



# Internet of Everything

## The Value of Connections

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June 10, 2015



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# The Impact the Internet has on our Life

*“I cannot imagine a life without...”*

- A mobile phone: 97%
- The Internet: 84%
- A car: 64%
- My current partner: 43%

% of 14 – 29 year olds

Source: BITKOM – Bundesverband Informationswirtschaft, Telekommunikation und neue Medien







Do you want to manually

configure

all that stuff?



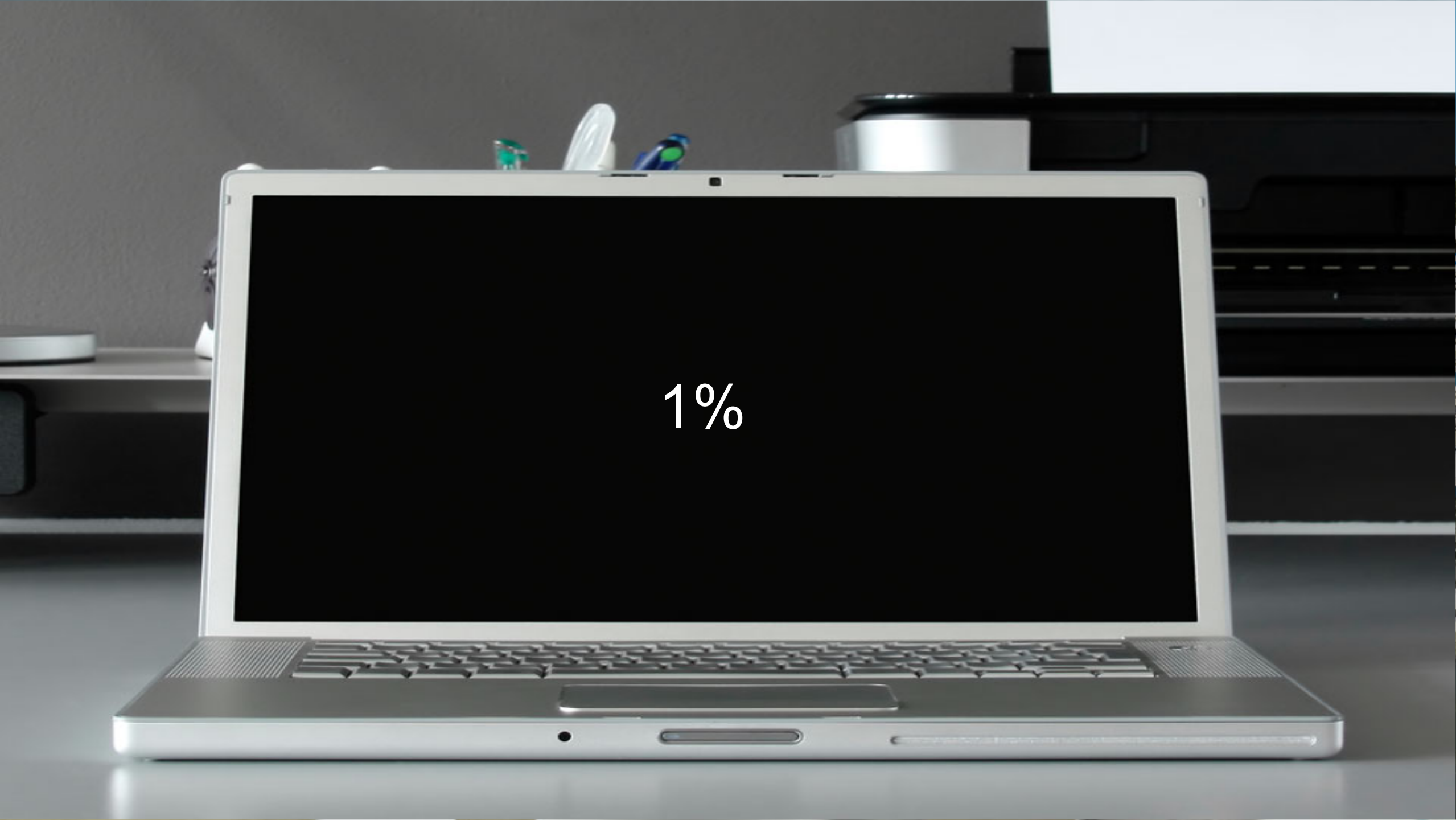
**Already taken!**

Mist?







A silver laptop is open on a desk. The screen is black with the text "1%" in white. In the background, there is a pen holder with pens and a silver coffee cup. The laptop is on a light-colored surface, and the background is a dark wall.

1%



The World is  
**CHANGING**



# And it's CHANGING FAST

Market  
Transitions

Enterprise architecture (EA) is a discipline for proactively and holistically leading enterprise responses to disruptive forces by identifying and analyzing the execution of change toward desired business vision and outcomes.  
- Gartner

