Power Systems Virtual User Group Technical Webinars
Wiki: http://tinyurl.com/PowerSystemsTechnicalWebinars

PowerVC 1.3.1 New Features & Demonstration

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IBM Europe

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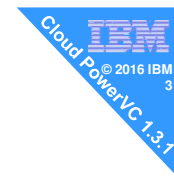

PowerVC 1.3.1

This video assumes:
- You already know PowerVC version 1.3
  - So I'll cover the new features

If you have not used PowerVC:
  Watch this YouTube video
- Power Systems Virtual User Group
- Session 52 – January 2016 roughly 90 minutes
- Name PowerVC 1.3.0
- https://www.youtube.com/watch?v=yOTuavd0dc0
    ~660 views so far plus the live audience on the day

→ My PowerVC YouTube videos have 16,000++ views in 2016 & growing

IBM PowerVC 1.3.1

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Cloud PowerVC 1.3.1

Announced: April 2016
GA Released: 17th June 2016

Comes in two editions
1. PowerVC Standard Edition
2. Cloud PowerVC Manager Edition

PowerVC 1.3.1 Redbook available

– Already pretty good

– Draft under rapid writing & reviews
  until released ~August 2016

IBM PowerVC Version 1.3.1
Introduction and Configuration
Including IBM Cloud PowerVC Manager

Cloud
Power Systems

Redbooks
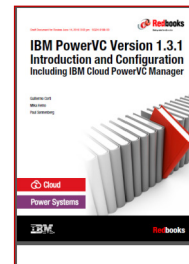
Nigel's 1.3.1 Announcement Highlights

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Cloud PowerVC 1.3.1

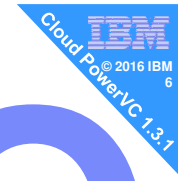IBM Cloud PowerVC Manager **V1.3.1** includes NEW THINGS:

1. AIX VM - Active Memory Expansion ✔
2. Dynamic Resource Optimiser – can be scheduled ✔
3. Remove a VM but keep the storage "just in case" ✔
4. Internal database moved from DB2 to MariaDB ✔
5. Novalink improvements [not covered in this session]
6. Project & user role admin for separating resources: VMs, Disks, Images ✔
7. Hitachi Storage Provider   Postponed

PowerVC
Standard
Edition

8. IBM Cloud Manager merging in to PowerVC
   – Self-service user has limited actions
     – User role "self-service" ✔
     – Deploy Templates from their project(s) only ✔
     – Policy based with or without admin approval process ✔
     – VM expirations - admin or auto remove ✔
   – Metering data that can be used for chargeback (REST API) ✔
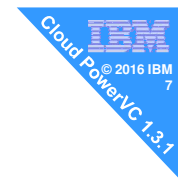
Cloud PowerVC
Manager Edition
adds to the
Standard Edition

DEMO

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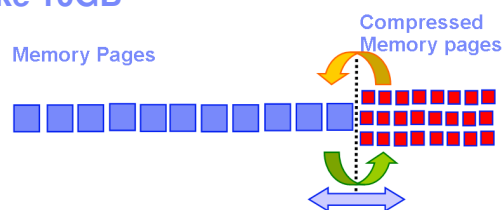Cloud PowerVC 1.3.1

of
AME **+ SRR, CPU mode, CPU pool, weight**
DRO scheduling **+ thresholds**

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Cloud PowerVC 1.3.1

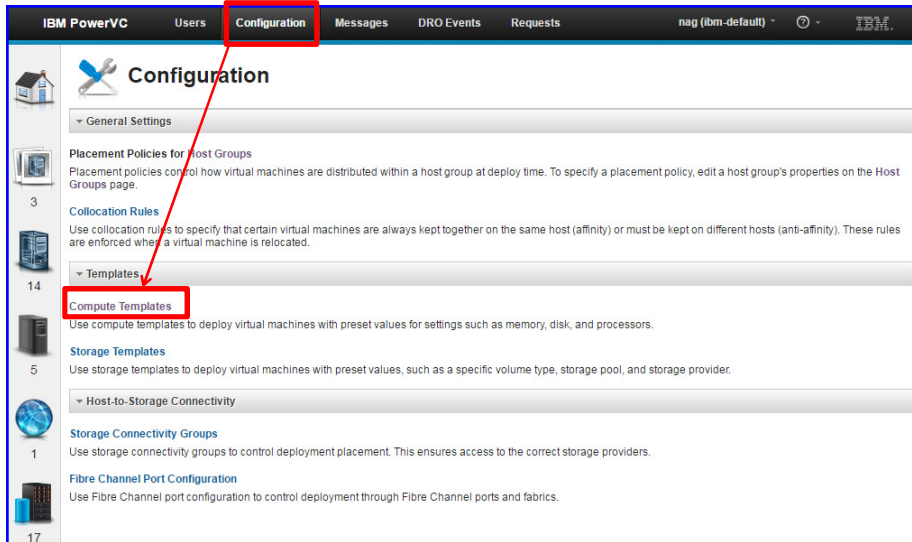## 1 Active Memory Expansion

AIX only feature
Compresses memory for efficient use & performance

Switch on at the HMC + set the Expansion Factor
      EF 1.0 = on but not active yet
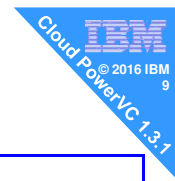   **EF 2.5 = 4GB looks like 10GB**

Compressed
Memory pages

Memory Pages

Active Memory Expansion

- Configuration → Compute Templates

Active Memory Expansion

- Configuration → Compute Templates

Advanced → Active Memory Expansion

Advanced → Simplifed Remote Restart

Simplifed Remote Restart (SRR) Update

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Cloud PowerVC 1.3.1*

▪ SRR v1 HMC 8.4 + current FW & VIOS in Dec 2015
– LPM (static) from a dead machine + reactivate LPAR
– Via HMC command line and/or PowerVC
– Wrinkle: the dead machine must be a zombie (FSP alive)

▪ SSR v2 HMC 8.5 + current FW & VIOS in June 2016
– By popular demand → it doesn't need that FSP
– Via HMC command line add the --noconnection option
– Wrinkle: If it fails try the other HMC!
– Wrinkle: PowerVC needs a small update to 1.3.1

– Also larger concurrency = 32 SRR at a time

Shared Processor Pool → SW license control

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Cloud PowerVC 1.3.1*

Check your software vendor
supports CPU Pools for licensing

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Cloud PowerVC 1.3.1

IBM
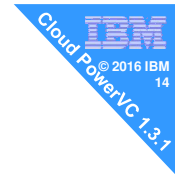
2 Dynamic Resource Optimizer (DRO)

New in 2015:
PowerVC using LPM to load balance servers or
Enterprise Mobile CPU core license balancing

Now with scheduling periods
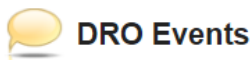
Dynamic Resource Optimizer	
Mode:	Active
Operations:	Migrations
CPU utilization threshold:	64%
Run interval:	5 minutes
Stabilization:	2 times
Maximum concurrent migrations:	5
Schedule:	DRO is always enabled

💬 **DRO Events**

Dynamic Resource Optimizer (DRO)

▪ As before DRO is a Host Group feature

▪ Scheduling set-up here

IBM PowerVC · Users · Configuration · Messages · DRO Events · Requests

Hosts ▸ Host Group: Default Group

Host Group: Default Group

Host groups allow you to logically partition your hosts for placement targeting.
ⓘ Learn more about host groups

* Host group name:
Default Group

* Placement policy:
Striping

Dynamic Resource Optimizer
ⓘ Learn more about DRO settings
☑ Enable Dynamic Resource Optimizer (DRO)

Schedule:
○ Keep DRO enabled at all times
◉ Enable DRO during specific time frames

✚ Add Time Frame   ✎ Edit Time Frame   🗑 Delete Time Frame

To add time frames to the DRO schedule, click on **Add Time Frame** above.

