The Value of Refreshing Your 4-Socket Servers with the ThinkSystem SR860 V2 and SR850 V2

Article (withdrawn product)

Today's 4-socket servers last longer than ever, but data centers will inevitably need to purchase new servers. There comes a point when server hardware is simply too old to perform effectively. The key is to identify when increased performance, energy-efficiency requirements, maintenance cost and reduced risk of hardware failure will justify a new purchase.

Why Upgrade your 4S Servers?

Reducing costs and driving operational efficiencies are two of the primary reason's organizations upgrade server infrastructure. As servers naturally age, they typically become costlier to maintain and support. Business productivity can also be adversely impacted by older servers, which tend to require more IT staff time and come with a greater risk of unplanned downtime.

The costs associated with aging servers like warranties, IT staff time, and downtime can often exceed the cost of buying new servers and upgrading infrastructure, particularly as servers extend past optimal life cycles.

In addition to cost and operational advantages, regular server refreshes enable you to consolidate IT footprints onto a fewer number of more powerful systems. This can translate to an array of other IT benefits including greater performance, agility, and efficiency. A more powerful, agile, and efficient IT environment can ultimately help you achieve business goals like improving customer service or accelerating time to market.

The common benefits of server refresh are the following:

- Higher system reliability
- Improved application performance
- Increased security
- Faster application updates
- Improved virtualization
- Lower maintenance and warranty cost
- Support for the latest Operating system
- Improved employee and customer experience
- Improved infrastructure scalability
- Faster deployment of services
- Improved ability to support innovation efforts
- More efficient IT staffing
- Reduction in Data Center floor space
- Reduced Total Cost of Ownership

Let's look further into reason to refresh your older 4S server with a new 4S server.

1. Slow Application Performance

Your enterprise applications can be severely impacted by older and slower servers. Application performance is a critical issue that IT and networking professionals must fully address in order to improve employee productivity, enhance the user experience and solidify your strategic commitment to delivering IT services.

Application impacts include:

- Internal facing applications
- Customer facing applications
- Customer facing mobile applications
- Database applications
- Commerce applications
- Reporting and Analytics
- Internet of things

2. Performance Increases with each Processor Generation

Server performance increases with each server and processor generation.

A 4S system that is 6 years old system will only perform at 31% the level of a new system. A 4 year old system will only perform at 40% the level of a new system. Its also likely that the system has slowed down over time as well making these percentages even lower.

Table 1. Comparison of processor performance

System	Codename	Year	CPU	CPU2017	% Performance
x3850 X6	Ivy Bridge	2014	E7-4890 v2	251	31%
x3850 X6	Haswell	2015	E7-8890 v3	294	37%
x3850 X6	Broadwell	2016	E7-8890 v4	322	40%
SR950	Sky Lake	2017	8180	583	72%
SR950	Cascade Lake	2019	8280	675	84%
SR860 V2	Cedar Island	2021	8380H	806	100%

- SPEC CPU 2017 Baseline
- The top performing 4S processor was used in each generation
- Conversion from SPEC 2006 to 2017 result was done on older systems

3. Consolidating older 4S servers

Fewer servers mean smaller numbers of boxes to manage, maintain and physically house in expensive data center real estate. When one new SR860 V2 does the work of 2-3 older servers, the environment becomes easier to manage. An additional benefit to a smaller server footprint is a reduction in the number of maintenance contracts.

As an example, one SR850 V2 can replace 3.2 of the older x3850 X6 (E7 v2) systems launched in 2014.

