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SUSE Linux Enterprise 15

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#MultimodalOS

SUSE is Redefining What it Means to be Open

Open Source

Community

Customers & Partners

➤ Committed to open source

➤ Being a leader and contributor within the open source community

➤ Delivering technology and corporate openness, interoperability and flexibility for our customers/partners

The Open, Open Source Company

IT Transformation

	Mode 1		Mode 2
IT Infrastructure	Datacenter	Hosted / Managed	Cloud
Application Deployment	Physical Servers	Virtual Servers	Containers
Application Architecture	Monolithic	N-Tier	Microservices
Development Process	Waterfall	Agile	DevOps

4
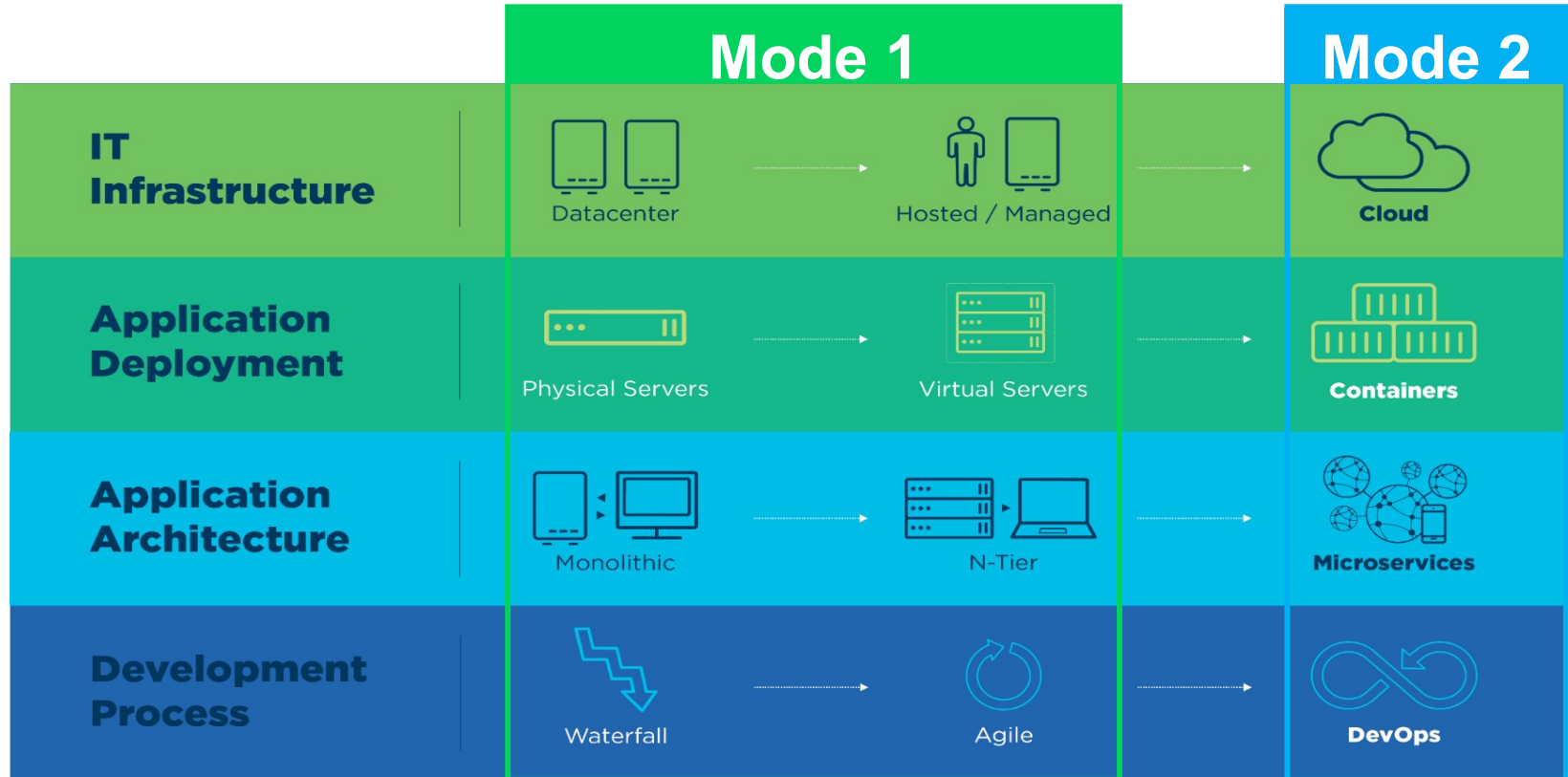
Multimodal IT

Bridge traditional & software-defined infrastructure

Improve application mobility

Improve systems management

Bring simplicity to support & services
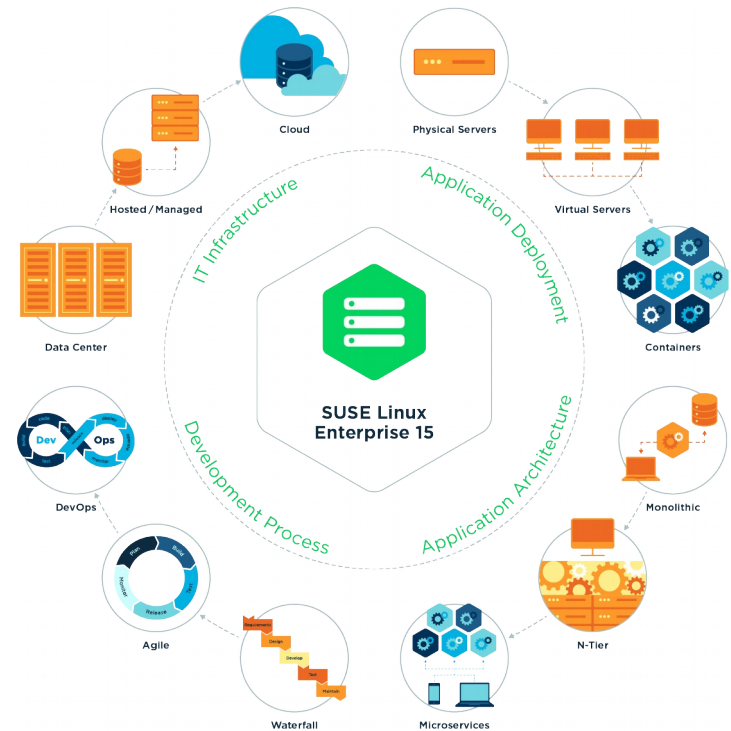
The "**common code base**" is a key feature of SLE15 platform that helps to bridge traditional and software-defined infrastructure. **IDC Market Note, 2018**

Multimodal IT

A co-existence of **traditional infrastructure**, **software-defined infrastructure** and application oriented architectures.

