

# Governing IoT Records in an IG World

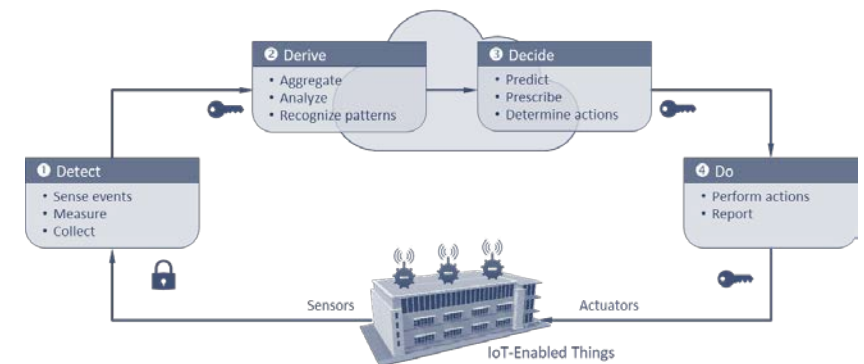


Records Knowledge Conference  
Sacramento, California  
May 23<sup>rd</sup>, 2019

By Bassam Zarkout

# Contents

- ❑ Introduction
- ❑ IoT Trustworthiness
- ❑ Related Topics
- ❑ Governance of IoT Data
- ❑ Conclusion



# Session: Governing IoT Records in an IG World

- IoT systems (smart cities, smart factories, smart healthcare, smart grids, etc.) are starting to produce massive amounts of data that dwarf the amounts produced by business systems:
  - IG professionals might tell you that this IoT data is corporate data that must be governed per se
  - IoT professionals will tell you... not so fast
- IoT Trustworthiness is a critical property of IoT systems that encompasses the convergence of:
  - IT issues like Security and Privacy with
  - Physical OT (Operational Technology) issues like Reliability, Resilience and Safety
- Important to look at the governance of IoT data through the prism of IoT Trustworthiness
- Session will describe the concept of IoT Trustworthiness and will cover how developers and operators of IoT solutions can:
  - Align IoT Trustworthiness objectives with the Information Governance objectives
  - Define levels of trustworthiness mandated by various laws and regulations
  - Establish levels of trustworthiness in their systems
  - Sustain them throughout the lifecycle journey of their IoT systems

# About Bassam Zarkout

- Technology tech executive (25+ years of experience in Canada, US, Europe)
  - Focus on IoT, Information Governance (IG) and Data Governance:
  - Public speaking, panelist, thought leadership, servant leadership, Twitter
  - IG, IoT, Privacy, AI, DL, etc.
- Held executive C-positions at RSD Switzerland (8 years)
  - CTO (technology), CSO (strategy)
  - Design/build RSD's Information Governance Platform
- Founded IGnPower in 2016
  - IoT consulting practice
    - Focused on IoT Trustworthiness related topics: Assessment, Journey, Program
  - IIC member since 2016
    - IoT Trustworthiness, Data Governance, Data Privacy, Data Residency, Data Protection
    - Industrial Digital Transformation and IT-OT convergence
    - Other areas: Industrial AI, Industrial DL



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@bzarkout

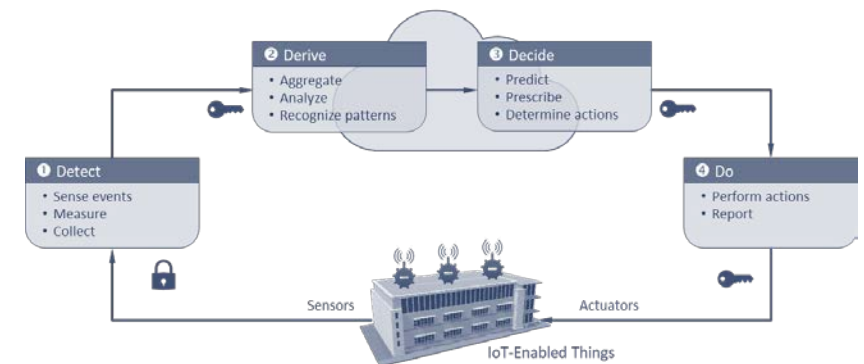


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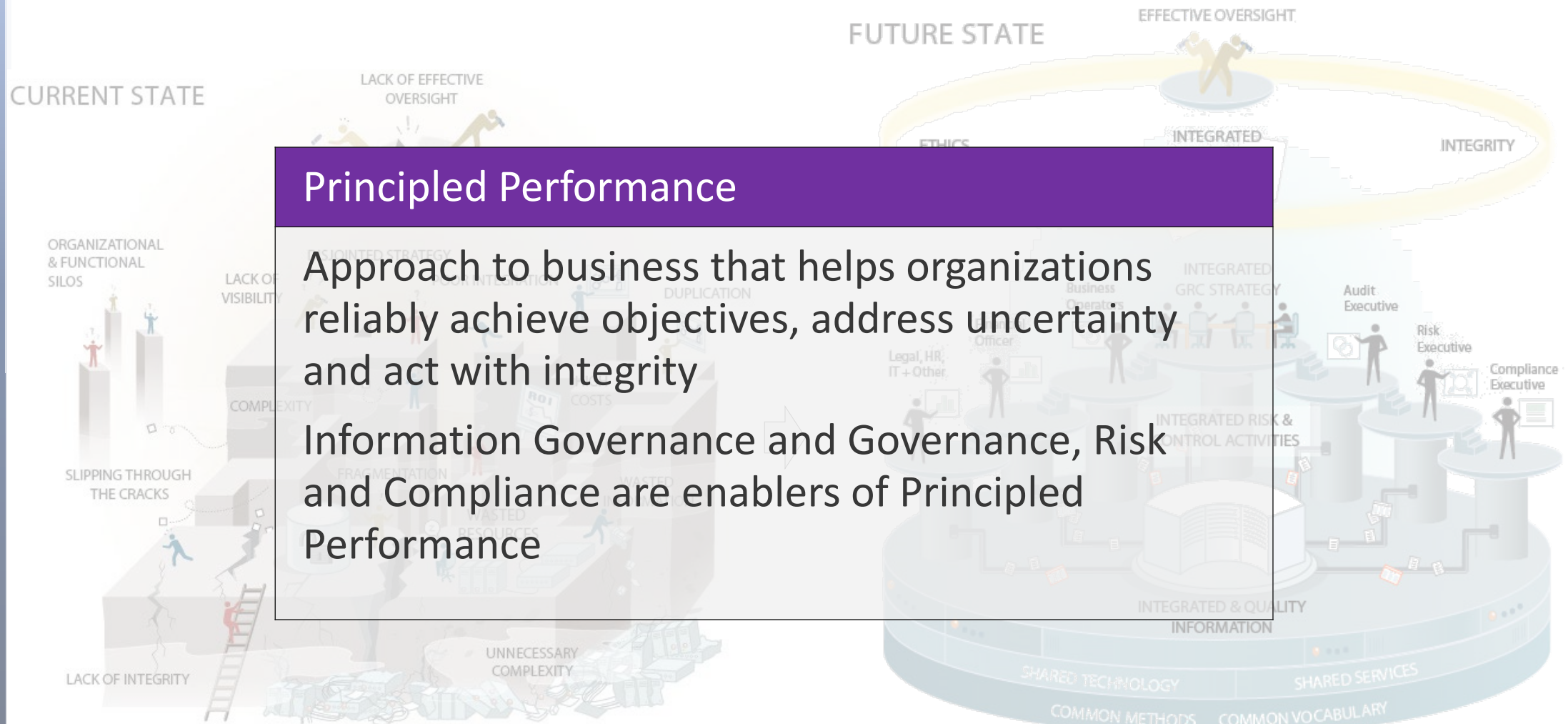


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# Principled Performance ↔ GRC ↔ IG