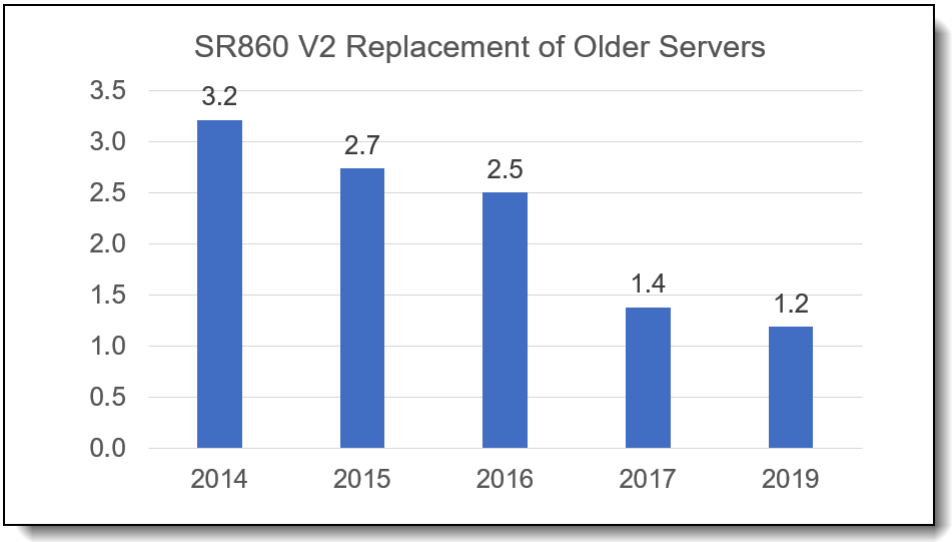

Figure 1. SR860 V2 Replacement of Older Servers

4. Fewer Total Cores - Reduces Software cost

By consolidating servers, the total core count is also reduced even though the core count per CPU goes

up over time.

Using the same consolidation ratios, you can see how the total core count is reduced. This savings can be significant depending on the software licensing agreements and how much total cores increases the software cost.

Table 2. Core counts

Year	Core	Core Per System	Equal performance	
			1 SR860 V2 =	Total Core
2014	15	60	3.2	193
2015	18	72	2.7	197
2016	24	96	2.5	241
2017	28	112	1.4	155
2019	28	112	1.2	134
2021	28	112	1.0	112

5. Operating System Support

In many cases, an older server cannot support the latest operating systems from Microsoft, VMware and Linux. The latest operating systems have new capabilities or improvements with virtualization, reliability, security, storage handling, provisioning, server management and licensing.

You also might need to be get off your older Operating System version but your current server won't support the newer software versions.

The following table lists examples of operating systems that have hit or are hitting end of support.

Table 3. Operating systems at or near end of service

Software	End of Mainstream Support	End of Extended Support
Windows Server 2008 and 2008 R2	1/13/2015	1/14/2020
Windows Server 2012	10/9/2018	10/10/2023
VMware vSphere 6.0	3/12/2020	
VMware vSphere 6.7 & 6.7	11/15/2021	
VMware vSAN 6.5 & 6.6	11/15/2021	
SUSE Linux Enterprise Server 11	3/31/2019	3/31/2022

6. Warranty Cost

New servers typically come with a 3-year warranty. After the third year, server hardware maintenance and warranty become expensive to maintain while the likelihood of server hardware and software issues increases as it gets older. Support and warranty costs associated with aging servers can quickly exceed the cost of upgrading to new infrastructure.

7. Security and Compliance

Security hackers are now more sophisticated than ever. As your server hardware ages, hackers have had more opportunity to break past the security guards. Meanwhile, the latest firmware and patching updates constantly applied. This process can be cumbersome and time intensive, as you have to ensure hardware and application compatibility. This process gets harder the older as your server becomes older.

In addition to security holes, you must make sure that all your systems comply with regulatory

requirements. By simply always patching and fixing, you are creating a suboptimal solution to meet those standards, and you are constantly treading on the border of being out of compliance.

What 4S Server Should I Choose for my Refresh?

The SR860 V2 and SR850 V2 are the perfect choice for a 4S refresh of older 4S servers. Let's look at these servers from a performance, cost and feature perspective.

1. Performance

The SR860 V2 has 58 World Record performance benchmark results as of January 1, 2021.

The performance of the 4S SR860 V2 is unmatched in the industry. Industry standard benchmark results are the way to judge and compare the performance of a given server.

The SR860 V2 has 58 world record performance benchmark results as of January 1, 2021:

- 3 SAP HANA world records
- 6 SPEC CPU 2017 world records
- 22 STAC-M3 world records
- 2 TPC-E world records
- 1 SPECjbb2015 world record
- 1 SPEC Power world record
- 6 SPEC ACCEL world records
- 16 SPEC MPI world record
- 1 SPEC OMP world record

Read more about these SR860 V2 World Record Benchmarks.

