Can Cloud, Fog, and rAIn Bring us a Sunny Future?

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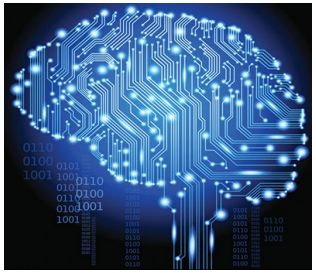
CTO – AI, IoT and Cloud
Qamcom Research and Technology

ESBRI
2018-09-27

AI, IoT, Cloud and Fog …

Artificial Intelligence



Learn from data to make inference or predictions

Machines mimic human cognition

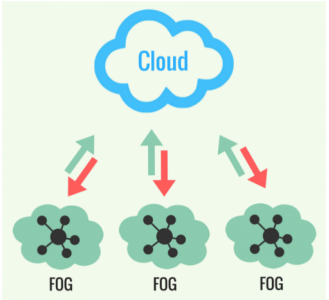
Internet of Things

Things That Talk To Internet

70B connected devices by 2025

Explosion of sensors/data

Cloud and Fog Computing



Cloud: Centralized High-performance compute and storage

Fog: Distributed compute close to things

Connected World

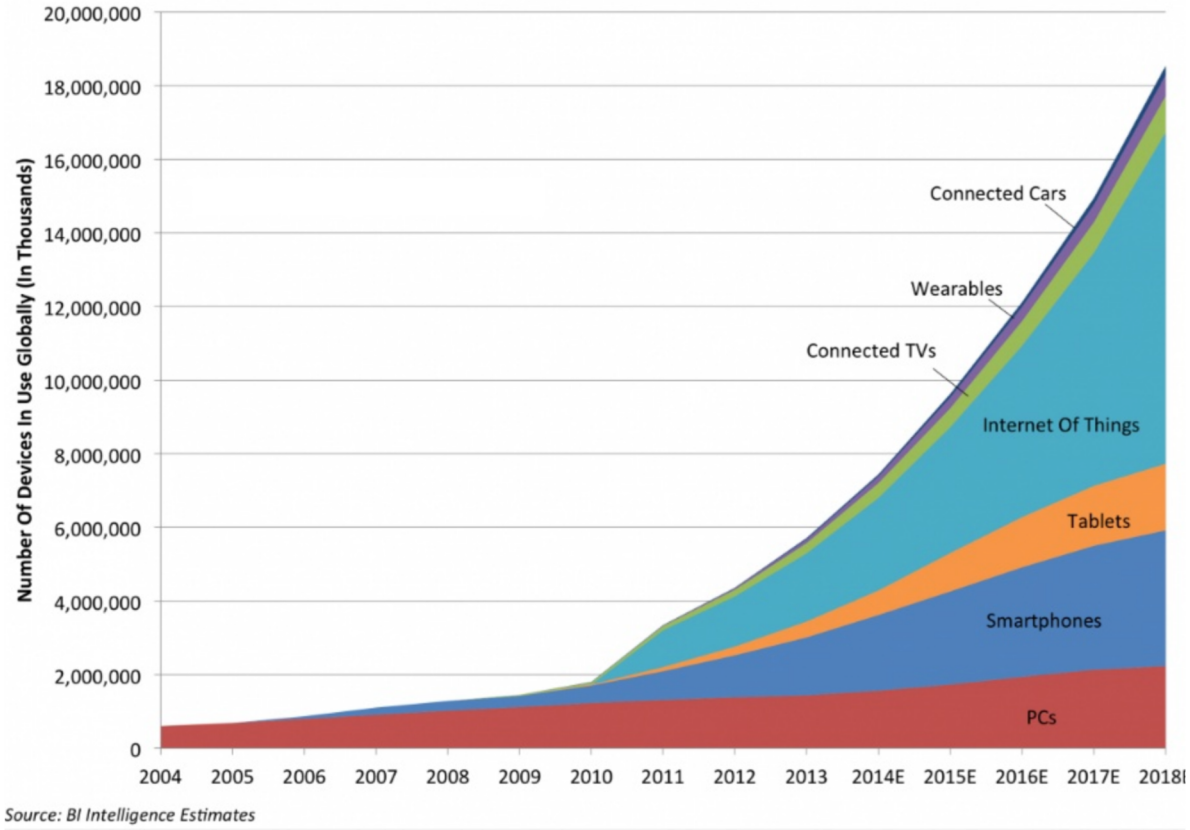
Data generated by IoT objects 2EB/day

A jet engine produces 20TB flight data/hour

A self-driving car produces 1-10TB data/day

More than 90% of the world's data created in last 2 years

Less than 1% of the data is utilized - McKinsey

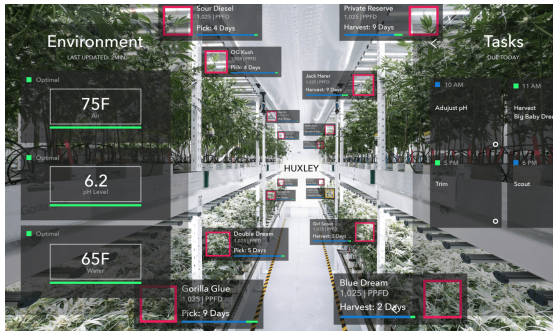


Future is Already Here …

Advanced Healthcare Systems

Smart Homes, Smart Cities

Environmental Monitoring



Augmented Human Intelligence and Power

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How is Technology Reshaping Business Landscape?

10 Most Valuable Companies, 1999

