

Quick Start - SUSE Rancher

Draft

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Preface

The purpose of this document is to provide an overview and procedure for implementing SUSE Rancher (<https://rancher.com/products/rancher/>), as a multi-cluster container management platform for organizations that deploy containerized workloads, orchestrated by Kubernetes. SUSE Rancher makes it easy to deploy, manage, and use Kubernetes everywhere, meet IT requirements, and empower DevOps teams.

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1 Introduction

On the digital transformation journey to a full Cloud Native Landscape, utilization of microservices becomes the main approach with the dominant technology for such container orchestration being Kubernetes¹ With its large community of developers and abundant features and capabilities, Kubernetes has become the defacto standard and is included across most container-as-a-service platforms. With all of these technologies in place, both developer and operation teams can effectively deploy, manage and deliver functionality to their end users in a resilient and agile manner.

1.1 Motivation

While any developer or organization may simply start with a single, Kubernetes-based deployment, it is very common for that number of cluster instances to rapidly grow. While each of these may have specific focus areas, it becomes imperative to figure out how to use, manage, maintain and replicate the all of these instances over time.

This is where SUSE Rancher leads the industry, being able to manage access, usage, infrastructure and applications across clusters, that are Cloud Native Computing Foundation (CNCF²) compliant, anywhere across edge, on-premise data centers, or cloud service providers. SUSE Rancher optimizes creating and managing Kubernetes clusters like:

- Rancher Kubernetes Engine (RKE (<https://rancher.com/products/rke/>)³)
- Lightweight edge-centric K3s (<https://rancher.com/products/k3s/>)⁴
- other Kubernetes clusters that are based upon CNCF³ certified⁴ Kubernetes distributions or installers

and deployed across various supported⁵ infrastructure elements.

¹ <https://kubernetes.io/>


² <https://www.cncf.io/certification/software-conformance>

³ <https://www.cncf.io/>

⁴ <https://www.cncf.io/certification/cka/>

⁵ <https://rancher.com/support-maintenance-terms/all-supported-versions/rancher-v2.5.7/>

1.2 Scope

The scope of this document is to provide a [quick start \(\)](#)  of SUSE Rancher. This can be done in a variety of solution stack, architectural scenarios as a fundamental component of a managing overall Kubernetes ecosystems.

1.3 Audience

This document is intended for IT decision makers, architects, system administrators and technicians who are implementing a flexible, software-defined Kubernetes management platform. You should be familiar with the traditional IT infrastructure pillars — networking, computing and storage — along with the local use cases for sizing, scaling and limitations within each pillars' environments.

2 Architectural overview

This section outlines the overall elements of the SUSE Rancher solution, along with the suggested target platforms and then how it can be used.

2.1 Solution architecture

The figure below illustrates the high-level architecture of SUSE Rancher installation that manages multiple downstream Kubernetes clusters:

