

Power Virtual User Group: 112

PowerVS simple Starter Pack for AIX including the new AIX 7.3

With a small njmon project update



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<https://www.linkedin.com/in/nigelargriffiths/>

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How low can we go?

PowerVS Pricewise!

A tiny virtual machine
for AIX is less than a
fancy coffee per day!

Per day

8 hours

£2

67p

\$3

\$1

€3

€1

[24 hours]

If you use AIX for 8 hours & then
delete the VM, it is 1/3 that price!

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What is PowerVS?

Where is PowerVS?

HowTo PowerVS?

Why PowerVS?

Projects . . .

3

What is PowerVS?

Where is PowerVS?

HowTo PowerVS?

Why PowerVS?

Projects . . .

PowerVS like:

your Power computers in your computer room
but at an IBM Cloud Data Centre.

You the rent

CPU, RAM, storage & networks by the hour

IBM manages up to OS deployment and you
or your client self-manages the OS and up

Briefly,

- POWER9 S922 & E980s
- CPU cores 0.25 to 143
- RAM 1GB to 100's GB
- Storage 10 GB to many TB
- Network Public Internet or Private VLAN
- Running AIX, IBM i, or Linux

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What is PowerVS?

Where is PowerVS?

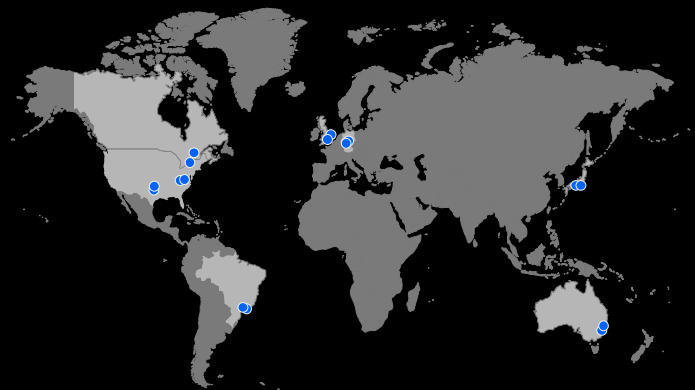
HowTo PowerVS?

Why PowerVS?

Projects . . .

14 Data Centers

7 Countries



In 2021

4 New Data Centers

2 Data Center Expansions

4 Geographies

5

What is PowerVS?

Where is PowerVS?

HowTo PowerVS?

Why PowerVS?

Projects . . .

Easy

Go to cloud.ibm.com & find
Power Systems Virtual Server

We will come back to this later .

. .

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What is PowerVS?

Where is PowerVS?

HowTo PowerVS?

Why PowerVS?

Projects . . .

Who better to run
Power Systems in the Cloud
than IBM?

To be blunt some other Cloud
vendors claim Power based
computers but they are all
“embarrassingly amateur”
- IMHO

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Can't find PowerVS?

What is PowerVS?

Where is PowerVS?

HowTo PowerVS?

Why PowerVS?

Projects . . .

My initial reason = AIX access problem

- No AIX at work? Or a student
- No access to AIX at work?
- Power servers are expensive!
- AIX licensed & updates not public
- ISV wanting to develop & test on different AIX versions
- Solution developers check the desired application combination works well
- System Tests / benchmarks

All of these want temporary access to
Power hardware running AIX

PowerVS = excellent solution

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Can't find PowerVS?

What is PowerVS?

Where is PowerVS?

HowTo PowerVS?

Why PowerVS?

Projects . . .

What you can't do on PowerVS!

Warning:
The next three
slides might be
psychologically
damaging!

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Can't find PowerVS?

What is PowerVS?

Where is PowerVS?

HowTo PowerVS?

Why PowerVS?

Projects . . .

What you can't do on PowerVS!

No access to physical server
- A shock for me after 30 years!

Some features available via
- PowerVS GUI or API
- Set/change the VM size
→ CPU, RAM, disks, net
→ add new disks & networks
→ access to other services

Feels limiting but then feels GOOD

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Can't find PowerVS?

What is PowerVS?

Where is PowerVS?

HowTo PowerVS?

Why PowerVS?

Projects . . .

What you can't do on PowerVS!

Can't worry about:

Electrical power supply, aircon,
physical security, system
firmware, adapter firmware,
upgrading HW, VIOS set-up or
management, virtual networks
& disks, tuning the VIOS, HMC
set-up or management,
skills/training, shift work, HW
error reporting, Remote
Restart, network or storage
physical infrastructure ...

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Can't find PowerVS?

What is PowerVS?

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Why PowerVS?

Projects . . .

What you can't do on PowerVS!

Not available in no particular order:

- Can't decide VM placement
- AIX Active Memory Expansion
- Live Partition Mobility
- Shared Processor Pools
- Shared Storage Pools
- LPAR Processor modes
(it uses the default mode)
- Huge Page Memory
- Physical adapters
(all VMs are Pure Virtual)
- Physical DVD or virtual optical
(use Cloud Object Storage)

Some of these could be available in the future, so ask!

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PowerVS

- High tech, powerful, function rich service but tricky for 1st time user
- Like a JCB excavator: house foundation, swimming pool, sky scraper
- Overkill to plant a rose tree

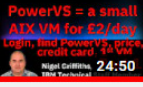
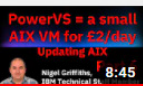


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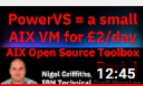
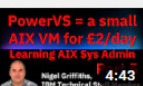
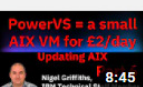
Answer:
PowerVS for
a tiny AIX VM
- to keep the
costs down

How
to get
started?

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	PowerVS: AIX for £2/day - 1 Starter Pack Nigel Griffiths	YouTube Playlist ibm.biz/AIXonPowerVVideos ~90 minutes in total Also find it in my ^{Advert} YouTube Channel of 200+ Techie videos
	PowerVS: AIX for £2/day - 2 Create VM & Networking Nigel Griffiths	
	PowerVS: AIX for £2/day - 3 Hands-on with Disks Nigel Griffiths	
	PowerVS: AIX for £2/day - 4 AIX Open Source Tools Nigel Griffiths	
	PowerVS: AIX for £2/day - 5 Learning AIX SysAdmin Nigel Griffiths	
	PowerVS: AIX for £2/day - 6 Updating AIX Nigel Griffiths	

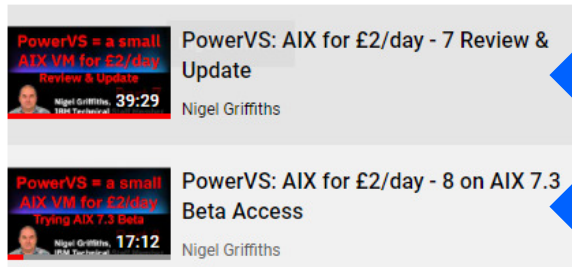
15

	PowerVS: AIX for £2/day - 1 Starter Pack Nigel Griffiths	Intro via slideware
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	PowerVS: AIX for £2/day - 5 Learning AIX SysAdmin Nigel Griffiths	Learn AIX SysAdmin
	PowerVS: AIX for £2/day - 6 Updating AIX Nigel Griffiths	Updating AIX → suma

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Basis for todays talk
Total views 3,600
and counting

Two more
7) Review & Update
8) AIX 7.3



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Lets get
practical

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PowerVS

Bluntness Warning

IBM wants you to have 100's of large Virtual Machines
- spend lots of €\$£

Power Servers are seriously fast scalable computers
- IBM Cloud website is built to handle this