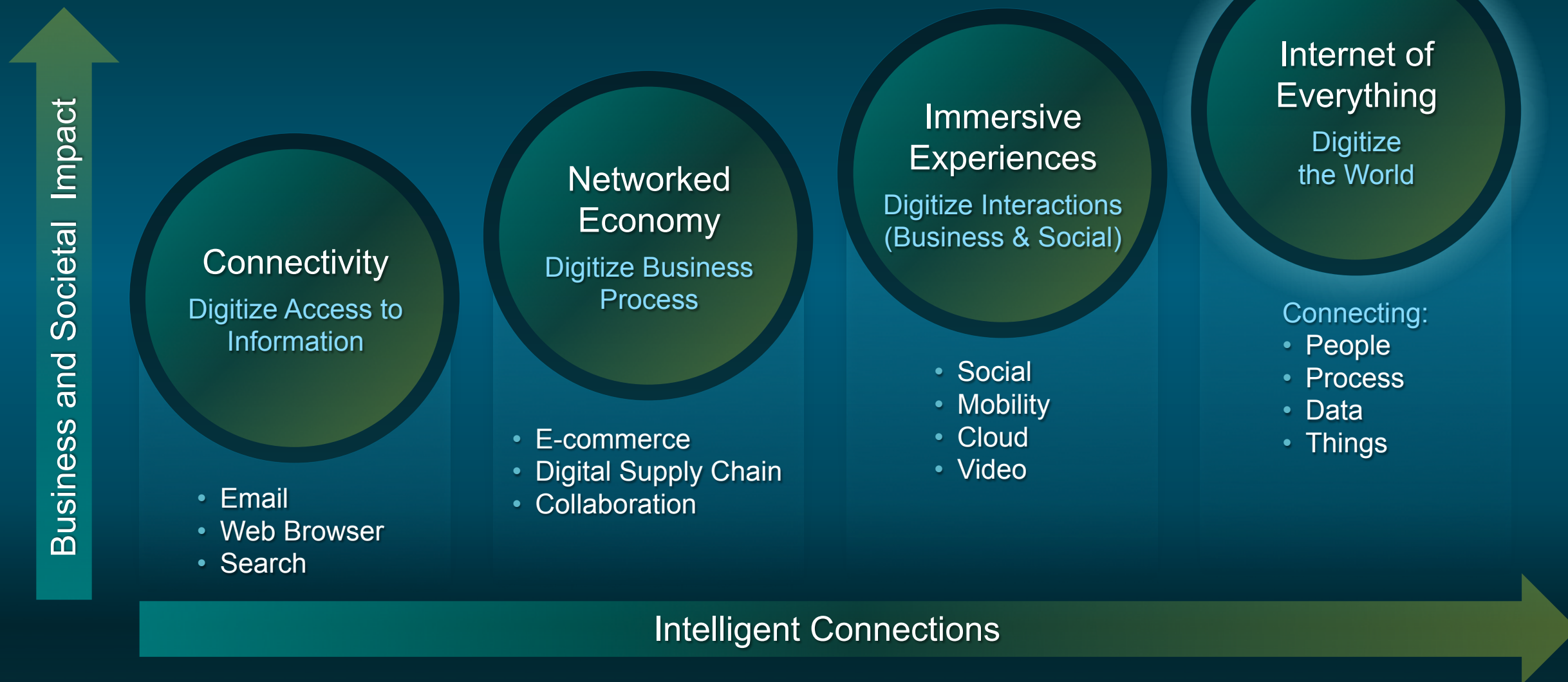
Economic  
Transitions

Technology  
Transitions

PACE OF CHANGE <sup>2</sup>



# Evolution of the Internet





# MASSIVE WAVE of Economic Opportunity

# \$19T

Private Sector: \$14.4T  
Public Sector: \$4.6T



Machine-to-Machine  
(M2M) \$7.4T

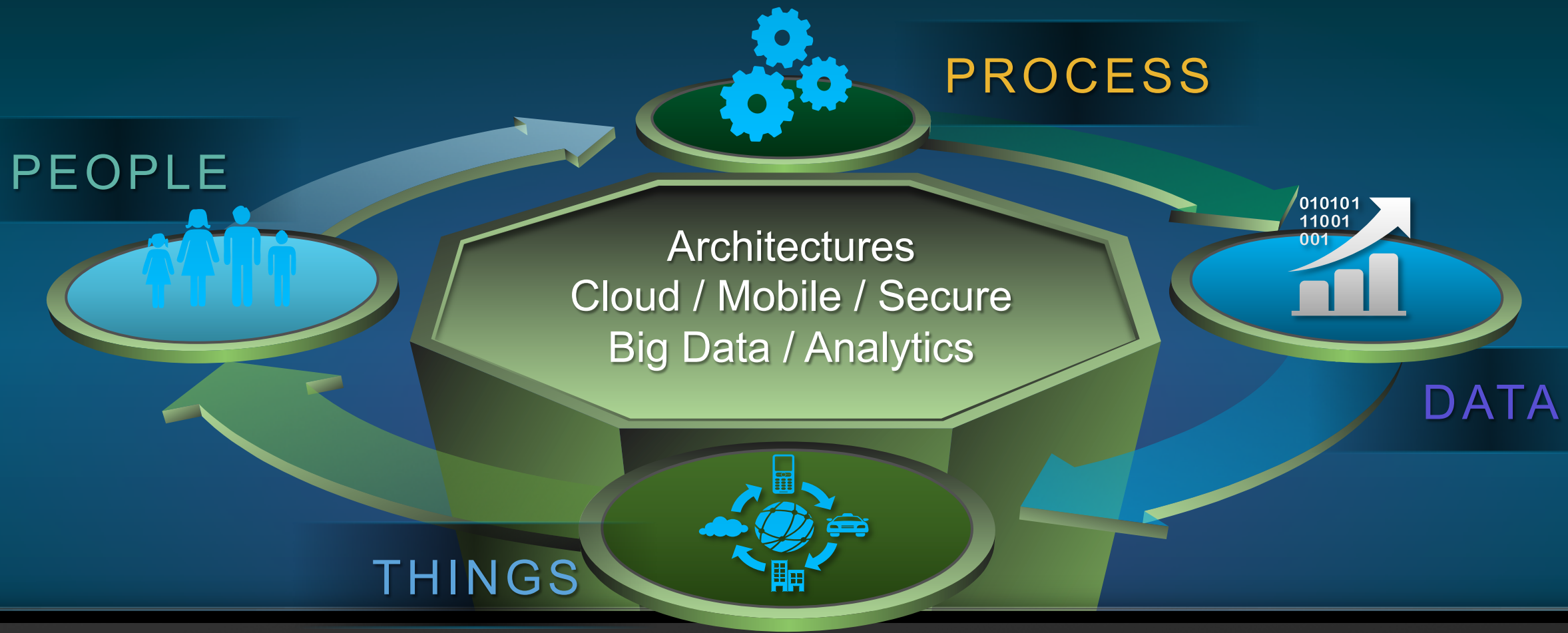


Machine-to-People  
(M2P) \$4.6T



People-to-People  
(P2P) \$7.0T

# Next Disruption... IoE



Network Value = # Connections<sup>2</sup>  
200M → 10B → 50B → 500B<sup>2</sup> = \$19T



