Today

POWER8 E850 from hands-on experience

Starting at 10:00 am UK time by Nigel Griffiths and Gareth Coates

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:
PowerSC Tools for IBM i
HMC 8.20 Tech Preview
The "Key" to IBM i Licensing
POWER8 E870 from exper
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
And more…..

Future Sessions →

- July 22nd - Linux on POWER Field Experience
- More Being planned
- Suggestions Welcome

Webinar wiki: http://tinyurl.com/PowerSystemsTechnicalWebinars
Youtube Channel: http://tinyurl.com/IBMPowerVUGYoutubeChannel

Twitter:
Gareth Coates @power_gaz
Jyoti Dodhia @JyotiDodhia
Nigel Griffiths @mr_nmon
Mandie Quartly @mandieq

Session 47:

POWER8 E850
from hands-on experience

POWER Advanced Technology Support
IBM Europe

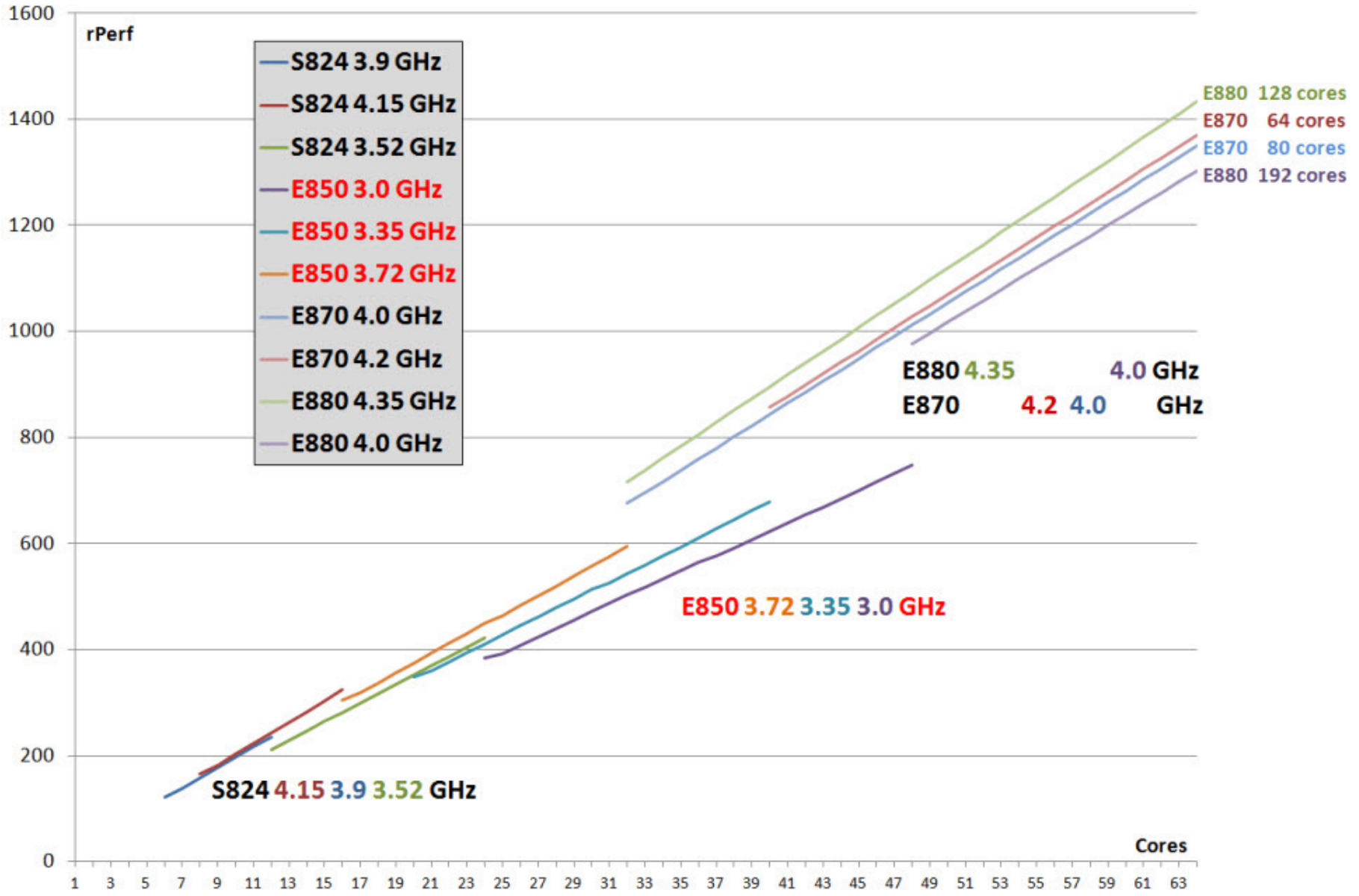
Nigel Griffiths

Gareth Coates

Abstract

- Be the first to learn about the E850 Power System before it becomes generally available (GA)!
- This session explores what was found during hardware and software testing with loads of pictures and some demonstrations.
- Get to know the machine before it arrives in your computer room because this is going to be a popular configuration and high performance model.

Model Comparision

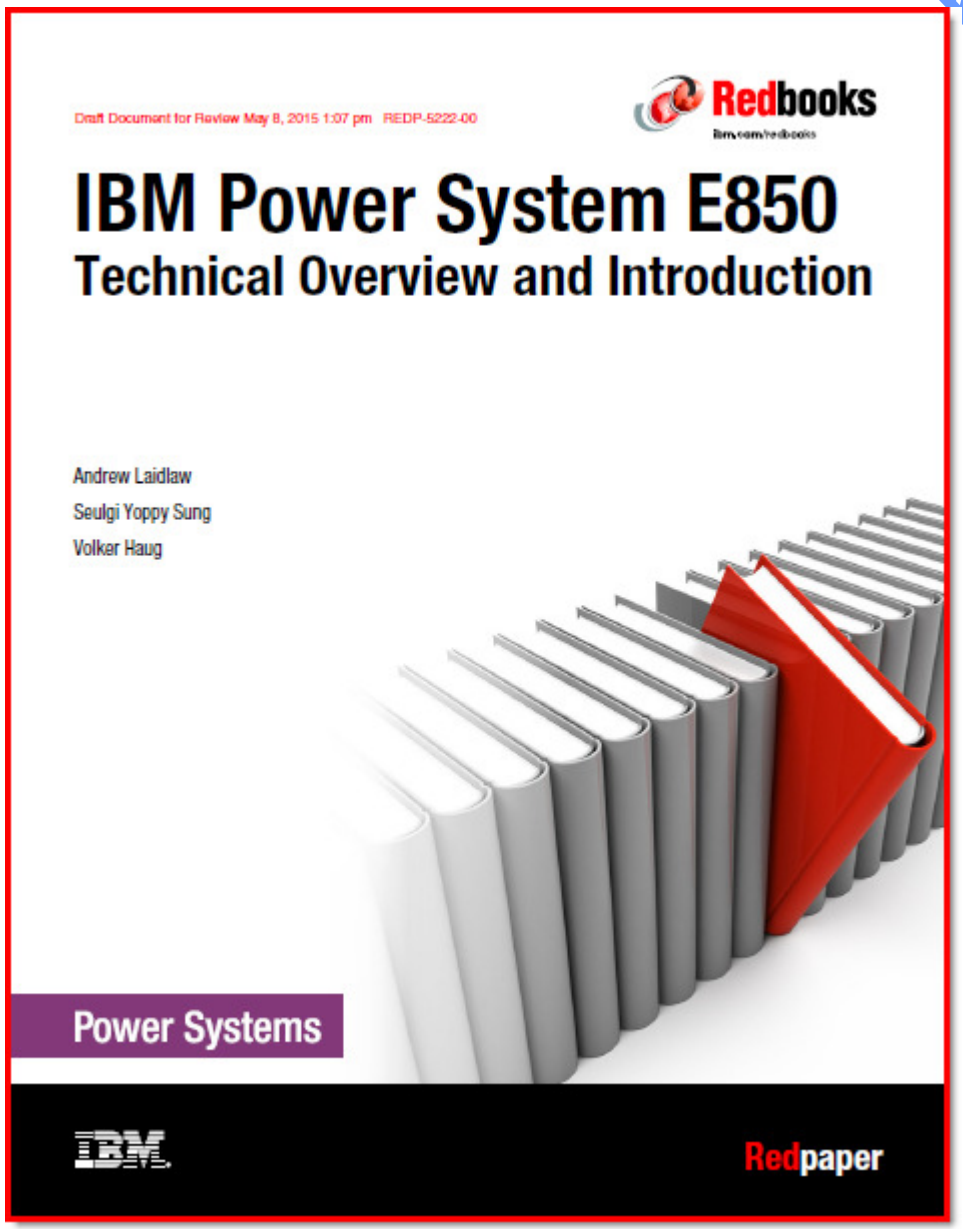


IBM Power System E850

- **Announcement date** **11th May 2015**
- **Planned Availability date** **June 5, 2015**
- Machine type name: IBM Power System E850 server
- Machine type model: 8408-E8E
- New Style Announcement
  - http://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/9/877/ENUSZG15-0009/index.html&lang=en&request_locale=en
- **http://tinyurl.com/PowerE850announce**

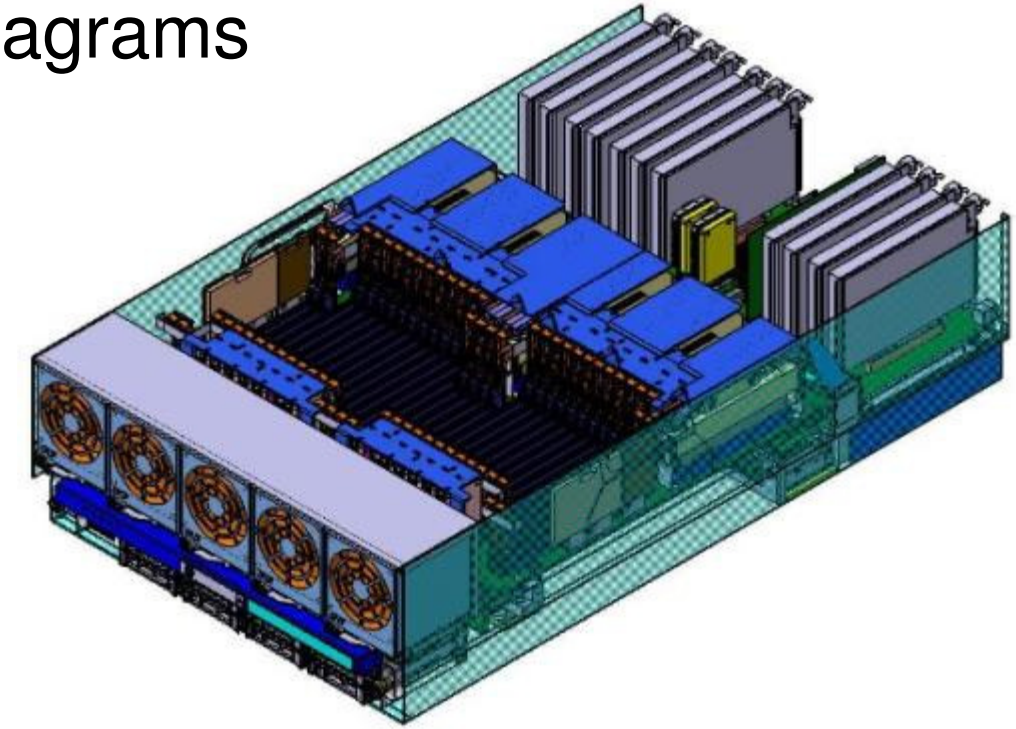
Stop Press

- E850 Redbook
- Just out, 3 week ago
- 200 pages



So far:

- We have seen the diagrams



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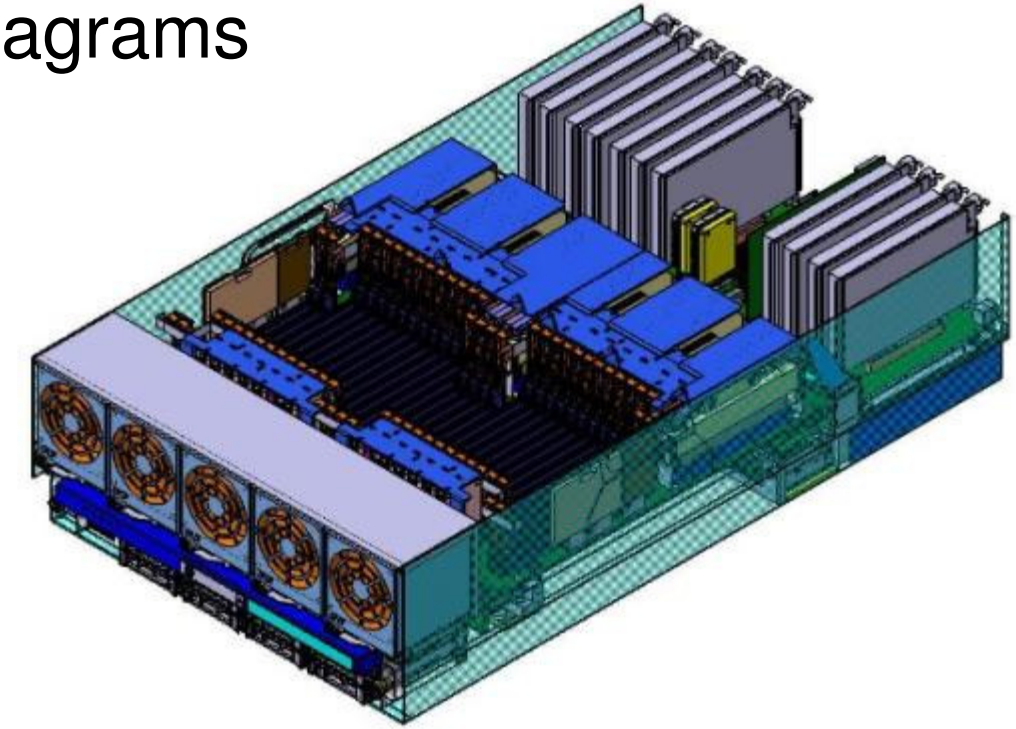
- We have seen the diagrams



- But what does it actually look like?
- Is it easy to install?

Warning

about pictures and features:

- This is an early / “proto-type” box
  - Details may differ from Generally Available machines
- Including but not limited to:
  - Packaging
  - Missing labels & Warning stickers
  - Handle colours may be different
  - Air flow barriers may be different

Early Ship Program – my E850 config

- E850 → 32 cores at 3.72 GHz using 8 core sockets
- 512 GB memory (32 x 16 GB) plus AME

- Split disk backplane RAID Controllers EPVP
  - 4 x 600 GB 10K Disks ESD5 (got Disks 4 x 146 GB 15K)
  - 4 x 177 GB SSD ESOY (SAS SFF 4K S/S DRIVE)

- Adapters (full height for the E850)
  - 4 x ENOK Ethernet adapters (2 x 1Gb + copper 2 x optic)
  - 4 x 5735 Fibre Channel 8 Gb/s
  - 1 x 4 port USB card

- EMX0 POWER8 Drawer (full height blind swap)

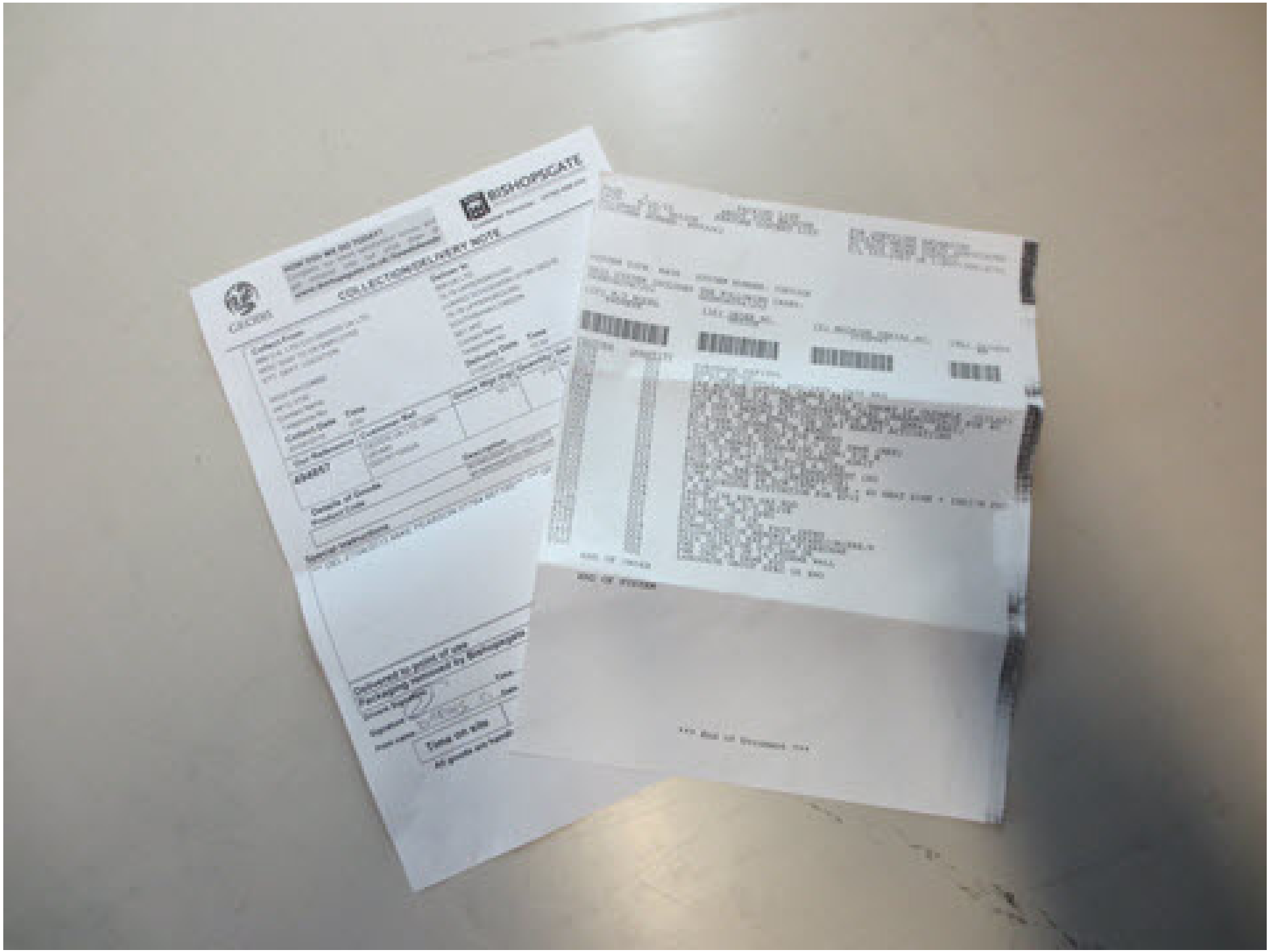
Going to cover the install of

1. POWER8 I/O Drawer
2. Power E850

POWER8 I/O Drawer

- Seen already on Power E870 / E880 in 2014
- Now also on the Scale-Out Servers (new option)


E850, EMX0 & cables


BISHOPSGATE
COLLECTION/DELIVERY NOTE
End of Document


IBM
IBM
Unwrap


Installing the IBM Power System E850
(8408-E8E)
IBM
Follow the Install Instructions


Open the smaller top box


Have we been robbed?