Rank	Company
1	General Motors
2	Ford Motor
3	Wal-Mart Stores
4	Exxon Mobil
5	General Electric
6	Intl. Business Machines
7	Citigroup
8	Altria Group
9	Boeing
10	AT& T

10 Most Valuable Companies, 2018

Rank	Company
1	Apple
2	Amazon.com
3	Alphabet
4	Microsoft
5	Facebook
6	Berkshire Hathaway
7	JPMorgan Chase & Co.
8	Exxon Mobil
9	Johnson & Johnson
10	Bank of America Corp.

"Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000"

Pierre Nanterme, CEO Accenture

Source: Fortune 500

How is Technology Reshaping the Business Execution?

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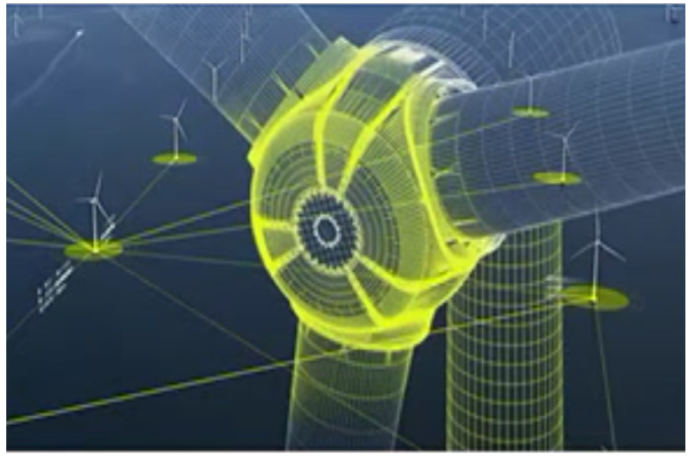
How is Technology Reshaping the Business Execution?

Predict ⟷ Product ⟷ Promote ⟷ Provide

Preventive maintenance



Demand forecasting

Predict Epidemics

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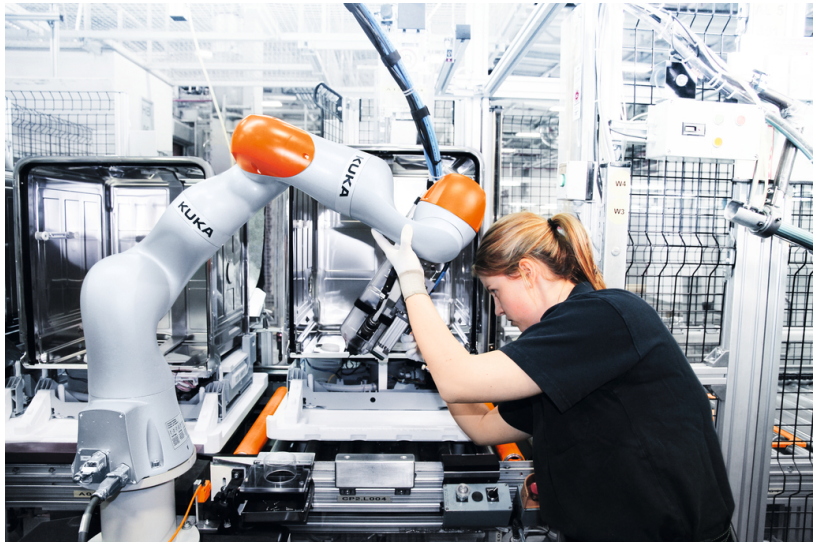
How is Technology Reshaping the Business Execution?

Predict ⟷ Product ⟷ Promote ⟷ Provide



Increase Automation:
Context-aware collaborative robots

Quality Improvement:
Reducing errors at product line

Higher Productivity
Lower Cost

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How is Technology Reshaping the Business Execution?