6
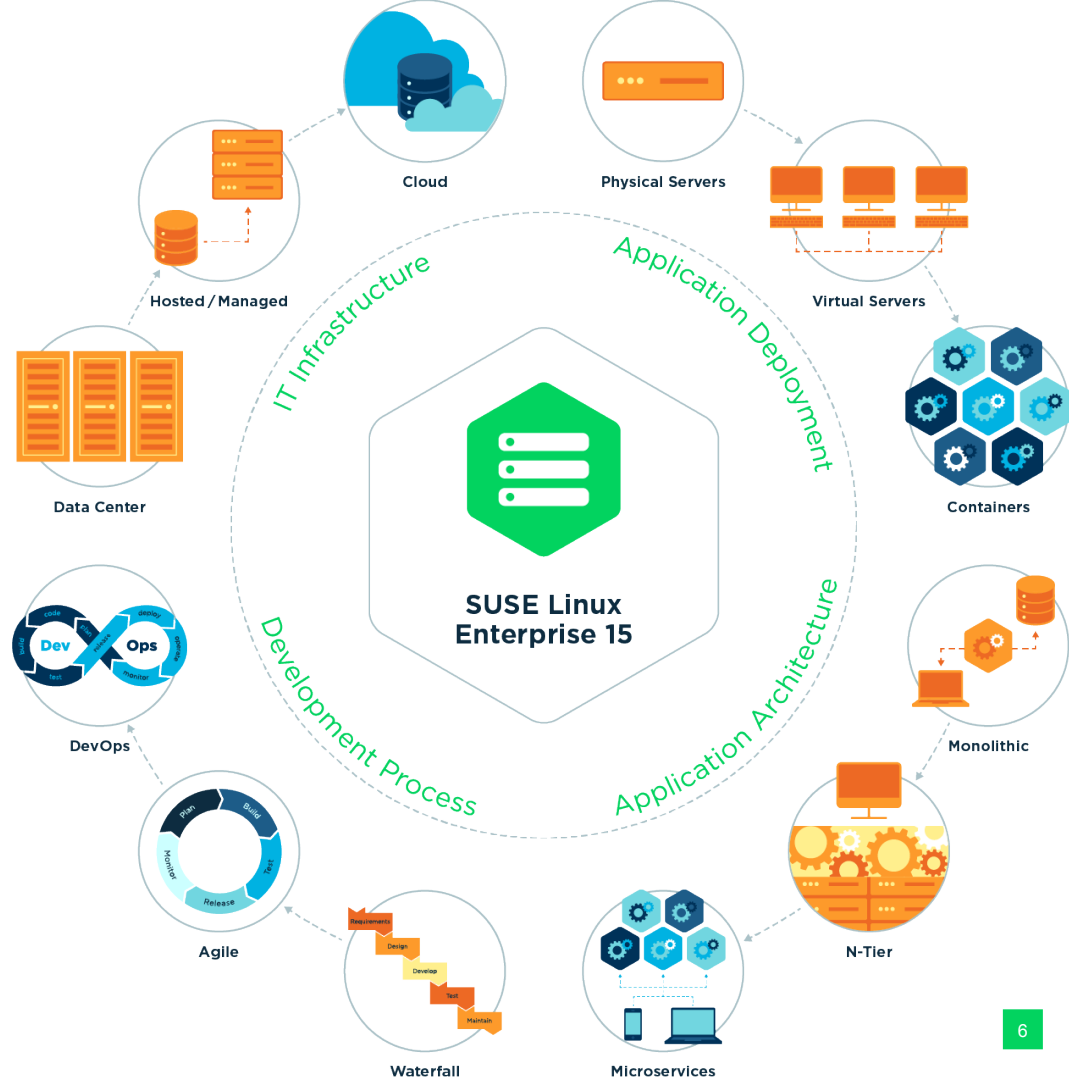
Multimodal IT needs bridges

Move workloads from
on-premise to cloud

Leverage data center for
container applications
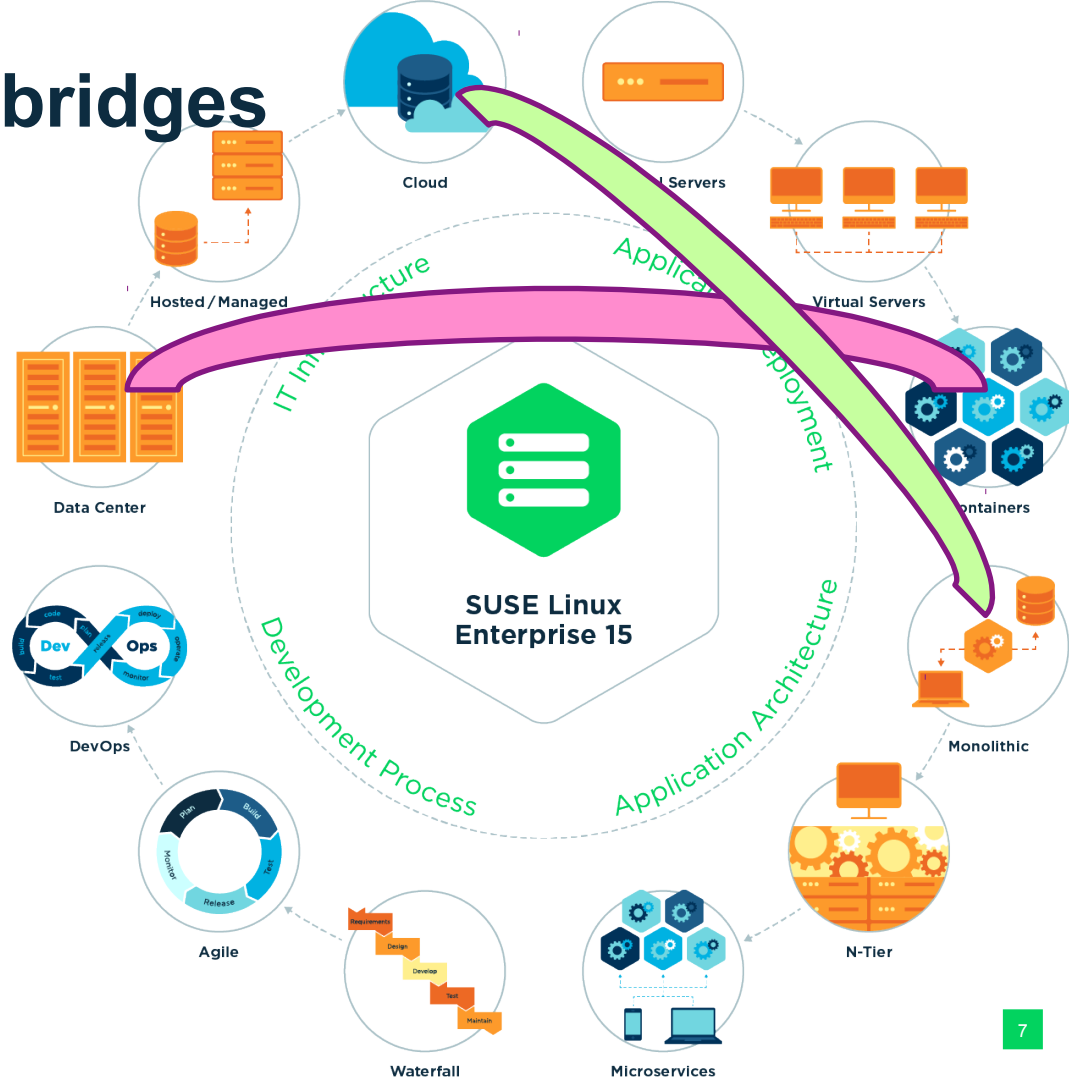
Multimodal IT – Mixed IT Infrastructure

Servers reside within traditional infrastructure and applications run on software-defined infrastructure

Traditional Infrastructure

SAP

SQL

Oracle

Software-Defined Infrastructure

Container Applications
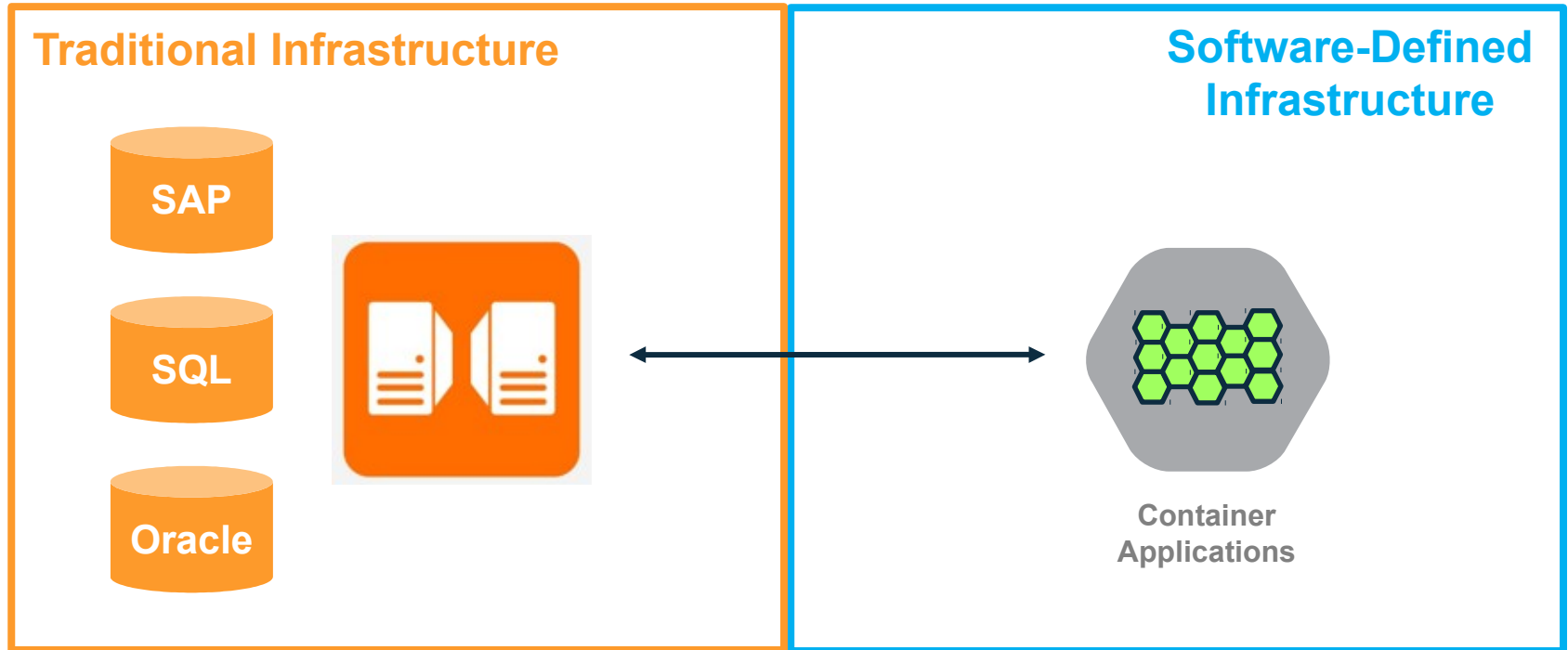
Multimodal IT – Application Mobility across mixed IT

