



Linux操作系统 变迁之旅

林培峰

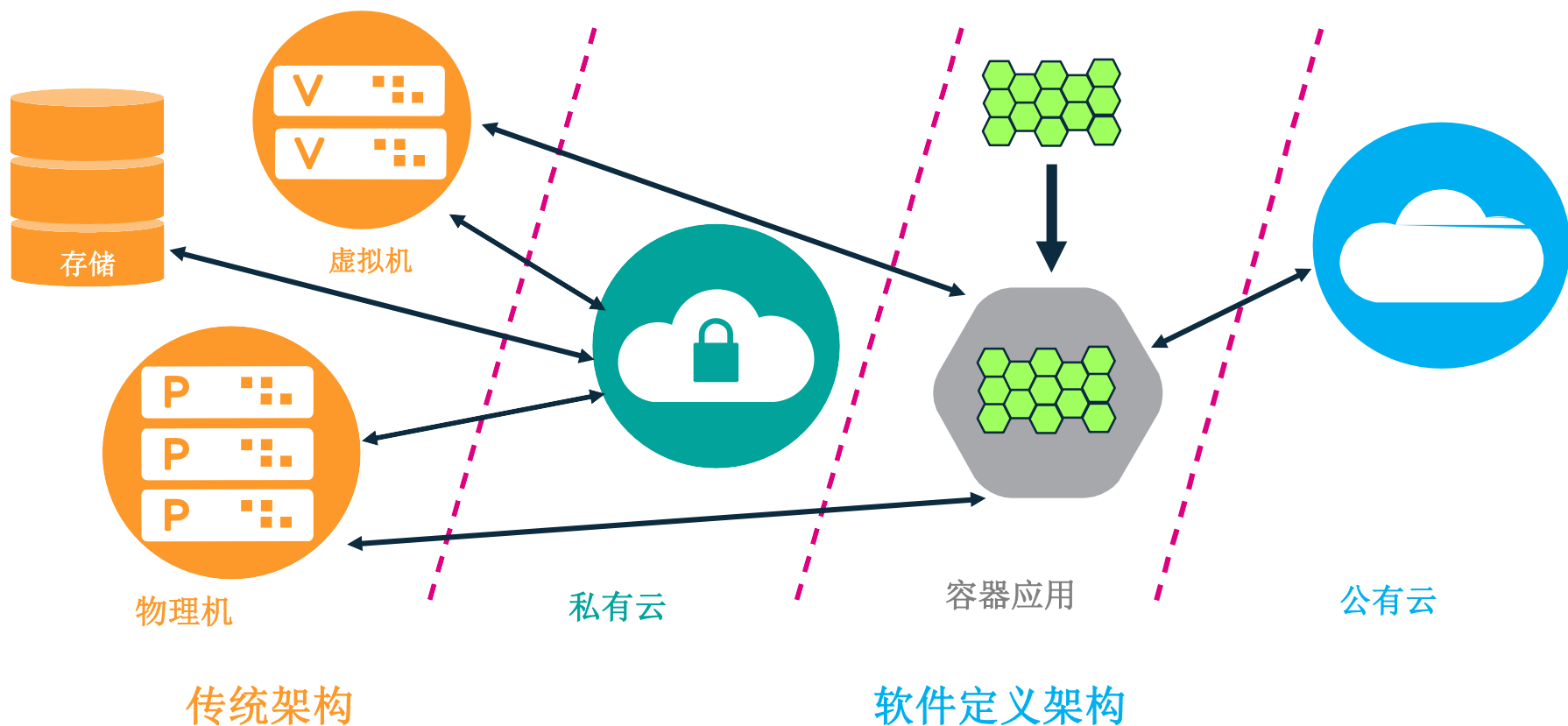
pflin@suse.com

SUSE 专家日 2019

中国 北京

2019.07

混合 IT 环境应用部署场景

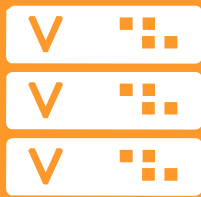


多模操作系统

传统架构

SUSE Linux
Enterprise 15

软件定义架构
SDI

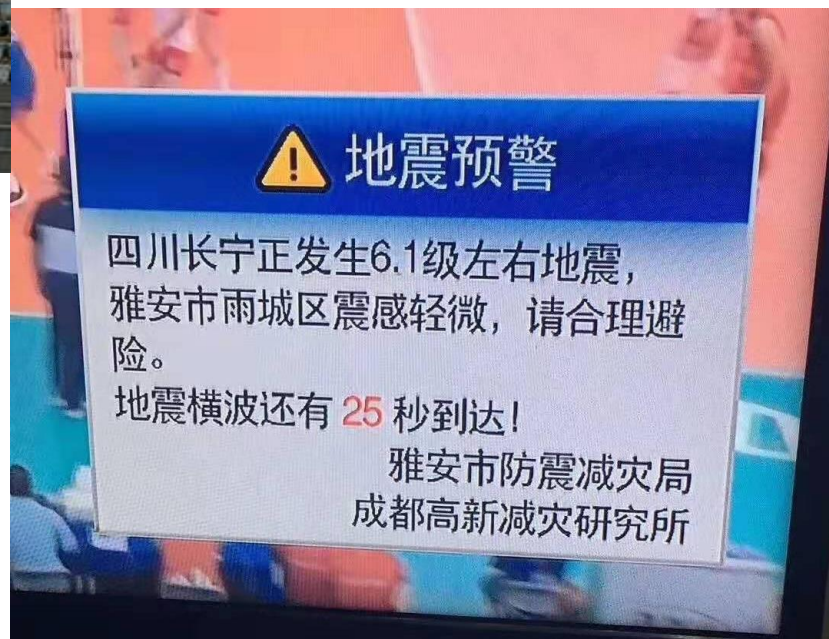


传统架构

地震预警系统

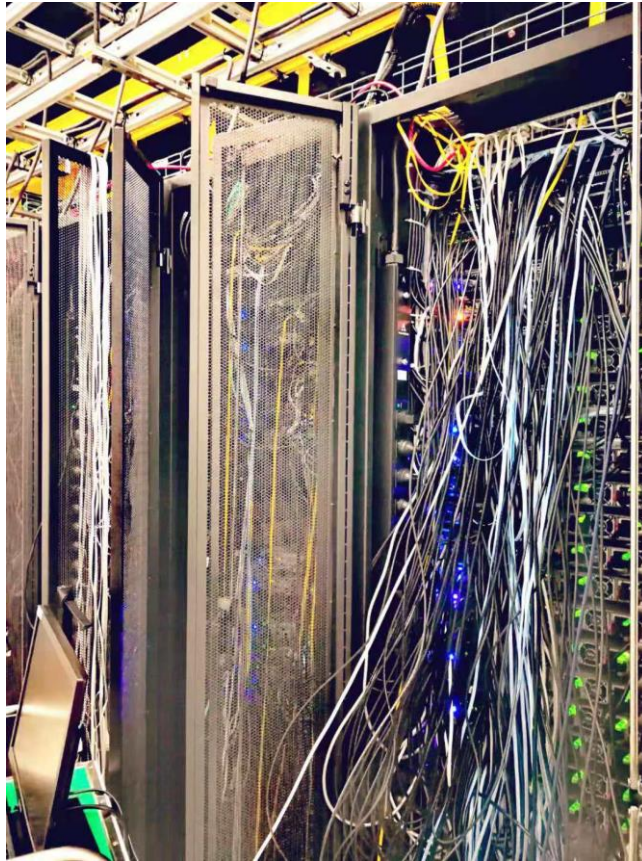


2008.05.12

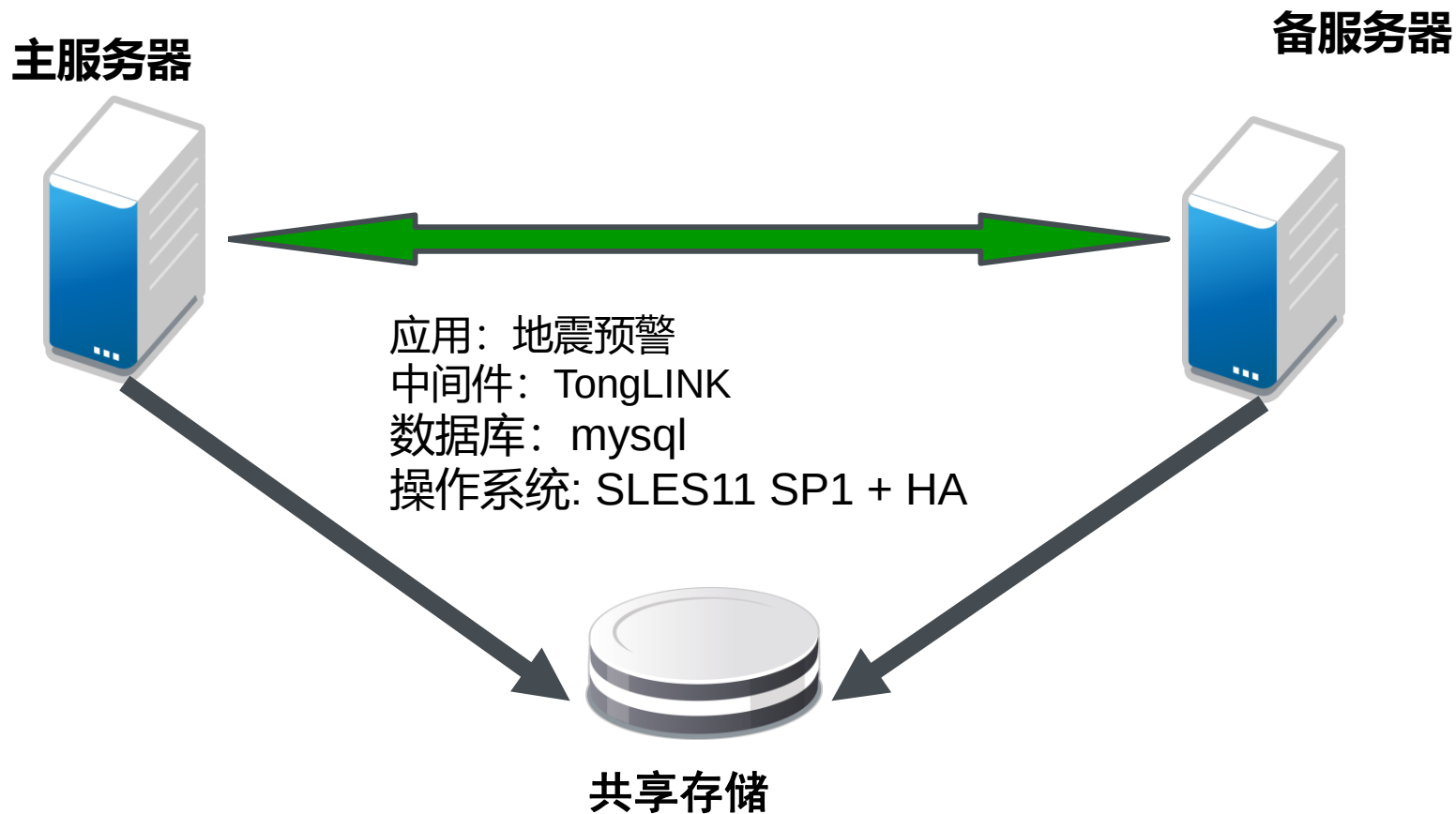


2019.06.17

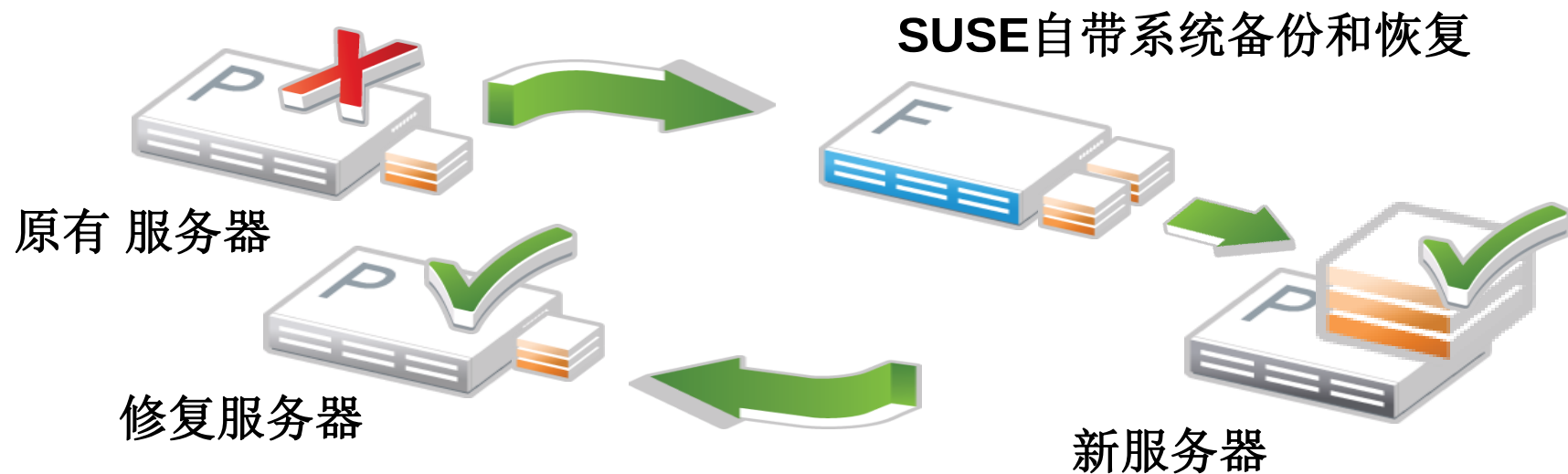
