Internet-of-Things and Internet-of-Space
A Unique and Necessary Combination

The Internet of Things
Meets
The Internet of Space

Orlando, Florida
February 20th, 2019

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Orlando, Florida
January 20th, 2019

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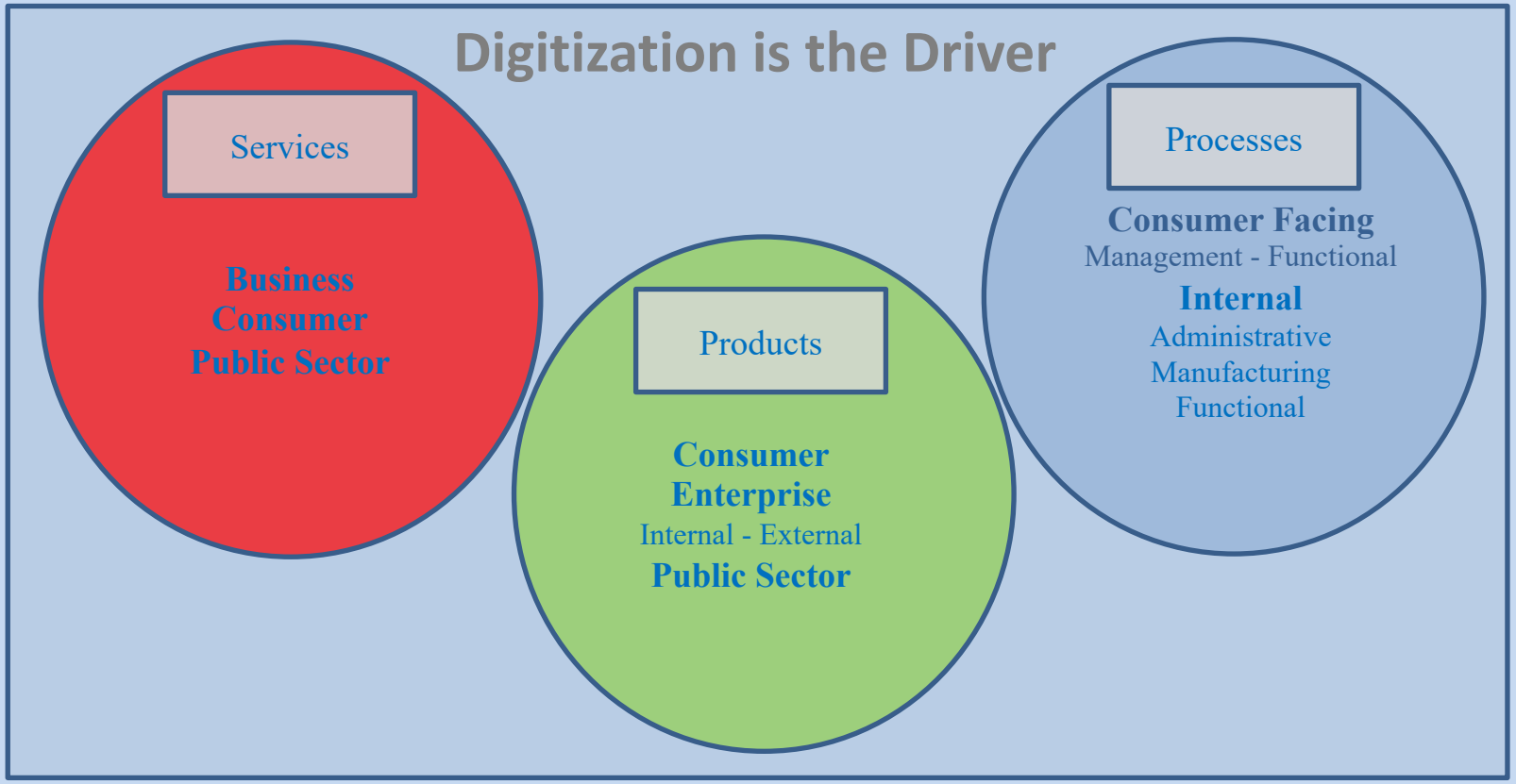
Outline

- *Internet of Things and the Internet of Space*
  - *A bit about:*
    - *IoT*
    - *IoS*
    - *Applications*
  - *Summary and Discussion*

