June 18, 2020

Four use cases when using SUSE products with IBM Z and LinuxONE

Virtual VM Workshop



Contact



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Agenda

- 1 Building repeatable images for LPAR, z/VM and KVM
- 2 Assessing impact of a security vulnerability
- Make mission critical applications more resilient to unexpected failures
- 4 Minimize reboots when running mission critical applications

SUSE and 20+ years of IBM Z and LinuxONE partnership



SUSE innovations **IBM** innovations **Ecosystem on Linux**



2008: First Starter System for Z released

2011: Image building for IBM Z with SUSE Studio

2015: SUSE Linus Enterprise for IBM Z and LinuxONE

- SMT, SIMD in kernel
- 10Gb PCI/RoCE
- Crypto enhancements

2015: KVM for IBM Z 2015: IBM Wave update 2015: IBM zAware for Linux

2015: DB2 BLU 2015: GDPS® Virtual Appliance 2015: Financial Transaction **MAINFRAME** Manager 2015: Open source ecosystem

kubernetes

2019: Nearly 8,000 s390 packages on SUSE Package Hub 2019: SLES for Z/L1 15

OUDFOUNDRY

- Kubernetes
- Cloud Foundry
- Crypto updates

2000: First release of SUSE Linux on Z (first enterprise-class Linux OS WM

2000: Integrated Facility for Linux (IFL)

2000: DB2, WebSphere

2004: Formal strategic alliance with IBM 2004: SLES for Z 9 released

2013: >3,000 apps available for Linux on mainframes

nego

z/VM

billid

service

2014: IBM Wave for

2014: Spectrum Scale™ (GPFS)

2014: Open Stack

2014: Oracle 12c

2016: KVM 1.1.2 2016: z/VM 6.4

KVM

2016: Blockchain 2016: Open Source

ecosystem ext.

2017: IBM z14

2017: Crypto enhancements

2017: KVM support in SLES

2017: z/VM Sub-capacity 2017: IBM Wave 1.2 SP6

2017: Docker EE 2017: DBaaS ref arch 2017: Spectrum Scale

4.2.3.1

1999: SUSE-IBM partnership begins 1999: SUSE-IBM-Marist College port Linux to **IBM** mainframes

1999: Linux on S/390®

1999: IBM Linux Tech Center

2002: SAP certified on SLES for Z

2002: major ISVs: SAP, Oracle 9i

2009: SLES for Z 11 released

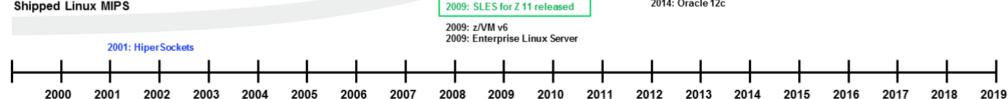
2007: IBM Big Green consolidation 3900 servers to 30

mainframes running Linux

2006: SLES for Z 10 launched (fifth

generation of SLES for Z)

2006: 1,000 apps, 300 ISVs



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Underpinning Digital Transformation