Move workloads across traditional and software-defined infrastructure
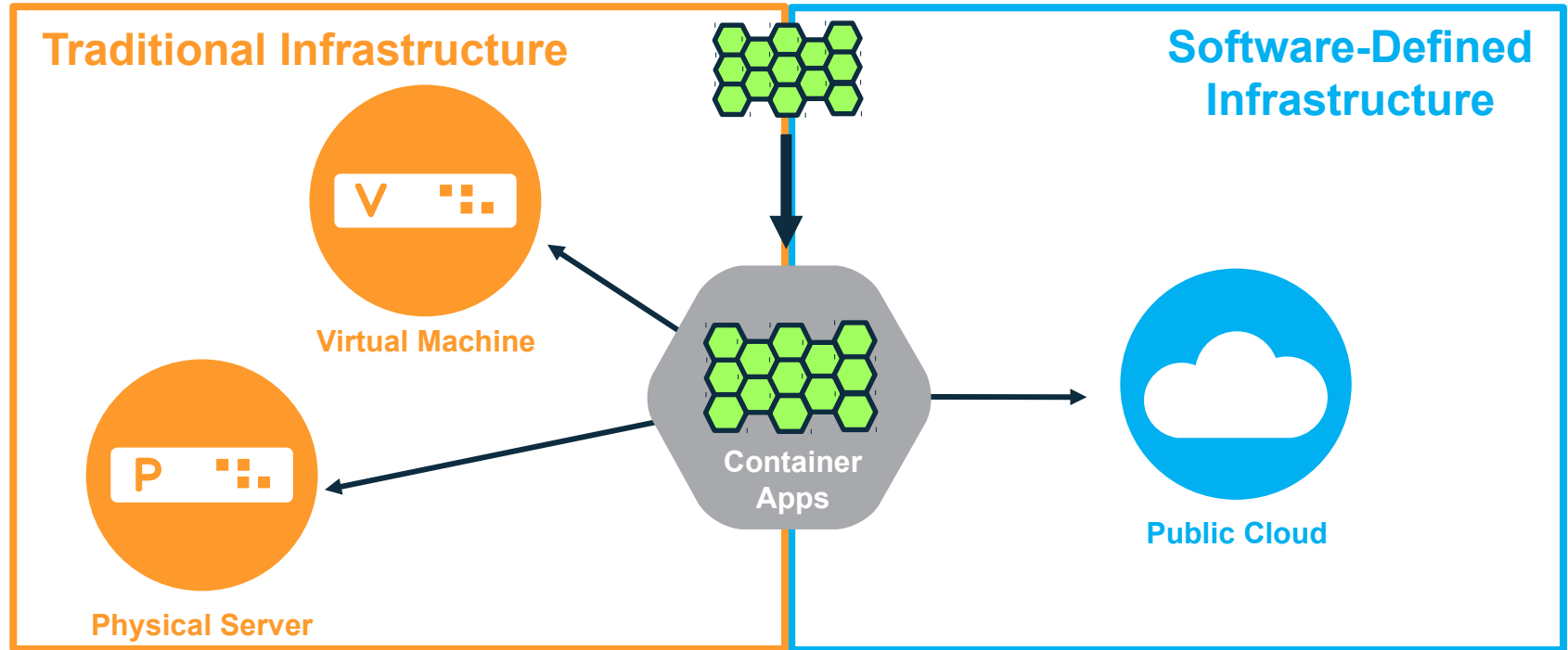
Multimodal IT – Mix of deployment scenarios

Variety of deployment scenarios co-exist spanning traditional and software-defined infrastructure

Storage

Virtual Machines

Physical Servers

OpenStack Cloud

Container Applications
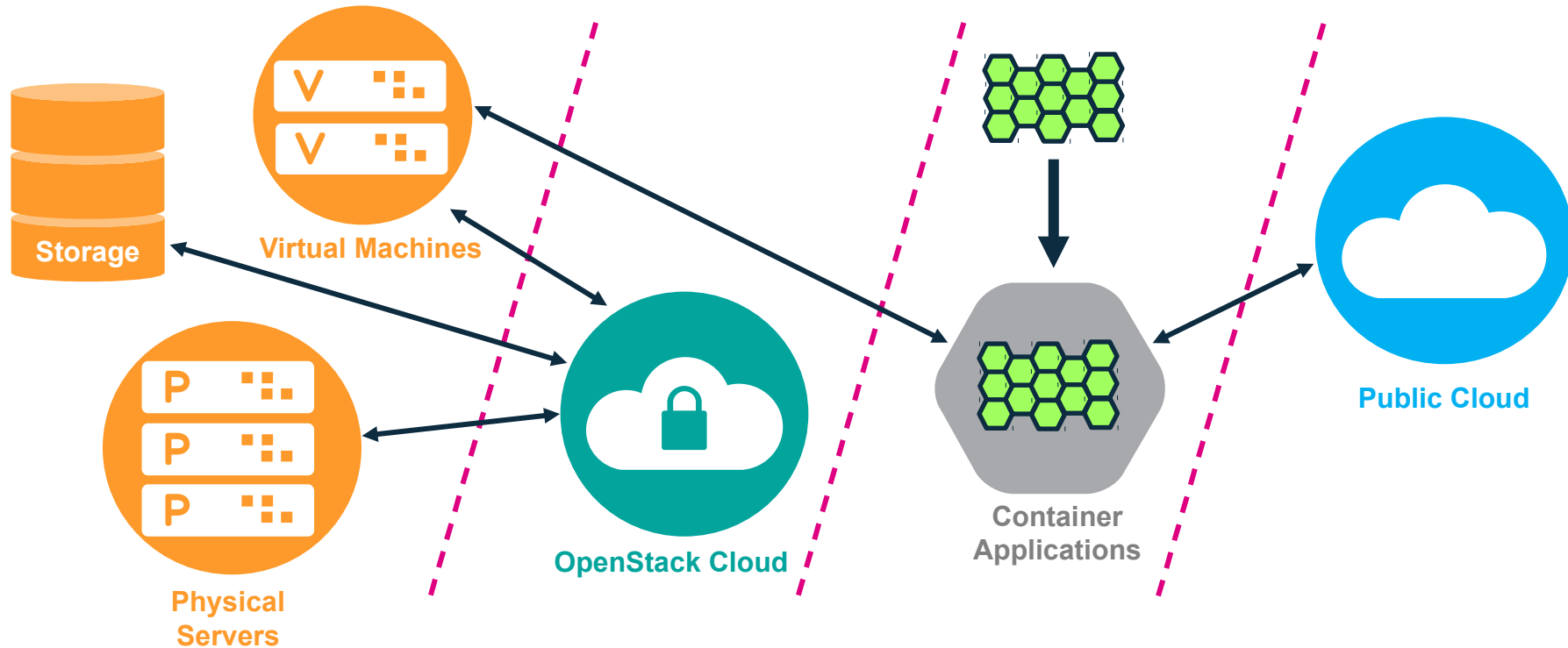
Public Cloud

Traditional Infrastructure

Software-Defined Infrastructure

More efficient IT infrastructure

Minimize upfront planning and simplify decision making

Easily transition to and from public cloud – Azure, AWS, Google, Alibaba etc. etc.

Secure & consistent environment – Installation, Management, Maintenance

Simplify IT operations – Management across platforms & functions

SUSE Software-Defined Infrastructure

Application Delivery

Container Management
SUSE CaaS Platform

Platform as a Service
SUSE Cloud Application Platform

Infrastructure & Lifecycle Management

SUSE Manager

SUSE OpenStack Cloud Monitoring

Software-Defined Infrastructure

Private Cloud / IaaS
SUSE OpenStack Cloud

Compute
Virtual Machine & Container

Storage
SUSE Enterprise Storage

Networking
SDN and NFV

Operating System
SUSE Linux Enterprise Server

Physical Infrastructure: Server, Switches, Storage

Public Cloud

SUSE Cloud Service Provider Program

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SUSE Linux Enterprise Roadmap

Roadmap

	2014	2015	2016	2017	2018	2019
SLE 11		SP4				GE LTSS
SLE 12	GA	SP1	SP2	SP3	SP4	SP5
SLE 15					GA	SP1
CaaSP				1		
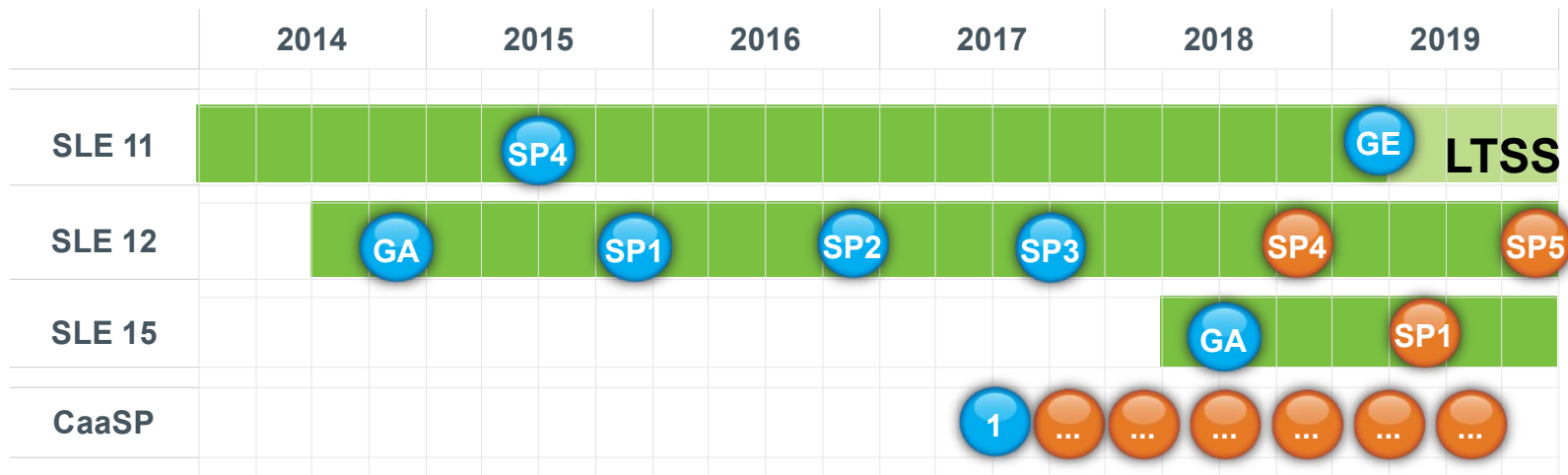
SUSE Linux Enterprise 15 - Multimodal delivery
Ready for traditional Data Center and Software
Defined Infrastructure