Mode:
◉ Advise only: Optimization operations are recommended but not performed when the specified threshold value is exceeded.
○ Active: Optimization operations are performed when the specified threshold value is exceeded.

Operations (select at least one):
☑ Migrate virtual machines to another host in the host group. Migrations are performed after mobile cores have been activated, if applicable.
☐ Activate mobile cores on the host. Requires that the host is a member of an enterprise pool.

* CPU utilization threshold (%): 70

← More below here →

Save Host Group   Cancel

Dynamic Resource Optimizer (DRO)

- Enable and …
- "Add Time Frame"

- Days of the week + Hours of the day
- Can have many periods

- Lets you decide when LPM or Enterprise Mobile cores changed

Schedule:
○ Keep DRO enabled at all times
● Enable DRO during specific time frames

✚ Add Time Frame   ✎ Edit Time Frame   ✖ Delete Time Frame

To add time frames to the DRO schedule, click on **Add Time Frame** above.

Add Time Frame
Specify a time frame when DRO should be enabled.

Start time:
Mondays   ▼   08:00 am ⊘

End time:
Fridays   ▼   09:00 pm ⊘
12:00 am
12:15 am
12:30 am
12:45 am
01:00 am
01:15 am
01:30 am
01:45 am
02:00 am
02:15 am
02:30 am

Cancel

Dynamic Resource Optimizer (DRO)

- Example midday to 6 pm weekdays and any time at the weekend
- Not weekday morning = our busy time
- Click a period and you can adjust it (Edit)

- **Welcome Feedback on how you see this being used!**
- Blobs are active periods
- Bar is now

Dynamic Resource Optimizer
? Learn more about DRO settings
☑ Enable Dynamic Resource Optimizer (DRO)
   Schedule:
   ○ Keep DRO enabled at all times
   ● Enable DRO during specific time frames
   ✚ Add Time Frame   ✎ Edit Time Frame   ✖ Delete Time Frame

Mondays Tuesdays Wednesdays Thursdays Fridays Saturdays Sundays

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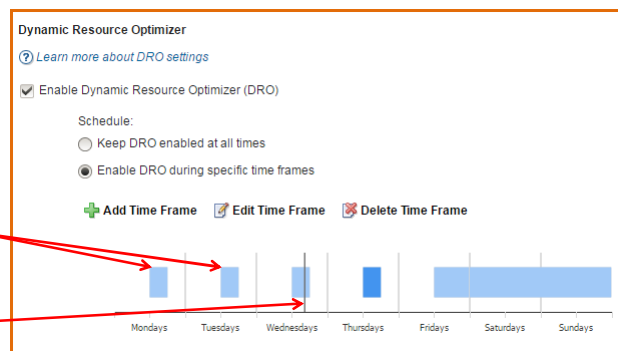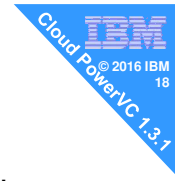
Dynamic Resource Optimizer (DRO)

- Go to a particular Host's Details
- DRO actions when above the 70% threshold (settable)

---
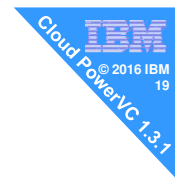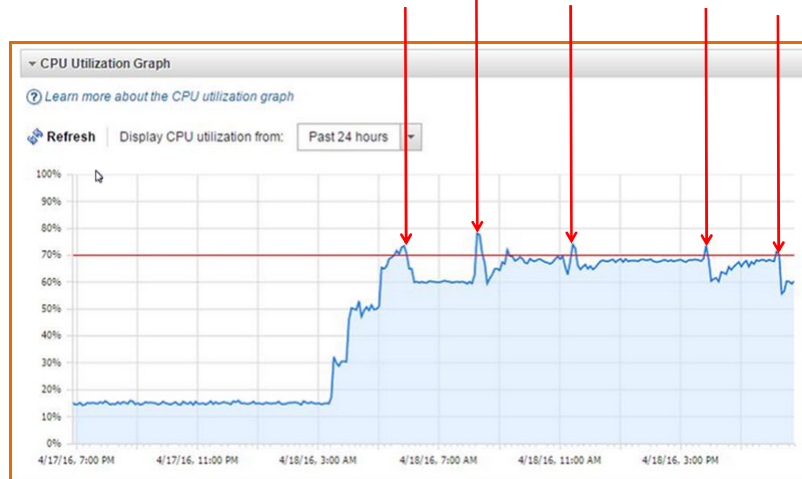
3 Storage Life Cycle

Improved Lifecycle Control of Data Volumes

VM delete release CPU & RAM + removed the disks

Now you choose which disks to permanently destroy

– Example policy 1: Keep for 2 months as "dumb" users
   often want them back tomorrow!

– Example policy 2: Keep them to archive & destroy that evening

Delete

Before deleting virtual machine **kmgaritt_testDeploy**, select the attached storage volumes that should also be deleted.

Delete the following volumes:

◉ Boot volumes (1)

○ All volumes (1)

○ Select volumes

ℹ Volumes that are attached to multiple virtual machines cannot be deleted and are not included above.

Delete   Cancel

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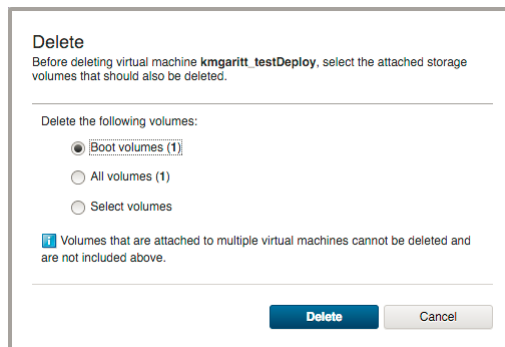
PowerVC 1.3.1
Install & Upgrade

Cloud PowerVC 1.3.1
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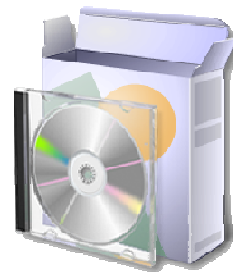
List prices

- PowerVC Standard – additional features
- IBM Cloud PowerVC Manager
  - Name decided by committee!
  - Massive feature jump and more to come in Q4
  - Effective merge IBM Cloud Manager into PowerVC

Power Systems Tiers	PowerVC Standard Edition License	IBM Cloud PowerVC Manager License
Large	$160	$460
Medium	$120	$320
Small	$80	$160

  - Price per core managed by PowerVC
  - Confirmed by the Product Manager April 2016

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Cloud PowerVC 1.3.1

Installation PowerVC 1.3.1

1. You install RHEL 7
2. Single media → DVD or large file (700MB)
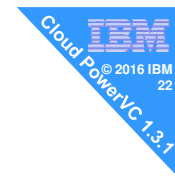3. Unzip the .tgz file
4. Untar the .tar file
5. cd to the directory that tar created
6. -s option decides what gets installed:
   -s standard   or   -s powerkvm   or   -s cloud_powervm

7. Pre-test readiness ./install -s cloud_powervm -t
8. Install with   ./install -s cloud_powervm
9. Takes about 30 minutes on fast disks

- If upgrading still use ./install → it finds the older release
- If running PowerVC Standard Edition you can upgrade later to Cloud PowerVC Manager Edition

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Cloud PowerVC 1.3.1
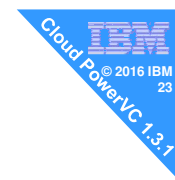
Install

I prefer
RHEL 7.1 on POWER8
Can be BE or LE
but can be x86_64 LE

Hints:
- On network – doh!
- Red Hat repositories connected up
- Install DVD repo

