Image ready for deployment on IBM LinuxONE Systems

Owner
Sebastien Llaurency

Provisioned
9/6/17, 2:46 PM

Type
Cloud Machine

Parent
Redhat 7.3-25657086

Cost
NA

Lease
Indefinite

Lease Cost
NA

General **Network** Properties

Name: 1664-67

Component: Redhat7.3

Status: On

CPUs: 1

Memory (MB): 1024

Storage (GB): 0

Description: Redhat 7.3 Image ready for deployment on IBM LinuxONE Systems

Owner: Sebastien@icmpl.demo

Blueprint: Redhat.7.3

Compute resource: IBM LinuxONE Systems (Newton)-zCloud

Business group: ICCMPL SMEs

Actions:

- Associate Floating IP
- Change Lease
- Connect using Console
- Connect using RDP
- Destroy
- Disassociate Floating IP
- Expire
- Export Certificate
- Power Cycle
- Power Off
- Reboot
- Reconfigure
- Shutdown
- Suspend

vRA VM lifecycle management for Power Systems & LinuxONE, IBM Z Servers

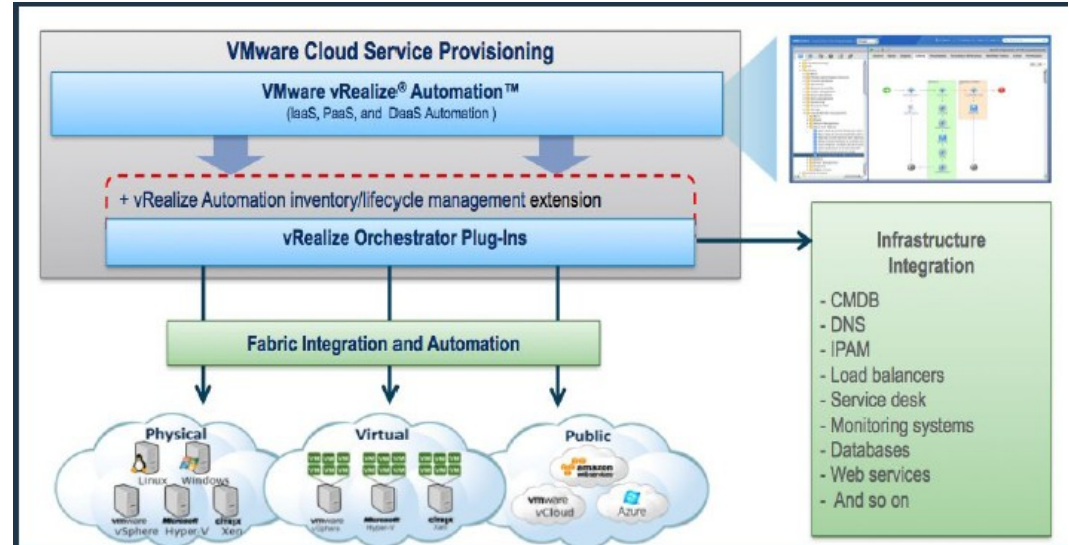
Support of Post-Deploy Action Options

Platform	VM Guest	Post-deploy Actions	Pre-Requisites	OpenStack Version
PowerVM (HMC or NovaLink)	AIX, Linux & i	Power On, Off, Destroy, Expire, Reboot	IBM PowerVC	Kilo, Liberty, Mitaka, Newton
KVM on Power	Linux	Power On, Off, Destroy, Expire, Reboot	Ubuntu OpenStack	Mitaka
z/VM	Linux	Power On, Off, Destroy, Expire, Reboot	IBM Cloud Managed Appliance (CMA), SUSE OpenStack Cloud (SOC)	Liberty, Newton
KVM on IBM z	Linux	Power On, Off, Destroy, Expire, Reboot	Ubuntu OpenStack	Mitaka

Asset discovery and data collection are completed after the endpoint creation

VMware vRealize Orchestrator (vRO) as Unified Integration Layer for VMware vRealize Automation (vRA)

