



Linux操作系统 变迁之旅

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SUSE"专家日"2019

中国 深圳

2019.08

Linux Kernel

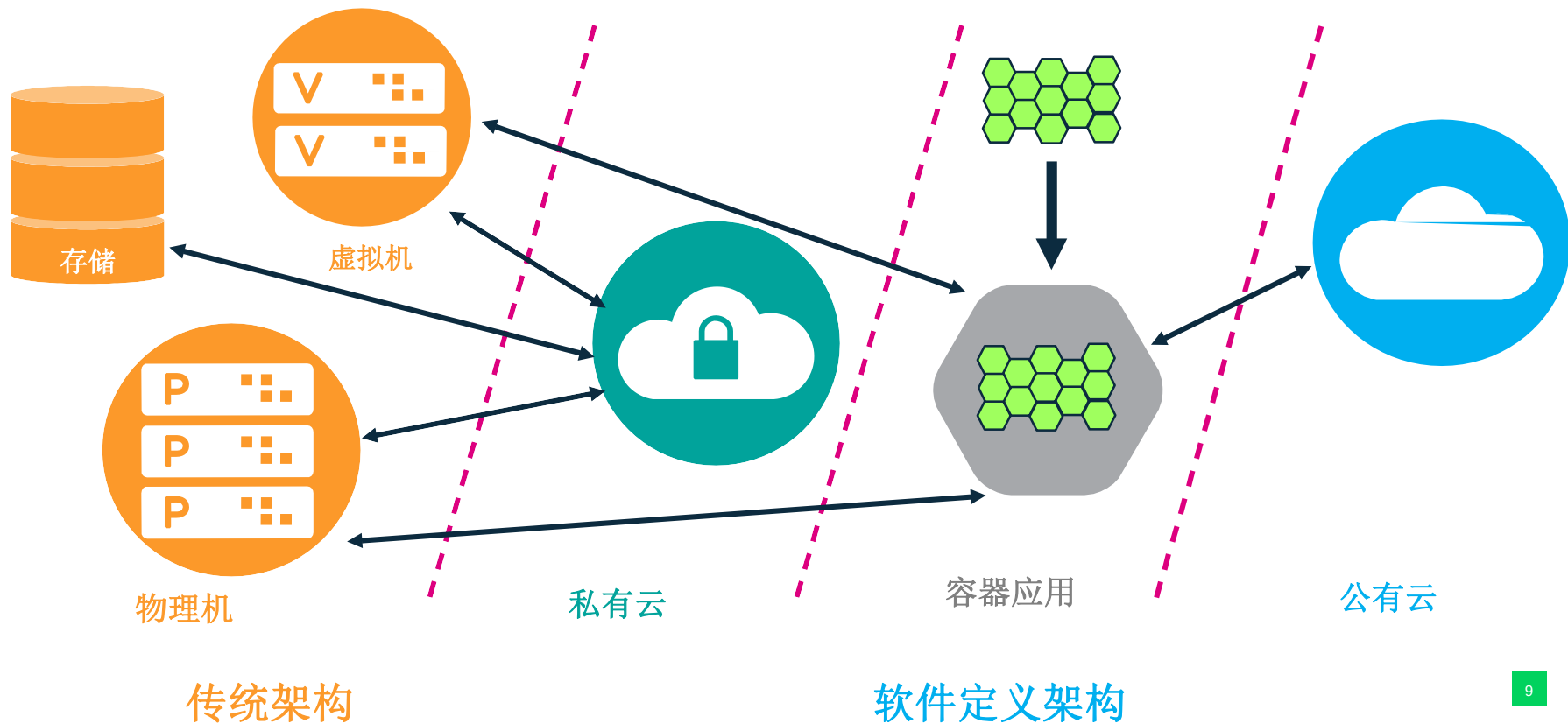
哪年发布第一个版本？ 1991年8月26日

0.01版本的代码量： 10229行

目前最新的稳定版本号？ 5.x

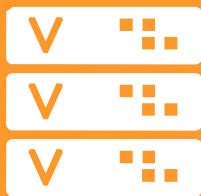
目前最新版本的代码量？ 2600万

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

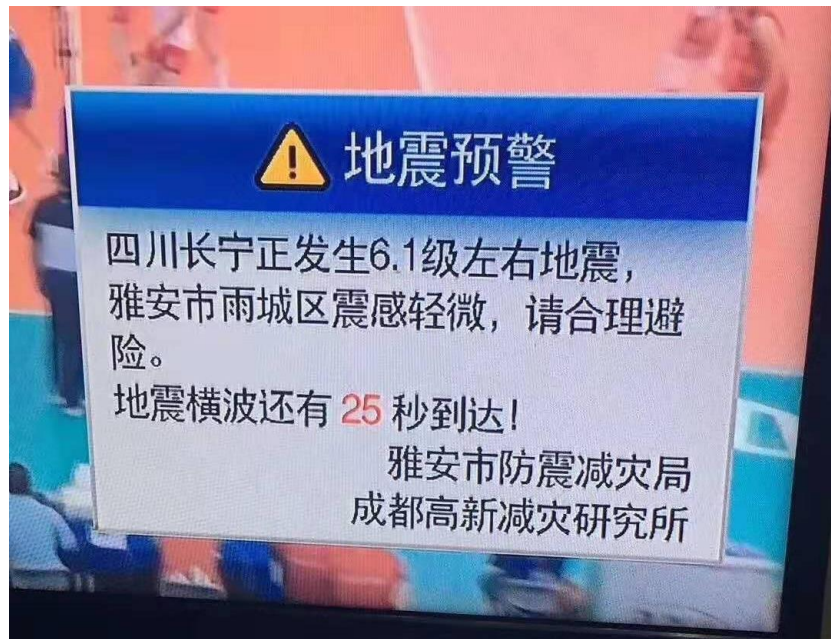


传统架构

地震预警系统

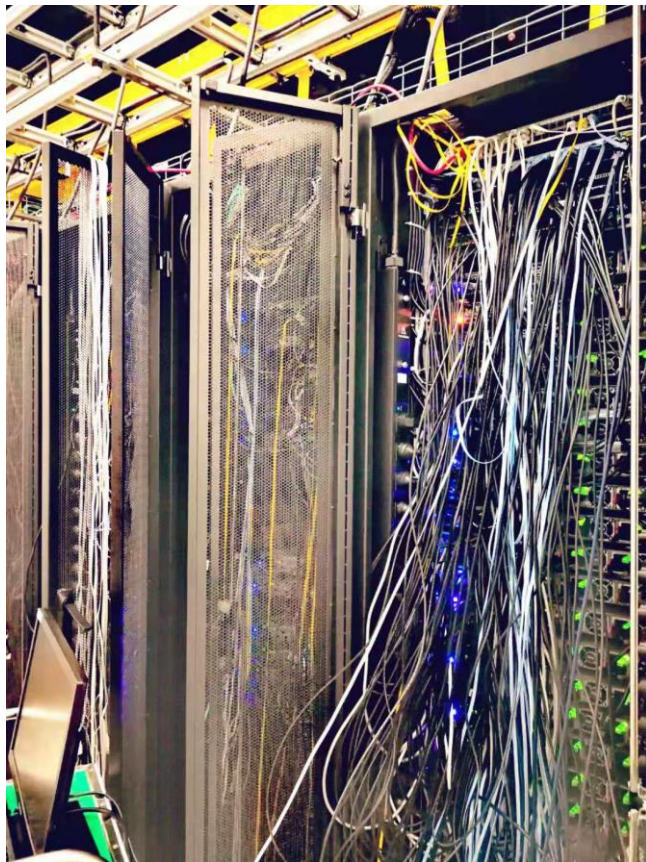


2008.05.12



2019.06.17

数据中心



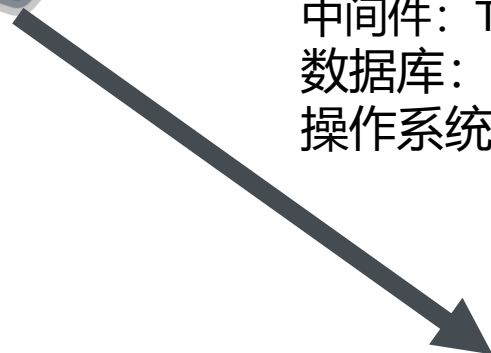
高可用-HA

主服务器

备服务器

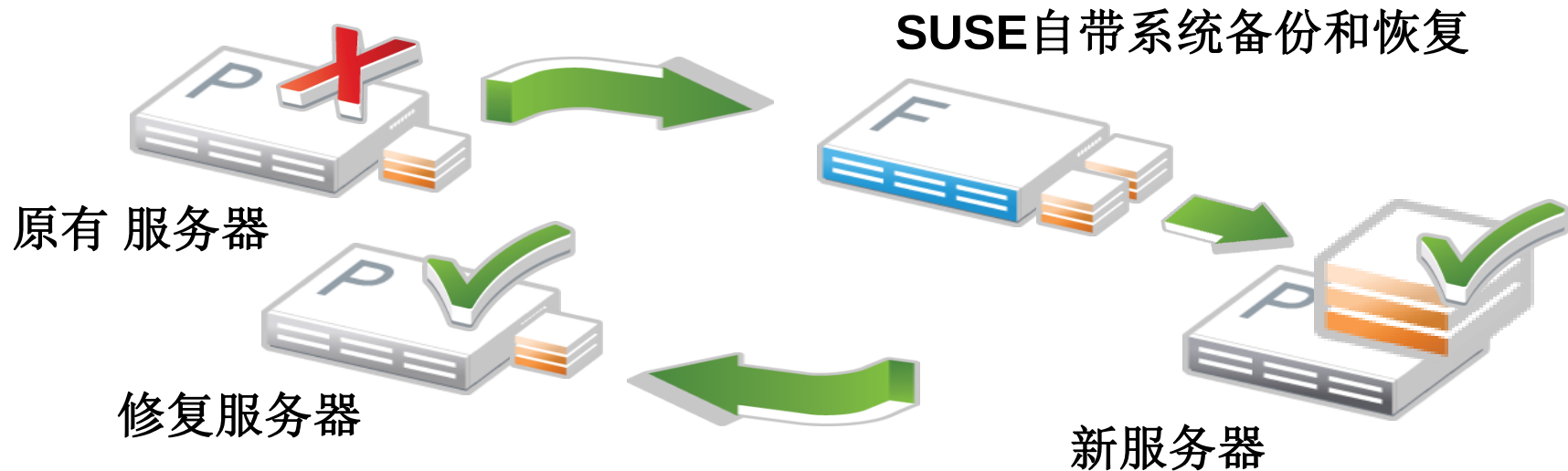


应用：地震预警
中间件：TongLINK
数据库：mysql
操作系统：SLES11 SP1 + HA



共享存储

一键部署和恢复





Boot from Hard Disk

Installation

一键安装

Upgrade

More ...