A bit about: The Internet of Things



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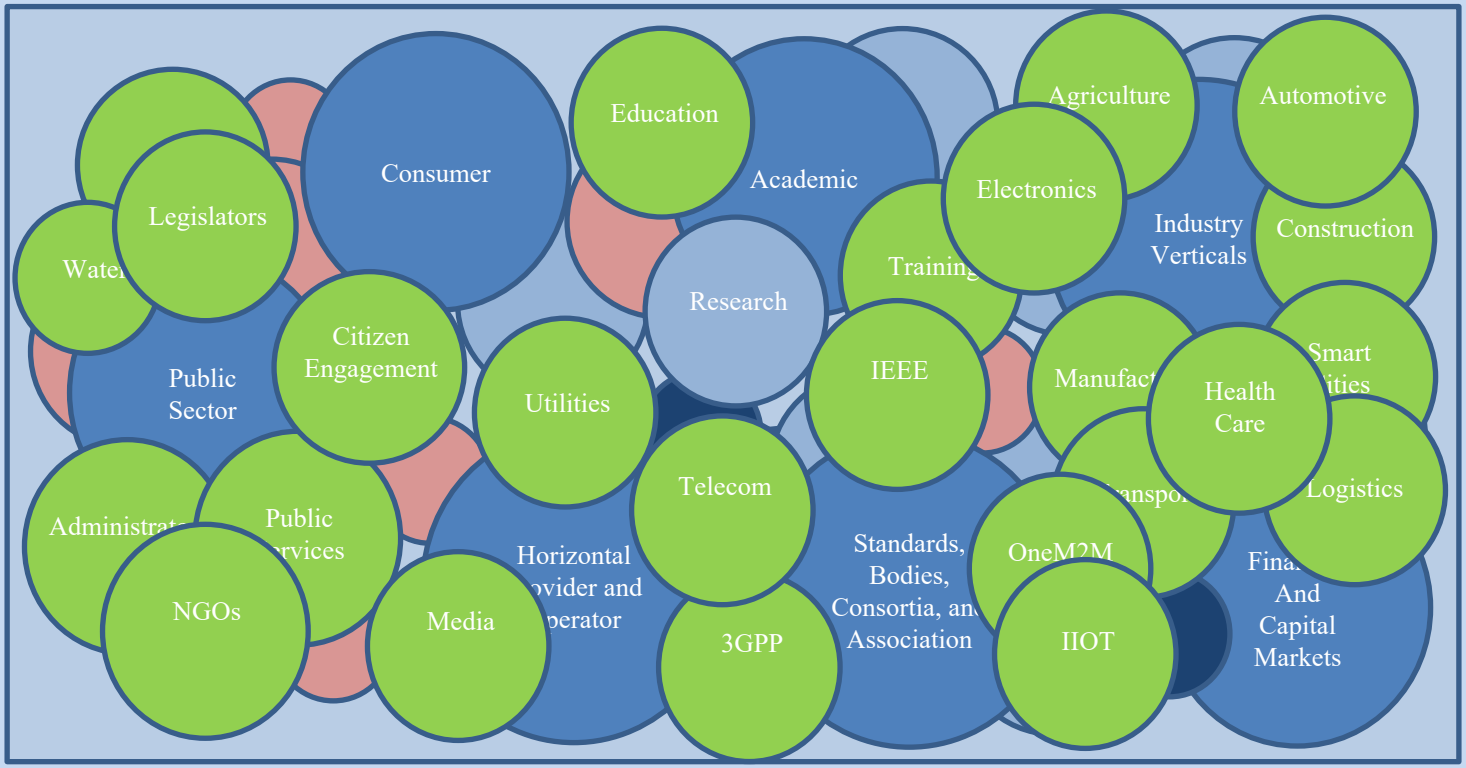
A bit about: The Internet of Things

A Very Complex Eco-System With Many Stakeholders



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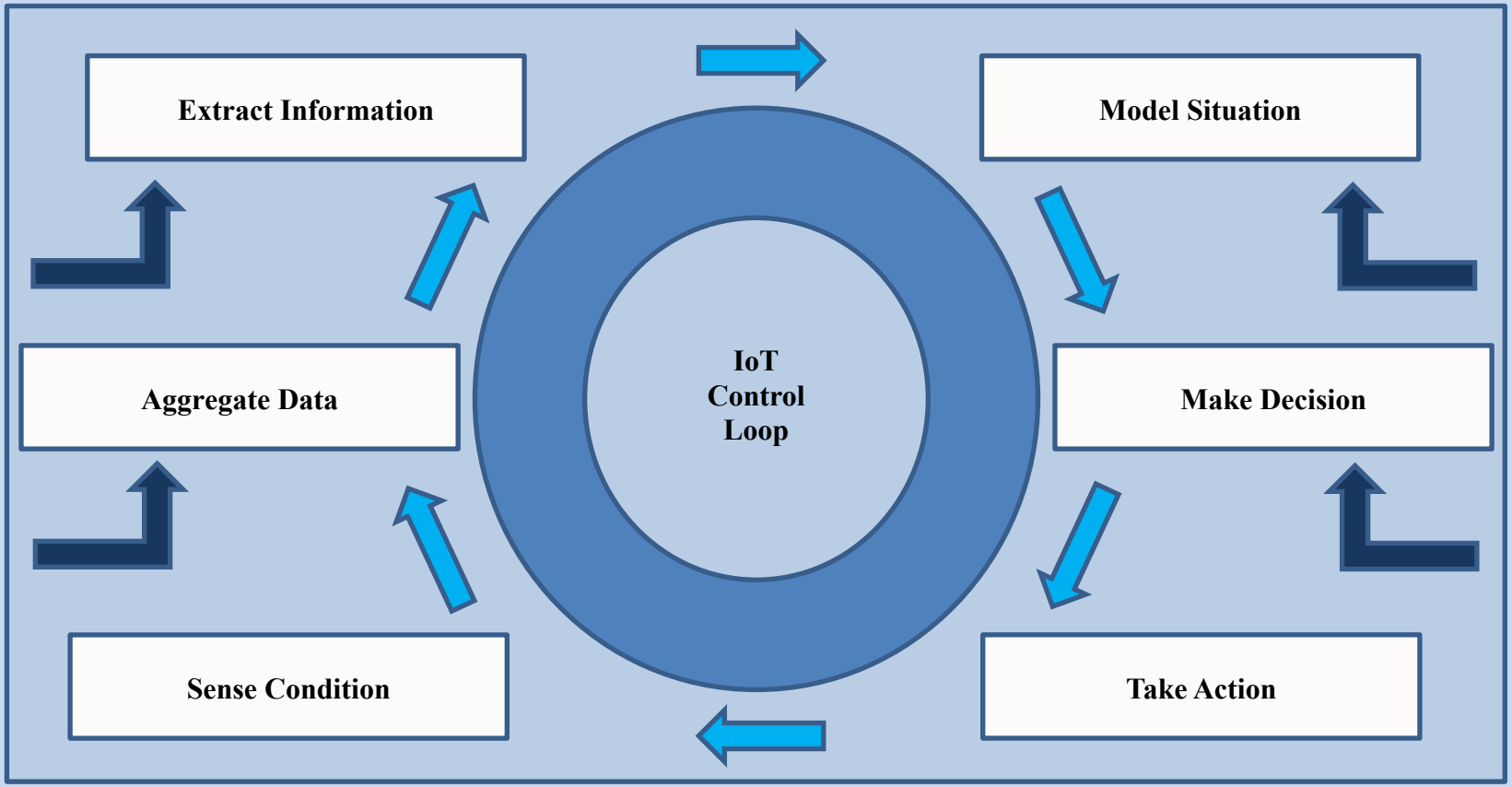

