

# Appendices for SAP Applications Built on FlexPod

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Building Architectures to Solve Business Problems

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**vm**ware<sup>®</sup>



# Appendix

# **Appendix A Installing SuSE Linux Enterprise Server**

SuSE Linux Enterprise Server (SLES) is installed by means of a graphical user interface. In addition to the standard installation shown in this appendix (including the special software components that must be installed), a few post-installation procedures must be added to build an OS for use in a FlexPod environment.

## **SuSE Linux Installation (SLES 11)**

The following are the installation steps as carried out on a virtual machine (see section "Linux Template Creation"). After the boot process has completed, mount the installation DVD to start the SuSE installation.





1

Select Installation at the SuSE Boot Options screen to proceed.

2

1

If desired, check the installation medium. Otherwise, click Next.

	🖲 Media Check	
SUSE. Linux Enterprise	It is recommended to check all installation media to avoid installation problems.	
Preparation	CD or DVD Drive	
► Welcome	NECVMWar VMware IDE CDR00 (/dev/sr01 + Start Check Eject	
System Analysis	Check ISO File	
Time Zone		
Installation	Status Information	
Server Scenaria		
Installation Summary		
Perform Installation		
Configuration		
Check Installation		
Hostname		
• Network		
Customer Center		
• Online Update		
Service		
Clean Up		
Release Notes		
Hardware Configuration	Proyes	-
	Carcel	
	Help Abort Back	lext

<sup>3</sup> Select English (US) as the language, select a keyboard layout, and read and accept the license terms.



Select New Installation.

4

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### 5 Define your time zone settings.



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Select Physical Machine as the server base scenario.



7 On the Expert tab under Installation Settings, change the partitioning of the hard disk and the software components to be installed.



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Select the Custom Partitioning option to prepare the hard disk.



Add two primary partitions: a 20GB Linux native type with Ext3 FS type mounted at /; and a 40GB Linux swap partition. Click Accept.

1

1

SUSE. Linux	System View	ioner	isk: /dev	//sda				
Enterprise	B / en	Overview	Pa	entitions	1.	and Devices		
Preparation		Trease	1 2		1 *	nes previces		
	T sda	Device Si	ze F	Enc	Type	FS Type	Label	Mount Po
Sustem Analysis	- RAID	/dev/sdal 19	99 GB F	-	Linux nat	tive Ext3	10	1
J Time Zone	- 💌 Volume Manage							
Installation	- P Crypt Files							
. a Sanuar Scanaria	- Device Mapper							
Installation Summary	- D NFS							
Perform Installation	Unused Devices							
Configuration	- Settings							
Check Installation								
+ Hostname								
Network								
Customer Center								
Online Update								
Service								
Clean Up								
Release Notes	4							
Hardware Configuration								
			_					*
		Add	Edit	Res	jre	Dejete	Eg	pert *
	Help				Ab	oort Da	eck	Accept

10

9

Add the following software components in addition to the standard: SAP Application Server Base, C/C++ Development tools, and your desired desktop. Click Details.

nterprise		Pattern	1	* CI	C++ Compil	er and	Toole
reparation	1	Base System Novell AppArmor	8	Min	imal set of tools for	compiling an	nd linking
Welcome	1	32-Bit Runtime E	nvironment	400	lications		
System Analysis		Virtualization Hor	t (non-e				
Time Zone	- C	Help and Support	Docume				
		Graphical	Envir				
stallation		GNOME Desktop	Environ				
Server Scenario		KDE Desktop Em	vironment				
Installation Commany		X Window System	n				
Designment of the line	8	Primary Fu	nctions				
Perform Installation		Filegerver					
onfiguration		Print Server					
Charle Installation		Mail and News S	erver				
Check Instanation		Web and LAMP 5	erver				
Hostname	H	Internet Gatemar	<u></u>				
Network	H	DHCP and DNS	Server				
Customer Center		Directory Server	(LDAP)				
Online Update	-	SAP Application 1	Server Base				
Service		Oracle Server Ba	58				
Clean Up		Xen Virtual Mach	ine Host S	Nar	Disk Usane	Free	Total
Release Notes	1	Web-Based Enter	prise Man	/	11%	17.0 6	8 20.0 G
Hardware Configuration	-	Developme	ent		-		
		C/C++ Company	and loos	-			
	-						
	Deta	ds					

11 On the screen that is displayed, search for ODBC.

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Package Groups	4						
Education Games Graphics Office Programming Multimedia System GNOME Desktop KDE Desktop		Package	Summ	any Ven	iion	Size	
KDE Desktop Other Desktops Publishing Admin Tools Localization Security Network Unknown Group	\$					~~	
Suggested Packages Orphaned Packages All Packages		Dgscription	Jechvical Data	Dependencies	Versions	1	

12 Select unixODBC, unixODBC-32bit, unixODBC-devel, and unixODBC-devel-32bit. In addition, search for java and install java-1\_4\_2-ibm. Confirm that Perl 5 is selected for installation. If not, select Perl 5 also. When you are finished, click Accept.

	Summary Pa	ckage <u>G</u> roups	EPM Groups			2
odbc 💌 Search	/ Package	Sur	nmary		Version	Size
Search in	i java-1, 6, i libgda-3,0 php5-odb v unicOB80 v un	D-Born-jabor (008) Hodbor (008) C PHB 2 008 -32bit (008 dewel Inck dewel 2008 (rsk) gui-gt (008	CrOBE bridge driv IC Provider for GNU IC Provider for GNU IC driver manager i IC driver manager i des and Static Libra des and Static Libra IC Configuration UR	er for jave-1.6.0-i I Data Access (G Hh some drivers Hh some drivers His some drivers His for 008C D. Jose for 008C D. Jity, Data Sourc	160, #70-1621 315-2176 526-50241 2212-19817 2212-19817 2212-19817 2212-19817 2212-19817	77.0 K 35.0 K 97.0 K 1.6 M 1.4 M 196.0 20.0 × 2.5 M
Contains						
	Description	Jechnical Data	Dependencies	Yersions		
🗌 Case Sensitiye	Description unixODBC-de Includes and st Supportability	Jechnical Data evel-32bit - Inclus atic libraries for OC Level 3	Dependencies des and Static Librar DBC development (1	Versions lies for ODBC Deve based on univODBC	Ropment 2).	

#### 13 Click Install to start the installation.



1

14 After the components have been installed, click Next.

SUSE, Linux	Media	Size	Packages	Time	
Enterprise	Total	1 03 68	405	0219	
Preparation	SUSE-Linux-Enterprise-Serve Medum 1	-11-SP1 11.11-1.152 1.03 GB	405	02:19	
✓ Welcome					
🖉 System Analysis					
🗸 Time Zone					
Installation					
✓ Server Scenario					_
Installation Summary	Actions performed				
<ul> <li>Perform Installation</li> </ul>	Instaling xorg-x11-ibXprint	Uti-7.4-1 17 x86 64 rpm (installed	size 35.00 k	8)	
Configuration	Instaling xorg-x11-lbXprint	Util-32bit-7.4-1.17.x86_64.rpm (in	stalled size 3	4.00 kB)	
	Instaling xaw3d-32bit-1.50	-408 13 x86_64 rpm (installed size	670.00 kB)		
Check Installation	Installing xaw3d-1.5E-408.1 Installing Buttlet+udevel.4	3.x86_64.rpm (installed size 788.0 3.62 198 x86_64 rpm (installed siz	0 kB)		
- Hostname	Instaling lbqt4-32bit-4.6.2-	1.6.9.x86_64.rpm (installed size 6.)	04 MB)		
• Retwork	Instaling libproxy0-config-gr	nome-0.31-11111 x86_64 rpm (i .0.3262.010 25-31 46 x86 64 rm	installed size	15.00 kB)	
Customer Center	Instaling lbgmime-2_0-3-2.	2.23-1.41.1 x86_64.rpm (installed	size 396.00 k	d)	-
Online Update					
Service					
Clean Up	Installing grub-0.97-162.9.1 x8	6_64.rpm (installed size 1.38 MB)			
Release Notes		100%			
Hardware Configuration	(internet of the second s				
	Installing Packages (Remaini	ng 1.03 GB / 02:19)			



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16 Select Change Hostname through DHCP.

SUSE. Linux Enterprise Preparation Velcome System Analysis Time Zone Installation	Hostname and Domain Na	ime
V Server Scenario		
Installation Summary		
Perform Installation	Hostname and Domain Name	Demain Hame
Configuration	Tostname	
root Password	Change Hostname via DHCP	) [inte
Check Installation	Assign Hostname to Leopback IP	
► Hestname		
<ul> <li>Network.</li> </ul>	8	
Customer Center		
Online Update		
• Service		
Users		
Service     Users     Clean Up		
Service     Users     Clean Up     Release Notes		
Service     Users     Clean Up     Release Notes     Mardware Configuration		

17 Open the SSH ports in the firewall and set the network interfaces (eth0-ethX) to internal networks.



18

Use the default network services configuration.



#### 19 Skip the network test.

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20 Change the User Authentication Method to NIS.



21 Configure the NIS: Select the Use NIS and Open Port in Firewall.

<b>~</b>	S Configuration of NIS client	
SUSE- Linux Enterprise Preparation	⊖ Da nat wae NIS ⊛ gise NIS	
✓ Welcome ✓ System Analysis ✓ Time Zone Instalization	NIS client Nescentig NIS Policy Default Policy +	
✓ Server Scenario ✓ Installation Summary	NjS Demain 1902: company.com nis	
<ul> <li>Perform Installation</li> <li>Configuration</li> </ul>	Addresses of NIS servers	
✓ root Password ✓ Check Installation	Digadcast Additional NIS Domains	Find
✓ Noticania ✓ Network ✓ Customer Center	J	Ldu
Contine Update     Service     Users	Copen Port in Firewall     Firewall Details  Firewall port is open on all interfaces	
Clean Up     Release Notes     Hardware Configuration	Expert_	
	Help Aboyt Back	Liest

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22 Read the release notes and click Next.

<u></u>	C Release Notes
SUSE: Linux Enterprise Preparation	Language English (US)
<ul> <li>✓ Welcome</li> <li>✓ System Analysis</li> <li>✓ Time Zone</li> <li>Installation</li> </ul>	Release Notes for SUSE Linux Enterprise Server 11 Service Pack 1
Server Scenaris Installation Summary Perform Installation Configuration Configuration Configuration Configuration Hostname Hostname Network Customer Center Configuration Update	Abstract These release notes are generic for all products that are part of our SUSE Linux Energines Server 11 product line. Some parts may not apply to a particular architecture or product. Where this is not abvious, the specific architectures or products are explicitly listed. Statup and Deployment Guides can be found in the devu directory on the media. Documentation (if installed) can also be found below the <i>nux rabaxe riser</i> directory in an installed system. This Nevell product includes materials licensed to Novell under the GNU General Public License (GPL). The GPL requires that Nevell makes available certain source code that counsponds to the GPL-licensed material. The source code is available for download at <u>two</u> <i>heaven nevel</i> (continuedure). Also, for up to the system that Nevell makes of the Novell product, upon equent Novell mail a capy of the isource code. Requests thou's dist hours of the Novell to gent the source prove the reasonable costs or distribution.
<ul> <li>✓ Senice</li> <li>✓ Uses:</li> <li>✓ Clean Up</li> <li>► Release Notes</li> <li>• Hardware Configuration</li> </ul>	SUSE Linux Entrarprise Server     Z. Installation     S. Features and Vesions     S.1. Linux Kernel and Toolchain     King     Reip     King     Back     vest

### 23 Accept the default hardware configuration.

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<sup>25</sup> Click Finish to complete the installation. If you want to repeat this installation for another VM, select the Clone This System for AutoYaST checkbox.

