



Red Hat Dallas Emerging Tech Summit

December 5, 2019

The Red Hat Vision and the Office of the CTO

Chris Wright, CTO

The Hybrid Cloud Is Reality



Hybrid Cloud Infrastructure

Infrastructure software across footprints, with Linux at the core



Cloud-Native Development

Software to rapidly & efficiently develop & deploy apps across hybrid cloud



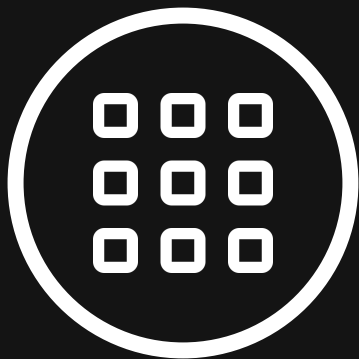
Automation & Management

Software to simplify management & automation of hybrid cloud environments

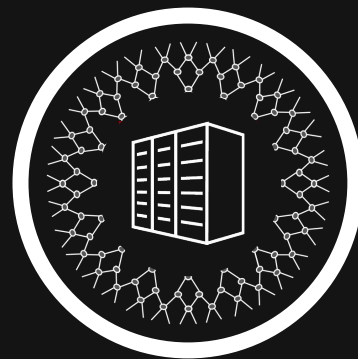
Enterprises with a hybrid strategy grew to **58 percent** in 2019 from 51 percent in 2018.

RightScale [2019 State of the Cloud Report](#)

The Hybrid Cloud Is Being Driven by Mega Trends

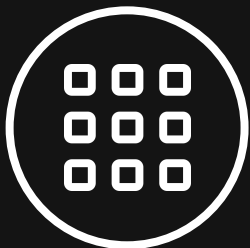


**The Economics Of
Modern Apps**



**The Changing,
Distributed Datacenter**

Modern Applications Cause Infrastructure Concerns



The Economics Of Modern Applications

TRADITIONAL COMPANIES



Manage their own datacenters...



...Struggle to migrate legacy workloads to the cloud.



CLOUD-NATIVE COMPANIES



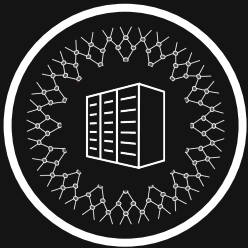
Minimal initial capex costs...



...Struggle to manage cost & complexity with scale.



The Concept of a Datacenter Is Changing



The
Changing,
Distributed
Datacenter

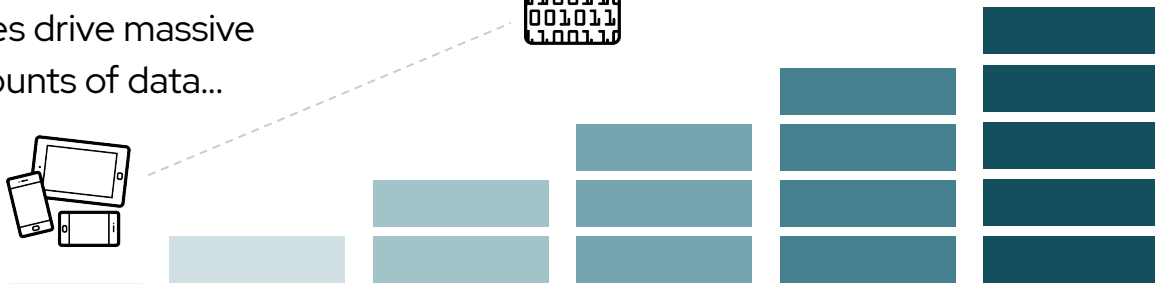
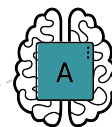
More and smarter
devices drive massive
amounts of data...



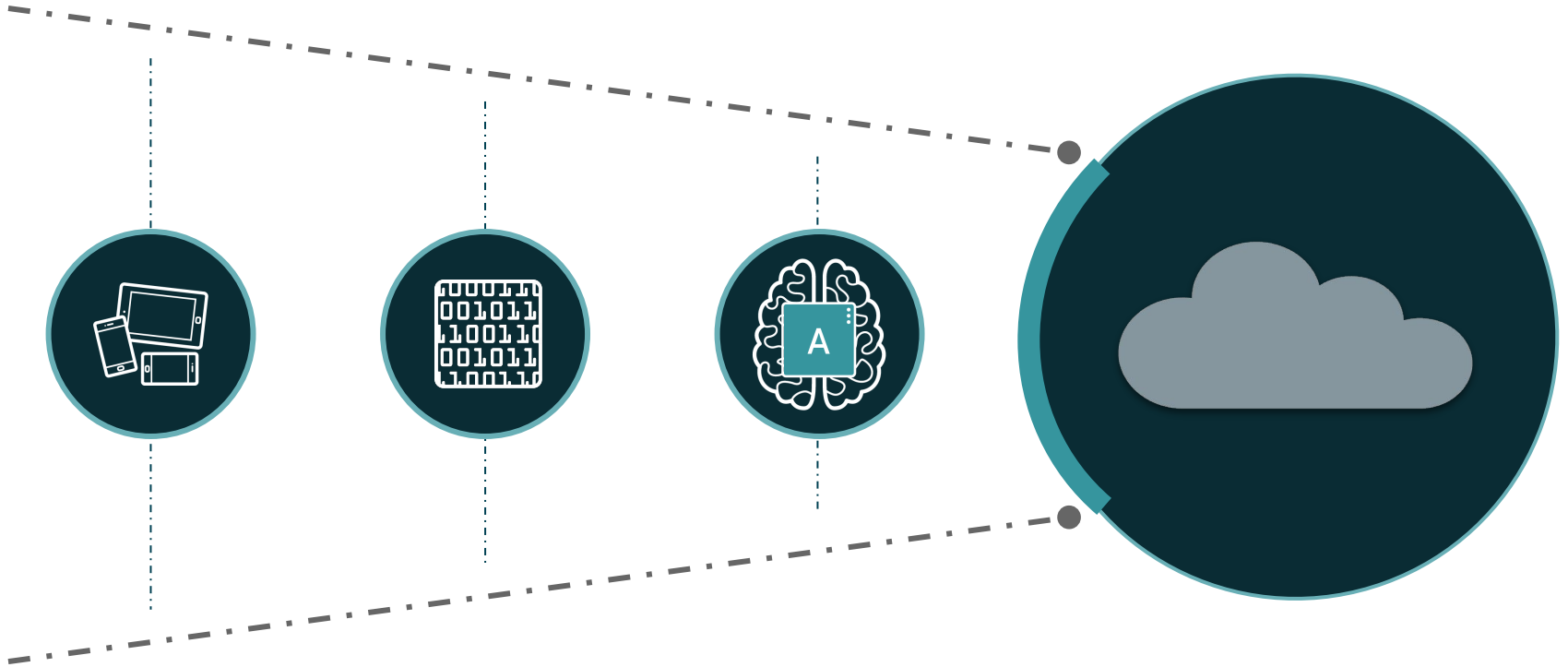
...More data pushes
Compute further out to
the network Edge...



...Requiring robust,
non-centralized data
production & processing.