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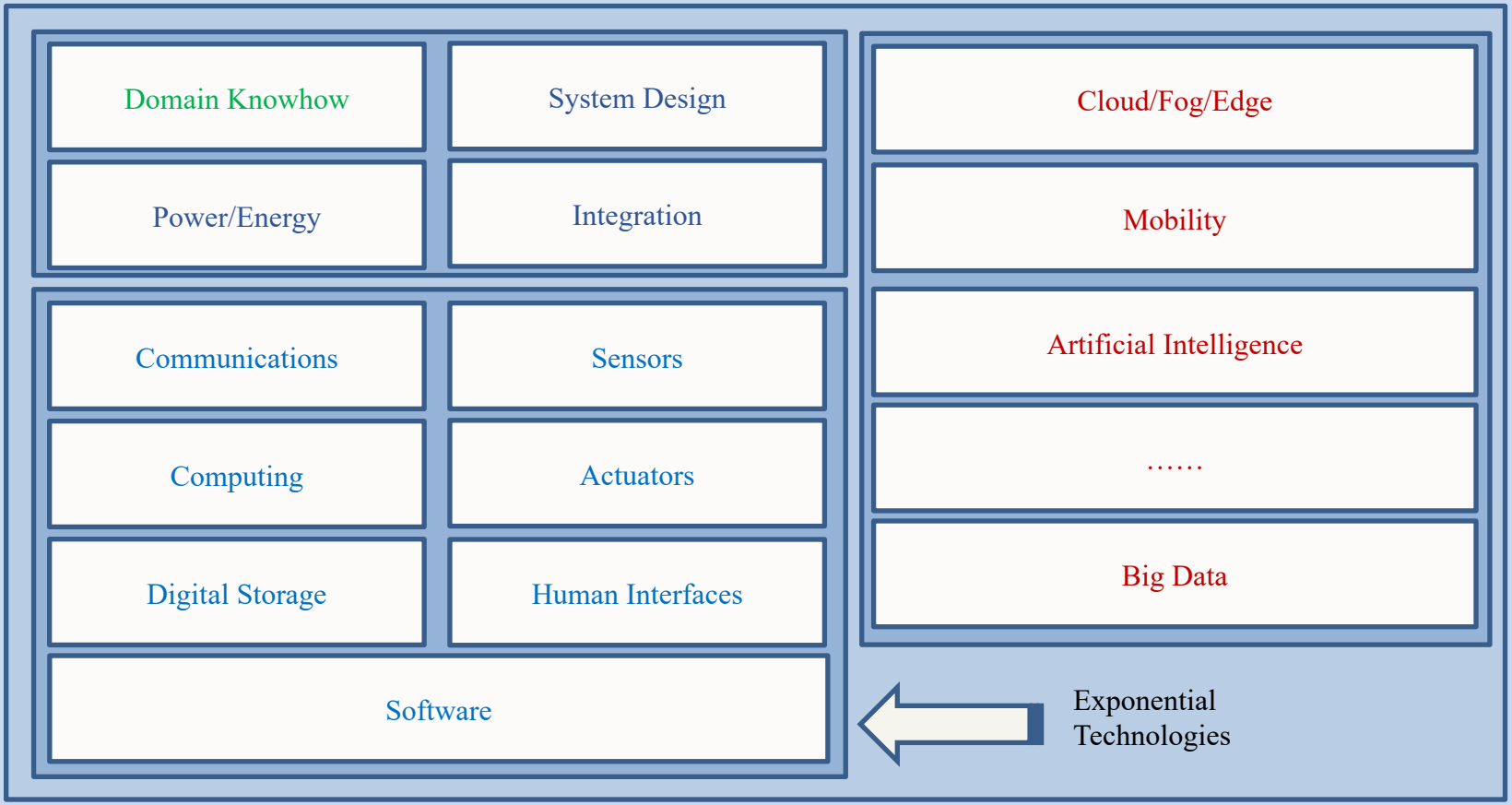