SUSE. Linux Enterprise Preparation	Installation Co	ompleted				
<ul> <li>✓ Welcome</li> <li>✓ System Analysis</li> <li>✓ Time Zone</li> <li>Installation</li> </ul>	The installation ha log in to the system Pfease visit us at h	s completed successfully. You 1. ttp://www.novell.com/linux/.	n system is ready	/ for use. Click	Finish to	
<ul> <li>✓ Senser Scenario</li> <li>✓ Installation Summary</li> <li>✓ Perform Installation</li> <li>Configuration</li> </ul>						
<ul> <li>y soot Passwood</li> <li>✓ Check Installation</li> <li>✓ Hostname</li> <li>✓ Network</li> <li>✓ Custamer Center</li> </ul>						
Coline Update  Service  Uses  Clean Up  Release Notes  More Configuration	X ⊆lone This System	fer AutoYaST	2			
Prate are Conguration	Help			Abogt	Back	Finish

### **DHCP Client Configuration**

This section describes the required DHCP client configuration and other network-related configurations.

Set the DHCP client timeout to 99 seconds. This prevents the DHCP client from going into the background to get the DHCP lease. This is necessary to prevent other scripts or services that require network access from failing to start at boot time. Edit /etc/sysconfig/network/dhcp and change the timeout value to 99:

#### DHClient TIMEOUT='99'

Because all interfaces should get the same hostname, insert the line hostname > /etc/HOSTNAME into the section case\$state in /etc/sysconfig/network/scripts/dhcpd-:

#### hostname > /etc/HOSTNAME

In addition, it is necessary for all other interfaces to wait until the first interface (eth0) is up and gets the new hostname assigned. Therefore add the following line to the configuration files (for example, /etc/sysconfig/network/ifcfg-eth1 for eth1) of all interfaces except for eth0:

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PRE\_UP\_SCRIPT='wait4eth0'

Then create the script wait4eth0 in the directory /etc/sysconfig/network/script with the following content:

```
#!/bin/bash
ifstatus eth0
eth0up=$?
while [ $eth0up -gt 0 ]; do
        echo "waiting for eth0...";
        sleep 5;
        ifstatus eth0;
        eth0up=$?;
done
```

Disable the use of persistent network device names by clearing the UDEV configuration for network interfaces according to the Novell/SUSE TID 3048119:

cat</dev/null>/etc/udev/rules.d/70-persistent-net.rules

This step must be repeated if the template is started or rebooted for other changes.

Check whether the network interfaces are set to internal networks at the firewall.

Open /etc/sysconfig/SuSEfirewall2 and check whether the network interfaces are included in FW DEV INT:

FW\_DEV\_INT="eth0 eth1 eth2"

### **NIS Configuration**

The OS template is configured to run a NIS client communicating with a NIS server to provide central user management capabilities. The following maps are provided by the NIS server: passwd, group, services. This section describes the necessary configurations.

#### nsswitch

The file /etc/nsswitch.conf configures the source of data for the different user configuration files. The OS template should contain the following nsswitch.conf entries:

passwd:	compat
shadow:	files
group:	compat
hosts: networks:	dns files files dns
services:	nis

#### passwd

If it is not already present, the following line must be appended to the file /etc/passwd to merge NIS users with local users:

+:::::

Groups

If it is not already present, the following line must be appended to the file /etc/group to merge NIS groups with local groups:

+:::

#### Services

The services definition is retrieved solely from the NIS server. No local services are possible.

### **Linux Kernel Configuration**

No special kernel settings are required for the SAP Applications built on FlexPod landscape other than the ones mentioned in SAP note 1310037 for SLES 11 installations. The most important item to install is the sapconf (fka sapinit) package. This is done automatically when you select the pattern SAP Application Server Base during the SLES installation procedure.

## **Appendix B Installing Red Hat Enterprise Linux**

This section describes the creation of a VMware template for Red Hat Enterprise Linux (RHEL) 5.5.

The first sections ("OS Template Installation" and "Post-installation Activities") describe the standard OS installation and post-installation procedures required to install RHEL on a virtual machine.

The final section, "Preparing Red Hat for a Kickstart Installation on Bare Metal", focuses on an automated procedure that uses a predefined kickstart file.

### **OS** Template Installation

The standard RHEL installation procedure starts when the virtual machine (or physical server) is booted with the installation DVD mounted in the CD-ROM (physical or virtual) drive. The following lists the installation steps:



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5	Select English as the default language.
	🚱 RHEL5-Template on 192.160.99.59
	File Vew VM
	RED HAT
	ENTERPRISE LINUX 5
	What language would you like to use during the Installation process?
	Chinese(Simplified) (算佛中文)
	Chinese(Traditional) (累費中文)
	Croatian (Hrvatski)
	Czech (Čeština)
	Danish (Dansk)
	Dutch (Nederlands)
	English (English)
	Estonian (eesti keel)
	Finnish (suomi)
	French (Français)
	German (Deutsch)
	Greek (Ελληνικά)
	Gujarati (2928d)
	Belease Notes
6	Calactic Kayboard Jayout
Ŭ	
	Image: State on 192.168.99.59
	RED HAT
	ENTERPRISE LINUX 5
	Select the appropriate keyboard for the system.
	Slovenian
	Spanish
	Swedish
	Swiss French
	Swiss French (latin1)
	Swiss German
	Swiss German (latin1)
	Tamii (Inscript)
	Tamii (Typewriter)
	Turkish
	U.S. English
	U.S. International
	Ukrainian
	United Kingdom
	Belease Notes

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7	Skip the step of entering the installation number.	
	Installation Number	
	Would you like to enter an Installation Number (sometimes called Subscription Number) now? This feature enables the installer to access any extra components included with your subscription. If you skip this step, additional components can be installed manually later.	
	See http://www.redhat.com/InstNum/ for more information.	
	O Installation Number:	
	Skip entering Installation Number	
	<u>↓ Васк</u>	
8	Click Skip to acknowledge that you have skipped entering	ng the installation number.
	Skip If you cannot locate the Installation Number, consult http://www.redhat.com/InstNum/	
	<u>B</u> ack <u>Skip</u>	
9	Click Yes to initialize the disk.	
	Warning	
	The partition table on device sda (VMware Virtual disk 61436 MB) was unreadable. To create new partitions it must be initialized, causing the loss of ALL DATA on this drive.	
	This operation will override any previous installation choices about which drives to ignore.	
	Would you like to initialize this drive, erasing ALL DATA?	

10	From the drop-down list, select "Remove all partitions on selected drives and create default layout,"
	then select the "Review and modify partitioning layout" checkbox.
	Image: Second
	RED HAT ENTERPRISE LINUX 5
	Installation requires partitioning of your hard drive. By default, a partitioning layout is chosen which is
	reasonable for most users. You can either choose to use this or create your own.
	Remove all partitions on selected drives and create default layout.
	Encrypt system
	Select the drive(s) to use for this installation.
	Sda 61436 MB VMware Virtual disk
	Advanced storage configuration
	Review and modify partitioning layout
	Belease Notes
11	Click Yes to create the partition table.
	Warning
	You have chosen to remove all partitions (ALL DATA) on the following drives:
	sda (VMware Virtual disk 61436 MB)
	Are you sure you want to do this?
	<u>▶</u> No <u>Y</u> es

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	lisk layout.				
RHELS-Template on 192.160.5 File Vew VM	99.59				×
• • • • • • •	Ga 📫 🔂 😏				
RED HAT	SE LINUX 5	112		27.	
Drive	re /dev/sda (61436 MB) (Model: VMw	are Virtual disk)			
6133	34 MB				
New	Edit Delete	Reset	RAID	LVM	
Device	Mount Point/ RAID/Volume Type Format	Size (MB) Start End			-
✓ LVM Volume Groups✓ VolGroup00 LogVol00 LogVol01	6 / ext3 √ 5 swap √	51312 51328 9984	,		
Hard Drives     Hide RAID device/LVM	Volume Group members				•
Belease Notes			¢ 8	ack 🔯 <u>N</u> ext	1
Review the boot l	oader configuration				
RHELS-Template on 192.168.	99.59				×
File View VM					
	un 12 16 19				
RED HAT					
ENTERPRIS	SE LINUX 5	• •	-	- 1.4	
The GRUB boot loade     No boot loader will be	e installed on /dev/sda.				
You can configure the bo	oot loader to boot other operating syst	tems. It will allow y	ou to select an	operating system	
to boot from the list. To a change the operating sys	add additional operating systems, wh stem booted by default, select 'Defau	ult' by the desired o	tically detected perating system	, click 'Add.' To n.	
Default Label	Device			Add	
Red Hat Enterp	rise Linux Server /dev/VolGroup00/Lo	ogVol00		Edit	
				Delete	
	prevents users from changing options ou set a password.	s passed to the kerr	el. For greater	system security, it	
A boot loader password p is recommended that you Use a boot loader pas	ssword Change password				
A boot loader password j ls recommended that you Use a boot loader pas	boot loader options				
A boot loader password j is recommended that yo Use a boot loader pas	boot loader options				
A boot loader password j is recommended that yo Use a boot loader pas	boot loader options				

14	Select the Activate on Boot checkbox for all Ethernet interfaces.
	🔗 RHILS-Template on 192.160.99.59
	File Vew VM
	RED HAT
	ENTERPRISE LINUX 5
	Network Devices
	Active on Boot Device IPv4/Netmask IPv6/Prefix Edit
	eth0 DHCP Auto
	eth1 DHCP Auto
	Hastrame
	Set the hostname:
	automatically via DHCP
	O manually localhost.localdomain (e.g., host.domain.com)
	Miscellaneous Settings
	Gateway:
	Primary DNS:
	Secondary DNS
	Belease Notes
15	Select the time zone for your location.
	ØRHEL5-Template on 192.168.99.59 ■ 🛛
	File Yew VH
	RED HAT
	ENTERPRISE LINUX 5
	Please click into the map to choose a region:
	- The second
	and the second
	Europe/Berlin 🗘
	System clock uses UTC
	Belease Notes