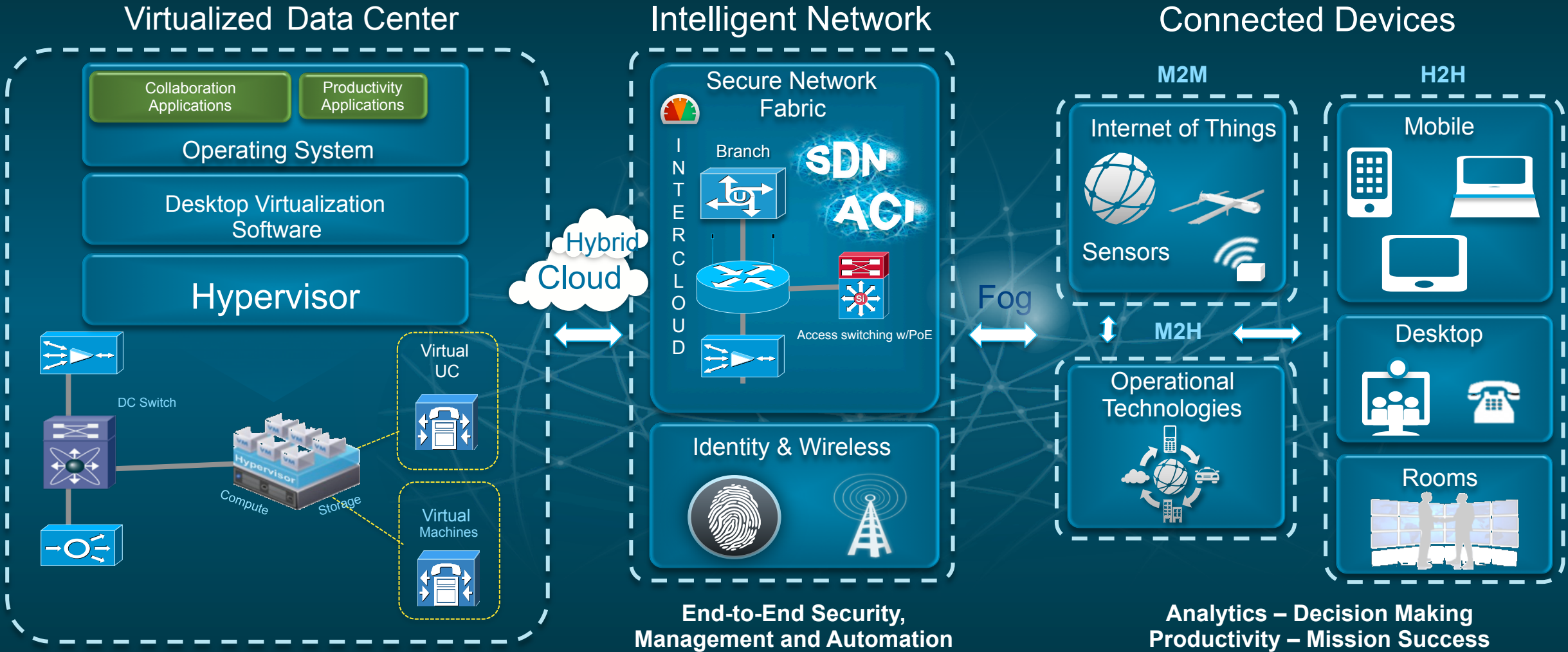
# A Perfect Storm

## Multiple Concurrent Inflection Points

- Standardized IP across all industries → IPv6
- Mainstreaming Cloud Computing
- Pushing Intelligence... App Layer → Network – Fog Computing
- Explosion / Monetization... Software Apps
- Big Data & Analytics
- Network capacity... affordable, removing bottlenecks on information flows
- Consumerization ... Enriched / Intimate experiences with Things
- Nanotechnology – Miniaturization of sensors and actuators



# End-to-End Architecture





# Internet of Everything Reference Model

## Levels

- 7 Collaboration & Processes**  
(Involving People & Business Processes)
- 6 Application**  
(Reporting, Analytics, Control)
- 5 Data Abstraction**  
(Aggregation & Access)
- 4 Data Accumulation**  
(Storage)
- 3 Edge Computing**  
(Data Element Analysis & Transformation)
- 2 Connectivity**  
(Communication & Processing Units)
- 1 Physical Devices & Controllers**  
(The "Things" in IoT)



# Data Center / Cloud: Customers Want Hybrid Clouds

Will your enterprise be pursuing a hybrid cloud strategy by 2015?

