

Keynote

IoT and Smart Grid: The 21st Century Technologies for the Power Sector Mainstreaming in Asia and the Pacific

Deep Dive Workshop
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Agenda

- Definition of Internet of Things
- IoT in the Power Sector
- Vision of IoT

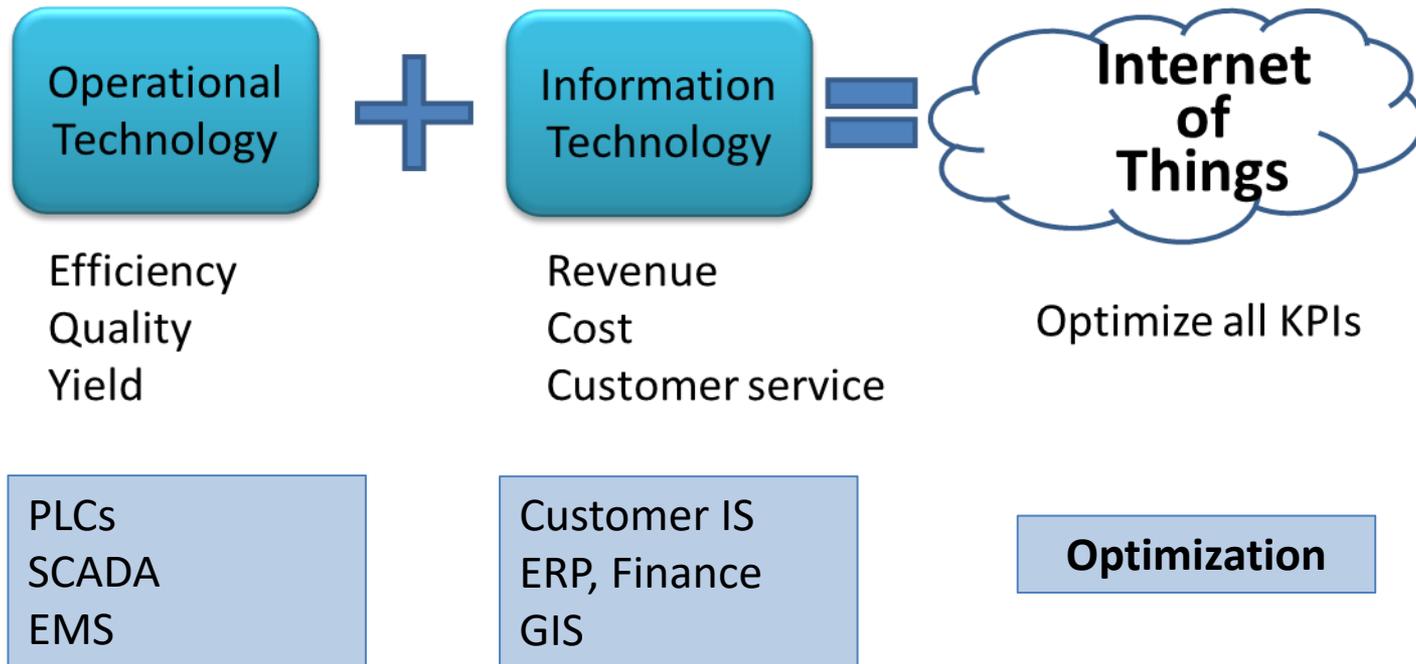
Definition of Internet of Things

- Internet of **People** **VERSUS** Internet of **Things**
- Internet of **People** **AND** Internet of **Things**

