Why a Multi modal OS is vital in a cloudy world

Brian Petch : Sales Engineer, SUSE UK&I

GSE UK Conference November 5th, 2019

WARNING !

premise:
"An assertion or proposition which forms the basis for a work or theory"

premises:
"A house or building, together with its land and outbuildings, occupied by a business or considered in an official context."

en.oxforddictionaries.com

SUSE Timeline

1992 to Present

The Pioneering Years

1992

S.u.S.E. founded (German acronym for “Software und System-Entwicklung)

SLS is released, it’s the first comprehensive Linux distribution.

1997-1998

SUSE becomes Europe’s leading Linux distribution.

2004

openSUSE Launched.

2011

SUSE OpenStack Cloud released.

2014

SUSE joins Micro Focus.

SUSE Linux Enterprise 12 released.

SUSE Manager released.

2015

SUSE Enterprise Storage based on Ceph launched.

SUSE joins Cloud Foundry.

2017

SUSE acquires OpenStack IaaS and Cloud Foundry PaaS talent and technology assets from HPE.

SUSE celebrates it’s 25th anniversary.

SUSE Cloud Application Platform Certified by Cloud Foundry

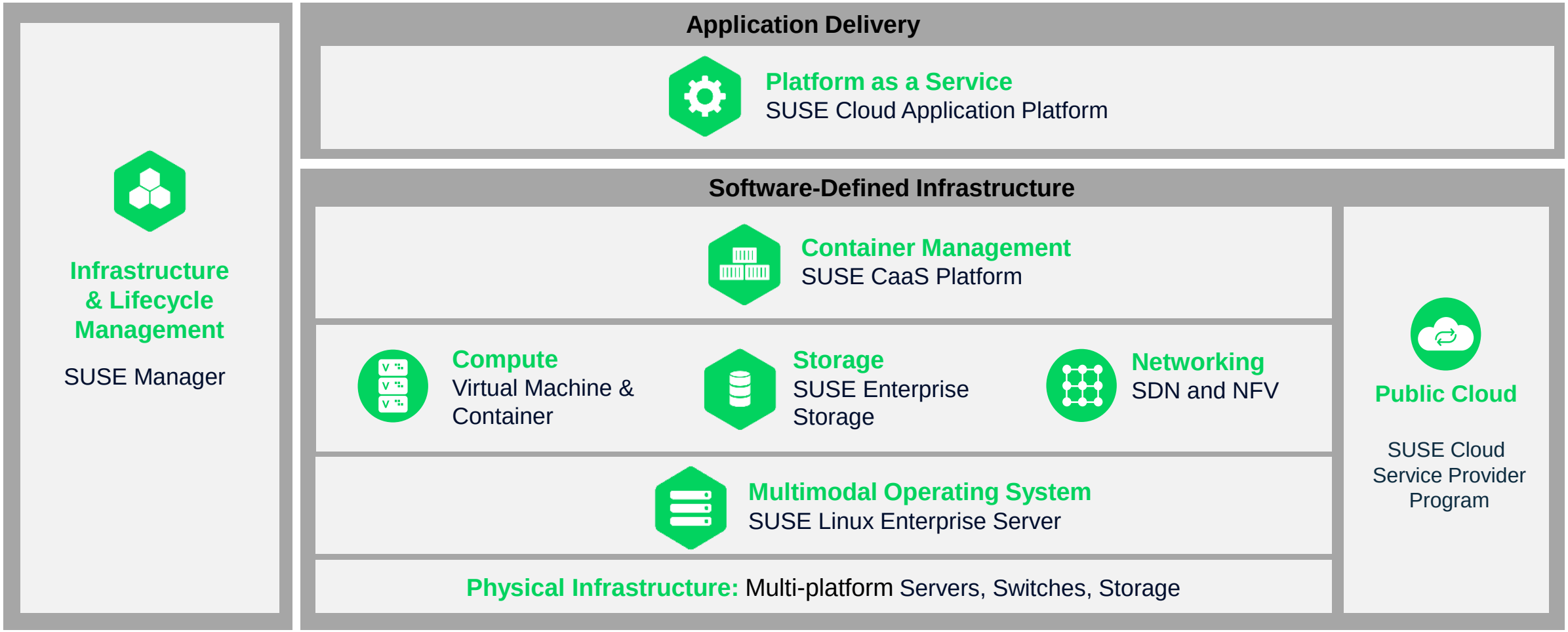
SUSE CaaS Platform released.

2019

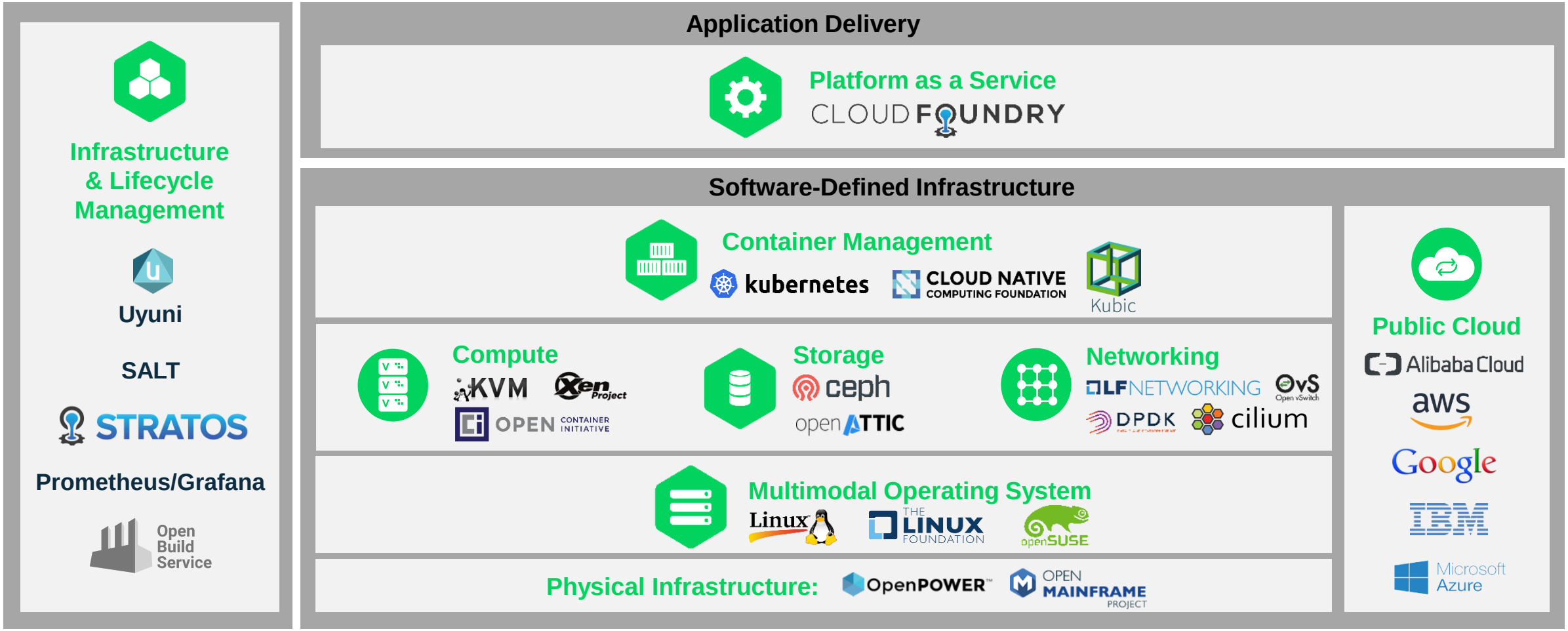
Partnership with EQT sees SUSE become largest independent open source software company.