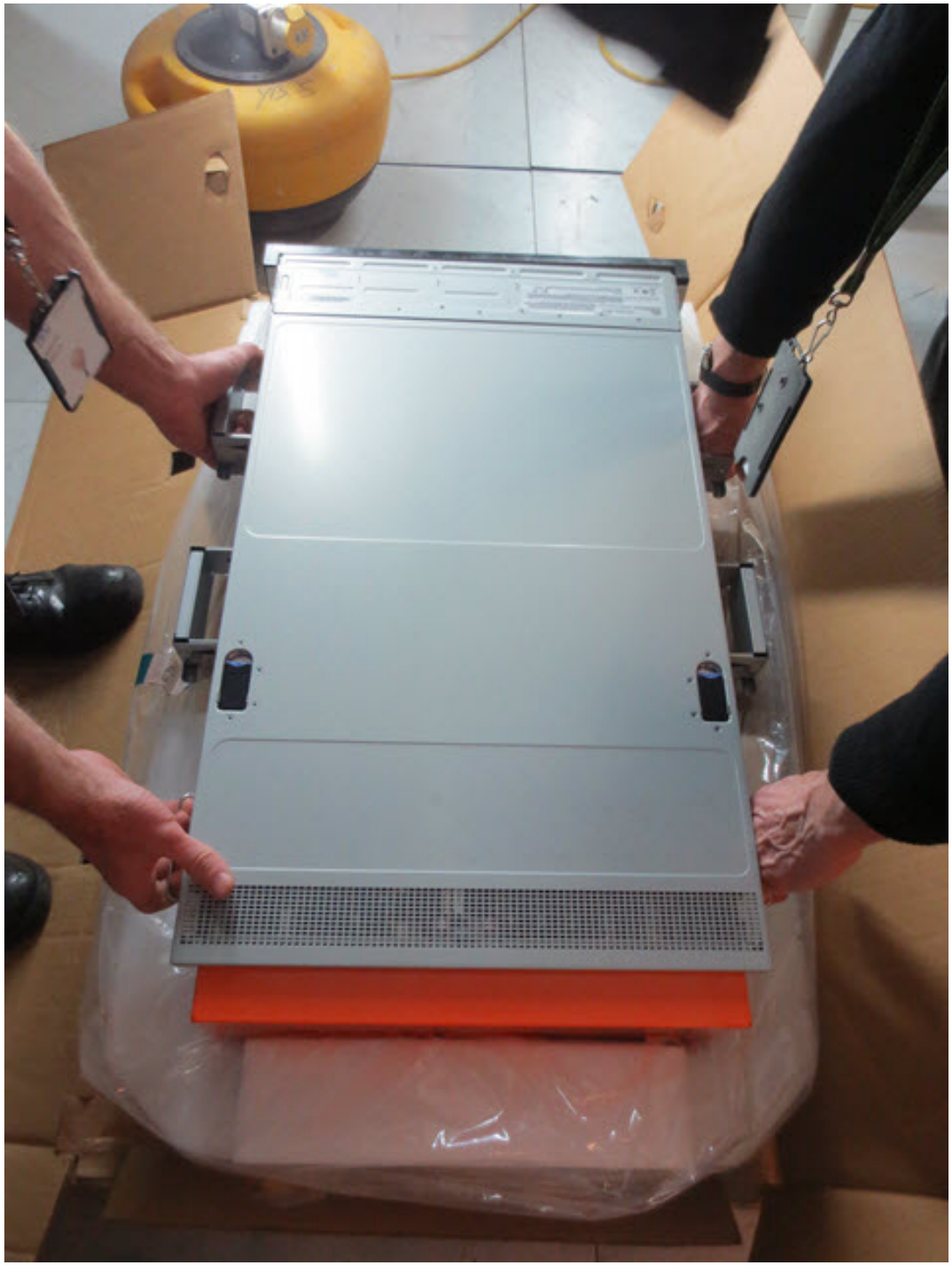
Remove the white clips & lift. Don’t cut the sellotape!


Small rails & MASSIVE rails!!


Unwrap the E850


Looking good

Find the handles, push clicks in and raise till they lock



Six handles:
4 click-on added +
2 permanent
=
Three person lift

It is heavy
It is very heavy

We used 2 Rugby Players !!!

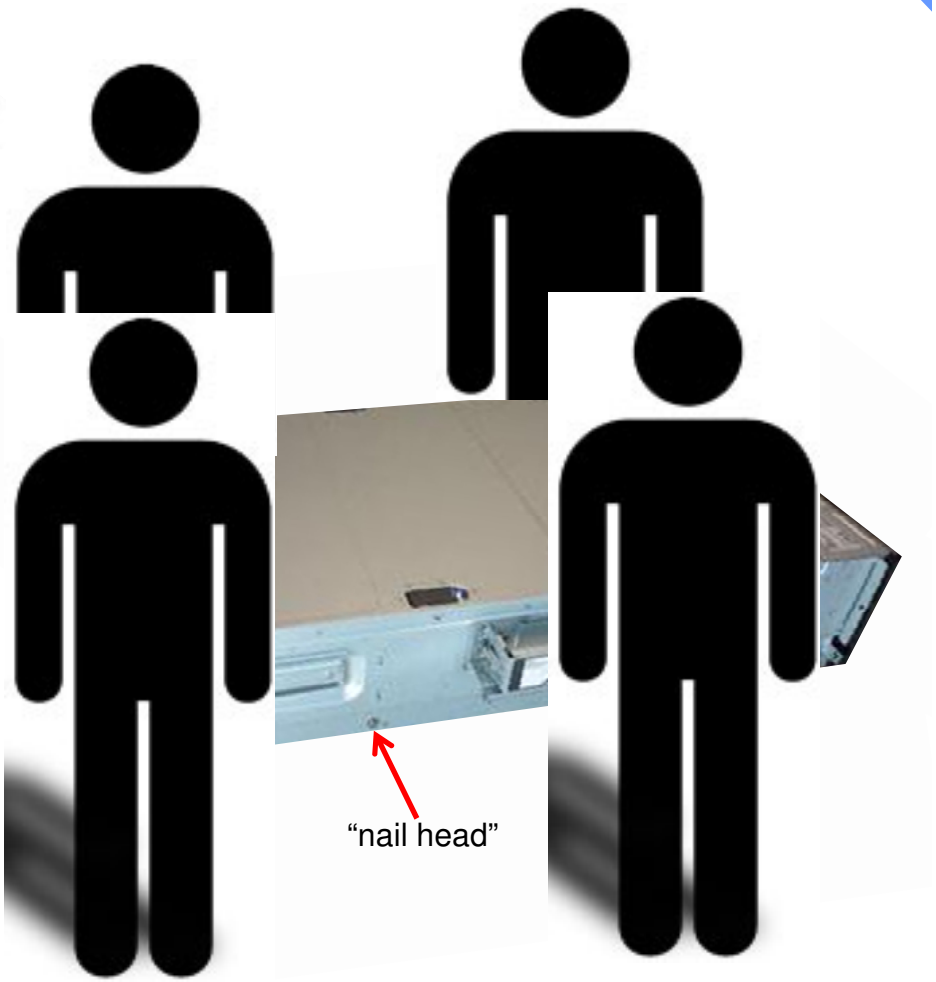
We placed it temporarily on a table. Note orange I/O protection

Official 3 person-lift

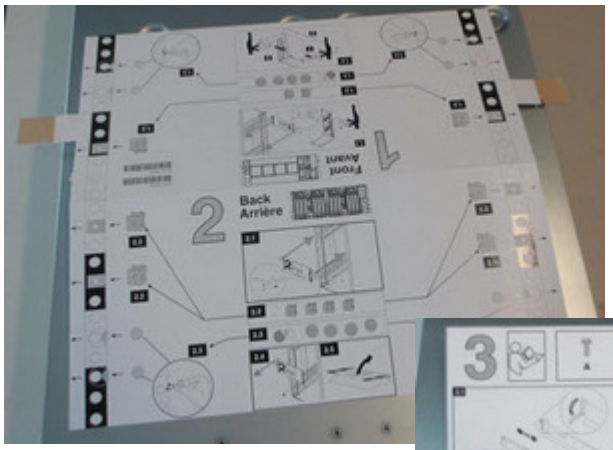
Front person tricky
as holding both sides

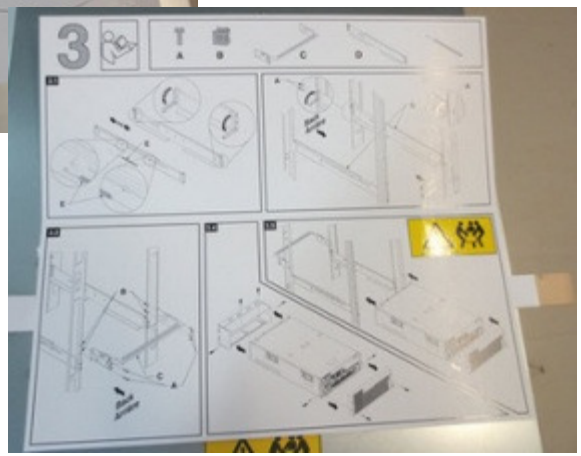
Off The Record

4 person a lot easier



- We decided to have the E850 above the I/O Drawer
- So 1st we added the I/O Drawer



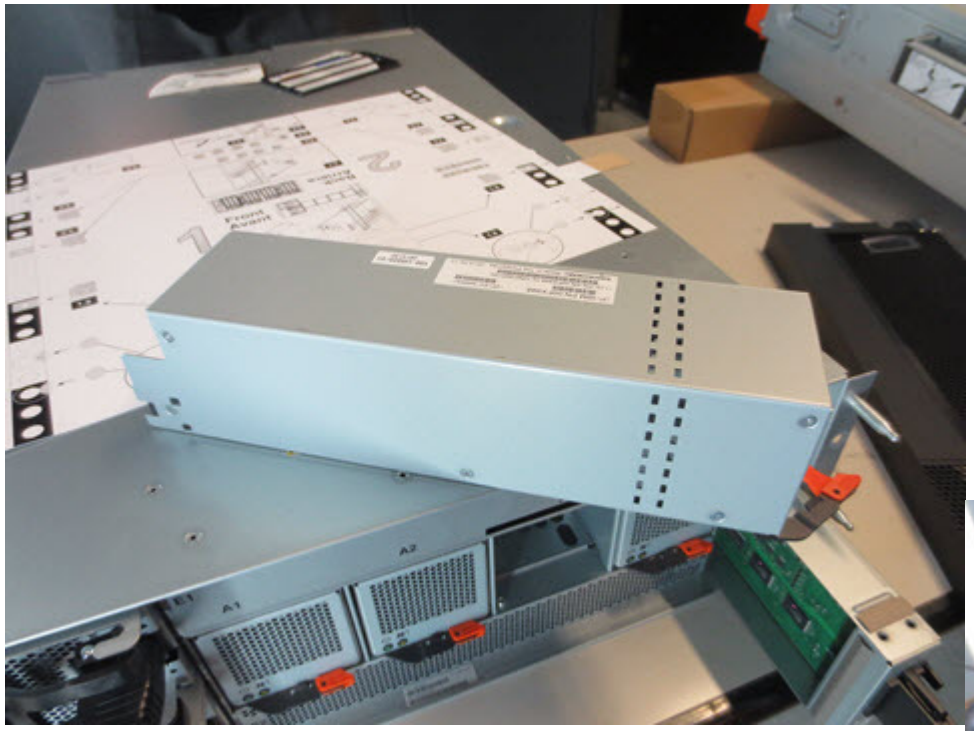


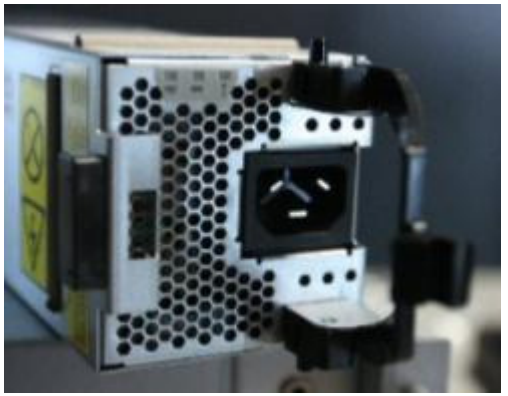
EMX has a slide on shelf rather than rails
= very easy to fit

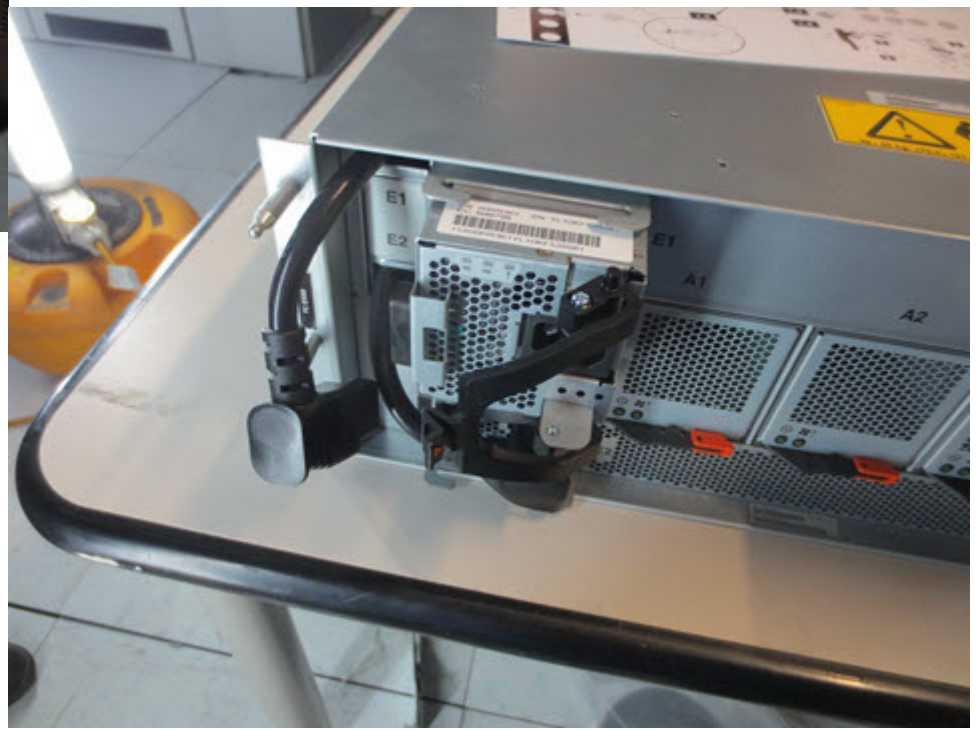
Rear view
6 adapter slots

Front view
2 power units +4 fans

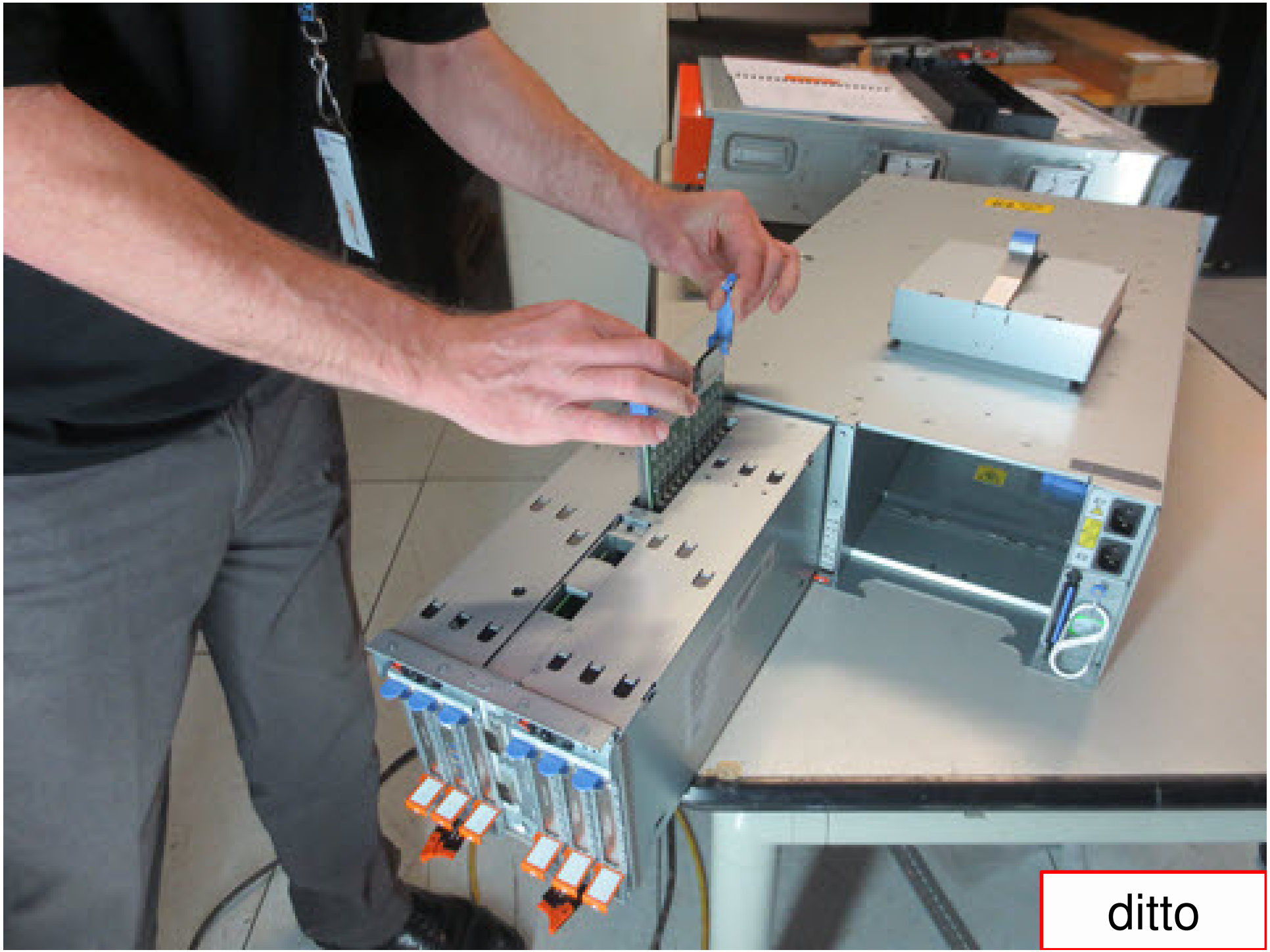
This example has
only one fan-out module