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14	
10	Enter the root password twice.
	CRHELS-Template on 192.168.99.59
	File View VH
	RED HAT
	ENTERPRISE LINUX 5
	The root account is used for administering the system. Enter a passwort for the root user
	Root Password: ······
	Confirm:
	Belease Notes
17	Select Customize now and click Next.
	2 RHEL5-Template on 192.168.99.59
	File View VM
	RED HAT
	ENTERPRISE LINUX 5
	The default installation of Red Hat Enterprise Linux Server includes a set of software
	applicable for general internet usage. What additional tasks would you like your system to include support for?
	Software Development
	Web server
	You can further customize the software selection now, or after install via the software management application.
	Customize later Customize now
	Belease Notes

Select of deselect the GNO	ME of NDE desktop.
RHELS-Template on 192.168.99.59	
	>
RED HAT	UX 5
Desktop Environments Applications Development Servers Base System Languages	CNOME Desktop Environment
GNOME is a powerful, graphic icons, and a graphical file ma	cal user interface which includes a panel, desktop, system anager.
	32 of 38 optional packages selected
	<u>Sprional packages</u>
Betease Notes Select Development, select	Development Libraries and Development Tools, and click Next.
Belease Notes Select Development, select BHLS-Template on 192.166.99.59 Fie View Vie BLD HAT ENTERPRISE LIN	Development Libraries and Development Tools, and click Next.
Belease Notes Select Development, select BRILLS-Template on 192.164.99.59 File View VII BENTERPRISE LIN Desktop Environments Applications	Development Libraries
Belease Notes Select Development, select Belease Notes Select Development, select Belease Notes Complete on 192164.99.59 File View View Desktop Environments Applications Development Servers	Development Libraries
Belease Notes Select Development, select Belease Notes Select Development, select Belease on 192164.99.59 File View M Belease on 192164.99	Development Libraries UX 5 Sevelopment Libraries Constraints Const
Belease Notes Select Development, select Belease on 192,168,99,59 The View M Belease on 192,168,99,50 The View M Belease on 192,169,170 The View M Belease on 192,170 The View M Belease on 193,	Development Libraries UX 5 VX 5
Belease Notes Select Development, select Built S-Template on 1922 164.99.59 The Yeaw M Built P Construction RED HAT ENTERPRISE LIN Desktop Environments Applications Development Servers Base System Languages	Back   Development Libraries and Development Tools, and click Next.
Belease Notes Select Development, select Select Development, select Prevent Me Desktop Environments Applications Development Servers Base System Languages The packages in this group at	<image/>
Select Development, select	Development Libraries and Development Tools, and click Next.     UX 5     Development Libraries     Development Tools     Development

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## **Post-Installation Activities**

### **NIS Client Configuration**

The NIS client can easily be configured by using the graphical interface (GNOME). The following lists the steps to configure the NIS client.

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Authentication Co	onfiguration
User Information Authentication	Options
NIS	
Enable <u>N</u> IS Support	Configure NIS
LDAP	
Enable LDAP Support	Configure LDAP
Hesiod	
Enable <u>H</u> esiod Support	Configure H <u>e</u> siod
Winbind	
Enable <u>W</u> inbind Support	Configure Win <u>b</u> ind
	X Cancel
Enter + 0.02 company, com	man is a sthe NIS Domain and leave the NIS Server field emoty
OK to close the NIS Settings	window.
NIS Settings	×
NIE Domain (†002.compan	
Nis Domain (1002.compan	IV.Corp.nis
NIS <u>S</u> erver	
NIS <u>S</u> erver	
NIS <u>S</u> erver	<u>₽ ок</u>

6	Open a terminal	window.			
	RHELS-Template on 192.1	68.99.59			
	File View VM				
		A 🛛 🗟 🤣			
	Applications Places	System 😝		2:48 PM 🚳	
	Elle Edit Va	rootgt002-2	/8-lmc-		
	C [root@t002-2	8-lnx ~]#		P	
	rox		Ι		
	🛷 📑 root@t002-28-in	IX:~		9	
7	Open the file / e follows:	tc/nsswitch.con	f with an editor such as	vi and change the listed	lines as
	Passwd:	files nis			
	Shadow:files	nis			
	Group:	files nis			
	Hosts:	files dns			
	Services:files	nis			

## **DHCP Client Hook**

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To retain all necessary search domains in the /etc/resolv.conf file, a custom DHCP client hook is needed. Therefore the file /etc/dhclient-enter-hooks must be created with the following content.

Copy the function make\_resolv\_conf() from the original /sbin/dhclient-script to the file. Replace the if [ -n "\$SEARCH" ]; ... fi clause with the following:

```
if [ -z "$SEARCH" ]; then
    make_search $new_domain_name
fi
echo search $SEARCH >> $rscf
Add the following function to the file:
make_search() {
    domain_name=`dnsdomainname`
    if [ -z "$domain_name" ] ||
        [ "$domain_name" == "localdomain" ]; then
        domain_name=$1
```

```
fi
echo "using domain $domain_name..."
old search=`grep search /etc/resolv.conf`
old search="$old search $1"
new search=
for item in $old_search; do
 match=`echo $item | grep -o $domain_name`
  if [ -n "$match" ]; then
    already added=
    for added item in $new search; do
      if [ "$item" == "$added_item" ]; then
        already_added=1
     fi
    done
    if [ -z "$already added" ]; then
     new_search="$new_search $item"
    fi
  fi
done
SEARCH=$new_search
```

#### **Network Card Configuration**

Add the following line to /etc/sysconfig/network-scripts/ifcfg-eth1:

DHCP HOSTNAME=`hostname`

Delete the following line from /etc/sysconfig/network-scripts/ifcfg-eth0 and /etc/sysconfig/network-scripts/ifcfg-eth1:

HWADDR=....

#### **Linux Kernel Configuration**

No special kernel settings are required for the FlexPod on SAP Application landscape other than the ones mentioned in SAP note 1048303 for Red Hat Enterprise Linux 5 installations.

### **Preparing Red Hat for a Kickstart Installation on Bare Metal**

Instead of a manual installation of the OS, Red Hat supports an automated installation procedure (kickstart) that allows you to install not only the base operating system, but additional software components as well. Especially for the provisioning of bare metal servers, where the OS is to be installed on local (SAN) disks with the attendant difficulty of preparing a standard boot image, this is an easy method to standardize the installation process.

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To use the kickstart file listed in this section, the reference software must be in place.

The difference between automated installation and a standard installation is that in an automated installation all additional components and configuration steps have already been applied.

#### **ISO Images**

Copy ISO image RHEL 5.5 to the central software share on the central software vFiler unit.

Log in to a server in the infrastructure tenant with read/write permissions on the central software share. The default mountpoint on Linux operating systems is /mnt/software.

Create a new directory for the ISO images:

Mkdir /mnt/software/ISO

Copy the required ISO images to the new directory:

Cp /tmp/rhel-server-5.5-x86-\_64-dvd.iso /mnt/software/ISO/rhel-server-5.5-x86\_\_64-dvd.iso

#### **Required Software**

The kickstart files refer to software components on the software share /mnt/software. To use the kickstart file as shown, the software components must be found at the following locations:

- /mnt/software/SMT\_Software/SDU/netapp.snapdrive.linux\_4\_2.rpm
- /mnt/software/SMT\_Software/SMSAP/netapp.smsap.linux-x64-3.1.bin
- /mnt/software/SMT\_Software/SMSAP/snapmanager
- /mnt/software/SMT\_Software/SMSAP/ORADBUSR.SQL
- /mnt/software/SMT\_Software/SMSAP/os\_db\_authentication.sh
- /mnt/software/ACC/hostagent7.2L.tgz
- /mnt/software/ACC/installsapinit.sh
- /mnt/software/scripts/flexpod\_config

#### **Kickstart File for RHEL 5.5**

Create a new directory on the central software share:

Mkdir /mnt/software/RHEL

Create a new kickstart file in the new directory:

vi /mnt/software/RHEL/rhel55.ks

Add the following lines to the new kickstart file:

```
START OF SAMPLE KICKSTART
# Kickstart file automatically generated by anaconda.
install
nfs --server=192.168.96.10 --dir=/vol/software/ISO
key --skip
lang en_US.UTF-8
keyboard us
network --device eth0 --bootproto dhcp
network --device eth1 --bootproto dhcp --hostname `hostname`
rootpw --iscrypted $1$BCDPox75$CyI4U56yKfDkd5E/lCQrh.
firewall --enabled --trust eth0 --trust eth1
authconfig --enableshadow --enablemd5 --enablenis --nisdomain=company.corp.nis
selinux --permissive
reboot
timezone --utc Europe/Berlin
bootloader --location=mbr --driveorder=sda --append="rhgb quiet"
# The following is the partition information you requested
# Note that any partitions you deleted are not expressed
# here so unless you clear all partitions first, this is
```

