SUSE Linux Enterprise A-Z

SUSECON 2019 –BOV1226

Matthias G. Eckermann
Director Product Management
mge@suse.com
2019-04-03
Rules for today

- Members of the audience chose a character from A-Z
- The presenter “pays” for the choice and talks about a keyword behind the character
- Most characters are only available once, some characters do not exist
- Double payment for characters, which do not exist
- Questions are allowed & appreciated at any point in time
Application delivery & SDI

Common Code Base: Compatibility, Stability, Quality

Physical Infrastructure: Multi-platform Servers, Switches, Storage

Container Management
SUSE CaaS Platform

Platform as a Service
SUSE Cloud Application Platform

Software-Defined Infrastructure

Private Cloud / IaaS
SUSE OpenStack Cloud

Compute
Virtual Machine & Container

Storage
SUSE Enterprise Storage

Networking
SDN and NFV

Multimodal Operating System
SUSE Linux Enterprise Server

Infrastructure & Lifecycle Management
SUSE Manager

Application Delivery

Public Cloud
SUSE Cloud Service Provider Program
Btrfs

- Copy on Write filesystem
- Default for OS & Containers
- Data- and Metadata checksums
- Compression
- Deduplication
- Rollback to a well known state → faster recovery from planned or unplanned downtime
- Rollback for service pack migration
- Transactional updates

Modern filesystem, reliable, efficient.
Btrfs data volume use cases – Containers

Traditional Stack
• 7 Layers → complexity

<table>
<thead>
<tr>
<th></th>
<th>Container</th>
<th>Overlay Filesystem</th>
<th>Filesystem</th>
<th>Device Mapper LV</th>
<th>Device Mapper VG</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV</td>
<td>PV</td>
<td>PV</td>
<td>PV</td>
<td>PV</td>
<td></td>
</tr>
<tr>
<td>part</td>
<td>part</td>
<td>part</td>
<td>part</td>
<td>part</td>
<td></td>
</tr>
<tr>
<td>physical device</td>
<td>physical device</td>
<td>physical device</td>
<td>physical device</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

btrfs simplified Stack
• 3 Layers

<table>
<thead>
<tr>
<th></th>
<th>Container</th>
<th>btrfs Filesystem</th>
</tr>
</thead>
<tbody>
<tr>
<td>part</td>
<td>part</td>
<td>part</td>
</tr>
<tr>
<td>part</td>
<td>part</td>
<td>part</td>
</tr>
<tr>
<td>physical device</td>
<td>physical device</td>
<td>physical device</td>
</tr>
</tbody>
</table>

Reduce complexity, improve scalability
Compliance & Certifications

- Common Criteria Certification
- DISA STIG
- FIPS 140-2
- IPv6 / USGv6
- YES certification (hardware)

Answer compliance needs, improve trust
Developers

SUSE Developer Program

• Study & identify developer needs and technology trends

• Represent developer needs & feedback towards SUSE

• Build outreach channels and relationships

Improve developer experience, increase productivity.
Extensions

- SUSE Linux Enterprise Live Patching
- SUSE Linux Enterprise High Availability Extension + GEO
- SUSE Linux Enterprise Virtual Machine Driver Pack
- SUSE Linux Enterprise Workstation Extension
- Long Term Service Pack Support

The right solution for customer specific needs
## Filesystems & Use Cases

<table>
<thead>
<tr>
<th>Use Case</th>
<th>btrfs</th>
<th>ext4</th>
<th>xfs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for Deduplication (Backup Server)</td>
<td>++</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Container Host</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Database</td>
<td>+¹</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Fileserver (NFS, Samba)</td>
<td>++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>Home Directory (no Quota)</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Home Directory (with Quota)</td>
<td>o³</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Operating System</td>
<td>++</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Need for Snapshots</td>
<td>++</td>
<td>o²</td>
<td>o²</td>
</tr>
<tr>
<td>VM Host</td>
<td>+¹</td>
<td>+</td>
<td>++</td>
</tr>
</tbody>
</table>

+¹ with NoCoW  
 o² Snapshots via DM/LVM  
 o³ subvolume quota only

The right tool for the job
GPU Computing, ML, AI

Enable data analytics for the infrastructure and business
High Availability – Highlights

- SAP/Oracle integration
  - Cluster file system OCFS2
  - SAP reference HA design
- Virtualization Agnostic
  - Virtual cluster on all hypervisors
- Scale Network Services
  - IPv4 / IPv6 load-balancing

- Disaster tolerance
  - Data replication via IP (DRBD)
  - Node recovery (ReaR)
- User friendly tools
  - Graphical user interface
  - Unified command line
- Geo Clustering
  - Cluster across unlimited distance
  - Included in SLE HA 15

Availability of data and services as needed
High Performance Computing / HPC

Enterprise-class, high performance, highly scalable open source operating system designed to utilize the power of parallel computing for modeling, simulation and advanced analytics applications

- **Accelerate innovation** with a broad ecosystem of hardware and software partners, delivering cohesive HPC stacks for the latest supercomputers
- **High scalability, efficiency and performance** by utilizing Linux clustering and the power of parallel computing running on a wide range of hardware
- **SUSE-supported HPC module** for x86-64 and ARM64, providing simple and reliable access to high-demand HPC capabilities such as slurm for workload management