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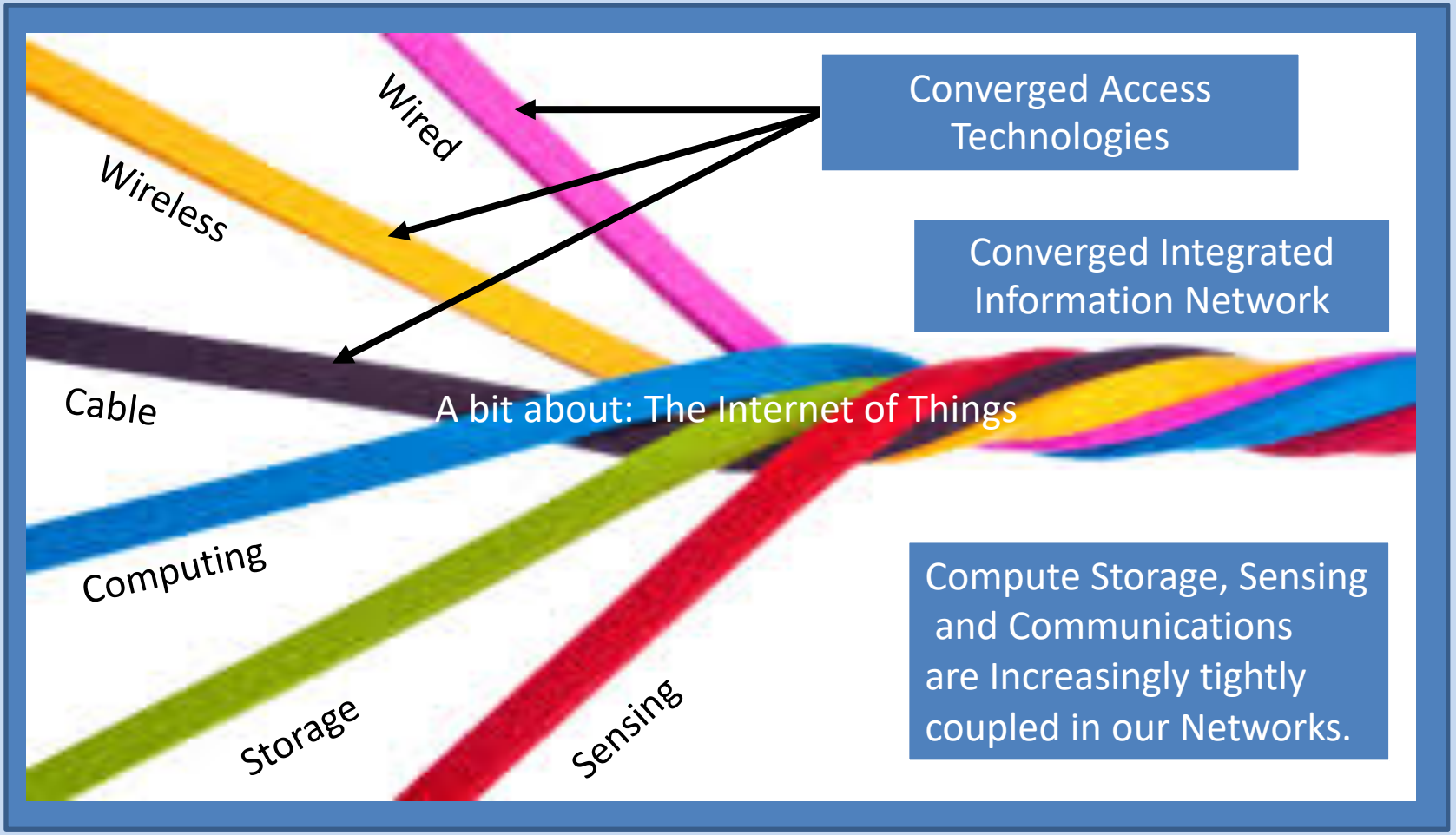

