RED HAT FORUM
Europe, Middle East & Africa

Red Hat's vision on Telco/NFV/IOT

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RHCE, RHCI, RHCVA, RHCSA, 4 RHCP

Senior Solution Architect

Cloud

Management

Infra

The FitBit raffle example

So – What is NFV?

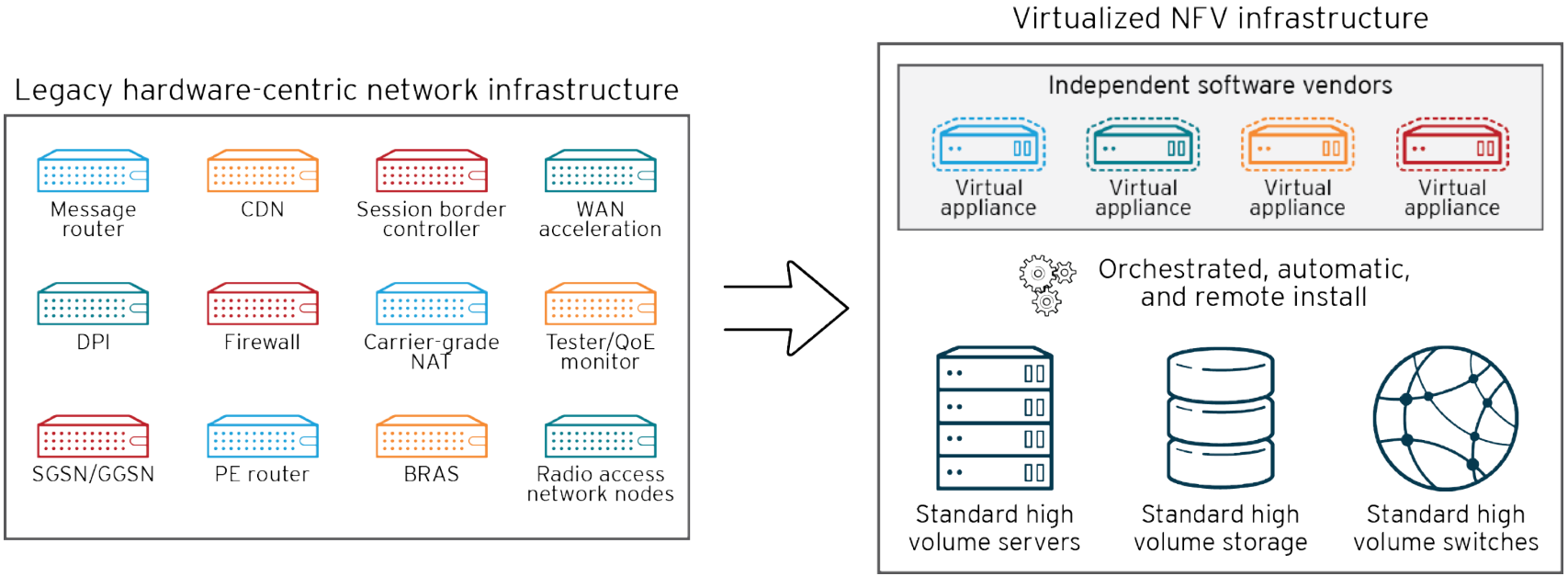
What is NFV

Network functions virtualization (NFV) is revolutionizing the way communications companies deliver services.

Open technologies provide the **accelerated innovation** and **new ideas** needed to advance NFV.

Red Hat, the open source leader, delivers an ideal platform for NFV with the **entire core software stack**, professional **services**, and large partner **ecosystem of industry leaders**.

What is NFV?


Legacy hardware-centric network infrastructure
Message router
CDN
Session border controller
WAN acceleration
DPI
Firewall
Carrier-grade NAT
Tester/QoE monitor
SGSN/GGSN
PE router
BRAS
Radio access network nodes
Virtualized NFV infrastructure
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Virtual appliance
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Orchestrated, automatic, and remote install
Standard high volume servers
Standard high volume storage
Standard high volume switches

The communications services market outlook

By 2019…

Mobile data traffic will increase by **10x**

There will be **9.2 billion** mobile subscriptions

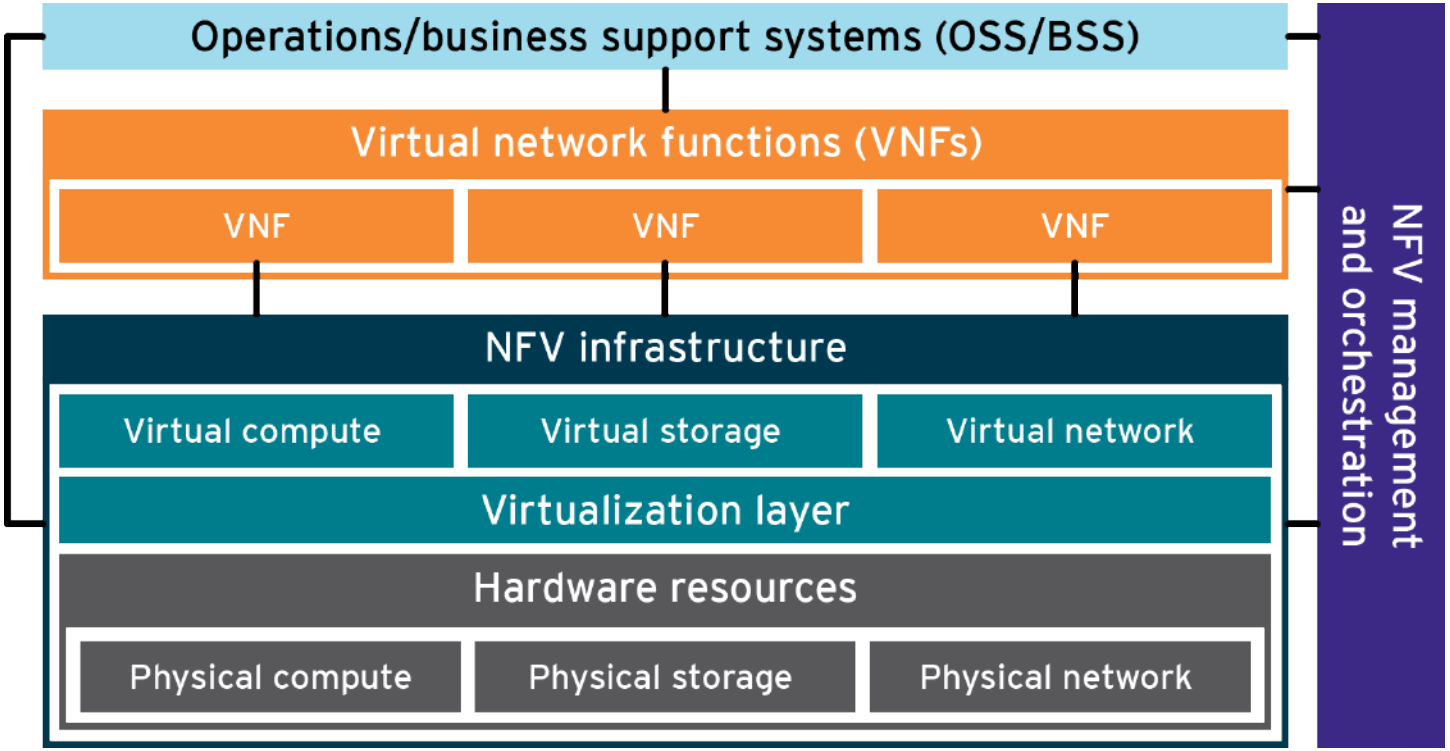
>80% of subscriptions will be for mobile broadband

The **cost** to support data traffic is **increasing**, but the **revenue** from data services is **growing much slower**.

