Power Systems

Today

POWER8 Enterprise E870 from Hands-on Experience

Starting at 10:00 am UK time by Nigel Griffiths

Smart Meeting → Put questions into the Chat box or AT&T Toll Free phone for better audio

- 0800-368-0638 = UK Toll Free
- 0203-059-6451 = UK but you pay for the call
- Then 6403785# Participant Code
- Other countries see chat box for the website
- Please Mute with *6

Previous Sessions:
Linux+Power: Best Practice
Linux for AIX/IBM i guys
PowerKVM Deep Dive
More Tricks Power Masters
POWER8 from hands-on
Power up your Linux
PowerVC
PowerVP
SSP4
Best Practices
Tricks of Power Masters
IBMi and External Storage
And more…..

Future Sessions →

- Feb 4th - The "Key" to IBM i Licensing & more – Part 1
- Feb 11th - The "Key" to IBM i Licensing & more – Part 2
- Mar 4th - HMC 8.20 User Interface Tech Preview

- Suggestions Welcome

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Mandie Quartly @mandieq
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Youtube Channel: http://tinyurl.com/IBMPowerVUGYoutubeChannel

Speaker Name Gareth Coates & Nigel Griffiths
Job Role Power Advanced Technology Support (Europe), IBM

POWER8 High End machines from Hands-On experience

Previously given at the Las Vegas & Budapest Technical Universities in October 2014 but lots of added content from the last 3 months

Enterprise2014

2014 IBM Power Systems Technical University

20 - 24 October Budapest, Hungary

Gareth Coates

Nigel Griffiths

ATS computer room now in IBM Southbank London

Early Ship Programme (ESP)

- ESP machine shipped late Sept, 2014
- GA Generally Available 18th Nov, 2014

- First machine outside of the USA
- Test install, HW, SW, performance, tools & user experience

- Some beta Hardware
- Beta HMC, System Firmware, VIOS, AIX, IBM i

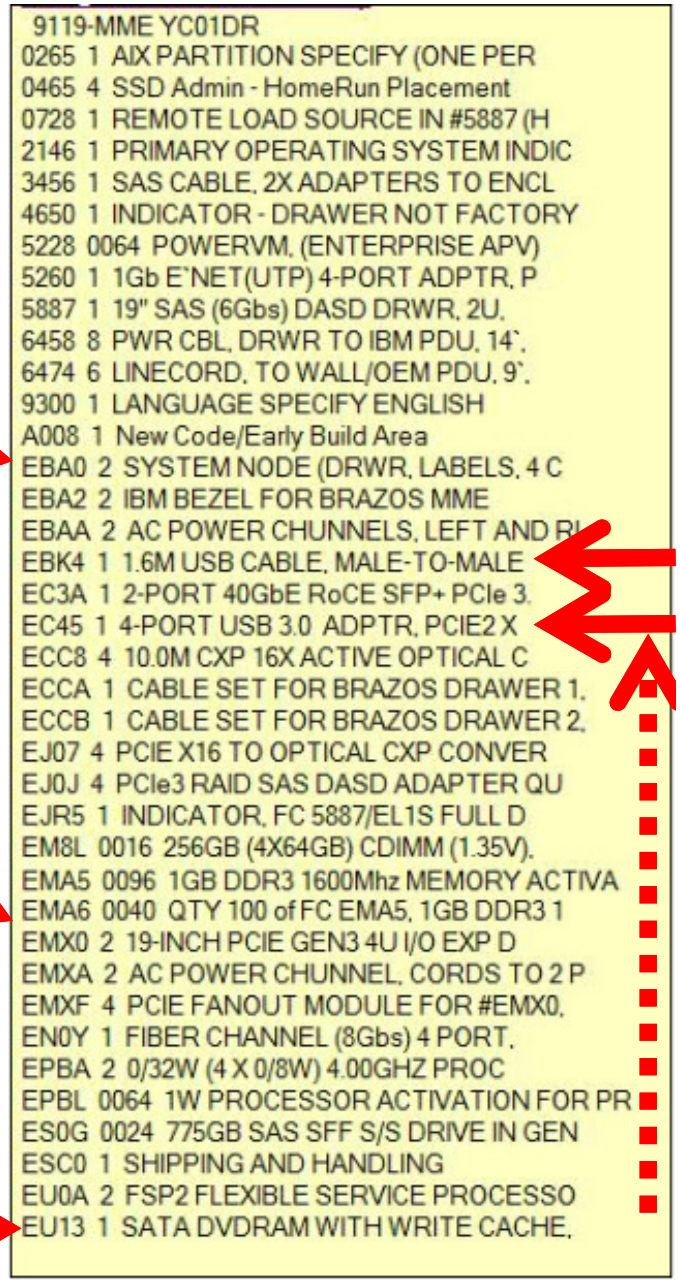
EMEA ATS ~~E880~~ → E870

- RAM = 16 x 256GB (4x 64GB) CDIMM
  - Activation 4TB= 96 x 1GB +
    40 x 100 x 1GB
- Configured 64 way (8 core chips)
  - 4 GHz

9119-MME YC01DR
0265 1 AIX PARTITION SPECIFY (ONE PER
0465 4 SSD Admin - HomeRun Placement
0728 1 REMOTE LOAD SOURCE IN #5887 (H
2146 1 PRIMARY OPERATING SYSTEM INDIC
3456 1 SAS CABLE, 2X ADAPTERS TO ENCL
4650 1 INDICATOR - DRAWER NOT FACTORY
5228 0064 POWERVM, (ENTERPRISE APV)
5260 1 1Gb E`NET(UTP) 4-PORT ADPTR, P
5887 1 19" SAS (6Gbs) DASD DRWR, 2U,
6458 8 PWR CBL, DRWR TO IBM PDU, 14`,
6474 6 LINECORD, TO WALL/OEM PDU, 9`,
9300 1 LANGUAGE SPECIFY ENGLISH
A008 1 New Code/Early Build Area
EBA0 2 SYSTEM NODE (DRWR, LABELS, 4 C
EBA2 2 IBM BEZEL FOR BRAZOS MME
EBAA 2 AC POWER CHUNNELS, LEFT AND RI
EBK4 1 1.6M USB CABLE, MALE-TO-MALE
EC3A 1 2-PORT 40GbE RoCE SFP+ PCIe 3.
EC45 1 4-PORT USB 3.0 ADPTR, PCIE2 X
ECC8 4 10.0M CXP 16X ACTIVE OPTICAL C
ECCA 1 CABLE SET FOR BRAZOS DRAWER 1,
ECCB 1 CABLE SET FOR BRAZOS DRAWER 2,
EJ07 4 PCIE X16 TO OPTICAL CXP CONVER
EJ0J 4 PCIe3 RAID SAS DASD ADAPTER QU
EJR5 1 INDICATOR, FC 5887/EL1S FULL D
EM8L 0016 256GB (4X64GB) CDIMM (1.35V),
EMA5 0096 1GB DDR3 1600Mhz MEMORY ACTIVA
EMA6 0040 QTY 100 of FC EMA5, 1GB DDR3 1
EMX0 2 19-INCH PCIE GEN3 4U I/O EXP D
EMXA 2 AC POWER CHUNNEL, CORDS TO 2 P
EMXF 4 PCIE FANOUT MODULE FOR #EMX0,
EN0Y 1 FIBER CHANNEL (8Gbs) 4 PORT,
EPBA 2 0/32W (4 X 0/8W) 4.00GHZ PROC
EPBL 0064 1W PROCESSOR ACTIVATION FOR PR
ES0G 0024 775GB SAS SFF S/S DRIVE IN GEN
ESC0 1 SHIPPING AND HANDLING
EU0A 2 FSP2 FLEXIBLE SERVICE PROCESSO
EU13 1 SATA DVDRAM WITH WRITE CACHE,

EMEA ATS E880

- 1 SAS 5887 EXP-24S drawer
  - With disks
- 2 CEC Nodes
  - No disks possible
- 2 “MEX” (EMX0) I/O drawers
  - No disks possible
- 4 Fanout modules
- 1 DVD



POWER8 E870 ESP

Pictures might have minor changes with GA

From this

Instructions are specific and unique for each system

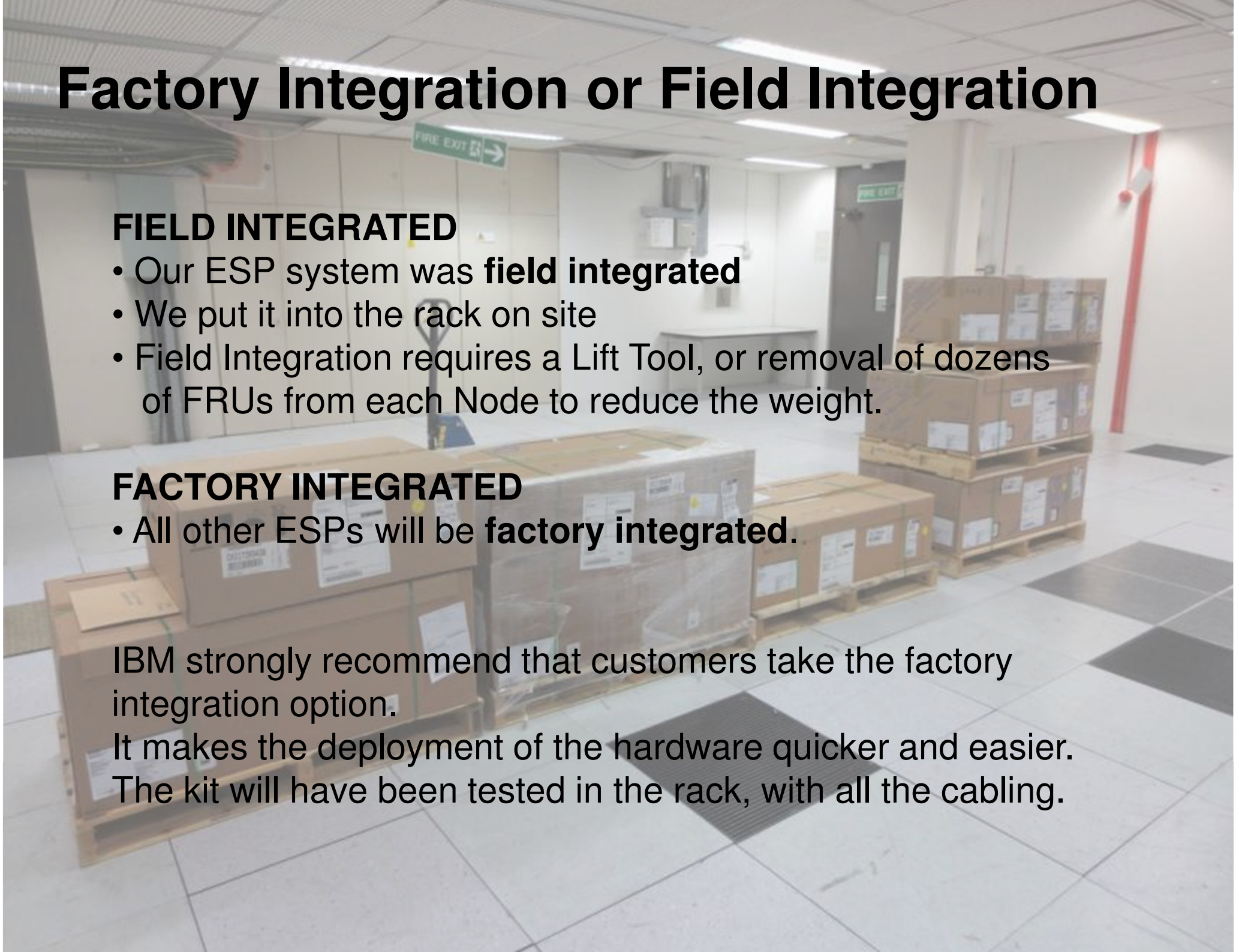
IBM

New Mfg-Order – 1AQH4Y3 –
9119-MME, SN 10-8D2C7 –
New System Installation Guide

From this

To this

Factory Integration or Field Integration



FIELD INTEGRATED

- Our ESP system was **field integrated**
- We put it into the rack on site
- Field Integration requires a Lift Tool, or removal of dozens of FRUs from each Node to reduce the weight.

FACTORY INTEGRATED

- All other ESPs will be **factory integrated**.

IBM strongly recommend that customers take the factory integration option.
It makes the deployment of the hardware quicker and easier.
The kit will have been tested in the rack, with all the cabling.

So, what is this session for?

There is still a lot of valuable information we can share with you.