Predict ⟷ Product ⟷ Promote ⟷ Provide

Understand the state of the mind of the customers by the provided data

Set the right price to increase the revenue

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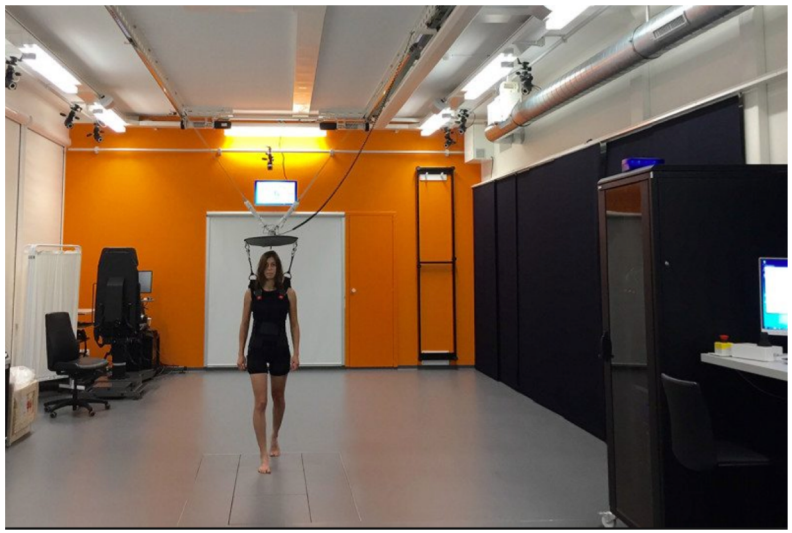
How is Technology Reshaping the Business Execution?

