Session: PowerVS Series - Introduction

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Thanks to:
    IBM Power Team
    IBM Hybrid Cloud Team

Power Systems

#include <std_disclaimer.h>
    These notes have been prepared by an Australian, so
        beware of unusual spelling and pronunciation.
    All comments regarding futures are probably nothing
        more than the imagination of the speaker and are
        IBM Confidential till after GA.

Agenda

- Introduction to PowerVS (part 1)
  - Hardware and options
    - Hardware and resources
    - Storage
    - Operating systems
    - Networks
  - Use cases
    - Move to Power applications to Cloud
    - Testing
    - HA or DR
  - Create an AIX instance
    - IBM Images
    - Use your captured OVA
    - Use NIM

- IBM Power Virtual Server (PowerVS)
  - A Power Systems Infrastructure as a service offering on IBM Cloud, providing us a way to purchase AIX, IBM i or Linux Power LPARS as a service.
  - Simple to provision CPU, memory, storage and networking through the IBM catalogue. IBM manages up to the OS deployment and we manage the OS and up. IBM's full catalogue of Cloud Services is available to build out a secure and scalable hybrid multi-cloud infrastructure.
  - Consumption based pricing plans.
  - Server options currently consist of scale-out (S922) or scale-up (E880 or E980) running PowerVM. We can currently select:
    - 0.25 to 15 cores on S922 or 0.25 to 153 cores on E880/980 in 0.25 increments.
    - If you choose more than 64 GB per core, the number of GB > 64 is charged at a higher price. Typically a maximum of about 940GB available for S922 instances.
    - 10GB up to 2TB (max per disk) in 10GB increments on Tier 1 (NVMe) or Tier 3 (SSD)
    - AIX, IBM i and SLES images from the IBM Catalogue, or you can import your own image.
    - Public facing network, or private network (easy to configure security, eg VPN / Jump server if required)

For latest updates, see the release notes: https://cloud.ibm.com/docs/power-iaas

Introduction to PowerVS (cont)

- IBM Power Systems Virtual Server enables provisioning of Power Virtual Server LPARs (VMs) in the following multi-zone regions:

| Region	S922	E880	E980
US-East (WDC04)	✓	✓	
US-South (DAL13 and DAL12)	✓	✓	
Germany-Frankfurt (FRA04 and FRA05)	✓		✓
UK-London (LON06 and LON04)	✓		✓
Canada-Toronto (TOR01)	✓		✓
Australia-Sydney (SYD04)	✓		✓
Coming soon.....*			
Canada-Montreal (MON01)	✓		✓
Japan-Tokyo and Osaka (TOK04, OSA02)	✓		✓
Brazil-Sao Paulo (SAO01, SAO04)	✓		✓
Australia-Sydney (SYD05)	✓		✓

If you have need for PowerVS in your geography for regulatory reasons, let me know and we can try to build a case

PowerVS examples

- Use cases
  - Test AIX and IBM i in the Public Cloud
    - A separate but secure sandbox environment for Power Systems users to test their own AIX, IBM i and Linux workloads.
    - Try out new OS, Application or hardware versions.
    - Test migration, upgrade and recovery procedures
  - Run enterprise Power workloads in the Cloud
    - AIX, IBM i and Linux on Power applications are no longer restricted to on on-premise. We can build out a hybrid cloud environment with the ability to host our Power applications in the Public Cloud. A flexible test/dev environment.
  - High Availability and/or Disaster Recovery with control of resources.
    - Currently, Power Clients need to build out their own data centre to ensure DR. Now, with the Cloud, they get those options at a more reasonable cost based on actual utilisation.

