

Decoding the IOT Ecosystem

RIPE NCC - IPv6 Coordination Meeting

Marc Nader
@mourcous



DATACONSULT

Agenda

- The business background
- The IOT Ecosystem
- The sensor data aggregation challenge
- The IOT Data flow

Will not cover:

- IOT Applications
- IOT Security
- Smart Device's IOT

From a gadget...

DATACONSULT





Global IP Traffic & Service Adoption Drivers

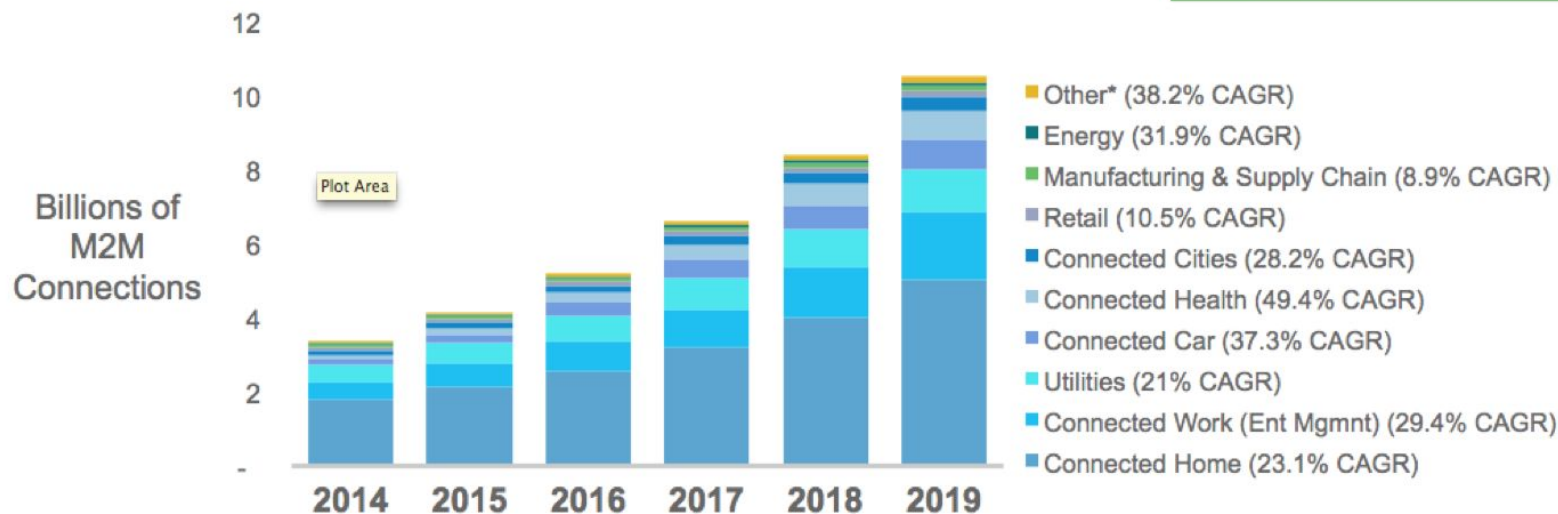
By 2019:



Global M2M Connections / IoE Growth By Vertical

By 2019, Connected Home Largest, Connected Health Fastest Growth

26% CAGR 2014–2019



*Other includes Agriculture, Construction & Emergency Services

Source: Cisco VNI Global IP Traffic Forecast, 2014–2019

© 2015 Cisco and/or its affiliates. All rights reserved. Cisco Public

3

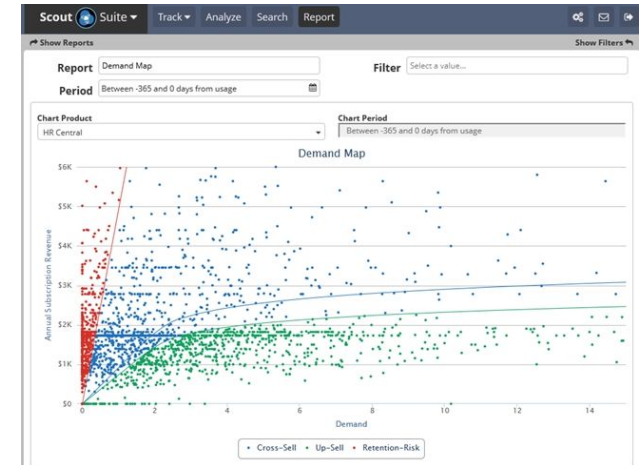
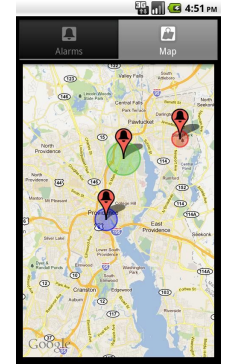
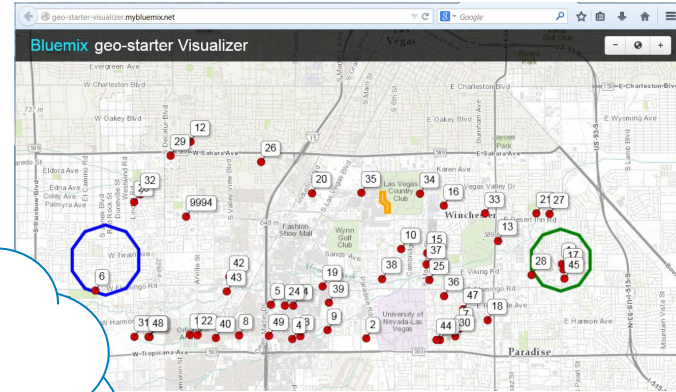
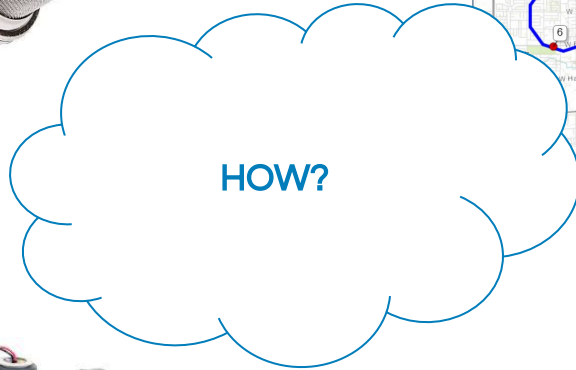
2010

2015



The IOT Paradigm

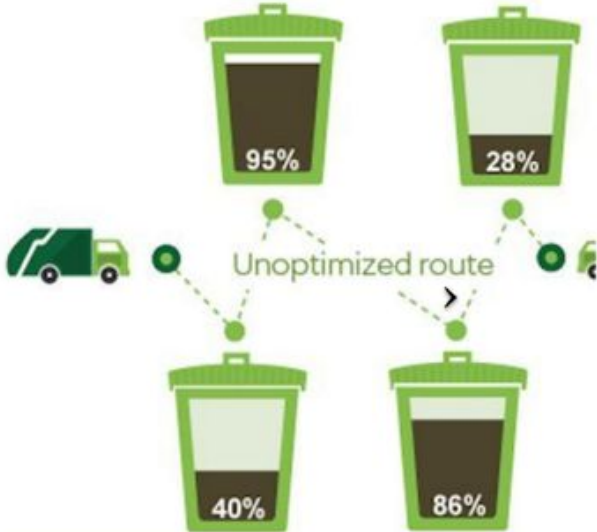
How do we get there?