Melissa Di Donato appointed as new CEO of an independent SUSE.

SUSE Software-defined Infrastructure and Application Delivery Approach



Open Source at the Heart of Our SDI and Application Delivery Approach



Where SUSE Plays

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

70% SAP on Linux

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

80% Linux in Large Enterprise

Over 80% of the Fortune Global 50 are active SUSE Customers

9/10 Linux in Aerospace

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

x10 Linux in Telecom

10 of the largest telecommunications carriers rely on SUSE

7/10 Linux in Pharma

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

7/10 Linux in Retail

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

x10 Linux in Automotive

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

50% Linux in HPC

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

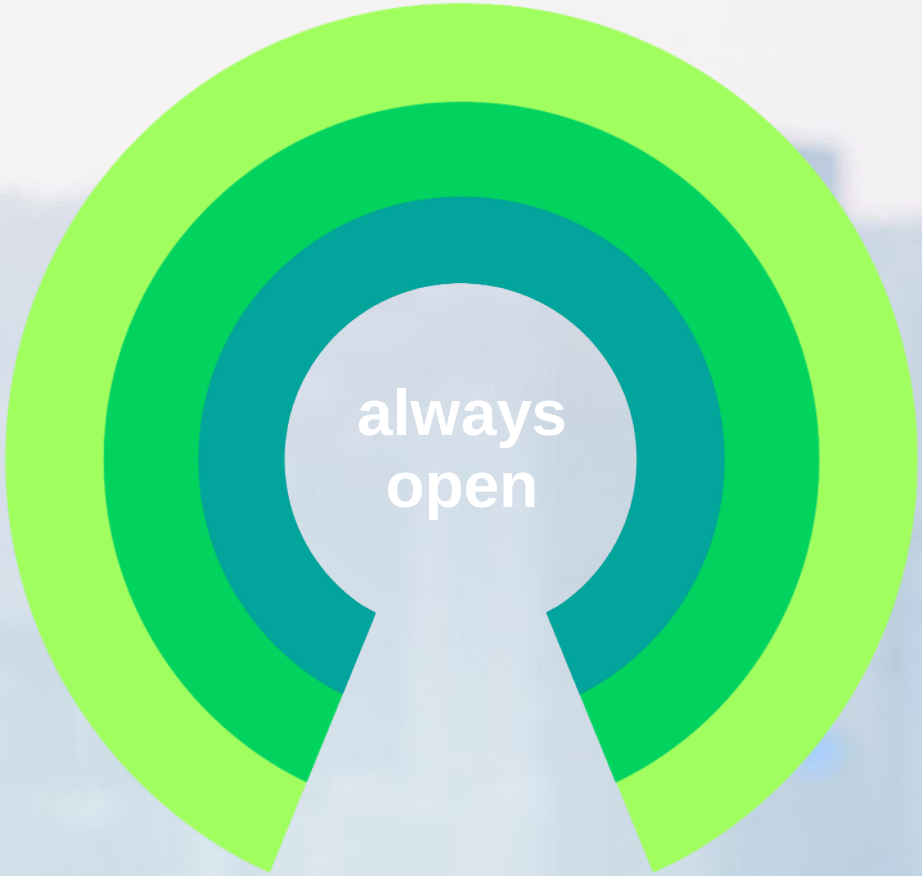
7/10 Linux in Manufacturing

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

What Do We Mean by Always Open?

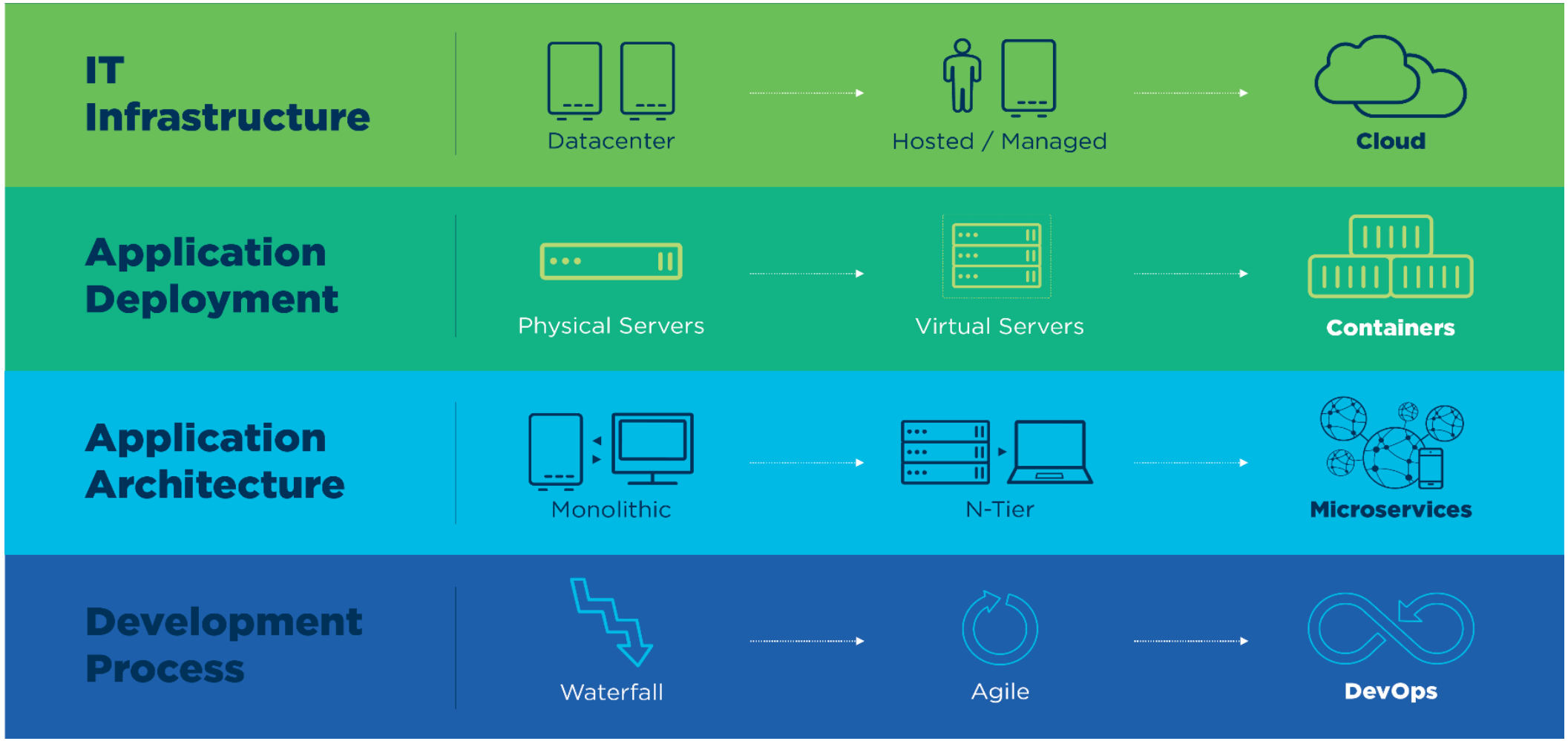
It’s not just WHAT we do.
It’s HOW we do it.

