ITIC 2019 Global Server Hardware, Server OS Reliability Survey

March 2019

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ITIC Principal
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Overview: Methodology

• ITIC’s annual Hardware and Server OS Reliability survey polled over 1,000 global businesses from November 2018 through January 2019.
• The Web-based survey included multiple choice questions and one Essay question.
• ITIC’s 2019 Reliability survey focus:
  - Server and OS reliability/uptime
  - External factors impacting server reliability (e.g. security breaches; user carelessness)
  - Top causes of unplanned downtime for servers, OS & virtualization
  - Customer satisfaction with vendor service and support
  - **New questions focusing on:** Server and OS **Availability** and Downtime as a result of **Server hardware component failures**

• ITIC also conducted separate surveys detailing the latest Annual Cost of Hourly Downtime; Downtime Costs by Vertical Market segments and Minimum Uptime and Reliability requirements and the impact of Security breaches.
• The survey was independent; **No Vendor Sponsorship**
• ITIC analysts again conducted two dozen, in-depth first person customer interviews to validate the updated Web survey responses.
• Approximately 67% of respondents hailed from North America; 33% were international customers
• All market sectors were represented: SMBs = 32%; SMEs = 26% and Enterprises = 43% of respondents
• Survey respondents hailed from 22 vertical markets & 23 countries
• ITIC used security & authentication to prevent tampering
Survey Highlights: Reliability Trends

• **Overall**, the inherent reliability of the majority of server hardware, server operating systems and the underlying processor technology continues to improve. Human Error, Increasing complexity and Security issues undermine reliability particularly with respect to mainstream, “workhorse” commodity servers.

• **Vendor Performance:**
  - IBM Z and IBM Power Systems delivered the highest reliability for the 11th year in a row while Lenovo x86 servers had the best uptime among all x86 platforms for the 6th straight year.
  - IBM, Lenovo, HPE Integrity, Huawei KunLun record best Availability
  - IBM and Lenovo server reliability are up to 24x more reliable than worst rivals
  - HPE’s Integrity Superdome, Stratus ftServer and Fujitsu Primergy also scored high
  - Lenovo, IBM, HPE and Huawei rated highest in customer satisfaction

• **Reliability Trends:**
  - Majority of corporations - 85% Require “Four Nines” of Uptime - 99.99% for mission critical hardware, operating systems & main line of business (LOB) applications. This in an increase of four (4) percentage points from ITIC’s 2017 – 2018 Reliability poll.
  - **Patch Time Increases**: 60% of firms now spend from two-to-four hours applying patches
  - **Increase in Server Workloads** causes reliability declines in 64% of servers > 4 years old that haven’t been retrofitted or upgraded to accommodate increased workloads.
  - **Cost of Hourly Downtime Increases**: 98% of firms say hourly downtime costs exceed $150K;
  - 35% of respondents estimate hourly downtime costs their companies up to $400K.

• **Top Issues Negatively impacting network reliability are:**
  - End User Carelessness – 74%; Human Error (e.g., misconfiguration, right-sizing server workloads etc.) – 59%; Security -51%.
Survey Highlights contd.

• **IBM Z continues to have the lowest incidence – 0% -- of > 4 hours of per server/per annum downtime** among all servers. Over 90% of customers reported the IBM Z averaged between **32 seconds and five minutes of unplanned per server/per annum downtime**. That equates to “five nines” and “six nines” of Reliability.

• **IBM Power Systems and Lenovo System x and ThinkSystem hardware and the Linux operating system distributions** were either first or second in every reliability category, including server hardware, virtualization and security.

• **Lenovo System x and ThinkSystem, HPE Integrity Superdome and the Huawei KunLun servers** achieved the highest reliability ratings among all competing x86 platforms with each platform recording just under 2 minutes of per server/per annum unplanned downtime due to inherent problems with the server or component parts.

• **Stratus Technologies**, Stratus ftServer, a veteran niche market platform, known for its mainframe like fault tolerance and availability also displayed very high reliability, recording just 0.90 seconds of unplanned per server monthly downtime.

• **Users rated Lenovo, IBM, HPE and Huawei tech support the best.**

• **Reliability continues to decline** for the **sixth straight** year on the HPE ProLiant and Oracle’s SPARC & x86 hardware and Solaris OS. Reliability on the Oracle platforms declined slightly mainly due to aging hardware in less robust configurations that also lacked RAS 2.0 features.