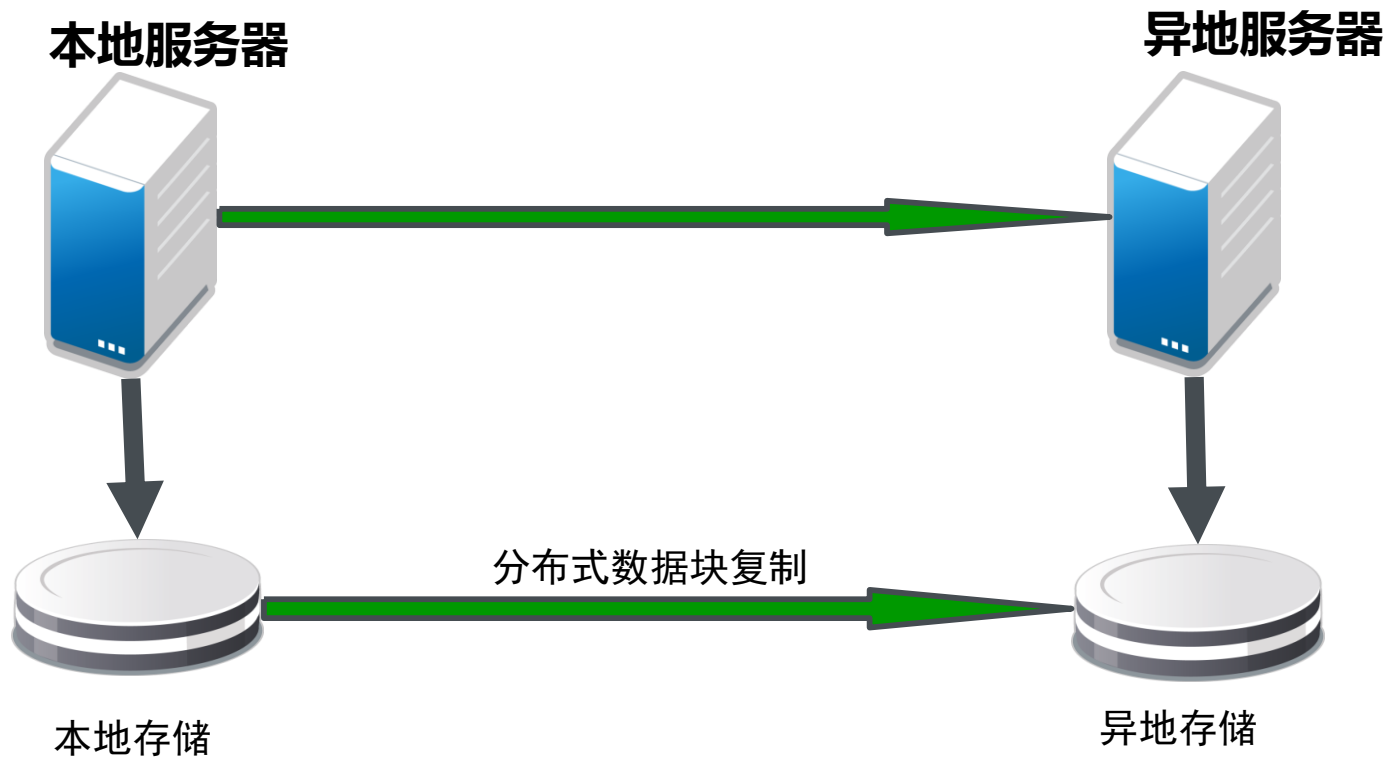


Boot Options |

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

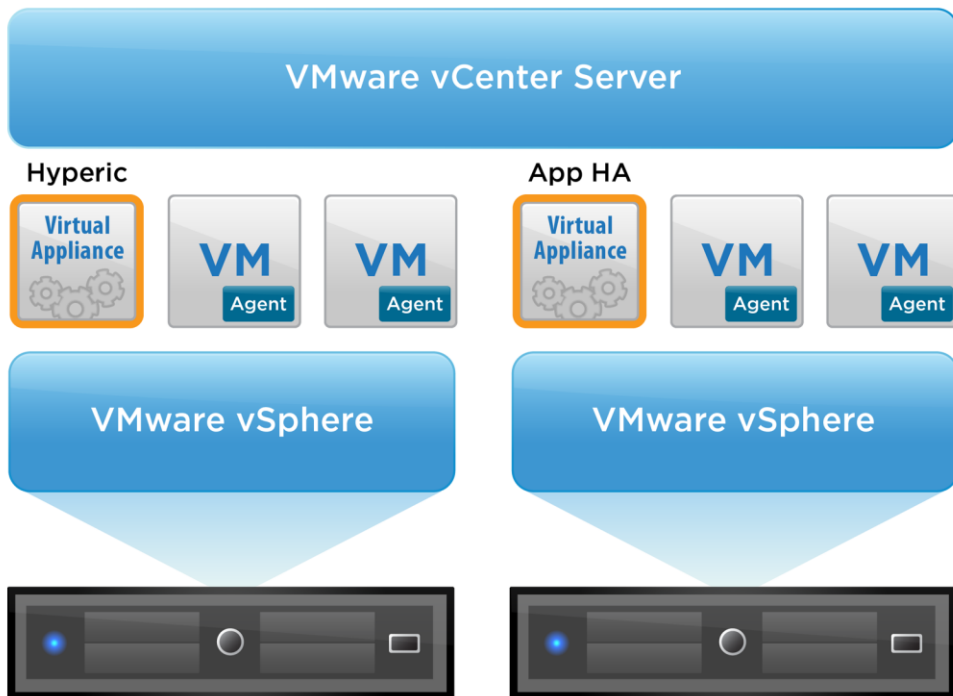


x86服务器



ARM服务器

定制虚拟机基础镜像



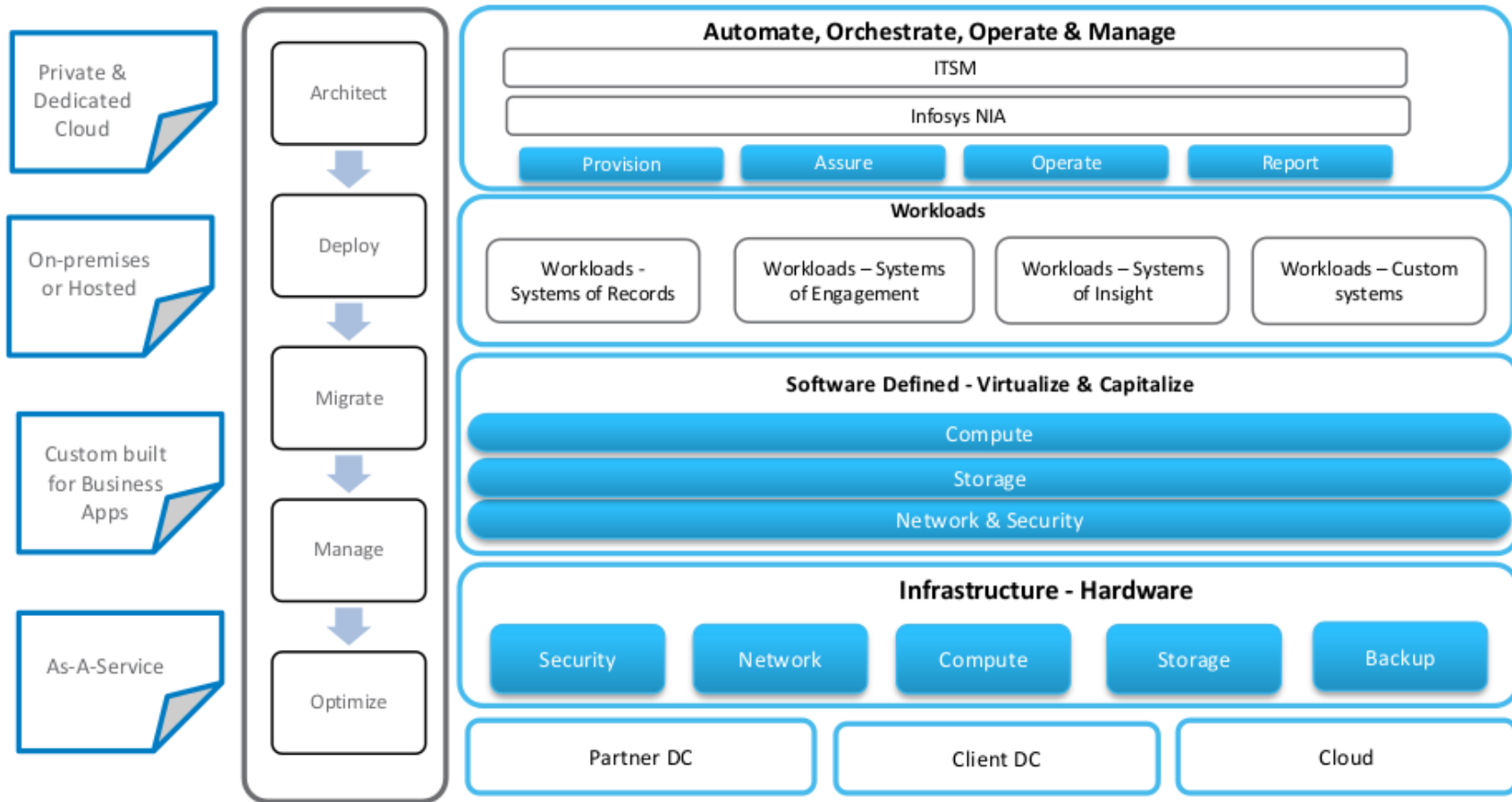
基础镜像要求:

- 最小化安装
- 安全加固
- 基础参数可配置



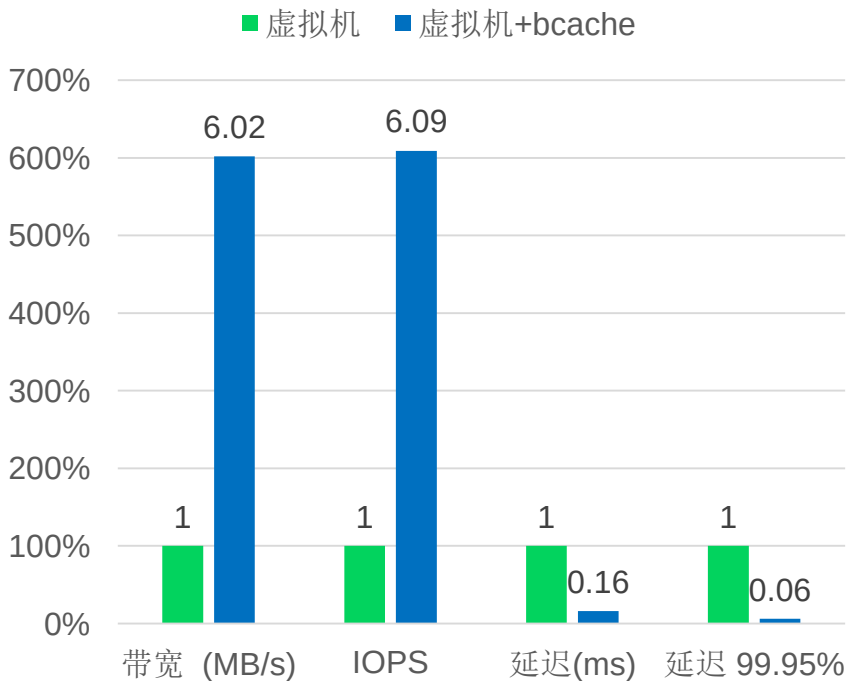
软件定义架构

Infosys – 从VMWare迁移到OpenStack



虚拟机性能提升 - 缓存加速bcache

虚拟机 & 虚拟机+bcache



Expert Partitioner

System View

- linux-mnbw
 - Hard Disks
 - vda
 - vda1
 - vda2
 - vdb
 - RAID
 - Volume Management
 - system
 - home
 - root
 - swap
 - Bcache**
 - bcache0
 - NFS
 - Btrfs
 - Device Graphs
 - Installation Summary
 - Settings

 BcacheBcache DevicesCaching Set Devices

Caching Device	Size	UUID	Used By
/dev/vdb	100.00 GiB		/dev/bcache0

[Help](#)[Abort](#)[Next](#)

工作负载上云 - 公有云



腾讯云

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 HVM on-demand	SLES15-SAP-EC2-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	