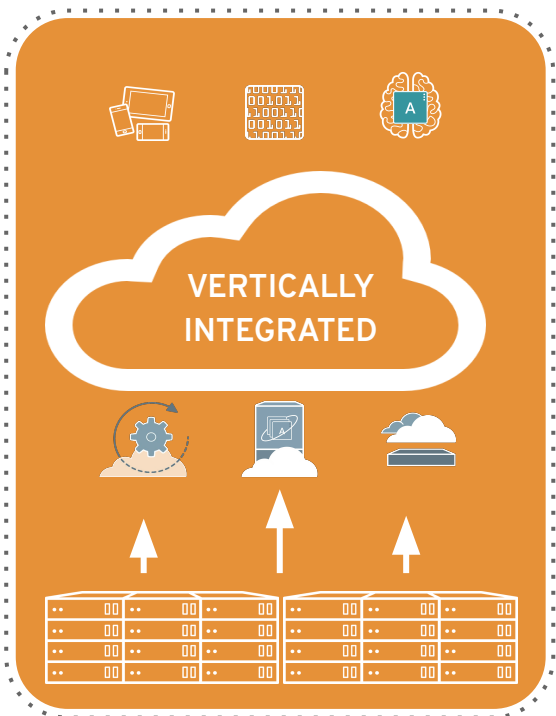


Result: Hybrid Cloud Is Becoming Increasingly Distributed

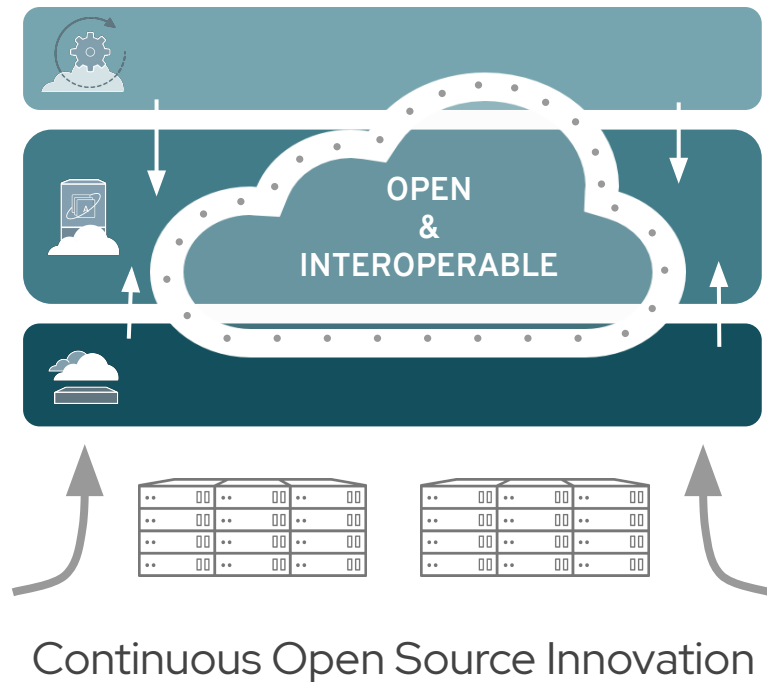


Determine Your Control over Distributed Systems

Public Cloud



Open Hybrid Cloud



We Are Red Hat

Red Hat has been innovating using Open Source for **25+ Years**.

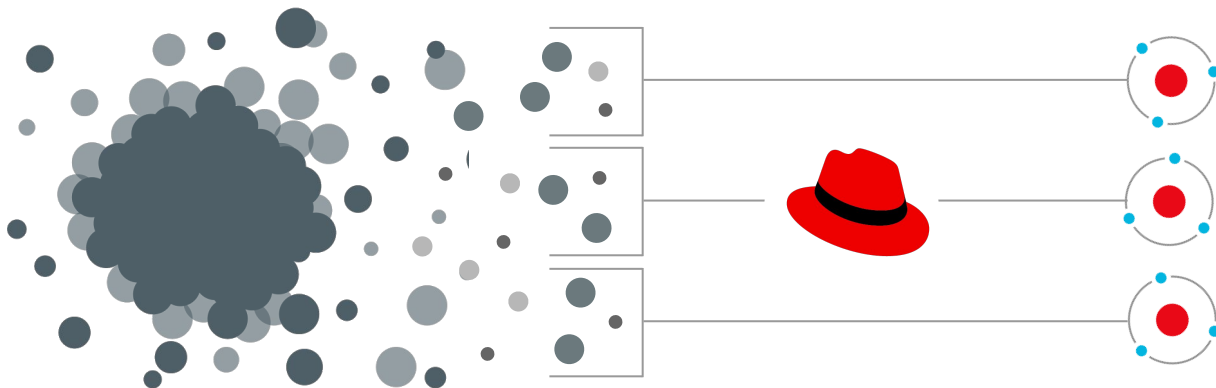
Customer requirements drive the need for innovation

Open source enables innovation

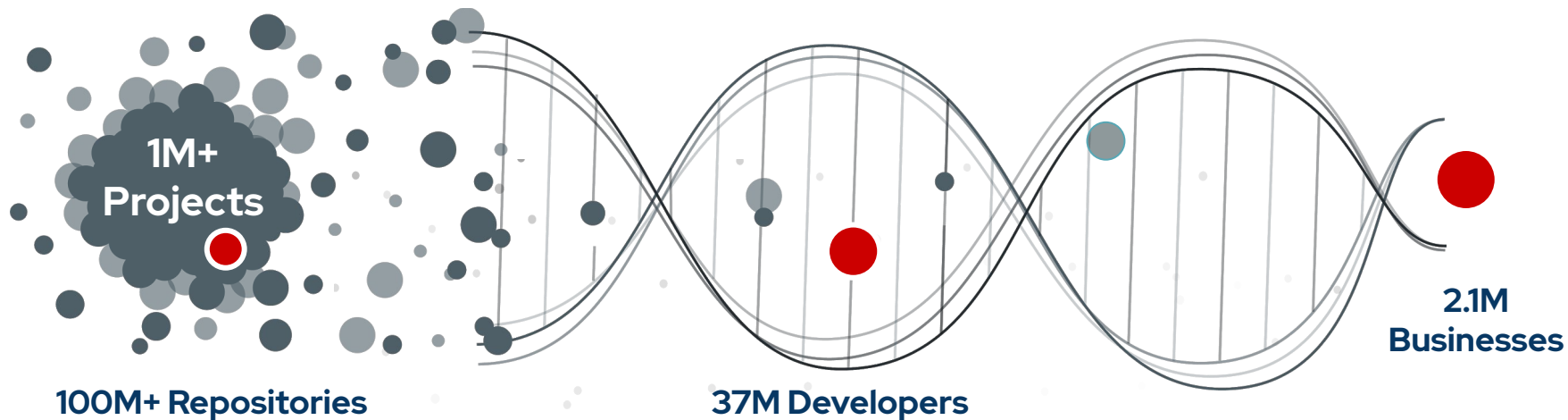
Communities are the catalyst for innovation

Red Hat is a leader in open source innovation

**Community-Powered
Innovation**



Open Source is the Source of Technological Innovation



*[GitHub](#)

The Perpetual Pursuit of Excellence Drives Open Source Innovation

USER EXPERIENCE

SIMPLE
INTUITIVE
DELIGHTFUL
PERSONALIZED
REDUCE COGNITIVE LOAD
ATTRACT AND RETAIN CUSTOMERS

OPS EXPERIENCE

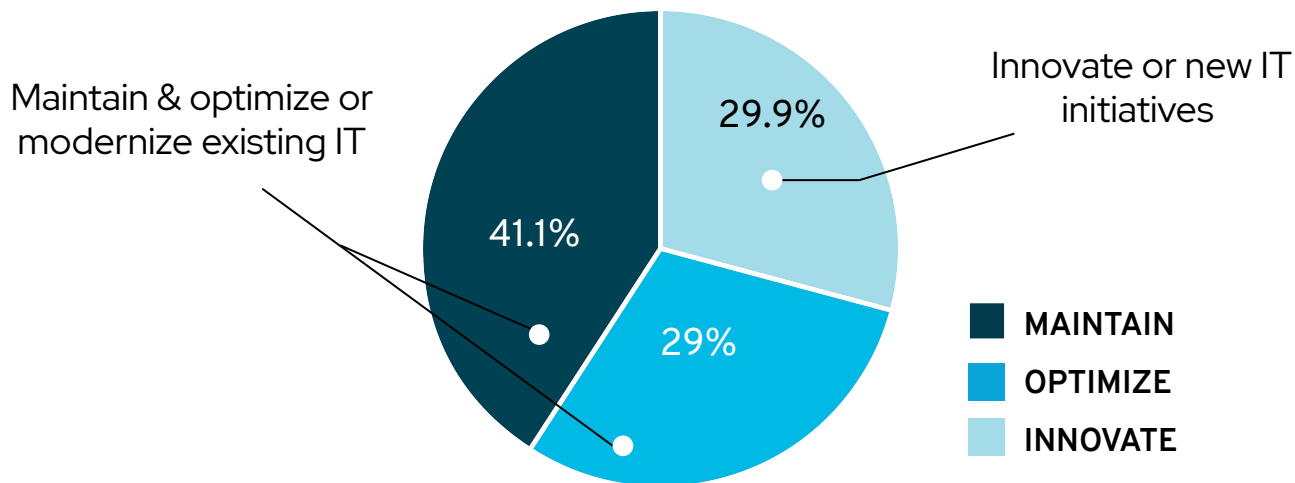
SECURITY
RELIABILITY
SCALABILITY
AVAILABILITY
DIVERSE WORKLOADS
MINIMIZE OPERATIONS COST

DEV EXPERIENCE

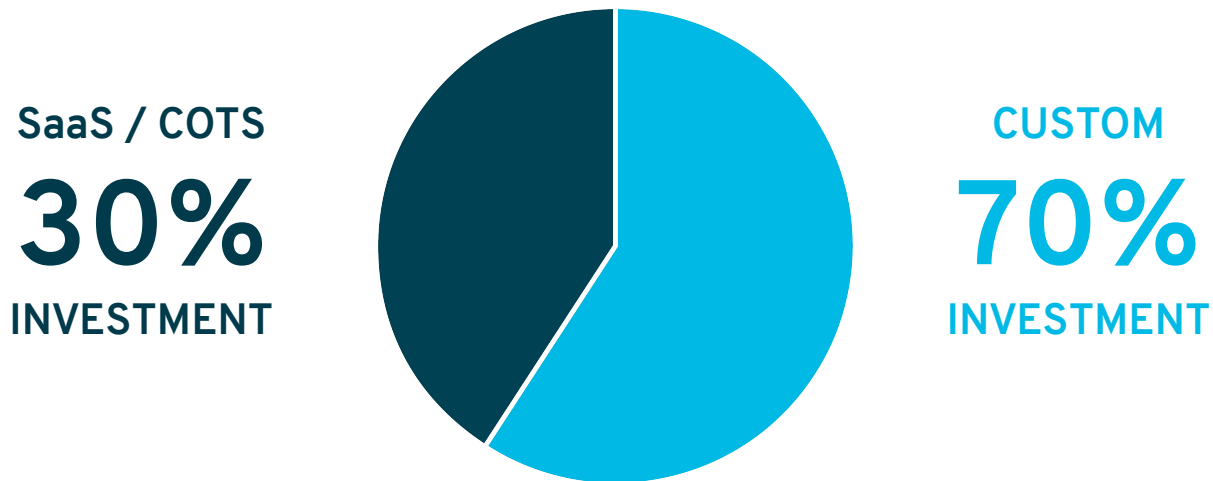
SPEED
ITERATIVE
APP CENTRIC
REDUCE SCOPE
APIS & SERVICES
MAXIMIZE BUSINESS VALUE

Your Challenge: Taking Advantage of Open Source Innovations

70% on Maintenance & Optimization versus 30% on Innovation



How Do You Flip the Script?



