Sensor Based Business and Supply Chain Optimization

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December 1, 2016
IoT SLAM Conference

Optimization:
an act, process, or methodology of making something (as a design, system, or decision) as fully perfect, functional, or effective as possible; specifically : the mathematical procedures (as **finding** the maximum of a function) involved in this.

- achieved through visibility and complete dataset

Supply Chain Visibility (SCV)

Supply chain visibility (SCV) is the ability of parts, components or products in transit to be **tracked** from the manufacturer to their final destination. The goal of SCV is to **improve** and **strengthen** the supply chain by making data readily available to all stakeholders, including the customer.

- achieved through measurement and sensing

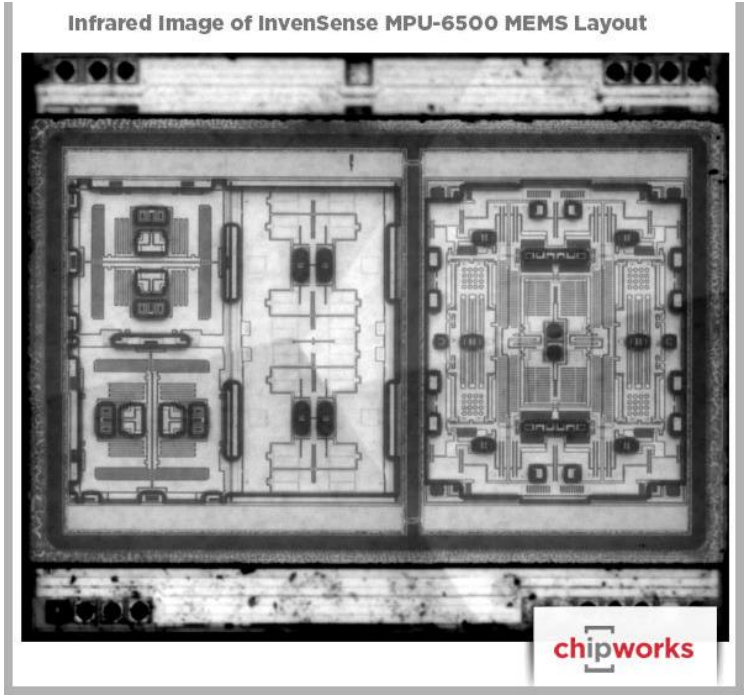
Sensor

A sensor is a device that detects and responds to some type of input from the physical environment. The specific input could be **light, heat, motion, moisture, pressure, or any** one of a great number of other environmental phenomena. The output is generally a signal that is converted to human-readable display at the sensor location or transmitted electronically over a network for reading or further processing.

- achieved through intelligent HW+SW sensing solutions

Advancements in Sensing Technology

All <4x4mm



iPhone 6S Sensors:

- Touch ID Fingerprint Sensor
- Accelerometer Sensor
- Gyroscope Sensor
- Barometer Sensor
- Proximity sensor
- Ambient light sensor
- Temperature Sensor

achieved through:

- MEMS
- photo-diodes
- shrinking of CMOS gate size

http://media.digikey.com/Photos/Bosch%20Sensortec/MFG_BME280.jpg
http://www.globalspec.com/npapics/96/98927_01182012723_ExhibitPic.jpg
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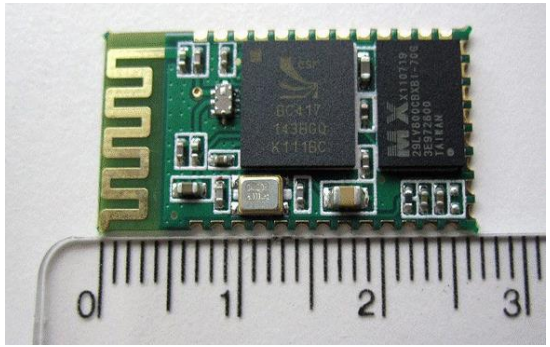
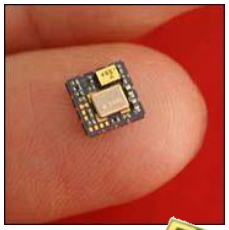
Advancements in Connectivity





