Demo : SUSE CaaS Platform

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This document outlines the process to install SUSE CaaS Platform 4.0 on a set of available virtual machines as a solution cluster in the Hewlett Packard Enterprise Customer Innovation Center. While citing steps, values or inputs which need to be changed from the default, documented process in this environment, you can refer to respective SUSE CaaS Platform 4.0 Deployment Guide (https://documentation.suse.com/suse-caasp/4.0/single-html/caasp-deployment/)↗ for more complete solution overview and details.

Tip

Supplementary Videos - A condensed video version of this end-to-end process is available, within the Hewlett Packard Enterprise Customer Innovation Center at video::FixMe (https://www.youtube.com/watch?v=4VrhlyIgo3M)↗. Likewise, there are full-length videos of the important process sections referenced throughout this document.

1 Hewlett Packard Enterprise Customer Innovation Center

Through a corporate sponsorship between SUSE and Hewlett Packard Enterprise, the resources provided for this solution demo are located in the Customer Innovation Center (https://www.hpe.com/us/en/about/executive-briefing-centers/geneva.html)↗ facility. Joint sales teams and customers are encouraged to interact and engage in this environment to understand the joint value proposition.

Environment Access

This section outlines how to access the Hewlett Packard Enterprise Customer Innovation Center environment and what core functionality is present to leverage.

1.1 Virtual Private Network (VPN)

The following preparatory actions are required

1. Request a set of VPN user credentials
2. Request a copy of the Hewlett Packard Enterprise Customer Innovation Center Remote Access document to learn how to
    - Download and Install OpenVPN client
    - Configure the client
    - Start the VPN tunnel, connecting via your VPN user credentials

1.2 Environment Core Functionality

Next, request a copy of the environment service's login credentials. Once connected via the VPN, you can now access the following infrastructure

- The following table lists the various network parameters and services:

TABLE 1.1: ENVIRONMENT ACCESS - GENERAL NETWORKING / SERVICES

Role	Description	Value	Notes
Demo Subnet	IPRange/CIDR	10.6.64.0/24	Class C
	Router	10.6.64.1	
DNS	Primary	10.3.61.31	
	Secondary	10.11.0.13	
NTP	Primary	10.11.0.10	

- The following table lists the relevant infrastructure hosts to interact with:

TABLE 1.2: ENVIRONMENT ACCESS - INFRASTRUCTURE HOSTS

Function	Role	IPAddress	Notes
Desktop Environment	JumpHost	10.6.64.2	Windows
Virtualization Host	VMware	10.3.61.10	vSphere

-

The following additional command line interfaces, accessible from the JumpHost, may be relevant to interact with a Kubernete infrastructure, like SUSE CaaS Platform:

- `kubectl`
  - An example invocation via *Start* → *Command Prompt* → `Downloads\kubectl.exe version`

    
    Tip

    If this is not available, refer to Install kubectl on Windows (https://kubernetes.io/docs/tasks/tools/install-kubectl/#install-kubectl-on-windows)↗.

- `helm` FixME
  - An example invocation via *Start* → *Command Prompt* → `Downloads\helm.exe version`

    
    Tip

    If this is not available, refer to Installing Helm (https://helm.sh/docs/intro/install/)↗.

Via the Remote Desktop Protocol (RDP), login to the provided JumpHost to utilize as desktop environment.

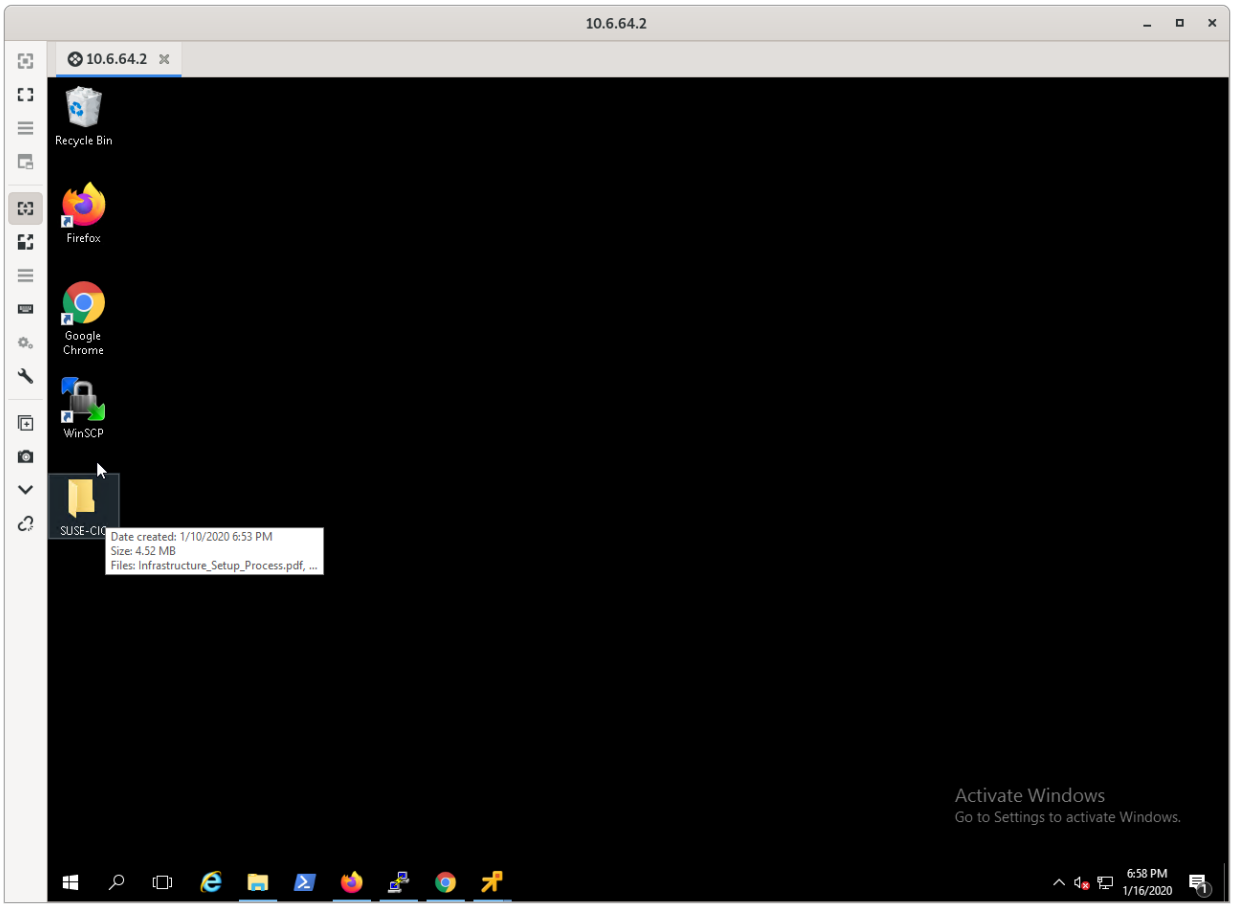


FIGURE 1.1: ENVIRONMENT JUMPHOST ACCESS

You should be able to

1. Access copies of this and other demonstration documents from the *SUSE-CIC* Desktop Folder
2. Use a web browser to access
    - the Internet (via any of the browsers types, Chrome, Edge, Firefox)
    - vSphere HTML client for VMware® host (recommend using Chrome, using HTML5 access)