Legacy infrastructure can’t keep up

- Rigid and inflexible
- High costs
- Limited scalability
- Difficult to innovate

Core components of NFV architectures



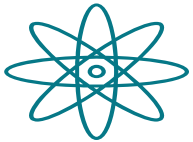
Why use open source technologies for NFV?

83%

of telco operators **demand** or prefer **open systems** for their networks

95%

of telco operators see **open source** as a **positive** attribute for NFV solutions



Fast **innovation**

Modern new ideas

Choice of vendors

Red Hat advances innovation through open source communities

Open platform for network programmability for SDN and NFV

Open source software for cloud computing

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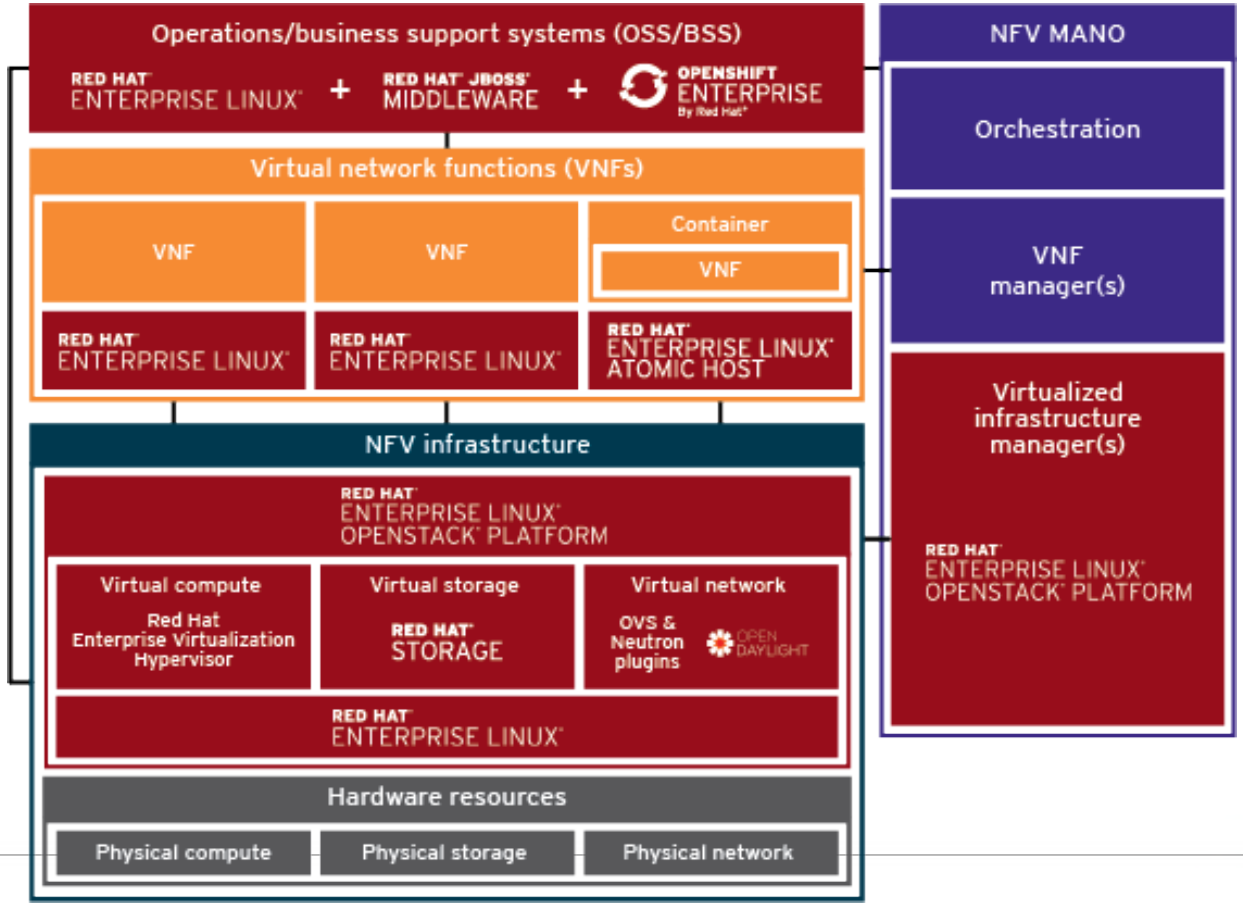
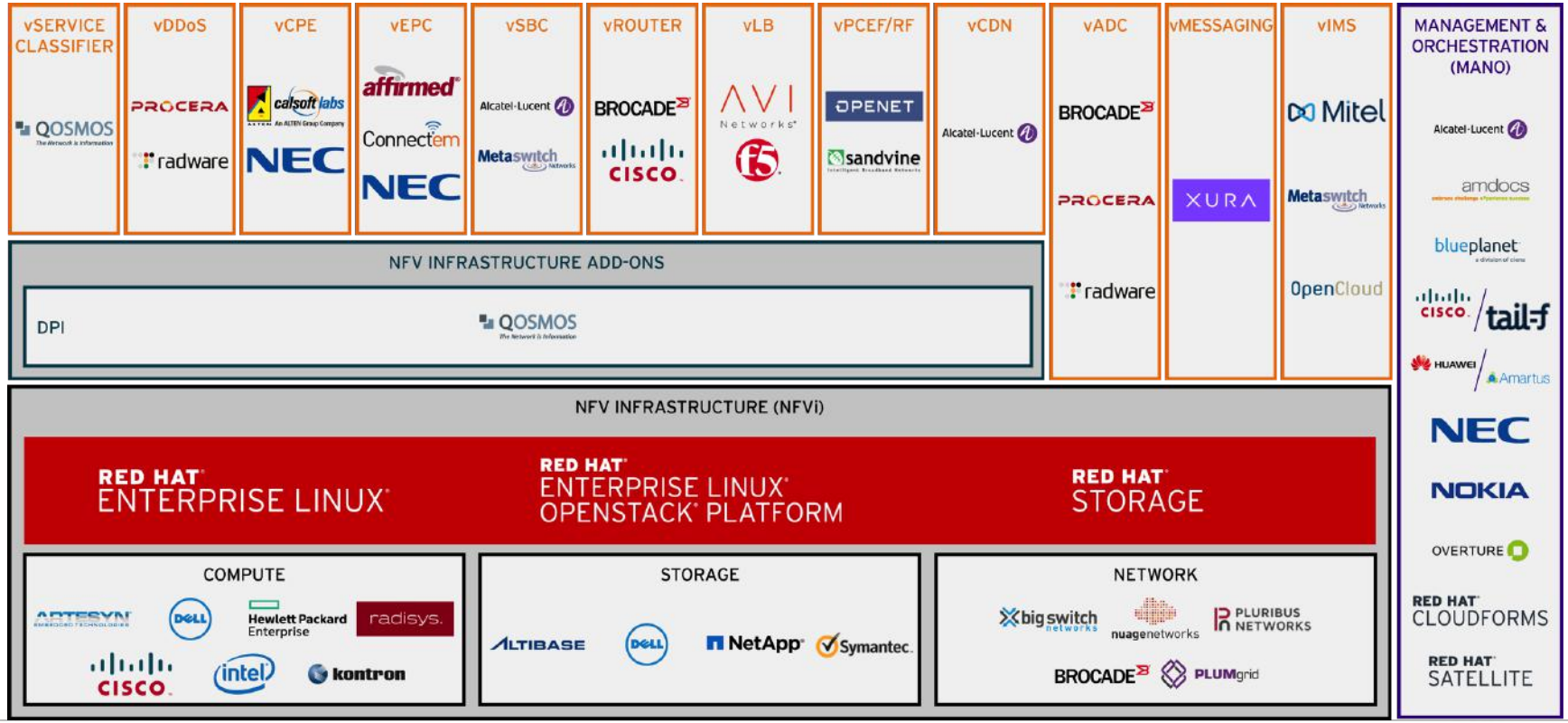