数据中心



高可用



一键部署和恢复



一键部署和恢复



Boot from Hard Disk

Installation

一键安装

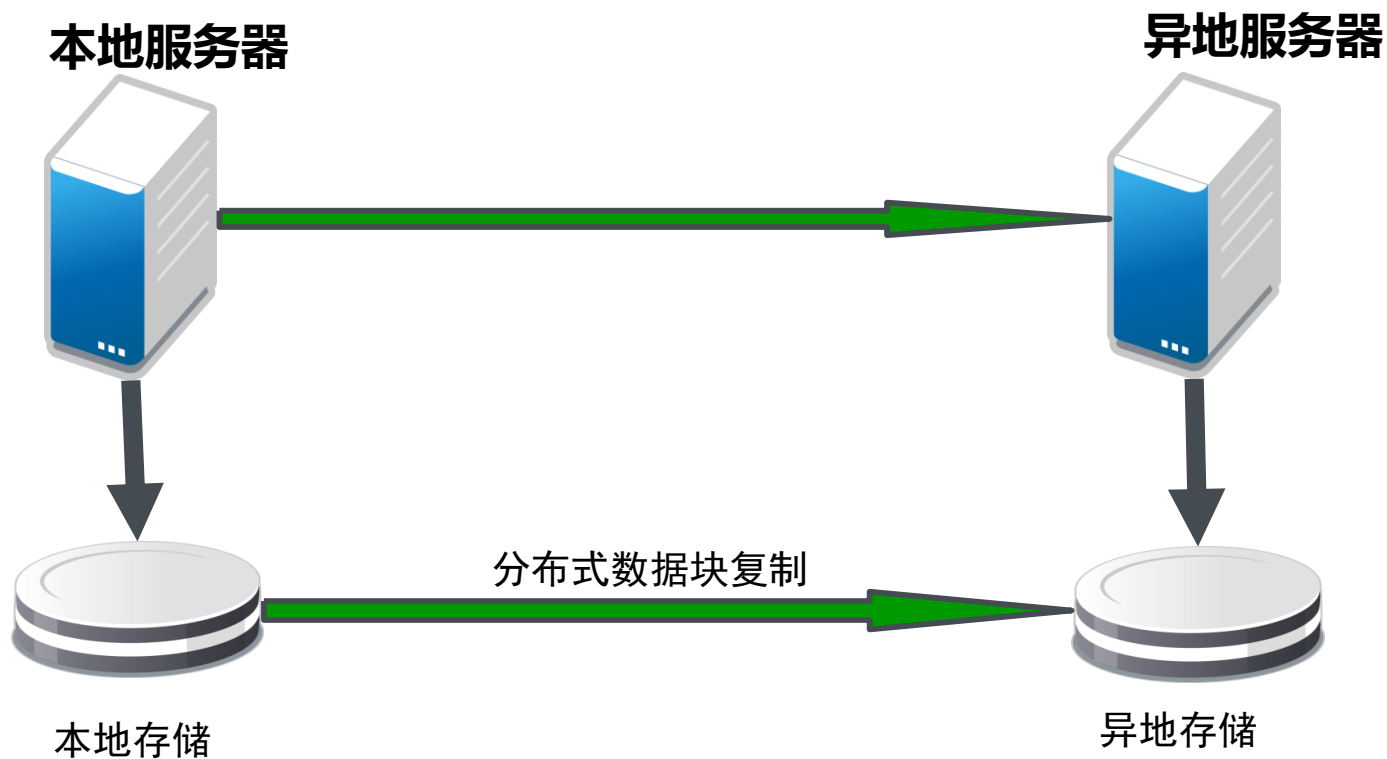
Upgrade

More ... ▶

Boot Options |

F1 Help F2 Language F3 Video Mode F4 Source F5 Kernel F6 Driver
English (US) Default DVD Default No

数据灾难备份



多种硬件架构支持



IBM大型机

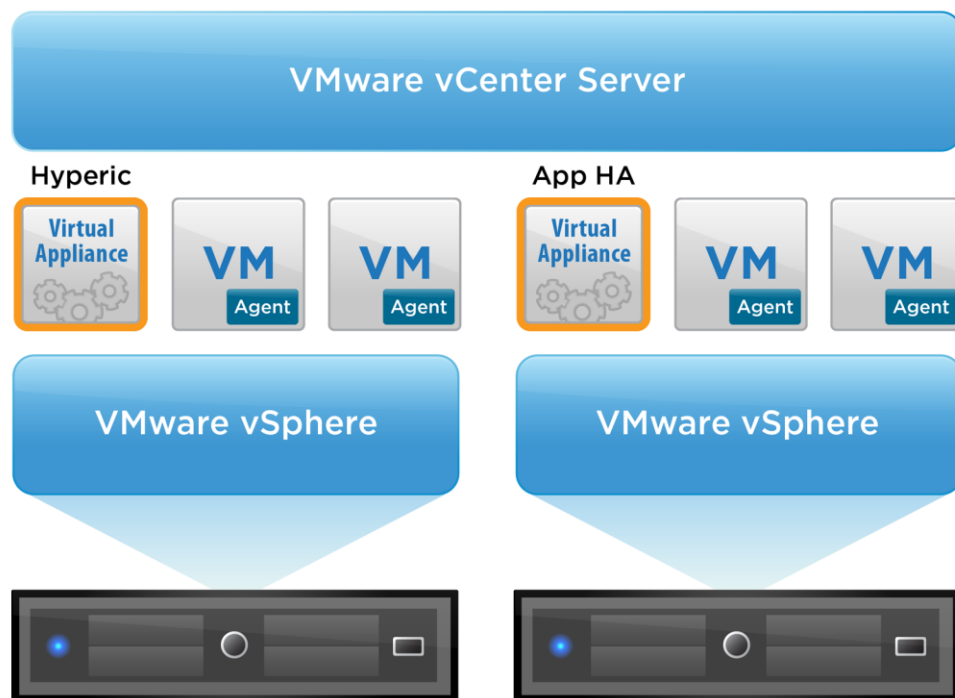


IBM Power
Openpower



x86服务器

定制虚拟机基础镜像



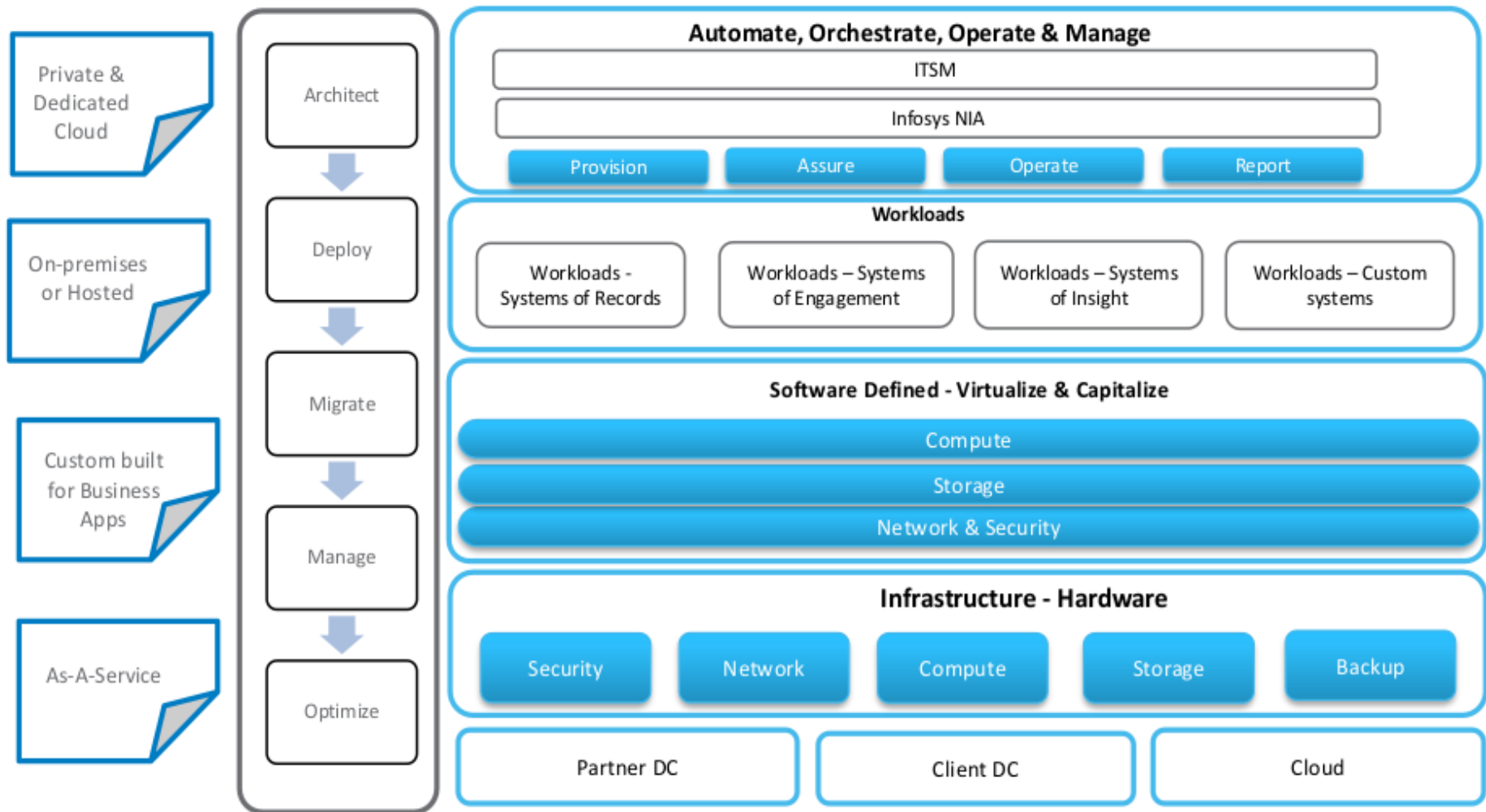
基础镜像要求:

- 最小化安装
- 安全加固
- 基础参数可配置

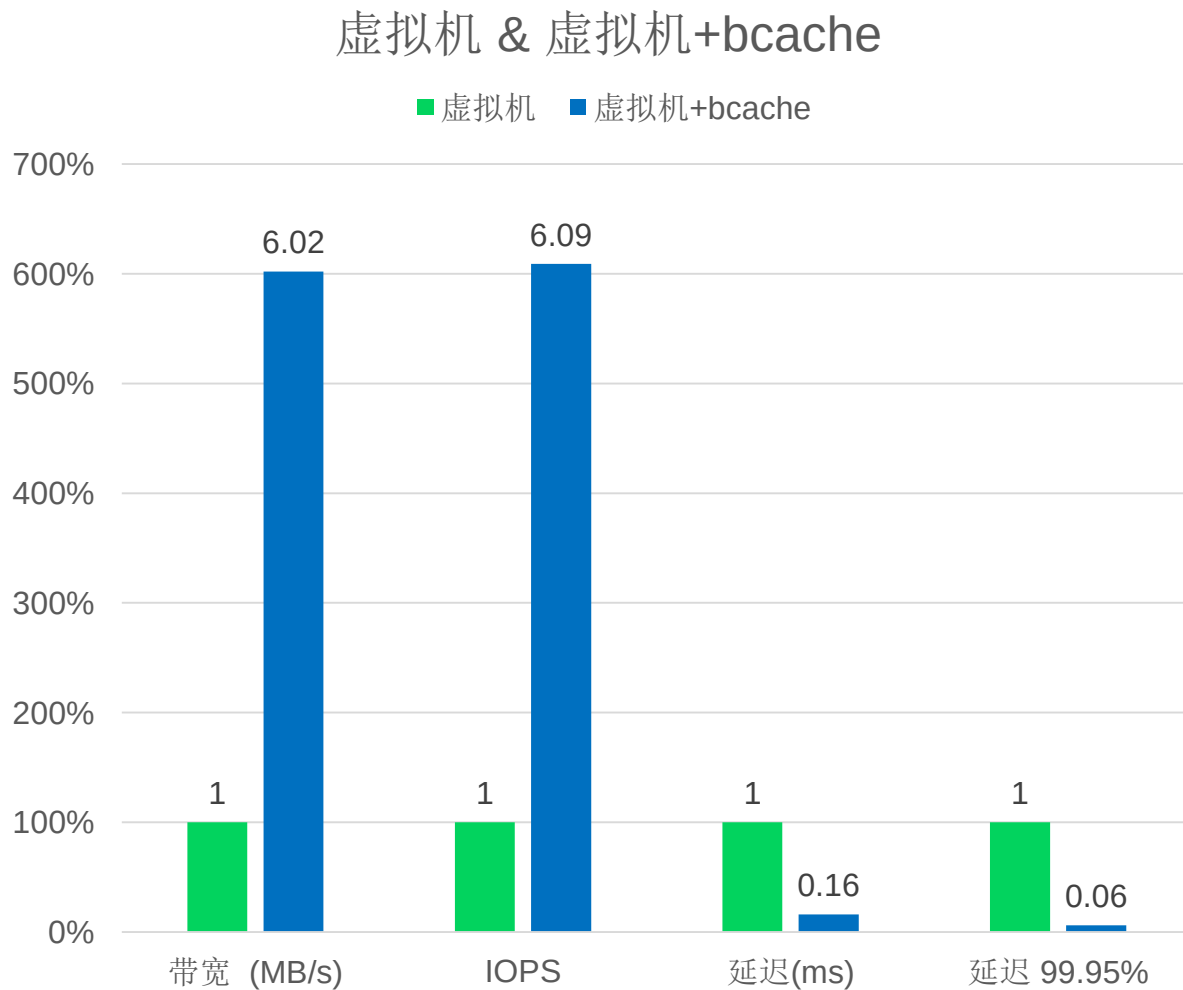


软件定义架构

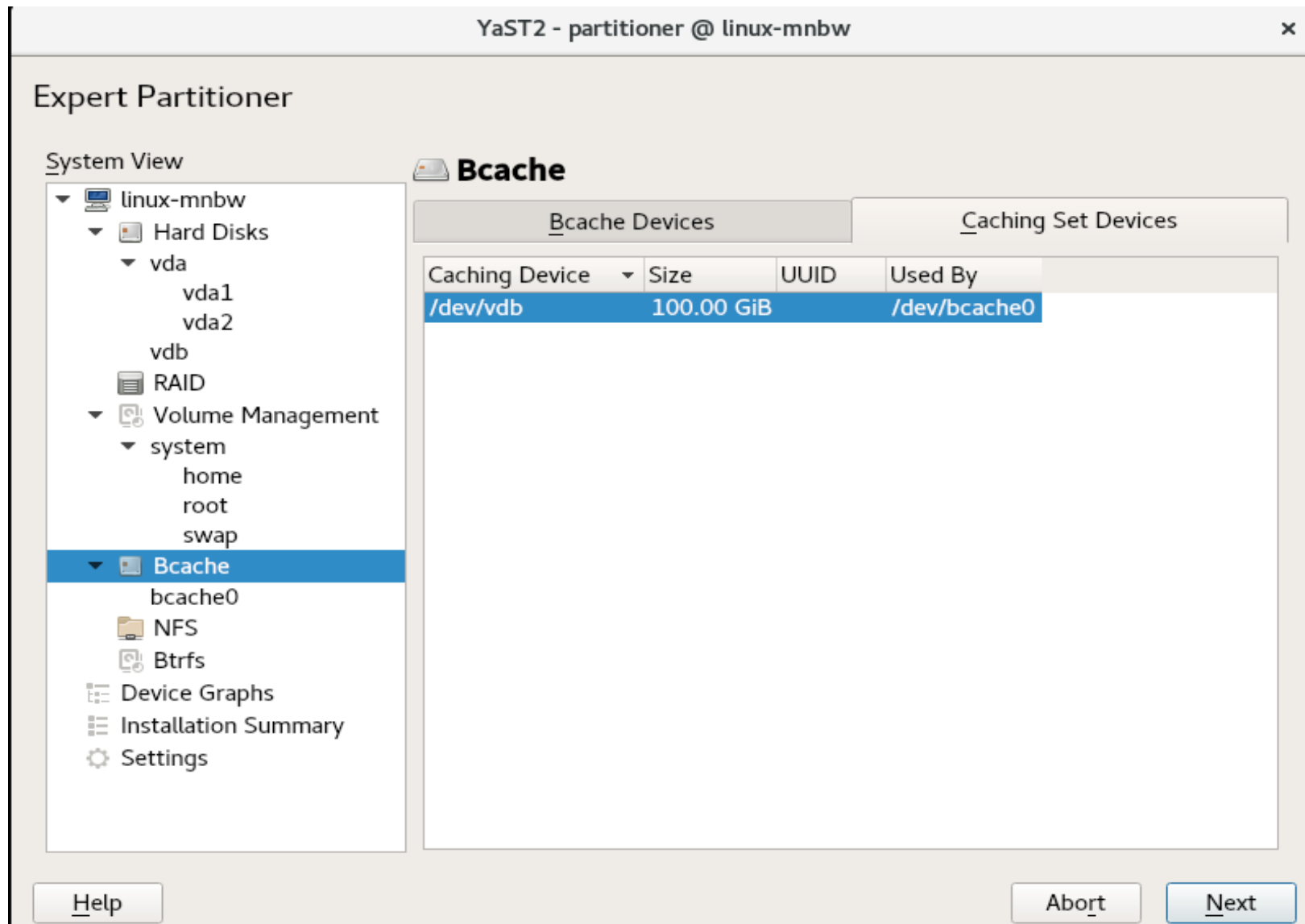
从VMWare迁移到OpenStack Infosys



虚拟机性能提升 - 缓存加速bcache



方便配置bcache



工作负载上云 - 公有云



公有云最佳实践

SLES 12	SLES for SAP 12	SLES 11	SLES 15	Other
SLES12-SP3-EC2 -> EC2 PV on-demand	SLES12-SP2-SAP-EC2-HVM -> EC2 SLES4SAP on-demand	SLES11-SP4-EC2-BYOS -> EC2 PV BYOS	SLES15-EC2-ECS-HVM	SLES12-SP3-CaaSP-2-1-Admin-EC2-HVM-BYOS -> EC2 CaaSP Admin BYOS
SLES12-SP3-EC2-BYOS -> EC2 PV BYOS	SLES12-SP2-SAP-EC2-HVM-BYOS -> EC2 SLES4SAP BYOS	SLES11-SP4-EC2-HVM -> EC2 HVM on-demand	SLES15-EC2-HVM	SLES12-SP3-CaaSP-2-1-Cluster-EC2-HVM-BYOS -> EC2 CaaSP Cluster BYOS
SLES12-SP3-EC2-ECS-HVM -> EC2 on-demand for ECS	SLES12-SP3-SAP-EC2-HVM -> EC2 SLES4SAP on-demand	SLES11-SP4-EC2-HVM-BYOS -> EC2 HVM BYOS	SLES15-EC2-HVM-BYOS	
SLES12-SP3-EC2-HVM -> EC2 HVM on-demand	SLES12-SP3-SAP-EC2-HVM-BYOS -> EC2 SLES4SAP BYOS	SLES11-SP4-EC2-RightScale -> EC2 PV on-demand with RightScale agent	SLES15-SAP-EC2-HVM	
SLES12-SP3-EC2-EKS-HVM -> EC2 on-demand for EKS*		SLES11-SP4-EC2-RightScale-HVM -> EC2 HVM on-demand with RightScale agent	SLES15-SAP-EC2-HVM-BYOS	
SLES12-SP3-EC2-HVM-BYOS -> EC2 HVM BYOS		SLES11-SP4-EC2-SAPCAL-HVM -> EC2 HVM on-demand for SAPCAL	SLES15-EC2-EKS-HVM*	

SLES 12	SLES for SAP 12	SLES 11	SLES 15	Other
SLES12-SP3-Azure -> Azure on-demand (basic)	SLES12-SP1-Azure-SAPCAL -> Azure on-demand for SAPCAL	SLES11-SP4-Azure -> Azure on-demand (basic)	SLES15-Azure-Basic	SLES12-SP3-CaaSP-2-1-Admin-Azure-HVM-BYOS
SLES12-SP3-Azure-Standard -> Azure on-demand (STD)*	SLES12-SP2-SAP-Azure -> Azure SLES4SAP on-demand	SLES11-SP4-Azure-BYOS -> Azure BYOS	SLES15-Azure-Standard	SLES12-SP3-CaaSP-2-1-Cluster-Azure-HVM-BYOS
SLES12-SP3-Azure-Priority-> Azure on-demand (priority)	SLES12-SP2-SAP-Azure-BYOS -> Azure SLES4SAP BYOS	SLES11-SP4-Azure-Priority -> Azure on-demand (Priority)	SLES15-Azure-Priority	
SLES12-SP3-Azure-BYOS -> Azure BYOS	SLES12-SP3-SAP-Azure -> Azure SLES4SAP on-demand	SLES11-SP4-Azure-SAPCAL -> Azure on-demand for SAPCAL	SLES15-Azure-BYOS	
SLES12-SP3-Azure-HPC-Priority -> Azure on-demand HPC (priority)	SLES12-SP3-SAP-Azure-BYOS -> Azure SLES4SAP BYOS		SLES15-Azure-HPC-Standard*	
			SLES15-Azure-HPC-Priority*	
			SLES15-SAP-Azure	
			SLES15-SAP-Azure-BYOS	