Predict ⟷ Product ⟷ Promote ⟷ Provide



Personalized Service

Enhanced Customer Experience

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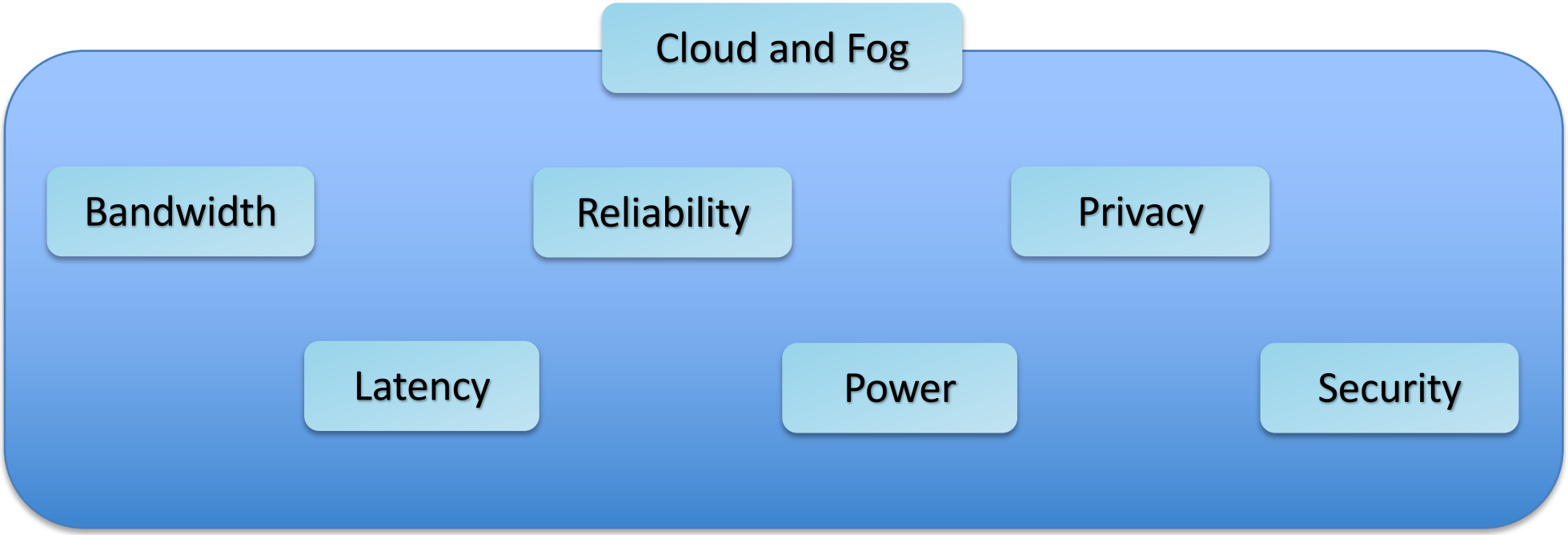
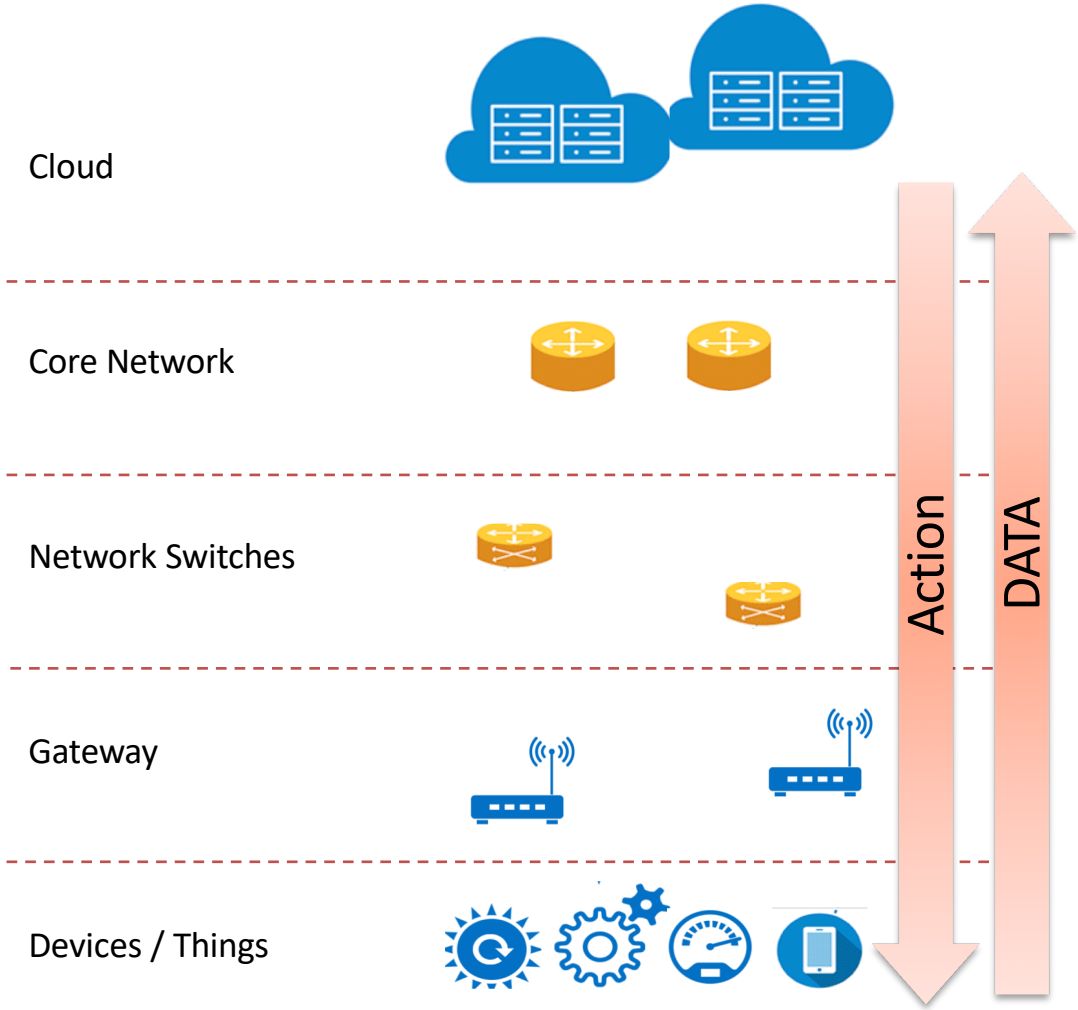
Technology Implementation



