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Shared IT Services for Higher Education & Research

Conference 2017

Securing The IoTs

Dr. Musfiq Rahman
Thompson Rivers University

Roadmap

- Flavors of the Internet of Things

- Benefits of IoT

- Security challenges of IoT

- Secure Architecture for IoT

- Conclusion

Flavor of the Internet of Things

In your kitchen, a **blinking light** reminds you, its time to take medicine

The clock **checks the train times online** and lets you sleep 5 mins more

In case you forget, it sends an email to your doctor

Flavor of the Internet of Things

On your way out of the house, your umbrella handle is **lit up**, which means that it has **checked the today's weather report** and predicts rain.

Flavor of the Internet of Things

On the way to station, a large LCD with flashing display **"BUS 23: ARRIVING IN 30 SECS"**

Flavor of the Internet of Things

When you get to the train station, your phone **checks you in automatically**…

Your **family also gets a text notification**…

Flavor of the Internet of Things

On your lunch break, run and **track your run** using **a pedometer in your shoes** and **a heart monitor in your wrist band**…

Flavor of the Internet of Things

All the **data** is automatically **uploaded to your sports tracking site**
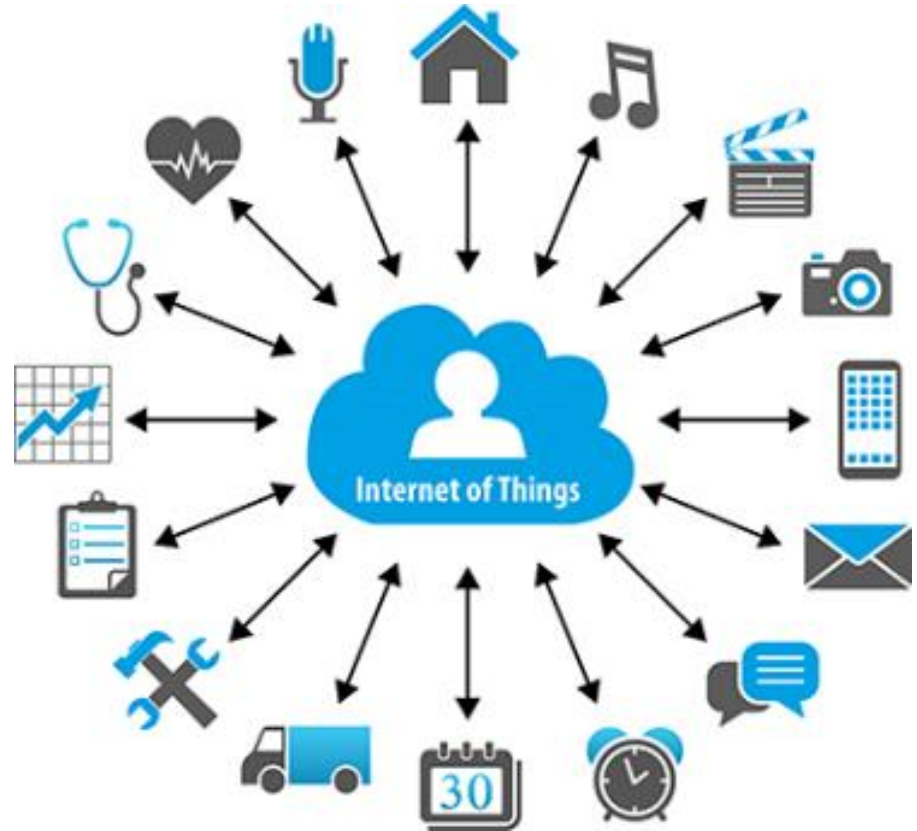
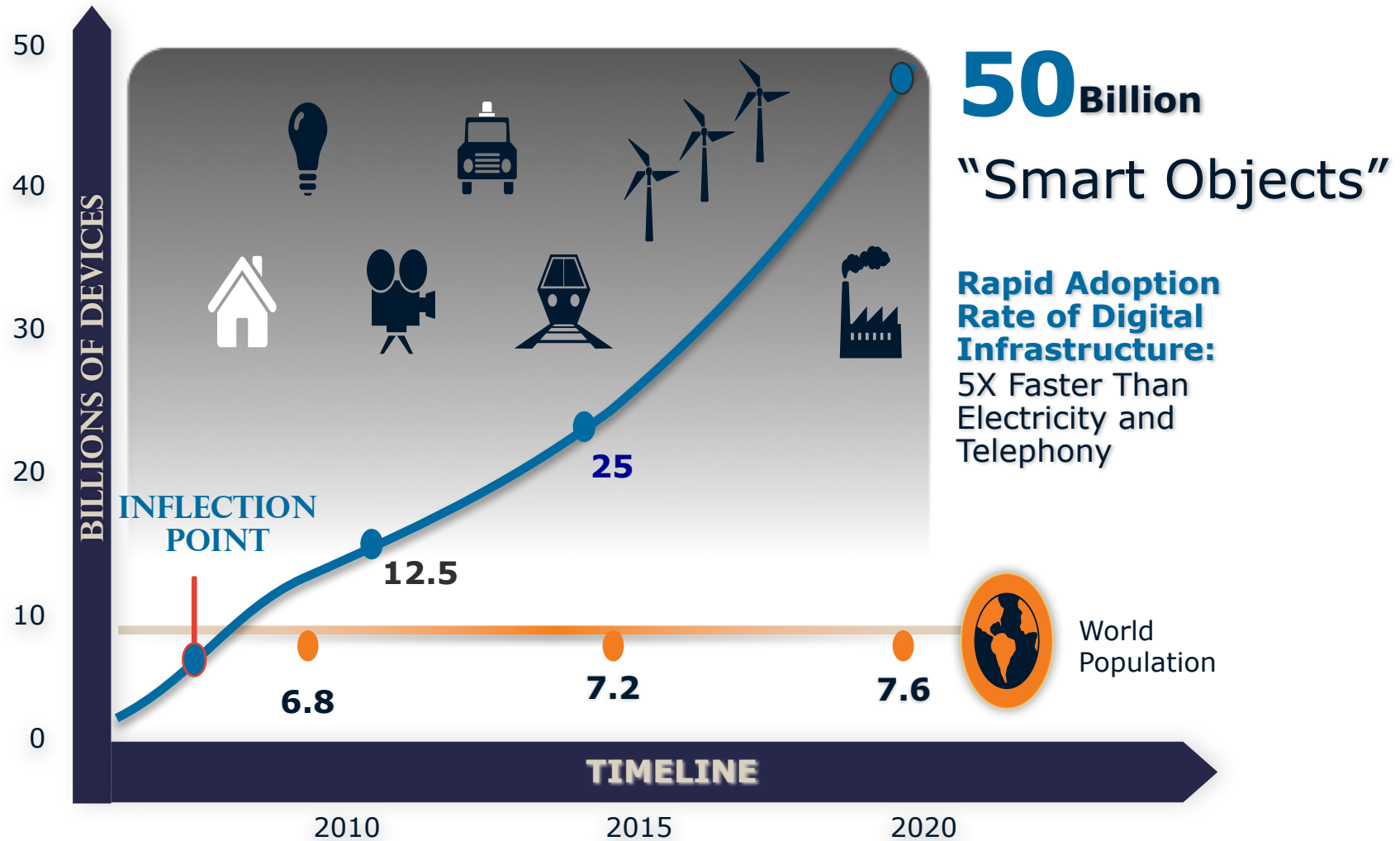**Integrates with your online supermarket shopping account** to compare with how many calories you've eaten.

What is IoT?

Physical Object
+
Controller, Sensor, and Actuators
+
Internet
=
Internet of Things

IoT is Growing!

