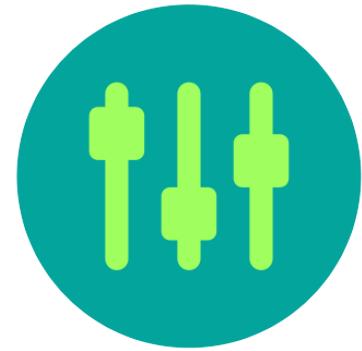




Tooling Linux for the Future of Embedded Systems

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With SUSE You Can



**Control
Infrastructure**



**Optimize
Operations**



**Innovate
Faster**

What is SUSE® Embedded



SUSE Embedded solutions deliver an optimized operating system for single-purpose workloads



Reduced Operating System

SUSE Linux Enterprise Server as the Foundation

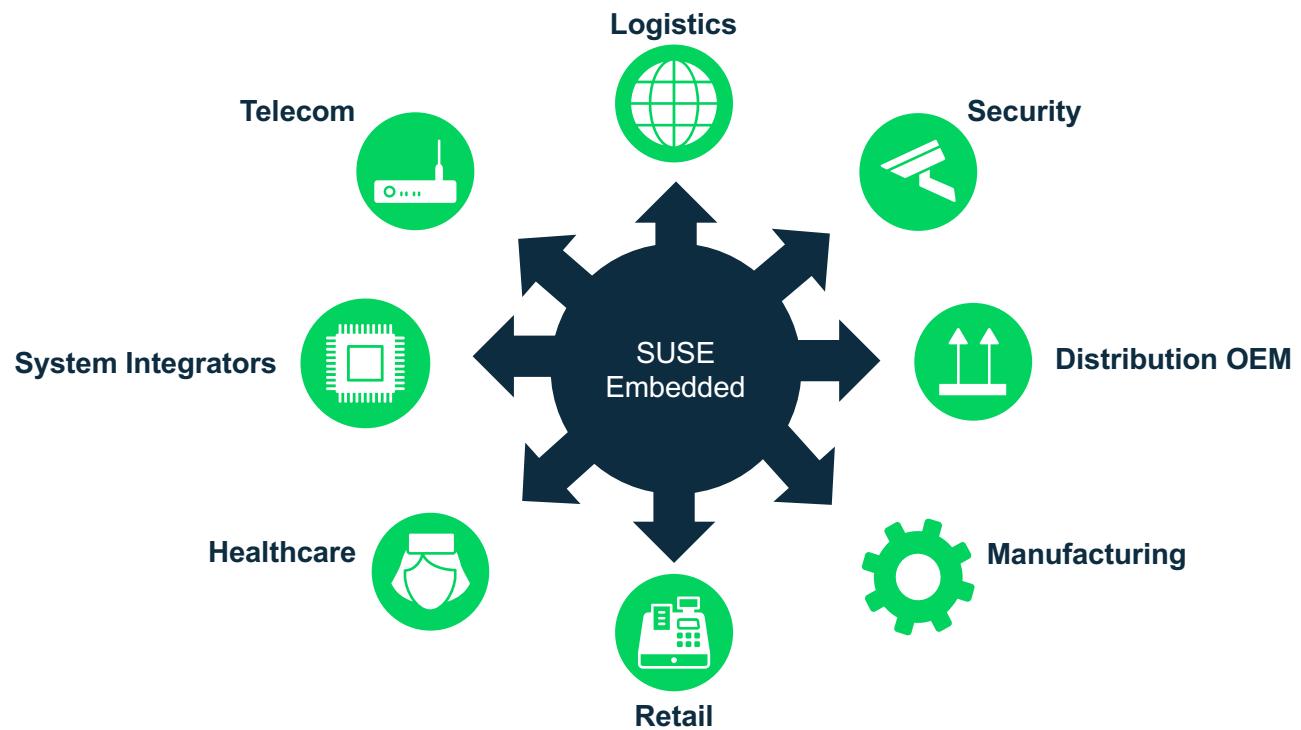
Embedded-based Subscription

JeOS provides a lean, yet powerful footprint for a task-specific, fixed-function hardware or software stack

