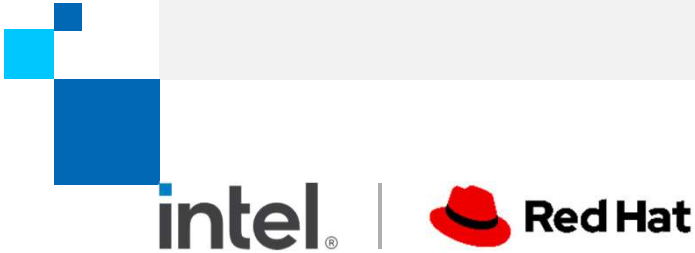
Red Hat – Intel Open Tour

Build on Open
Run on Intel

Nawras Sawsou – Strategic Alliances Manager, Nordics
Intel Corporation



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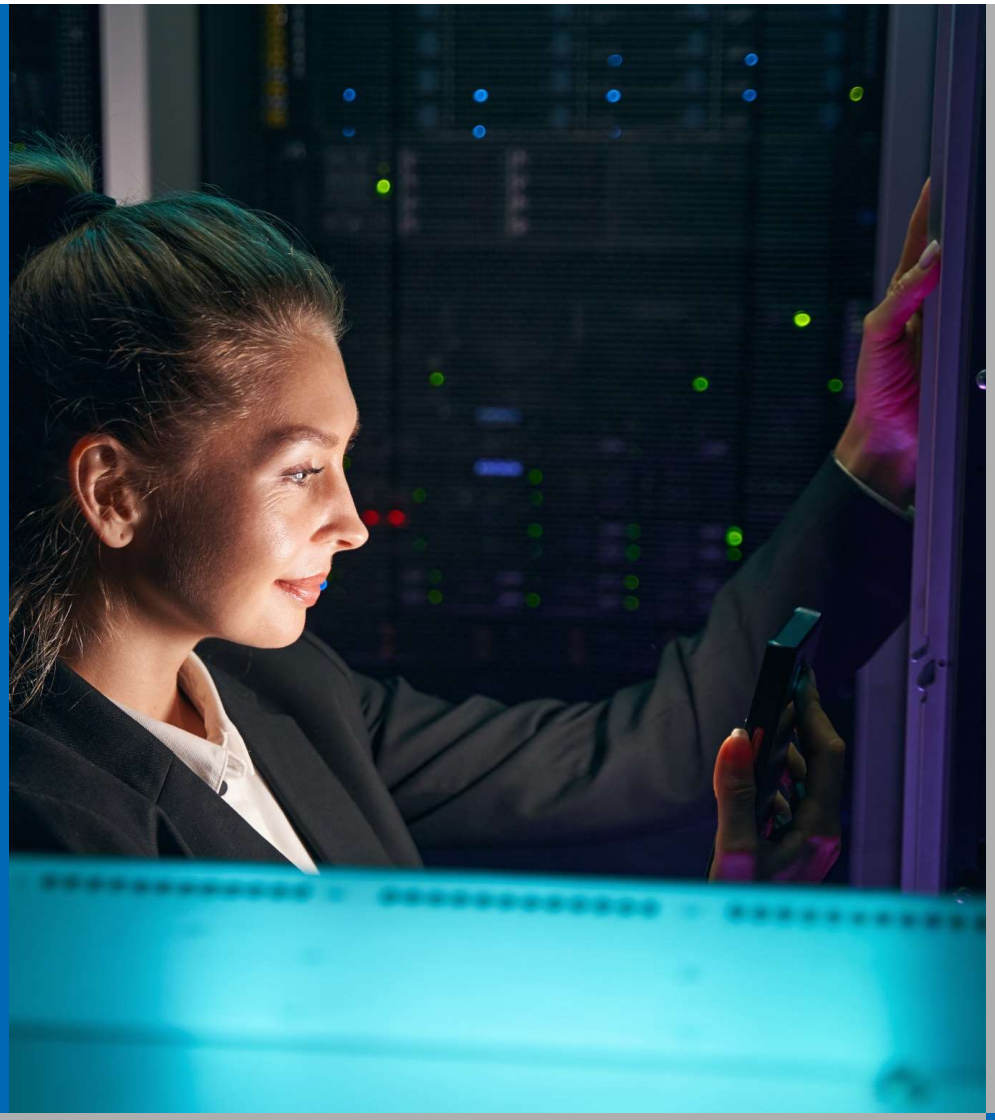
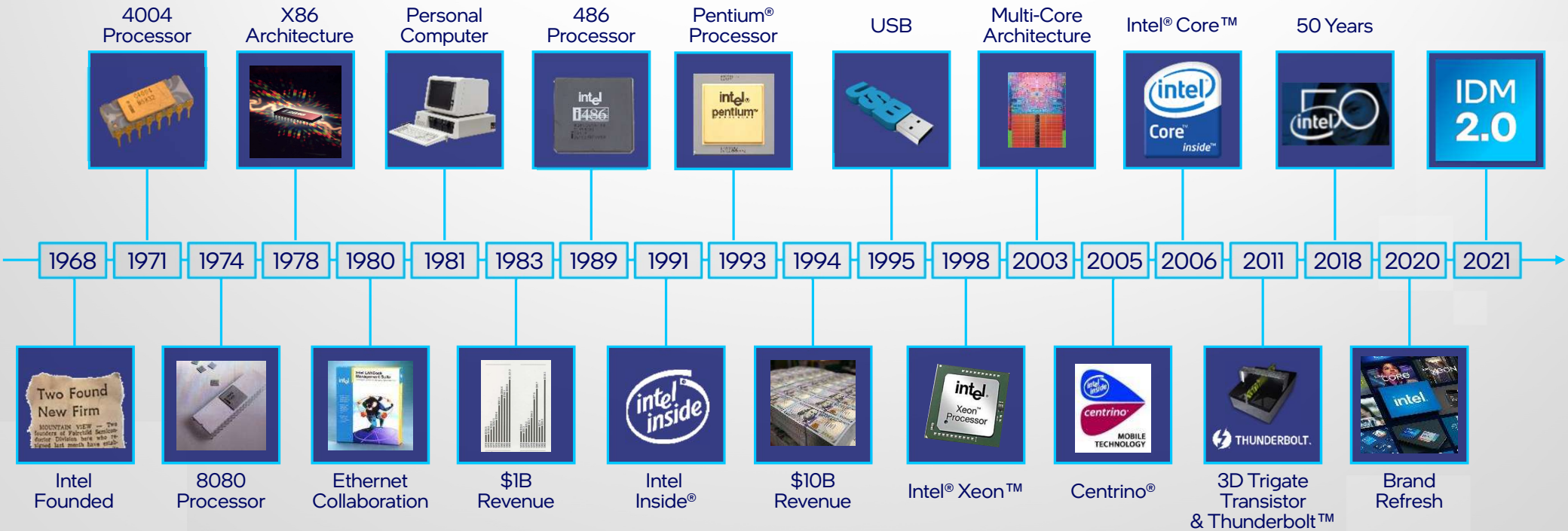
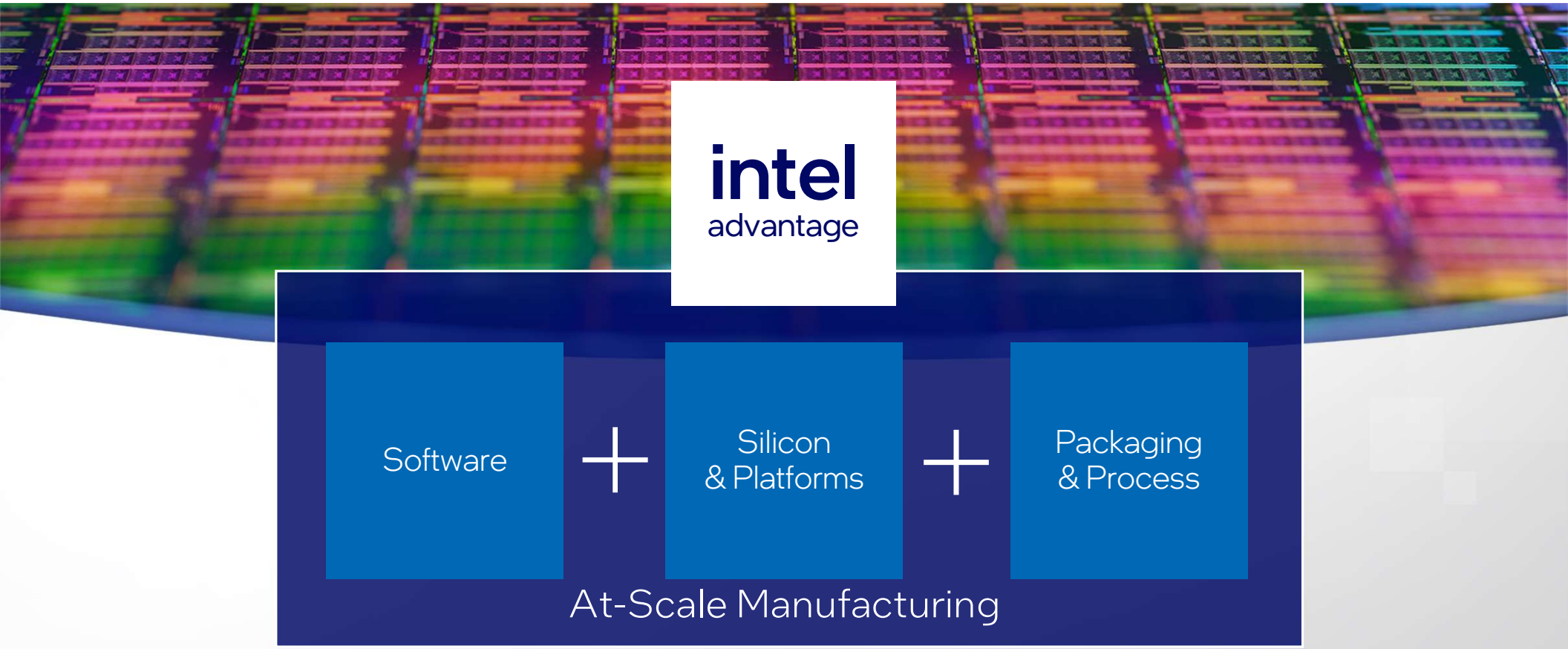
The Intel Story