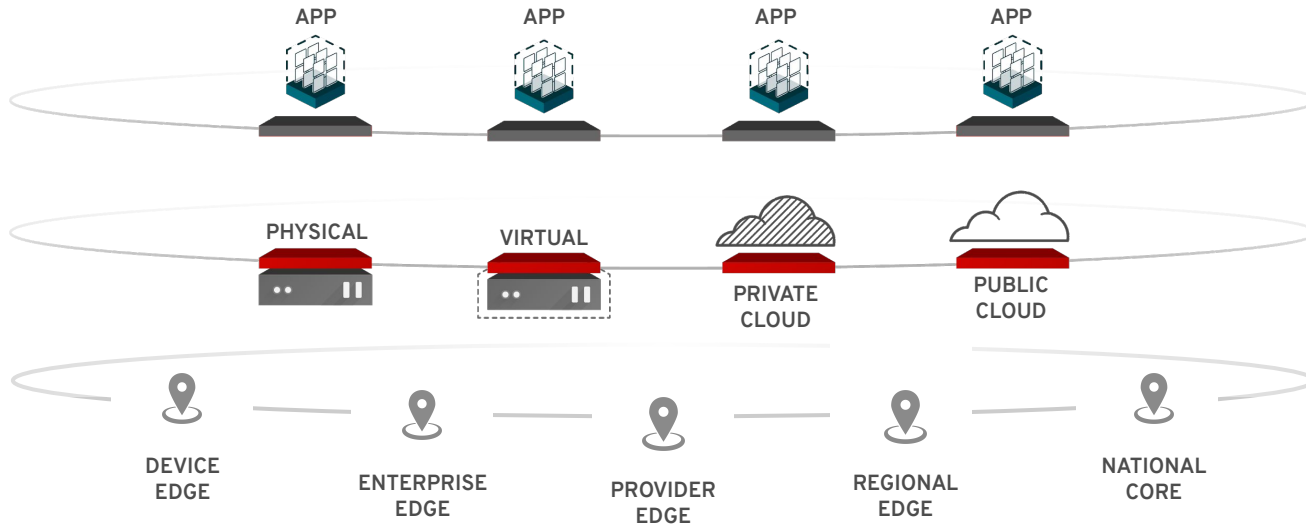
Our Challenge: Delivering Enabling Open Source Innovation

Innovation Enabling IT To Create Business Value with Less Wasted Time and Effort.

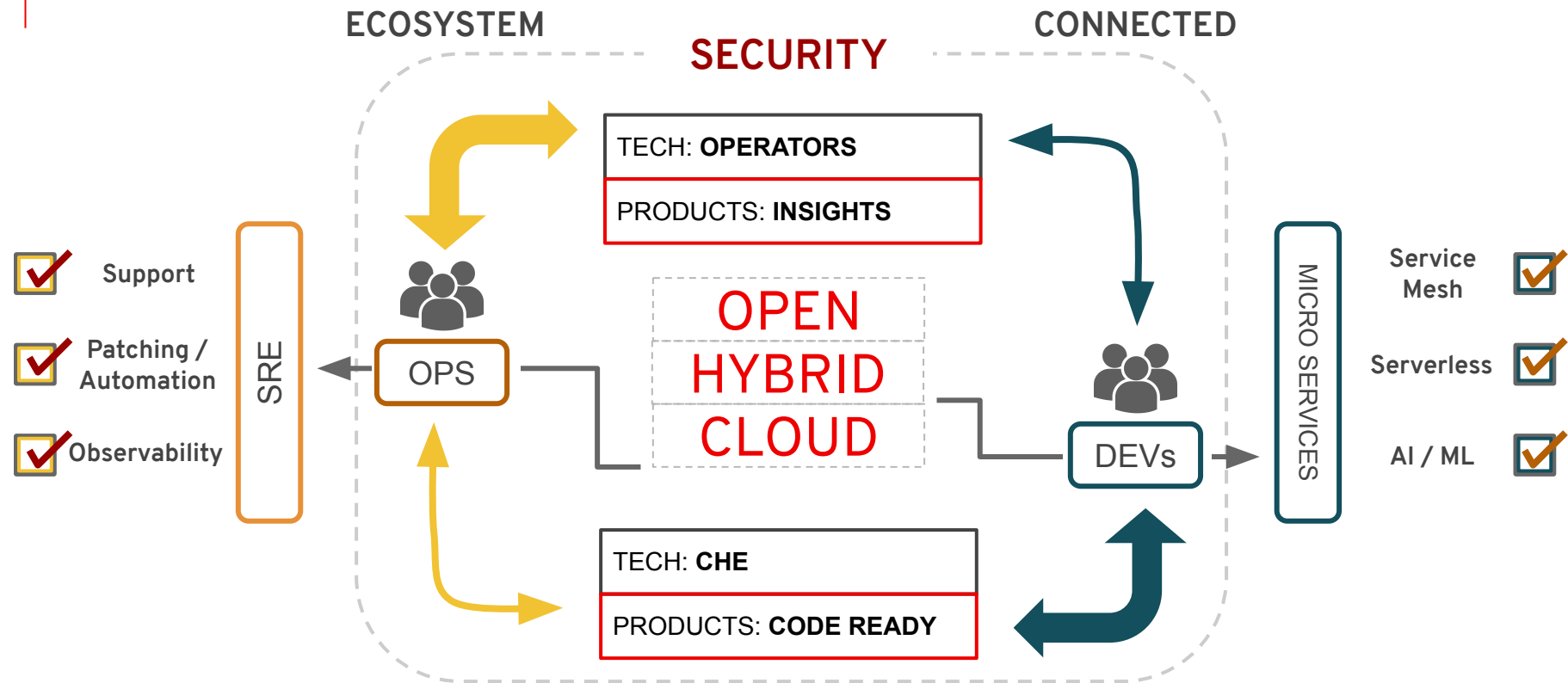


Our Vision

Fully Automatable, Fully Distributed Open Hybrid Cloud (OHC)



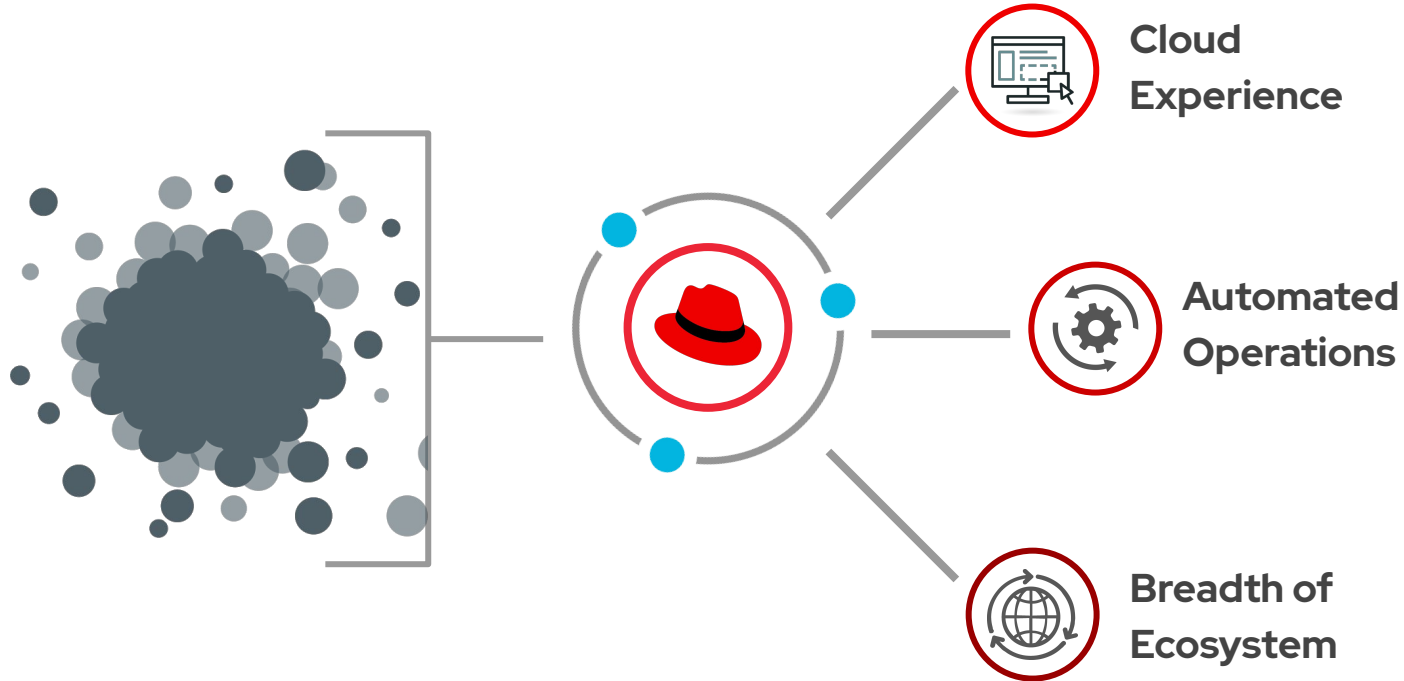
Any Workload, Any Footprint, Any Location.



