2.1 mSAN Overview

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Micron21's Ceph Storage Solutions on mCloud Platform: Optimized for Performance, Reliability, and Scalability

At Micron21, we've engineered our mCloud platform with a focus on delivering the highest levels of performance, reliability, and scalability in cloud storage. Central to this achievement is our deployment of Ceph, a unified, distributed storage system renowned for its robustness and flexibility. We offer four distinct Ceph storage clusters, each tailored to meet specific workload requirements and use cases. All clusters utilize a 3N replication strategy, ensuring that every byte of data is written and confirmed on three independent storage nodes, providing enterprise-grade, mission-critical storage you can rely on.

Understanding Ceph on mCloud

Ceph is an open-source storage platform designed to present object, block, and file storage from a single distributed computer cluster. Its architecture ensures:

High Availability and Reliability: Through data replication and self-healing capabilities.

Scalability: Seamlessly expand storage capacity without downtime.

Performance: Optimized for both high-throughput and low-latency workloads.

By integrating Ceph into our mCloud platform, we provide a storage solution that adapts to a wide range of applications, from high-performance computing to bulk data archiving.

Micron21's High-Performance Ceph Storage: Unparalleled Speed and Reliability for mCloud

At Micron21, we have meticulously researched and engineered our Ceph storage environment to deliver the highest levels of performance and reliability for our mCloud public and private cloud platforms. By leveraging dedicated storage nodes powered by Intel Xeon Gold CPUs, connected via a

redundant 100 Gbps Cisco networking fabric, we ensure that our clients experience unparalleled storage speed and stability.

Why Ceph Is the Foundation of Our Storage Platform

Ceph is globally recognized as one of the most robust and scalable open-source storage solutions available today. It offers a unified, distributed storage system designed for excellent performance, reliability, and scalability. Ceph's architecture provides:

Predictable, Stable, Always-On Storage: Ceph's self-healing and self-managing capabilities ensure continuous availability and data integrity.

Massive Scalability: Seamlessly scale out storage clusters to petabytes and beyond without disruption.

Community and Industry Support: Backed by technology giants and research institutions like IBM, Samsung, Intel, and CERN, Ceph benefits from continuous development and innovation. Its active global community contributes to regular events, technical discussions, and collaborations, keeping the platform at the forefront of storage technology.

By choosing Ceph as the backbone of our storage infrastructure, we provide our customers with a proven platform that meets the demanding requirements of modern enterprise applications.

Our Design Philosophy: Dedicated Storage Nodes for Maximum Performance

While hyper-converged infrastructures combine compute and storage resources to reduce costs and overhead, they often compromise on performance due to resource contention between computing tasks and storage operations. At Micron21, we prioritize performance and reliability over minimal cost savings. Therefore, we have designed our Ceph storage architecture with dedicated storage nodes. This approach offers several key advantages:

Resource Isolation: Storage nodes are exclusively dedicated to handling storage tasks, eliminating interference from compute workloads.

Optimized Performance: By separating storage and compute, we ensure that each can perform at its maximum potential without bottlenecks.

Enhanced Reliability: Dedicated nodes reduce the complexity of resource management, leading to more predictable and stable operations.

Powerful Hardware: Intel Xeon Gold CPUs and Ample Memory

Each of our Ceph storage nodes is equipped with dual Intel Xeon Gold CPUs and substantial memory resources. Here’s why this hardware choice is critical:

High Processing Power: Intel Xeon Gold processors offer high core counts and advanced features optimized for data center performance. They handle the intensive processing required for managing storage operations, especially with high-speed NVMe drives.

Large Memory Capacity: Ample RAM allows for efficient caching and faster data retrieval, enhancing overall storage performance.

Scalability and Flexibility: The combination of powerful CPUs and large memory ensures that our storage nodes can handle increasing workloads and adapt to evolving performance demands.

Ultra-Fast Networking: Dedicated 100 Gbps Cisco Leaf and Spine Redundant Fabric

Our storage nodes are interconnected via a dedicated, redundant 100 Gbps networking fabric, which provides:

High Throughput: Supports massive data transfer rates between storage nodes and compute resources, reducing latency and improving application performance.

Redundancy: Eliminates single points of failure by providing multiple pathways for data, ensuring continuous availability even if one network component fails.

Low Latency: Critical for applications that require real-time data access and processing.

Maximizing NVMe Performance with Dedicated CPUs

Enterprise NVMe (Non-Volatile Memory Express) drives offer exceptional read and write speeds but demand significant CPU resources to reach their full potential. Here’s how our architecture addresses this:

Dedicated CPU Resources: By assigning powerful CPUs exclusively to storage nodes, we ensure that the processing power required to handle NVMe operations is readily available.

Enhanced I/O Processing: CPUs handle tasks such as I/O scheduling, data placement, and redundancy calculations, which are crucial for maintaining

high-speed storage performance.

Avoiding Performance Degradation: Without sufficient CPU resources, NVMe drives cannot perform optimally, leading to bottlenecks. Our design eliminates this risk by providing ample dedicated CPU capacity.

Benefits of Our Dedicated Ceph Storage Architecture

Guaranteed Disk Performance:

Consistent Speeds: With storage nodes dedicated solely to storage tasks, we deliver consistent and predictable performance, critical for enterprise applications.

High IOPS and Throughput: Optimized for intensive workloads, our storage platform handles high input/output operations per second (IOPS) and large data transfers efficiently.

Zero Interference from Compute Workloads:

Resource Availability: Storage resources are not shared with compute tasks, preventing competition for CPU and memory.

Stability: Reduces the likelihood of performance spikes or drops caused by fluctuating compute demands.

Scalability and Flexibility:

Easy Expansion: Add more storage nodes to increase capacity and performance without disrupting existing operations.

Adaptable Infrastructure: Customize storage configurations to meet specific workload requirements.

Enhanced Data Protection and Reliability:

Ceph’s Self-Healing: Automatically detects and repairs data inconsistencies or hardware failures.

Data Redundancy: Employs replication or erasure coding to protect against data loss.

Why Choose Micron21’s High-Performance Storage for mCloud

Expertise in Ceph Deployment: Our team has extensive experience in

designing and managing Ceph storage clusters, ensuring that best practices are followed for optimal performance and reliability.

Commitment to Performance: By investing in dedicated hardware and high-speed networking, we prioritize delivering the fastest storage experience to our customers.

Reliable and Predictable Storage:Ideal for mission-critical applications that require high availability and consistent performance.

Support from a Trusted Provider: Micron21 is committed to providing exceptional customer service and technical support, assisting you in maximizing the benefits of our storage solutions.

At Micron21, we understand that storage performance and reliability are paramount for businesses operating in today's data-intensive environments. Our carefully engineered Ceph storage platform, featuring dedicated storage nodes with Intel Xeon Gold CPUs and connected via a 100 Gbps redundant network fabric, delivers exceptional speed, scalability, and stability.

By choosing Micron21's high-performance storage for your mCloud deployments, you are investing in a solution designed to meet the highest standards of enterprise storage requirements. Experience the difference that a purpose-built, expertly managed storage infrastructure can make for your business.

Discover how Micron21's Ceph storage solutions can elevate your cloud experience. Contact us today to learn more.