RED HAT'S NFV PARTNERS ECOSYSTEM

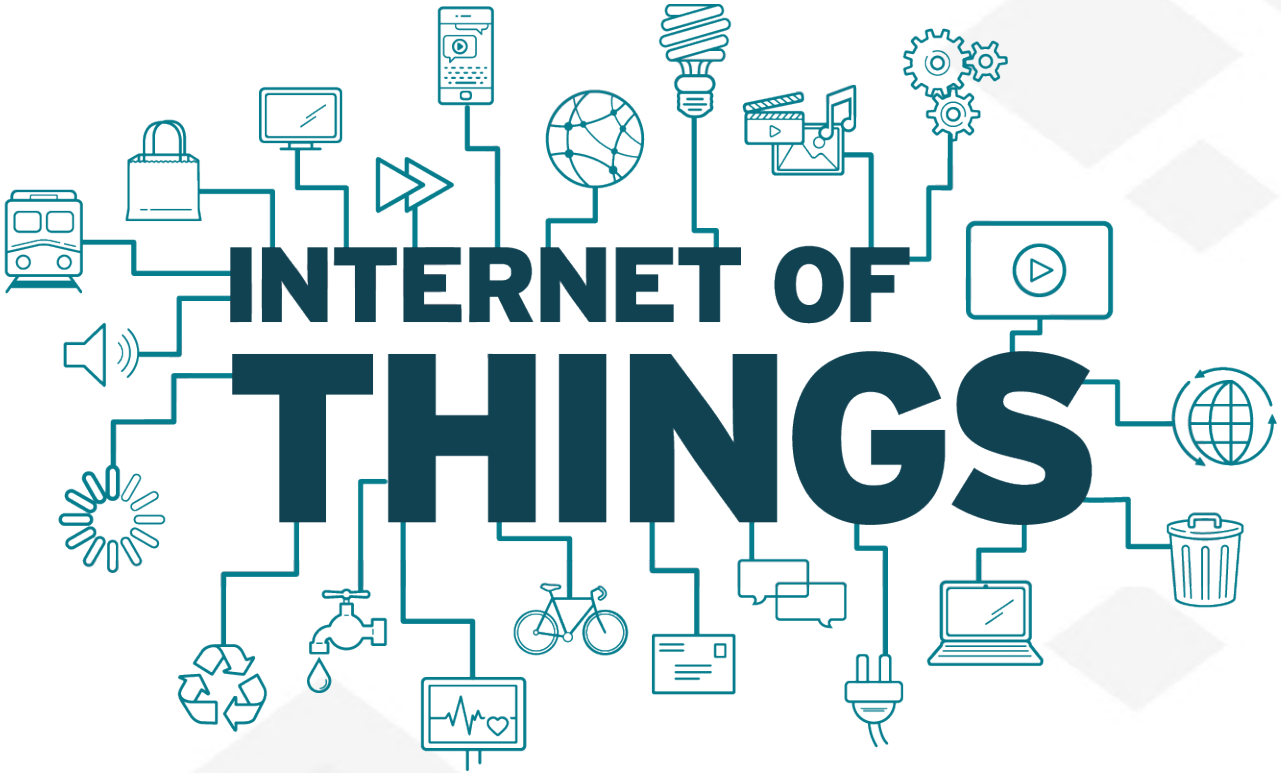


Red Hat delivers the only fully integrated, open software stack for NFV

Stable

Secure

Supported


INTERNET OF
THINGS

THE INTERNET OF THINGS LANDSCAPE

Connectivity and “smarter” devices driving change

EXPLOSIVE GROWTH IN CONNECTED DEVICES

UBIQUITOUS INTERNET CONNECTIVITY

AFFORDABLE BANDWIDTH

COMMODITIZED STANDARDIZED HARDWARE

- Microcontrollers
- Electronic sensors

ADVANCES IN CLOUD COMPUTING

- Decreased cost of storing and processing data

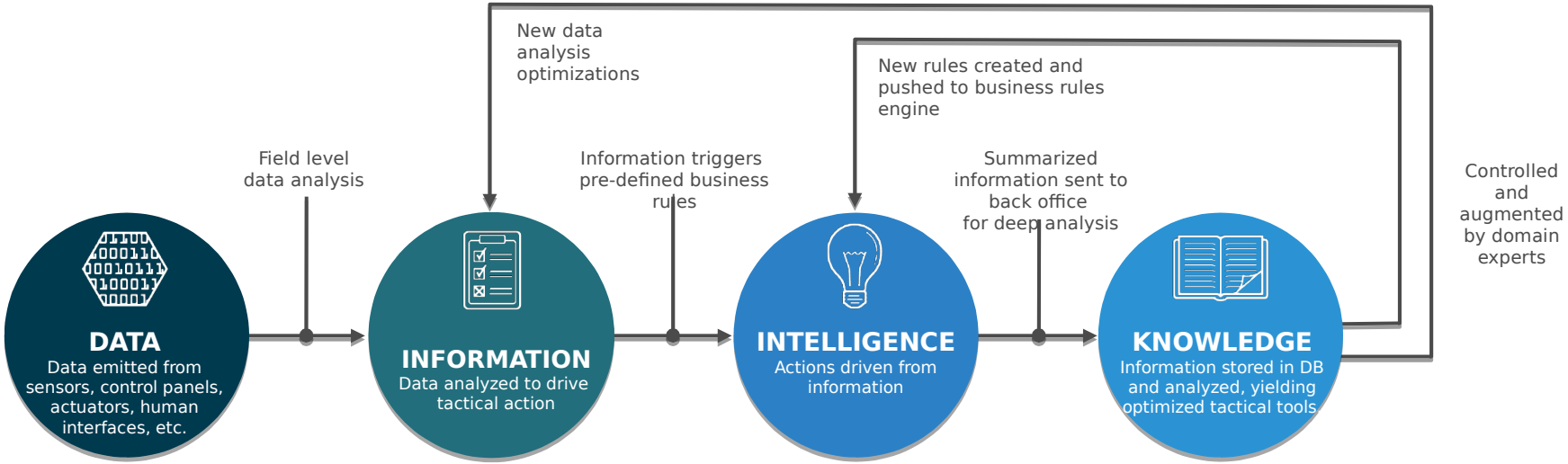
STANDARDS BASED AND OPEN SOURCE SOFTWARE

THE DATA-DRIVEN IoT

DEVICES **DATA** **BUSINESS MODELS**

Devices are the eyes and ears of the intelligent system, not its brain.