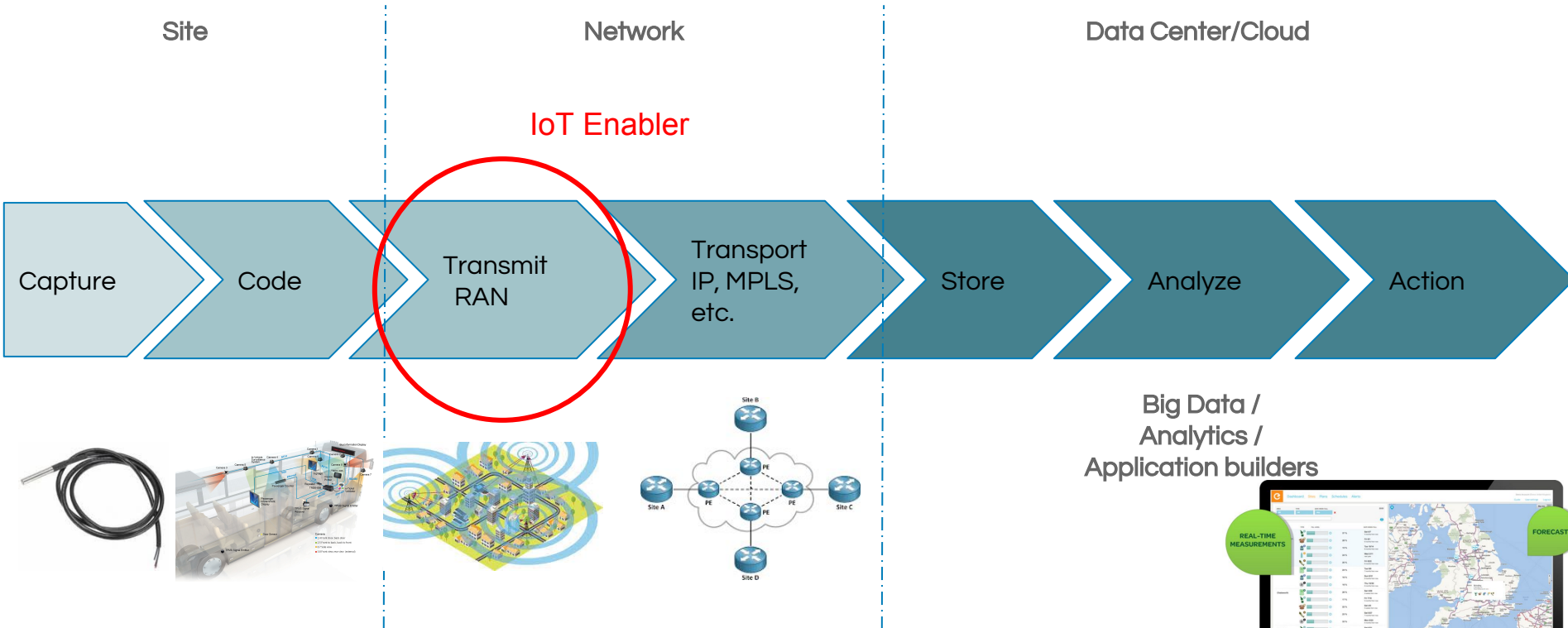
Mapping the business case: waste management



