

Out-of-box comparison between Dell, HP, and IBM servers

Executive summary

Dell Inc. (Dell) commissioned Principled Technologies (PT) to compare the out-of-box experience of a Dell PowerEdge 2970 Server with that of an HP ProLiant DL380 G5 Storage Server and an IBM System x3650. We received each system in the manufacturer's original packaging. We then compared the amount of time it took us to set up each system. Due to differences in packaging and design, the times for each step of the setup process for the three systems varied considerably.

Figures 1A, 1B, and 1C show the three servers and accessories after we unpacked them, not including the rail installation packs. These photographs illustrate similarities in the number of accessories included with each server. We found that the major differences in the out-of-box experience of the three servers were in the installation of the rails and cable management systems.

KEY FINDINGS

- The Dell PowerEdge 2970 system took 9 minutes, 25 seconds to unpack and install; the fastest time of any system. The IBM x3650 took the longest amount of time to unpack and install at 21 minutes, 45 seconds.
- The Dell PowerEdge 2970 was the simplest system to unpack; taking only 1 minute, 27 seconds.
- The IBM System x3650 cable management system took more than three times as long to install than the equivalent hardware for the Dell PowerEdge 2970.



Figure 1A: Dell server and accessories



Figure 1B: HP server and accessories



Figure 1C: IBM server and accessories

Figure 2 summarizes the amount of time we spent unpacking each system, installing the rails, installing the server in the rack, and installing the cable management system.

	Dell PowerEdge 2970 Server	HP ProLiant DL380 G5 Storage Server	IBM System x3650
Task executed			
Removing items from shipping boxes	01:27	03:57	02:26
Installing rails on server rack	02:28	02:13	04:14
Installing server in rack	01:03	00:24	00:49
Installing cable management system	04:27	03:02	14:16
Total time required	09:25	09:36	21:45

Figure 2: Time to unpack and install the three systems. Times are in minutes: seconds. Shorter times are better.

Test results

In this section, we detail our experience setting up the Dell PowerEdge 2970 Server, the HP ProLiant DL380 G5 Storage Server, and the IBM System x3650, from the time each system arrived through our installation of the server in a rack. We discuss this process in the following stages:

- Receiving the system
- Removing system components from their packaging
- Installing server mounting rails in the server rack
- Installing the system in the server rack
- Installing the cable management system and power cords

For each stage after we received the systems, we enumerate the steps we took, note the amount of time each step took, and provide representative photographs.

Receiving the system

Dell

As Figure 3A shows, the Dell shipment consisted of one large box. The shipping service delivered the box to our second-floor lab.



Figure 3A: Dell box as delivered

HP

As Figure 3B shows, the HP shipment consisted of one large box. The shipping service delivered the box to our second-floor lab.



Figure 3B: HP box as delivered

IBM

As Figure 3C shows, the IBM shipment consisted of one large box. The shipping service delivered the box to our second-floor lab.



Figure 3C: IBM box as delivered

Removing the system components from their packaging

Dell

1. Open shipping box. (00:15)
2. Remove rail kit and accessories boxes (00:14)
3. Remove server from packaging and box. (00:20)
4. Open accessories box. (00:05)
5. Remove accessories from box. (00:15)
6. Open mounting hardware box. (00:18)

HP

1. Open shipping box and remove contents. (1:00)
2. Remove plastic shipping bags and open Accessories and Manuals packet. (00:44)
3. Open small cords/kit box. (00:10)
4. Remove items from small box. (00:10)
5. Open mounting hardware box. (00:17)
6. Open and read Setup poster instructions. (1:36)

IBM

1. Open shipping box. (00:13)
2. Remove non-server contents. (00:17)
3. Remove server and manuals. (00:20)
4. Verify packing list contents and server configuration. (00:30)
5. Open accessory box. (00:18)
6. Open smaller box inside of accessory box and remove contents. (00:24)

- 7. Open box containing mounting rails and remove contents. (00:19)
- 8. Open power cord box. (00:05)

Total time: 1 minute, 27 seconds

Total time: 3 minutes, 57 seconds

Total time: 2 minutes, 26 seconds



Figure 4A: Dell server being unpacked.