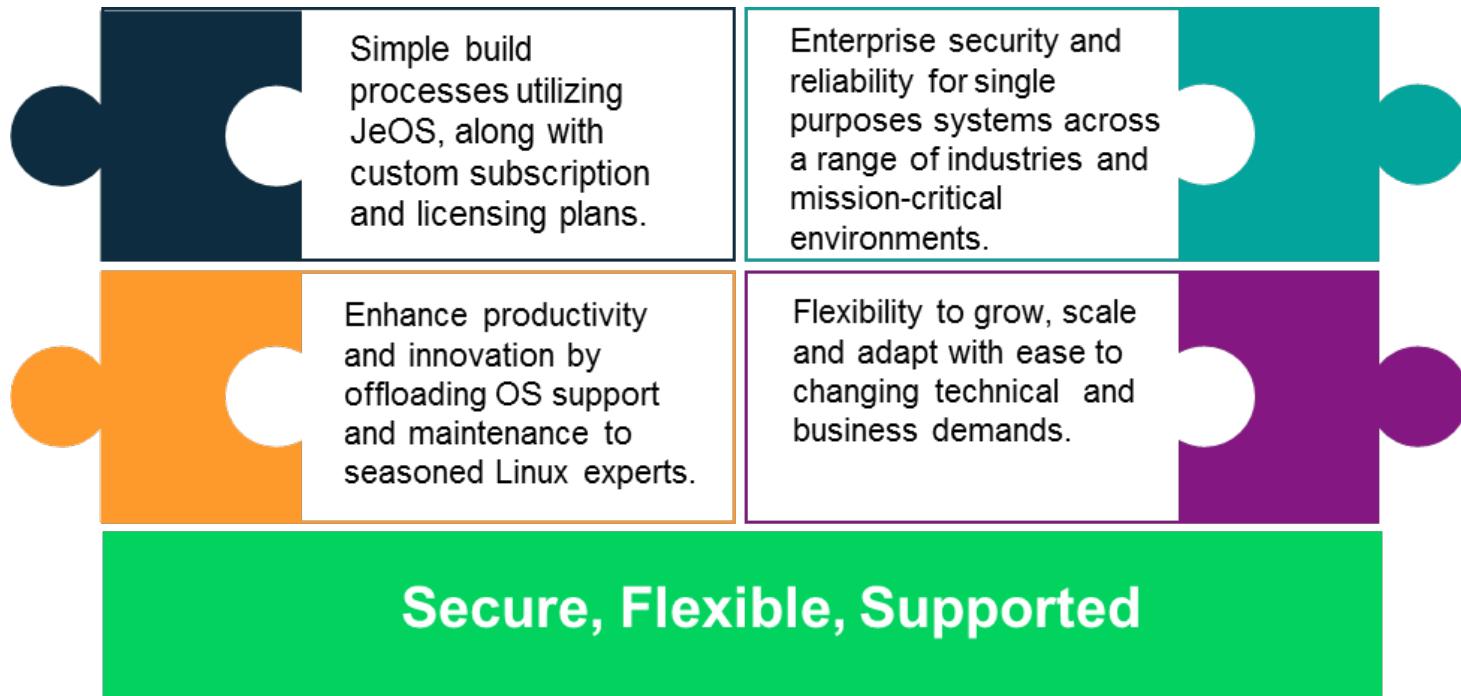
Enterprise-grade systems made simple for fixed-function product solution development

Flexible and customized licensing and subscription model allows access to a select set of SUSE components