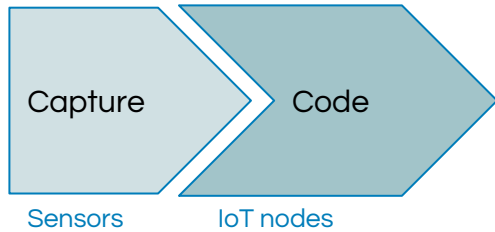
Optimized route vs. unoptimized route



Optimized route vs. unoptimized route



Within the Site

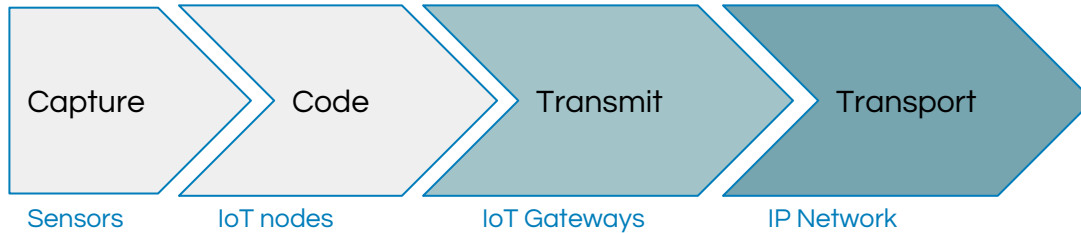


- Part of Operation Technology (OT);
- Sensors with analog (0-10V) or digital electrical outputs;
- Powered by the IOT gateway or through an external source;
- The IOT gateway transforms the electrical signal into data packets;
- Message Queuing Telemetry Transport (MQTT)
- Rugged design;
- Or Sensors can take form of any IP based protocol.

IoT nodes connect one or multiple sensors and translate an analog signal into packets.



Radio Access Network: Transmitting the M2M chatter



- Collecting data from on a massive scale while preserving the sensor battery life is a challenge;
- Ferocious competition for the Low Power Wide Area (LPWA) technology dominance;
- The "LPWAR": lets look at the market alternatives in this area:
 - Sigfox
 - LoRaWAN
 - LTE-M
 - Wifi + 3/4G
 - Zigbee + 3/4 G

Privately owned, French.

Technology

- Ultra narrow band 868Mhz - 100Hz
- 140 messages per unit per day. 1 every 10 minutes
- 12 bytes per message
- 15 km
- High battery life

Applications

- Limited bandwidth applications
- City wide deployments, short message communications
- Shipping and very active

El Towers and SIGFOX to Connect Italy to SIGFOX Internet of Things Global Network

SOGEDO Chooses SIGFOX's Internet of Things Network To Bring Enhanced Water-management Services to Customers

Posted by M2M.World.News | Date: November 03, 2015 | in: Smart Cities & Homes

OCT 27, 2015 @ 08:00 AM 5,751 VIEWS

San Francisco Now Has Its Own Cellular Network Just For The 'Internet Of Things'

LoRa Alliance, backed by Cisco, IBM

Technology

- Wideband CDMA: 868Mhz - <500kHz
- 0.3kbps - 50kbps
- 15 km
- High battery life
- 3 Classes:
 - A: similar to Sigfox. Receiver Initiated Transmission Strategy (RIT)
 - B: scheduled downlink slot, intermittent device sleep.
 - C: always on. Mains Powered.

Applications

- Just getting started.
- City wide deployments with 2 way communications.

Le réseau LoRa de Bouygues Telecom accueille ses premiers clients



Le réseau LoRa de Bouygues Telecom dédié à l'Internet des Objets, équipé par Sagemcom, commence à accueillir ses premiers clients.

Une couverture pour 1er semestre 2016

Tata Communications to deploy LoRa network in India

Telstra to trial LoRaWAN IoT wireless technology in Melbourne

3GPP, Huawei (Neul acquisition)

Technology

- LTE-M - 1.4Mhz (1Mbps/1Mbps)
- NB LTE-M - 200khz (200kbps/144kbps)
- One LTE cell can handle 100k LTE-M devices
- 10 years battery life (200 bytes daily update)
- Low cost terminal
- Leverage the LTE network with a software upgrade.
- LTE-M +15dB link budget (x7 coverage)
- NB LTE-M +20dB link budget (x10 coverage)

Applications

- 3GPP Rel. 13 - Q1 2016
- Coming with LTE Advanced (4.5G)
- Mobile operators become IoT operators.