Figure 4B: HP server being unpacked.



Figure 4C: IBM server being unpacked.

Installing server mounting rails in the server rack

Dell

- 1. Read rail installation instructions and install rails. (2:28)

Total time: 2 minutes, 28 seconds

HP

- 1. Read rail installation instructions and install rails. (1:46)
- 2. Attach rail arm guides to side of server. (00:27)

Total time: 2 minutes, 13 seconds

IBM

- 1. Read rail installation instructions and install rails. (4:14)

Total time: 4 minute, 14 seconds

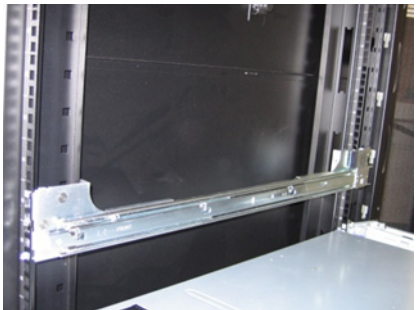


Figure 5A: Dell mounting rails in rack.

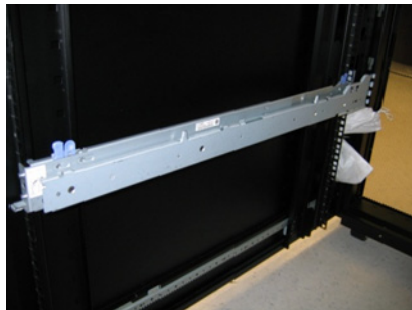


Figure 5B: HP mounting rails in rack.



Figure 5C: IBM mounting rails in rack.

Installing the system in the server rack

Dell

1. Mount server on rails in rack. (00:48)
2. Install front server cover. (00:15)

Total time: 1 minute, 3 seconds

HP

1. Mount server on rails in rack. (00:24)

Total time: 24 seconds

IBM

1. Mount server on rails in rack. (00:49)

Total time: 49 seconds



Figure 6A: Dell server in rack.



Figure 6B: HP server in rack.



Figure 6C: IBM server in rack.

Installing the cable management system and power cords

Dell

1. Install cable management arm bracket. (00:59)
2. Attach cable management arm ramp assembly. (00:30)
3. Route cables and attach system status indicator cables. (2:58)

Total time: 4 minutes, 27 seconds

HP

1. Install cable management arm swing. (2:11)
2. Route and attach power cables. (00:51)

Total time: 3 minutes, 2 seconds

IBM

1. Install cable management arm bracket. (9:24)
2. Install cable management system and power cords. (4:52)

Total time: 14 minutes, 16 seconds



Figure 7A: Dell cable management system and power cords.



Figure 7B: HP cable management system and power cords.



Figure 7C: IBM cable management system and power cords.

Test methodology

We attempted to recreate the way a typical buyer would unpack and install each server. We generally followed the instructions the vendors provided in their packaging. Occasionally, such as when we were opening the boxes, we had to use our own judgment, but whenever possible, we followed the vendors' instructions.

As one person executed the tasks, another person documented the process by recording the steps, timing each step, and photographing as many steps as possible.

Appendix A – Test system configuration information

This appendix provides detailed configuration information about each of the test server systems, which we list in alphabetical order.