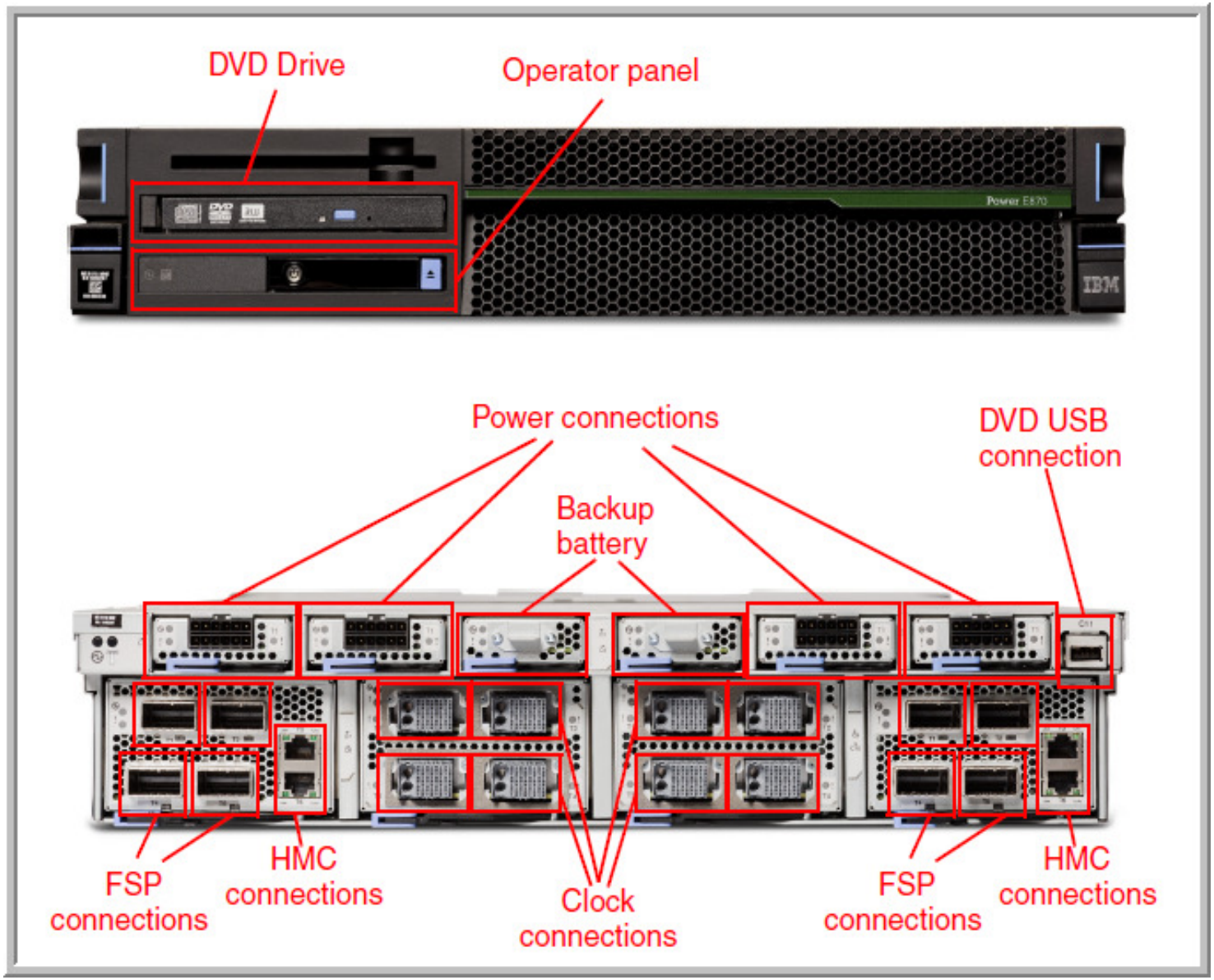
Pictures paint a thousand words.

MES upgrades will typically be field integrated.

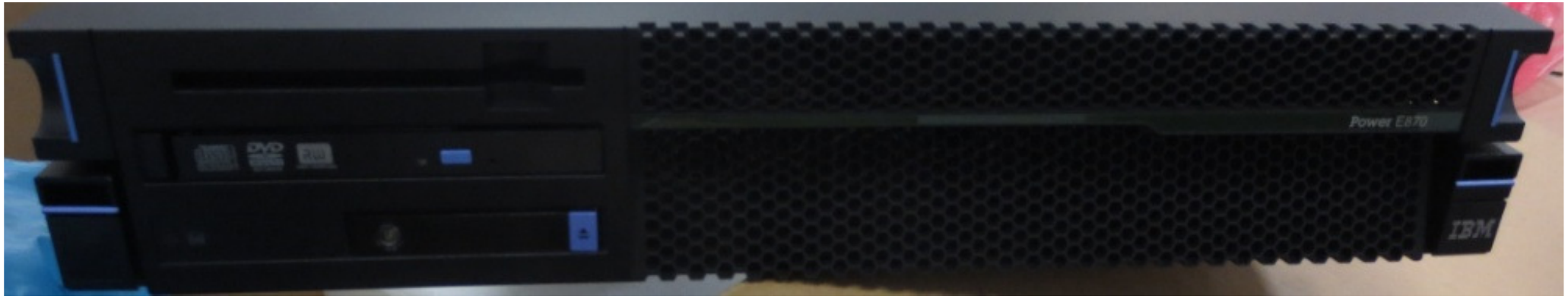
Taking photographs in a machine room, and getting the lighting, depth of focus, perspective and other factors right is tricky without spending ages composing each one ….

But we have done our best.

The System Control Unit



The System Control Unit



Every E870 and E880 needs exactly one of these.

The System Control Unit

2U
- Redundant FSPs
- Redundant Clocks
- No Power Supplies
- Redundant Power

- Optional DVD
  Needs cable & USB adapter

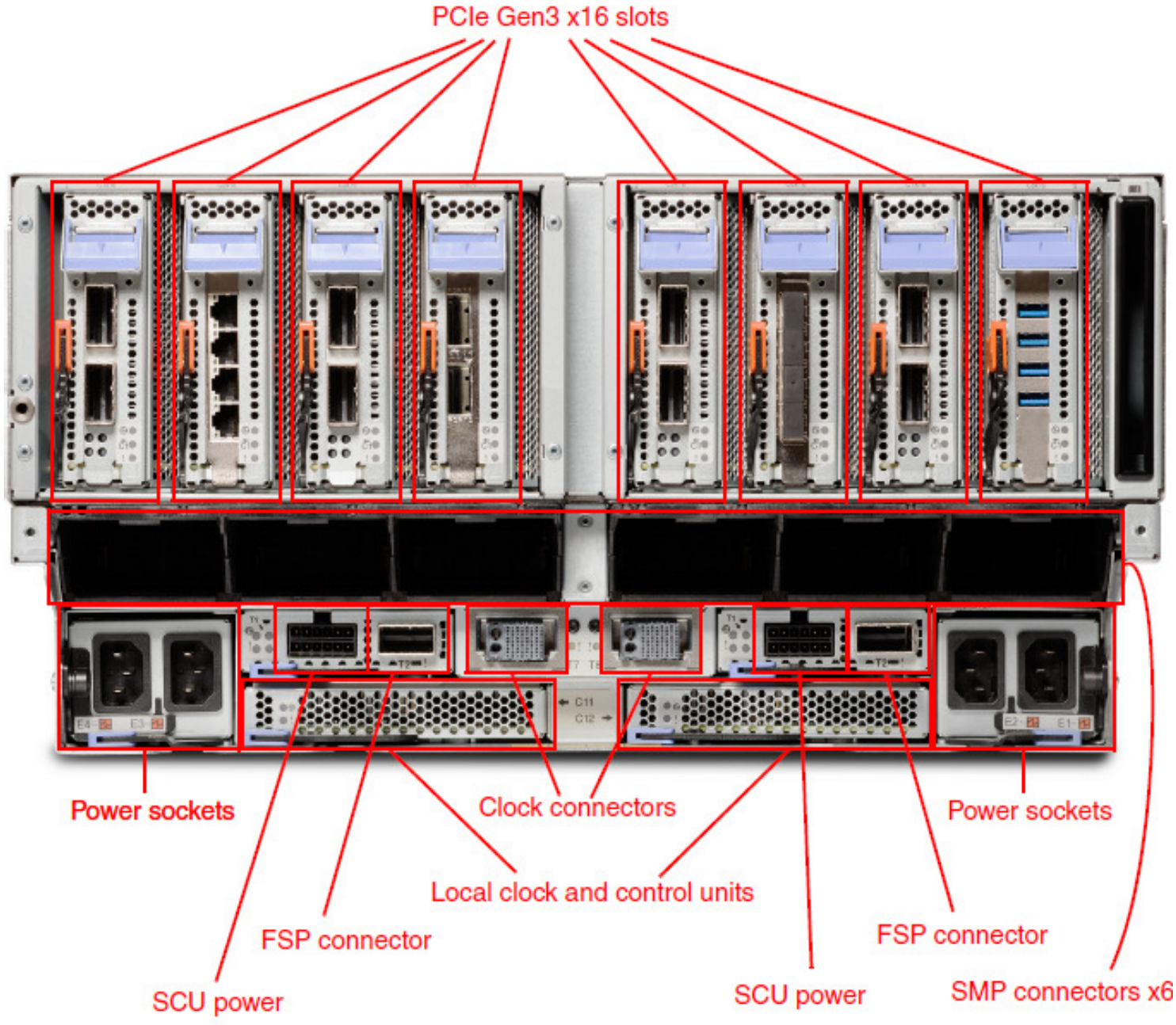
Nodes

5U
- Heavy 55kg / 121 lbs
- No Full Height PCIe
- 8 Low Profile PCIe

CEC Nodes (Central Electronic Complex)

CPU + RAM + 8 adapter slots

CEC Nodes


PCIe Gen3 x16 slots
Power sockets
Clock connectors
Power sockets
Local clock and control units
FSP connector
FSP connector
SCU power
SCU power
SMP connectors x6

CEC Nodes

PCIe underneath comms + Power

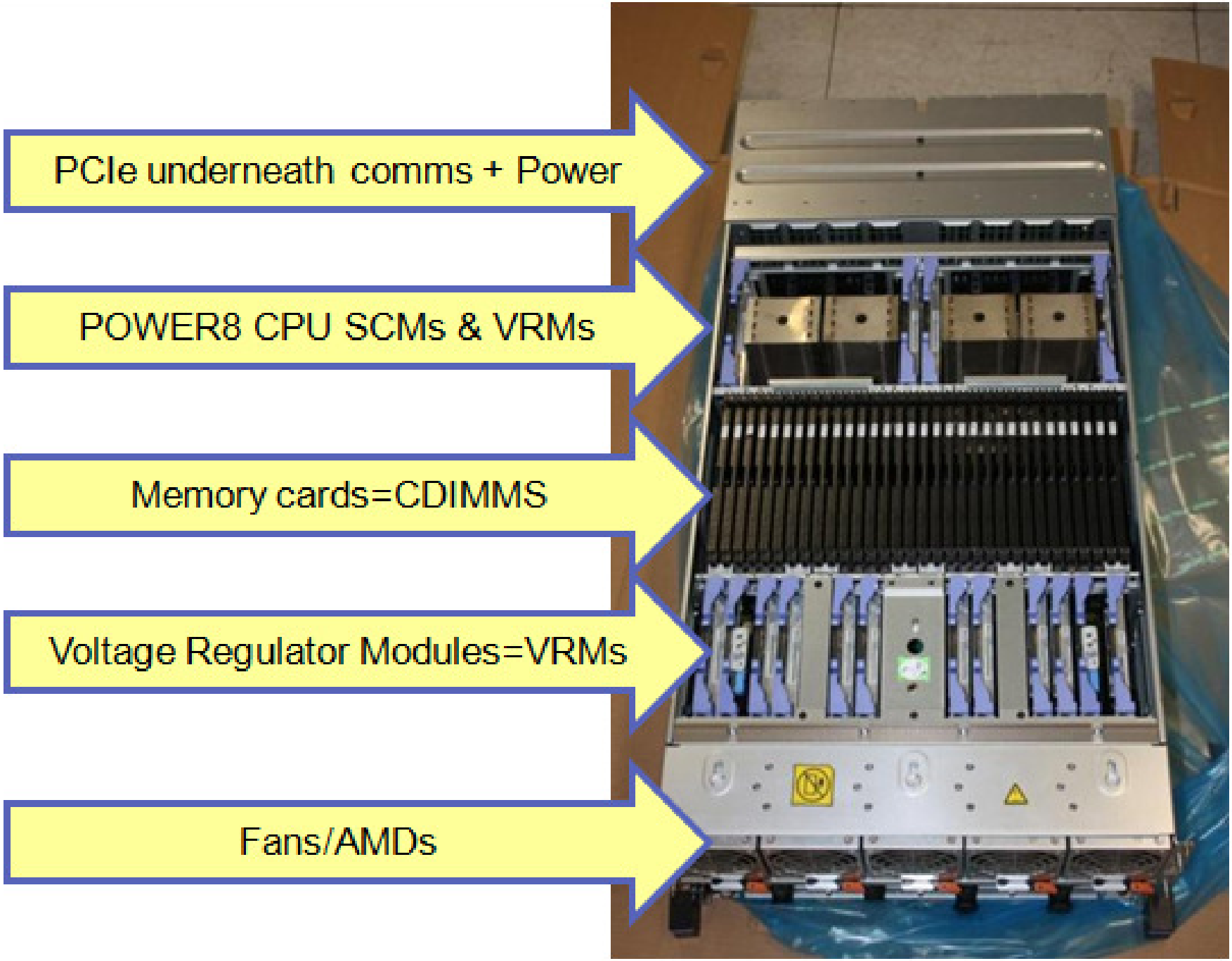
POWER8 CPU SCMs & VRMs

Memory cards=CDIMMS

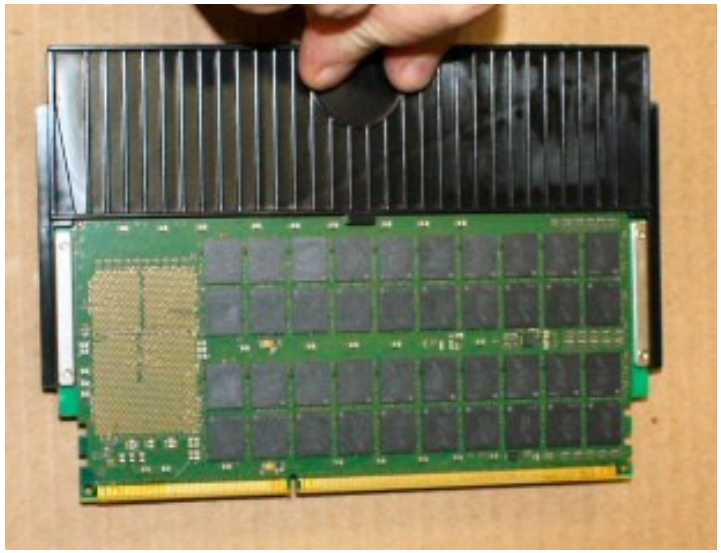
Voltage Regulator Modules=VRMs

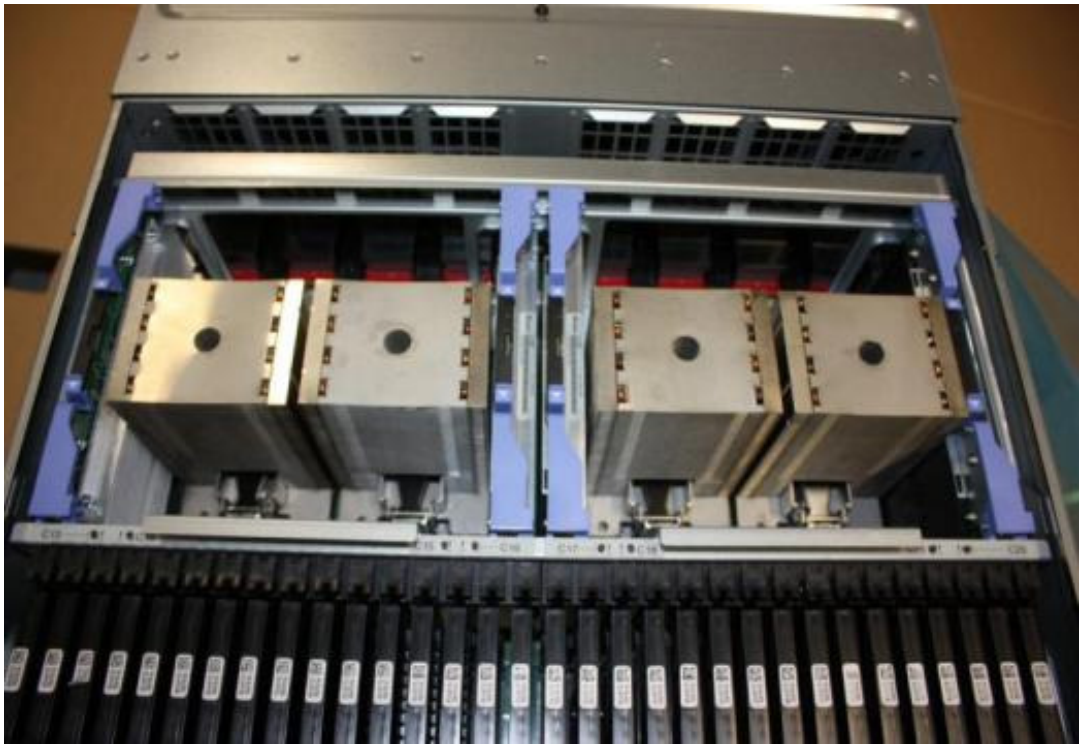
Fans/AMDs

CEC Nodes


PCIe underneath comms + Power
POWER8 CPU SCMs & VRMs
Memory cards=CDIMMS
Voltage Regulator Modules=VRMs
Fans/AMDs