Deutsche Telekom & Huawei strike back with a 'pre-standard' NB-IoT trial

▶ IOT / IOT STRATEGIES

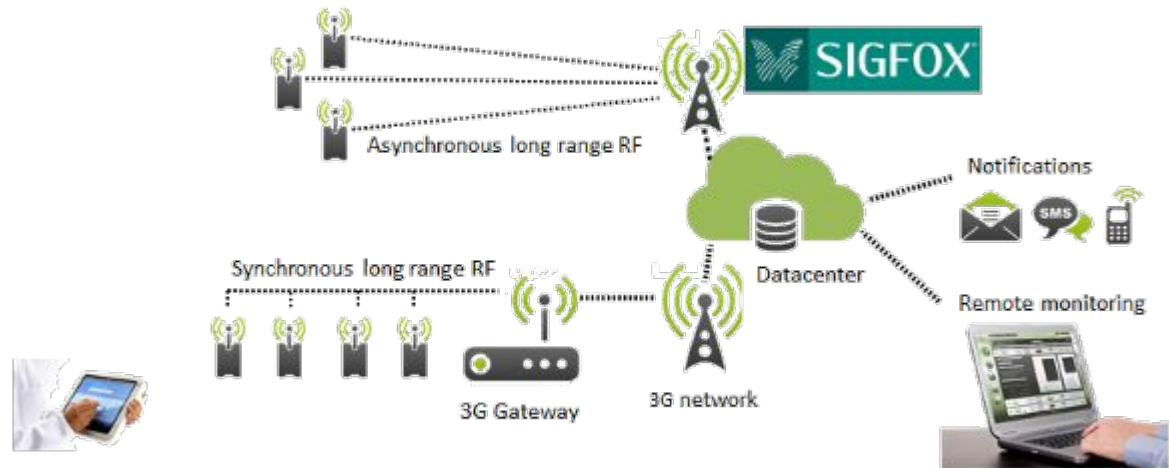
**Huawei Strikes Strategic Alliance With
Vodafone Global Enterprise**

Technology

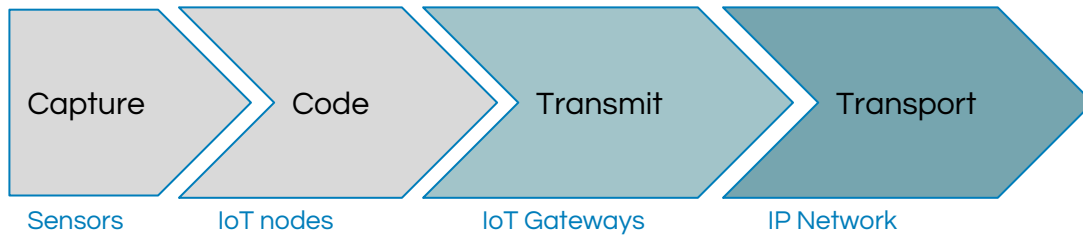
- Local Aggregation of IOT nodes is done through:
 - Wifi
 - Zigbee / 802.15.4
- Uplink from the site is done through 3g/4g
- Need external power source
- Higher throughput

Applications

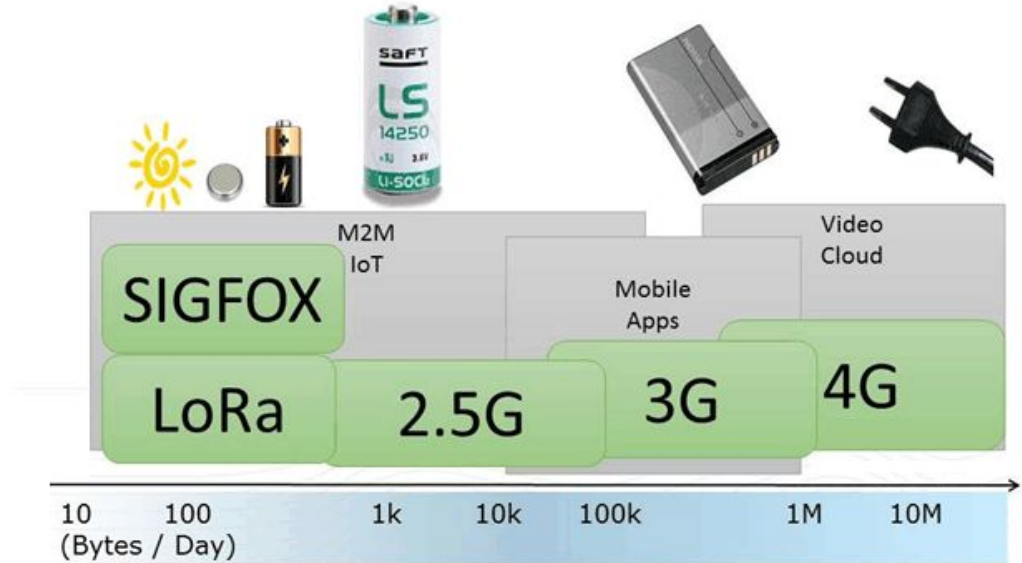
- High throughput, sending voice/video
- Real Time or near-RT