## Principled Performance

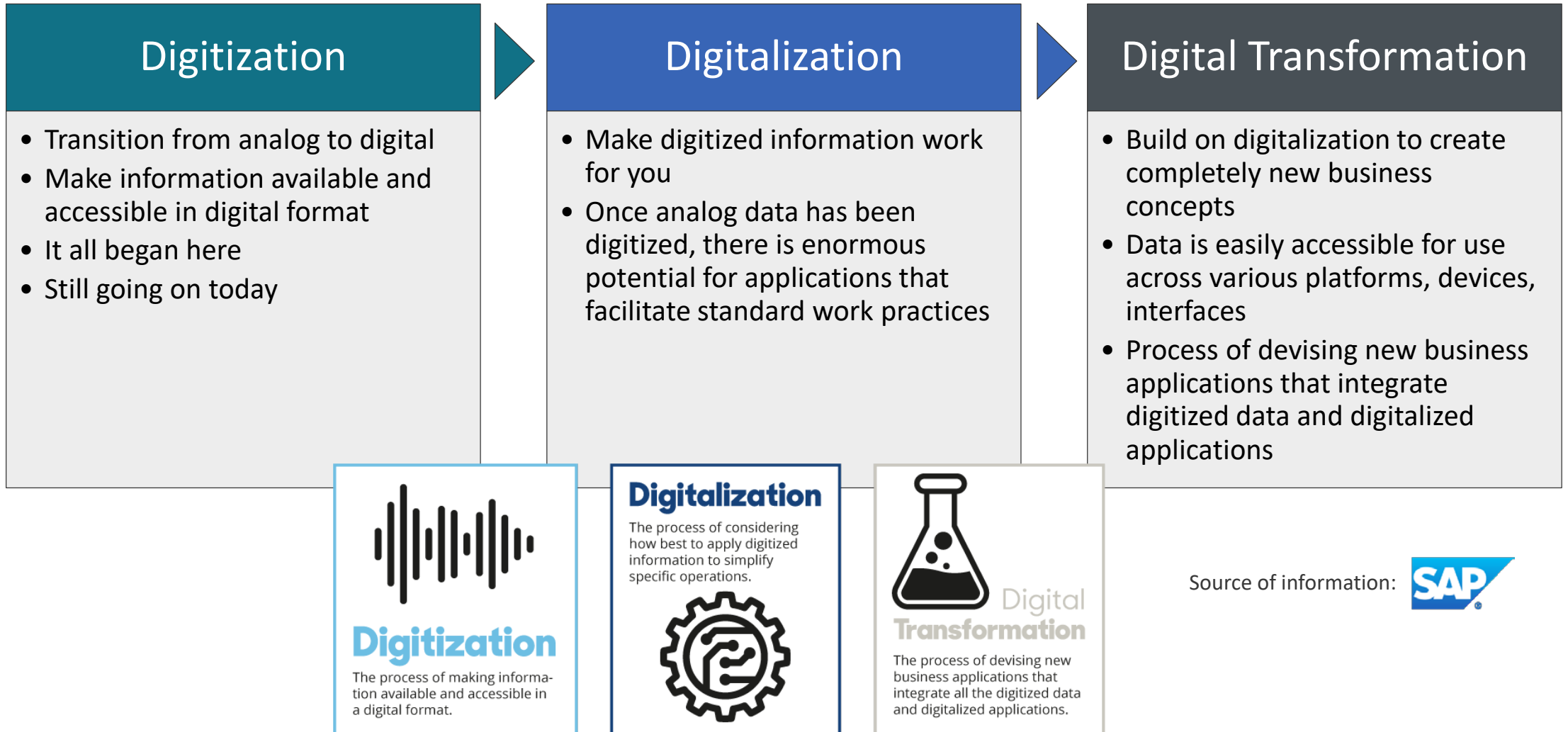
Approach to business that helps organizations reliably achieve objectives, address uncertainty and act with integrity


Information Governance and Governance, Risk and Compliance are enablers of Principled Performance

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# Digitization vs Digitalization vs Digital Transformation



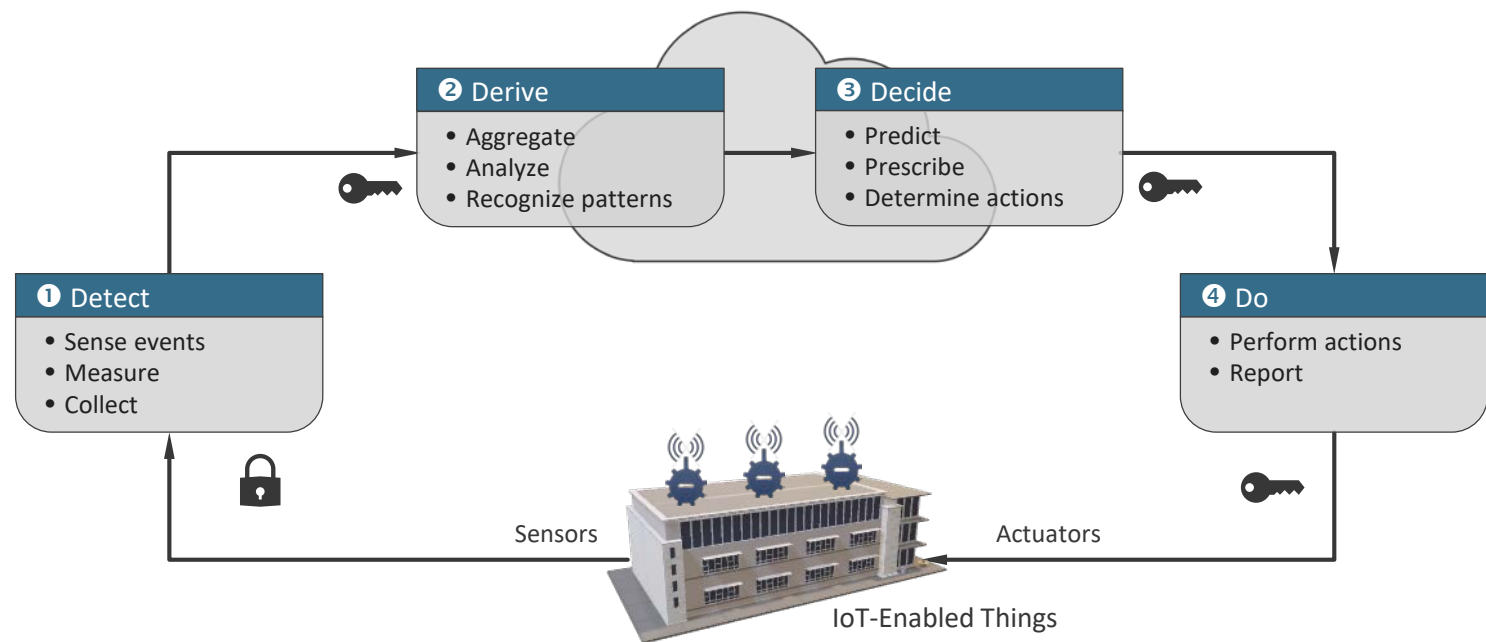
Source of information: 

# Internet of Things is more than IT for Things

## Key enabler for Digital Transformation

- Capture operational data
- Analyze and exploit that data
- Gain insight about the operation of things
- Control them and alter their behavior