CEC Nodes – Memory cards with L4 cache



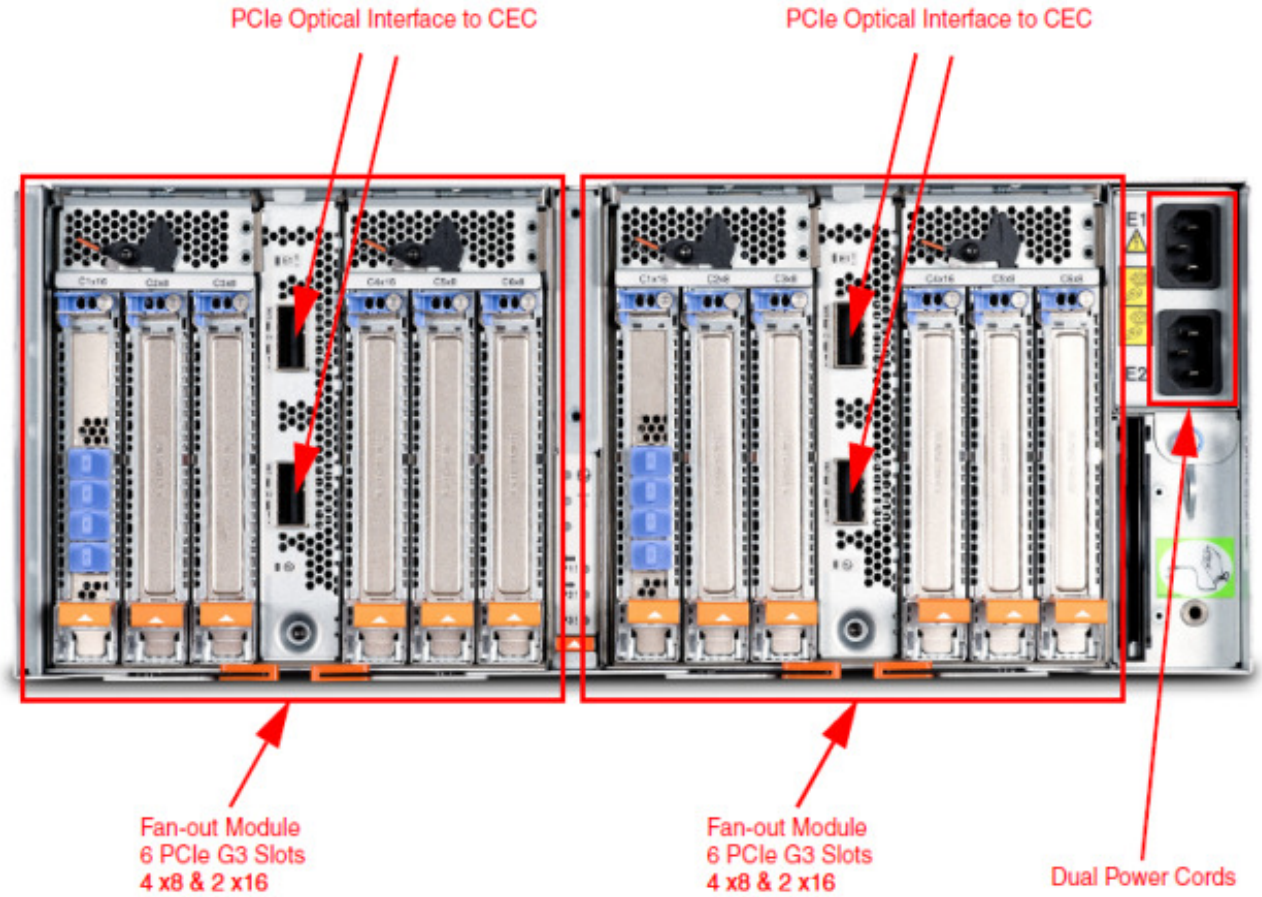


CEC Nodes – Low height adapter carrier

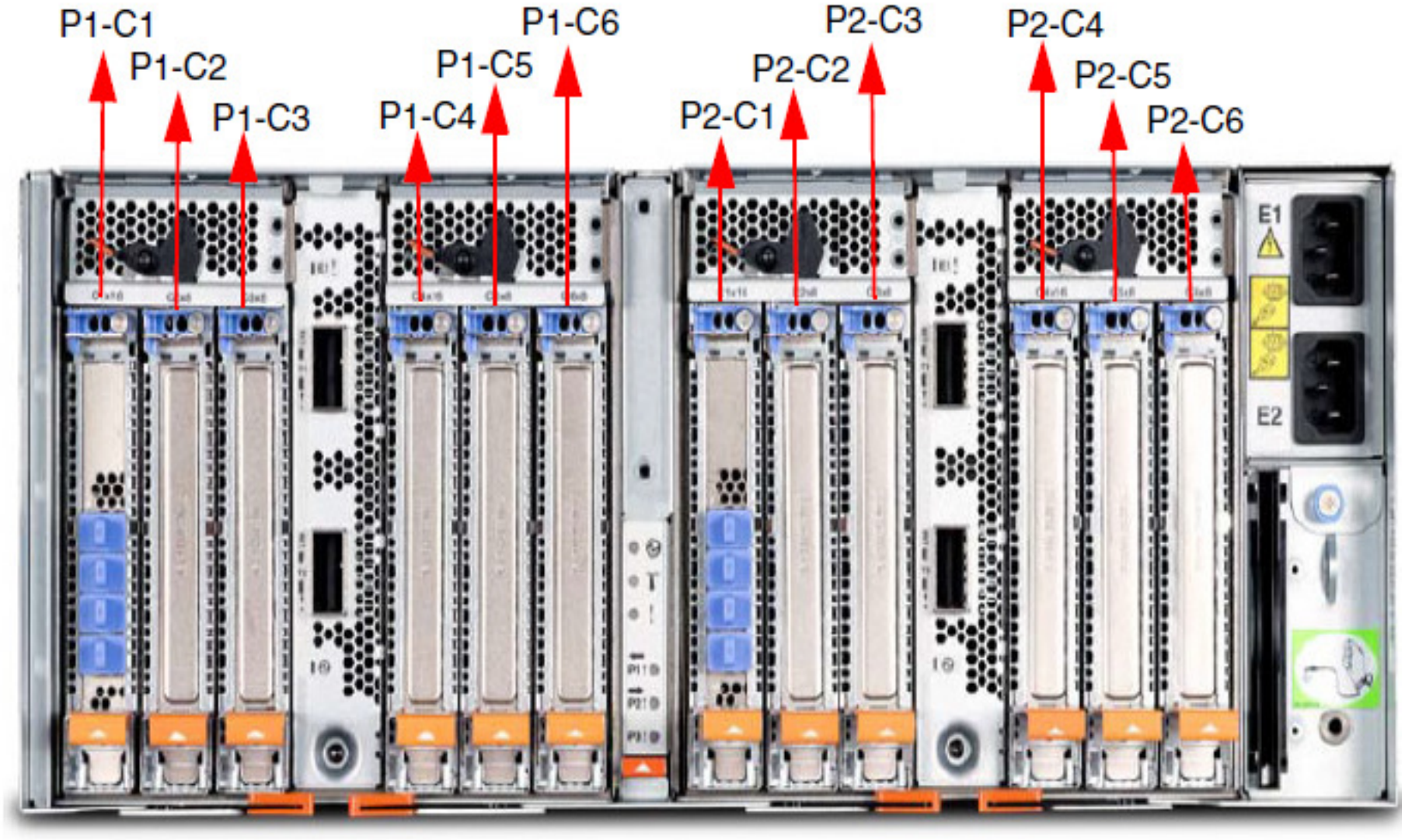
CEC Nodes – placed on rails

I/O Drawers

I/O Drawers


PCIe Optical Interface to CEC
PCIe Optical Interface to CEC
Fan-out Module
6 PCIe G3 Slots
4 x8 & 2 x16
Fan-out Module
6 PCIe G3 Slots
4 x8 & 2 x16
Dual Power Cords

I/O Drawers



I/O Drawers - Fanout

SCU to CEC Cabling – clock flex cables

CEC to SCU Cabling – UPIC cables

•Universal Power Interface Cable

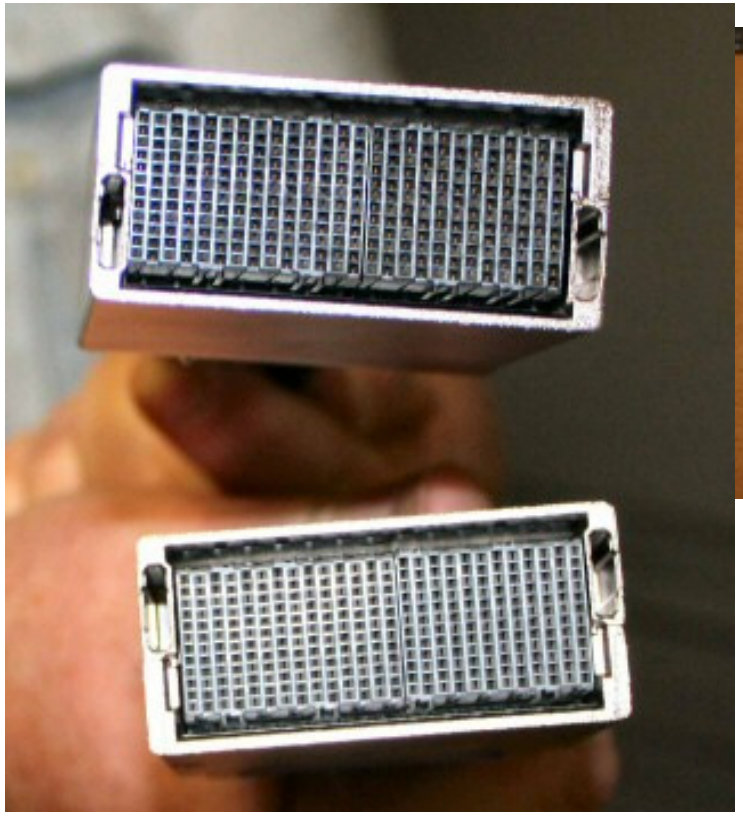
Cabling – Clock and UPIC cables

SCU to CEC Cabling – GFSP cables

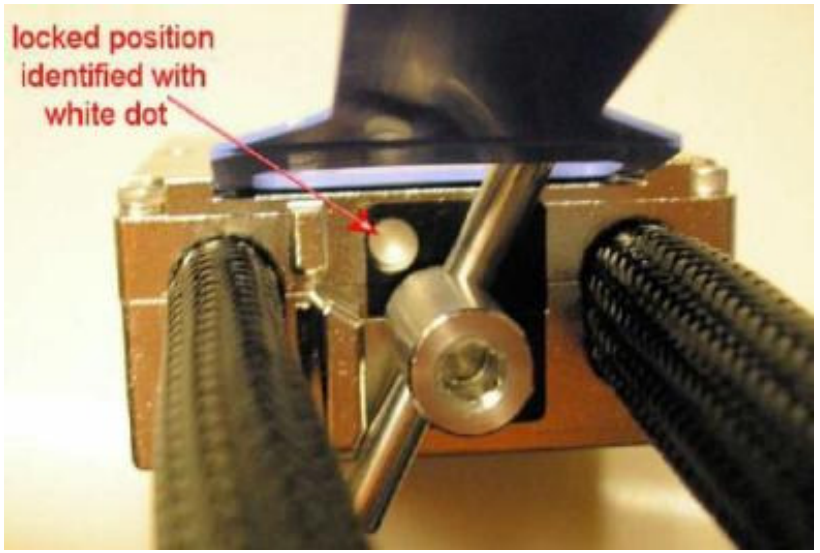
- Global Flexible Service Processor Cable

CEC to CEC Cabling – SMP cables

•Symmetric Multi Processor Cable



•4mm Hex



12*26=312

Cabling to I/O drawers

•CEC NODE Adapter slot

•I/O Drawer

•Intelligent cables!