- vRealize Orchestrator provides the Extensibility for vRA
- Developers can write own vRO custom integration to execute a workload from vRA
- vRO is the stated extensibility platform for the vRealize Suite from VMware
- vRO can be used to program workflows for reaching outward from vRA and the vRealize Suite into other software stack



vRA Event Broker Extensibility Features

Ability to control lifecycle extensibility by using custom property

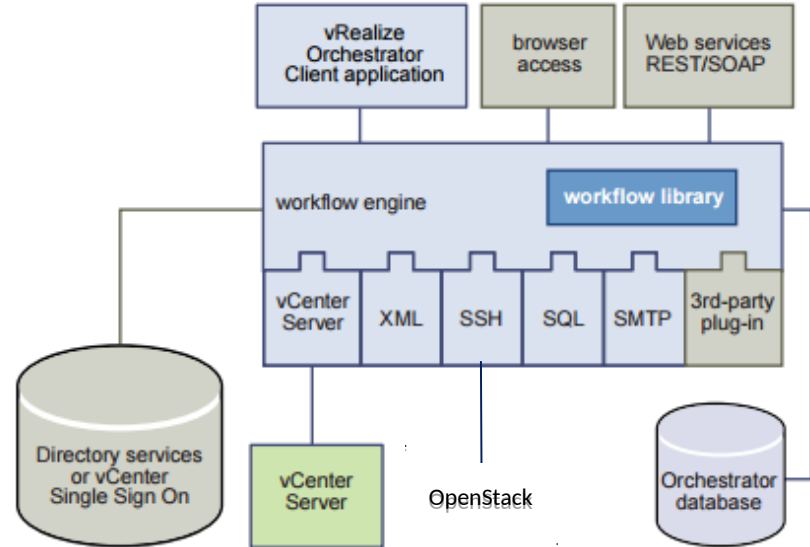
Easy to install (1 package / 1 configuration workflow)

Easy to manage (per blueprint) No advanced features

No advanced configuration, fixed predefined list of states (the most commonly used)

Use of SSHCommand to build workflow for OpenStack endpoint

Figure 1-1. VMware vRealize Orchestrator Architecture



Configuration Management Tool Integration

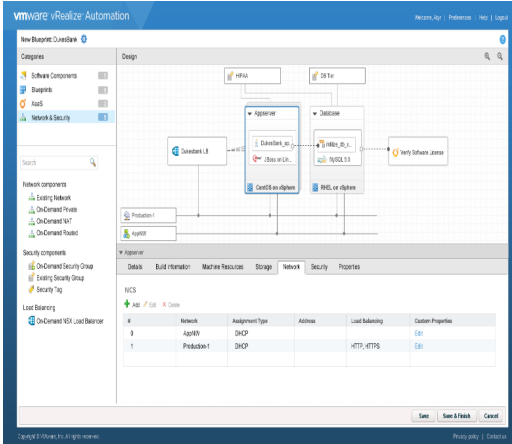
Use Cases

- OS and Middleware Modeling
- Drift Remediation and Introspection
- Infrastructure Management
- Content Delivery Solution



```
id: Blueprint.EcommerceApp
name: E-commerce Application
components:
  Apache:
    type: PuppetModule.Apache
    data:
      host: '${_resource-MySQL}'
  ...
  MySQL:
    type: PuppetModule.MySQL
    data:
      db_port: 3306
  AppServer:
    type: Puppet.AppServer
    data:
      db_port: ${MySQL-db_port}
      db_username: ${DB_Setup-db_username}
  ...
```

Inter-operable



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How it works behind the scene ?

Conversations with Enterprise Systems

**LIVE
DEMO TIME**

**Cloud Services
on IBM Z**

Through Conversations !

