PowerVC 1.2 Q4 2013
Power Systems Virtualization Center

“At last a simple tool to spin-off Power Virtual Machines with very little effort”

Nigel Griffiths
IBM Power Systems
Advanced Technology Support, Europe

Man-Power & Costs

User Demands

Flexibility

Responsiveness

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Move from a “hand crafted” cottage industry … to a streamlined factory floor
Hand-made Solution  versus  Standard Sizes

Two Classes of Workload

1. Production
   - High Performance
   - High I/O rates
   - Careful Specification, Sizing, Layout & Tuning
Two Classes of Workload

1. Production
   - High Performance
   - High I/O rates
   - Careful Specification, Sizing, Layout & Tuning

2. Regular workloads
   - Small
   - Medium
   - Large
   - then monitor to check the fit

OpenStack Infrastructure Management Software

- Higher Level Mgmt Ecosystem (Cloud, Enterprise, etc)
- OpenStack API
- Security (KeyStone)
- Scheduler
- Images (Glance)
- Projects
- Flavors
- Quotas
- AMQP
- DBMS
- Cinder
- Nova
- Quantum
- Storage
- Servers
- Network

Cloud Management APIs
  - Focus on providing lead
  - Broad Ecosystem

Management Services
  - Image Management
  - Virtual Machine placement
  - Accounts Management

Foundation (Middleware)
  - AMQP Message Broker
  - Database for persistence

Virtualization Drivers
  - Adapters to hypervisors
  - Server, storage, network
  - Vendor-led drivers
OpenStack + Drivers + IBM “value add” = PowerVC

Drivers for IBM Hardware
- Storage
- Servers
- Network

Some unique feature for IBM
- Graphical User Interface
- Advanced Algorithms

IBM PowerVC

IBM adds new features that it wants to see & support drivers for IBM HW to add PowerVC functions

IBM offers most updates to open source

IBM offers updates to open source but not all features

IBM takes latest OpenStack adds new or updated features that is wants for PowerVC

Packages updated here are for illustration purposes only & selected at random!
Separate “islands” of Resources

Single set of Resources with PowerVC
**PowerVC so far …**

**Releases**
- Limited release 1.1 in China for Power Linux machines with IVM ~May 2013
- First release 1.2 is available from 6th December 2013

**PowerVC 1.2 Editions:**
- **Express** Edition is for IVM
  - Small tier machines: PowerBlades, Power 710 to 750 + 7R1, 7R2 & 7R4
- **Standard** Edition is for HMC
  - As above plus Power Medium & Large tier machines
  - PureFlex nodes controlled by a HMC
- Further releases expected in 2014 to expand on initial 1.2 features

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**Supported HW and OS**

**PowerVC runs on:**
- Red Hat RHEL 6.4 running on Power Server - - or - - x86
- You are responsible for sourcing, licensing and S/W maintenance of RHEL 6.4 (Red Hat offers a 60 day trial)

**PowerVC controls Virtual Machines running**
- AIX 6 TL9 & 7 TL3
- Red Hat RHEL 6.4+ & SUSE SLES 11 SP3+ on Power
- Statement of direction for IBM i

**Server Hardware it will control**
- PowerVC Express: POWER7/7+
- PowerVC Standard: POWER7/7+ and POWER6/6+
Pre-requisites Details

1. Red Hat RHEL 6.4 for **Power** or **x86**
   - Clean install no other workloads
   - CPU x86 → 2 CPUs with 2+ GHz
   - CPU Power → 2 VP, uncapped, Entitled=1.0 (2 recommended)
   - 8 GB memory
   - 40 GB of disk
     Express: more disk space, if you will be importing many ISO images

2. IBM SVC-family Storage
   - SVC/V7000/V3700/V3500 with V6.4+ firmware

3. PowerVC server must have network access to:
   - HMC / IVM, SAN storage, SAN fabric/switch (Standard Edition)

4. VIOS already installed and configured
   - PowerVC does not install VIOS or IVM

PowerVC Architecture

Express

- PowerVC
- SVC family V7000
- SAN Switch Pre-zoned
- IVM/VIOS
- Virtual Ethernet
- Virtual SCSI
- VMs

Standard

- PowerVC
- SVC family V7000
- SAN Switch
- HMC
- IVM/VIOS
- Dual VIOS
- Virtual Ethernet
- NPIV storage
- VMs
Requisites – Express Edition specific

- IVM → VIOS V2.2.1.5 or later
- LUN over Virtual SCSI only
  - Storage must be pre-zoned
  - No SAN switch [Fabric] connectivity required
- POWER7/7+ Express servers with 780 firmware
  - Older firmware will work with loss of functionality

- Limits
  - 5 managed hosts running IVM
  - Maximum of 100 LPARs

- Images
  - Boot from AIX, RHEL or SLES DVD install media
  - Boot from mksysb burnt to DVD
  - Capture using ActivationEngine (AE)

Requisites - Standard Edition specific

- HMC V7.7.8 or later → CR5/C08 or later
- VIOS V2.2.3 or later
- NPIV-only
  - Fabric connectivity required
  - Brocade SAN switch only or IBM version of this

- Limit of
  - 10 managed hosts
  - 40 LPARs per host
  - Maximum of 400 LPARs
  - Maximum of one managed storage subsystem

- Images
  - Manual create NPIV LPAR/VM install OS then capture using ActivationEngine (AE)
The place for discussion, hints and tips & requesting new features. Recent topics include warm standby for HA and backups recovery.