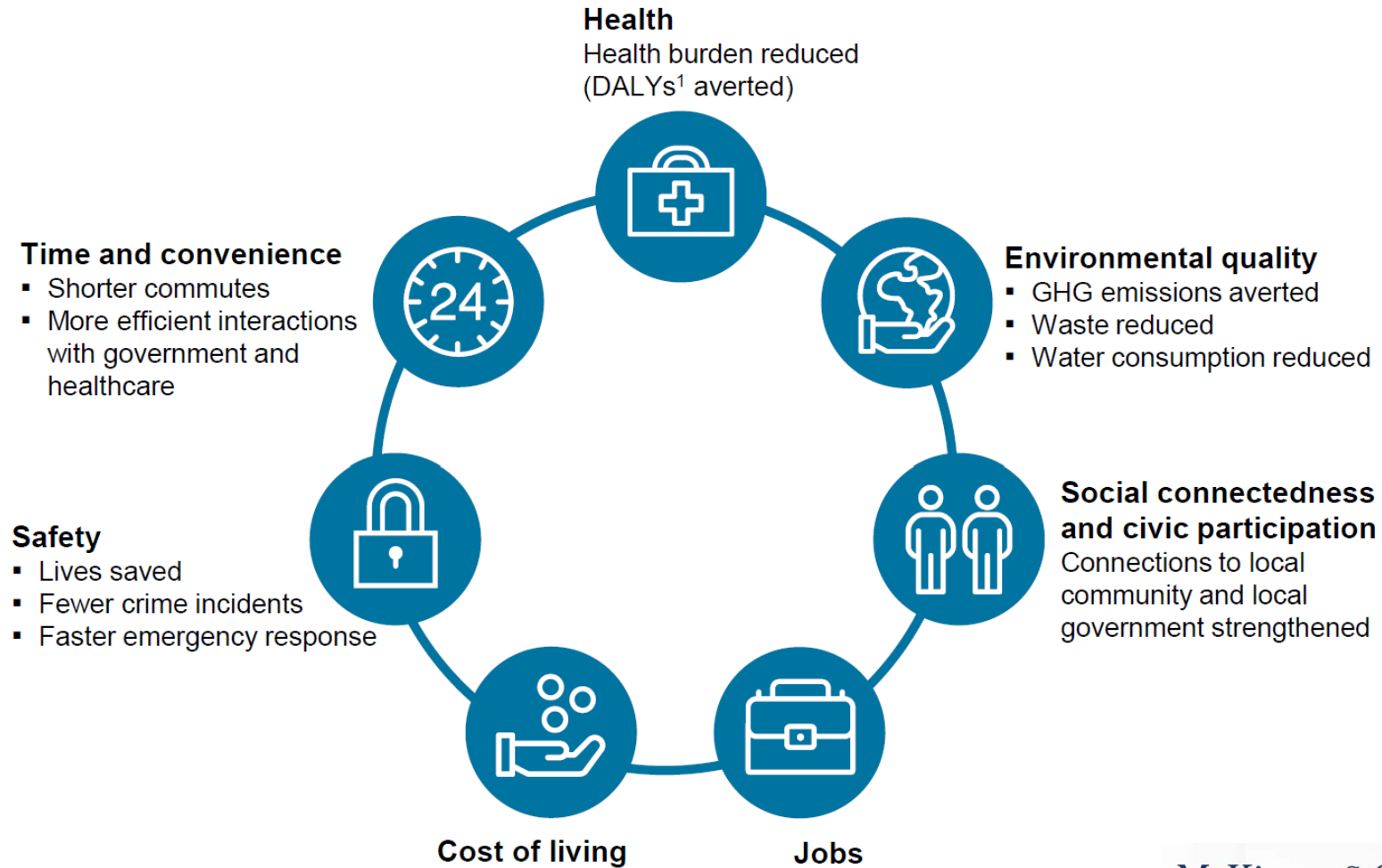
Produce Better Outcomes



Principle of operation of IoT systems is straight forward



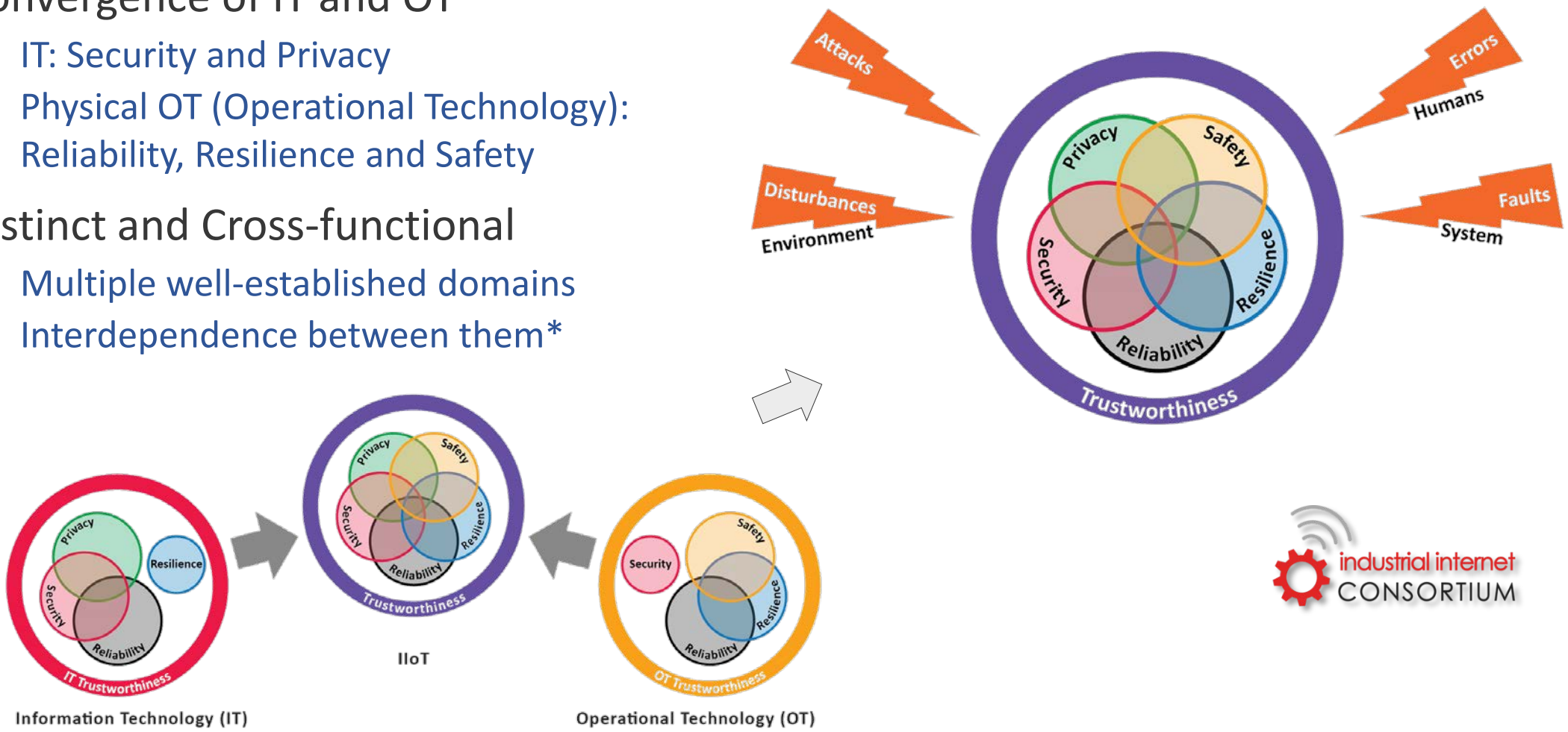
# Example Benefits of IoT Solutions: Smart Cities



McKinsey&Company

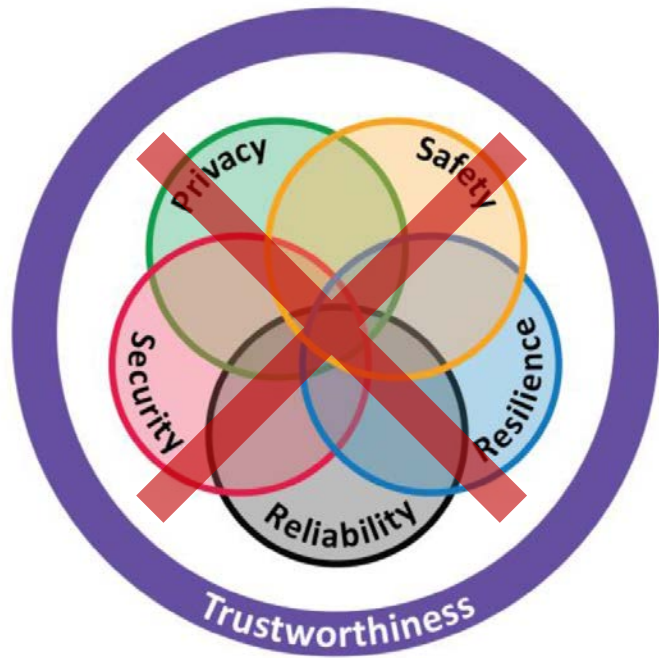
# IoT Trustworthiness

- Convergence of IT and OT
  - IT: Security and Privacy
  - Physical OT (Operational Technology): Reliability, Resilience and Safety
- Distinct and Cross-functional
  - Multiple well-established domains
  - Interdependence between them\*



\* Example: Delaying Security updates to maintain Reliability levels can negatively affect Safety.