• **Only 1% of IBM and Lenovo customers and 3% of Fujitsu, HPE and Huawei users** gave those vendors “Poor” or “Unsatisfactory” customer support ratings.

• **A 60% majority** of 2019 survey respondents say increased workloads negatively impact reliability on aged hardware >3 ½ years old. This is up 15% from the 45% that indicated uptime declined due to higher workloads in the ITIC 2017 – 2018 Reliability poll.
Reliability Results

Corporate enterprise minimum Server Hardware, Server OS Requirements Increase Year Over Year (Y0Y): 85% of Organizations Now Need a Minimum of 99.99% Uptime. This is an Increase of over 25% in the last 30 months.
Has the increase in server workloads had a noticeable impact on monthly and annual server reliability/availability in 2018?

- Yes, increased workloads significantly reduced reliability by 11% to 20%+: 23%
- Yes, increased workloads minimally reduced reliability by 1% to 4%: 22%
- Increased workloads have not impacted reliability: 19%
- Yes, increased server workloads have moderately reduced reliability by 5% to 10%: 15%
- Unsure: 11%
- We upgraded/retrofitted servers; reliability increased: 6%
- We don't calculate reliability/downtime: 4%

A 60% majority of respondents say increased workloads negatively impact reliability; up 15% percentage points since 2017. Of that 60%, approximately 80% of firms experiencing reliability declines have commodity servers: e.g., White box; older Dell, HPE ProLiant & Oracle hardware >3 ½ years old that haven’t been retrofitted/upgraded.

Has the increase in server workloads had a noticeable impact on monthly and annual server reliability/availability in 2019?

- Yes, increased workloads significantly reduced reliability by 11% to 20%+: 25%
- Yes, increased workloads minimally reduced reliability by 1% to 4%: 23%
- Yes, increased server workloads have moderately reduced reliability by 5% to 10%: 18%
- Increased workloads have not impacted reliability: 16%
- We upgraded/retrofitted servers; reliability increased: 8%
- Unsure: 7%
- We don't calculate reliability/downtime: 3%

A 66% majority of respondents say increased workloads negatively impact reliability; up six percentage points since 2018 and 21% percentage points since 2017. Of that 66%, approximately 74% of firms experiencing reliability declines have commodity servers: e.g., White box; older Dell, HPE ProLiant & Oracle hardware >3 ½ years old that haven’t been retrofitted/upgraded.
Unplanned Downtime of up to four (4) hours during the past 12 months on each server hardware platform (2019)

- 40 minutes or less
- 41 minutes up to 4 hours

<table>
<thead>
<tr>
<th>Server Type</th>
<th>40 min or Less</th>
<th>41 min to 4 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dell PowerEdge Servers</td>
<td>64%</td>
<td>27%</td>
</tr>
<tr>
<td>HPE ProLiant Servers</td>
<td>62%</td>
<td>24%</td>
</tr>
<tr>
<td>HPE Integrity Superdome</td>
<td>97%</td>
<td>2%</td>
</tr>
<tr>
<td>Lenovo System x/ThinkSystem</td>
<td>98%</td>
<td>1%</td>
</tr>
<tr>
<td>IBM Z</td>
<td>99%</td>
<td>1%</td>
</tr>
<tr>
<td>IBM POWER</td>
<td>98%</td>
<td>2%</td>
</tr>
<tr>
<td>Oracle x86</td>
<td>55%</td>
<td>30%</td>
</tr>
<tr>
<td>Oracle SPARC</td>
<td>64%</td>
<td>26%</td>
</tr>
<tr>
<td>Cisco UCS</td>
<td>80%</td>
<td>15%</td>
</tr>
<tr>
<td>Toshiba Magnia</td>
<td>99%</td>
<td>1%</td>
</tr>
<tr>
<td>Stratus ftServer</td>
<td>92%</td>
<td>4%</td>
</tr>
<tr>
<td>Fujitsu Primergy</td>
<td>90%</td>
<td>5%</td>
</tr>
<tr>
<td>Fujitsu Primequest</td>
<td>86%</td>
<td>9%</td>
</tr>
<tr>
<td>Fujitsu SPARC</td>
<td>98%</td>
<td>1%</td>
</tr>
<tr>
<td>Huawei KunLun</td>
<td>98%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Server Reliability Gap Grows Among Mission Critical and Commodity Servers: IBM, Lenovo, HPE Integrity & Huawei Record Least Amount of Unplanned Downtime >Four Hours in 2019