I/O Drawer – SAS Drawer cables

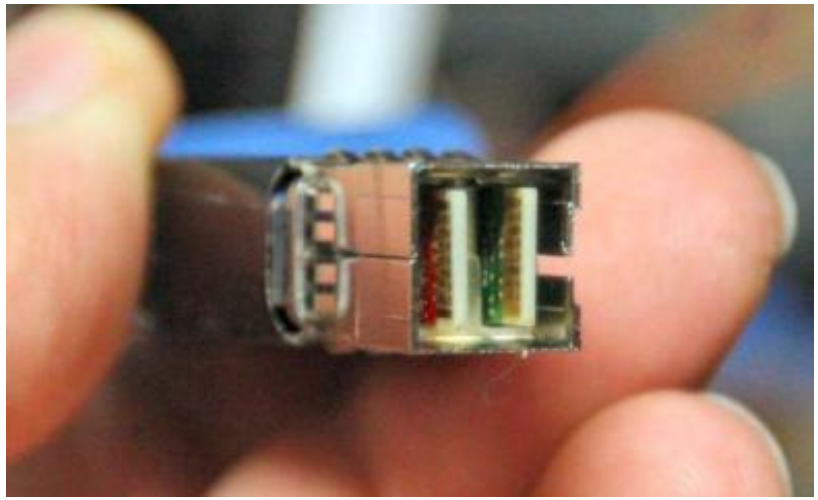
SAS Connectors

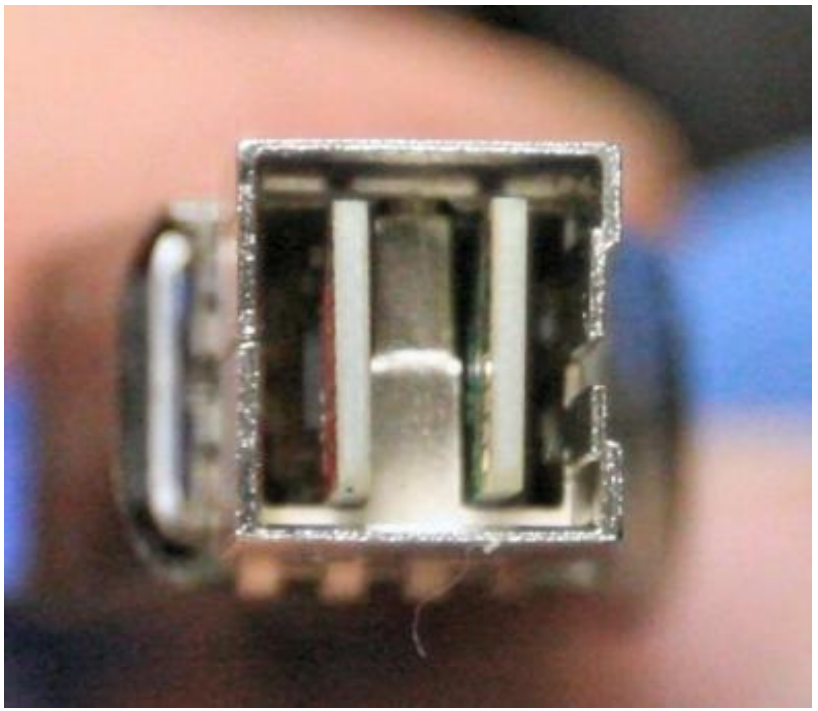
Make sure that you insert the plugs in the correct orientation.

They are square!

They lock into place with a click.

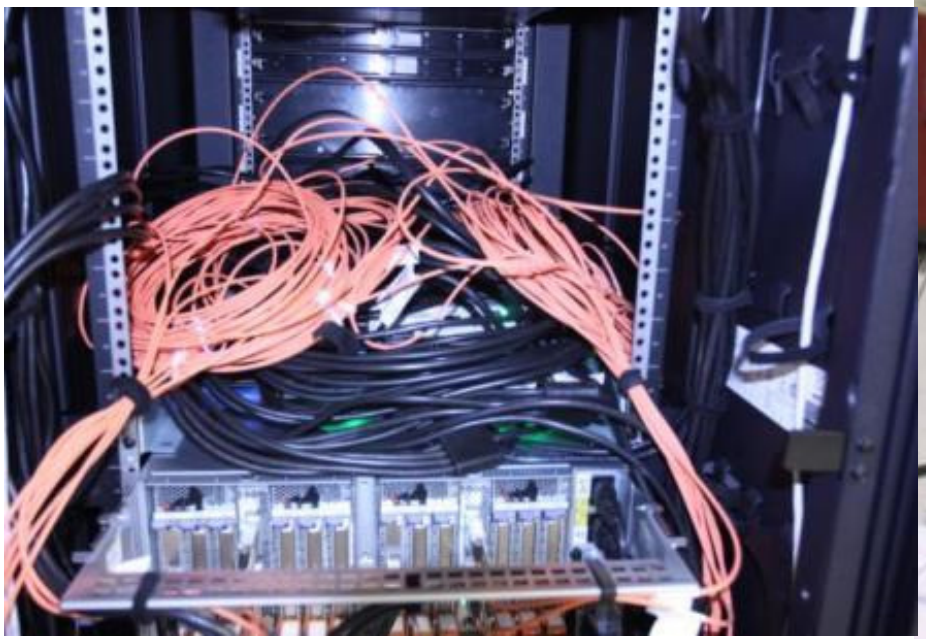
Pull the blue tab to release.

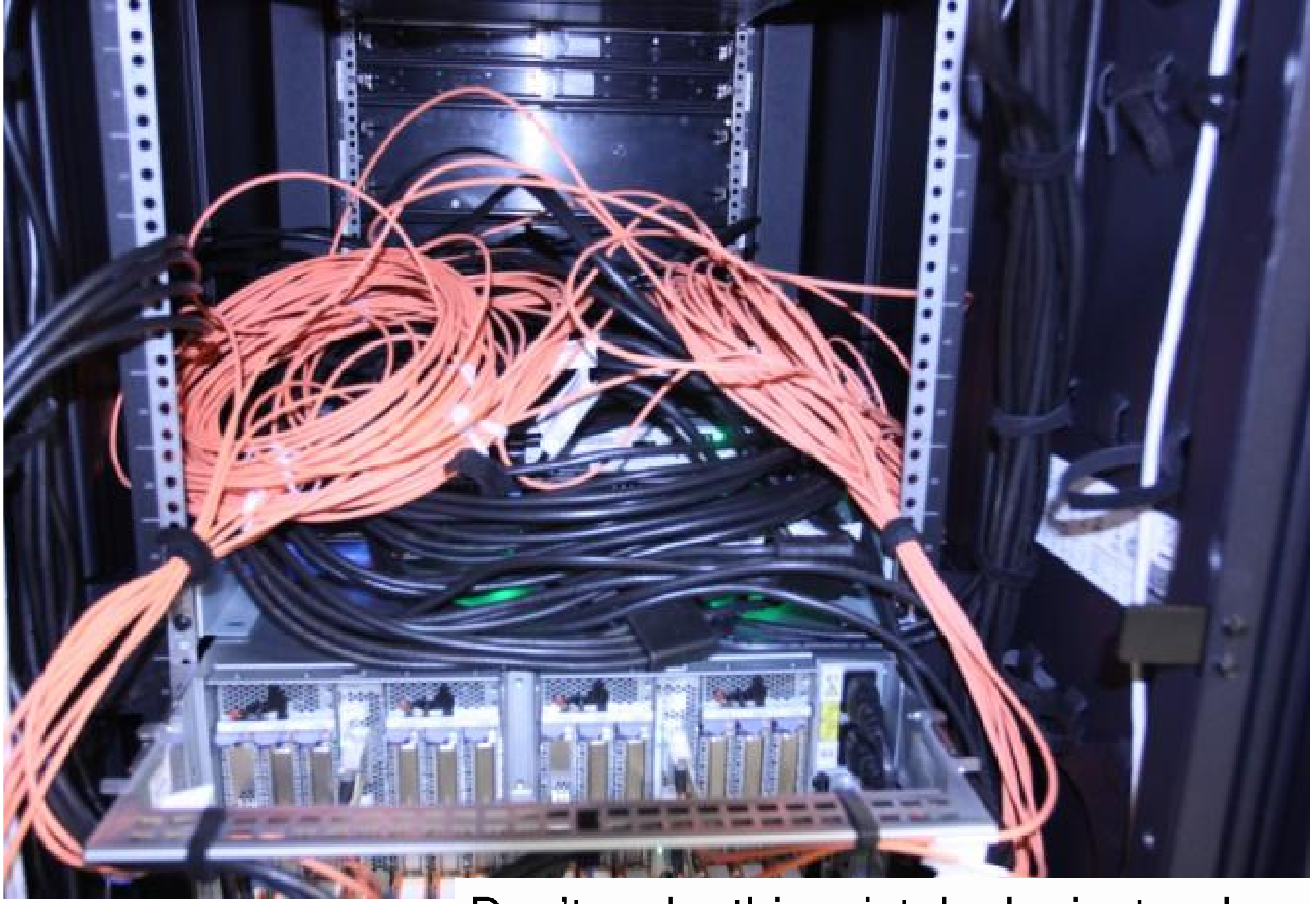




Cabling – lengths

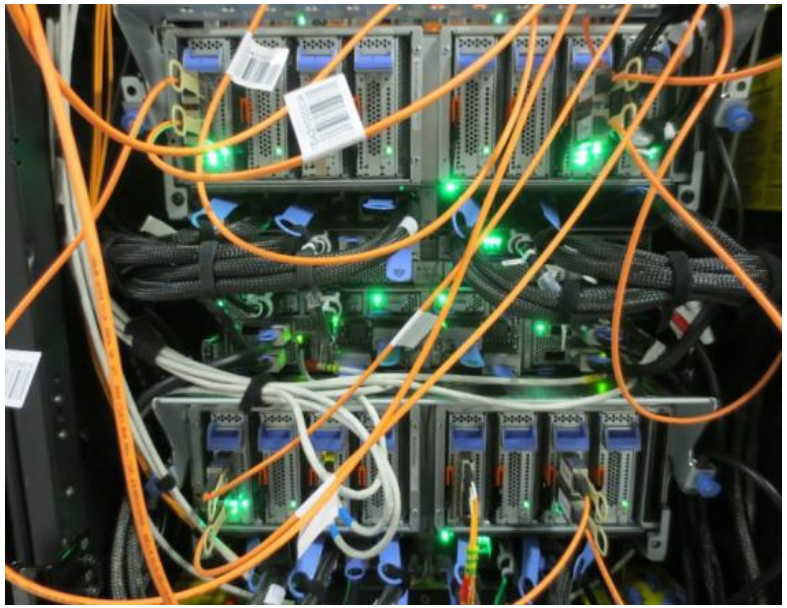
Cabling – lengths





Don’t make this mistake by just order the longer cabled to be safe

Initial quick plug-in to check the machine worked

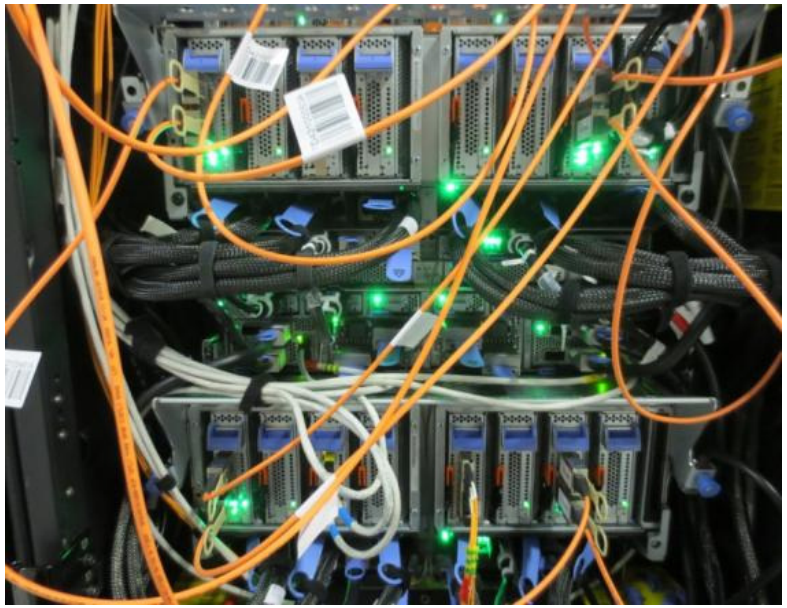


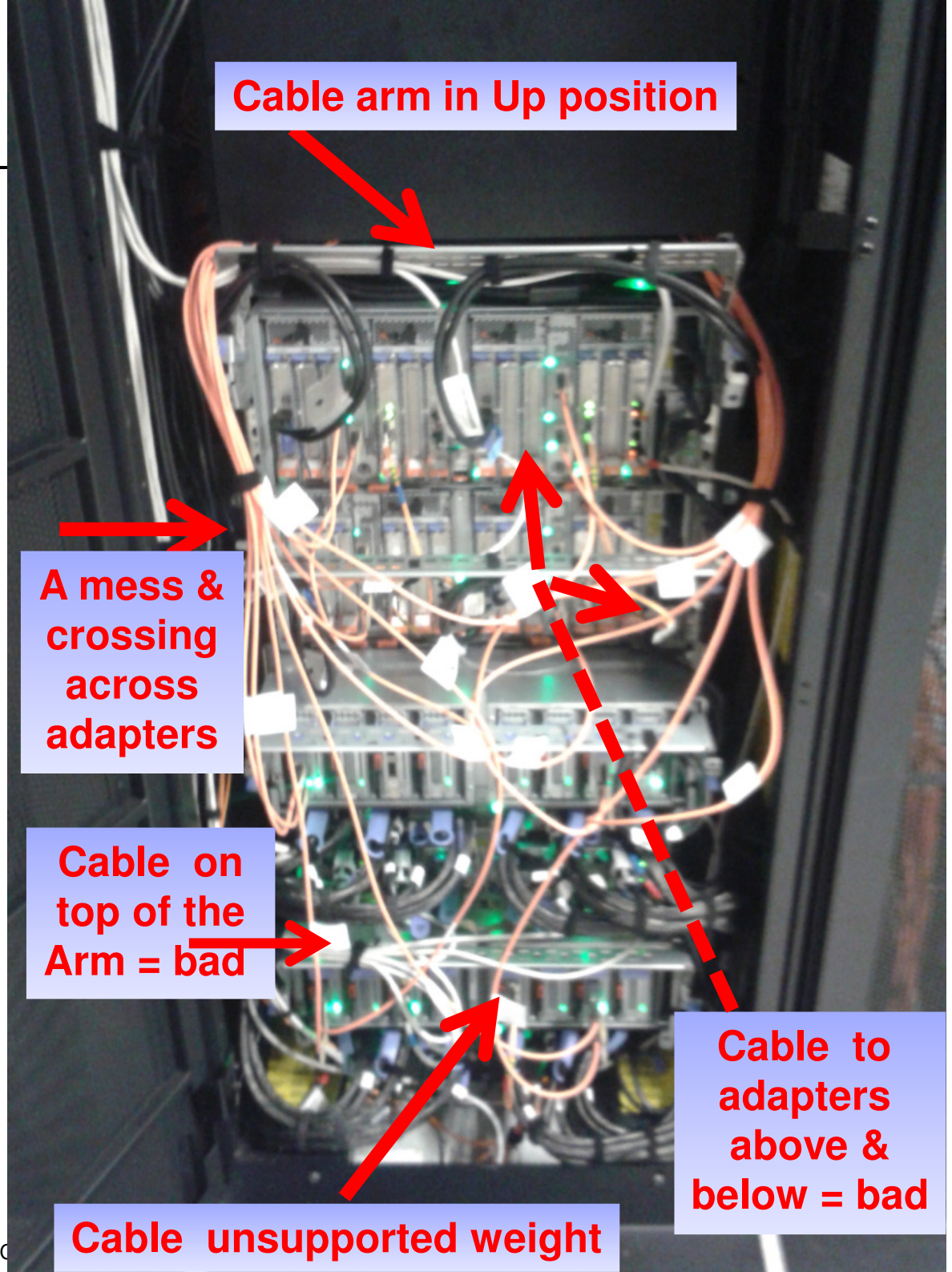
We did lots of testing of alternative I/O Drawer cabling options for Austin
- Thick optical orange cables