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Lifecycle – SUSE Linux Enterprise Server
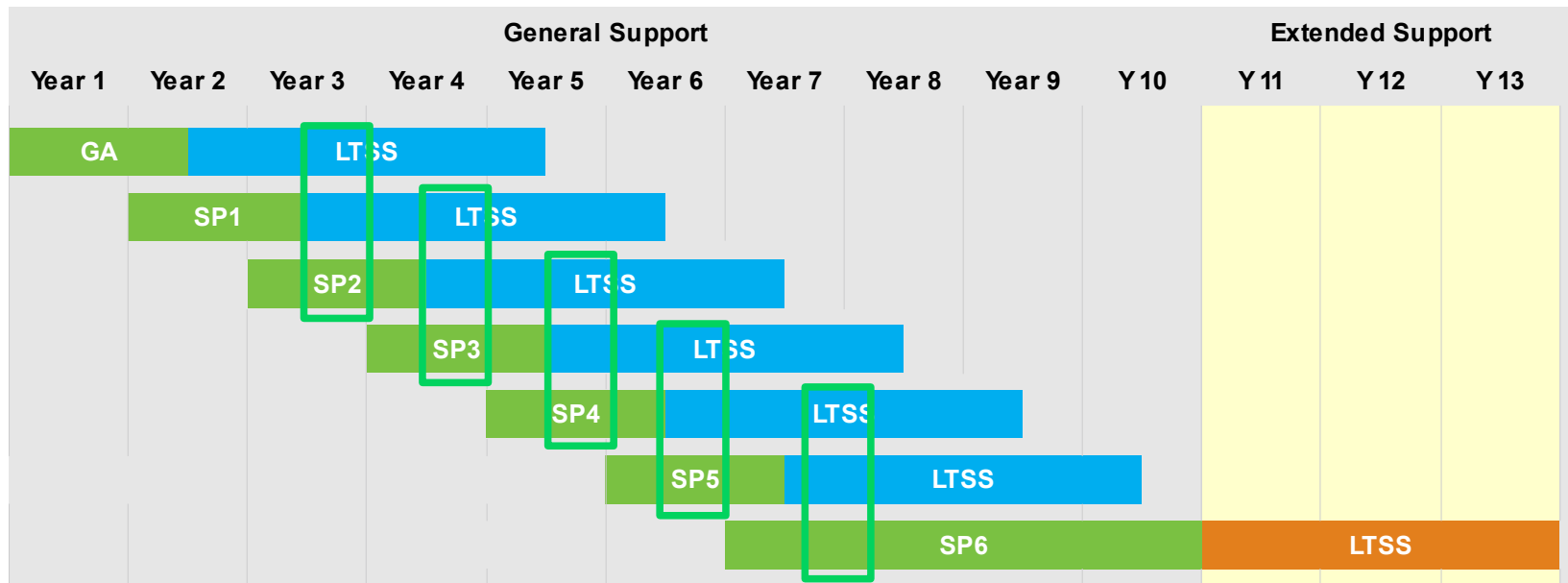
- Service Pack Overlap Support: 6 months
- Long Term Service Pack Support: up to 3 years after generic end of support
- Skip-a-service-pack support
- Service Pack 6 will be evaluated at time of Service Pack 5

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SUSE Linux Enterprise 15

The Operating System Challenge

Do we still need an Operating System?

Yes – Remember how it was to run Applications without an Operating System?

Yes – Do you want each different system to be handled different?

Yes – *anthroposophical principle*

YOU are here so YOU need it

wikipedia.org:Poil,Papertape2.jpg

SUSE Linux Enterprise 15

SUSE Linux Enterprise 15 is a **multimodal operating system** that paves the way for IT transformation in the software-defined era.

The modern and modular OS helps simplify multimodal IT, makes traditional IT infrastructure efficient and provides an engaging platform for developers. As a result, you can easily deploy and transition business-critical workloads across on-premise and public cloud environments.

SLE15 is another example of our **open, open** approach helping you optimize and modernize your multimodal IT infrastructure.

Key Benefits of SLE15:

- Simplify multimodal IT by bridging traditional and software-defined infrastructure
- Make traditional IT infrastructure more efficient with **Modular+** architecture
- Accelerate transition from community Linux based developer setups to fully supported enterprise Linux environment

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Building Bridges with **Multimodal OS**

SUSE Linux Enterprise 15

Traditional Infrastructure

Software-Defined Infrastructure

Container Apps
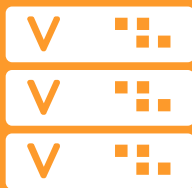
SUSE Linux Enterprise 15 – Portfolio Overview

Server and Desktop

- SUSE Linux Enterprise Server for x86-64, z Systems, LinuxOne, IBM Power, ARM64
- SUSE Linux Enterprise Server for SAP Applications
- SUSE Linux Enterprise Server for High Performance Computing
- SUSE Linux Enterprise Desktop
- SUSE Linux Enterprise Real Time

- SUSE Linux Enterprise Server with Expanded Support
- SUSE Linux Enterprise Point of Service

Server Extensions

- SUSE Linux Enterprise High Availability & GEO Clustering
- SUSE Linux Enterprise Live Patching
- Long Term Service Pack Support
- SUSE Linux Enterprise Workstation Extension

- SUSE Linux Enterprise Virtual Machine Driver Pack
- ~~SUSE Linux Enterprise Software Development Kit~~

Cloud, Storage and Management

- SUSE OpenStack Cloud
- SUSE Enterprise Storage
- SUSE CaaS Platform
- SUSE Manager
- SUSE Manager Management Pack for Microsoft System Center Operations Manager
- SUSE Studio

SUSE Linux Enterprise 15

Development Module

SUSE Linux Enterprise 15 – Ubiquity

Multiple HW architectures
- X86-64, POWER LE, Z Systems, ARM64
- All 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)

SUSE Linux Enterprise 15 Product Family

SUSE Linux Enterprise High Performance Computing 15

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

What's New:

- **SUSE-supported HPC module** in SLE HPC 15, including latest levels of popular HPC services and capabilities such as Slurm for workload management, Ganglia for performance monitoring, OpenMPI for high-performance message passing, scientific and mathematical libraries for parallel computing, and much more)

- **Enhanced HPC partnerships** with hardware partners (including HPE, Cray, Lenovo, Cavium and Arm) and software partners (including Microsoft, Bright Computing, Univa and the OpenHPC Community)

- **New HPC Sales Plays** with HPE and Lenovo; **new HPC initiatives** with HPE, Arm and Cray

- **Lower prices and revised terms and conditions** to ease adoption of HPC environments in smaller clusters, on cost-effective to high-end supercomputers

- **Extended and long term support options** for HPC environments

SUSE Linux Enterprise for High Availability Extension 15

Integrated suite of robust open source clustering technologies that enable enterprises to implement highly available Linux clusters and eliminate single points of failure. Also included is geo clustering, designed to manage cluster servers in data centers anywhere in the world

- **Easily manage clustered Linux servers** and monitor the clustered environment
- **Prevent mission-critical application downtime** by replicating data across multiple clusters
- **Maximize mission-critical service availability** in mixed clustering environments of both physical and virtual Linux servers
- **Protect against regional disasters** with geo clustering for service failover over any distance

What's New:

- **Geo Clustering is included** in SLE HAE 15, protecting workloads across globally distributed data centers and providing rules-based failover for automatic and manual transfer of a workload to another cluster outside of the affected area

- **Improved graphical interface (HAWK)** saves time and easily manages, configures and monitors clustered Linux servers

- **Faster time to value** with enhanced and continuous data replication via DRBD (Distributed Replicated Block Device), enabling locking and synchronization across multiple systems on the cluster

- **Ability to configure containers** as cluster resources for high availability (tech preview)

- **Enhanced Pacemaker support** for flexible, policy-driven clustering, enabling probes of guest nodes for resource status to prevent any possible concurrency violations

- **AutoYaST support for Geo Clustering** instead of installing manually, use AutoYaST to clone the HA configuration of existing nodes

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SUSE Linux Enterprise Server for z Systems and LinuxONE 15

Enterprise-class, highly reliable, scalable and secure open source server operating system, optimized for the IBM s390 architecture and the complete range of IBM Z and LinuxONE systems, and built to power physical, virtual and cloud-based mission-critical workloads

- **Lower total cost of ownership and accelerate innovation** through database consolidation and advanced virtualization
- **Boost performance and throughput** while increasing uptime and simplifying data center management
- **Improve operational efficiency** through a common code base that comes with integrated systems management tools unique to SUSE

What's New:

- **High performance and throughput** with support for the latest technology advances in SIMD and SMT across IBM z13/14/L1 hardware

- **Increased security and data protection** by supporting the latest cryptographic acceleration for secure-key operations and new hardware assists for fast data encryption

- **Enhanced virtualization capabilities** to boost resource utilization using KVM and z/VM, giving you the ability to create several virtual machines that run on a single processor and handle multiple workloads

- **Advanced RAS capabilities** that increase reliability and reduce costs, providing extra dimensions of availability and ensuring the highest levels of security

- **Improved operational efficiency** with tools you won't find anywhere else and by taking advantage of the networking and communications features of OFED and HiperSockets.

