# Shopping for Storage in the Container Age

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The container revolution is occurring along with another important trend in IT: the Big Data revolution. To keep your organization focused on innovation, choose a storage solution that is fault-tolerant, self-managing, easy on the budget, and container-ready.

The IT universe is undergoing a massive transition, from the local, on-metal enterprise server rooms of the past to a new vision of clouds, containers, hybrid networks, and software-defined infrastructure. To make things even more interesting, this revolution in infrastructure technology is occurring along with a parallel revolution in data. The Big Data explosion is upending all the conventional metrics for estimating storage needs. Sales data, performance data, environmental data from IoT sensors, and large files associated with simulation and medical records are just some of the modern storage needs that are driving the demand for storage transformation.

In the busy life of a modern enterprise, it is all too tempting to add storage resources piecemeal as you need them — a file server here, a RAID unit there, but experts know it is more efficient and cost effective to plan carefully and build around a comprehensive vision.

If you manage a container environment and are looking for a secure, cost effective, and comprehensive solution to your storage needs, take a look at Ceph. This paper highlights some of the benefits of Ceph for the container environment and introduces you to SUSE Enterprise Storage—a versatile, secure, and a cost-efficient Ceph-based alternative.

### Persistence

To successfully integrate container-based resources with your data-centric environment, you'll need a solution for persistent storage.

Persistent storage is a permanent data store that persists regardless of the state of the container space (Figure 1).

IT runs on data, and, for many environments and workloads, the persistent storage system is a critical component that significantly affects the performance, security, and uptime for the overall environment.

According to the experts, the persistent storage solution you choose as the foundation for your containerized environment should provide:

· Fault tolerance
· Flexibility
· Self-healing and self-management capabilities

Another important factor in selecting a persistent storage system is cost. Prices vary greatly for proprietary and open source storage solutions, and if you're not careful, you could pay more than you need to pay.
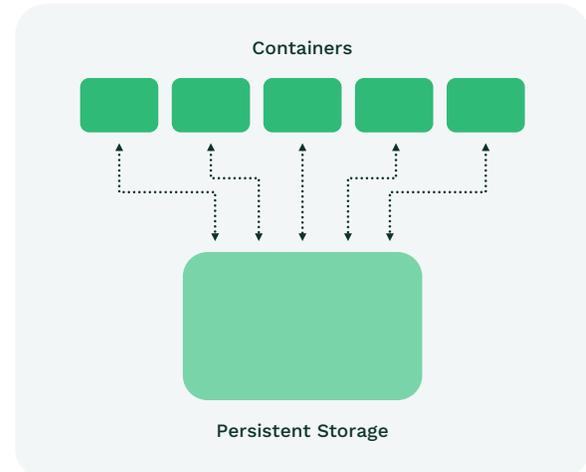


Figure 1: Persistent storage provides a permanent data store for the flexible and fast-changing world of containers and the cloud.

Ceph is a powerful virtual storage solution that offers self-healing, self-management, built-in fault tolerance, and strong support for the Kubernetes container environment. An innovative system of interfaces lets you deploy Ceph in a number of different scenarios and contexts, and, because Ceph is open source software, it allows you to avoid the hidden costs associated with vendor lock-in.

### Understanding Ceph

Ceph is a versatile, cluster-based, software-defined storage system. A Ceph cluster is a self-healing, self-managing storage environment that scales easily and operates at a per-gigabyte storage total cost of ownership that is up to 70 percent less than conventional storage. Ceph runs on commodity hardware, which keeps the upfront hardware expenses to a minimum, and an open source license minimizes software cost.

In Ceph, the cluster itself handles storage decisions, with built-in redundancy to protect against data loss. If a storage node goes down, Ceph adjusts automatically, continuing to operate with no downtime or data loss. If you need to expand the system at a later date, add a new node and the cluster recalibrates automatically, integrating the additional resources with

minimal intervention or overhead. The automation features built into Ceph mean that a single admin can manage up to six times more data than an admin in a conventional block storage environment.

The versatile Ceph provides a number of different interfaces for supporting storage clients. Depending on your own needs and the structure of your environment, you can configure Ceph to provide storage as a:

- Block device
- Network filesystem
- Object storage gateway accessed using the S3 API

This sophisticated system of interfaces makes it easy to integrate Ceph with your existing landscape, regardless of your preferred configuration. If your critical applications expect to interact with the file and directory structure of a conventional filesystem, use the CephFS filesystem interface. Or, if you prefer that your applications address the storage system as if it were a hard disk or other block storage device, choose the RADOS Block Device (RBD) interface. Use the object storage gateway if your configuration benefits from efficient scaling and powerful metadata search capabilities.

### SUSE Enterprise Storage: Frugal Solution for Ceph and Kubernetes

SUSE Enterprise Storage is a reliable and powerful storage solution built around Ceph. SUSE Enterprise Storage is designed and optimized to serve as the storage core of a Cloud Native storage environment, providing a complete solution that combines full support for Ceph with other important features that are essential to enterprise customers, including security updates, hardware certification, and enterprise-quality professional support.

SUSE Enterprise Storage is tightly integrated with Kubernetes and the SUSE CaaS (Container as a Service) platform for efficient, secure, and continuous operation in a containerized environment. The SUSE CaaS platform is built on the Kubernetes container orchestration system and is recognized as a certified Kubernetes solution by the Cloud Native Foundation.

The new SUSE Enterprise Storage 7 release brings even deeper integration with Kubernetes, supporting efficient co-location of compute and storage for hyperconverged infrastructures. The product offers two deployment options – traditional and Kubernetes-based stacks that incorporate the new cephadm framework and an improved dashboard bringing storage management to a new level.

Regardless of how your environment is organized, SUSE Enterprise Storage acts as a permanent, fault-tolerant storage target as the landscape evolves and transforms. An open architecture, along with an innovative licensing model that doesn't escalate based on storage size, gives SUSE Enterprise Storage the lowest TCO of any enterprise-grade Ceph solution.

### Conclusion

If you oversee a modern network, you're already in the middle of the container revolution. The power and flexibility of container technologies can improve security, lower cost, and keep your department at peak efficiency even in times of tight budgets and streamlined staffing. But before you lock in your expansion plans, keep in mind that there is another revolution. The Big Data revolution is in full swing, and whatever plans you make for retooling your network should include a plan for scalable storage at an affordable cost.

Ceph is an open source virtual storage solution that scales easily and adapts to a variety of storage scenarios. Ceph's self-healing and self-management features mean a single admin can administer more than six times more data than an admin in a conventional block storage environment. A powerful collection of interfaces allow Ceph to operate in a block storage, object storage, or file storage context.

SUSE Enterprise Storage brings the power of Ceph to the enterprise, providing security updates, hardware certification, technical support, and other value-added features for lowest-in-class total cost of ownership. SUSE Enterprise Storage is closely integrated with SUSE CaaS for seamless support of Kubernetes container orchestration, and the latest release adds enhancements for co-location in hyper-converged environments. Strong support for containers and Kubernetes container orchestration make SUSE Enterprise Storage a smart choice for storage in the container age.

Contact the experts at SUSE for more information on adding Ceph and SUSE Enterprise Storage to your container environment.

# Thank You