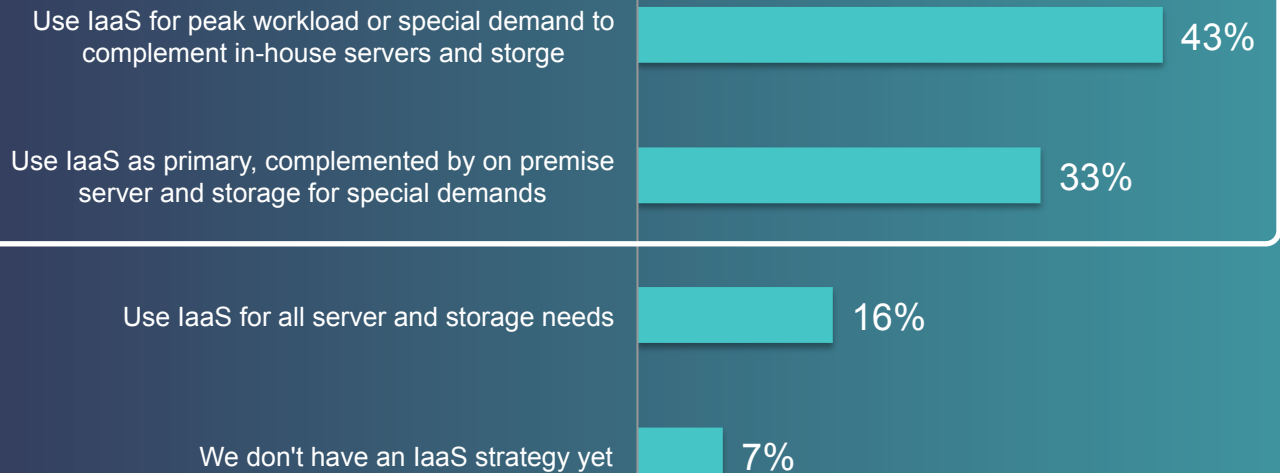
76%

IT will act as a “broker” of cloud services across internal and external clouds for LOBs\*

Source: Gartner DC Summit , December 2012  
(Base 400+ Enterprise customers)

Enterprises seek to augment on-premise servers with service provider clouds

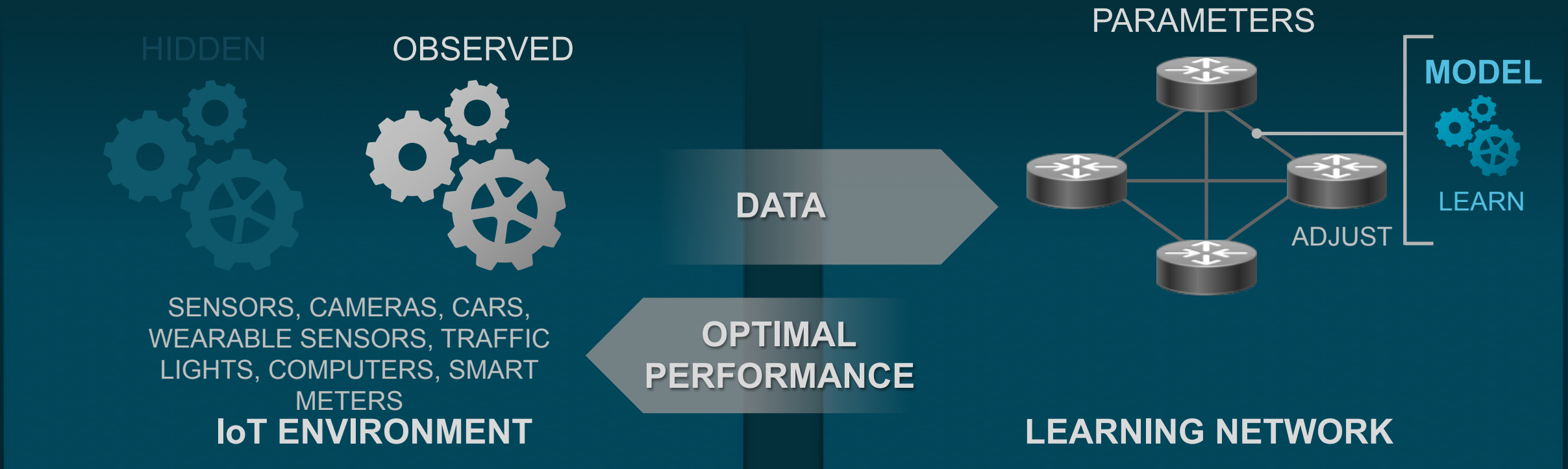
Which statement best describes your firm’s current or planned strategy regarding the use of service providers for cloud IaaS?



Source: Forrester, 2013 (study commissioned by Cisco)