容器化是趋势

SUSE镜像库

App

App

App

App

App

App

App

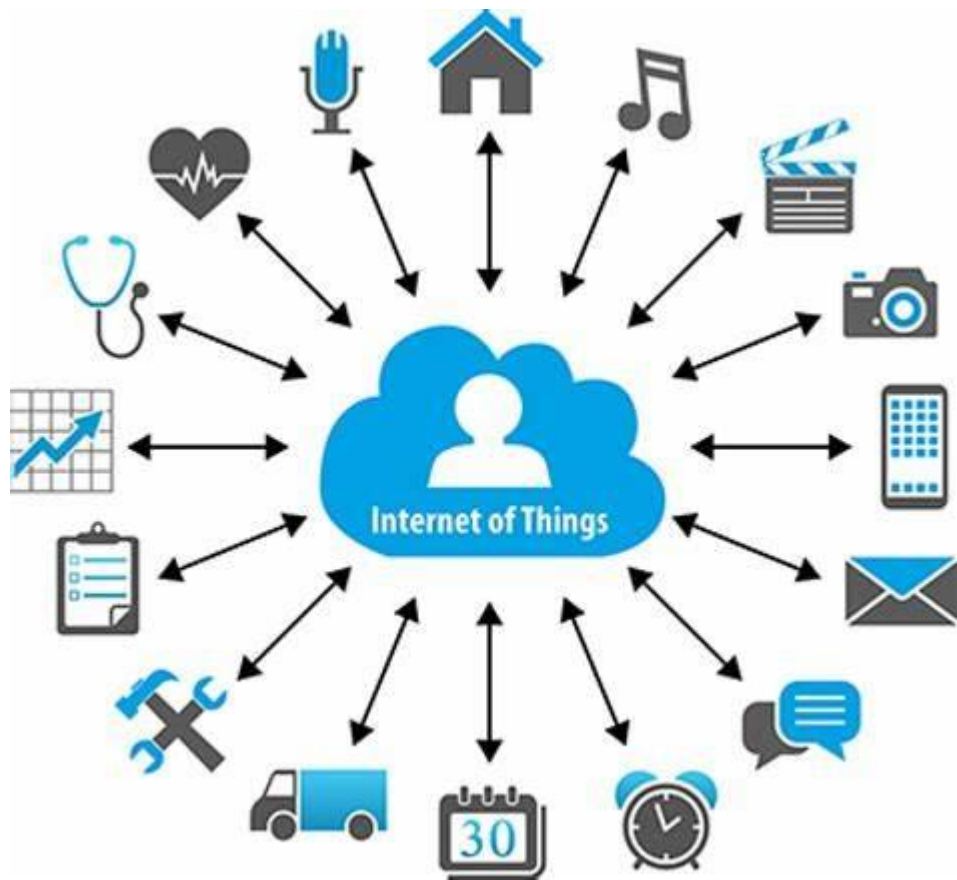
App

App

容器引擎: Docker / CRI-O

SUSE Linux Enterprise MicroOS
容器操作系统

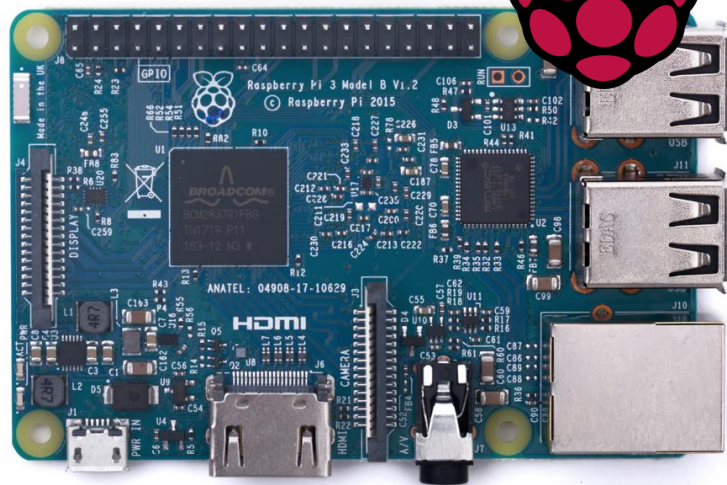
IoT物联网 - Linux无处不在



某大型仓库物流状态监控



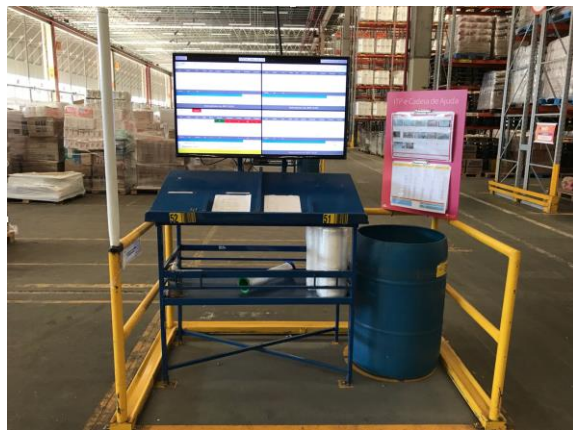
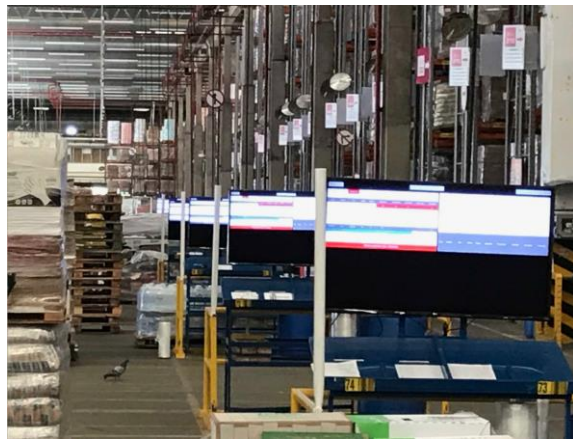
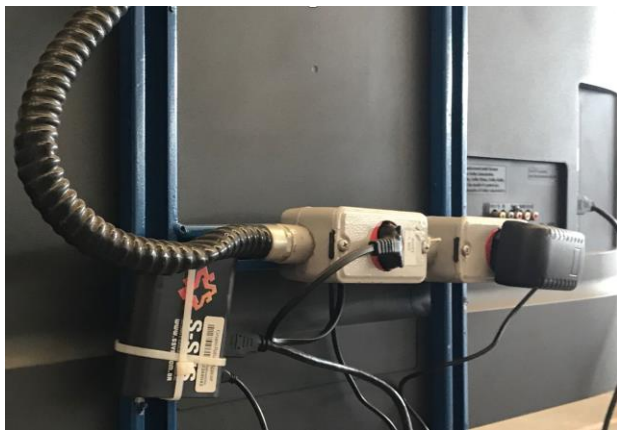
Windows CE



SLES for Raspberry Pi

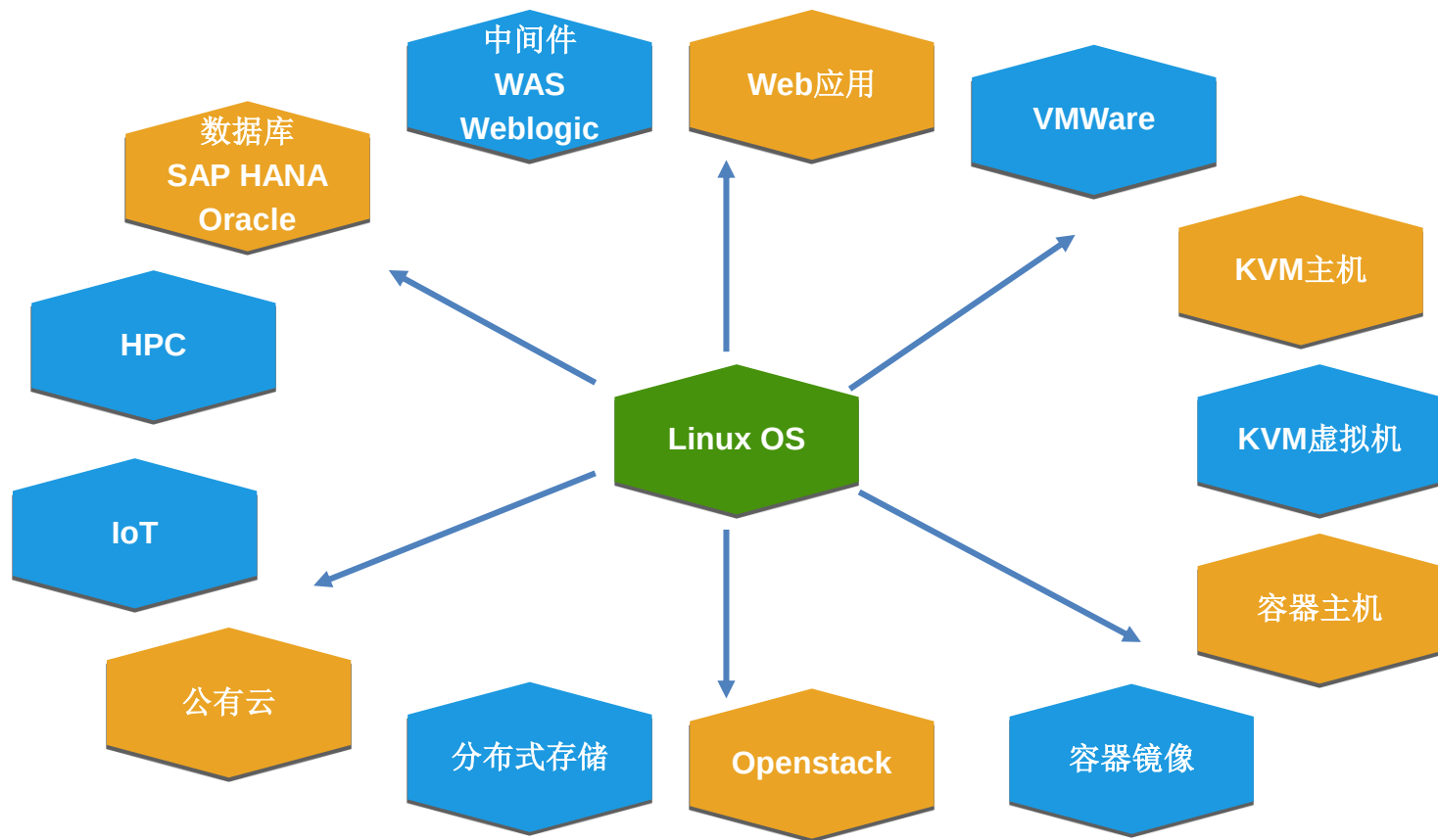
名称	Raspberry Pi 3B	Raspberry Pi 3B+	Raspberry Pi 4B
芯片	Broadcom BCM2837	Broadcom BCM2837B0	Broadcom BCM2711
CPU	64位 - 1.4GHz四核	64位 - 1.4GHz四核	64位 - 1.5GHz四核
蓝牙	蓝牙4.1	蓝牙4.2	蓝牙5.0
WiFi	802.11n无线 2.4GHz	802.11AC无线 2.4GHz/5G双频WiFi	802.11AC无线 2.4GHz/5G双频WiFi
USB接口	USB2.0*4	USB2.0*4	USB3.0*2 USB2.0*2
有线网络	10/100MB/s以太网	千兆以太网	千兆以太网
HDMI	标准HDMI	标准HDMI	Micro HDMI*2 支持双屏
电源接口	Micro USB	Micro USB	Type-C (5V 3A)
外形尺寸	85mm*56mm	85mm*56mm	85mm*56mm
多媒体	H.264, MPEG-4 decode (1080p30); H.264 encode(1080p30); OpenGL ES 1.1,2.0 graphics	H.264, MPEG-4 decode (1080p30); H.264 encode(1080p30); OpenGL ES 1.1,2.0 graphics	H.265 (4Kp60 decode); H.264 (1080p60 decode, 1080p30 encode); OpenGL ES, 3.0 graphics
以太网POE	无	通过额外的Hat以太网 (POE供电)	通过额外的Hat以太网 (POE供电)