# not guaranteed to work

```
%include /tmp/part-include
%packages
@base
@core
@development-libs
@development-tools
@editors
@legacy-software-development
@legacy-software-support
@printing
@base-x
@gnome-desktop
iscsi-initiator-utils
fipscheck
device-mapper-multipath
sgpio
python-dmidecode
imake
openssl097a
compat-open1dap
xorg-x11-utils
xorg-x11-server-Xvfb
-emacs-leim
-psgml
-emacspeak
%post
#!/bin/bash
. /etc/bashrc
( # for logging purpose
echo "BEGIN: KICKSTART POST PROCEDURE"
echo "BEGIN: Prepare eth1 setup"
cat > /etc/sysconfig/network-scripts/ifcfg-eth1 <<EOF</pre>
DEVICE=eth1
BOOTPROTO=dhcp
DHCP HOSTNAME=`hostname`
ONBOOT=yes
EOF
echo "Bring up eth1"
ifconfig eth1 up
dhclient eth1 -H `hostname`
echo "Start portmap"
/etc/init.d/portmap start
echo "END : Prepare eth1 setup"
echo "BEGIN: MKDIR and MOUNTS"
mkdir /mnt/software
mkdir /mnt/data
mkdir /mnt/backup
sleep 2
echo "Mount"
/bin/mount <<var software ip>>:/vol/software /mnt/software
sleep 1
/bin/mount
echo "END : MKDIR and MOUNTS"
echo "BEGIN: NetApp SDU SnapDrive"
rpm -ivh /mnt/software/SMT Software/SDU/netapp.snapdrive.linux 4 2.rpm
echo "use-https-to-filer=off" >> /opt/NetApp/snapdrive/snapdrive.conf
echo "snapcreate-check-nonpersistent-nfs=off" >> /opt/NetApp/snapdrive/snapdrive.conf
echo "autosupport-enabled=off" >> /opt/NetApp/snapdrive/snapdrive.conf
```

```
echo "END : NetApp SDU SnapDrive"
echo "BEGIN: NetApp SnapManager for SAP"
/mnt/software/SMT Software/SMSAP/netapp.smsap.linux-x64-3.1.bin <<EOF</pre>
root
root
1
EOF
echo "auto support.on=off" >> /opt/NetApp/smsap/properties/smsap.config
cp /mnt/software/SMT Software/SMSAP/snapmanager /etc/pam.d/snapmanager
cp /opt/NetApp/smsap/plugins/examples/clone/create/post/*activities.sh
/opt/NetApp/smsap/plugins/clone/create/post/
cp /opt/NetApp/smsap/plugins/examples/clone/create/post/os db auth*.sh
/opt/NetApp/smsap/plugins/clone/create/post/
cp /mnt/software/SMT Software/SMSAP/ORADBUSR.SQL
/opt/NetApp/smsap/plugins/clone/create/post/
cp /mnt/software/SMT_Software/SMSAP/os_db_authentication.sh
/opt/NetApp/smsap/plugins/clone/create/post/
echo "END : NetApp SnapManager for SAP"
echo "BEGIN: SAP Hostagent "
cd /tmp
tar -xf /mnt/software/ACC/hostagent7.2L.tgz
groupadd sapsys
useradd -q sapsys sapadm
cd /tmp/hostctrl
cp -fp /mnt/software/ACC/installsapinit.sh .
./saphostexec -install
echo "END : SAP Hostagent "
echo "BEGIN: FlexPod bootscript config "
mkdir /opt/NetApp/FlexPod
sleep 1
cp /mnt/software/scripts/flexpod config /etc/init.d
/sbin/chkconfig --add flexpod config
echo "END : FlexPod bootscript config "
echo "END : KICKSTART POST PROCEDURE"
%pre
#!/bin/bash
# VMs may have different device name for 1st hdd
if [ -b /dev/vda ]; then
        disk=vda
        disk2=vda
elif [ -b /dev/mapper/mpath0 ]; then
        disk=mapper/mpath0
        disk2=dm-0
elif [ -b /dev/sda ]; then
        disk=sda
        disk2=sda
fi
# decide whether to use LVM or not (size < 40gb ==> no LVM)
size=$(grep "$disk2$" /proc/partitions | awk '{ print $3 }')
if [ -z "$size" ]; then
        echo "E: could not get size of installation disk"
        exit 1
fi
```

```
if [ "$size" -gt 40000000 ]; then
        # lvm setup, 100m /boot, 2g swap, 10g root
        cat > /tmp/part-include <<-EOF
                bootloader --location=mbr --append=selinux=0
                clearpart --all --initlabel --drives=$disk
                part /boot --fstype ext3 --size 100
                part pv.01 --size 1000 --grow --ondisk=$disk
                volgroup vg0 pv.01
                loqvol swap --fstype swap --name=swap --vqname=vq0 --size=40000
                loqvol / --fstype ext3 --name=root --vqname=vq0 --size=10000
        EOF
else
        # small disk, use one big plain parititon, no swap
        cat > /tmp/part-include <<-EOF
                bootloader --location=mbr --append=selinux=0
                clearpart --all --initlabel --drives=$disk
                part / --fstype ext3 --size 100 --grow
        EOF
fi
%end
%end
```

# **Appendix C Configuring PXE Boot with SuSE Linux Enterprise Server**

This Appendix explains the process of configuring a PXE boot process for the SAP Application built on FlexPod environment. The goal of this configuration is to support the use of physical blades in almost the same way as booting a virtual machine.

The following overview summarizes the procedure:

- 1. For every server that should be used as a physical blade in a tenant, a dedicated server profile must be created, except that in this case the servers are configured diskless and they boot by using the storage LAN NIC.
- 2. Because network traffic is isolated in a tenant, the PXE boot server is configured in a tenant. The tenant-specific services VM with dnsmasq is used for a TFTP service that assigns the MAC address of the created server to an IP address and OS image.
- **3.** The OS image must be provisioned from the vFiler unit in a tenant. Once created globally, an OS image needs only minor adaptations in a given tenant. As usual with PXE boot, the image is mapped 1:1 to a server profile by using the MAC addresses.

This three-step procedure assumes that an OS image has already been created in such a way that it includes all the tools and procedures to be started by means of PXE boot and all the features and tools that are required for the SAP Application built on FlexPod environment.

### **Creating a Server Profile**

Most of the settings and definitions in the Cisco UCS Manger can be reused. Only new settings are covered in this section.

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#### **Creating Required Policies**

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To simplify the server profile creation, you must create the following policies:

- No local storage usage
- Boot using storage LAN (eth1)

The following describes the steps to create the required boot policies.



Select Create Local Disk and save the settings.	Configuration Policy, enter a name, select No Local Storage	for the mod
🌲 Create Local Disk Confi	guration Policy	
Create Local Di	sk Configuration Policy	
Name:	PXE-No-Storage	
Description:	No Local Storage	
Mode:	No Local Storage 🔹	
Protect Configuration:		
If Protect Configura	tion is set, the Local Disk Configuration is preserved on disassociation.	
if the new Local Disk Co	onfiguration is different.	

## Create a Service Template

The following describes the steps to create a service template that can be used to provision service profiles for a tenant.

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Create Service Profile Template	Computing System Managar	
Create Service Profile Template	Storage Optionally specify disk policies and SAN configuration information.	
Templake     Templake     Yorrang     Yorrang	Select a local disk configuration policy. Local Storage Protect Configuration is estimate the local Disk Configuration is preserved on disassociation. On reasociation of the same Server, a configuration error will be raised if the new Local Disk Configuration is different. How would you like to configure SAN connectivity? Simple Expert No VHBAS This server associated with this service profile will not be connected to a storage area network.	

Server Bool Computing System Manager         •	nection Policy VLAN
Create Service Profile       Image: Service Profile       Optionally specify LAN configuration information.         1       Image: Service Profile       Optionally specify LAN configuration information.         2       ✓ Storage       Optionally specify LAN configuration information.         3       Image: Metworking       Optionally specify LAN configuration information.         4       Image: Metworking       Image: Metworking         4       Image: Metworking       Image: Metworking         5       Server Root Order       Image: Metworking       Image: Metworking         6       Maintenance Policy       Select a Policy to use (no Dynamic VNIC Policy by default)       Image: Create Dynamic VNIC Connection Policy:         7       Server Root Order       Image: Metworking       Simple Image: Create Dynamic VNIC Connection Policy:         8       Operational Policies       How would you like to configure LAN connectivity?       Simple Image: Create Dynamic VNIC Connection Policy:         1       Marce       MAC Address       Fabric ID       Native V         1       Name       MAC Address       Fabric ID       Native V	nection Policy
Isomolate.         2. ✓ Storage         3. ✓ hetworking         4. △ MIC/MBA Placement.         5. △ Server Boot Order.         6. → Maintenance Policy.         7. △ Server Assignment.         8. → Operational Policies    Click Add to specify one or more vNICs that the server should use to connect to the LAN.          Name       MAC Address       Fabric ID       Native V	VLAN
6. ☐ Mantenance Policy. 7. ☐ Server Assignment 8. ☐ Operational Policies Click Add to specify one or more vNICs that the server should use to connect to the LAN. Name MAC Address Fabric ID Native V @ Delete ▲ Add ▲ Modify	VLAN
Name MAC Address Fabric ID Native 4	VLAN
Delete 🏊 Add 🔚 Modify	

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and the second se				
Name: eth0		MAC Address		
Use LAN Connectivity Te	emplate: 🗖	MAC Address As:	signment: MAC_Pool_A(194)	(200)
		🕂 Create MAG	I Pool	
Construction Construction	h-	The MAC addres	se uill be outomotically assign	ad from the colocted peo
	ice	The MAC addres	ss will be automatically assign	lea from the selected poo
Fabric ID: 💽 Fabric A	A 🔘 Fabric B	Enable Failover		
VIANS				
			1	
Select		IName		
	Kei Toʻ	mote_span	0	
	TO	D1-Application	0	
	100		6	
	100	JZ-ALLESS	-	<b>T</b>
Create VLAN MTU: 1500 Pin Group: <not set=""></not>	, <b>,</b>	🕂 Create LAN Pin Group		
Create VLAN     MTU: 1500     Pin Group: <not set<="" td=""><td>&gt;</td><td>Create LAN Pin Group</td><td></td><td></td></not>	>	Create LAN Pin Group		
Create VLAN     MTU: 1500     Pin Group: <not operational="" parar<="" set:="" td=""><td>&gt; v</td><td>+ Create LAN Pin Group</td><td>_</td><td>8</td></not>	> v	+ Create LAN Pin Group	_	8
Create VLAN     MTU: 1500     Pin Group: <not operational="" paran<="" set="" td=""><td>&gt;</td><td>+ Create LAN Pin Group</td><td>_</td><td>8</td></not>	>	+ Create LAN Pin Group	_	8
Create VLAN MTU: 1500 Pin Group: <not adapter="" operational="" paran="" performance<="" set:="" td=""><td>neters e Profile</td><td>🕂 Create LAN Pin Group</td><td></td><td>8</td></not>	neters e Profile	🕂 Create LAN Pin Group		8
Create VLAN MTU: 1500 Pin Group: <not adapter="" operational="" parar="" performanc<="" set:="" td=""><td>• • •</td><td>Create LAN Pin Group</td><td>ant Adapter De<sup>t</sup>ru</td><td>8</td></not>	• • •	Create LAN Pin Group	ant Adapter De <sup>t</sup> ru	8
Create VLAN MTU: 1500 Pin Group: <not adapter="" operational="" parar="" performanc="" policy:<="" set:="" td=""><td>e Profile</td><td>+ Create LAN Pin Group</td><td>net Adapter Policy</td><td>8</td></not>	e Profile	+ Create LAN Pin Group	net Adapter Policy	8
Create VLAN MTU: 1500 Pin Group: <not adapter="" operational="" parar="" performanc="" policy:="" policy:<="" qos="" set:="" td=""><td>Profile</td><td>Create LAN Pin Group     Greate Ether     Greate QoS F</td><td>net Adapter Policy Policy</td><td>8</td></not>	Profile	Create LAN Pin Group     Greate Ether     Greate QoS F	net Adapter Policy Policy	8

Name: eth1	ctivity Template C Template	abric B 🔽 Enable	MAC Address A MAC Address A Create MA The MAC addre	ssignment: MAC_Pool_B(194; C Pool ess will be automatically assign	200) ned from the selected pr
VLANs					
	Select	T002 A**	Name	Native VLAN	<b></b>
		T002-Applical	ion d	0	<b>_</b>
		T002-March	9	0	<b></b>
		T003-Access	8	Ö	
Pin Group: Operation	al Parameters	▼ 🕂 Create	e LAN Pin Group		8
Adapt Q	er Policy: Linux O oS Policy: MTU9	•	<ul> <li>Create Ethe</li> <li>Create QoS</li> </ul>	rnet Adapter Policy Policy	