Not so good for your 1st tiny AIX VM for testing and skills development → hence my videos

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PowerVS – Six Mini Hurdles

- 1 Create an **Account** on IBM Cloud
- 2 Finding **PowerVS** → “Catalog” + Search: “Power Systems Virtual Server”
- 3 **Pricing** a small AIX Virtual Machine
- 4 Add your **Credit Card** details
- 5 Create a “**Resource**” (Project)
 - Create a small **AIX Virtual Machine** → easy
 - Access your **AIX Virtual Machine** → easy
 - Delete* your **AIX Virtual Machine** → easy
- 6 Re-finding the **Virtual Machine dashboard**



Resource list

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Cost Estimator

- Washington DC
- S922
- Shared (CPU)
- AIX (inc. license)
- Cores 0.25
- RAM 4 GB
- Tier3 disk (SSD)
- Boot disk ++

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Cost Estimator

- Washington DC
- S922
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- Boot disk ++

Create virtual machine = the same question plus:

- Number of instances (VMs)
- Add an optional ssh key
- AIX OK but which AIX version or disk image?
- Public Internet - or - VPN to your computer room
- Agree “Terms & Conditions” tick box

Click: CREATE

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On the IBM Cloud website click: Open Console

→ AIX prompt

→ Login no passwd

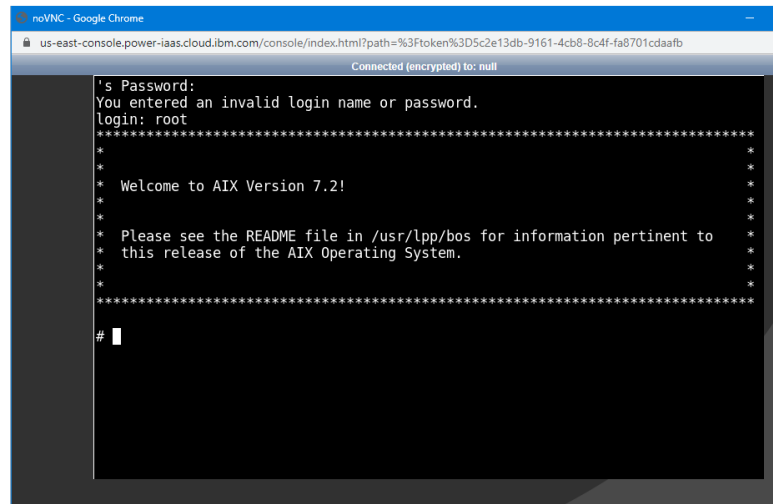
So

→ Add root passwd

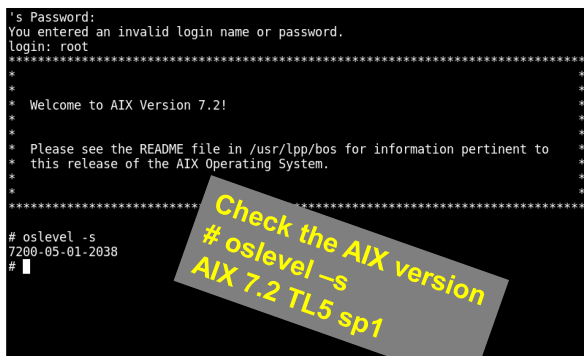
Only then can you
ssh via the Internet

Find IP address on the
IBM Cloud GUI then
ssh directly into the VM

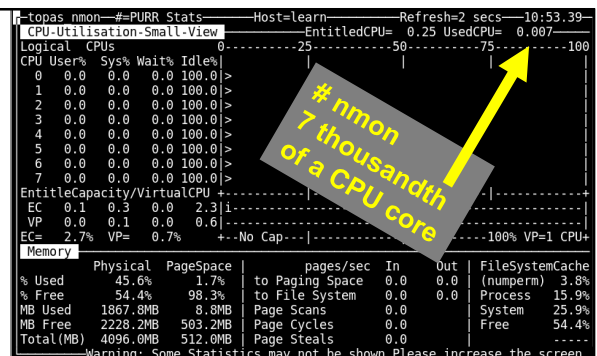
1st two videos



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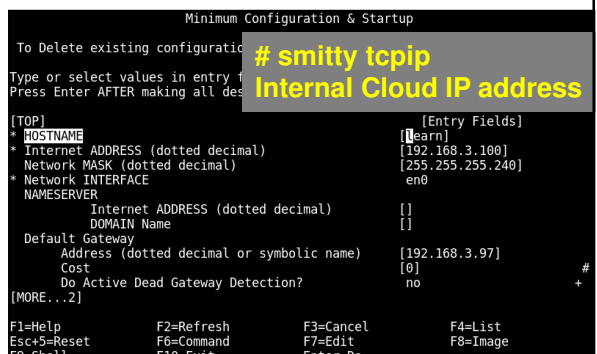
Check the AIX version
oslevel -s
AIX 7.2 TL5 sp1



nmon
7 thousandth
of a CPU core

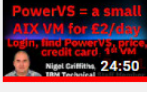
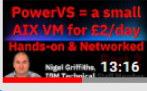
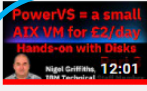
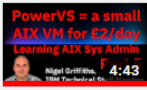
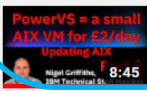


AIX Open Source Toolbox
Yum to install them in seconds
- Pulls in all the pre-reqs



smitty tcpip
Internal Cloud IP address

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	PowerVS: AIX for £2/day - 6 Updating AIX Nigel Griffiths	Updating AIX → suma

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Part 2	PowerVS with AIX 7.3
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PowerVS with AIX 7.3

AIX 7.3 arrives in Dec 2021

- Beta version was available on PowerVS
- GA version is now available on PowerVS

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PowerVS with AIX 7.3

Uses the same process to migrate your own on-prem AIX rootvg disk(s) to PowerVS

1. Capture the boot disk (rootvg)
2. Upload it to Cloud Object Storage (COS)
3. Copy from COS to PowerVS “Resource” Project
4. Create a normal VM but use this new boot disk

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PowerVS with AIX 7.3

In this case, the AIX 7.3 developers have captured an AIX 7.3 boot disk, create an ova and uploaded it to PowerVS Cloud Object Storage

Well done AIX team = the hard bit is done

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PowerVS with AIX 7.3

1. Capture the boot disk (rootvg) = **DONE**
2. Upload it to Cloud Object Storage (COS) = **DONE**
3. Copy from COS to PowerVS “Resource” Project
4. Create a normal VM but use this new boot disk
5. Console login to set root password = BAU
6. Remote ssh login = BAU
7. Explore AIX 7.3 Beta . . . = BAU

BAU = Business as Usual

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Assumptions

- Already using PowerVS
- Hands-on experience of a small AIX VM
- Watch my videos & had ago

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PowerVS – BEFORE you start

Register to get the PowerVS boot image details:

https://ibm.biz/AIX73_OpenBeta_Registration

Fill in:

Name, company, country, email address

Role (Client, ISV, BPer, IBMer, other)

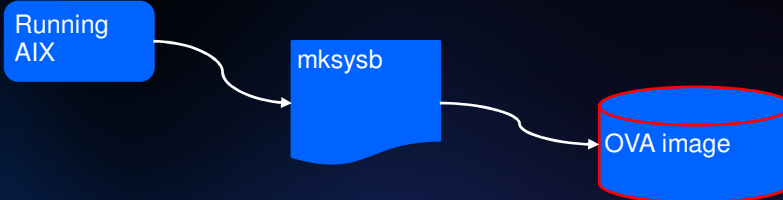
What you want to test?