INTERNET OF THINGS INFORMATION LIFECYCLE



TOP 10 ENTERPRISE CONCERNS

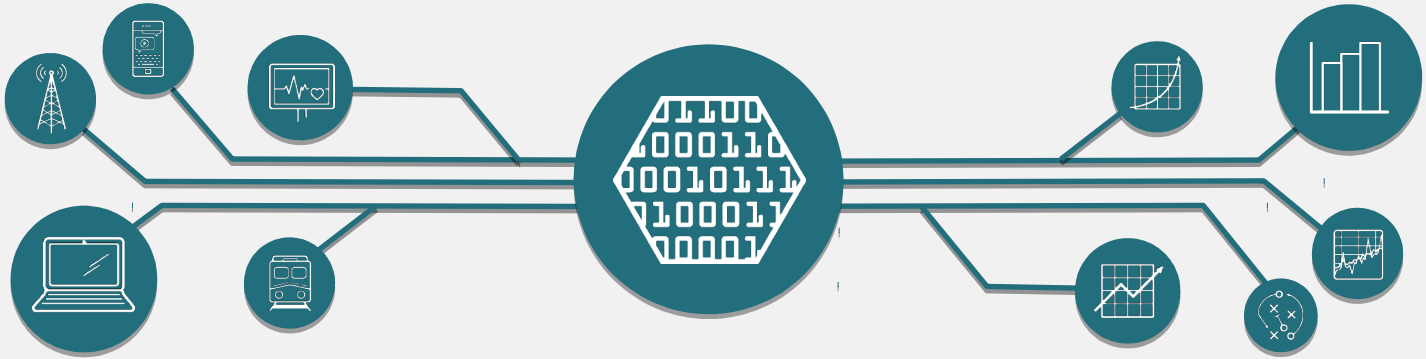
Driving design considerations for intelligent systems and the IoT

1. Securing the connected ecosystem
2. Ability of disparate systems to communicate reliably and take uniform action, regardless of protocol
3. Managing patches and updates
4. Moving as much intelligence as close to the edge as possible
5. Data integrity before, during, and after transmission
6. Managing large amounts of data
7. Storing and analyzing unstructured data
8. Using commoditized hardware to gain competitive advantage
9. Meeting regulatory requirements
10. Business impact

RED HAT - A FOUNDATION FOR IoT

Red Hat provides an extensible and consistent foundation

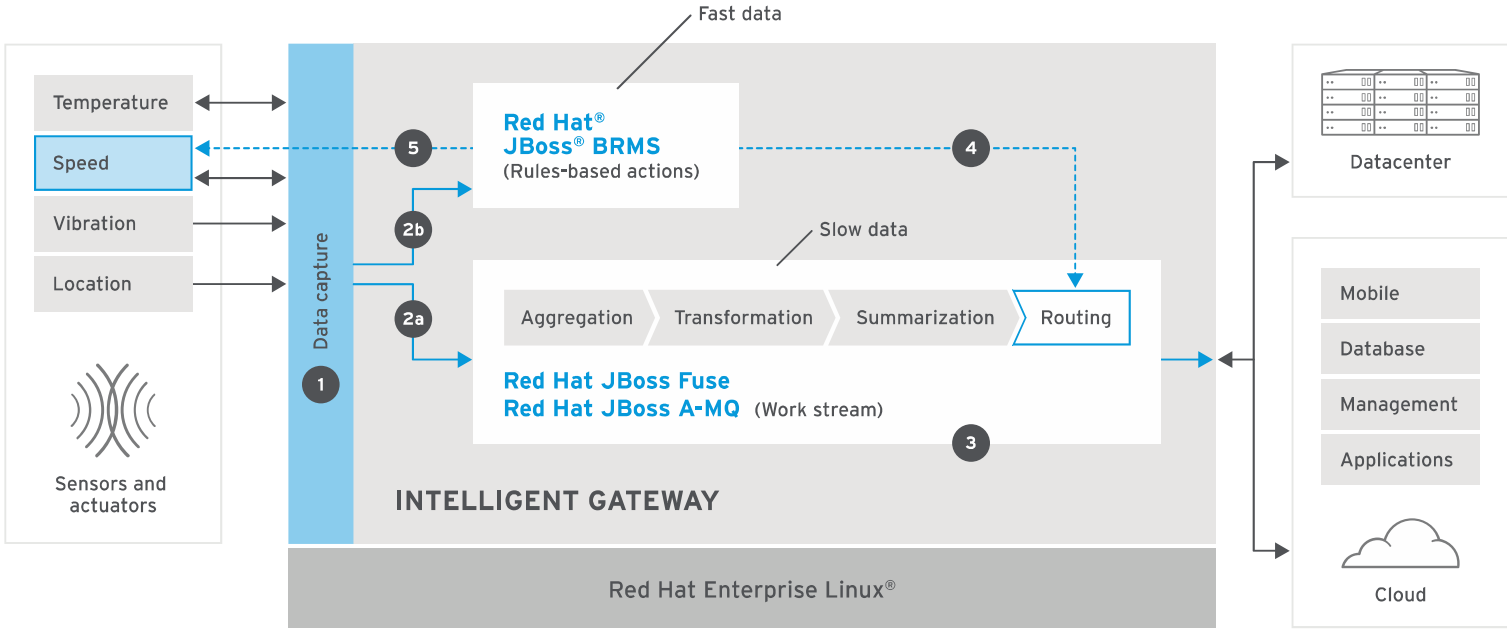
- secure, easily managed, mature, flexible, scalable
- enables connectivity, interoperability, services
- supports open standards



From edge devices to gateways, the datacenter, and the cloud across the life cycle from development to production

INTELLIGENT GATEWAY ARCHITECTURE

Transforming device data into actionable information

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Cloud (IOT, Teloc, Containers, OSP etc)

Management (CF, SAT, Ansible, Insight)

Infra (RHEL* + CEPH and Gluster)