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	omputing	System	Manager	_	
Create Service Profile Template 1. ✓ <u>Identify Service Profile</u> Template	VNIC/vHBA Placem Specify how vNICs and v VNIC/vHBA Placement specifies how v	<b>tent</b> HBAs are placed on phys /NICs and vHBAs are placed o	ical network interface ca physical network interface (i	rds mezzanine) cards	_
2. ✓ <u>Storage</u> 3. ✓ <u>Networking</u> 4. ✓ <u>vNIC/vHBA Placement</u> 5. □ <u>Server Boot Order</u> 6. □ <u>Maintenance Policy</u>	in a server hardware configuration in Select Placement: Let System Pe	dependent way. srform Placement 💌 💽 🗲 C	reate Placement Policy		
7. Dispersion Server Assignment 8. Dispersional Policies	System will perform automatic p	lacement of vNICs and vHBAs	based on PCI order.		
	Name	Address	Order	<b>1</b>	
	VNIC eth0	derived	1		
				×	
	Move Lin	🕶 Move Down 🛛 👚 Delete	C Reorder Modify		

Unified	Computing	g Syst	em Ma	nager		=	
Create Service Profile Template  1.   1.   1.   1.   1.   1.   1.   1.	Server Boot Ord Optionally specify the Select a boot policy. Boot Policy: PK_SUSE Nam Descriptio Reboot on Boot Order Chang Note: reconfiguration of boot Enforce vNIC/vHBA Nam WARNINGS: The type (primary/Secondary The effective order of boot d If Enforce vNIC/vHBA Nam If it is not selected, the vNIC Boot Order Boot Order Name Call AN	e: PXE_SUSE e: PXE_SUSE n: Lan Boot Suse e: yes devices will always co e: yes ) does not indicate a the evices within the same ne is selected and the s/vHBAs are selected rt is Print i Order 1	s service profile te Create Boot Policy use a reboot on non- oot order presence. device class (LAN/SI vNLC/vHBA does not they exist, otherwis vNLC/vHBA	virtualized adapters orage) is determine exist, a config error e the vNIC/VHBA wi	. will be reported. th the lowest PCIe but Lun ID	rder. us scan order is WW/N	: used.
	LAN eth1		eth1	primary			×

## **Create Service Profiles from the Template**

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The following describes the steps to create the service profiles from the template.



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## **Required Storage Layout**

To support the PXE boot process and simplify maintenance, the storage layout shown in Figure 1 should be used.



To configure PXE boot, each tenant must have the following volumes:

- Tnnn-tftp. This volume holds all required information for the TFTP server, such as Initrd, vmlinuz, and additional configurations. This volume is mounted from the tenant-specific services VM that must be configured as the TFTP server.
- Tnnn-osmaster. This is the osmaster image that a server must boot. It is considered to be tenant specific to allow tenant-specific adaptations. The osmaster volume must have two qtrees, one for the OS itself, the other for the swap area. The naming convention can be used to identify the kernel release. In the example, Rel 2.6.32.49 results in:
  - /vol/t001-osmaster/sles\_263249\_001
  - /vol/t001-osmaster/swap\_263249\_001
- Tnnn-OS-server or servers. Each PXE server that must be booted is assigned to a specific volume in a tenant.

The infrastructure tenant volumes are considered to be "golden images." All of the tenant-specific volumes are based on clones from this master copy. The server-specific OS volumes in a tenant are also clones of the tenant-specific OS master image.

To focus on the PXE boot configuration, this appendix assumes that the storage has been created and is available for NFS mount in the tenant.

## **Golden Image Creation**

In the example configuration, the golden image creation occurs in the infrastructure tenant. It is also possible to create a dedicated test tenant in which all of the golden image preparation steps can be applied. This test tenant can also be used for SAP installation and other administrative tests. The rest of this appendix uses the infrastructure tenant.

The following steps are required to create the golden image:

- 1. Extract the SuSE DVD.
- 2. Mount the golden TFTP and osmaster volumes.
- 3. Prepare the TFTP boot volume
- 4. Configure dnsmasq
- 5. Install Linux

#### **Extract the SuSE DVD**

On the software vFiler unit, create a folder to hold the SuSE installation DVD. It is assumed that DVD.iso is copied to /mnt/software/SLES.

```
T001-0-lnx:~ # cd /mnt/software/SLES
T001-0-lnx:~ # mkdir ISO
T001-0-lnx:~ # mount -o loop SLES-11-SP1-DVD-x86_64-GM-DVD1.iso ISO
T001-0-lnx:~ # mkdir SLES11
T001-0-lnx:~ # cp ISO/* SLES11/
```

#### Mount the Golden TFTP and Osmaster Volumes

Create the folder structure and mount the volumes:

T001-0-lnx:~ # mkdir /NetApp
T001-0-lnx:~ # mkdir /NetApp/osmaster
T001-0-lnx:~ # mkdir /NetApp/tftpboot
T001-0-lnx:~ # mount -t nfs software:/vol/t001-osmaster /NetApp/osmaster
T001-0-lnx:~ # mount -t nfs software:/vol/t001-tftp /NetApp/tftpboot
T001-0-lnx:~ # ln -s /NetApp/tftpboot /tftpboot

#### **Prepare the TFTP Boot Volume for the First Installation**

To start the SLES installation by means of PXE boot, you must prepare the tftpboot folder for the first installation: pxelinux.0 must be copied from an existing Linux installation (such as the tenant-specific services VM) and the boot configuration files must be created.

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```
T001-0-lnx:~ # cp /usr/share/syslinux/pxelinux.0 /tftpboot
T001-0-lnx:~ # cd /mnt/software/SLES/ISO/boot/x64_64/loader
T001-0-lnx:~ # cp initrd /tftpboot/initrd-iso
T001-0-lnx:~ # cd /tftpboot
T001-0-lnx:~ # cd /tftpboot
T001-0-lnx:~ # mkdir pxelinux.cfg
T001-0-lnx:~ # cd pxelinux.cfg/
T001-0-lnx:~ # vi default
T001-0-lnx:~ #
The default configuration must contain the following:
# SAP UCS PXE Boot Definition
```

display ../boot.msg default Install

##

```
#
prompt 1
timeout 10
LABEL Install
     KERNEL linux-iso
     APPEND initrd=initrd-iso
install=nfs://192.168.96.10:/vol/software/SLES/SLES11/?device=eth1
Create the file boot.msg:
T001-0-lnx:~ # cd /tftpboot/
T001-0-lnx:~ # vi boot.msg
T001-0-lnx:~ #
The content should be:
******
###############
#####
                                                     #####
##
                      CISCO Systems Inc.
                                                       ##
##
                  SAP Applications built on FlexPod
#####
                                                     #####
################
*******
```

#### **Configure dnsmask**

Dnsmask is already used for DNS and DHCP. The extension to enable tftpboot is quite simple.

To adapt the configuration file /etc/dnsmasq.conf, insert these lines:

#
# Activate MAC address based ip's
#
read-ethers
Also enter the tfpt boot activation at the end of the file:

enable-tftp
tftp-root=/tftpboot
dhcp-boot=pxelinux.0
tftp-no-blocksize
If you have not yet enabled the infrastructure tenant dhcp functionality, dnsmasq.conf should also
contain:

```
# 1: Subnet Mask
dhcp-option=1,255.255.255.0
```

```
# 3: Router (default gateway)
dhcp-option=tag:access,3,192.168.99.1
dhcp-option=tag:backend,3
```

```
# 6: Domain Name Server
#dhcp-option=tag:access,6,192.168.99.50
#dhcp-option=tag:backend,6,192.168.101.50
dhcp-option=6,192.168.99.50
```

```
# 119: DNS domain search list
dhcp-option=119,t001.company.corp,bknd.t001.company.corp
```

Create or add the file /etc/ethers. Here you need the MAC addresses of your service profile:

00:25:B5:44:A0:5F 192.168.99.51 00:25:B5:44:B0:4F 192.168.101.51 Add the appropriate hostnames to the file /etc/hosts, assuming that t001-1-lnx is the host name: # PXE Boot pairs 192.168.99.51 t001-1-lnx.t002.company.corp t001-1-lnx

#### **Install SuSE Linux**

With these settings in place, the server profile is ready to boot the SuSE installation. The following describes the PXE boot-specific installation steps.

I

```
Assign the service profile to a blade, start the KVM, and boot the system. The following boot message appears.

CLIENT MAC ADDR: 00 25 B5 FA BA 3F GUID: 1616FC94-B44C-11E0-0022-000000000004F CLIENT IF: 192.168.202.10 MASK: 255.255.255.0 DHCP IF: 192.168.202.5

PXELINUX 3.82 3.82 Copyright (C) 1994-2009 H. Peter Anvin et al tFXE entry point found (we hope) at 9A91:00CC via plan A UNDI code segment at 9A91 len 0AF0 UNDI data segment at 9A91 len 0AF0 UNDI code segment at 9A91 len 0AF0 UNDI code segment at 9A92 len 06D4 Getting cached packet 01 02 03 My IF address seems to be COA0CA0A 192.168.202.10 ip=192.168.202.10 Sol.0.0.0:255.255.255.0 TFTT prefix:

Trying to load: pxelinux.cfg/1616fc94-b44c-11e0-0022-000000000004f Trying to load: pxelinux.cfg/0A08CA0A Trying to load: pxelinux.cfg/C0A0ACA0A Trying to load: pxelinux.cfg/C0A8CAA Trying to load: pxelinux.cfg/C0A8CA Trying to load: pxelinux.cfg/C0A8CA8 Trying
```

192.168.101.51 t001-1-lnx.bknd.t002.company.corp

You must add the volu mount it as root. (The	ume /vol/t001-osma screenshot shows differ	ster/sl ent values	les_263249_ 3.)	001 from the	e vFiler u
SUSE Linux		<b>B</b>			
Enterprise	System View	NES Sha	File System (NFS)	nas	
Preparation	- 🤷 Hard Disks				
Velcome	🔂 RAID	Server 192.168.202.2	201 /vol/osmaster	Mount Point	NFS Type nfs
<ul> <li>System Analysis</li> <li>Time Zone</li> </ul>	Volume Management				
Installation					
Server Scenario	NFS				
Installation Summary	Unused Devices				
Perform Installation	YaST2				
Configuration	NFS Server Hostname B	emote Directory			
Check Installation	192.168.202.201 ▼ Choose //	vol/osmaster	Select		
<ul> <li>Hostname</li> <li>Network</li> </ul>	Mount Point (local)				
Customer Center	1		Browse		
<ul> <li>Online Update</li> </ul>	Options				
Service     Clean Un	defaults				
Release Notes		ancel <u>H</u> elp			
Hardware Configuration	· · · · · · · · · · · · · · · · · · ·				
					•
		A <u>d</u> d Ed <u>i</u> t	t Dele <u>t</u> e		
	Itala			Abort Ba	ck Accopt

#### Create the nfsroot initrd

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At this point, the newly created initrd must be customized for a PXE boot.

Initially, kernel version 2.6.32.12 is installed.

1. Mount the newly created OS master, copy the initrd to the tftpboot folder, and unpack it in a temporary folder.