容器化是趋势

SUSE镜像库

App

App

App

App

App

App

App

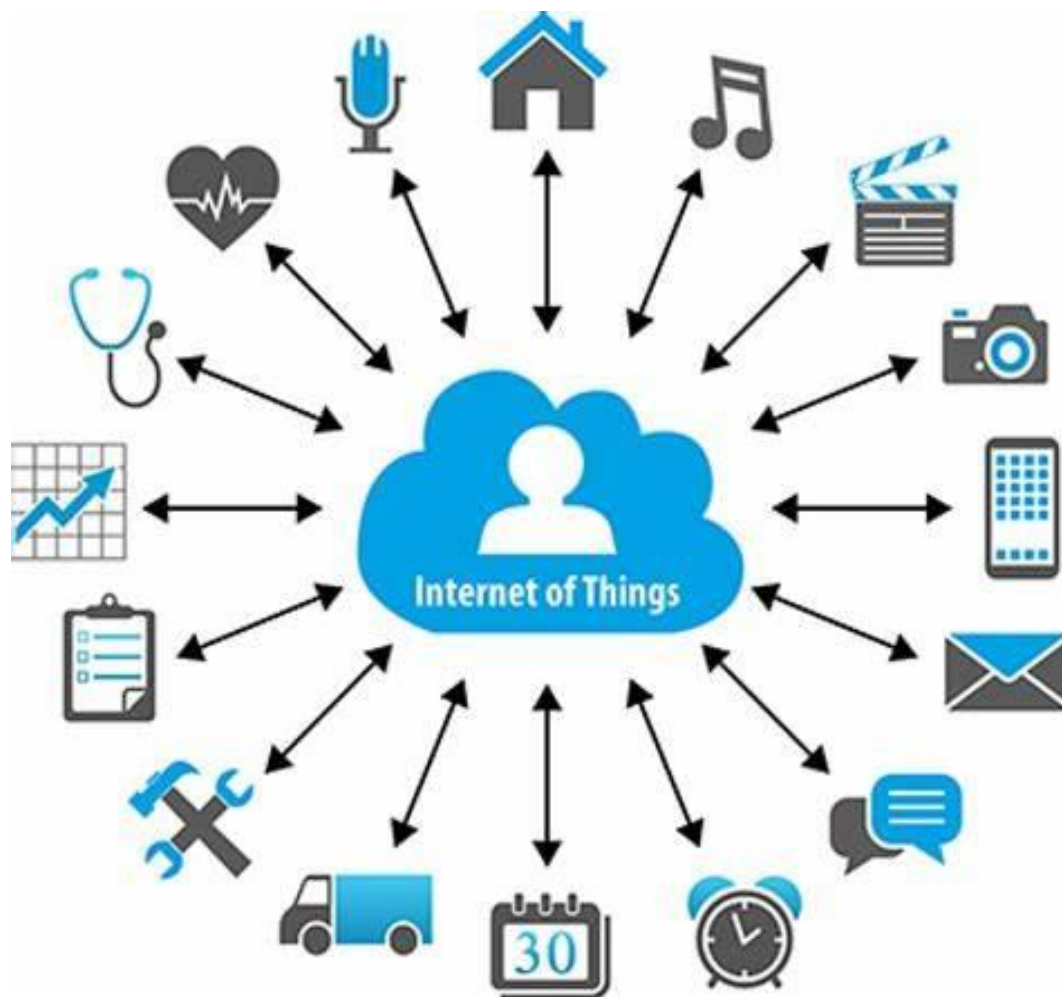
App

App

容器引擎: Docker / CRI-O

SUSE Linux Enterprise MicroOS
容器操作系统

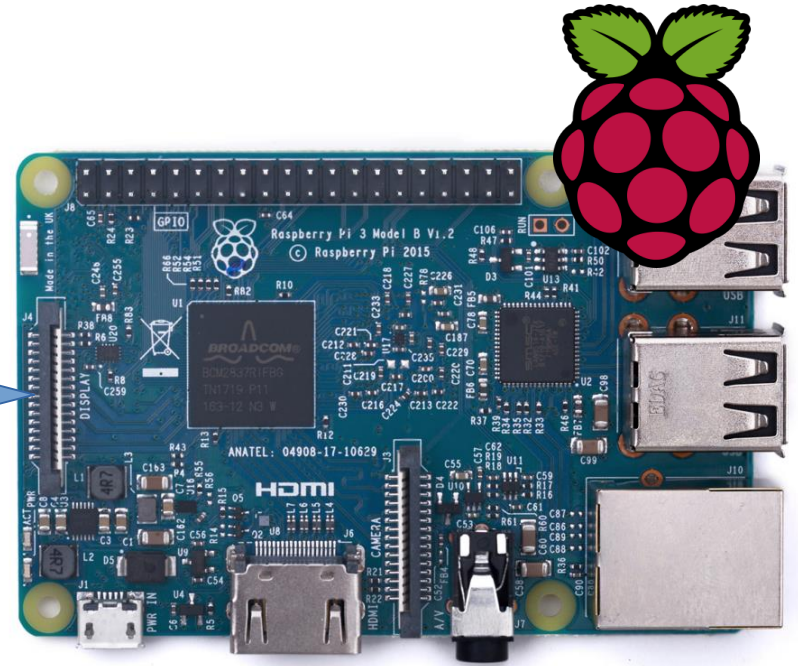
IoT物联网 - Linux无处不在



某大型仓库物流状态监控



Windows CE

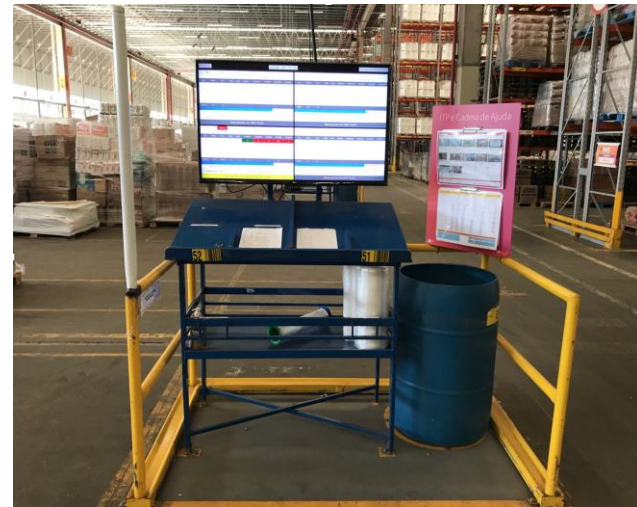


SLES for Raspberry Pi

树莓派

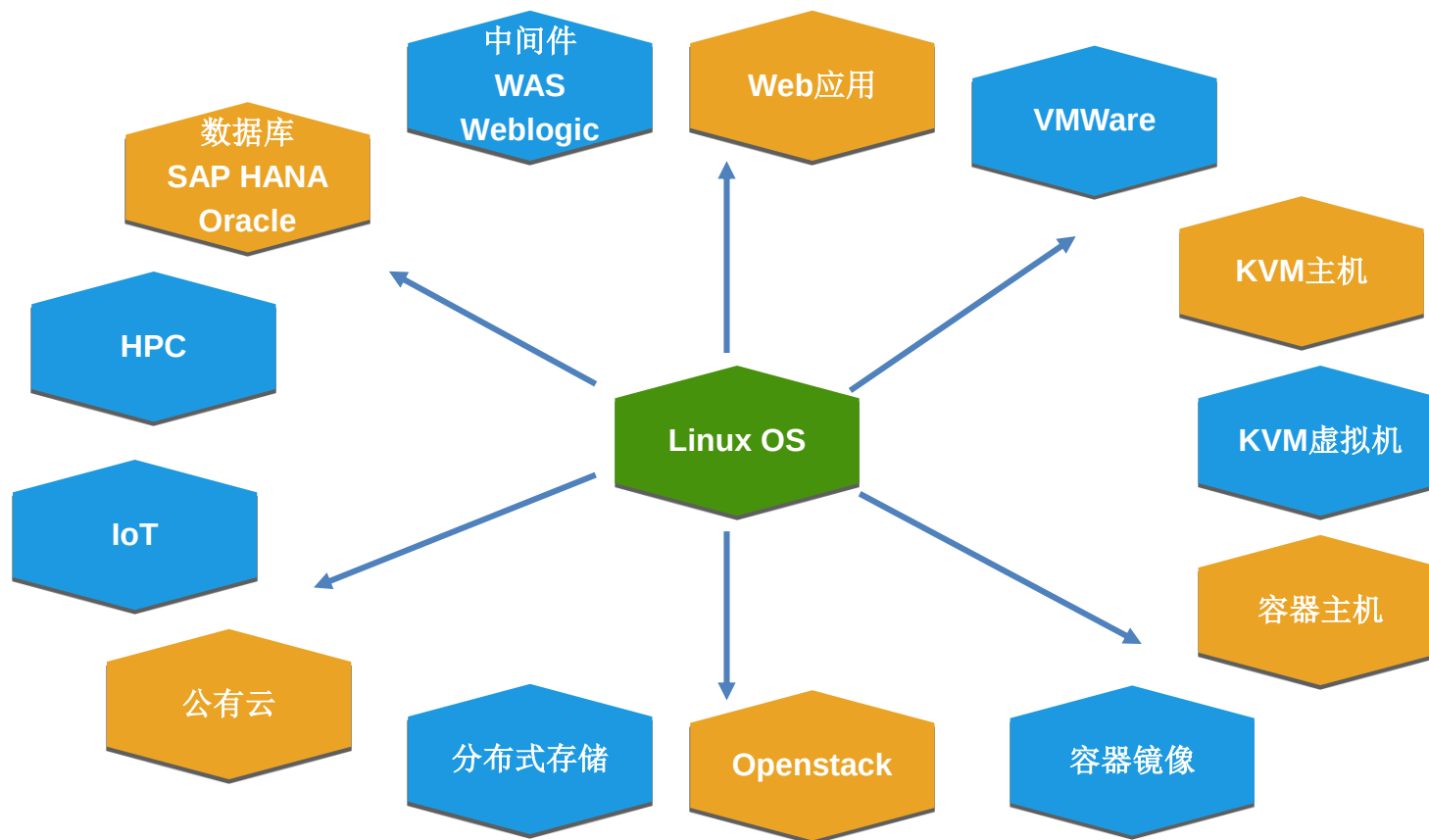
名称	Raspberry Pi 3B	Raspberry Pi 3B+
SOC	Broadcom BCM2837	Broadcom BCM2837B0
CPU	64-位 1.2GHz四核 (E14版本已升级至64位 1.4GHz)	64-位 1.4GHz四核
蓝牙	蓝牙4.1	蓝牙4.2
Wifi网络	802.11n无线 2.4GHz	802.11AC无线 2.4GHz/5GHz 双频Wifi
Wifi天线	陶瓷天线	Zero W天线方案
有线网络	10/100Mb/s以太网	千兆以太网
以太网Poe	无	通过额外的HAT以太网 (Poe) 供电
同等条件温度测试	85°	81° (CPU自带散热外壳)
电源管理IC	SMSC LAN9514	Microchip LAN7515

大型仓库物流状态监控

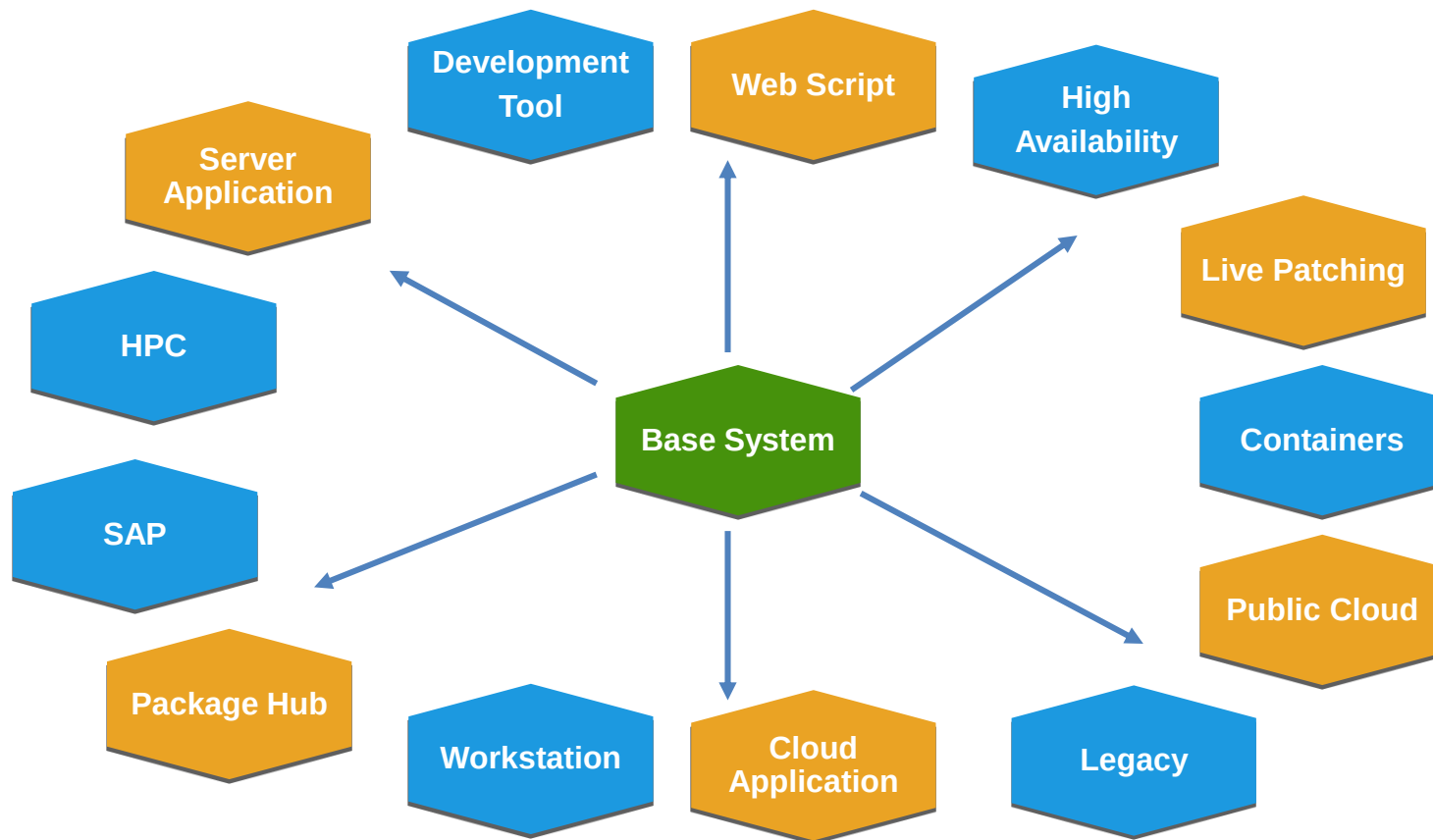


多模操作系统

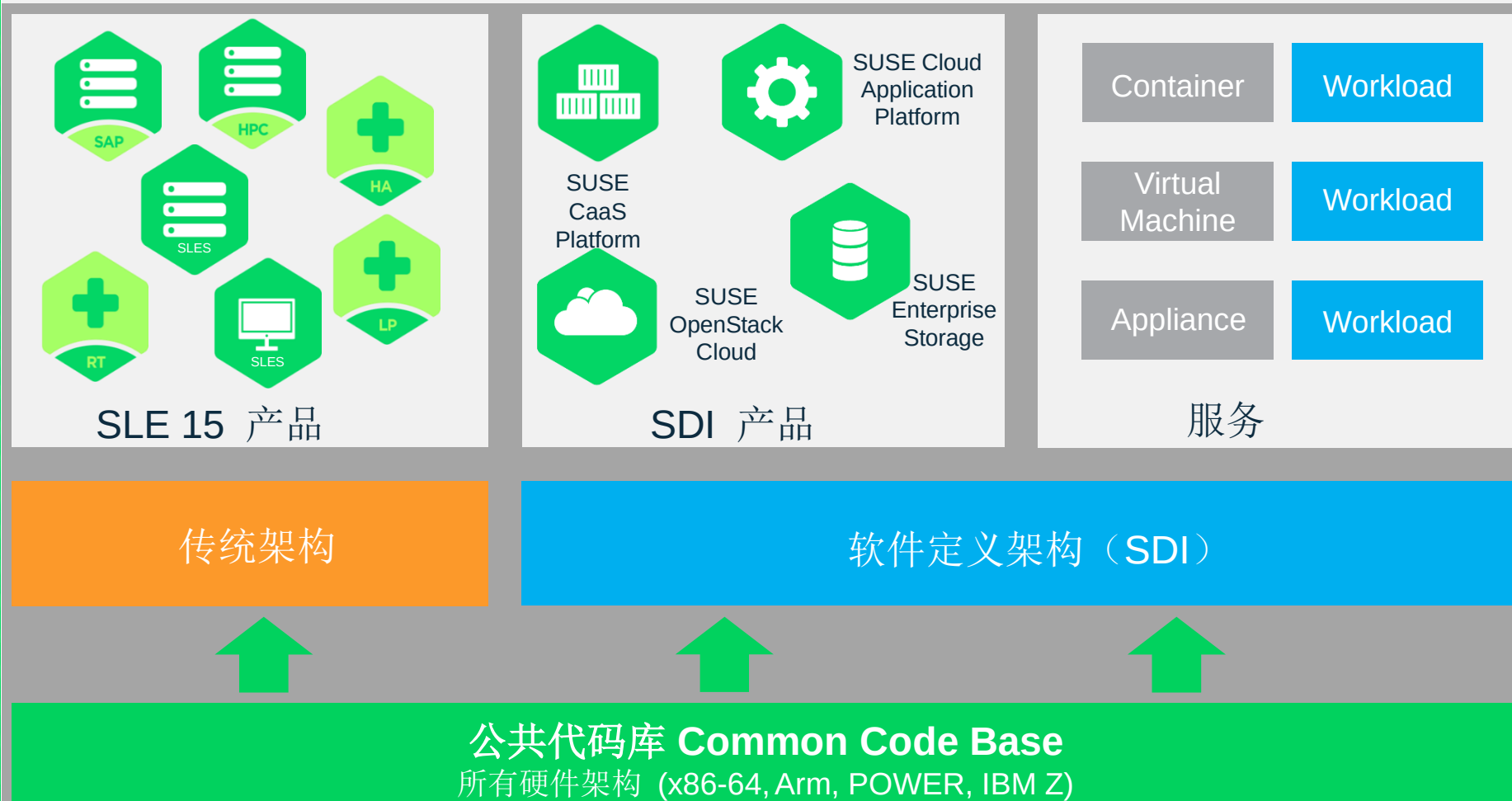
一个OS镜像能满足所有需求吗？



SUSE Linux Enterprise 15多模操作系统



多模架构



“IDC认为， SUSE Linux Enterprise 15 的
多模操作系统使产品成为一种适合异构计算
环境的多平台OS。”

– IDC 市场报告，2018 年

自动化运维最佳实践

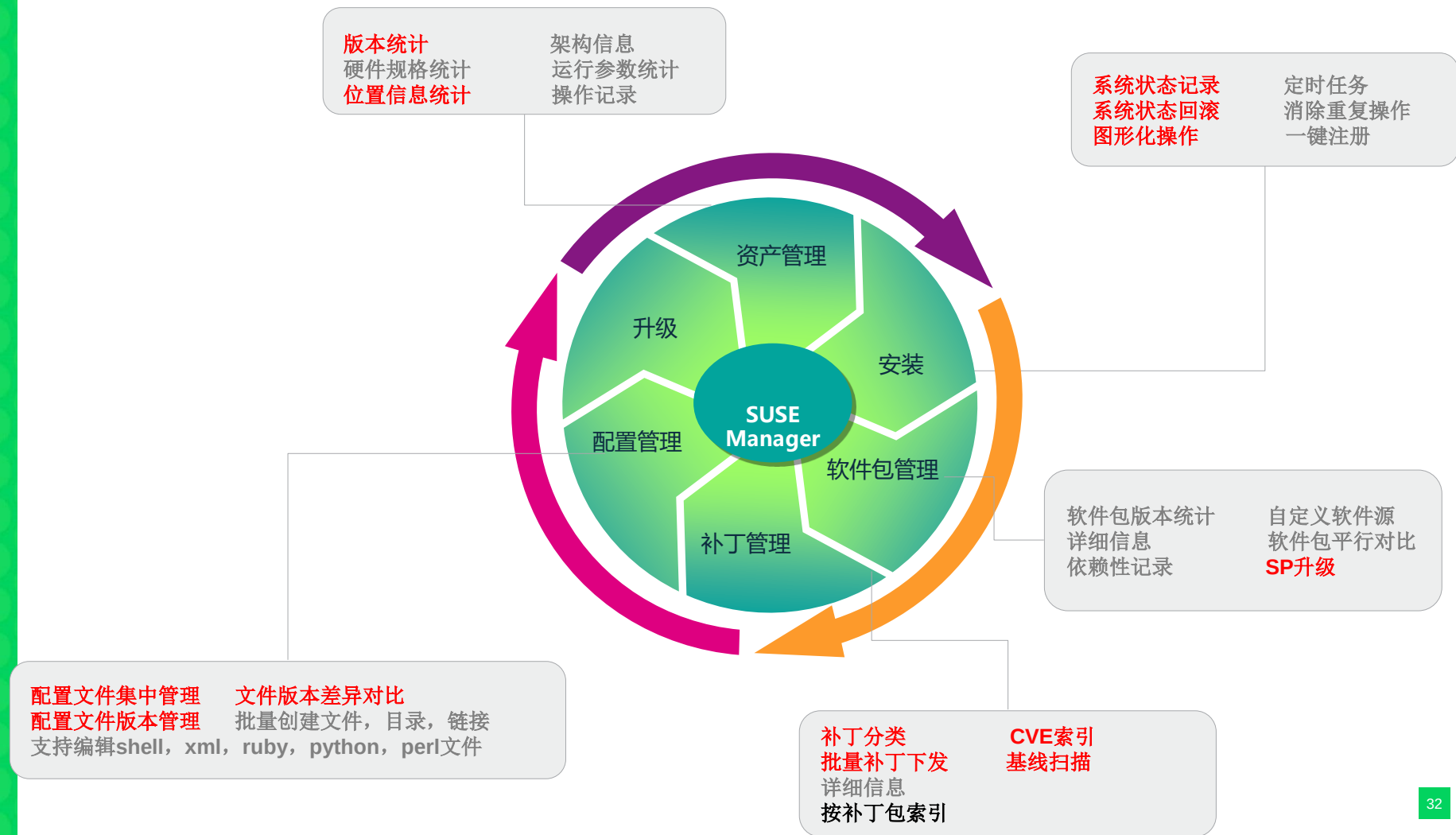
护网行动

- 远程登录可以使用**root**权限
- 用户密码太简单
- 端口扫描
- 有些安全漏洞**CVE**还存在
- 启动不必要服务： **VNC, telnet, ftp**