Also eager to connect up Ethernet & FC to get VIOSs and VMs running to start testing

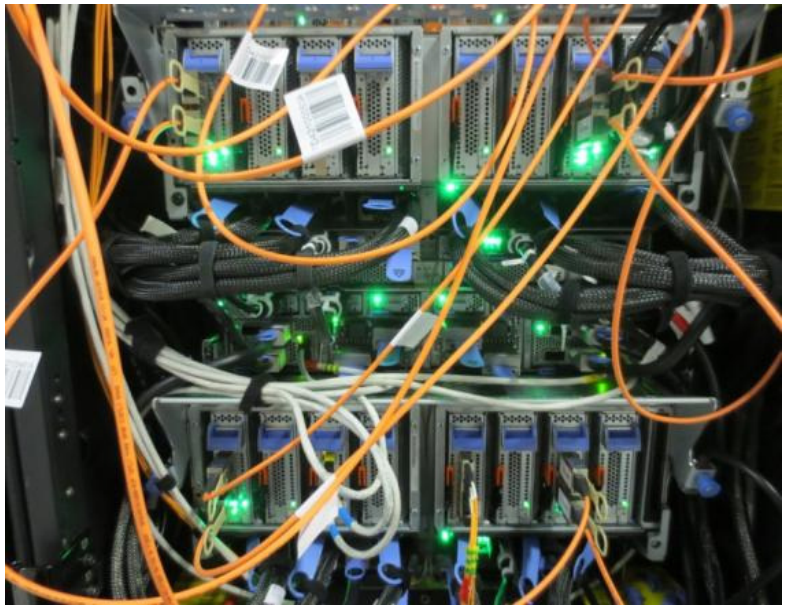
We planned for a tidying later!!

Quick tidy up

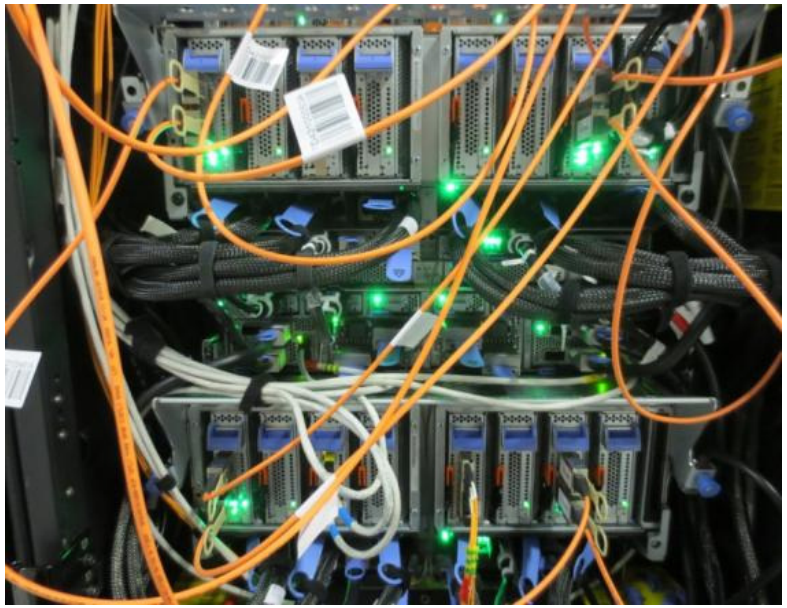


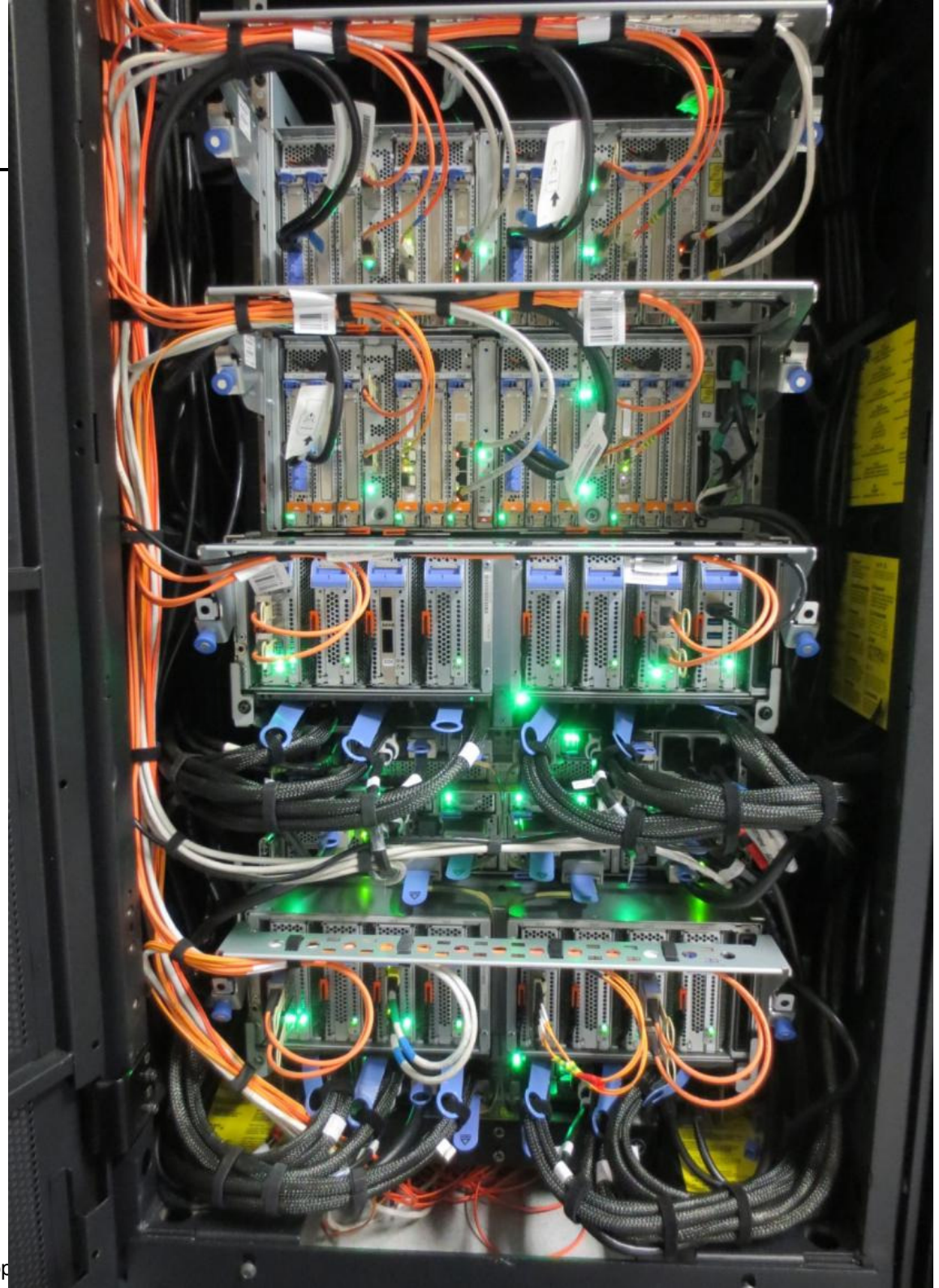


Then we let the export guru loose



Clive Benjamin UK PE





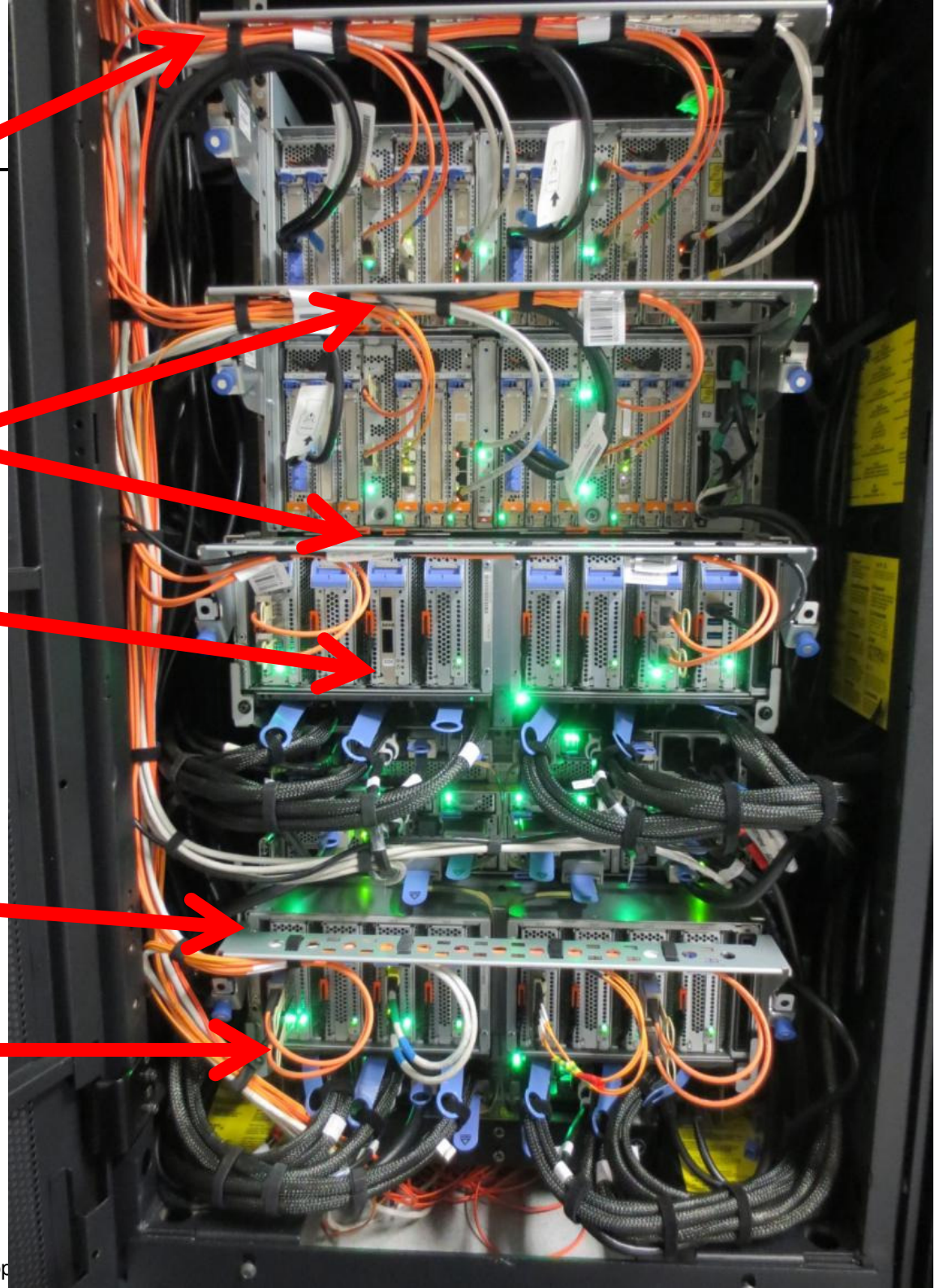
Every cable is support for entire length = no weight on plugs

Cables attached underneath so above adapters can be removed without snagging

Every adapter has a clear path for removal

Cables attached to the cable tidy arm in the high position so they aren't stretched

4 inches diameter for I/O Drawer cables (minimum)