# Acting badly leads to negative consequences



Inaction, poor awareness, and lack of visibility and planning → low levels of IoT Trustworthiness → negative consequences

- Risks to human life
- Long term negative impact on environment
- Interruption of critical infrastructure
- Unauthorized disclosure of sensitive data
- Destruction of equipment
- Economic loss
- Damage to reputation
- Non-compliance with regulations
- Liability and litigation

# States of IoT Trustworthiness

## Current State

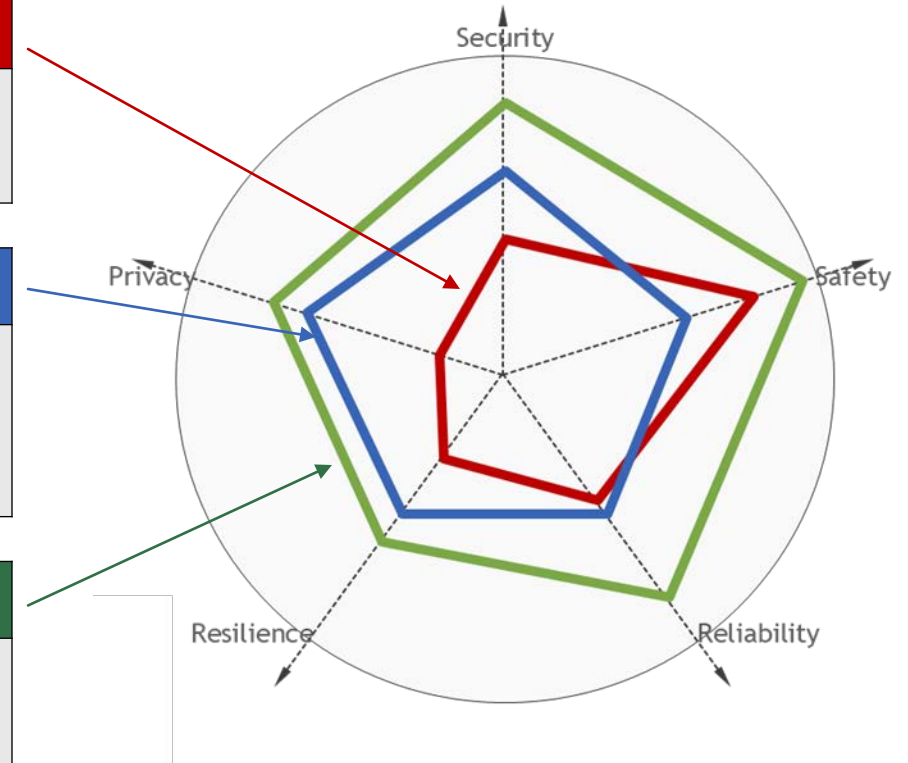
- Actual state as it exists now
- Progresses over time

## Minimum State (external drivers\*)

- Min non-negotiable and mandated level
- Laws, regulations, standards, best practices, etc.
- Jurisdictional variations

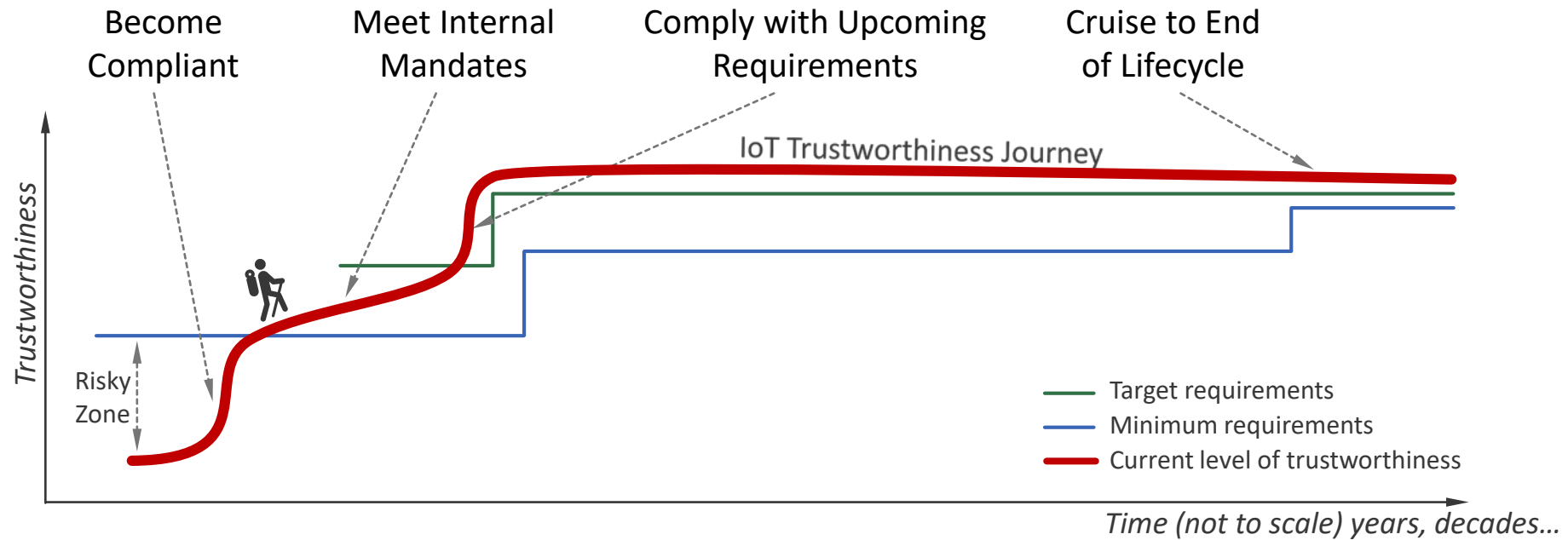
## Target State (internal drivers)

- Objective level of Trustworthiness to achieve
- Alignment with corporate vision, ROI, risk, etc.
- Alignment with product strategy and roadmap



\* Eg: OSHA 29 CFR 1910, IEC 61508, EU GDPR, EDRM.net, etc.

# IoT Trustworthiness... is a Journey



Trustworthiness requirements may change during lifecycle  
 System structure & architecture may change/evolve  
 IoT data produced/consumed have their own lifecycle



