

Experience in Connection: Innovation's Next Frontier

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The “12-quarter year” is now the norm

At Salesforce, we tell newly hired employees that “we run on a twelve-quarter year”

What this means is that we look at numbers, compare them to goals, and initiate corrective action at least three times more frequently than most companies

Why is this necessary, today, in every field? Because **the “half-life of facts”** (the time required for half of what you “know” to become untrue) **is shrinking**

Philippe Kruchten examined 1988 issues of *IEEE Software* and evaluated which ideas “are still important or at least recognizable.” He estimated that the half-life of software engineering ideas is likely not much more than 5 years.

A working engineer needs $\sim 7\frac{1}{2}$ hours’ study per week, 48 weeks/year, to stay as current as at time of first college degree.

spectrum.ieee.org/riskfactor/computing/it/an-engineering-career-only-a-young-persons-game



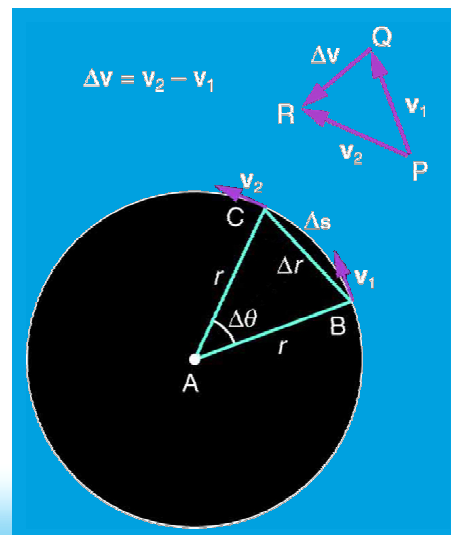
Acceleration is a vector

“Faster” in the wrong direction may not actually be a “positive” change

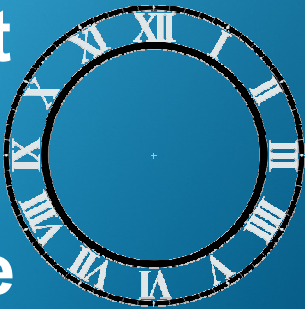
We often speak of “the pace of change” as if it were a speed: a scalar quantity, “more” being unambiguously...more

Improvement metrics are conventionally stated as %’age improvement per unit time

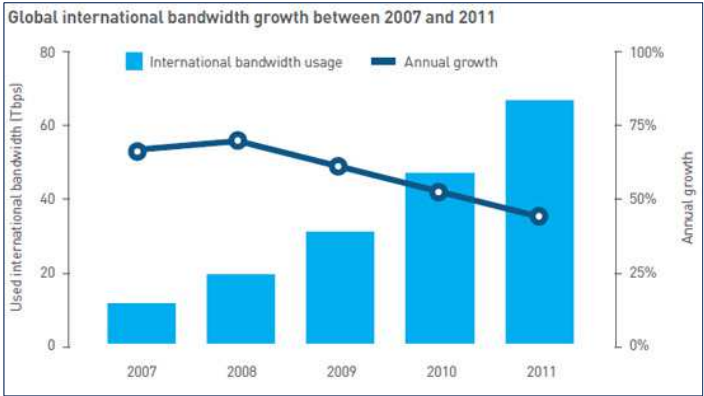
“Better, faster, cheaper” at the wrong thing...
...is the wrong thing



- i. Environment
- ii. Strategies
- iii. Examples
- iiii. Experience

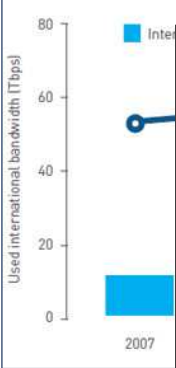


It Took a While...But We Have Connected the Planet



It Took a While...But We Have Connected the Planet

Global international bandwidth growth between 2007 and 2011



TeleGeography²⁵
RESEARCHUPDATE

APRIL 23, 2015

Global Network Construction Resurgence

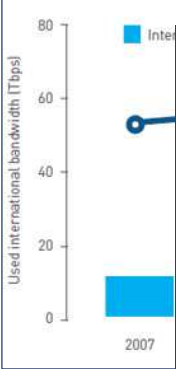
New data from TeleGeography's Global Bandwidth Research Service reveal that international bandwidth grew 44 percent in 2014, to reach 211 Tbps. The 65 Tbps of new capacity deployed in 2014 are comparable to nearly the entire amount of bandwidth in service globally in 2011.