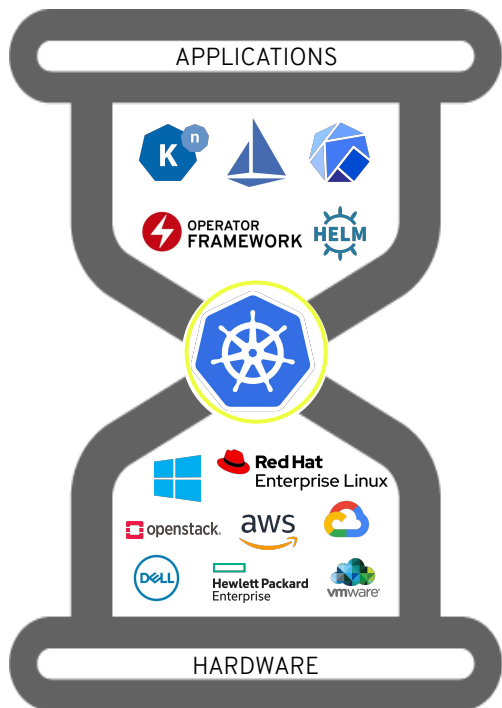
LEVERAGE RED HAT KNOWLEDGE OF OPEN SOURCE

Leveraging Innovation Is Key to OHC Success

OHC Must Deliver...

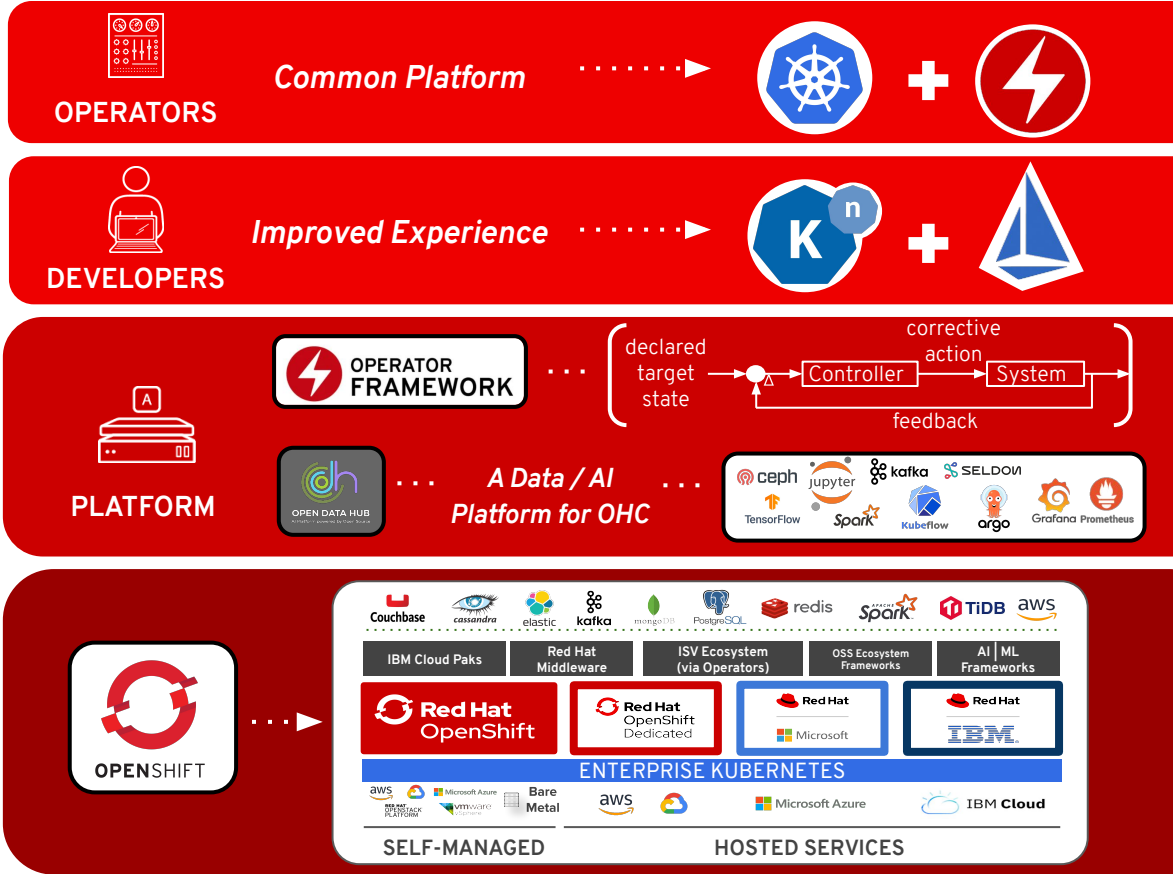
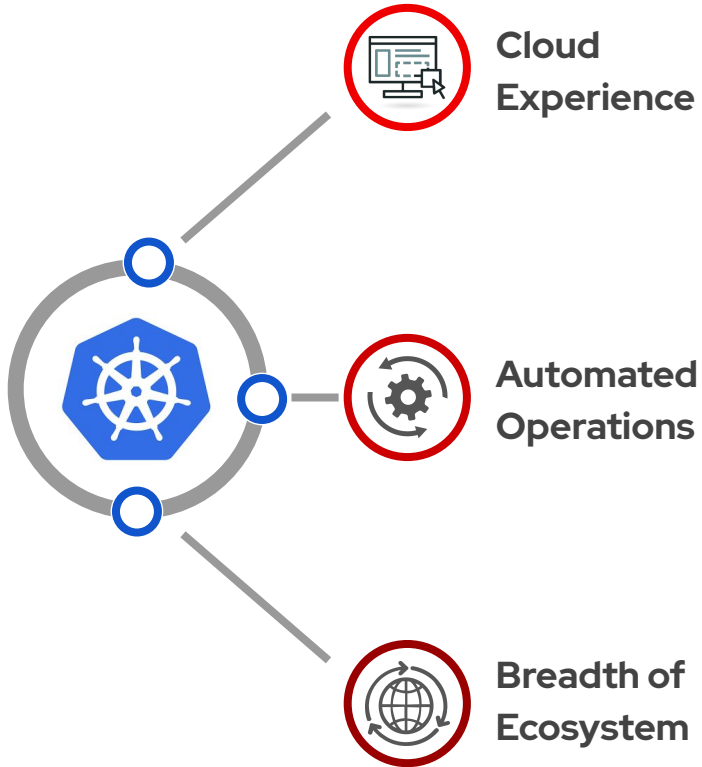