Cloud Infrastructure

High-performance centralized compute platform to enable AI



Cloud Infrastructure

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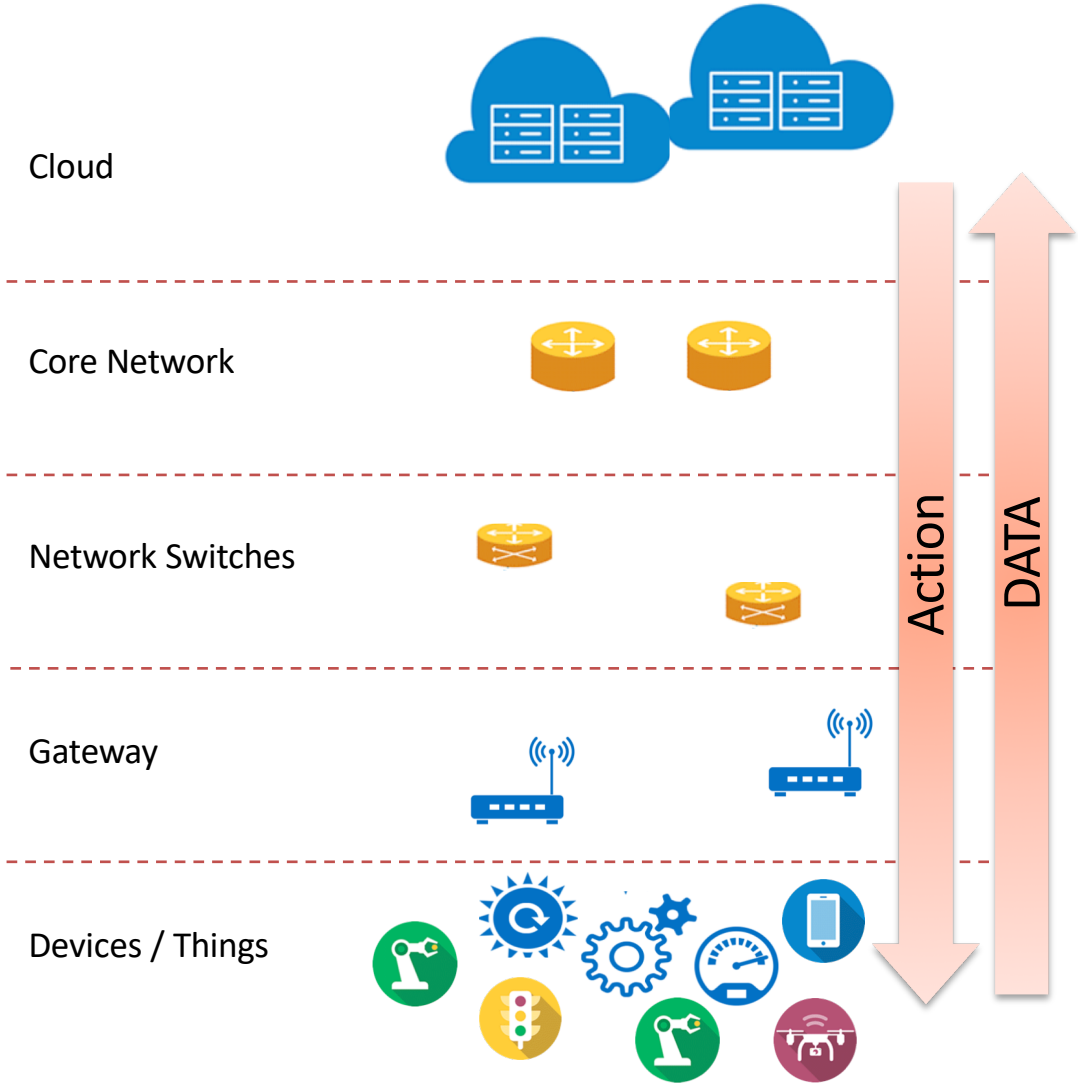
Limitations