This rapid capacity growth is driven by a changing mix of global network operators. Private networks, particularly those of large content providers, account for a growing share of international bandwidth, even surpassing Internet bandwidth on the trans-Atlantic route last year. Consequently, network operation has become a core part of the business for some of the largest content providers.



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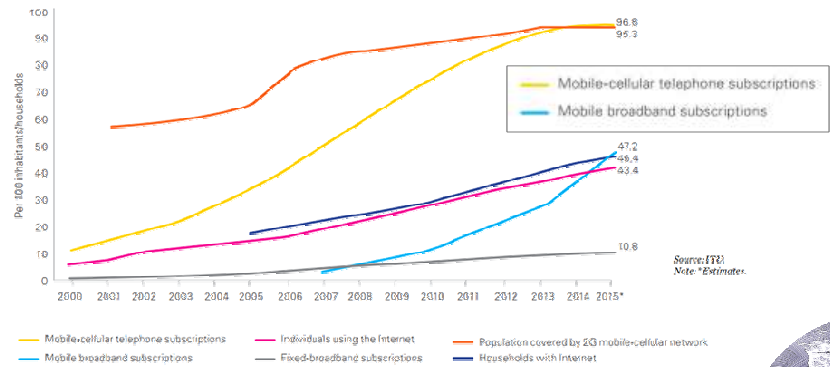
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Median 10Gbps price trends on major international routes between Q1 2009 and Q1 2012

A line chart showing the median 10Gbps price trends on major international routes between Q1 2009 and Q1 2012. The y-axis is labeled 'Monthly recurring charge (US\$)' and ranges from \$0 to \$250,000. The x-axis shows quarters from 2009 Q1 to 2012 Q1. Five routes are tracked: Miami-São Paulo (dark blue), Hong Kong-Tokyo (purple), Los Angeles-Tokyo (dark red), London-New York (light blue), and London-Paris (dark blue). All routes show a general downward trend in price over the period.



Connection Creates the New Context



Connections Counter

As of today, **July 5, 2015**, there are:

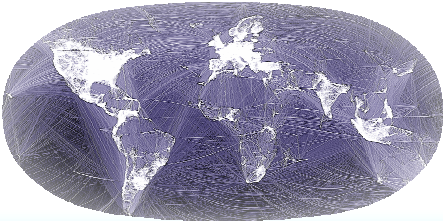
16,290,321,507

People, processes, data and things connected to the Internet.

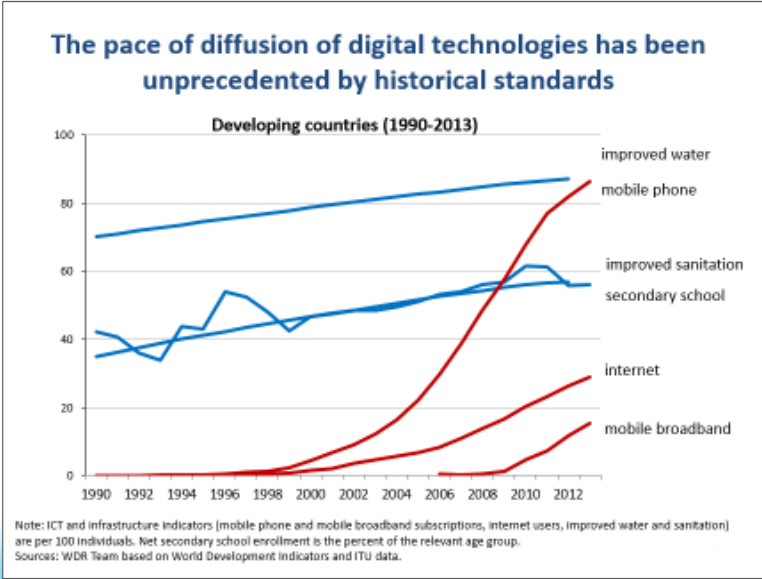
By 2020, the Internet of Everything has the potential to connect 50 billion.