- Support is "RHEL7.1 or later", so you can upgrade RHEL 7.1 & even use RHEL 7.2

```
# ./install -h
Installs the IBM PowerVC version 9.9.9.9.
Usage: install [-s <offering type>]
    install [-c nofirewall]
    install [-t]
    install [-u] [-f]
    install [-n preferipv4 | preferipv6 | requireipv4 | requireipv6]
    install [-h]


Options:
 -c nofirewall  No firewall configuration will be performed during installation
                Admin will need to manually configure the firewall
                per documentation.
 -s <offering>  Run a silent installation and requires the offering
                value to be set to 'standard','powerkvm','cloud_powervm'
 -t             Run the prerequisite checks and exit
 -u             Uninstall to attempt clean up of failed installation and exit
 -f             Force install to override or bypass certain checks
                Used with the uninstall option to bypass
                failures during uninstall
 -n             preferipv4 (default) - This is the default option for IBM PowerVC installation.
                Select this option to install IBM PowerVC using the IPv4
                address. If the IPv4 address is unavailable, the
                installation will use the IPv6 address.
                preferipv6 -  Select this option to install IBM PowerVC using the
                IPv6 address. If the IPv6 address is unavailable,
                the installation will use the IPv4 address.
                requireipv4 - Select this option to install IBM PowerVC using the
                IPv4 address only. If the IPv4 address is unavailable,
                the installation will fail.
                requireipv6 - Select this option to install IBM PowerVC using the
                IPv6 address only. If the IPv6 address is unavailable,
                the installation will fail.
 -h             Display this help message and exit
```

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Cloud PowerVC 1.3.1
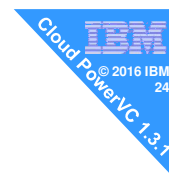
DB2 to MariaDB

- Installing PowerVC 1.3.1
  - MariaDB installed automatically behind the covers

- If Upgrading to PowerVC 1.3.1
  - the DB2 database is moved automatically to MariaDB

- If I did not tell you then you may not have noticed !

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Cloud PowerVC 1.3.1

```
# ps -ef | grep -i maria
mysql   3464 2961 0 Jun13 ?      00:22:22 /usr/libexec/mysqld --basedir=/usr --
   datadir=/var/opt/ibm/powervc/db --plugin-dir=/usr/lib64/mysql/plugin --log-
   error=/var/log/mariadb/mariadb.log --open-files-limit=8192 --pid-
   file=/var/run/mariadb/mariadb.pid --socket=/var/lib/mysql/mysql.sock --port=50110

[root@vm17 yum.repos.d]# rpm -qa | grep -i maria
mariadb-server-5.5.47-1.el7_2.ppc64
mariadb-libs-5.5.47-1.el7_2.ppc64
mariadb-5.5.47-1.el7_2.ppc64
```

Projects & User Roles

Projects

START

PROJECT

FINISH
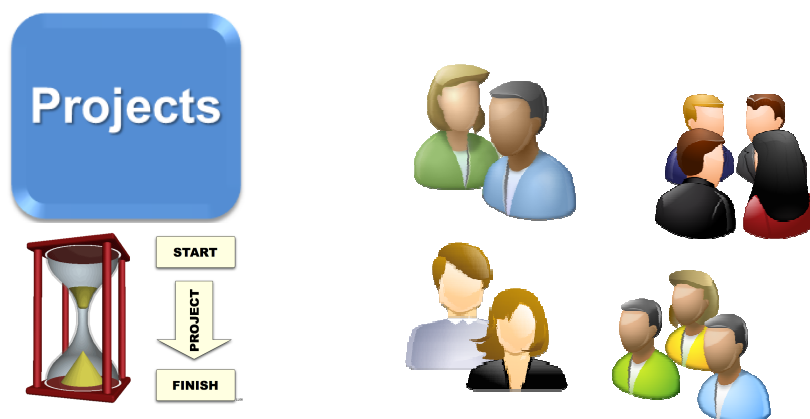
Project & user roles for separating resources: VMs, Disks, Images
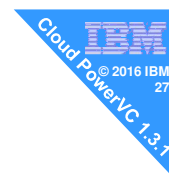
Why?

- Previously, one project "ibm-default" &
  one PowerVC super "admin role" owns everything &
  connected to the Linux user group "admin"

  – Likewise for user group deployer & viewer but less authority

- Now, different people (or teams) own & control
  their subset of PowerVC resources
- Makes for

  – Simpler management of larger PowerVC set-ups

  – Isolation of resources = reduced mistakes / multi-tenancy

Project and roles – "Old School"

- PowerVC 1.3.0 (& older) already knew about projects
  - EVERYTHING was in project: ibm-default
  - EVERYTHING access by admin Role via admin Linux user group

ibm-default

- Images to deploy

- Virtual Machines

- Admin Users also see
  - Host machines
  - Storage providers
  - Disk volume
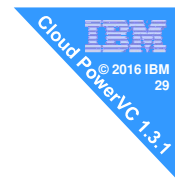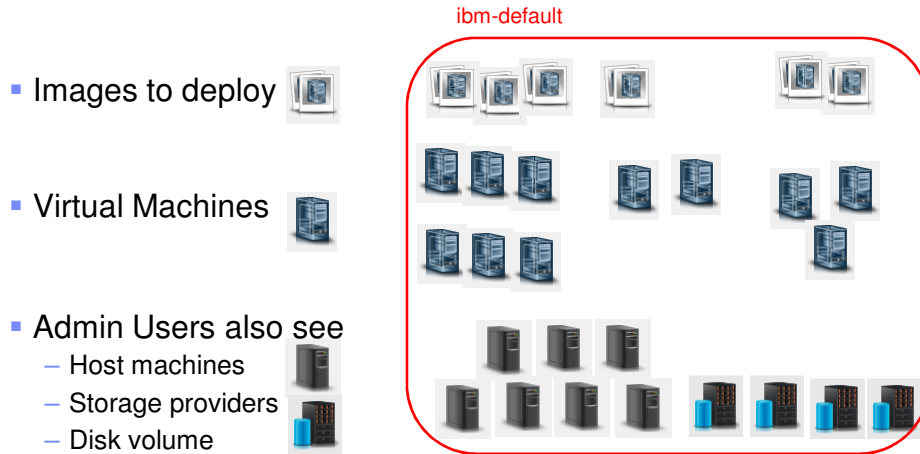
Project and roles – new way

- Created three projects

ibm-default   six   seven

- Image/Deploy-Template

- Virtual Machine

- Admin Users also see
  - Host machines
  - Storage providers
  - Disk volume
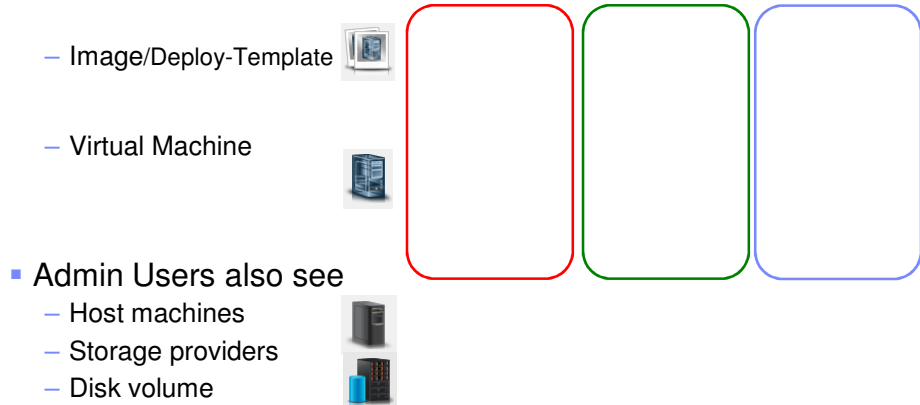
Project and roles – new way