50Billion

"Smart Objects"

Rapid Adoption Rate of Digital Infrastructure: 5X Faster Than Electricity and Telephony

BILLIONS OF DEVICES

INFLECTION POINT

25

12.5

World Population

6.8

7.2

7.6

TIMELINE

2010   2015   2020

50

40

30

20

10

0

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IoT Delivers Extraordinary Benefits

Connected Train

Passenger Security

Route Optimization

Critical Sensing
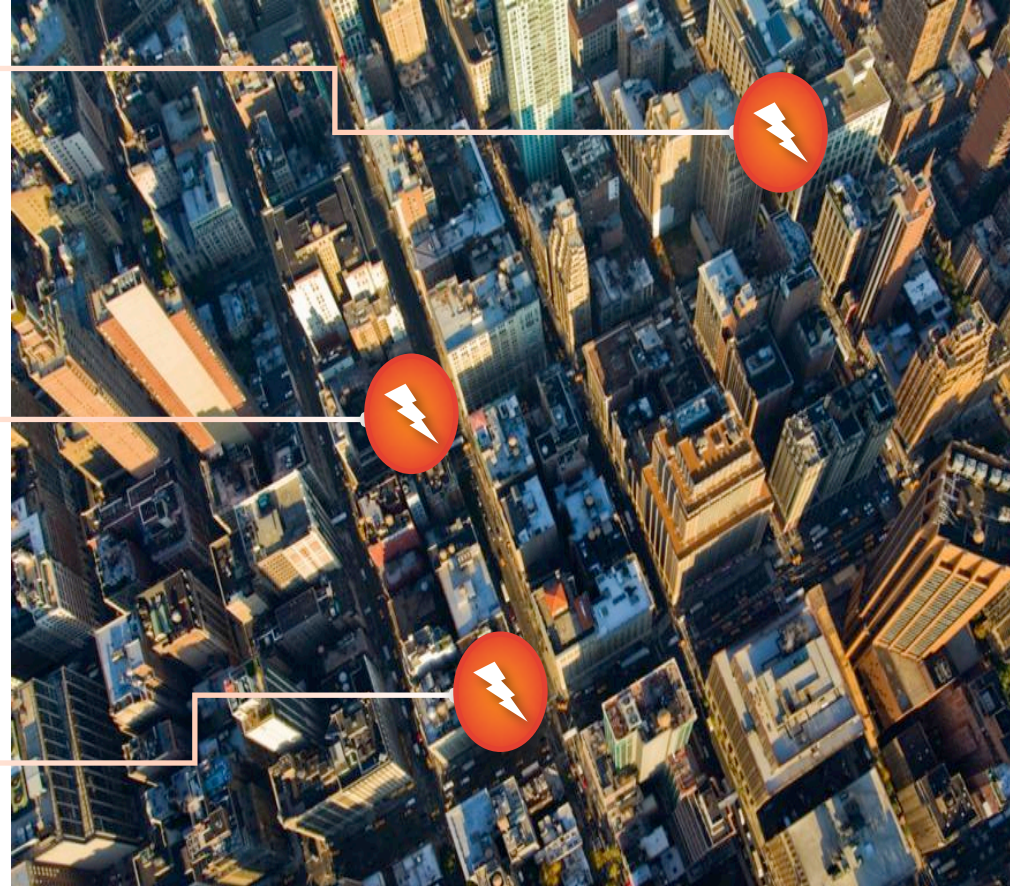
Smart City

Connected Traffic Signals

- Reduce Congestion
- Improve emergency services response times
- Lower fuel usage