Current Market Penetration

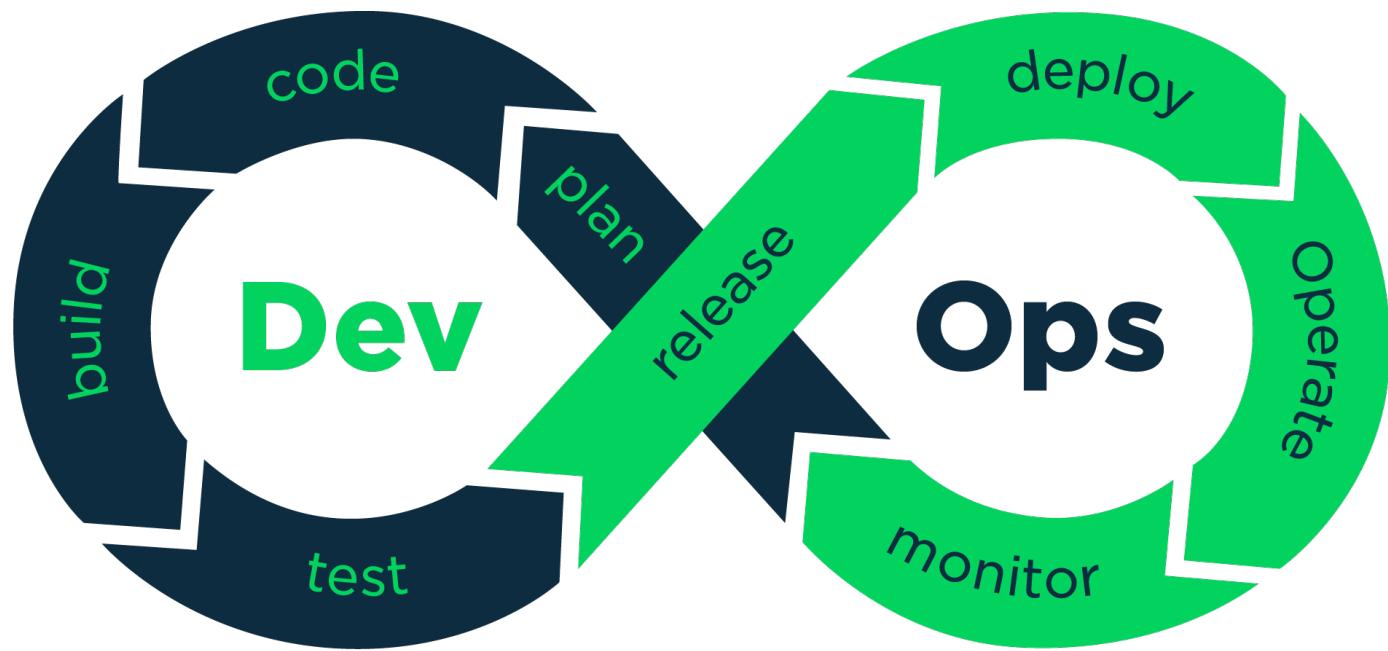


Advantages of a SUSE Embedded Solution



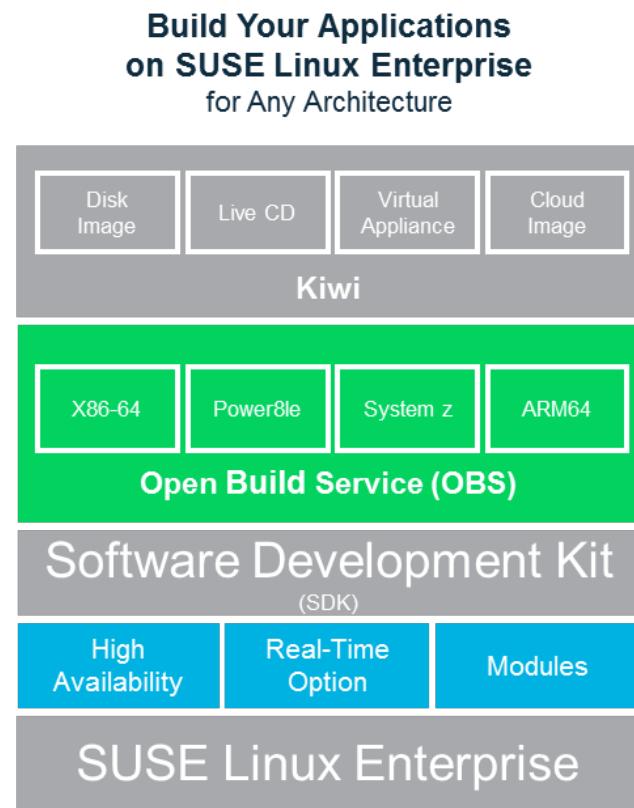
SUSE Embedded

Building an Embedded System is Challenging



Embedded Systems Simplified

- Enterprise Quality OS
 - Maintenance Updates
 - Security patches
 - Just enough OS
- Package Builds
 - X86, ARM64, Power, System z, more...
- Package Repositories
 - Public
 - Private
- Repeatable Clean Builds
 - Multiple hypervisors or image formats
- Version control



SUSE Linux Enterprise Server

Power your physical, virtual, and cloud-based, mission-critical workloads with a world-class, secure open source server operating system

- Create an agile IT infrastructure using the latest container applications
- Maximize service uptime with live patching and built-in virtualization
- Improve IT infrastructure with proven security and optimized performance

99.999%

Mission-critical availability

80%

Savings in server management

80%

Cost reduction



www.suse.com/products/server

SUSE Linux Enterprise Server 12

Life Cycle Model

- **13-Year Life Cycle**
 - 10 years general support
 - 3 years extended support
 - Different life cycles for modules
- **Long Term Service Pack Support (LTSS)**
 - Available for all versions
 - Up to 3 years extended support



Rapid Innovation

- Leverage latest Linux kernel
- Avoid backporting patches; benefits of peer review with upstream Kernel
- Improved hardware support

SUSE Release	Kernel Version	Competitive Kernel
SLES 11	2.6.27	2.6.32
SLES 11 SP1	2.6.32	2.6.32
SLES 11 SP2 - SP4	3.01.101	2.6.31
SLES 12	3.12	3.10
SLES 12 SP1	3.12	3.10
SLES 12 SP2	4.4	3.10

Focus on the Solution, Not the Operating System

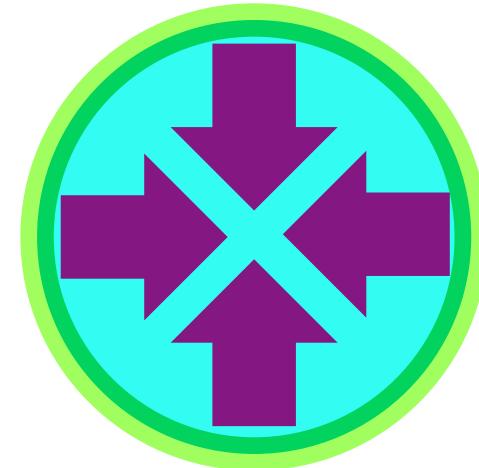
Just Enough Operating System (JeOS)

What is JeOS?

- A lean, function-specific operating system built on SUSE Linux Enterprise Server
- Ideal platform for products and appliances in today's agile environments
- Perfect minimized host operating system

Take Advantage of JeOS

- KVM/Xen Fully Virtualized
- Xen Para-virtualized
- Microsoft Hyper-V
- VMware
- OpenStack Cloud