# Network / SDN: Learning Networks Enable Scale



**PREDICTIVE  
PERFORMANCE  
ANALYSIS**

**ANOMALY  
DETECTION**

**ADAPTIVE  
SECURITY**



Mobility  
IoT



Cloud



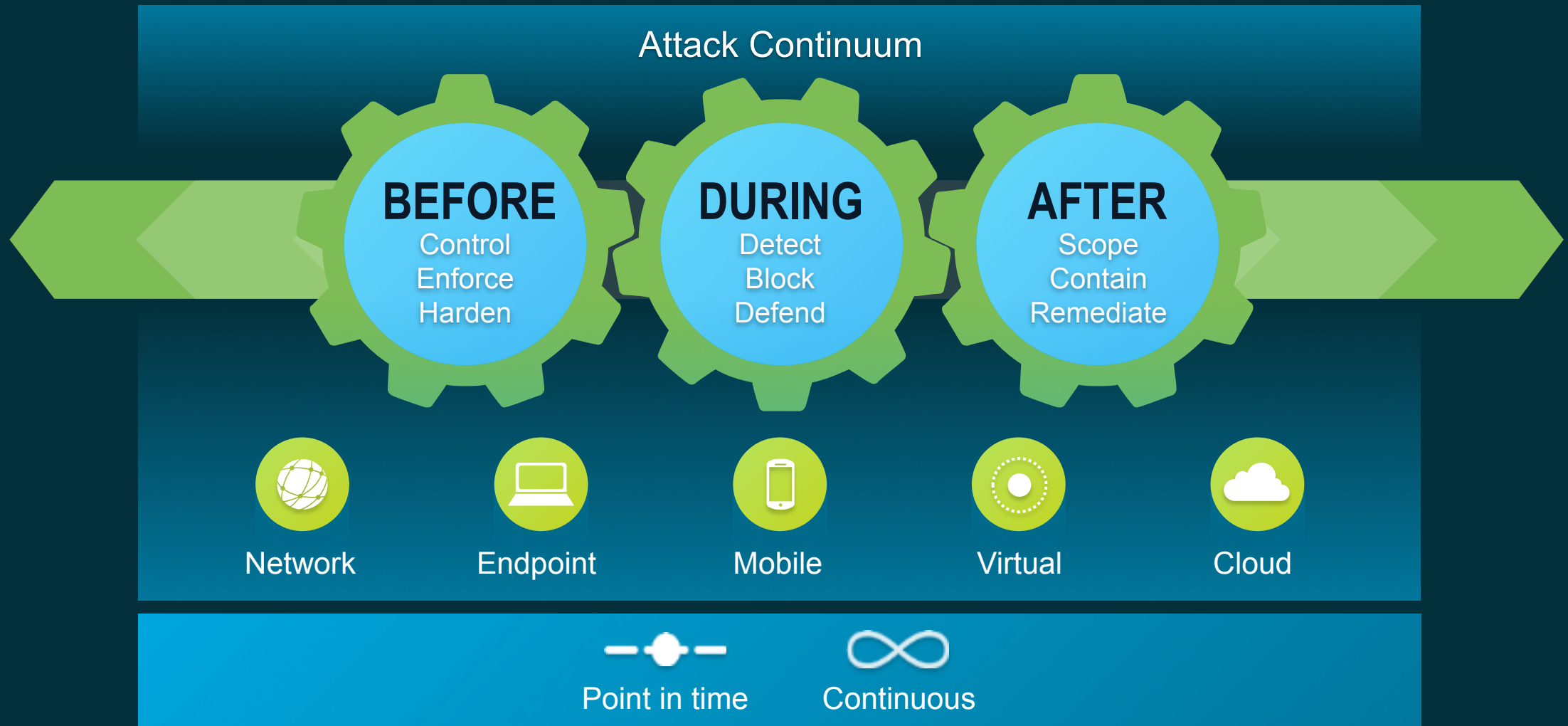
Threat



Users and Administrators require an  
end-to-end security architecture



# Security: The Cybersecurity Model



# Pace of Change is Accelerating

By 2017, 90% of internet users will access via a mobile device

2014, 74% of enterprises had a hybrid cloud strategy

50B autonomous connected devices by 2020

180B mobile application downloads in 2015

From 2012 until 2020 the amount of data will double every 2 years



Mobile



Cloud



IoT



Apps



Big Data & Analytics



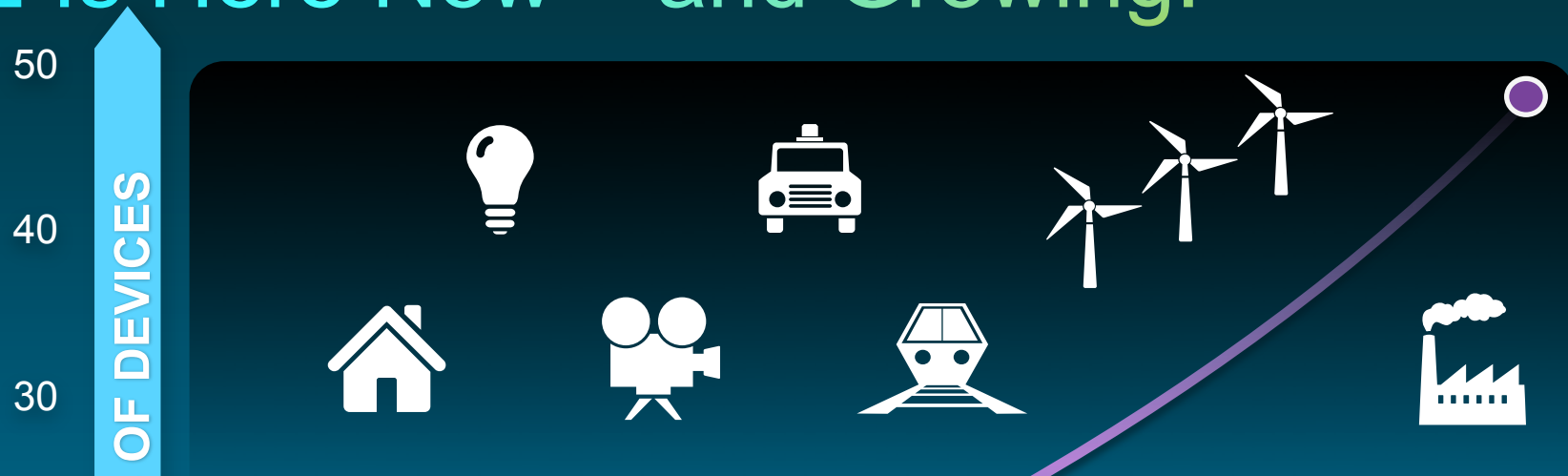
# Number of DEVICES

1984:	1,000
1992:	1 million
2008:	1 billion
2010:	10+ billion
2014:	# mobile devices > # people
2020:	50 billion → 500 billion