Parking and Lighting

- Increased efficiency
- Power and cost savings
- New revenue opportunities

City Services

- Efficient service delivery
- Increased revenues
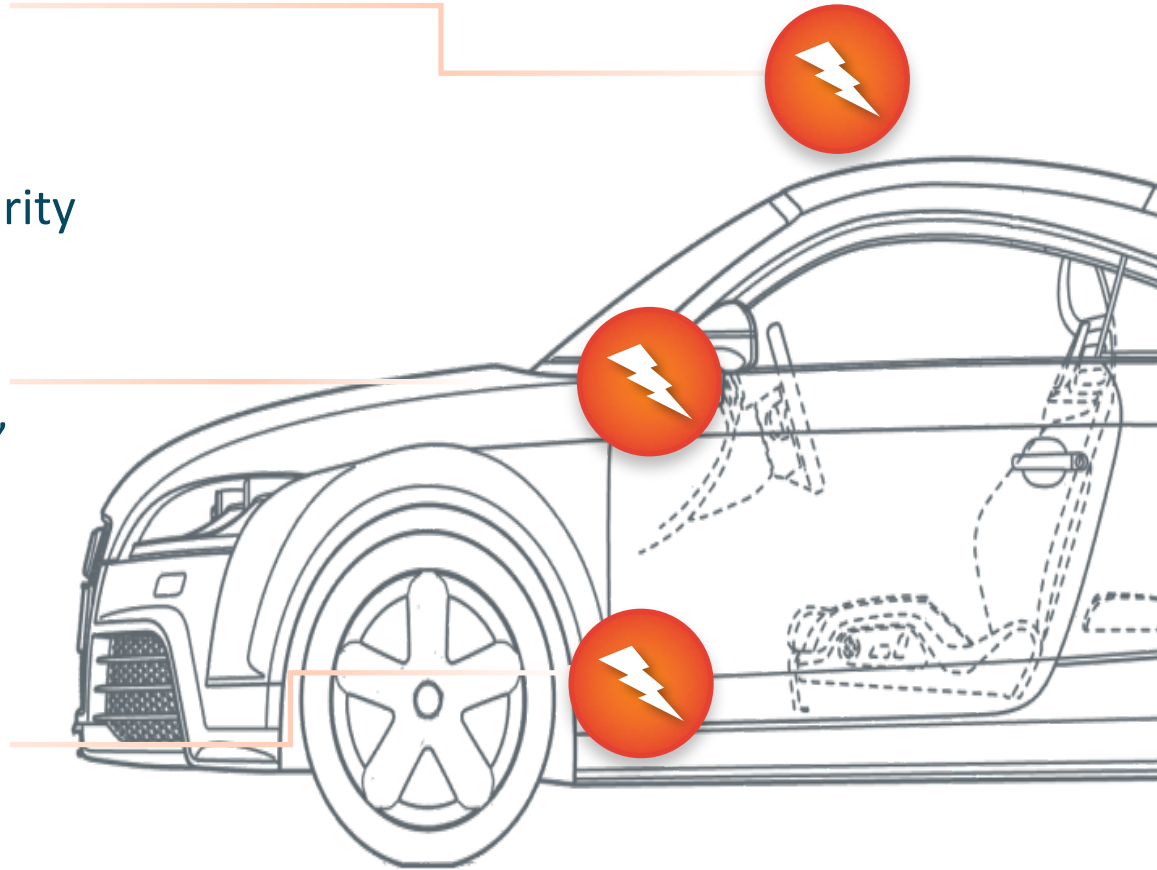- Enhanced environmental monitoring

The Connected Car

Wireless Routers
- Online entertainment
- Mapping, dynamic re-routing, safety, and security

Connected Sensors
- Transform "data" to "actionable intelligence"
- Enable proactive maintenance

Urban Connectivity
- Reduce congestion
- Increase efficiency

…but it adds also adds complexity

Connectivity tools be added to the platform

- ••Smaller, more self-contained switches, routers
- ••Operates in challenging environments

Billions of "smart objects" share IT infrastructure

- ••Networked together, yet independent
- ••Invisible, NOT owned or control by IT

Applications are different

- ••Value from the data intelligence
- ••Application provides a way to access intelligence

What Comprises IoT Networks?