Systems	Dell PowerEdge 2970 with two Dual-Core AMD Opteron 2222 SE Processors	HP ProLiant DL380 G5 with two Dual-Core Intel Xeon 5160 Processors	IBM System x3650 with two Dual-Core Intel Xeon 5160 Processors
General processor setup			
Number of processor packages	2	2	2
Number of cores per processor package	2	2	2
Number of hardware threads per core	1	1	1
CPU			
Vendor	AMD	Intel	Intel
Name	Opteron 2222 SE	Xeon 5160	Xeon 5160
Stepping	F2	B2	B2
Socket type	Socket F	LGA771	LGA771
Core frequency (GHz)	3.0 GHz	3.0 GHz	3.0 GHz
Front-side bus frequency (MHz)	1,000 MHz HyperTransport technology	1,333 MHz	1,333 MHz
L1 cache	64 KB + 64 KB (per core)	32 KB + 32KB (per core)	32 KB + 32KB (per core)
L2 cache	2 x 1 MB	4 MB (shared)	4 MB (shared)
Platform			
Vendor and model number	Dual-Core AMD Opteron processor model 2222 SE-based server	Dual-Core Intel Xeon processor model 5160-based server	Dual-Core Intel Xeon processor model 5160-based server
Motherboard model number	Dell CN-OFP973-69702-74H-0091	HP P3021ADMQUN203	IBM 7979AC1
Motherboard chipset	Broadcom HT-2100 and HT-1000 Chipset	Intel 5000 Series Chipset	Intel 5000 Series Chipset
Motherboard serial number	F3G57D1	013096-001	KQHRHY0
BIOS name and version	Dell BIOS 1.0.0	HP BIOS P56	IBM BIOS 1.05
BIOS settings	Default	Default	Default
Power settings (default)	Demand-Based Power Management (PowerNow) disabled	HP Dynamic Power Savings Mode enabled	PowerExecutive Power Capping enabled

Memory module(s)			
Vendor and model number	Infineon HYS72T256220HP-3S-A	Kingston KTH-XW667/4G	Kingston KTM5780/4G
Type	PC2-5300 DDR2	PC2-5300 FBDIMM	PC2-5300 FBDIMM
Speed (MHz)	667 MHz	667 MHz	667 MHz
Speed in the system currently running @ (MHz)	333 MHz	333 MHz	333 MHz
Timing/Latency (tCL-tRCD-iRP-tRASmin)	5-5-5-12	5-5-5-10	5-5-5-11
Size	16 GB	16 GB	16 GB
Number of RAM modules	8 x 2,048 MB	8 x 2,048 MB	8 x 2,048 MB
Chip organization	Double-sided	Double-sided	Double-sided
Hard disk			
Vendor and model number	Seagate ST973451SS	Seagate ST973451SS	Seagate ST973451SS
Number of disks in system	5	5	5
Size	73 GB	73 GB	73 GB
Buffer Size	16 MB	16 MB	16 MB
RPM	15,000	15,000	15,000
Type	SAS	SAS	SAS
Controller	PERC 5i	Smart Array P400	IBM ServeRAID 8K
Graphics			
Vendor and model number	ATI ES1000	ATI ES1000	ATI ES1000
Chipset	ATI ES1000 PCI	ATI ES1000 PCI	ATI ES1000 PCI
Type	Integrated	Integrated	Integrated
Memory size	16 MB	32 MB	16 MB
Network card/subsystem			
Vendor and model number	Broadcom NetXtreme II Gigabit	NC373i Multifunction Gigabit Network Adapter	Broadcom NetXtreme II Gigabit & Intel PRO/1000 PT
Type	Integrated	Integrated	Broadcom integrated & Intel PCI
Optical drive			
Vendor and model number	TEAC CD-224E	TEAC DV-W28EA	TEAC UJDA-770
Type	CD-ROM	DVD/CDRW	DVD/CDRW
Interface	IDE	IDE	IDE
Dual/single layer	Single	Dual	Dual
USB ports			
Number of ports	4	5	6
Type of ports (USB 1.1, USB 2.0)	USB 2.0	USB 2.0	USB 2.0

Figure 8: Detailed system configuration information for the test servers.



Principled Technologies, Inc.
1007 Slater Rd., Suite 250
Durham, NC 27703
www.principledtechnologies.com
info@principledtechnologies.com

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