Agenda

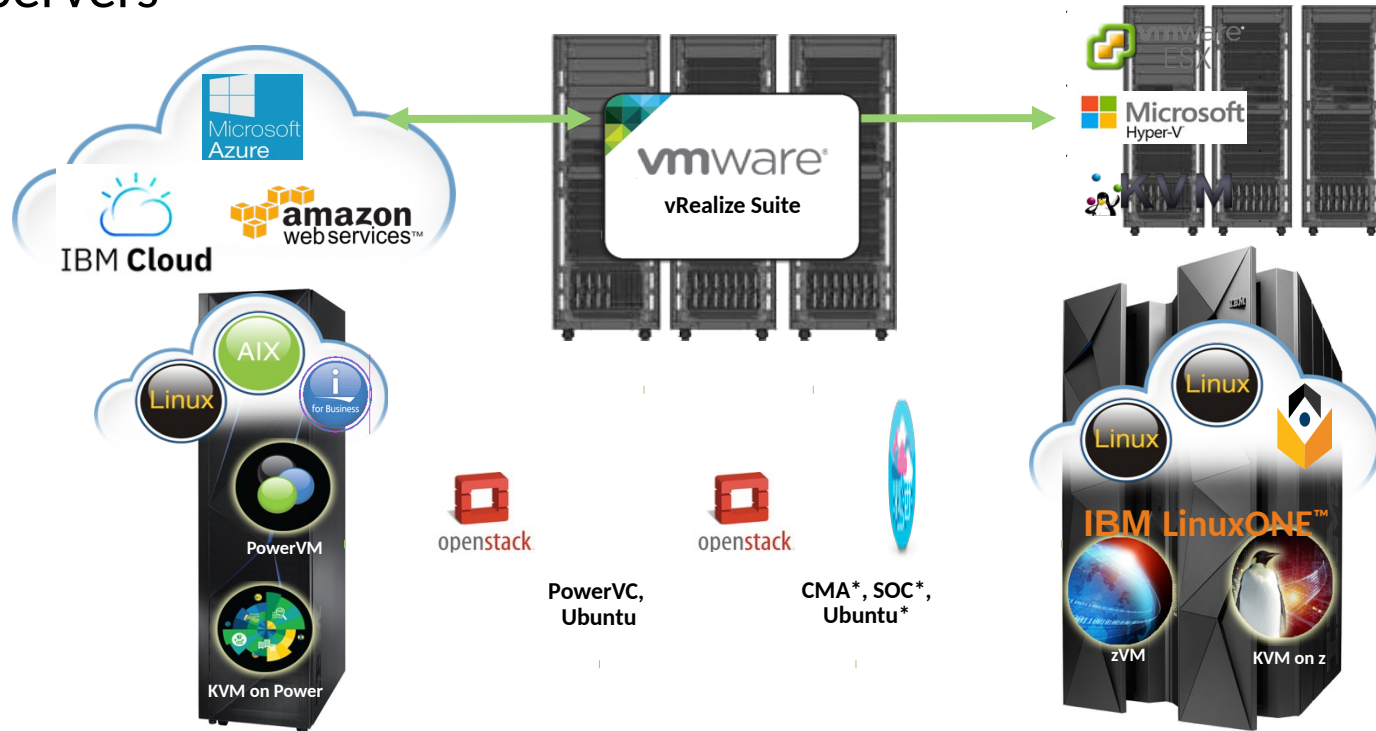
Digital Transformation Challenges

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VMware vRealize Automation Architecture uses IBM PowerVC and OpenStack to provision workloads to IBM Power Systems, LinuxONE & IBM Z Servers



**Note: Cloud Manager Appliance (CMA) @ Liberty for zVM, SUSE OpenStack Cloud 6 for zVM and Ubuntu OpenStack for KVM on Power Systems and IBM Z*

The Secure Gateway : bridge for Public & Private Clouds

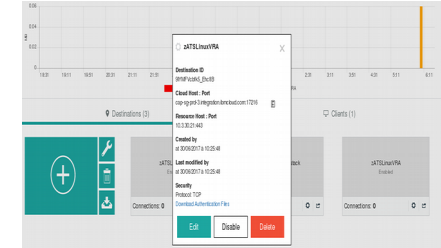
Chatbot (microservice appl.) deployed in a container in IBM Bluemix

Containers 384 MB/2 GB 0/2 Pkts 1/0 Requested | 0 Used

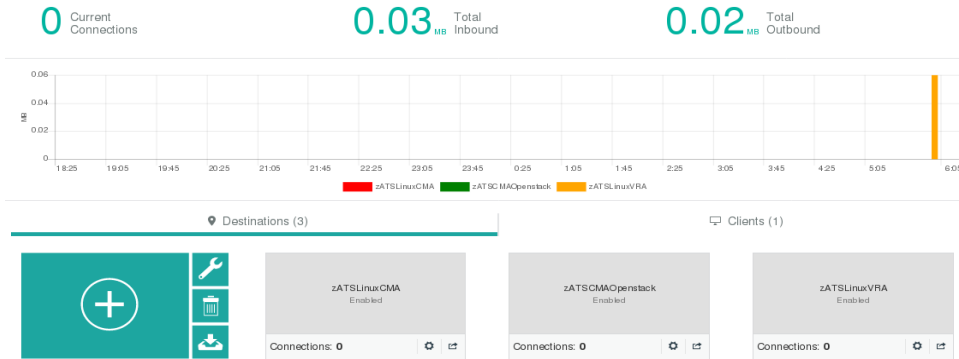
NAME	INSTANCES	IMAGE	CREATED	STATUS	ACTIONS
ic-awap2	1	zatsmp/awap@h2/latest	3/23/2017 10:52 AM	Stopped	
ic-awapcalogcheck	1	zatsmp/awaprodered/latest	2/22/2017 5:16 PM	Stopped	
ic-awapmongo	1	zatsmp/mongo/latest	2/22/2017 1:30 PM	Stopped	