- Manage a HMC → visible to admin user in all 3 projects

- Users see only their project
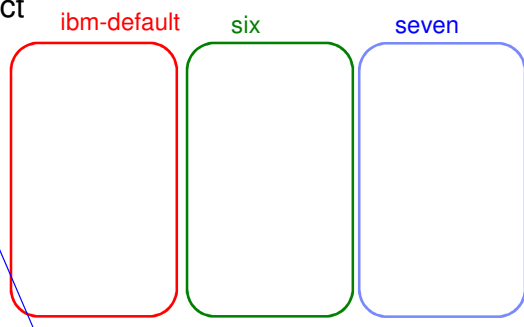
  ibm-default   six   seven

  – Image/Deploy-Template

  – Virtual Machine

- Admin Users also see
  – Host machines
  – Storage providers
  – Disk volume

  HMC

Project and roles – new way

- Next manage the host Power machines
  → visible in all projects

- Users see only their project
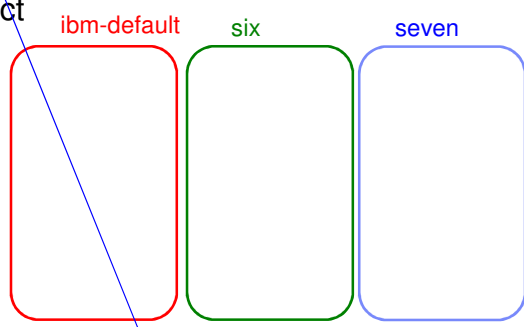
  ibm-default   six   seven

  – Image/Deploy-Template

  – Virtual Machine

- Admin Users also see
  – Host machines
  – Storage providers
  – Disk volume

  HMC

Project and roles – new way

- Manage Storage Providers → visible from all 3 projects
- Shared Storage Pool found when managing VM using SSP

- Users see only their project
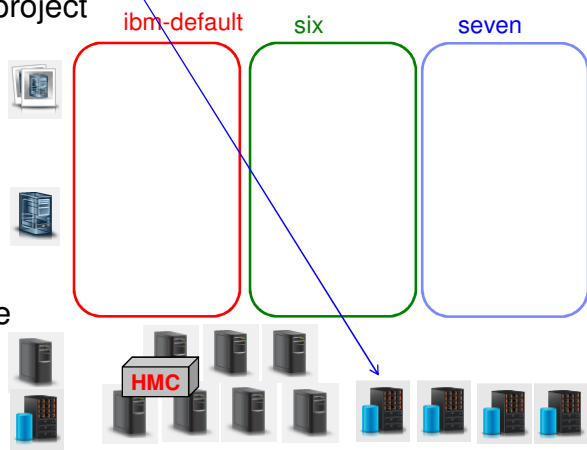
  ibm-default   six   seven

  – Image/Deploy-Template

  – Virtual Machine

- Admin Users also see
  – Host machines
  – Storage providers
  – Disk volume

  HMC

Project and roles – new way
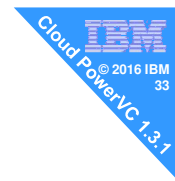
- Now you can "see" VM's, images and virtual Disks

- Users see only their project

  ibm-default   six   seven

  – Image/Deploy-Template

  – Virtual Machine

- Admin Users also see
  – Host machines
  – Storage providers
  – Disk volume

  HMC

Project and roles – new way

- Now you can "see" VM's, images and virtual Disks
- But these resources can only be managed in <u>one Project</u>

- Users see only their project

  ibm-default   six   seven

    – Image/Deploy-Template

    – Virtual Machine

- Admin Users also see
  - Host machines
  - Storage providers
  - Disk volume

HMC

Project and roles – new way

- Now you can "see" VM's, images and virtual Disks
- But these resources can only be managed in <u>one Project</u>

- Users see only their project
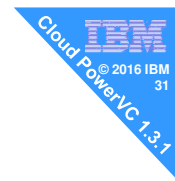
  ibm-default   six   seven

    – Image/Deploy-Template

    – Virtual Machine

- Admin Users also see
  - Host machines
  - Storage providers
  - Disk volume

HMC

Project and roles – new way

▪ Now you can "see" VM's, images and virtual Disks
▪ But these resources can only be managed in <u>one Project</u>

▪ Users see only their project

    ibm-default   six   seven

  – Image/Deploy-Template

  – Virtual Machine

▪ Admin Users also see
  – Host machines
  – Storage providers
  – Disk volume

HMC

Project & Role Management:

Now in PowerVC 1.3.1+
1. Use openstack command to create a project (once for each)
  – This is mostly giving it a name
  – The default project is "ibm-default"

2. Next create a Linux user: # adduser
3. Use openstack commands to
  – Assign the new user to one (or more) project with a specific role

▪ There are 9 roles defined: See Redbook section 3.8.2
  – Previous Roles: admin, deployer, viewer
  – Six new ones   → variations on the above three
  – Self-service   → only for Cloud PowerVC Manager Edition

But first lets do something simpler

- By default root user has the admin role for ibm-default project
  - Not a good idea to use root id for accessing PowerVC

- So for security reasons
  - Create a powervc "master" user: "powervc"
  - With admin role for the default project "ibm-default"

- This should help you understand projects

Create new "master" user for GUI access
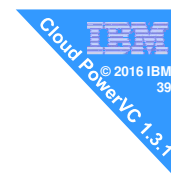
```
# adduser powervc -p SECRET
#
#
# openstack role add --project ibm-default --user powervc admin
Missing parameter(s):
Set a username with --os-username, OS_USERNAME, or auth.username
Set an authentication URL, with --os-auth-url, OS_AUTH_URL or auth.auth_url
Set a scope, such as a project or domain, set a project scope with --os-project-name,
    OS_PROJECT_NAME or auth.project_name, set a domain scope with --os-domain-
    name, OS_DOMAIN_NAME or auth.domain_name
```

Ugh!!!
REST API experts might recognise some of this as
    standard info needed to "talk" to openstack services

Create new "master" user for GUI access
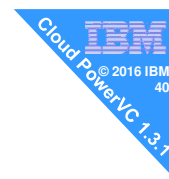
```
# adduser powervc -p SECRET
#
# source /opt/ibm/powervc/powervcrc
#
# export OS_USERNAME=root
# export OS_PASSWORD= <ROOT-PASSWD>   ←actual password
#
# openstack role add --project ibm-default --user powervc admin
#
```

Now you can login as Linux user: powervc at
   the PowerVC GUI webpage as the "master" user

However, CLI PowerVC commands still need to be run as root
   as in /opt/ibm/powervc/bin/ . . .

Create new "master" user for GUI access

So what is in that "magic" file? /opt/ibm/powervc/powervcrc
- Automatically created at install/upgrade time

```
                                        My PowerVC's hostname
export OS_IDENTITY_API_VERSION=3
export OS_REGION_NAME=RegionOne
export OS_AUTH_URL=https://pvc.acme.com:5000/v3/
export OS_CACERT=/etc/pki/tls/certs/powervc.crt
export OS_PROJECT_DOMAIN_NAME=Default
export OS_PROJECT_NAME=ibm-default
export OS_TENANT_NAME=ibm-default
export OS_USER_DOMAIN_NAME=Default
export OS_USERNAME=                    ← can add user name
export OS_PASSWORD=                    ← can add password
export OS_COMPUTE_API_VERSION=2.25
export OS_NETWORK_API_VERSION=2.0
export OS_IMAGE_API_VERSION=2
export OS_VOLUME_API_VERSION=2
```

Create new "master" user for GUI access

1. To let powervc user run PowerVC CLI commands
   – cp   /opt/ibm/powervc/powervcrc   /home/powervc/powervcrc
2. Set the OS_USERNAME & OS_PASSWORD for root user
   – vi /home/powervc/powervcrc
3. Make it read/write only for powervc
   – chmod 700 /home/powervc/powervcrc
   – chown powervc /home/powervc/powervcrc
4. Add it to .bash_profile
   – cd /home/powervc
   – echo source /home/powervc/powervcrc >> .bash_profile
5. Then log out and back in again