More to come on: Install, resize, migrate (LPM), life cycle, advanced topics.
Installation – Redbook chapter 3

- Install Red Hat RHEL 6.4 on Power or x86 → 20 mins
  - Setup date, time
  - Put on your network: IP, DNS, hostname, gateway …
  - Don’t install anything else – except nmon 😊
  - Set SELinux to “permissive”

- Setup yum RPM repositories: → 10 mins
  - install media & for RH updates plus IBM extras for Power

- PowerVC load media: DVD or file.tar.gz unpacked
  - cd to media
  - ./install → 20 mins
  - Once done browse to https://<your-PowerVC-machine>.com

  - Log file /opt/ibm/powervc/log/powervc_install_[install date].log

Pre-Packaged Images … ready for shipping to the VMs
Full Virtual Machine Life Cycle

Pricing

Pricing Stand Alone

- PowerVC Express Edition is $60 per managed core for Small tier machines controlled by IVM
- PowerVC Standard Edition is $80 / $120 / $160 per managed core for Small/medium/large machines controlled by HMC

PowerVC will be included in
- SWMA for SmartCloud Entry Bundle in Power (5765-SB3)
- SWMA for AIX Enterprise Edition
- SWMA for System Director VMControl
- SWMA for System Director Standard Edition or Enterprise Edition

These List prices are in US Dollars on 8th Oct 2013. They may be different in other countries or not available. Please ask your IBM Representative for a quote in your country.

SWMA = Software Maintenance
Demonstration

Call to Action

- Decide:
  - How much system admin time that PowerVC will save you & the value of rapid responses to users & consistent VMs

- Run a test project
  - Read up on PowerVC
  - Get Red Hat RHEL6.4
  - Allocate Machine resources
  - Prepare suitable software stacks

- Purchase/“blag” a copy of PowerVC & Get Started

Resources:
- http://tinyurl.com/IBMPowerVCwebsite
- http://tinyurl.com/IBMPowerVCredbook
- http://tinyurl.com/IBMPowerVC
- http://tinyurl.com/IBMPowerVClorum
- LinkedIn PowerVC group
PowerVC - Briefly

PowerVC Highlights:
- Quick to install & setup (~20 mins)
- Connects to your HMC/IVM, SVC/Storwiz disks & switches
- Simple to learn & fast to use Graphical User Interface
- Install Image & Virtual Machine (VM) Management
- Resource Pooling across host machines
- VM Capture with software stack in a few minutes
- VM Deploy with policy based placement in a few minutes
- VM sizing simplification through config templates
- VM life cycle operations:
  - capture, deploy, start, stop, delete, resize, migrate
  - Dynamic CPU, RAM, Disk Management (DLPAR)
  - Live VM Mobility / Relocation (LPM)
  - Health status checks of the virtualized environment

PowerVC has generated lots of customer interest as:
"At last a simple tool to spin-off Power Virtual Machines with no effort"

Screen Shots
Home screen showing Resource Summary

Configured Storage showing 2 Storwize V7000
Configured Networks

### Networks

<table>
<thead>
<tr>
<th>Name</th>
<th>VLAN ID</th>
<th>Type</th>
<th>Virtual Machine Usage</th>
<th>Subnet Mask</th>
<th>Gateway</th>
<th>DNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATS B 137 V2.7.2.0</td>
<td>137</td>
<td>Static</td>
<td>4</td>
<td>255.255.255.0</td>
<td>9.137.62.1</td>
<td>9.137.62.2</td>
</tr>
<tr>
<td>Imported Network / VLAN 137</td>
<td>137</td>
<td>DHCP</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Configured Physical Machines

### Hosts

<table>
<thead>
<tr>
<th>Name</th>
<th>Virtual Machines</th>
<th>State</th>
<th>Health</th>
<th>HMC Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>green-0331-EBE-5M1TCPUP</td>
<td>6</td>
<td>Running</td>
<td>OK</td>
<td>HMC12</td>
</tr>
<tr>
<td>green-0331-EBE-5M1TCPUP</td>
<td>6</td>
<td>Running</td>
<td>OK</td>
<td>HMC12</td>
</tr>
</tbody>
</table>

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Pre-Packaged Images of Software Stacks