运维人员之痛



SUSE Manager: 解决运维人员的烦恼



操作系统运维场景之- 主流Linux

SUSE Linux



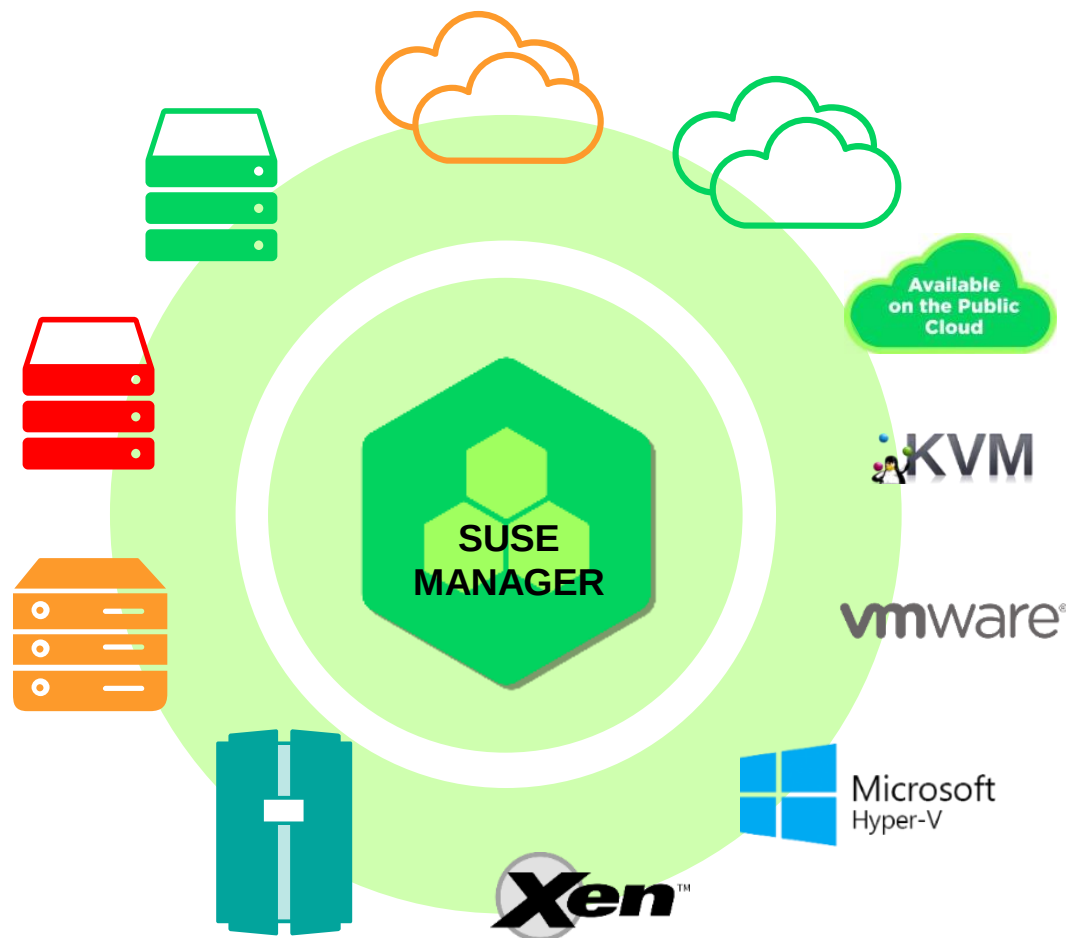
Red Hat Linux
Centos
Oracle Linux



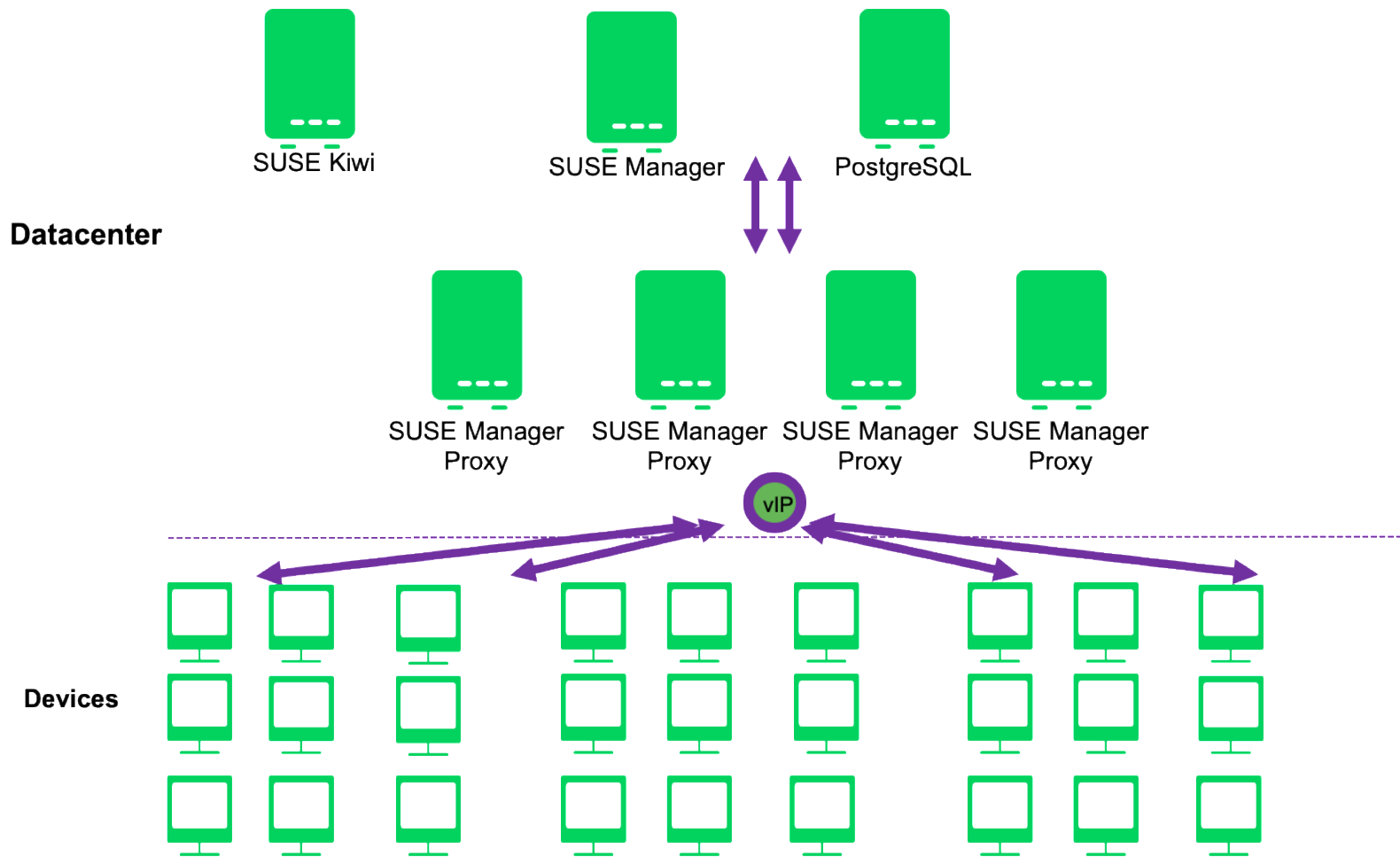
Ubuntu Linux



操作系统运维场景之- 复杂IT环境



操作系统运维场景之- 大规模管理



操作系统运维场景之- 系统管理

System Info

Hostname:	hqpg-11sp4-51
IP Address:	172.16.0.4
IPv6 Address:	unknown
Virtualization:	Hyper-V
UUID:	8ae44ad1761f47f19664092e1cbeaf0e
Kernel:	3.0.101-68-default
SUSE Manager System ID:	1000010255
Activation Key:	11-11sp4-x86_64
Installed Products:	SUSE Linux Enterprise Server 11 SP4 SUSE Linux Enterprise Software Development Kit 11 SP4

Subscribed Channels [\(Alter Channel Subscriptions\)](#)

- [SLES11-SP4-Pool for x86_64](#)
- [SLES11-SP4-SUSE-Manager-Tools x86_64](#)
- [SLES11-SP4-Updates for x86_64](#)

System Events

Checked In:	Today at 10:47 AM
Registered:	03/06/2018
Last Booted:	5 months ago (Schedule System Reboot)

System Properties [\(Edit These Properties\)](#)

System Types:	[Salt]
Contact Method:	Default
Auto Patch Update:	No
System Name:	hqpg-11sp4-51
Description:	Initial Registration Parameters: OS: sles-release Release: 11.4 CPU Arch: x86_64
Location:	(none)

操作系统运维场景之- 批量安装

The screenshot shows a web browser window with the address bar displaying `https://smgr.susemgr.com/rhn/kickstart/TreeCreate.do`. The browser tabs include 'SUSE Manager - Syst...' and '+'. The page title is 'SUSE Manager - Systems - Autoinstallation - Distributions - Mozilla Firefox'. The browser's address bar shows the URL and a search bar. The page header includes the SUSE Manager logo and navigation links: 'Systems > Autoinstallation > Distributions'. The header also shows a search bar, a 'systems selected' button, and user information: 'admin', 'Widgets-4-U', and a settings icon.

The main content area is titled 'Create Autoinstallable Distribution' with an information icon. It contains the following text:

The following details are needed to define an autoinstallable distribution. The tree path field should be a valid path to an installation tree located on this SUSE Manager server.

The Distribution Label field should contain only letters, numbers, hyphens, periods, and underscores. It must also be at least 4 characters long.

The Tree Path, Base Channel, and Installer Generation should always match. This generally means that the versions for each field should be from the same version of SUSE Linux Enterprise.

The Tree Path must be a local disk path on your SUSE Manager server containing the entire autoinstallable tree for a distribution including kernel, initrd, and repo information, but excluding any rpms. This directory should be readable by the apache and tomcat users. If you have media located on the SUSE Manager server at: `/var/distro-trees/sles-11-server/` you would specify that path as your Tree Path value.

The form fields are as follows:

- Distribution Label*:**
- Tree Path*:**
- Base Channel*:**
- Installer Generation*:**
- Kernel Options:**

操作系统运维场景之- 第三方软件管理

The screenshot displays the SUSE Manager web interface in a Mozilla Firefox browser. The address bar shows the URL `https://smgr.susemgr.com/rhn/channels/manage/Edit.do`. The page title is "SUSE Manager - Software - Manage Software Channels". The left sidebar contains a navigation menu with options: Home, Systems, Salt, Images, Patches, Software (selected), Channels, Package Search, Manage Software Channels (selected), Overview, Manage Software Packages, Manage Repositories, and Repositories. The main content area is titled "Create Software Channel" and includes a section for "Basic Channel Details". This section provides instructions on creating or editing software channels, noting that the parent channel can be 'none' for a base channel or a specified channel for a child. It lists requirements for channel names and labels: minimum 6 characters, maximum 256 for names and 128 for labels, starting with a letter or digit, and containing only lowercase letters, hyphens, periods, underscores, and numerals. Channel names may also include spaces, parentheses, and forward slashes. A channel summary is also required, limited to 500 characters. Below the text, there are input fields for "Channel Name*", "Channel Label*", "Parent Channel:", "Architecture:", and "Repository Checksum Type:". The values entered are "prod openjava sles12-sp3-x86_64", "prod-openjava-sles12-sp3-x86_64", "prod-SLES12-SP3-Pool for x86_64", "x86_64", and "sha256" respectively.

SUSE Manager - Software - Manage Software Channels - Mozilla Firefox

SUSE Manager - Soft... x +

https://smgr.susemgr.com/rhn/channels/manage/Edit.do

SUSE Manager > Software > Manage Software Channels

0 systems selected admin Widgets-4-U

Search page

Home Systems Salt Images Patches Software Channels Package Search Manage Software Channels Overview Manage Software Packages Manage Repositories Repositories

Create Software Channel

Basic Channel Details

Create or edit software channels from this page.
If the parent channel is set to 'none', the channel is a base channel. Otherwise, the channel is a child of the specified channel.

Channel name and label are required.
They each must be at least 6 characters in length.
Channel name must not be longer than 256 characters and channel label must not be longer than 128 characters.
Channel name must begin with a letter and channel label may begin with a letter or digit.
They each must not begin with rhn, redhat or red hat.
They each must contain only lowercase letters, hyphens ("-"), periods ("."), underscores ("_"), and numerals.
Channel name may also contain spaces, parentheses () and forward slashes ("/).