# Power of NETWORKS

Source: Telefonica I&D 2011 Cisco Visual Networking Index 2012

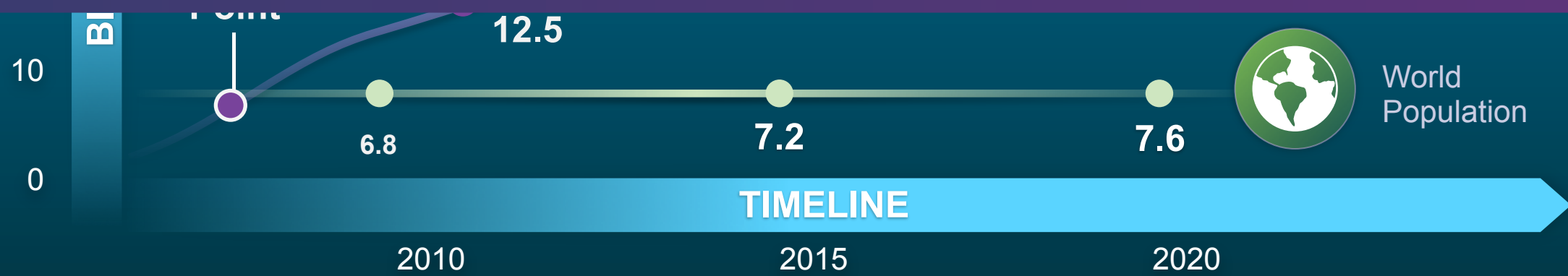
# IoE Is Here Now – and Growing!



**50 Billion**  
“Smart Objects”

Rapid Adoption  
Rate of Digital  
Infrastructure:

## The New Essential Infrastructure



Source: Cisco IBSG, 2011



# Connected Objects Generate Big Data



46 million smart meters in the U.S alone  
1.1 billion data points (.5TB) per day



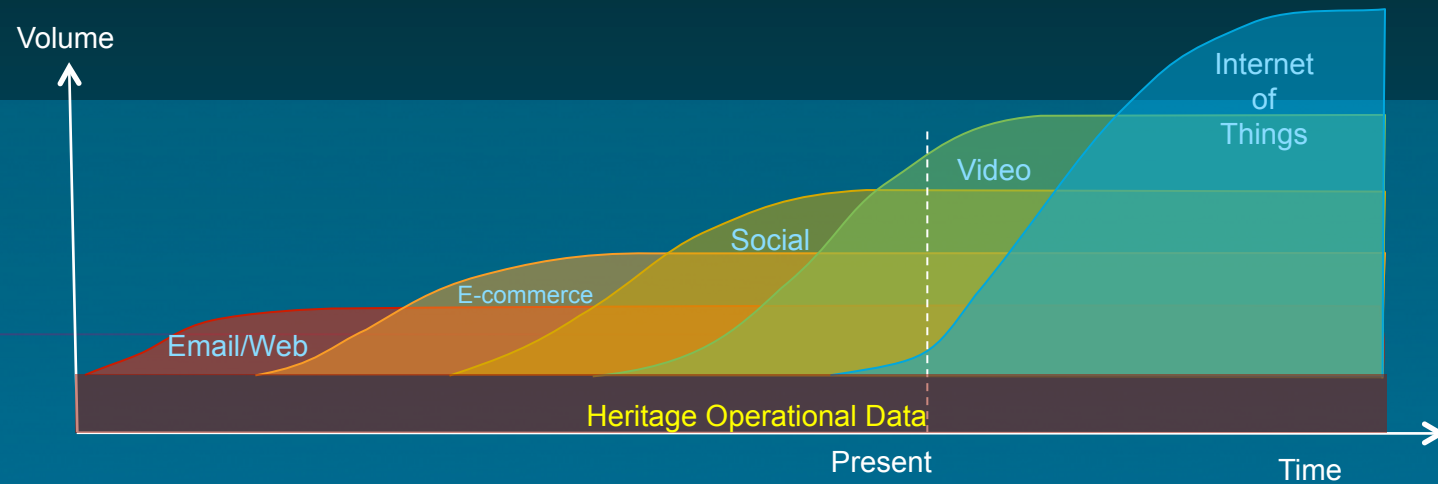
A single consumer packaged good  
manufacturing machine generates 13B data  
samples per day



A large offshore field produces 0.75TB of data weekly  
A large refinery generates 1TB of raw data per day



10TB of data for every 30 minutes of flight  
With >25,000 flights per day, petabytes daily



