The Advantages of Keeping Mission Critical Workloads On-Premises vs Going to the Cloud

Article

When evaluating the decision to move your Mission Critical workloads and processing to the cloud or keep it on your premises, several factors need to be evaluated that aren't commonly talked about that might change your mind about moving your Mission Critical software, servers and storage to the cloud.

Figure 1. The ThinkSystem SR950 is Lenovo's flagship server for mission-critical workloads

What are Mission Critical Workloads?

A Mission Critical workload is a workload or application that is essential to the survival of a business or organization. When a Mission Critical workload fails or is interrupted, business operations are significantly impacted.

Mission Critical workloads support the business in every dimension, its organization, its employees, and its customers. These workloads are the most demanding types of applications and databases running on servers today. Mission Critical applications, such as ERP, CRM, business intelligence, data warehousing, and analytics, advance and support business in many fundamental ways. In the modern, global corporate landscape, it is almost certain that users will need to access these systems at any time of day, demanding around-the-clock, 24/7 availability. Any outage of Mission Critical server infrastructure directly impacts revenue and profitability, so downtime must be avoided.

Mission Critical workloads require systems that can handle demanding applications and databases, are high performing, easy to service, and have a high degree of availability. Read more about Mission Critical workloads in the article Lenovo Servers for Mission Critical Workloads .

Security

Many companies view their unique and valuable intellectual property (IP) as the lifeblood of their business. With an on-premise solution, your critical data is stored in one of your organization's buildings with no third-party access. Putting your IP on a public cloud, relinquishing control over your own security, and needing to trust a separate organization to manage security can be tough to accept. Many businesses want to control and manage their own security.

The recently published RightScale 2018 State of the Cloud Report indicated:

- 77% stated cloud security is a challenge
- 29% stated cloud security is a significant challenge

Lenovo Mission Critical ThinkSystem servers incorporate the best industry-standard features, as well as a unique set of features that together create multiple layers of security. All security features are linked together into a “chain of trust” via a combination of hardware and firmware support.

Examples of Lenovo ThinkSystem Security features:

- **Systems Management Controller Management** – ThinkSystem servers have an integrated Trusted Platform Module (TPM) 2.0 chip that helps protect the operating system apps from attack through external communications.
- **Boot Firmware** – Lenovo’s Trusted Platform Assurance (TPA) program institutes rigorous security processes to all stages of firmware development, building, and validation to ensure that all firmware is secure. All firmware is designed, managed, complied and stored in a secure US data center before it is digitally signed and released.
- **UEFI Firmware** – ThinkSystem servers provide secure UEFI firmware that prevents firmware updates to a previous authentic version, unless performed by a secure mechanism or authorized user. Also, firmware can only execute, boot or be updated if digitally verified with public/private keys.
- **Supply Chain** – Lenovo closely controls the supply chain to ensure that suppliers follow industry-standard security practices for all active components used in Lenovo products.
- **Manufacturing** – Lenovo owns most of its manufacturing facilities around the world (including North America) and all personnel in these facilities are Lenovo employees.

Customization and Differentiation

On-premise systems are much easier to configure, customize and modify. The ability to customize to specific needs and requirements is paramount for many organizations, especially in highly competitive industries. On-premise hardware and software puts control in the hands of the organization.

With on-premises systems, your IT team has full access to your dedicated server resources 24x7x365, which can be advantageous for high-demand or business-critical operations. Depending on your needs, the server may be located onsite or in a conveniently-located colocation facility. Your IT staff can fully customize and configure the server to your specifications and business requirements.

The Lenovo Mission Critical servers are high customizable. As an example, the SR950 can be configured from 2S to 8S, from 24 DIMM slots to 96 DIMMs slots and from three PCIe slots on the main system board to up to 14 PCIe slots with risers. Some configurations support a max of 12 storage bays and six NVMe while others support a maximum of 24 storage bays and 12 NVMe. The SR950 supports three series of Intel Scalable Processors (5100 Series, 6100 Series and 8100 Series) each of which provides varying levels of capabilities and performance.

By owning and controlling your own Mission Critical servers you can also take advantage of The ThinkSystem SR950’s impressive 77 Performance World Records as of September 14, 2018, more than any other server in the industry. These #1 world record benchmarks are based on a variety of workloads and include business processing, Big Data analytics, infrastructure virtualization, server-side Java, and general and technical computing.

Reliability and Availability

Server reliability, availability, and serviceability (RAS) are crucial issues for modern enterprise IT shops that deliver Mission Critical applications and services, and application delivery failures can be extremely costly per hour of system downtime. In addition, the likelihood of such failures increases statistically with the size of the servers, data, and memory required for these deployments.

Mission Critical applications such as database, enterprise resource planning (ERP), customer resource management (CRM), and business intelligence (BI) applications need to be available 24/7 on a wide area or global basis. These workloads require high availability and fault tolerance as well as low latency's and response times. Migrating these workloads to the cloud has always proven to be difficult and you're at the mercy of your ISP's network performance which in some places can be slow or unstable.

The Lenovo ThinkSystem SR850 and SR950 servers feature advanced reliability, availability and serviceability (RAS) features. These servers drive outstanding system availability and uninterrupted application performance needed to host Mission Critical applications.

Figure 2. The Lenovo ThinkSystem SR850 is a Mission Critical 4-socket server in a 2U form factor

The Lenovo Press article RAS Features of the Lenovo ThinkSystem Intel Servers provides further information on the cost of downtime, defining RAS and the unique RAS features of both the SR950 and SR850.