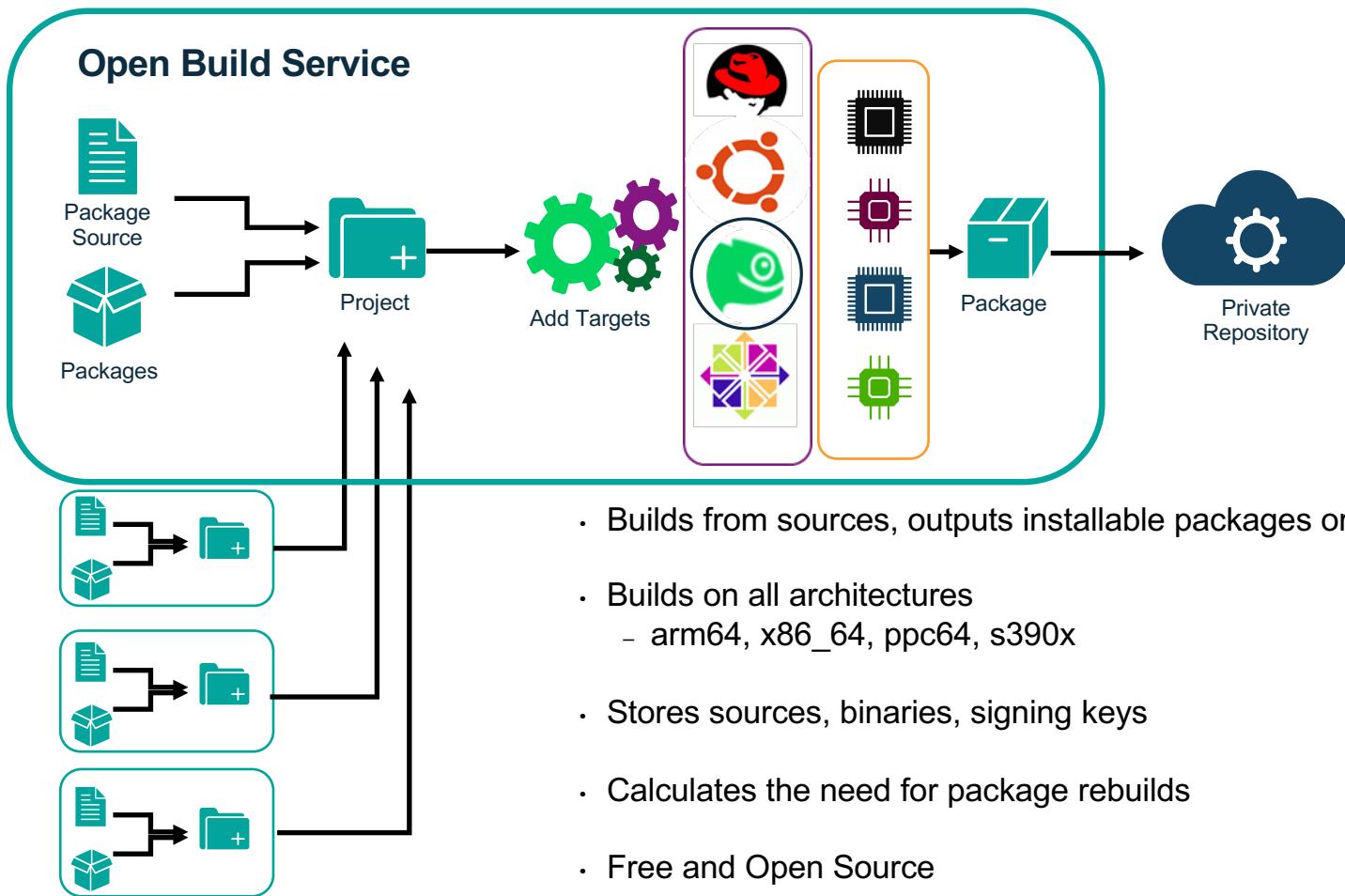
Packages, Platforms, and Repositories

SUSE Open Build Service (OBS)

OBS is a generic system to build and distribute binary packages from sources in an automatic, consistent and reproducible way.

- Build (Packaging) Formats
 - rpm (spec)
 - deb (dsc)
- Build Architectures: Qemu can be used to emulate not existing hardware
 - ia32, ia64, x86-64, ppc*,_hppa, mips, m68k, s390*, various ARM architectures.
- Image System (KIWI)
 - ISO, Live CD/DVD, PXEBoot, HDD, etc.
 - Build in chroot, lxc, XEN or KVM, etc.
- Repositories: rpm-md, yast, apt, maintenance channels
- Build Process Features

Open Build Service



SUSE Package Hub

Community Packages for SLES

- Built and maintained by the community of users
- Approved and supported by SUSE
- High-quality, up-to-date packages delivered by openSUSE Factory
- No additional charge to use packages
- Packages available for the life of the product, including multiple releases



Over 600 packages available for all architectures

Virtual, Physical and Cloud

SUSE KIWI

KIWI is a command line tool, written in Perl, for building Linux images & supporting a variety of image formats.

- Types & Formats:
 - Images: ISO, Live CD/DVD, PXEBoot, HDD, USB
 - Appliances: .ovf, .ova
 - Virtual Machines: .vmdk, .vhdx, .vdi, .qcow2
 - Containers
- Hosted on github <https://github.com/openSUSE/kiwi>
- All SUSE® & openSUSE images are built with KIWI
 - Physical, Virtual and Cloud!
- KIWI can produce most formats known to humankind



