Introduction

- Pictures are from an Early Ship Program (ESP) Server
  - Arrived in the ATS, London, UK → 21st June 2018
  - Yours might be slightly different

- This is a Single node and System Control Unit
  - So you will not see the inter-node cables (until the end)

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

- POWER9 E980 is SSR (Client Engineer) install
  - If you have E880 experience you know 75% already
System Control Unit unpack

1. Arrives in June

2. System Control Unit unpack

3. Rails

4. Front bezels
Zooming in

Three Fans

Two power connections from node

Two Fast Service Processors with Ethernet to 2 HMCs + Blue TOD battery covers

USB 3.0

Input from 1st node

FSP to nodes

FSP to nodes

System Unit Fans – nothing else is removable

Development style “bits” box
System Unit “Engineering proto-type” label

System Unit is not heavy
System Control Unit pretty standard rails are easy to fit & the Unit slides on

More like a shelf

Pushing the unit along – no sliding rail
Starting to look good

Reading the E880 manual & preparing the install
E980 Rails & cable check

Node power to System Unit cable

USB cable

Node ↔ FSP cable

Getting organised
Sorting out the node rails

Adding the node Rails: like E880 so no issues
Screws to remove node metal transport covers

E980 node rear
E980 Adapter cassette
E980 Adapter cassette

[Images of an E980 adapter cassette being assembled and disassembled]
Is the E980 Adapter cassette the same as the E880 Adapter cassette?

Looks very similar - working the same way

But not the same:
  - Mechanically slightly different = slimmer
  - Additional RAS & usability features
  - Now PCIe Gen4 based

Note there are electronics in the cassette
E980 node rear
- 8 Low profile adapters cassettes – all PCIe Gen4
- 4 NVMe (where clock cables were in E880)
- 12 inter node cables
- 2 node clocks
- 2 + 2 power cords

Power to System Control Unit
3 x USB 3.0

Four U.2 NVMe bays per node
Removing a NVMe

2 inch NVMe device (works as a fast SSD)
Cable support bracket side pieces screw on (unlike the E950!)

E980 front
- Five air movement devices (fans)
- Four power supplies
- Power Cable run down channels to the rear
Fan removal is simple

Zoom in to the MTM & Serial No.(missing) + IBM logo
Removing the top lid

First look inside
How different to E880?

E980 2018
- Memory DDR4
- 15 VRMs

E870/E880 2015
- Memory DDR3 initially
- 12 VMRs
The Memory card with Centaur L4 & DDR4 chips

Improvised lifting device

Installing the E980 node
Used the E880 approach

Nail heads nearest the rack locked in first then lower front down

Don’t let go until you have triple checked
- I am not clear whose insurance would pay out if it got dropped!
- for E980 damage or client injury

Installing the E980 node reminder

A little worried about the weight!
E980 System Control Unit & node above

Screws to lock it in to the rack

In case of the 1st big earth quake in London for 10,000 years!
With the bezels

Its new home for 5 years
Single node is simple to connect up

USB to front

HMC

Node to FSPs

Electrical power

Node to FSPs

Electrical power

Single node is simple to connect up
Yes, that is far too easy but we did not cheat!

Only one node = zero node to node cables

Next chart is borrowed from Gareth’s E980 Deep Dive for high numbers of nodes

**SMP cabling**

Each connection shown in the diagram represents a pair of SMP cables.
SMP cabling

Add “user” Ethernet & FC cables

Cables strapped to underside of cable tidy arm
Summary: Hardware Install ☺

- Easy
  - OK we only had 1 low down node & no inter node cables
- If previously installed a E880 = no brainer
- If new → follow manual
- If not new → follow the manual

- No clock cable makes the E980 simpler
- Inter node cables are clever:
  on plugging-in LEDs flash to highlight if you got it right/wrong

- Regular E880/980 rules apply
  - HMC’s running 920 or above
  - Prepare for arrival: site survey, weight, height, power, network, SAN
  - Not client install
  - Its heavy so buy / order a Lift Tool
  - These are high end servers – so get it right first time → RTFM
  - Ear protection on power up fan noise

Software Install 😊

- Connect up the HMC running 920+ software

- Quickly setup the basics
  - Quad VIOS
  - VIOS have FC SAN adapters to Shared Storage Pool (SSP)
    - A major asset for our crash & burn environment
    - Our record beating AIX LPAR with 11,000 LPMs

- Bad news
  - It’s a 3 month loaner
  - E980 (like the E880) take quite a long time to cold boot-self test
    These servers only start once and then run for five years
Initial power - up

Bug: The HMC guys promised to fix the picture

Server renamed to “brick” – all servers are colours!
Server renamed to "brick" – all servers are colours!

4 x 8 Cores
½ TB RAM

Processor, Memory, and I/O

View or change the memory, processor, and physical I/O resource settings for the managed system.

- Processors
  - Available: 26
  - Assigned To Partitions: 6
  - Configurable: 32
  - Installed: 32
  - Multiple Shared Processor Pools Support: Yes

- Memory
  - Available: 453.00 GB (444.094.0 MB)
  - Assigned To Partitions: 49.00 GB (48710.0 MB)
  - Reserved: 10.00 GB (10150.0 MB)
  - Configurable: 512.00 GB (512400.0 MB)
  - Installed: 512.00 GB (512400.0 MB)
  - Memory Region Size: 0.25 GB (254.8 MB)
  - Active Memory Sharing Support: Yes
Call to Client Action

Good News
1. E980 is not a massive external change from E880
2. HW Install is a no brainer
3. No clock cables = easier
4. Expecting a large POWER9 performance boost

Bad News
1. Nothing like the shocks we had with the E950 😞
2. Shows confidence to loan us a E980 this early
3. **SECRET:**
   - Some teething issues – for sure
   - Nothing unexpected 14 weeks before GA
4. Many already addressed by developers
5. Reporting a few PMR / PMH to get fixed
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

```
brickvios1:/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:  00fb601f0000163b6bdc0b7
VG STATE:           active     PP SIZE:        1024 megabyte(s)
TOTAL PPs:      745 (762880 megabytes)
```
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 EnergenScale white paper for more information on power saving modes.

Continue
nmon on AIX is OK

- POWER9 mode at 3.4 GHz + MTM+serial OK
- AIX 7200-02-02-1810

```
# lparstat -E 1 3
System configuration: type=Shared mode=Uncapped smt=4 lcpu=16 mem=16384MB ent=2.00 Power=Dynamic-Performance
Physical Processor Utilisation:
       Actual         Normalised
            user   sys  wait  idle      freq user   sys  wait  idle
------------- --------- ------------- --------- --------- --------- ------------- 
 0.001 0.001 0.000 1.998 3.8GHz[111%] 0.001 0.001 0.000 1.998
 0.000 0.001 0.000 1.999 3.8GHz[111%] 0.000 0.001 0.000 1.999
 0.000 0.001 0.000 1.999 3.8GHz[111%] 0.000 0.001 0.000 1.999
```

Max Perf mode at 3.9 GHz
Beta chips

Load of detailed picture in the deck for you
E980 during an explosion!
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

+ More links to information