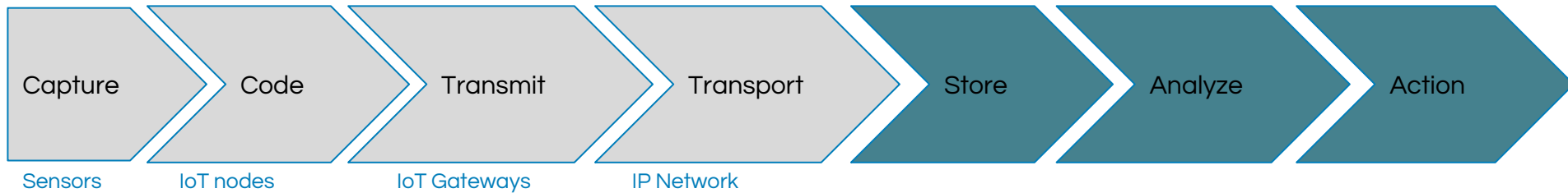
Transmitting the M2M chatter



Technology
decision factor



Gathering, structuring and processing the data






- Input from IOT Gateways (MQTT)
- Any other input
- Data modeling and data set definitions
- Machine Learning, Analytics

Data Science for IOT: making sense of massive data and give the machines the ability to take intelligent decisions.

Top courses on coursera about data science and machine learning.

coursera Catalog Search catalog Institutions Log In Sign Up

1,260 matches

<input type="checkbox"/> Now 560	 Big Data 6-course Specialization · University of California, San Diego
<input type="checkbox"/> Within 1 month 30	 Python for Everybody 5-course Specialization · University of Michigan
<input type="checkbox"/> 2 to 3 months 22	 Data Science 10-course Specialization · Johns Hopkins University