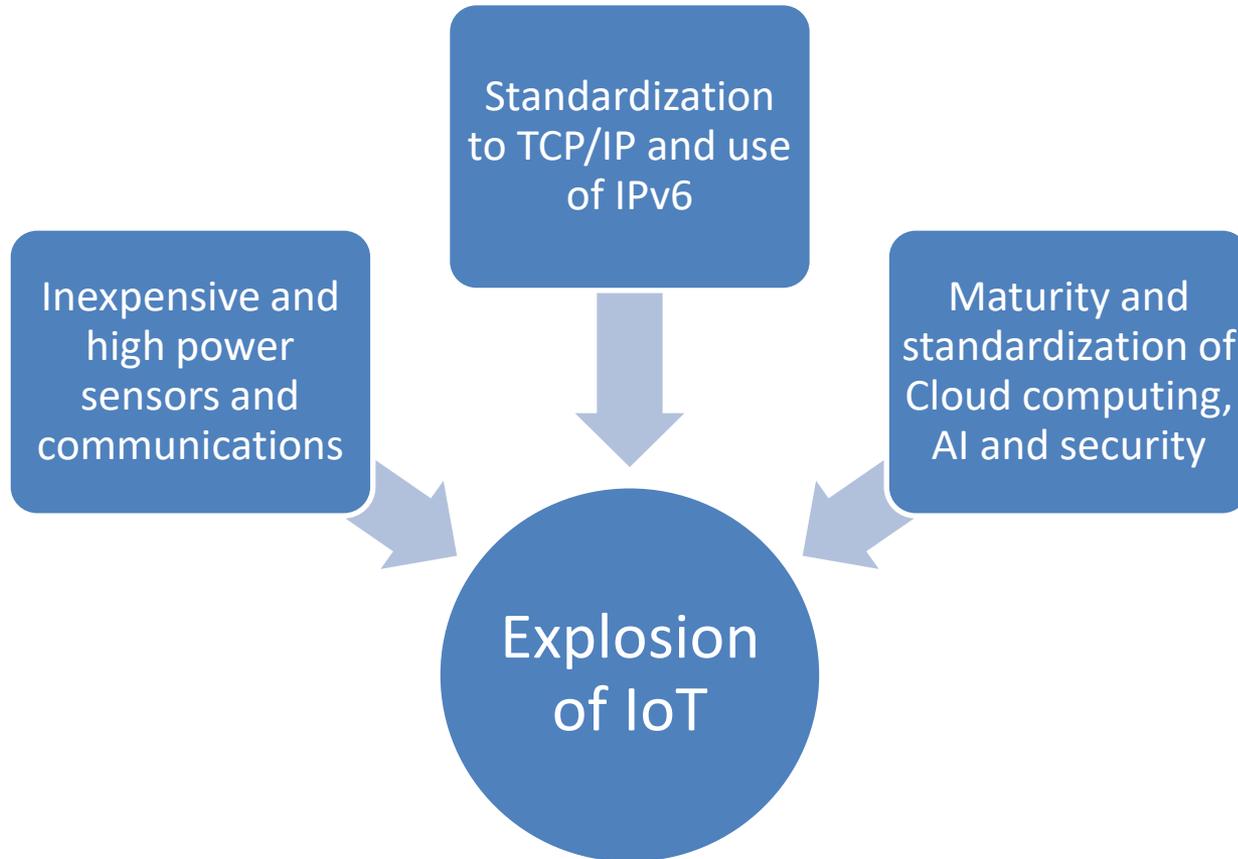
We define the Internet of Things as sensors and actuators connected by networks to computing systems. These systems can monitor or manage the health and actions of connected objects and machines. Connected sensors can also monitor the natural world, people, and animals.

Source: J. Manyika, M. Chui, P. Bisson, J. Woetzel, R. Dobbs, J. Bughin and D. Aharon, "The Internet of Things: Mapping Value Beyond the Hype," McKinsey Global Institute, 2015.