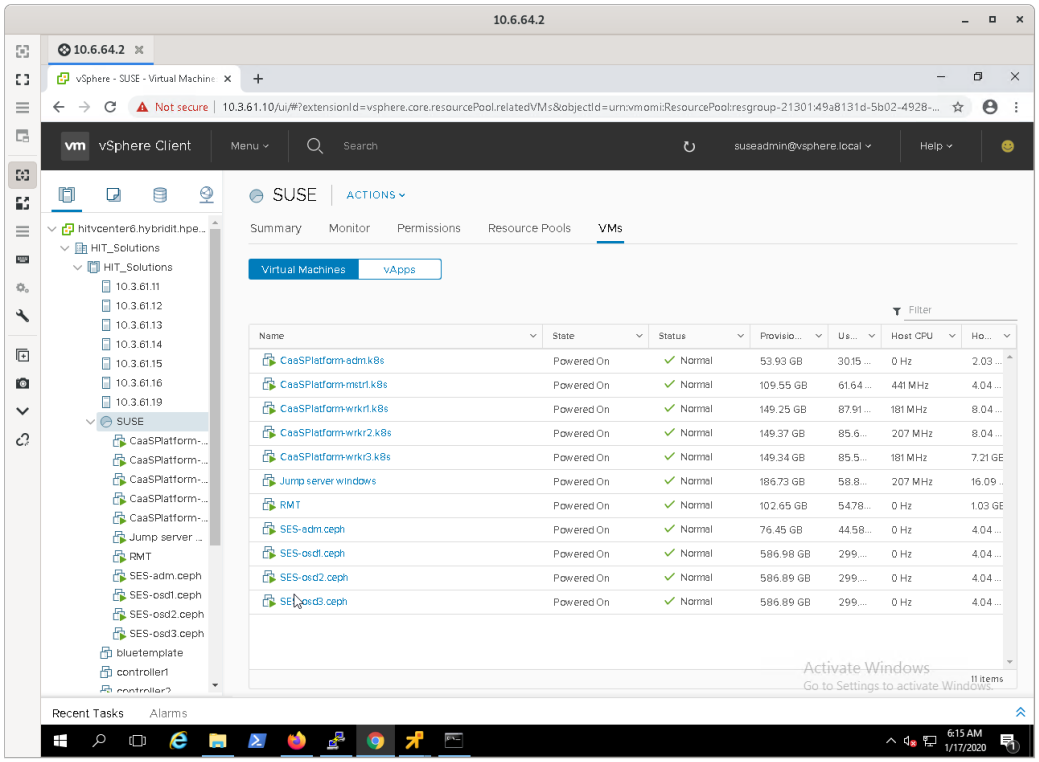


FIGURE 1.2: ENVIRONMENT VSPHERE ACCESS

2 Required Demo Infrastructure

These necessary infrastructure service components have been previously setup and should be operational. Most all of these services should remain running at all times and configuration values should remain static so as not to impact the deployments or operational aspects.

Prerequisite Services

This section outlines required background services for this document's SUSE solution within the Hewlett Packard Enterprise Customer Innovation Center environment. It also provides rudimentary checks to verify the services and some simple troubleshooting examples.

2.1 Internet Access

In order to access components and downloads from ouside the Hewlett Packard Enterprise Customer Innovation Center environment, it is assumed that outbound Internet access is available, likely through the Demo Subnet Router.

2.2 Repository Mirroring Tool [RMT] Service

In order to have a local, synchronized repository of the required SUSE Customer Center (https://scc.suse.com/)↗ [SCC] content (for quick/easy access), the best practice is to have a local RMT server running in the demo environment.

Important

This node (virtual machine) and service should be up and running at all times, to provide the repository contents for both installs and updates of all the other solution nodes and servcies. By default, it automatically mirrors the content each night to stay current.

Verify Functionality

Once connected to the Hewlett Packard Enterprise Customer Innovation Center environment via the VPN, RDP and logged into the JumpHost

1. Launch a web browser and visit the RMT URL:

```
http://10.6.64.15/repo/SUSE
```

or

```
http://rmt.suse.cic/repo/SUSE
```

Browsing the underlying *Products* and *Updates* links will show what content is available.

Note

The IP-based URL is based upon the designated, reserved IP address of the respective RMT server. By default the JumpHost does not utilize the local demo environment's DNS service but can have this hostname entry added to it's local host file.

TABLE 2.1: DEMONSTRATION ENVIRONMENT SUGGESTED REPOSITORY CONTENT

Function	Product	Version	Architecture	Notes
Infrastructure	Basesystem Module	15 SP1	x86_64	
	Desktop Applications Module	15 SP1	x86_64	
	Server Applications Module	15 SP1	x86_64	
	SLES	15 SP1	x86_64	
SUSE CaaS Platform	SUSE-CAASP	4.0	x86_64	
	Containers Module	15 SP1	x86_64	

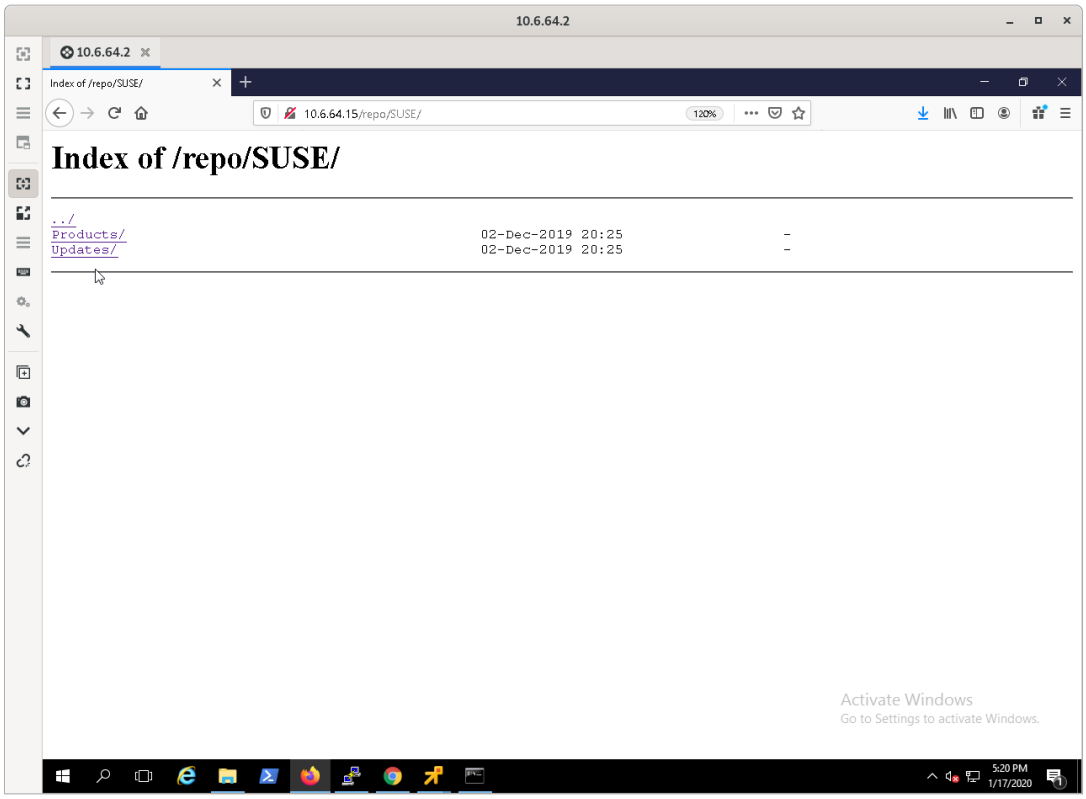


FIGURE 2.1: VERIFYING RMT FUNCTIONALITY

If this appears to be functioning, skip to the next section.

Troubleshooting

If the previous access does not work, try the following additional checks:

- Launch a command prompt from the JumpHost *Start* menu and type

```
ping 10.6.64.15
```

- Launch the `putty` SSH client from the JumpHost *Start* menu and try connecting, logging in to the RMT IP address 10.6.64.15, then

```
systemctl status rmt-server
```

- Using the Google Chrome web browser, connect to the vSphere HTML5 client interface, log in and make sure the RMT virtual machine is powered on. The virtual remote console can also be launched to assess the state and potentially remedy any operational issues on the node. Refer to the

Tip

Review the SUSE Linux Enterprise Server RMT Guide (https://documentation.suse.com/sles/15-SP1/single-html/SLES-rmt/)↗

If any of the above attempts fails, an RMT virtual machine can be recreated per the process mentioned in the Chapter 5, *Appendices*.

2.3 Domain Name Service [DNS]

To have a coherent, self-contained name service for elements of the SUSE solution in the local environment, mapping IP addresses to hostnames, this service is co-located on the RMT server virtual machine.

Important

This service should be left running at all times, to provide the name to IP resolution installs, updates, and runtime operation of all the other nodes.

