Google Distributed Cloud with Lenovo ThinkSystem SR650 V3
Solution Brief

Hybrid Cloud Challenges and a Solution

Google Distributed Cloud on bare metal for hybrid cloud addresses several key business challenges by offering flexibility, scalability, and control. As a Google Kubernetes Engine (GKE) based solution, it enables businesses to run and manage containers and cloud services directly on their on-premise infrastructure, ensuring low latency and enhanced performance for critical applications. By providing a unified management interface, it simplifies IT operations and enhances an organization's agility, enabling businesses to quickly adapt to changing market demands.

It also supports compliance with regulatory requirements by keeping sensitive data on-premises while leveraging the cloud's benefits. Furthermore, it facilitates seamless integration with existing systems, reducing the complexity and cost associated with cloud migrations. The Lenovo ThinkSystem SR650 V3 is an ideal high-performance platform for this level of scalable container infrastructure. Google Distributed Cloud can be deployed on either VMware or bare metal. This solution is focused on a bare metal deployment.

Lenovo solutions for hybrid cloud on ThinkSystem SR650 V3 are optimized for low latency and storage dense workloads such as Kubernetes clusters. This technical brief features Google Distributed Cloud running on bare metal high-performance Lenovo 2U rack mounted systems. The server is configured with 4th Generation Intel® Xeon® Scalable Processors, code named Sapphire Rapids, TruDDR5 4800MT/s memory and NVMe SSD drives. The processors from Intel support up to 60 cores and 32x memory DIMMs.

The SR650 V3 server is a storage dense system supporting up to 40 2.5" drives including front, rear, and internal bays plus an additional 2 internal M.2 drives for the OS. For this solution the 3 SR650 V3 node servers are running Ubuntu 20.04 as the current recommendation from Google.

Highlights
- Reduce time to value with pretested and sized hardware configurations
- Simplified evaluation, fast and easy deployment and workload optimized performance
- Kubernetes sized solution with optimal compute, memory, and storage components
- Reduce TCO through better performance, rapid deployment and advanced hardware
- Optimized configuration with pretested ThinkSystem SR650 V3 hardware/li>

Google Distributed Cloud

Google Distributed Cloud on bare metal enables enterprises to deploy Google Cloud services directly on a server without the need for a separate hypervisor or virtualization layer. The solution seamlessly integrates on-premises infrastructure with Google Cloud and enables running containerized workloads on industry-standard hardware.

The main components of Google Distributed Cloud on bare metal include:

- Anthos: Enables management of applications in hybrid / multi-cloud environments. It provides consistent development and operations, integrating Kubernetes, Istio, and other cloud-native tools.

- Google Kubernetes Engine (GKE) On-Prem: A managed Kubernetes service that allows users to run and control Kubernetes clusters on-premises, consistent with the Google Cloud Kubernetes.

- Bare Metal Solution: Software provided by Google that allows enterprises to run workloads on servers within their own data centers.

- Service Mesh (Istio): Manages microservices traffic, providing visibility, security, and resilience for distributed applications. It simplifies service-to-service communications for secure connections.

- Operations Suite: Monitoring, logging, and diagnostics tools that provide visibility into performance and health for proactive management and troubleshooting.

- Security and Identity Management: Security features and identity management tools that ensure protection and compliance such as workload identity, policy management, and access controls.

Configuration Overview

The proof-of-concept for this solution included the following components:
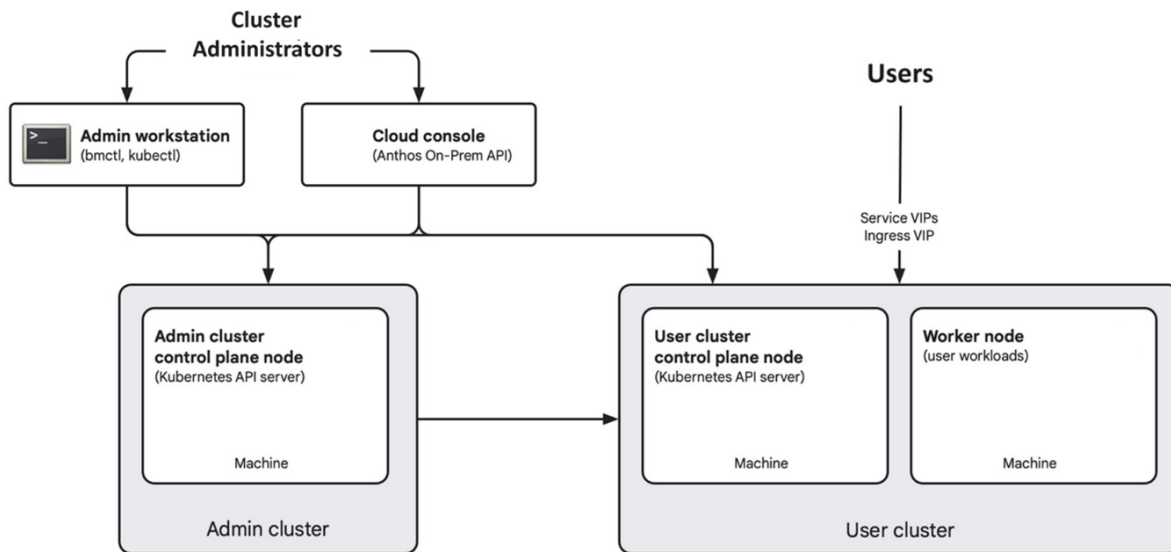