SUSE Linux Enterprise Server for ARM 15

SLES for ARM is an enterprise-grade Linux distribution that is optimized for unique 64-bit Arm chip capabilities and is designed to:

- **Exploit unique AArch64 capabilities** on a well-established open source, industry standard OS distribution
- **Improve time to market** with an array of advanced tools to more quickly compile, package and deploy Linux solutions for 64-bit Arm server and IoT systems
- **Deliver innovative solutions** with a rock solid OS foundation that is flexible to support advanced features of a broad set of AArch64 processors and open source solutions

What's New:

Exploit ARM System-On-a-Chip specific features

- Full subscription support for Raspberry Pi 3 B+ for industrial automation IoT device use cases
- Crypto accelerator support of the Cavium Nitrox5 PCI card

Deliver innovative solutions

- Linux kernel 4.14 supports Arm device-specific error handling and resolution commands for improved reliability, availability and serviceability (RAS)

SUSE Linux Enterprise Server for POWER 15

***SUSE Linux Enterprise Server for POWER** is an enterprise-grade Linux distribution optimized for POWER8/9-based systems and is designed to:*

- **Increase reliability & reduce costs for mission-critical applications** with advanced RAS capabilities optimized to support IBM Power Systems features
- **Deliver a high-performance platform to meet increasing business demands** with improved application performance and instant access to data
- **Accelerate innovation and improve deployment times** for a broad choice of open source and partner solutions

What's New:

Improve performance and flexibility

- SR-IOV ibmvnic shared adapter support with IBM PowerVM increases system I/O performance by reducing the CPU load and providing the ability to enforce Quality-of-Service
- Enhanced IBM POWER9 processor support with tracing tools, tuning and GCC 7.2 enables improved application performance, tuning and diagnostics

SUSE Linux Enterprise Server for SAP Applications 15

SAP

SUSE Linux Enterprise Server for SAP Applications *is the leading platform for SAP HANA, SAP NetWeaver and S/4HANA solutions providing the capability to:*

- **Reduce downtime of critical operations** with built-in business continuity including an advanced high availability solution, and automated data recovery for SAP HANA

- **Boost performance for mission-critical SAP applications** with the Linux OS that is performance-optimized and configurable to sustain high performance of SAP apps

- **Minimize the time and effort to migrate to S/4HANA and deploy SAP landscapes** with a unified solution that includes application installation, migration and superior support

What's New:

Reduce downtime of critical operations

- NVDIMM support enables diskless databases for faster reboot
- Support for >32 TB SAP HANA databases on IBM POWER reduces reboots after memory fragmentation
- Relax and Recovery now supported on IBM POWER
- New SAPHanaSR service calls for faster takeovers after service change notifications
- Operations pre-/post-scripts to adapt SAP HANA failover/recovery to customer scenarios

Boost performance of mission-critical SAP applications

- "Workload Memory Protection" (based on cgroup) replaces Page Cache Management
- Configurable TCP connection sharing improves communication throughput on platforms with a high NFS load

Minimize the time and effort to deploy SAP landscapes

- Immediately start sapconf package changes rather than reboot
- System role enables easier installation with customized SAP environment scenarios

SUSE Linux Enterprise 15 – Themes

Multimodal – address traditional & containerized infrastructure
Provide a common code base for traditional and software defined data center.

Modular+
Everything is a module: A stable base, progressive options, flexible delivery.

Unified Installer
Install all SUSE Linux Enterprise 15 products starting from a single medium.

Ease of use – hassle-free use of modules & extensions
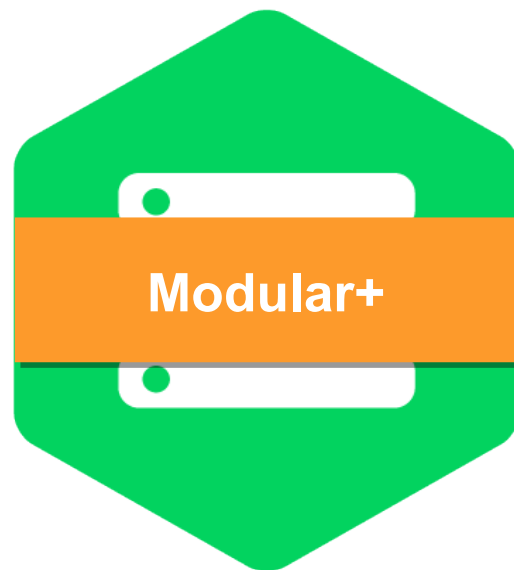Easily search, install, and use packages across the SUSE universe.
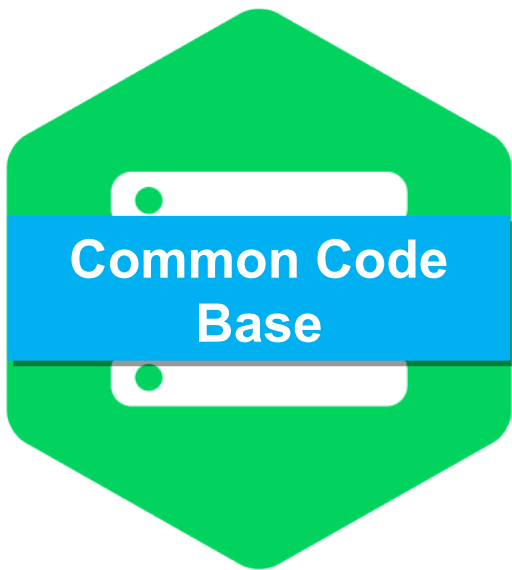
Developer & Community Linux
Migrate from openSUSE LEAP to SUSE Linux Enterprise Server, Develop with and for SUSE Linux Enterprise

Multimodal

SUSE Linux Enterprise 15

Multimodal OS

Common Code Base

Modular+

Multimodal OS Requirements

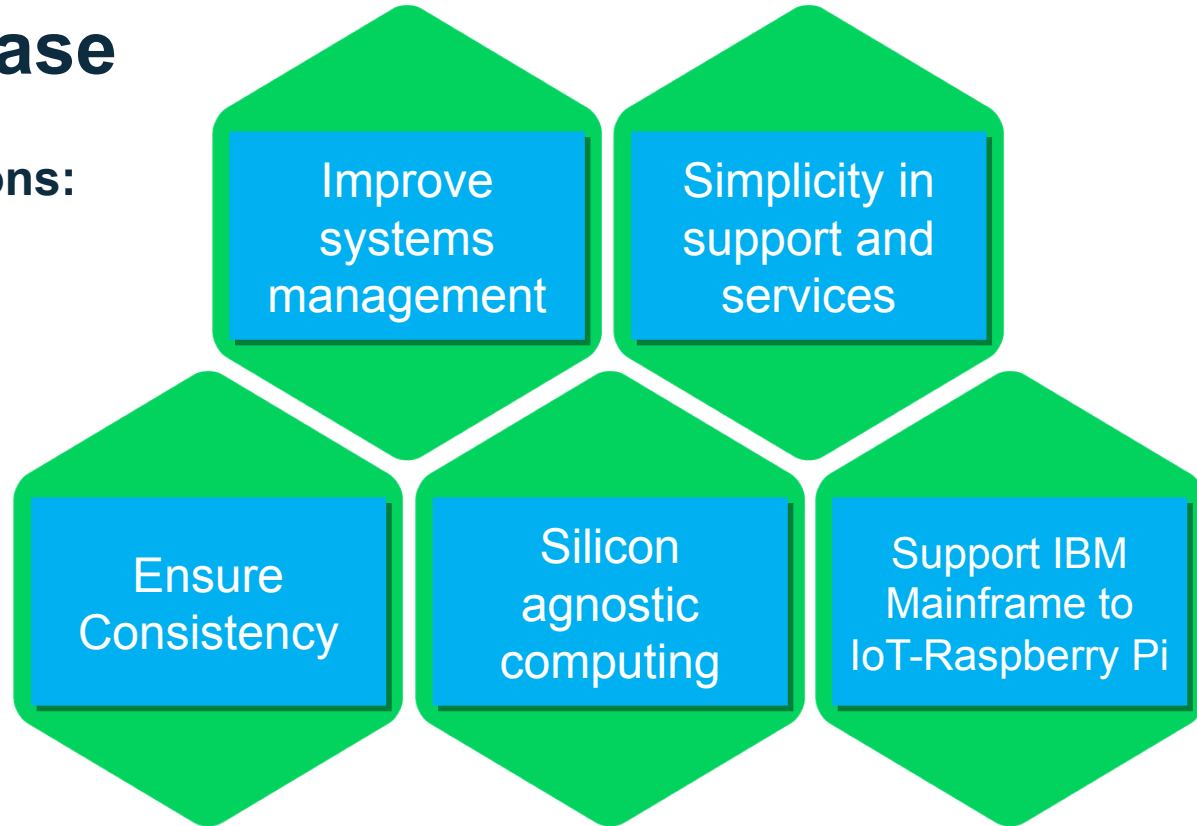| Traditional Infrastructure	Software-defined Infrastructure
Multiple use cases	Single use case, multiple systems
Manual and automatic installation	Automatic and centralized installation
Variety of updates, upgrades, legacy	Always up-to-date
Variable packaging and installation	Fit one purpose
May become huge in size and management	Small as possible for size and management

Common Code Base

Benefits across 3 dimensions:
Hardware Architecture,
Applications and
Systems Management

Improve systems management

Simplicity in support and services

Ensure Consistency

Silicon agnostic computing

Support IBM Mainframe to IoT-Raspberry Pi

"IDC believes the **common code base** of SLE 15 makes the product a multi-platform OS that is well suited for heterogenous computing environments."
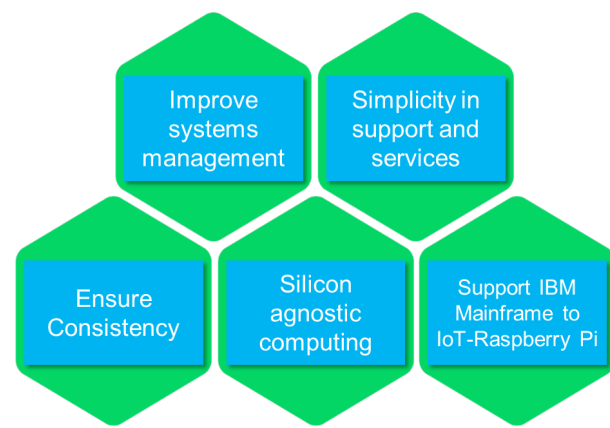**IDC Market Note, 2018**

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Multimodal Architecture

SLE 15 Products

- SAP
- HPC
- HA
- SLES
- RT
- SLED
- LP

SDI Products

- SUSE CaaS Platform
- SUSE Cloud Application Platform
- SUSE OpenStack Cloud
- SUSE Enterprise Storage

Services

Container	Workload
Virtual Machine	Workload
Appliance	Workload

Traditional Infrastructure

Software-Defined Infrastructure (SDI)