- 936 million daily active users on average for March 2015
- 798 million mobile daily active users
- 82.8% of daily active users outside the US and Canada

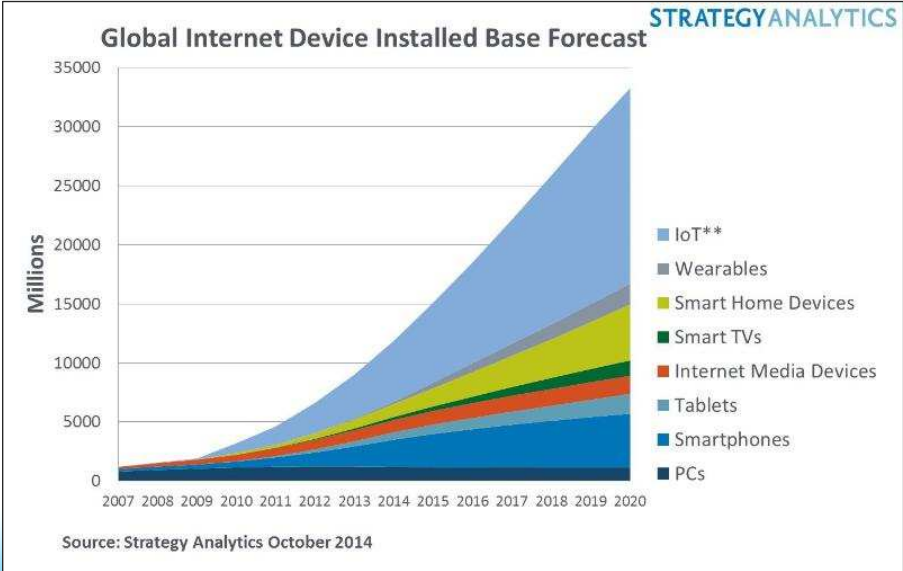


Connection Creates the New Context



Retail Beacons - Nebraska Crossings Mall In Omaha

<http://www.omaha.com/article/20131219/MONEY/131218749>





<u>ATEK Business Value</u>	<u>ROI (estimated)</u>
• New recurring revenue stream • Preventative maintenance model • Safer solution	• \$100K new revenue in year 1 • \$50K ROI in year 1 • \$250K profit expected in year 2

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Wearables Already Entering 2nd Generation



“The demand for basic wearables, those that do not run third party apps, has been absolutely astounding. Vendors like Fitbit and Xiaomi have helped propel the market with sub-\$100 bands.”

“We expect smart wearables, those capable of running third party apps, to take the lead in 2016. The transition from basic to smart wearables opens up a slew of opportunities for vendors, app developers, and accessory makers.”

www.idc.com/getdoc.jsp?containerId=prUS25096745

It's About Not Getting in the Way

“Truck drivers at Rio Tinto's coal mines in Hunter Valley, Australia, for example have been using a device called ‘SmartCap’ which looks like a regular baseball cap but has sensors to detect the alertness.

“It provides an early warning for when a driver is approaching a ‘microsleep,’ designed to reduce fatigue-related accidents.”



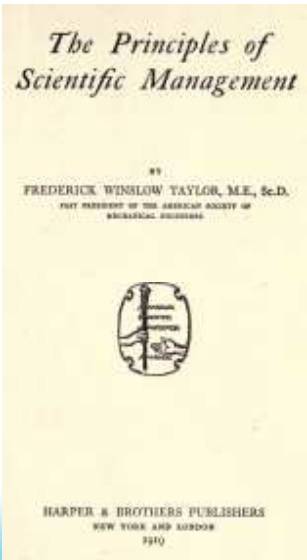
www.bloomberg.com/news/articles/2015-08-07/wearable-technology-creeps-into-the-workplace



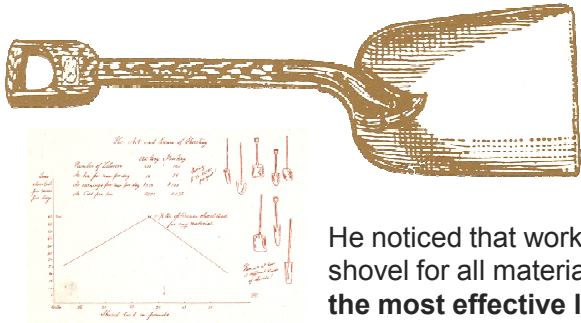
Ultimately, We'll Expect Environment to Obviate Device



Data + Direction := ++Performance



One hundred years ago, Frederick Taylor measured workers' behavior – and found that effective use of data improved both their performance and their health.