Verify Functionality

Once connected to the Hewlett Packard Enterprise Customer Innovation Center environment via the VPN, RDP and logged into the JumpHost

1. Launch a Command Prompt from the JumpHost *Start* menu and type

```
nslookup rmt.suse.cic 10.6.64.15
```

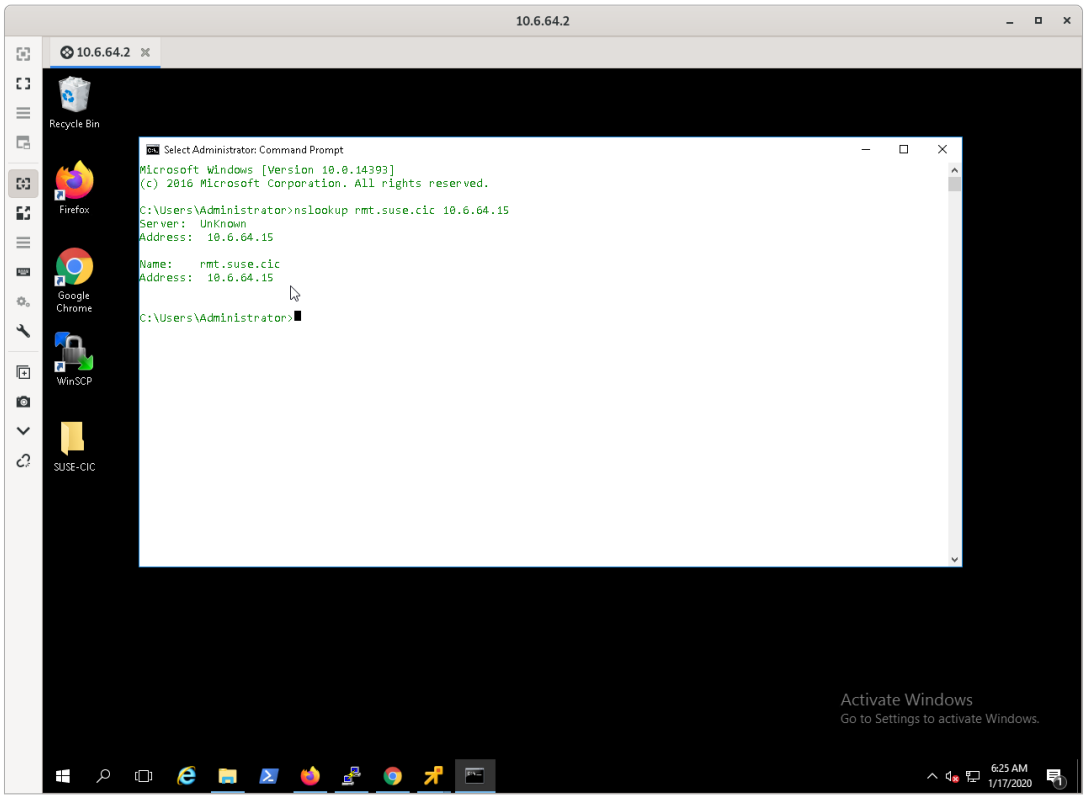


FIGURE 2.2: VERIFYING DNS FUNCTIONALITY

If this appears to be functioning, also ensure the other relevant solution's Hostname to IPAddress mappings are configured and available:

TABLE 2.2: DEMONSTRATION ENVIRONMENT SUBNET MAPPING

Function	Role	Hostname	IPAddress	Notes
Infrastructure	RMT	rmt.suse.cic	10.6.64.15	local solution DNS, also referenced in JumpHost *hosts* file
SUSE Enterprise Storage	Admin	adm.ceph.suse.cic	10.6.64.32	also referenced in JumpHost *hosts* file
SUSE CaaS Platform	Admin/Mgmt	adm.k8s.suse.cic	10.6.64.64	also referenced in JumpHost *hosts* file
	LB	mstr.k8s.suse.cic	10.6.64.65	co-located VIP on RMT
	Master	mstr1.k8s.suse.cic	10.6.64.66	
	Worker	wrkr1.k8s.suse.cic	10.6.64.69	
		wrkr2.k8s.suse.cic	10.6.64.70	
		wrkr3.k8s.suse.cic	10.6.64.71	
spares		n/a	10.6.64.201	
		n/a	10.6.64.202	
		n/a	10.6.64.203	
		n/a	10.6.64.204	
		n/a	10.6.64.205	
		n/a	10.6.64.206	
		n/a	10.6.64.207	
		n/a	10.6.64.208	

> **Note**
>
> The entries denoted as "spares" do not have specific hostname mappings and are just intended as available addresses for initial operating system installations on the virtual machines.

Troubleshooting

If the previous access does not work, try the following additional checks:

- Launch a Command Prompt from the JumpHost *Start* menu and type

```
ping 10.6.64.15
```

- Launch the `putty` SSH client from the JumpHost *Start* menu and try connect to the RMT IP address 10.6.64.15. Once logged in as root, try:

```
systemctl status named
```

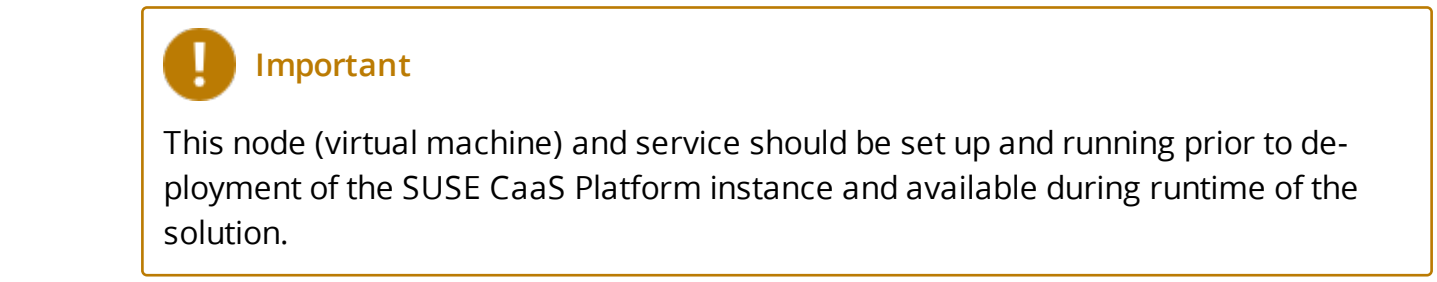
- Using the Google Chrome web browser, connect to the vSphere HTML5 client interface, log in and make sure the RMT virtual machine is powered on. The virtual remote console can also be launched to assess the state and potentially remedy any operational issues on the node.

> **Tip**
>
> Review the DNS Chapter (https://documentation.suse.com/sles/15-SP1/single-html/SLES-admin/#cha-dns/)↗ of the SUSE Linux Enterprise Server Administration Guide.

If any of the above attempts fails, a DNS function can be recreated per the process mentioned in the Chapter 5, *Appendices*.

2.4 Load Balancer (LB) Service

In order to provide resiliency for a given set of APIs of the local SUSE CaaS Platform solution, this service must be configured and running. It is hosted on the RMT server with a secondary IP address.



Important

This node (virtual machine) and service should be set up and running prior to deployment of the SUSE CaaS Platform instance and available during runtime of the solution.