Information Technology (IT) + **Operational Technology (OT)** + **Smart Objects**

The Flip Side: Major Security Challenges

Iot expands security needs…

IoT Security

- Increased Attack Surface
- Threat Diversity
- Impact and Risk
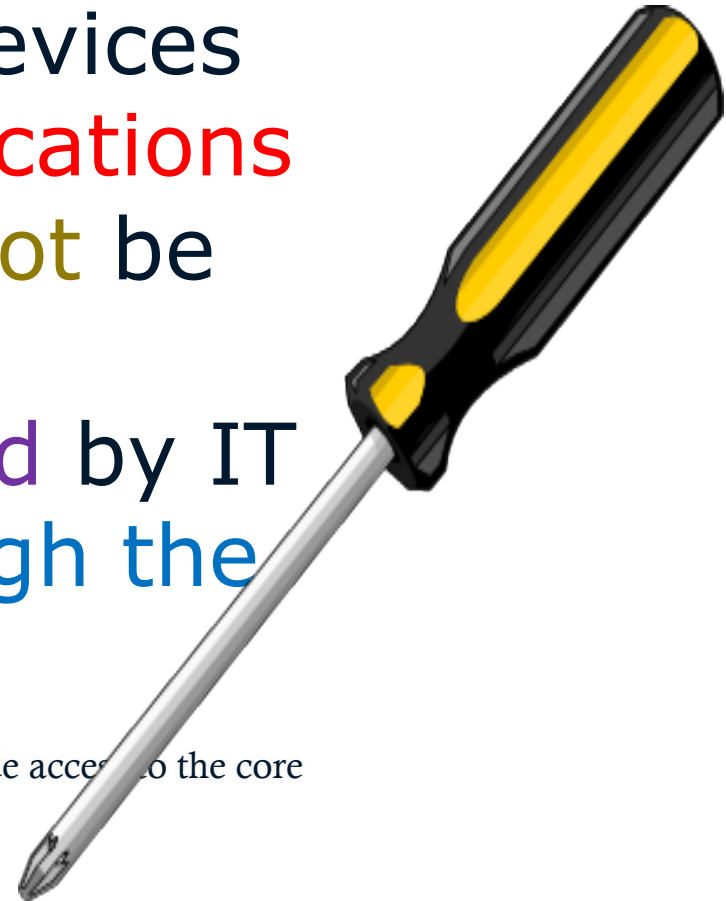- Remediation
- Protocols
- Compliance and Regulations

What Can Go Wrong…

What can't?

Billions of connected devices
Secure and insecure locations
Security may or may not be built in …
Not owned or controlled by IT
… but data flows through the network

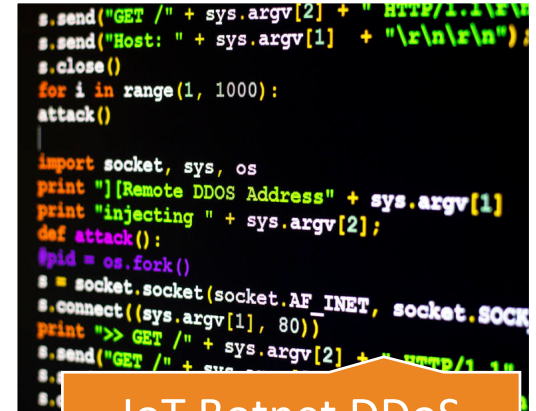Any node on your network can potentially provide access to the core