- IBM Z 0%
- Stratus ftServer 0%
- IBM Power Systems 1%
- Lenovo System x and ThinkSystem 1%
- Huawei KunLun 1%
- HPE Integrity Superdome 1%
- Huawei FusionServer 2%
- Fujitsu Primergy 4%
- Cisco UCS 5%
- Toshiba Magnum 5%
- Fujitsu SPARC 5%
- Dell PowerEdge 9%
- Oracle SPARC 10%
- HPE ProLiant 14%
- Oracle x86 15%
- White Box x86 20%

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Annual Server Downtime of >4 hours by vendor platform in 2019

NOTE: Lenovo System x and ThinkSystem servers, HPE Integrity Superdome and Huawei KunLun platforms continue to record the lowest percentage (1%) of >4 hours of per server/per annum server outages among Intel x86 platforms due to inherent system failures or flaws.

How much Unplanned Downtime have you experienced in Minutes, per server/per annum in 2018?

- IBM z Systems mainframes achieve true fault tolerance experiencing just 0.90 minutes of unplanned per server, per annum annual downtime. Due to inherent hardware or component flaws.
- IBM POWER (2.0), Lenovo System x and ThinkSystem, HPE Integrity & Huawei KunLun/Fusion Servers running Linux have least amount of unplanned downtime 2.1 minutes per server per year. They are 17x to 18x more reliable than the least reliable White Box servers w/Linux.
- 88% of IBM POWER Systems and 87% of Lenovo System x and ThinkSystem users running RHEL, SuSE or Ubuntu Linux experience fewer than one unplanned outage per server, per year due to inherent server hardware or component flaws.
Reliability Gap Widens Among High-end & Commodity Server Hardware Platforms in 2019

Unplanned Downtime Due to Inherent system or component flaws in Minutes per Server/per Annum

- White Box servers w/Linux: 49 minutes
- HPE ProLiant w/Linux: 42 minutes
- Oracle OpenSolaris UltraSPARC: 41 minutes
- Oracle x86 w/Linux: 39 minutes
- Dell PowerEdge w/Linux: 25 minutes
- Cisco UCS w/Linux: 4.3 minutes
- Fujitsu Primergy w/Linux: 3.5 minutes
- HPE Integrity Superdome w/Linux: 2 minutes
- Huawei KunLun & FusionServer w/Linux: 2 minutes
- Lenovo System x/ThinkSystem w/Linux: 1.88 minutes
- IBM Power w/Linux: 1.75 minutes
- Stratus ftServer w/Linux: 0.95 minutes
- IBM Z w/Linux or z/OS: 0.74 minutes

- IBM Z achieves true fault tolerance experiencing just 0.74 minutes of unplanned per server, per annum annual downtime. Due to inherent hardware or component flaws.
- IBM POWER8 and IBM POWER9, Lenovo System x and ThinkSystem, HPE Integrity & Huawei KunLun/Fusion Servers running Linux have least amount of unplanned downtime 2 minutes or less per server/per year due to hardware or component failures. They are over 20x more reliable than the least reliable White Box servers w/Linux.

IBM, Lenovo Running Linux, Open Source Deliver Best Enterprise Server OS System Availability & Unplanned Downtime in 2019 (Hours per Year)

- IBM RHEL/SUSE/Ubuntu on Power: 0.08 hours
- IBM AIX on Power Systems: 0.08 hours
- Lenovo RHEL Linux x86: 0.12 hours
- Huawei SUSE/RHEL KunLun: 0.13 hours
- HPE RHEL/SUSE Integrity: 0.16 hours
- Cisco RHEL: 0.17 hours
- Dell RHEL/SuSE: 0.25 hours
- Windows 12/2016/2019 x86: 0.23 hours
- HPE ProLiant RHEL: 0.35 hours
- HPE ProLiant Ubuntu: 0.43 hours
- Oracle Sun x86 Oracle Linux: 0.49 hours
- Oracle Solaris SPARC: 0.51 hours

Enterprises in 2019 classify mission-critical class reliability as 0.19 (<12 min.) per server/per year.

