



On “Big Data”

The Challenge of Managing Big Data, Steve Goodman talks to Martin Adolph of the ITU



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Martin Adolph is a Programme Coordinator at the International Telecommunication Union (ITU), the United Nation’s specialized agency for information and communications technologies (ICT). Working in the Policy and Technology Watch Division of ITU’s standards bureau, Martin is responsible for surveying the ICT environment to capture new topics for standardization activities. Fascinated with innovation and new technologies, he authored Technology Watch reports (<http://itu.int/techwatch>) on biometrics, cloud computing, gaming, e-learning, sensor networks and other topics. Martin is coordinating ITU-T activities in the area of intelligent transport systems (ITS) and machine-to-machine communications (M2M). Martin holds diplomas in Computer Science from Dresden University of Technology and Engineering from Ecole Centrale Paris.

Q: Between texts, tweets, mobile commerce, GPS, telecom, etc, I have read that it is now something like upwards of 2 quintillion bytes of data being generated daily. What exactly do we mean by “Big Data” and what challenges is it creating?

A: In our upcoming Technology Watch report, *Big data – big today, normal tomorrow*, we describe Big Data as a composite term describing emerging technological capabilities in solving complex tasks. It has been hailed by industry analysts, business strategists and marketing pros as a new frontier for innovation, competition and productivity. The hype around big data looks set to match the stir created by cloud computing where existing offerings were rebranded as ‘cloud-enabled’ overnight and whole organizations moved to the cloud.

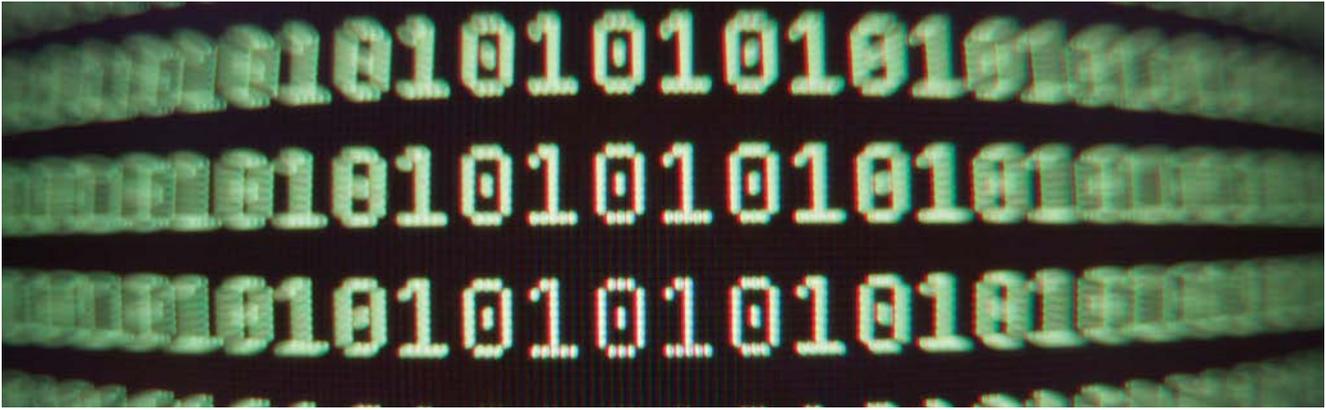
However, putting the buzz aside, big data has transformational capabilities and motivates researchers from fields as diverse as physics, computer science, genomics and economics – where it is seen as an opportunity to invent and investigate new methods and algorithms capable of detecting useful patterns or correlations present in big chunks of data. Analyzing more

data in shorter spaces of time can lead to competitive advantage and better, faster decisions in areas spanning finance, health and research.

What’s clear is that global standards are a key missing ingredient, perhaps one of the biggest challenges in terms of global adoption of big data solutions in a wider range of scenarios.

Q: And, it is not only the volume of Big Data that creates challenges, it is its complexity, isn’t that correct? We are dealing with a combination of structured data like banking and ecommerce transactions, and unstructured data such as text and video, and everything else in between, can you elaborate?

A: Much of the growth of data is unstructured data, making it critical for systems to be able to process it efficiently and to correctly determine the meaning contained within it. For example, emails and text messages as well as audio and video streams are some of the largest categories of unstructured data today. This type of unstructured data continues to grow unabated, making the efficient processing of it critical to the continued success of business analytic processing systems. ▶



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- ▶ Health, science and transport are likely to be major contributors of data and thus users of big data applications. Imagine that with medical image archives growing by 20 to 40 per cent annually, by 2015, an average hospital will be generating 665 terabytes of medical data each year. Comparing the effectiveness of a treatment on a population-wide base, considering thousands of factors, yields far better results than would the same analysis for a dataset of 100 patients.

Q: Big data is also ushering a menagerie of new platforms - Hadoop, NoSQL, in-memory, and graph databases, for example, alongside existing platforms such as MPP RDBMS, columnar, and dimensional databases. What challenges do these create in terms of IT integration and lifecycle management?

A: Achieving the big data goals set out by business and consumers will require the interworking of multiple systems and technologies, legacy and new. Technology integration calls for standards to facilitate interoperability among the components of the big data value chain.

Our Technology Watch report details some of the standards initiatives in the space and identifies some areas in which ITU members can accelerate their work.

Q: So we have the challenges of transmission, storage, emerging platforms and security of all of this Big Data – what is being done in general to address these kinds of challenges, and specifically by ITU and its membership?

A: With a membership comprising governments, telecommunications operators, equipment manufacturers and academia and research institutes from around the world, ITU is ideally positioned to review current Big Data practices, including challenges such as data protection, privacy and cybersecurity, and to develop related technical standards and policies.

To take just a couple of areas in which Big Data thrives, ITU has been accelerating its efforts to increase interoperability in electronic health applications, in areas such as the exchange of health data and the design of personal health systems. In addition there are ongoing standardization efforts in the home automation sector. And, as open data – an important big data enabler – matures ITU is in an opportune situation to embrace and advance the

cause of open data in partnership with the many open data champions within and outside its membership.

Q: Where there is challenge, there can also be opportunity. All of that data has extreme value to businesses if it can be legally and properly analyzed and interpreted. Can you explain some of the opportunities that Big Data presents, and how is ITU trying to explore and implement those opportunities from a developmental standpoint?

A: At present, ITU's standardization activities address individual infrastructure requirements, including optical transport and access networks, future network capabilities (e.g., software-defined networks), multimedia and security. A review of this work from the angle of data-driven applications has yet to be undertaken but could yield significant results in the big data context.

From a developmental perspective the UN's Global Pulse is an initiative established in response to the need for more timely information to track and monitor the impacts of global and local socio-economic crises. The initiative is exploring how new, digital data sources and real-time analytics technologies can help policymakers understand human well-being and emerging vulnerabilities in real time, in the interests of better protecting populations from the aftershock of financial and political crises. Global Pulse is a strong advocate of big data for development and humanitarian purposes.

Q: So what is the “end game” for Big Data if there is one? With data usage continuing to expand exponentially, how will technologies for storage, transmission, analysis, and not to mention, regulation – ever keep up?

A: It's true big data will get bigger but evidence so far has shown that the supporting infrastructure, hardware, software and protocols will keep-up.

ITU via its global membership will continue to work on standards and policies that will facilitate the development of all new ICT innovation including big data. ICTs evolve at incredible speed and ITU has consistently adapted to meet the demands of this fast-paced environment.

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