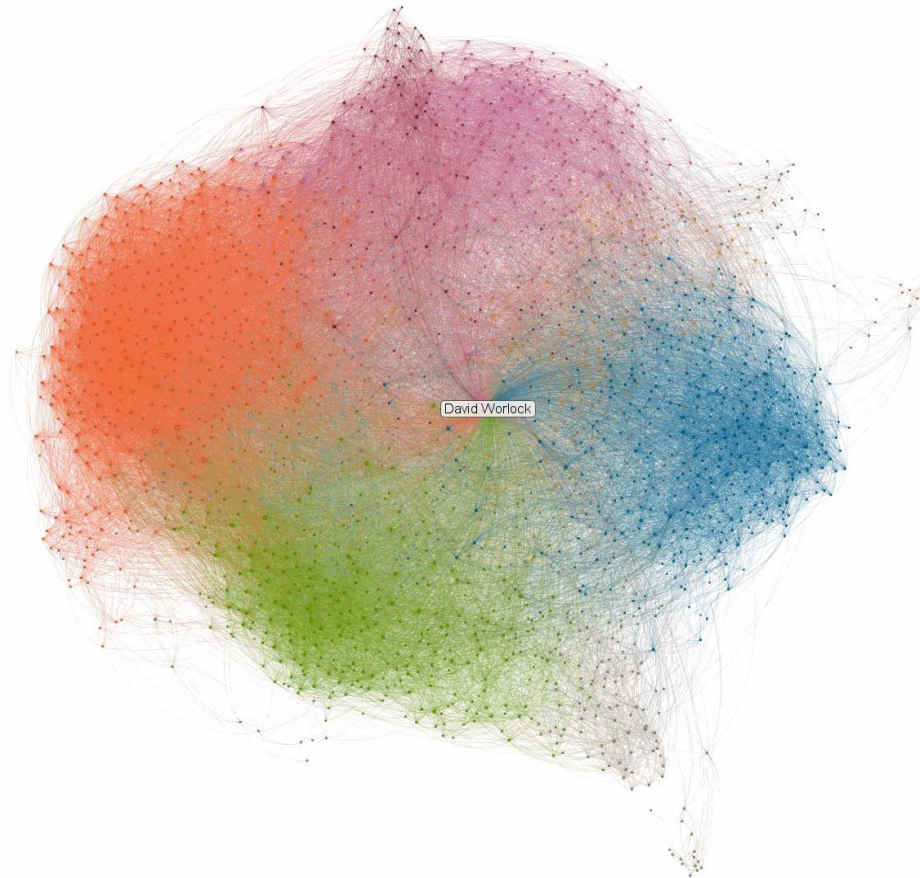# The Internet of Things: Making Sense of Data Profusion in Science and the Internet Society

David Worlock

Washington DC. December 2016

You are what the data visualises you to be!

Describing the World – to a Machine

- Data
- Metadata
- Ontology and the Semantic Web
- AND THEN?
- Physical mark-up, geolocation, tagging and tracing from sensors to RFID

Marvin Minsky
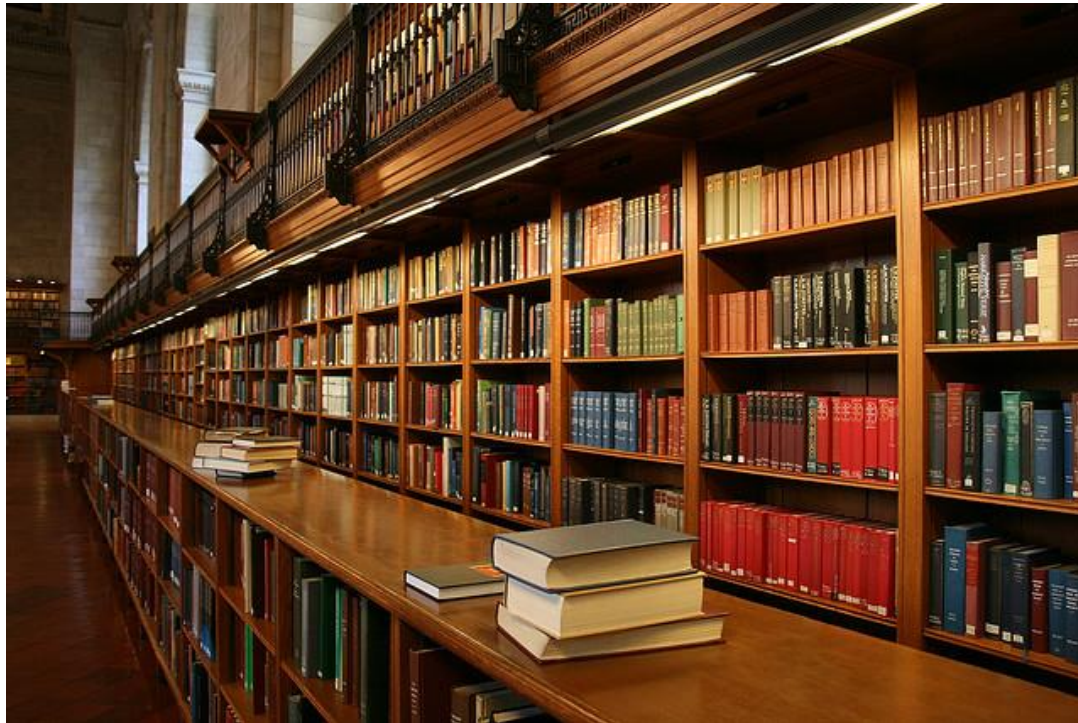
"The surprizing thing about 2010 was that they had all those books in their libraries, but none of the books could talk to each other"

We are the publishers now!