Initial steps

- Getting started
  Before you create your first Power Systems Virtual Server instance, you will need to check the following:
  - Log into the IBM Cloud
    https://cloud.ibm.com/login
  - If you don't already have an account, you will need to create one. You can select the icon on the top right to change your profile and security settings.
  - You will need a public and private SSH key to access your instances (we will upload our public key before creating our first instance).
  - If you want to use a custom image (AIX, IBM i or Linux), you will need to create an IBM Cloud Object Store (COS) and upload it there.
  - As well as a public address, you can also use a private network for communications between LPARs, so decide what range you will use. (Note: you no longer need to contact support once you have defined it).
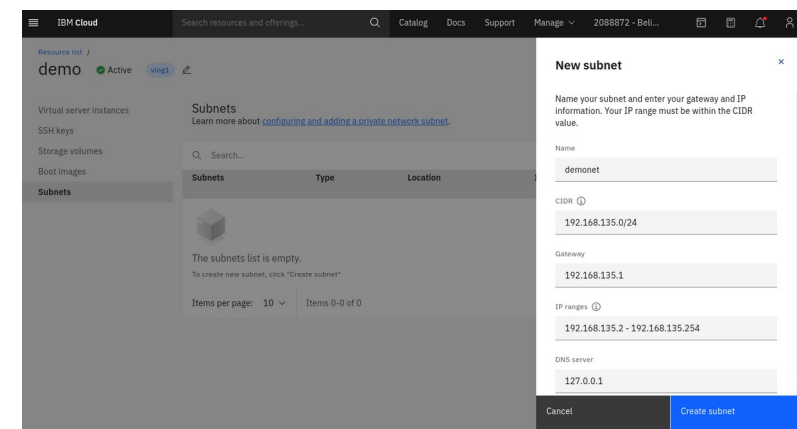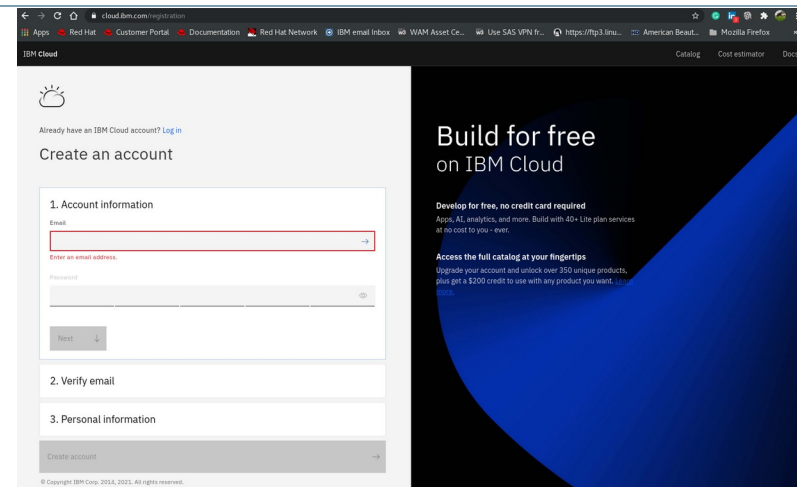
How to create an instance