IBM Power Virtual Servers? Answer=YES

AIX 7.3

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PowerVS – Upload Your own Boot Image



For Reference

Upload Manual Page might be helpful:

<https://cloud.ibm.com/docs/power-iaas?topic=power-iaas-deploy-custom-image#upload-custom-boot>

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PowerVS – Clone COS Boot image

AIX 7.3 Boot Image Details – will be sent to you

Region: **us-east**

Image filename: **AIX730-OpenBeta.ova.gz**

Bucket Name: **aix730-beta**

HMAC access key:

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

HMAC secret key:

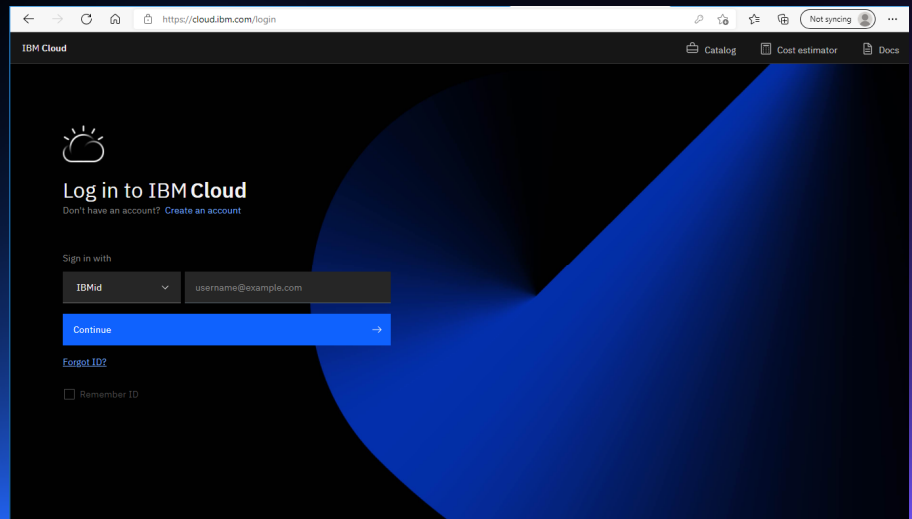
XX

HMAC = Hash-based Message Authentication Code

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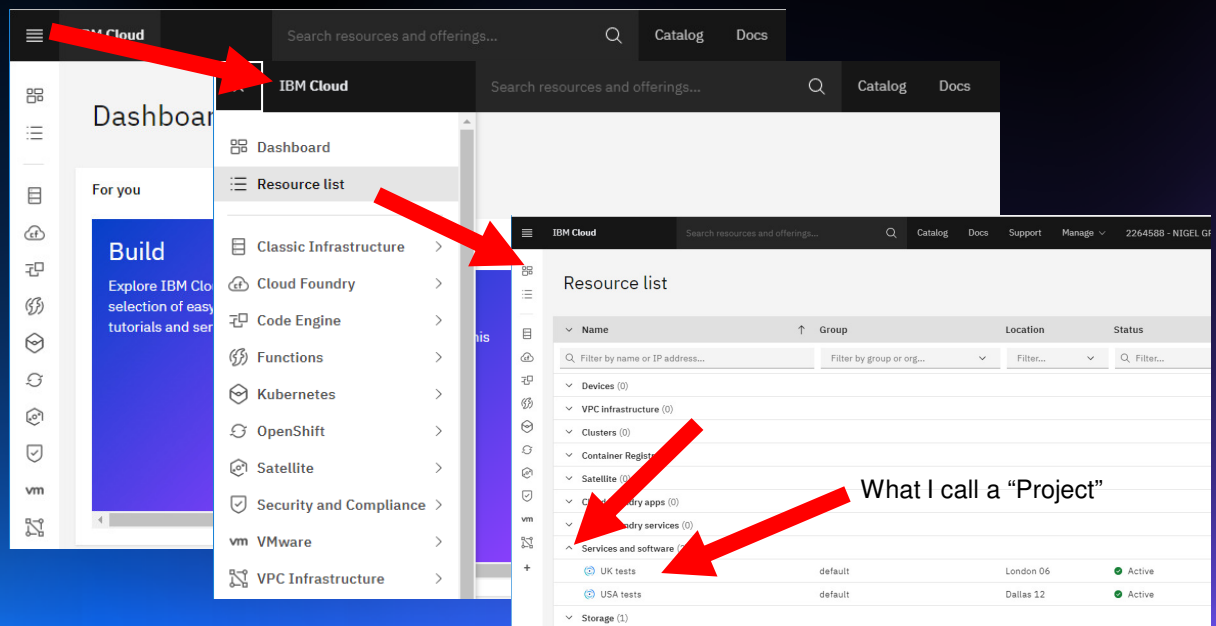
PowerVS <https://cloud.ibm.com/login>

Hands-on



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Find your PowerVS resources



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Find your Boot Images

UK tests Active [Add tags](#)

Virtual server instances

SSH keys

Storage volumes

Virtual tape libraries

Boot images

Subnets

Cloud connections

Additional services catalog

Virtual server instances

Learn more about [getting started](#) and [creating a virtual server instance](#).

Create instance +

Name	IPs	Operating system	Cores	Memory	Status
Basic-AIX-7251	192.168.139.171	aix	0.25 cores	2 GiB	Warning

Items per page: 10 Items 1-1 of 1

1 of 1

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Import the AIX 7.3 beta image

UK tests Active [Add tags](#)

Virtual server instances

SSH keys

Storage volumes

Virtual tape libraries

Boot images

Subnets

Cloud connections

Additional services catalog

Boot images

Learn more about [how to import a boot image](#).

Import image +

Name	OS	Size	Tier	Status
7200-05-01	AIX	20 GB	Tier 3 (3 IOPs / GB)	Active
AIX730	AIX	25 GB	Tier 3 (3 IOPs / GB)	Active
Linux-CentOS-8-3	RHEL	250 GB	Tier 3 (3 IOPs / GB)	Active

Items per page: 10 1-3 of 3 items

1 of 1 page

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Import

Import boot image

Limited actions available during import
Once requested, an image import must be completed before a VM capture, image export, or additional image import can be requested

Destination details

Custom image name: Tier: Tier 3 (3 IOPs / GB)

Enter name to be displayed during VM provisioning

Source details
Specify the import location from Cloud Object Storage (COS) below. Image import requires HMAC credentials created as part of your COS service credential. [Learn more](#)

Region: Image filename:
.ova, .ova.gz, .tar, .tar.gz, .tgz, .ova.tgz are supported

Bucket name: HMAC access key:
E.g. bucket-name[/optional/folder]

HMAC secret access key:

Cancel

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Import the AIX 7.3 beta image

Take a long lunch break with a pudding

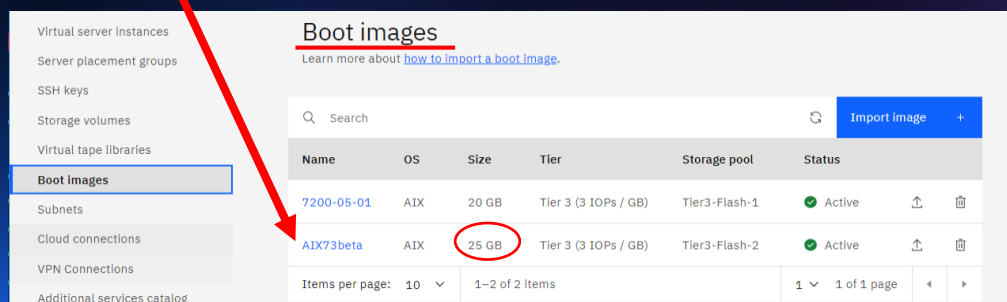
It is copying a 25 GB disk to your Account
Probably, across the world.

