Systems of Discovery
The Perfect Storm of Big Data, Cloud and Internet-of-Things

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Forecast for connected devices

“Number of connected objects Expected to reach 50 Billion by 2020” - Cisco

“There will be 212 Billion devices or things connected to networks by 2020” - IDC

“In 2020, Over 30 Billion Connected Devices Will Be In Use.” - Gartner

“There are more than 10 billion wirelessly connected devices in the market today; with over 30 Billion devices expected by 2020.” - ABI Research
Economic Value of IoT Economy

“IoT product and service suppliers will generate incremental revenue exceeding $300 billion, mostly in services, in 2020.” – Gartner

Internet of Everything -- connected products ranging from cars to household goods -- could be a $19 trillion opportunity - Cisco

“Sized applications of the Internet of Things could have direct economic impact of $2.7 trillion to $6.2 trillion per year in 2025.” – McKinsey

“Service Revenues for the IoT will reach $500 billion by 2018, dwarfing the $33 Billion in revenue expected from devices in 2018” - Harbor Research

“IoT technology and services spending to generate global revenues of $4.8 trillion in 2012 and $8.9 trillion by 2020, growing at a compound annual rate (CAGR) of 7.9%.” – IDC
Different Names
Slightly different capabilities

“3rd Platform” - IDC

“Internet of Everything” - Cisco

“Industrial Internet” - GE

“Nexus of Forces” - Gartner
New Approaches and New Skills

Few organizations will escape the need to connect smart objects with corporate systems and applications. Therefore, IT organizations must master **the new skill, tools and architectures** required by the Internet of Things - Gartner

“As it becomes easier and easier to design and develop smart systems, competitive differentiation will **shift away from unique, vertically focused product features** towards how the product is actually used and how the product fosters interactions between and among users in a networked context.” – Harbor Research

“Survey found that 51 percent of CIOs are concerned that the digital torrent is coming **faster than they can cope** and 42 percent don't feel that they have the talent needed to face this future.” - IDC
Components of an IoT system

- **Securely collect** data from various sources using different protocols
- **Store** the data in a highly scalable distributed storage system
- **Analyze** data **real time** and provide insights
- **Advanced analytics** using historical data
- **Manage** end points (sensors) from the platform. This should include the ability to register / discover a device.
- Provide users with the ability to **customize and build applications** for their specific scenarios
Securely handling the combination of a huge number of devices, the large amount of data being generated by these devices that are geographically distributed and getting insights into the data is a Perfect Storm
The Need for “Cloud Speed”

CEO Studies 2004 – 2013

CEOs think technology will be the most important external force shaping the future of their enterprise

Technology factors:
- Market factors
- Macro-economic factors
- People skills
- Regulatory concerns
- Socio-economic factors
- Globalization
- Environmental issues
- Geopolitical factors
Data is the new currency for business

The challenge is no longer to connect the data sources within the enterprise, but to connect data sources from a myriad of places – both inside and outside the enterprise.

Getting insight into the available data is what determines the success of an enterprise.
Handling “The Perfect Storm”

Connectivity
Sensors use a variety of access methods to send data
Sensors use a variety of protocols to send data
Frequency of data transmits vary widely

Flexibility and efficiency in data acquisition is critical

Security
Security for the entire flow of data
From sensors to platform to storing
Regulations pertaining to data
Consistent security model regardless of the method in which data is handled

Clear end to end security model is critical
Handling “The Perfect Storm”

**Scale and Elasticity**
Handle variety and high velocity of data
Ability to elastically scale with minimal effort
Robust easy to manage and fail proof environment
Extensible geographically with high speed connectivity

Cloud based system with **transparency** for management, ability to **scale on-demand** is critical

**Data and Analytics**
Data storing and retention
Real-time insight into data
Historical analysis of data
Data locality and Fast I/O

Transparent **data handling** and **easily accessible analytics** is critical
Handling “The Perfect Storm”

**Extensibility and Eco-system**
APIs to access the IoT system
Simple easy functions to gain insight
Ability to notify on events
Platform to write a variety of applications

Enabling an eco-system to **extend the platform** is critical