大型仓库物流状态监控

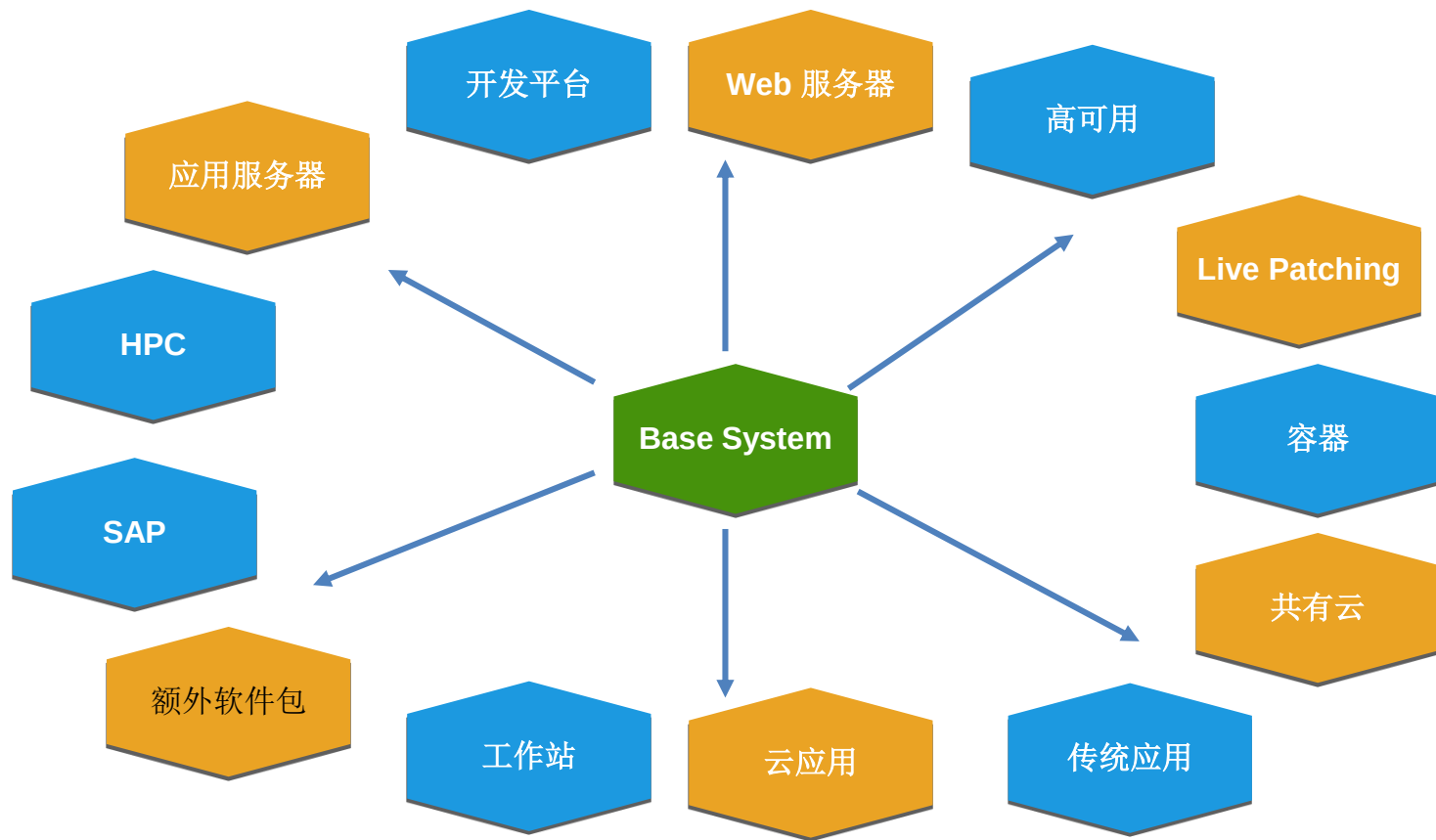


多模操作系统

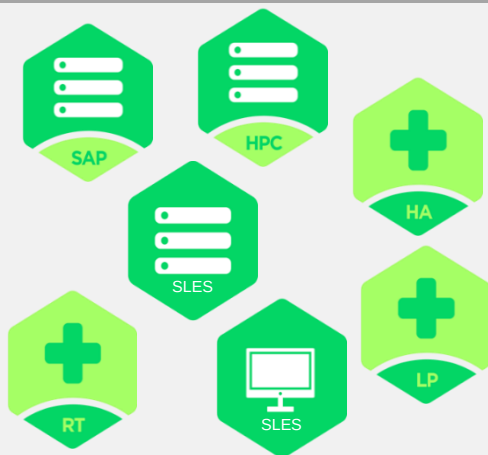
一个OS镜像能满足所有需求吗？



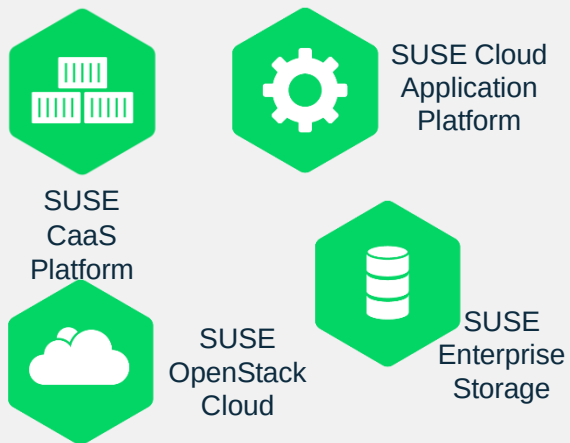
SUSE Linux Enterprise 15多模操作系统



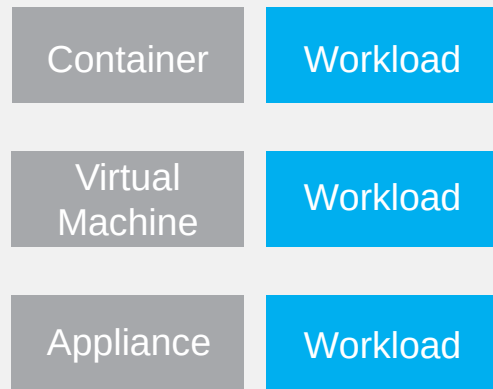
多模架构



SLE 15 产品



SDI 产品



服务

传统架构

软件定义架构 (SDI)

公共代码库 **Common Code Base**
所有硬件架构 (x86-64, Arm, POWER, IBM Z)