Update the “Boot Images” page until complete
... You can’t continue until it is done

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PowerVS with AIX 7.3 Beta

1. Capture the boot disk (rootvg) = **DONE**
2. Upload it to Cloud Object Storage (COS) = **DONE**
3. Copy from COS to PowerVS “Resource” Project

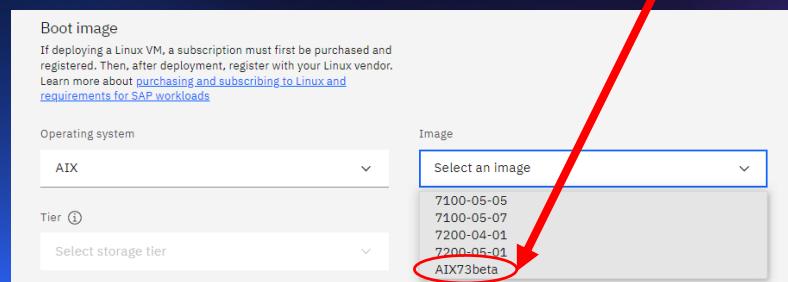


Boot images						
Learn more about how to import a boot image .						
Q Search						
Name	OS	Size	Tier	Storage pool	Status	
7200-05-01	AIX	20 GB	Tier 3 (3 IOPs / GB)	Tier3-Flash-1	Active	
AIX73beta	AIX	25 GB	Tier 3 (3 IOPs / GB)	Tier3-Flash-2	Active	

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PowerVS with AIX 7.3 Beta

1. Capture the boot disk (rootvg) = **DONE**
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4. Create a normal VM but use this new boot disk



Boot image

If deploying a Linux VM, a subscription must first be purchased and registered. Then, after deployment, register with your Linux vendor. Learn more about [purchasing and subscribing to Linux and requirements for SAP workloads](#)

Operating system: AIX

Tier: Select storage tier

Image: Select an image

- 7100-05-05
- 7100-05-07
- 7200-04-01
- 7200-05-01
- AIX73beta

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PowerVS with AIX 7.3 Beta

1. Capture the boot disk (rootvg) = DONE
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6. Remote ssh login = BAU
7. Explore AIX 7.3 Beta . . . = BAU

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PowerVS with AIX 7.3 Beta

This is AIX 7.3!!!

5. Console login to set root password = not BAU

```
Your new password must have:
  maximum of 8 repeated characters
  minimum of 2 alphabetic characters
  minimum of 1 lower case alphabetic character
  minimum of 1 upper case alphabetic character
  minimum of 1 non-alphabetic character
  minimum of 1 digit
  minimum of 0 special character
  minimum of 15 characters in length
```

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PowerVS with AIX 7.3 Beta

Now it is AIX Business As Usual (BAU)

Unless you live in Austin Texas

→ Fix the time zone + date (using smitty)

oslevel -s

7300-00-00-0000

Not safe Gold master = add 1st service pack

It is on FixCentral AIX 7.3 TL0 sp1 = 7300-00-01-2148

- Or suma command

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nmon

Yuck!

```
-----
N   N   M   M   0000   N   N   For online help type: h
NN  N   MM  MM   0    0   NN  N   For command line option help:
N N  N   M   MM   0    0   N N  N   quick-hint nmon -?
N   N   N   M   M   0    0   N   N   full-details nmon -h
N   NN  M   M   0    0   N   NN   To start nmon the same way every time?
N   N   M   M   0000   N   N   set NMON ksh variable, for example:
-----                               export NMON=cmt

TOPAS_NMON      I

                        8 - CPUs currently
                        8 - CPUs configured
                        2500 - MHz CPU clock rate (press 'r' for current MHz)
PowerPC_POWER9 - Processor
                64 bit - Hardware
                64 bit - Kernel
10,AIX73-for-Tes-8457dcd1-0000 - Logical Partition
                        7.3.0.0 TL00 - AIX Kernel Version
aix73-for-testing - Hostname
aix73-for-testing - Node/WPAR Name
                        788D230 - Serial Number
IBM,9009-22A - Machine Type
```

Please raise a PMR

Actually, it is the same on AIX 7.2 ☹

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AIX Open Source toolbox preinstalled but not in roots \$PATH
Just for this PowerVS AIX image
[[You can install the yum-bundle – see AIXpert Blog]]

```
#  
# yum  
ksh: yum: not found  
#  
#  
#  
# /opt/freeware/bin/yum install gcc  
Last metadata expiration check: 0:01:12 ago on Wed Jan 12 15:20:12 CST 2022.  
Package gcc-1:10-1.ppc is already installed.  
Dependencies resolved.  
Nothing to do.  
Complete!  
#
```

```
# gcc  
ksh: gcc: not found  
# /opt/freeware/bin/gcc  
gcc: fatal error: no input files  
compilation terminated.  
#
```

Toolbox has 852 packages & 190 installed!

```
# /opt/freeware/bin/yum list | wc -l  
852  
#
```

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Python 3.9.6 default install + very current.
- Good for Ansible

```
# python --version  
Python 2.7.18  
# python3 --version  
Python 3.9.6  
#
```

Bash is installed for the Linux people
– don't make this the default root user shell

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AIX 7.3 places of interest

www.ibm.com/ibm_aix/os

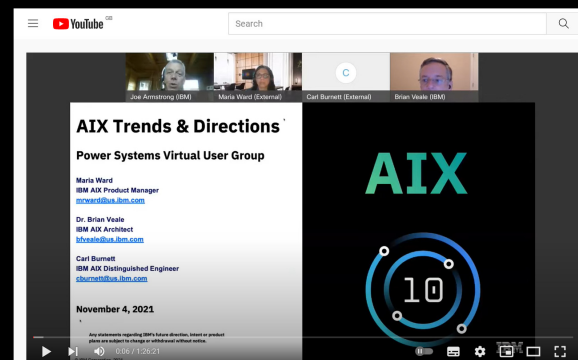
Steve Sibley, Power Vice President



Power Systems Virtual User Group (VUG)
run by Joe Armstrong

<https://www.youtube.com/watch?v=vY1F-T5A0iM>

Maria Ward – Product Manager
Carl Burnett – Distinguished Engineer
Brian Vale – AIX Architect

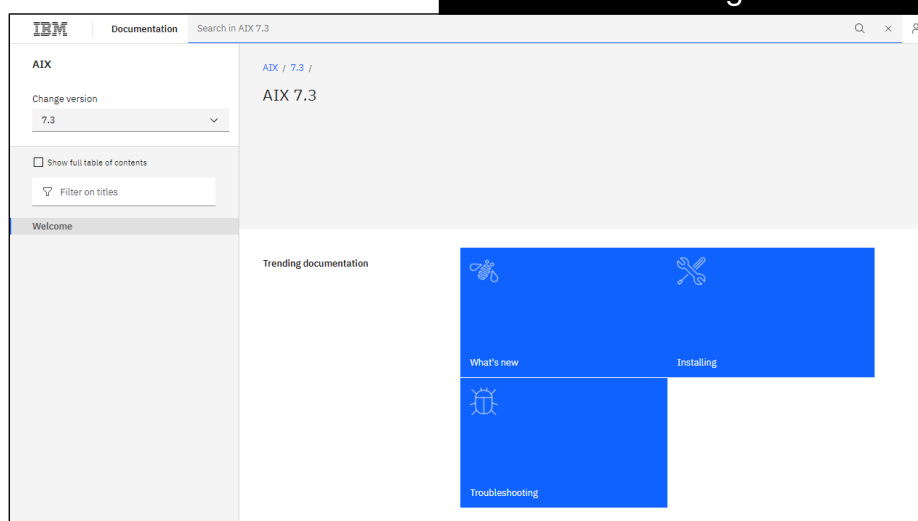


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AIX 7.3 Landing Zone

<https://www.ibm.com/docs/en/aix/7.3>

1. What's New + What's New Commands
2. Installing
3. Troubleshooting is AIX 7.2!



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AIX 7.3

Is Fast!