OHC Innovation Runs through Kubernetes



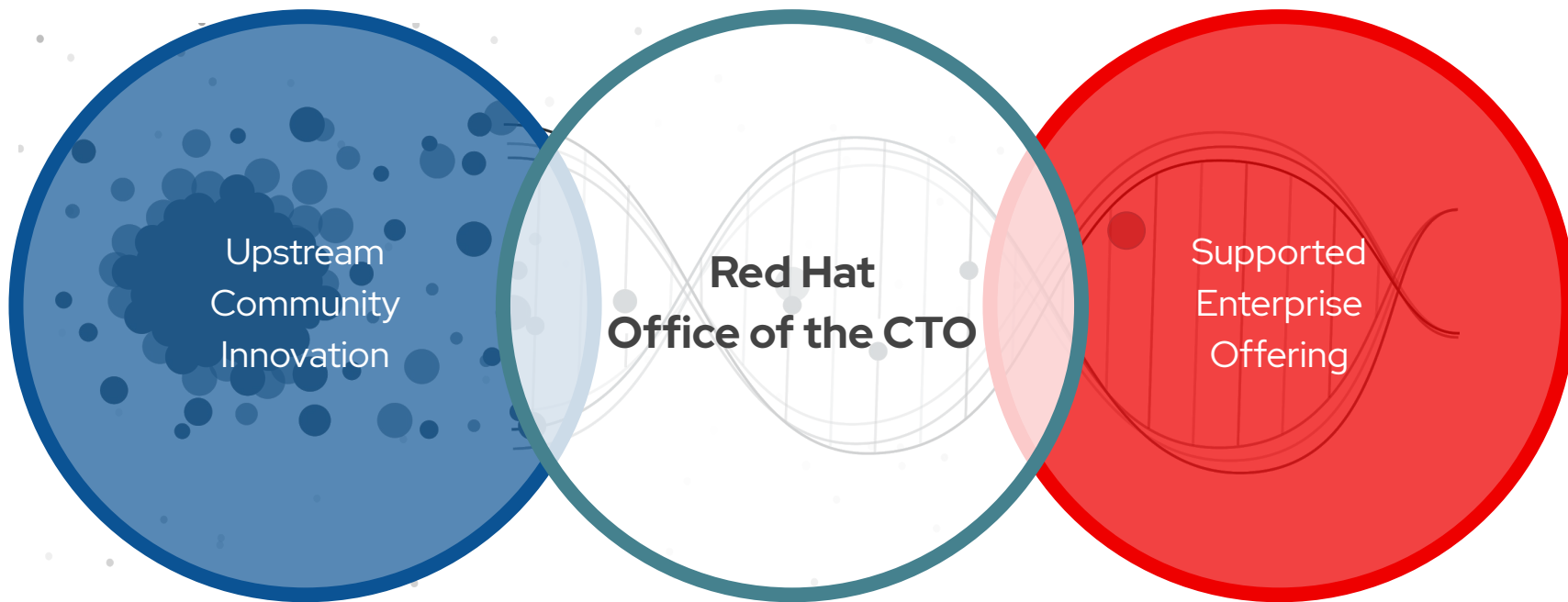
- Kubernetes is to Cloud what IP was to Networking, and Linux is to the OS.
- Provides container orchestration on top of an infrastructure abstraction (bare metal, VMs, on-prem or public cloud).
- Foundation for higher-level abstractions such as applications, functions, and services.

Red Hat Is Ensuring OHC Enabled with Kubernetes-Based Innovation

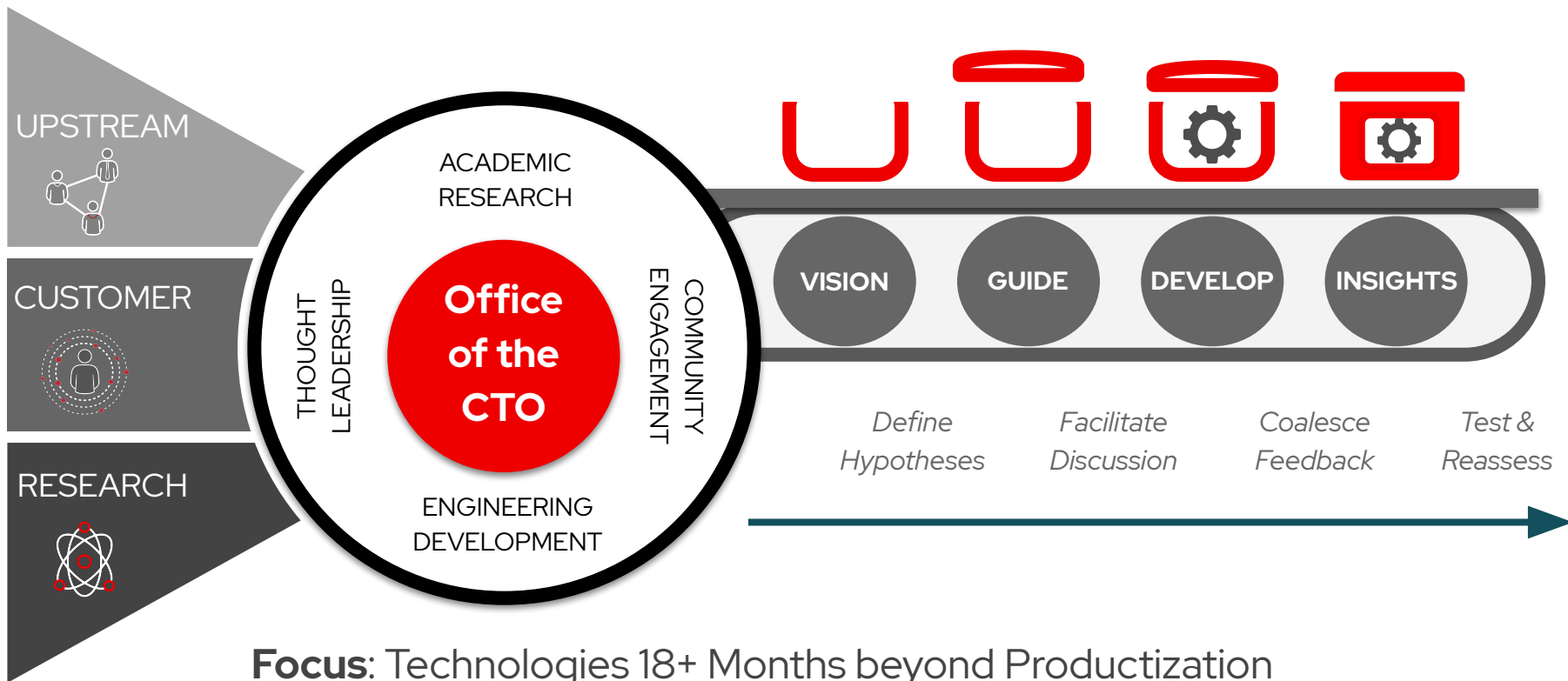


The Office of the CTO: Helping Bridge the Innovation Gap

The Office of the CTO works with Red Hat Product teams and Customers to refine and deliver emerging technology insights.



Creating Context and Aiding Development of Pre-Product Innovation



Focus: Technologies 18+ Months beyond Productization

Today's Speakers from the Office of the CTO



Deborah Bryant

**Open Source
Program Office**



Steve Watt

**Emerging Technologies,
Cloud Platforms**




Daniel Riek


**Artificial Intelligence
Center of Excellence**


Thank you

Red Hat is the world's leading provider of enterprise open source software solutions. Award-winning support, training, and consulting services make Red Hat a trusted adviser to the Fortune 500.

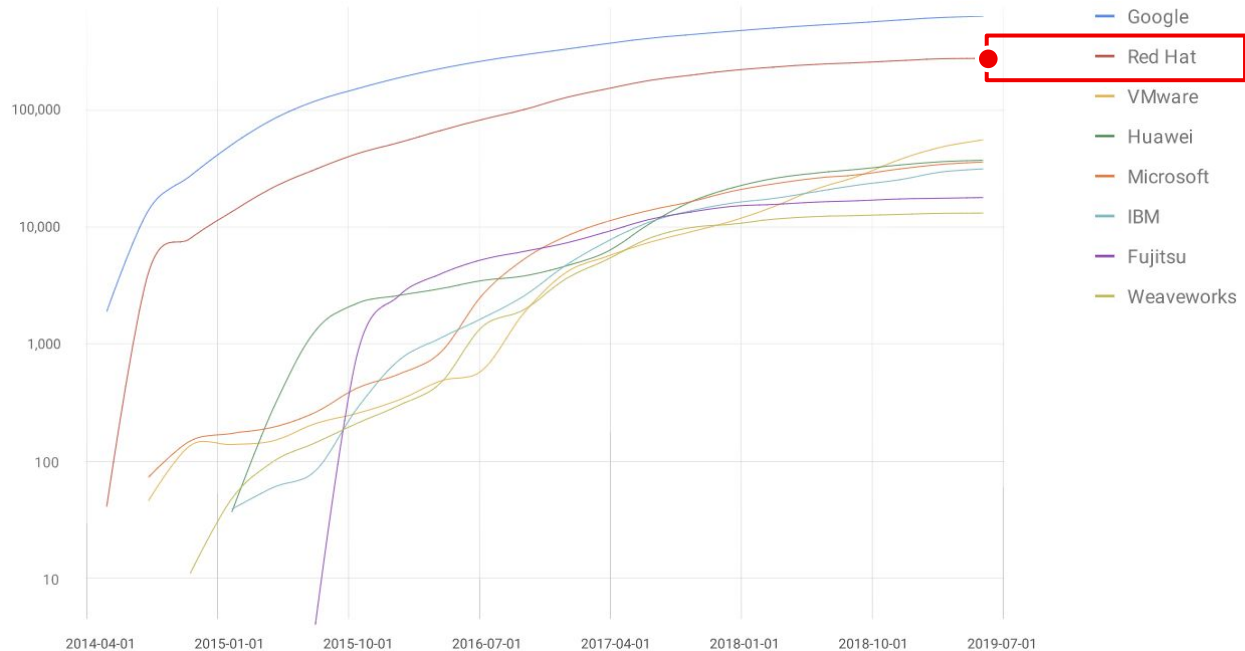
 [linkedin.com/company/red-hat](https://www.linkedin.com/company/red-hat)

 [facebook.com/redhatinc](https://www.facebook.com/redhatinc)