```
T001-0-lnx:/tftpboot # mount -t nfs 192.168.99.10:/vol/t001-osmaster/sles_263249_001
/NetApp/osmaster
T001-0-lnx:/tftpboot # cd /NetApp/osmaster/boot
T001-0-lnx:/tftpboot # cp initrd-2.6.32.12-0.7-default
/tftpboot/initrd-2.6.32.12-0.7-default.gz
T001-0-lnx:/tftpboot # cp vmlinuz-2.6.32.12-0.7-default /tftpboot/
T001-0-lnx:/tftpboot # cd /tftpboot
T001-0-lnx:/tftpboot # gunzip initrd-2.6.32.12-0.7-default.gz
T001-0-lnx:/tftpboot # dury initrd-2.6.32.12-0.7-default.gz
T001-0-lnx:/tftpboot # cd tmp_12
T001-0-lnx:/tftpboot # cd tmp_12
T001-0-lnx:/tftpboot/tmp 12 # cpio -idumf < ../initrd-2.6.32.12-0.7-default</pre>
```

. . .

2. Edit run\_all.sh in the unpacked initrd and change the following sections to reflect the location of the boot image.

```
. .
source boot/02-start.sh
[ "$modules" ] && load modules
[ "$debug" ] && echo preping 03-storage.sh
[ "$fallback_rootdev" ] ||
fallback rootdev='192.168.101.10:/vol/t001-osmaster/sles 263249 001 '
[ "$rootdev" ] || rootdev='192.168.101.10:/vol/t001-osmaster/sles_263249_001 '
[ "$rootfsopts" ] || rootfsopts='defaults'
. .
[ "$debug" ] && echo preping 12-network.sh
[ "$nettype" ] || nettype='dhcp'
[ "$ip" ] || ip='::::eth1:none'
[ "$interface" ] || interface='eth1'
[ "$macaddress" ] || macaddress=''
[ "$drvlink" ] || drvlink=''
if [ "$interface" -o "$dhcp" -o "$ip" -o "$nfsaddrs" -o "$drvlink" ]; then
modules=" af_packet $bonding_module"
. . .
. .
[ "$debug" ] && echo running 82-resume.kernel.sh
source boot/82-resume.kernel.sh
[ "$modules" ] && load modules
[ "$debug" ] && echo preping 83-mount.sh
[ "$rootdev" ] || rootdev='192.168.101.10:/vol/t001-osmaster/sles 263249 001 '
if [ ! "$root_already_mounted" ]; then
[ "$debug" ] && echo running 83-mount.sh
source boot/83-mount.sh
[ "$modules" ] && load modules
3. Recreate the new initrd.
T001-0-lnx:/tftpboot/tmp_12 # find . |cpio --create --format='newc' >
../initrd nfsroot 2.6.32.12-cisco
31301 blocks
T001-0-lnx:/tftpboot/tmp_12 # cd ..
mgmtsrv02:/tftpboot # gzip -9 initrd_nfsroot_2.6.32.12-cisco
mgmtsrv02:/tftpboot #
4. In the mounted OS image, disable the network resources during shutdown; otherwise the system will
    not shut down completely.
T001-0-lnx: # cd /NetApp/osmaster/etc/init.d/rc3.d
T001-0-lnx:/NetApp/osmaster/etc/init.d/rc3.d # rm K04nfs K07network K05rpcbind
T001-0-lnx:/ NetApp/osmaster/etc/init.d/rc3.d # cd ../rc5.d
T001-0-lnx:/ NetApp/osmaster/etc/init.d/rc5.d # rm K04nfs K07network K05rpcbind
T001-0-lnx:/ NetApp/osmaster/etc/init.d/rc5.d #
5. Disable the cups daemon, smartd, samba fs, splash, kernel dump, and raid-manager.
T001-0-lnx:~ # chkconfig cups off
T001-0-lnx:~ # chkconfig smartd off
T001-0-lnx:~ # chkconfig smbfs off
T001-0-lnx:~ # chkconfig splash off
T001-0-lnx:~ # chkconfig boot.kdump off
T001-0-lnx:~ # chkconfig boot.md off
T001-0-lnx:~ # chkconfig boot.cycle off
T001-0-lnx:~ # chkconfig postfix off
6. Extend the PXE default configuration to include the new kernel (initrd, vmlinuz).
```

```
T001-0-lnx:~ # cd /tftpboot/pxelinux.cfg/
T001-0-lnx:~ # vi default
T001-0-lnx:~ #
```

7. Add the following lines, so that the final default content is:

```
# SAP UCS PXE Boot Definition
display ../boot.msg
#default Install
default SLES11 12
prompt 1
timeout 10
LABEL Install
        KERNEL linux-iso
        APPEND initrd=initrd-iso
install=nfs://192.168.96.10:/vol/software/SLES/SLES11/?device=eth1
LABEL SLES11 12
        KERNEL vmlinuz-2.6.32.12-0.7-default
        APPEND initrd=initrd nfsroot 2.6.32.12-cisco.qz rw
rootdev=192.168.101.10:/vol/t001-osmaster/sles 263249 001 rootfsopts=default
ip=:::::dhcp
8. Reboot the system to activate the kernel.
```

#### **Online Update**

The process described throughout this document assumes that an online update is performed to reach the most recent kernel version (currently 2.6.32.49). While online, you must apply an online update. Depending on your network scenario, you may have to adjust the proxy settings.

After the online upgrade, do not reboot. Instead, apply the similar steps previously described to adapt the initrd and PXE boot configuration for the new kernel.

From the KVM, reboot the system to activate the new kernel. If everything is fine, the OS master image must be cleaned of temporary files.

Clean up the OS master image:

```
T001-0-lnx:/ # cd /NetApp/osmaster
T001-0-lnx: /NetApp/osmaster # rm -rf tmp/*
T001-0-lnx: /NetApp/osmaster # rm -rf tmp/.*
rm: cannot remove `.' directory `tmp/.'
rm: cannot remove `..' directory `tmp/..'
T001-0-lnx: /NetApp/osmaster # cd var/log
T001-0-lnx: /NetApp/osmaster/var/log # rm *
rm: cannot remove `ConsoleKit': Is a directory
rm: cannot remove `YaST2': Is a directory
rm: cannot remove `apparmor': Is a directory
rm: cannot remove `audit': Is a directory
rm: cannot remove `cups': Is a directory
rm: cannot remove `gdm': Is a directory
rm: cannot remove `krb5': Is a directory
rm: cannot remove `news': Is a directory
rm: cannot remove `puppet': Is a directory
rm: cannot remove `sa': Is a directory
rm: cannot remove `samba': Is a directory
rm: cannot remove `zypp': Is a directory
T001-0-lnx: /NetApp/osmaster/var/log # rm ConsoleKit/* YaST2/* apparmor/* audit/* cups/*
qdm/* krb5/* news/* puppet/* sa/* samba/* zypp/*
rm: cannot remove `apparmor/reports': Is a directory
rm: cannot remove `apparmor/reports-archived': Is a directory
rm: cannot remove `apparmor/reports-exported': Is a directory
```

```
rm: cannot remove `krb5/*': No such file or directory
rm: cannot remove `puppet/*': No such file or directory
rm: cannot remove `samba/*': No such file or directory
T001-0-lnx: /NetApp/osmaster1/var/log #
T001-0-lnx:/NetApp/osmaster1/var/log # cd ../../etc
At this point, all of the FlexPod specific installations and configurations as described throughout the VM
template creation process must have been applied. See section "Installation of Additional Software
Components" for details.
```

After all steps have been tested and the cleanup procedures described in section "Converting the Virtual Machine to a Template" have been performed, create a golden Snapshot copy of the osmaster image and the tftpboot volume. Create the Snapshot copy by using the snap create command (with the desired options) at the command line of the controller that contains the volumes.

This Snapshot copy must be used to create the template volumes for each tenant.

## **Preparation for PXE Boot in a Tenant**

At this point it is assumed that the new tenant has clones of the tftpboot and osmaster images with the following names:

- Tnnn-tftpboot
- Tnnn-osmaster

In a new tenant, the preparations for the PXE boot must be done similarly to the steps described in "Golden Image Creation," earlier in this appendix. The following is a general checklist:

- 1. Mount the tnnn-tftpboot in the tenant /tftpboot folder.
- 2. Configure dnsmasq to enable tftpboot.
- **3.** Configure a tenant service profile template and create the required number of service profiles. Note the MAC address for each of the service profiles that you create.
- 4. Edit the /etc/ethers and /etc/hosts files to define the host names and IP addresses for the newly created service profiles.

#### Based on this checklist, the following additional steps must be performed:

Clone the Osmaster for Each of the Servers

Based on the mapped MAC-to-IP address, calculate the ex IP for each server (storage LAN).

If the IP for server T002-1-lnx is 192.168.102.44:

 Using the MAC address 00:25:B5:44:A0:2F, run the command gethostip 192.168.102.44, resulting in 192.168.102.44 192.168.102.44 C0A8662C>

The hex IP is used to create a unique name for the OS master volume. Create a clone of the OS template and name it as the hex IP. This name is unique through the whole infrastructure.

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#### Adapt the tftpboot Configuration

The tftp boot configuration must be adapted so that every server can find its own image.

```
T002-0-lnx:/tftpboot # cd pxelinux.cfg/
T002-0-lnx:/tftpboot/pxelinux.cfg # cat default
# SAP UCS PXE Boot Definition
display ../boot.msg
```

```
#default Install
default SLES11_49
prompt 1
timeout 10
LABEL Install
        KERNEL linux-iso
        APPEND initrd=initrd-iso
install=nfs://192.168.96.10:/vol/software/SLES/SLES11/?device=eth1
LABEL SLES11 12
        KERNEL vmlinuz-2.6.32.49-0.3-default
        APPEND initrd=initrd nfsroot 2.6.32.49-cisco.gz rw
rootdev=192.168.101.10:/vol/osmaster/sles 263249 001 rootfsopts=default ip=:::::dhcp
T002-0-lnx:/tftpboot/pxelinux.cfg # cp default C0A8662C
T002-0-lnx:/tftpboot/pxelinux.cfg # vi C0A8662C
# SAP UCS PXE Boot Definition
display ../boot.msg
#default Install
default SLES11 49
prompt 1
timeout 10
LABEL Install
        KERNEL linux-iso
        APPEND initrd=initrd-iso
install=nfs://192.168.96.10:/vol/software/SLES/SLES11/?device=eth1
LABEL SLES11_49
        KERNEL vmlinuz-2.6.32.49-0.3-default
        APPEND initrd=initrd nfsroot 2.6.32.49-cisco.qz rw
rootdev=192.168.102.10:/vol/COA8662C /sles_263249_001 rootfsopts=default ip=::::::dhcp
OS VOLUME=C0A8662C
T002-0-lnx:/tftpboot/pxelinux.cfg #
```

### **First Boot**

Before you can boot the server for the first time, the individual swap file must be configured.

#### **Create the Swap Partition**

Boot the server and log in as root (assuming server name T002-1-lnx):