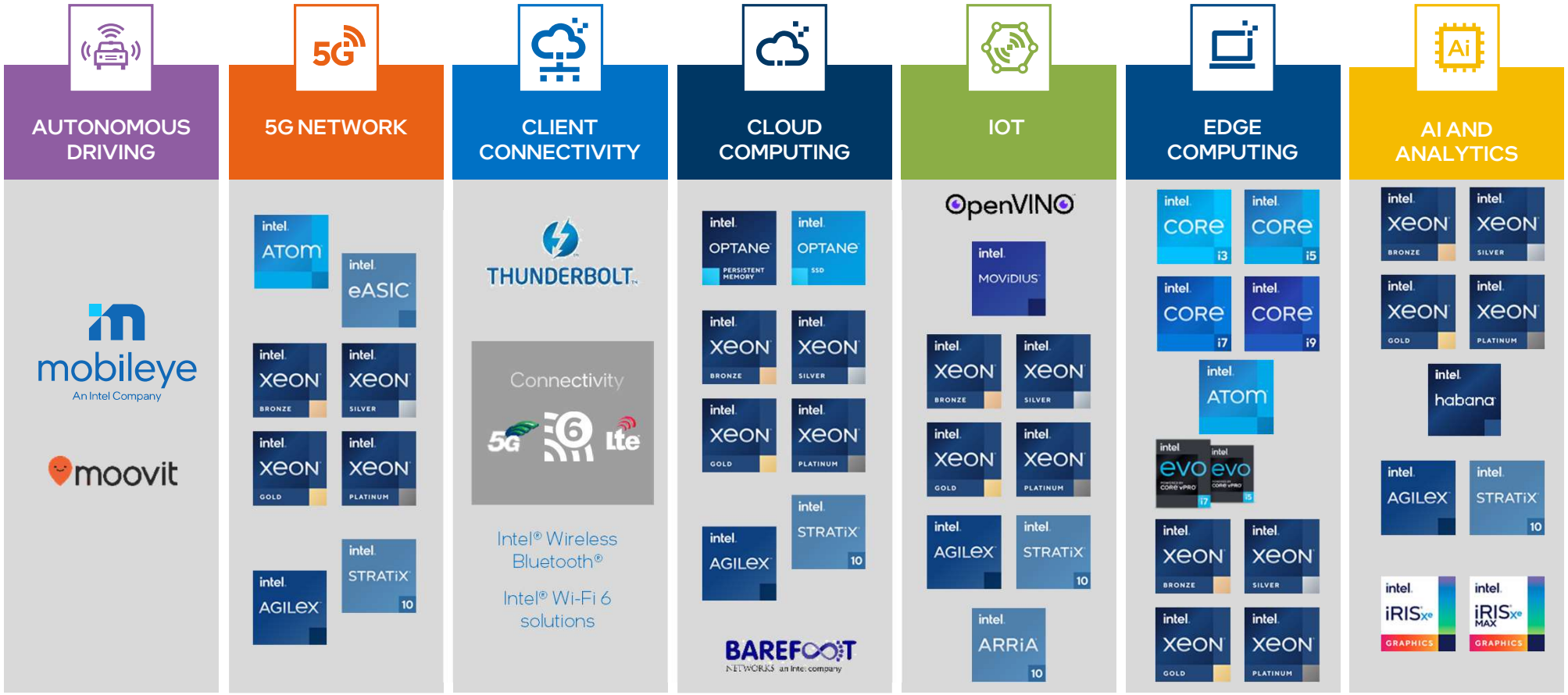
Intel Journey



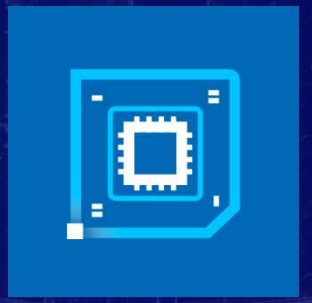


The leading provider of silicon globally

Intel End-to-End Product Portfolio and Solutions



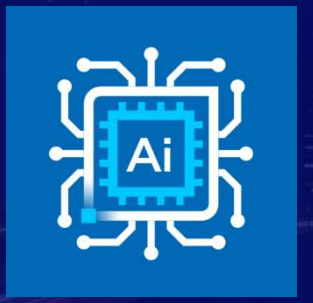
The Entire World is Becoming **Digital**



Ubiquitous Compute

Pervasive Connectivity

Cloud to Edge Infrastructure



Artificial Intelligence

Semiconductors are the underlying technology empowering developers and powering our customers' innovations

How We Win

Our Beliefs

1. We are in an era of sustained, long-term demand
2. The insatiable need for compute drives the value of Moore's Law
3. Open ecosystems unleash innovation and democratize compute
4. The world needs more balanced and resilient supply chains

Our Strategy

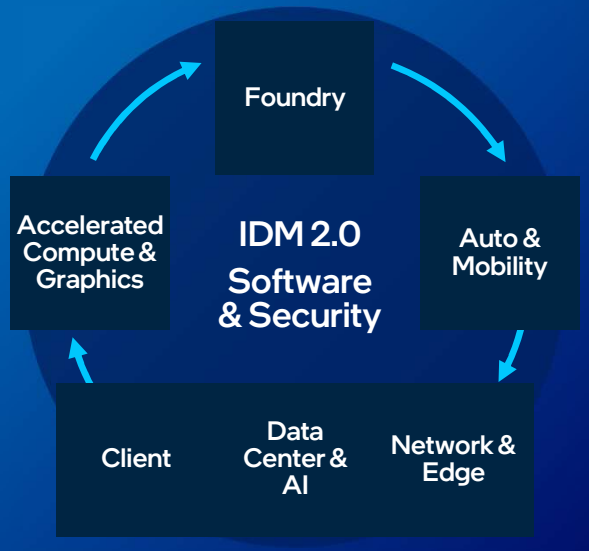
Deliver leadership products...

...Anchored on open and secure platforms

...Powered by sustainable manufacturing at scale

...Supercharged by our people and culture

Our Execution



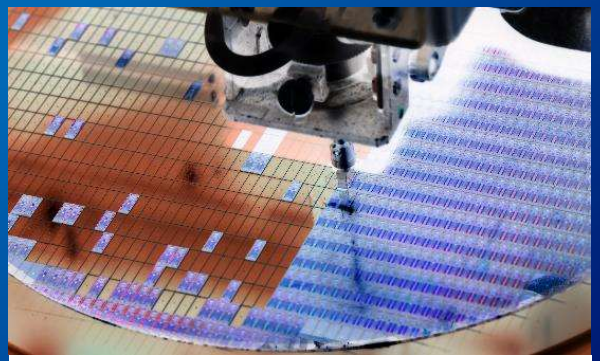
Delivering Leadership Manufacturing: IDM 2.0

Product Leadership, Supply Resilience, Superior Cost

Internal Factory Network

Intel's global, internal factory network for at-scale manufacturing

External Foundries



Expanded use of third-party foundry capacity

Intel Foundry

Building a world-class foundry business, Intel Foundry Services

Leveraging Intel's leading-edge packaging & process technology & world-class IP portfolio

Oregon | Arizona | New Mexico | Ohio | Costa Rica | Ireland | Germany | Israel | Chengdu | Vietnam | Malaysia

Intel Worldwide Headquarters
Santa Clara, California

Geographically Diverse Manufacturing Capacity

■ Wafer Fabs ■ Assembly & Test ■ Future Site

ComputerSweden BRANSCH EVENT WHITEPAPERS NYHETSBREV

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Här är Intels massiva Europasatsning – lägger 800 miljarder på nya chippfabriker

PRO Processorjätten Intel ska satsa 800 miljarder kronor i Europa de kommande tio åren. Bland annat ska de bygga två nya fabriker i Tyskland. "Vi ska ta den mest avancerade tekniken till Europa och hjälpa EU att bygga nästa generations europeiska chipp-ekosystem", säger vd Pat Gelsinger.

BIZTECH NEWS

Intel set to build a new €17 billion chip manufacturing hub in Germany as it pours money into Europe

A rendering shows early plans for two new Intel processor factories in Magdeburg, Germany. - Copyright Credit: Intel Corporation

Building Manufacturing Capacity in Europe

Open Platforms

Optimize more than **100** different operating systems

#1 contributor to the Linux kernel

Top-3 contributor to Chromium OS

Top-10 contributor to OpenStack

Deliver open & secure software and hardware platforms with industry-defining standards

Our People

Our Values

- Customer First
- Fearless Innovation
- Results Driven
- One Intel
- Integrity
- Quality
- Inclusion

121,000+ employees → **89%** technical

20,000 Software Engineers

~70,000 patent assets worldwide

"We push forward at a torrid pace with our purpose at the heart of everything we do — creating world-changing technology that improves the life of every person on the planet."