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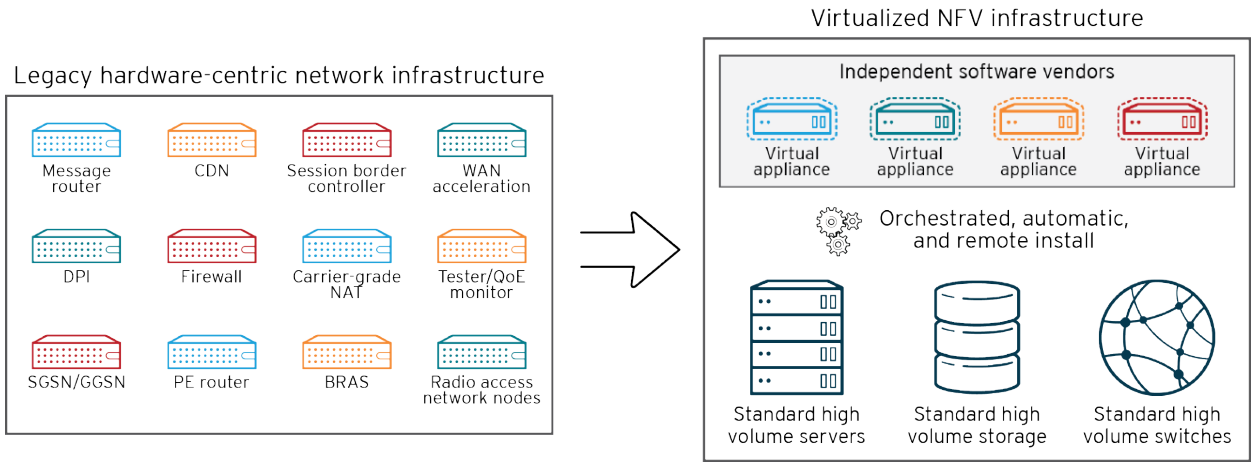
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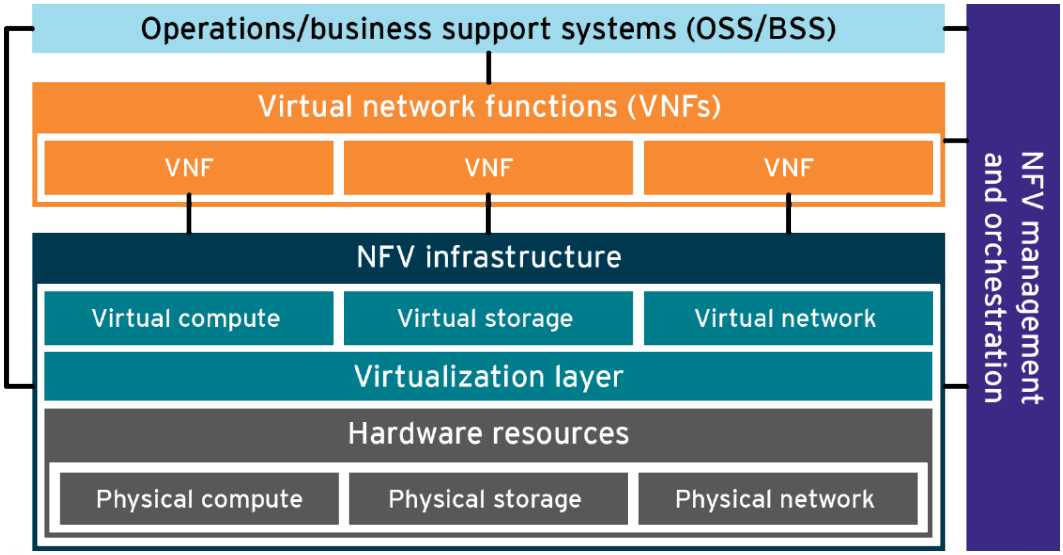

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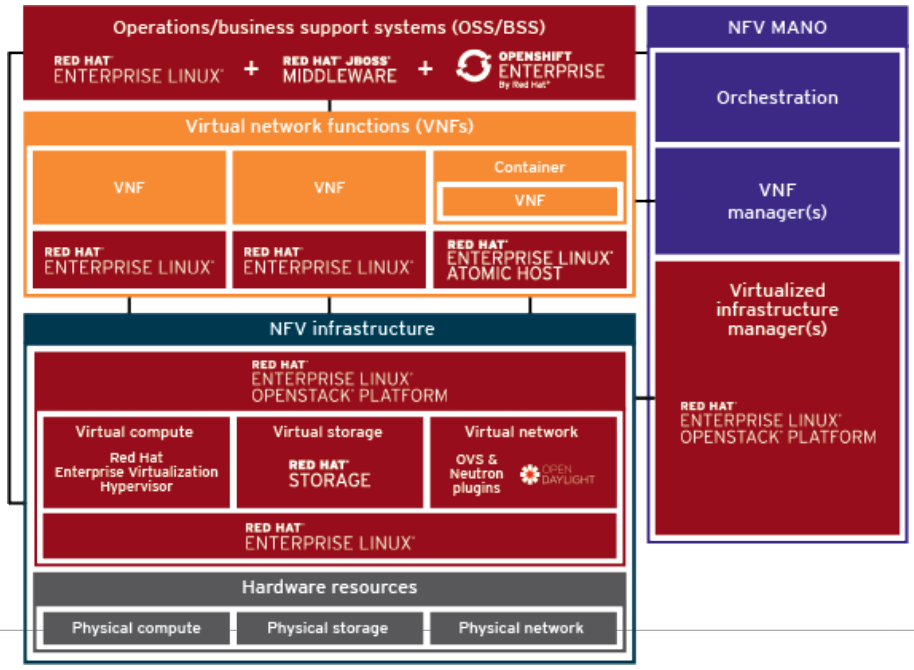

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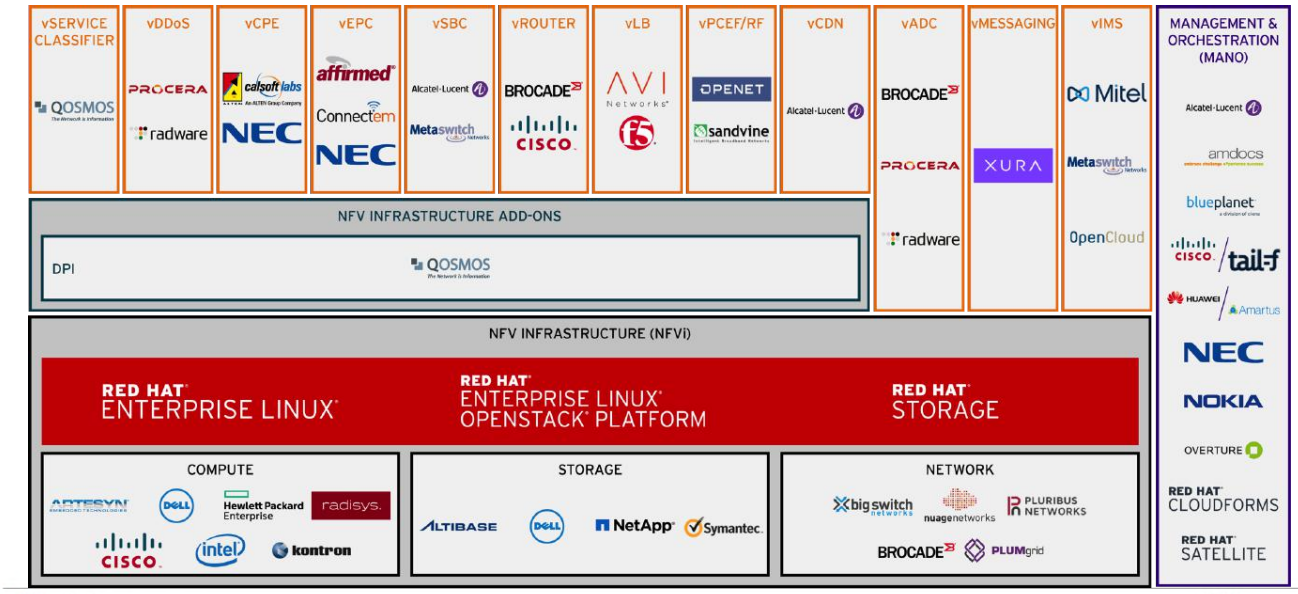

