International Telecommunication Union

ITU Workshop on Spectrum Management for Internet of Things Deployment
(Geneva, 22 November 2016)

ITU WORKSHOP ON SPECTRUM MANAGEMENT FOR INTERNET OF THINGS DEPLOYMENT

GENEVA, SWITZERLAND
22 NOVEMBER 2016

www.itu.int/go/ITU-R/RSG1SG5-IoT-16

Organised by:

Views of a Telecommunication Operator on IoT

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AT&T
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AT&T - Internet of Things

35B

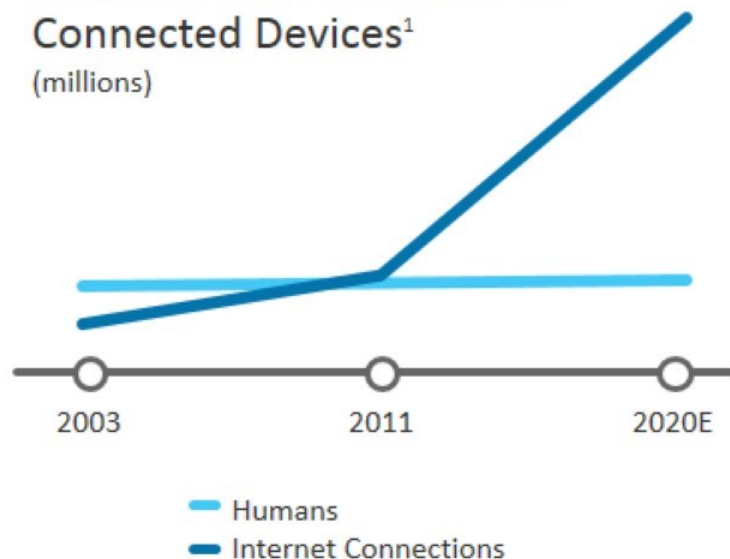## Things connected to the Internet by 2020

Source: IDC

4X

More than
the world's
current
population

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The accelerating pace of IoT growth

Human Beings vs. Internet Connected Devices[1]
(millions)

2003   2011   2020E

— Humans
— Internet Connections

80 "things"
are connected for the
first time to the Internet
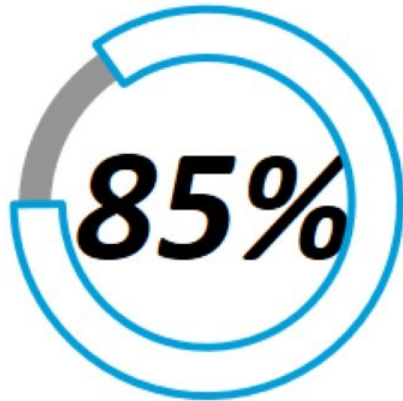every second[2]

By 2020,
this will expand to
250 "things"
every second[2]

[1]The Internet of Things: A Study of Hype, Reality, Disruption and Growth, Raymond James & Associates, Jan, 2014.

[2]How Many Internet Connections are in the World? Right. Now., Cisco, July, 2013.