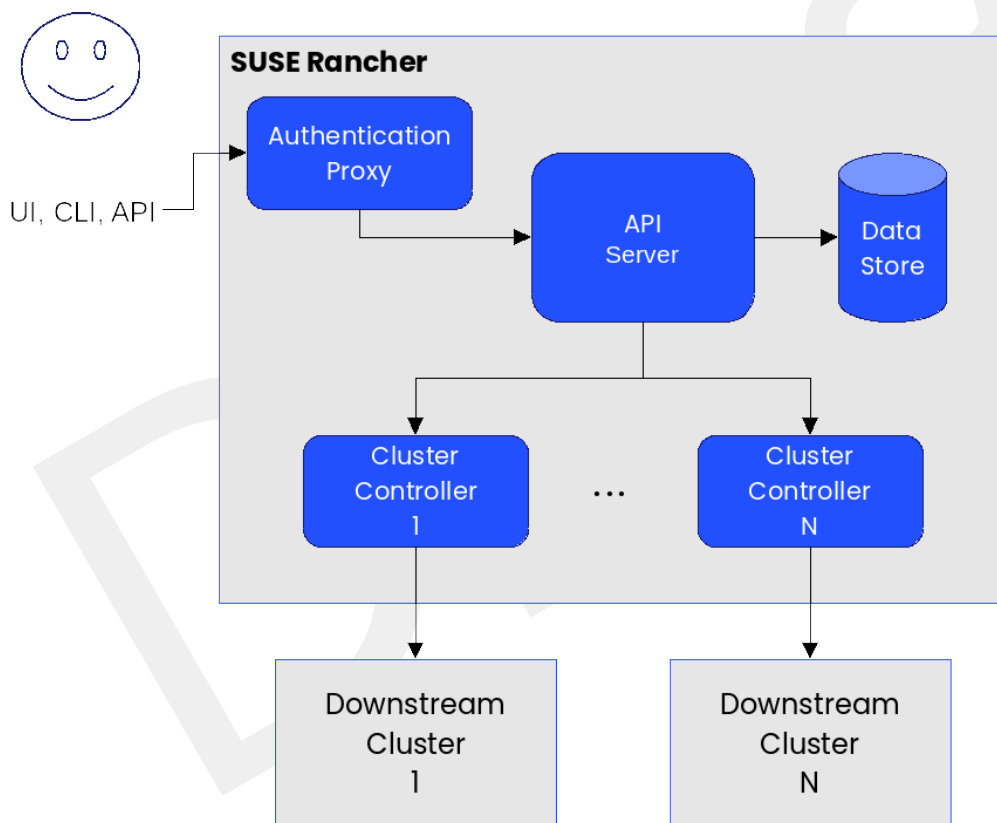


FIGURE 2.1: ARCHITECTURE OVERVIEW - SUSE RANCHER

Authentication Proxy

A user is authenticated via SUSE Rancher and then, if authorized, can access both the SUSE Rancher environment and the downstream clusters and workloads.

API Server

This provides the programmatic interface backend for user, command-line interactions with SUSE Rancher and the managed clusters.

Data Store

The purpose of this service is to capture the configuration and state of SUSE Rancher and the managed clusters to aid in backup and recovery processes.

Cluster Controller

Interacting with a cluster agent on the downstream cluster, the cluster controller allows the communication path for users and services to leverage for workloads and cluster management.

Once setup, users can potentially interact with SUSE Rancher through the web-based user interface (UI), the command-line interface (CLI), and programmatically through the application programming interface (API). Depending upon the assigned roles, group membership and privileges, a user could:

- manage all clusters, users, roles, projects
- deploy new clusters, import other clusters, or remove existing ones
- manage workloads across respective or labeled clusters
- simply view clusters or workloads, or just benefit from what is running

To aid in planning, training or assessing functionality like in a [proof-of-concept ()[↗](#)] deployment, SUSE Rancher can be installed on a single node as described later in this document.



Tip

The SUSE Rancher backup operator can then be used to migrate from the single node to an installation on a high-availability Kubernetes cluster ¹



Note

Regardless of the deployment target, SUSE Rancher should always run on a node or cluster that is separate from the downstream clusters that it manages. Running user workloads on this cluster is not advised.

¹ <https://rancher.com/docs/rancher/v2.5/en/backups/migrating-rancher/> [↗](#)

3 Component model

This section describes the various components being used to create a SUSE Rancher deployment, in the perspective of top to bottom ordering. Once completed, the SUSE Rancher instance enables the management of multiple Kubernetes clusters, as shown in the following figure:

3.1 Component overview

By utilizing:

- Multi-cluster Management Server - SUSE Rancher

one can create the necessary infrastructure and services to administer and manage multiple Kubernetes clusters. Further details for these components are described in the following sections.

3.1.1 Software - SUSE Rancher

SUSE Rancher is a complete cluster and container management platform built to reside on Kubernetes itself. It addresses these challenges by delivering the following key functions, as shown in the following figure:

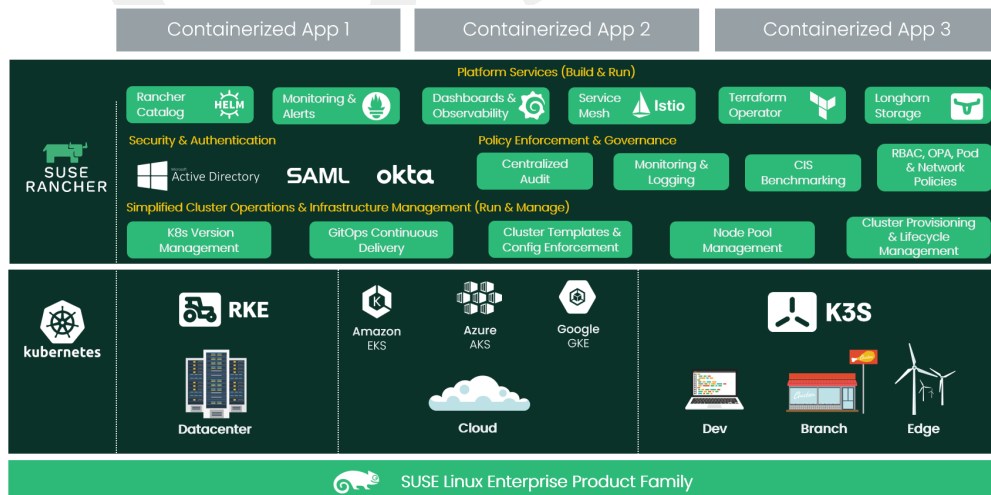


FIGURE 3.1: OVERVIEW OF SUSE RANCHER

Certified Kubernetes Distributions

SUSE Rancher supports management of any certified Kubernetes distribution. That includes:

- for on-premises workloads, a SUSE offering Rancher Kubernetes Engine (RKE (<https://rancher.com/products/rke/>)), a certified Kubernetes distribution for both bare-metal and virtualized servers
- for the public cloud, hosted Kubernetes services like
 - Amazon Elastic Kubernetes Service (EKS ¹),
 - Azure Kubernetes Service (AKS ²) and
 - Google Kubernetes Engine (GKE ³)
- for edge, branch and desktop workloads, SUSE offerings like K3s (<https://rancher.com/products/k3s/>), a certified lightweight distribution of Kubernetes.

Simplified Cluster Operations and Infrastructure Management

SUSE Rancher provides simple, consistent cluster operations including provisioning and templates, configuration and lifecycle version management, along with visibility and diagnostics.

Security and Authentication

SUSE Rancher incorporates and leverages various single-signon services, to automate processes and apply a consistent set of user access and security policies for all the managed clusters, no matter where they're running.

Policy Enforcement and Governance

SUSE Rancher includes audit and security guideline enforcement, monitoring and logging functions, along with user, network and workload policies distributed across all managed clusters.

¹ <https://aws.amazon.com/eks/>

² <https://azure.microsoft.com/en-us/overview/kubernetes-on-azure/>

³ <https://cloud.google.com/kubernetes-engine>

Platform Services

SUSE Rancher also provides a rich catalog of services for building, deploying and scaling containerized applications, including app packaging, CI/CD, logging, monitoring and service mesh.

As SUSE Rancher can be deployed on a single node, only some prerequisites for the underlying operating system are needed and will be detailed in the deployment section.

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4 Deployment

This section describes the base process steps to deploy SUSE Rancher including the prerequisites for the node operating system.

4.1 Deployment overview

The deployment stack is represented in the following figure:



FIGURE 4.1: SUSE RANCHER DEPLOYMENT STACK

and details are covered in the following sections.

4.1.1 SUSE Rancher Deployment

The underlying Linux operating system can be:

- A cloud-host virtual machine (VM)
- An on-prem VM
- A bare-metal server

To meet the SUSE Rancher prerequisite and requirements, SUSE offerings, like [SUSE Linux Enterprise Micro](https://www.suse.com/products/server/) (<https://www.suse.com/products/server/>) or [SUSE Linux Enterprise Server](https://www.suse.com/products/micro/) (<https://www.suse.com/products/micro/>), can be utilized:

1. Ensure these services are in place and configured for this node

- Domain Name Service (DNS) - an external network-accessible service to map IP Addresses to hostnames
- Network Time Protocol (NTP) - an external network-accessible service to obtain and synchronize system times to aid in timestamp consistency
- Software Update Service - access to a network-based repository for software update packages. This can be accessed directly from each node via registration to
 - the general, internet-based [SUSE Customer Center](https://scc.suse.com/login) (<https://scc.suse.com/login>) (SCC) or
 - an organization's [SUSE Manager](https://www.suse.com/products/suse-manager/) (<https://www.suse.com/products/suse-manager/>) or
 - a local server running an instance of [Repository Mirroring Tool](https://documentation.suse.com/sles/15-SP2/single-html/SLES-rmt/#book-rmt) (<https://documentation.suse.com/sles/15-SP2/single-html/SLES-rmt/#book-rmt>) (RMT)



Note

During the installation, the node can be pointed to the respective update service. This can also be accomplished post-installation with the command-line tool, [SUSEConnect](https://documentation.suse.com/sle-micro/5.0/single-html/SLE-Micro-installation/#article-installation) (<https://documentation.suse.com/sle-micro/5.0/single-html/SLE-Micro-installation/#article-installation>).

2. Enable the required container runtime engine

- for SUSE Linux Enterprise Micro (version 5.0)

```
sudo transactional-update pkg install docker
sudo reboot
sudo systemctl enable --now docker.service
sudo systemctl status docker.service
```

- for SUSE Linux Enterprise Server (version 15-SP2)

```
sudo SUSEConnect -p sle-module-containers/15.2/x86_64
sudo zypper refresh ; zypper install docker
sudo systemctl enable --now docker.service
sudo systemctl status docker.service
```

3. Then install SUSE Rancher, with a self-signed security certificate.

- Run the following command

```
sudo docker run -d --restart=unless-stopped -p 80:80 -p 443:443 --privileged
rancher/rancher
```

- Then from a client system, connect a web browser to the IP address or hostname of the SUSE Rancher node
 - Enter a new admin password



Important

On the second configuration page, ensure the "Server URL" is set to the IP address or hostname of this deployed SUSE Rancher node.