Pat Gelsinger
Intel CEO

Tech as a Force for Good

Responsible
Revolutionize how technology will improve health and safety

Inclusive
Make technology fully inclusive and expand digital readiness

Sustainable
Achieve carbon-neutral computing to address climate change

Enabling
Accelerate the ways we enable progress through our technology and the expertise and passions of our employees

Leading in the Future

Means Living Up to Our Purpose

Net-Zero Greenhouse Gas Emissions by 2040

03

Why Run on Red Hat & Intel

The Demand for More

Faster digital transformation is placing extraordinary demands on an organization's infrastructure

More
Applications

Applications will

double

over next

4 years[1]

More
Data

Data will proliferate at

4 to 5x

over

4 years[1]

More
Clouds

"Cloud in all its permutations will play ever greater, and even dominant roles across the IT industry..." (IDC[2])

More 5G Edge Platforms
Gartner estimates that by 2025,

80%

of enterprises will have shut down their traditional data center versus

10% in 2020[3]

More
Security Demands

Devices are doubling every

5 years[4]

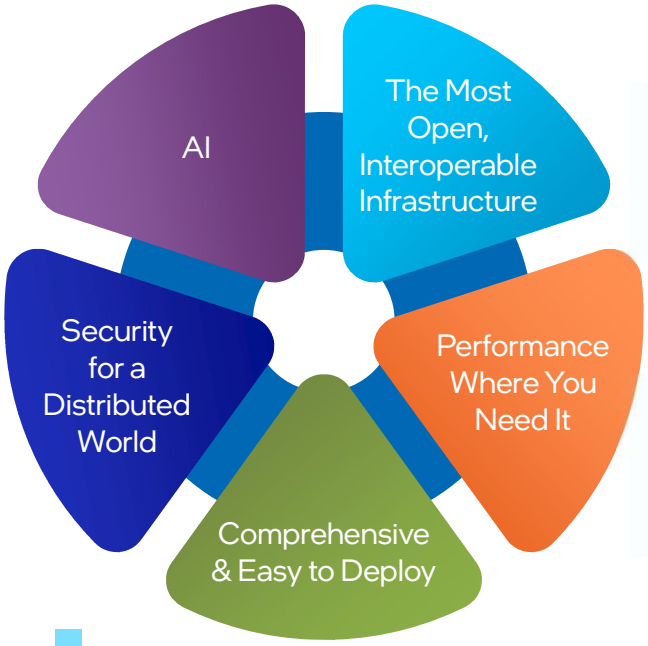
and connecting to infrastructures, increasing security risks

The demand for more is creating an urgency to get an infrastructure ready for digital everything

1. Today's Trends in Cloud and the Future of Enterprise, December 14, 2020, Matt Eastwood
2. IDC: Cloud Adoption and Opportunities Will Continue to Expand Leading to a $1 Trillion Market in 2024, According to IDC
3. Gartner, 2021 Planning Guide for Cloud and Edge Computing, Oct. 9, 2020
4. Gartner: Predicts 2021: Cloud and Infrastructure," December 2020,, John McArthur, Arun Chandrasekaran , Thomas Bittman, Tim Zimmerman

A New Digital Infrastructure Tailored for You

The Intel® solution for Red Hat OpenShift Container Platform scales for today & tomorrow



Software

- Red Hat® OpenShift Container Platform
- Red Hat® OpenShift® Data Foundation
- Red Hat® Enterprise Linux

Hardware

- 3rd Generation Intel® Xeon® Scalable Processors with Built-in AI, Acceleration & Security
- Intel® Optane™ Technology
- Intel® Ethernet Connection

Red Hat & Intel combine best-in-class technologies for a new era of digital everything

An Open Foundation

Modernize and migrate mission-critical workloads on a common platform that keeps pace with business shifts

Hybrid cloud portability on your terms:

- Combination of Red Hat OpenShift Container Platform and 3rd Gen Intel® Xeon® Scalable processors provide container-based apps on a consistent foundation to easily move across different cloud environments

Address workload diversity & complexity:

- Red Hat is the leader in enterprise Kubernetes to build and migrate business-critical applications with ease
- The latest Intel Xeon processors are built on open standards and APIs

Performance Made Flexible

Drive business results with performance across the platform

Increase business continuity

- 62% more performance on network and 5G workloads[1] with 3rd Gen Intel® Xeon® Scalable processors
- Achieve 50% more performance[2], on average gen over gen, for workload efficiencies

Achieve a faster return on your data

Process data from cloud to edge with built-in acceleration technologies in 3rd Gen Intel Xeon Scalable processors.

Innovate with ease and speed

OpenShift Data Foundation delivers critical data services using Intel® Optane™ SSDs with the world's fastest performance[3] and reliability for your demanding AI, analytics and database workloads.

A more flexible path to 5G services

Accelerate cloud-native networks with agility. Red Hat OpenShift is combined with Intel Xeon Scalable processors, Intel Ethernet Network Adapters, and software toolkits to realize a 5G infrastructure with flexible deployment models from hybrid to edge.

1. See [91] at www.intel.com/3gen-xeon-config for details. Results may vary; 2. See [98,97,81] at www.intel.com/3gen-xeon-config for details. Results may vary; 3. See claim [14] at https://edc.intel.com/content/www/us/en/products/performance/benchmarks/intel-optane-ssd-p5800x-series/