Common Code Base
All Architectures (x86-64, Arm, POWER, IBM Z)
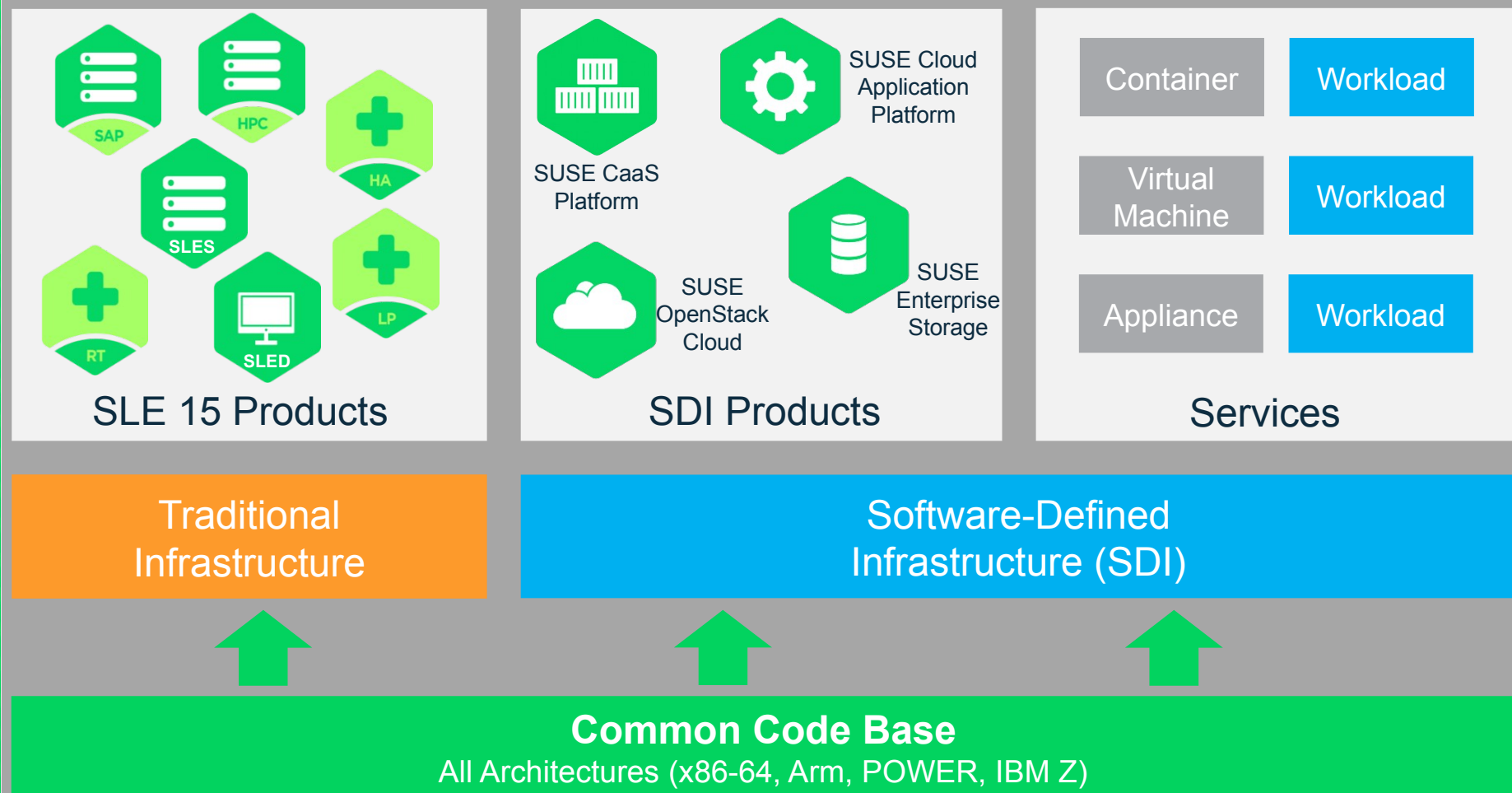
Common Code Base – Benefits

- You can move application workloads transparently across containers, VMs, bare metal, SUSE OpenStack Cloud & other SLE products.

- Provides a unified platform for bare-metal, virtual and container based applications. You can run containers as well as large database applications such as Oracle, SQL and SAP without the worry of supporting them on separate Linux platforms.

- Develop and support optimal applications that can leverage all your IT resources and bridge across your multimodal infrastructure.

- Avoid the hassles of maintaining multiple code streams for different hardware setups in your mixed IT environment – the same operating system code runs IBM Mainframe and Raspberry Pi based IoT devices.

- Enables silicon agnostic computing that is independent of underlying CPU architecture. As a result, you gain a consistent experience across architectures – x86-64, ARM, POWER and IBM Z.

Improve systems management

Simplicity in support and services

Ensure Consistency

Silicon agnostic computing

Support IBM Mainframe to IoT-Raspberry Pi

Modular+

Evolution of **Multimodal OS**

Modular+

"Everything is a module"

A product (SLE Server) is a set of Modules.

Pool of Modules

- Containers
- Public Cloud
- Certifications
- . . . .

SLE High Availability

- High Availability

SLE Server

- Server Apps
- Legacy

SLE Desktop

- Desktop Productivity

Common Code Base Modules

- Base System
- Desktop Apps
- . . . .
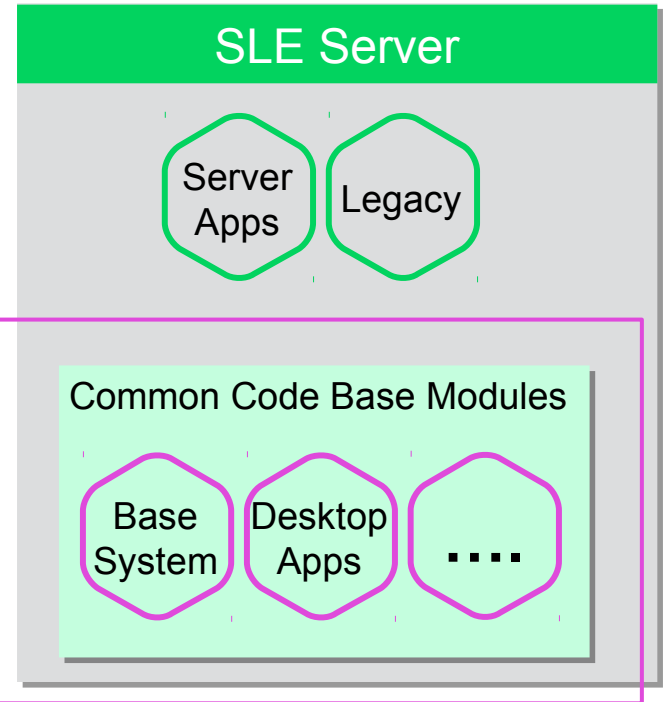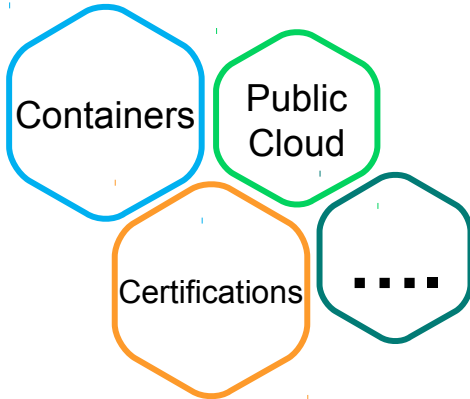
SUSE Linux Enterprise 15 Modules

- Base System
- Desktop Applications
- Server Applications
- High Availability
- High Performance Computing

- SAP Applications
- Desktop Productivity
- Development Tools
- Containers
- Public Cloud
- Legacy

Not all modules are available with all products or in all combinations
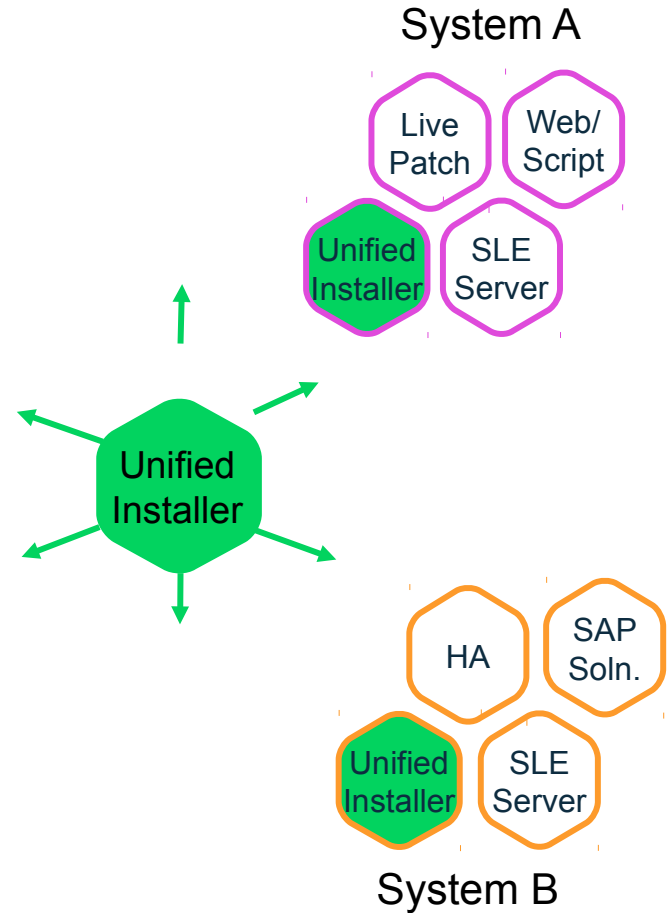
Unified Installer

Unified Installer

Single starting point

The Unified Installer installs all SUSE Linux Enterprise 15 products from a single medium.