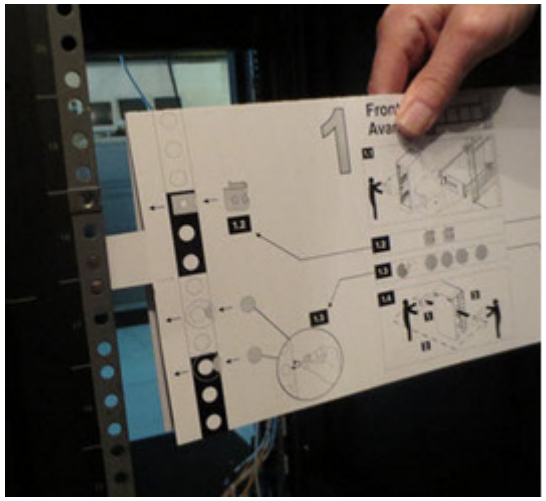


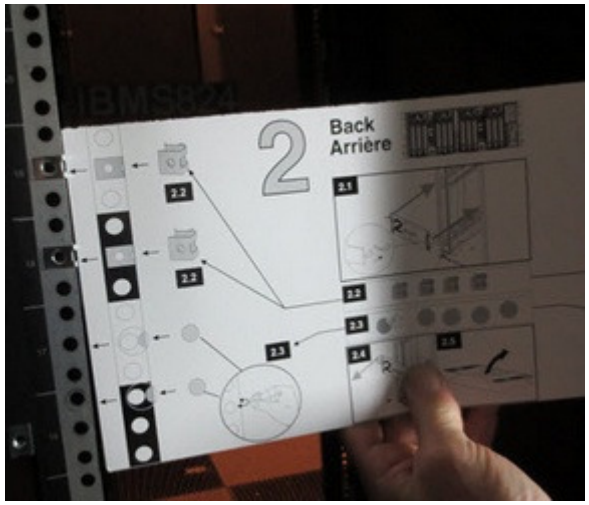


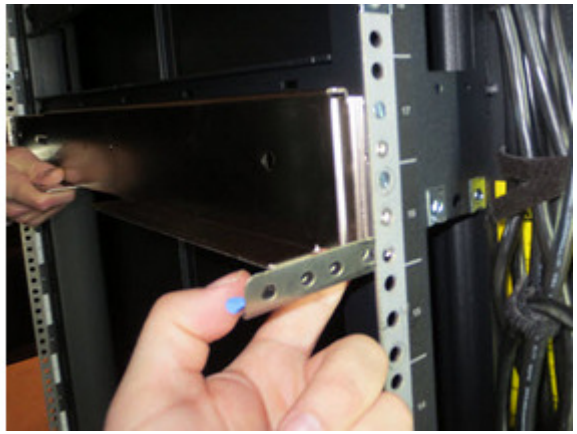


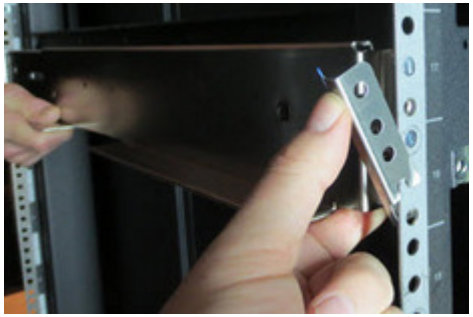
And of course we had to take it apart ☺

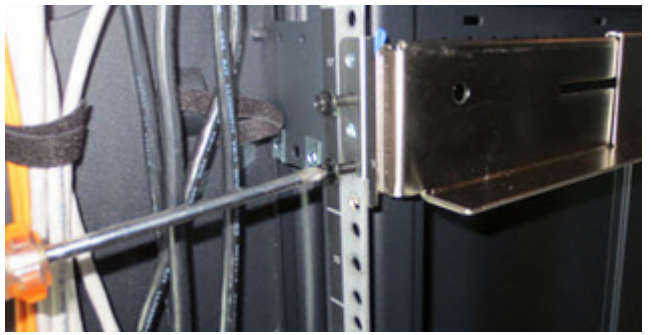

ditto



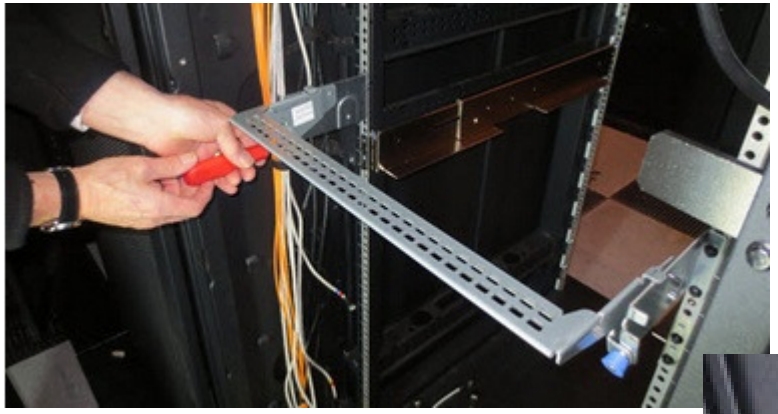


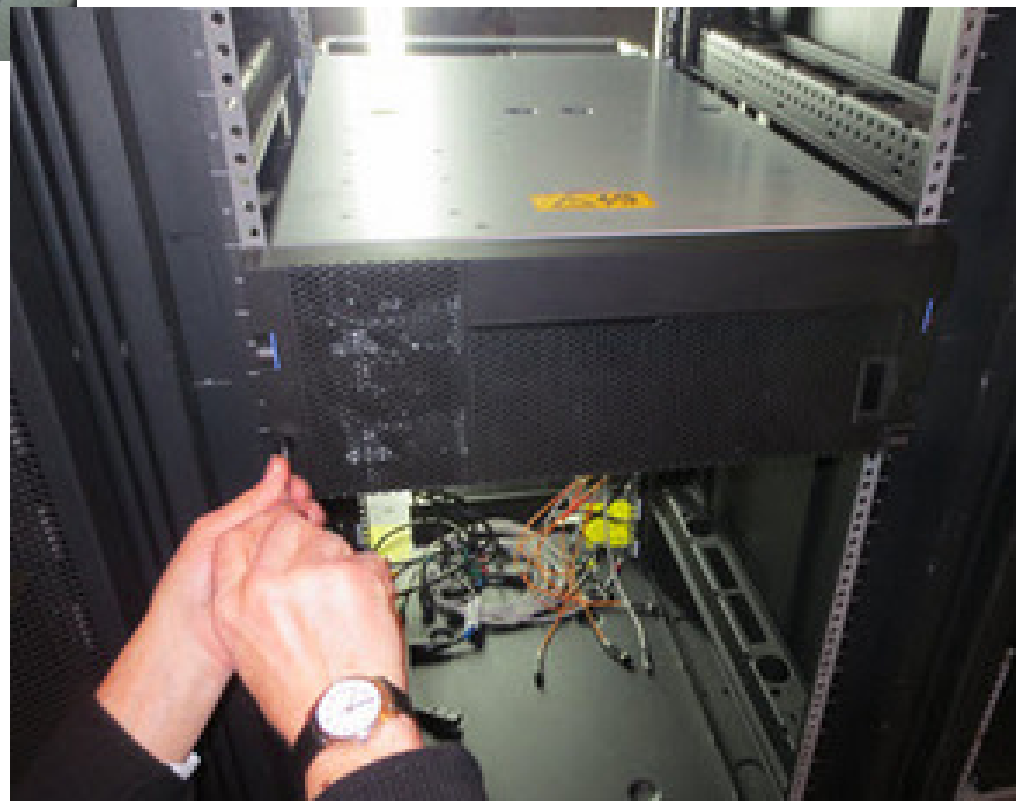






About 20 seconds work





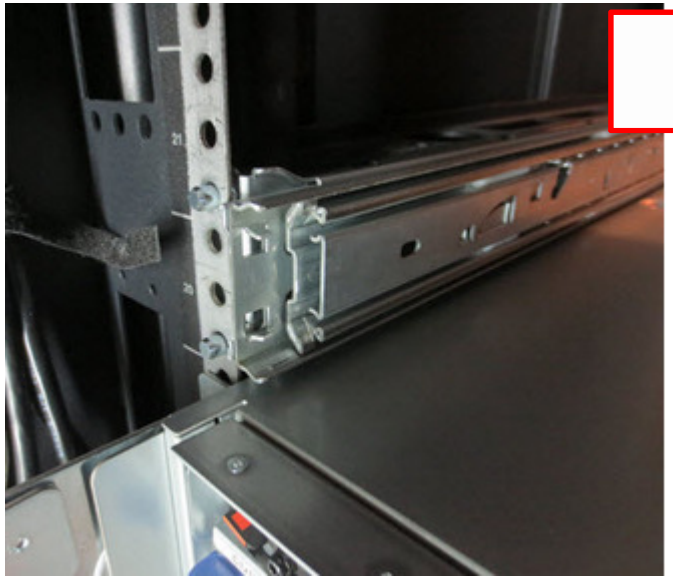
Slide in the drawer & put a few screws in = done!

Back to the E850

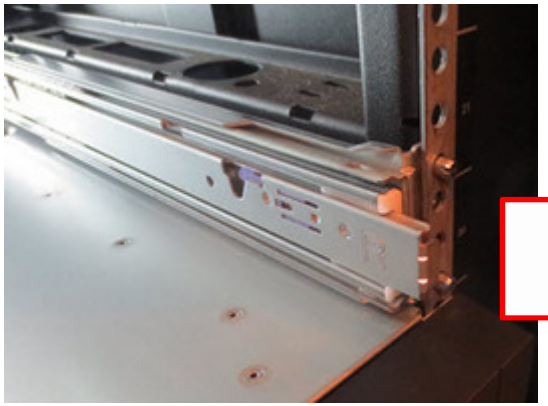
The E850 is a customer install machine and they should follow the instructions.

The customer could pay their CE, or BP or services to do it for them.