Verify Functionality

Once connected to the Hewlett Packard Enterprise Customer Innovation Center environment via the VPN, RDP and logged into the JumpHost

1. Launch a web browser and visit the LB URL:

```
http://mstr.k8s.suse.cic:9000/stats
```

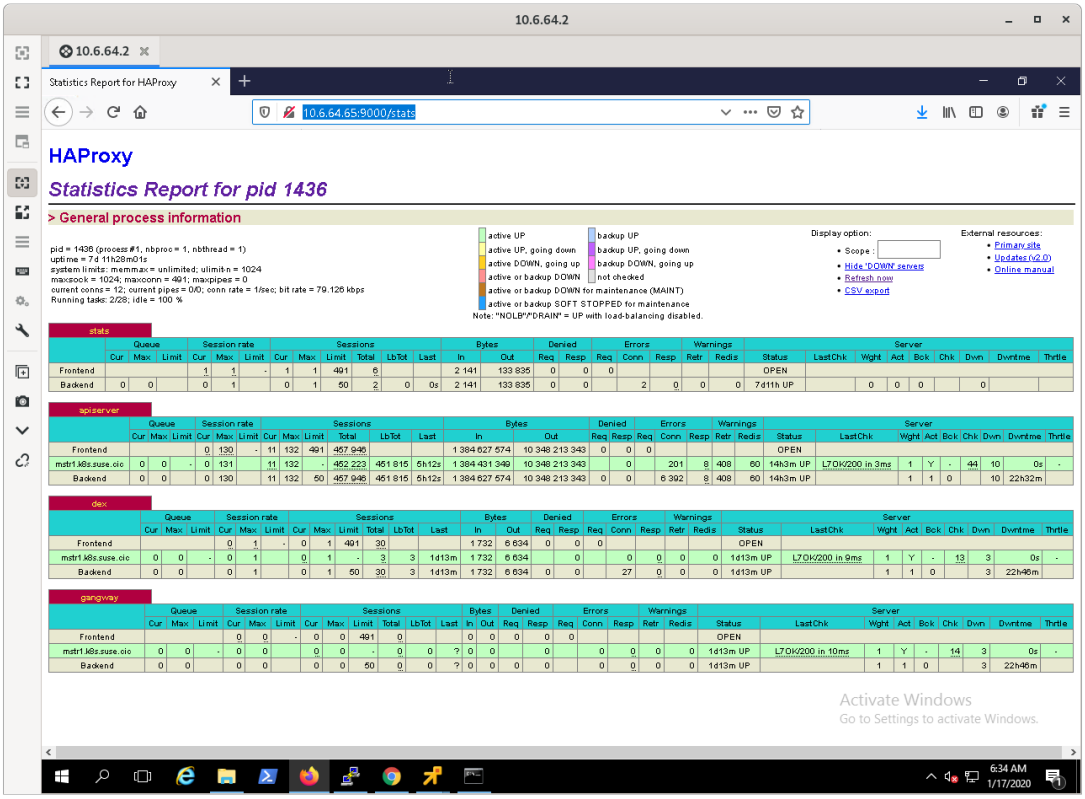


FIGURE 2.3: VERIFYING RMT FUNCTIONALITY

Note

This URL is based upon the designated, reserved IP address of the respective LB service and it's internal configuration. Beyond the "stats" output, this web page shows the status for the three necessary API services, pointing to mstr1.k8s.suse.cic. Before the solution deployment is completed, that status will be designated as "down" and will show as "active UP" when the solution is successfully installed.

If this appears to be functioning, skip to the next section.

Troubleshooting

If the previous access does not work, try the following additional checks:

- Launch a command prompt from the JumpHost *Start* menu and type

```
ping 10.6.64.15
```

- Launch the `putty` SSH client from the JumpHost *Start* menu and try connect to the RMT IP address 10.6.64.15. Once logged in as root, try:

```
systemctl status haproxy
```

- Using the Google Chrome web browser, connect to the vSphere HTML5 client interface, log in and make sure the RMT virtual machine is powered on. The virtual remote console can also be launched to assess the state and potentially remedy any operational issues on the node. Refer to the

Tip

Review the Load Balancer (https://documentation.suse.com/suse-caasp/4.0/single-html/caasp-deployment/#deployment.preparations)↗ section of the SUSE CaaS Platform Deployment Guide.

If the above attempts fails, an LB service function can be recreated per the process mentioned in the Chapter 5, *Appendices*

3 Solution Cluster Deployment

Overview

The following process encompasses an end-to-end deployment on Virtual Machines (VM), installation of the operating system and then creation of the cluster to provide the SUSE CaaS Platform solutin cluster. While many alternatives exist to create such a working solution cluster, the process outlined below is closely parallel to accomplishing the same thing on a set of baremetal nodes.

Important: Given the Hewlett Packard Enterprise Customer Innovation Center is potentially a shared demo environment, ensure these nodes are not in active use before recreating the solution from scratch!

3.1 Allocation of Target Virtual Machines

Purpose

This section outlines how to allocate, prepare and setup the virtual machines to run the various roles of the SUSE solution in the Hewlett Packard Enterprise Customer Innovation Center.

Note

If the required Virtual Machines already exist, review their settings and modify as needed to make sure they match the configurations below.

3.1.1 Create and prepare virtual machine settings

From the JumpHost, launch the Google Chrome browser to connect to the vSphere HTML5 Web Client, then follow the steps below:

1. Via *Hosts and Clusters* context

    - Expand *hitvcenter6.hybritit_hpecic.net* > *HIT_Solutions* > *SUSE* and select *New Virtual Machine*