Realizing the Power of AI

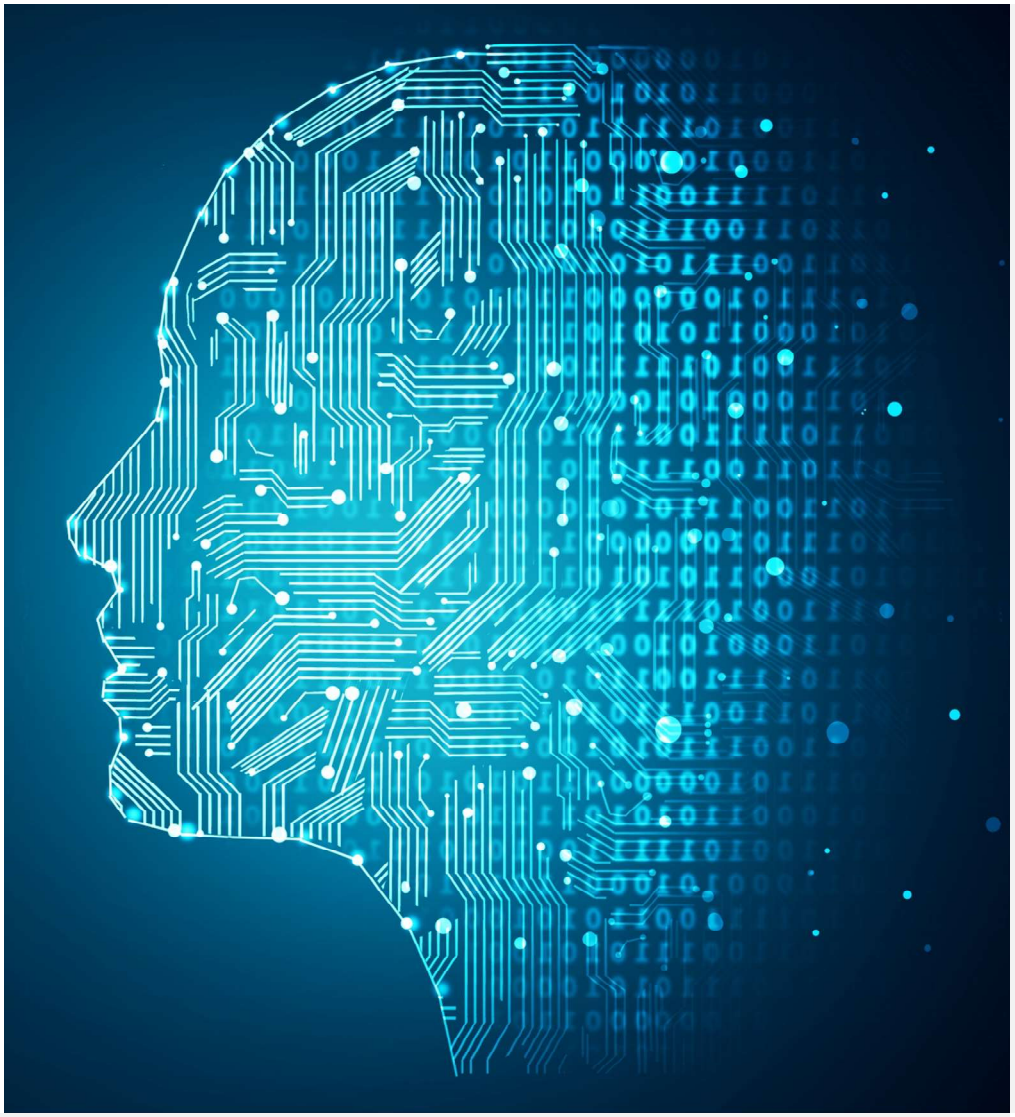
A new way to extract the value of AI

Drive cost savings

Only x86 datacenter CPU with built-in AI; the integration can save customers space, cost and energy.

Making AI more accessible

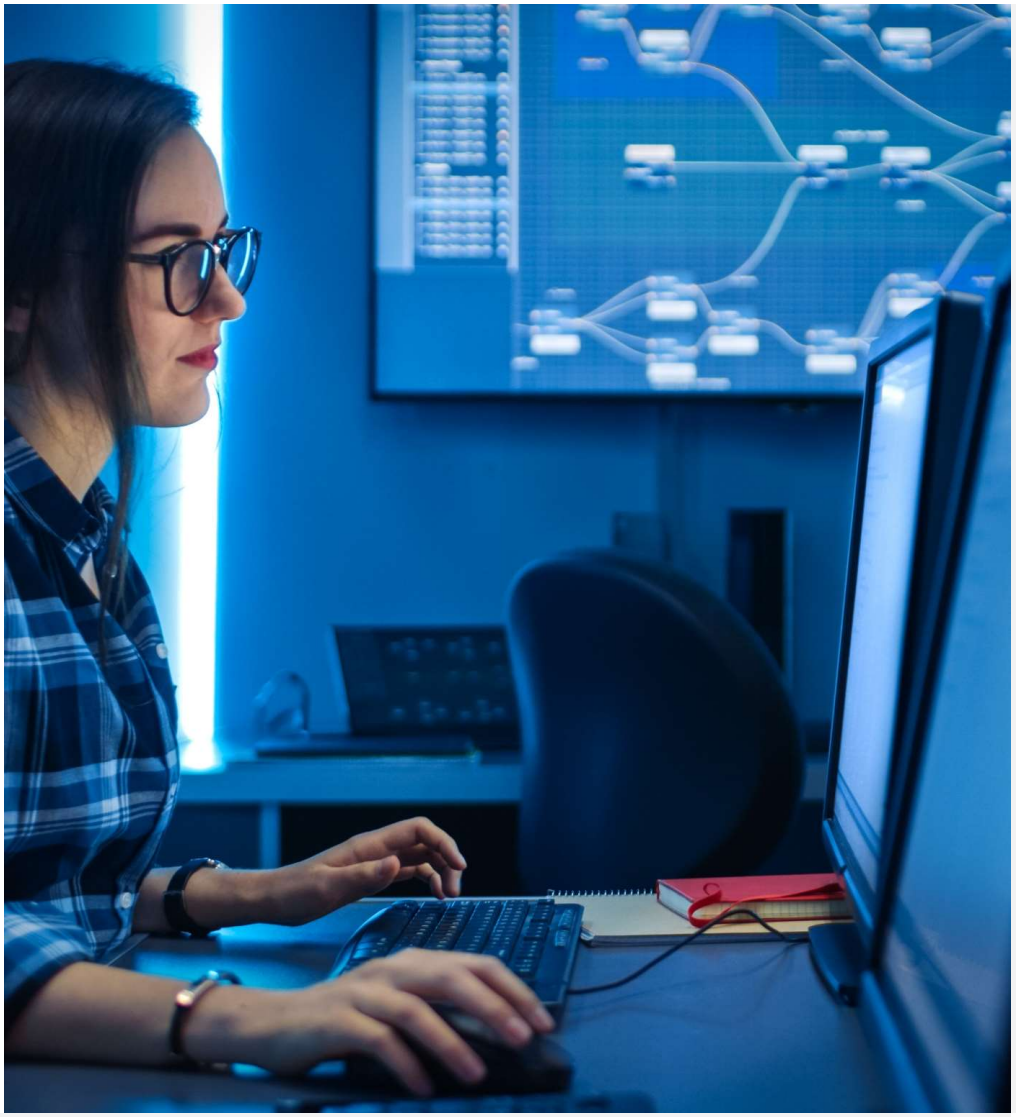
Data usability increases with Red Hat OpenShift Data Science that takes advantage of Intel's built-in AI capabilities in 3rd Gen Intel Xeon processors; automates data pipeline process for smarter ingesting, modeling and time to insight.



Turnkey

Optimizes existing investments; simple to deploy

- Deploy solution in **60 minutes** or less
- Fully integrated, tested and verified
- Works with existing IT environment*
- Build applications once, run them anywhere
- Automated, easy to maintain