“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

版本统计
硬件规格统计
位置信息统计

架构信息
运行参数统计
操作记录

系统状态记录
系统状态回滚
图形化操作

定时任务
消除重复操作
一键注册



软件包版本统计
详细信息
依赖性记录

自定义软件源
软件包平行对比
SP升级

配置文件集中管理
配置文件版本管理
文件版本差异对比
批量创建文件，目录，链接
支持编辑shell, xml, ruby, python, perl文件

补丁分类
批量补丁下发
详细信息
按补丁包索引

CVE索引
基线扫描

操作系统运维场景之- 主流Linux

SUSE Linux



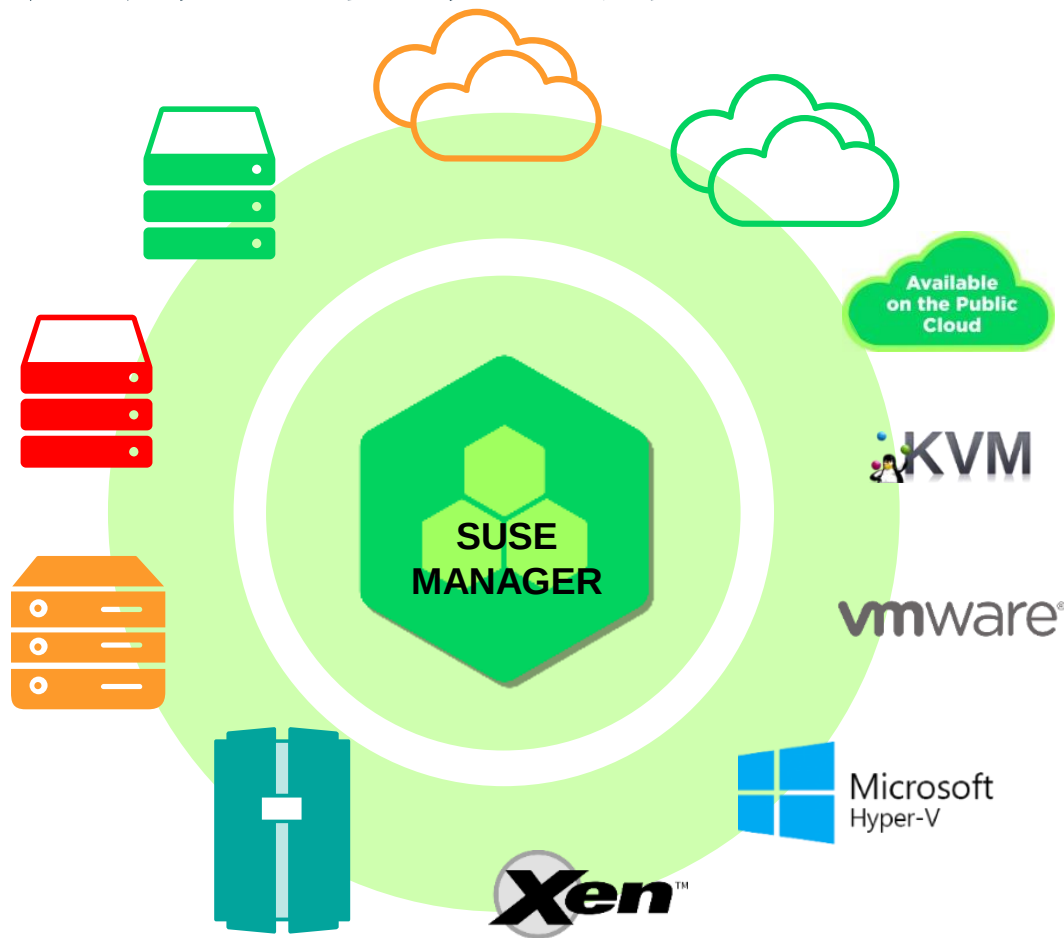
Red Hat Linux
Centos
Oracle Linux



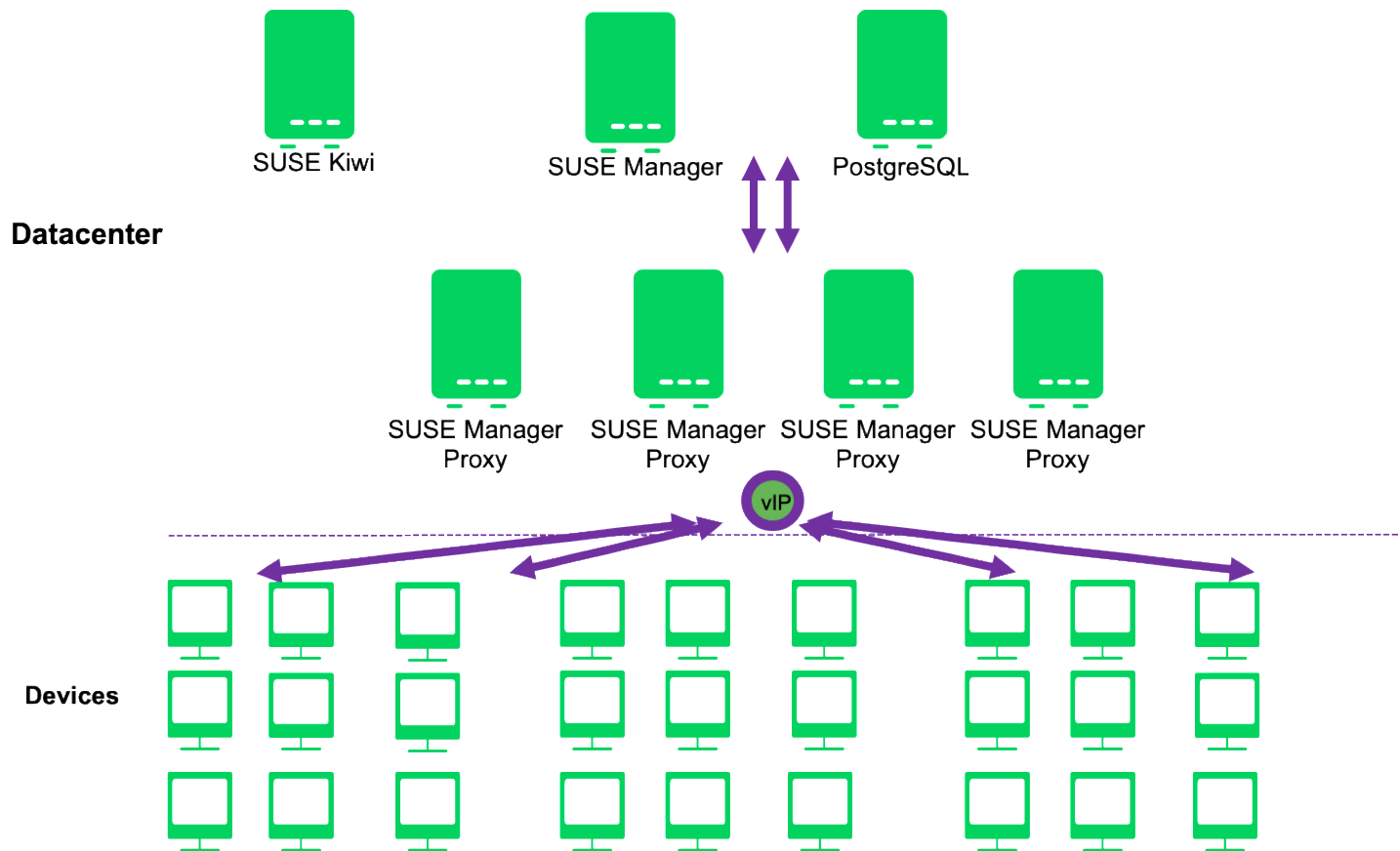
Ubuntu Linux



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

SUSE Manager - Systems - Autoinstallation - Distributions - Mozilla Firefox

SUSE Manager - Syst... x +

https://smgr.susemgr.com/rhn/kickstart/TreeCreate.do

SUSE Manager > Systems > Autoinstallation > Distributions

0 systems selected

admin Widgets-4-U

Create Autoinstallable Distribution

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.

Create Autoinstallable Distribution

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

SUSE Manager - Software - Manage Software Channels - Mozilla Firefox

Search page

- Home
- Systems
- Salt
- Images
- Patches
- Software**
 - Channels
 - Package Search
 - Manage Software Channels**
 - Overview
 - Manage Software Packages
 - Manage 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*:

Channel Label*:

Parent Channel:

Architecture:

Repository Checksum Type:

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

☒ Dhcpd

☐ Locale

☐ Tftpd

☒ Vsftpd

Dhcpd

Domain Name:

example.org

Domain Name Servers:

example.org

Listen Interfaces:

em2

Max Lease Time:

20001

Default Lease Time:

20000

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

Search page

Home

Systems

Overview

Systems

All

Physical Systems

Virtual Systems

Unprovisioned Systems

Out of Date

Requiring Reboot

Non Compliant

Without System Type

Ungranted

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	1	2	4	0	test-SLES12-SP3-Pool for x86_64	Salt
☐ srv2.susemgr.com	0	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扫描