AIX for the past 20 years take 20 to 25 minutes to install = fast CPUs but more packages

Yesterday install AIX 7.3 from virtual optical DVD on E850 = 11 minutes

Also does not install ftp/telnet

Regularly supported AIX versions are

- AIX 7.3 TL0 sp1
- AIX 7.2 TL5 sp3
- AIX 7.2 TL4 sp5
- AIX 7.1 TL9 sp9 - 14 months left

→ IMHO

Extended Support = short term option

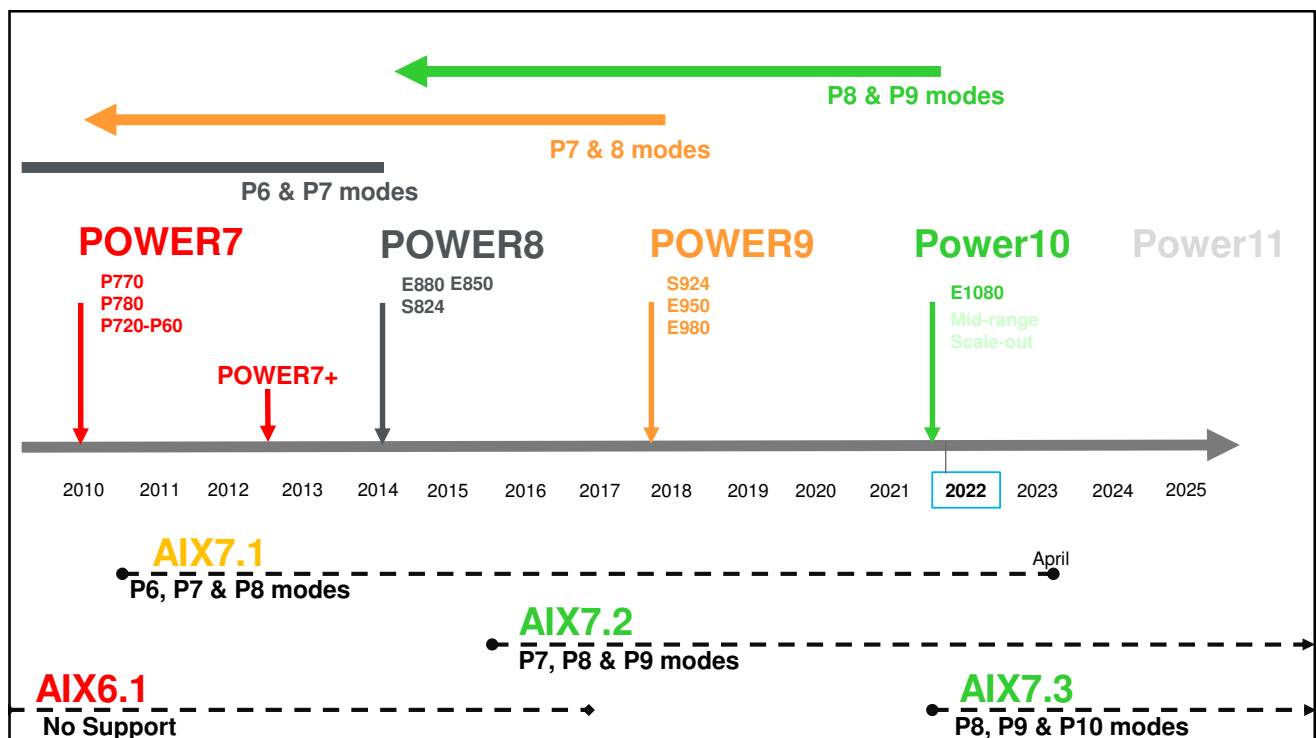
= Not an excuse for inactivity

= Buying you time to remove your

Technical Debt

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51



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Updates/s=206
SerialNum=C04930
LPAR-Num =27
LPAR-Name=u3-blue

Workload Single Threaded - wormc_no_opt 1 1

- C code uses curses to display "wiggly worms" on the screen
- no_opt = no compiler optimisation
worms are slowed down with a large maths compute loop
- Each loop does a large chunk of maths a one time

$a + b = c$
 $d * e = f$
 $g / h = i$
 $j - k = m$

AIX 7.2 TL2 on POWER9
in POWER9 mode

Same VM AIX 7.2 TL2 after
LPM to Power10 E1080

Different VM
AIX 7.3 beta on Power10 in POWER9 or POWER10 mode

Updates/s=410
SerialNum=C55AD8
LPAR-Num =27
LPAR-Name=u3-blue

AIX VM with
Shared Pool CPU=2
Entitlement=2
RAM=8 GB

vm135

Updates/s=443
SerialNum=C55AD8
LPAR-Num =13
LPAR-Name=vm135 AIX73beta NG

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njmon & nextract

Why njmon?

Can't change nmon
file format much!
Due to other tools.

nmon limited #
of tuning stats,
njmon 100's

1000's of nmon file
creates a data
management issue

njmon near real-
time injection to
a stats DB

JSON processing is
easy as it is a Python
dictionary. Load fast too.

Graph with dynamic
online tools (browser) &
merge with other stats

JSON=self documenting
& handles extra new
data on the fly

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Abstract:

njmon is Nigel's replacement for the much-loved nmon but saves data to JSON or straight to a Time-Series database like InfluxDB for beautiful graphs via Grafana. It covers AIX, VIOS and Linux (on any platform).

nextract plus is a small Python program to extract the performance statistics from the HMC covering all Power operating systems at server, VIOS, OS levels - no agent needs to be installed.

This combination covers everything you need to visualise and tune your Power servers for maximum performance, efficiency and find spare resources.