Images + Deploy → Size Template
### Created Virtual Machines

<table>
<thead>
<tr>
<th>Name</th>
<th>Host</th>
<th>IP</th>
<th>State</th>
<th>Health</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLES_11_1</td>
<td>green-ES31-E25-</td>
<td>9.137.62.126</td>
<td>ALIVE</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>green2</td>
<td>green-ES31-E25-</td>
<td>9.137.62.125</td>
<td>Active</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>green3</td>
<td>green-ES31-E25-</td>
<td>9.137.62.125</td>
<td>Active</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>green4</td>
<td>green-ES31-E25-</td>
<td>9.137.62.24</td>
<td>Active</td>
<td>Warning</td>
<td></td>
</tr>
<tr>
<td>green5</td>
<td>green-ES31-E25-</td>
<td>9.137.62.125</td>
<td>Active</td>
<td>Warning</td>
<td></td>
</tr>
<tr>
<td>green6</td>
<td>green-ES31-E25-</td>
<td>9.137.62.24</td>
<td>Active</td>
<td>Warning</td>
<td></td>
</tr>
<tr>
<td>green7</td>
<td>green-ES31-E25-</td>
<td>9.137.62.24</td>
<td>Active</td>
<td>Warning</td>
<td></td>
</tr>
<tr>
<td>green8</td>
<td>green-ES31-E25-</td>
<td>9.137.62.24</td>
<td>Active</td>
<td>Warning</td>
<td></td>
</tr>
<tr>
<td>green9</td>
<td>green-ES31-E25-</td>
<td>9.137.62.24</td>
<td>Active</td>
<td>Warning</td>
<td></td>
</tr>
</tbody>
</table>

### Backup Charts

...
Adding Users

- As root user on the PowerVC hosting server

  useradd -c "Nigel Griffiths" -g admin -m nag
  - -c add name to the /etc/passwd
  - -g admin = the Linux user group for PowerVC admin
  - -m nag = user name

- Set the users password
  - passwd nag

- Now nag can login to PowerVM

Backup

- Default backup directory /var/opt/ibm/powervc/backups
  - /opt/ibm/powervc/bin/powervc-backup --targetDir /backup

- If you have a PowerVC problem → restore the backup

High Availability

- Only 1 PowerVC to manage each machine
  - More is not supported

Warm Standby

- Copy backup files to a warm stand-by PowerVC box
  - Just OS and PowerVC installed but NOT used

- If you get a PowerVC disaster …
  - Restore the backup file and it will start PowerVC
  - Then don’t use the original PowerVC copy
Using PowerVC Standard Edition with HMC

- Create a pure virtual LPAR
  - Using a NPIV disk via the VIOS – mandatory for 1.2 release
  - Using a virtual network via the VIOS

- Install the OS
  - Current AIX, RHEL or SUSE

- Regular post install setup
- Install your applications etc.

Pre-Capture Checklist

- Date, time & timezone
- IP address & full hostname OK
- Remove junk files from /tmp etc. & old / large logs
- Set filesystem to sensible sizes
- Remove old user accounts or unused apps / tools
- ulimit set
- Installed OS updates/fixes
- Installed generally useful tools
- Know the root passwd

- Cleanly reboots

Any other house keeping you don’t want to do after every subsequent Deploy?
Activation Engine

 `/opt/ibm/powervc/activation-engine/vmc.vsae.tar`

~10MB

- **Install**
  - `tar xvf vmc.vsae.tar`
  - AIX: `export JAVA_HOME=/usr/java5/jre ; ./aix-install.sh`
  - Linux: See manual then run `./linux-install.sh`

- **Prepare**
  - Check Redbook/ Manual for extra Linux prepare steps
  - `rm /opt/ibm/ae/AP/*`
  - `cp /opt/ibm/ae/AS/vmc-network-restore/resetenv /opt/ibm/ae/AP.ovf-env.xml`

- **Do**
  - `/opt/ibm/ae/AE.sh -R`

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Systems Director and PowerVC!!
Lots of SM features: central error alerting, automated reactions & correction, Inventory, HMC update, Firmware update, AIX update, WPAR manager, Active Energy, remote login, DSH & more → not in PowerVC
FAQ – Nigel’s Opinions

1. Can I run PowerVC on AIX?
   - No and no plans. That would cost serious money to port/support, would you pay say 100’s of Dollars more per core for AIX option?

2. Can one PowerVC do both HMC & IVM? Not currently.

3. When is the next release? When will SSP be supported? What is in the next release? When will my “xxxxxxxx” disks be supported?
   - I expect more than one release a year.

4. Can I add other OpenStack modules to PowerVC? No

5. PowerVC High Availability?
   - PowerVC dynamically gets status info, so low private data
   - Simple backup command takes a few minutes
   - You can have warm PowerVC’s ready for backup restore
   - You can fail back to IVM/HMC/VIOS etc

6. User control
   - LDAP or Linux user groups: admin / deployer / viewer

7. SmartCloud products like SCE?
   - SCE3.2 can now control ISD+VMControl - - or - - PowerVC