Machine Learning



Internet of Things



Business Analytics



High Performance Computing



Traditional IT & Applications

Public Cloud

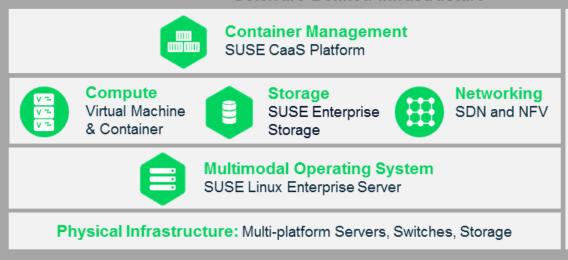
SUSE Cloud

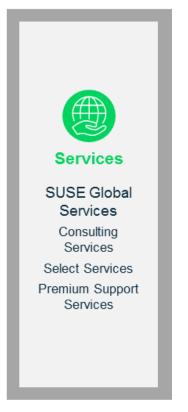
Service Provider

Program









Open, Secure, Proven

The focus of this presentation



Applications



Machine Learning



Internet of Things



Business Analytics

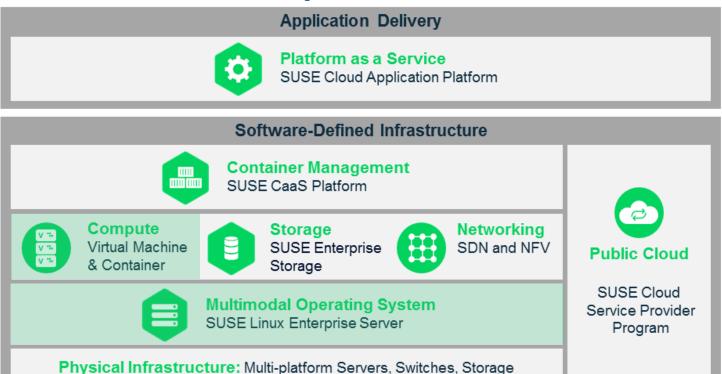


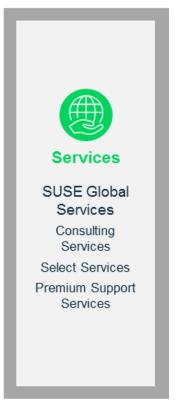
High Performance Computing



Traditional IT & Applications







Open, Secure, Proven

Building repeatable images for LPAR, z/VM and KVM

Image building with kiwi

- Also known as KIWI NG
 - Open Source project available on GitHub
- Included in the Development Tools Module in SUSE Linux Enterprise Server 15 SP1
- Build SLES, RHEL, Ubuntu, openSUSE, CentOS, Debian and other Linux distro images
 - Example image descriptions available in GitHub
 - Image types include virtual disk, OEM (raw disk), bootable/installable ISO, container
- SUSE includes templates in SLES for getting started
 - SLES JeOS (Just Enough Operating System) template that is available is for x86_64
 - SLES JeOS template for s390x with documentation is available <u>here</u>

Describing a reproducible image

- Image description is a XML file
 - image type (e.g. QEMU disk image, PXE bootable image, Vagrant box, etc.)
 - partition layout
 - packages to be installed on the system
 - users to be added
- Optional scripts run in a chroot environment for additional flexibility
- An optional root directory for files
- Use git for version control of an image description!!

```
<?xml version="1.0" encoding="utf-8"?>
<!-- OBS-Profiles: @BUILD_FLAVOR@ -->
<image schemaversion="6.9" name="SLES15-SP1-JeOS"</pre>
displayname="SLES 15 SP1">
    <description type="system">
        <author>SUSE Linux GmbH</author>
        <contact>mikef@suse.com</contact>
        <specification>SUSE Linux Enterprise 15 SP1
JeOS</specification>
   </description>
    cprofiles>
        file name="kvm" description="JeOS for KVM"
arch="s390x"/>
        file name="kvm-unpatched" description="Unpatched
JeOS for KVM" arch="s390x"/>
        cprofile name="OpenStack-Cloud" description="JeOS for
OpenStack Cloud" arch="s390x"/>
        cprofile name="raw" description="JeOS raw image"
arch="s390x"/>
   </profiles>
    ferences profiles="kvm,kvm-unpatched,OpenStack-Cloud">
        <version>15.1
        <packagemanager>zypper</packagemanager>
        <bootsplash-theme>SLE</bootsplash-theme>
        <bootloader-theme>SLE
   <!-- those settings are applied by suseConfig in config.sh
        <locale>en_US</locale>
        <keytable>us.map.gz</keytable>
        <timezone>Europe/Berlin</timezone>
        <hwclock>utc</hwclock>
        <rpm-excludedocs>true</rpm-excludedocs>
        <type
                                                       SUSE
           image="vmx"
           filesystem="xfs"
```