Open Source (free):

njmon & nextract

Open Source (free):

InfluxDB Time-Series DB

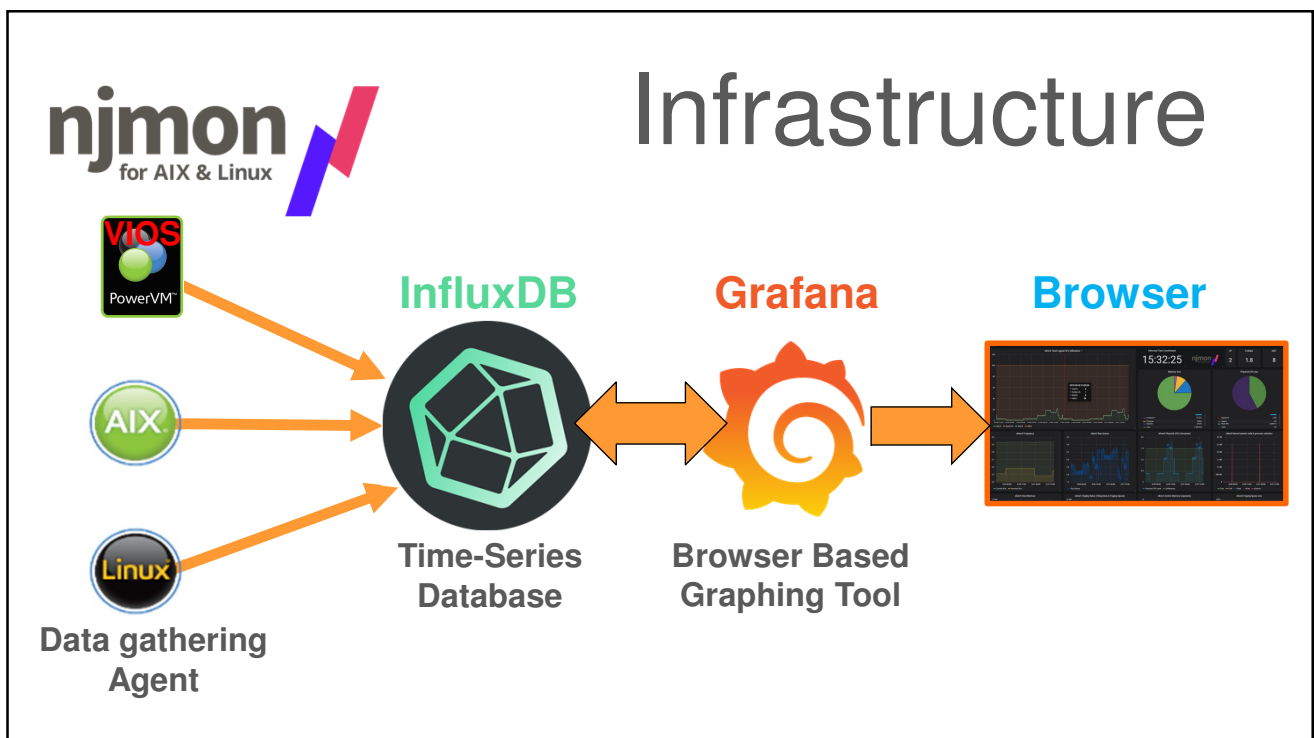
Grafana Graphing Engine

Options

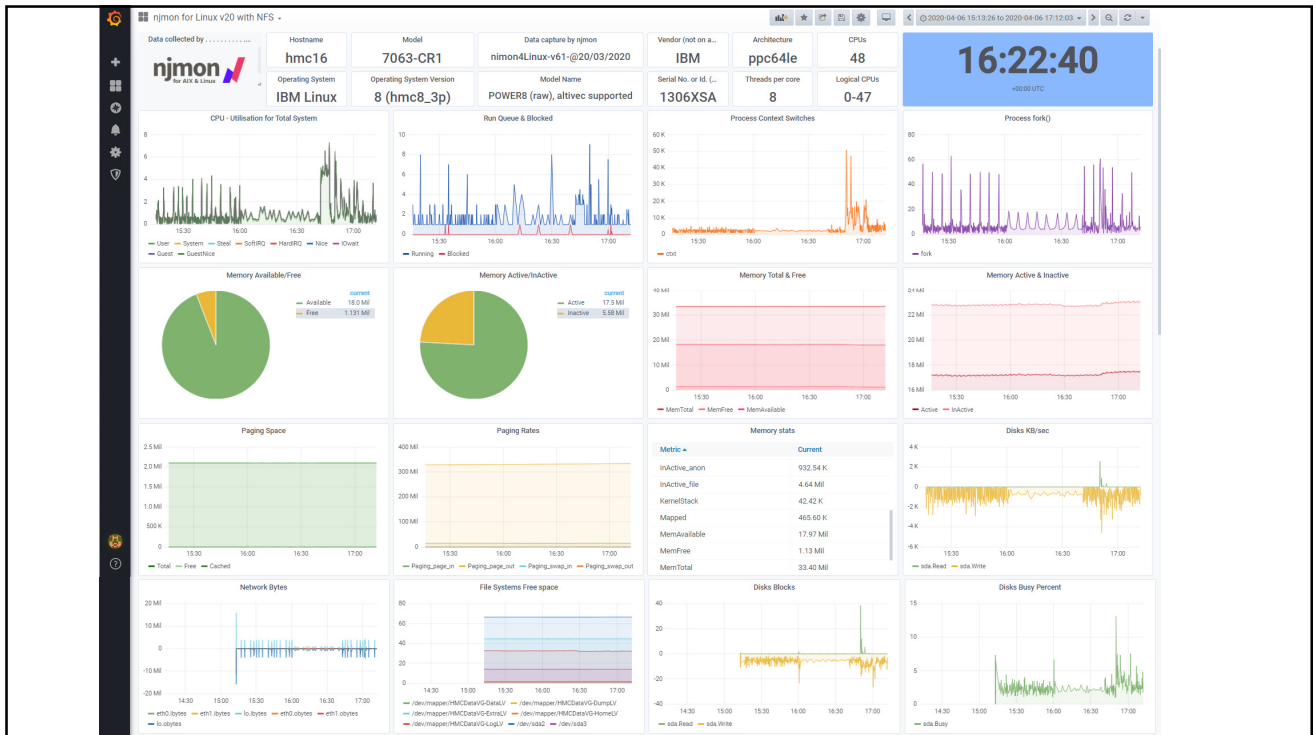
Fully Supported (Enterprise)
Cloud Service

Note: Other time-series databases & graphing engines can also be used via JSON format