```
T002-1-lnx:~ # mkdir /swap
T002-1-lnx:~ # mount -t nfs 192.168.102.10:/vol/C0A8662C/swap 263249 001 /swap
T002-1-lnx:~ # dd if=/dev/zero of=/swap/swap-0001 bs=1M count=1024
1024+0 records in
1024+0 records out
1073741824 bytes (1.1 GB) copied, 9.99352 s, 107 MB/s
T002-1-lnx:~ #
T002-1-lnx:~ # mkswap /swap/swap-0001
Setting up swapspace version 1, size = 1048572 KiB
no label, UUID=7a8fabb2-b4a5-456c-8853-fe0f4033b42a
T002-1-lnx:~ # swapon /swap/swap-0001
T002-1-lnx:~ # swapon -s
Filename
                                        Type
                                                        Size Used
                                                                        Priority
/swap/swap-0001
                                        file
                                                        1048568 0
                                                                        -1
T002-1-lnx:~ #
T002-1-lnx:/etc/init.d # cp splash early nfs-swap
```

#### **Create an Automatic Swap Mount File**

```
T002-1-lnx:/etc/init.d # vi nfs-swap
#! /bin/sh
#
# /etc/init.d/nfs-swap
#
### BEGIN INIT INFO
# Provides: nfs-swap
# Required-Start:
# Should-Start: $network $syslog
# Required-Stop:
# Should-Stop: $syslog
# Default-Start: 2 3 5
# Default-Stop: 0 1 4 6
# Description: kills animation after network start
### END INIT INFO
. /etc/rc.status
case "$1" in
start)
echo -n "Starting swap: "
mount -o vers=3,proto=tcp,rsize=32768,wsize=32768,hard,intr 192.168.102.10:/vol/COA8662C
/swap_263249_001 /swap
sleep 1
 swapon /swap/swap-0001
 echo "done"
 ;;
stop)
echo -n "Stopping swap: "
swapoff /swap/swap-0001
umount -1 /swap
 echo "done"
 ;;
restart)
 swapoff /swap/swap-0001
 swapon /swap/swap-0001
 ;;
 *)
echo "Usage: swap { start | stop | restart }" >&2
exit 1
 ;;
esac
rc exit
T002-1-lnx:/etc/init.d #
T002-1-lnx:/etc/init.d # chmod 755 nfs-swap
T002-1-lnx:/etc/init.d # chkconfig nfs-swap
nfs-swap off
T002-1-lnx:/etc/init.d # chkconfig nfs-swap on
T002-1-lnx:/etc/init.d # ./nfs-swap stop
Stopping swap: done
T002-1-lnx:/etc/init.d # swapon -s
                                                         Size
                                                                 Used
                                                                         Priority
Filename
                                        Туре
T002-1-lnx:/etc/init.d # ./nfs-swap start
Starting swap: done
T002-1-lnx:/etc/init.d # swapon -s
                                        Type
                                                        Size Used
Filename
                                                                         Priority
/swap/swap-0001
                                        file
                                                         1048568 0
                                                                         -1
T002-1-lnx:/etc/init.d #
```

The new server with the previously mentioned IP now uses the C0A8662C configuration for PXE boot. Create a dedicated configuration for each of the servers in a tenant.

Each server profile now has its own preconfigured image and can be PXE booted into the tenant.

# Appendix D Configuring Cisco VM-FEX with the Cisco UCS Manager

## **Background**

FlexPod for VMware and thus SAP applications built on FlexPod utilize a distributed switch to manage the VLAN settings on a VMware vCenter from a central point. This not only simplifies the management but also provide additional features.

While the previous version used Cisco Nexus 1000 / Cisco Nexus 1000V, the new available hardware used in this setup allow using the built-in functionality within the Cisco UCS Manager. This offers several advantages.

- 1. There is no need for an extra hardware such as Cisco Nexus 1010.
- 2. Cisco Unified Computing System provides a central configuration environment with which the administrator is already familiar
- **3.** Compared to using the Cisco Nexus 1010 V as virtual appliances within the VMware vCenter itself, this setup avoids a SPOF and common restart issues when running the distributed switches in an environment in which they are required for the network functionality of the ESX servers they are running on. This is a common problem that needs to be taken care in the solution design.

The Cisco UCS Manager dramatically simplifies the hardware setup and operation utilizing the new HW features to its fullest.

### **Process Overview**

The setup and configuration of the distributed switches (Cisco Nexus 1000/V) in the previous setup is described in TR-3939: VMware vSphere Built on FlexPod Implementation Guide in detail and is also distributed and embedded in various sections of the document. This section provides a detailed overview of all related topics such as setup, configuration, and operation using the Cisco UCS Manager.

The following sections provide:

- Background information on VM-FEX on Cisco UCS
- Initial set up and configuration
- · Operation, i.e. adding networks for additional tenants

## **Initial Setup**

The initial setup is a three-step procedure:

- Create a vNIC Connection policy in the Cisco UCS Manager
- · Install the VEM software on the ESX server

• Install the plug-in into the VMware vCenter.

## **Create a vNIC Connection Policy**

To create a vNIC connection policy, follow these steps:



🗼 Create Dynamic vNIC Connecti	on Policy
Create Dynamic vN	IC Connection Policy 0
Name: FEX Number of Dynamic vNICs: 64 Adapter Policy: WMWare Protection: C Prot	Description:     VNIC Connection Policy for FEX
	OK Cancel
In the Main section, re	tain the platform defaults.
Unified C	∞ computing System Manager
Create BIOS Policy  1. ✓ Main  2. ✓ Processor  3. □ Intel Directed IO  4. □ RAS Memory  5. □ Serial Port  6. □ USB  7. □ PCI Configuration  8. □ Boot Options  9. □ Server Management	Main Name: FEX Reboot on BIOS Settings Change: Quiet Boot: Quiet Boot: Quiet Boot: Quiet Boot: Quiet Boot: Quiet Boot: Quiet Boot: Quiet Boot: Gisabled enabled Platform Default Resume Ac On Power Loss: Stay-off Iast-state reset Platform Default ACPI10 Support disabled enabled Platform Default

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Unified C	omputing	System	n Manag	er
Create BIOS Policy 1. √ <u>Main</u> 2. √ <u>Processor</u> 3. √ <u>Intel Directed IO</u> 4. RAS Memory 5. Server Management 6. USB 7. PCI Configuration 8. Boot Options 9. Server Management	Intel Directed IO VT For Directed IO: Interrupt Remap: Coherency Support: ATS Support: Pass Through DMA Support:	C disabled (• enabled C disabled (• enabled C disabled (• enabled C disabled (• enabled C disabled (• enabled	Platform Default     Platform Default     Platform Default     Platform Default     Platform Default     Platform Default	



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	amouting	Suctor Monoro	
	Jomputing	System Manager	
Create BIOS Policy	Processor		
1. √ <u>Main</u>			
2. √ <u>Processor</u> 3. √Intel Directed IO	Tube Death	C disabled C coabled C Distance Default	
4. √RAS Memory	Turbo Boost:		
5. √ <u>Serial Port</u>	Enhanced Intel Speedstep:	C disabled C enabled C Platform Default	
<ol> <li>V USB</li> <li>V PCI Configuration</li> </ol>	Hyper Threading:	🔿 disabled 🔿 enabled 📀 Platform Default	
8. √ <u>Boot Options</u> 9. D <u>Server Management</u>	Core Multi Processing:	Platform Default	
	Execute Disabled Bit:	C disabled C enabled . Platform Default	
	Virtualization Technology (VT):	C disabled ( epabled C Platform Default	
	(virtualization rechnology (vir).		
	Direct Cache Access:	C disabled C Platform Default	
	Processor C State:	○ disabled ○ enabled ④ Platform Default	
	Processor C1E:	C disabled C enabled . Platform Default	
	Processor C3 Report:	Platform Default	
	Processor C6 Report:	O disabled O enabled I Platform Default	
	CPU Performance:	C enterprise C high-throughput C hpc • Platform	Default
	Max Variable MTRR Setting:	🔿 auto-max 🔿 8 💿 Platform Default	
Create BIOS Policy	Server Management @		
---	--		
<ol> <li>2. √<u>Processor</u></li> <li>3. √ <u>Intel Directed IO</u></li> <li>4. √<u>RAS Memory</u></li> <li>5. √<u>Serial Port</u></li> <li>6. √<u>USB</u></li> <li>7. √<u>PCI Configuration</u></li> <li>8. √<u>Boot Options</u></li> <li>9. √<u>Server Management</u></li> </ol>	Assert Nmi On Serr: C disabled C enabled Platform Default Assert Nmi On Perr: disabled enabled Platform Default OS Boot Watchdog Timer: disabled enabled Platform Default Console Redirection Console Redirection: disabled serial-port-a serial-port-b Platform Default Flow Control: none rts-cts Platform Default BAUD Rate: Platform Default Terminal Type: Platform Default Legacy OS Redirect: disabled enabled Platform Default		
Leaving the Wizard yo Equipment Servers LAN SAN VM Admi Filter: All U U VLAN 1003-Access (2103) VLAN VM Traffer-UAN (1) VLAN VM-Traffer-UAN (1) VLAN VM-Traffer-UAN (1) VLAN VM-Traffer-UAN (1)	< <tr>          Prev         Next &gt;         Finish         Cancel           u see the created Profile.           Image: Seneral Events           Image: Properties           Image: Properties</tr>		

# Install the VEM Software on each ESXi Server

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The communication between the vCenter, the Cisco UCS Manager's FEX and the ESXi server requires installing a VEM (Virtual Ethernet Module) on each of the ESXi servers.

Download and install the VEM software according to the VM-FEX for VMware Configuration Guide: http://www.cisco.com/en/US/partner/products/ps10281/products\_installation\_and\_configuration\_guide s\_list.html

### Integrate Cisco UCS with VMware vCenter

The vCenter integration requires configuration within the Cisco UCS Manager and the vCenter. To do this integration, follow these steps:



🗼 Configure ¥Mware Integration	
Unified C	Computing System Manager
Configure VMware Integration	Define VMware Distributed Virtual Switch(DVS)
Yinstal Pluq-in on vCenter Server     Yoefine YMware Distributed Yirtual Switch(DYS)     J    Define Port Profile     Distributed Virtual Machines in vCenter Server     Server	vCenter Server         vCenter Server Name:         Description:         vCenter Server Hostname or IP Address:         172.21.1.233
	Datacenter VCenter Datacenter Name: Flexpod-Dev Description:
	DVS Folder Folder Name: DVS-FEX Description:
	DVS Name: DVS-FEX Description: DVS C Disable C Enable

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Unified C	omputing	System M	anager		X
Configure VMware Integration	Define Port Profi	ile	anagoi	_	Ø