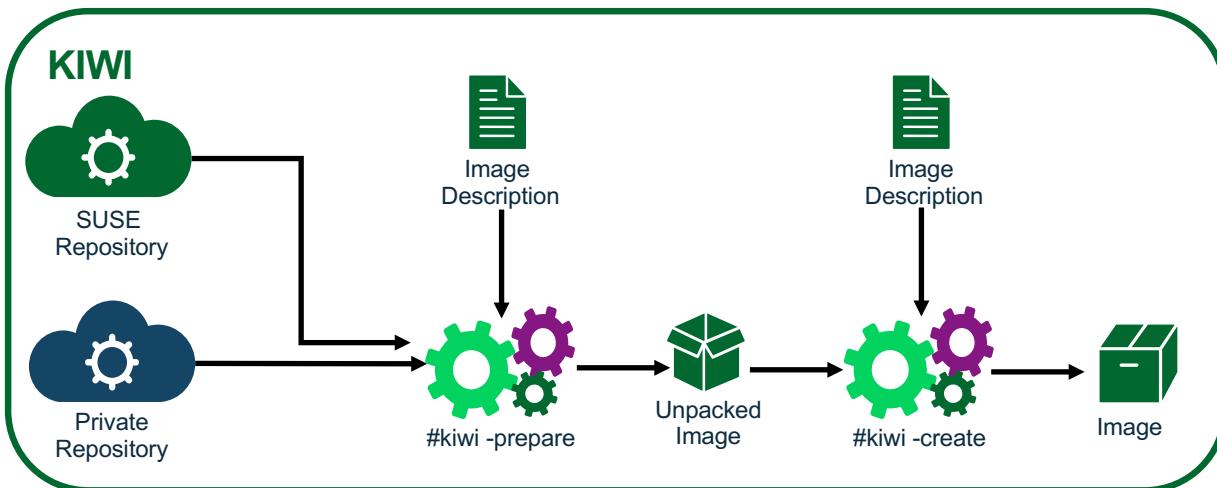
Leveraging the Benefits of KIWI

Prepare

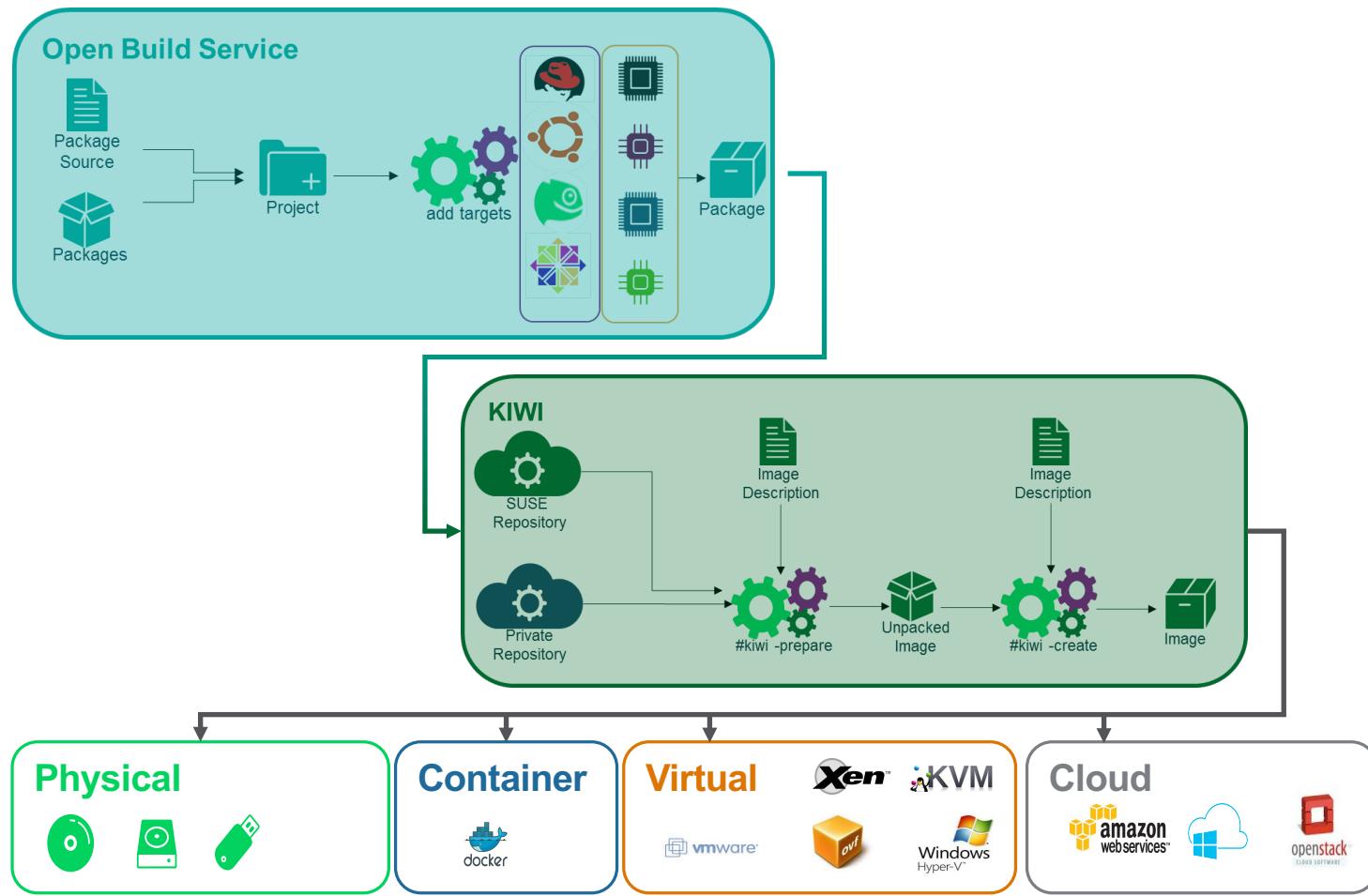
- Read config.xml
- Initialize the repositories
- Install Packages
- Apply overlay files
- Execute config.sh
- Output is an unpacked image tree (directory)