Some Security Incidents
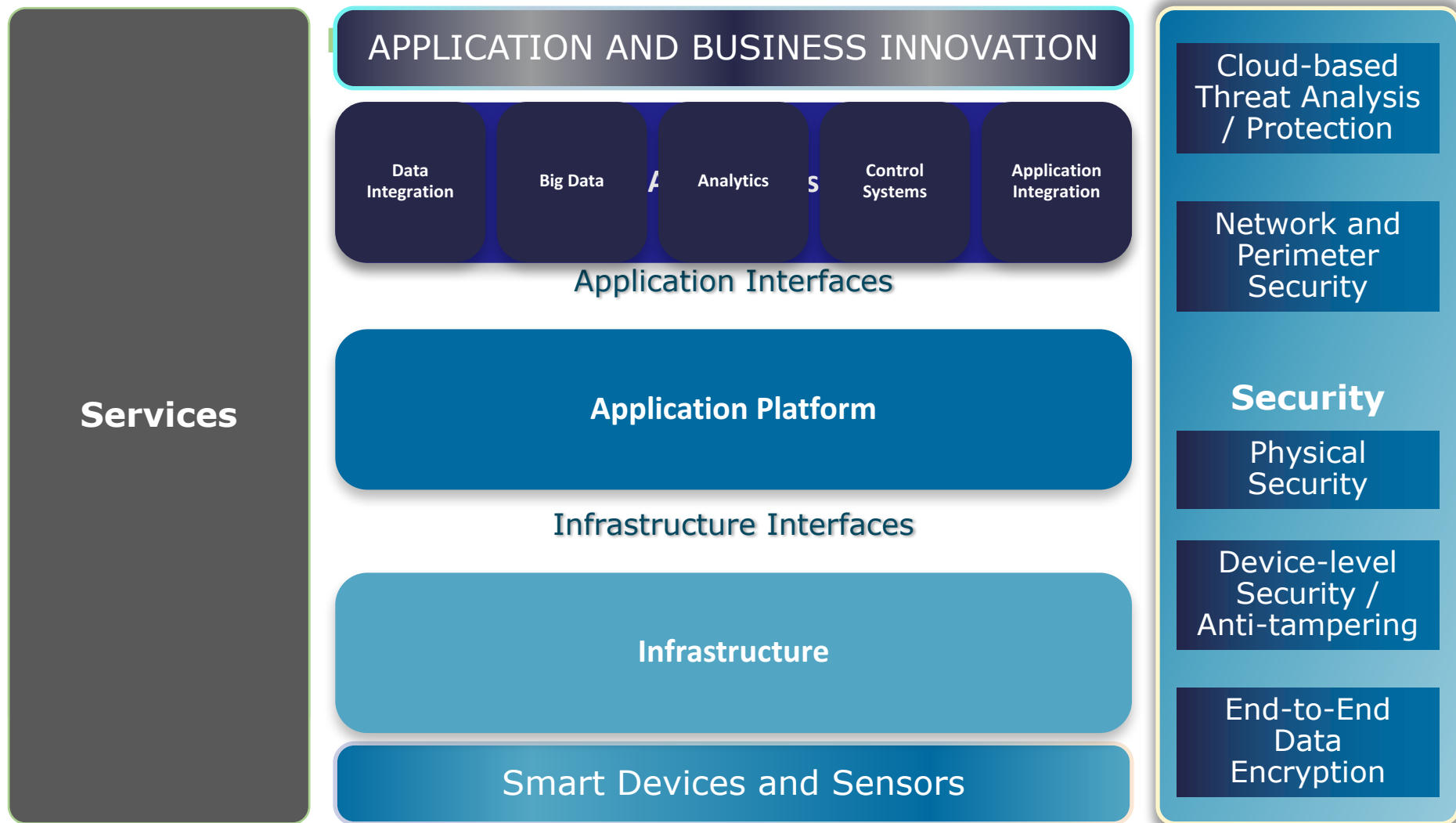

Firm Feeding System in the U.S.

Hackers Take Control of Cars

IoT Botnet DDoS Attacks

Delivering Security Across the Extended Network

The Secure IoT Architecture

Services

APPLICATION AND BUSINESS INNOVATION

Data Integration	Big Data	Analytics	Control Systems	Application Integration

Application Interfaces

Application Platform

Infrastructure Interfaces

Infrastructure

Smart Devices and Sensors

Cloud-based Threat Analysis / Protection

Network and Perimeter Security

Security

Physical Security

Device-level Security / Anti-tampering

End-to-End Data Encryption

Conclusion: Securely Embrace IoT!

New challenges require new thinking!

- avoid operational siloes
- networking and convergence are key
- a sound security solution is integrated throughout
- build for the future

Security must be pervasive

- inside and outside the network
- device- and data-agnostic
- proactive and intelligent

Intelligence, not data

- convergence, plus analytics
- speed is essential for real-time decisions

Thank you!