NOTE: In comparable server OS configurations, workloads and age (new to 3 years old) Intel Xeon processors achieved equivalent levels of 98.99% and 99.99% uptime as rival UNIX/CISC servers. As of February 2019, the reliability of OSes running IBM, Lenovo and HPE Integrity improved as did newer Dell (new to two years old). HPE ProLiant and Oracle x86 reliability continued to exhibit higher instances of downtime due to longer upgrade cycles w/o retrofitting & failure to right-size server to accommodate higher workloads.
Cost of One Minute of Hourly Downtime of $100,000 for a Single Server by Server Vendor Platform

- IBM Power Systems w/Linux 1.75: $2,917
- Lenovo System x and ThinkSystem w/Linux 1.88: $3,134
- Huawei KunLun w/Linux 2: $3,334
- HPE Integrity w/Linux 2: $3,334
- Fujitsu Primergy w/Linux 3.5: $5,835
- Cisco UCS w/Linux 4.3: $7,168
- Dell PowerEdge w/Linux 25: $41,675
- Oracle x86 w/Linux 39: $65,013
- HPE ProLiant w/Linux 42: $70,014
- Unbranded White Box w/Linux 49: $81,683

ITIC 2019 survey data indicates 86% of Corporate enterprises say one hour of Downtime Now costs at least $300,000. One minute of Downtime at $300,000 = $4,998 per server. ITIC multiplied that by the number of minutes of Downtime experienced by each server hardware Platform.

Cost of One Minute of Hourly Downtime of $300,000 for a Single Server by Server Vendor Platform

- IBM Power Systems w/Linux 1.75: $8,747
- Lenovo System x and ThinkSystem w/Linux 1.88: $9,396
- Huawei KunLun w/Linux 2: $9,996
- HPE Integrity w/Linux 2: $9,996
- Fujitsu Primergy w/Linux 3.5: $17,493
- Cisco UCS w/Linux 4.3: $21,491
- Dell PowerEdge w/Linux 25: $124,950
- Oracle x86 w/Linux 39: $194,922
- HPE ProLiant w/Linux 42: $209,916
- Unbranded White Box w/Linux 49: $244,902

ITIC 2019 survey data indicates 86% of Corporate enterprises say one hour of Downtime Now costs at least $300,000. One minute of Downtime at $300,000 = $4,998 per server. ITIC multiplied that by the number of minutes of Downtime experienced by each server hardware Platform.
IBM Power Systems, Lenovo System x, HPE Integrity and Huawei KunLun deliver least amount of *Unplanned Server Downtime* in 2019 (Hours per Year) in comparable hardware configurations and workloads.

**NOTE:** In comparable server configurations, workloads and age (new to 3 years old) Intel Xeon processors achieved equivalent levels of 99.99% and 99.999% uptime as rival UNIX/RISC servers. As of February 2019, the reliability of OSes running IBM, Lenovo and HPE Integrity improved as did newer Dell (new to two years old), HPE ProLiant and Oracle x86 reliability continued to exhibit higher instances of downtime due to longer upgrade cycles who retrofitting & failure to right-size server to accommodate higher workloads.

**Comparing Corporate Enterprise Server OS Planned Downtime and System Unavailability in 2018 (Hours per Month)**

**NOTE:** ITIC’s definition of **Planned Downtime** is any activity e.g. applying patches, upgrades or routine maintenance. This potentially can still disrupt operations causing in the server OS and possibly necessitating taking the server offline.
Corporate Enterprise Server OS *Planned Downtime* and System Unavailability in 2019 (Hours per Month)

<table>
<thead>
<tr>
<th>OS</th>
<th>Downtime (Hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM zOS</td>
<td>0.55</td>
</tr>
<tr>
<td>IBM AIX</td>
<td>0.69</td>
</tr>
<tr>
<td>IBM RHEL/SuSE</td>
<td>1.1</td>
</tr>
<tr>
<td>Lenovo System x/ThinkSystem</td>
<td>1.2</td>
</tr>
<tr>
<td>Huawei KunLun Linux</td>
<td>1.2</td>
</tr>
<tr>
<td>HPE Linux</td>
<td>1.3</td>
</tr>
<tr>
<td>HPE UX</td>
<td>1.5</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux</td>
<td>1.8</td>
</tr>
<tr>
<td>SUSE Linux Enterprise</td>
<td>1.9</td>
</tr>
<tr>
<td>Oracle Solaris v.11x</td>
<td>2.1</td>
</tr>
<tr>
<td>Windows Server 2012/2016/2019</td>
<td>2.3</td>
</tr>
<tr>
<td>Ubuntu</td>
<td>2.8</td>
</tr>
<tr>
<td>Debian</td>
<td>3.1</td>
</tr>
</tbody>
</table>

*NOTE: ITIC's definition of Planned Downtime is any activity e.g. applying patches, upgrades or routine maintenance. This potentially can still disrupt operations and possibly necessitating taking the server offline.*

How long does it take to apply patches overall in 2018?

