Introduction

- Pictures are from an Early Ship Program (ESP) Server
  - Arrived in the ATS, London, UK → 18th May 2018
  - Yours might be slightly different

- A heads-up on what to expect with POWER9 Enterprise

- POWER9 E950 is customer install but built to Enterprise standards
Unpacking

- It arrived upright

Open the box

Including:
- Rails
- Cables to external I/O Drawer
- Unexpected Power cables type
- Six metal handles for lifting the server to the rails
The Server nicely wrapped up

Unwrapped & the super nice handles added
Weight warnings & it is heavy

Tipping risk

Lifting tool
Not forklift truck!!

Four strong person lift

Three strong person lift

Remove Bezel, fans power supplies & 11 adapters (not the FSP in C1)

Remove lid & memory cards

Note: Front 8 SFF disks are heavy too!

Top lid
Technical Diagram label

Excellent Information + terms + numbering
Close up of the handles (six of them)

On the bench
Front View
- LCD panel & Power Up button & Indicators
- 8 x 2.5 inch SFF disks
- 2 x USB 3.0
- 4 x 2 inch NVMe devices (we think)
- MTM + Serial No.
- Drawer pull on rails handles

View from the top – middle section
- Memory Card with Centaurs & 16 DIMMs
- POWER9 Heat Sink
- VRMs Voltage Regulator Module
- POWER9 Dummy Baffle
- Memory Cards Blanking card
- VPD Vital Product data
Dummy POWER9 CPU air baffle & POWER9 Socket at the bottom

Real POWER9 CPU & POWER9 Socket at the bottom
Memory Card 16 DDR4 DIMMs (simple/easy to remove)
Memory blanking plate
Missed opportunity to spell out “IBM”

E950 rear end

- 11 Adapter slots
- 2 SAS cables to SAS disk Drawer
- FSP battery cover
- Service Processor
- USB 3.0
- FSP HMC ports
- 4 Power Supplies
Rear View with cabling bracket—see later
Close ups of the Voltage Regulator Modules?
12V at 50AMP to 1.04V at 97A

Hot Swap adapters

Flexible Server Processor
Press right release catch & turn down
Give it a tug & the adapters slides out

Note: the handles lock the adapters and do the final push in via the slots below
Make sure the angle is right to allow this
New Adapter Cassette

Remove an adapter from the cassette 1

It releases & slide away/out the card edge locking devices

It was not obvious that the handle is turnable … to me!
It releases the top of the tail stock
Remove an adapter from the cassette 2

But HOW?

1 Hold firmly
2 Press down
3 Slide back
Remove an adapter from the cassette 3

Adapter tail stock now free for removal
Flexible Service Processor 2
with time of day battery cover removed

Air Moving Device (fan)
Air Moving Device (fan)

1. You can feel it sucking your hand in
2. Initial start up → very noisy
   louder than our 2 CEC E880 !!
3. It quietens down after a few minutes
4. Developers told me this is to safely support the full 16TB of RAM configuration for extreme environments like:
   - heavy RAM use (gets warmer)
   - hot computer room (more air needed for cooling)
   - high altitude (thin air)

Seriously Powerful Fans
Internal Disk and NVMe drive removal
- Press blue triangle to release the handle
- Rotate handle outwards to release drive
- Pull

800GB SSD via NVMe
2.5 inch x 7 mm
other GB sizes available
No front covers (yet) + standard tiny MTM+Serial No

Mystery items (a pair)
Mystery item is a cable arm bracket
Screws don’t fully lock the bracket in place as Movement aids the server sliding back

Narrow cable arm for T42 rack even then tight fit

Wider cable arm for S42 rack
Software: must use the Approved Levels

In beta testing we used
- HMC → software 9 series
- New VIOS → 2.2.6.20+
- New AIX → 7200-02-02-1822

Now Running but need to upgrade to official GA levels
- VIOS 2.2.6.21* - to be upgraded
- AIX 7.2, 7.1, 6.1 as virtual machines
- SLES 15
- Ubuntu 18.04 (not supported but works fine)
11 Quick Observations

1 Power cords are IEC 60320 C19 /C20

- Not the regular “kettle leads” = C13

- Four Power supplies of 2000 Watts each
  - Different to the POWER8 E850

- Documents says 2 + 2
  - 1 power supply failure = carry on
  - 2 power supply failures = may reduce GHz
IMPORTANT: Make sure to plug to the PDUs - the right way

2 We placed the server onto the rails badly

- Entirely our fault (excuse no docs available)
- Need to seat the rear nail heads first
- Then lower the front
3 Surprisingly Heavy!

- Roughly: 69 kg or 152 Lbs (depends on config)
- This is a Four person lift

I (Nigel) recommend:
If above the waist height: use the famous Lifting Tool

4 Surprisingly long!

- E850 is 776 mm
- E950 is 35.5 inches
4 Surprisingly long!