Now powervc user can issue openstack commands

Now back to create project and setting user roles
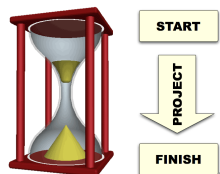
Create a project

```
[root@vm19 ~]# openstack project create \
                --description "Six Project" six
+-------------+----------------------------------+
| Field       | Value                            |
+-------------+----------------------------------+
| description | Six Project                      |
| domain_id   | default                          |
| enabled     | True                             |
| id          | 4e5ed9491daf44319eab573ebd0825e6 |
| is_domain   | False                            |
| name        | six                              |
| parent_id   | default                          |
+-------------+----------------------------------+

[root@vm19 ~]# openstack project list
+----------------------------------+-------------+
| ID                               | Name        |
+----------------------------------+-------------+
| 135537788461455183a90a4886142a65 | powervm     |
| 1f0ca545a81a4fffa8af6cf5fd2bea91 | ibm-default |
| 4e5ed9491daf44319eab573ebd0825e6 | six         |
| aa0ed38f28154f0aaac3c0e60decfb65 | service     |
+----------------------------------+-------------+
```

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Create users and add them to a project

```
[root@vm19 ~]# adduser sixadmin  -p 666          ← NOT good password
[root@vm19 ~]# adduser halfdozen -p 666          ← NOT good password
[root@vm19 ~]#

[root@vm19 ~]# openstack role add --project six --user sixadmin  admin
[root@vm19 ~]# openstack role add --project six --user halfdozen admin
[root@vm19 ~]# openstack user list
+------------------------+------------------+
| ID                     | Name             |
+------------------------+------------------+
. . .
| 1dd45dfca1d83b0e38 . . . | powervc        |
| 79d13683f8ab37b1d5 . . . | sixadmin       |
| 897db369914c6109c4 . . . | halfdozen      |
+------------------------+------------------+
```

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Fixing a role — **above halfdozen should have deployer role**
```
[root@vm19 ~]# openstack role remove --project six --user halfdozen admin
[root@vm19 ~]# openstack role add --project six --user halfdozen deployer
```

WARNING: Not the "delete" sub-command
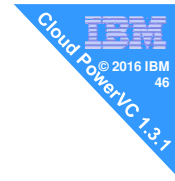
User role list

```
[root@vm19 ~]# openstack role list
+----------------------------------+-------------------+
| ID                               | Name              |
+----------------------------------+-------------------+
| 0bd36ecc931549f5a0fe71a99c2a74e9 | storage_manager   |
| 135f12bbf7c449e195c47bfdf4d6c216 | viewer            |
| 27547b499f9d47009284b29525f4b921 | service           |
| 4426e5babb864a12ab417d8178ab229d | deployer_restricted |
| 4bfea43c1019490eaf3aec4fa2a921c6 | admin             |
| 72ad4c6b05d442cab7973a9d035a68b1 | image_manager     |
| b9b2866254dc40aa9512ec988ea76938 | vm_manager        |
| f864d7e879164df583098c318e7c5302 | deployer          |
| fda52585536d476793d2764fa76c4042 | vm_user           |
+----------------------------------+-------------------+
```

See the PowerVC Redbook for the full Role Descriptions

admin   vm_manager   vm_user
deployer*   deployer_restricted   storage_manager
viewer   image_manager
       service**

*deployer is deprecated (to be removed in later releases)
** service not for us

DEMO
of projects   powervc & sixadmin

As sixadmin user

Username (Project)

Rather boring as I have not discovered anything yet!

Change project but these is only one!

Click

sixadmin (six)
Change Project
Log Out

Change Current Project

Select a project and click Change Project to change to a different project.

Current project: six

Name	Description
six	Six Project

Total: 1 Selected: 0

Change Project   Cancel

Can't change as sixadmin is only in one project

User with two projects can switch

4 Cloud PowerVC Manager Edition
   IBM
      Cloud
         Power
            Virtualization
               Center
                  Manager
                     Edition

ICPVCME
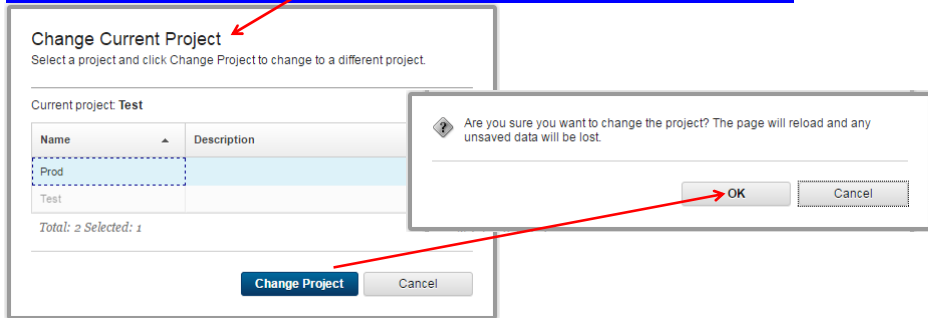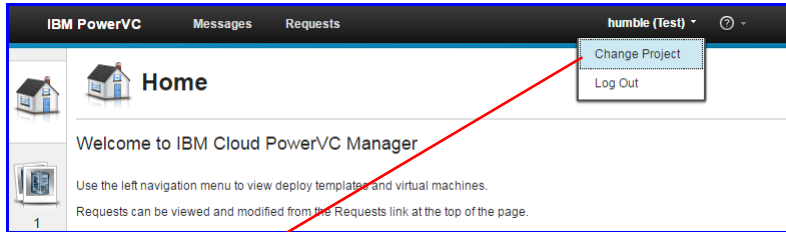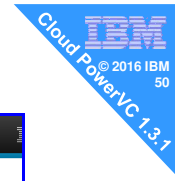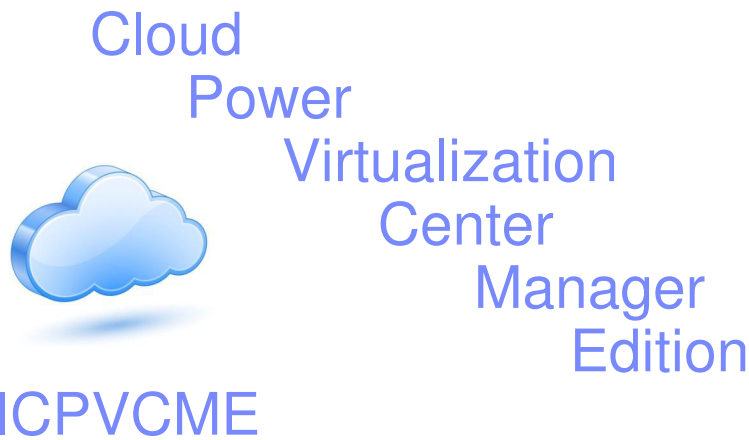
Installing the Cloud Edition Features Changes

- New Role: self-service   [mandatory]
- Manage Projects & User Roles   [mandatory]
- Manage VM Deploy requests   [optional]
- Manage VM Expiration   [optional]
- You need at least 1 Deploy Image per Project   [mandatory]
  – Currently these are not shared
- New Deploy-Templates resource   [mandatory]
  – Deploy Image + Compute-Template
  – = one click Deploy with no questions for Self-Service users
- New power-cloud-config command for   [mandatory]
  – Setting VM deploy, VM expire & Image Capture
- Metering usage stats   [optional]
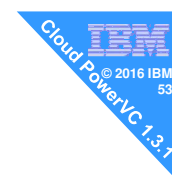
DEMO
of Self-service

humble

Don't make my mistake!!

I crash & burn my PowerVC host so I then
- Find all the HMC
- Find the host machines
- Find the VMs
- Find the images

- Now look for the new cloud / projects stuff

- If you found everything its in the ibm-default project
- There is nothing left for Cloud projects to manage!