- True to open source vision
- Zero lock-in for customers
- Open to partnering



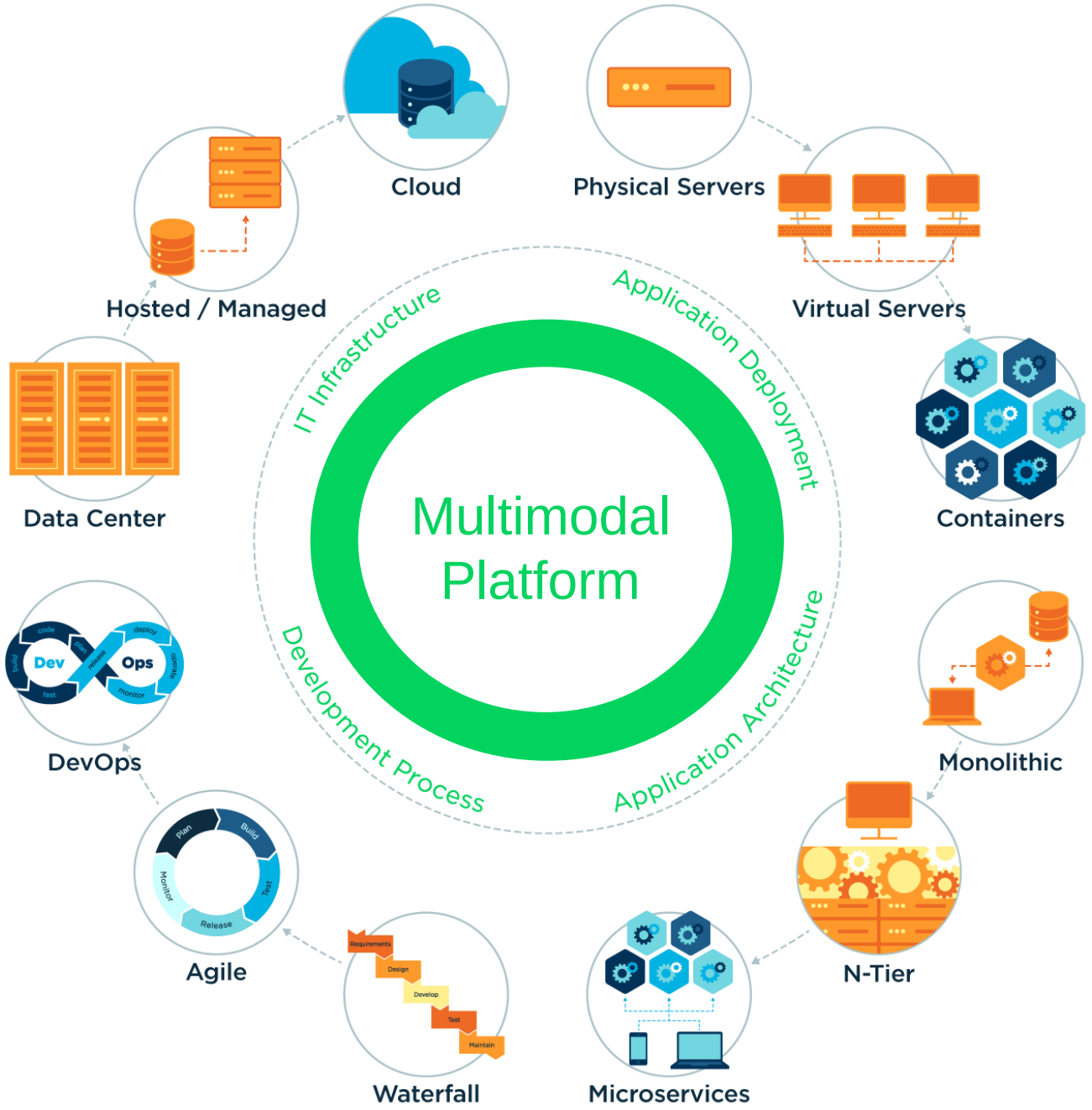
So what is this multi-modal thing?

IT Transformation is Required to Meet Changing Demands



Multimodal IT

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



SUSE Modules

Base System
(required for any module)

Desktop Applications
(basic functionality)

Workstation Extension
(requires desktop applications)

Development Tools
(requires desktop applications)

Public Cloud
(AWS, Azure, GCE integrations)

Containers
(Docker & tools, SLES Containers)

High Availability
(hawk, crm, Pace-maker, Corosync)

SAP Applications

High Performance Computing
(tools for HPC)

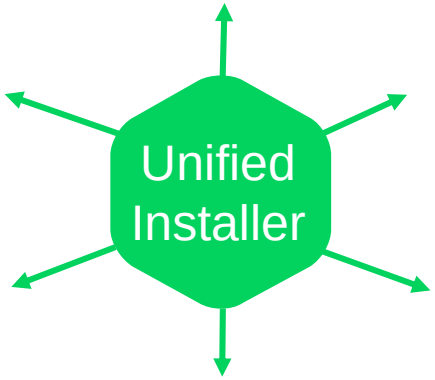
Legacy
(limited support timeframe)

Server Applications
(web server, NVDIMM)

Unified Installer

Single starting point

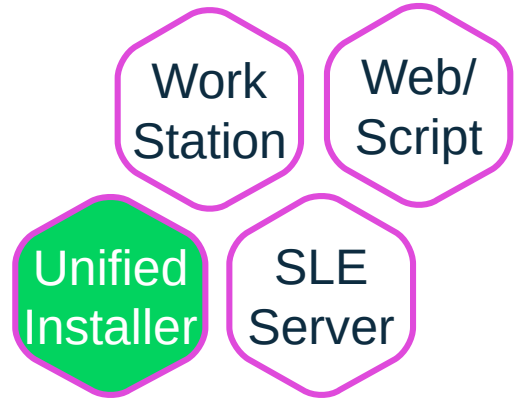
The Unified Installer installs all SUSE Linux Enterprise 15 products from a single medium.