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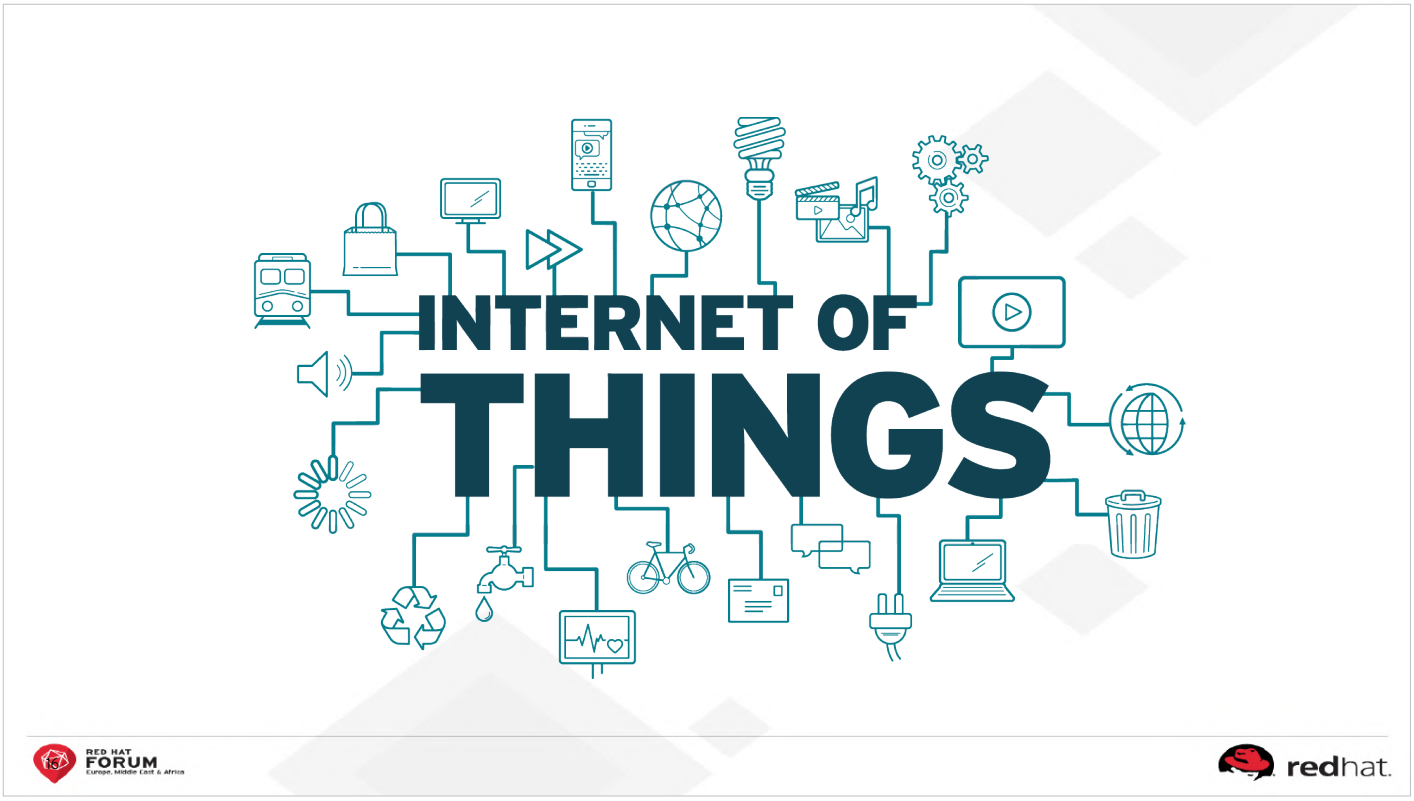
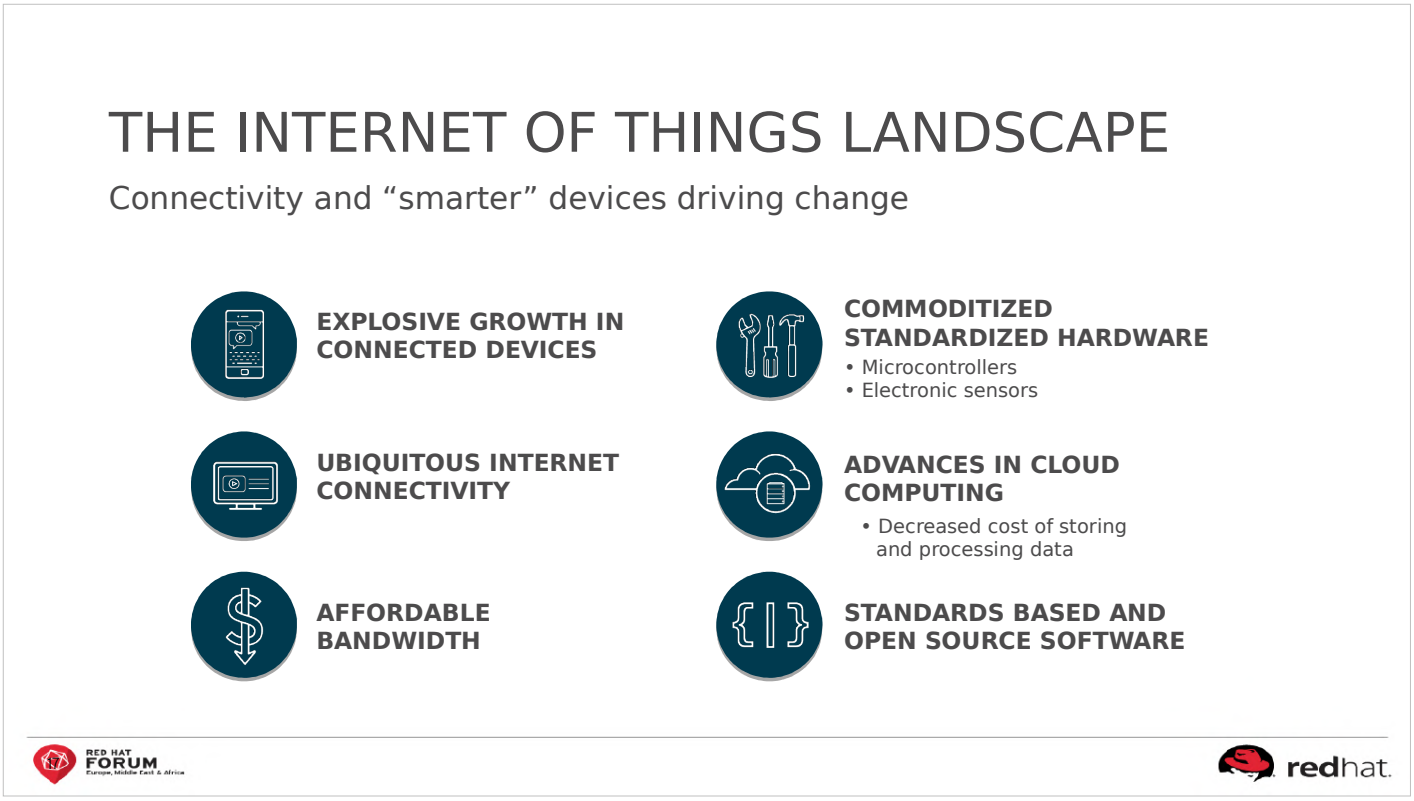


The Internet of Things (IoT) is changing the way businesses use technology. The Internet has become a medium to connect people, share information, find solutions, and report problems. With the advancement and availability of smart devices and smart machines, the Internet of Things will evolve to billions of interconnected devices and machines measuring, collecting, analyzing, monitoring, and sharing useful information.