- **2 to 4 hours**: 21%
- **31 to 60 minutes**: 18%
- **More than 4 hours**: 17%
- **1 to 2 hours**: 16%
- **15 to 30 minutes**: 14%
- **Automatically applied via Group Policy**: 9%
- **Less than 15 minutes**: 5%

*NOTE: 17% of respondents spent >4 hours applying patches vs. 14% in 2014 and 11% in the 2013. The percentage of firms automatically applying patches decreased from 30% in 2016 to just 9% in the latest 2018 poll. In 2018 companies apply 27% more patches now than anytime since 2015 – mainly security.*

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How long does it take to apply patches overall in 2019?

- 2 to 4 hours: 39%
- 1 to 2 hours: 16%
- More than 4 hours: 15%
- 31 to 60 minutes: 10%
- 15 to 30 minutes: 10%
- Automatically applied via Group Policy: 8%
- Less than 15 minutes: 2%

NOTE: 43% of respondents spent 2 to 4 hours applying patches vs. 21% in 2018. The percentage of firms automatically applying patches decreased from 30% in 2016 to just 8% in the latest 2019 poll. In 2019 companies apply 32% more patches now than anytime since 2015 – mainly security.
Top Causes of Server Downtime
What are Your Firm’s Top Technical Causes of Server Failure and Problems? (Select All that Apply)

- Hard disk drive: 58%
- Motherboard: 43%
- Processor: 38%
- Fans/Cooling: 35%
- Memory (RAM, DIMM etc): 31%
- Network connection: 29%
- Backup: 28%
- Audio: 26%
- Power Supply: 25%
- Video: 9%
- Other: 3%

If your firm experienced significant server quality or components failure issues, when did the problems first arise?

- Immediately: 30%
- Within the first week: 19%
- Within the first month: 17%
- In one to two months: 6%
- In two to three months: 4%
- In three to six months: 3%
- In six to nine months: 5%
- Nine to 12 months: 2%
- One to two years: 3%
- Two to three years: 2%
- > Three years: 7%
Describe the Server Problems/Failure (Select all that Apply)

- Hard disk drive died: 58%
- Server boot failure: 53%
- HDD read failure: 48%
- Motherboard failure: 46%
- Processor L1/L2 cache errors: 41%
- Multibit memory errors: 40%
- Server overheated/fan failed: 39%
- DIMM failed: 38%
- Exceeded capacity: 36%
- Power surge: 33%
- Power source failure: 32%
- Multiple components failed: 29%
- IT Manager overclocked server: 16%
- Indeterminate failure: 14%
- Unsure: 3%
- Other: 3%
- Server was DOA: 2%

What percentage of your firm’s server hardware experienced significant problems/failures within the first year of usage?

- IBM Z: 0.4%
- IBM Power Systems: 0.7%
- Lenovo System x and ThinkSystem: 1%
- Huawei KunLun: 1%
- Huawei Fusion Server: 2%
- HPE Integrity: 3%
- Fujitsu Primergy: 3%
- Cisco UCS: 5%
- Toshiba Magnia: 7%
- Dell PowerEdge: 11%
- Oracle x86: 12%
- HPE ProLiant: 14%
- Unbranded White Box: 19%
Estimate the impact (or perceived impact) that server and OS security have on overall network reliability in 2019

<table>
<thead>
<tr>
<th>Impact Perceived</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1%</td>
</tr>
<tr>
<td>Minimal impact</td>
<td>9%</td>
</tr>
<tr>
<td>Moderate impact</td>
<td>42%</td>
</tr>
<tr>
<td>Significant impact</td>
<td>30%</td>
</tr>
<tr>
<td>Extremely crucial</td>
<td>16%</td>
</tr>
<tr>
<td>We don't keep track</td>
<td>2%</td>
</tr>
</tbody>
</table>

What issues most negatively impact Reliability & Cause Downtime for server HW and Server OS platforms in 2012 – 2013? (Select all that apply)

- Bugs/flaws in the server OS: 31%
- Human error: 28%
- Instability/problems with server HW: 24%
- IT understaffed/overworked: 22%
- Security flaws: 22%
- Integration and interoperability: 20%
- Lack of support for crucial apps: 19%
- Server HW is too old or inad. for workload: 18%
- IT managers lack training and cert.: 16%
- Complex configuring, provisioning apps: 16%
- Vendor tech svc./supp. slow or inadequate: 11%
- Server OS is too old to run newer apps: 11%
- Vendors issue patches or fixes slowly: 9%
- Lack of documentation for problems: 7%
What Issues Most Negatively Impact Reliability & Cause Downtime for Server hardware, Server OS platforms **in 2019**? (Select all that apply)