E850 rails = Follow the Install Instructions



Back

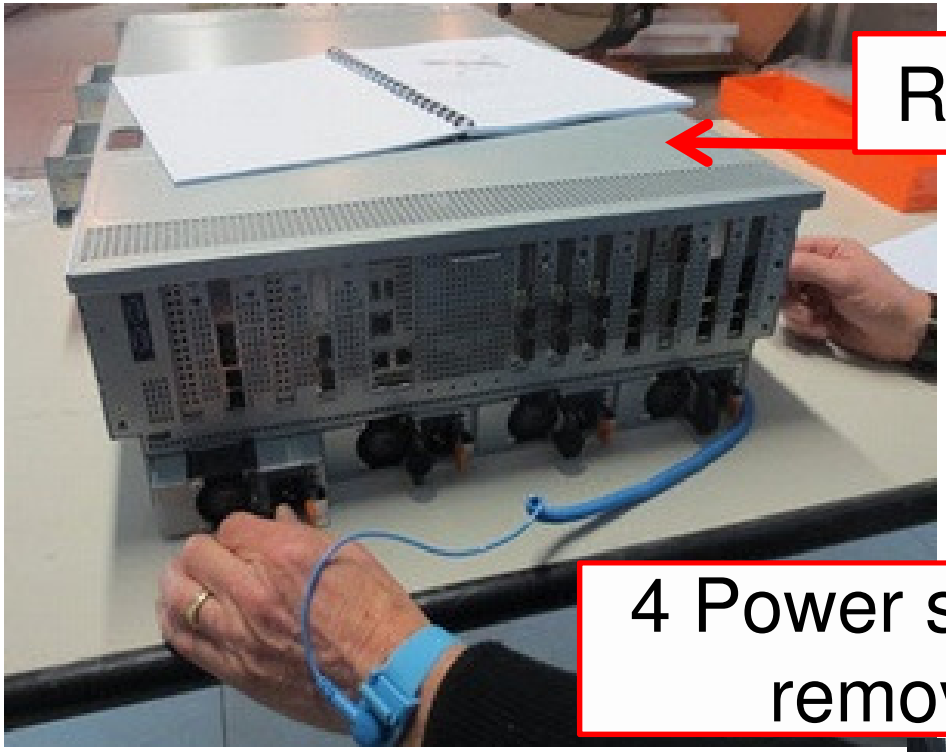


Front

Plus added
the screw clips

Allen key bolt

Pretty standard good quality rails



Removed I/O cover

4 Power supplies removed

5 Fans Removed

Weight Reduction

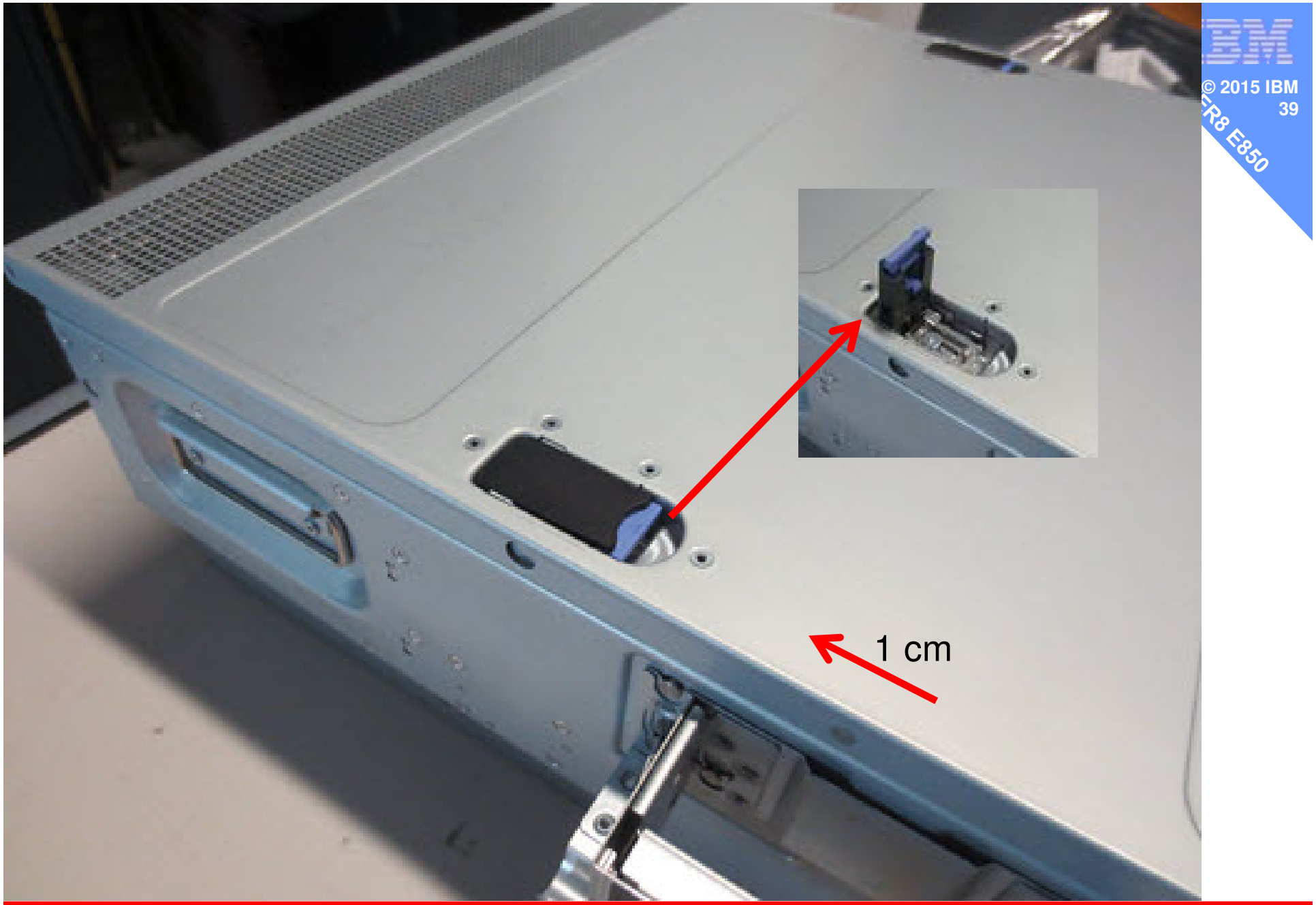
Disks 4 of 8

If you have them, remove the SSD's

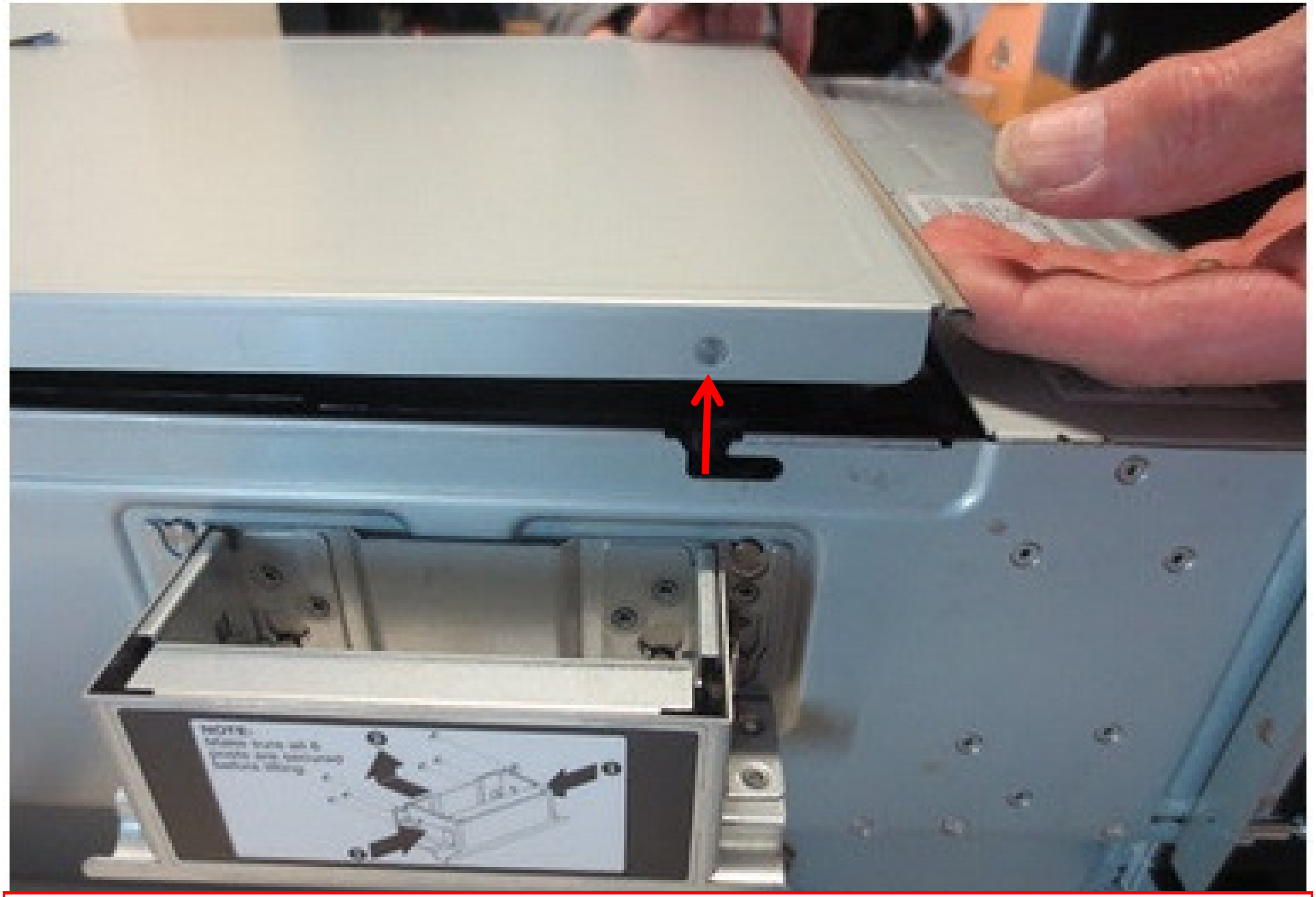
Weight Reduction

Of course, we wanted to look inside
and take some pictures

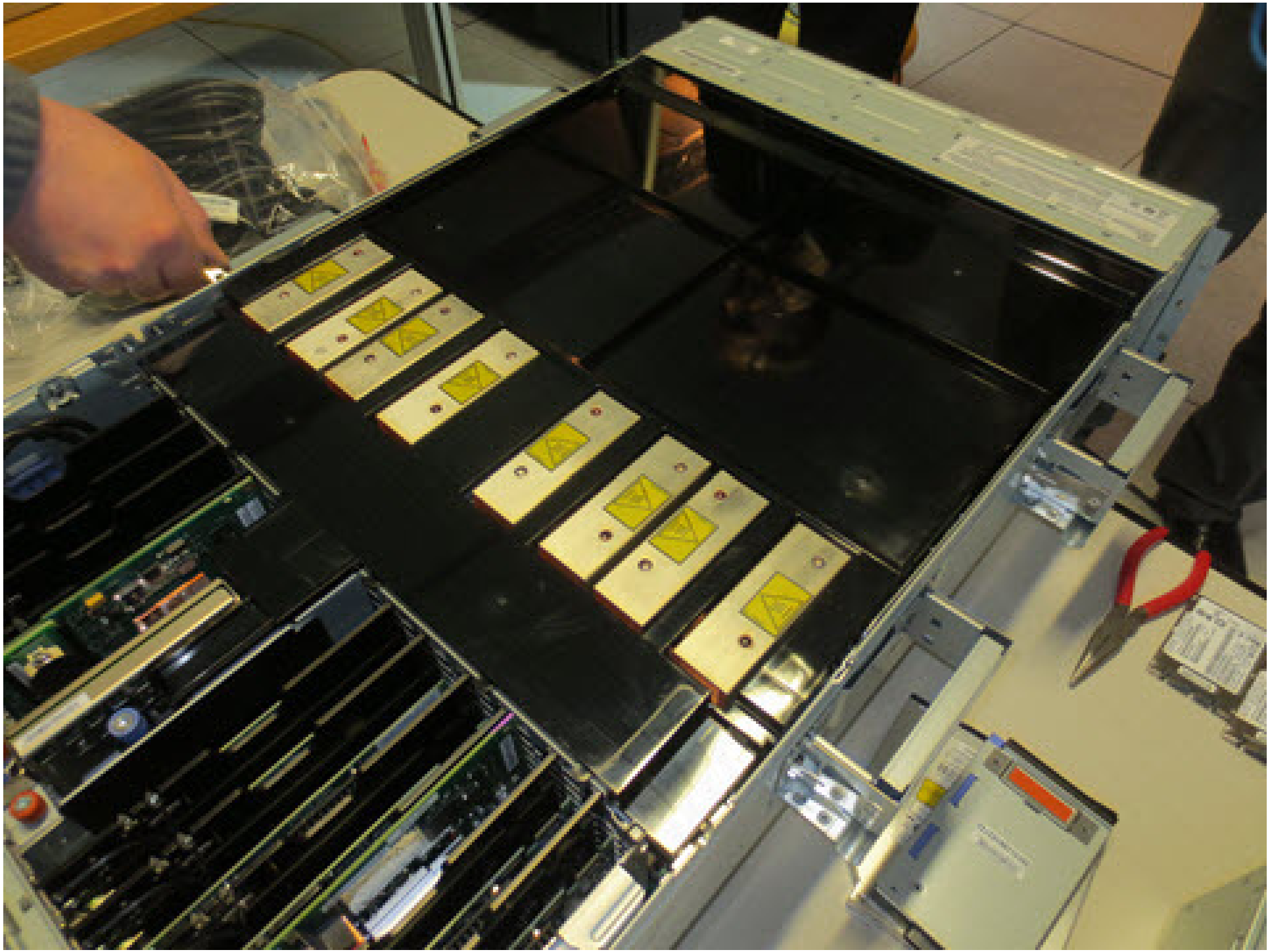
Not necessary for installing the E850

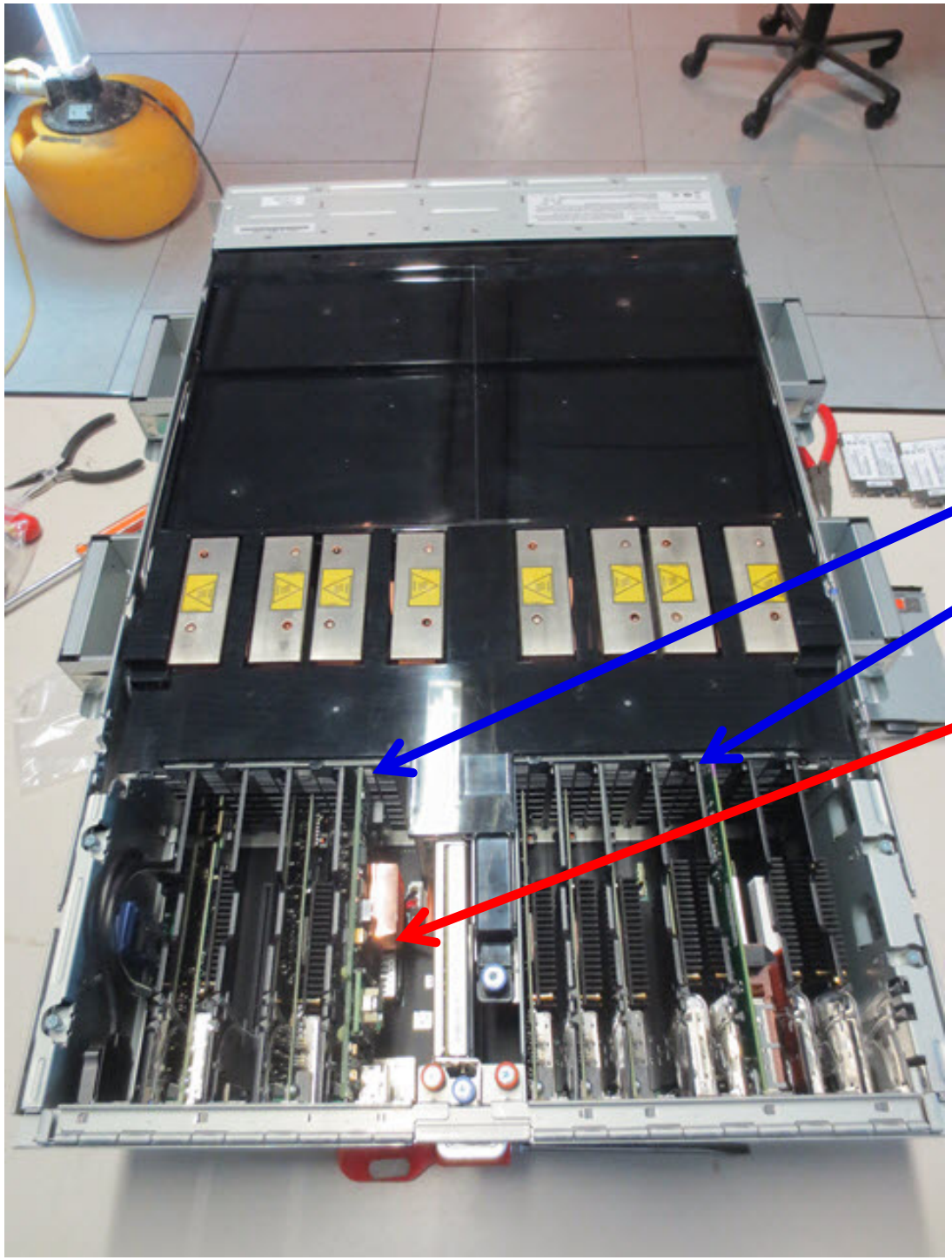


Before we place it in the Rack – let's open the box ☺



It was a bit of a shock & everyone said “wow!”





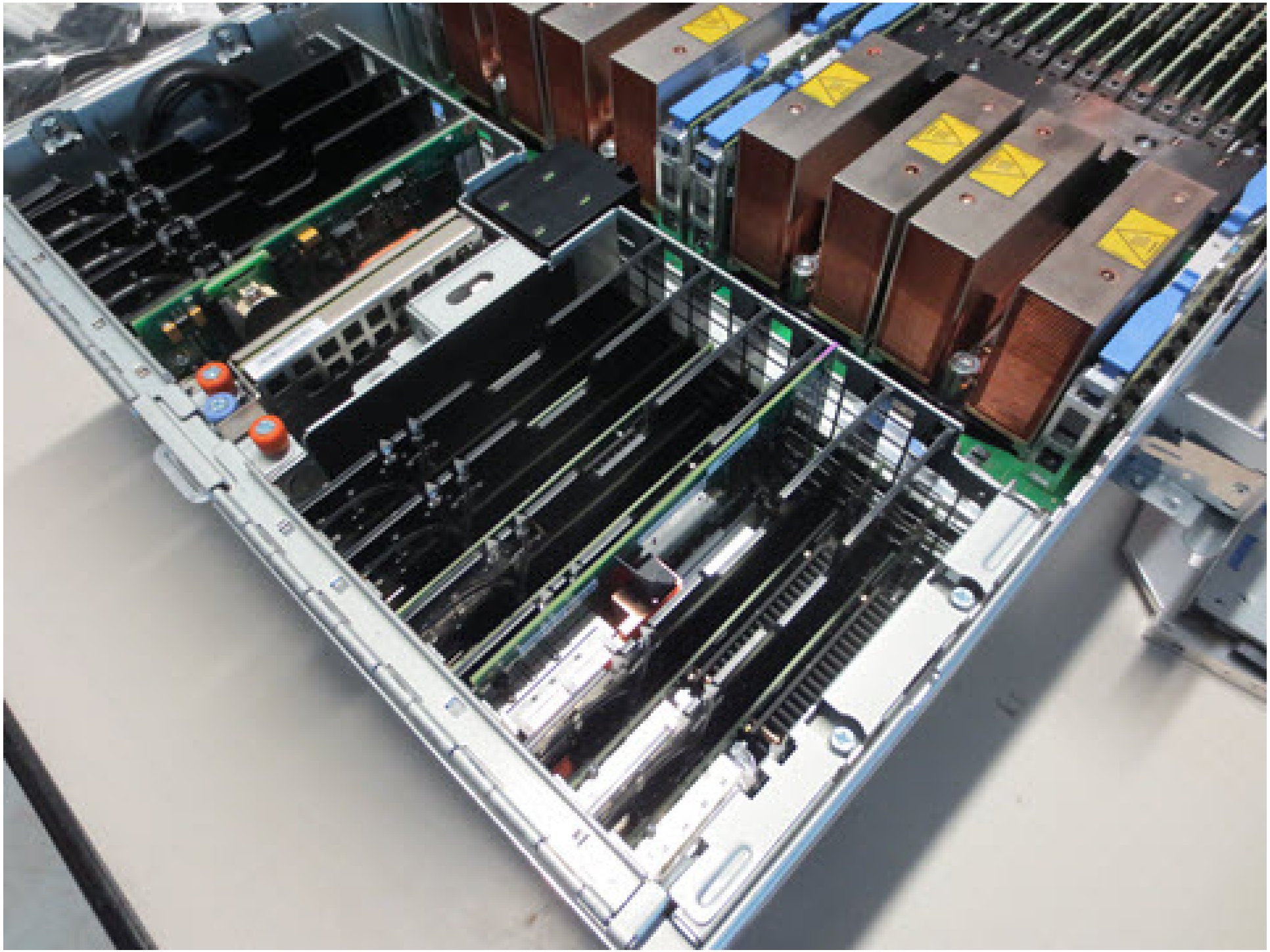
4 adapter slots
7 adapter slots

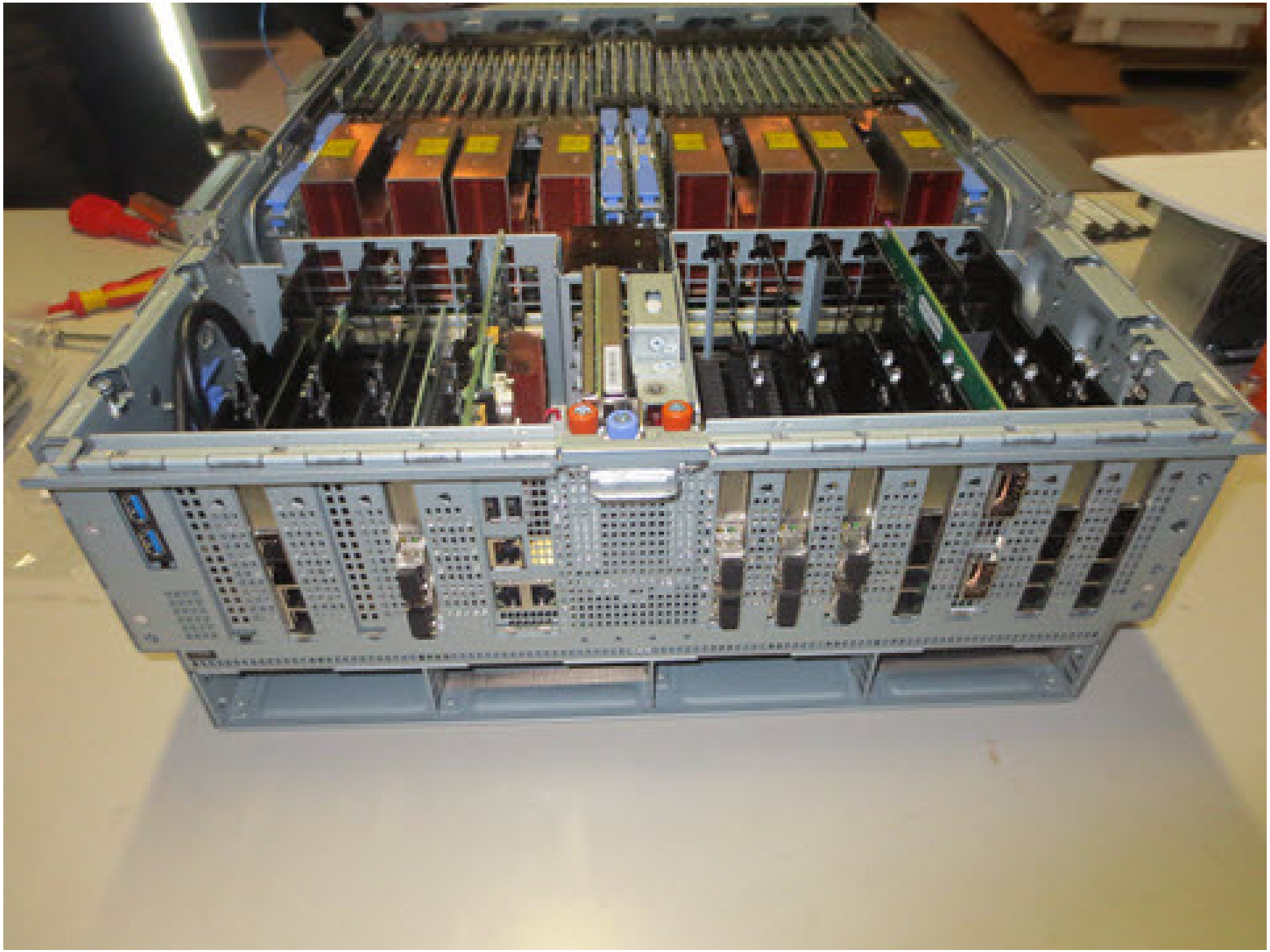
FSP + HMC sockets
in the middle

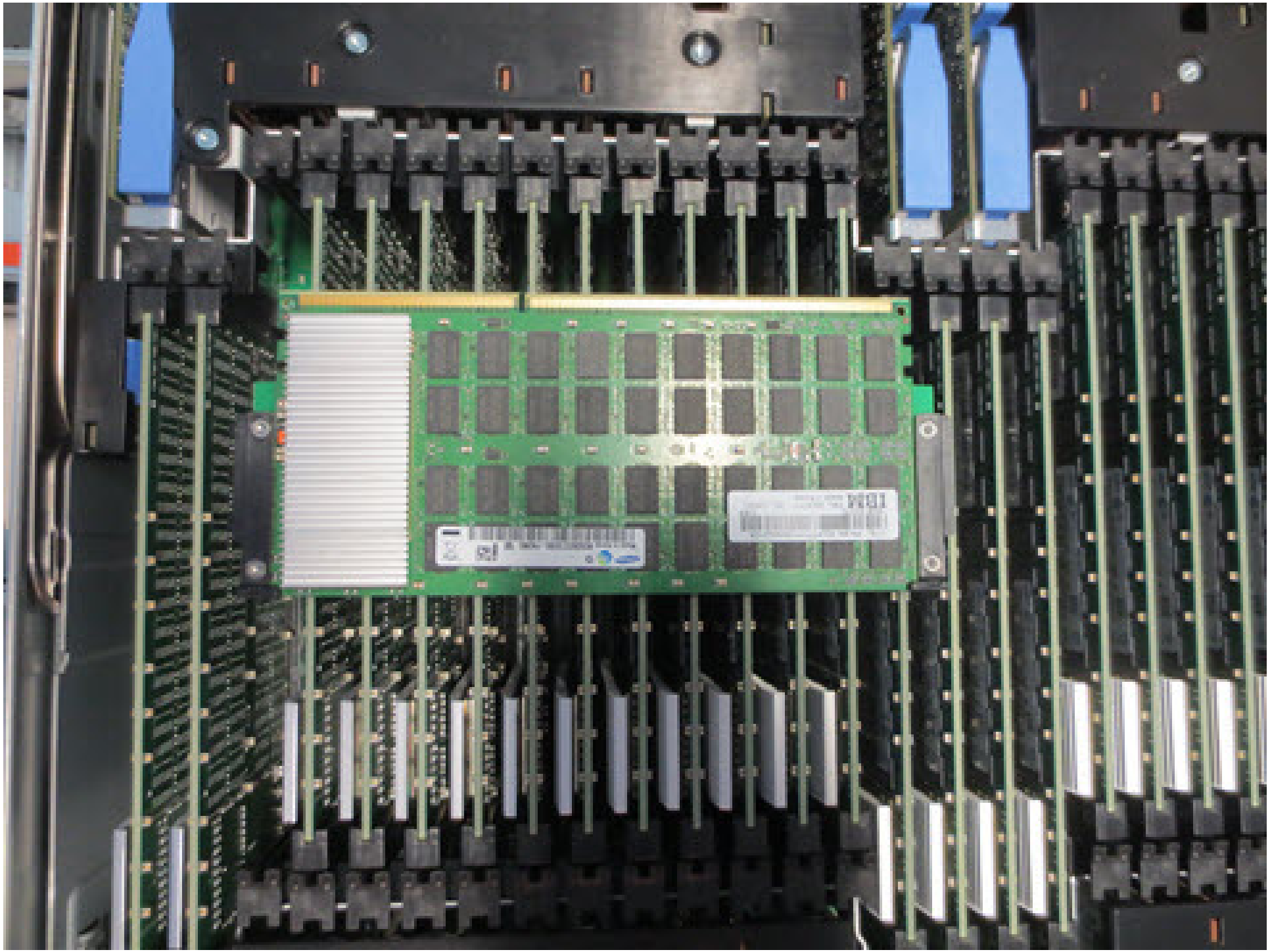
Picture is odd angle
& makes it look like
the back is missing

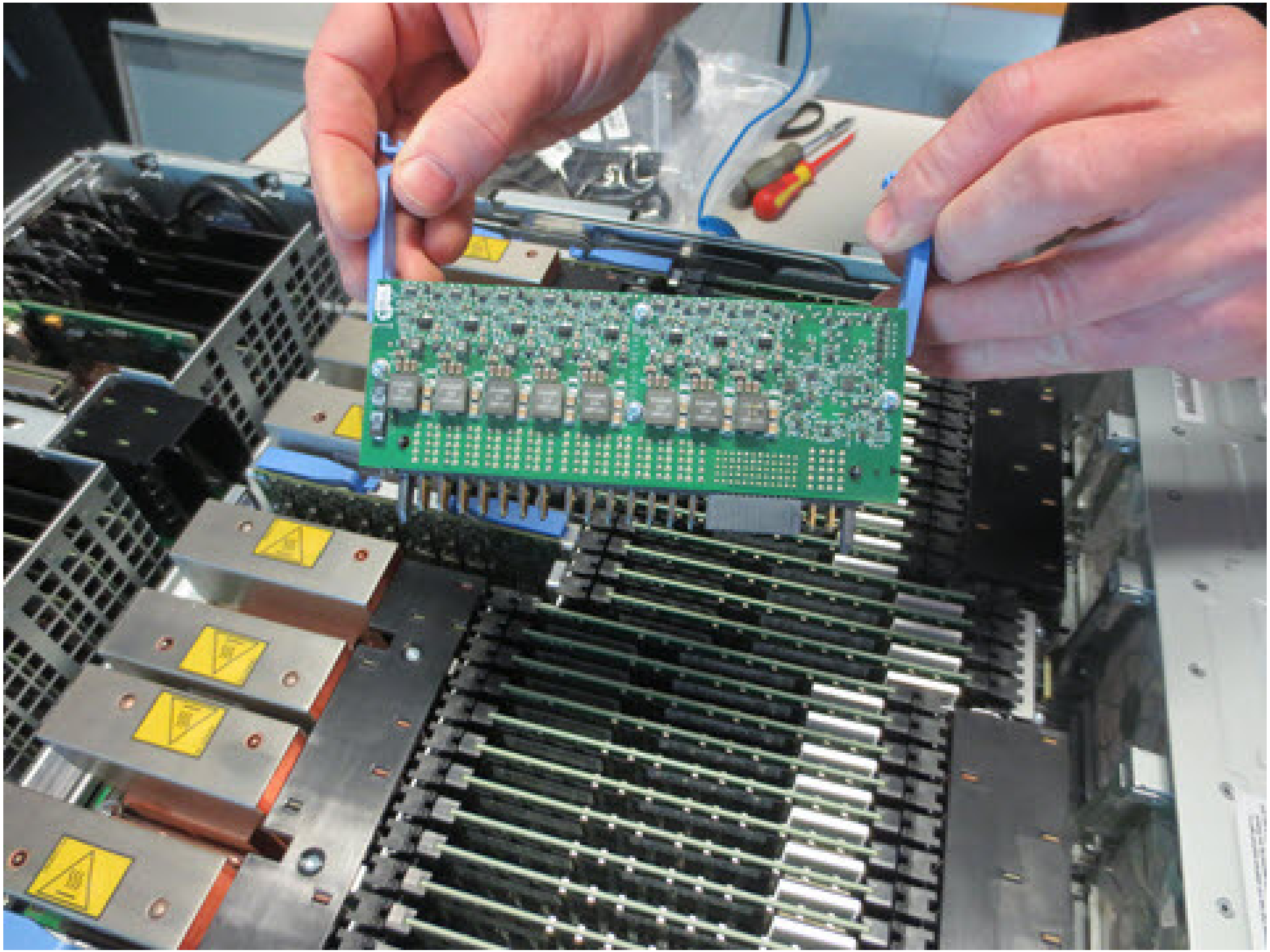
Warning: This is a Early Machine

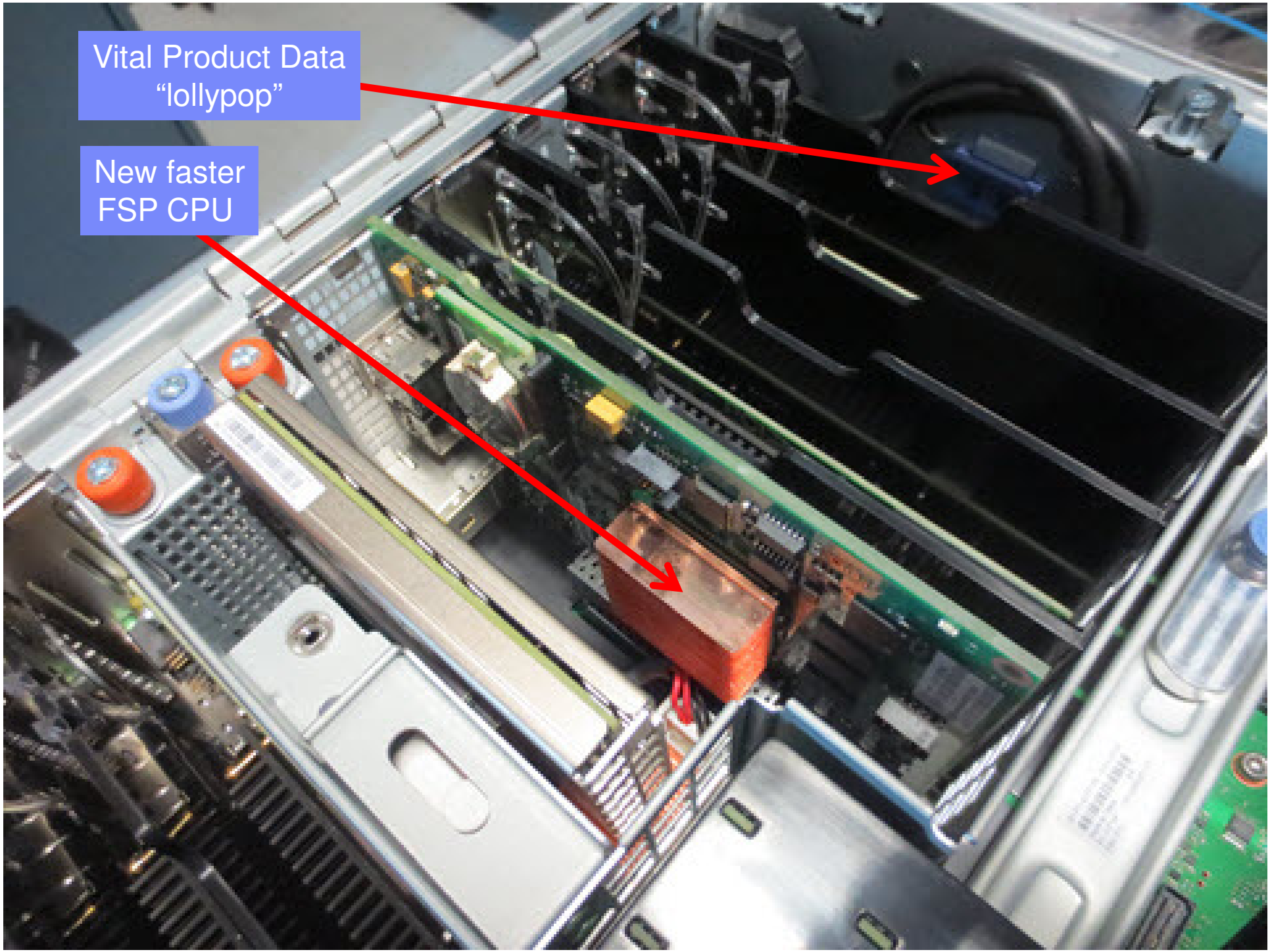
Development told us that customer machines will not have a black air cover & probably have a clear see through cover so you can see any Diagnostic light path LEDs