He noticed that workers used the same shovel for all materials. He determined that **the most effective load was 21½ lb**, and found or designed shovels that for each material would scoop up that amount.

en.wikipedia.org/wiki/Frederick_Winslow_Taylor

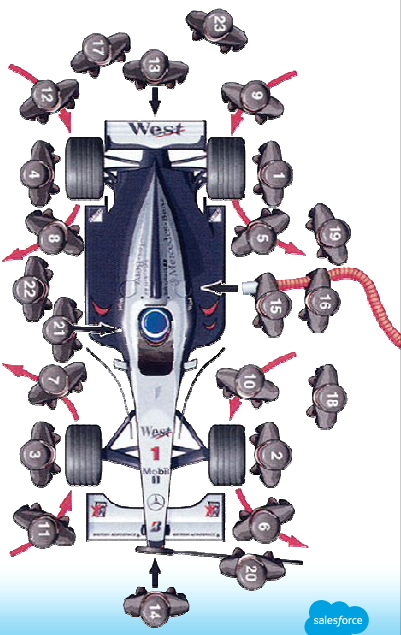


It's About Human Performance in Context

McLaren Applied Technologies works on evidence-based systems to maximize human efficiency. Internally the company has been exploring how to get its Formula One teams to recover from jet lag most effectively.

“Our teams are travelling around the world a lot. Some of them have to change wheels in the pit stop and be alert and fit, while others have to look at reams of data and need to be cognitively alert,” explains Duncan Bradley, Head of High-Performance Design.

By plotting data relating to travel schedules with heart rate variability monitors and tests to monitor cognitive alertness, the company was able to reorganize journey times and teams to suit the way different individuals coped with jet lag and stress.

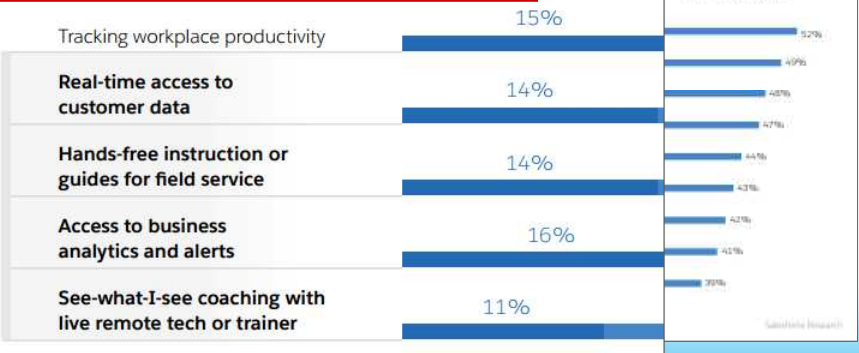


<http://www.bloomberg.com/news/articles/2015-08-12/wearable-biosensors-bring-tracking-tech-into-the-workplace>

Wearables Open New Channels to Profitable Customers

Nearly 3x Growth Expected for Use Cases That Help Employees Serve Customers

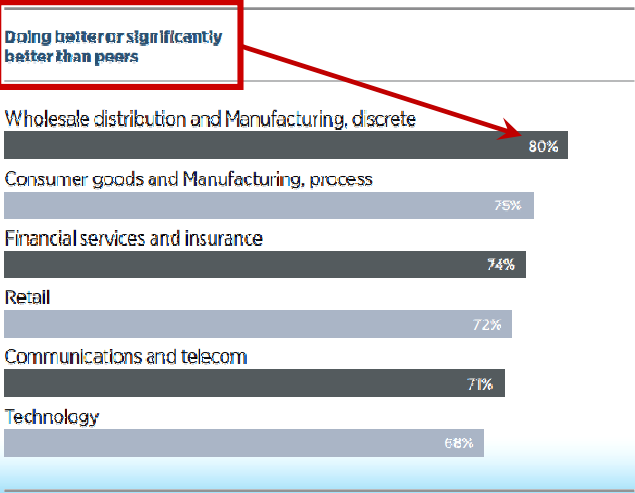
Four of the top five growth areas for employee wearable tech use focus on improving the customer experience.