 [youtube.com/user/RedHatVideos](https://www.youtube.com/user/RedHatVideos)

 twitter.com/RedHat

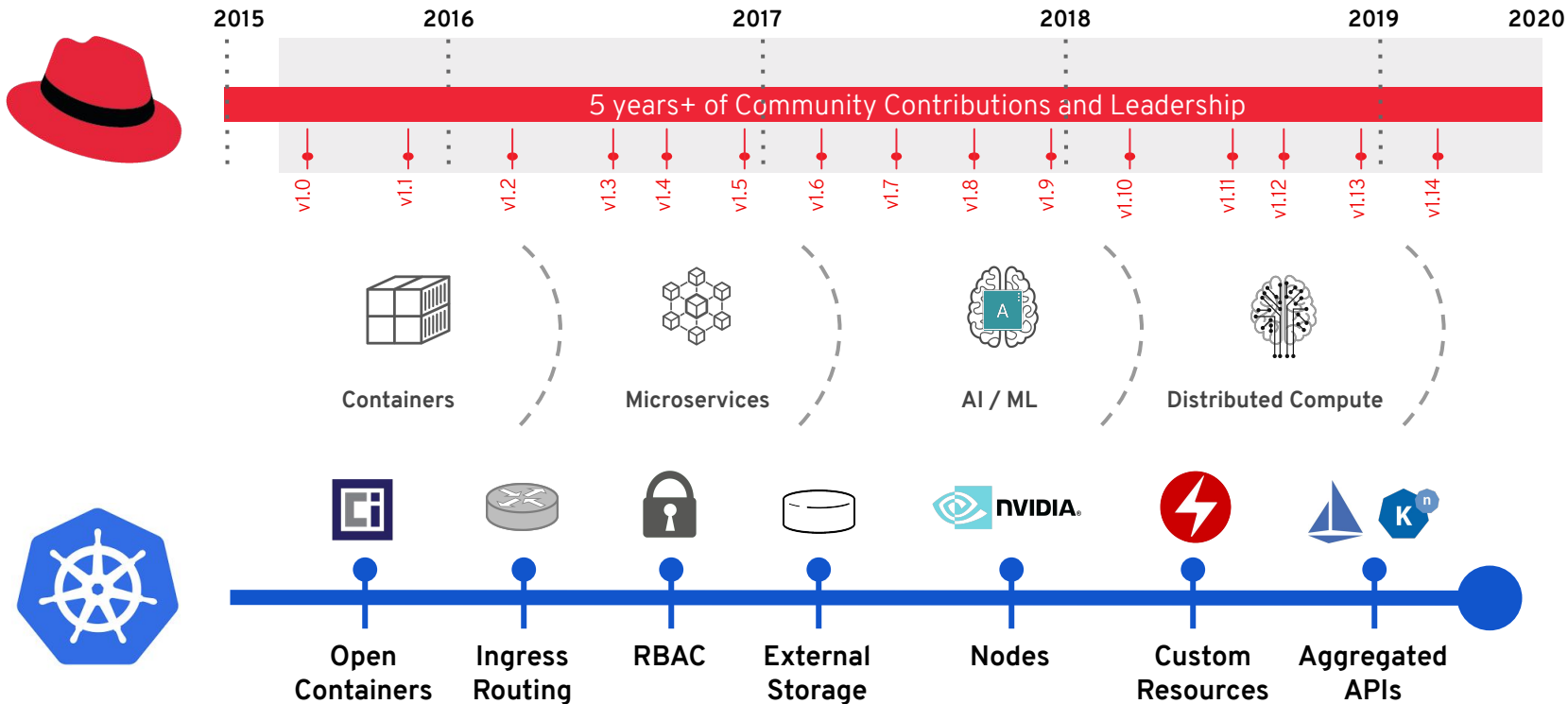
Kubernetes Community Leadership Is Critical...



Source: Cloud Native Computing Foundation. "[CNCF Kubernetes Project Journey Report](#)," 2019.

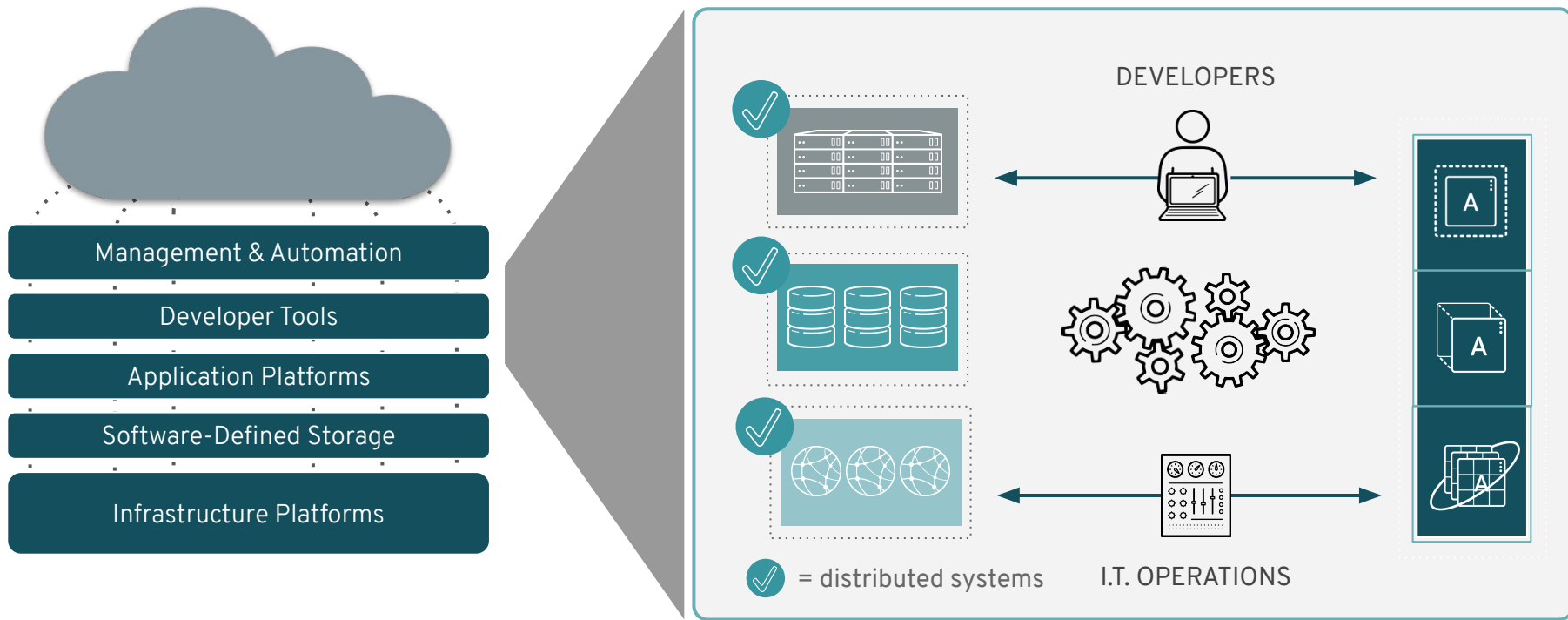
...To Develop Expertise To Continually Meet Customer Demands