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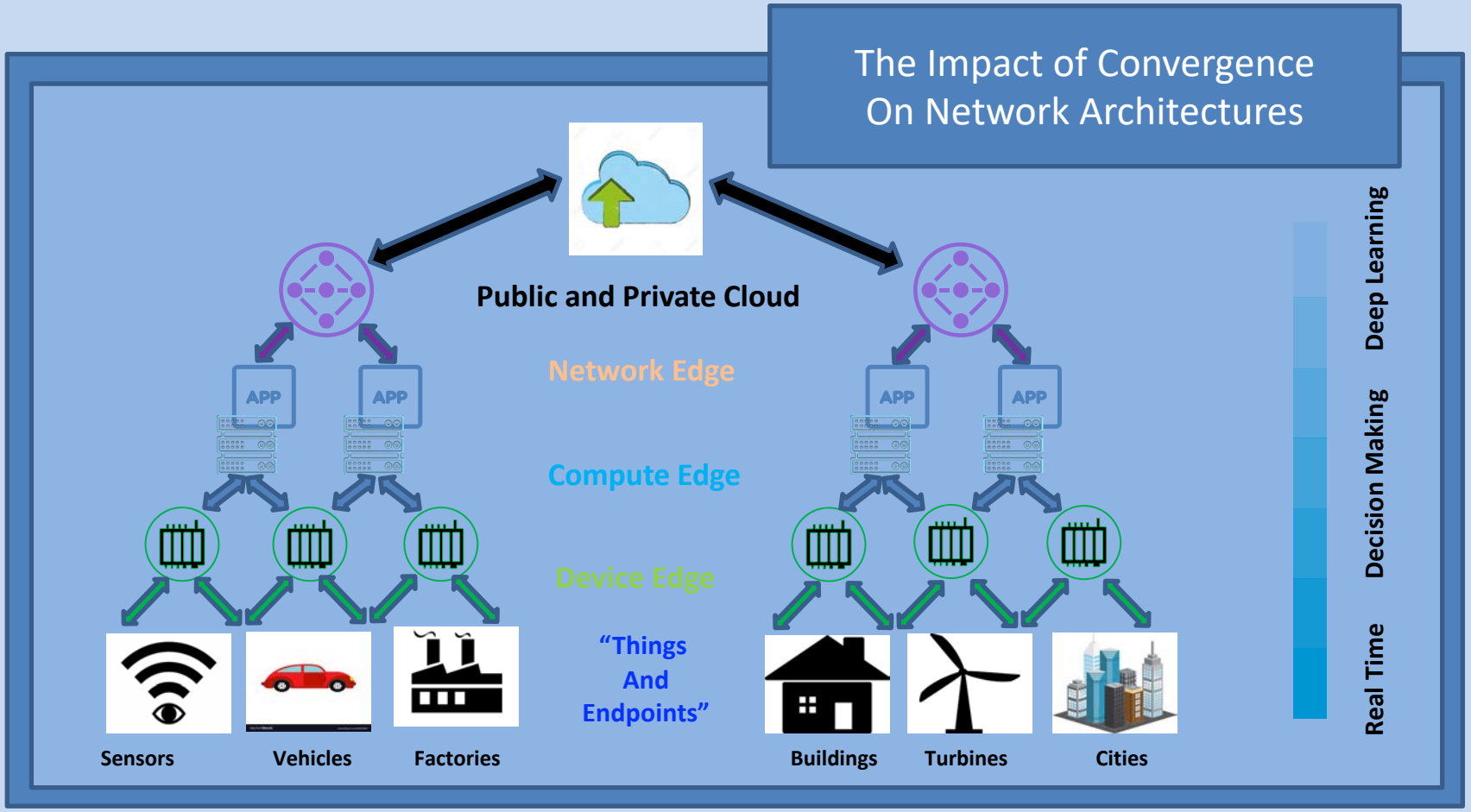

