

A Fast, Flexible Container Infrastructure from SUSE® and Dell EMC

Bring containers to your organization with a lightweight proof of concept and an easy path to production workloads.

Agile Application Delivery and Digital Transformation Through Containers

A nimble IT infrastructure is the foundation for any digital transformation plans, which is why the desire to transform has led many organizations to look at containers. Containers can speed up application delivery and help organizations unite their development and operations teams. However, as the foundation for your application development and delivery, the reliability of your container solution is paramount. To achieve this goal, SUSE® and Dell EMC offer an easy to deploy and scale container as a service (CaaS) infrastructure that helps you speed application delivery and digital transformation.

The Right Path to Capturing the Benefits of Containers

The solution combines SUSE CaaS Platform and Dell EMC servers and switches to support containerized workloads, a move to software-defined infrastructure or a DevOps model.

The primary reason most organizations embrace containers is the ability to speed software development by reducing application delivery cycles. However, many organizations also appreciate that containers make it easier to upgrade legacy applications.

Containers enable you to migrate monolithic applications piece by piece to a microservice-based, cloud-native model with much lower risk than most migration approaches.

These benefits are available through any container platform—but competitive enterprises do not want just any container platform. The SUSE and Dell EMC solution increases the value of containers by offering ease of setup, ease of management and reliability. You can simplify the management and control of your container platform with the efficient installation and automation of

Kubernetes. Multiple user interfaces are available. The solution is designed in a cluster for high availability as well.

Best of all, the solution makes it easy to get started. The SUSE and Dell EMC solution provides a lightweight proof of concept for rapid evaluation and adoption, using only virtual machines (VMs). This model enables you to get a container platform running in close to an hour, rather than the hours, days or longer required by many other, more resource-intensive offerings.

The reference architecture describes how to easily scale up from this proof of concept to a full production solution with simple additions to the cluster. Together, SUSE and Dell EMC implemented, tested and validated the deployment process for each of these modes in the Dell EMC Partner Lab.

The SUSE and Dell EMC Partnership

SUSE and Dell EMC work together frequently to ensure the success of organizations around the world. SUSE Linux Enterprise Server is tested and validated on all of Dell EMC's enterprise platforms, including Dell EMC PowerEdge servers and Dell EMC OpenManage. The two organizations worked closely together in the Dell EMC Partner Lab to develop this solution and the reference architecture that describes it.

The SUSE Software-Defined Infrastructure

SUSE CaaS Platform is an enterprise-class container management solution that enables IT and DevOps professionals to easily deploy, manage and scale container-based applications and services. It includes Kubernetes to automate the lifecycle management of modern applications and the surrounding technologies that enrich Kubernetes and make the platform itself easy to operate.

SUSE CaaS Platform uses a Cloud-Native Computing Foundation (CNCF)-certified Kubernetes distribution. It can leverage Kubernetes orchestration to continually and seamlessly apply security updates to the operating system and all of its components across all nodes. You can apply these updates in a rolling release, moving across the entire cluster one machine at a time, to maintain resiliency while still keeping your nodes current.

SUSE CaaS Platform offers role-based access control to limit access to resources, functions and services as necessary. It provides a local container registry to help you manage container images more efficiently and securely.



Figure 1. SUSE CaaS Platform

To help you take advantage of your new container infrastructure, SUSE partners with a number of independent software vendors (ISVs) that offer containerized versions of workloads and use cases such as augmented intelligence, machine learning, block-chain, SAP Data Hub and more. You can see the full SUSE partner software catalog here: suse.com/susePSC/home.

The SUSE and Dell EMC solution provides a lightweight proof of concept for rapid evaluation and adoption, using only virtual machines.

Dell EMC Servers and Switches

The Dell EMC PowerEdge server portfolio supports business innovation through scalable architecture, intelligent automation and integrated security. Dell EMC PowerEdge servers deliver a perfect balance between storage scalability and performance. This solution calls for the two-socket platforms, the Dell EMC PowerEdge R640 and R740xd. Both platforms support the Dell EMC OpenManage portfolio, delivering intelligent, automated management of routine tasks.