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Why Engage in IoT

85%

Of global organizations are considering or **exploring an IoT strategy**

Increase Revenue

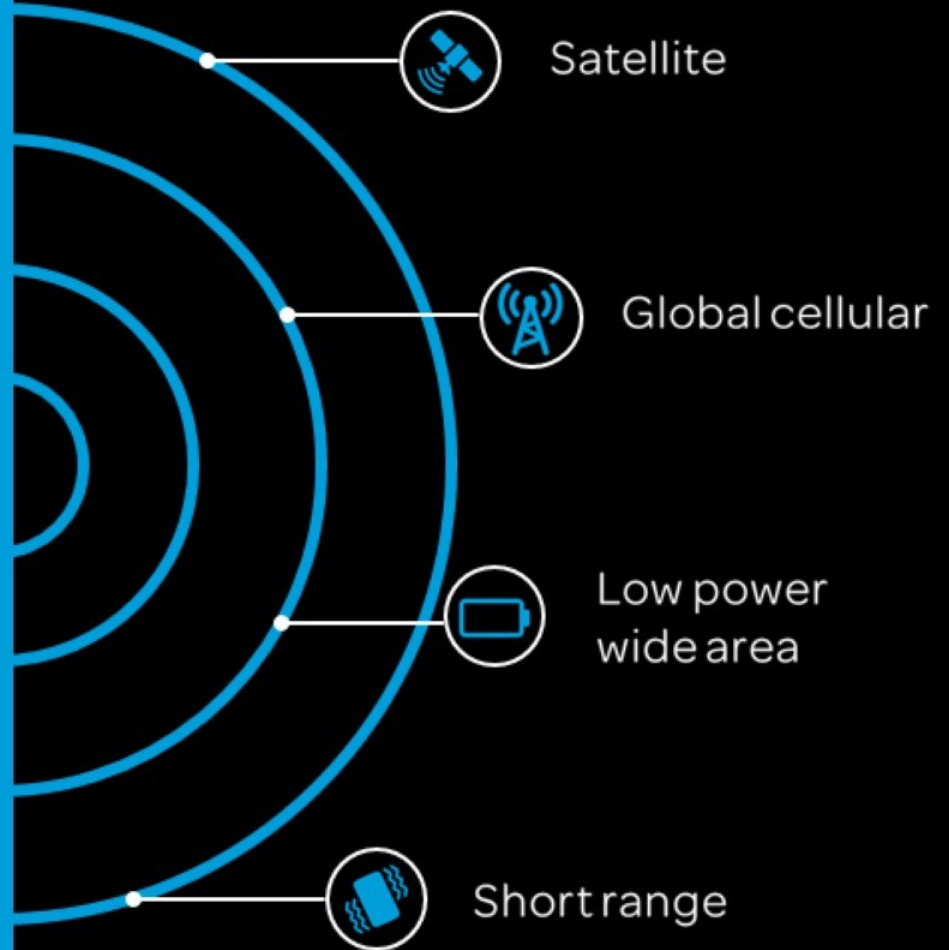Streamline Operations

Reduce Cost

Save Time

Increase Visibility

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# Connecting things may sound easy...

63%

of developers find
IoT challenging

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Variety of Connection Options

Satellite

Global cellular

Low power wide area

Short range

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Variety of connection options

- Another big challenge is placing the right bets, on the right technologies, to ensure a seamless and cohesive approach to serving this evolving market.
- When it comes to wireless networks, it is difficult – if not impossible – to bring a one-size-fits-all approach to IoT.
- Cellular IoT costs are coming down and there's now more utility, opportunity, and application for cellular on a global basis
  - Some newer network technologies are even being invented to solve specific problems like battery life as we just discussed – LWPA technologies are an example
- LPWA Technologies are
  - Low Power - Capable of delivering multiple years of device operation on a single, small form factor battery
  - Wide Area - Capable of delivering nationwide and international Cellular level coverage to cover multiple use cases –such as urban and subterranean environments. (water meters, alarm panels, electric panels – "things" in basements)
  - Other benefits include:
- High Endpoint Density
- Reduced Hardware Costs
- Reduced Connectivity Costs
- Low Data Rate
- Constrained Latency
- Mobility

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Many factors to consider

Coverage

Cost Battery life Power Throughput

Latency Voice Mobility

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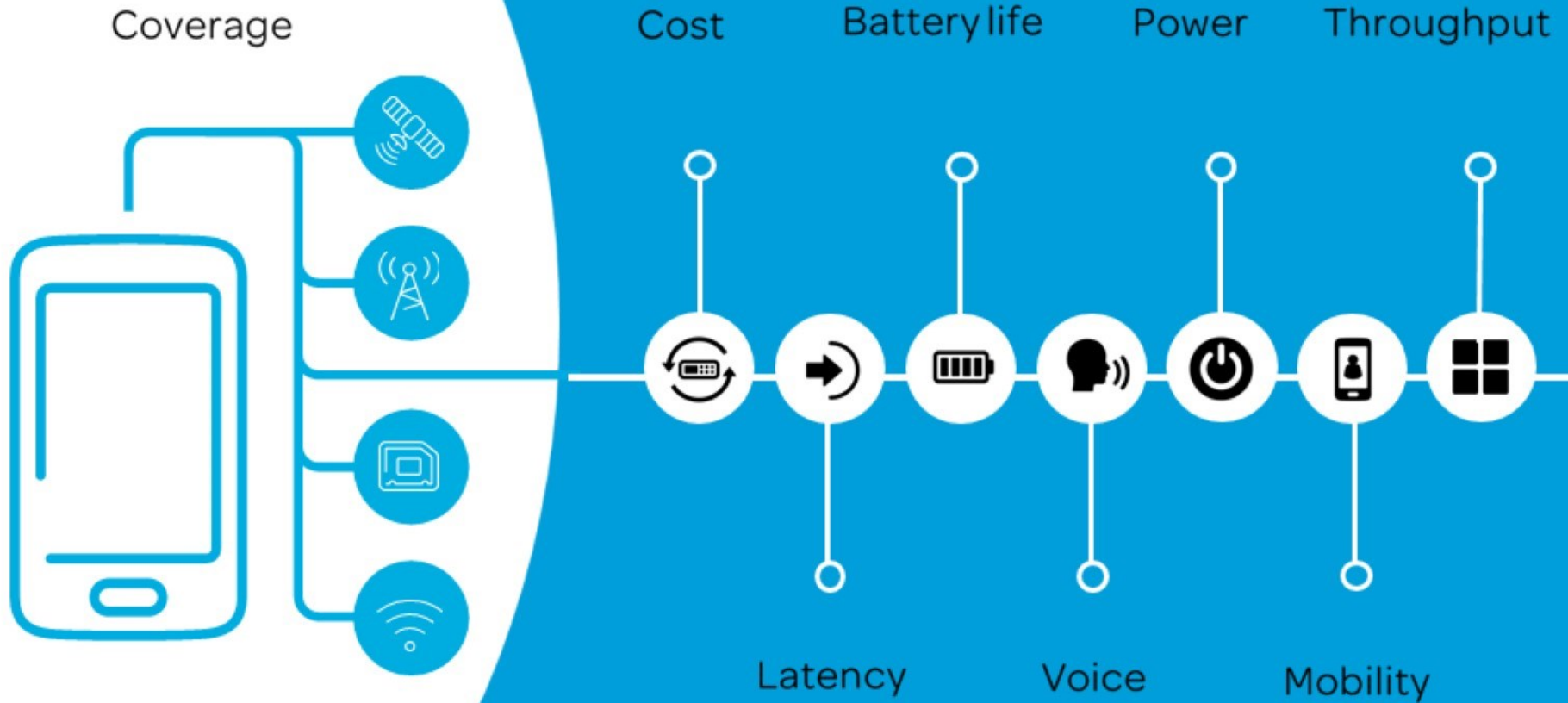
A fundamental challenge - Not all IoT devices have the same needs