KUBERNETES RELEASES

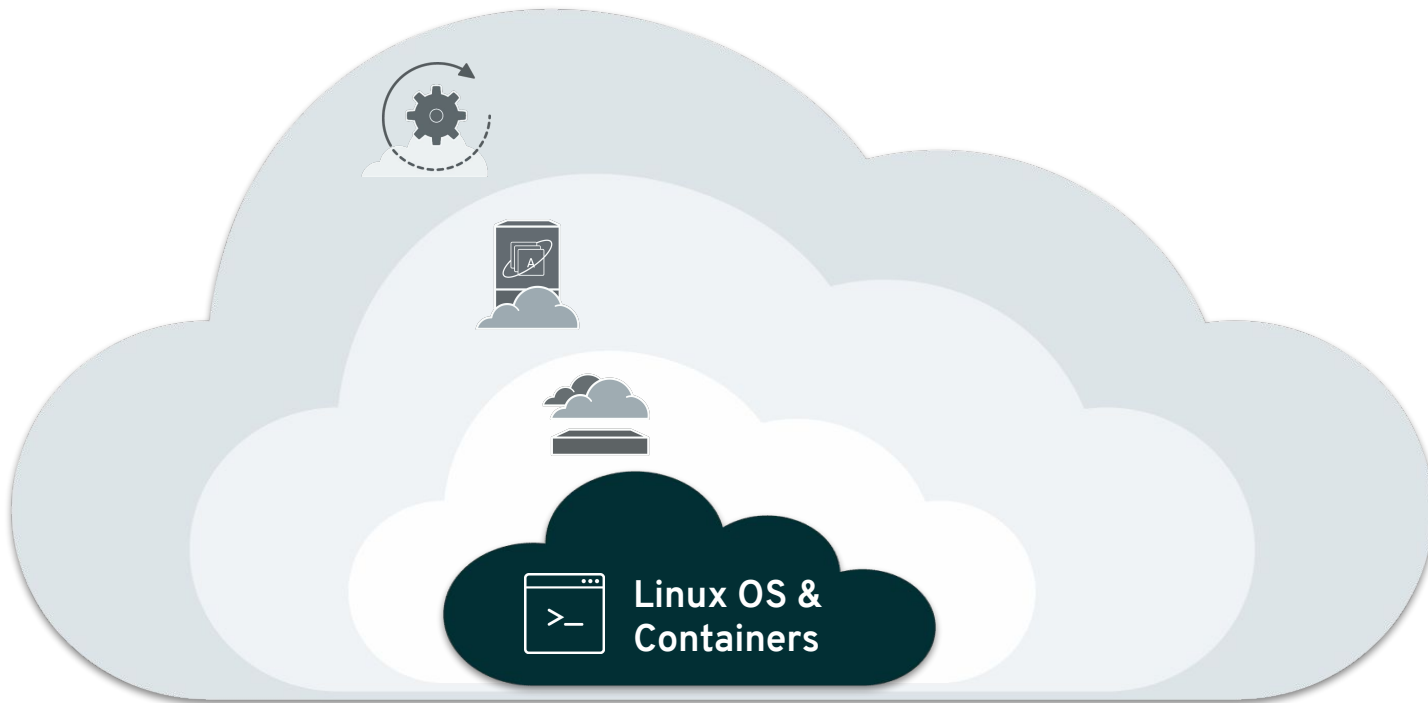


Distributed Systems Are Complex, Requiring Automation to Scale

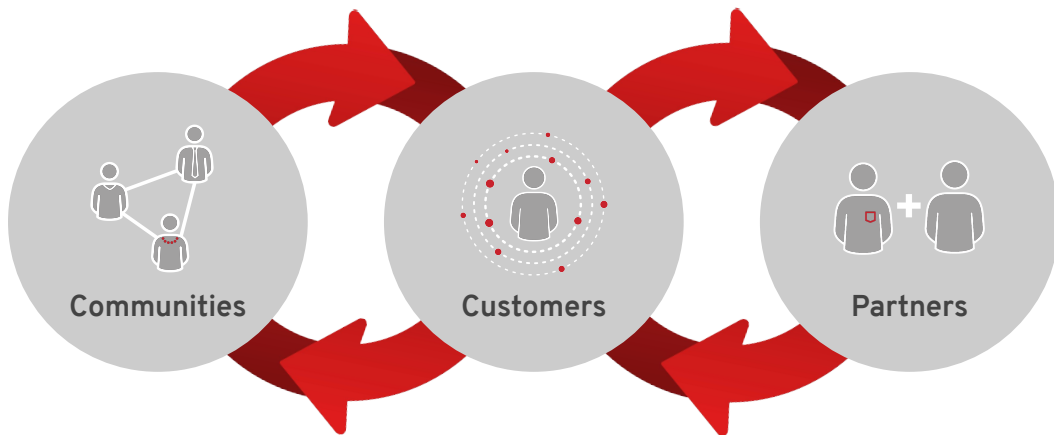
Maximize Business Value While Managing For Scale



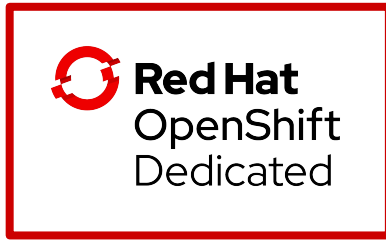
Linux is at the Core of The Hybrid Cloud



We Act As A Catalyst For Communities, Customers, And Partners



The Importance of Expertise in Hybrid Multi-Cloud



SELF-MANAGED

HOSTED SERVICES

Open Hybrid Cloud: Platform Requirements

LIFECYCLE



From 10 changes per hour
to
10-year lifecycle

**OPEN
HYBRID
CLOUD**

SECURE BY DEFAULT



Trusted
Content



Trusted
Updates

OPEN SOURCE

UPSTREAM

OPEN
HYBRID
CLOUD

OPEN
ECOSYSTEM

CO-CREATION

↪ CentOS Streams

**BARE
METAL**

**VIRTUALIZED
DATA CENTER**

OPEN
HYBRID
CLOUD

**PRIVATE
CLOUD**

EDGE

**PUBLIC
CLOUD**

(Multi)

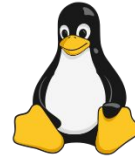
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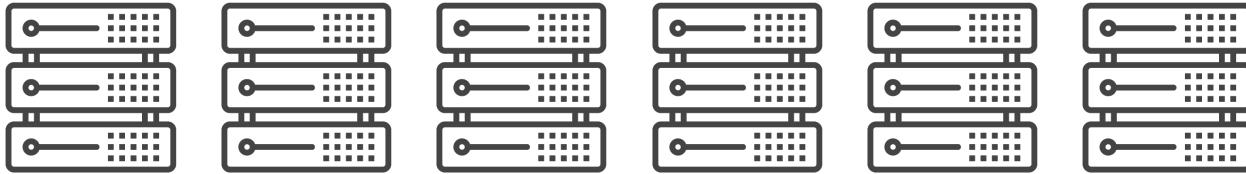
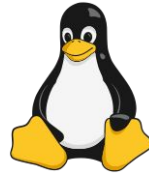
PUBLIC
CLOUD

(Multi)

CLOUD NATIVE

SCALE OUT

RUN ANYWHERE



BARE METAL

ECOSYSTEM?

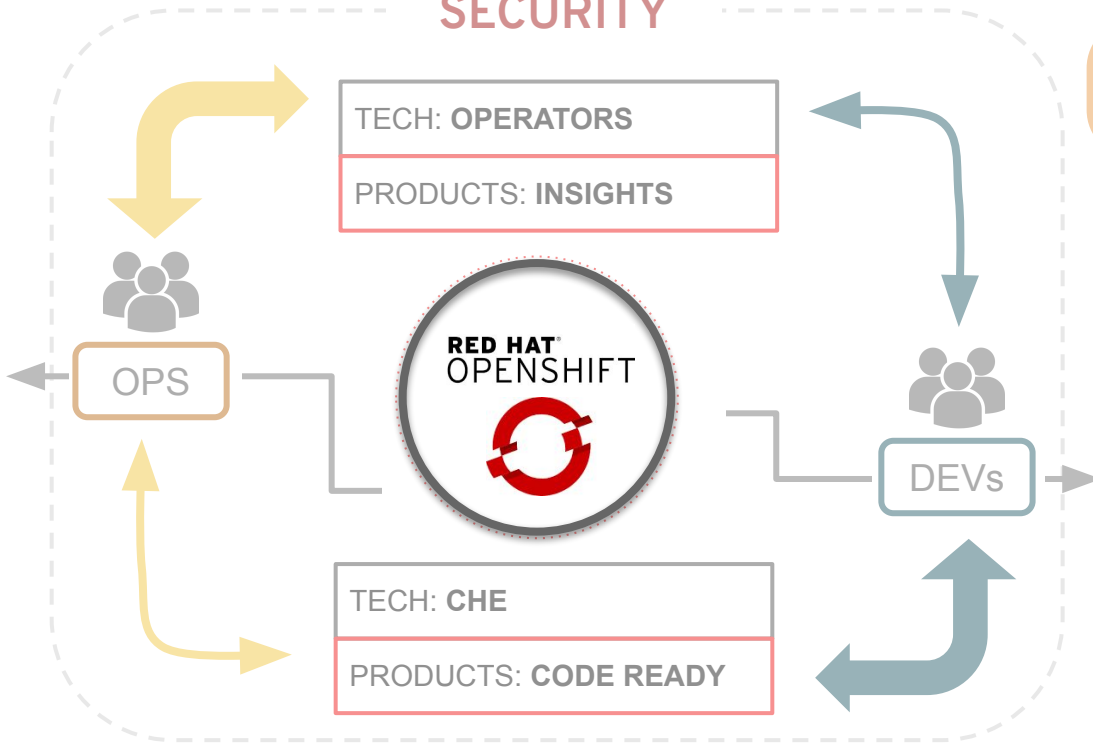
SECURITY

CONNECTED?