- E850 is 30.5 inches = 776 mm
- E950 is 35.5 inches = 902 mm  Longer by 5 inches = 126 mm

Classic IBM rack is the T42
  - Hard to stay within the T42 → rear door needing a push
  - Particularly: Power cables & remote I/O drawer connectors
  - Even with thin cable bracket is a problem due to EIA19 cable turn
  - Having to push the door close against cables = not good

Recommend: T42/S42 (Constellation) with 8 inch extension
  - Double check 3rd party racks carefully

Could cause issues:
  - Client upgrading E850 to E950
  - Multiple servers = many cables to push in with the door
Reworked the cables
Changed to the cable management bracket
This is just inside the door
The EIA19 cables still touch the rear door foam padding

5 Label on inside of the top lid

- If you lift the lid then place it on a table, you will never see the information labels

- So now you know
6 Wrong (ugly) icon on HMC

- Partly fixed on a HMC upgrade

- HMC development team say they have this fixed

7 Missing slots → E950 rear end

FSP ← 4 empty slots → C6 full
Not a PCIe

← Six full slots →

Slots C1 → C2 → C6

C7 → → → C12
7 Missing adapter slots C2-C5 not HMC list

NVMe devices are on PCIe ports but no adapter slot
7 Missing slots C2 to C5

Due to not having POWER9 processors 3 & 4

8 NVMe Usability

- NVMe is like SSD – it wears out
- Built with plenty of “spare” capacity to replace wear
- Life depends on its use → I/O’s per day
- We don’t count that on disks – they just fail
- NVMe has better engineering & monitors/reports wear
- `nmvemgr` command . . .
8 NVMe Usability

silvervios1:/home/padmin $ lsdev | grep -i nvme
hdisk0  Available  NVMe 4K Flash Disk
nvme0  Available  PCIe3 x4 NVMe Flash Adapter
silvervios1:/home/padmin $

# nvmemgr -M -l nvme0
Critical Warning ........................................ 0x0
Composite Temperature (Kelvin) ......................... 306
Available Spare (%) .................................. 100
Percentage of NVM subsystem life used .................. 0
Data Units Read (1000 units of 512 bytes) ............. 1928423
Data Units written (1000 units of 512 bytes) .......... 2141752
Host Read Commands .................................... 14109948
Host Write Commands ................................... 29866123
Number of Power Cycles ................................ 30
Power On Hours ....................................... 1620
Unsafe Shutdowns ..................................... 10
Media and Data Integrity Errors ......................... 0
Number of Error Information Log Entries ............... 54
# lsvg rootvg
VOLUME GROUP: rootvg  VG IDENTIFIER: 006b601f0000163b6bdc0b7
VG STATE: active  PP SIZE:  1024 megabyte(s)
VG PERMISSION: read/write TOTAL PPs: 745 (762880 megabytes)

8 Check the POWER9 Performance mode
Default is: admin/admin
Many site have a policy to change it!
Select + Continue for instant mode change

- Power and Performance Mode Setup
  - Current Power Saver Mode: Enable Maximum Performance mode
    - Disable all modes
    - Enable Static Power Saver mode
    - Enable Dynamic Performance mode
    - Enable Maximum Performance mode

Note: Enabling any of the Power Saver modes will cause changes in the processor frequencies, changes in processor utilization, changes in power consumption, and performance to vary. Other effects are possible as well. Please see the EnergyScale™ white paper for more information on power saving modes.

9 Surprisingly Noisy!

- We had early firmware
  - Fans at 100% all the time! → not untypical for early servers
  - The noise was VERY LOUD

- Current firmware does proper thermal fan control
  - Noise is actually low for our small config
  - Completely drowned out the E880 in next rack!

- Please:
  - Read the documentation on noise levels
  - and take suitable ear protection precautions
10 nmon on AIX is OK

- POWER9 mode at Nominal 3.3 GHz + MTM+serial OK
- AIX 7200-02-02

If you want nmon to report the actual GHz, please raise a PMR ☺

11 Top lid refit

- Only remove the lid when needed
  - Weight reduction
  - Upgrade CPU, RAM
  - Fix CPU, RAM, VRM
- otherwise no need to remove
Call to Client Action

→ We need to make sure everyone understands

Good News
1. E950 is not a massive change from E850
2. Up to 48 CPU cores: POWER9 performance boost ~42%
3. Memory jump → 4 TB to 16 TB
4. Adapters → Easy rear PCIe cassette access

Shocks
1. Electricity → C19/C20 connectors for higher amps
2. Size → It’s a longer - check racks & doors
3. Heavy → Loading in to the rack needs extra care or lift tool
4. Noisy → May need ear protection
Before we end
- Slides
- Replays

- Much larger slide deck

PDF of today's slides & replay from http://tinyurl.com/PowerVUG

Going to share the PowerPoint on the Power VUG website http://tinyurl.com/AIXpert
I have ~250 slides including
~ 100 picture slides of the server
- Pictures are of a beta machine
- GA servers might differ slightly