Easy to deploy

The Unified Installer medium is small.
It allows easier handling, remote deployment, and faster deployment cycle.

System A

Live Patch

Web/ Script

Unified Installer

SLE Server

Unified Installer

HA

SAP Soln.

Unified Installer

SLE Server

System B

Install Workflow

Start Unified Installer

The Unified Installer is the same for all SUSE Linux Enterprise 15 products

Select the product to install

The Unified Installer allows to select product and applicable extension

Register

Register a system for production or evaluation

Run product installation

The Unified Installer installs the product using the designed product workflow

Install Sources

On-line
Unified Installer medium & Repositories direct from SCC, indirect via SUSE Manager, proxied via SMT/RMT

Disconnected
Unified Installer medium & Repositories from pre-loaded/disconnected SMT/RMT

Off-line
Unified Installer medium & Packages medium

Image based
Unified Installer medium + on-line / disconnected Repositories → silver image
JeOS images + on-line / disconnected Repositories
Open Build Service + KIWI → SUSE Studio Express

Ease of use

Ease of use – package handling

Easy to …

Search

Find packages across all products, extensions and modules

Avoid missed-but-available features

Leverages SUSE Customer Center search engine

View

Display different policies and entitlement needs
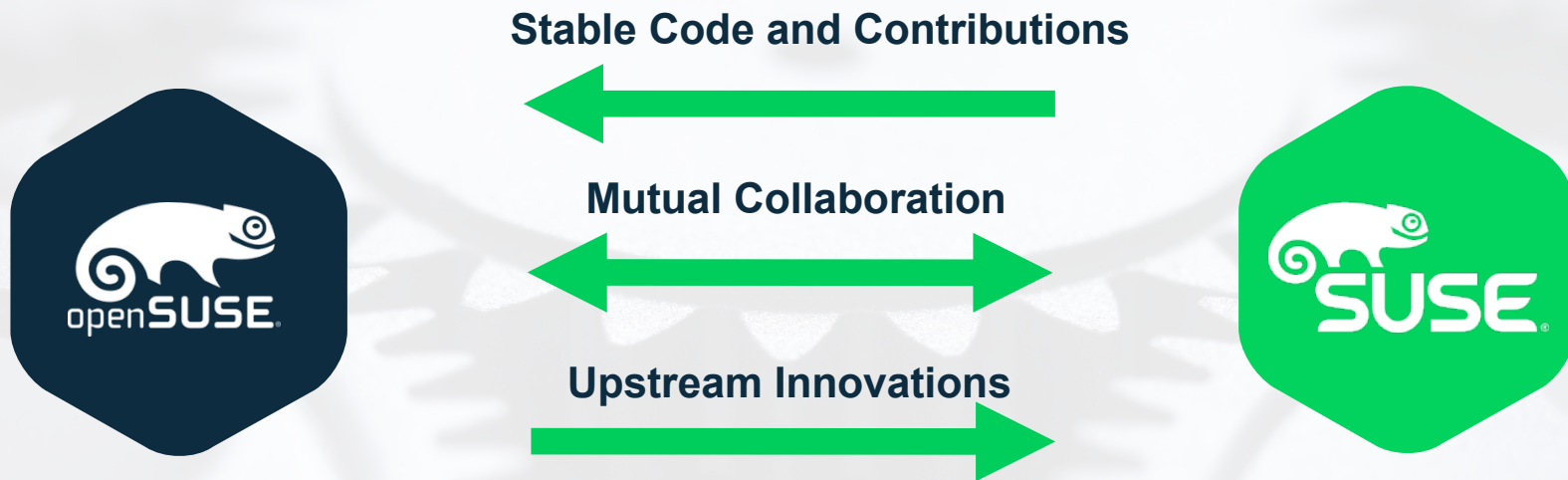
Allow customers to mix and match requirements

Trace

Document the used package sources

Allow customers to align with **policies**

Developer & Community LInux

SUSE & openSUSE – Working Together

Stable Code and Contributions

Mutual Collaboration

Upstream Innovations

Developer friendly

Move to production faster from developer setups

Two options for a direct path to SUSE Linux Enterprise

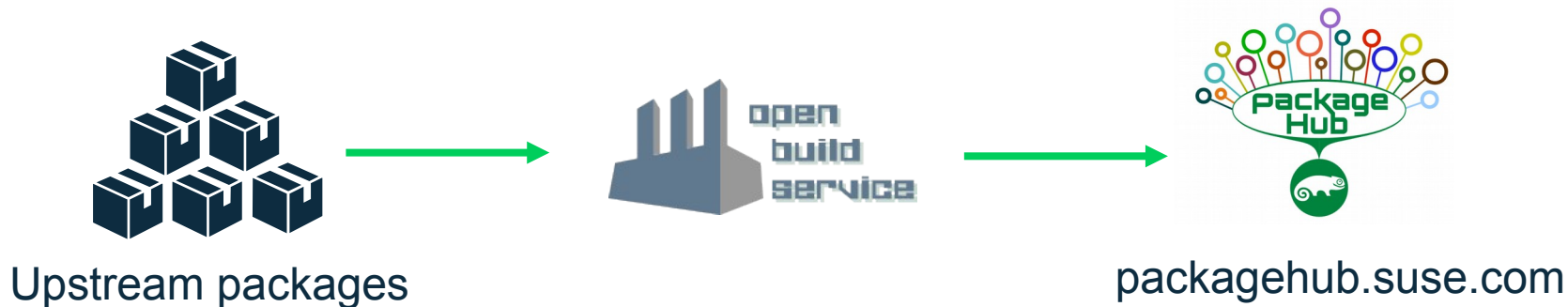| Option 1 | Community Linux **openSUSE Leap 15** | → | SLE 15 |

| Option 2 | Free Developer Subscription | → | SLE 15 |

SUSE Package Hub

- Broadening software choices for enterprise users, save to install
- Community built and maintained
- SUSE-approved and built at no extra cost
- Public download and SCC integration

Upstream packages

packagehub.suse.com

Summary SLE 12 vs. SLE 15

SLE 12 vs SLE 15

SUSE Linux Enterprise 12
- One image per each product
- Some modules on top
- "Software Development Kit" (SDK) on top

SUSE Linux Enterprise 15
- One installation image for ALL products
- "Everything is a module" – Modular+
- Integrated SDK
- Search across all SUSE modules

SUSE Linux Enterprise 15

Kai Dupke

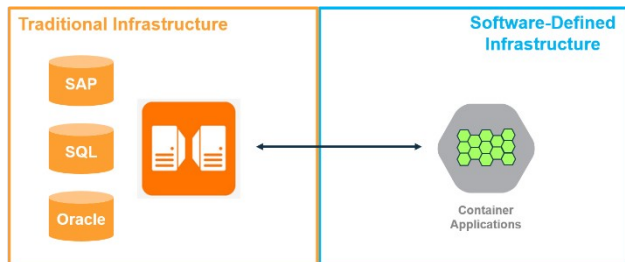Sr. Product Manager
SUSE Linux Enterprise 15

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linkedin.com/in/kaidupke/

Details

Get ready for SUSE Linux Enterprise 15

Blogs

Links:

[The Rise of Multimodal IT and What It Means To You](https://www.suse.com/c/the-rise-of-multimodal-it-and-what-it-means-to-you/)

https://www.suse.com/c/the-rise-of-multimodal-it-and-what-it-means-to-you/

Links:

[Multimodal OS – Designed for IT Transformation](https://www.suse.com/c/multimodal-os-designed-for-it-transformation/)
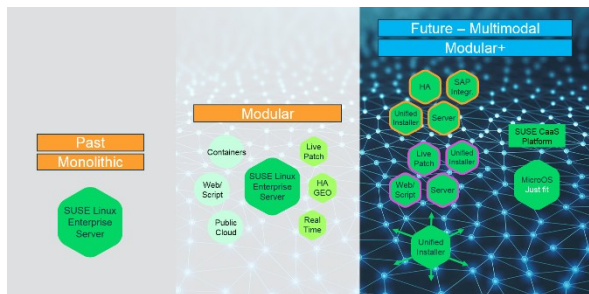
https://www.suse.com/c/multimodal-os-designed-for-it-transformation/

SLE 15 Collateral

Data Sheet: *SUSE Linux Enterprise Server 15*

Blogs

The Rise of Multimodal IT and What It Means To You   **(MUST READ)**

Multimodal OS – Designed for IT Transformation

Webinars

SLE15 Introduction (Beta)

How to Migrate to SUSE Linux Enterprise 15 (Technical Briefing)

SLE HPC New/Updated Collateral

White Paper: *HPCwire – HPC Goes Mainstream*

Data Sheet: *SUSE Linux Enterprise High Performance Computing*

Analyst Paper: *Hyperion: Linux and Open Source are Driving HPC into New High-growth Markets*

White Paper:
Powering Disruptive Technologies with HPC, Supercomputing, AI/ML with SUSE HPC

White Paper: *Powering Artificial Intelligence with High Performance Computing*

Video: *Sam the IT Admin Discovers High Performance Computing*

Chalk Talk: *SUSE High Performance Computing*

Blog: *A new day for High Performance Computing with SUSE Linux*

Campaign: *Powering AI and the Future of Business*

Sales Play: *Transform Your Enterprise with HPC from SUSE and HPE*

Sales Play: *Capture the Power of HPC with SUSE and Lenovo*

Analyst Video: *10 Questions for Hyperion Research on AI and HPC*

SLE HA New/Updated Collateral

FAQ: *SUSE Linux Enterprise High Availability Extension and Geo Clustering FAQ*

Data Sheet: *SUSE Linux Enterprise High Availability Extension 15*

Analyst Paper: *451 Research: Next-Gen Resilience for Nonstop Business-Critical Apps*