2. Cost Savings

You can frequently use a processor that is one step below the previous generation and improve performance while also reducing cost. This is a Win-Win.

Example 1: 4S - 16C

You achieve a 32% performance gain and 32% cost savings in CPUs by using the 6328H CPU with the SR860 V2 or SR850V2 system vs a 4S system one generation back.

Table 4. Example 1

System	Generation	CPU	Core	Watt	SPEC 2017 Int_ratebase	Performance Gain	CPU Cost Reduction
Avg 4S Competitor	Gen 2 Cascade Lake	6242	16C	150W	366		
Lenovo	Gen 3 Cedar Island	6328H	16C	165W	484	32%	30%

Example 2: 4S – 24C

You achieve a 5% performance gain and 54% cost savings in CPUs by using the 6348H CPU with the SR860 V2 or SR850 V2 system versus a 4S system one generation back.

Table 5. Example 2

System	Generation	CPU	Core	Watt	SPEC 2017 Int_ ratebase	Performance Gain	CPU Cost Reduction
Avg 4S Competitor	Gen 2 Cascade Lake	8268	24C	205W	584		
Lenovo	Gen 3 Cedar Island	6348H	24C	165W	614	5%	54%

3. Key Features

The SR860 V2 Key Features:

- Scalability to Grow- from 2S to 4S, up to 48 DIMM, 14 PCIe and 48 drives
- Tremendous Storage Capabilities – Up to 48 drives, up to 24 NVMe and two 7MM rear accessible boot drives
- Accelerate Workloads with GPUs – support for up to 4x double -wide or 8x single wide low profile GPUs
- High Memory and Virtualization Capability – up to 48 DIMM and 12TB of memory
- Reliability and Availability - Lenovo servers continue to be the industry's #1 most reliable, with the industry's highest customer reliability rating. Lenovo x86 servers had the best uptime among all x86 platforms for the 7th straight year.

Figure 2. ThinkSystem SR860 V2

SR850 V2 Key Features:

- 4S Density – 2U, 4S dense server
- High Memory and Virtualization Capability - up to 48 DIMM and 12TB of memory
- Compute and Memory Scalability – scale from 2 CPUs to 4 CPUs, up to 48 DIMM and 7x PCI
- Storage Capabilities – Up to 24 storage bays and up to 24 NVMe
- Reliability and Availability – Lenovo servers continue to be the industry's #1 most reliable, with the industry's highest customer reliability rating. Lenovo x86 servers had the best uptime among all x86 platforms for the 7th straight year.

Figure 3. ThinkSystem SR850 V2

Conclusion

By replacing older, less capable servers with newer, more powerful Lenovo ThinkSystem SR860 V2 or SR850 V2 servers, you can perform the same amount of computing with only a fraction of the total number of systems. You can achieve your business objectives by improving application performance and scalability, reducing IT sprawl and complexity, lowering hardware and licensing costs, and by operating an environmentally “green” data center.

About the author

Randall Lundin is a Senior Product Manager in the Lenovo Infrastructure Solution Group. He is responsible for planning and managing ThinkSystem servers. Randall has also authored and contributed to numerous Lenovo Press publications on ThinkSystem products.

This article is one in a series on the ThinkSystem SR850 V2 and SR860 V2 servers:

- Five Highlights of the Lenovo ThinkSystem SR850 V2
- Five Highlights of the Lenovo ThinkSystem SR860 V2
- Why Scale-Up With 4S and 8S Servers?
- Unique Intel Features Available with ThinkSystem SR850 V2 and SR860 V2
- ThinkSystem SR860 V2 is the New 4S Performance Leader
- **The Value of Refreshing Your 4-Socket Servers with the ThinkSystem SR860 V2 and SR850 V2**
- The Perfect 4-Socket and 8-Socket Servers for SAP HANA
- Total Cost of Ownership Comparison of Running SAP HANA on Lenovo ThinkSystem Servers

Related product families

Product families related to this document are the following:

- ThinkSystem SR850 V2 Server
- ThinkSystem SR860 V2 Server

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