HPC experience with Enterprise software and support options
JeOS and more

Just enough Operation System

A subset of SUSE Linux Enterprise Server, designed for:

- Efficient virtual deployments
- Delivered as pre-packaged, ready-to-run images

SUSE Linux Enterprise Server with respect to:

- Certifications
- Availability of packages
- Subscriptions and pricing
- Policies & Support

Quick start to the SUSE Linux Enterprise world
(Kernel and Userland) Live Patching

- Kernel Live Patching!
  Provides fixes for Kernel bugs which affect
  - Security
  - Stability
  - Data Integrity

- Userland Live Patching?
  - Customers and partners want to be able to live patch userland (selected bins/libs)
  - SLE Live Patching “SDK” for partners

“Non stop“ availability for systems and services
Lifecycle
SUSE Linux Enterprise Server 12 and 15

- Service Pack (SP) Overlap Support: 6 months
- Long Term Service Pack Support (LTSS): up to 3 years after end of general support
- Reactive Support may be available for specific Service Packs
- Skip-a-servicepack support (green boxes)
- The current plans for SLE 12 and SLE 15 consider only 5 Service Packs

Trusted roadmap, predictability, long term support options
MultiModalOS

Bridge worlds – Answer needs of Multimodal IT
NVDIMM & Persistent Memory

NVDIMM (Non-Volatile In-line Memory Module) technology is used to achieve Persistent Memory.

NV-DIMM supports 3 types of access with SLE15:
- Memory addressable
- Block device
- Block device + filesystem

SLE 15 and SLE 12 SP4 increase the level of support for NV-DIMM, since SLE 12 SP3

Instant database recovery – Supported in SLES for SAP Applications
Open Build Service

Builds from sources, outputs installable packages or ISOs
- Builds on all architectures
- Stores sources, binaries, signing keys
- Calculates the need for package rebuilds
- Free and Open Source

Customer choice and freedom: Architectures, OS, Version
Package Hub & Partner Hub

Package Hub

• Collection of supplemental open source software for SUSE Linux Enterprise
• Built and maintained by the community, approved by SUSE
• → Broaden the package choices for enterprise users

Partner Hub

• “App Store“ like approach
• Simplify installation of third party software on SUSE Linux Enterprise
• Integration into SUSE Systems Management Stack

Ease of use – Software from Open source and ISV Communities
Quality – openQA

- Multi-architecture support
- Multi-machine testing
- Multi-hypervisor support (KVM, XEN, VMWare, Hyper-V)
- Disk image creation
- Real hardware testing (IPMI and IP KVM)
- Automatic incident reporting in Bugzilla when test cases fail

Higher overall quality – more and faster QA cycles
RMT (formerly known as SMT)

- Repository Mirror
  - Bandwidth
  - Security
- Staging support
- Registration Proxy
- Reporting & Management
  - Compliance
  - Client patch level

Fulfill security needs – work disconnected – save bandwidth
Make “best practices“ available to all customers
Transactional Updates

**Automatic**
Keep Kubernetes up-to-date without manual intervention

**Recoverable**
Roll back easily to any previous release

**Atomic**
Eliminate failures due to partial updates

**Transparent**
Continue to run workloads while updating your system(s)

Improve reliability of updates → Trust → more frequent updates
Unified Installer

One for all
The Unified Installer install all SUSE Linux Enterprise 15 products from a single medium.

One small
The Unified Installer medium is small. It allow easier handling, remote use, and faster refresh cycle.

Quick and easy entry into the SUSE world
Virtualization and beyond: Ubiquity

Multiple HW architectures
- X86-64, POWER LE, Z Systems, ARM64
- Architectures are treated equally
- Differences based on business case and capabilities

Deployment
- Physical
- Virtual host (XEN, KVM, container)
- Virtual guest (XEN, KVM, Hyper-V, VMware, zVM, etc.)
- Public cloud (Amazon EC2, Microsoft Azure, Google Cloud)
- Containers

Customer choice – Answer needs of a Hybrid world
Zero Downtime

RAS

High Availability & Geo

Full System Rollback

Live Patching

Business Critical applications
Unpublished Work of SUSE LLC. All Rights Reserved.

This work is an unpublished work and contains confidential, proprietary and trade secret information of SUSE LLC.

Access to this work is restricted to SUSE employees who have a need to know to perform tasks within the scope of their assignments. No part of this work may be practiced, performed, copied, distributed, revised, modified, translated, abridged, condensed, expanded, collected, or adapted without the prior written consent of SUSE.

Any use or exploitation of this work without authorization could subject the perpetrator to criminal and civil liability.

General Disclaimer

This document is not to be construed as a promise by any participating company to develop, deliver, or market a product. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. SUSE makes no representations or warranties with respect to the contents of this document, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. The development, release, and timing of features or functionality described for SUSE products remains at the sole discretion of SUSE. Further, SUSE reserves the right to revise this document and to make changes to its content, at any time, without obligation to notify any person or entity of such revisions or changes. All SUSE marks referenced in this presentation are trademarks or registered trademarks of Novell, Inc. in the United States and other countries. All third-party trademarks are the property of their respective owners.