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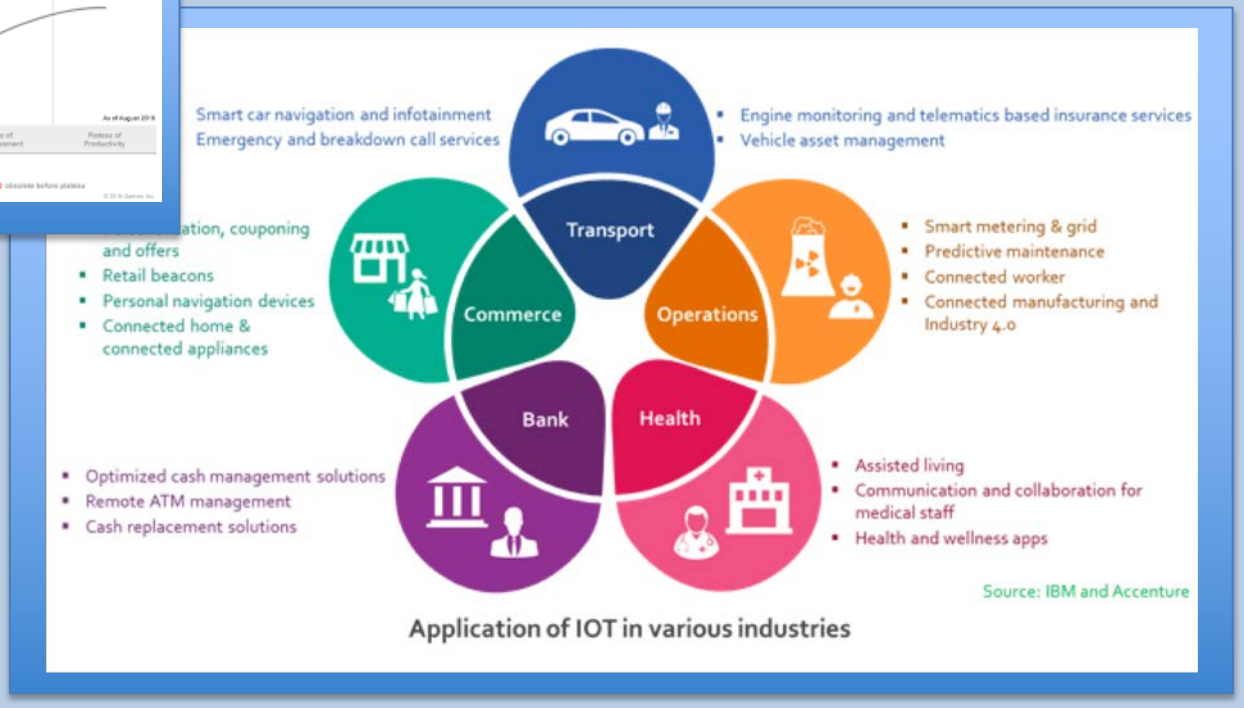

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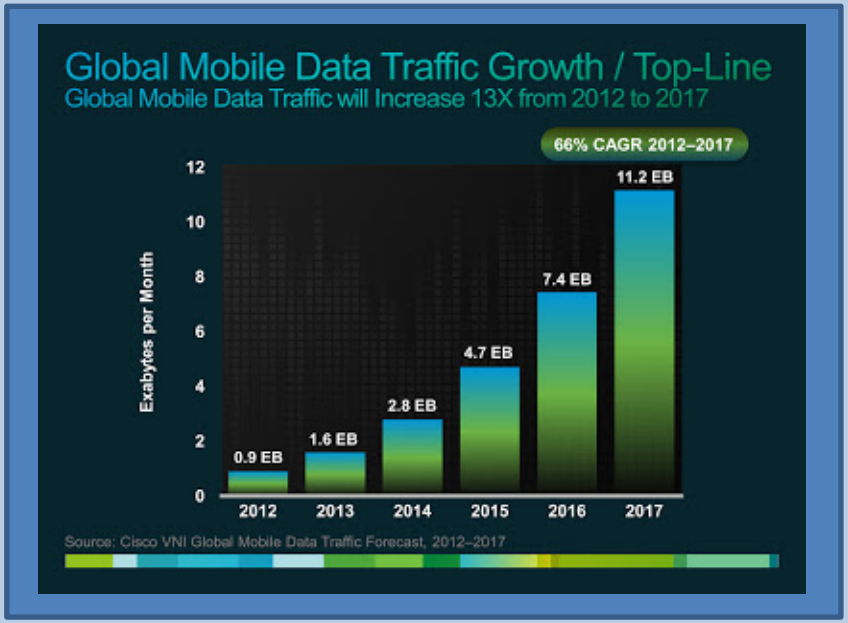
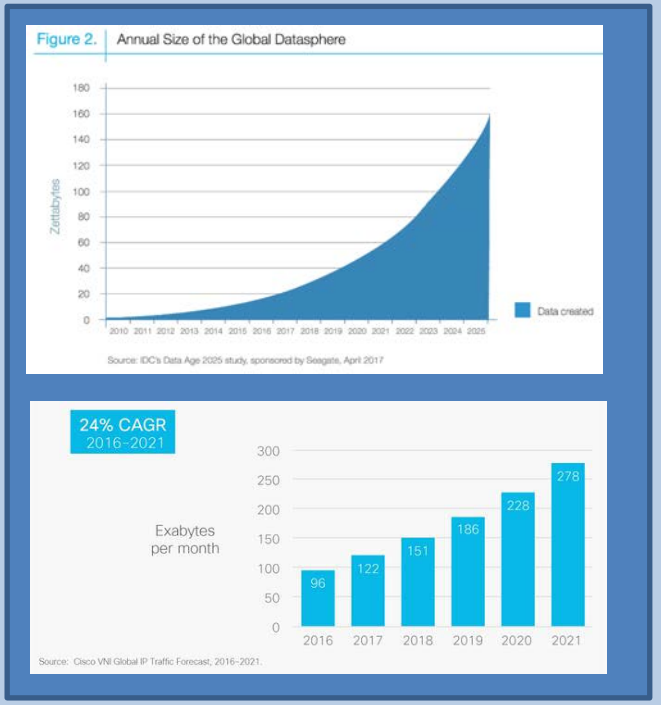
Growth in Data Traffic