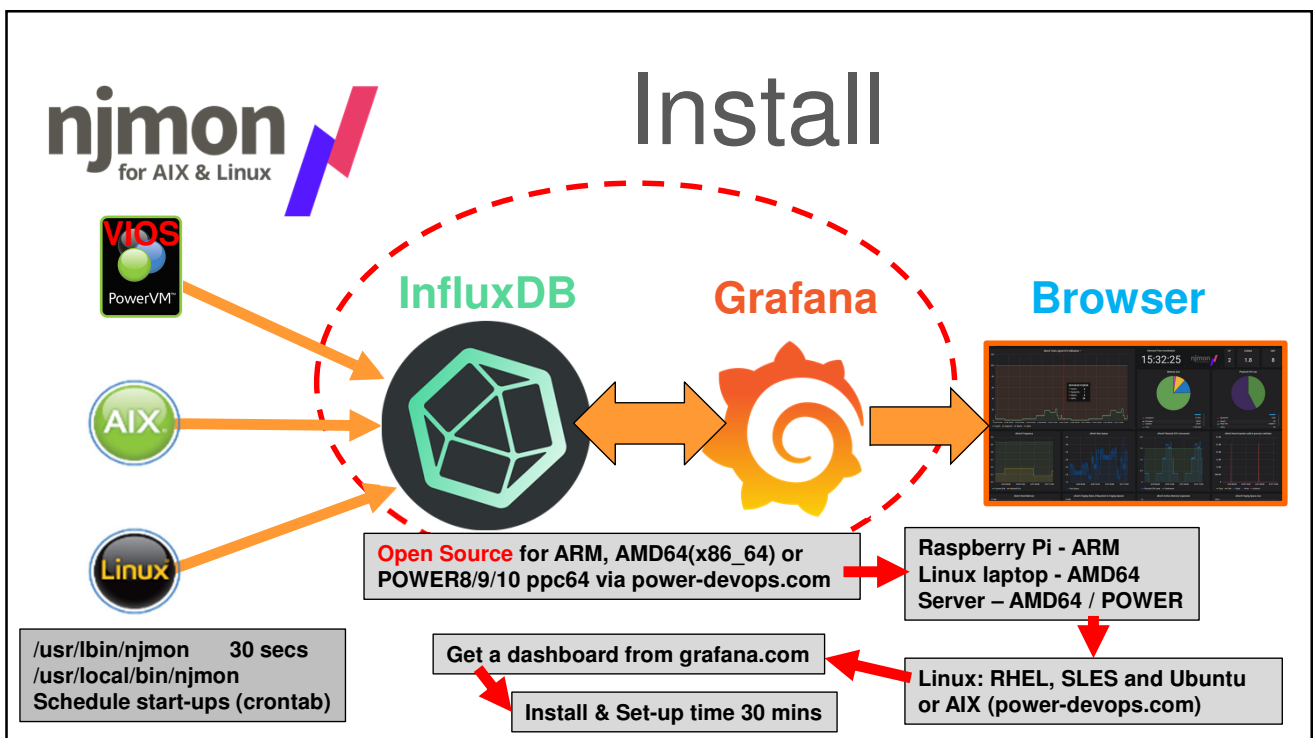
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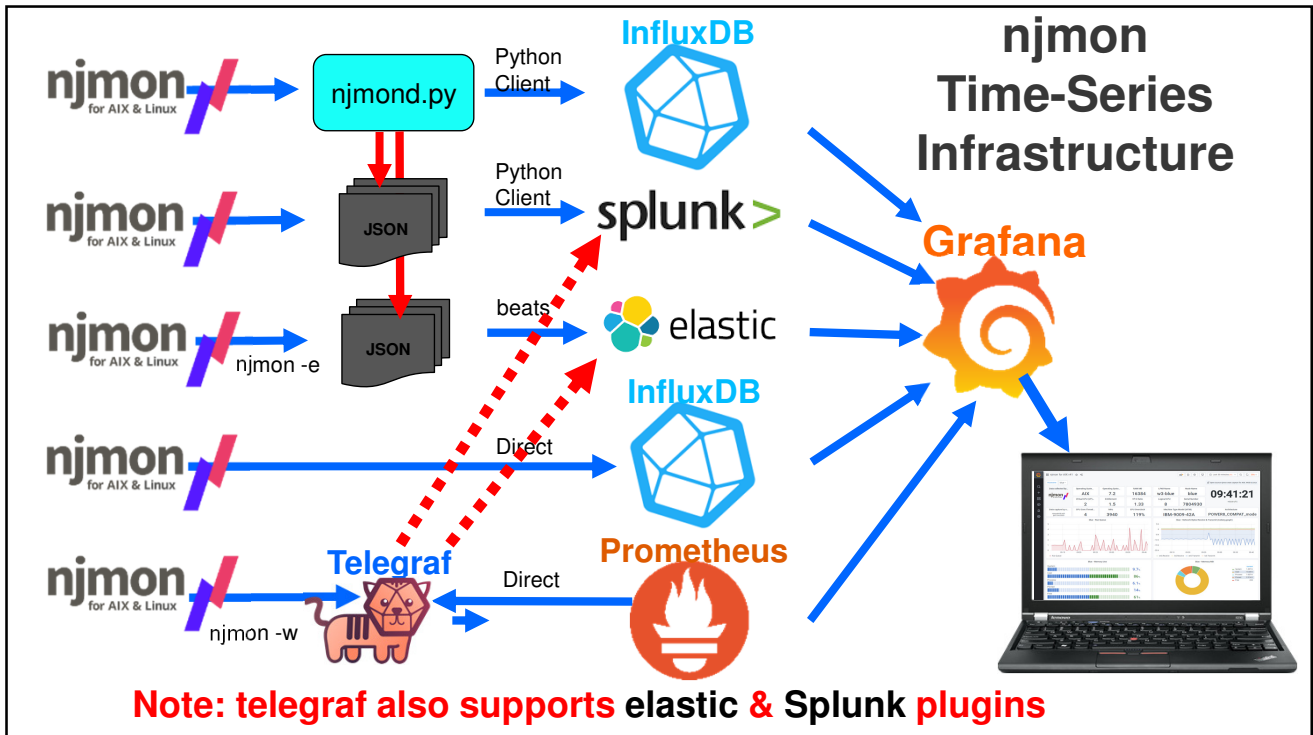
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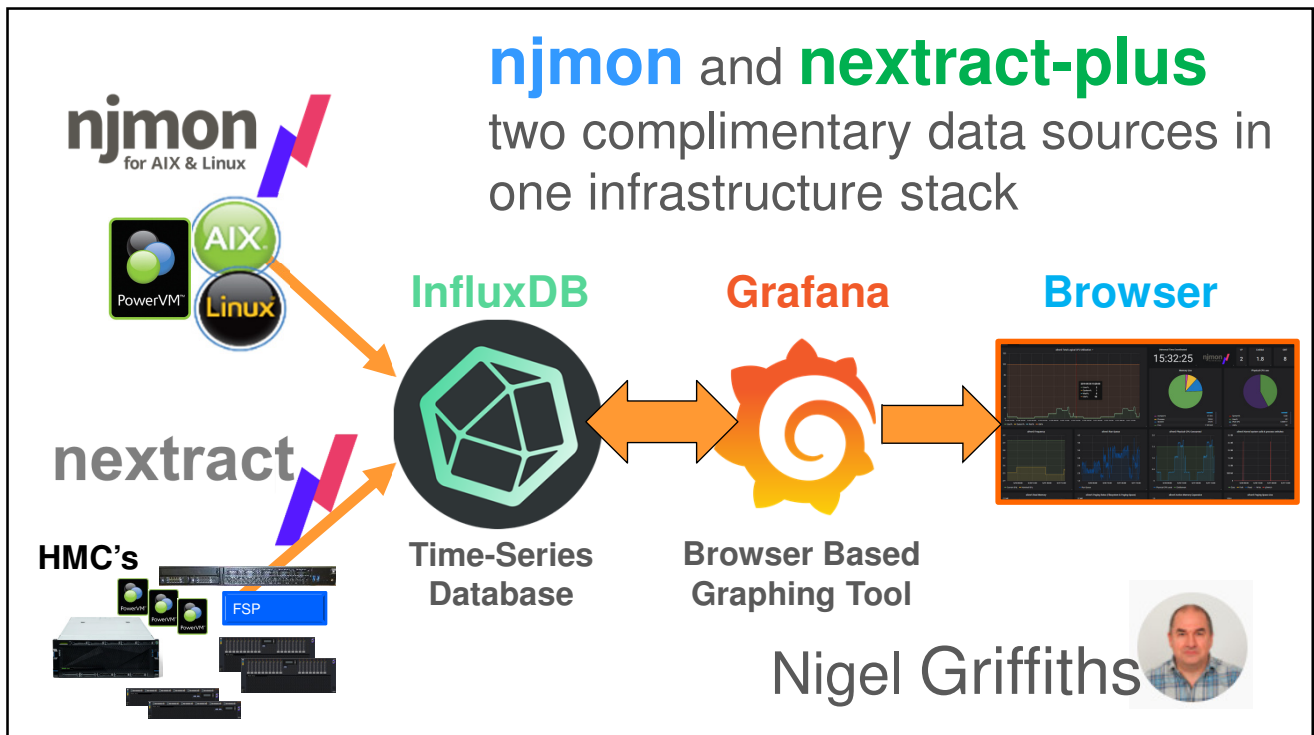
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nextextract  plus