- To create an instance on Power
  - Log in to the IBM Cloud and select "Catalog" menu on the top bar.
  - In the search box start typing "Power S" and Power Systems Virtual Server will come up.
  - Choose the location of your service (and details of the pricing options at thet location will be displayed).
  - Enter a name for your service and any useful search tags.
  - Press "Create".
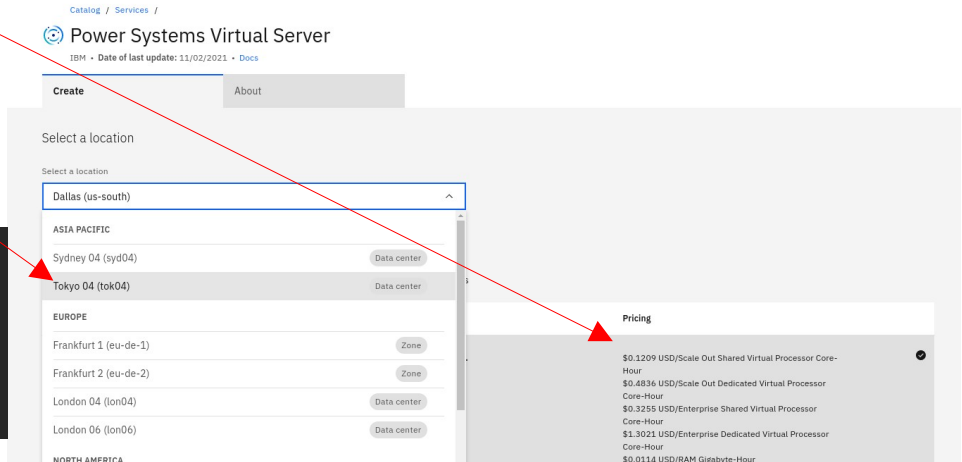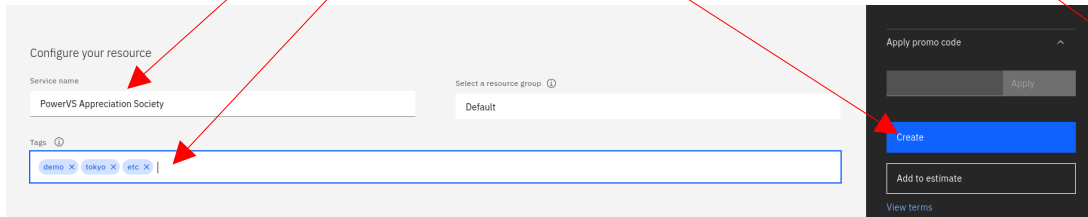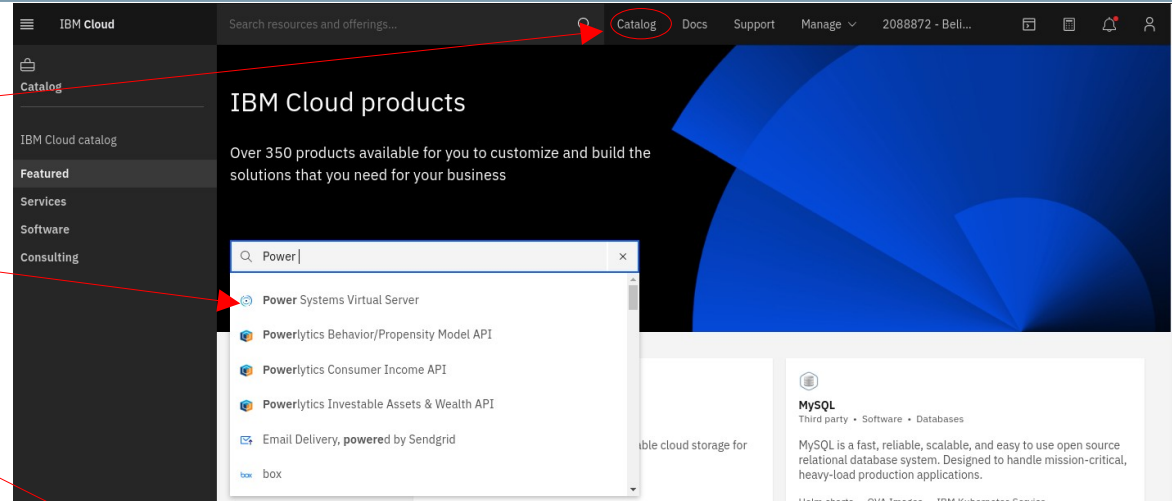
How to create an instance (cont)

- To create an instance on Power (cont)
  - You will now see your "Resources List"
  - Under "Services", you will find your newly created Power Systems Virtual Server.
    It will probably show status "Provisioning in Progress"
  - When it is active select it.

- Documentation
  - General
  - PowerVS Specific

How to create an instance (cont)