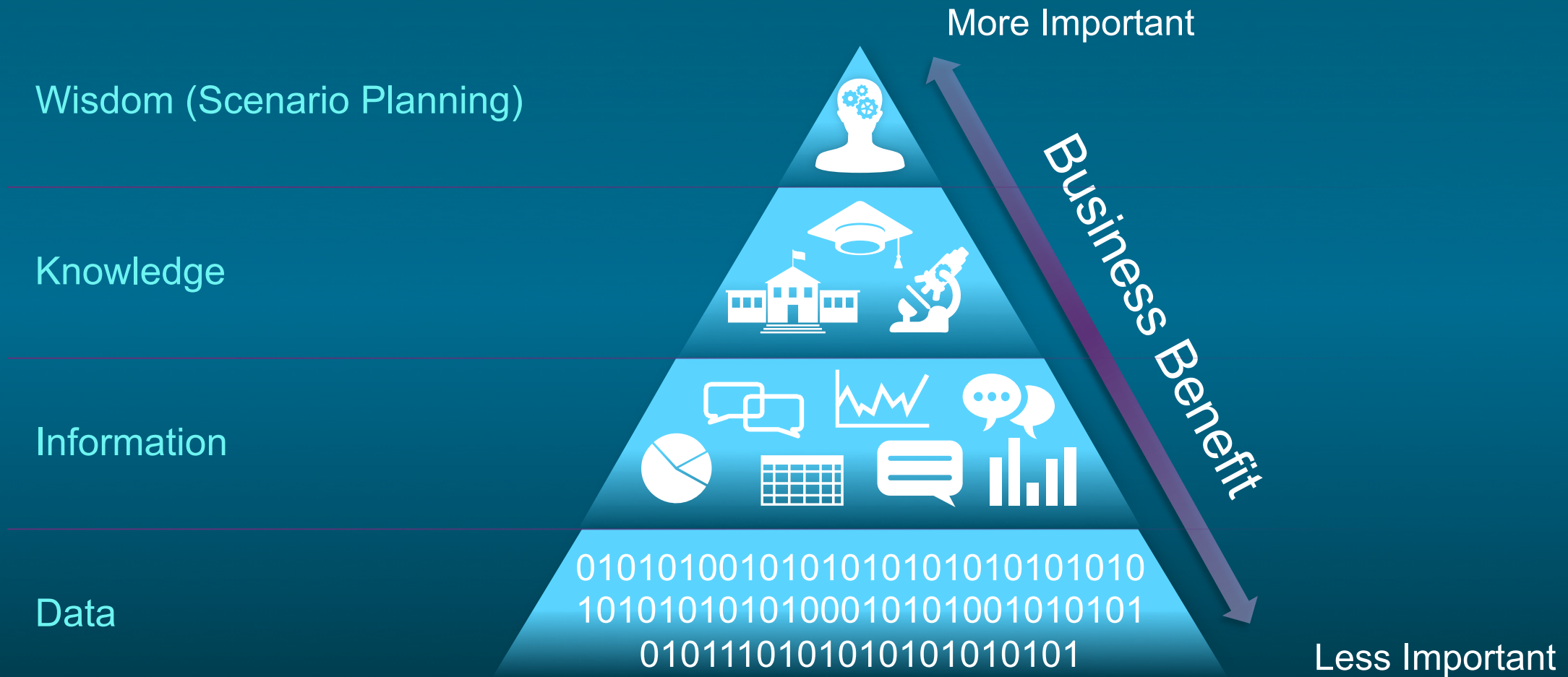
Projected world population by 2016 is 7.3 Billion,  
with 10 Billion mobile-connected devices

By 2016, global IP traffic will reach 1.3 zettabytes;  
growing 4-fold from 2011 to 2016

By 2016, there will be nearly 19 billion global  
network connections (fixed and mobile);  
- the equivalent of two and a half  
connections for every  
person on earth

The World Generates More Than 2 Exabytes of Data Every Day

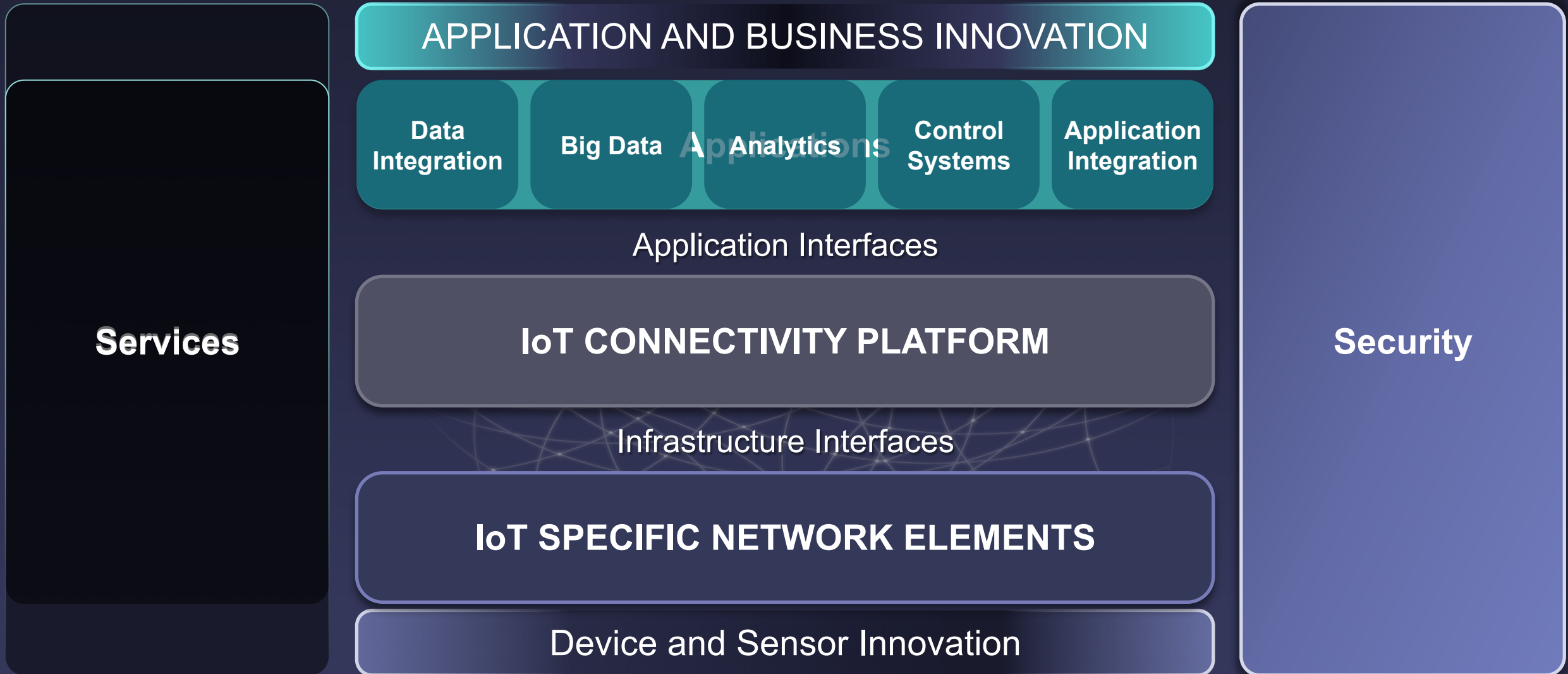
# Transform Data into Wisdom



Big Data becomes Open Data for Customers, Consumers to Use



# ... But It Also Adds Complexity



# IoE Is Prompting IT to Support the Innovative Enterprise





# IT Must Evolve to Respond to Business and Technology Transitions

## Technology Transitions



Mobility and Video



Cloud



New Types of Applications



Internet of Things



Big Data and Analytics

- Growing operational complexity and new security requirements
- Rapidly evolving business needs
- Lack of budget to address new requirements