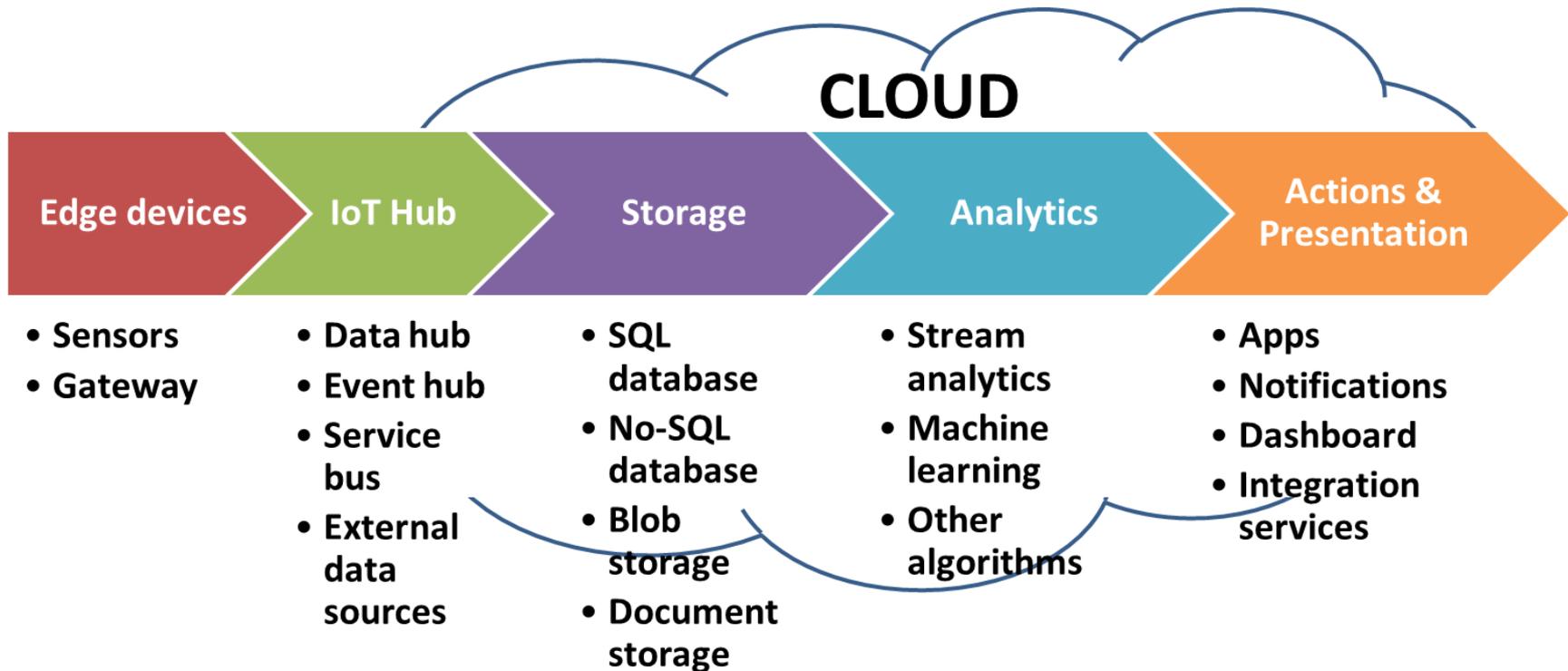
Industrial IoT Definition: IT + OT = IoT



Drivers of IoT



Architecture of IoT



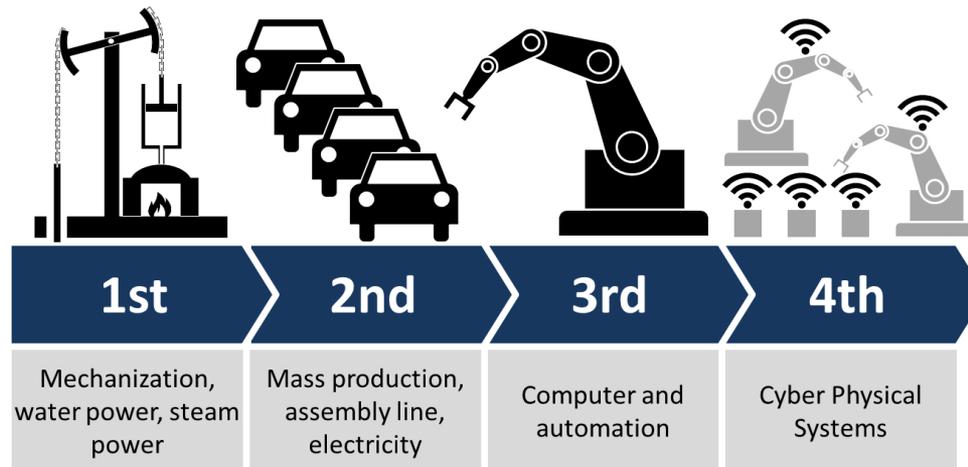
IoT in the Power Sector

- **Distribution: Smart Grid**
 - Hemendra Agrawal, Power Grid Corp of India
 - Huyoung Lee, KEPCO
- **Transmission & Distribution**
 - Somesh Kumar, E&Y
 - Santhosh Nair, IBM
- **Generation, Predictive Maintenance**
 - Ganlu Chen, Vestas
 - June Choi, LSIS

Predictions About IoT

"Electricity changed nearly everything about the way we live and work—and that scale of transformation is possible with the Internet of Thing." Ian Goldin, Director of Oxford Martin School, University of Oxford.