- To create an instance on Power (cont)
  - Before create an instance, we will need to create an ssh key (if we don't already have one).
    Give your key a useful name and paste in the public key
  - When you create an instance, you will be able to add an address on a the public network, but if you need a private network for communication between LPARs, you will need to create your private network now.
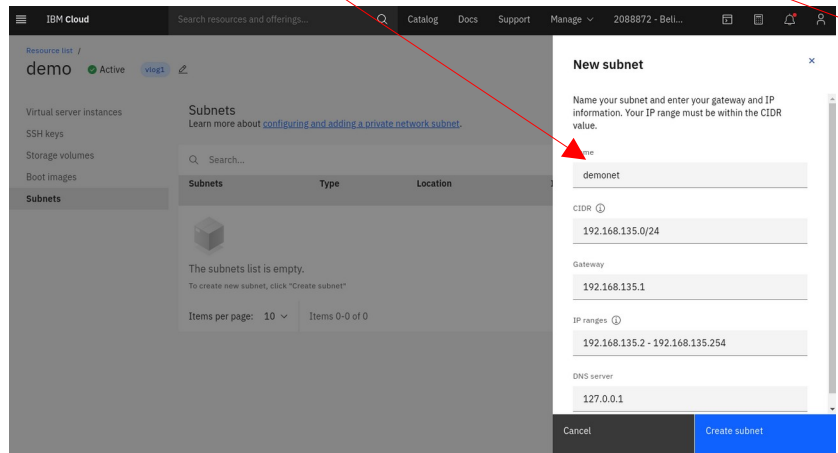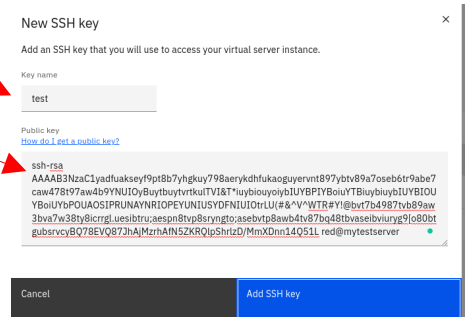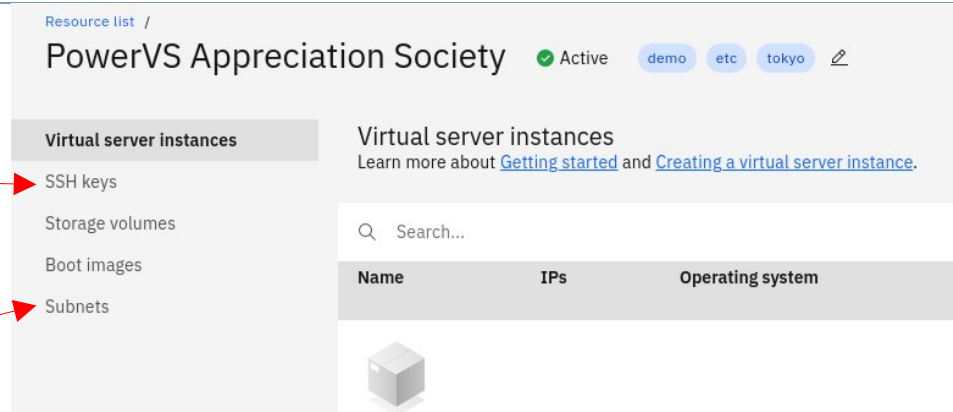
How to create an instance (cont)

- To create an instance on Power (cont)
  - Select "Create Instance"
  - Chose a name for your instance and the number of instances to create. If you choose more than one, you can then specify prefix/suffix and collocation rules (no preference, same or different server)
  - Chose your pinning option (Off; soft - move back to original host after a failure; hard - if you have licensing restrictions.
  - Select your ssh key that was created earlier.

How to create an instance (cont)

- To create an instance on Power (cont)
  - Select the OS for your boot image
    For this example we will choose AIX
    Note: Adding a license will add to the service cost.
  - Select the version
  - (If you have captured/imported images, you may see more options)
  - Select the tier of storage
    - Tier 1 NVMe
    - Tier 3 SSD
    Currently cannot mix storage tiers
  - Choose the Machine type (E model options will depend on Data Centre).
    For this session we will choose s922

Boot image

Select from AIX, IBM i, or Linux boot images. If you are deploying a Linux virtual machine (VM), you must first purchase a subscription, then register it and register with your Linux vendor after deployment. Learn more about purchasing and subscribing to Linux

Operating system

Select the OS

AIX
IBM i
Linux - Client supplied subscription
SLES for SAP (HANA) - Client supplied subscription
SLES for SAP (NetWeaver) - Client supplied subscription

Choose your machine type, processor, memory and cores.