All Services (2) Create Service

NAME	SERVICE OFFERING	PLAN	ACTIONS
Cloud Automation Manager-02		Experimental	
Secure Gateway-tg	Secure Gateway	securegatewayplan	



Start the container,
Request a public ip to demo the hybrid cloud service



IBM Bluemix Containers

ic-awap4 Status: Running

Resource	Value
SIZE	Micro
MEMORY	256 MB
DISK USAGE	37.5%
MONITORING OVERVIEW	
MEMORY USED	52.77 MB
CPU USED	0%
NETWORK TRAFFIC	0 Bytes/Sec

Container details:

- Created: 6/30/17, 12:50 PM
- Ports: 3000
- Public IP: 168.46.05.102
- Private IP: 172.30.0.1
- Volumes: None
- Image: zatsmp/awap@h2/latest
- Storage: 16 GB

Vulnerability Adviser: 0 Policy Violations (0 of 3) Policy status: Passed

Secure Gateway information On- Premises

A Linux Ubuntu virtual machine on LinuxONE System is running the secure gateway client code.

It has an environment configuration file
`/etc/ibm/sgenvironment.conf`

And an Access Control List (ACL) file :
`/opt/ibm/securegateway/client/zATSACLFile.txt`

```
acl allow YourIPOpenstackAuthentication:5000
acl allow YourIPOpenstackCommands:8774
acl allow YourIPVmwareVReazlize:443
acl deny :
```

```
root@ubunchef: ~
# /bin/bash
#
# Stop and Restart the client during install or up
# If manually modifying the following, accepted va
RESTART_CLIENT=No

# Configuration ID to connect
# If manually modifying the following, accepted va
paces
GATEWAY_ID="91YMFVcbfk5_prod_ng"
export SECGW_GATEWAYID="$GATEWAY_ID"

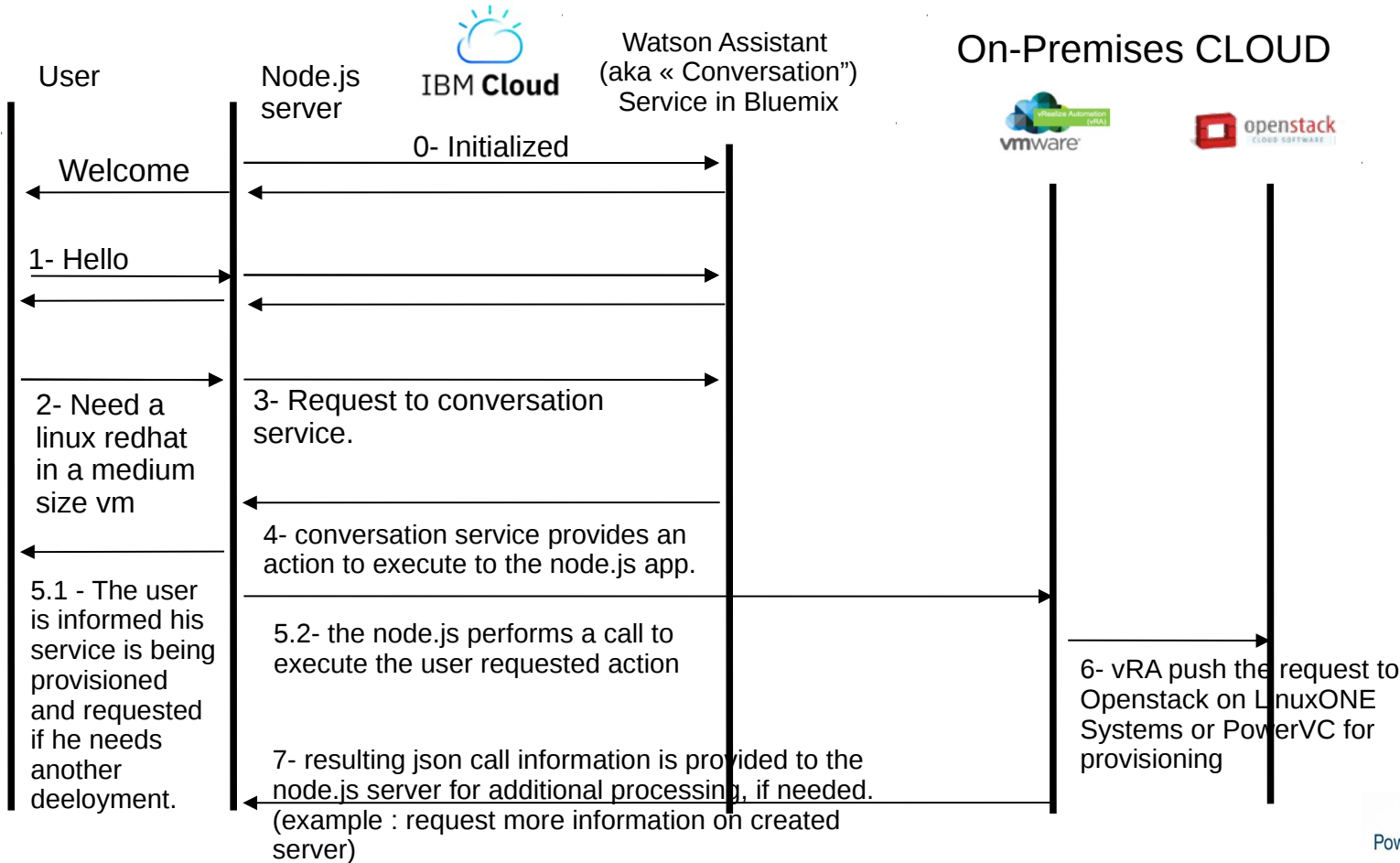
# Security Token for this Configuration ID (if any
# If manually modifying the following, accepted va
'none' if no token, separated by '--' otherwise)
SECTOKEN=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJj
F9uZyIsInJlZ2l2b2I6IiInVzLXNvdXRoIiwiaWF0IjoxNDk4NjM
NjRjZi

# Access Control List File
```

```
root@ubunchef:~# systemctl start securegateway_client.service
```