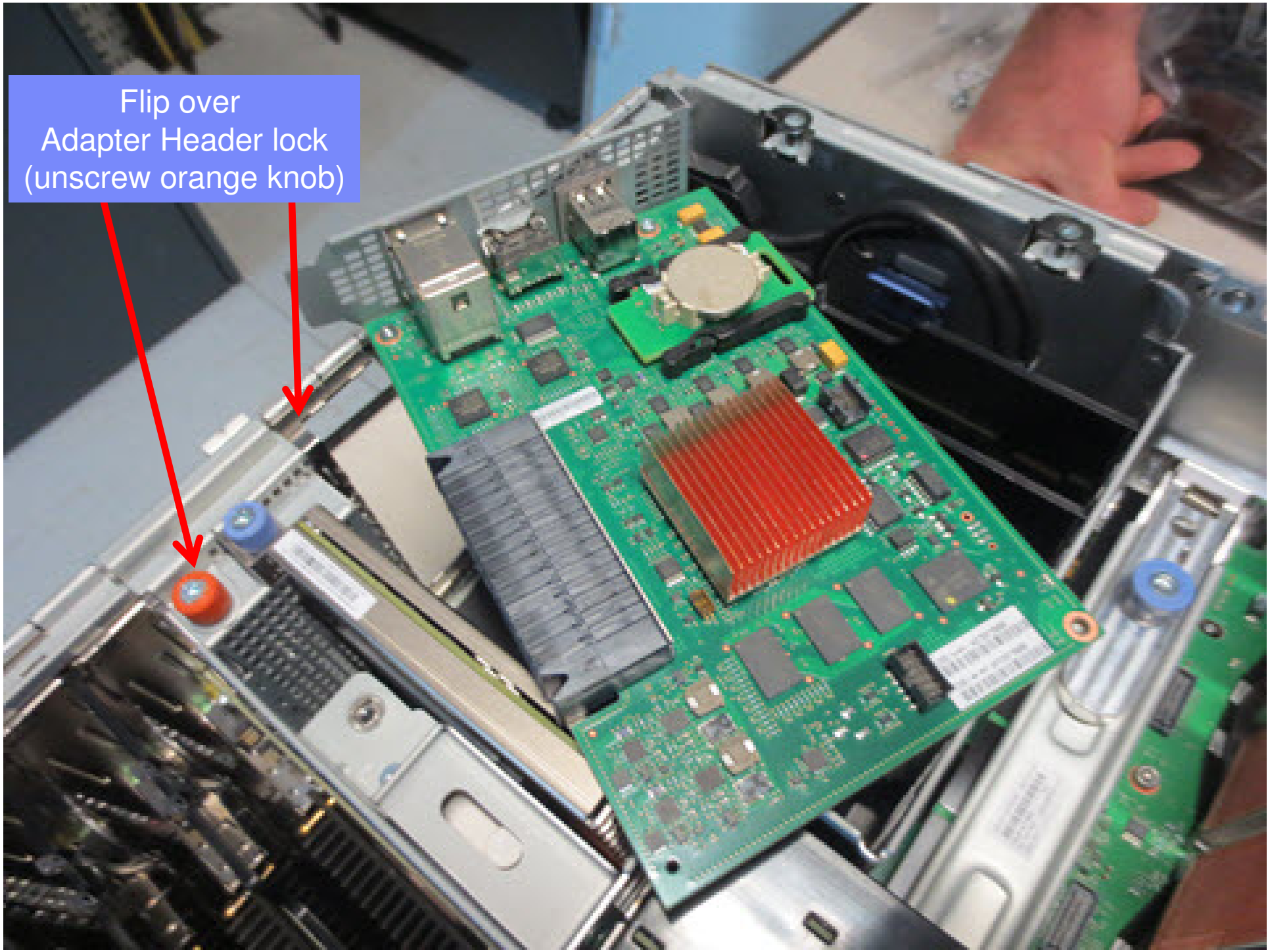


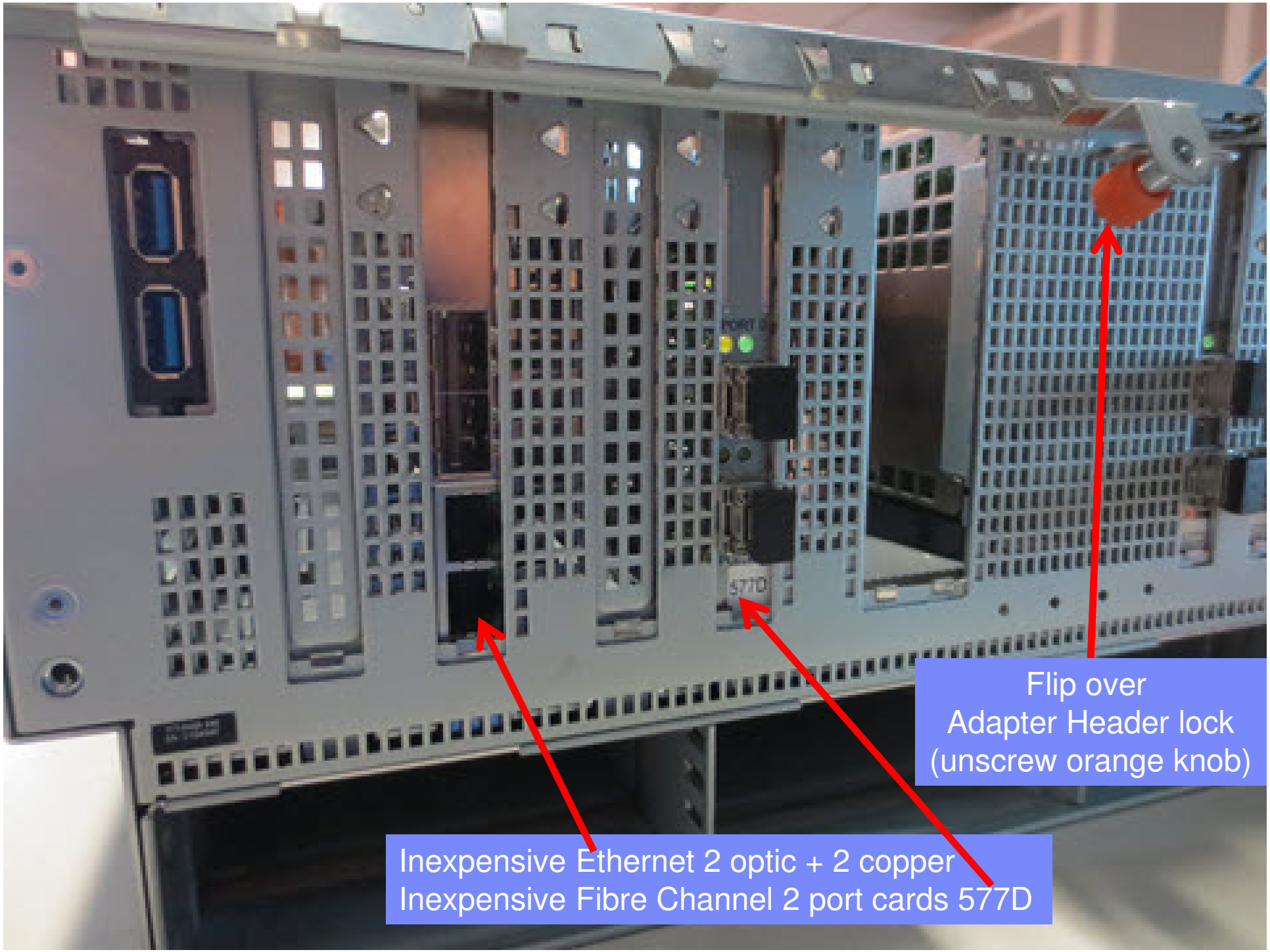


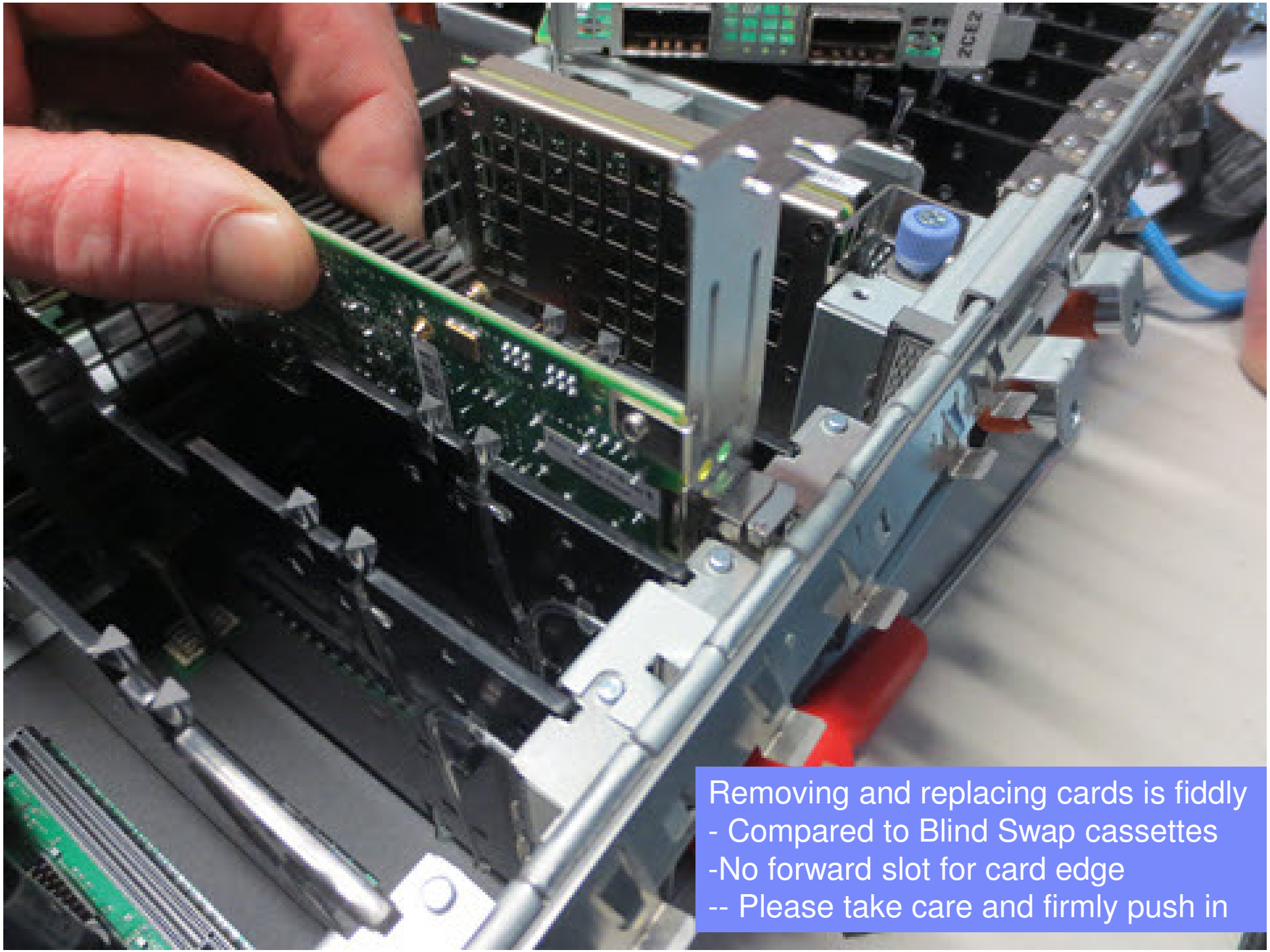


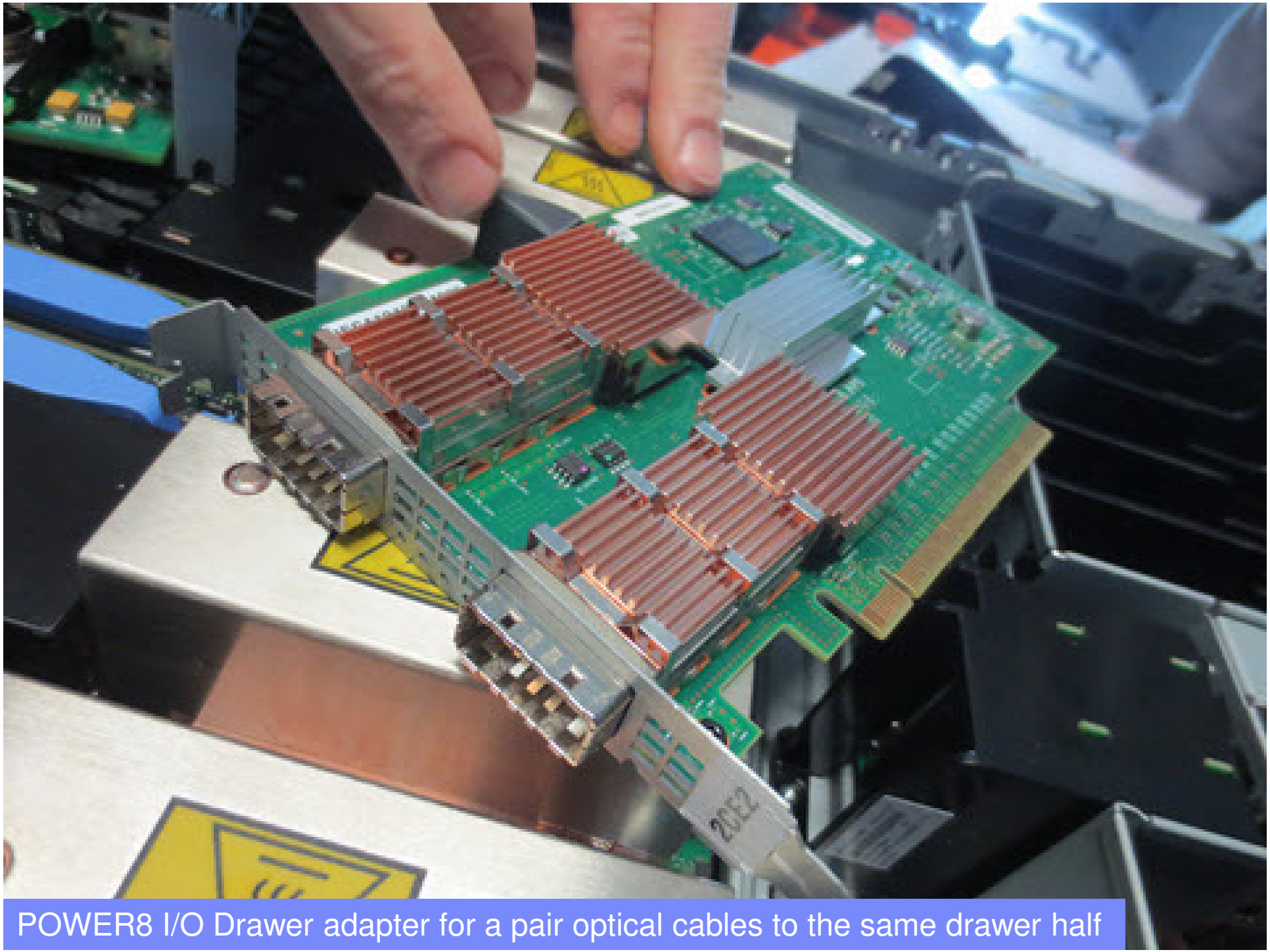



Vital Product Data
“lollypop”
New faster
FSP CPU


Flip over
Adapter Header lock
(unscrew orange knob)

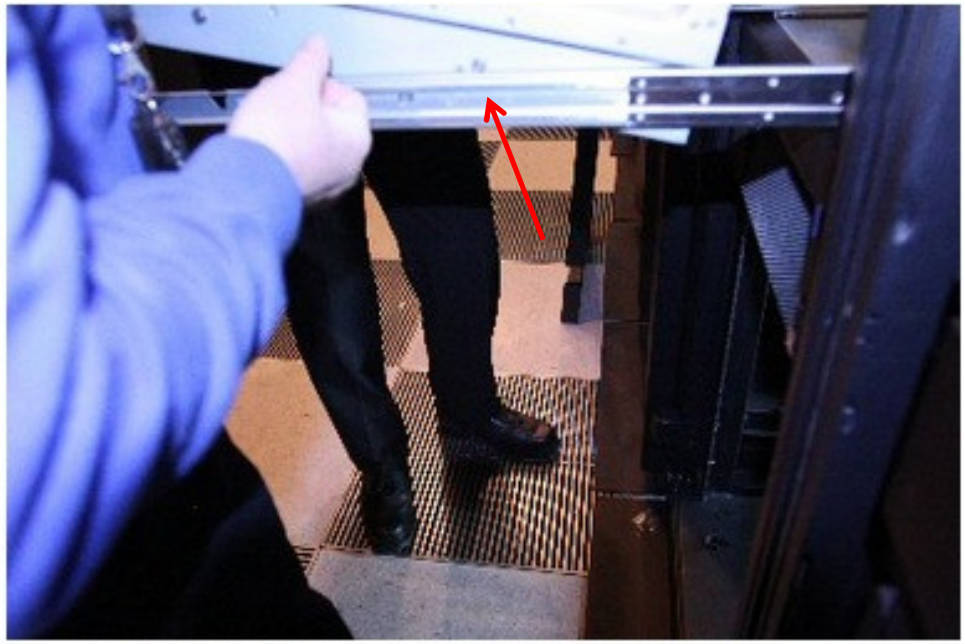

Flip over
Adapter Header lock
(unscrew orange knob)
Inexpensive Ethernet 2 optic + 2 copper
Inexpensive Fibre Channel 2 port cards 577D