Most Companies Overestimate User-Experience Leadership

We can't *all* be above average

Figure 2 How do you believe the customer service in your company performs compared to your peers?



What's Needed Now is a Process

“Wearables are not useful on their own,” adds Guillaume Roques, head of developer relations EMEA at Salesforce. “They have to be part of the move toward a system of intelligence, which combines big data, the cloud and analytics.

“Connecting them all together is a big challenge.”



76% are seeing a boost in business performance

79% Say wearables are strategic to success

86% are increasing investments this year

3x expected growth across the enterprise



www.bloomberg.com/news/articles/2015-08-07/wearable-technology-creeps-into-the-workplace



“With IoT Cloud our connected devices will tell us when it’s time for a service call ”

Todd Finders, CIO, Emerson Climate Technologies



salesforce IoT cloud

salesforce service cloud



Emerson monitors and responds to issues with connected thermostats

Emerson Climate division creates thermostats and climate controls for both residential and commercial use

Connected thermostats provide continuous monitoring, problem identification, preventative maintenance, proactive alerting, and customer lifecycle management

Device data use used for preventative service opportunities to connect homeowners and certified installation contractors when service need arise or there are additional products and services offers

“IoT Cloud helps us react to events before they become problems”

Milan Kocic, Director Innovation, Hexagon Metrology



salesforce IoT cloud



Hexagon Metrology Enables Real-Time Factory Monitoring With IoT

Global manufacturing company headquartered in London builds precision measurement equipment

Monitoring real-time data feeds from quality laboratory and production metrology machines in Salesforce IoT Cloud for catastrophic events (vibration, drastic temperature change, crash)

Combine IoT data with real time on-duty manager information and notify manager when event occurs; shows real-time machine status in Platform built Dashboard running on Salesforce App Cloud

LYNX

Internet of Grilled Things:
Lynx Builds Their SmartGrill on Heroku Platform, Wins Innovation Award at CES 2015

Worked with partner Ethos Solutions to build SmartGrill app allowing users to choose recipes, set preferences and automatically cook their food

Built the server side on Heroku and delivered it in 3 weeks with two Java developers and one front-end web developer

Grill Connected



"Heroku was absolutely the best choice for this project. Our developers love it, it allows them to move quickly and to focus on the most important and fun part of any development project: delivering innovative features."

- Steven Simpson, President of Ethos Solutions

CLOUD APPLICATION PLATFORM

 heroku

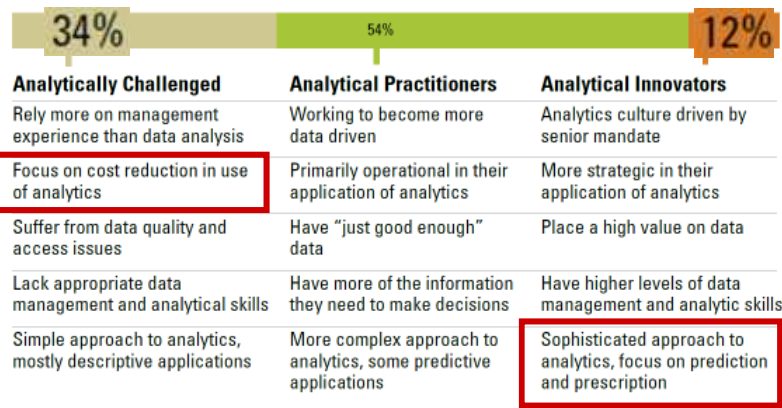
LEARN MORE AT: smartlynxgrills.com



Mandate for Forward Motion: Become Truly Data-Driven

Three Levels of Analytical Maturity

We classify organizational analytical maturity based on a company's ability to gain competitive advantage from analytics and its ability to use analytics to innovate. (See last year's report, *The Analytics Mandate*, for details.)