Operating system
AIX

Image
Select an image
7100-05-05
7100-05-07
7200-04-01
7200-05-01

Profile

Select an image
7100-05-05
7100-05-07
7200-04-01
7200-05-01
PowerHA_725_AIX_7.2.5.1
aix-72
aix72_full_210211
ha723_aix_full

Machine type
Choose a type
e980
s922

Operating system
AIX

Image
7200-05-0

Tier ⓘ
Tier 1
Tier 1
Tier 3

How to create an instance (cont)

- To create an instance on Power (cont)
  - Note, if you select the scale-out option, you will be limited to 15 cores and about 940GB memory
  - Select the Processor mode
    - Dedicated – CPU allocated to this LPAR
    - Uncapped shared – CPU can be shared amongst other clients
    - Capped shared – CPU shared but doesn't expand beyond what is requested (eg for licensing purposes)
  - Select CPU in increments of 0.25 There is a core to vCPU ratio of 1:1. For shared processors, fractional cores round up to the nearest whole number. For example, 1.25 cores equals 2 vCPUs.
  - Select memory (1GB increments).
  - s922 resources

Processor

◉ Dedicated ◯ Shared uncapped ◯ Shared capped

Alert! Due to limited capacity on s922, the maximum availability for cores and memory is limited. Typically, max capacity is 15 cores and 942 GB memory.

Cores (Entitled CPUs)	Memory (GB)
1	2

Machine type

s922

Processor

◯ Dedicated ◉ Shared uncapped ◯ Shared capped

Alert! Due to limited capacity on s922, the maximum availability for cores and memory is limited. Typically, max capacity is 15 cores and 942 GB memory.

Cores (Entitled CPUs)	Memory (GB)
0.25	4

- To create an instance on Power (cont)
  - Create extra storage volumes if required (the OS LUN/VG is defined when you select your OS)
  - Select a name for the Volume
  - If it is shareable with other LPARs
  - Size (in 10GB increments)
  - Number of volumes to create
  - (The Tier will be the same as that chosen for the OS)

Storage volumes

Attached storage volumes   Create volume   +

Name	Size	Tier	Shareable	Quantity

No volumes attached

Existing volumes can only be attached after
provisioning. To create a new volume, click Create
volume.
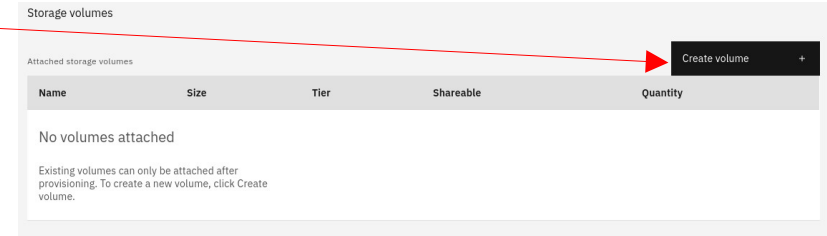
Create volume   ✕

Create and attach new storage volumes; already existing volumes
can only be attached after the instance is provisioned. Learn more
about minimum requirements for SAP workloads.

Name

Shareable

⬤ On

Size (10GB-2TB)   Quantity ⓘ

10 GB   ⌄   1   ⇕

Tier

Tier 3   ⌄

How to create an instance (cont)

- To create an instance on Power (cont)
  - Select networking options, slide if you want connection to the public network (off by default)
  - Add a connection to previously created private network if required
  - Select your network
  - Define IP if you want

Public network allows:
- SSH
- HTTPS
- Ping
- Port 922 for IBM i 5250 terminal emulation with SSL

How to create an instance (cont)

- To create an instance on Power (cont)
  - Review the configuration, price and tick you agree to the terms and conditions.
  - Create the instance(s)

How to create an instance (cont)

- To create an instance on Power (cont)
  - After a few minutes the build will have finished, then after a little while longer rmc will have settled down and the status will go from "Warning" to "Active"
  - Click on testbuild to view details
  - Use the External IP for access

Name	IPs		Operating system	CPUs	RAM	Status
testbuild	192.168.135.119, 192.168.186.125		aix	0.25 cores	4 GB	✓ Active