Availability

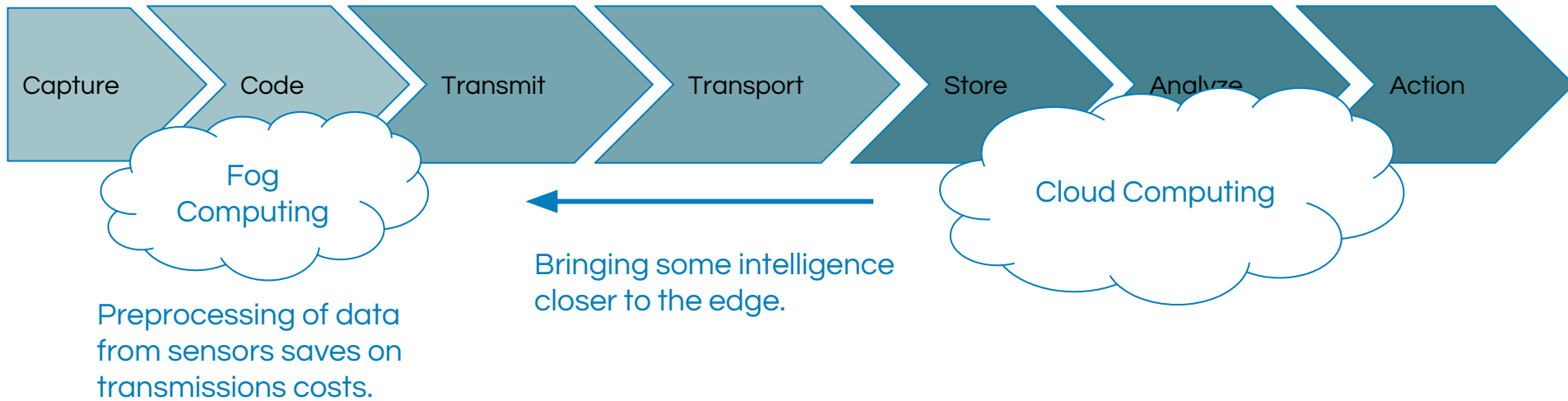
All Topics

<input type="checkbox"/> Business 272
<input type="checkbox"/> Social Sciences 258
<input type="checkbox"/> Computer Science 205

Languages

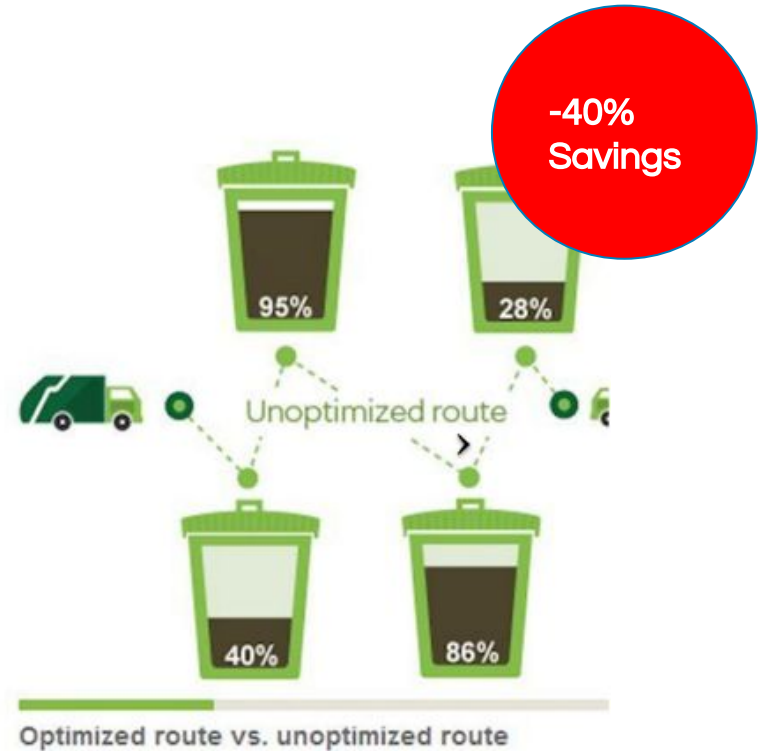
<input type="checkbox"/> English 1202

Eliminating the unnecessary chatter on the radio

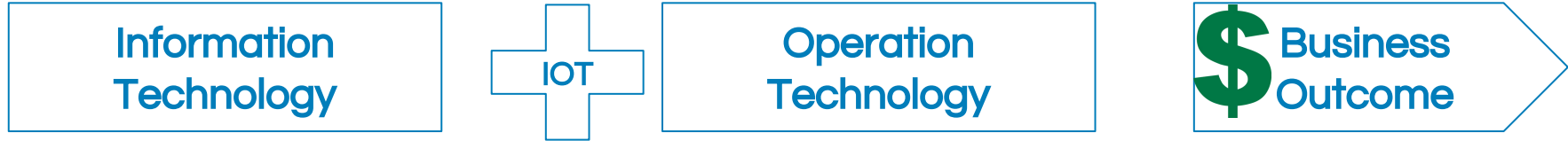


Back to our IoT application

It's all about the business case



Finally



System Integration

- Operation technology & Low Current
- Radio Access
- Networking
- Data Integration, software
- Data science

Thank you!

Marc Nader

mnader@dcgroup.com

@mourcous