- So lets talk more about projects
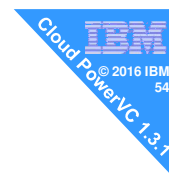
My Projects and User roles

- Super admin: powervc = admin for all projects
- Project: six for POWER6 host group
  - Admin user: sixadmin
  - Deployer: halfdozen
  - Users: sixtus and sixtine   and humble
- Project: seven
  - Admin user: sevenadmin
  - Deployer: sevendep
  - Users: sevenself   and humble
- Project: eight
  - Admin user: eightadmin
  - Deployer: eightdep
  - Users: eightself   and humble

How do we review the projects and role assignments?

- openstack project list
- openstack role list
- openstack user list

- openstack role assignment list
  - Oh dear! hexadecimal id's → Yuck!

```
+-------------------+-------------------+-------------------+-------------------+--------+-----------+
| Role              | User              | Group             | Project           | Domain | Inherited |
+-------------------+-------------------+-------------------+-------------------+--------+-----------+
| c9df2d090f1e4153b | 0688b01e6439ca32d |                   | c511b521ca9349839 |        | False     |
| f0de1306132c189   | 698d20789d5216912 |                   | 7f33f1fa4b16dfc   |        |           |
|                   | 6fb41fb1a4ddafceb |                   |                   |        |           |
|                   | b97d854e836c9     |                   |                   |        |           |
```

"--names" can fix that but it is good to strip out some
information we don't need to see. Next slide →

List Project + Role + User script:

Replaces Hex with readable names

```
openstack role assignment list –c Project –c Role –c User --names –f value | \
grep –v @Service | sed 's/@Default//g' | \
awk '{ printf "%-15s %-15s %-15s\n", $3, $1, $2 }' | sort
```

Removes internal user Id's & fluff

Smarter columns & reorder

```
eight           admin           eightadmin
eight           admin           powervc
eight           deployer        eightdep
eight           self_service    eightself
eight           self_service    humble
ibm-default     admin           powervc
ibm-default     admin           root
ibm-default     self_service    humble
seven           admin           powervc
seven           admin           sevenadmin
seven           deployer        sevendep
seven           self_service    humble
seven           self_service    selfish
seven           self_service    sevenself
six             admin           powervc
six             admin           sixadmin
six             deployer        halfdozen
six             self_service    humble
six             self_service    sixtine
six             self_service    sixtus
```

Alternatively: User + Project + Role
```
awk '{ printf "%-15s %-15s %-15s\n", \
$2, $3, $1}' | sort
```

powervc-config command - awkward

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- Many PowerVC commands merging in this one
- This allows lots of settings like
  - PowerVC IP addresses
  - User web timeouts ← good
  - Max deploy image size
  - DNS domain defaults ← mandatory
  - Metering ← Cloud Edition more later

- See AIXpert blog
  - **PowerVC 1.3.1 Cheat Sheet**
  - for details on how to use this unhelpful command!
  - https://www.ibm.com/developerworks/community/blogs/aixpert/entry/PowerVC_1_3_1_Cheat_Sheet

powervc-cloud-config command - painful

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Cloud PowerVC 1.3.1
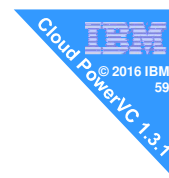
- Projects with Self-Service users Settings
  - VM deploy needs Admin approval?
  - VM to have expiration date?
  - Image Capture limits?

- If not set then something's <u>do not appear on the GUI</u>

- See AIXpert blog
  - **PowerVC 1.3.1 Cheat Sheet**
  - for details on how to use this command!
  - https://www.ibm.com/developerworks/community/blogs/aixpert/entry/PowerVC_1_3_1_Cheat_Sheet

powervc-cloud-config command - painful

▪ Need those powervcrc shell variables set

▪ This allows lot of settings like (my shorthand reminder)

|	
default_request_wait_time	Days waiting for VM approval before it's automatically approved
deploy_approval_limit	Number of VMs a user can have without needing approval
expired_resources_lifetime	After a VM expired, the days before the VM is deleted
extension_approval_limit	Number of VM user extensions before approval is needed
default_expiration_days	Number for the default days before the VM is expired and a limit to the maximum days that can be requested
snapshot_approval_limit	Number of VM Captures before approval needed

powervc-cloud-config command - painful

You must script this or you will get caught out
If OS_TENANT_NAME="ibm-default" then
the --project six below is totally ignored!!

unset OS_TENANT_NAME
powervc-cloud-config --project six set-policy default_request_wait_time 5
powervc-cloud-config --project six set-policy deploy_approval_limit 3
powervc-cloud-config --project six set-policy expired_resources_lifetime 90
powervc-cloud-config --project six set-policy extension_approval_limit 4
powervc-cloud-config --project six set-policy default_expiration_days 30
powervc-cloud-config --project six set-policy snapshot_approval_limit 10
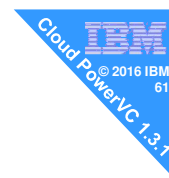
Project and User Control

- Linux user is allocated a role on specific project(s)

  – Admin full access

  – Self-service limited

  – Project Policy decides if VM needs approval
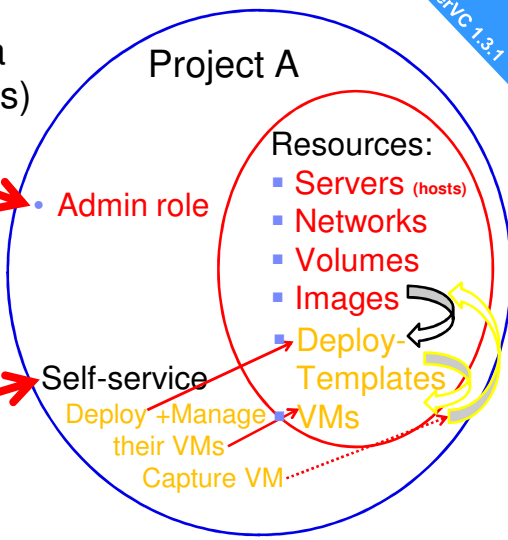
Project A

- Admin role

Self-service

Deploy +Manage their VMs

Capture VM

Resources:
- Servers (hosts)
- Networks
- Volumes
- Images
- Deploy-Templates
- VMs

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Project six

sixadmin =
Admin with full access
for project **six**

ALL Resources:
- Servers
- Networks
- Volumes
- Images
  - AIX 7.2 TL0 sp1

- ALL VMs
- Compute Template

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Project six

sixadmin =
Admin with full access
for project **six** → ALL Resources:

- Servers
- Networks
- Volumes
- Images
  - AIX 7.2 TL0 sp1
- ALL VMs
- Compute Template
  - # of CPU, GB RAM
    Hosts group + settings

Deploy-Templates
AIX 7.2 TL0 sp1

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Project six

sixadmin =
Admin with full access
for project **six** → ALL Resources:

- Servers
- Networks
- Volumes
- Images
  - AIX 7.2 TL0 sp1
- ALL VMs
- Compute Template

Deploy-Templates
AIX 7.2 TL0 sp1

humble   sixtus   sixtine   Self-service users
vm1   vm4   vm6
vm2   vm5
vm3

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Project six

sixadmin = **Admin** with full access for project **six** → ALL Resources:
- Servers
- Networks
- Volumes
- Images
  - AIX 7.2 TL0 sp1

- ALL VMs
- Compute Template

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Deploy-Templates
AIX 7.2 TL0 sp1

humble | sixtus | sixtine
vm1 | vm4 | vm6
vm2 | vm5
vm3

Self-service users can't see other users VMs

Project six

sixadmin = **Admin** with full access for project **six** → ALL Resources:
- Servers
- Networks
- Volumes
- Images
  - AIX 7.2 TL0 sp1