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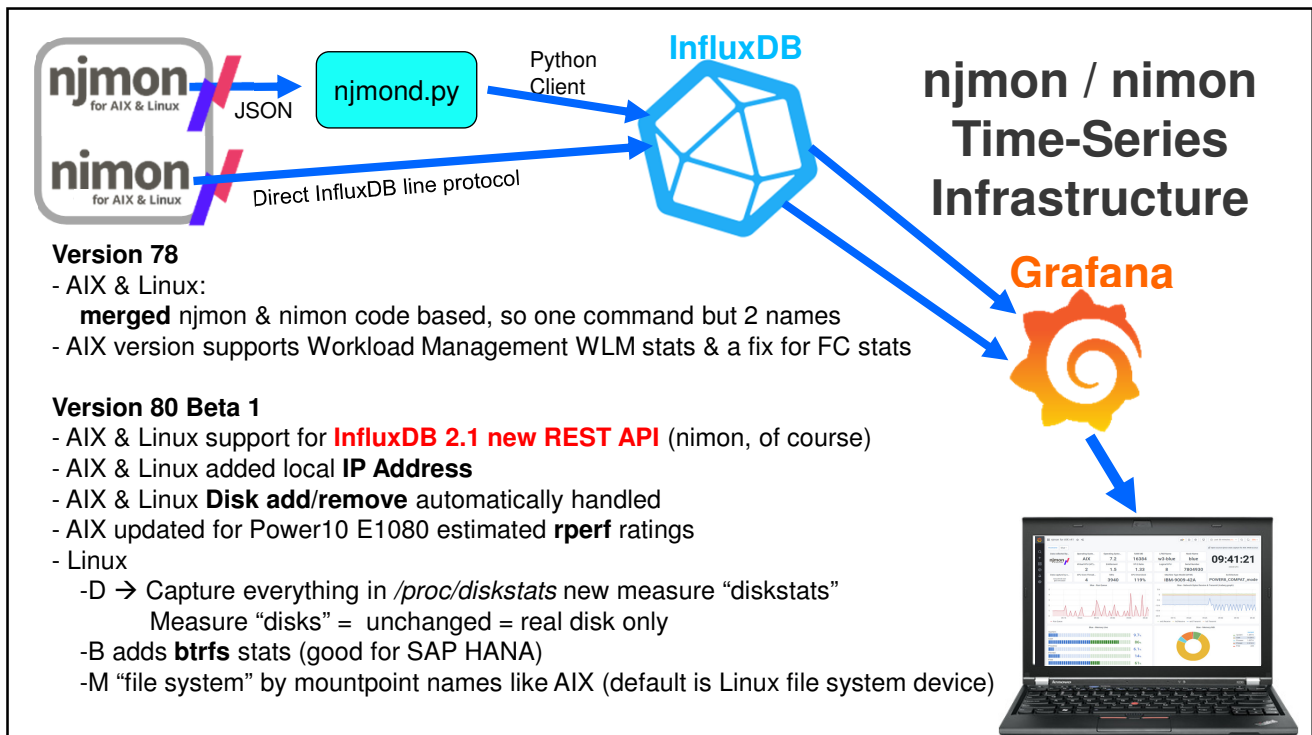


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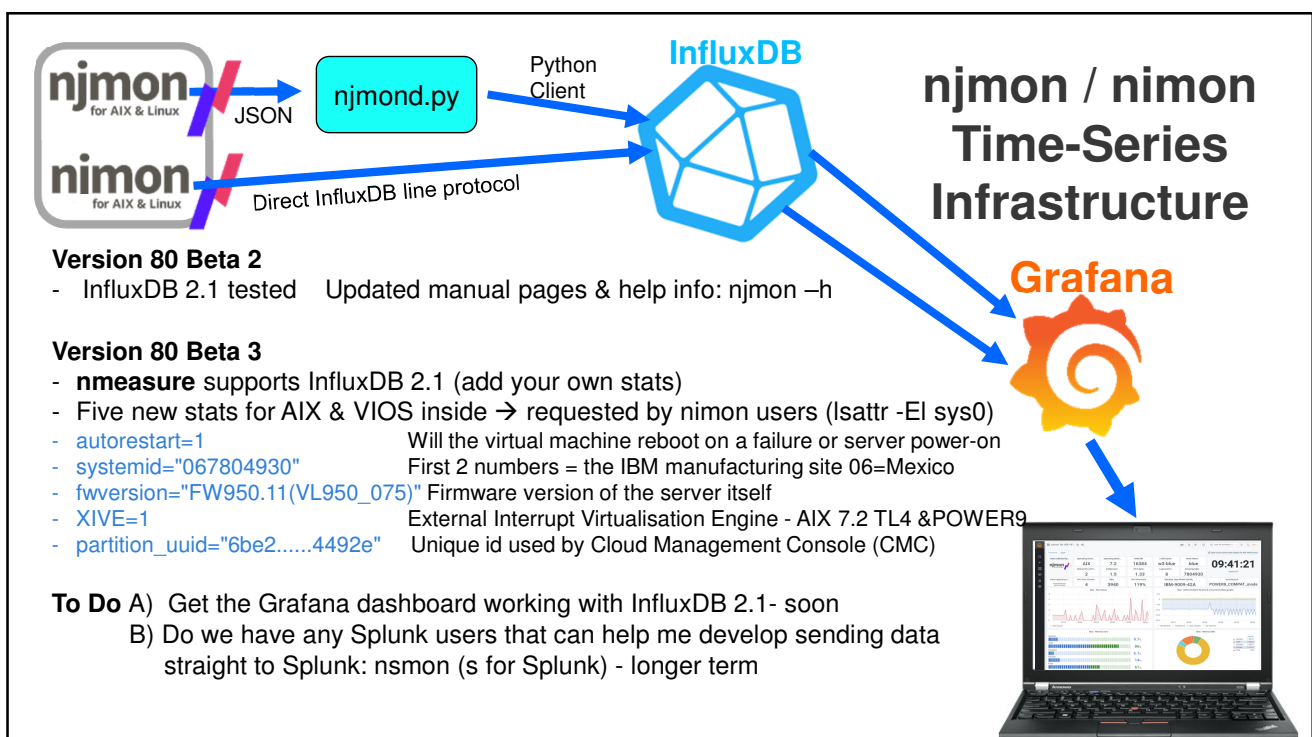
What's New with njmon / nimon?



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<https://www.youtube.com/user/nigelargriffiths>

AIX 7.3

https://ibm.biz/AIX73_OpenBeta_Registration

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	PowerVS: AIX for £2/day - 2 Create VM & Networking Nigel Griffiths	
	PowerVS: AIX for £2/day - 3 Hands-on with Disks Nigel Griffiths	
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	nextract_plus - Output Grafana Graphs Nigel Griffiths	njmon → 15 Videos → 5 hours
	nextract_plus - Data Handling and Statistics Nigel Griffiths	
	nextract_plus - Install & Setup Nigel Griffiths	
	njmon & nextract_plus Performance Stats for Power Systems: AIX & Linux Nigel Griffiths	
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