The term itself, Internet of Things, was coined in 1999 by Procter & Gamble's Kevin Ashton, who later co-founded the Auto-ID Center at MIT.

The concept, however, is much older. The Internet of Things is not new. The idea of a huge network consisting of billions of connected devices was made

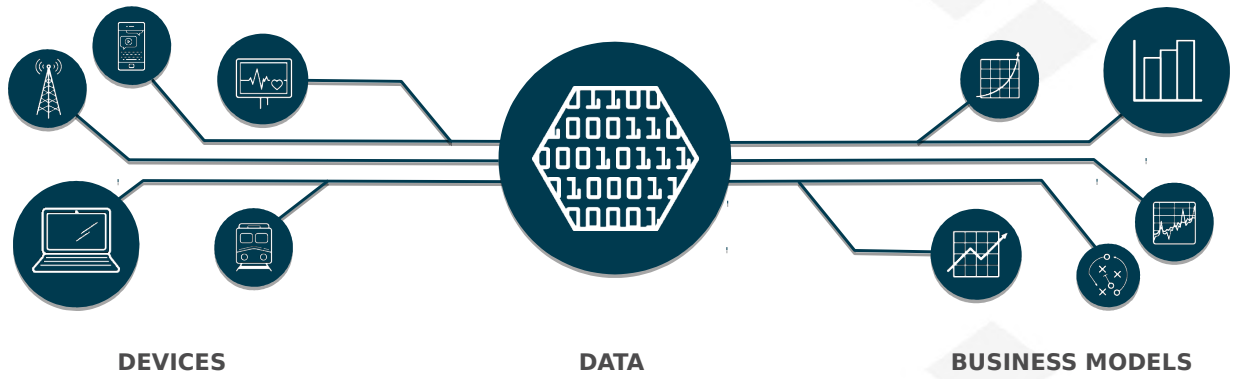


There are several major factors that are driving the **economics** of the IoT architecture.

The **hardware**. Up until just a few years ago hardware deployed outside of four temperature-controlled walls was specialized and expensive. Any small form factor hardware was also incredibly limited in its capabilities and performance. This led to unique, specialized requirements all the way up the stack. This fact has fundamentally changed. Commodity single board computers and systems on chip have changed the equation of what can be accomplished in small form factor devices, and the price point of those devices. This **concept of hardware commoditization and standardization** is a constant driving force.

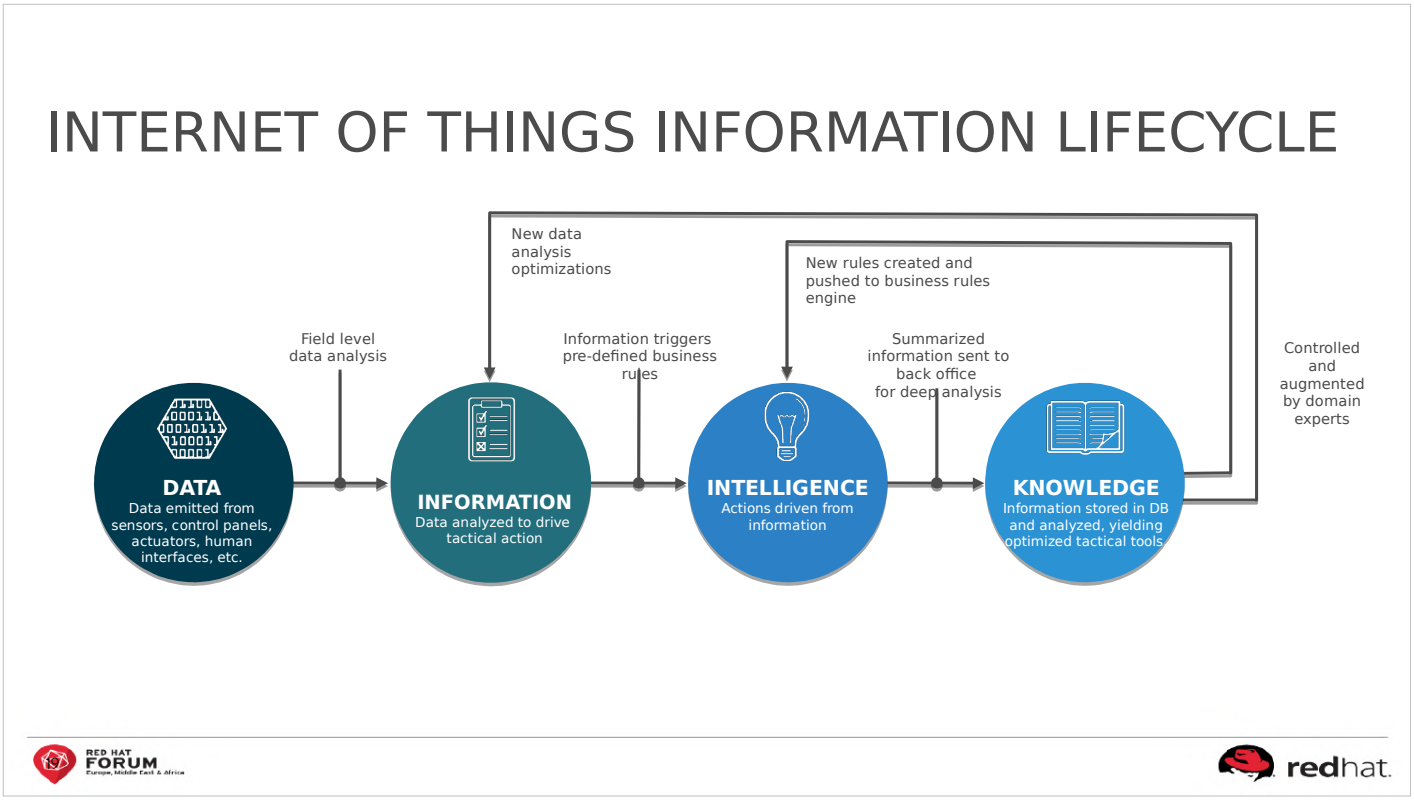
Another factor is the **ubiquitous nature of**

THE DATA-DRIVEN IoT



Devices are the eyes and ears of the intelligent system, not its brain.

While connecting the physical world to the digital world is an important first step in the realization of the IoT, the real value of connecting devices is in the data that they generate. Being able to effectively use the volumes of data being generated is what will change businesses, improve customer experiences, and create new opportunities. Intelligence derived from this data is already driving new applications and business models, transforming and redefining markets and industries in fundamental ways.