*For OpenShift Container Platform version 4.x and beyond

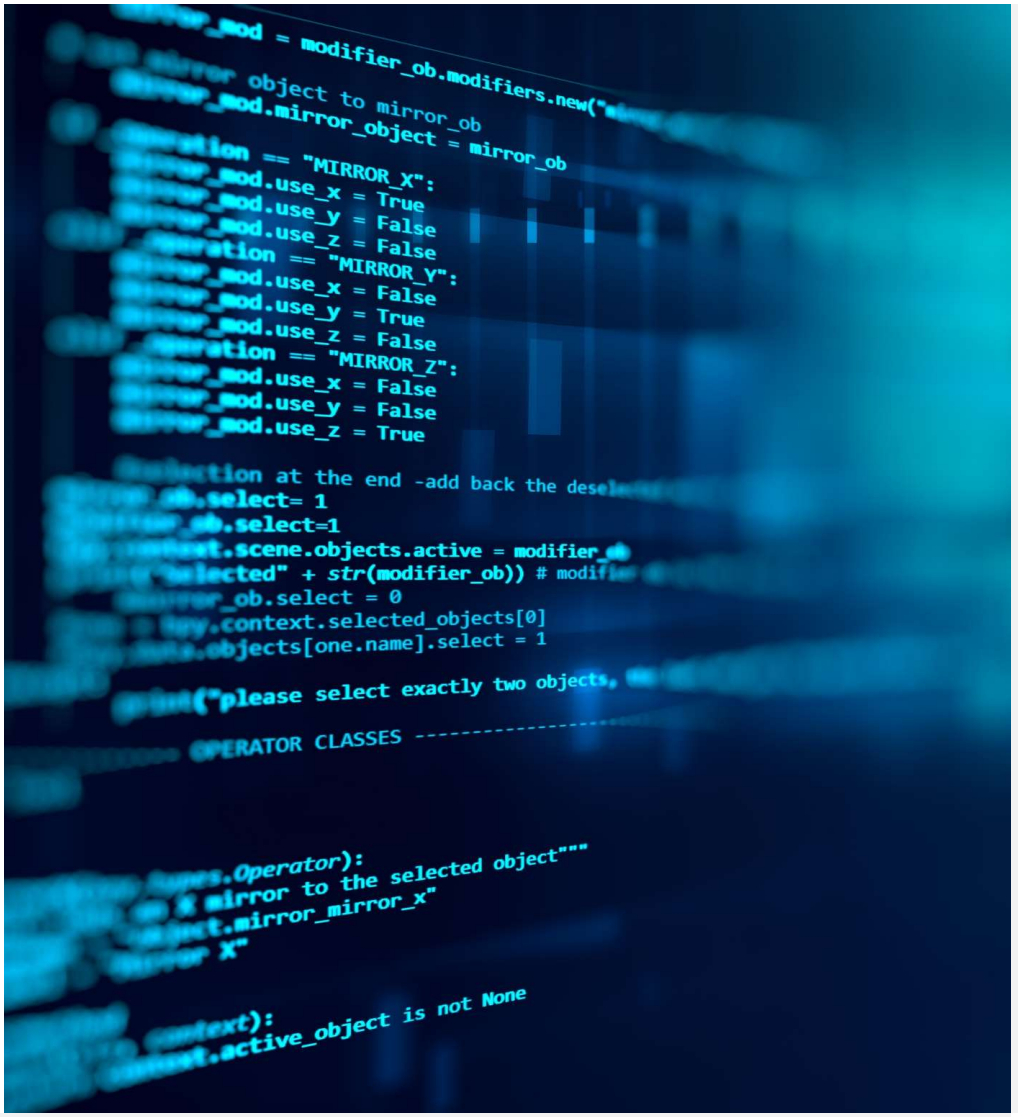
Built-in Security

Encrypt and protect your most critical business assets while reducing costs

Advanced enterprise-class security

Red Hat OpenShift lights up Intel's crypto technology

- Intel® Crypto Acceleration increases the performance of encryption-intensive workloads including SSL web serving, 5G infrastructure, and VPN/firewalls and reduces the performance impact of pervasive encryption.



02

Red Hat & Intel

The Intel + Red Hat Partner Ecosystem

Red Hat software

the default platform for digital transformation

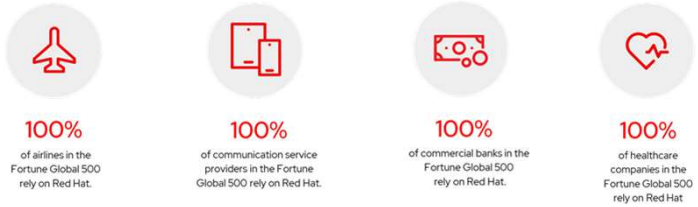
- 25+ years of working together
- Share a vision for the future
- Help organizations navigate digital transformation

Better Together

Intel silicon

- Joint engineering collaboration in Kubernetes and Cloud-Native container development community
- Best on Intel: Automation Manageability, Security, Reliability & performance

Majority of Fortune 500 companies use Red Hat Enterprise Linux[1]



powered by INTEL run on Red Hat

Public Cloud Providers

aws · Azure · Google Cloud · IBM Cloud

System Integrators

accenture · Atos · NTT DATA · Tech Mahindra · Capgemini · wipro · World Wide Technology

Software Vendors

SAP Global Partner · CLOUDERA · SAS · NetApp

Certified Cloud & Service Provider

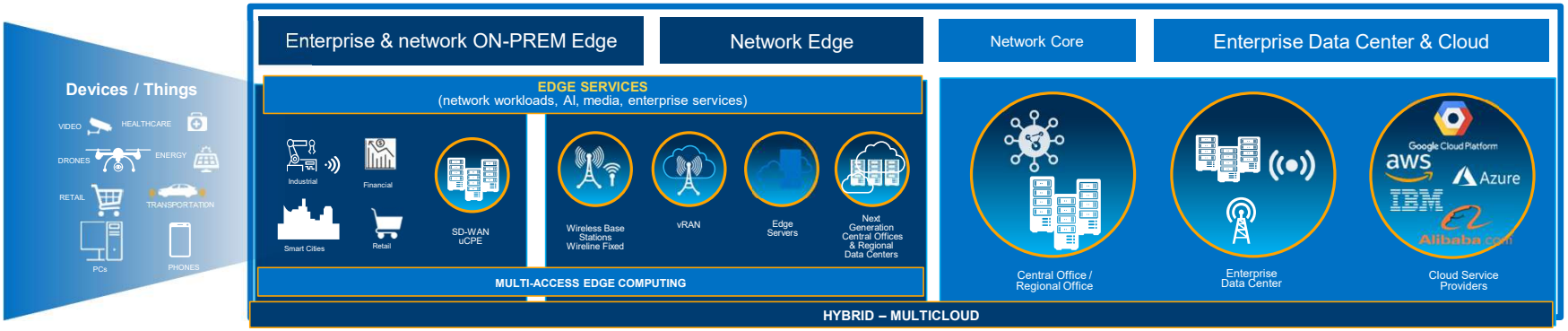
EQUINIX · Open Telekom Cloud · ukcloud · KDDI France

OEMs certified for Red Hat solutions

Hewlett Packard Enterprise · DELL · cisco · Lenovo · SUPERMICRO

Source: Red Hat client data and Fortune 500 list, 2020. https://www.redhat.com/en/about/company.