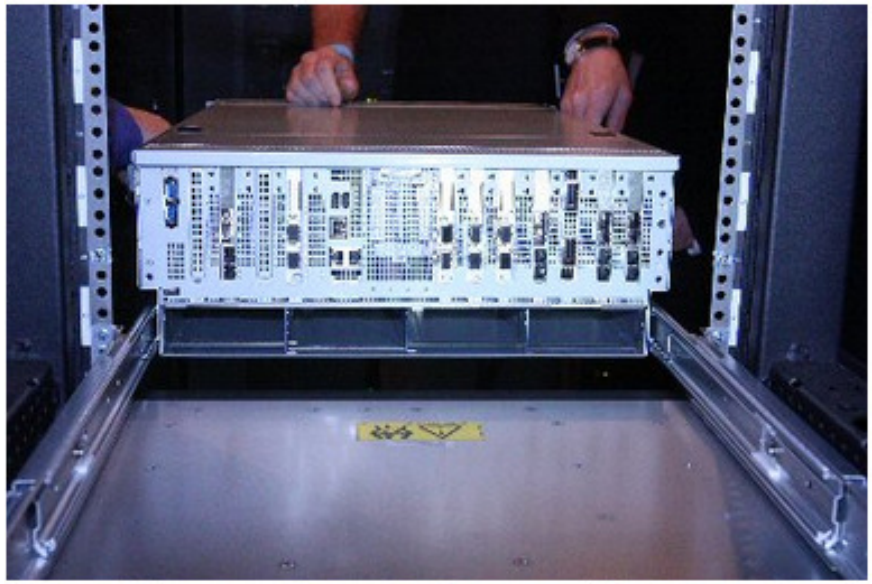

Removing and replacing cards is fiddly
- Compared to Blind Swap cassettes
-No forward slot for card edge
-- Please take care and firmly push in

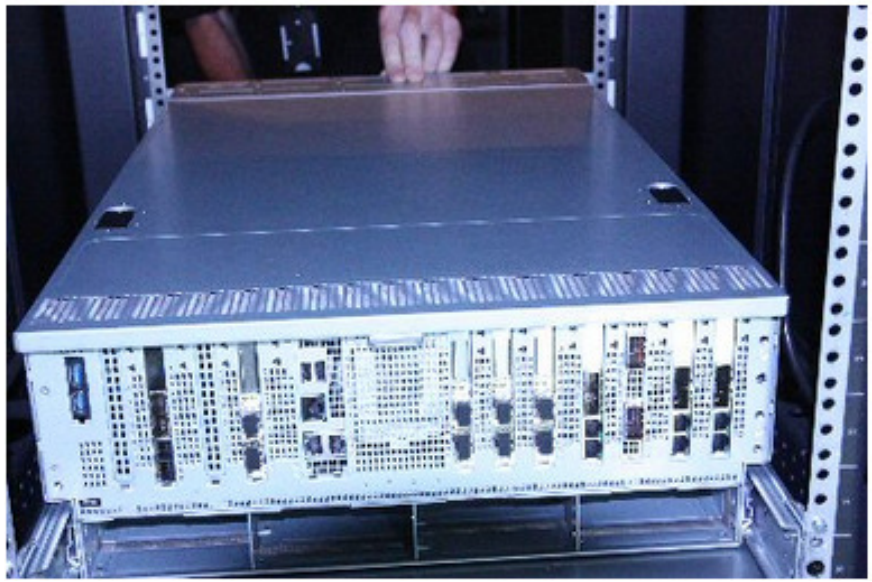


POWER8 I/O Drawer adapter for a pair optical cables to the same drawer half


Follow the Install Instructions



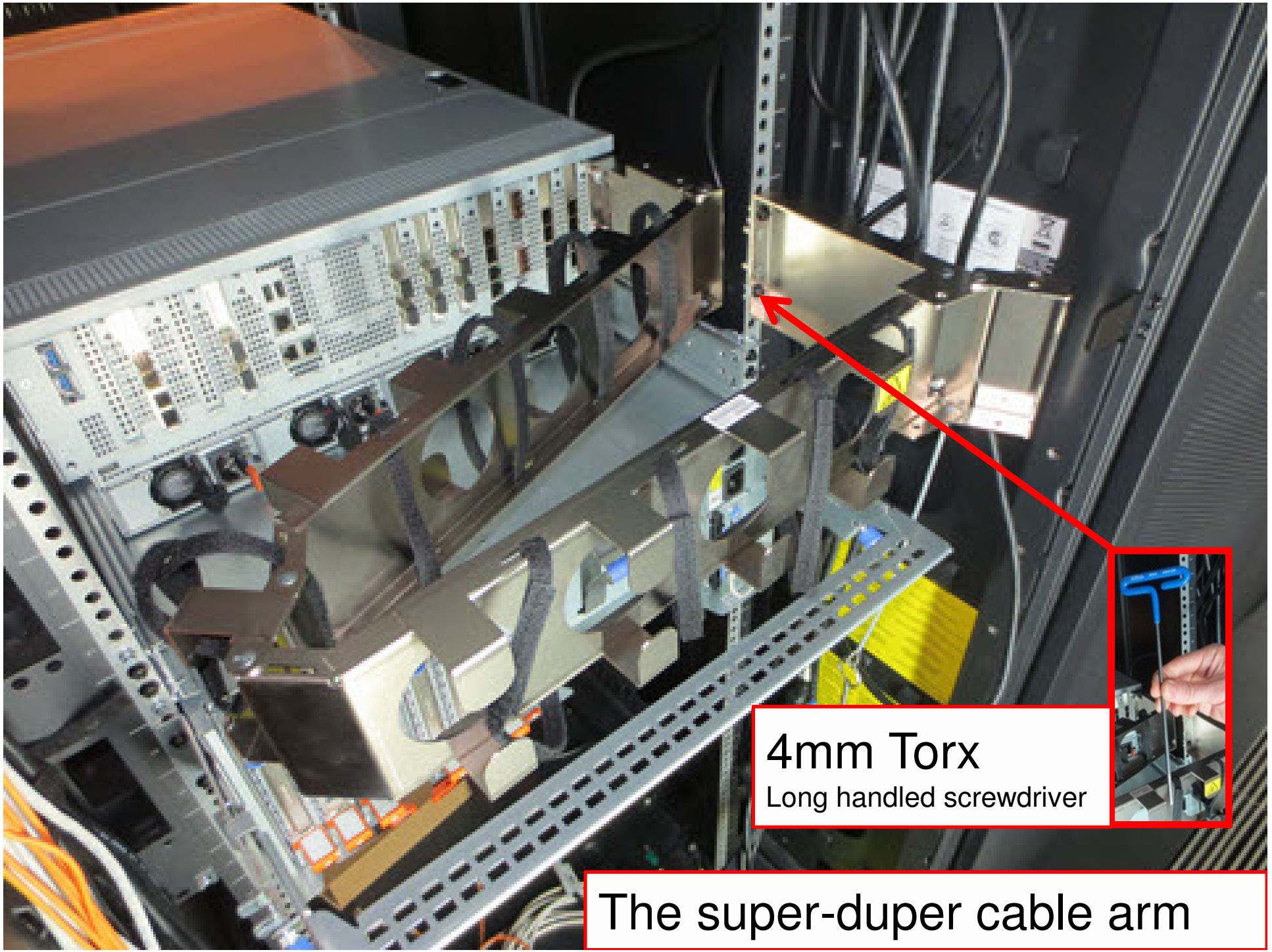




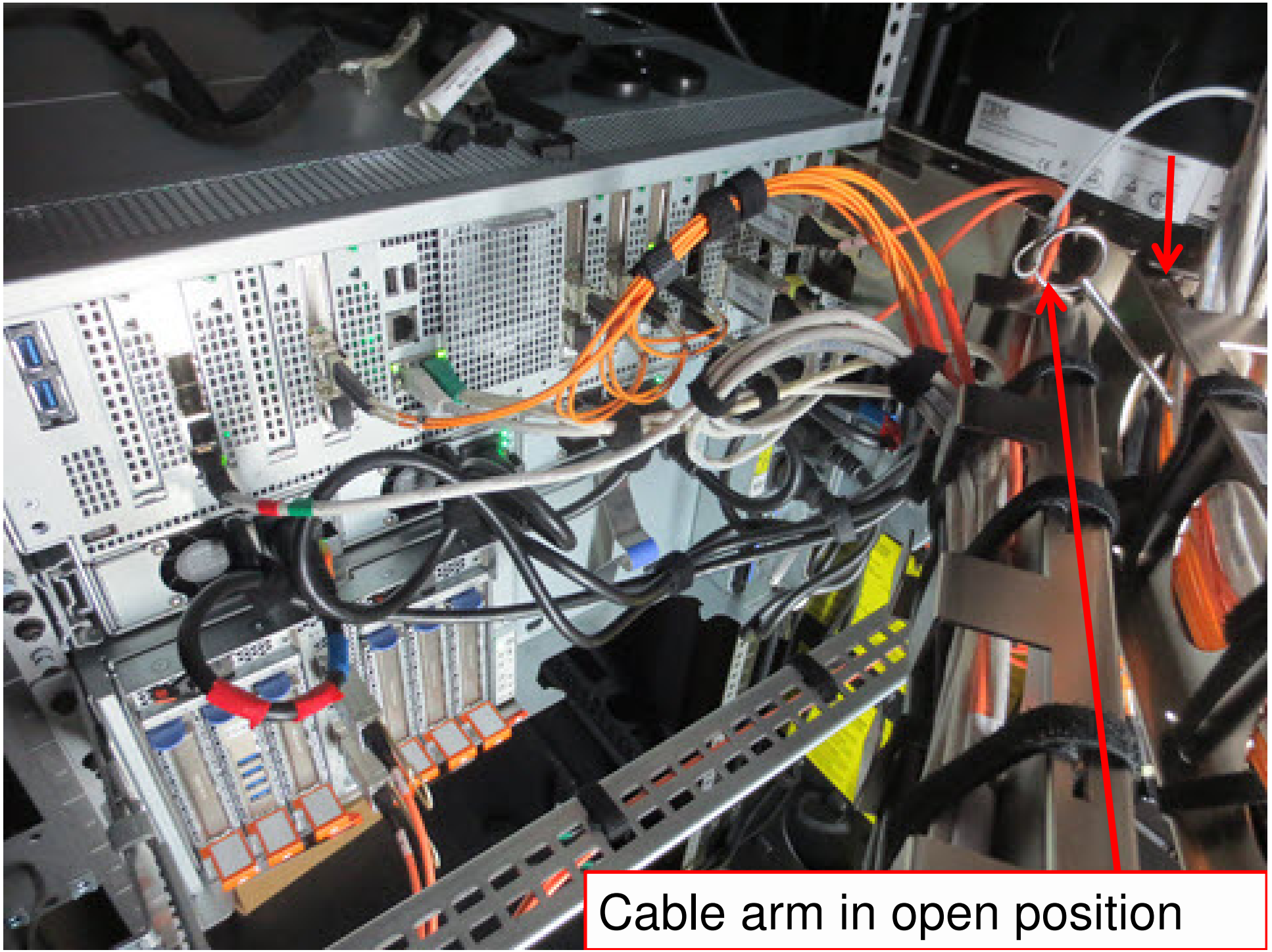
Back 1st, lower the front, unclip the handles & roll in

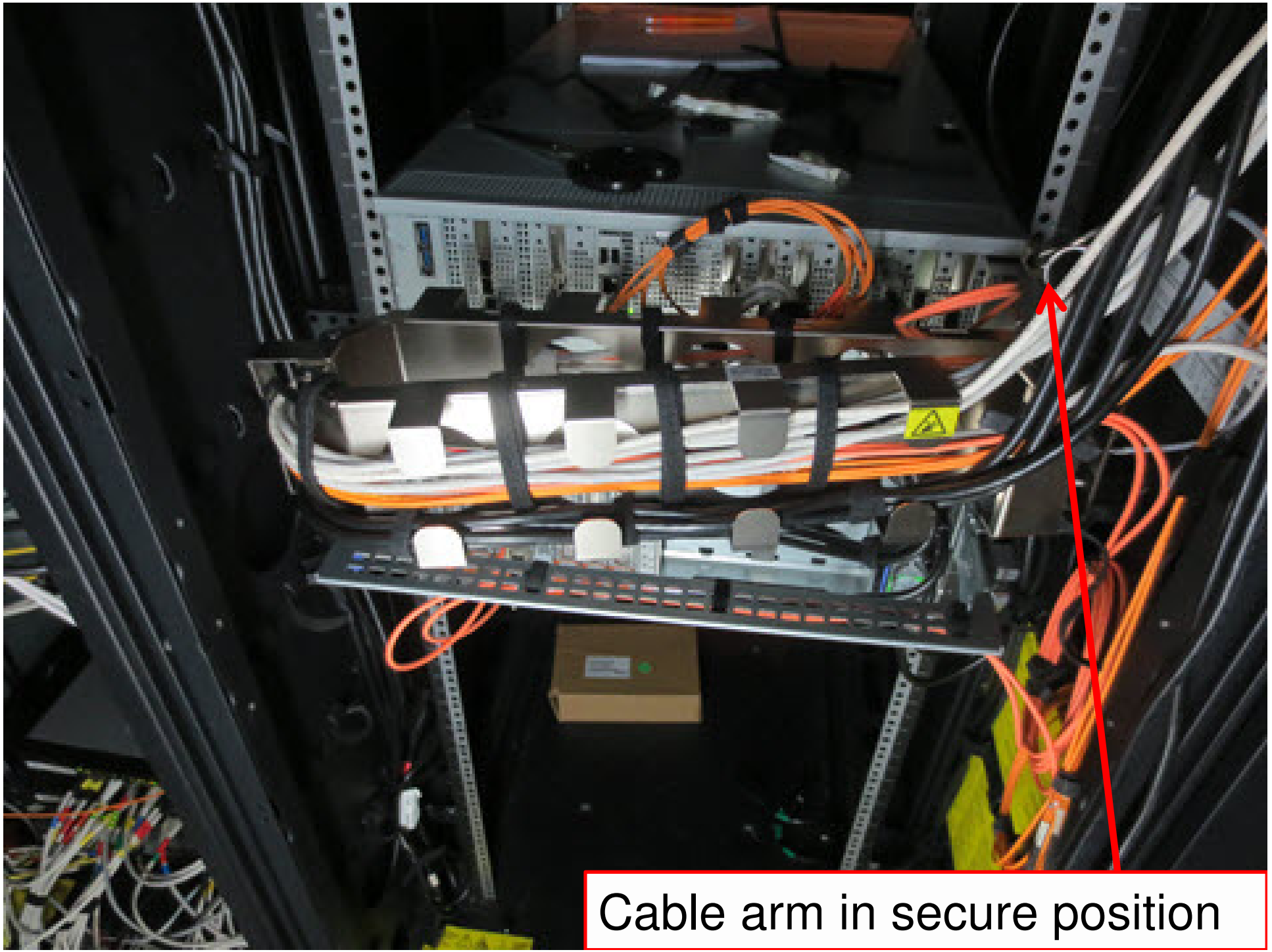
Not showing adding the Power Supplies, Fans & Disks

Next the cable tidy arm

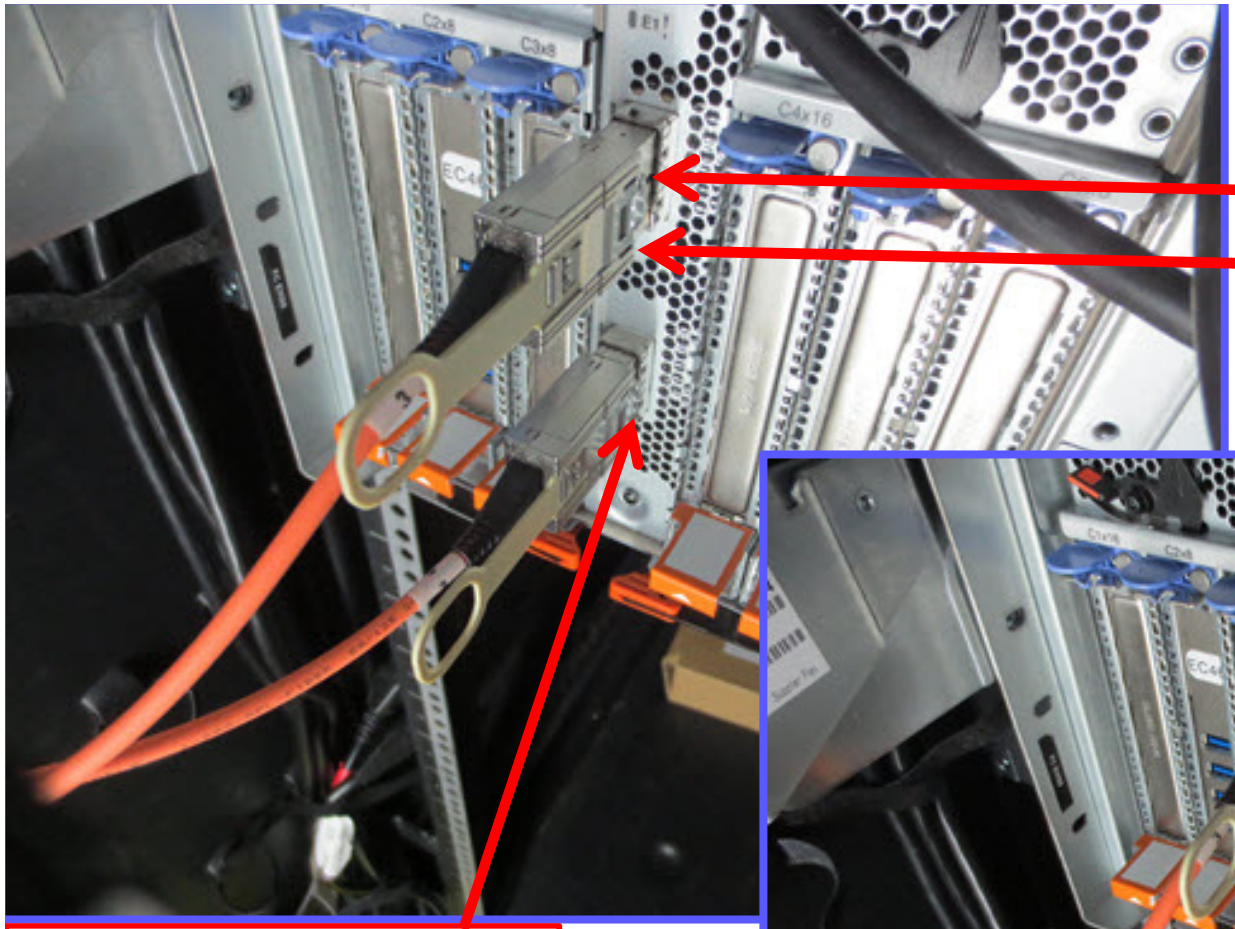


The super-duper cable arm


Cable arm in open position

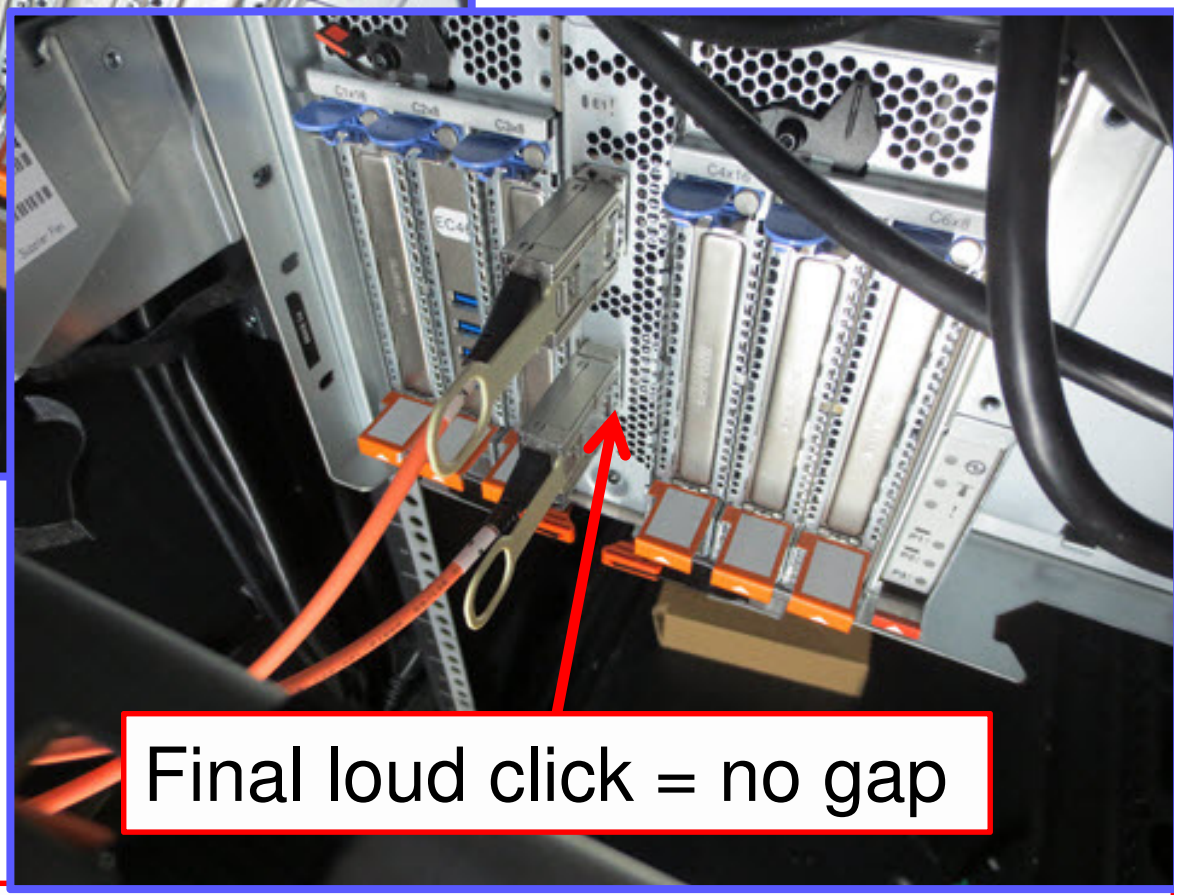

Cable arm in secure position


POWER8 I/O Drawer cables
This groove **MUST** match notch on the socket



Not pushed in!