- Network bandwidth
- Real-time actions

Data Gravity: Move analytics to the edge



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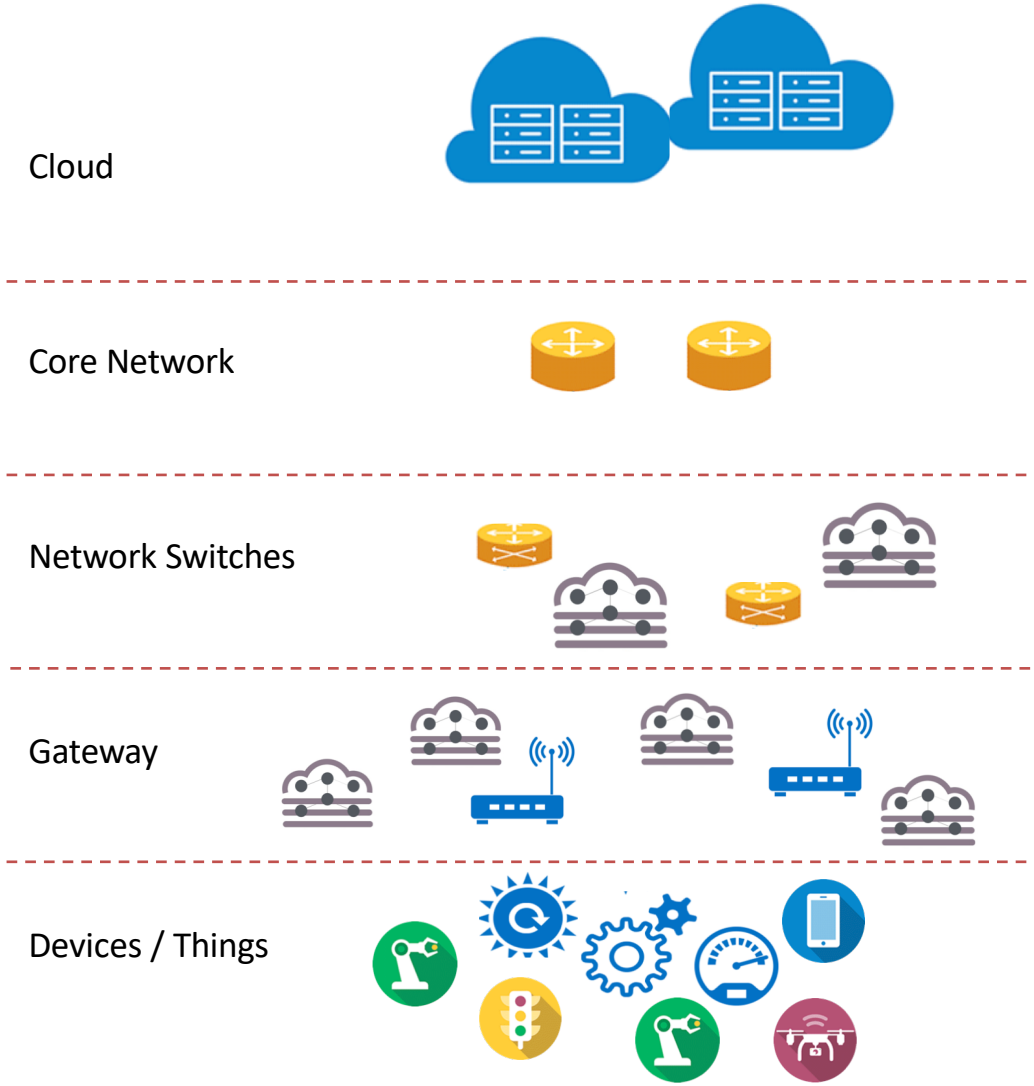
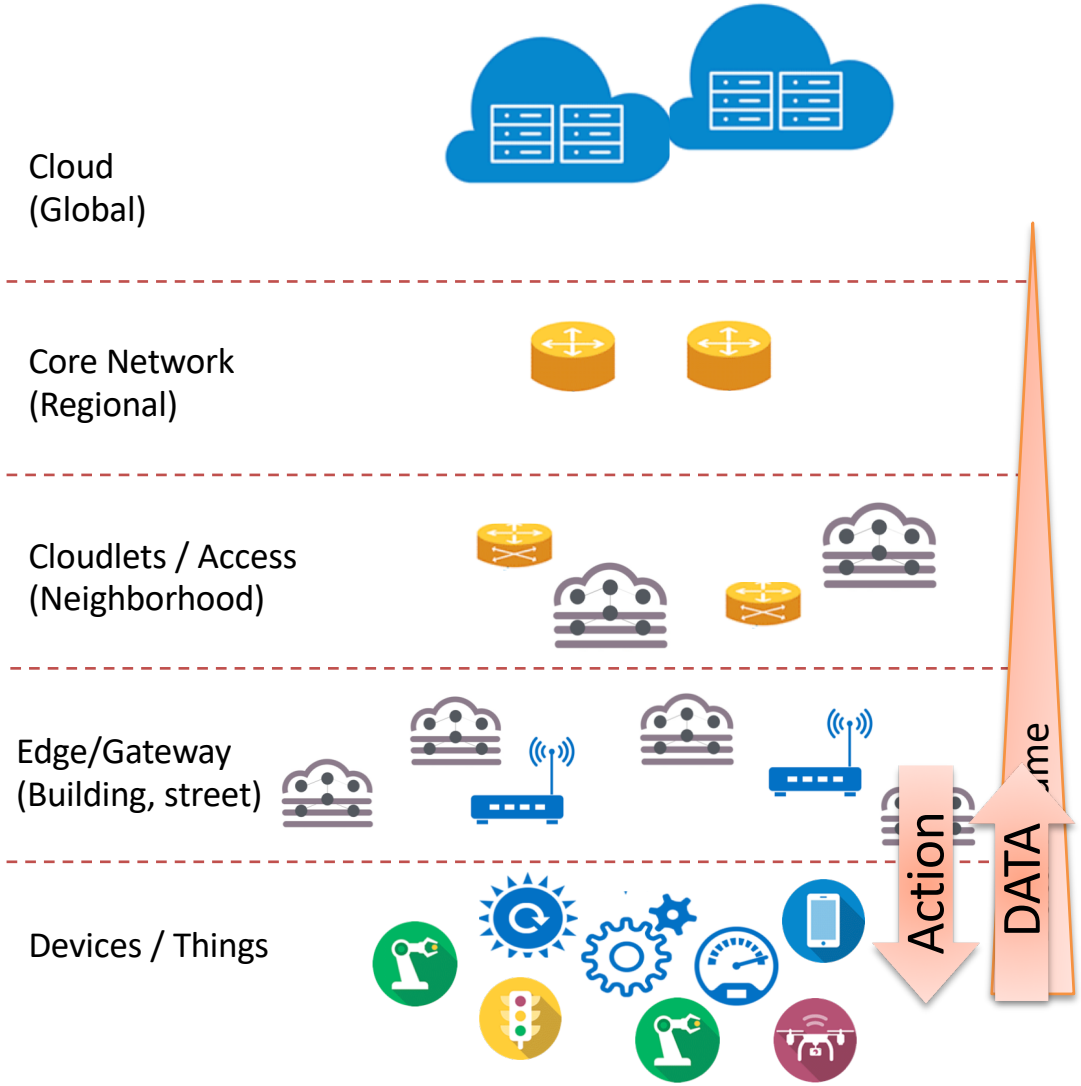