Combined with unique agent-free management capabilities, the R640 and R740xd are simple to manage, freeing up time for

high-profile projects. The R640 and R740xd leverage new security features built into every new PowerEdge server, strengthening protection so you can reliably and securely deliver accurate data.

Dell EMC network switches are cost-effective and easy to deploy at any scale, from 1 G to multirate 100 G, for optimum connectivity both within the rack or blade chassis and across the data center. The solution calls for Dell EMC S-Series top-of-rack (ToR) open networking switches such as the 10GbE S4048-ON for the physical switching layer and a 1GbE S3048-ON open networking switch to handle management functions. The switches feature a choice of innovative Dell EMC or third-party software options. SUSE is able to offer the latest features and performance enhancements, support the latest hardware, and do it all while continuing to deliver enterprise reliability and application compatibility. Amazon EC2 customers can run SUSE Linux Enterprise Server on all instance types and sizes, enabling them to maximize cost-effectiveness and performance for a particular workload.

Three Deployment Modes

This SUSE and Dell EMC container infrastructure is designed with an easy-to-deploy proof-of-concept mode, a virtual-to-physical-migration mode and a production mode.

PROOF-OF-CONCEPT MODE

You can set up a proof of concept for the solution using only virtualized machines. This makes setup extremely fast. It also minimizes your initial investment, while still giving you a way to evaluate the solution's many benefits.

The solution requires an Admin node, at least one Kubernetes Master node and two or more Kubernetes Worker nodes. The proof-of-concept mode uses VMs for all of these roles, as shown in Figure 2. The HAProxy provides load balancing and can be run on any virtual or physical machine. While it is not required for a cluster with a single Master node, setting it up in advance allows for easy scaling of the cluster.

VIRTUAL-TO-PHYSICAL-MIGRATION MODE

As you increase testing of your containerized infrastructure, you will want to increase your workload capacity. You can add physical systems one by one or replace your initial VMs with physical systems with more resources.

Figure 3 shows the VM Kubernetes Worker nodes having been replaced by physical systems. SUSE CaaS Platform makes installing

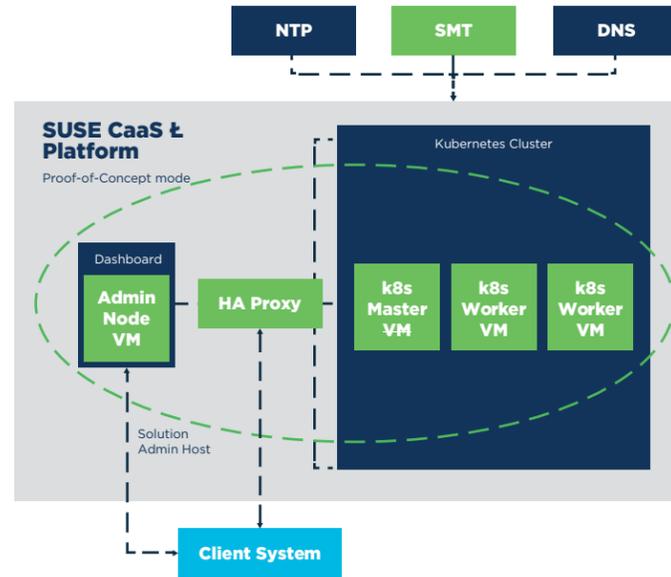


Figure 2. SUSE CaaS Platform Proof-of-Concept mode.