Clunk but a gap

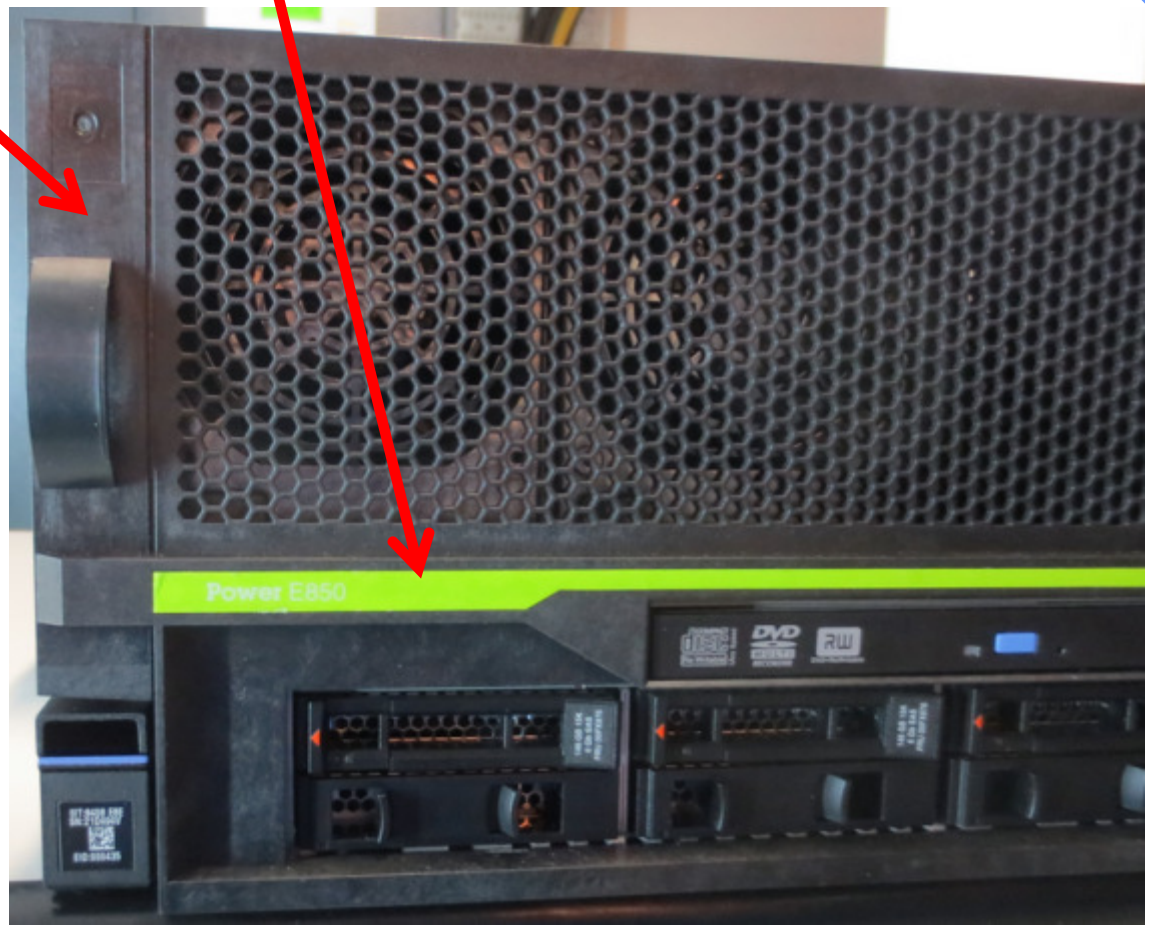


Final loud click = no gap

POWER8 I/O Drawer cable pair: top→top & bottom→bottom

Early Ship has some hand-made parts

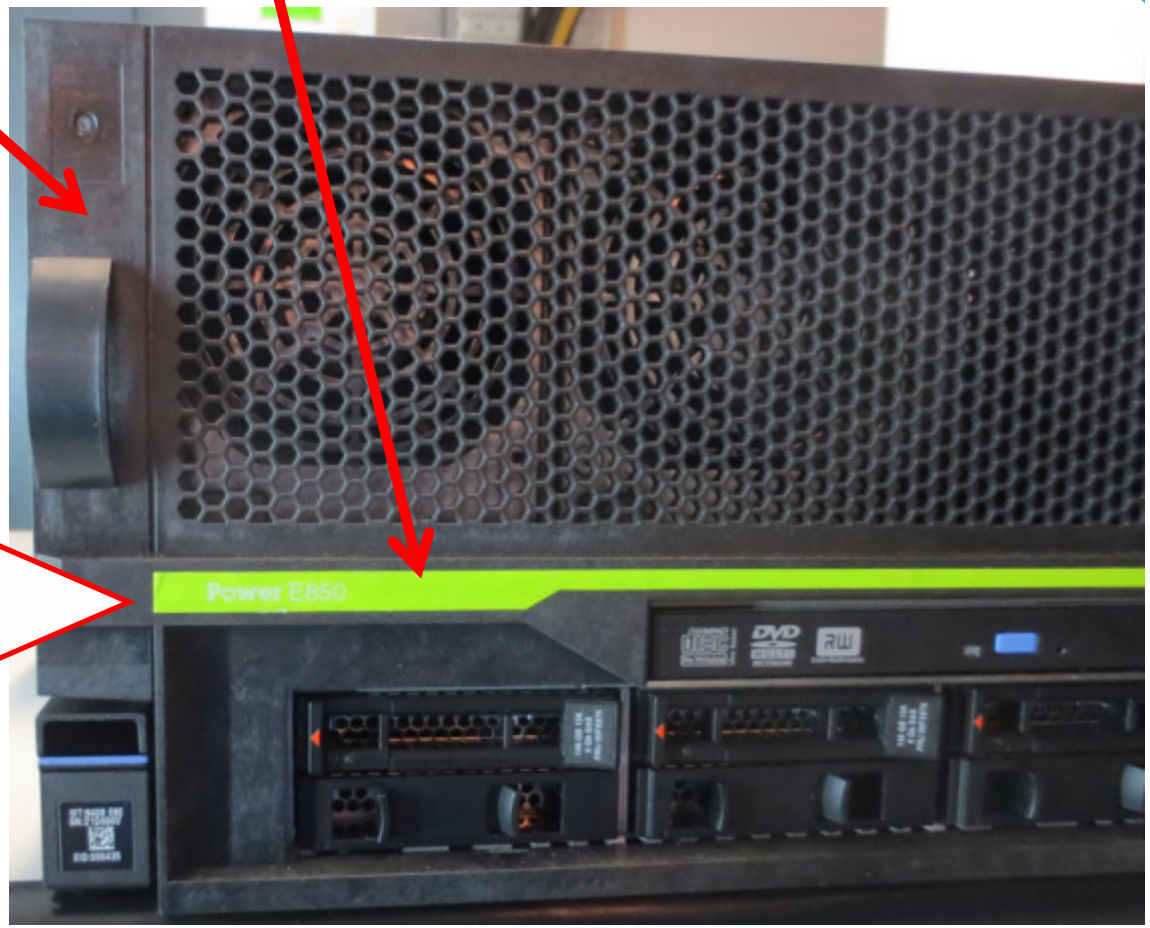
1. Horrid green “Power E850” Logo
2. Dull grey finish



- You will also get lots more stickers

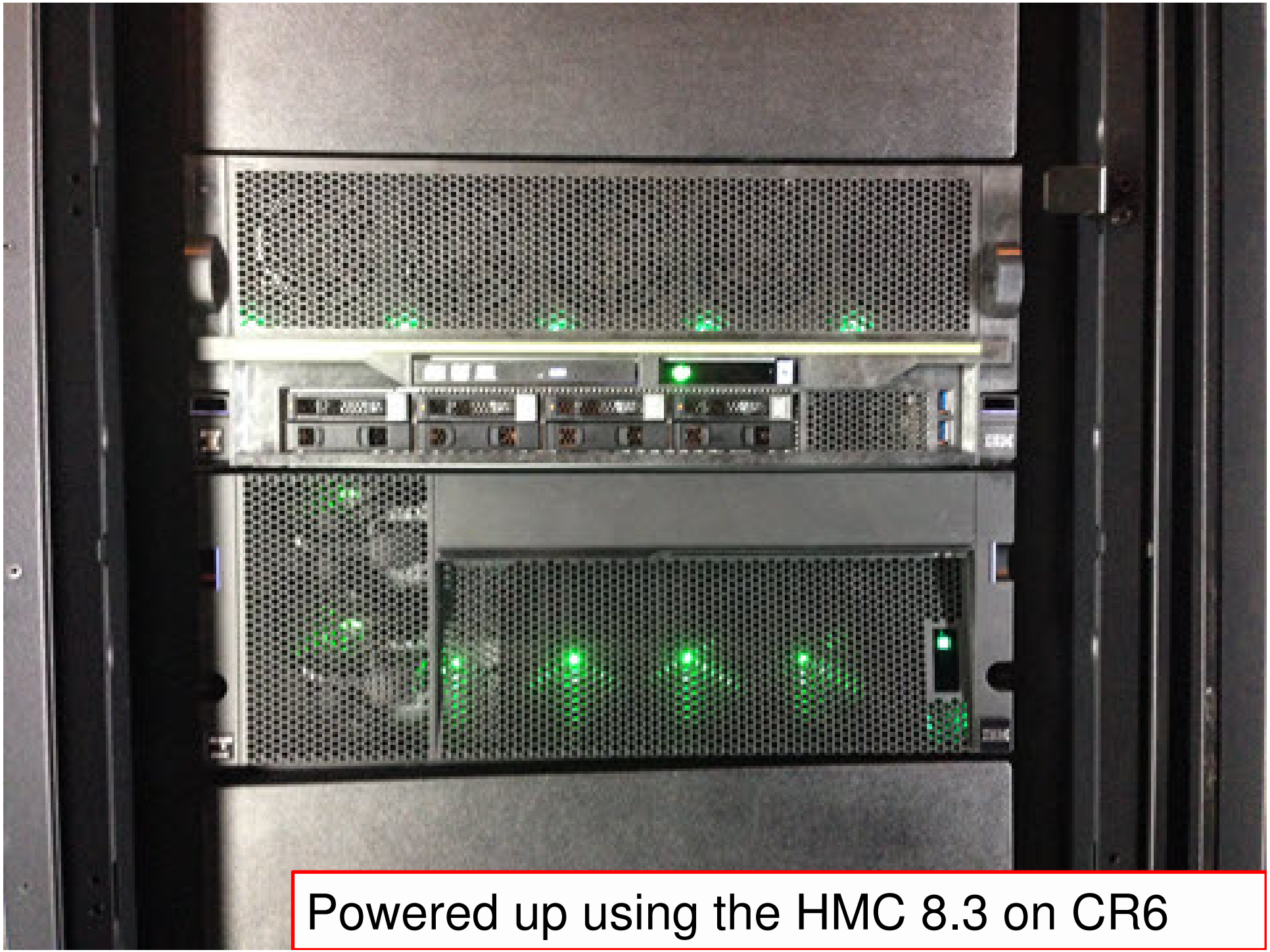
Early Ship has some hand-made parts

1. Horrid green “Power E850” Logo
2. Dull grey finish



This will change

- You will also get lots more stickers



Powered up using the HMC 8.3 on CR6

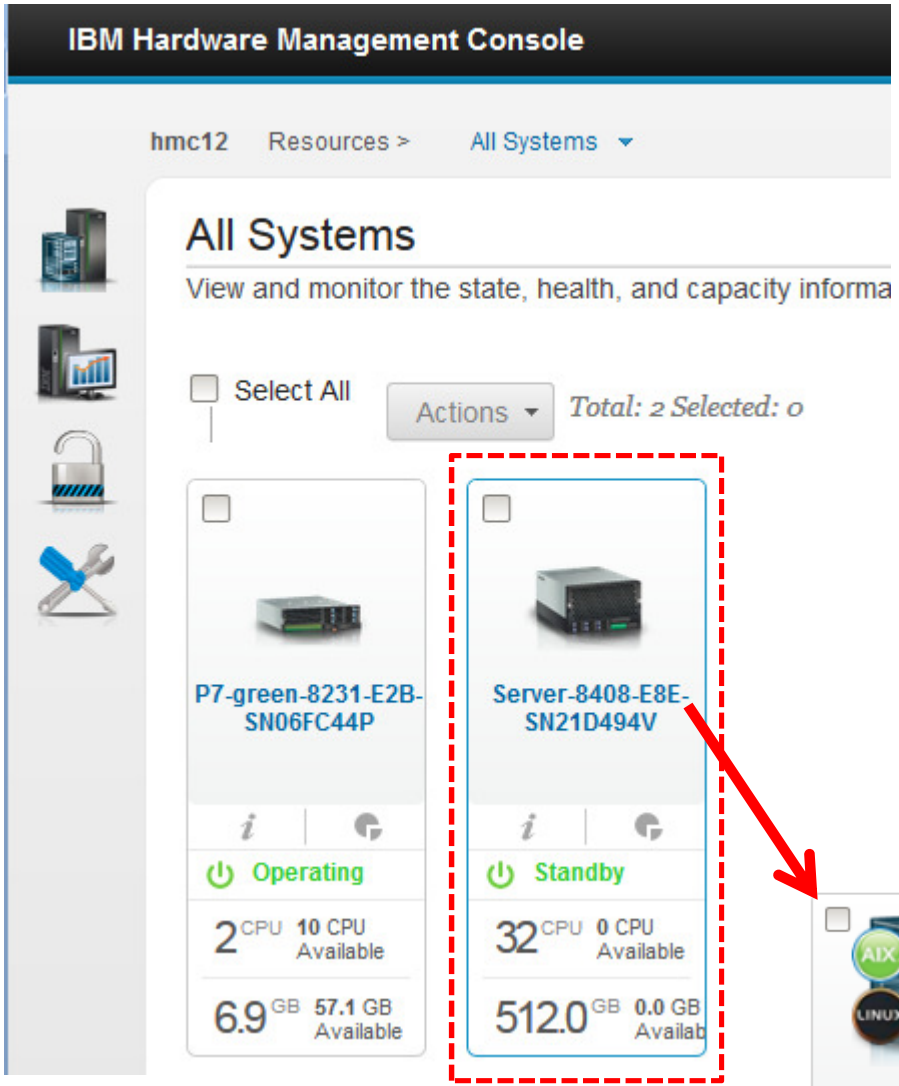
Cover off

Pulled out of the rack

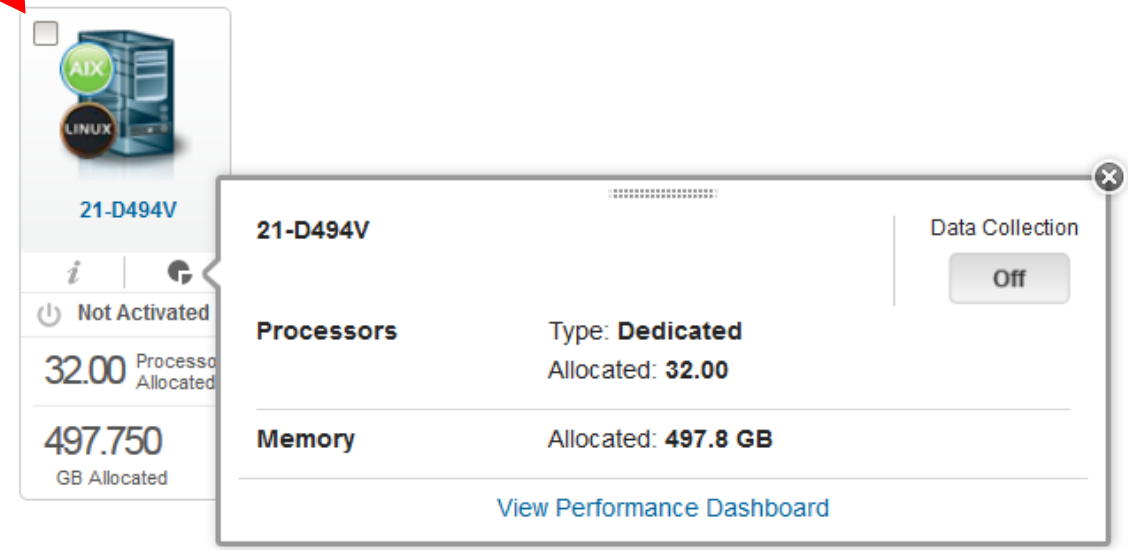
Ready for Maintenance
-Power Supplies
-Fans
-Disks
-SSD or DVD
-Adapters

Following the HMC procedures

But not for CPU or RAM



HMC 8.30
No longer Tech-Preview
Just Enhanced+



Split Backplane with two RAID controllers

Slot	Description	Bus	I/O Pool Id	Owner	Type
U78C7.001.053K040-P1-C10	PCIe Expansion Drawer Cable Card	16	Unassigned	Unassigned	
U78C7.001.053K040-P3-R1	RAID Controller	17	Unassigned	21-D494V	
U78C7.001.053K040-P1-C11	PCIe2 4-port(10Gb FCoE & 1GbE) Copper&RJ45	24	Unassigned	21-D494V	
U78C7.001.053K040-P1-C12	PCIe2 4-port(10Gb FCoE & 1GbE) Copper&RJ45	25	Unassigned	21-D494V	
U78C7.001.053K040-P1-C8	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	32	Unassigned	21-D494V	
U78C7.001.053K040-P3-R2	RAID Controller	33	Unassigned	21-D494V	
U78C7.001.053K040-P1-C9	PCIe2 4-port(10Gb FCoE & 1GbE) Copper&RJ45	40	Unassigned	21-D494V	
U78C7.001.053K040-P1-T1	Universal Serial Bus UHC Spec	43	Unassigned	21-D494V	
U78C7.001.053K040-P1-C6	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	44	Unassigned	21-D494V	
U78C7.001.053K040-P1-C7	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	45	Unassigned	21-D494V	
U78C7.001.053K040-P1-C3	Empty slot	48	Unassigned	21-D494V	
U78C7.001.053K040-P1-C4	8 Gigabit PCI Express Dual Port Fibre Channel Adapter	56	Unassigned	21-D494V	
U78C7.001.053K040-P1-C1	Empty slot	64	Unassigned	21-D494V	
U78C7.001.053K040-P1-C2	PCIe2 4-port(10Gb FCoE & 1GbE) Copper&RJ45	72	Unassigned	21-D494V	
U78CD.001.FZH0676-P1-C1	Empty slot	257	Unassigned	21-D494V	
U78CD.001.FZH0676-P1-C2	4-Port USB 3.0 Adapter	258	Unassigned	21-D494V	
U78CD.001.FZH0676-P1-C3	Empty slot	259	Unassigned	21-D494V	
U78CD.001.FZH0676-P1-C4	Empty slot	260	Unassigned	21-D494V	
U78CD.001.FZH0676-P1-C5	Empty slot	261	Unassigned	21-D494V	
U78CD.001.FZH0676-P1-C6	Empty slot	262	Unassigned	21-D494V	