Once configured, you need to start the secure gateway client service to enable the Hybrid Cloud communication

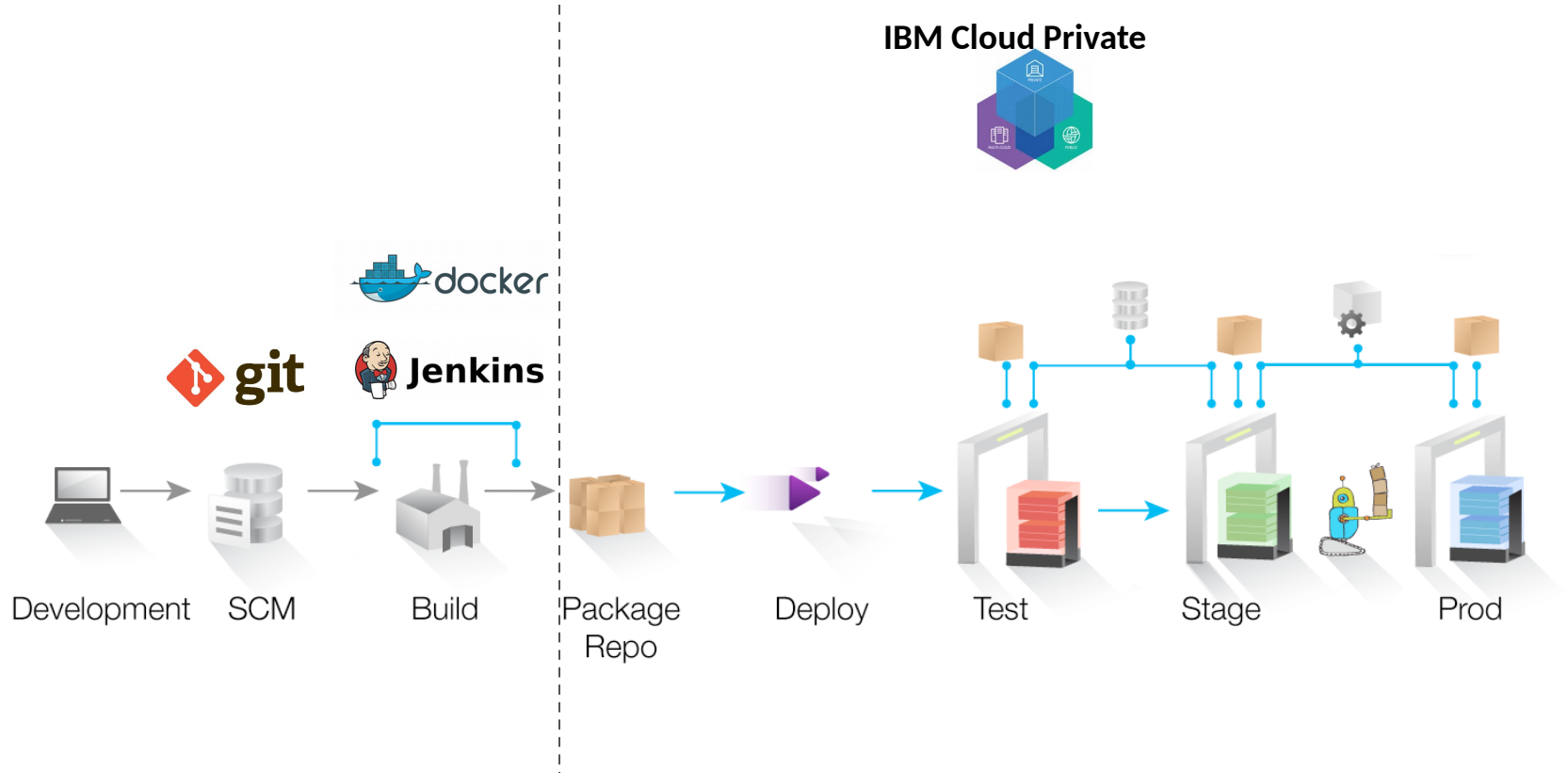
Sequence Diagram



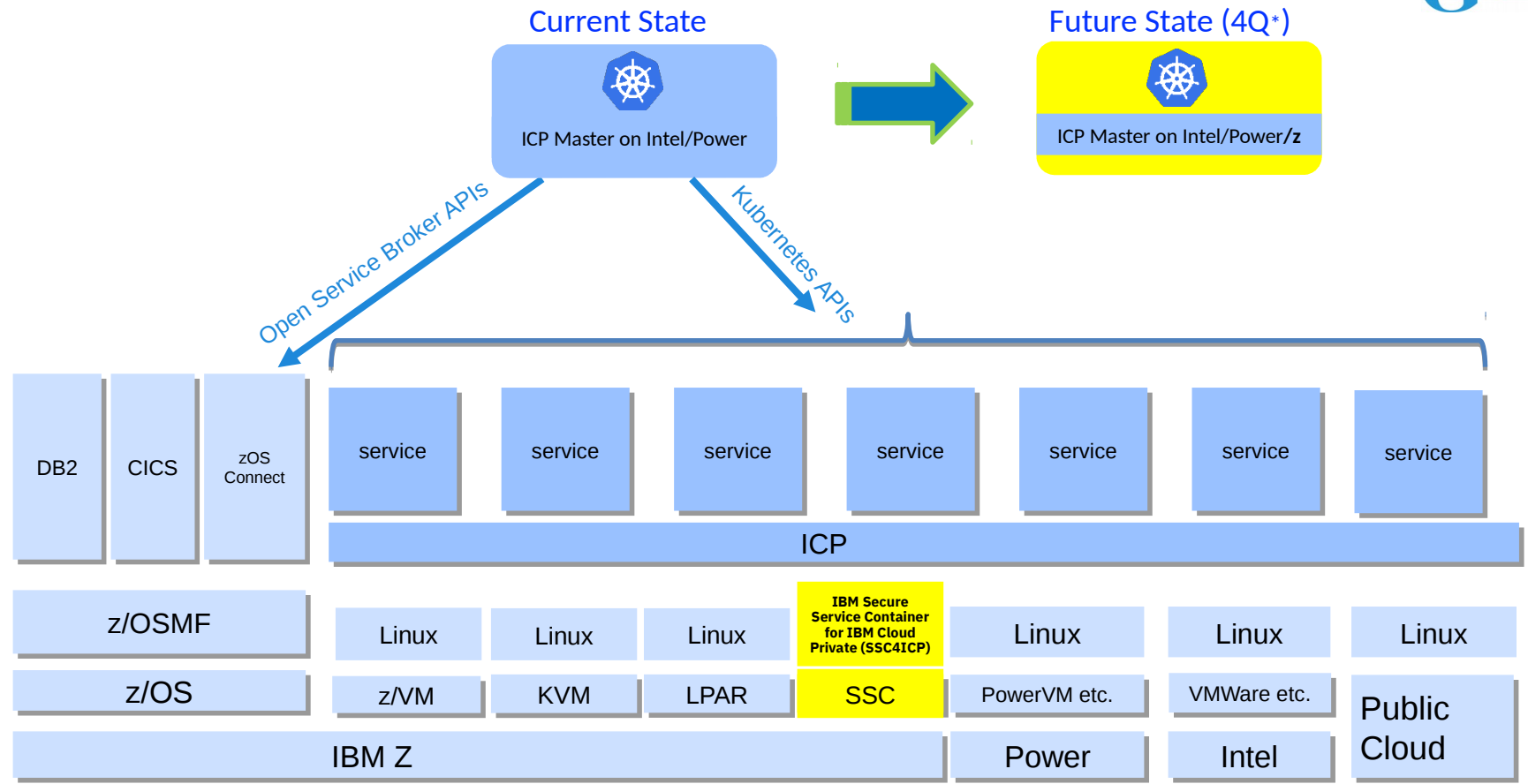
What's next ?