POWER8 Enterprise mandatory HMC 8.20

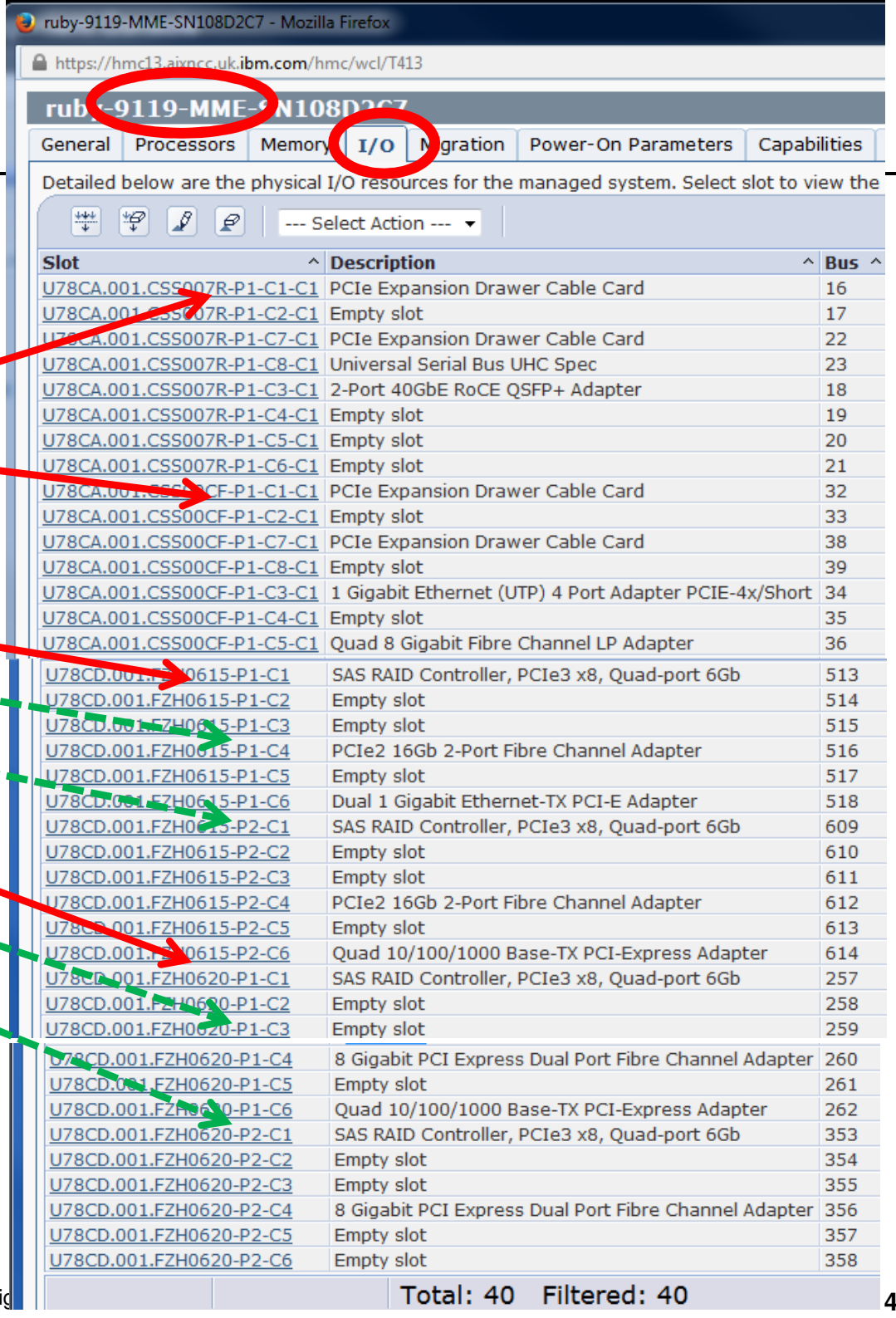
- Will work with POWER6 and above
  - Not with POWER4 nor POWER5
- Check your POWER6, POWER7 have current System Firmware & VIOS
- Regular rules apply:
  A Systems should not be connected to different HMC levels as in 7 and 8
- See AIX Virtual User Group webinar on HMC8 for details

HMC 8.20 Adapter Slots

U78CA.001.CSS007R-P1-C1-C1

E870 → U78CA.001.CSS00**
CEC1 → 7R with slots C1 to C8
CEC2 → CF with slots C1 to C8

I/O drawer 1
→ U78CD.001.FZH0615
→ slots P1 C1 to C6
→ slots P2 C1 to C6
I/O drawer 2
→ U78CD.001.FZH0620
→ slots P1 C1 to C6
→ slots P2 C1 to C6



I/O

615-P1-C1 to C6
615-P2-C1 to C6

I/O

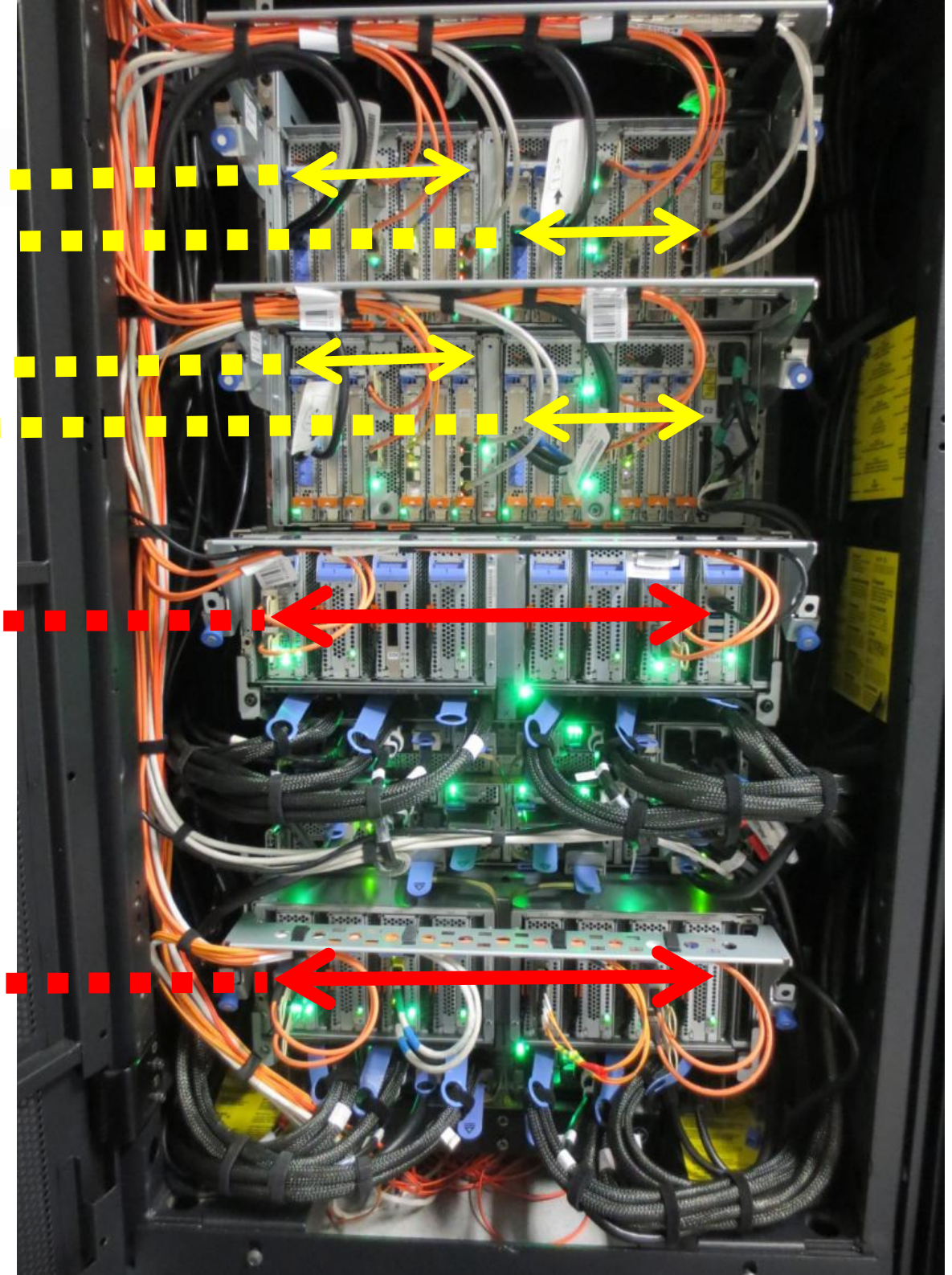
620-P1-C1 to C6
620-P2-C1 to C6

CEC

7R-C1 to C8

CEC

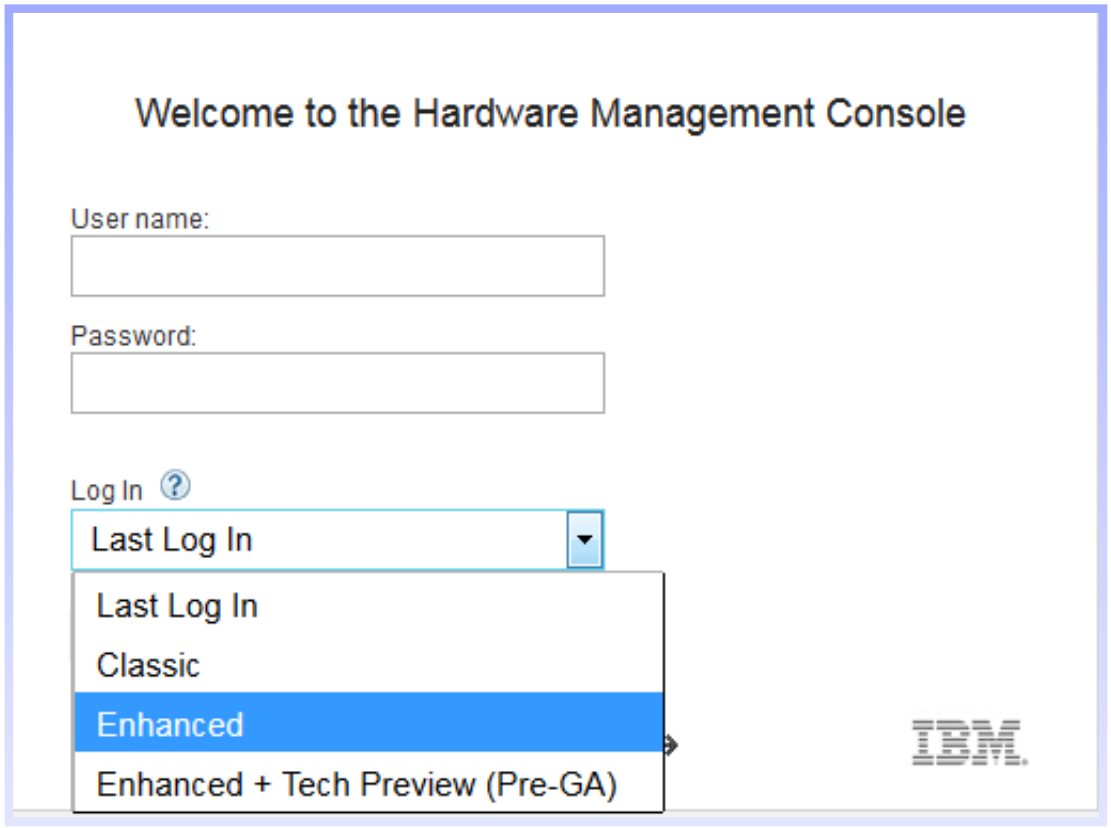
CF-C1 to C8



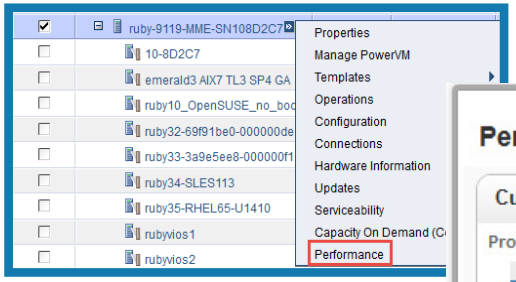
POWER8 Enterprise mandatory HMC 8.20

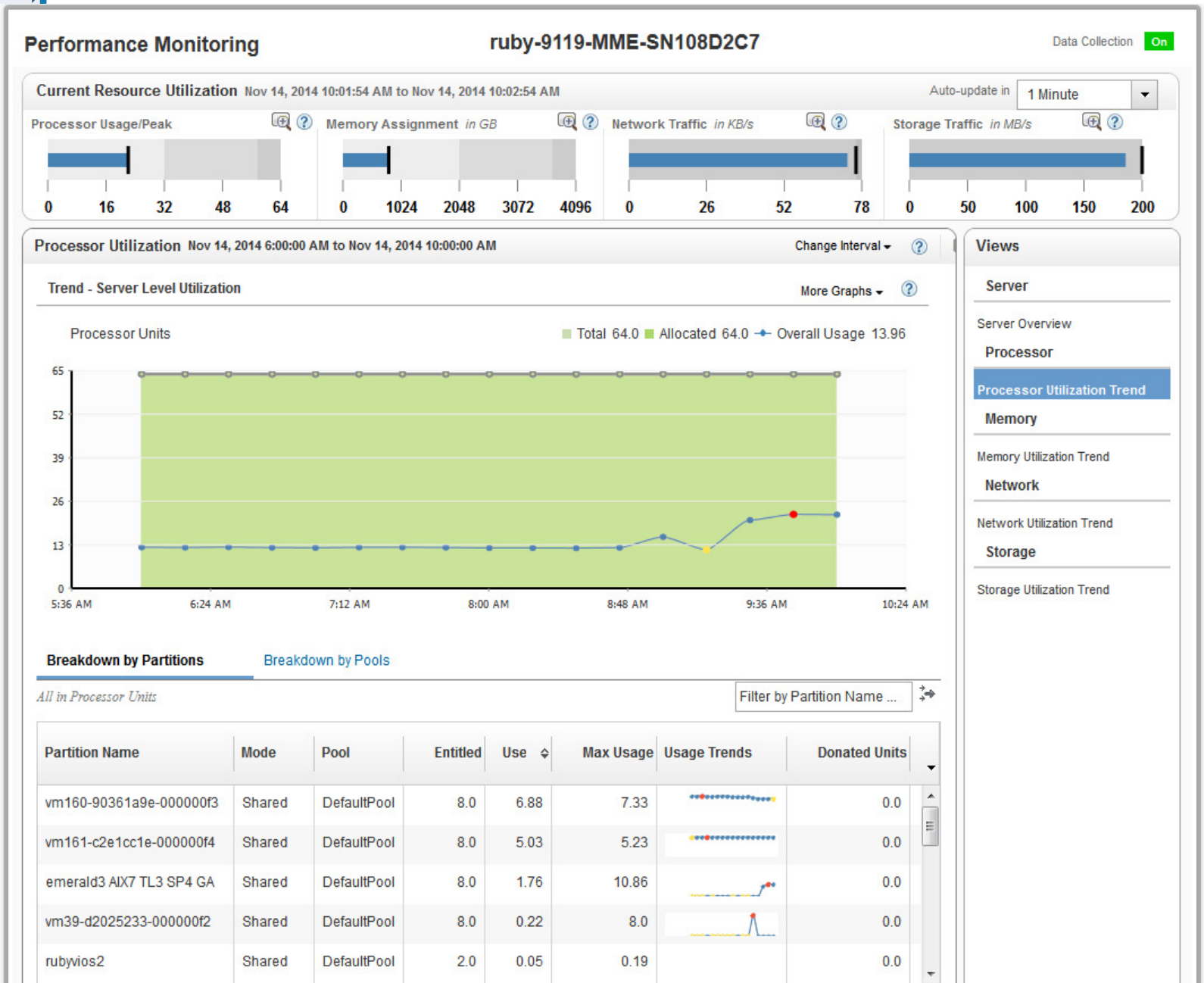
- HMC three modes
  - Classic
  - Enhanced GUI
  - Enhanced Technical Preview

  Also called:
  - Boring, clunky & click city
  - Interesting …
  - Wow!