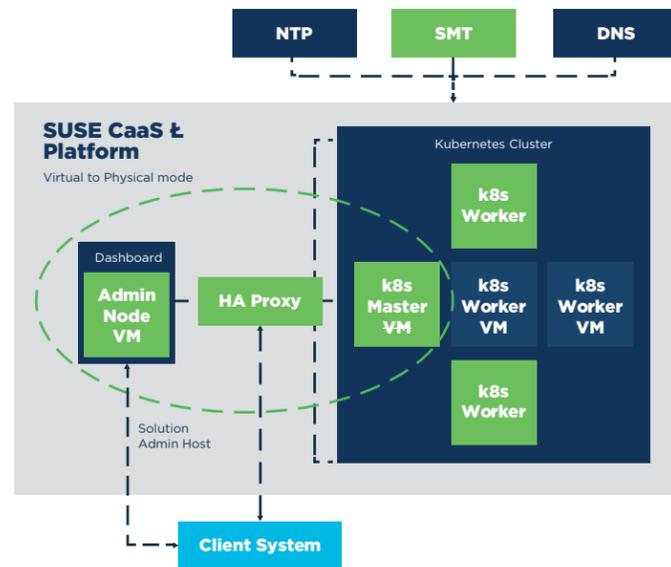


Figure 3. SUSE CaaS Platform Virtual to Physical mode.

Master and Worker nodes relatively simple. Once installed, you simply have to accept the nodes into the cluster and designate them as Worker nodes. You can then remove the VM nodes as desired.

Note that the various services used by SUSE CaaS Platform, such as Network Time Protocol, the Subscription Management Tool and Domain Name Service, remain the same as you move through the modes.

PRODUCTION MODE

The solution makes it straightforward to migrate cluster functions to create a full production instance of the infrastructure. This production mode provides all the required functionality and services for administrators, developers and users to operate at scale. This is an operationally complete solution that you can monitor and maintain over time.

In Figure 4, additional Kubernetes Worker nodes and physical systems have been added to take over the Kubernetes Master role. Note that the Admin node can still be a VM running outside the Kubernetes cluster.

Figure 4 also shows a persistent storage back end based on SUSE Enterprise Storage. Certain containerized workloads have stateful components that require persistent storage. You can add persistent data storage to complement this solution by integrating a Ceph-based storage back end, such as one based on SUSE Enterprise Storage.

Each of these modes is detailed in the reference architecture, along with the considerations and requirements necessary to move seamlessly through the modes.

The SUSE and Dell EMC solution adds to the value of containers by offering ease of setup, ease of management and reliability.

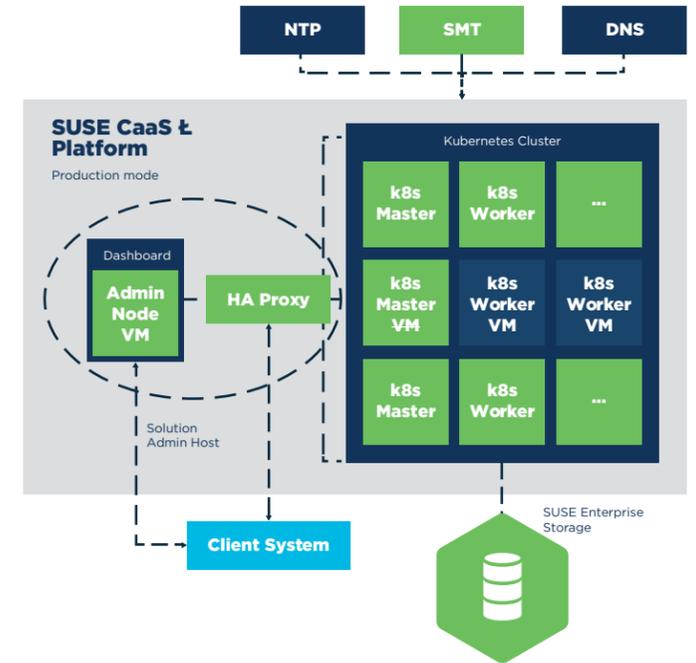


Figure 4. SUSE CaaS Platform Production mode.

Harness the Power of Containers

Containers can help your organization modernize legacy apps and create new, cloud-native applications faster. To bring these benefits to your organization, though, you need the right container infrastructure. SUSE and Dell EMC provide an easy-to-deploy-and-scale container-as-a-service infrastructure that helps you speed application delivery and digital transformation.

Contact your local SUSE solutions provider
or call SUSE at:

1-800-796-3700 U.S./Canada
1-801-861-7000 worldwide

SUSE
1800 S. Novell Place
Provo, UT 84606

SUSE
Maxfeldstrasse 5
90409 Nuremberg
Germany

www.suse.com