SAP System

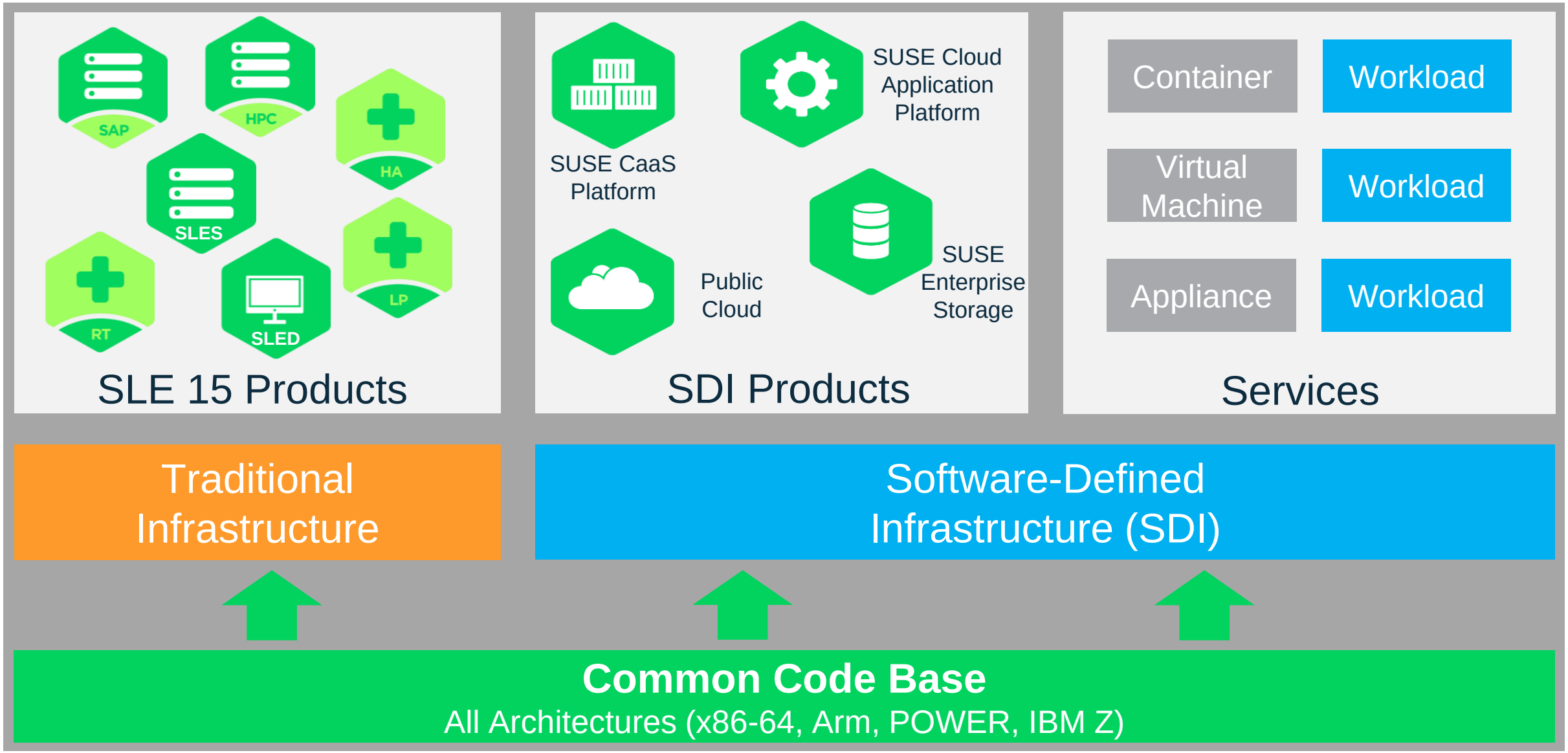
Easy to deploy

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

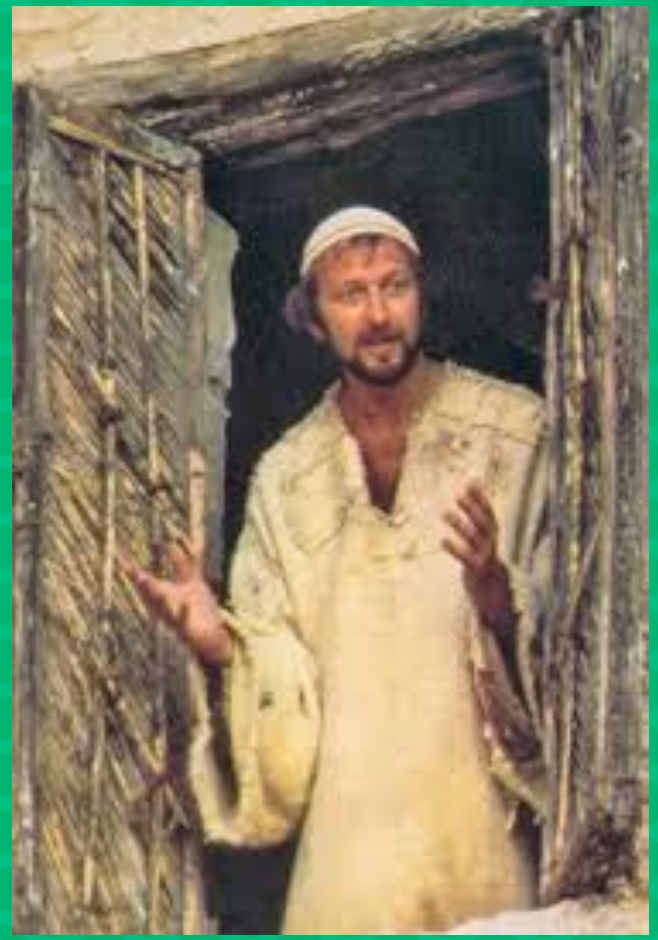


Dev System

Multimodal Architecture



“Please, please listen… I’ve got one or two things to say.”



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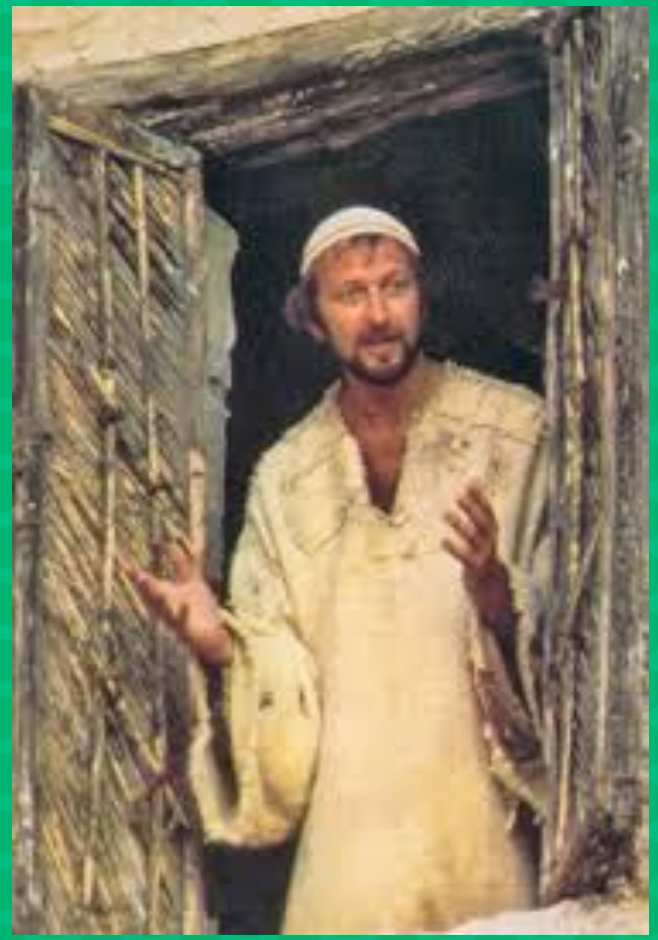


Tell us. Tell us both of them!

Enabling Advanced Data Center Solutions for More Than 20 Years

20 years of Linux collaboration and leadership for IBM Z and LinuxONE.

SUSE Linux Enterprise Server for SAP Applications is the default distribution for SAP HANA and S/4HANA on IBM Power Systems.

Tight integration between IBM and SUSE engineering.