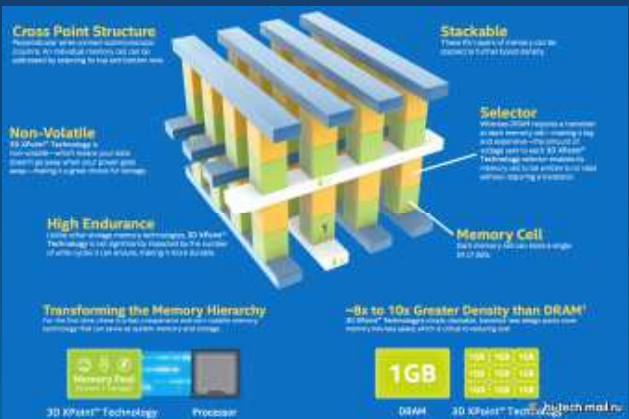
If memory could be faster...and powerless



“3D XPoint will have about 1,000 times the performance of NAND flash, **1,000 times the endurance of NAND flash** and about 10 times the density of DRAM”

“Performance will be on the order of **nanoseconds** compared to microseconds of latency for NAND flash and millisecond for disk drives.”

“The interesting part about 3D XPoint is that it will be bit addressable, like DRAM, and **non-volatile** like NAND flash”



theplatform.net/2015/08/18/intel-reveals-plans-for-optane-3d-xpoint-memory

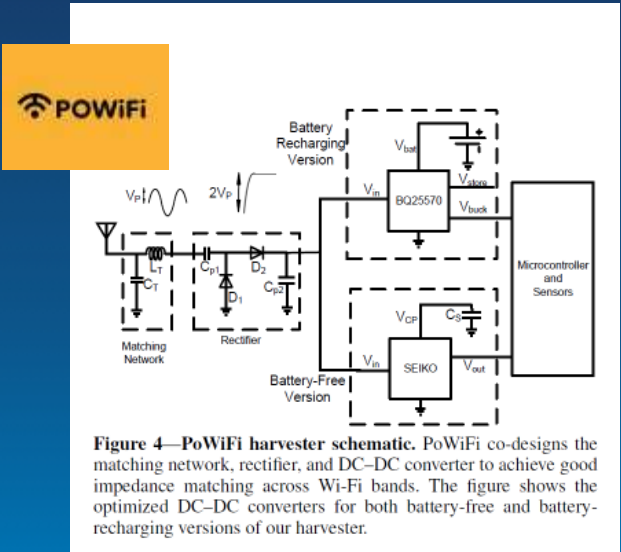
Remember when power needed a source?



“Wi-fi signals have been used to **beam power to a surveillance camera**. The battery-free camera was modified so it could scavenge power from ambient wi-fi signals, store it and then use it to take photos.”

The team modified standard routers to broadcast noise when a channel was not being used to send data: the power of the wi-fi signals stayed constant, and high enough to power some components.”

www.bbc.com/news/technology-33020523



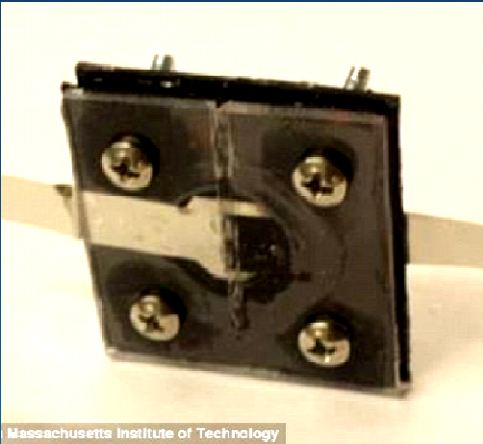
Tomorrow's devices think you're hot



A battery that can convert your body heat into electricity could lead to mobile phones capable of charging themselves while in your pocket.

Researchers at the Massachusetts Institute of Technology have developed a **button sized self-charging battery that can scavenge energy from low temperature sources of heat.**

The device can charge itself at temperatures **between 20°C(68°F) and 60°C (140°F)**, far lower than other heat-harvesting technologies.