Now other Kubernetes clusters can be deployed, imported and managed from this SUSE Rancher instance.

5 Summary

Using components and offerings from SUSE and the Rancher portfolio streamlines your ability to quickly and effectively engage in a digital transformation, taking advantage of cloud native resources and disciplines. Using such technology approaches lets you deploy and leverage transformations of your infrastructure into a durable, reliable enterprise-grade environment.

Simplify

Simplify and optimize your existing IT environments

- Using SUSE Rancher enables you to simplify Kubernetes cluster deployment and management of the the infrastructure components.

Modernize

Bring applications and data into modern computing

- With SUSE Rancher, the digital transformation to containerized applications can benefit from the ability both to manage many target clusters, for each of the respective user bases and to facilitate the actual workload deployments.

Accelerate

Accelerate business transformation through the power of open source software

- Given the open source nature of SUSE Rancher and the underlying software components, you can simplify management and make significant IT savings as you scale orchestrated, microservice deployments anywhere you need to and for whatever use cases are needed in an agile and innovative way.

6 References

WHITEPAPERS

- A Buyer's Guide to Enterprise Kubernetes Management Platforms - <https://info.rancher.com/enterprise-kubernetes-management-buyers-guide>
- How to Build an Enterprise Kubernetes Strategy - <https://info.rancher.com/how-to-build-enterprise-kubernetes-strategy>

BOOKS

- Kubernetes Management - <https://info.rancher.com/kubernetes-management-for-dummies-rancher-and-suse-0-0>

TRAINING

- SUSE - <https://training.suse.com/>
- Rancher - <https://rancher.com/training/>

WEBSITES

- SUSE - <https://www.suse.com>
- SUSE Customer Center (SCC) - <https://scc.suse.com/login>
- Products
 - SUSE Rancher - <https://rancher.com/products/rancher/> (documentation (<https://rancher.com/docs/rancher/v2.x/en/>))
 - Rancher Kubernetes Engine (RKE) - <https://rancher.com/products/rke/> (documentation (<https://rancher.com/docs/rke/latest/en/>))
 - K3s - <https://rancher.com/products/k3s/> (documentation (<https://rancher.com/docs/k3s/latest/en/>))
 - SUSE Linux Enterprise Micro (SLE Micro) - <https://www.suse.com/products/micro/> (documentation (<https://documentation.suse.com/sle-micro/5.0/>))
 - SUSE Linux Enterprise Server (SLES) - <https://www.suse.com/products/server/> (documentation (<https://documentation.suse.com/sles/15-SP2/>))

- SUSE Manager - <https://www.suse.com/products/suse-manager/> (documentation (<https://documentation.suse.com/suma/4.1/>))
- SUSE Repository Mirroring Tool (RMT) - <https://www.suse.com/products/server/> (documentation (<https://documentation.suse.com/sles/15-SP2/single-html/SLES-rmt/#book-rmt>))
- Projects
 - Rancher Kubernetes Engine Government (RKE2) - <https://github.com/rancher/rke2> (documentation (<https://docs.rke2.io/>))

Glossary

- Document Scope

Quick Start

A guide with the basic steps to quickly and simply deploy the one layer of the referenced component of the SUSE portfolio, with generalized pointers to other required elements.

Reference Architecture¹

A guide with the general steps to deploy and validate the structured solution components from both the SUSE and partner portfolios. This provides a shareable template of consistency for consumers to leverage.

- Deployment Flavor

Proof-of-Concept²

A partial or nearly complete prototype constructed to demonstrate functionality and feasibility for verifying specific aspects or concepts under consideration. This is often a starting point when evaluating a new, transitional technology. Sometimes it starts as a Minimum Viable Product (MVP³) that has just enough features to satisfy an initial set of requests. After such insights and feedback are obtained and potentially addressed, redeployments may be utilized to iteratively branch into other realms or to incorporate other known working functionality.

¹ link: Reference Architecture (https://en.wikipedia.org/wiki/Reference_architecture) 


² link: Proof of Concept (https://en.wikipedia.org/wiki/Proof_of_concept) 

³ link: Minimum Viable Product (https://en.wikipedia.org/wiki/Minimum_viable_product) 

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