White Paper: *Make Nonstop IT a Reality for Your Business*

White Paper: *Becoming a Nonstop IT Shop*

Chalk Talk: *Toward Zero Downtime*

Blog: *Toward Zero Downtime with SAP HANA and More on IBM Systems*

Campaign: Nonstop IT for Business-Critical Applications

HA+GEO

SLES Z New/Updated Collateral

FAQ: *SUSE Linux Enterprise Server for z Systems and LinuxONE FAQ*

Data Sheet: *SUSE Linux Enterprise Server for z Systems and LinuxONE 15*

SUSE POV Article: *A Strategy Shift*

Flyer: *SUSE Linux Enterprise Server for z Systems and LinuxONE*

Case Study: *ICU IT Services Expands its Market Base by Embracing Linux on IBM LinuxONE*

Podcast: *Open Mainframe Project: I Am A Mainframer*

Podcast: *IBM and SUSE – An Ongoing Success Story*

Chalk Talk: *Server Consolidation on Z*

Success Story: *C&A Fashion*

Success Story: *Vitec Autodata*

Update/Migration

Migration Types

Online Update
- The update runs inside the up and running to-be-updated system
- Limited to non-intrusive changes

- → Designed for **minor** version updates

Offline Update
- Update is done using an update-system
- The to-be-updated system's file systems are mounted
- Intrusive changes are possible

- → Designed for **major** version updates

Migration Paths

SUSE Linux Enterprise 12 SP3 → SUSE Linux Enterprise 15

- Boot Unified Installer (Offline update)

SUSE Linux Enterprise 11 SP4 → SUSE Linux Enterprise 15

- Boot Unified Installer (Offline update)
- Major changes require manual interaction

**SUSE Linux Enterprise 15 → SUSE Linux Enterprise 15 SP1/SP2**

- Boot Unified Installer (Offline update)
- +
- Run update from installed system (Online update)

Kernel and Other Changes

Linux Kernel

Kernel 4.12

- Preliminary Radeon Vega support
- USB Type-C support
- New BFQ I/O scheduler for a more responsive desktop
- New Kyber I/O scheduler
- Upstream Progress in Live kernel patching
- Add support for Intel IMSM's Partial Parity Log
- Expose OpenChannel SSDs as device blocks
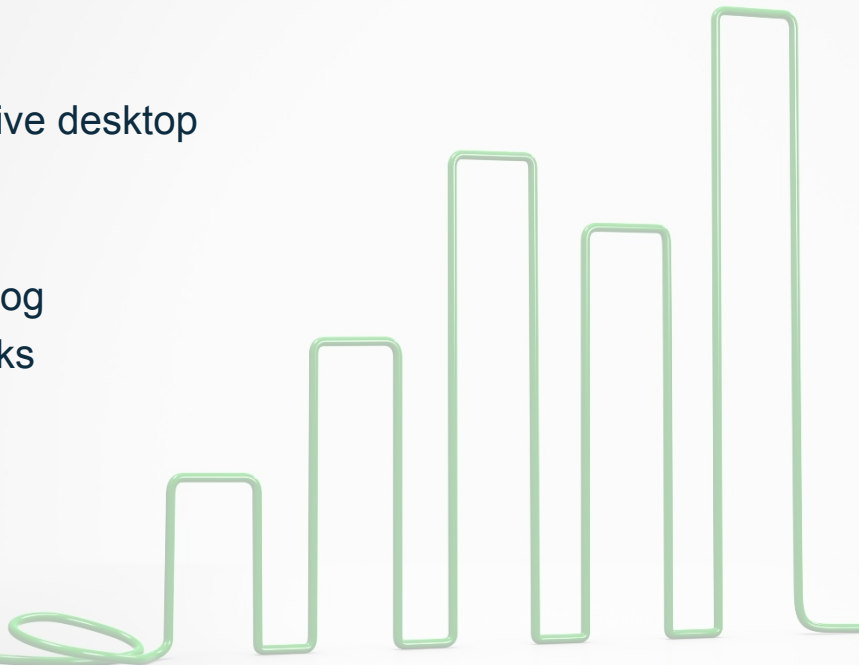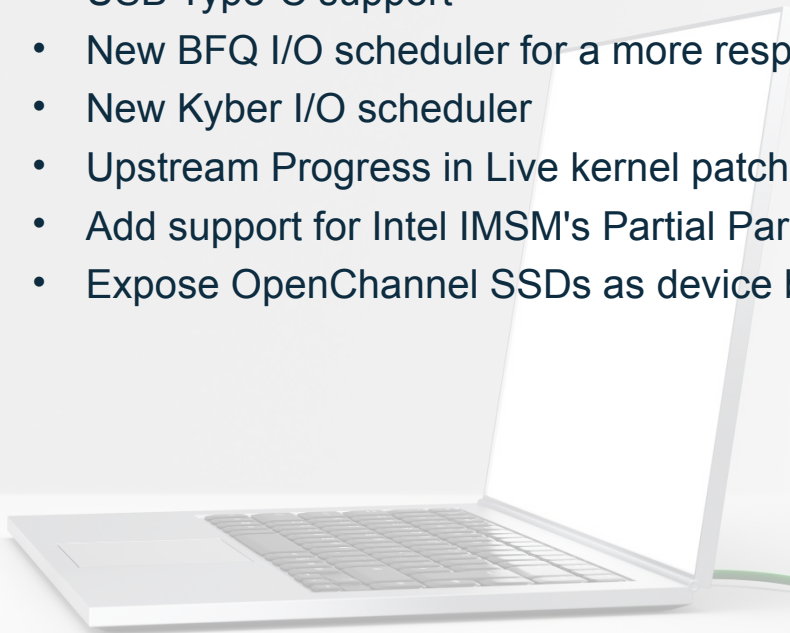
Additional Changes

- **GCC7 as system compiler**

  Will stay the same during SLE 15 lifetime, Yearly updates will be provided in a channel

-

- **Scripting languages**

  Ruby 2.5, PHP7, Perl 5.26, Python 3.6 (Python 2 will be in Legacy Module for a grace period)

- **Gnome 3.26**

- **High Availability**

  - Hawk2 UI improvements

  - DRBD multi-node three-way replication

  - Cluster-raid 10 (as Technical Preview)

Additional Changes

- **Chrony (ntpd will be in Legacy for a grace period)**
- **Firewalld (replaces SUSEFirewall2)**
- **SALT available in ase system**
- **Wayland (default for Desktop)**
- **389-DS (openLDAP libraries still available)**
- **Improved: Package search**
    - Across modules
- **Nvdimm improvements**
- **OpenJDK 9**

Security

Security

Frameworks
- SELinux
- AppArmor
- TLS 1.3
- OpenSSL: 1.1.x as default, 1.0.x available in Legacy for a grace period

Certification Targets
- Remain compliant with NIST SP 800-131a and similar standard
- Common Criteria certification valid in US and outside US
- Certify for FIPS 140-2 (or successor)
- Work on a STIGs for SUSE Linux Enterprise Server
- Contribute SUSE specific to the the openSCAP community

Non-Volatile Dual In-line Memory Module (NV-DIMM)

Increase database performance with NV-DIMM

Increase database performance with enhanced NV-DIMM (Non-Volatile In-line Memory Module) support for block devices (disk drives)

- NV-DIMM is persistent system memory which improves application performance, data security, and system crash recovery time

- Provides a performance boost for storage and database applications such as online transaction processing and financial apps that are downtime-sensitive

- Faster access to persistent data: expand memory sizes on x86 64 servers with enhanced NVDIMMs support for existing and upcoming devices and huge memory-demanding workloads
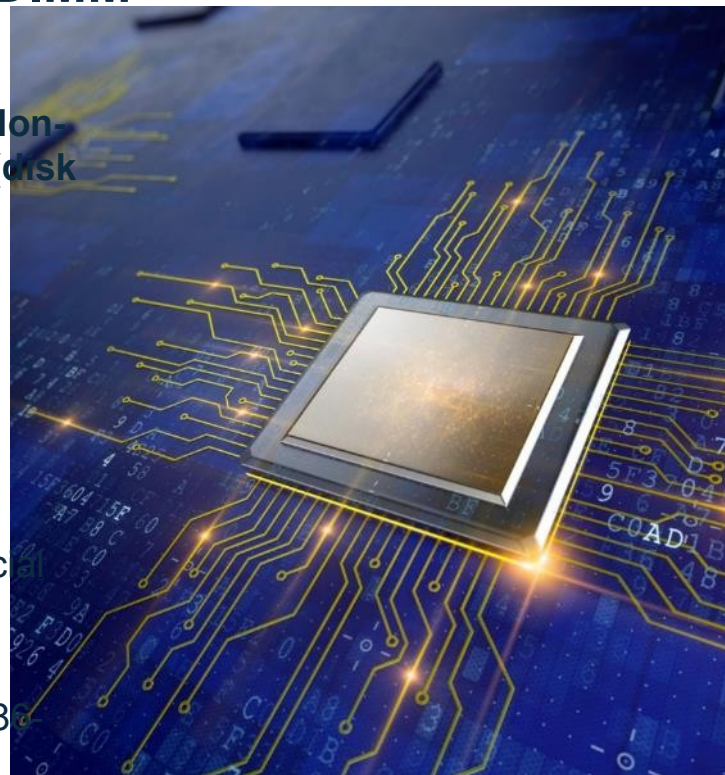
NV-DIMM

SLE 15 has increased the level of support for NV-DIMM, since SLE 12

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

- NV-DIMM block device support boosts database performance when placing database transaction logs on these devices

- NV-DIMM support for disk-less databases paves the way for instant database recovery after system reboots. **SLES for S Applications** is supported.

- Traditional database performance is gated by the scalability the underlying hardware infrastructure to store the related transaction logs to persistent storage

- Overall performance of database will increase due to NV-DIMM's low latency access for read/write

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