Source: Cisco



Source: Data Age 2025 Study - IDC

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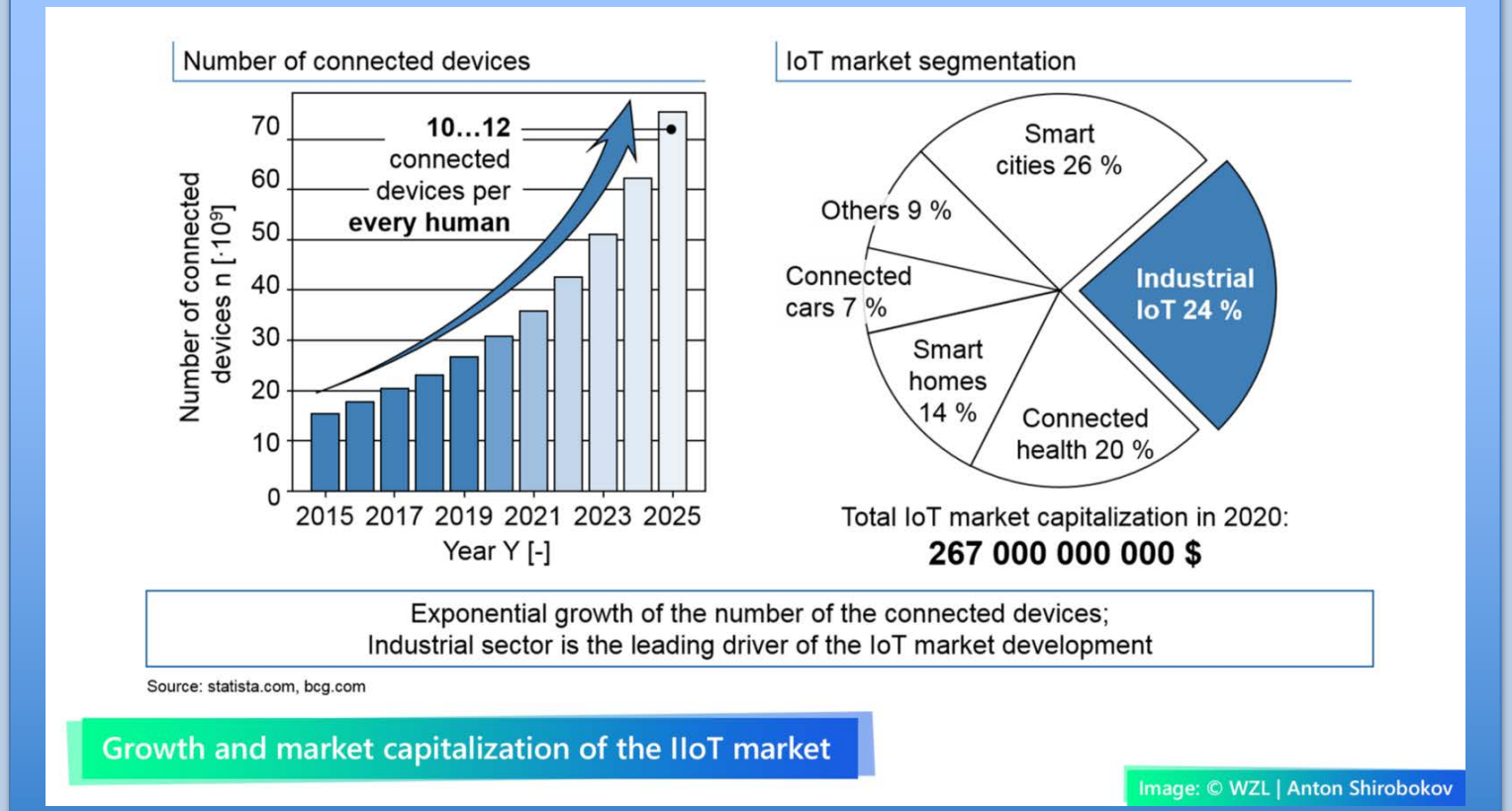

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Trends for 2019: Gartner defines a strategic technology trend as one with substantial disruptive potential that is beginning to break out of an emerging state into broader impact and use; or as a trend that is rapidly growing with a high degree of volatility, and that will reach a tipping point over the next five years.

Trend No. 1: Artificial Intelligence (AI)
Trend No. 2: Social, Legal and Ethical IoT
Trend No. 3: Infonomics and Data Broking
Trend No. 4: The Shift from Intelligent Edge to Intelligent Mesh
Trend No. 5: IoT Governance
Trend No. 6: Sensor Innovation
Trend No. 7: Trusted Hardware and Operating System
Trend No. 8: Novel IoT User Experiences
Trend No. 9: Silicon Chip Innovation
Trend No. 10: New Wireless Networking Technologies for IoT

A bit about: The Internet of Things

Important Issues

1. For economic viability IoT is highly dependent on infrastructure – the use of common services available for multiple purposes – power, computing, connectivity, etc. This includes connectivity and now "sensing".
2. The pattern for wireless connectivity has been built out to maximize population coverage. There are many IoT Application Verticals that require both mobility and Area Coverage. Examples are Agriculture, Mining, Natural Resource Management, Connected Vehicles, Emergency Services, Healthcare, etc.
3. Digitizing the Planet – as a source of knowledge and as a critical resource for responsibly managing what we have.