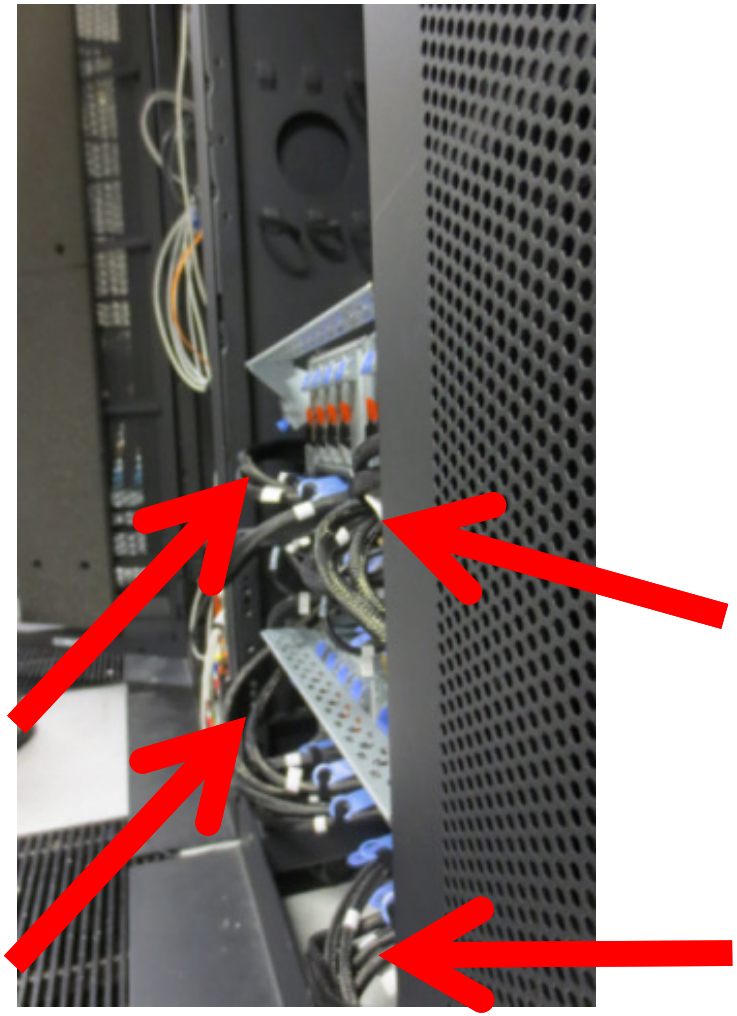
Enhanced – Performance Capacity

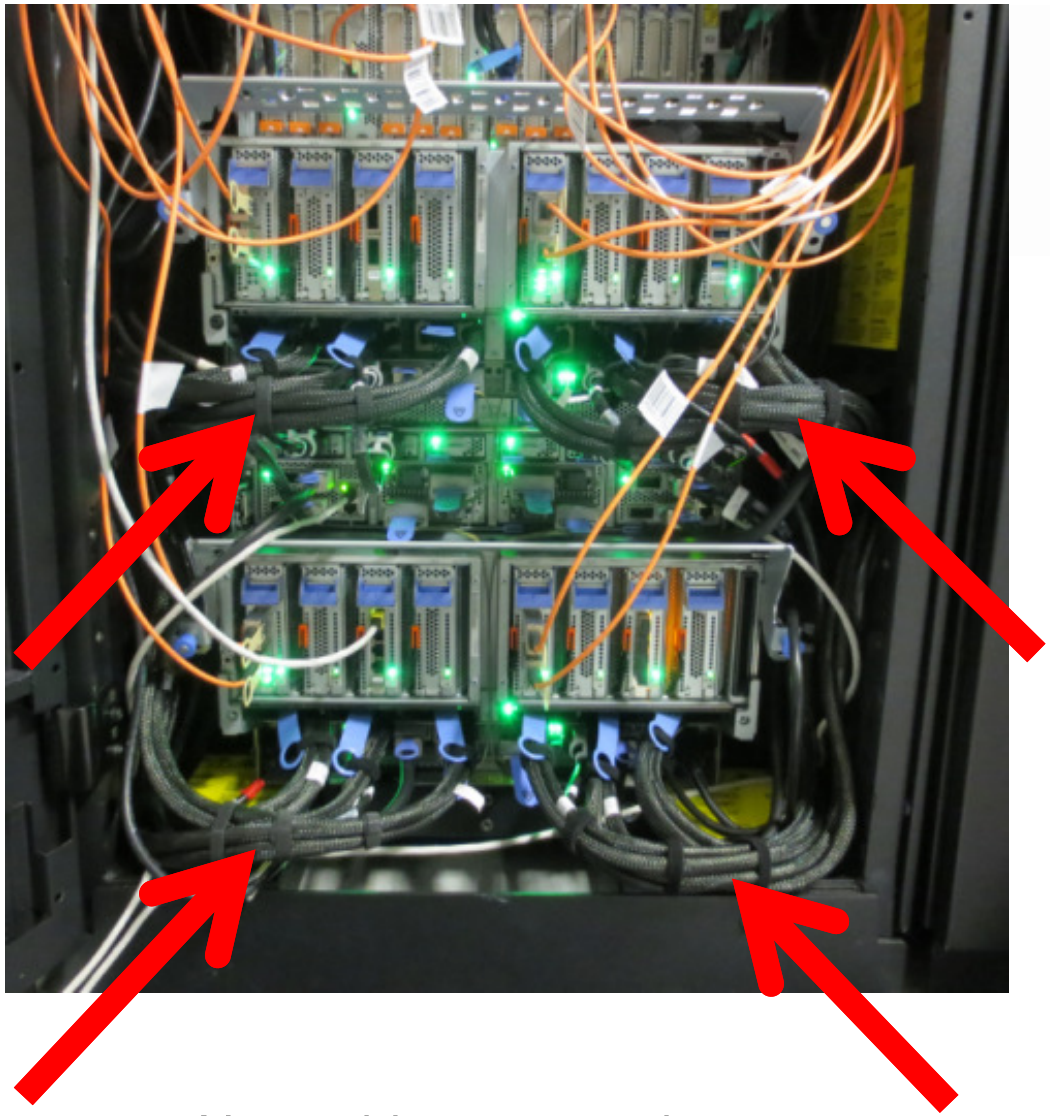




Be aware f the big SMP cables

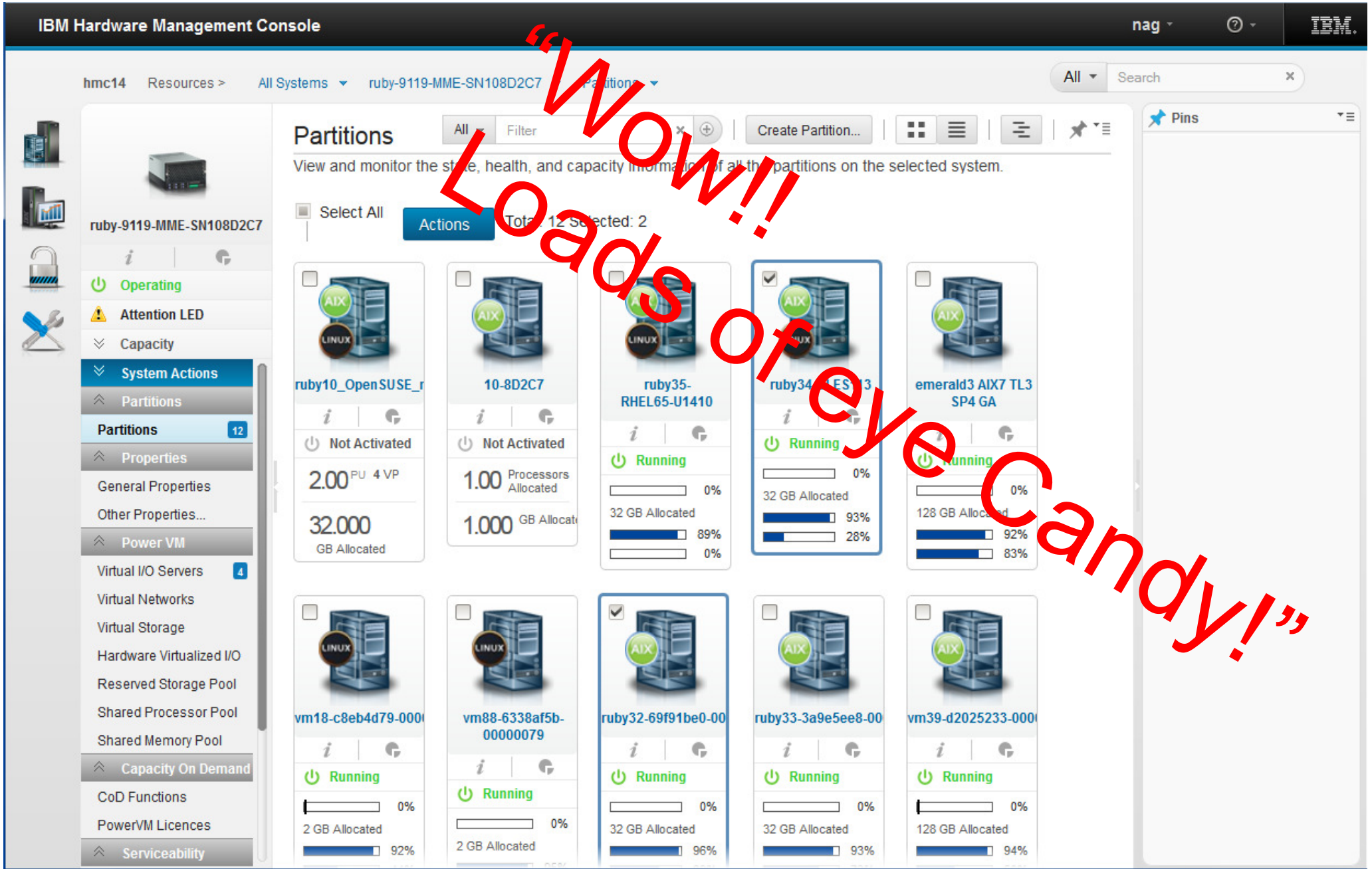
Rear of CEC node space is limited





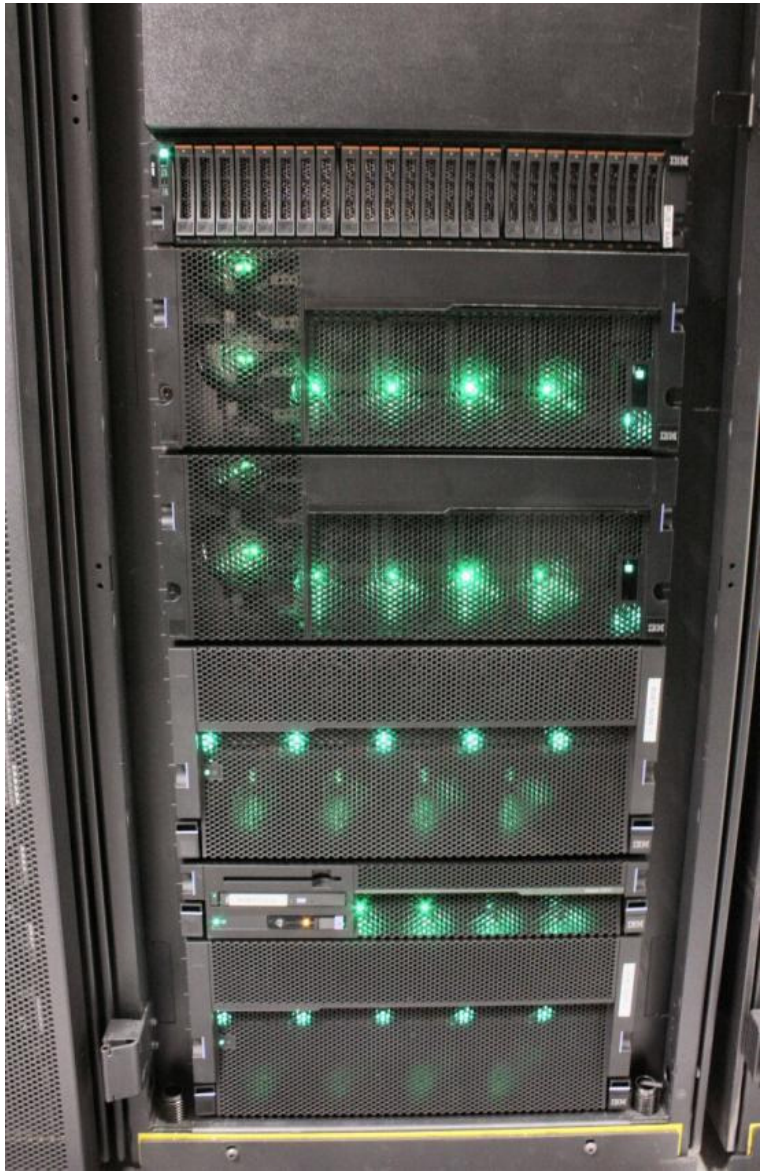
- Now add 38 extra adapters and ~70 adapter cables !!!!

HMC 8.2+ has Enhanced – Tech Preview



"Wow!! Loads of eye Candy!"