Intelligent Transportation Systems

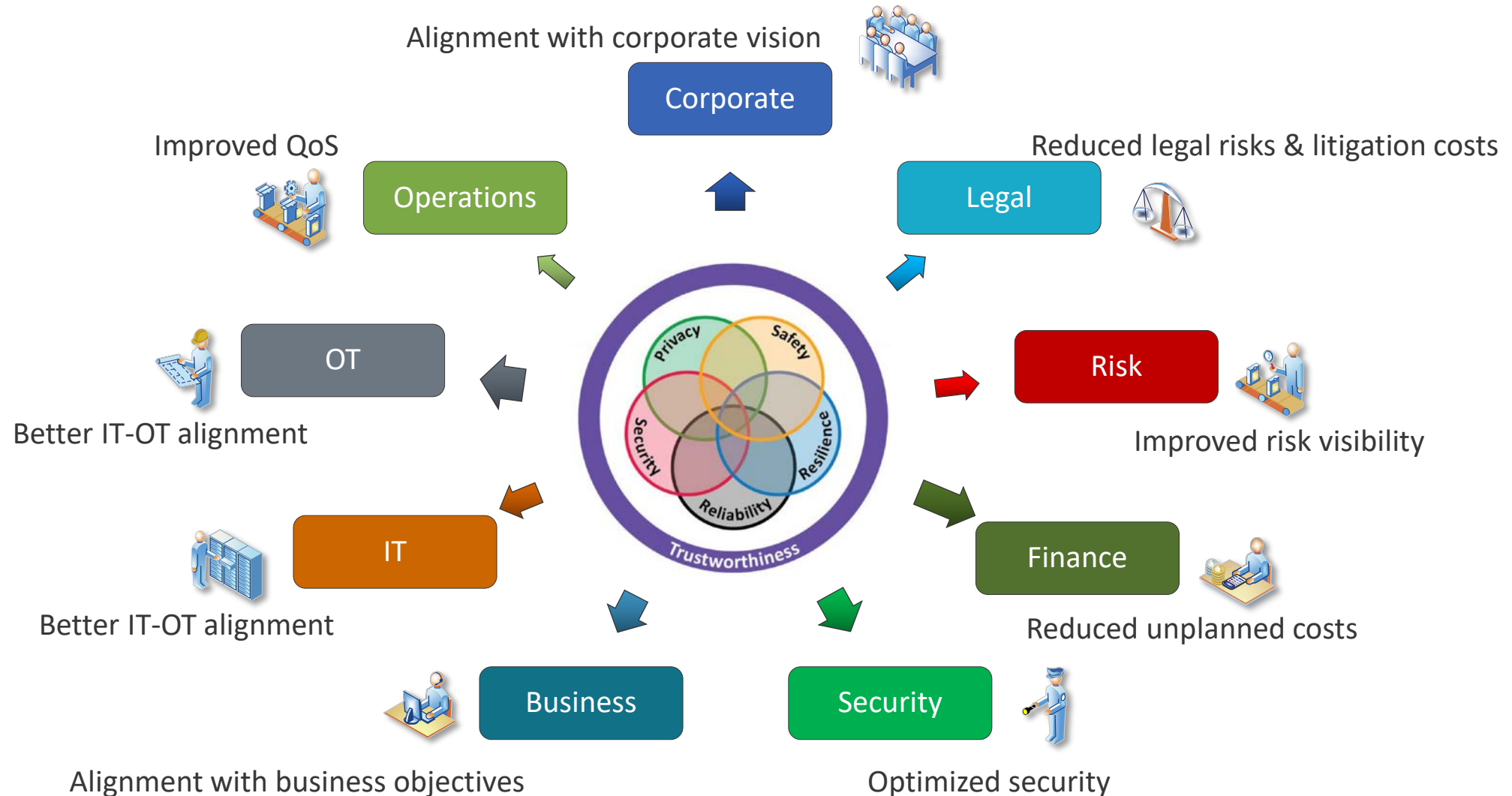
# IoT Trustworthiness Journey MUST be powered by a Program



Responsibilities? | Profile/Role? | Reporting? | Budget?



# IoT Trustworthiness... MUST deliver real value to the organization



# IoT Trustworthiness ↔ Principled Performance in IoT systems

## Principled Performance

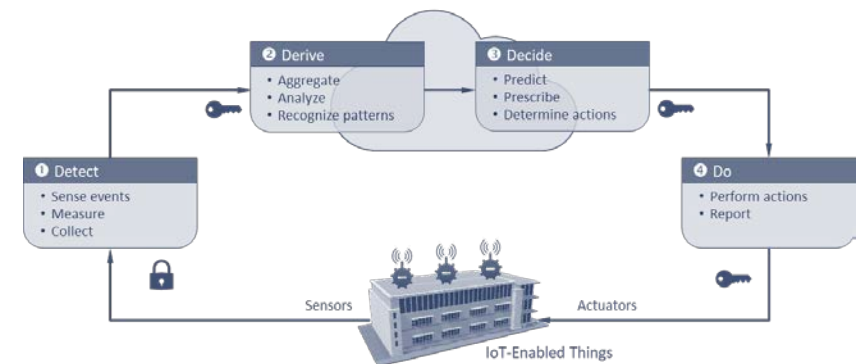
Approach to business that helps organizations reliably achieve objectives, address uncertainty and act with integrity

IoT Trustworthiness is an enabler of Principled Performance in IoT systems



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# Topics related to IoT

**Trust**  
Distributed Ledger




**Autonomy**  
Artificial Intelligence



**Protection**  
Cybersecurity




**Confidentiality**  
Privacy



**Connectivity**  
5G



**Immediacy**  
Edge Computing



# Distributed Ledger (DL)

- ❑ Blockchain → type of Distributed Ledger
- ❑ Cloud-based database shared by every participant in a transaction
  - Essentially a peer-to-peer ledger
- ❑ Blockchain protects data integrity
  - Secure data integrity
  - Strengthen chain of custody of data
- ❑ Integrated approach
  - IoT, Ubiquitous Connectivity (5G), AI, etc.
  - Cloud is so 2010's... welcome to Fog & Edge

2,308 views | May 19, 2019, 11:16am

## Blockchain Is Gaining Trust In The Enterprise



**Louis Columbus** Contributor  
Enterprise & Cloud

### TWEET THIS

- 83% of senior executives say their enterprises are seeing compelling use cases for blockchain today.
- 40% of enterprises are willing to invest \$5M or more in new blockchain initiatives over the next 12 months.



ISTOCK

# Distributed Ledger (DL)

- ❑ Smart Cities
  - Improve operational efficiency, drive citizen engagement, identify new revenue sources, etc.
- ❑ Smart Contracts
  - Computer protocols that facilitate, verify, or enforce negotiation / performance of contract
  - Smart Contracts in State Government business
- ❑ Supply Chains
  - Time Is Right For Disruption (Forbes)
  - Government, Aerospace, Automotive, other

IDG CONTRIBUTOR NETWORK [Want to Join?](#)  
**DEFINING THE CONNECTED FUTURE**  
By Dilip Sarangan, Contributor, Network World |  
MAR 1, 2018 10:07 AM PT  
Opinions expressed by ICM authors are their own.

**OPINION**  
**Digital transformation of cities: Creating smart and engaged communities with IoT**  
Ubiquitous connectivity, AI, distributed computing and blockchain help cities transform their data to actionable intelligence.

[Twitter](#) [Facebook](#) [LinkedIn](#) [Google+](#) [Reddit](#) [StumbleUpon](#) [Email](#) [Print](#)

An isometric illustration of a modern city with various buildings and streets. Several circular icons are overlaid on the scene, representing different IoT and smart city concepts: a person with a gear, a shopping cart, a factory, a heart with a pulse line, and a leaf with a drop.

**Central Blockchain Council of America** @cbca\_insights · May 18  
There are many impactful **#Blockchain** business use cases for industries like **#RealEstate**, Government and **#FinancialServices**, here are the obvious and not-so-obvious blockchain benefits in **#SupplyChain** industry: [bit.ly/2M6u66v](https://bit.ly/2M6u66v)  
**#Bitcoin #CryptoCurrency #CyberSecurity**

A graphic with a dark blue background. It features a glowing blue globe with binary code (0s and 1s) and a hand holding a glowing blue cylinder. The text "BLOCKCHAIN THE PERFECT MATCH FOR SUPPLY CHAIN" is written in white, bold, capital letters. The logo for the Central Blockchain Council of America is in the top right corner.

**BLOCKCHAIN  
THE PERFECT MATCH  
FOR SUPPLY CHAIN**

CENTRAL BLOCKCHAIN COUNCIL OF AMERICA

1 1 1

# AI in various domains

**Autonomous cars mean a new mindset for motoring**

With car-sharing gaining traction, carmakers are moving towards a different business model, while also developing a brand of electric vehicles

BY OLIVER PICKUP - SEPTEMBER 14, 2018

**Text and data analytics**

We explain how

>>> IAA

**Retailers can know more about what shoppers want – sometimes before shoppers themselves**

Facial recognition software, machine learning, and natural language enable virtual agents to greet you personally, anticipate orders, and provide directions

Machine learning personalizes promotions to match shoppers' profiles; in-store beacons send offers to their smartphones as they browse through the store

Autonomous drones using deep learning technology complete last-mile delivery, and are able to handle obstacles or absent recipients

Computer vision with deep learning identifies articles bagged by shoppers;

**AI can make the smart grid smarter and reduce the need for utilities to add power plants**

Sensors and machine learning allow for by-the-minute adjustments to maximize generation efficiency by adjusting to changes in wind conditions, for example

Machine learning-enabled forecasting anticipates supply and demand peaks, and maximizes the use of intermittent renewable power

Smart wires combine with machine learning to enable real-time power dispatching, and optimize it to current grid load and to buildings' asset portfolios

Drones and insect-sized robots can identify and predict failures to inspect and maintain production

- Keeping well
- Early detection
- Diagnostics
- Decision making
- Treatment
- End of life care
- Research
- Training