An overview of your future assistant

DevOps – Continuous Integration & Continuous delivery (CI/CD)



IBM Cloud Private & IBM Z



* Disclaimer - Roadmap is subject to change without notification

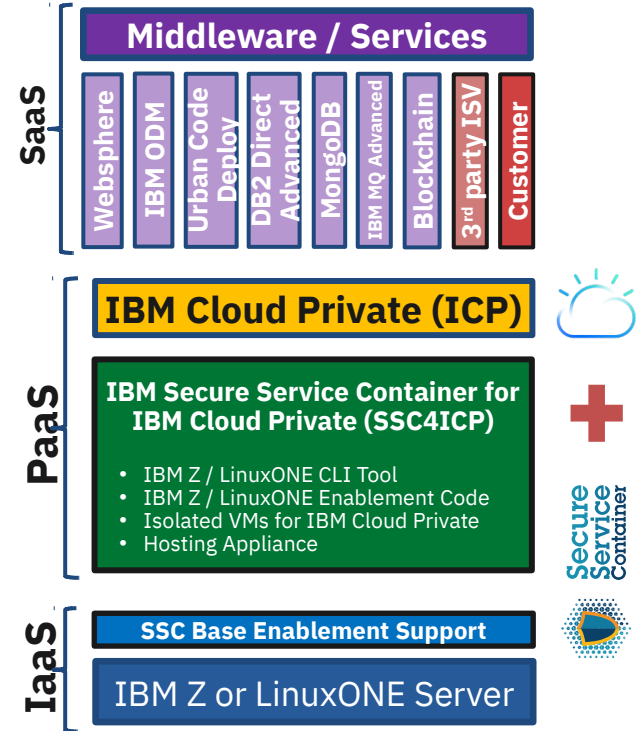
What is IBM Secure Service Container for IBM Cloud Private?

IBM Secure Service Container for IBM Cloud Private (SSC4ICP) is a software appliance built on the Secure Service Container framework that **securely hosts IBM Cloud Private Docker / Kubernetes based solutions** on IBM Z or LinuxONE Private and Hybrid cloud deployments.

SSC4ICP provides an encrypted environment (data at rest, data in flight), with peer to peer and **peer to host isolation protecting container applications from access via Hardware and Operating System admin credentials**, whether access is accidental or malicious, internal or external to an organization.

SSC4ICP provides these protections while integrating with **IBM Cloud Private, a Platform as a Service (PaaS)** management stack that delivers **rapid innovation and application modernization, investment leverage, enterprise integration, as well as management and compliance** to containerized applications.

Full Stack Solution



Announced 2nd of October 2018

<https://www.ibm.com/us-en/marketplace/secure-service-container>

Take away

Many ways to have IBM Z integrated in your cloud strategy depending on your security, performance & governance requirements.

The efficiency of your current architecture can take benefits of new solutions for more agility

Open Source solutions available with Linux on z Systems/LinuxONE Systems

Transform your IBM Z in an innovative platform reusing existing services

Discover DevOps solutions with IBM Z for managing the continuous deployment on an Hybrid Cloud

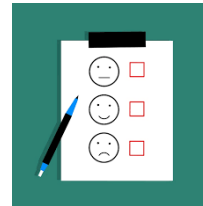
To get started:

- **IBM z Systems** Cloud Computing Workshop
- **Linux z System/LinuxONE Systems** Open Source Discovery Session

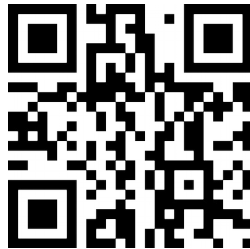
We want your feedback!

- Please submit your feedback online at
 - <http://conferences.gse.org.uk/2018/feedback/CB>

- Paper feedback forms are also available
Chair person



- This session is **CB**



Appendix. Screenshots

Show/Hide Watson Intents Console

Welcome to AWAP

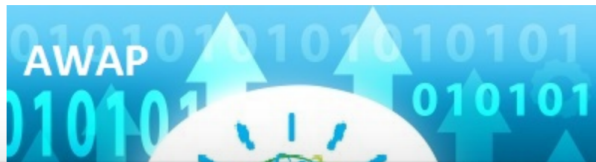
Hello

Hello and welcome to this cognitive demonstration platform, how are you today ?