Create

- Read information from unpacked image tree
- Read the config file
- Execute images.sh
- Read bootimage description
- Create bootimage
- Bundle boot image and target image to create final image



Compile, Build, Run



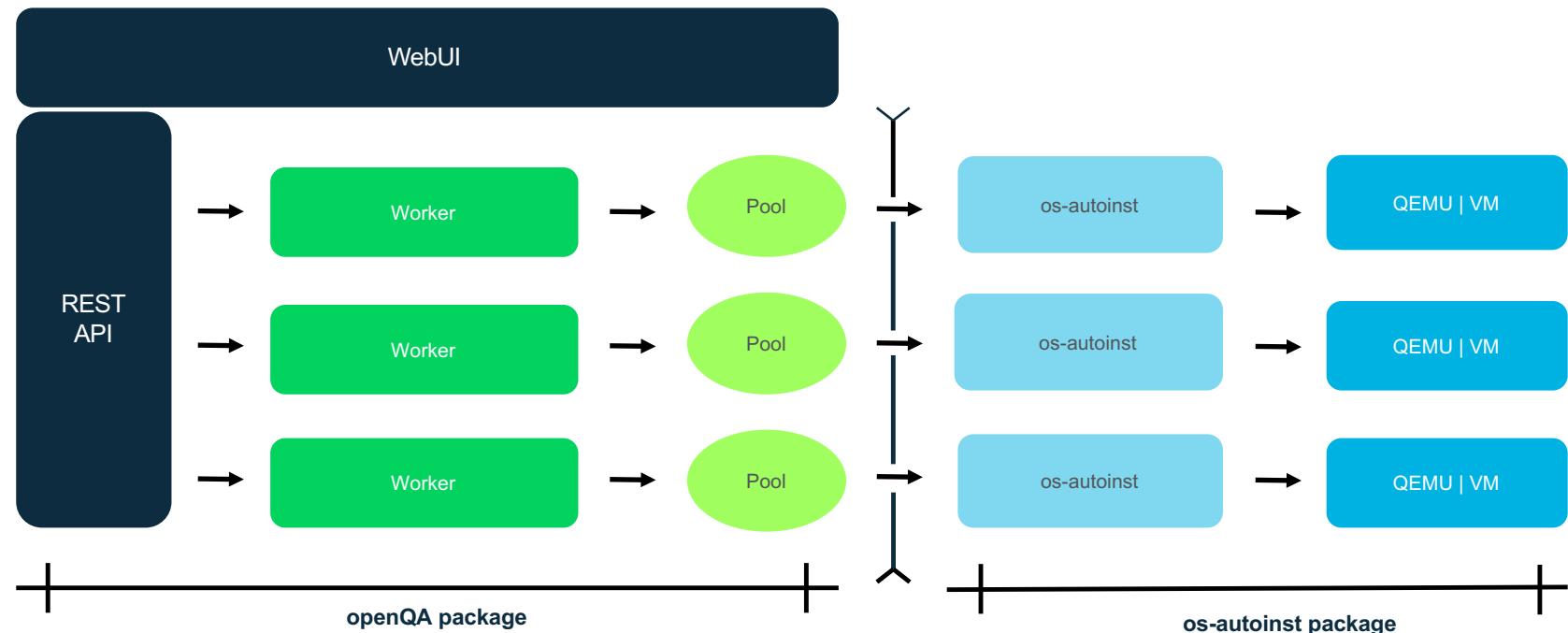
Automated Testing

openQA

- Used by openSUSE® Leap, Tumbleweed, SUSE® Linux Enterprise & Fedora®
- Tests Operating Systems and Applications
- GUI & Console Testing
 - Uses OpenCV to 'read' the actual screen output and compare to predefined needles
 - Controls keyboard & mouse and uses them like a user
 - Also reads plain text from serial
- Execute console test scripts (openQA DSL, (bash perl, python) Deployed via openQA test API
- Comparison
 - String comparison, Junit Parsing, custom results in openQA DSL
- Pluggable backend for os-autoinst support QEMU/VM, LibVirt/RemoteVM, IPMI/HW