2018

2017

2016

2015

2014

2013

CVE 2018

systems selected

✓ ! 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

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

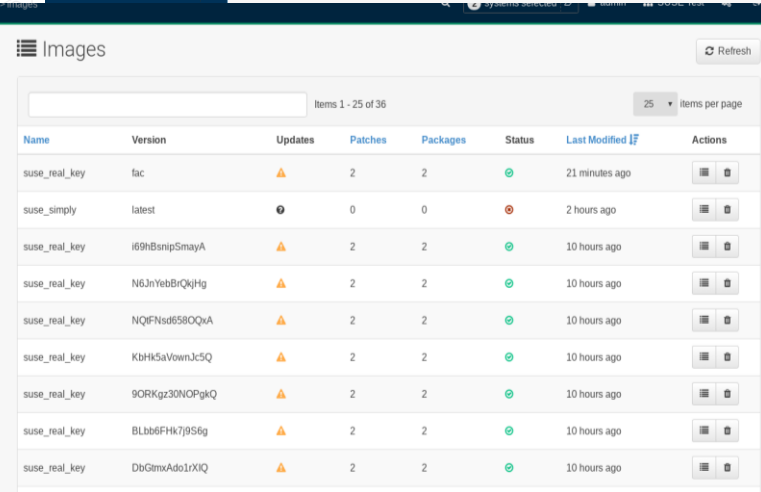
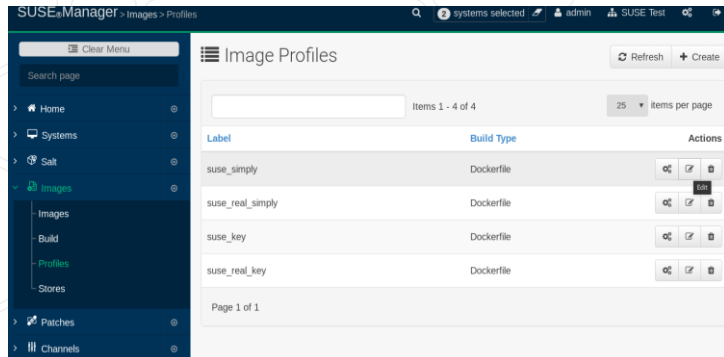
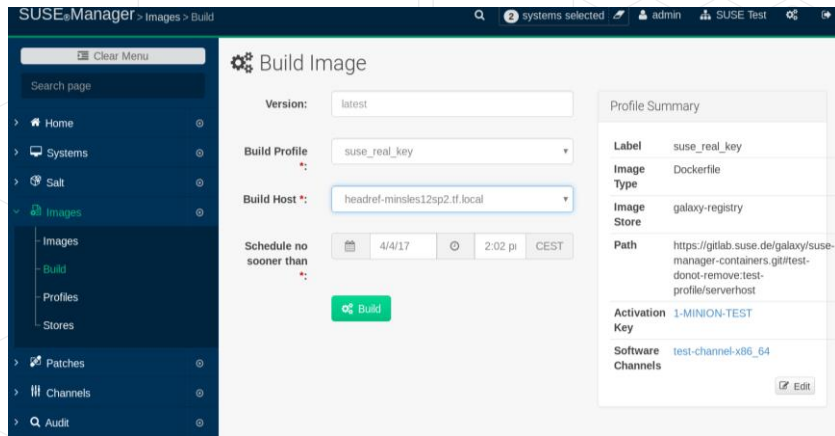
Title sysctl net.ipv6.conf.all.forwarding must be 0
Rule rule-sysctl-ipv6-all-forward
Result pass

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



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:

SLES12-SP3-Pool for x86_64

• 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

45

操作系统运维场景之- 执行远程命令

Search page

Home

Systems

Salt

Keys

Remote Commands

State Catalog

Formula Catalog

Images

Patches

Software

Audit

Configuration

Schedule

Users

Admin

Help

Remote Commands

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

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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



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



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](#)

Package	Architecture	Current Version	Snapshot Version
aaa_base	x86_64	13.2+git20140911.61c1681-32.1	13.2+git20140911.61c1681-28.1
aaa_base-extras	x86_64	13.2+git20140911.61c1681-32.1	13.2+git20140911.61c1681-28.1
apparmor-docs	noarch	2.8.2-54.1	2.8.2-45.1
apparmor-parser	x86_64	2.8.2-54.1	2.8.2-45.1
apparmor-profiles	noarch	2.8.2-54.1	2.8.2-45.1
apparmor-utils	noarch	2.8.2-54.1	2.8.2-45.1

操作系统运维场景之-拓扑图

SUSE®Manager > Systems > Visualization > Systems Grouping

Search page

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 - 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





Search page



- Home
- Systems
- Salt
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- 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

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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

mandatory

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

recommended

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

recommended

☒ SLE-Manager-Tools15-Pool for x86_64 SP1

recommended

☒ SLE-Manager-Tools15-Updates for x86_64 SP1

recommended

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

recommended

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

recommended

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

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

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

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

Cancel

Save

Delete

+ Edit Properties

+ Attach/Detach Sources

+ Attach/Detach Filters

Build (0)

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



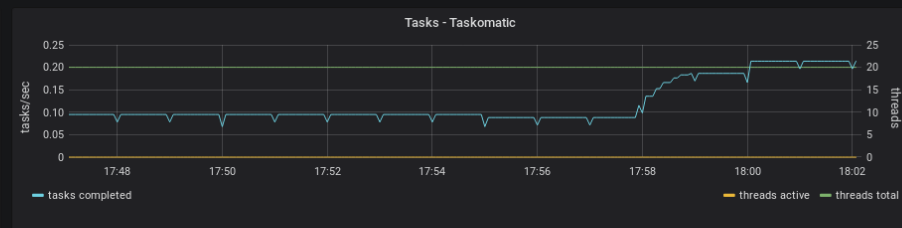
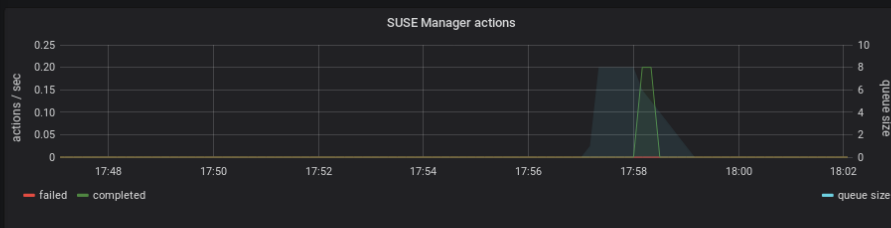
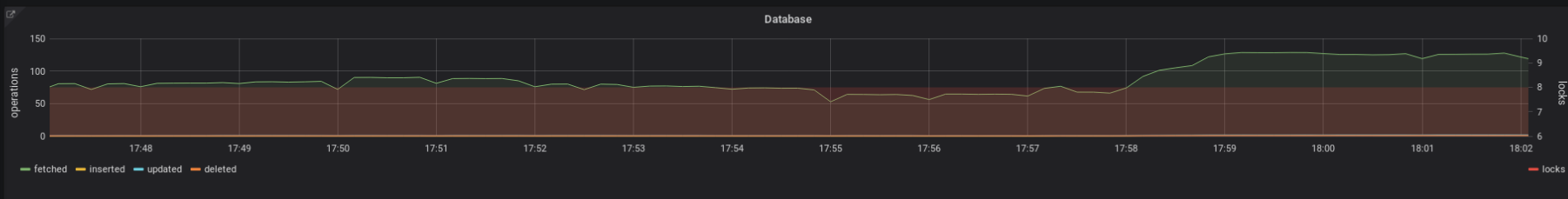
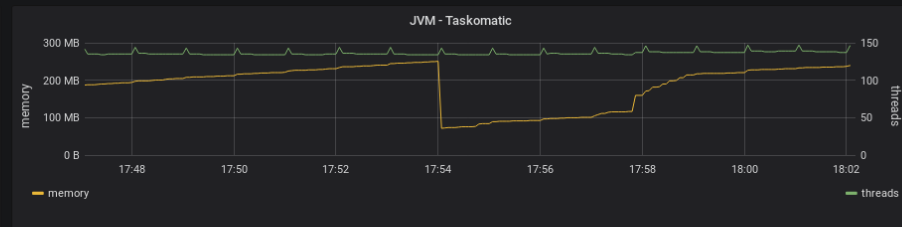
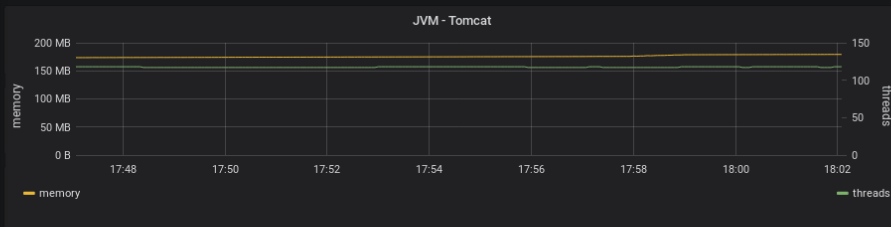
操作系统运维场景之- 监控





server server.tf.local

SUSE Manager





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SUSE Manager Configuration - Monitoring

Setup your SUSE Manager server monitoring.