Channel summary is also required and must not exceed 500 characters.

Channel Name*: prod openjava sles12-sp3-x86_64

Channel Label*: prod-openjava-sles12-sp3-x86_64

Parent Channel: prod-SLES12-SP3-Pool for x86_64

Architecture: x86_64

Repository Checksum Type: sha256

操作系统运维场景之- 配置管理

DetailsSoftwareConfigurationProvisioningGroupsAuditStates

FormulasEvents

Formulas

This is a feature preview: On this page you can select [Salt formulas](#) for this group/system, which can then be configured on group and system level. This allows you to automatically install and configure software. We would be glad to receive your feedback via the [forum](#).

SaveRemove allReset Changes

Formulas

Choose formulas:

☐ General System Configuration

☒ Bind

☒ Dhcpcd

☐ Locale

☐ Tftpd

☒ Vsftpd

Dhcpcd

Domain Name:

example.org

Domain Name Servers:

example.org

Listen Interfaces:

em2

Max Lease Time:

20001

Default Lease Time:

20000

39

操作系统运维场景之- 补丁管理

SUSE Manager - Systems - Systems - All - Mozilla Firefox

SUSE Manager - Syst... x +

https://smgr.susemgr.com/rhn/systems/SystemList.do

SUSE Manager > Systems > Systems > All

0 systems selected admin Widgets-4-U

Search page

Home Systems

Overview Systems

All Physical Systems Virtual Systems Unprovisioned Systems Out of Date Requiring Reboot Non Compliant Without System Type Ungrouped

Systems ?

Select All 1 - 2 of 2

Filter by System Name: Select first character 25 items per page

☐ System	Updates	Patches	Packages	Configs	Base Channel	System Type
☐  srv1.susemgr.com		2	4	0	test-SLES12-SP3-Pool for x86_64	Salt
☐  srv2.susemgr.com		0	0	0	prod-SLES12-SP3-Pool for x86_64	Salt

Download CSV

操作系统运维场景之-安全漏洞CVE

it > CVE Au
ound ⚙️ systems selected ✎

2018
2017
2016
2015
2014
2013

CVE 2018

- ☒ Affected, patches available in channels which are not assigned
- ☒ Affected, at least one patch available in an assigned channel
- ☒ Not affected
- ☒ Patched

System Currency Report [?]

1 - 7 of 7

Filter by System Name:

Select first character ▾ 25 items per page

System	Security (Critical)	Security (Important)	Security (Moderate)	Security (Low)	Bug Fixes	Enhancements	Score
hqpg-12sp1-58	4	208	116	4	504	76	5484
testingpg-12sp2-53	0	84	150	6	840	12	4260
hqpg-cent7-vm1	5	80	50	15	705	155	3465
hqpg-11sp4-51	3	99	114	0	81	0	2754
testingpg-sap-12sp2-49	0	72	112	4	240	0	2544
hqpg-12sp3-55	0	36	72	0	120	0	1392
testingpg-12sp1-50	0	15	48	3	273	33	1215

[Download CSV](#)

操作系统运维场景之- 安全合规性检查



sles12sp1.test.demo

[Delete System](#) | [Add to SSM](#)

[Details](#) [Software](#) [Groups](#) [Audit](#) [States](#) [Formulas](#) [Events](#)

[List Scans](#) [Schedule](#)

OpenSCAP Scans

Xccdf Test Result	Diff	Completed
This system has not yet reported any SCAP results.		

Tip: Compliance column represents unweighted pass/fail ration. Compliance = $P/(Total - S)$

```
sles12sp1:~ # /usr/bin/oscaped eval /usr/share/openscap/scap-xccdf.xml
```

Title **sysctl net.ipv4.ip_forward must be 0**

Rule rule-sysctl-ipv4-forward

Result **pass**

Title **sysctl net.ipv4.tcp_syncookies must be 1**

Rule rule-sysctl-ipv4-tcpsyncookies

Result **pass**

Title **sysctl net.ipv6.conf.all.forwarding must be 0**

Rule rule-sysctl-ipv6-all-forward

Result **pass**

Title **sysctl net.ipv6.conf.default.forwarding must be 0**

Rule rule-sysctl-ipv6-default-forward

Result **pass**

Title **kernel config CONFIG_SYN_COOKIES must be y**

Rule rule-kernel-syncookies

Result **fail**

Title **file /etc/login.defs must have a line that matches ^PASS_MAX_DAYS.*99999**

Rule rule-pwd-maxdays

Result **pass**

操作系统运维场景之- 容器管理

SUSE Manager > Images > Build

Clear Menu

Search page

Home Systems Salt Images Images Build Profiles Stores Patches Channels Audit

Build Image

Version: latest

Build Profile: suse_real_key

Build Host: headref-minstes12sp2.tf.local

Schedule no sooner than: 4/4/17 2:02 pm CEST

Build

Profile Summary

Label: suse_real_key

Image Type: Dockerfile

Image Store: galaxy-registry

Path: https://gitlab.suse.de/galaxy/suse-manager-containers.git/test-donot-remove:test-profile/serverhost

Activation Key: 1-MINION-TEST

Software Channels: test-channel-x86_64

Edit

SUSE Manager > Images > Profiles

Clear Menu

Search page

Home Systems Salt Images Images Build Profiles Stores Patches Channels Audit

Image Profiles

Refresh Create

Items 1 - 4 of 4

25 items per page

Label	Build Type	Actions
suse_simply	Dockerfile	
suse_real_simply	Dockerfile	
suse_key	Dockerfile	
suse_real_key	Dockerfile	

Page 1 of 1

SUSE Manager > Images > Images

Clear Menu

Search page

Home Systems Salt Images Images Build Profiles Stores Patches Channels Audit Configuration Schedule Users

Images

Refresh

Items 1 - 25 of 36

25 items per page

Name	Version	Updates	Patches	Packages	Status	Last Modified	Actions
suse_real_key	fac		2	2		21 minutes ago	
suse_simply	latest		0	0		2 hours ago	
suse_real_key	i69hBsnipSmayA		2	2		10 hours ago	
suse_real_key	N6JnYebBrQkjHg		2	2		10 hours ago	
suse_real_key	NQIFNsd658OQxX		2	2		10 hours ago	
suse_real_key	KbHk5aVownJc5Q		2	2		10 hours ago	
suse_real_key	9ORKgz30NOPgkQ		2	2		10 hours ago	
suse_real_key	BLbb6FHk7j9S6g		2	2		10 hours ago	
suse_real_key	DbGtmxAdo1rXIQ		2	2		10 hours ago	

操作系统运维场景之- 批量升级

 lptidx001.test.demo 

Details Software Configuration Provisioning Groups Audit Events

Patches Packages Software Channels SP Migration Software Crashes

Service Pack Migration - Channels

There are outstanding Package Management Stack updates available for this system. Please update all Software Update Stack related

Installed Products: SUSE Linux Enterprise Server 12 SP2

Target Products: SUSE Linux Enterprise Server 12 SP3

Target Base Channel:

• Mandatory Child Channels:

- ☒ SLE-Manager-Tools12-Pool x86_64 SP3
- ☒ SLE-Manager-Tools12-Updates x86_64 SP3
- ☒ SLES12-SP3-Updates for x86_64

• Optional Child Channels:

- ☐ None

[Schedule Migration](#)

操作系统运维场景之- 执行远程命令

The screenshot displays the SaltStack Remote Commands interface. On the left is a dark sidebar with a search bar and a navigation menu. The main panel is titled "Remote Commands" and contains a command input field with the text "ls -lha", a "Stop waiting" button, and a list of target systems. The first target system, "sles12sp1.test.demo", shows the output of the command as a directory listing. The second target system, "client2.test.demo", is marked as "pending".

Sidebar Navigation:

- Search page
- Home
- Systems
- Salt
 - Keys
 - Remote Commands
 - State Catalog
 - Formula Catalog
- Images
- Patches
- Software
- Audit
- Configuration
- Schedule
- Users
- Admin
- Help

Remote Commands Interface:

Command: `ls -lha` [Stop waiting]

Target systems (3)

sles12sp1.test.demo [hide response]

```
total 124K
drwx----- 6 root root 4.0K Jul  4 07:40 .
drwxr-xr-x 22 root root 4.0K Jul  3 13:36 ..
-rw----- 1 root root 1.8K Jul  4 08:17 .bash_history
drwx----- 2 root root 4.0K Jul  3 13:38 .gnupg
drwxr-xr-x  3 root root 4.0K Jul  3 13:44 .local
-rw----- 1 root root 2.2K Jul  3 15:52 .viminfo
-rw-r--r--  1 root root 31K Jul  3 13:39 autostart.xml
drwxr-xr-x  2 root root 4.0K Sep 21  2014 bin
-rw-r--r--  1 root root 27K Jul  3 15:52 bootstrap.sh
-rw-r--r--  1 root root 617 Jul  3 15:51 client-config-overrides.txt
-rw-r--r--  1 root root 6.4K Jun 20 01:09 client_config_update.py
drwxr-xr-x  5 root root 4.0K Jul  3 13:34 inst-sys
-rw-r--r--  1 root root 20K Jul  3 13:47 sles12sp1.sh
```

client2.test.demo [pending]

操作系统运维场景之- 定时任务

SUSE Manager - Admin - Task Schedules - Mozilla Firefox

SUSE Manager - Admin... x

https://smgr.susemgr.com/rhn/admin/SatSchedules.do

SUSE Manager > Admin > Task Schedules

0 systems selected admin Widgets-4-U

Search page

SUSE Manager Schedules ?

+ create schedule

Below is a list of defined schedules. A schedule defines frequency, how often a predefined bunch shall be triggered.

1 - 23 of 23

25 items per page

Schedule name	Frequency	Active From	Bunch
auto-errata-default	0 5/10 * * * ?	2017-08-11 13:21:02 CEST	auto-errata-bunch
channel-repodata-default	0 * * * * ?	2017-08-11 13:21:02 CEST	channel-repodata-bunch
cleanup-data-default	0 0 23 ? * *	2017-08-11 13:21:03 CEST	cleanup-data-bunch
clear-taskologs-default	0 0 23 ? * *	2017-08-11 13:21:03 CEST	clear-taskologs-bunch
cobbler-sync-default	0 * * * * ?	2017-08-11 13:21:02 CEST	cobbler-sync-bunch
compare-configs-default	0 0 23 ? * *	2017-08-11 13:21:03 CEST	compare-configs-bunch
cve-server-channels-default	0 0 23 ? * *	2017-08-11 13:21:03 CEST	cve-server-channels-bunch

Home Systems Salt Images Patches Software Audit Configuration Schedule Users Admin

Setup Wizard Organizations

操作系统运维场景之- 快照和回滚



Snapshot Tags

The following list of tags mark moments in time when the latest system snapshot was noted. Clicking the links below will allow you to rollback

Select All

1 - 1 of 1 (0 selected)

Filter by Tag name:



Tag name

Created



[patch at 2018/03/08-20:00](#)

Thu Mar 08 17:21:02 CST 2018



2018-03-08 17:18:29 Snapshot - RPM Packages

Below is a comparison of the current package profile and the snapshot package profile.

1 - 25 of 26



Filter by Package Name:



Select first character ▾

25

items per page

Package	Architecture	Current Version	Snapshot Version	Difference
aaa_base	x86_64	13.2+git20140911.61c1681-32.1	13.2+git20140911.61c1681-28.1	Current profile newer
aaa_base-extras	x86_64	13.2+git20140911.61c1681-32.1	13.2+git20140911.61c1681-28.1	Current profile newer
apparmor-docs	noarch	2.8.2-54.1	2.8.2-45.1	Current profile newer
apparmor-parser	x86_64	2.8.2-54.1	2.8.2-45.1	Current profile newer
apparmor-profiles	noarch	2.8.2-54.1	2.8.2-45.1	Current profile newer
apparmor-utils	noarch	2.8.2-54.1	2.8.2-45.1	Current profile newer
at	x86_64	3.1.14-8.3.1	3.1.14-7.3	Current profile newer
at-spi2-core	x86_64	2.20.2-14.3.1	2.20.2-12.3	Current profile newer

操作系统运维场景之-拓扑图

SUSE Manager > Systems > Visualization > Systems Grouping

Search page

Home

Systems

- Overview
- Systems
 - System Groups
 - System Set Manager
 - Bootstrapping
- Visualization
 - Virtualization Hierarchy
 - Proxy Hierarchy
 - Systems Grouping
- Advanced Search
- Activation Keys
- Stored Profiles
- Custom System Info
- Autoinstallation
- Software Crashes

Systems Grouping

Toggle filters

Filter by system name
e.g., client.nue.sles

Show systems with:
☐ security advisories
☐ bug fix advisories
☐ product enhancement advisories

Filter by system base channel
e.g., SLE12

Filter by system installed products
e.g., SLES

Split into groups
Add a grouping level
San Francisco
PROD
London
Joe's Systems
Remove this level
San Francisco
PROD
London
Joe's Systems
Remove this level

cb-minsles.tf.local

[System details page](#)

Type	system
Add/remove system from SSM	+ -
Base entitlement	salt_entitled
Base channel	SLES12-SP1-Pool for x86_64
Checkin time	an hour ago
Installed products	SLES
Patch status	84 security advisories 113 bug fix advisories 1 product enhancement advisories

操作系统运维场景之- 项目管理





0 systems selected



admin

SUSE PM



Search page

Home

Systems

Salt

Images

Patches

Software

Content Lifecycle

Projects

Filters

+ Create a new Content Lifecycle Project

+ Create

Project Properties

Label *:

web_servers

Name *:

Web Servers

Description:

My web servers

SUSE® Manager

> Content Lifecycle > Projects

22

0 systems selected

admin

SUSE PM

Search page

Home

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Images

Patches

Software

Content Lifecycle

Projects

Filters

Audit

Configuration

Schedule

Users

Admin

Copyright Notice

SUSE Manager release 4.0 RC1

Sources

Type:

Channel

New Base Channel

SLE-Product-SLES15-SP1-Pool for x86_64

Choose the channel to be elected as the new base channel

Child Channels (8)

Search a channel

☒ Vendors

☒ Custom

☒ Clones

☒

▼

 SLE-Product-SLES15-SP1-Pool for x86_64 (8)

☒ include recommended

☒ SLE-Product-SLES15-SP1-Updates for x86_64

i

mandatory

☒ SLE-Module-Basesystem15-SP1-Updates for x86_64

i

recommended

☒ SLE-Module-Basesystem15-SP1-Pool for x86_64

i

recommended

☒ SLE-Manager-Tools15-Pool for x86_64 SP1

i

recommended

☒ SLE-Manager-Tools15-Updates for x86_64 SP1

i

recommended

☒ SLE-Module-Server-Applications15-SP1-Pool for x86_64

i

recommended

☒ SLE-Module-Server-Applications15-SP1-Updates for x86_64

i

recommended

☐ SLE-Module-Containers15-SP1-Updates for x86_64

i

☐ SLE-Module-Containers15-SP1-Pool for x86_64

i

☐ SLE-Module-Python2-15-SP1-Updates for x86_64

i

☐ SLE-Module-Python2-15-SP1-Pool for x86_64

i

Cancel

Save

Environment Lifecycle

[+ Add Environment](#)

dev

[+ Edit](#)

Description: Development Environment

Version: Version 3: With emergency bug fixes from June 15

Status: Generating repositories data 🔄



Promote



qa

[+ Edit](#)

Description: QA Environment

Version: Version 2: Latest Build from June 11

Status: Built



Promote



prod

[+ Edit](#)

Description: Production Environment

Version: Version 1: Initial build ...