POWER8 I/O Drawer

p8-ruby-8408-E8E-SN21D494V	⚠	Operating		Managed Sys	
emerald3 AIX7 TL3 SP4 GA		Running		Logical Partiti	AIX 7.1 7100-03-04-1441
ruby34		Running		Logical Partiti	AIX 7.1 7100-03-04-1441
ruby35-Ubuntu1504		Running	Linux ppc64	Logical Partiti	Unknown
rubyvios1		Running		Logical Partiti	VIOS 2.2.3.50 6100-09-04-1441
rubyvios2		Running		Logical Partiti	VIOS 2.2.3.50 6100-09-04-1441
rubyvios3		Running		Logical Partiti	VIOS 2.2.4.0 6100-09-04-1441
rubyvios4		Running		Logical Partiti	VIOS 2.2.4.0 6100-09-04-1441
vm160-90361a9e-000000f3		Running		Logical Partiti	AIX 7.1 7100-03-04-1441
vm20-SLES-11.3		Running	SUSE Linux	Logical Partiti	Linux/SuSE 3.0.101-0.42.1.7881.0.PTF11 11
vm22-RHEL7-GA		Running	Linux ppc64	Logical Partiti	Unknown
VM27_IBMi_1		Running	00000000	Logical Partiti	IBM i Licensed Internal Code 7.2.0.3060.0

Updates

HMC Code Level

Version: 8
Release: 8.3.0
Service Pack: 0

Build Level: 20150302.2
Base Version: V8R8.3.0

Serial Number: 102B0DC
Model Type: 7042CR6
BIOS: D6E149AUS-1.09

Update HMC

System Code Levels

Filter | Tasks | Views

Select	Name	Status	Platform IPL Level	Activated Level	EC Number
☐	P7-green-8231-E2B-SN06FC44P	Operating	142	142	01AL730
☐	p8-ruby-8408-E8E-SN21D494V	⚠ Operating	FW830.00 (24)	FW830.00 (24)	01SV830

Max Page Size: 500

Total: 2 Filtered: 2 Selected: 0

We are Running …

- HMC 8.3
- Firmware new 830 stream
- VIOS 2.2.3.50 (min) can be in a SSP on 2.2.3.4
- AIX
  - Using physical devices then AIX 7.3.4
  - More relaxed with pure virtual VM's [anything in last year]
- Linux
  - Check with your vendor
  - if POWER8 ready it will run on E850 with virtual I/O
    - **SLES 11.3** and12
    - Ubuntu 14.10, **15.04**
    - Red Hat 6.6, **7.1** and 7.1LE
- Tested LPM of AIX & Linux works from POWER7 or 8

E850 Supported OS Levels

If installing AIX LPAR with any I/O configuration:
- AIX V7.1 TL3 SP5 and APAR IV68444, or later
- AIX V7.1 TL2 SP7, or later (planned availability September 30, 2015)
- AIX V6.1 TL9 SP5 and APAR IV68443, or later
- AIX V6.1 TL8 SP7, or later (planned availability September 30, 2015)

If installing AIX Virtual-I/O-only LPAR:
- AIX V7.1 TL2 SP1, or later
- AIX V7.1 TL3 SP1, or later
- AIX V6.1 TL8 SP1, or later
- AIX V6.1 TL9 SP1, or later

If installing VIOS:
- VIOS 2.2.3.51 or later

If installing the Linux operating system *:
- Big Endian
  - Red Hat Enterprise Linux 7.1, or later
  - Red Hat Enterprise Linux 6.6, or later
  - SUSE Linux Enterprise Server 11 Service Pack 3
- Little Endian
  - Red Hat Enterprise Linux 7.1, or later
  - SUSE Linux Enterprise Server 12 and later Service Packs
  - See also SUSE SOD
  - Ubuntu 15.04

* see SUSE Linux Enterprise Server SOD

rPerf's but no CPW's (of course)

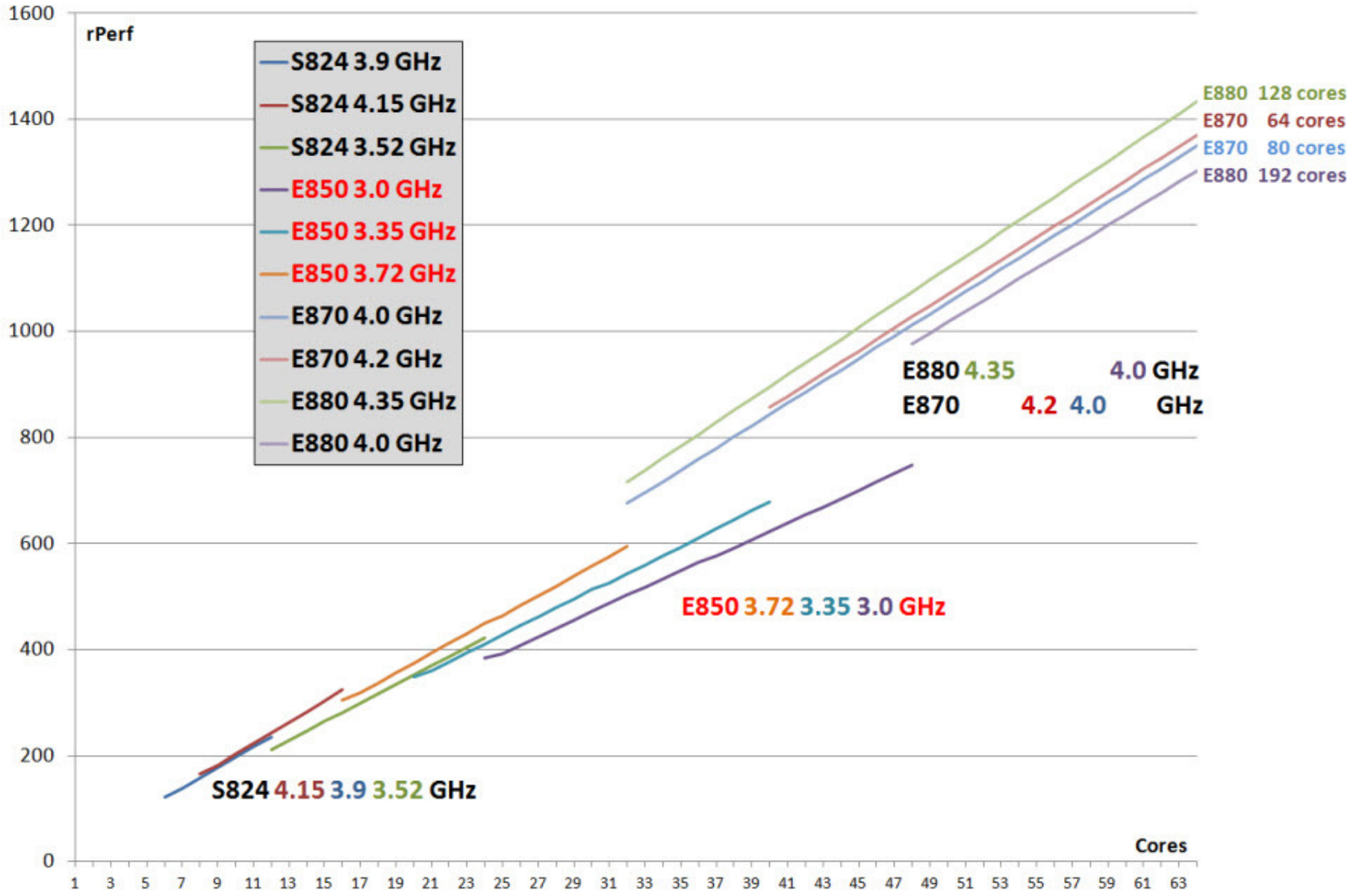
IBM Power Systems

May 2015

IBM Power Systems Facts and Features:

Enterprise and Scale-out Systems with POWER8™ Processor Technology

Model Comparision



I/O Planar options

- There are:
  - 8 x SAS SFF bays for HDDs or SSDs
  - 4 x SAS 1.8” bays for SSDs
  - 1 x DVD drive

- But there are various options

E850 Storage Backplane Options

Must select one → of three SAS controller options:	#EPVQ	#EPVP	#EPVN
	6+6 SAS bays **2x (4 SFF-3 & 2 1.8")** **2 SAS controllers** **0 GB cache** **DVD bay**	**12 SAS bays** **(8 SFF-3 & 4 1.8")** **Dual SAS controlrs** **0 GB cache** **DVD bay**	**12 SAS bays** **(8 SFF-3 & 4 1.8")** **Dual SAS contrllrs** **7.2** GB cache** **DVD bay**
	$ 3000	$ 3000	$ 6000
AIX / Linux	YES	YES	YES
Easy Tier Function	YES	YES	YES
JBOD	YES	NO	NO
RAID 0 / 1	YES	YES	YES
RAID 5 / 6 / 10	YES	YES	YES
RAID 5T2 (Easy Tier)	NO	YES	YES
RAID 6T2 (Easy Tier)	NO	YES	YES
RAID 10T2 (Easy Tier)	YES	YES	YES
Split backplane	YES	NO	NO

** 1.8GB physical write cache provides up to effectively 7.2GB with compression

USA list price is subject to change. Reseller prices will vary.

Dual vs Split SAS Controller Considerations

- "Dual" controllers have two controllers working together for additional protection (redundancy) and performance (active-active).
  - Treat the pair conceptually as ONE resource.
    - Both assigned to a partition or a VIOS. Can not split.
    - Both controllers see all 12 SAS bays.
  - If one of pair fails, it is designed for the remaining controller to take over all work
  - If multiple arrays configured, controllers split primary responsibility for handling arrays, increasing performance
  - If have write cache, each controller keeps a copy of the data in cache to protect against loss of data.
    - If one controller fails, the other controller stops using write cache after writing out contents until pairing restored. This can impact performance significantly.

Dual vs Split SAS Controller Considerations

- "Split" controllers have two controllers working independently.
  - Treat each controller as one resource.
    - Can assigned each independently to a partition or a VIOS.
    - Each controller sees only its own 6 SAS bays.
  - You may want to assign each to a VIOS and then mirror the two VIOS for protection.
  - Or assign each to the same partition and then mirror the two sets of drives.

E850 Processor Modules and Activations

More modules = more memory & more I/O

Number of processor modules	CDIMM memory slots	PCIe slots in system unit	Max PCIe Gen3 I/O Drawers
2	16	7	2
3	24	9	3
4	32	11	4

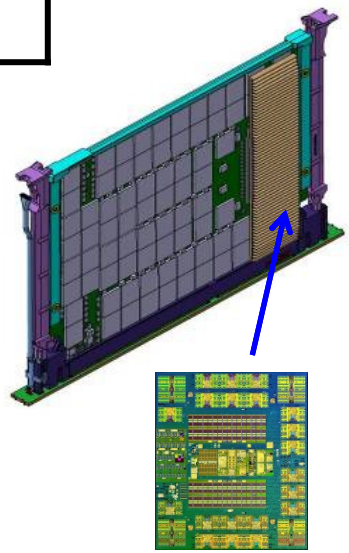
E850 offers CoD processor flexibility

- 1st & 2nd processor module cores 100% permanently activated
- 3rd & 4th processor module cores optionally activated
  - Elastic CoD, Utility CoD, Trial CoD

E850 DDR3 1.6 GHz Memory with L4 Cache

16GB, 32GB, 64GB CDIMMs (Custom DIMMs)

Number of processor modules	Max CDIMM slots	Max TB Memory using 64GB CDIMMs
2	16	1
3	24	1.5
4	32	2

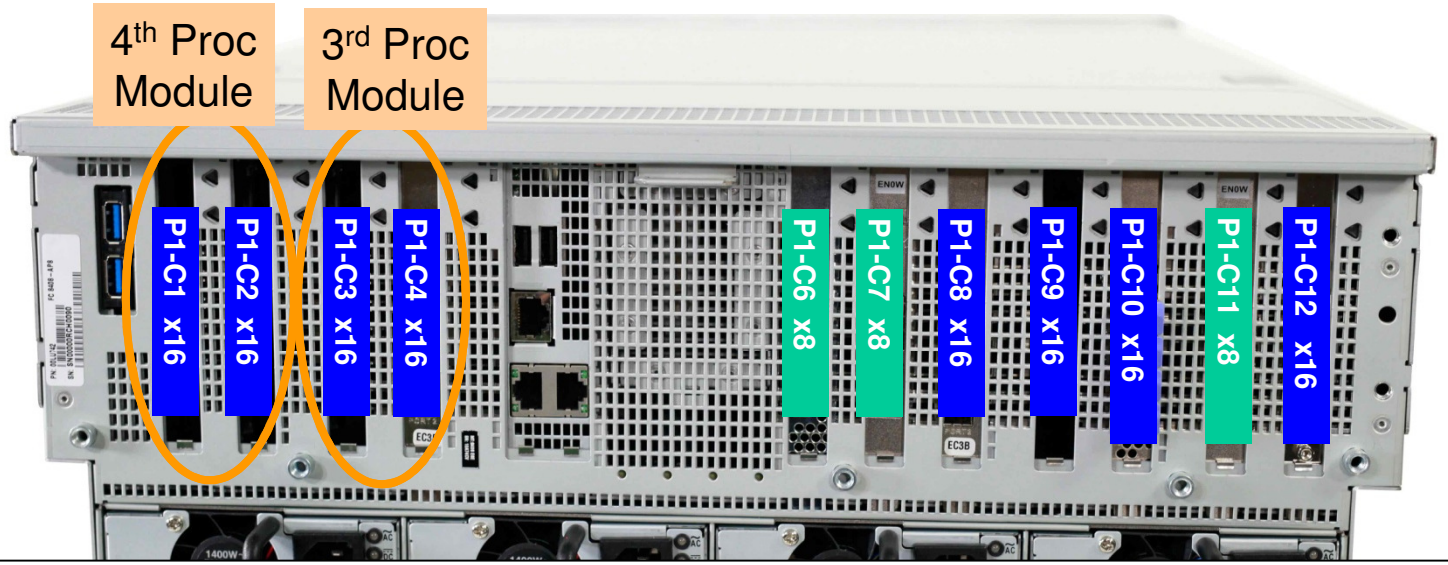


- 8 CDIMM slots per processor module
- Each memory feature adds bandwidth
- Minimum of 4 CDIMMs per processor feature
- Permanent activations: minimum of 50% or 128GB activations (which ever is more)
- SOD for higher memory max

Hot swap

HOT	NOT
HDD	RAM
SSD	CPU
Fans	I/O Modules
PSUs	FSP

Power E850 PCIe Slots in System Unit

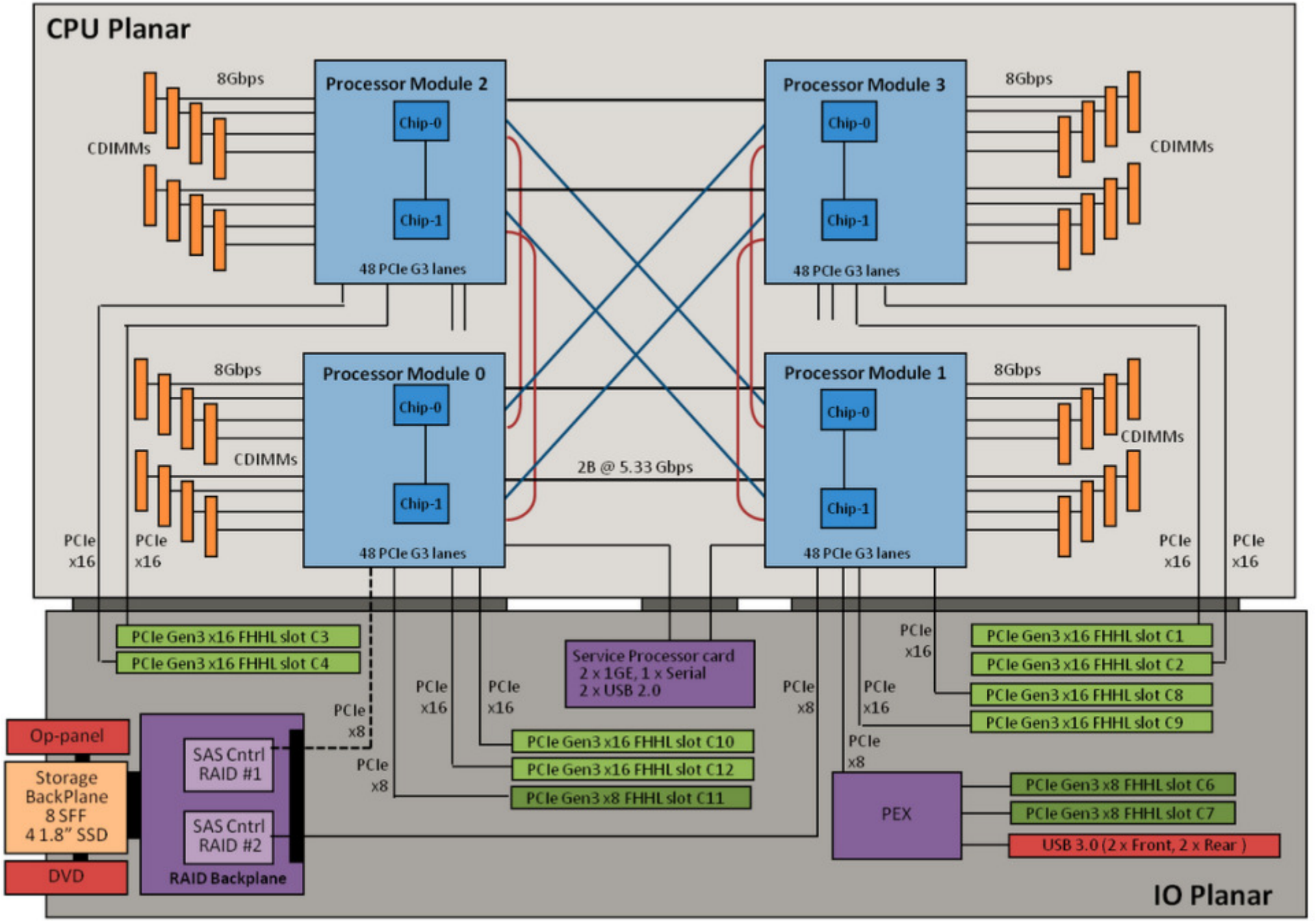


Up to 11 PCIe Gen3, full-high slots in the system unit

- For 2 processor modules: 3 x8 slots + 4 x16 slots = 7 total PCIe slots
- For 3 processor modules: 3 x8 slots + 6 x16 slots = 9 total PCIe slots
  (add C3 & C4)
- For 4 processor modules: 3 x8 slots + 8 x16 slots = 11 total PCIe slots
  (add C1 & C2)

x16 slots can be used for PCIe Gen3 I/O Drawer or PCIe adapters

7/9/11 slots available independent on the number or processor activations


CPU Planar
Processor Module 2
Processor Module 3
Processor Module 0
Processor Module 1
Chip-0
Chip-1
48 PCIe G3 lanes
8Gbps
CDIMMs
2B @ 5.33 Gbps
PCIe x16
PCIe x8
PCIe Gen3 x16 FHHL slot C3
PCIe Gen3 x16 FHHL slot C4
PCIe Gen3 x16 FHHL slot C1
PCIe Gen3 x16 FHHL slot C2
PCIe Gen3 x16 FHHL slot C8
PCIe Gen3 x16 FHHL slot C9
PCIe Gen3 x16 FHHL slot C10
PCIe Gen3 x16 FHHL slot C12
PCIe Gen3 x8 FHHL slot C11
PCIe Gen3 x8 FHHL slot C6
PCIe Gen3 x8 FHHL slot C7
USB 3.0 (2 x Front, 2 x Rear)
Service Processor card
2 x 1GE, 1 x Serial
2 x USB 2.0
PEX
Op-panel
Storage BackPlane
8 SFF
4 1.8" SSD
DVD
SAS Cntrl RAID #1
SAS Cntrl RAID #2
RAID Backplane
IO Planar

Questions:

-Not price
-Not rPerf / CPW
-Not eConfig

This is an Early Ship machine
Yours will be slightly different

Warning

about pictures and features:

- This is an early / “proto-type” box
  - Details may differ from Generally Available machines
- Including but not limited to:
  - Packaging
  - Missing labels & Warning stickers
  - Handle colours may be different
  - Air flow barrier may be different

Next Time

July 22nd : Linux on POWER Field Experience
Tom Watts

Previous Sessions:
PowerSC Tools for IBM i
HMC 8.20 Tech Preview
The "Key" to IBM i Licensing
POWER8 E870 from exper
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
And more…..

Future Sessions →

- Suggestions Welcome

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