Automated Test Infrastructure

SUSE openQA



Patch and update

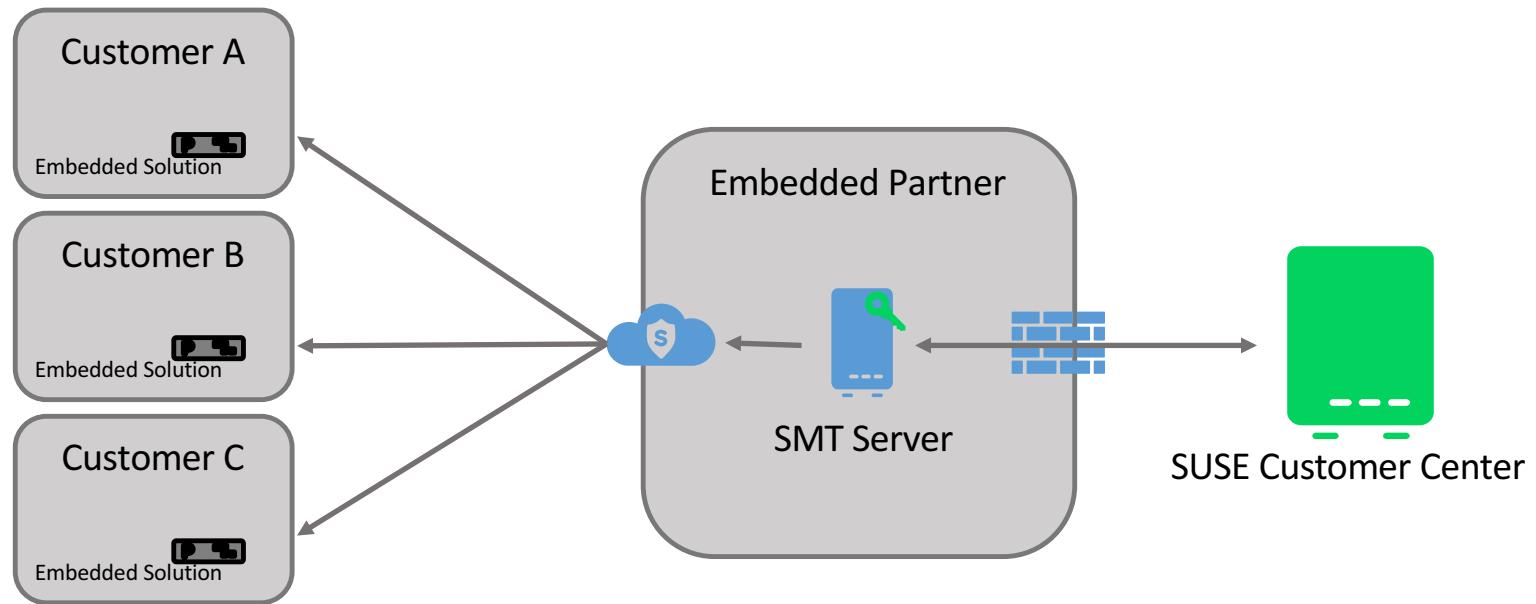
Subscription Management Tool

The Subscription Management Tool establishes a proxy system for SUSE Customer Center which allows enterprise customers to optimize the management of SUSE Linux Enterprise software updates and subscription entitlements.

- The proxy provides repository and registration targets while optimizing bandwidth consumption
- The Subscription Management Tool informs the SUSE Linux Enterprise devices throughout the network of available software updates.
- Firewall policy and regulatory compliance during the software update process
- Automated server entitlement tracking across large server deployments and effective measurement of subscription use
- Staging
 - Mirror
 - Test
 - Validated

Subscription Management Tool

Mirror Patches and Updates for Active Subscriptions



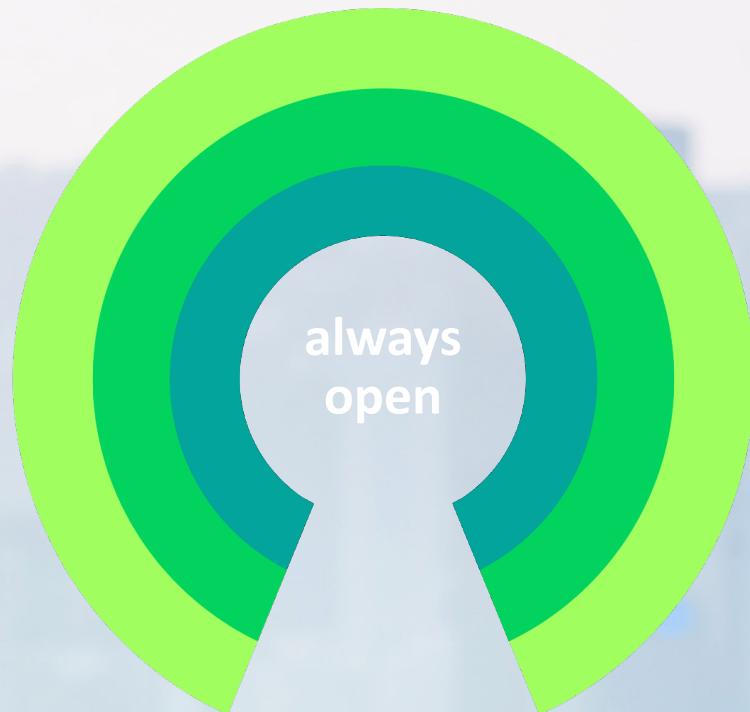
Why SUSE?



What Do We Mean by Always Open?

It's not just WHAT we do.
It's HOW we do it.