Status: Built



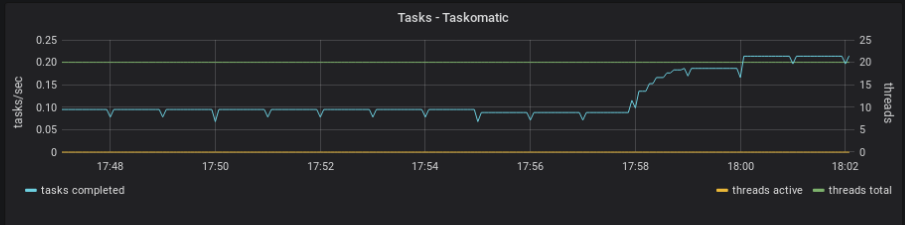
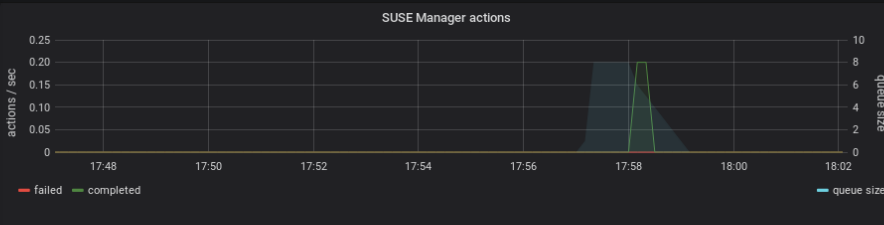
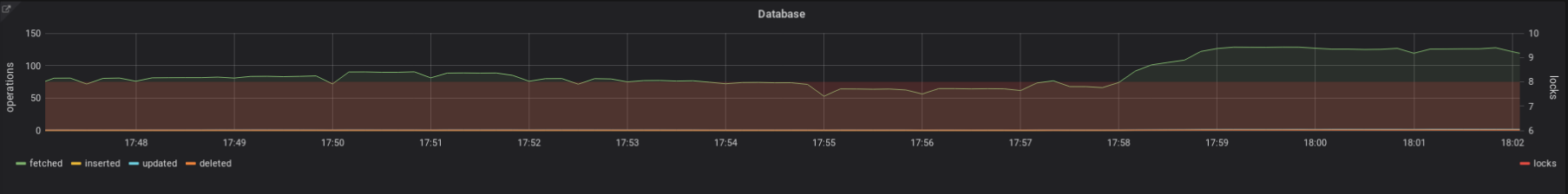
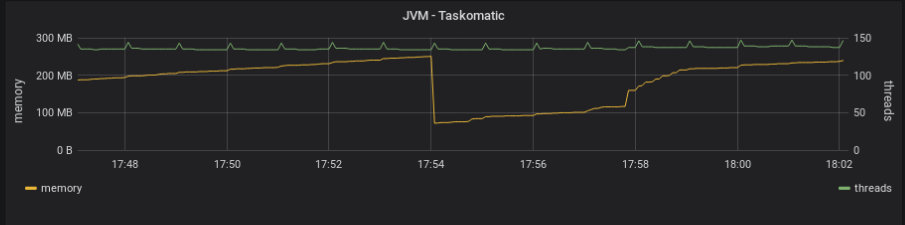
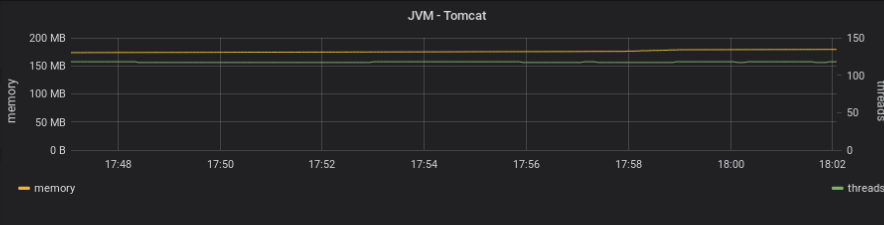


操作系统运维场景之- 监控





SUSE Manager





Search page



Home



Systems



Salt



Images



Patches



Software



Content Lifecycle



Audit



Configuration



Schedule



Users



Admin



Setup Wizard

SUSE Manager Configuration - Monitoring[?]

Setup your SUSE Manager server monitoring.

General

Bootstrap Script

Organizations

Restart

Cobbler

Bare-metal systems

Monitoring

Monitoring

Monitoring

- ✗ System
- ✗ PostgreSQL database
- ✗ Taskomatic (Java JMX)
- ✗ Tomcat (Java JMX)

Server Monitoring

The server uses [Prometheus](#) exporters to expose metrics about your environment.

Refer to the [documentation](#) to learn how to consume these metrics.

 Enabling services...

操作系统运维场景之- SLES for SAP HANA





0 systems selected



admin

SUSE PM



Search page

- Home
- Systems**
 - Overview
 - System List
 - System Groups
 - System Set Manager
 - Bootstrapping
 - Visualization
 - Advanced Search
 - Activation Keys
 - Stored Profiles
 - Custom System Info
 - Autoinstallation
 - Software Crashes
 - Virtual Host Managers
- Salt

Copyright Notice

SUSE Manager release

min1.su.se

Delete System

Details Software Configuration Provisioning Groups Audit States **Formulas** Events

Formulas Locale Prometheus Exporters

On this page you can select [Salt Formulas](#) for this group/system, which can then be configured on group and system level. This allows you to automatically install and configure software.

Save Remove all Reset Changes

Formulas

Choose formulas:

- ☐ No group
- ☐ Webserver
- ☒ Cluster
- ☒ Cluster
- ☒ Sap Hana Deployment
- ☒ Hana

On this page you can configure [Salt Formulas](#) to automatically install and configure software.

[< Prev](#)[Next >](#)

Save Formula

Clear values

Cluster

Cluster name:

hacluster

First node:

Unicast:

☐

Interface:

wlan0

Ntp:

pool.ntp.org

Watchdog configuration

Watchdog module to load:

softdog

Watchdog device:

/dev/watchdog

SBD configuration

Diskless SBD (If device is set this option is skipped):

☐

SBD device url:

/dev/vdb

SSH keys configuration

Share SSH keys information:

☒

Overwrite current keys:

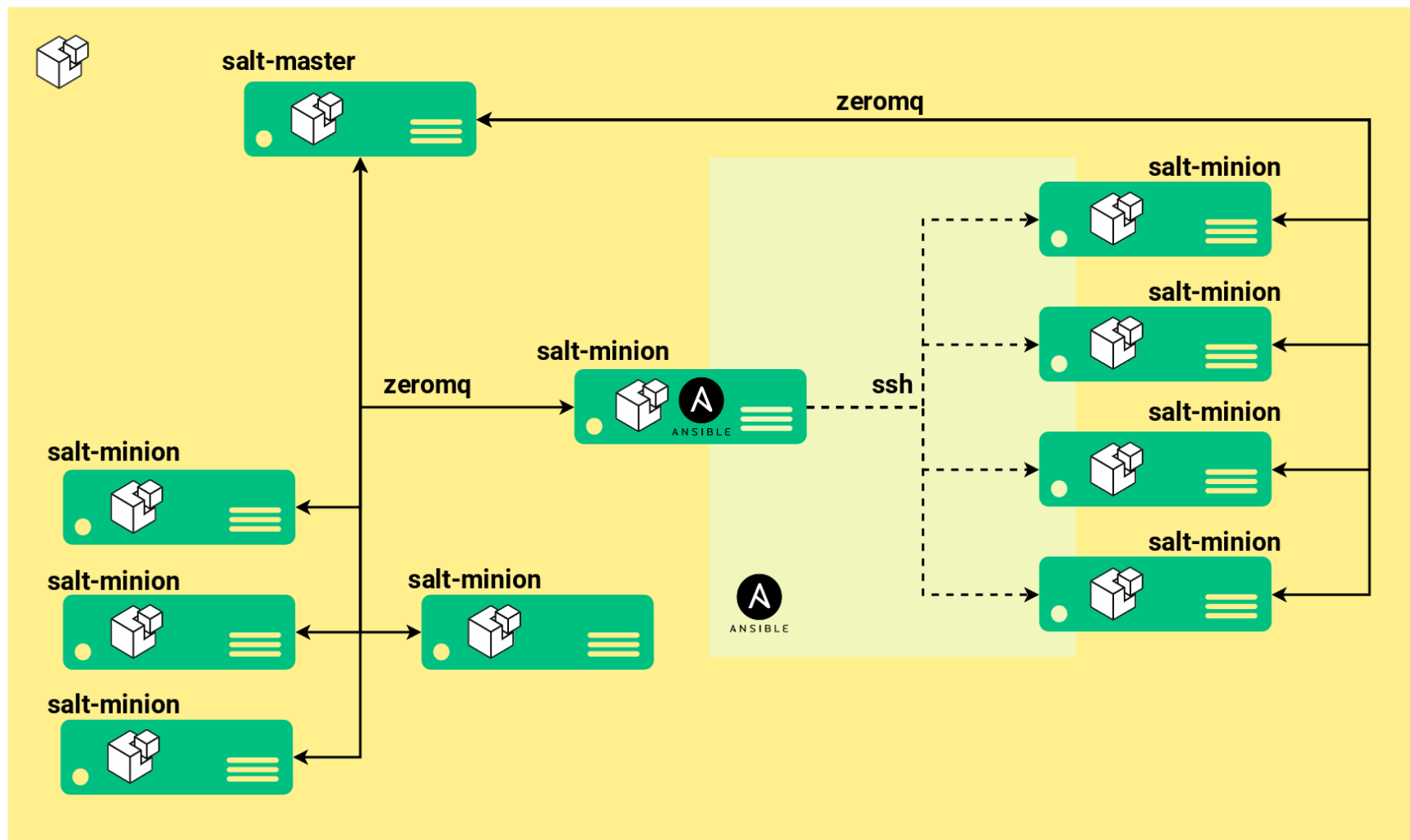
☐

操作系统运维场景之- 虚拟化管理



操作系统运维场景之- 二次开发

集成SaltStack



自动化运维关键

- 标准化
- 标准化
- 标准化

自动化运维关键

- 操作系统标准化
- 应用上线标准化
- 安全合规性标准化
- 变更流程标准化
- 故障处理标准化

演示

为IoT用例轻松部署SUSE Linux Enterprise Server

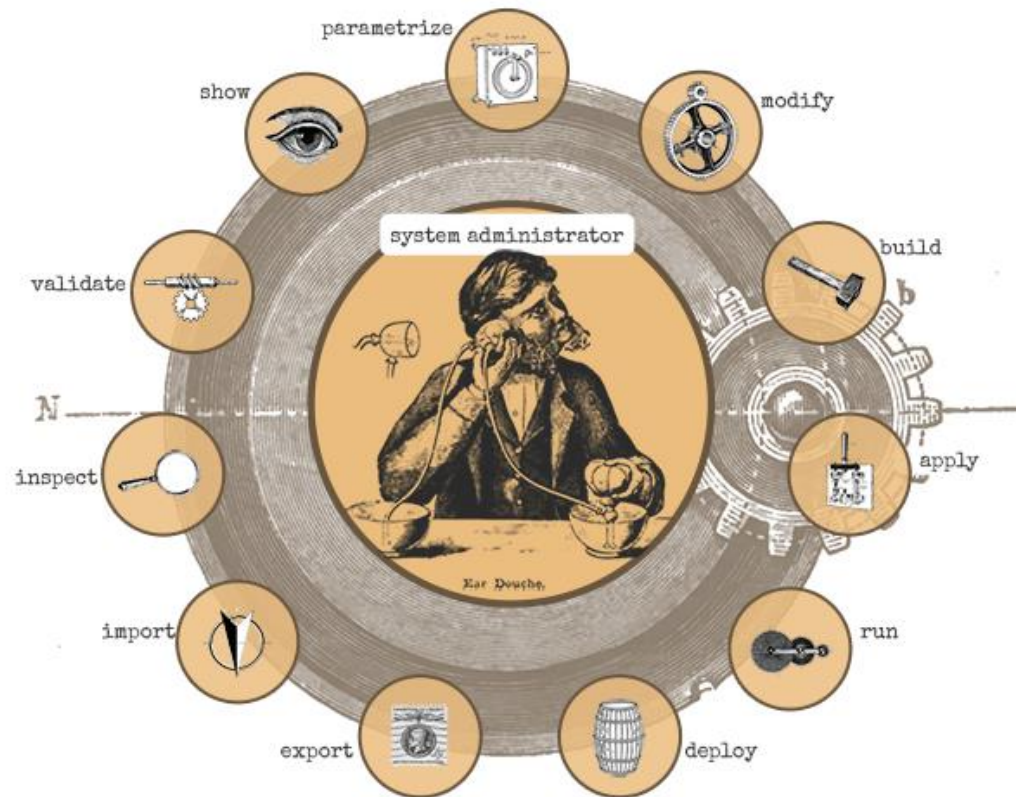
工具

- **Machinery** – 系统机械学习工具，在**Package Hub**中提供
- **kiwi**开放构建服务 – 在本地或<https://build.opensuse.org/>提供

任务

- 通过**machinery**智能学习系统
- 导出为**Kiwi**或**Autoyast**
- 构建镜像
- 部署

Machinery



通过machinery智能学习系统

```
linux-7a4s:/home/cliddle # machinery inspect 172.16.147.216 --name SLES15-ED19 --extract-files -r root
Inspecting 172.16.147.216 for os, packages, patterns, repositories, users, groups, services, changed-config-files, changed-managed-files, unmanaged-files...
```

Note: There are filters being applied during inspection. (Use `--verbose` option to show the filters)

Inspecting os...