Massachusetts Institute of Technology

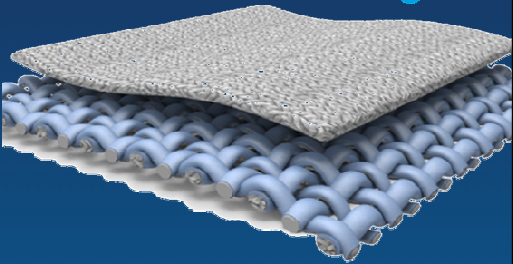
www.dailymail.co.uk/sciencetech/article-2848868/Mobile-phones-charge-batteries-pocket-using-body-heat.html

Making this all wear well



“Scientists in South Korea have developed a flexible, foldable and wearable fabric that generates electricity as it bends and flexes. A person wearing a shirt tailored from the material only has to move around to power a small screen or other electronic devices.”

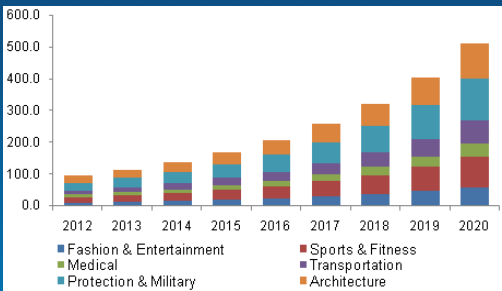
student.societyforscience.org/article/“smart”-clothes-generate-electricity



“The global smart textile/fabric market is expected to be valued at USD 1.59 billion by 2020, growing at a CAGR of 24.1% from 2013 to 2020.

Bluetooth Low Energy (BLE) technology enables the connection of devices to Internet through phones.”

www.grandviewresearch.com/industry-analysis/smart-textiles-industry



Let's illuminate more options



Office environments: “Researchers at the University of Oxford have reached a new milestone in networking by using light fidelity (Li-Fi) to achieve **bi-directional speeds of 224 gigabits per second (Gbps)**... ‘To the best of our knowledge, this is the first demonstration of a link of this type with a FOV that offers **practical room-scale coverage.**”

Medical devices: narrow-band color filters can separate signals from differently colored LEDs: patient need not be connected by fragile, uncomfortable wires.



Perhaps we should stop saying “Internet”oT



“The Internet” is not “the Web,” which is defined by HTTP...

...but “**the Internet**” **does have a specific meaning:** the routing of TCP/IP packets by DNS.

MQTT is a machine-to-machine (M2M)/“Internet of Things” connectivity protocol: extremely lightweight publish/subscribe messaging, useful where small code footprint required and/or bandwidth at a premium.

UDP, DTLS, DDS, Weightless...and many other* options

Your body doesn't have just one messaging system. Neither will the IoT.



* postscapes.com/internet-of-things-protocols

> 1 kind of data; > 1 kind of thing

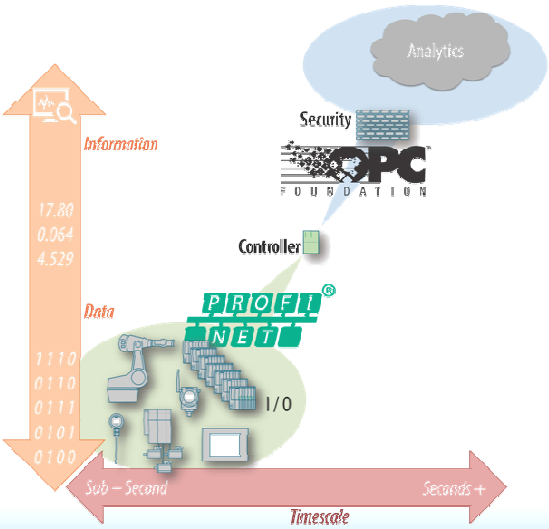
There are at least four kinds of “thing” data

- Status
- Location
- Automation
- Actionable data

They present different tradeoffs of

- Update interval
- Accuracy
- Downside risk
- Post-collection complexity

David Friedman, CEO, Ayla Networks
readwrite.com/2015/08/13/five-types-data-internet-of-things



www.automationworld.com/industrial-internet-things/standards-and-protocols-industrial-internet-things

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Thank you

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