Key relationships within IBM for SUSE:

- IBM Z: mainframe computing
- IBM Power: server based on Power processors
- Technology Support Services (TSS): Single provider support org for IBM and 3rd party technologies
- IBM Cloud: IBM's own CSP solution
- IBM Software: broad portfolio of Software solutions

SUSE and 20 years of mainframe partnership

SUSE innovations
IBM innovations
Ecosystem on Linux

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

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

2000: Integrated Facility for Linux (IFL)

2000: DB2, WebSphere

2001: HiperSockets

2002: SAP certified on SLES for Z

2002: major ISVs: SAP, Oracle 9i

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

2006: SLES for Z 10 launched (fifth generation of SLES for Z)

2006: 1,000 apps, 300 ISVs

2007: IBM Big Green consolidation 3900 servers to 30 mainframes running Linux

2008: First Starter System for Z released

2009: SLES for Z 11 released

2009: z/VM v6
2009: Enterprise Linux Server

2011: Image building for IBM Z with SUSE Studio

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

2014: IBM Wave for z/VM
2014: OpenStack

2014: Spectrum Scale™ (GPFS)
2014: Oracle 12c

2015: SUSE Linux Enterprise for IBM Z and LinuxONE 12 SP1
- 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 Manager
2015: Open source ecosystem

2016: KVM 1.1.2
2016: z/VM 6.4

2016: Blockchain
2016: Open Source ecosystem ext.

2017: KVM support in SLES
2017: Crypto enhancements

2017: IBM z14
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

2019: Nearly 8,000 s390 packages on SUSE Package Hub
2019: SLES for Z/L1 15
- SOC
- Kubernetes
- Cloud Foundry
- Crypto updates

Shipped Linux MIPS

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

z15 YES certification

IBM® z15™, z15 (8561)

Network Server

IBM

19 Sep 2019
148679

YES CERTIFIED with the following products:
Operating Systems:
SUSE® Linux Enterprise Server for z Systems 15 Service Pack 1 for SUSE® SLES 15

Tested Configuration:

Computer Type:	System z Platform
Mother Board Revision:	N/A
BIOS/uEFI:	N/A
CPU:	16 IBM z15 CPU (8561)
RAM:	16 GB
Ports and Bus Types:	zSeries
Host Bus Adapter:	IBM SCSI/FCP , SCSI IBM Ficon Express16 , FibreChannel
Hard Disk Drive:	IBM SCSI/FCP Disk Storage Device , SCSI IBM FICON DASD Storage Device , FibreChannel IBM ECKD DASD Storage Device , FibreChannel
Test Kit:	System Certification Kit 8.3.0-27.1

SUSE Linux Enterprise Server 12 SP5 for IBM Z and LinuxONE

Support for IBM z15:

- exploitation of integrated compression for zlib and gzip
- toolchain support (glibc, binutils, ...)
- kernel support, e.g. enhanced CPU-MF hardware counters

Enhancements for...

- kernel: qeth performance, SMC updates, ...
- Security: Enhancements for protected key usage, openCryptoki ep11 token, fine granular access control to HW crypto resources, openSSL
- SIMD implementation enhancements
- KVM: IBM z15 support, huge page support, interactive bootloader, PCI passthrough, crypto passthrough ...
- Various package updates: s390-tools, smc-tools, qclib, ...

SUSE Linux Enterprise High Availability Extension

Virtually eliminate unplanned downtime with an advanced clustering system that can be deployed in both physical and virtual environments.

- **Get near 100% uptime**, maximized for your Linux workloads.
- **Boost flexibility** and maintain continuity by supporting mixed clustering.
- **Protect data integrity** and minimize data loss with data replication across clusters.

75%	100%	99.999%
Cost Savings	Server Deployment	Uptime

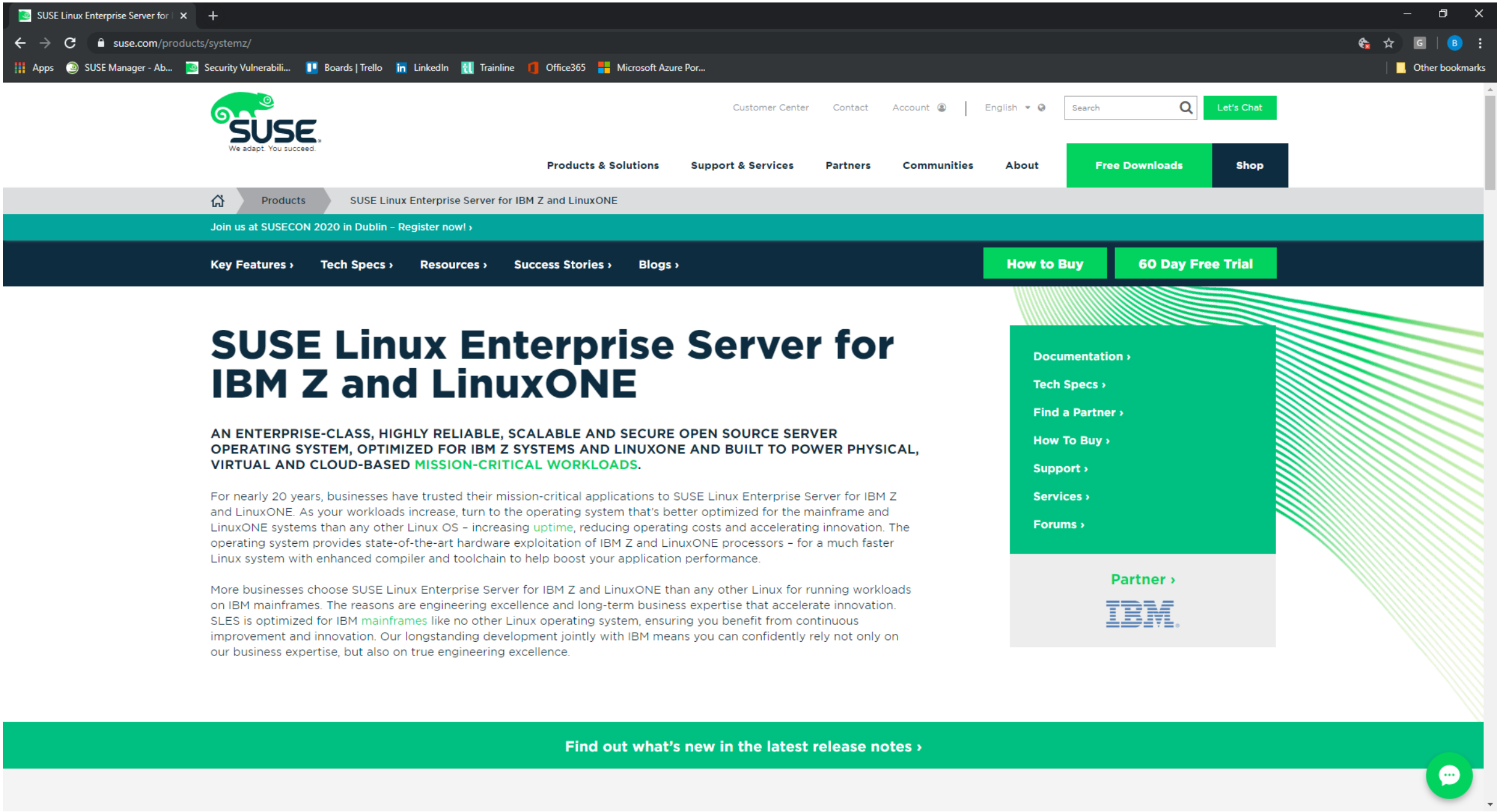
www.suse.com/products/highavailability

SUSE Linux Enterprise Live Patching

Eliminate planned downtime for Linux kernel patches

Perform live kernel patching to keep systems stable and secure

- No interruption to workloads
- No performance impact
- No downtime
- No audit concerns