How are you?

I am ok ! All my functions seem to work properly :-) !
Ok, So what can I do for you today ?

Start the conversation here



I am OK ! All my functions seem to work properly :-) !

Ok, So what can I do for you today ?

what do you do?

- | My main function is to assist you with questions, demonstrations and capabilities related to Linux Enterprise Systems. I can help with cloud, presentations, customer references, demonstrations, lab, proof-of-concept and consolidation projects on Linux z Systems or LinuxONE Systems.

What are we doing today ?

Start the conversation here



Show/Hide Watson Intents Console

and capabilities related to Linux Enterprise Systems. I can help with cloud, presentations, customer references, demonstrations, lab, proof-of-concept and consolidation projects on Linux z Systems or LinuxONE Systems.

What are we doing today ?

I would like to work with Cloud Project today

Let's go for Cloud ! I am connected to a Cloud Environment running on a LinuxONE System. It is based on Openstack, Would you like to work with this environment ?

Start the conversation here



Show/Hide Watson Intents Console

Let's go for Cloud ! I am connected to a Cloud Environment running on a LinuxONE System. It is based on Openstack, Would you like to work with this environment ?

no

No problem, I understood we are not going to use directly OpenStack, so may I propose you another set of cloud environments ? Please select one between: OpenAudel (a custom advanced provisioning solution) or VMWare vRealize Automation ?

let's go with VMware vRealize Automation

Start the conversation here



Show/Hide Watson Intents Console

let's go with VMWare vRealize Automation

I can deploy cloud services to IBM LinuxONE Systems (or others systems) using VMWare vRealize Automation. Would you like to use this environment ?

yes

Great ! So I can access the following services through VMWare vRealize Automation: a Linux image on x86, an AIX image on Power Systems and a Linux Redhat, SUSE or Ubuntu on IBM LinuxONE System. Which service do you need ? (You can also

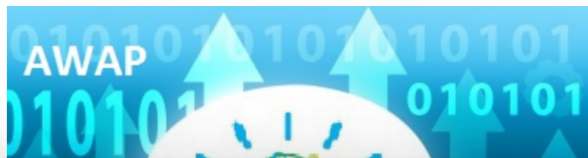
Show/Hide Watson Intents Console

vRealize Automation: a Linux image on x86, an AIX image on Power Systems and a Linux Redhat, SUSE or Ubuntu on IBM LinuxONE System. Which service do you need ? (You can also mention a size: small, medium or large for the VM)

let's deploy a AIX VM on Power Systems

Ok so you would like a AIX on Power High-End using VMWare vRealize (I also recognized you need a specific VM size). Please Enter a Description for this new deployment. I will push this information into the deployed service.

Start the conversation here



Show/Hide Watson Intents Console

Ok so you would like a AIX on Power High-End using VMWare vRealize (I also recognized you need a specific VM size). Please Enter a Description for this new deployment. I will push this information into the deployed service.

This is a test for Setareh from Bluemix

Ok thank you ! I provisioned automatically a Blueprint with AIX on Power High-End. I also added your description as a reason for the deployment. You can check the deployment here [ACCESS to VMWare vRealize Automation Console](#).

Start the conversation here



Request #1138 Details



AIX 7.1 Simple Blueprint

Status
In Progress

Submitted By
Sebastien Llaurency

Submitted
7/5/17, 5:59 PM

Last Updated
7/5/17, 5:59 PM

Business Group
ICCMPL SMEs

Deployment: AIX 7.1 Simple Blueprint

Request Information Execution Information

Execution information for

Name	Status	Details	Waiting for	Component ID	Component Type	Request Type	Start Time	Completion Time
OpenStac...	Successful			OpenStack_M...	OpenStack M...	Allocate	7/5/2017, 6:0...	7/5/2017, 6:0...
OpenStac...	In progress		OpenStack_M...	OpenStack_M...	OpenStack M...	Provision	7/5/2017, 6:0...	



OK

Request #1061 Details



ubuntu

Ubuntu 16.04
Ubuntu 16.04 Blueprint for IBM LinuxONE Systems

Status
In Progress

Submitted By
Sebastien Llaurency

Submitted
7/3/17, 1:34 PM

Last Updated
7/3/17, 1:34 PM

Business Group
ICCMPL SMEs

Deployment: Ubuntu 16.04 [Request Information](#) [Execution Information](#)

General

Description: Deployed from Application AWAP

Reason for request: Test for Setareh

Deployments: 1

OK