Assessing impact of a security vulnerability



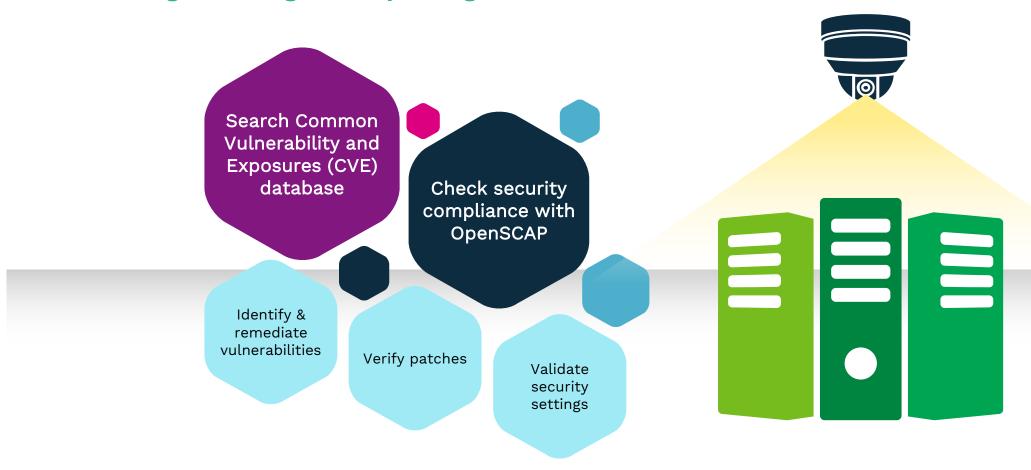
Best-in-class open source infrastructure management solution designed to help your enterprise DevOps and IT Operations teams to:

- Optimize operations while reducing costs
- Reduce complexity and regain control of IT assets
- Ensure compliance with internal security policies and external regulations



Ensure Compliance

With internal security policies and external regulations with automated monitoring, tracking, auditing and reporting



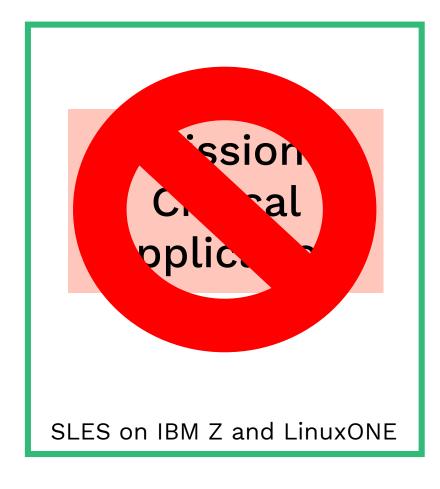
Make mission critical applications more resilient to unexpected failures



Mission Critical Application

SLES on IBM Z and LinuxONE





Potential reasons for a failure

- Hardware failure
- Human error
- External factors
- Etc...

Setup a high availability cluster

SLE HA Installation and Setup Quick Start

Mission
Critical
Application

Node 1

SLES on IBM Z and LinuxONE

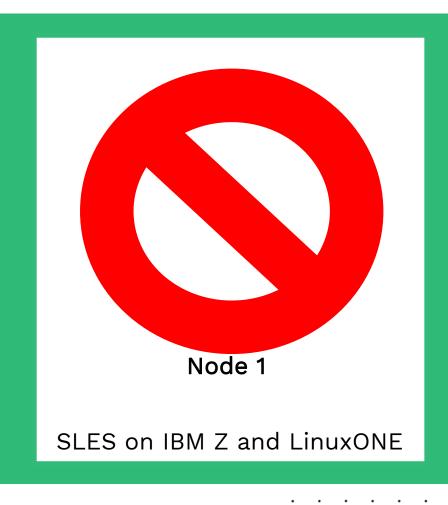
SLE High Availability Extension Types of applications that can be managed by SLE HA

- Database
- Message Bus
- SAP components
- Infrastructure
- Cloud services
- Storage
- Linux services/daemons
- Custom/in-house