Fog Computing

Distributed processing and storage infrastructure

Fast Control Loop

Sense Inference Action



Camera – Cost of Pixels

- Camera cost dropping toward $5
- Compress data by understanding the image sequence

Format Camera-> cloud	3 years wired bandwidth	3 years storage of 1 year data @ 24/TB/year	Compression rate
Raw 4K UHD	$726,589	$2,259,984	1x
H.264p60	$3,650	$11,353	200x
H.264 1 fps	$61	$189	12,000x
H.264 1 fpm	$1	$3	720,000x

Source: http://www.cogniteventures.com

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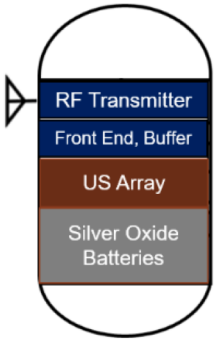
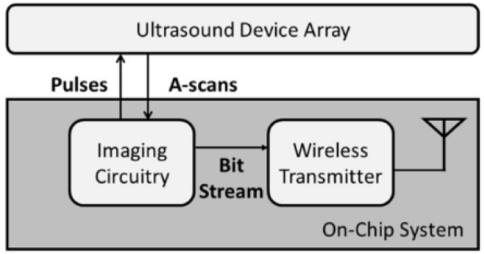
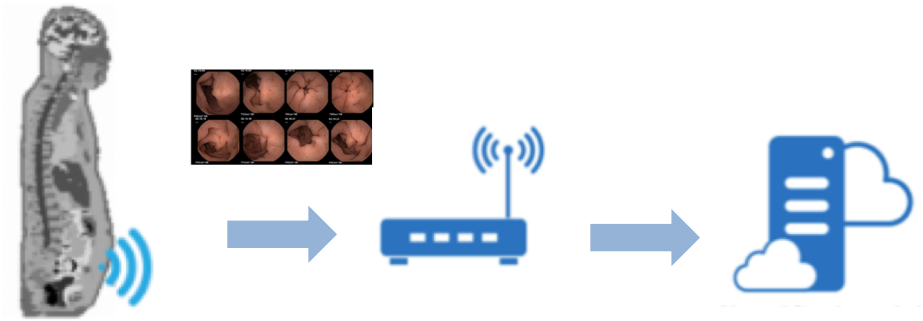
Ingestible Imaging Capsules