- Human Error: 59%
- Security: 51%
- Software bugs/flaws: 29%
- Old, inadequate server hardware: 22%
- Complexity in configuring/provisioning: 21%
- Understaffed/Overworked IT Dept.: 20%
- Integration/Interoperability: 19%
- Lack of support for crucial apps: 17%
- Server instability problems: 16%
- Server OS is too old: 16%
- IT lacks training/certification: 14%
- BYOD: 12%
- Poor vendor tech support: 11%
- Mobility: 9%
- Edge Computing: 8%
Cost of Hourly Downtime Increases
Has your firm calculated the hourly cost of downtime for mission critical servers and business applications in 2019?

The percentage of enterprises unable to calculate the hourly cost of downtime consistently outpaces those that can over the last 10 years. Of the 39% that responded "Yes" only 42% - can make detailed downtime estimates. In actuality, only 22% of organizations, approximately 1 in 5 can accurately assess the hourly cost of downtime & its impact on productivity and the business’ bottom line.

Cost of Hourly Downtime for Enterprises in 2019

A 98% majority of respondents say a single hour of downtime per year costs their firms over $100,000. An 86% majority say the cost exceeds $300,000 up from 76% in 2014 and 81% in 2018. And 34% - three in 10 enterprises - say hourly downtime costs their firms $1M to >$5M.
Corporate Minimum Reliability Requirements
Enterprise Minimum Required Levels of Reliability/Uptime Increase Dramatically from 2013 to 2018

In 2018, 84% of businesses require a minimum 99.99% reliability/uptime; up 25% since 2014 and an increase of 43% since 2013. 99.99%+ and greater reliability are mission-critical.

Actual unplanned annual downtime
87.66 hours 8.76 hours 52 minutes 5.25 minutes or 52 seconds

In 2019: Eighty-five percent of Enterprises Require a Minimum of 99.99% Reliability/Availability

In 2019, 85% - >8 out of 10 firms now need at least 99.99% Reliability & Availability for their mission critical systems. Nearly two in 10 companies demand 99.999% or greater uptime.

Demand for “five nines” or greater reliability continues to rise YoY. Also noteworthy: in 2014, some 12% of firms said 99.9% reliability was adequate and 7% of companies said they required only 99% uptime. In 2019 – none of the survey respondents said that anything less than “four nines” – 99.99% or less uptime is acceptable.
IBM Customer Satisfaction Results
February/March 2019
Rate your satisfaction with your server hardware vendor’s products, service and support (2019)

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Poor</th>
<th>Unsatisfactory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco</td>
<td>24%</td>
<td>24%</td>
<td>15%</td>
<td>5%</td>
<td>1%</td>
<td>9%</td>
</tr>
<tr>
<td>Dell</td>
<td>25%</td>
<td>20%</td>
<td>6%</td>
<td>9%</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>HP</td>
<td>27%</td>
<td>16%</td>
<td>13%</td>
<td>14%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>IBM</td>
<td>39%</td>
<td>35%</td>
<td>27%</td>
<td>15%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Oracle (Sun)</td>
<td>41%</td>
<td>22%</td>
<td>16%</td>
<td>9%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Fujitsu</td>
<td>33%</td>
<td>31%</td>
<td>21%</td>
<td>10%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Lenovo</td>
<td>43%</td>
<td>37%</td>
<td>18%</td>
<td>18%</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Describe Your Initial Experience with IBM Power Systems Configuration & Setup in 2019

- Excellent, straightforward, no issues: 55%
- Very Good, one or two minor, easily resolved issues: 32%
- Good, a few challenges due to IT Administrator inexperience: 32%
- Poor, significant setup, configuration issues: 9%
- Unsatisfactory, major setup issues: 2%
Did the time it took to configure and deploy IBM Power Systems and IBM Z servers meet expectations?

- Yes: 90%
- No: 2%
- Unsure: 8%

IBM Gets High Grades for Customer Satisfaction

Eight-in-10 customers – 80% - gave IBM “Excellent” or “Very Good” ratings in terms of their satisfaction with the vendor’s products, performance and technical service and support; among the highest marks in the survey. None of the respondents gave IBM “Poor” or “Unsatisfactory” ratings.

- Excellent: 35%
- Very Good: 39%
- Good: 22%
- Satisfactory: 4%
Questions?

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