Implications of IoT on Healthcare

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The Internet of things (IoT) is the internetworking of physical devices... embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect, exchange, and act on the data.
Smart assistant for new parents

An IoT device recognizes that Mom is putting Jim to sleep.

The IoT “brain” leverages multiple devices throughout the home to keep Jim asleep.

The Roomba avoids vacuuming Jim’s room.

An IoT device notifies Mom that Jim is awake.
FRAGMENTED CONNECTIVITY SOLUTIONS

Transport

Protocol

Custom
Weave
Custom
Custom
Custom + Zigbee
Zigbee LightLink
Assuming we can get the devices to talk, why does it matter?
The Internet of Things is already amongst us and it touches and helps us all in different ways.

- **people**: Increased safety, machines better serving people
- **workstation**: Ability to monitor and control all tools of production, predictive maintenance, avoid breakdowns
- **factory**: Better energy management, less downtime, increased efficiency, quality, productivity, like Tesla Gigafactory
- **country**: Socio economic impact, increase in production, trade, innovation jobs
- **planet**: Waste reduction, reduced environmental impact, disaster prevention
IT Load → Pump Speed → Chillers → Wet Bulb → PUE
Systems, protocols and IoT schema are based on open standards
CHALLENGES

Ease of configuration
and use at scale

Safe and secure
update of software

Common information
formats and semantics

Avoiding App-endicitis
(too many apps!)

Integration into useful ensembles

Resistance to intrusion
and attack
Ensemble

Single Device

Fixed Rules

Intelligence

STATE OF THE INDUSTRY

GOAL
Brillo is a free OS, tightly integrated with Android, tailored for IoT.

Brillo makes it cost-effective to build a **secure** connected device, with verified boot to ensure it runs only **trusted code**.

Brillo comes with services to help **understand** how customers interact with it, and keep it **updated over time**.

Have Brillo running on your device itself or use it as a hub to aggregate data from nearby (micro) processors.
Weave provides the fastest way to connect smart devices to the network, the cloud, and an ecosystem of (business) apps & smart devices.

Weave setup works on Android, iOS, and desktop.

Want more details? Visit: https://developers.google.com/weave/
Providers have been exposed to devices collecting information for a long time....
HEALTHCARE CHALLENGES

- Ease of configuration and use at scale
- Safe and secure update of software
- Common information formats and semantics
- Avoiding App-endicitis (too many apps!)
- Integration into useful ensembles
- Resistance to intrusion and attack
Ransomware paralyzed MedStar’s network of 10 hospitals for days.
Implantable devices are starting to get hacked, but at least it’s read only right now.
IoT, Google Cloud and Machine Learning helping Japanese Cucumber farmers