Items per page: 10 ∨   Items 1-1 of 1   1 of 1 ◄ ►

testbuild ✓ Active

Server details   Edit details ✎

Name	testbuild	Processor type	Uncapped shared processor
ID	a197b6bd-87e0-46ef-bd0c-ba4fd3da1ab6	Size	0.25 cores | 4 GB
IPs	192.168.186.125	Boot image	7200-05-01
	192.168.135.119	Pin virtual server	Off
Date created	19 February 2021, 17:11:05	Pin type	None
Machine type	s922		

System Reference Code

SRC	Timestamp
00000000	2021-02-19T09:19:15Z

Attached volumes

Manage existing   Create volume +

	Name	Size	Tier	Shareable	Bootable	
☐	testbuild-a197b6bd-00002408-boot-0	20 GB	Tier 3	⚪	🟢	Detach
☐	datavg	30 GB	Tier 3	🟢	⚪	Detach

Network interfaces

Public networks 🟢

Name	IP address	External IP	Gateway	MAC address	VLAN ID	CIDR
public-192_168_186_120-29-VLAN_2011	192.168.186.125	128.168.100.125	192.168.186.121	fa:4a:d9:7d:1d:20	2011	192.168.186.120/29

Private networks   Attach existing network +

Name	IP address	Gateway	MAC address	VLAN ID	CIDR	
demonet	192.168.135.119	192.168.135.1	fa:4a:d9:7d:1d:21	302	192.168.135.0/24	🗑

How to create an instance (cont)

- To create an instance on Power (cont)
  - Confirm External IP reachable
  - Log on using External IP no password for root as we configured the key earlier


```
red@vali:~                                   _  □  ✕

File   Edit   View   Search   Terminal   Help

vali:/home/red: ping 128.168.100.125
PING 128.168.100.125 (128.168.100.125) 56(84) bytes of data.
64 bytes from 128.168.100.125: icmp_seq=1 ttl=237 time=82.1 ms
64 bytes from 128.168.100.125: icmp_seq=2 ttl=237 time=81.3 ms
^C
--- 128.168.100.125 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 2ms
rtt min/avg/max/mdev = 81.328/81.714/82.101/0.480 ms
vali:/home/red: ssh root@128.168.100.125
15 unsuccessful login attempts since last login.
Last unsuccessful login: Fri Feb 19 04:06:59 CST 2021 on ssh from 116.96.77.141
Last login: Fri Feb 19 03:23:17 CST 2021 on /dev/pts/0 from 118.200.50.172
*******************************************************************************
*                                                                             *
*                                                                             *
*   Welcome to AIX Version 7.2!                                               *
*                                                                             *
*                                                                             *
*   Please see the README file in /usr/lpp/bos for information pertinent to   *
*   this release of the AIX Operating System.                                 *
*                                                                             *
*                                                                             *
*******************************************************************************
#
```

How to create an instance (cont)