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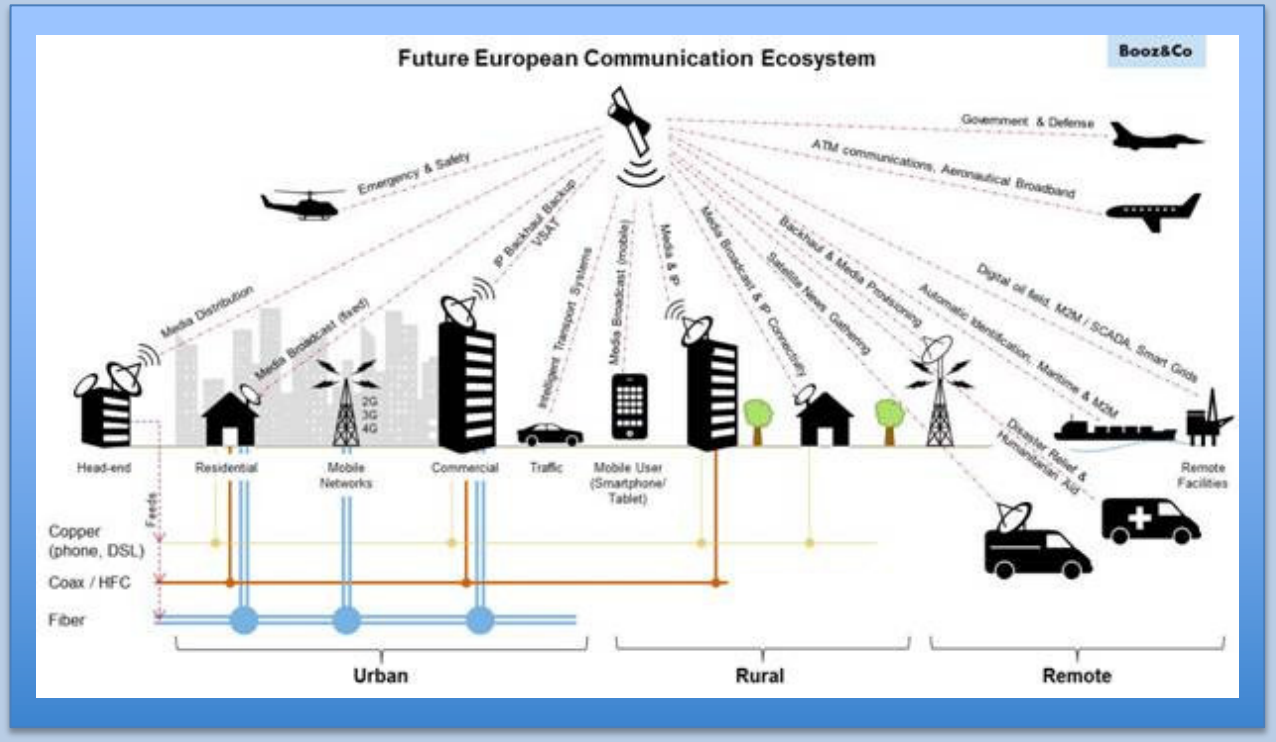
Source: Sanjay Raman, Robert Weigel and Tim Lee



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A bit about: The Internet of Space

Three Important Functions

- Unique source of sensor data and information
- A Component of the Communications Infrastructure
- An important service for space based assets

A bit about: The Internet of Space

Why now, and what has changed to make this possible:

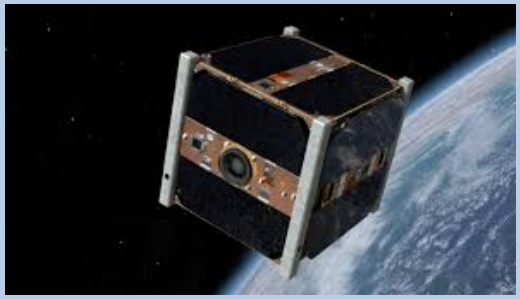
- Cost of access to space
- Miniaturization of building block components for space based systems – from mechanical to electronic
- Renaissance in underlying engineering disciplines and sciences and marked improvements in performance

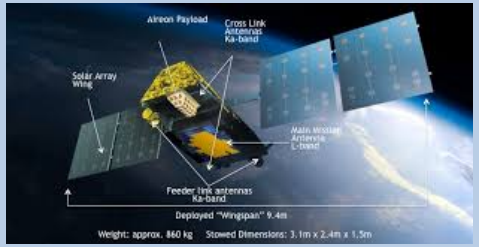
A bit about: The Internet of Space

Communications

- LEO, MEO, GEO
- Cross-Links
- Ground Infrastructure

- High Bandwidth
- Low Latency
- Precise Footprint





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A bit about: The Internet of Space

Sensors

- Position
- Imagery
- Radar
- Lidar
- Hyper-spectral
- ……..
- ……..

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Questions and Discussion