<ul> <li>A Instal Public Norware Distributed Server.</li> <li>Y Define VMware Distributed Wirkul Switch(VVS)</li> <li>Y Define Port Profile Depine Port Profiles to Virtual Machines in vCenter Server.</li> </ul>	Port Profile Name: FE QoS Policy: Cnt Network Control Policy: def Max Ports: 103 Pin Group: Cnt VLANS Select VLANS VLANS VLANS VLANS VLANS V	C-Port-Profile ault 24 24 bt set> Name default MGMT-VLAN_TO01 N=StvLAN_TO0 N=StvLAN_T	Native VLAN C C C C C C C C C		
				<b>_</b>	
	Profile Client Name: F Description: Datacenter: F Folder: D Distributed Virtual Switch:	EX-Profile lexpod-Dev • WS-FEX • WS-FEX •			

📥 Configure ¥Mware Integration	X
Unified C	omputing System Manager
nfigure VMware Integration	Apply Port Profiles to Virtual Machines in vCenter Server
<ol> <li>√Install Pluq-in on vCenter. Server</li> <li>√Define VMware Distributed Virtual Switch(DV5)</li> <li>√Define Port Profile</li> <li>√Apply Port Profiles to Virtual Machines in vCenter Server</li> </ol>	After you complete this wizard, use VMware vCenter to create the virtual machines (VMs). Associate the VMs with the distributed virtual switch (DVS). Associate the port profiles (available as port groups) with the DVS.
	Configure YMware Integration  vCenter v50-appliance successfully created.  Show Navigator for vCenter v50-appliance  OK
	Z Draw Martha Einich Cancel
	< Prev Next > Finish Cancel
hen finishing the V	Vizard, the Cisco UCS Manager connects to the vCenter and add

# Validate Settings in VMware vCenter

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To validate the successful installation of the Cisco UCS Manager plug-in, complete the following steps:

Log III to the v	Center Server				
A VMware vSphere Cli	ent	×	1		
<b>vm</b> ware <sup>.</sup>					
Million and California					
vinware vSpriere					
Client					
To directly mapage a	single bost, enter the IP address or boy	st name.			
To manage multiple ho vCepter Server	ists, enter the IP address or name of a	1			
Vecilitar Sciver.		_			
IP address / Nam	3: 172.21.1.235	<u> </u>			
User name:	administrator	_			
Password:	******				
	Use Windows session creden	ntials			
	Login Close	Help			
			]		
In the Main m	enu, select Plug-ins	> Manage	Plug-ins.		
		-1			
CC+	VLENTER - vSphere (	Llient			
Fi	le Edit View Invent	ory Admini	stration Plug-i	ns Help	
_				Manage Plug-inc	
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### **Standard Operations**

As part of standard operations such as the Tenant provisioning, the Network environment and such the additional port profiles (VLANS) at the distributed switch must be created. The following section shows in detail how to add this "additional" VLAN's i.e. distributed Port Groups.

### Add Distributed Port Group to the VDS (vSphere Distributed Switch)

### **Port Profiles**

Port profiles contain the properties and settings that you can use to configure virtual interfaces in Cisco UCS for VM-FEX. The port profiles are created and administered in Cisco UCS Manager. After a port profile is created, assigned to, and actively used by one or more distributed virtual switches (DVSs), any changes made to the networking properties of the port profile in Cisco UCS Manager are immediately applied to those DVSs.

In VMware vCenter, a port profile is represented as a port group. Cisco UCS Manager pushes the port profile names to VMware vCenter, which displays the names as port groups. None of the specific networking properties or settings in the port profile is visible in VMware vCenter. You must configure at least one port profile client for a port profile if you want Cisco UCS Manager to push the port profile to VMware vCenter.

### **Port Profile Client**

The port profile client determines the DVSs to which a port profile is applied. By default, the port profile client specifies that the associated port profile applies to all DVSs in VMware vCenter. However, you can configure the client to apply the port profile to all DVSs in a specific data center or data center folder or to only one DVS.

Complete the following steps to create VM-FEX port profiles for use on the Cisco UCS distributed virtual switch.



2.	Enter the name of	of the Port Pr	rofile. For exam	ole. T001-NFS	for the storage VL	AN in	
	tenant t001						
	Select the VLAN for NFS in t001 and press OK						
	🗼 Create Port Profile 🔀						
	Create Port Profil	e			0		
	Name:	T001-NF5					
	Description:			_			
	Qob Policy: Network Control Policy:	<not set=""> •</not>					
	Max Ports:	64					
	Host Network IO Performance:	O None    High Perform	nance				
	(i Pin Group:	<not set=""></not>					
	VLANs						
	Select	Name	Native VLAN	<b>T</b>			
		default MGMT-VLAN_TOO1	0	A			
		NFS-VLAN_T001					
		Native_VLAN_ID	0				
		VM_Traffic-VLAN	Č Č				
		vMotion-VLAN	0				
				<u> </u>			
				OK	Cancel		
3.	The Port profile	created will a	opear.				
•••							
	A Fisco Unified Computing Syste	m Manager - Ind-ucc-a					
	Fault Summary	intrianager - ipa-acs-a		inne 🖉 🔿 🗛 Ronding i			
	<b>V</b>	Δ					
	0 3	7 2	>> All >	Port Profile TO01-NFS			
	Equipment Servers LAN SAN V	M Admin	General VM LANS Profile Clien	ts   Virtual Machines   Events			
	Filter: All	•	Actions	Properties	TOOLNES		
	± =		- Modify VLANs	Description:			
	E 🤤 All E 💽 Clusters		🗂 Delete	QoS Policy:	<not set=""></not>		
	Port Profiles	Profile		Network Control Policy:	default 💌		
	Port Profile T001-Mgn	nt		Max Ports:	C None C High Devformance		
	Port Profile vNIC_Ter	nplate_A		Pip Group			
	Port Profile VNLC_Ten     Wware	nplate_B		Hin Group.	1003009		
	Datacenter Flexp	e od-Dev					
	E	EX					
	- Profile	e FEX-Port-Profile					
	Profile	e deleted-pg-DVS-FEX					
	Folders	e uplink-pg-DVS-FEX					
	Virtual Machines						

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4.	Create the profile client to be integrated in the vCenter as a distributed port group in vDS. To create profile client, right-click Port Profile T001-NFS and click Create Profile Client.				
		ght-click Fort From			
	Port Profile T001-NFS				
	Port Profile T002-Acce	Show Navigator			
	Port Profile T003-Acce	Create Profile Client	:		
	Port Profile T003-Stor	Modify VLANs			
	Port Profile vNIC_Tem	Сору	Ctrl+C		
	Port Profile vNIC_Tem	Copy XML	Ctrl+L		
	P vCenter vcenter	Delete	Ctrl+D		
	Choose the data center	er created in you	r vCenter Ser	ver, folder, and distributed	
	virtual switch previous	ly created.			
	Create Profile Client				
	Create Profile Clien	t			
	Name: T001-NF	5			
	Description:				
	Folder: DVS-FEX	<ul> <li>▼</li> </ul>			
	Distributed Virtual Switch: DVS-FEX	•			
				ОК	
	The client profile creat	ted will appear ir	n your distribut	ted virtual switch DVS-FEX.	



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## Adding Additional Tenant to Distributed Port Group to vCenter

As described in section, "Tenant Provisioning" part of the task to provision a tenant is to create the required networks, as follows:

- Access LAN (txxx-access)
- Storage or backend LAN (txxx-storage)

To create the network setting, the following configuration steps must be completed.

- 1. Create the VLAN on "Cisco Nexus" (not part of this section).
- 2. Create the VLAN in Cisco UCS Manager.
- 3. Uplink/Server port assignment (not part of this section)
- 4. Create the VM-FEX port profile.
- 5. Create the VM-FEX port client.

Steps 2, 4, and 5 are required for adding the tenant network to the vCenter and are described in detail. For all other network configurations, refer section, "Tenant Provisioning."

Step	Action							
1	Create VLAN.							
	Log in to Cisco UCS Manager. Click the LAN tab and click Create VLANs.							
	Equipment Servers LAN SAN VM Admin							
	Filter: All							
	Fabric B   QoS System Class   LAN Pin Groups   Threshold Policies   VLAN   VL   VL							

-	I						
2	Enter T004-Access as the VLAN name for tenant t004 access.						
	Enter 2014 as the VLAN ID. Click OK.						
	🗼 Create VLANs 🛛 🗙						
	Create VLANs 0						
	VLAN Name/Prefix: T004-Access						
	Common/Gobal C Eabric A C Eabric B C Roth Eabric Configured Differently						
	You are creating global VLANs that map to						
	une same vlam ups in all available fabrics.						
	Enter the range or VLAN IDS.(e.g. 2009-2019, 29,35,40-45, 23, 23,34-45)						
	Sharing Type:  O None C Primary C Isolated						
	Check Overlap OK Cancel						
3.	Click the VM tab in Cisco UCS Manager.						
		_					
	Equipment Servers LAN SAN VM Admin Port Profiles Faults Events FSM						
	Filter: All 💌 🕒 🖶 🖃 🕰 Filter 👄 Export 😓 Print						
	Name						
	Port Profile Default	_					
	All Port Profile FEX-Port-Profile						
	default						
	Virtual Machines						
	Port Profile T002-Access						
	Port Create Port Profile						
	Port Profile T003-Access						
	Port Copy Ctri+C Port Profile T003-Storage						
	Port Copy XML Ctrl+L Port Prorie viviotion						
	Port Delete Ctrl+D Port Profile vNIC Template B						
	Port Profile T003-Access						
	Port Profile VMotion						
	Port Profile vNIC_Template_A						
	Port Profile vNIC_Template_B	Right-click					
	Port Profile > Create Port Profile.						

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4. Enter T004-Access as name of the port profile. Select T004-Access, and select the Native VLAN button. 📥 Create Port Profile × 0 **Create Port Profile** Name: T004-Access Description: QoS Policy: <not set> • Network Control Policy: default -Max Ports: 64 Host Network IO Performance: 🔘 None 💿 High Performance Pin Group: • VLANs ₽ Native VLAN Select Name default C ٠ MGMT-VLAN\_T001 c Г NFS-VLAN\_T001 C Г Ê 0 Native\_VLAN\_ID Г Packet-Control-VLAN C T002-Access C 0 T002-Storage Г T003-Access 0 Г T003-Storage C Г 2  $\odot$ T004-Access Г VM\_Traffic-VLAN C -OK Cancel 5 Port profile created displays. General VM LANS Profile Clients Virtual Machines Events Equipment Servers LAN SAN VM Admin Filter: All 🔻 Actions Properties 🚦 Create Profile Client Name: T004-Access • -- Modify VLANs Description: . 👕 Delete QoS Policy: <not set> 🖻 💓 Clusters Ŧ - 🔀 default - 🧇 Virtual Machines Network Control Policy: default • Max Ports: 64 🖃 📑 Port Profiles 😑 Port Profile Default Host Network IO Performance: O None 💿 High Performance Port Profile FEX-Port-Profile Port Profile Packet-Control Pin Group: <not set> -Port Profile T001-Mgmt Port Profile T001-NFS Port Profile T002-Access 🚍 Port Profile T002-Storage Port Profile T003-Access = Port Profile T003-Storage Port Profile T004-Access E Port Profile VMotion -== Port Profile vNIC\_Template\_A



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