- To create an instance on Power (cont)
  - Confirm environment
    - Images directory
    - Network
      Public
      Private
      rmc
    - rootvg and data
      LUNs
    - oslevel

```
                                              red@vali:~                                    _  □  ✕

File  Edit  View  Search  Terminal  Help
# df
Filesystem     512-blocks       Free %Used    Iused %Iused Mounted on
/dev/hd4           196608      94976   52%     2910    22% /
/dev/hd2          4784128     558808   89%    37922    37% /usr
/dev/hd9var        393216     322152   19%      967     3% /var
/dev/hd3           458752     453432    2%       34     1% /tmp
/dev/hd1            65536      64792    2%        7     1% /home
/dev/hd11admin     262144     261384    1%        5     1% /admin
/proc                   -          -    -        -     - /proc
/dev/hd10opt       786432      85080   90%    11473    53% /opt
/dev/livedump      524288     523552    1%        4     1% /var/adm/ras/livedump
/dev/repo00      15794176      80424  100%     2130    19% /usr/sys/inst.images
/ahafs                  -          -    -       35     1% /aha
# ifconfig -a
en0: flags=1e084863,814c0<UP,BROADCAST,NOTRAILERS,RUNNING,SIMPLEX,MULTICAST,GROUPRT,64BIT,CHECKSUM_OFFLOAD(ACTIVE),LARGESEND,CHAIN>
        inet 192.168.186.125 netmask 0xfffffff8 broadcast 192.168.186.127
         tcp_sendspace 262144 tcp_recvspace 262144 rfc1323 1
en1: flags=1e084863,814c0<UP,BROADCAST,NOTRAILERS,RUNNING,SIMPLEX,MULTICAST,GROUPRT,64BIT,CHECKSUM_OFFLOAD(ACTIVE),LARGESEND,CHAIN>
        inet 192.168.135.119 netmask 0xffffff00 broadcast 192.168.135.255
         tcp_sendspace 262144 tcp_recvspace 262144 rfc1323 1
en2: flags=1e084863,814c0<UP,BROADCAST,NOTRAILERS,RUNNING,SIMPLEX,MULTICAST,GROUPRT,64BIT,CHECKSUM_OFFLOAD(ACTIVE),LARGESEND,CHAIN>
        inet6 fe80::4864:24ff:fe5e:1d48/64
         tcp_sendspace 262144 tcp_recvspace 262144 rfc1323 1
sit0: flags=8100041<UP,RUNNING,LINK0>
        inet6 ::/96
lo0: flags=e08084b,c0<UP,BROADCAST,LOOPBACK,RUNNING,SIMPLEX,MULTICAST,GROUPRT,64BIT,LARGESEND,CHAIN>
        inet 127.0.0.1 netmask 0xff000000 broadcast 127.255.255.255
        inet6 ::1%1/128
         tcp_sendspace 131072 tcp_recvspace 131072 rfc1323 1
# lspv
hdisk0          none                            None
hdisk1          00fa00d6b552f41b                rootvg          active
# oslevel -s
7200-05-01-2038
#
```

Current Systems / Regions

Geography	Location *	Region	IBM Power infrastructure zone	Colocated IBM Cloud Classic infrastructure data center	Colocated IBM Cloud VPC infrastructure zone
America	Dallas, USA	us-south	DAL12 us-south	DAL12 DAL13	us-south-2 us-south-3
America	Washington DC, USA	us-east	us-east	WDC04	us-east-1
America	São Paulo, Brazil	br-sao	SAO01	SAO01	br-sao-1
America	Toronto, Canada	ca-tor	TOR01	TOR01	ca-tor-1
Europe	Frankfurt, Germany	eu-de	eu-de-1 eu-de-2	FRA04 FRA05	eu-de-2 eu-de-3
Europe	London, UK	eu-gb	LON04 LON06	LON04 LON06	eu-gb-1 eu-gb-3
Asia Pacific	Sydney, Australia	au-syd	SYD04	SYD04	au-syd-2
Asia Pacific	Tokyo, Japan	jp-tok	TOK04	TOK04	jp-tok-2

*If you have need for PowerVS in your geography for regulatory reasons, let me know and we can try to build a case

Simplified logical topology

Belisama

IBM Cloud Portal

PowerVS Service Layer

Control

Data

Customer

Ingress virtual routers / firewalls (Juniper vSRX)

Data Centre

IBM Cloud Backend (Metering, Billing, etc)

PowerVS Backend

PowerVC

VIO LPAR LPAR FSP

VIO LPAR FSP

Storage Controller

V7k

Additional resource and and data from customer account

IBM Softlayer

······· Internal Management

- - - - - External tenant traffic

——— Tenant virtual

Backup and restore options

- Built in support
  - UI/CLI/REST interfaces to capture/deploy VMs
    - capture running VM image and push to COS
    - rootvg, rootvg + some or all data disks
    - These snapshots can be used as fast point in time backups and fast restores
- Customer installed
  - Spectrum Protect for AIX (TSM):
    - Granular backup/restore capability (file, file system)
  - NIM for AIX
  - Veeam for AIX
  - BRMS for IBM i