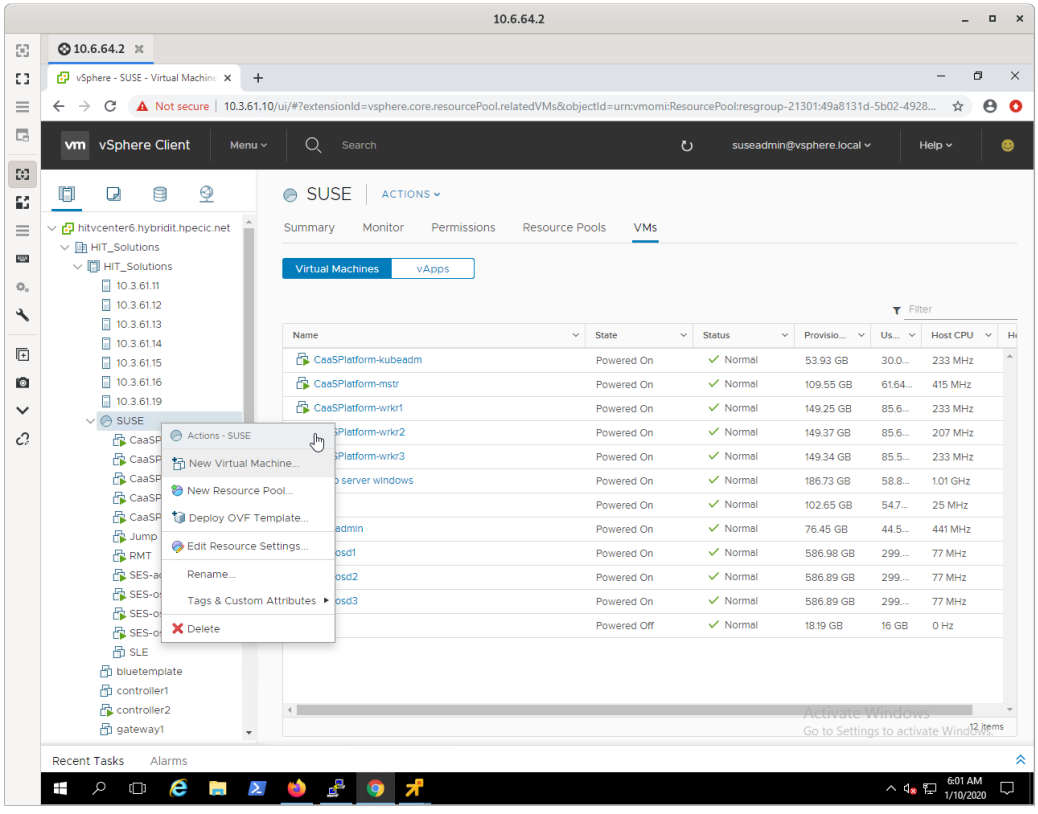


FIGURE 3.1: ADD A NEW VIRTUAL MACHINE

2. Using *New Virtual Machine* dialog

- Select *Create a new virtual machine* then **NEXT**

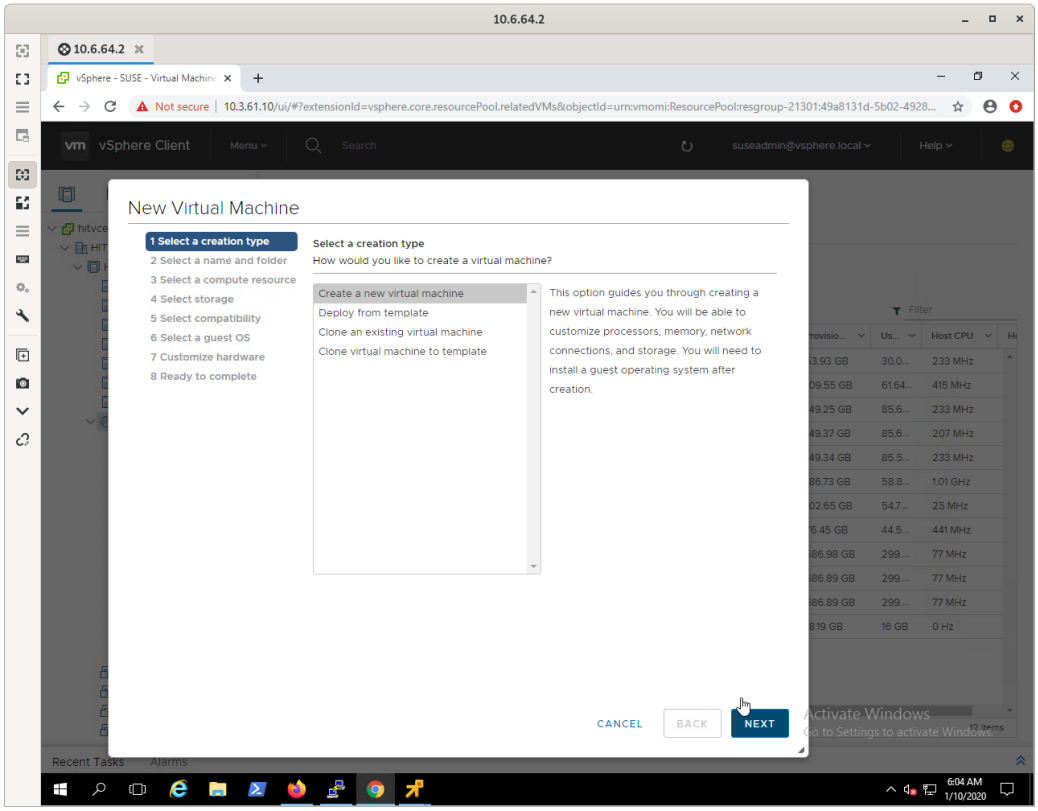


FIGURE 3.2: CREATE A NEW VIRTUAL MACHINE

- Provide an appropriate, distinct Virtual machine name in the text field. A suggested naming scheme is "<solution>-<role>"
  - For example - CaaS Platform-<role>.k8s
- Expand folder location *hitvcenter6.hybritit_hpecic.net* > *HIT_Solutions* select *SUSE* then **NEXT**

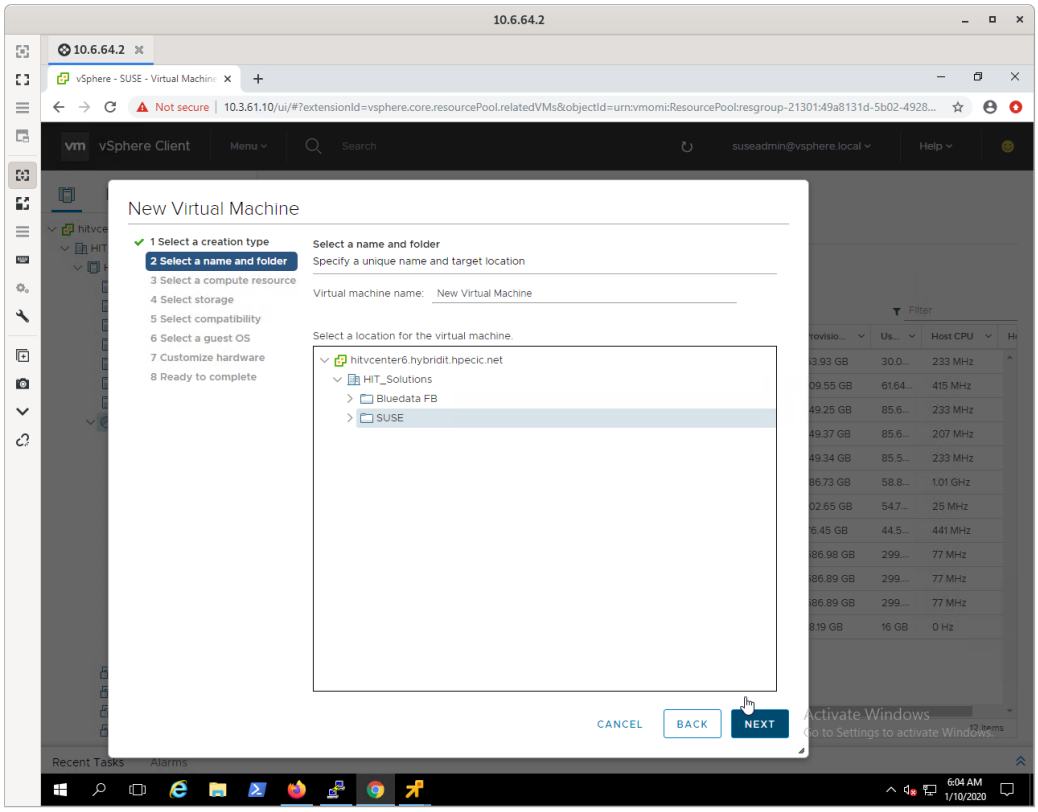


FIGURE 3.3: VIRTUAL MACHINE NAME AND LOCATION

- For destination compute resource, expand *hitvcenter6.hybritit_hpecic.net* > *HIT_Solutions* select *SUSE* then **NEXT**