“No changes round the front” says Mike Pearson

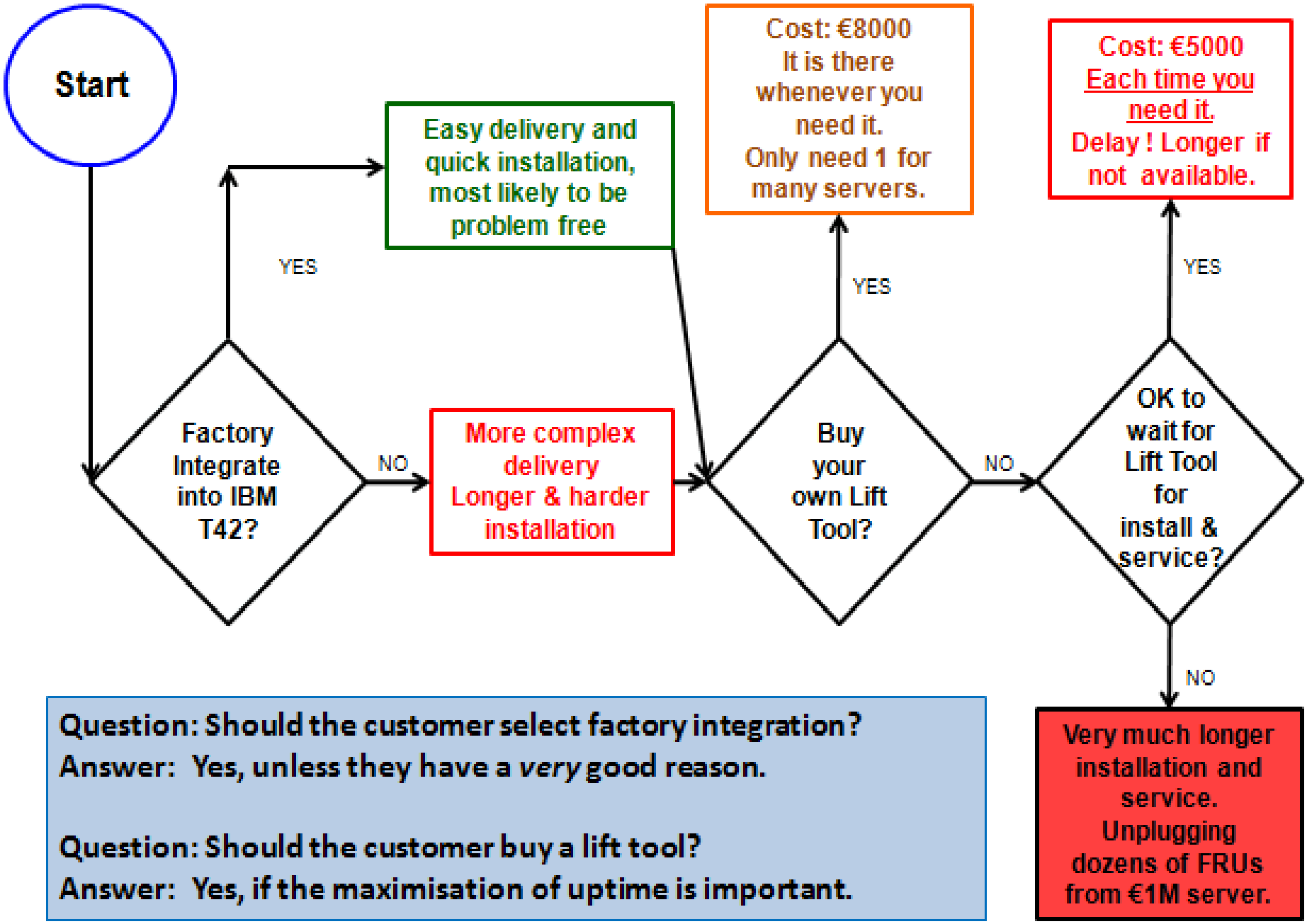


Next we have bits and bobs …

POWER 8 Lifting Tool

Lift-tool – Gareth's chart

Ball park costs
Check with your local IBM rep.



Question: Should the customer select factory integration?
Answer: Yes, unless they have a *very* good reason.

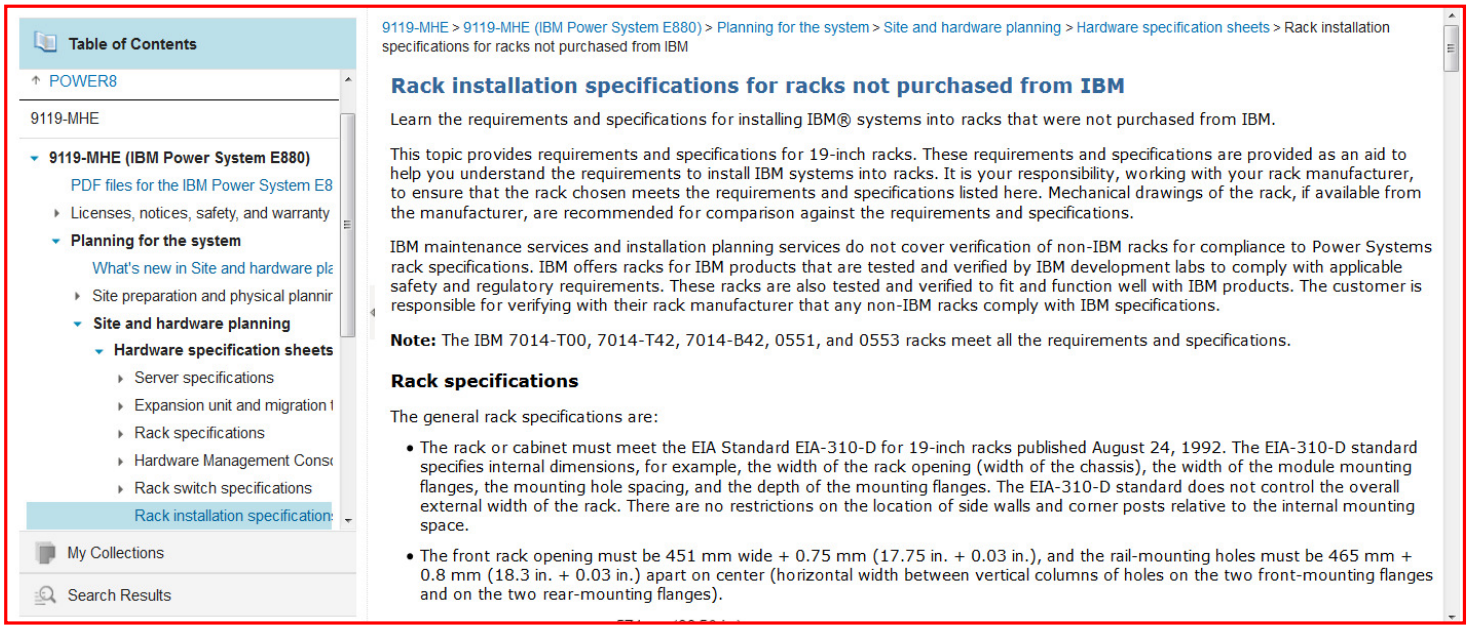
Question: Should the customer buy a lift tool?
Answer: Yes, if the maximisation of uptime is important.

OEM Racks

- IBM do not test or qualify OEM racks.
- Here is the URL on the specs that the rack has to meet:

http://www-01.ibm.com/support/knowledgecenter/9119-MHE/p8had/p8had_oemrack.htm

- If OEM rack meet these specs they should work but the customer is responsible for verifying with their rack manufacturer that the rack comply with IBM specifications.



- Two observations:
  - We strongly recommend that IBM rails are used
  - The installation will probably take even longer than a field integration into an IBM T42 rack as the SSR/CE will not be familiar with the rack
- Thanks Gareth

Small points

1. How to spell POWER8 ?

2. Briefly the differences between E870 and E880

3. Racks – please, please buy it in a new T42 rack
   - Very heavy and limited “Lifting Tool” in field
   - MUST put the machine low down in the rack

4. OS levels can mean upgrades needed (if not reasonable current OS)
   - Pure virtual LPARs much more likely to work

5. CEC drawer adapter slots are low height but EMX0 I/O drawer adapter slots are full height
   - So you can’t move adapters between them!
   - We have a CEC Node USB adapter = dumb use of CEC Node slot but can’t move it

Acoustics & exhaust

- The machine is loud and could cause hearing damage
  - Check your countries legal limits

- More CEC nodes = more noise
- Higher GHz or Performance modes = more noise
- Both for typically 8 hours a day:
  - May require: warning signs,
  - Employee hearing test programs,
  - Hearing protection may need to be worn

- Seriously consider: Acoustic doors are normal

Power saving mode now from the HMC command line

- Static power saving or not ?

- export RUBY=ruby-9119-MME-SN108D2C7

- lspwrmgmt -m $RUBY -r sys
  name=ruby-9119-MME-SN108D2C7,type_model=9119-MME,serial_num=108D2C7,curr_power_saver_mode=**Disabled**, \
  desired_power_saver_mode=**Disabled**

  chpwrmgmt -m $RUBY -r sys -o enable -t dynamic_favor_perf

- You did not used to be able to do that on the HMC CLI

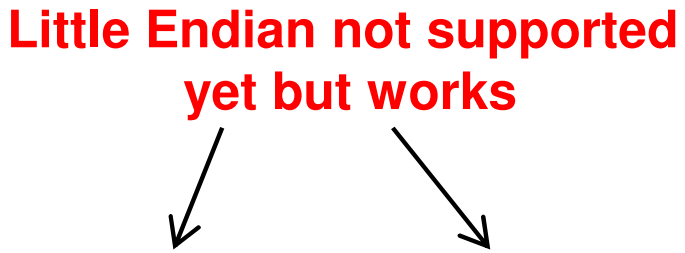
- lspwrmgmt -m $RUBY -r sys -F
  name,curr_power_saver_mode,curr_power_saver_mode_type
  ruby-9119-MME-SN108D2C7,**Enabled**,**dynamic_favor_perf**

SAFELY
Over clock
when busy
Under clock
when idle

ESP E870 – EMEA ATS (uk) - Tested

Tests

- Four VIOS 2.2.3.4 + fixes
- OSes:
  - AIX 6.9.4 & 7.3.5, RHEL6.5/7, SLES 11.3, Ubuntu 14.10, SLES12
- Local VIOS LV vSCSI disks – ok
- SSP with other P8 and P7 machines on VIOS 2.2.3.3 – ok
  - VIOS Shared Storage Pools
- LPM from other P8 and P7 – ok
- Full System mode with AIX 7.3.4
  - painful start up time due to 4TB RAM
- Stress: ncpu in the 58 CPU LPAR, nmem64, ndisk64
- PowerVC, Oracle, DB2, WAS, Day Trader
- …
- …



Power Systems

IBM i moves at last

- We failed to LPM IBM i 7.2 from S824 to E870
- Needed to clean up the LPAR
  - Remove virtual DVD = Optical devices
  - Checked all vSCSI devices connected to VIOS
- Stop the IBM i LPAR booting to the console for user action
- Applied two fixes resulting from a PMR (known VIOS issue in migmgr logging)
- And Live Partition Mobility worked fine = **Not a IBM i issue at all**.
  - This is a Shared Storage Pool based disk LPAR
- Thanks to Jyoti Dodhia and Rachel Meager for working with us
- Was a large LPAR on the S824 but seems tiny on the E870 ☺

Session so far summary

- The new POWER8 processor based Enterprise servers are beautifully engineered
- The ESP program has thrown up some things for us to fix before GA (this is a good thing), so you will never see them
- Plan carefully for racking and I/O
- IBM Recommend
  - Factory Integration
  - Acoustic doors
  - 8” Rack extension

Talking to A BIG International Bank

- Buying ~5000 POWER8 cores before end of 2015
- To move all their AIX workload to POWER8
  - Consolidate 10,000+ LPARs on 500 machines with 700 VIOS
  - All managed by 15 people → highly automated script and tools
- Standard Config
  1. E880 with 2 CECs
  2. 48 – 64 CPUs fastest GHz
  3. 1 TB RAM
  4. Both CECs full adapters
  5. **Dual VIOS** each with
     - two Network cards at 10 Gb
     - four FC cards at 8 Gb
  6. Other adapter slots for private LPM network and ultra encrypted net
  7. Every LPAR has a few TB space on non-IBM disks – uck!
  8. **No I/O Drawers so no internal disks**
  9. **FC boot everything**
  10. **T42 rack Factory Integrated** – "Mad not too!"
  11. "May" use **Shared Storage Pool** for migration P6/P7 to POWER8 to remove proprietary MPIO and move to AIX / VIOS MPIO

AIXpert Blog - http://tinyurl.com/AIXpert

A. POWER8 Enterprise Power E870 - First Look

B. POWER8 Enterprise Power E870 - 2nd Look at the Cabling

C. Power System E870/E880 - Reserved Memory too high by 100's GB?

- It's a feature you can switch off

D. Power System E870/E880 & HMC 8.2 Early Experience with Wrinkles

- 1) **Hidden Fixes on FixCentral** = annoying
- 2) **AIX command smtctl on large LPARs (58 CPUs or move)**
  - Switch off probevue
- 3) **HMC's new Graphical User Interface-Tech Preview** → Forum supported
  - http://tinyurl.com/HMC8-Tech-Preview-Forum
- 4) **HMC Virtual Storage Management Panel shows the Shared Storage Pools LU disks . . . poorly** = annoying
- 5) **Some non-critial AIX stats are wrong**
  - lparstat -E and nmon PURR stats after dozens of Dynamic LPAR changes
- 6) **HMC 8.2 does not work with Nigel's Internet Explorer 11 Browser**
  - Say no more!


POWER8
You're going to need
bigger data
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IBM

Next Time

Feb 4th
The "Key" to IBM i Licensing &more - Part1 with Andy Fellows

Previous Sessions:
Linux on Power: Best Pract
Linux for AIX/IBM i guys
PowerKVM Deep Dive
More Tricks Power Masters
Power8 from hands-on
Power up your Linux
PowerVC
PowerVP
SSP4
Best Practices
Tricks of Power Masters
IBMi and External Storage
And more…..

Future Sessions →

- Feb 11th - The "Key" to IBM i Licensing & more - Part2
- Mar 4th - HMC 8.20 User Interface Tech Preview
- Suggestions Welcome

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