Intel + Red Hat Solutions



Market Segments	Enterprise on-prem edge Retail, Industrial Financial, Smart City	Network On-Prem Edge Private Wireless	FAR edge virtual ran	Near edge 5g core & cloud svc.	Central / regional office Ngco, OSS/BSS & cloud svc.	Enterprise apps & db sap, databases	Open Data Hub AI platform
Solutions & Ecosystem	Openshift e2e reference architecture	intel select solutions	HW & SW Ecosystem	Market ready & rfp ready sols.			
Intel toolkits	OpenVINO	OpenNESS	LTE, 5G SD-RAT, WAN, NW Security/Analytics VNF/CNF	Intel® FlexRAN®	DPDK	EDGE INSIGHTS SOFTWARE	Open Visual Cloud oneAPI
Red Hat Foundation	Optimized for Hybrid – Multicloud with Intel OpenShift Operators	Red Hat OpenShift Container Platform	Red Hat OpenStack Platform	Red Hat Enterprise Linux	RED HAT ANSIBLE Tower	Red Hat Virtualization	Red Hat OpenShift Container Storage	Red Hat Ceph Storage
Intel HW							

What's in a modern application platform?

Unified platform for Dev, Sec and Ops

Transparent to developers

Extensible - works with what you have

Observability, management and monitoring

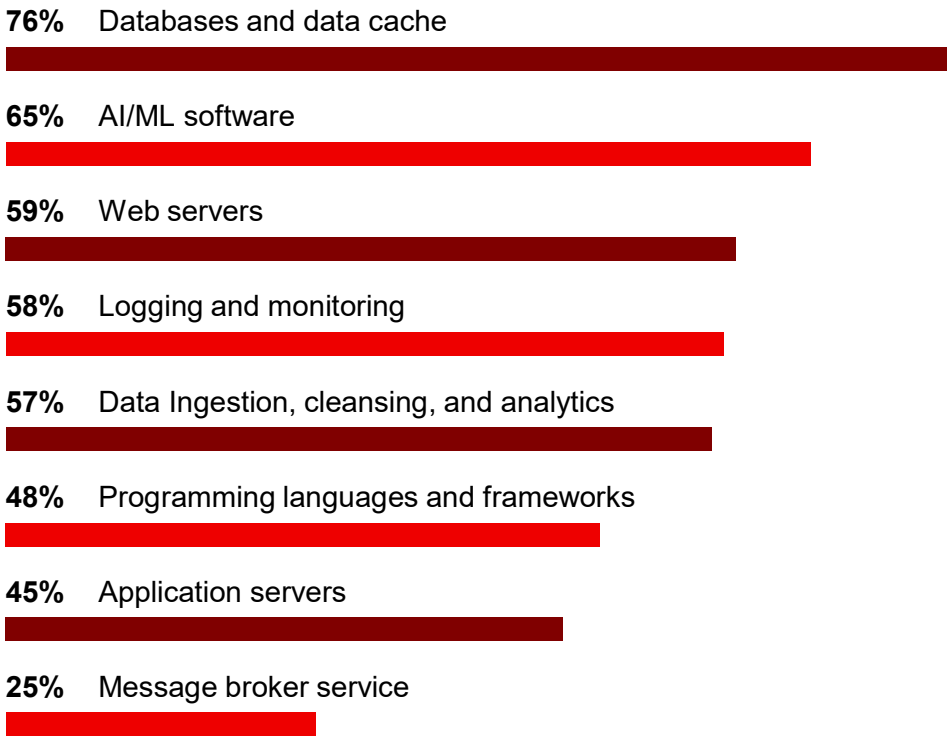
Runs on any infrastructure or cloud

Security configuration management and enforcement

Consistent data management

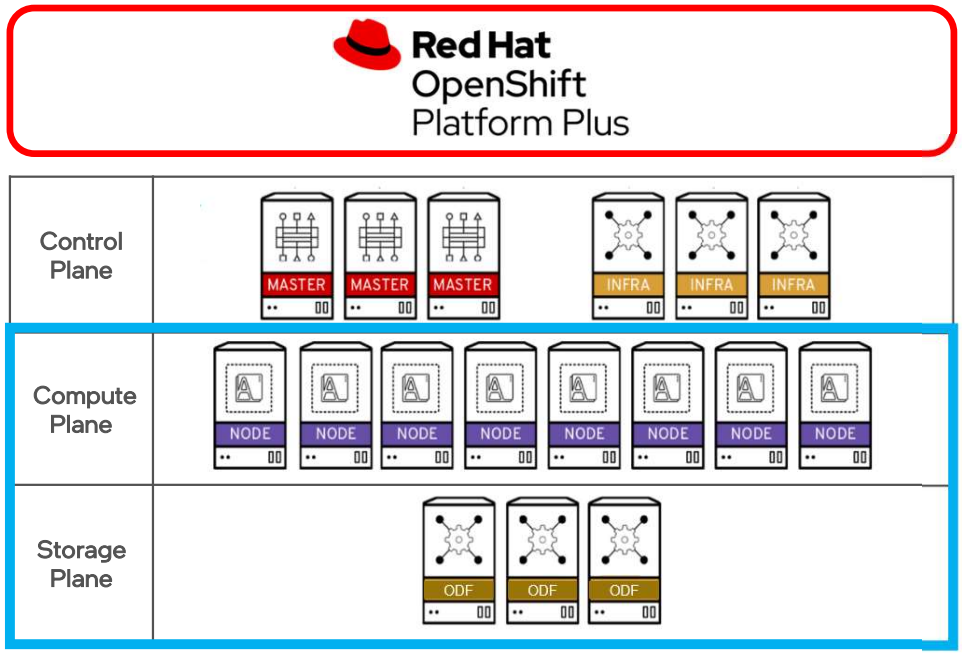
Vulnerability scanning and secure image management

Broad spectrum of workloads are being deployed in containers and Kubernetes[1]

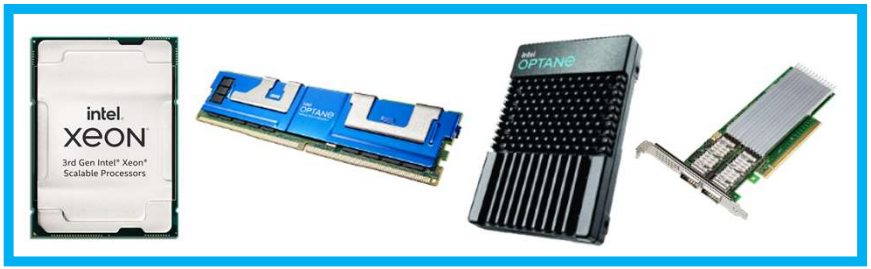


1 Pulse, sponsored by Red Hat. “State of workloads adoption on containers and Kubernetes,” November 2021.

Red Hat OpenShift Platform Plus with Intel® Xeon® Scalable Processors & Intel® Optane™ Technology