Node 2

SLES on IBM Z and LinuxONE

Keep a Mission Critical Application available



SLE High Availability Extension Mission Critical Application

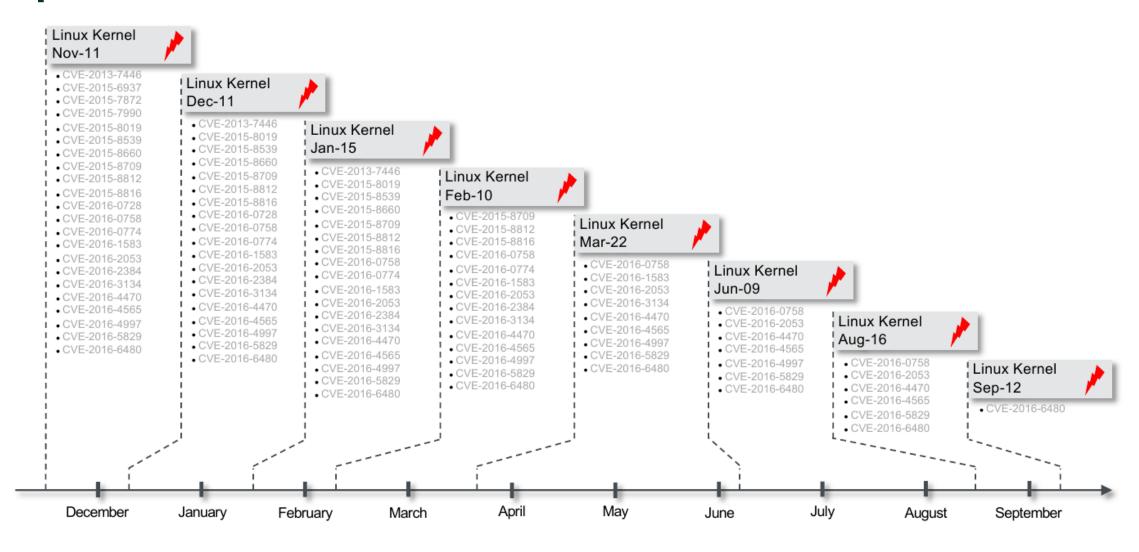
Node 2

SLES on IBM Z and LinuxONE

Minimize reboots when running mission critical applications



Update Kernel And Reboot Or...



Key Highlights For SLE Live Patching

No runtime performance impact and no interruption of applications

Provides fixes for Kernel bugs which affect

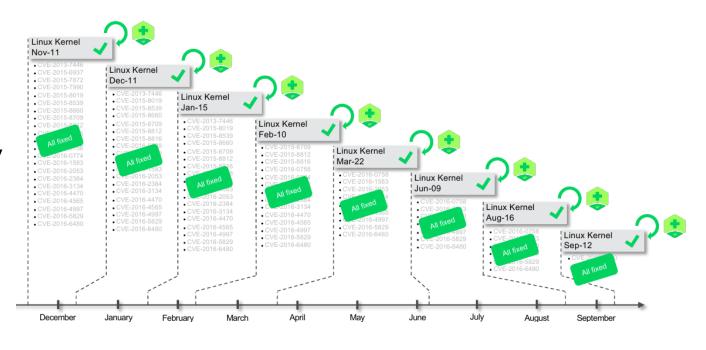
- Security (CVSSv2 >=6)
- o Security (CVSSv3 >=7)
- Data integrity or system stability

Deploy using existing package management frameworks

 Consider using SUSE Manager to automate deployment of Live Patches

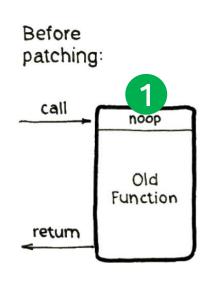
Availability

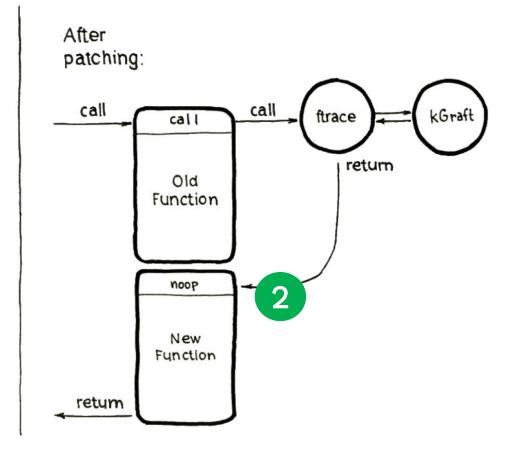
 SLE 12 SP4, SP5 and SLE 15 SP2 for s390x (June/July 2020)



Live Kernel Patching Using kGraft

Live Patching Is Easy To Understand





Replace the placeholder "noop" with call to ftrace

ftrace returns
execution to new
"patched"
Function

Old Function is by-passed New Function is now in use © 2020 SUSE LLC. All Rights Reserved. SUSE and the SUSE logo are registered trademarks of SUSE LLC in the United States and other countries. All third-party trademarks are the property of their respective owners.

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Questions?

Thank you!