## 7 ways artificial intelligence is transforming healthcare

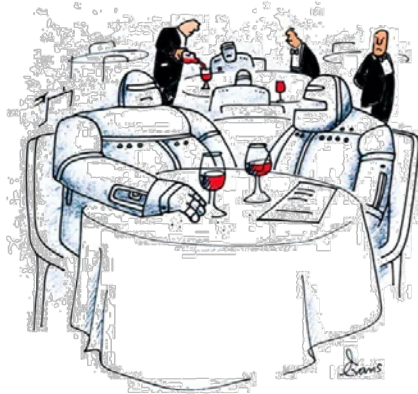




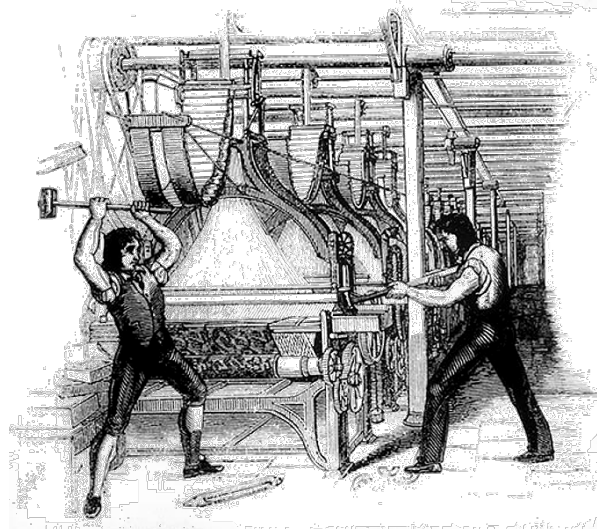
# Various AI Topics: Jobs, Ethics

## AI Impact on Jobs

- Fully automate simple and repetitive tasks? or
- Augment workers experience in complex tasks?



*'I can't imagine why they ever thought we'd take their jobs away.'*



The Luddites in 1812

## AI Ethics

1. Do no harm
2. Generate net benefits
3. Comply with laws and regulations
4. Protect privacy
5. Be fair
6. Be transparent and explainable
7. Be accountable

## Gavin Newsom (California Governor) at HAI 2019 Stanford CA

- ❑ “I read [PricewaterhouseCoopers]: 38 percent of jobs will be automated in the next 15 years. Then I relax because Bain comes out and says just 25 percent of the jobs in the next 20 years. Then Oxford says, that’s an old study, that 47 percent is only in 702 job categories, not all job categories. Then I got James [Manikya], which says it’s just 60 percent of current jobs that will be just 30 percent augmented.”
- ❑ With that kind of conflicting information flying around, Newsom asked rhetorically, “what do you want me to do as a policymaker?”



# Cybersecurity... a major concern



**NIST**

National Institute of Standards and Technology  
Technology Administration, U.S. Department of Commerce

## The Internet of INSECURE Things

From Stuxnet to Mirai to whatever insecurity comes next, billions of Internet-connected devices are under threat from an evolving arsenal of hacks and attacks.

**Internet of DANGEROUS Things**

About **25%** of these "Internet-connected" devices could kill or injure people if hacked.

**Why aren't IoT devices more secure?**

Too many embedded systems designers are more focused on shipping products than the security of the devices and their users. Nearly 22% say they don't even have security on their to-do list. Many design best practices that raise security levels aren't followed.

**BUG TRACKING**

Bug tracking is critical to ensure that problems don't fall through the cracks.

**17%** Don't have a bug database or other system to track known issues

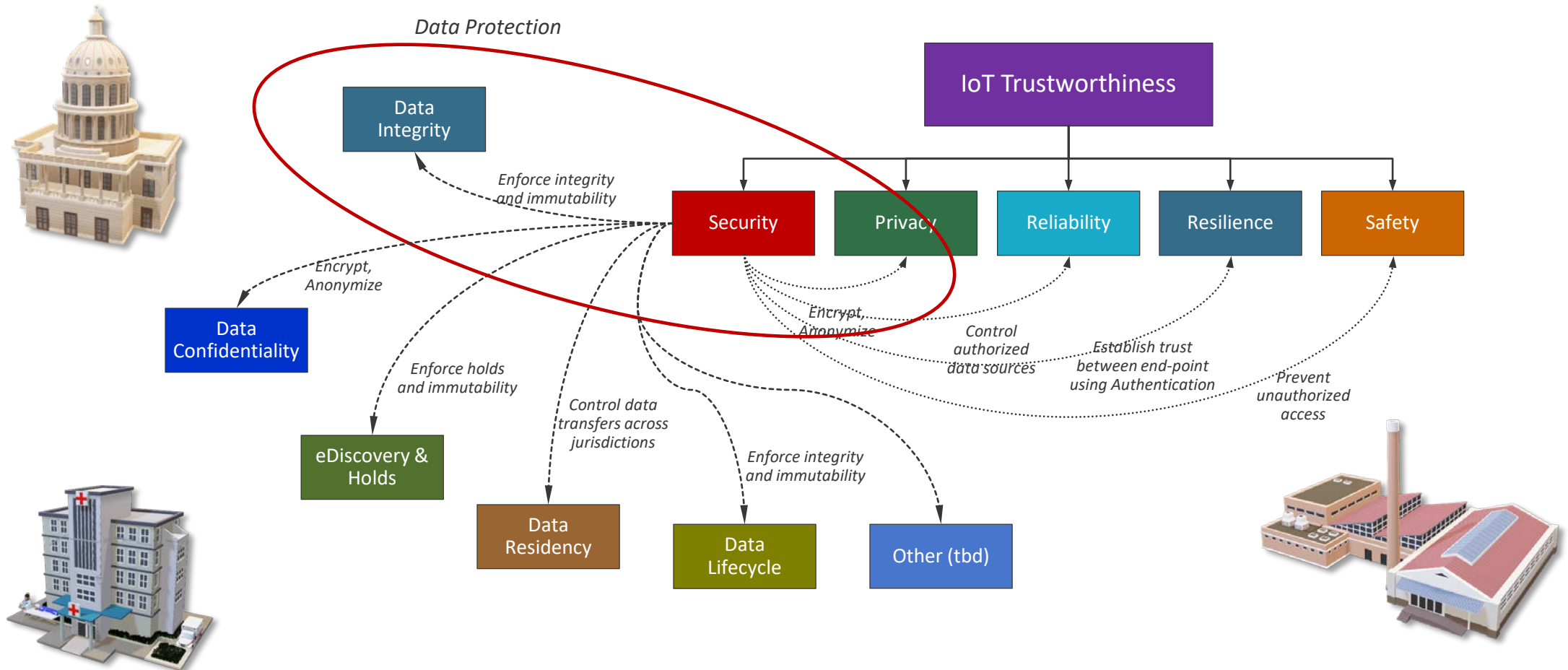
**54%** Don't perform

**CODE REVIEWS**

A second set of eyes on



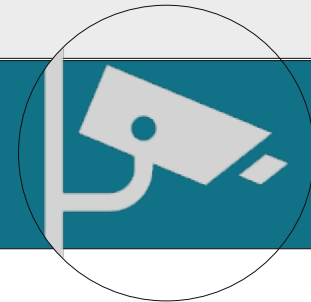
# Data Protection and the important role of Data Security