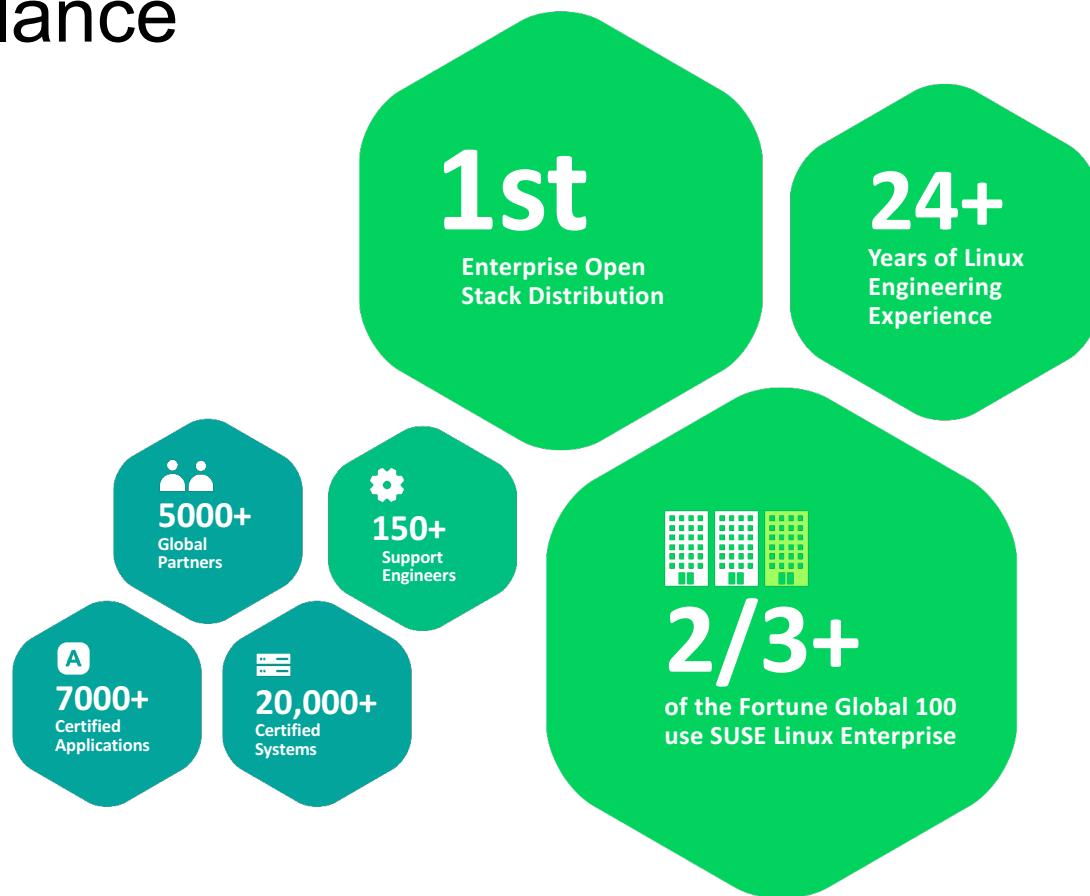
- True to open source vision
- Flexible and adaptive
- Enterprise support



Community Involvement

		 QEMU		 spec	 GNOME™	 OPEN DATA CENTER ALLIANCE
 OPEN CONTAINER INITIATIVE	 mozilla FOUNDATION	 openstack™	 KVM	 Red Hat	 SPACEWALK	
 visor PROJECT	 YaST		 openSUSE	 HighAvailability	 open build service	
 OPEN MAINFRAME PROJECT	 X.Org	 Xen™	 THE LINUX FOUNDATION	 ceph	 Samba	
 MariaDB	 OPEN VIRTUALIZATION ALLIANCE	openinventionnetwork™	CLOUD FOUNDRY	 efi	And more...	

SUSE at a Glance



Where SUSE Leads

70% 

SAP on Linux

70% of all SAP applications running on Linux run on SUSE

x10 

Linux in Telecom

10 of the largest telecommunications carriers rely on SUSE

x10 

Linux in Automotive

10 of the largest global automobile mfgs. are active SUSE customers

15+ 

Mainframe Linux

Over 15 years of mainframe Linux market share leadership

4/5 

Linux in Finance

4 out of 5 of the world's largest banks use SUSE Linux Enterprise

9/10 

Linux in Aerospace

9 out of 10 of the largest aerospace companies rely on SUSE

7/10 

Linux in Retail

7 out of 10 of the largest retailers in the U.S. are active SUSE customers

7/10 

Linux in Pharma

7 out of 10 of the largest pharmaceutical companies use SUSE Linux Enterprise

50% 

Linux in HPC

Half of the world's 20 largest super computers run on SUSE

7/10 

Linux in Manufacturing

7 out of 10 world's largest manufacturers use SUSE Linux Enterprise

Thank You



Embedded

www.suse.com/embedded

embedded@suse.com

Appendix: Resources

SUSE Embedded

- www.suse.com/embedded
Download the [White paper on Embedded Security](#)

Open Build Service

- Main website <http://openbuildservice.org/>
- Documentation <http://openbuildservice.org/help/manuals/>
- SUSE instance <https://build.opensuse.org/>

KIWI

- Main website <http://opensuse.github.io/kiwi/>
- Documentation <https://doc.opensuse.org/projects/kiwi/doc/>

openQA

- Main Website <http://open.qa/>
- Documentation <http://open.qa/documentation/>