-> Found operating system 'SUSE Linux Enterprise Server 15' version '15'.

Inspecting packages...

-> Found 1589 packages.

Inspecting patterns...

-> Found 13 patterns.

Inspecting repositories...

-> Found 34 repositories.

Inspecting users...

-> Found 24 users.

Inspecting groups...

-> Found 43 groups.

Inspecting services...

-> Found 249 services.

Inspecting changed-config-files...

-> Extracted 18 changed configuration files.

Inspecting changed-managed-files...

-> Extracted 25 changed managed files.

Inspecting unmanaged-files...

-> Extracted 1734 unmanaged files and/or trees.

Hint: To show the data of the system you just inspected run:

`machinery show SLES15-ED19`

检查系统配置

Machinery System Descriptions - Mozilla Firefox

Machinery System Description x +

← → ↻ 🏠 ⓘ http://127.0.0.1:7585/ ... 🔒 ☆

Select a description from the list below to show its details.

Reset

Name	Host	Scopes	Last update
SLES15-ED19	172.16.147.216	os, packages, patterns, repositories, users, groups, services, changed-config-files (extracted), changed-managed-files (extracted), unmanaged-files (extracted)	2019-04-29 01:56:09 UTC

检查系统配置

← → ↺ 🏠

http://127.0.0.1:7585/SLES15-ED19

⋮ 📌 ☆

🔍 📄 ☰

SLES15-ED19

⋮

No description selected for comparis

⋮

✕

Collapse all

Type To Filter

Reset

Scopes:

OS

PK

PT

R

U

G

S

CCF

CMF

UF

inspection details

created by Machinery
Machinery documentation

OS

^

Operating System (inspected host: '172.16.147.216', at: 2019-04-29 01:56:09)

Name	SUSE Linux Enterprise Server 15
Version	15
Architecture	x86_64

PK

^

Packages 1589 packages (inspected host: '172.16.147.216', at: 2019-04-29 01:56:09)

Name	Version	Release	Arch	Vendor	Checksum
AppStream	0.11.8	1.39	x86_64	SUSE LLC	df3212a69a44d9c3d6145e0511368ac1
AppStream-lang	0.11.8	1.39	noarch	SUSE LLC	af995f68d06f699ae370b353715f041a
GeolP	1.6.11	1.19	x86_64	SUSE LLC	e6a4320c2e7e5cb98423559967810cd8
GeolP-data	1.6.11	1.19	noarch	SUSE LLC	7577ca5258600dccfd56c67df8caf017
Mesa	18.0.2	27.3.1	x86_64	SUSE LLC	ecb6e47ee48d0d731021f32726fc1a69
Mesa-dri	18.0.2	27.3.1	x86_64	SUSE LLC	50752f400c7f685d638f8f28b4ea8cb2
Mesa-gallium	18.0.2	27.3.1	x86_64	SUSE LLC	4e368abfceaaffa19534a2d492590119

导出系统配置

```
linux-7a4s:/ # machinery export-autoyast SLES15-ED19 --autoyast-dir /tmp
```

Unmanaged files following these patterns are not exported:

```
var/lib/rpm/*  
etc/passwd*  
etc/shadow*  
etc/group*  
etc/fstab  
lib/mkinitrd  
etc/udev/rules.d/70-persistent-net.rules  
var/log/*  
etc/default/grub*  
etc/zypp/repos.d/*
```

Note: The permissions of the AutoYaST directory are restricted to be only accessible by the current user. Full permissions are provided by the README.md in the exported directory.

Exported to '/tmp/SLES15-ED19-autoyast'.

```
linux-7a4s:/ # cd /tmp/SLES15-ED19-autoyast/
```

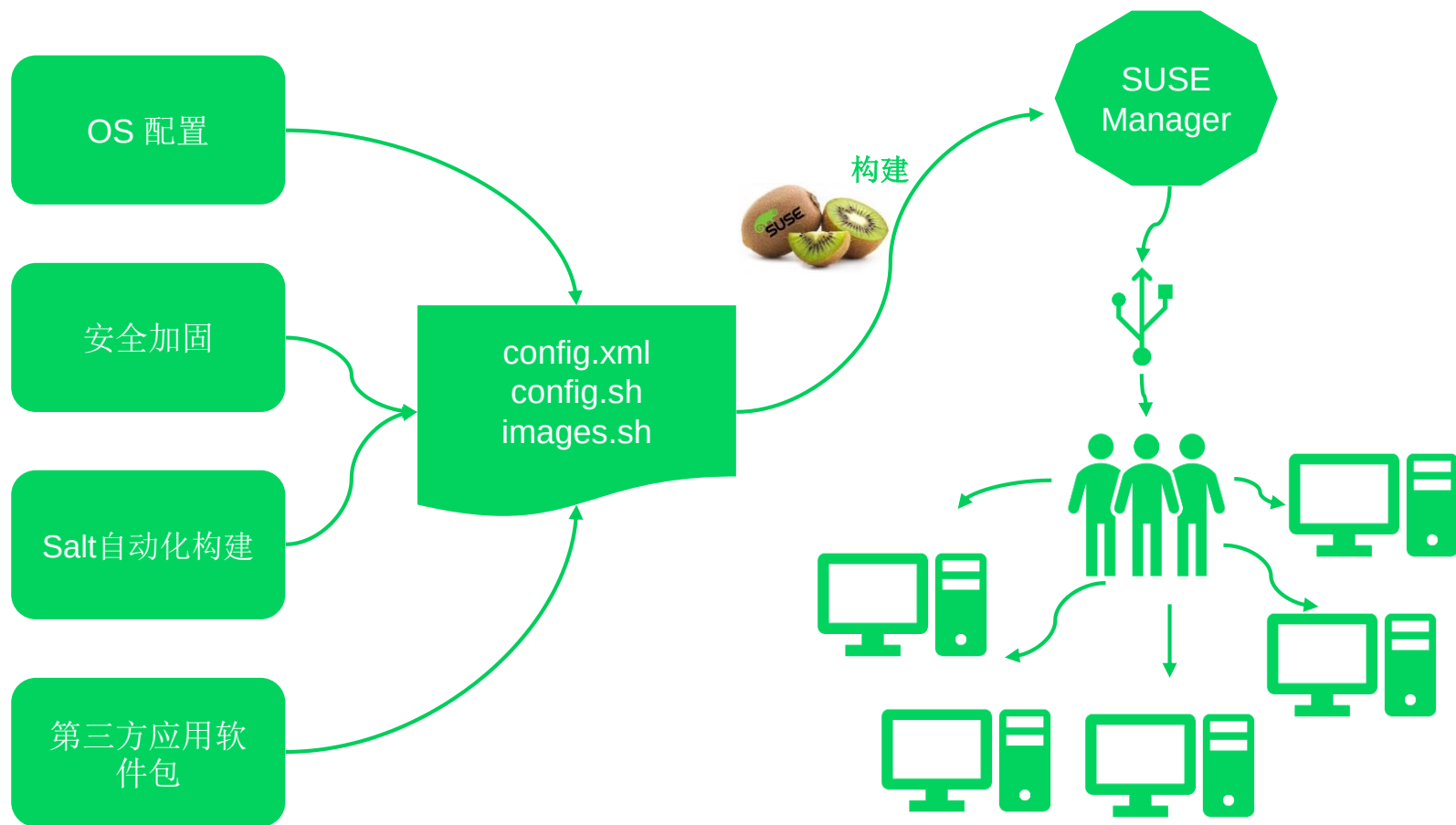
```
linux-7a4s:/tmp/SLES15-ED19-autoyast # ls  
README.md      changed_config_files  manifest.json          unmanaged_files_autoyast_excludes  
autoinst.xml   changed_managed_files  unmanaged_files
```

```
linux-7a4s:/tmp/SLES15-ED19-autoyast # █
```


生成镜像

```
linux-7a4s:/tmp # kiwi system build --description SLES15-ED19-kiwi --target-dir /tmp
[ INFO    ]: 01:36:28 | Loading XML description
[ INFO    ]: 01:36:29 | --> loaded SLES15-ED19-kiwi/config.xml
[ INFO    ]: 01:36:29 | --> Selected build type: vmx
[ INFO    ]: 01:36:29 | Preparing new root system
[ INFO    ]: 01:36:29 | Setup root directory: /tmp/build/image-root
[ INFO    ]: 01:36:30 | Setting up repository https://updates.suse.com/SUSE/Products/SLE-Module-Basesystem/15/x86_64/product?4Ep1mH5ghj4EfETIoawTmZCh-nrkkyoLGXF0roqYkGJ9UYFPLBKMitImkU0rh2mpMX-v6XGgSRADrKJBbwo4fSJsv_FsYL4T_DXysN3D8wL00qVBINF
MKScokX0PSPpU2JKNhNMB9Rx5xumsNwI1Vcg0cic
[ INFO    ]: 01:36:30 | --> Type: rpm-md
[ INFO    ]: 01:36:30 | --> Priority: 99
[ INFO    ]: 01:36:30 | --> Translated: https://updates.suse.com/SUSE/Products/SLE-Module-Basesystem/15/x86_64/product?4Ep1mH5ghj4EfETIoawTmZCh-nrkkyoLGXF0roqYkGJ9UYFPLBKMitImkU0rh2mpMX-v6XGgSRADrKJBbwo4fSJsv_FsYL4T_DXysN3D8wL00qVBINFMKScokX0PSPpU2JKNhNMB9Rx5xumsNwI1Vcg0cic
[ INFO    ]: 01:36:30 | --> Alias: Basesystem_Module_15_x86_64:SLE-Module-Basesystem15-Pool
[ INFO    ]: 01:36:30 | Setting up repository https://updates.suse.com/SUSE/Updates/SLE-Module-Basesystem/15/x86_64/update?nZ7QxoEU7F2Eqsw2CJDdXv2RrQADcI1RSnKnWGiRLp5SpXo5FaBCKLjX77yzDSVD-SwLSnU-oimNaNCf2JgnYaxvzE15QNBmMFH1IFX2kcHFki_C076w9
GMYhRPaUNUJJept9QfzmhSsd7o1TuvfTwAd-
[ INFO    ]: 01:36:30 | --> Type: rpm-md
[ INFO    ]: 01:36:30 | --> Priority: 99
[ INFO    ]: 01:36:30 | --> Translated: https://updates.suse.com/SUSE/Updates/SLE-Module-Basesystem/15/x86_64/update?nZ7QxoEU7F2Eqsw2CJDdXv2RrQADcI1RSnKnWGiRLp5SpXo5FaBCKLjX77yzDSVD-SwLSnU-oimNaNCf2JgnYaxvzE15QNBmMFH1IFX2kcHFki_C076w9GMYhRPaUNUJJept9QfzmhSsd7o1TuvfTwAd-
[ INFO    ]: 01:36:30 | --> Alias: Basesystem_Module_15_x86_64:SLE-Module-Basesystem15-Updates
[ INFO    ]: 01:36:30 | Setting up repository https://updates.suse.com/SUSE/Products/SLE-Module-Desktop-Applications/15/x86_64/product?X2QKBvZAXr0HBdcVjKHKwVzv35oxMGU-gPpYxm_oTsYD9Ekm56Sk1ljpfKL1LXZDRjQRhtIv_8h0JM55qCn0ZmII0WeSoR_N9V4nHXfwl
lj57Fr0g34-HQ0F6pAgGiRrHUIB-kqNc1pZDI0Lqr4HA9kpFeyX6zrp53pEX0w
[ INFO    ]: 01:36:30 | --> Type: rpm-md
[ INFO    ]: 01:36:30 | --> Priority: 99
[ INFO    ]: 01:36:30 | --> Translated: https://updates.suse.com/SUSE/Products/SLE-Module-Desktop-Applications/15/x86_64/product?X2QKBvZAXr0HBdcVjKHKwVzv35oxMGU-gPpYxm_oTsYD9Ekm56Sk1ljpfKL1LXZDRjQRhtIv_8h0JM55qCn0ZmII0WeSoR_N9V4nHXfwl
lj57Fr0g34-HQ0F6pAgGiRrHUIB-kqNc1pZDI0Lqr4HA9kpFeyX6zrp53pEX0w
[ INFO    ]: 01:36:30 | --> Alias: Desktop_Applications_Module_15_x86_64:SLE-Module-Desktop-Applications15-Pool
[ INFO    ]: 01:36:30 | Setting up repository https://updates.suse.com/SUSE/Updates/SLE-Module-Desktop-Applications/15/x86_64/update?T0Wi8SNwWl_6RdbZen_us_9C1EIES75UFjUx2rNxrpfpJ18xBCmX000nxfEoZ6loNIYubaNqx_YB71MaXWYfzvC_EyEK-K7JQVX5MfbwIO
p7cJ8nYAmP_xVVKfLLDEz_lubiabnvzZk-88TI1CZntSj9CZntJzVg9MAcw
[ INFO    ]: 01:36:30 | --> Type: rpm-md
```

镜像制作



Q & A



THANKS