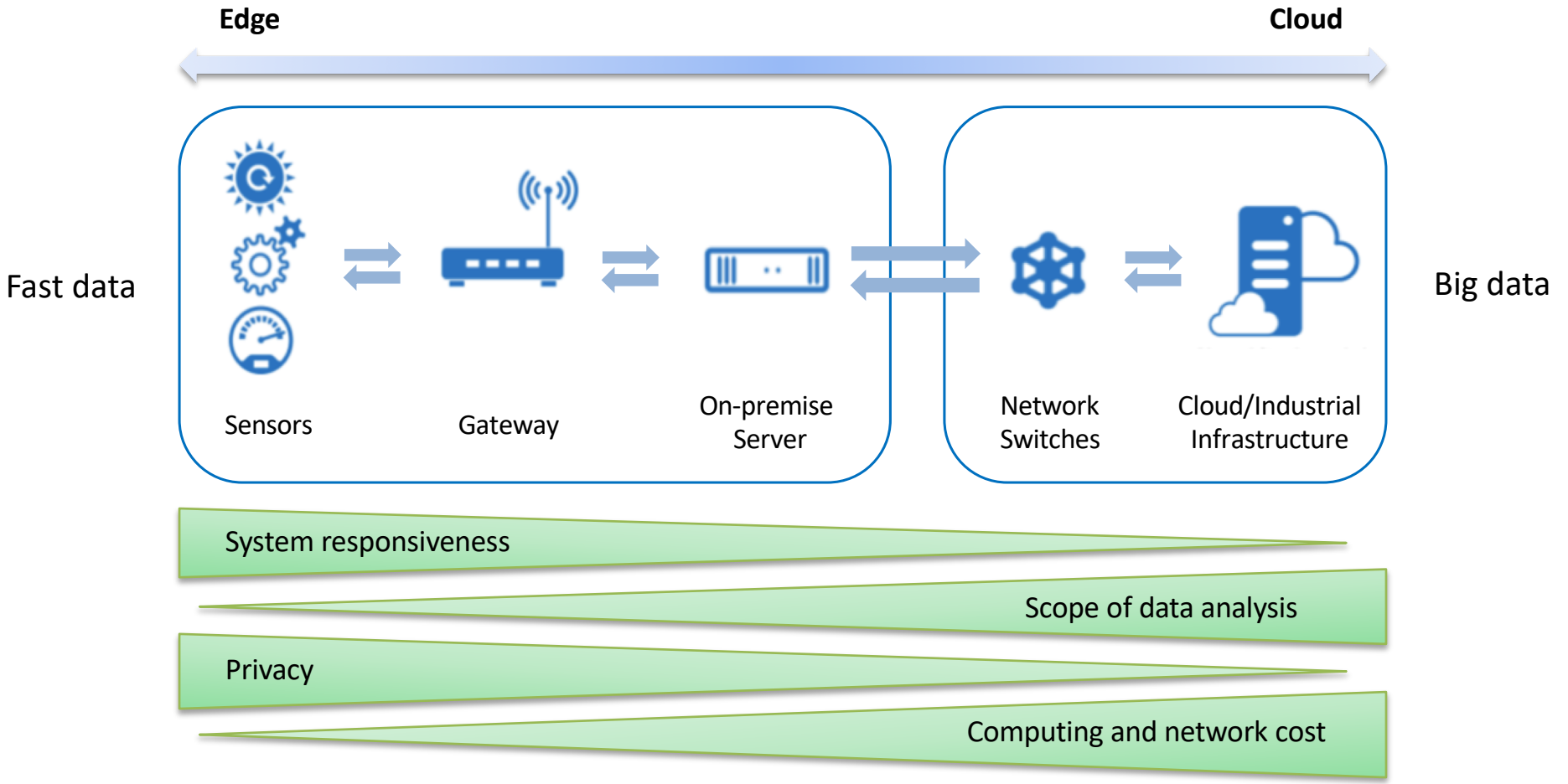
Capsule Ultrasound Device



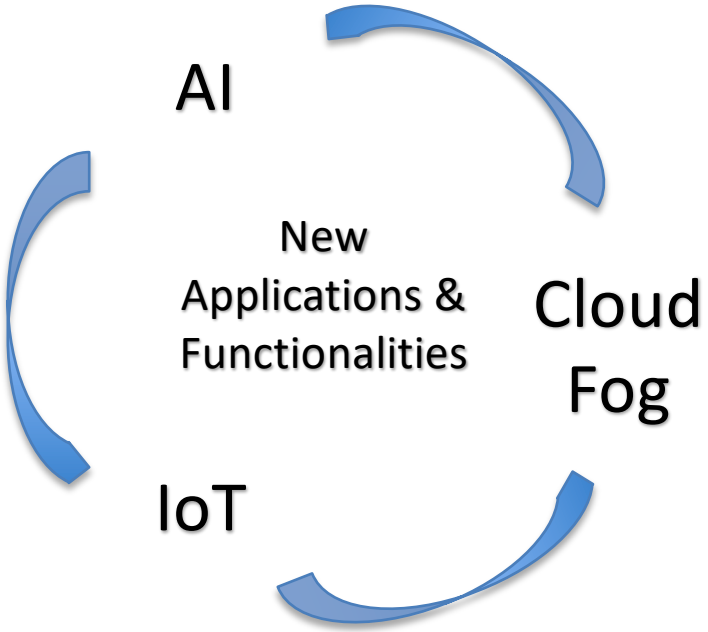




Edge to Cloud Continuum: System Tradeoffs



Takeaways



New Business Models

Products

Transition

Services, Capacity and Performance

Open Questions …

- Establish ethics and regulations
  - Responsibility
  - Privacy
- Certification of AI product
- Promote peaceful and inclusive AI for the benefit of everyone

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Thank You!