Industrial Revolutions



Predictions About IoT

- McKinsey predicts that the total potential economic impact of IoT will be in the range of \$3.9 trillion to \$11.1 trillion per year in 2025. On the top end, this would amount to 11% of the world economy.

https://www.mckinsey.de/files/unlocking_the_potential_of_the_internet_of_things_full_report.pdf

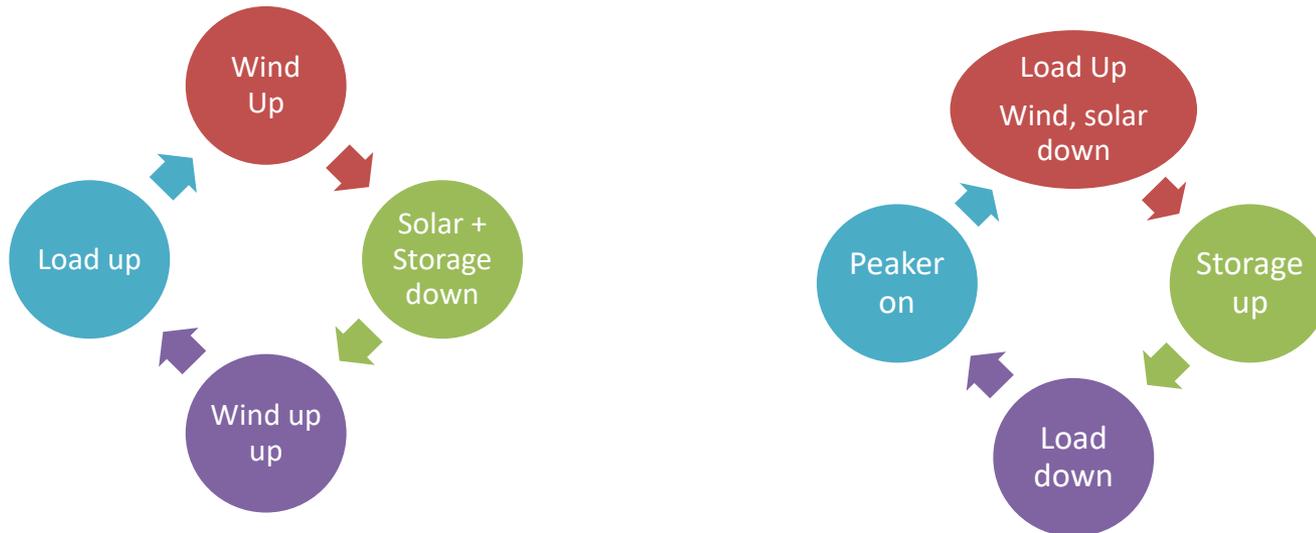
- GE predicts that in the electricity value chain \$1.3 trillion of value can be captured during 2016 to 2025 globally
 - Optimizing generation
 - Asset performance management
 - Smart substations, Smart grid
 - Smart meters, building management systems

Vision of IoT in the Power Sector

Given the trends:

1. LCOE for solar+storage at grid level are falling and may go below coal/gas generation
2. LCOE for wind+storage at grid level are falling and may go below coal/gas generation
3. LCOE for solar+storage at consumer level are close to retail rate
4. Demand Side Management
5. Dynamic pricing

IoT will be a key enabler to manage the dynamics of variable generation, storage, DSM and pricing.



IoT will support these emerging trends

- Higher operational efficiencies
- New connected ecosystems coalescing around software platforms
- Greater collaboration between humans and machines
- Pronounced shift from selling products/services to selling measurable outcomes

Further Reading

Pramod Jain, Arun Ramamurthy, “IoT in the Power Sector,” ADB Sustainable Development Working Paper Series, 2017