VIRTUALIZED DATA CENTER

- Support
- Patching / Automation
- Observability

SRE



MICRO SERVICES

- Service Mesh
- Serverless
- AI / ML

PRIVATE CLOUD

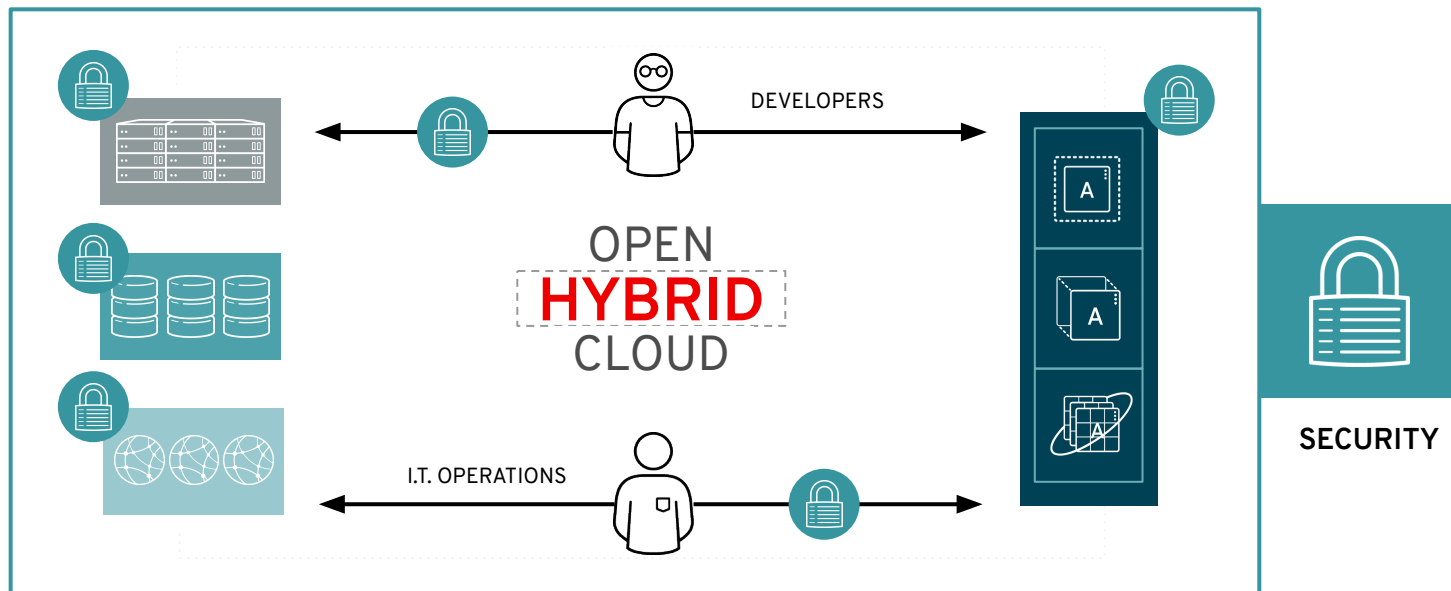
PUBLIC CLOUD

(Multi)

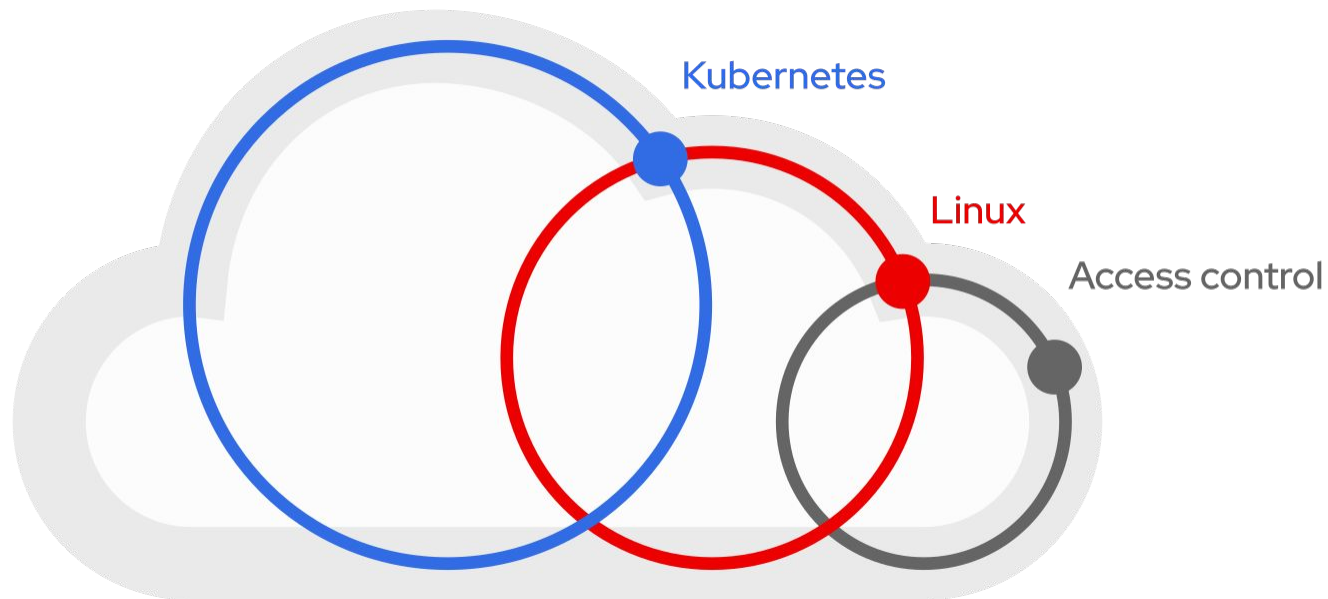
LEVERAGE RED HAT KNOWLEDGE OF OPEN SOURCE

EDGE

Security Requires A System View



What Is The System We Are Securing?



UPSTREAM DYNAMICS

LINUX KERNEL (NOT INCLUDING USERSPACE)

PROJECT INFLUENCE

21.6M

Lines of code

4,000

Committers

CONSUMPTION CONSIDERATIONS

230

Changes a day

6,340

Number of bugs

Over 2 years, 33% of the code has changed.

UPSTREAM DYNAMICS

OPENSTACK

PROJECT INFLUENCE

13.4M

Lines of code

2,600

Committers

CONSUMPTION CONSIDERATIONS

467

Changes per day

3,400+

Number current
issues / bugs

Over 3 years and 6 major releases, 97% of the code has changed.

MAKING OPEN SOURCE PRODUCTION GRADE

257

BUGS FIXED between
Kube 1.9 and
OpenShift 3.9

194

BUGS FIXED between
OpenShift 3.9
and 3.9.33

- The Hybrid Cloud is a Reality
- Linux is at the core of cloud
- World is changing (megatrends)
- Open source communit(ies) driving innovation in a perpetual pursuit of excellence
 - Sine Wave w/ numbers
 - Perpetual
 - Implicit is refinement on a bunch of ideas coming from upstream
- [Technical Discussion] Open Source Innovation as applied to Open Hybrid Cloud:
 - Kube, dev experience on Kube improving (Isto and KNative), ops improving by using common platform (Kube), insights into code (Operators), generating data and doing analysis to feed back recommendations, and then automating recommendations (closed-loop remediation system)
- Product v Project
 - Technology Rate of Change: not just justification for RHT, but shows how quickly things are evolving and that some discipline is needed in consumption
 - Note: "hear more about from Deb"
- OCTO (in between upstream and polished, supported product)

1. The Hybrid Cloud is Reality.

- a. Factors driving behind why

2. Open Source drives the Cloud

3. Innovation Question:

4. Open source is driving innovation, specifically hybrid cloud innovation -- consume software
5. Improve developer / operational experience (which is largely what we do)
6. Specific projects + details on those projects

We make big bets at RHT and dont bet on too many things; bet based on applicability of technology

Single, vertically integrated cloud, or an open hybrid cloud

Why? Industry moving along these trends (mega trends)

Then what open source is doing in response of that (perpetual pursuit of excellence)

Take that, and apply it to open hybrid cloud (open / hybrid / cloud)

World is changing (how) - megatrends

Open source communit(ies) driving innovation in perpetual pursuit of excellence (implicit is refinement on a bunch of ideas)

-- break into two slides; put the sine wave first (OSS innovation engine); what doing? Perpetual pursuit slide

When you take that concept and apply that to the OHC now we're talking about Kube, dev experience on Kube improving Isto and KNative, ops improving by common platform (Kube), insights into code (Operators), generating data and doing analysis to feed back recomendations, and then automating recommendations (closed-loop remediation system)

Product v project(hear more about from Deb -- not just justification for RHT, but shows how quickly things are evolving and that some discipline is needed in consumption)

- Rate of Change: needs refreshing (if we are to use it)

This is not just OCTO

OCTO



OUTLINE

- **The Vision**

- Red Hat Intro
 - Sine Wave: Red Hat creates stable enterprise platforms from numerous upstream communities
 - Challenge: enabling developers to create more business value with less wasted time / effort
- Red Hat's Vision is the expansion of a "Self-driving" (fully automatable) distributed Open Hybrid Cloud to the edge
 - Linux as core to cloud
 - Open / Hybrid / Cloud
 - Open Hybrid Cloud = RHEL & OpenShift
- This requires:
 - A similar ease of use to that found in the operating experience of a public cloud
 - Superior enablement (automation through data)
 - Unrivaled choice (strong ecosystem of partners)
- What's driving this?
 - [megatrends slides]
 - Conclusion: The Hybrid Cloud is becoming increasingly distributed; an open solution is critical
- The Office of the CTO works with Red Hat customers **and partners** to refine and deliver Open Source emerging technology insights
 - Pipeline of innovation
 - [Introduce OCTO as a refiner of insights, utilizing customer perspectives to clarify business needs]
- OCTO covers many technologies; based on customer feedback, we'll be presenting on these today:
 - [Introduce sectors / speakers]