- Options
  - OS based data mirroring
    - PowerHA SystemMirror for AIX EE with Geographic Logical Volume Manager (GLVM)
    - PowerHA SystemMirror for IBM I EE with GeoMirroring
  - Database replication
    - AIX
    - Oracle Dataguard
    - Oracle Goldengate
    - DB2 HADR
    - EPIC: Cache Replication
  - Logical Replication
    - IBM i
    - RobotHA
    - iCluster
    - Maxava
    - MIMIX

LPAR 1		LPAR 2
AIX	→ GLVM	AIX
	PowerHA cluster	
LPAR 1		LPAR 2
i for Business	→ GeoMirroring	i for Business
	PowerHA cluster	
On premise or IBM Cloud		IBM Cloud
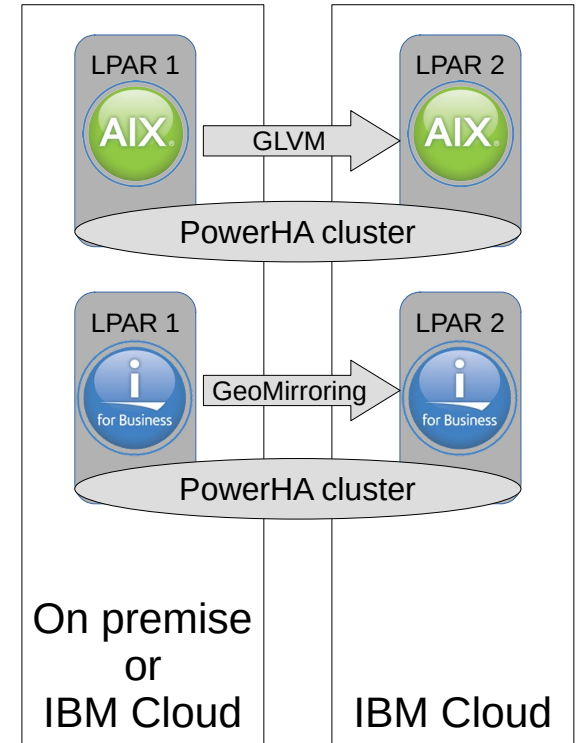
- Many IBM Partners and Lab Services can provide services around PowerVS
  - If you are looking at using Power in the Cloud or Power with consumption based pricing. A flexible pricing model using the reliability and security of Power.
  - Services can provide you with a strong design / build as your base.
  - Services available to assist you migrate Power workloads to PowerVS.
- Examples
  - Plan, demonstrate and test configurations
  - Plan, test and perform migrations of AIX, IBM i and Linux workloads to the Cloud
  - Plan and implement HA and DR strategies.
  - Demonstration management and monitoring of a hybrid cloud environment.

- References
  - Seismic Sales kit

    https://ibm.seismic.com/x5/doccenter.aspx?ContentId=dec429ec-2fa1-4a62-b71e-7c193979a843#/doccenter/53d171c3-dbd7-410a-a248-cd7f3c98eece/doc/%252Fdd403f39f8-c61b-9561-2093-d4ce35c97b83%252Fdddc22aa0b-4d78-03bf-e2ac-a232cd213893%252FdfNTY4NmVhOWItY2RkNS04ZWY3LTZkNzItZTQwZjczMWUyMjk1%252CPT0%253D%252CUHVibGljIENsb3VkIFBsYXRmb3Jt%252Flf81178f1b-9bcd-4247-b82a-f26d2bb11b16/grid/?anchorId=fa555524-4e07-401d-acf8-53a56d1640f9

  - Seismic revamp

    http://ibm.biz/sell-power

  - Publisher E2E Sales Page

    http://ibm.biz/e2e-power

  - IBM Hybrid multi-cloud white paper:

    https://www.ibm.com/downloads/cas/G4DO3DJE

  - Introduction

    https://cloud.ibm.com/docs/power-iaas?topic=power-iaas-getting-started

  - Pricing

    https://cloud.ibm.com/catalog/services/power-systems-virtual-server

Session: Introduction to Power Virtual Servers

¿ Questions ?

Thanks!

Your feedback about this session is very important to us.

For further information….
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Power
Systems

Backup Slides