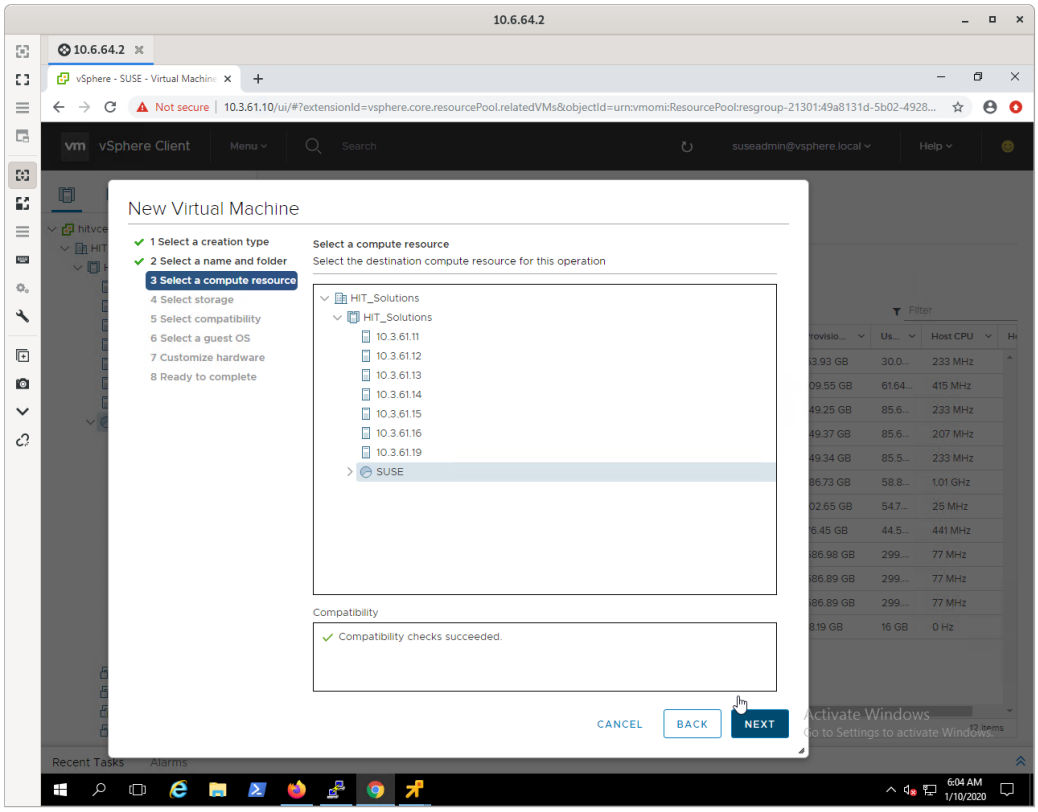


FIGURE 3.4: SELECT A COMPUTE RESOURCE

- For datastore, validate default value of *P20800-HIT-SUSE1064-D* then **NEXT**

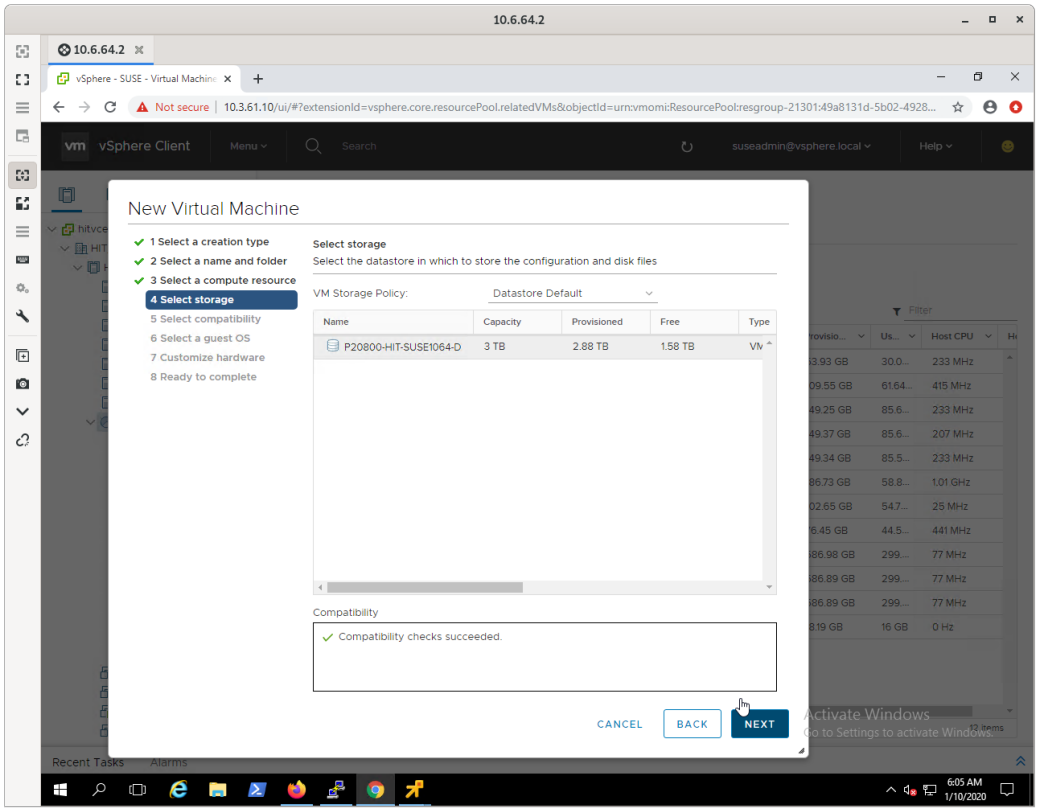


FIGURE 3.5: SELECT STORAGE

- For compatibility, leave default value of *ESXi 6.5 and later* then **NEXT**

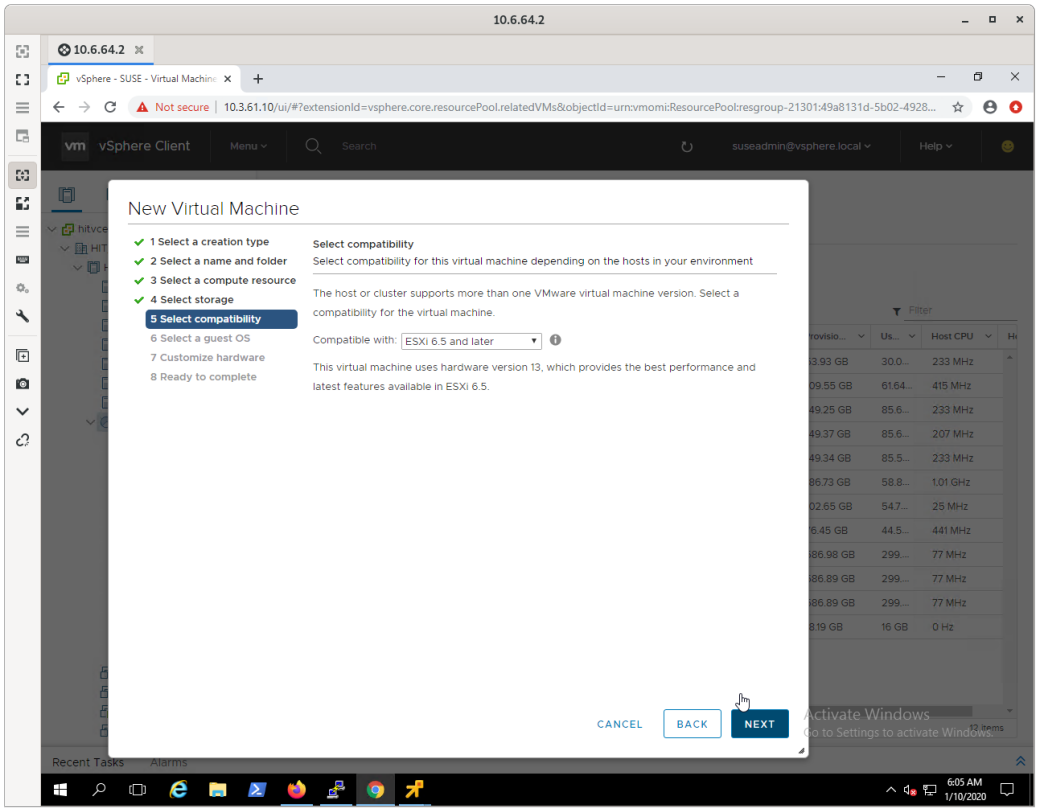


FIGURE 3.6: SELECT COMPATIBILITY

- For guest OS
  - Change *Guest OS Family* to *Linux*
  - Change *Guest OS Version* to *SUSE openSUSE (64 bit)* then **NEXT**

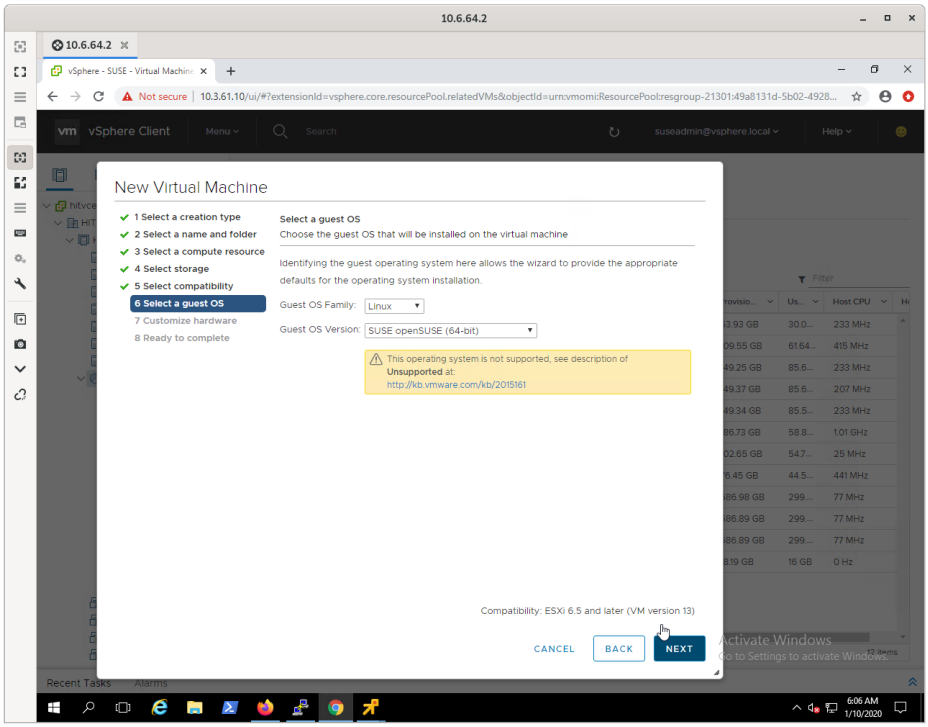


FIGURE 3.7: SELECT A GUEST OS

- Customize the virtual hardware resources, adjusting the quantity and capacity of *CPU*, *Memory*, *New Hard Disk Size* values to match at least the minimum requirement quantity/sizes of the target solution role.