SUSE Linux Enterprise Server for
suse.com/products/systemz/
Apps
SUSE Manager - Ab...
Security Vulnerabili...
Boards | Trello
LinkedIn
Trainline
Office365
Microsoft Azure Por...
Other bookmarks
SUSE
We adapt. You succeed.
Customer Center
Contact
Account
English
Search
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SUSE Linux Enterprise Server for IBM Z and LinuxONE
Join us at SUSECON 2020 in Dublin – Register now! ›
Key Features ›
Tech Specs ›
Resources ›
Success Stories ›
Blogs ›
How to Buy
60 Day Free Trial
SUSE Linux Enterprise Server for IBM Z and LinuxONE
AN ENTERPRISE-CLASS, HIGHLY RELIABLE, SCALABLE AND SECURE OPEN SOURCE SERVER OPERATING SYSTEM, OPTIMIZED FOR IBM Z SYSTEMS AND LINUXONE AND BUILT TO POWER PHYSICAL, VIRTUAL AND CLOUD-BASED MISSION-CRITICAL WORKLOADS.
For nearly 20 years, businesses have trusted their mission-critical applications to SUSE Linux Enterprise Server for IBM Z and LinuxONE. As your workloads increase, turn to the operating system that's better optimized for the mainframe and LinuxONE systems than any other Linux OS – increasing uptime, reducing operating costs and accelerating innovation. The operating system provides state-of-the-art hardware exploitation of IBM Z and LinuxONE processors – for a much faster Linux system with enhanced compiler and toolchain to help boost your application performance.
More businesses choose SUSE Linux Enterprise Server for IBM Z and LinuxONE than any other Linux for running workloads on IBM mainframes. The reasons are engineering excellence and long-term business expertise that accelerate innovation. SLES is optimized for IBM mainframes like no other Linux operating system, ensuring you benefit from continuous improvement and innovation. Our longstanding development jointly with IBM means you can confidently rely not only on our business expertise, but also on true engineering excellence.
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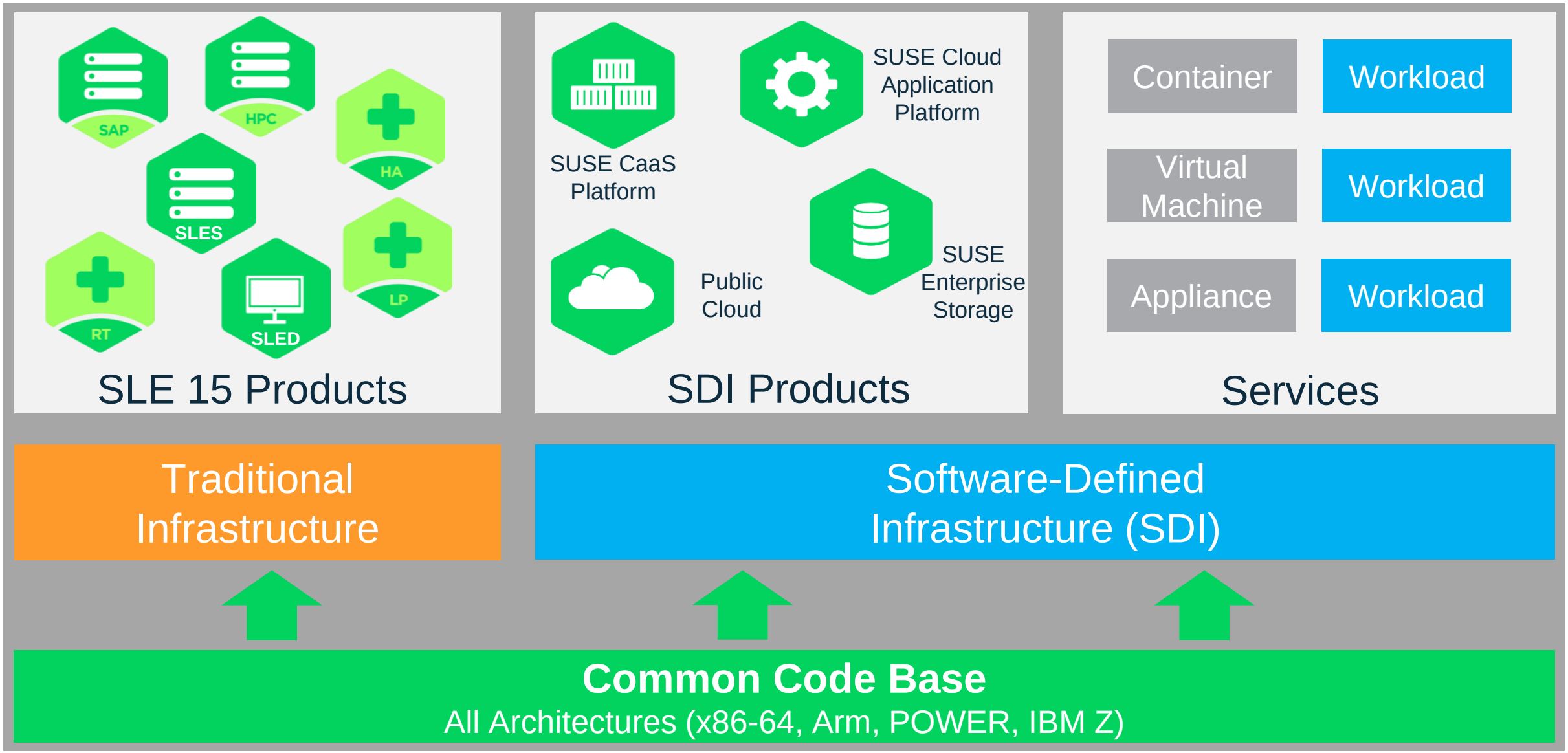
Multimodal Architecture