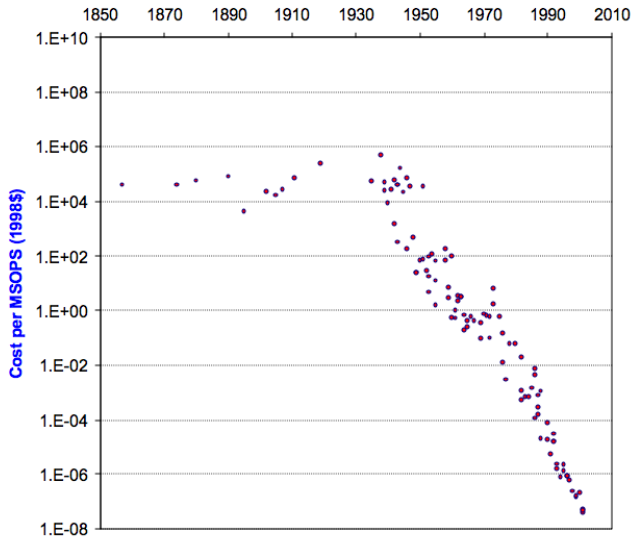
All < 27x27mm (including cellular)

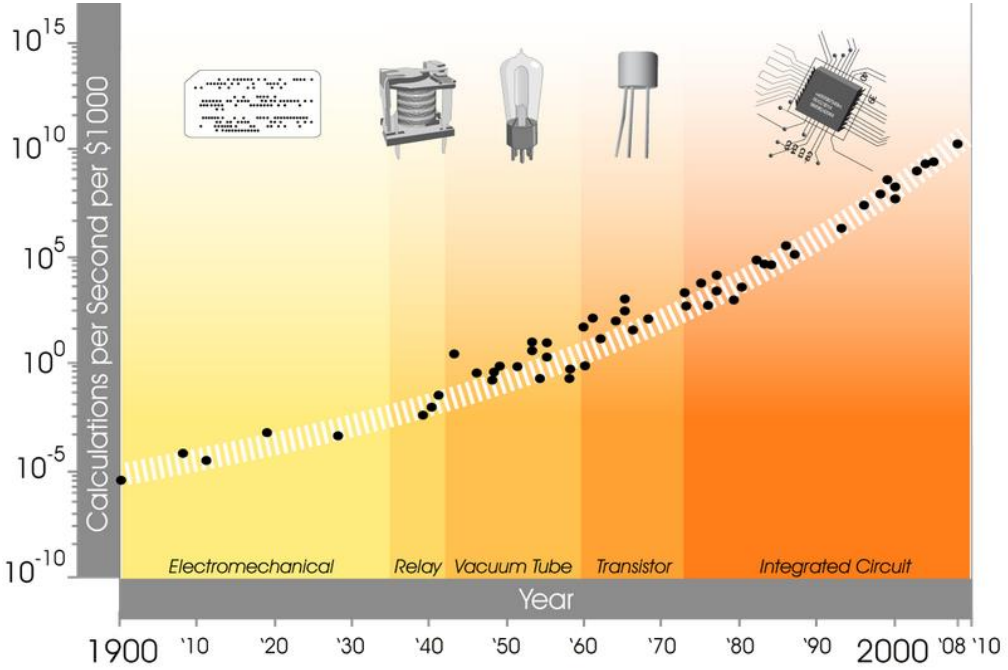
achieved through:

- shrinking of CMOS gate size
- Leaner Comms Protocols and more efficient RF Design
- Network carriers have adapted their data packages
- New Low Power Wide Area Network Protocols being deployed

http://www.kh-gps.de/d2a_37.gif
http://www.pentaxforums.com/forums/attachments/6-pentax-dslr-discussion/139949d1347127800-when-do-we-get-built-gps-wifi-bluetooth-cellular-data-lte-rakon-2006-smallest-gps-chipset.jpg

Advancements in Data Analytics and ML





achieved through:

- Cloud availability
- Cloud prices have declined tremendously.
- Moore's Law is still in effect

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http://aiimpacts.org/wp-content/uploads/2015/03/nordhauscomp-copy.png

Supply Chain Example

Asset management and supply chain monitoring through precise location, shipment integrity and climate monitoring. Enhanced visibility allows for proactive management and accurate planning.

Deployed modules monitor shipments of high-value hardware from the Netherlands to destinations around the world.