Figure 1. Overview of solution components

Lenovo ThinkSystem SR650 V3

Lenovo ThinkSystem SR650 V3 offerings are ideal for running containerized applications because of their compact and high-performance capabilities. They are industry standard servers providing cost effective computing and fast high-density local storage for your data center.

Each server configuration includes the following main components:

- **Server:** Lenovo ThinkSystem SR650 V3
- **Processor:** 2x 4th Gen Intel Xeon Platinum 8480+ 56C 350W 2.0 GHz
- **Memory:** 2TB of TRUDDR5 4800 MT/s memory
- **Storage pool:** 8x 7450 PRO 1.92TB NVMe SSDs
- **OS Storage:** 2x 7450 PRO 480GB M.2 NVMe SSDs (RAID 1)
- **Software:**
    - Google Gcloud CLI 1.29
    - Google Cloud GKE, 1.29.100-gke.251
    - OS - Ubuntu 20.04

Best Practices for Google Distributed Cloud on ThinkSystem SR650 V3

For a stable, high-performance deployment, use the following best practices:

- Set UEFI settings Operating mode to Maximum performance.
- Enable Hyper-threading.
- Set networking MTU to 9000.
- Ensure adequate storage for the worker nodes persistent volumes and application data.
- Maintain configuration consistency across all nodes in the cluster.
- Create a Google Cloud Platform (GCP) account and a GCP project before starting the install.
- Use Google's recommended OS (Ubuntu 20.04) for consistency with the Linux commands.
- Use the network load balancer that is included with the Google software.
- Follow Google step-by-step documentation, using provided Linux commands. There are many pages of documentation to deploy this solution. The best install approach is to start at this link and follow the install steps in the order presented.
- Use the Google Cloud Platform console to monitor and manage the on-premises clusters.

Figure 2. Lenovo ThinkSystem SR650 V3

Bill of Materials

Table 1. Bill of Materials

7D76CTO1WW	Server: ThinkSystem SR650 V3 - 3yr Warranty	1
BLKK	ThinkSystem V3 2U 24 x 2.5" Chassis	1
BNOM	Intel Xeon Platinum 8480+ 56C 350W 2.0GHz Processor	2
BNFC	ThinkSystem 128GB TruDDR5 4800 MHz (4Rx4) 3DS RDIMM	16
BNEG	ThinkSystem 2.5" U.2 P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	8
B8LU	ThinkSystem 2U 8 x 2.5" SAS/SATA Backplane	1
BH8D	ThinkSystem 2U/4U 8 x 2.5" NVMe Backplane	1
BM8X	ThinkSystem M.2 SATA/x4 NVMe 2-Bay Enablement Kit	1
AUUV	ThinkSystem M.2 128GB SATA 6Gbps Non-Hot Swap SSD	2
B93E	ThinkSystem Intel I350 1GbE RJ45 4-port OCP Ethernet Adapter	1
BLKM	ThinkSystem V3 2U x16/x16/E PCIe Gen4 Riser1 or 2	2
BMUF	ThinkSystem 1800W 230V Platinum Hot-Swap Gen2 Power Supply	2
BLL6	ThinkSystem 2U V3 Performance Fan Module	6
7S0XCTO2WW	Lenovo XClarity XCC2 Platinum Upgrade	1

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For More Information

To learn more about this Lenovo solution contact your Lenovo Business Partner or visit:
https://www.lenovo.com/us/en/servers-storage/solutions/kubernetes-containers/

References:

Lenovo ThinkSystem SR650 V3 servers: Link

Google Cloud Anthos product page: Link

Google GKE Enterprise cluster overview: Link

Google Distributed Cloud hardware partners page: Link (Lenovo listing pending)

Google Distributed Cloud, Bare Metal overview: Link

Related product families

Product families related to this document are the following:

- ThinkSystem SR650 V3 Server

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