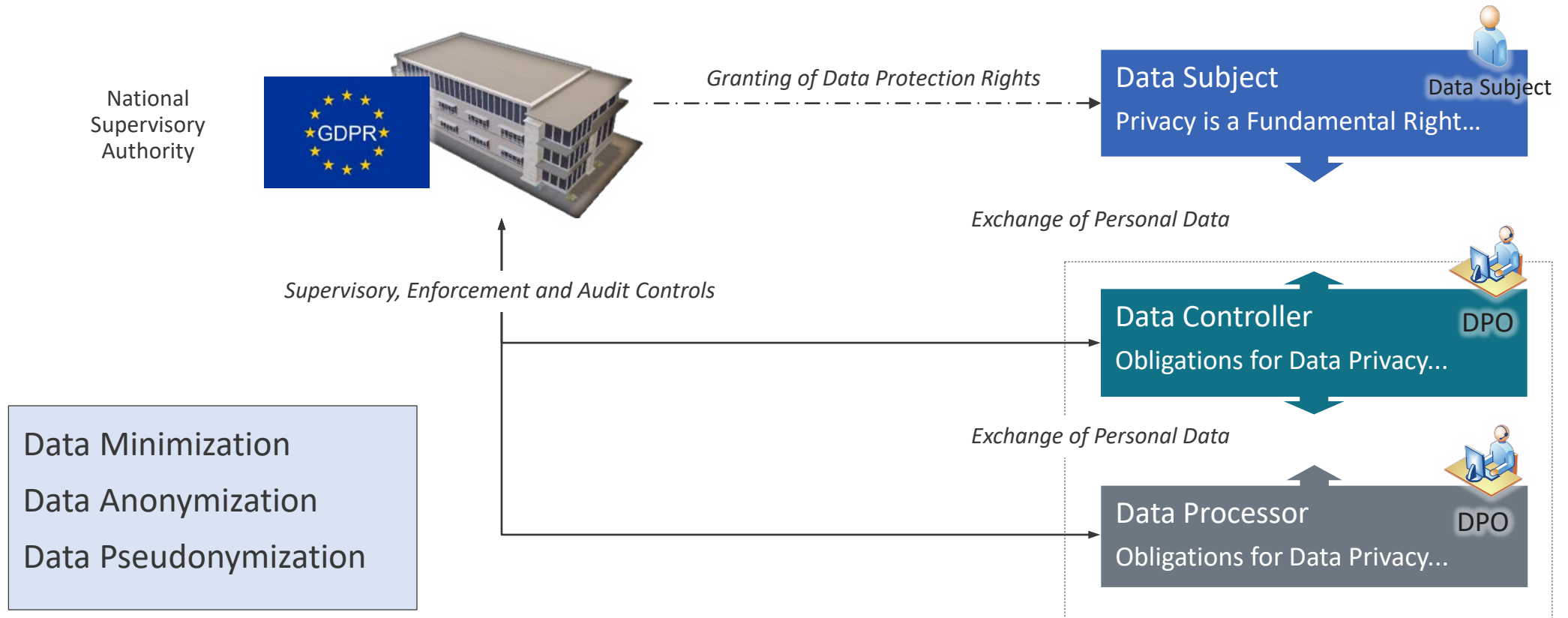
# Information and Data Protection & Privacy

- Aspect of Information Technology that deals with the ability of an Organization to determine what Personal Data (data about individuals) can be shared with 3<sup>rd</sup> parties
- Privacy Laws in the US
  - US Federal Privacy Act
  - State-level Privacy Acts, eg CCPA
  - HIPAA
  - PCI
  - Other

Information & Data Privacy



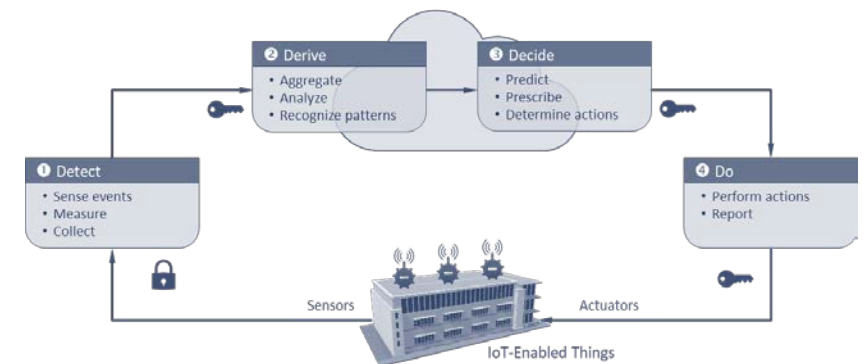
# Information and Data Protection & Privacy



Data Security plays a central role in Data Privacy

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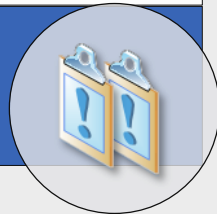


# Challenges facing Information Governance

Despite its short history, Information Governance has had its fair share of challenges...

- Lack of maturity in discipline and organizations
- Technical complexity
- Organizational complexity
- Moving target... Privacy, IoT, Blockchain, etc.

IG practices are maturing



- Long on vision
- Short on execution
- Short on effective executive sponsorship

Most IG programs not well established



- Tighter IT budgets
- Most CIOs focused on infrastructure
- RM stuck in the past
- Business Leaders focused on business