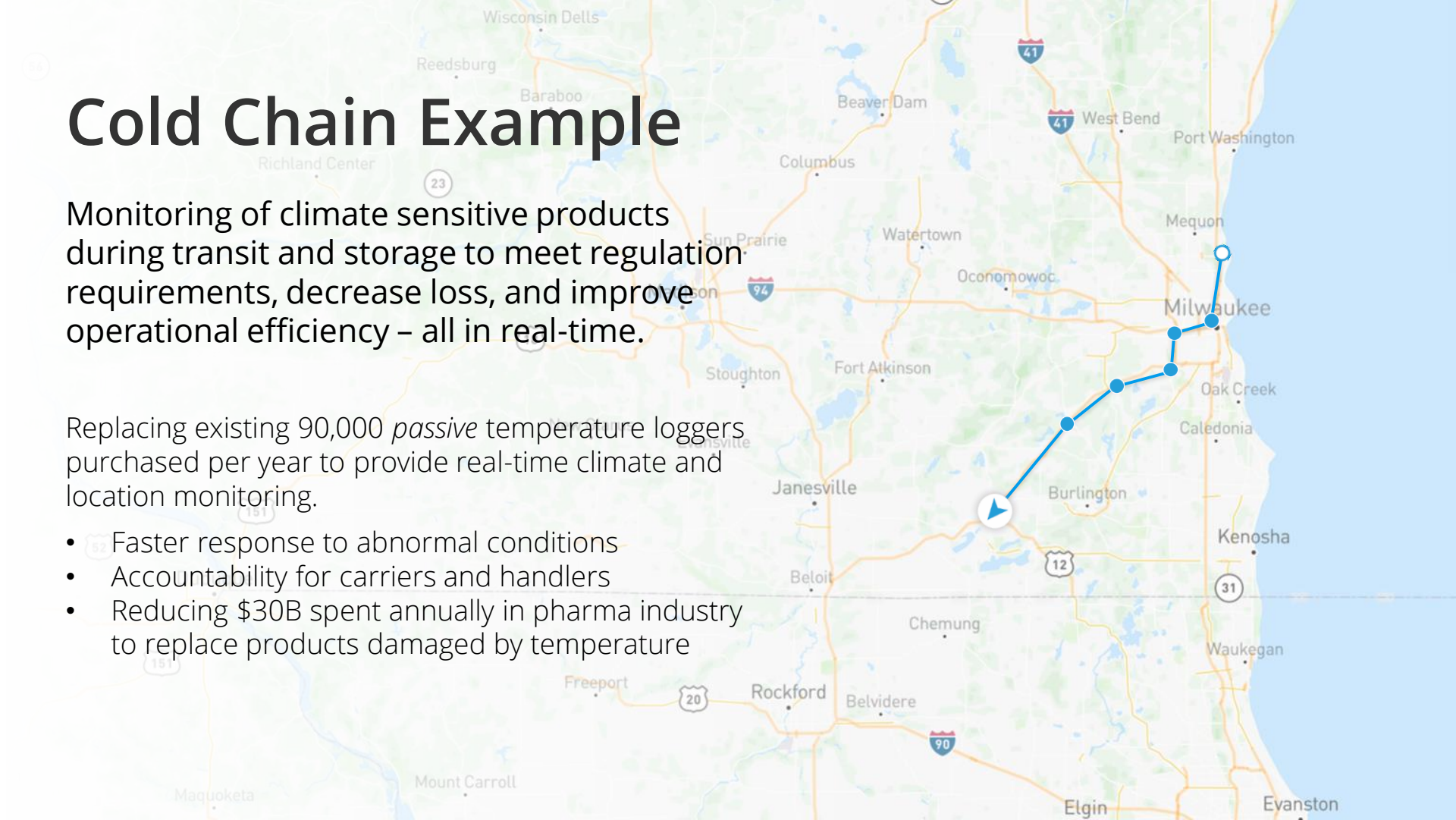
- Improved risk management
- Faster instillation upon delivery
- More efficient operations
- Reducing current $1B inventory

Cold Chain Example

Monitoring of climate sensitive products during transit and storage to meet regulation requirements, decrease loss, and improve operational efficiency – all in real-time.

Replacing existing 90,000 *passive* temperature loggers purchased per year to provide real-time climate and location monitoring.

- Faster response to abnormal conditions
- Accountability for carriers and handlers
- Reducing $30B spent annually in pharma industry to replace products damaged by temperature



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