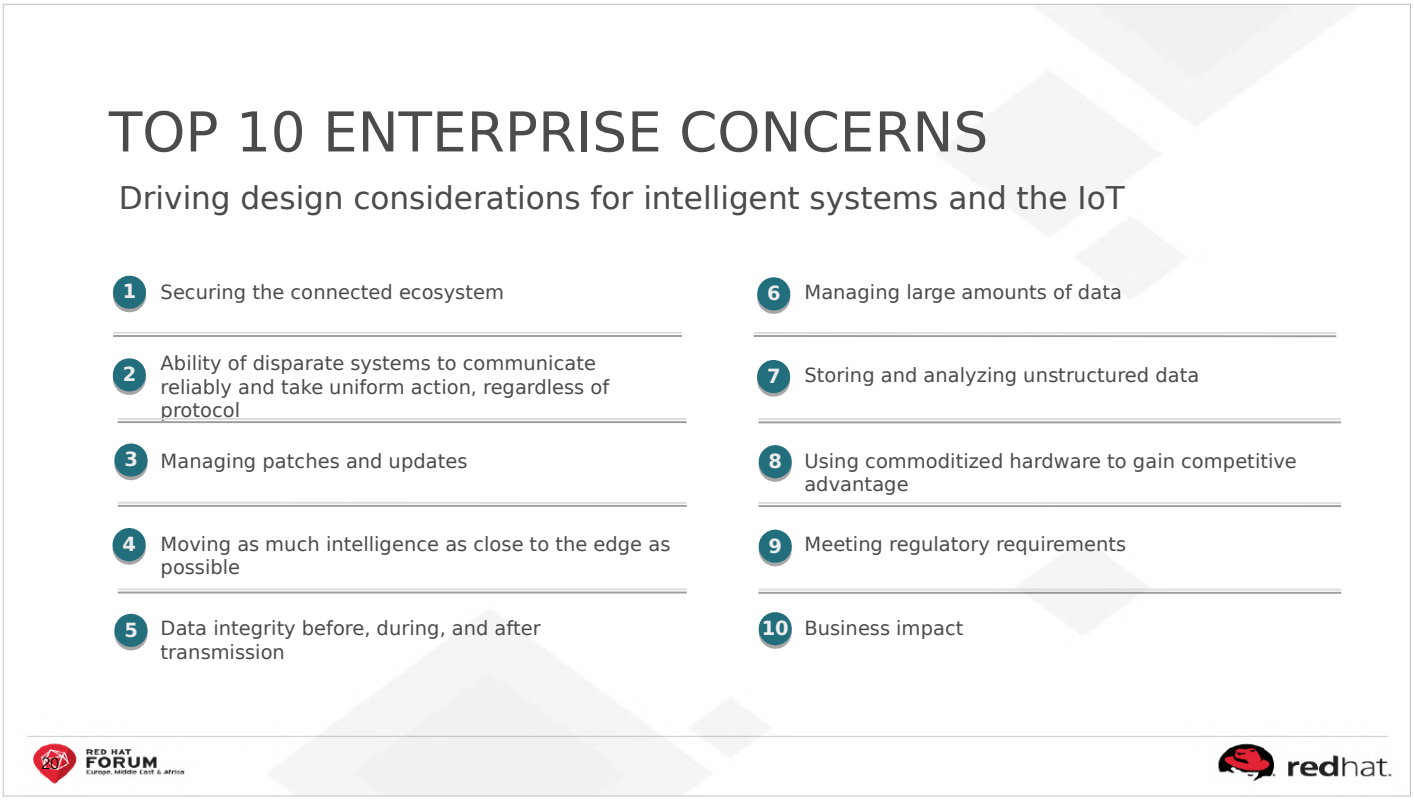


The true benefits of IoT really come from managing the information lifecycle.

In the IoT, the ability for newer, smarter devices to communicate with each other, with back-end datacenters, and with related systems requires data to be processed into information in different ways and in more than one location and direction.

Typically, we think of data being sent to and crunched in massive datacenters, producing analytics that can then be turned into intelligence for determining actions. But with the IoT, intelligent systems are redefining that process.

As the figure illustrates, tactical data processing can occur at the device level with data analyzed near field to allow immediate action to be taken. This field level data analysis



With input from our customers, we've identified a “top 10” list of considerations to address during an enterprise IoT project design, and throughout implementation.

Here's the countdown.

10 Business impact. Delve into the discussion on the business implications - and benefits (competitiveness, faster time to market, improved customer experience) - from implementing an IoT solution. We have found that determining and managing the business requirements is where every project should start, not end.

New IoT projects and pilot implementations should, from the outset, address well defined business goals and enterprise integration requirements. Defining KPIs for a project will help the business drive real value from their IoT

We offer a single, extensible, secure foundation that supports the end-to-end lifecycle of IoT solutions, from development to production. Building on our experience as the world’s largest open source company, we deliver trusted solutions which capture community innovation, eliminate vendor lock-in, and prevent cost escalation. Red Hat solutions provide the critical enterprise level security, reliability, and support required by the IoT so that you can focus on what matters most to your business: delivering business value and competitive differentiation.

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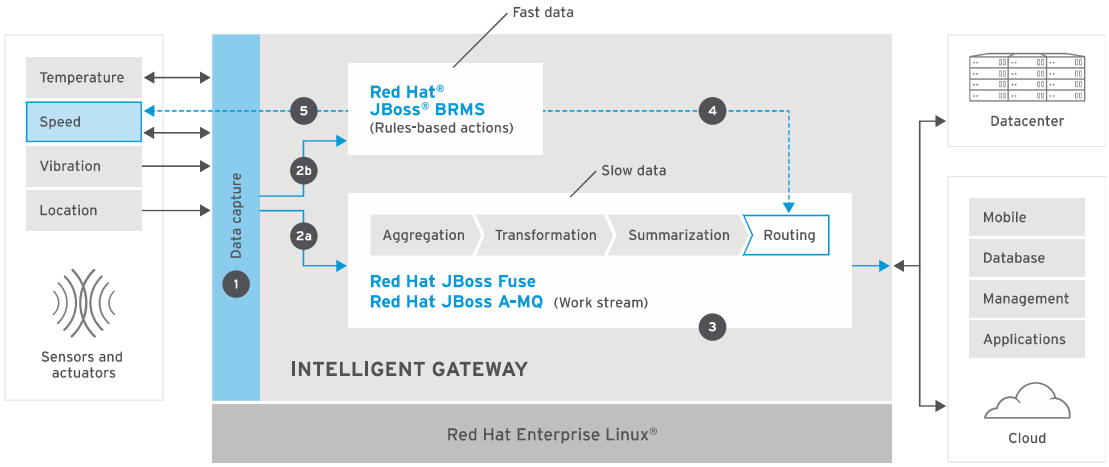

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This example shows how an intelligent gateway, powered by Red Hat technologies, transforms device data into actionable information. In this case, data is being captured (1) from sensors and actuators that are measuring vibration levels, speed, temperature, and location of each turbine in an engine room. Once the data has been captured, the gateway then sorts out urgent data (2b) from less urgent data (2a). Red Hat JBoss Fuse and A-MQ (3) work together to aggregate, transform, and summarize data. Routing (4) then occurs, with data sent to the appropriate place (mobile, database, management, applications, etc.) or routed to the BRMS rules-based platform (5). Having received the routing information, the rules platform acts immediately on pre-defined alerts, alarms, and actions. In this case, BRMS recognizes that a turbine is spinning too fast based on pre-defined rules that identify the conditions under which to change the speed of a turbine. A command is immediately


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