Unclear who is in charge



## Information Governance Program



Reduce cost of ownership of corporate information

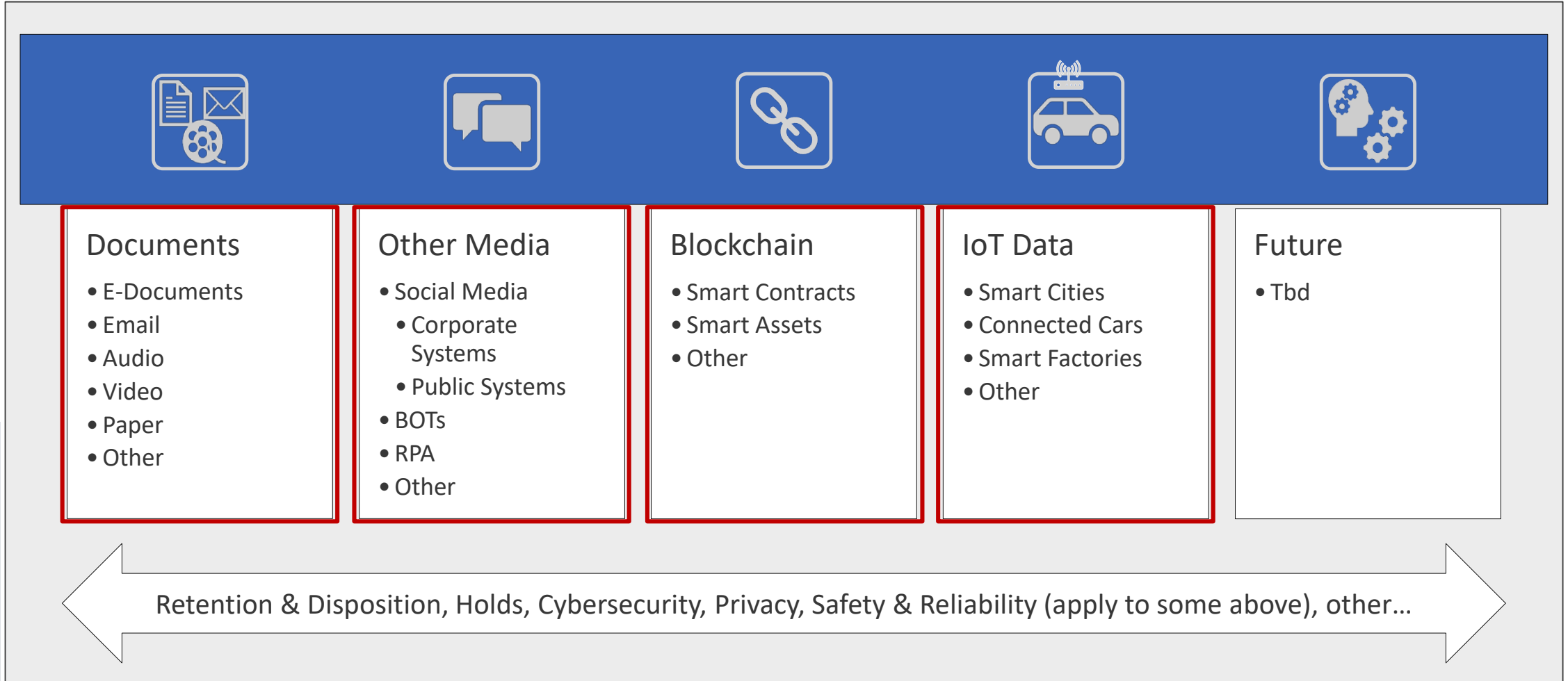


Reduce legal and regulatory compliance risks associated with owning information



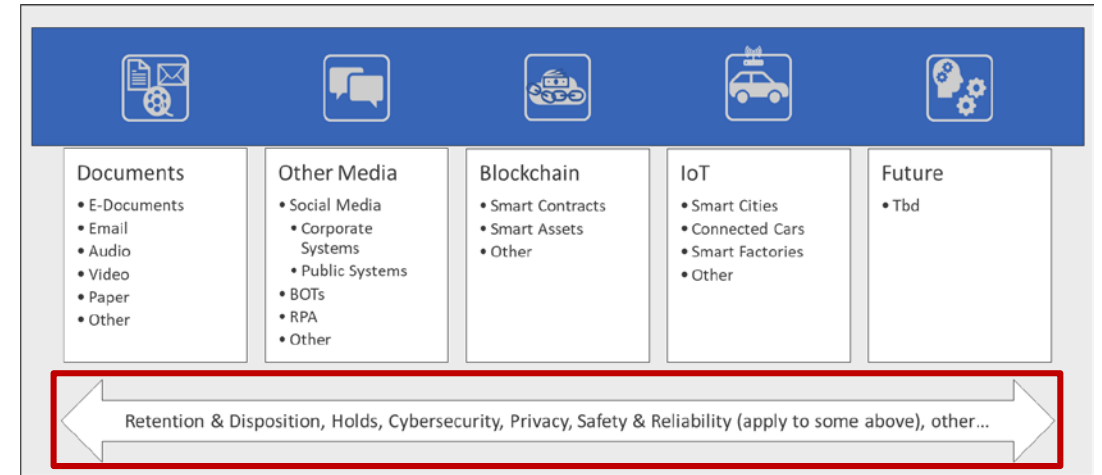
Increase business value of information

# More to Information Assets than just Documents



# Multiple Governance & Control concerns about Information Assets

- ❑ Retention, Disposition, and Holds
  - Applies to Information Assets
  - Records Management, Information Governance, eDiscovery
- ❑ Cybersecurity
  - Applies to Assets and Information Assets
- ❑ Privacy
  - Applies to Information Assets that reference Data Subjects
- ❑ Safety & Reliability
  - Applies to Assets
- ❑ Other



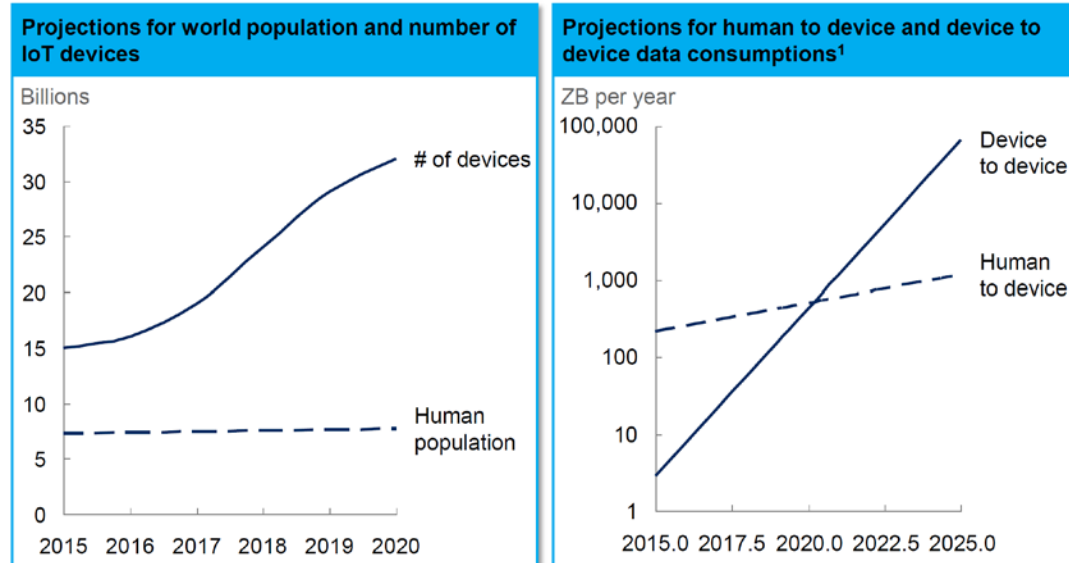
## Notes

- Multidisciplinary effort
- IG and RM are part of it
- Security is part of it
- Privacy is part of it
- In some cases, Safety and Reliability are part of it

Sometimes these requirements conflict with each other

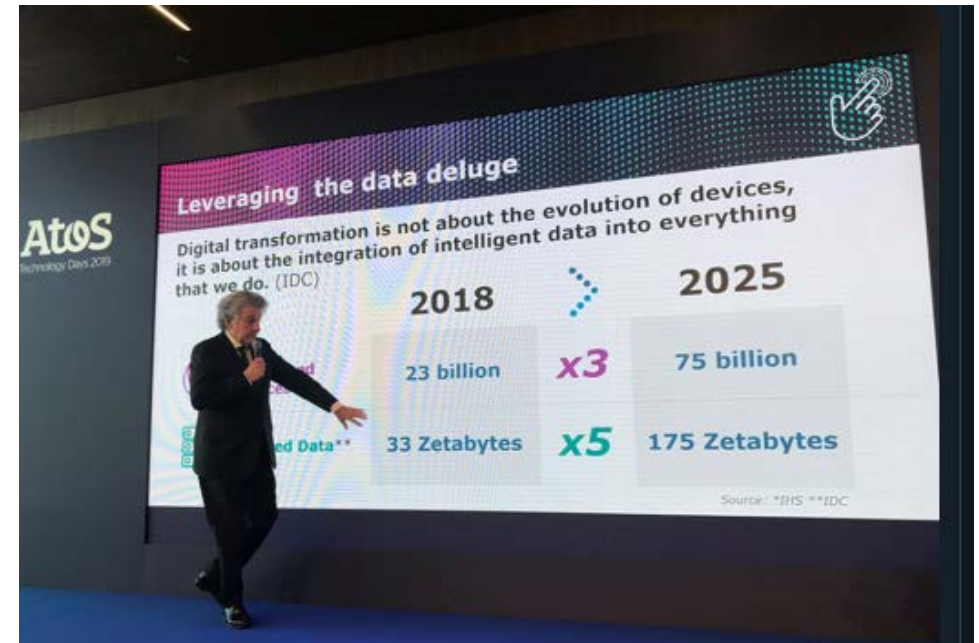
# If you think there is lots of corporate information... think again

IoT is quickly becoming ubiquitous...



Explosive growth in device to device traffic will introduce new challenges in areas such as bandwidth, management and security

McKinsey&Company

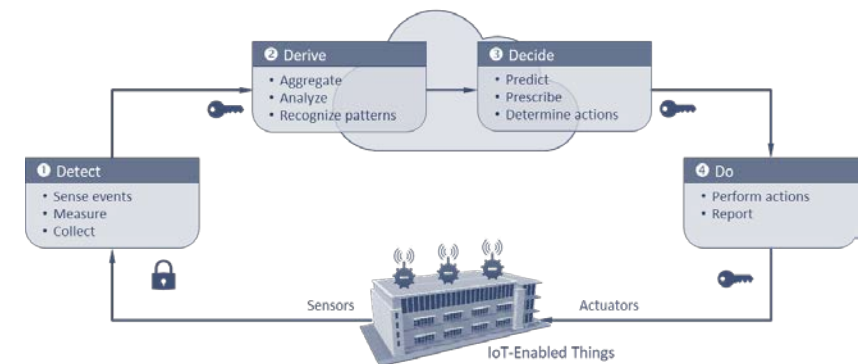


Analytics, internet of things to drive data volumes to 163ZB by 2025



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# Conclusion and Takeaways

## IoT Trustworthiness and Governance of IoT data

- Principled performance
- KEY to ensuring IoT systems can deliver on their intended objectives

## There is no time to waste here

- IoT technologies and architectures evolving fast
- IoT data volumes are exploding

## AI, DL, 5G, Edge Computing

- Play central roles within IoT systems
- AI ethics: why did the AI make that decision?
- Blockchain vs Privacy (Right-to-Forget)... conflict?

## Safety-by-Design Security-by-Design Privacy-by-Design

- Also “by Default”
- NOT mere catchy buzzwords
- Critical for success of Digital Transformation
- Must be understood and principles behind them woven into fabric of IoT systems

# Conclusion and Takeaways

Safe to say that the need to govern IoT data is real and looming



It is also inescapable!



Issues related the trustworthiness of IoT systems will dominate the conversation



IG professionals have an important role to play in all this



# Thank You...



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