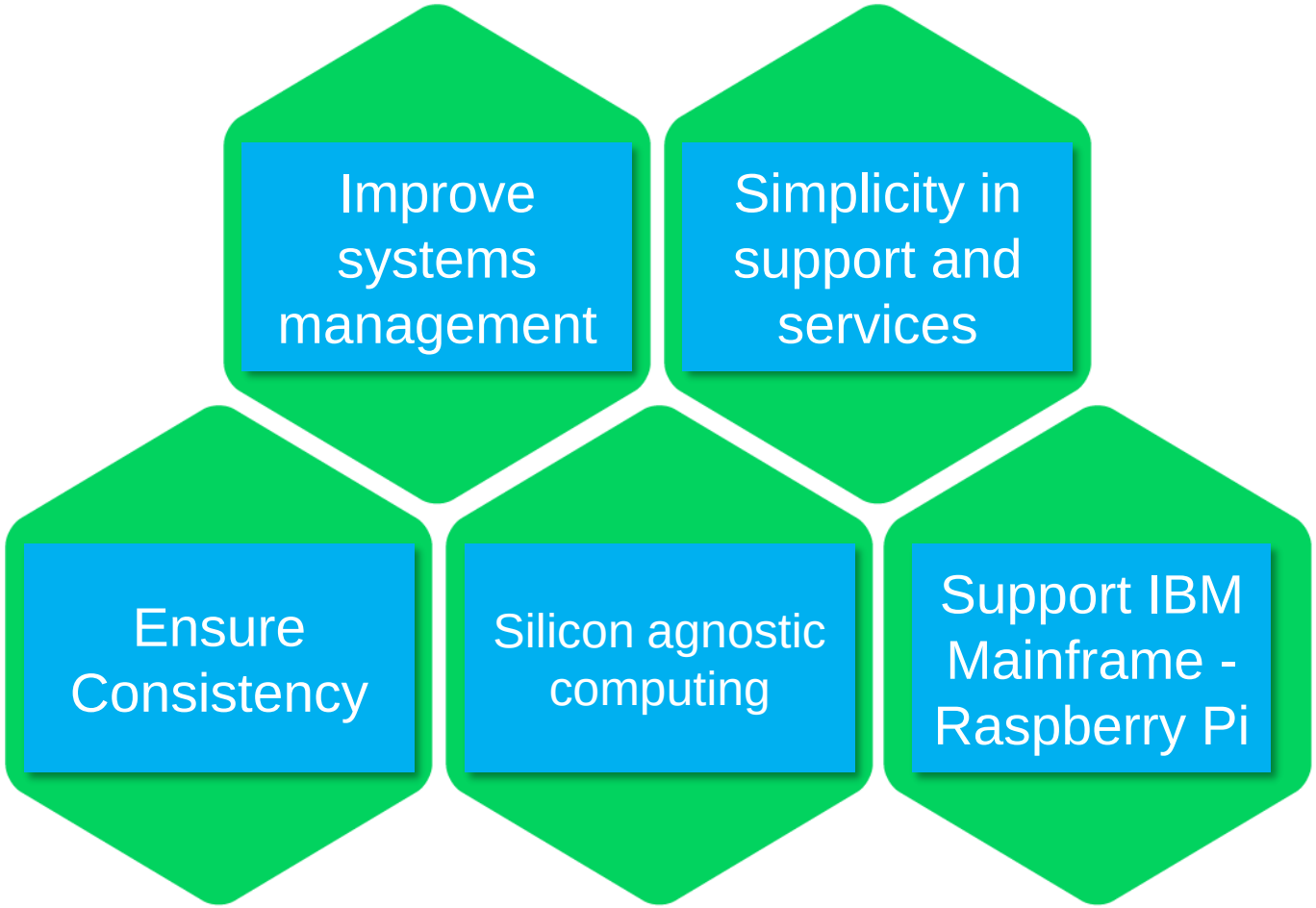
Common Code Base

Benefits across 3 dimensions:

- Hardware Architecture
- Applications
- Systems Management

"IDC believes the **common code base** of SUSE Linux Enterprise 15 makes the product a multi-platform OS that is well suited for heterogeneous computing environments."

– IDC Market Note, 2018



Success Story

SUSE Linux Enterprise Server for ARM

Knorr-Bremse AG

A fourth industrial revolution is powering a new wave of innovation, and emerging digital technologies look set to dramatically transform manufacturing operations worldwide. To stay ahead of the game, Knorr-Bremse used Raspberry Pi and SUSE® Linux Enterprise Server for ARM to build an IoT platform that will collect data from manufacturing machines in real time, enabling the company to accelerate failure responses, reduce unplanned downtime, improve factory-floor maintenance, and increase production efficiency.

Picture credit: Knorr-Bremse AG

Overview

Knorr-Bremse is the global market leader for braking systems and a leading supplier of other rail and commercial vehicle systems. Knorr-Bremse's products make a decisive contribution to greater safety and energy efficiency on rail tracks and roads around the world. About 29,000 employees at over 100 sites in more than 30 countries use their competence and motivation to satisfy customers worldwide with products and services. Knorr-Bremse delivers braking, entrance, control and auxiliary

Challenge

We are currently experiencing the Fourth Industrial Revolution. Emerging digital technologies such as automation, artificial intelligence, big data analytics, the Internet of Things (IoT) and robotics are transforming the way manufacturers operate—and Knorr-Bremse is no exception.

Florian Amann, Team Leader Technology at Knorr-Bremse Truck Division, begins: "We are always looking at how we can best harness new technologies to help