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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





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SUSE Manager release



min1.su.se

Delete System

Details

Software

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Provisioning

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States

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Events

Formulas

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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

[Details](#) [Software](#) [Configuration](#) [Provisioning](#) [Groups](#) [Audit](#) [States](#) [Formulas](#) [Events](#)[Formulas](#) [Cluster](#) [Hana](#)

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

[← Prev](#) [Next →](#) Save Formula Clear values

Cluster

Cluster name: First node: Unicast: ☐Interface: Ntp:

Watchdog configuration

Watchdog module to load: Watchdog device:

SBD configuration

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

操作系统运维场景之- 虚拟化管理





Hosted Virtual Systems

[+ Create Guest](#)[▶ Start / Resume](#)[■ Stop](#)[↺ Restart](#)[⏸ Suspend](#)[🗑 Delete](#)

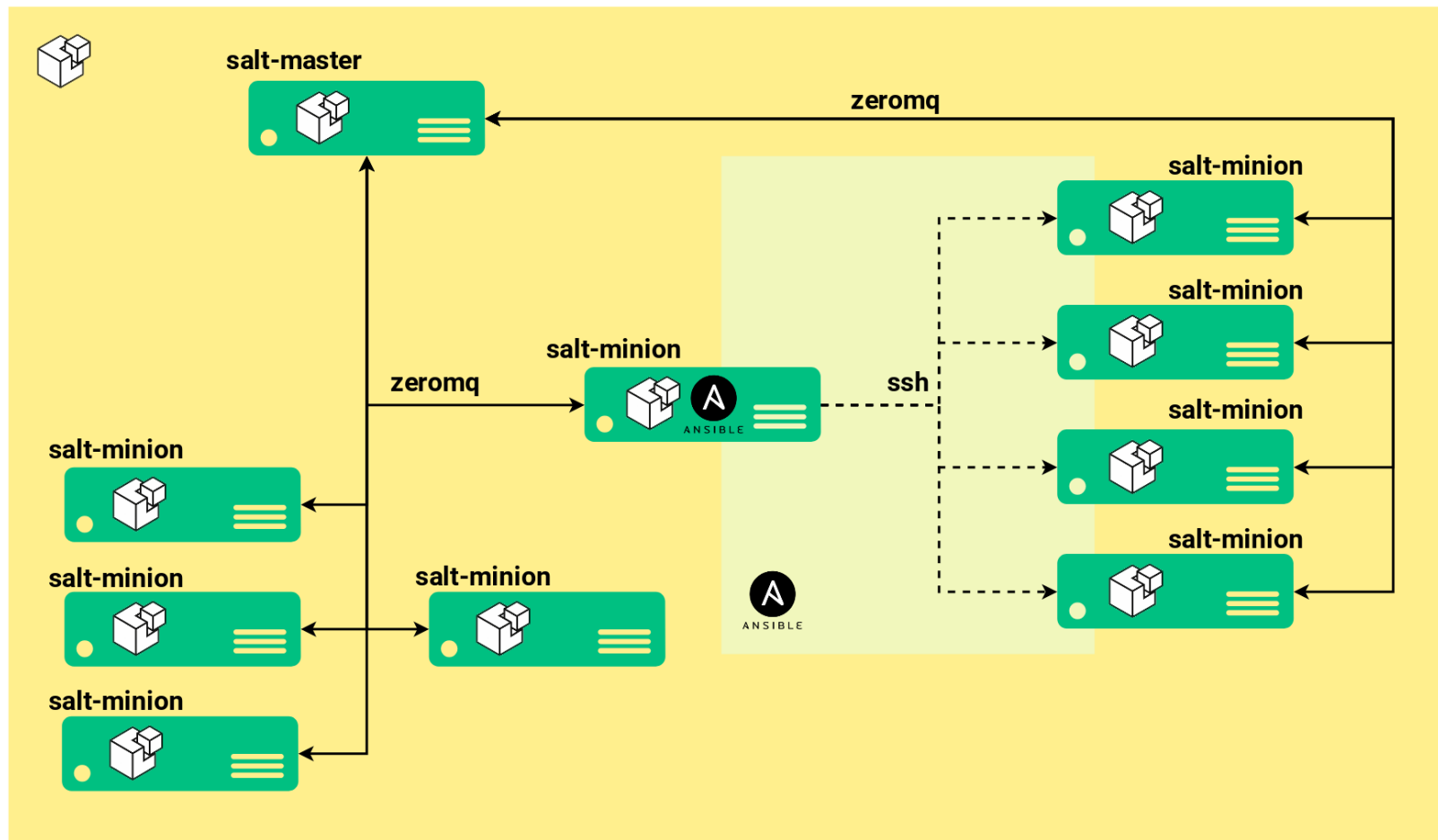
This is a list of virtual guests which are configured to run on this host.

Items 1 - 5 of 5 [Select All](#)

25 items per page

☐	Guest	System	Updates	State	Current Memory	vCPUs	Base Software Channel	Action Status	Actions
☐	client3	Unregistered System	-	Stopped	2048 MiB	2	(none)	-	▶ ✎ 🗑
☐	suma-client1	Unregistered System	-	Stopped	2048 MiB	2	(none)	-	▶ ✎ 🗑
☐	suma-client2	Unregistered System	-	Stopped	2048 MiB	2	(none)	-	▶ ✎ 🗑
☐	sumaadmin	Unregistered System	-	Stopped	4096 MiB	4	(none)	-	▶ ✎ 🗑
☐	win10	Unregistered System	-	Running	4096 MiB	4	(none)	✓	⏸ ■ ↺ 💬 ✎ 🗑

操作系统运维场景之- 二次开发



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

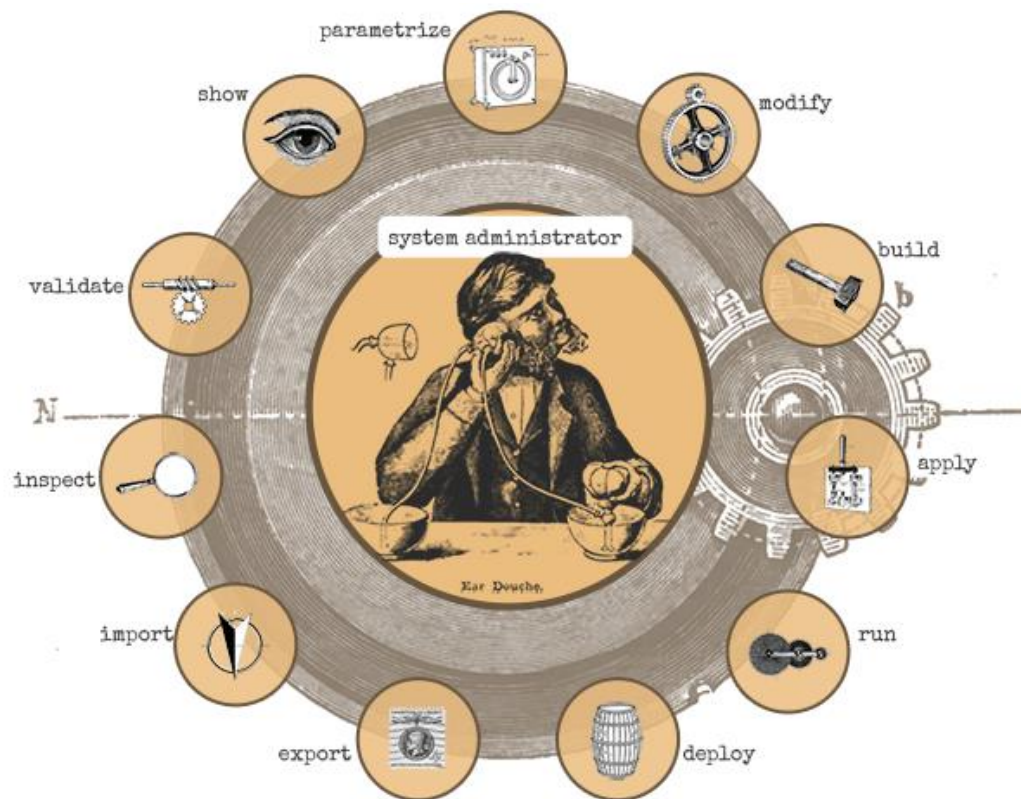
工具

- **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



```
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
```

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

SLES15-ED19

No description selected for comparison

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
GeolIP	1.6.11	1.19	x86_64	SUSE LLC	e6a4320c2e7e5cb98423559967810cd8
GeolIP-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

```
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 # █
```

```
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
MKScokXOPSPpU2JKNhNMB9Rx5xumsNwI1Vcg0cic
[ 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_DXysN3D8wL00qVBInFMKScokXOPSPpU2JKNhNMB9Rx5xumsNwI1Vcg0cic
[ 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
GMYhRPaUNUJept9Qfz mhSsd7o1TuvfTwAd-
[ 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_C076w9GMYhRPaUNUJept9Qfz mhSsd7o1TuvfTwAd-
[ 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_oTsYD9Ekm56Sk1ljpf nKL1LXZDRjQRhtIv_8h0JM55qCn0ZmIIOWeSoR_N9V4nHXfw
lj57Fr0g34-HQOF6pAgGiRrHUIB-kqNclpZDI f0Lqr4HA9kp fEyX6zrp53pEX0w
[ 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_oTsYD9Ekm56Sk1ljpf nKL1LXZDRjQRhtIv_8h0JM55qCn0ZmIIOWeSoR_N9V4nHXfwlj57Fr0g34-HQOF6pAgGiRrHUIB-kqNclpZDI f0Lqr4HA9kp fEyX6zrp53pEX0w
[ 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?T0W18SNwWL_6RdbZen_us_9C1Eies75UFjUx2RnrxpfspJ18xBCmX000nxfEoZ6loNIYubaNqx_YB71MaXWYfzvC_EyEK-K7JJQVX5MfbwIO
p7cJ8nYAMP_xVVKfllDEz_lubiabnvzzk-88TI1CZNTsJ9CZntJzVg9MACw
[ INFO ]: 01:36:30 | --> Type: rpm-md
```

镜像制作



Q & A