Cost Optimization

Cloud service providers offer fast start-up with low-cost entry points and pay-for-use pricing that is easy to scale up. For companies experiencing explosive growth or continually changing business needs, it is a good choice to optimize cost. For many companies that have more established business processes and predictable growth, the cloud economic model just doesn't make sense. Large companies are realizing that once you achieve a certain scale, public cloud becomes very expensive and owning your own private cloud makes more sense.

There can also be hidden cost with cloud computing including:

- Complexities in calculating charges – These cost include per GB and cost for ancillary requirements such as IP addresses, domain resilience and data transfers into, out of and between servers.
- Over-provisioning – Cloud providers make it easy to max out a virtual server or you may increase provisioning for a certain project but forget to drop it back down, resulting in inflated ongoing cost.
- User behavior - Untrained users may take advantage of the cloud environment's new, fast service provisioning to access all kinds of services from virtual machines to storage capacity without thinking hard about the consequences.
- Storage tiers – Not choosing the right storage tier for each application can result in overpaying for storage access.
- Telecom cost – Paying for the necessary bandwidth to migrate data and use it if often overlooked.
- "Free" but not really – Many "free" options have threshold limits or expiration dates. You can end up paying for things you believed were free.
- Appliance charges – Renting a virtual appliance can be challenging to know how often and how frequently they will be used.
- Pay to leave – The data you moved *to* the cloud for free will cost a lot to later move it *from* the cloud
- Troubleshooting – As troubleshooting becomes more complex, it becomes more expensive

The recently published RightScale 2018 State of the Cloud Report indicated:

- 76% stated cloud spend is a challenge
- 21% stated cloud spend is a significant challenge
- 30-35% of cloud spend was seen as wasted

With Lenovo Mission Critical servers, you can replace several older servers with much fewer new powerful servers with a payback in less than 12 months. Read the details in two TCO articles:

- The Value of Refreshing Your 4-Socket Servers with the ThinkSystem SR950
- The Value of Refreshing Your 8-Socket Servers with the ThinkSystem SR950

Control and Compliance

Some businesses have specific legal requirements, especially those in heavily regulated industries like law or healthcare. Laws like HIPAA (Health Insurance Portability and Accountability Act) and other regulations that protect the privacy and personal information of the public are always changing and often have very strict guidelines as to where the data is stored. This is very difficult to do in the public cloud and can result in storing the data locally onsite.

Virtually every compliance regulation requires organizations to adequately protect their physical and informational assets. To do this, it is assumed you have the ability to control and prove all of the following:

- What information is stored on a system?
- Where is the information stored?
- Who can access the system?
- What they can access?
- Is the access appropriate?

All of these questions imply some level of ownership of the assets in question, and that is where cloud compliance issues become apparent. In a public cloud environment, you are able to answer the first of those questions with certainty; the other four, however, end up posing a compliance challenge.

Summary

As you can see, moving your Mission Critical workloads and processing to the cloud has some obvious and not so obvious downsides. Security is in the hands of a 3rd party. Customization can be difficult or non-existent, depending on the cloud provider. Reliability varies by cloud provider and is out of your control. Many rising cost are hidden with cloud services. Compliance can be difficult to document.

Make sure you consider all the factors before moving your Mission Critical workloads to the cloud.

Further reading

For further reading, see these resources

- Lenovo Press product guide on the SR850
- Lenovo Press product guide on the SR950
- SR850 product web page
- SR950 product web page

This article is one in a series on the ThinkSystem SR950 and SR850 servers:

- Five Highlights of the ThinkSystem SR950
- Five Highlights of the ThinkSystem SR850
- Choosing between Lenovo ThinkSystem SR850 and SR950
- Workloads for 4-Socket and 8-Socket Servers
- Usability in the Design of the ThinkSystem SR950
- The Value of Refreshing Your 4-Socket Servers with the ThinkSystem SR950
- ThinkSystem SR950 Memory Decisions
- ThinkSystem SR950 Server Configurations
- The Value of Refreshing Your 8-Socket Servers with the ThinkSystem SR950
- Lenovo ThinkSystem SR950 New Options and Features - December 2017
- ThinkSystem SR950 Performance Leadership
- Lenovo Servers for Mission Critical Workloads
- Microsoft and Lenovo ThinkSystem SR950 – A Perfect Match
- Accelerate Your 4- and 8-Socket Server Refresh Cycle
- SAP Business Process Applications and Lenovo ThinkSystem SR950 – A Perfect Match
- ThinkSystem SR950 New Options - March 2018
- SAP HANA and Lenovo ThinkSystem SR950 – A Perfect Match
- ThinkSystem SR950 Performance Leadership Continues
- New Solution for SAP HANA - Lenovo ThinkAgile HX
- **The Advantages of Keeping Mission Critical Workloads On-Premises vs Going to the Cloud**
- SQL Server Migration and Lenovo ThinkSystem SR950

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.

Related product families

Product families related to this document are the following:

- 4-Socket Rack Servers
- Large Memory Capacity Servers
- ThinkSystem SR850 Server
- ThinkSystem SR950 Server

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
8001 Development Drive
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION ”AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

This document, LP1030, was created or updated on November 29, 2018.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
  https://lenovopress.lenovo.com/LP1030
- Send your comments in an e-mail to:
  comments@lenovopress.com

This document is available online at https://lenovopress.lenovo.com/LP1030.

Trademarks

Lenovo and the Lenovo logo are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at https://www.lenovo.com/us/en/legal/copytrade/.

The following terms are trademarks of Lenovo in the United States, other countries, or both:
Lenovo®
ThinkAgile®
ThinkSystem®

The following terms are trademarks of other companies:

Intel® is a trademark of Intel Corporation or its subsidiaries.

Microsoft® and SQL Server® are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.