Growth and Productivity Opportunities

New Business Models

User Experience and Expectations

Globalization

Security and Regulatory Compliance

## Business Transitions

# Evolving Requirements On IT

TRADITIONAL IT

FAST IT

Business Model

WEB ECONOMY

IT Usage Model

WORKPLACE-CENTRIC

IT Value Model

SERVICE DEVELOPMENT

IT Delivery Model

ON PREMISE IT SERVICES

IT Organizational Model

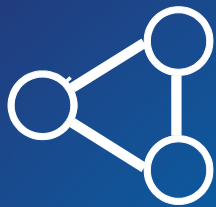
SILOD DEPARTMENTS





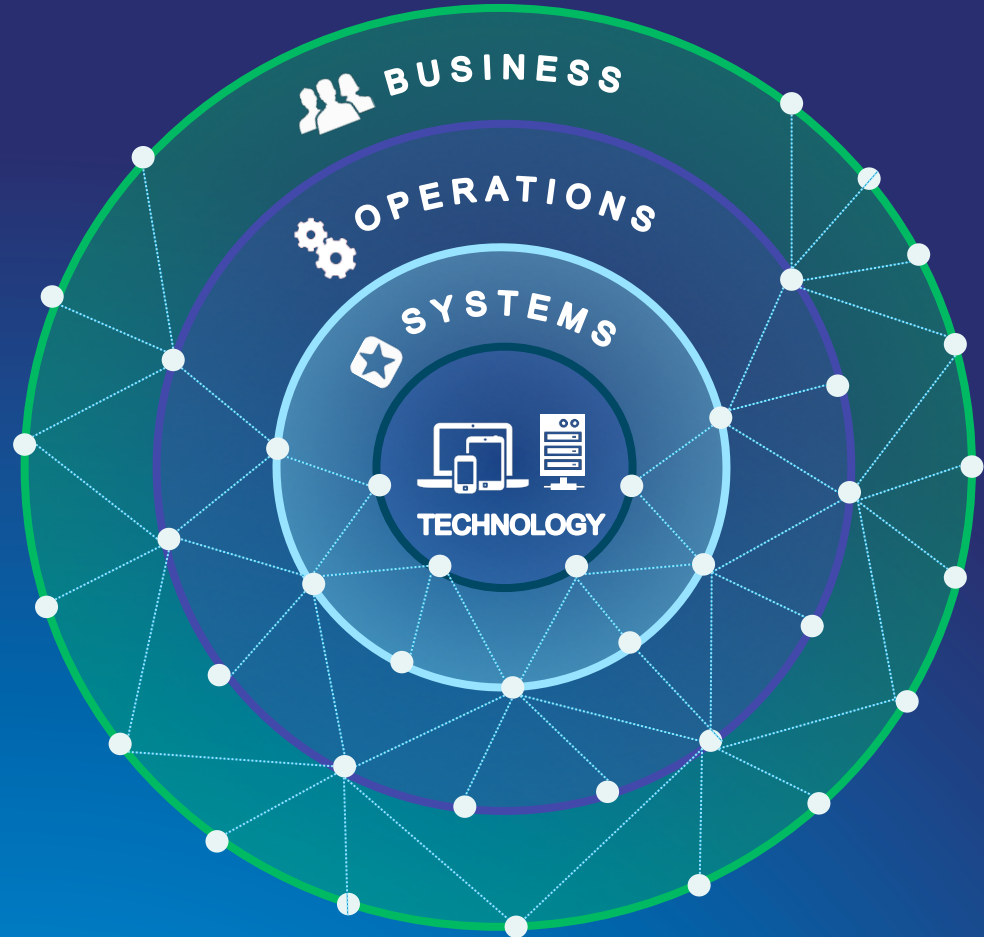
## Rapid Technological Innovation

*Moore's Law*



## Proliferation of nodes in the network

*Metcalfe's Law*



# Business Outcomes

MISSION IMPACT • ANY CONSUMPTION • EFFICIENCY • COST REDUCTION



Collaboration /  
Mobility



Application  
Centric



XaaS / Cloud



Cybersecurity



IoE

Integrated

Cross Architectural

Hyper-Aware

Predictive

Agile

• UC / Wireless

Route / Switch

Data Center

Security

IoT



# IoE Is Driving Exponential Change

IoE has the potential to grow global corporate profits by an estimated 21% by 2022

Firms captured just 53% of IoE's Value at Stake for 2013, leaving \$544B of unrealized value

By 2020, there will be approximately 50 billion objects connected to the Internet

In 2012 alone, we created more data than in the previous 5,000 years combined

“The next big wave is going to be around the Internet of Everything. It will be implemented by combining things with processes, with business changes, with people. **And, it will drive a productivity number, and a financial number, that is just mind-boggling.**” – John Chambers

Globally, machine-to-machine IP traffic will grow 20-fold from 2012 to 2017

In 2014, the number of mobile-connected devices will exceed the number of people on earth

An estimated 77 billion apps will be downloaded during 2014

2/3 of the world's mobile data traffic will be video by 2015

*TOMORROW  
starts here.*

Thank you.



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