

BIG DATA

Big data is big. Really big. You just won't believe how vastly hugely mindbogglingly big it is.



BIG DATA

- What is it?
 - Definition?
 - Data, not information
 - Have always had issues with processing and interpreting data
 - Much of the IoT data created today is neither analyzed nor stored
 - Not just data created, also data stored and transmitted

BIG DATA

- How big?
 - Approximately 5 billion devices currently, according to Gartner Research*
 - 2.9 billion in consumer space‡
 - Utilities, manufacturing, government
 - 25 billion by 2020
 - 13 billion in consumer space ‡
 - \$69.5 billion in related spending
 - \$263 billion by 2020 ‡

Category	2013	2014	2015	2020
Automotive	96.0	189.6	372.3	3,511.1
Consumer	1,842.1	2,244.5	2,874.9	13,172.5
Generic Business	395.2	479.4	623.9	5,158.6
Vertical Business	698.7	836.5	1,009.4	3,164.4
Grand Total	3,032.0	3,750.0	4,880.6	25,006.6

*<http://www.gartner.com/newsroom/id/2905717>

‡ Estimates (obviously)

BIG DATA

- How big?
 - Cisco has developed the Global Cloud Index (GCI)*
 - Some notable stats (distinction between data center traffic and IP traffic):
 - 1.2ZB per month in global cloud IP traffic by 2020 (current: 321EB)
 - 92 percent of global data traffic
 - Consumer cloud storage traffic/user: 1.7GB/month (current: 513MB/month)
 - Consumer cloud growth: 59 percent of CIP will use cloud storage (47 percent currently)
 - 600ZB annually by 2020 (60ZB of use)
 - Impact on data centers
 - Public v. Private cloud
 - Elephant v. Mouse flows

BIG DATA

- RFID market alone is currently valued at ~\$9 billion
 - \$27 Billion by 2024 (idtech)
- Submarkets exist
 - Industry IoT
 - Healthcare IoT
 - Municipal IoT
 - Security IoT
 - Consumer IoT (of course)
- As do new terms
 - IoE
 - IoAg

BIG DATA

What Makes a Smart City?
Multiple Applications Create Big Data

Connected Plane

40 TB per day (0.1% transmitted)

Connected Factory

1 PB per day (0.2% transmitted)

Public Safety

50 PB per day (<0.1% transmitted)

Weather Sensors

10 MB per day (5% transmitted)



Intelligent Building

275 GB per day (1% transmitted)

Smart Hospital

5 TB per day (0.1% transmitted)

Smart Car

70 GB per day (0.1% transmitted)

Smart Grid

5 GB per day (1% transmitted)

Source: Cisco Global Cloud Index, 2015-2020

BIG DATA

- International Conference of Data Protection and Privacy Commissioners (2014)
 - Mauritius Declaration on the Internet of Things
 - Self-determination is an inalienable right
 - IoT data should be treated as personal data
 - Transparency is key
 - Data processing starts the moment data are collected
 - Resolution on Big Data
 - Why is it being used
 - Collect only what's necessary
 - Be transparent about data use
 - Make data available

BIG DATA

- What can we do with this data?
 - Data Mining
 - Associations
 - Sequences
 - Clusters
 - Categorization
 - Prediction
 - NORA
 - Non-obvious Relationship Awareness