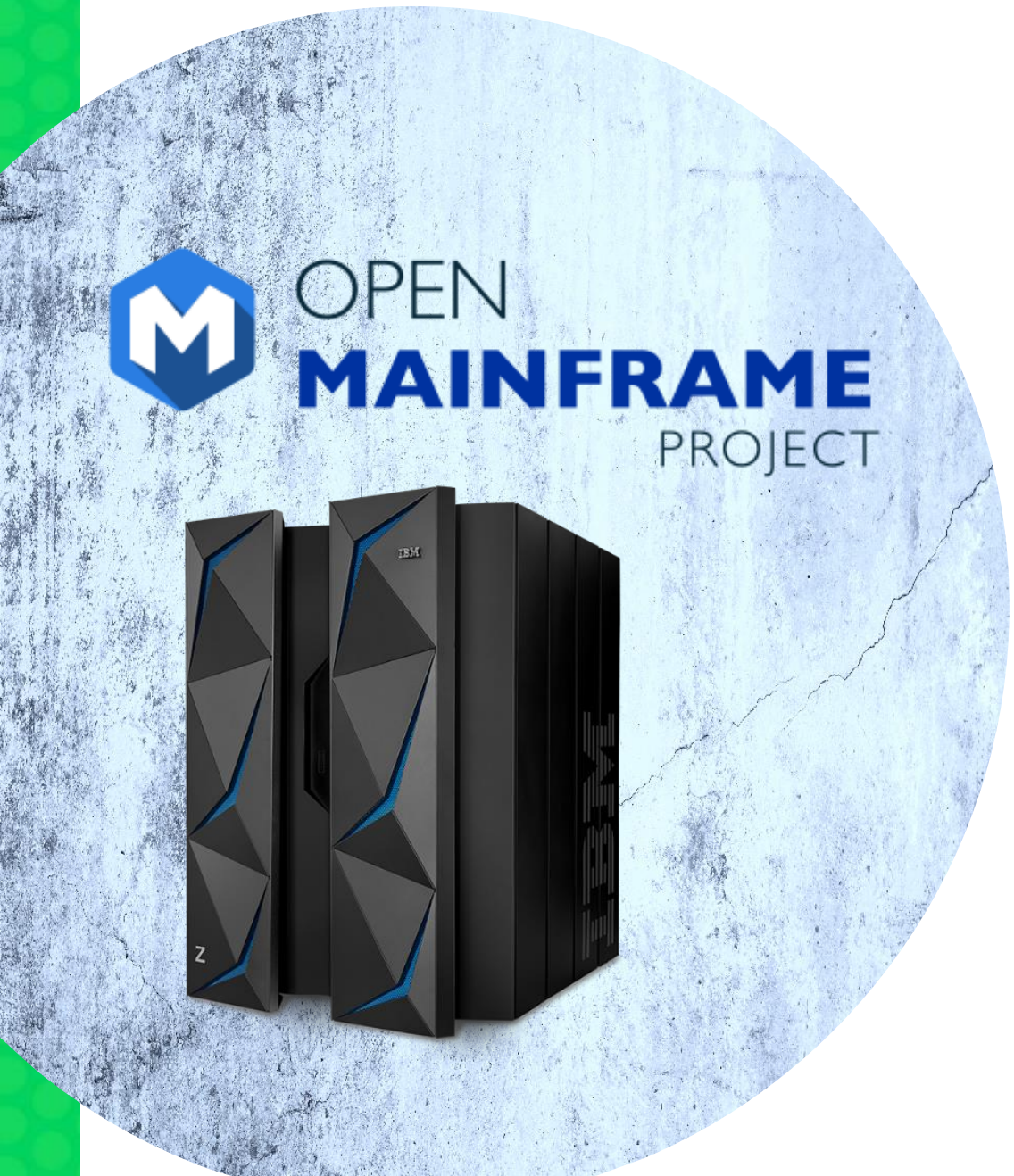
KNORR-BREMSE

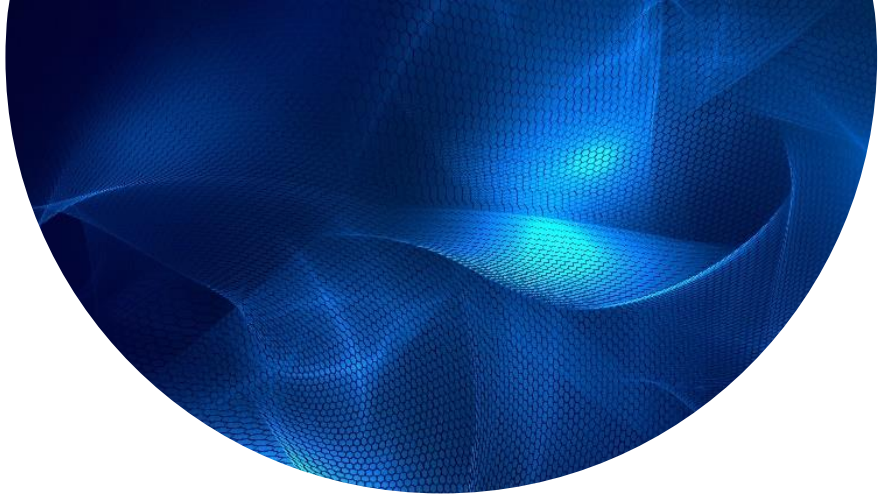
Knorr-Bremse at a Glance:

Knorr-Bremse is the global market leader for braking systems and a leading supplier of other rail and commercial vehicle systems. Knorr-Bremse has a total number of around 29,000 employees at over 100 sites in more than 30 countries.

- **Industry and Location**

  Manufacturing, Munich, Germany





Positive impacts on the mainframe ecosystem

Increased collaboration

More open source development

Renewed academic interest

Kubernetes and Containers for Z

Goal

Run containers on Z using Kubernetes and SLES

Expected Outcome

- Build, deploy and document Kubernetes on Z
- Create Docker Hub development stacks for Z

OPEN MAINFRAME PROJECT

Intern Projects

Cloud Foundry on Z

Goal

Build cloud applications on Z with SUSE Cloud Application Platform

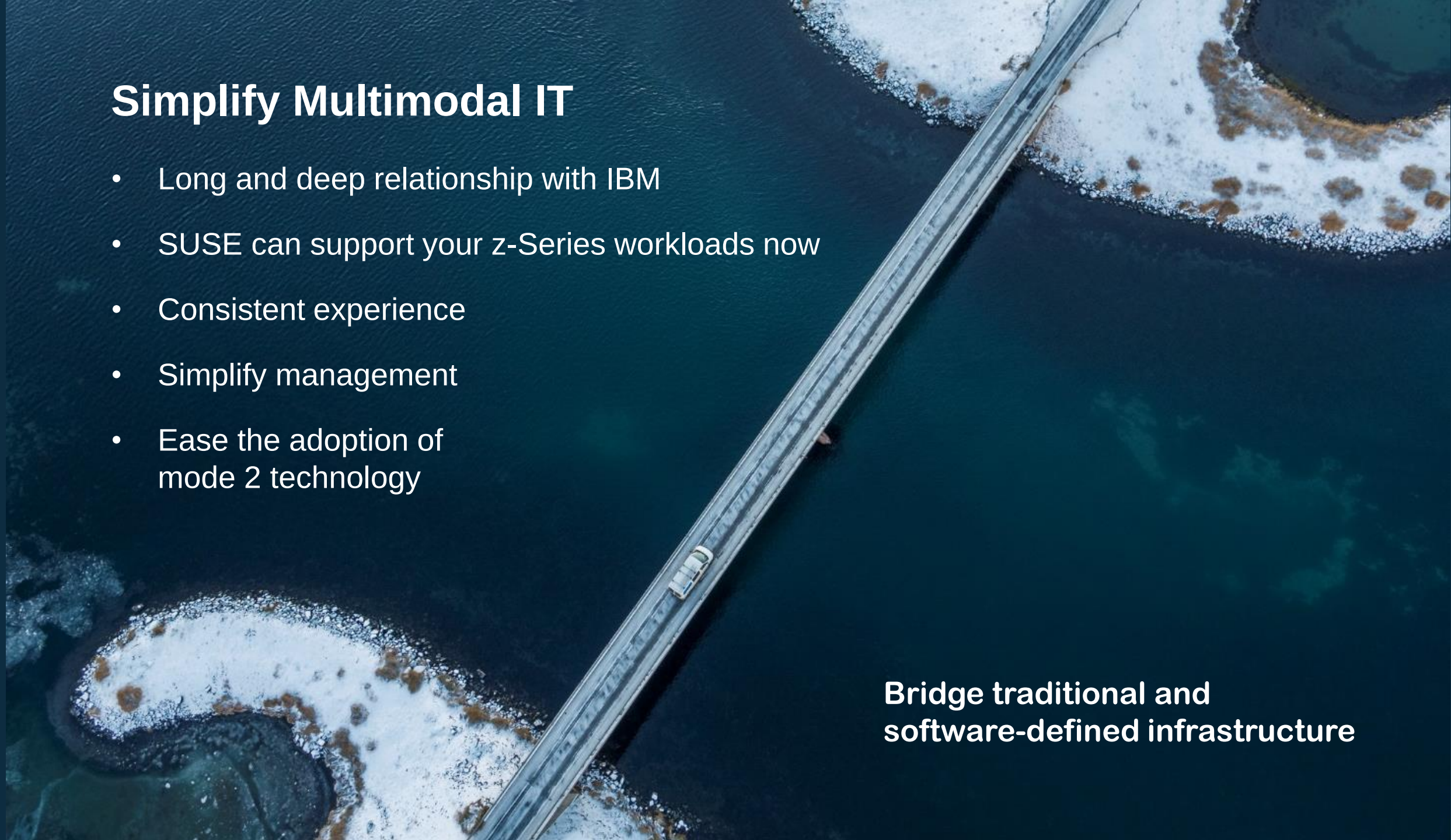
Expected Outcome

- **Containerized Cloud Foundry for Kubernetes on Z**

CLOUDFOUNDRY

OPEN MAINFRAME PROJECT

Intern Projects



Simplify Multimodal IT

- Long and deep relationship with IBM
- SUSE can support your z-Series workloads now
- Consistent experience
- Simplify management
- Ease the adoption of mode 2 technology

Bridge traditional and software-defined infrastructure

Thank You

References:

SUSE on IBM Z / LinuxONE:
https://www.suse.com/products/systemz

Customer case studies:
https://www.suse.com/c/success

https://www.ibm.com/case-studies/fort-vale-systems-hardware-linuxone-scalability

https://www.ibm.com/case-studies/ncfb-systems-hardware-growth-insurance

IBM Z supported platforms:
https://www.ibm.com/it-infrastructure/z/os/linux-tested-platforms

SUSE and IBM Alliance:
https://www.suse.com/ibm