- ALL VMs
- Compute Template

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Self-service users can't see Servers, Network, Disk volumes or Images
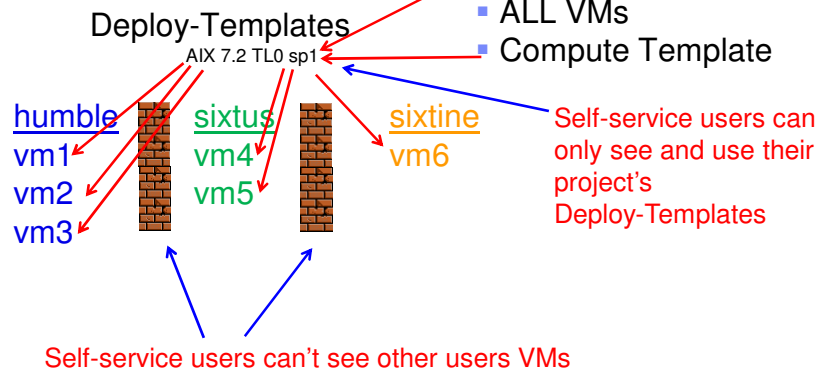
Deploy-Templates
AIX 7.2 TL0 sp1

humble | sixtus | sixtine
vm1 | vm4 | vm6
vm2 | vm5
vm3

Self-service users can only see and use their project's Deploy-Templates

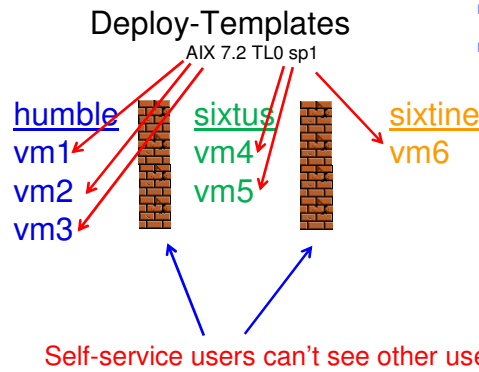Self-service users can't see other users VMs

Project six

sixadmin = **Admin** with full access for project **six**   → ALL Resources:

- Servers
- Networks
- Volumes
- Images
    - AIX 7.2 TL0 sp1
    - AIX7.2 TL0 sp2
- ALL VMs
- Compute Template

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Deploy-Templates
AIX 7.2 TL0 sp1

humble   sixtus   sixtine
vm1   vm4   vm6
vm2   vm5
vm3
Updated to
AIX 7.2 TL0 sp2
Capture

Self-service users Capture seems to disappear
as its added to the Image list that it can't see

Project six

sixadmin = **Admin** with full access for project **six**   → ALL Resources:

- Servers
- Networks
- Volumes
- Images
    - AIX 7.2 TL0 sp1
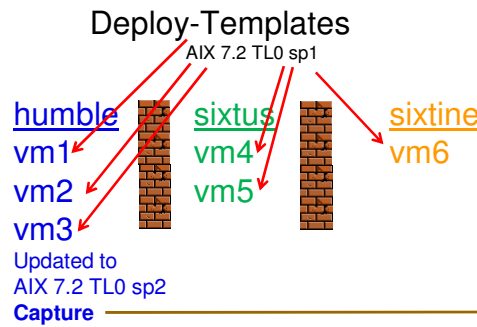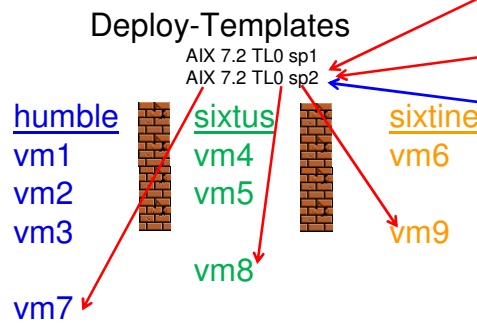   - AIX7.2 TL0 sp2
- ALL VMs
- Compute Template

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Deploy-Templates
AIX 7.2 TL0 sp1
AIX 7.2 TL0 sp2

humble   sixtus   sixtine
vm1   vm4   vm6
vm2   vm5
vm3
                        vm9
            vm8
vm7

If the Admin user
makes a new
Deploy-Template from
the new capture all
the self-service users
can deploy it

**Metering of
Resource Use**
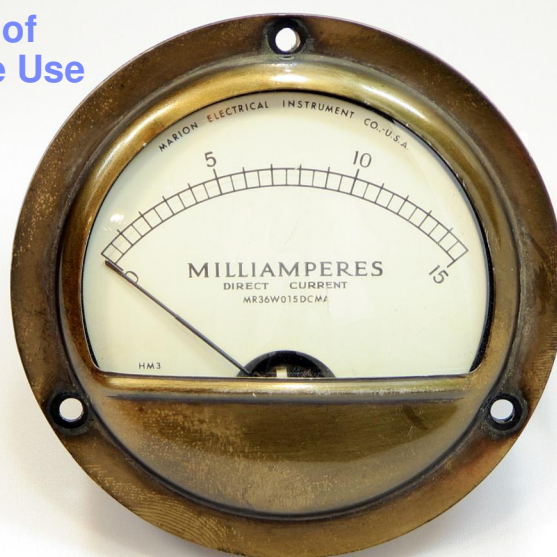
Users pay for their IT use?
– Multi-tenant or user department based charging
Currently, just raw stats - No invoice generation here!

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User Metering via REST API
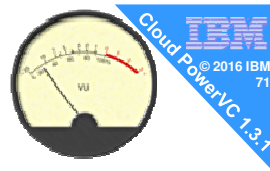
▪ Documented in the Manual
– https://www.ibm.com/support/knowledgecenter/en/SSVSPA_1.3.1/com.i
bm.powervc.cloud.help.doc/powervc_cloud_metering.html
– I found it very . . . challenging!
– Zero information about what you get

▪ Data extracted via REST API via tools like these:
– For scripting Curl (text) plus shell scripting
– Python with JSON modules
– GUI Firefox Rest Client
– GUI Chrome Postman

▪ We need a clear worked example

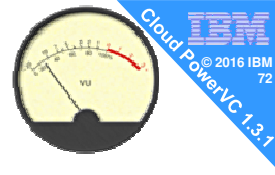## User Metering via REST API

- From experiments
  - I use the curl command (text based) for scripts
    It is already installed on PowerVC RHEL7.1+ server

  - Data in JSON format
    - IMHO one the worst formats on the planet!
    - Extreme duplication in returned text 95% pointless
      - 50 timestamps & numbers ~1KB and 45KB file and on one line
    - The data is often in internal ID form that you then need to decode

- REST API + JSON = good for program access
  for you to develop a billing application !

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CPU=1%   Machine   Timestamp