- **Coverage:**
  - Urban vs. rural? Within arm's reach? Over land or at sea?
  - Traditional cellular technologies have long enjoyed some of the best coverage options available but even the best networks will inevitably have some gaps where coverage is sporadic or nonexistent.
  - Satellite networks generally have a broad range at generally a higher cost but can have line of site challenges depending on the terrain. Some network technologies or spectrum bands have wide ranges which can lower deployment costs by requiring fewer hubs/stations but this often comes at the expense of throughput.
  - Devices that need to transmit long distances often require more power gain extensions. There's plenty to consider.

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And a few more …

- **Cost** is a big one – depending on the application, cost can drive which network technology is the right choice – cellular vs. satellite and so on… There are many things to consider…

- **Battery life** has often been one of the biggest challenges within the IoT space.

  - Some devices can get by on a 24-hour charging cycle while others require a much longer drain time.

  - Consumer wearables (e.g., smart watches) as an example would benefit from a battery that can last days/weeks/months vs 12-24 hours.

  - Other devices such as industrial grade asset trackers deployed in remote regions around the world may need to last for many years and on a small footprint battery (e.g., AA battery, coin-cell). These types of use cases favor low power technologies.

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LTE –M Pilot

Advanced LTE-based Technology

Low cost

Extended battery life

Subterranean

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AT&T Piloting Advanced Network Technologies for Internet of Things

New LTE-M Software Will Support a New Generation of IoT Devices and Services on the AT&T 4G LTE Network

- We are piloting the LTE-M in the San Francisco market starting in November.

- Several businesses will participate in the pilot with us at the AT&T Labs in San Ramon, Calif. (alarm monitoring, smart meters, vending inventory and propane tank monitoring)

- Following the trial we plan to make LTE-M available commercially in 2017

LTE-M achieves:

Access to low-cost module technology.

Extended battery life of 10 years or more expected for enabled IoT devices.

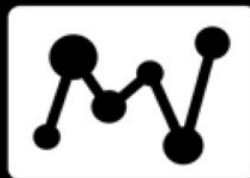Enhanced LTE coverage for underground and in-building areas that challenge existing coverage.

Top 3 resources needed for success

Security

Data Storage

Visualization

Internet of Things
AT&T Platforms

Analytics as a Service

Security

M2X and Flow Designer

Billing Management

Control Center
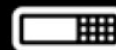
IoT Gateway

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Resources

➢ **AT&T Paper - What you need to know about IoT wide area networks:**

AT&T Info on IoT
Wide Area Networks

➢ **AT&T IoT Leadership**

AT&T IoT
Leadership

➢ **AT&T Internet of Things Web Page (click here)**

Discover
the
power
of

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AT&T Internet of Things

Security

Cloud

Platforms

Networks

Devices

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