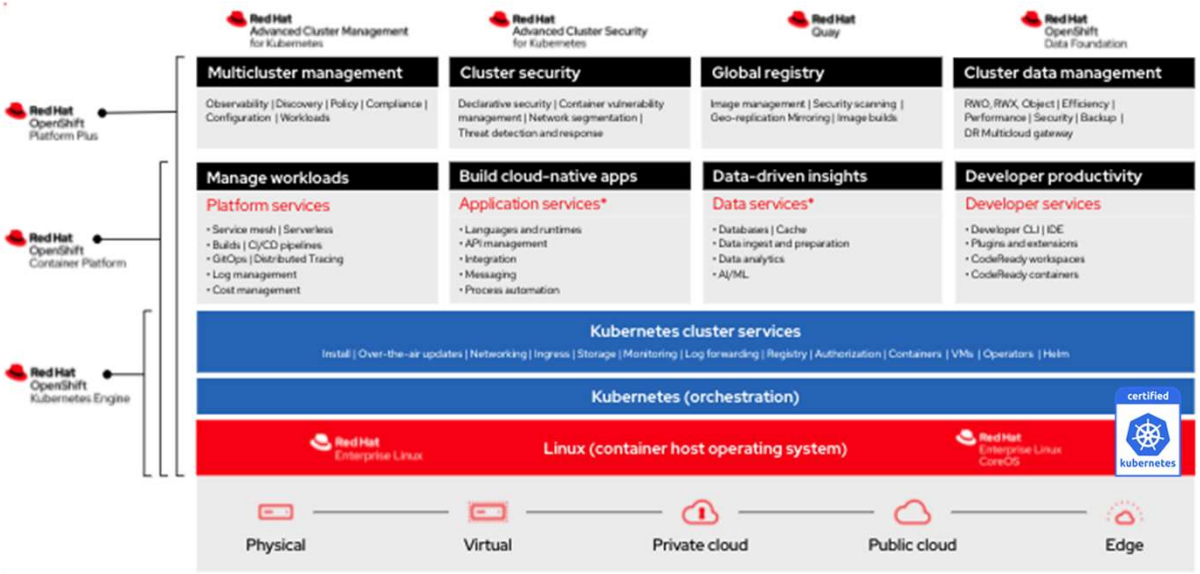
Red Hat OpenShift Container Platform Clusters
Compute (OCP) and Storage (ODF) nodes are combined in the Dell PowerEdge R750 server (**Converged**)



- **Dell PowerEdge R750**
- Intel® Xeon® Scalable processor 8358
- Intel® Optane™ persistent memory 200 series
- Intel® Optane™ SSD P5800X
- 2x Intel® Ethernet Adapter E810-CQDA2 (100 GbE)

Red Hat OpenShift Platform Plus

Complete hybrid cloud foundation to deploy and manage cloud-native applications



- Consistent user experience, management and security across hybrid infrastructure
- Comprehensive tools for cloud-native application development
- Built-in security across the entire application lifecycle with a global container registry
- Kubernetes-native multicluster security with active threat detection and remediation
- End-to-end management and observability

Solution Brief

Data Center | Container Data Services

Easily Scale Your Apps and Data Services

intel

Intel and Red Hat have co-developed workload-optimized data node configurations for Red Hat® OpenShift® Data Foundation, based on Intel® Xeon® Scalable processors and Intel® Optane™ technology

Red Hat OpenShift

In this era of digital transformation, data volumes are exploding while performance requirements escalate. Data pipelines and data access are increasingly complex. To keep up, your containerized apps must serve up data more quickly. But you don't have time to evaluate and test various combinations of hardware and software to determine if they meet your data services' needs. You just need your data services to work—on premises, in the cloud, or across multiple clouds.

Deliver Data Services with Ease

Red Hat delivers an automated, complete cloud-native development and deployment platform with integrated data services' through its Red Hat OpenShift and Red Hat OpenShift Data Foundation products. OpenShift Data Foundation delivers persistent storage through a data service and orchestration layer that's fully integrated with and built for Red Hat OpenShift. It natively includes all common storage services, including file, block, and object and also provides deterministic performance at scale to deliver a consistent user experience across any platform where Red Hat OpenShift is deployed. Red Hat and Intel combine cutting-edge software and hardware technologies to deliver a workload-optimized data services solution that uses an external data node featuring Intel® Xeon® Scalable processors and Intel® Optane™ SSDs.

Intel Optane SSDs serve as a cache tier in front of the capacity tier, speeding access to hot data and taking the write pressure off the capacity drives to create a solution that is optimized for both performance and cost. Intel Optane SSDs are fundamentally different from other types of SSDs because they feature a memory-like capability inside an SSD form factor. This provides lower latency, higher IOPS, and greater endurance. Data-centric workloads are I/O-intensive and benefit from Intel Optane SSDs' ability to support up to 100 drive writes per day (DWPD).[2] Intel Optane SSDs provide the performance, endurance, and reliability necessary to accelerate today's most demanding workloads, such as latency-sensitive big data analytics, machine learning/deep learning, and databases.

OpenShift Data Foundation data nodes are easy to deploy and configure, and are portable across clouds. They offer simplicity and flexibility, and streamline the process of going cloud-native using containers.

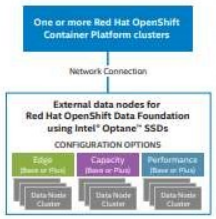
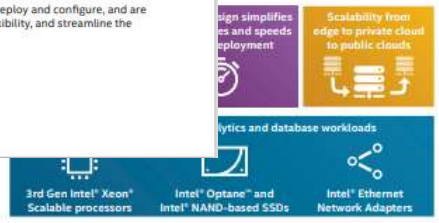


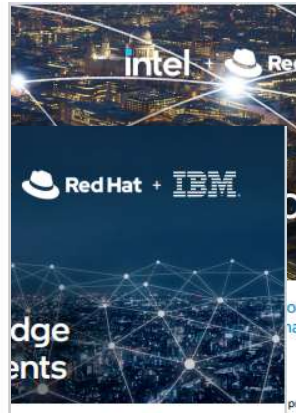
Figure 1. Predefined hardware-plus-software data node configurations eliminate guesswork and let you focus on scaling your apps and data services rather than infrastructure details.



ice platform for enterprise
re for Red Hat OpenShift
ble processors is the answer

lata scientists to develop
Shift for Data Science.
ts that amplify capabilities.

Enhanced with
ntel



nnecting branch offices across
ds solution built around

Red Hat & Intel Resources

- Red Hat & Intel Solution Spotlight
- Red Hat & Intel Reference Architecture
- Visit: www.Intel.com/Red Hat
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Red Hat
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Performance varies by use, configuration and other factors. Learn more at www.Intel.com/PerformanceIndex.

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

Intel contributes to the development of benchmarks by participating in, sponsoring, and/or contributing technical support to various benchmarking groups, including the BenchmarkXPRT Development Community administered by Principled Technologies.

Your costs and results may vary.

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Some results may have been estimated or simulated.

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All product plans and roadmaps are subject to change without notice.

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