TABLE 3.1: SOLUTION VM RESOURCE SETTINGS (MINIMUMS)

Solution	Quantity	Role	vCPU	Memory (GB)	Disk (GB)	Network
Infra	1	JumpHost	8	16	128	1
SUSE CaaS Platform	1	adm.k8s	2	2	24	1
	>=1	master.k8s	2	4	48	1
	>=2	worker.k8s	4	8	64	1

> **Note**
>
> Refer to respective SUSE product documentation (https://documentation.suse.com/)↗ for more details on the node resource requirements.

- Adjust *New Network* via *Browse* to *DPortGroup_PR_1064_HIT*, providing the recommended quantity of network interfaces then **OK**

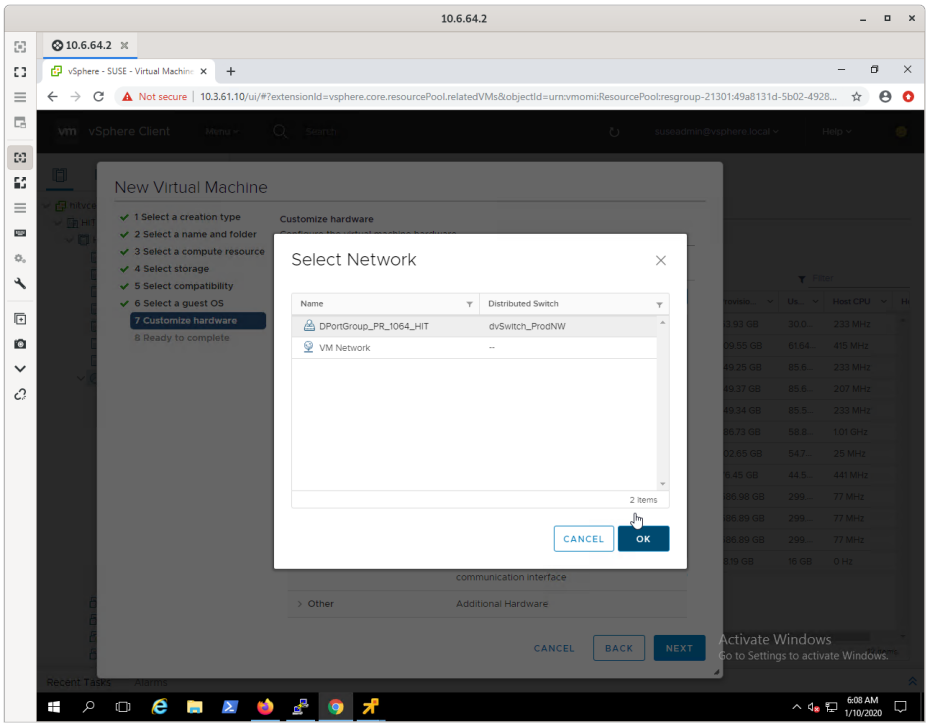


FIGURE 3.8: SELECT NETWORK

- Then **NEXT** and **FINISH**

3. Right click on the newly created "Virtual Machine Name", then *Edit Settings*

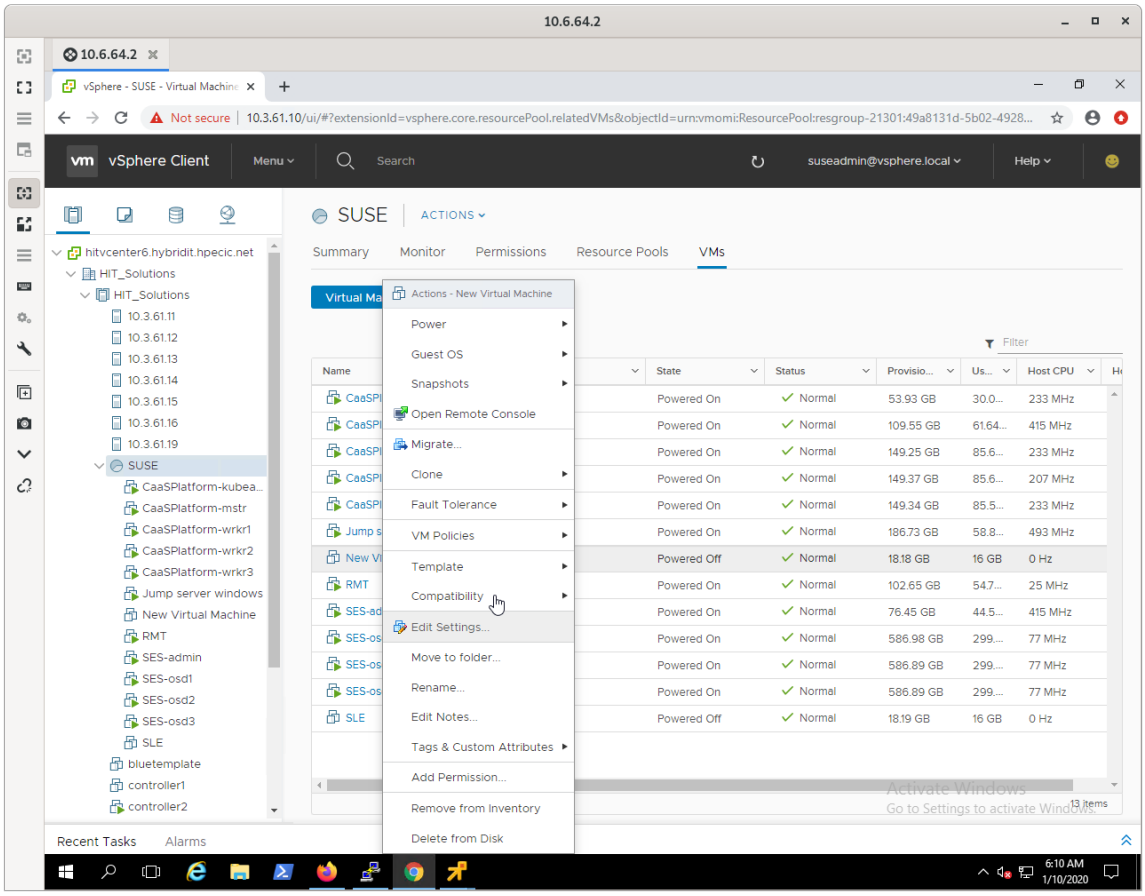


FIGURE 3.9: EDIT SETTINGS

- On *Virtual Hardware* tab, expand *CD/DVD Drive 1* and adjust settings
  - To *Datastore ISO File*
  - Select *Datastores* item *P20800-HIT-SUSE1064-D*
  - Select *Contents* item *SLE-15-SP1-Installer-DVD-x86_64-GM-DVD1.iso* then **OK**
  - Check *Connect At Power On*