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73

curl -1 -k -X GET https://vm17.aixncc.uk.ibm.com:5000/powervc/openstack/metering/v2/samples -H X-Auth-Token:2e1c30048a674ab28b698e516f9838b4
[{"user_id": null, "resource_id": "8408E8E_21D494V_8408E8E_21D494V", "timestamp": "2016-07-08T12:47:45.439914", "meter": "compute.node.cpu.percent", "volume": 1.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:45.828186", "project_id": null, "type": "gauge", "id": "2b333990-450a-11e6-9bb2-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.8408E8E 21D494V", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "8203E4A_10E0A21_8203E4A_10E0A21", "timestamp": "2016-07-08T12:47:43.762267", "meter": "compute.node.cpu.percent", "volume": 0.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:44.120103", "project_id": null, "type": "gauge", "id": "2a2ea8ea-450a-11e6-a822-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.8203E4A_10E0A21", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "828422A_215296V_828422A_215296V", "timestamp": "2016-07-08T12:47:42.012994", "meter": "compute.node.cpu.percent", "volume": 0.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:42.012994", "project_id": null, "type": "gauge", "id": "28ed22c2-450a-11e6-9326-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.828422A_215296V", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "8203E4A_10E0A31_8203E4A_10E0A31", "timestamp": "2016-07-08T12:47:40.043859", "meter": "compute.node.cpu.percent", "volume": 0.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:40.402204", "project_id": null, "type": "gauge", "id": "27f6ff0a-450a-11e6-8c8b-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.8203E4A_10E0A31", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "8231E2B_06FC44P_8231E2B_06FC44P", "timestamp": "2016-07-08T12:47:37.055099", "meter": "compute.node.cpu.percent", "volume": 0.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:37.440990", "project_id": null, "type": "gauge", "id": "2633c7b6-450a-11e6-bf81-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.8231E2B_06FC44P", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "8231E1C_0659FDR_8231E1C_0659FDR", "timestamp": "2016-07-08T12:47:33.231023", "meter": "compute.node.cpu.percent", "volume": 0.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:33.603068", "project_id": null, "type": "gauge", "id": "23e9dc34-450a-11e6-be74-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.8231E1C_0659FDR", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "8233E8B_100271P_8233E8B_100271P", "timestamp": "2016-07-08T12:47:28.998088", "meter": "compute.node.cpu.percent", "volume": 0.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:29.396018", "project_id": null, "type": "gauge", "id": "21682be6-450a-11e6-b359-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.8233E8B_100271P", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "9117MMB_100525P_9117MMB_100525P", "timestamp": "2016-07-08T12:47:28.269003", "meter": "compute.node.cpu.percent", "volume": 0.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:28.657466", "project_id": null, "type": "gauge", "id": "20f75574-450a-11e6-8fb3-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.9117MMB_100525P", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "8233E8B_100272P_8233E8B_100272P", "timestamp": "2016-07-08T12:47:20.238242", "meter": "compute.node.cpu.percent", "volume": 0.0, "source": "openstack", "recorded_at": "2016-07-08T12:47:20.612747", "project_id": null, "type": "gauge", "id": "1c2bf23e-450a-11e6-b14d-326cb0074402", "unit": "percent", "metadata": {"source": "powervc_nova.virt.ibmpowervm.hmc.driver.PowerVMDriver", "host": "compute.8233E8B_100272P", "event_type": "compute.metrics.update"}}, {"user_id": null, "resource_id": "8203E4A_10E0A51_8203E4A_10E0A51", "timestamp": "2016-07-08T12:47:15.238091", "meter": "compute.node.cpu.pe
out.samples

User Metering via REST API

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74
Cloud PowerVC 1.3.1
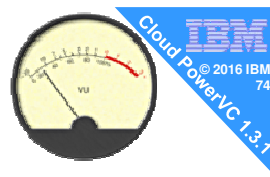
- From experiments
  - Project Data is taken every 10 minutes
    - It is <u>configuration</u> data
    - Project (admin) + User level (self-service)
  - Server Usage data is taken once a minute

- Data available
  - total_vcpu   = Entitlement (not virtual CPUs)
  - total_memory   = RAM in MB
  - total_volumes = Disk in GB (ignoring thin provisioning)
  - CPU Utilisation% per server (from HMC)

User Metering via REST API   **Work in Progress**

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Sort of remotely login to PowerVC as a website
```
# export POWERVC=vm17.ache.com
# curl -1 -k -i -X POST https://$POWERVC:5000/v3/auth/tokens \
-H "Accept: application/json" \
-H "Content-Type: application/json" -d @auth.json (file contains user/password/project)
```
Returns a TOKEN to use for the below GET data requests

Get a meter value, here Entitlement (called total_vcpu)
```
# curl -1 -k -i -H "X-Auth-Token:$TOKEN" -X GET \
https://$POWERVC:5000/powervc/openstack/metering/v2/meters/total_vcpu
```
Similar for total_memory (RAM MB) and total_volumes (Diskspace GB)
Get Machine CPU use called samples
```
curl -1 -k -X GET -H "X-Auth-Token:$TOKEN" \
"https://$POWERVC:5000/powervc/openstack/metering/v2/samples"
```

Then a few hours shell scripting to filter out the "noise" & for line by line CSV's
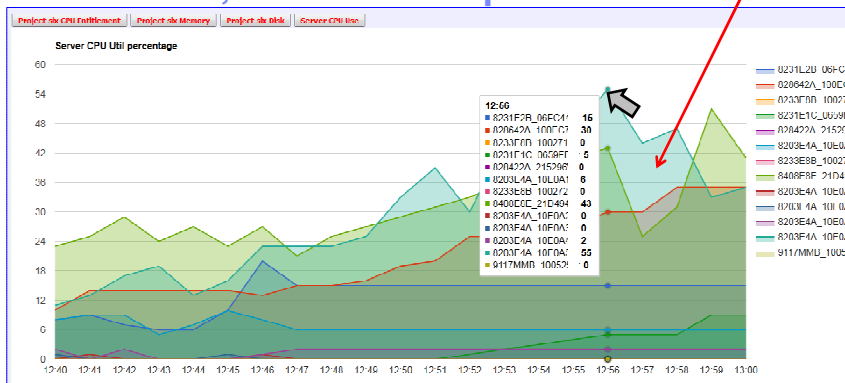```
2016-07-06T215810,0.5,sixtus
2016-07-06T215810,6.0,sixadmin
2016-07-06T215810,2.5,humble
2016-07-06T215810,1.5,sixtine
```

And using awk to do a matrix inversion you get to usable CSV file (nmon format ☺)
```
Entitlement,sixtus,sixadmin,humble,sixtine
2016-07-06T215810,0.5,6.0,2.5,1.5
```
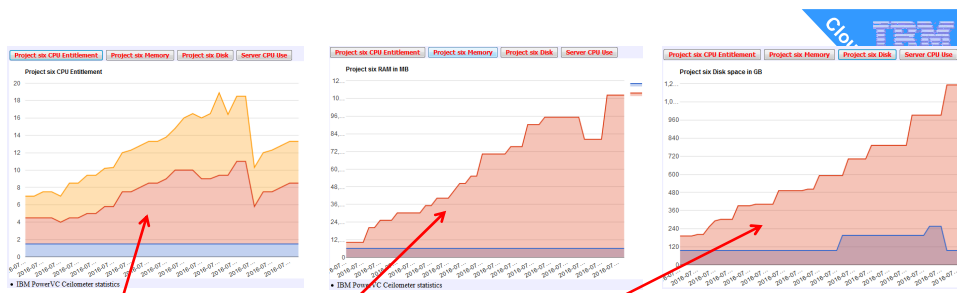
**Entitlement, RAM & Disk space + Server CPU% use**



## User Metering via REST API

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77

Cloud PowerVC 1.3.1

**Save events and data for 90 days = 2160 hours**

Events are causes if stats pass a threshold that you set
```
powervc-config metering event_ttl --set 2160 --unit hr
Setting event_time_to_live to 2160 hr
```

How much stats data you want to have stored
```
powervc-config metering meter_ttl --set 2160 --unit hr
Setting metering_time_to_live to 2160 hr
#
```

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78
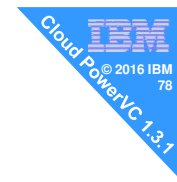
Cloud PowerVC 1.3.1

# DEMO

## of Admin & Self-Service

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79

Cloud PowerVC 1.3.1

## Summary – Good time for Questions

IBM Cloud PowerVC Manager **V1.3.1** includes NEW THINGS:

1. AIX VM - Active Memory Expansion ✔
2. Dynamic Resource Optimiser – can be scheduled ✔
3. Remove a VM but keep the storage "just in case" ✔
4. Internal database moved from DB2 to MariaDB ✔
5. Novalink improvements  [not covered in this session]
6. Project & user role admin for separating resources: VMs, Disks, Images ✔
7. Hitachi Storage Provider      Postponed

PowerVC
Standard
Edition

---

8. IBM Cloud Manager merging in to PowerVC
   – Self-service user has limited actions
     – User role "self-service" ✔
     – Deploy Templates from their project(s) only ✔
     – Policy based with or without admin approval process ✔
     – VM expirations - admin or auto remove ✔
   – Metering data that can be used for chargeback (REST API) ✔

Cloud PowerVC
Manager Edition
adds to the
Standard Edition