World's Content is Increasingly Findable + Shared + Tagged - Digital Info Created + Shared up 9x in Five Years

Amount of global digital information created & shared
– from documents to pictures to tweets –
grew 9x in five years to nearly 2 zettabytes* in 2011, per IDC.

Global Digital Information Created & Shared, 2005 – 2015E

Digital Information Created & Shared (zettabytes)

2005 · 2007 · 2009 · 2011 · 2013E · 2015E
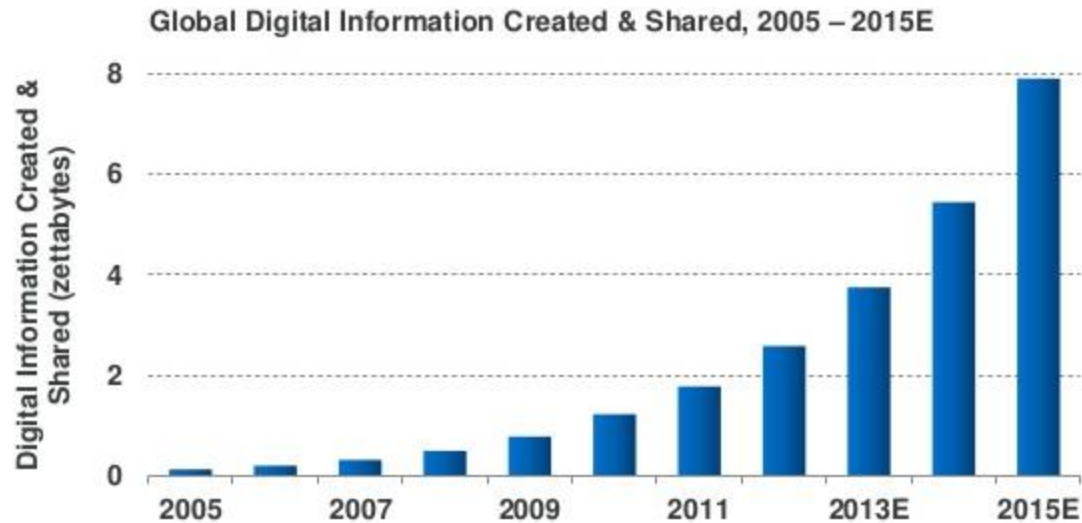
KPCB

Note: * 1 zettabyte = 1 trillion gigabytes. Source: IDC report "Extracting Value from Chaos" 6/11.   11

Science Drives Change

- Robotics
- AI
- 3D Printing
- Synthetic biology and the biochemistry revolution

Productivity Exploits Change

- Automated journalism

- Additive manufacturing

- The power of logistics

- Predictable climate

- Greater control of risk

Where are we Going?

- 25 billion devices connected 2015; 50 billion by 2020 CISCO

- Value at stake (net profit) created from 2014-2020 is $14 trillion - 21% of global corporate profits   CISCO

- From 2 billion objects in 2006 to 200 billion by 2020 INTEL

- US productivity grows by an additionally 1 to 1.5% pa   GE

- 3 billion information subscribers, 1.5 billion vehicles, 3 billion utility meters, 100 billion new processors added to the network by 2020   ERICSSON

Who is going with us?

The Real Thing – Human Augmentation?

- NOT just smart meters and self drive cars

- NOT just a revolution in manufacturing

- NOT just a massive boost for productivity – and a social revolution in employment

- BUT a major change in the way people behave, communicate and relate to each other

VIRTUAL BECOMES THE NEW REALITY?

Map of Agriculture

- "Our mission is to connect up our industry so that we all have better information, better communication and better farms as a result." Forbes Elworthy, Founder

- Big data, advanced analytics, an agricultural ontology. Better decisions, greater productivity, enhanced food security

- Founded 2012. UK, New Zealand, Australia, Argentina

MAP OF AGRICULTURE

Transcriptic.com

- "Since we founded Transcriptic in 2012, we have seen a significant change in how the industry thinks about lab work," said founder and CEO Max Hodak. "The Transcriptic platform has freed researchers from many hours of painstaking, error-prone work and enabled them to focus where their time is most valuable. Our goal is to make life science research cheaper, faster, and more accessible, and today's investment will enable us to deliver further innovations to make that a reality."

- A Digital Science investment

- Repeatability, repeatability, repeatability

Workflow

- Context-orientated world – situational pricing
- Business M2M world – credit rating, contract scrutiny, buying decision
- Consumer world – Uber and Google Now
- Educational world – learning driven by learners and their collaboration
- Research world – Big Questions, Big Data

Research on the Data Frontier

- Open Data and the Silo Wars

- IoT and bi-temporality

- The Figshare report – 2000 respondents and...

39% have no funds to make data available
60% are unsure of the licensing conditions
Most do not know what funders, institutions or publishers require
Almost no one knows what compliance requirements may apply

Scholarly Communications Market Leadership 2027

- **IBM Watson Science (the repeatability engine)**

- **Gates Guru (the reputational engine)**

Thanks for listening!

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