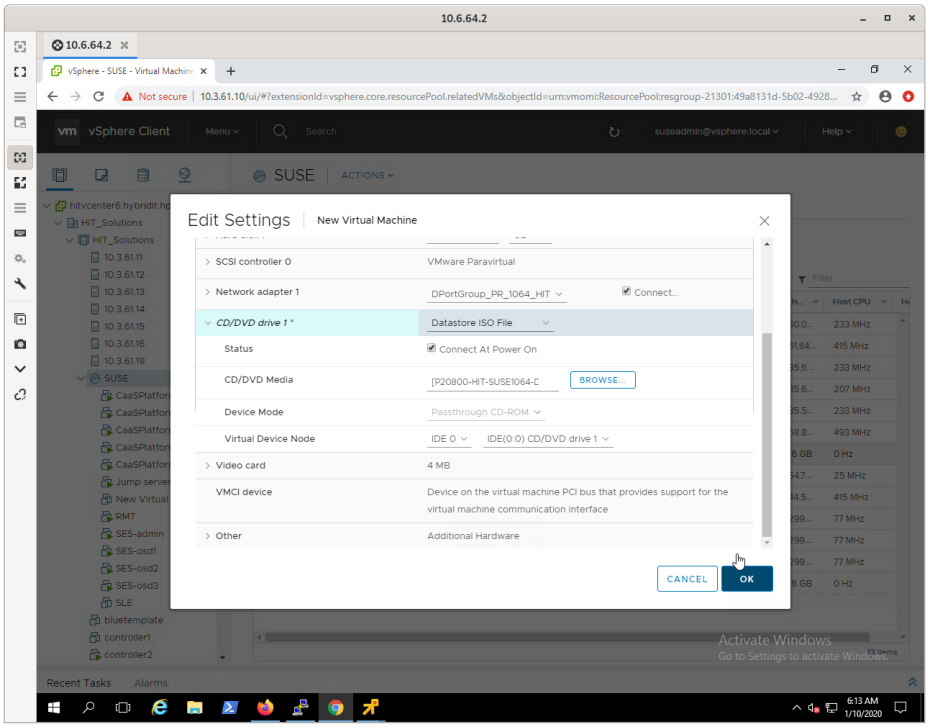


FIGURE 3.10: EDIT SETTINGS FOR CD/DVD DRIVE 1

- On *VM Options* tab, expand *Boot Options* and adjust *Boot Delay* to at least **2000** milliseconds then **OK**

> **Tip**
>
> This adjustment is to allow the ability to interrupt the boot process, with the **ESC** key to select the *CD/DVD drive* media for re-installs.

At this point you are ready to *Launch Remote Console* to power on and install the operating system on the virtual machine.

3.2 Node Operating System Install

Purpose

This section outlines how to install the base SUSE Linux Enterprise Server 15 SP1 on an available virtual machine node in a fairly automated fashion for the various roles of the SUSE solutions in the Hewlett Packard Enterprise Customer Innovation Center.

Note

For cluster-based solutions, each node can be done sequentially, yet all of the cluster nodes can be installed in parallel as well.

Tip

For a recorded, example video representative of this section's process, view video::SUSE CaaS Platform Node Operating System Install (https://drive.google.com/open?id=1nX6y8Rv0wFK-T9YE6EUzn3ldijXm1D1_)↗.

3.2.1 Install the base operating system

From the JumpHost, launch the Google Chrome browser to connect to the vSphere HTML5 Web Client, then follow the steps below:

Note

This document only cites values or inputs which need to be changed from the defaults. Refer to the node roles of SUSE solutions, as that respective document calls out further exceptions to this process.

Tip

Refer to the respective SUSE Linux Enterprise Server 15 SP1 Deployment Guide (https://documentation.suse.com/sles/15-SP1/single-html/SLES-deployment/#book-sle-deployment)↗ for further details.

1. Right click on the respective virtual machine and *Open Remote Console*

2. Power On the virtual machine

> **Tip**
>
> If this is a re-install of the given virtual machine, you likely need to hit **ESC** during the boot startup to ensure you can boot from *CD-ROM Drive* media.

- On the install boot screen, use the arrow key to select *Installation* on the boot screen

> **Note**
>
> Refer to specific DNS IP Subnet networking settings from the Section 2.3, “Domain Name Service [DNS]”

- In the *Boot Options* input field, create a temporary network configuration to access the unattended installation (autoYaST) file

> **Note**
>
> Within the Hewlett Packard Enterprise Customer Innovation Center you can view the contents of the respective solution node role’s autoYaST file via a web browser to review what configuration is being setup and installed by accessing the URL - http://rmt.suse.cic/repo/autoYaST/ (http://rmt.suse.cic/repo/autoYaST/)↗.

  - ifcfg=INTERFACE=IP_LIST,GATEWAY_LIST,NAMESERVER_LIST,DOMAIN autoyast=URL/PathToFile.xml
  - As an example, for this solution, use a spare IP for the node and enter

```
ifcfg=eth=10.6.64.208/24,10.6.64.1/10.6.64.15,suse.cic auto
```

At this point, the operating system will install has finished, the node will reboot and the automated post-install configuration will be applied.

3.2.2 Verify the operating system installation

From the JumpHost, launch the Google Chrome browser to connect to the vSphere HT ML5 Web Client, then follow the steps below:

1. Right click on the respective virtual machine and *Open Remote Console*

    - Login, via root, to the node and perform these few verifications and adjustments:

        - Check the output of

```
ip a
```

            - To ensure a match with the expected network interface IPAddress

            +

```
ip r
```

+ * To ensure a matching setup for the network routing

+

```
host rmt.suse.cic
```

+ * To access to the local DNS mapping service

+

```
hostname -f
```

+ * To ensure a matching setup for the fully-qualified domain name of this host

+ NOTE: This can be remedied by check the contents of the file(s): `/etc/hostname` to make sure it matches the intended fully-qualified node's Hostname and `/etc/hosts` which can have an entry added for the fully-qualified node's hostname

+ ** Run

+

```
yast2
```

+ **Selecting *Software*** * Then *Product Registration* **** Select ***Register System via local SMT Server*** * Input the appropriate *Local Registration Server URL* to the RMT server (e.g. http://rmt.suse.cic/ (http://rmt.suse.cic/)↗) then **Next** ** Add the respective *Extensions and Modules* for the desired role - may need to uncheck the *Hide Development Versions*

+ selecting *SUSE CaaS Platform 4.0 x86_64*

+ then **Next**

+ NOTE: Refer to the respective SUSE Solution Deployment Guides (https://documentation.suse.com)↗ for the required extensions/modules.

+ **** Read and *Accept* any additional license agreements, then *Next** ** *Accept*, *Ok* and *Finish* any recommended package installations

+ **** For each of the cluster nodes, visit *Software Management** * Change *Filter* to *Patterns*, search for and verify the respective ones for the target role are installed** for adm role, select *SUSE CaaS Platform Management** * for other nodes, select *SUSE CaaS Platform Node*

+ Then *Accept* and *OK* and *Finish*

+ **** Then *Online Update*** ** Peruse all available updates then *Accept* and *OK* and *Finish* and *Close* and *OK* and *Quit*

At this point, the node should be manually rebooted to ensure application of all the updates. After that the node should be ready for operational usage and inclusion into the solution cluster.

3.3 Deploying the Solution

After connecting via the VPN and logging into the jumphost, visit the vSphere Web Client, then follow the steps below:

Tip

For a recorded example video representative of this process, view video::SUSE CaaS Platform Cluster Deployment (https://drive.google.com/open?id=1KGwymW2SRukk_aG-XGDqYbMMKSFltGkz)↗.

1. Right click on the respective virtual machine *CaaS Platform-adm.k8s* and *Open Remote Console*

2. Login to the node as the "geeko" user

   - Setup the necessary Basic SSH Key Configuration (https://https://documentation.suse.com/suse-caasp/4.0/single-html/caasp-deployment/#deployment.preparations)↗
   - Ensure the "geeko" user has sudo access (https://https://documentation.suse.com/suse-caasp/4.0/single-html/caasp-deployment/#_)↗ on all the cluster ndoes
   - Then proceed with:
     - "Intializing the Cluster" process via

       ```
       skuba cluster init --control-plane mstr.k8s.suse.cic my-clu
       ```

       - "Cluster Bootstrap" via

         ```
         cd my-cluster

         skuba node bootstrap --user geeko --sudo --target ms

         skuba node join --role worker --user geeko --sudo --
         skuba node join --role worker --user geeko --sudo --
         skuba node join --role worker --user geeko --sudo --
         ```

       - Verify the cluster, via

         ```
         skuba cluster status
         ```

         And with the steps in "Using kubectl" (https://documentation.suse.com/suse-caasp/4.0/single-html/caasp-deployment/#_using_kubectl)↗.

4 Summary

At this point, the SUSE CaaS Platform solution cluster should be up, running and functional.

TBD - Only included base solution deployment so far, so may add additional sections over time. NOTE: In the interim, refer to SUSE CaaS Platform Administration Guide (https://documentation.suse.com/suse-caasp/4.0/single-html/caasp-admin/) ↗ for operational aspects and guidance.

5 Appendices

TBD - Will link to other content over time ////FixMe //// * RMT Setup //// * DNS Setup //// * LB Setup