# 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.**

nest
COOLING
72

chrome

PHILIPS

# Smart assistant for new parents

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

The Roomba avoids vacuuming Jim's room.

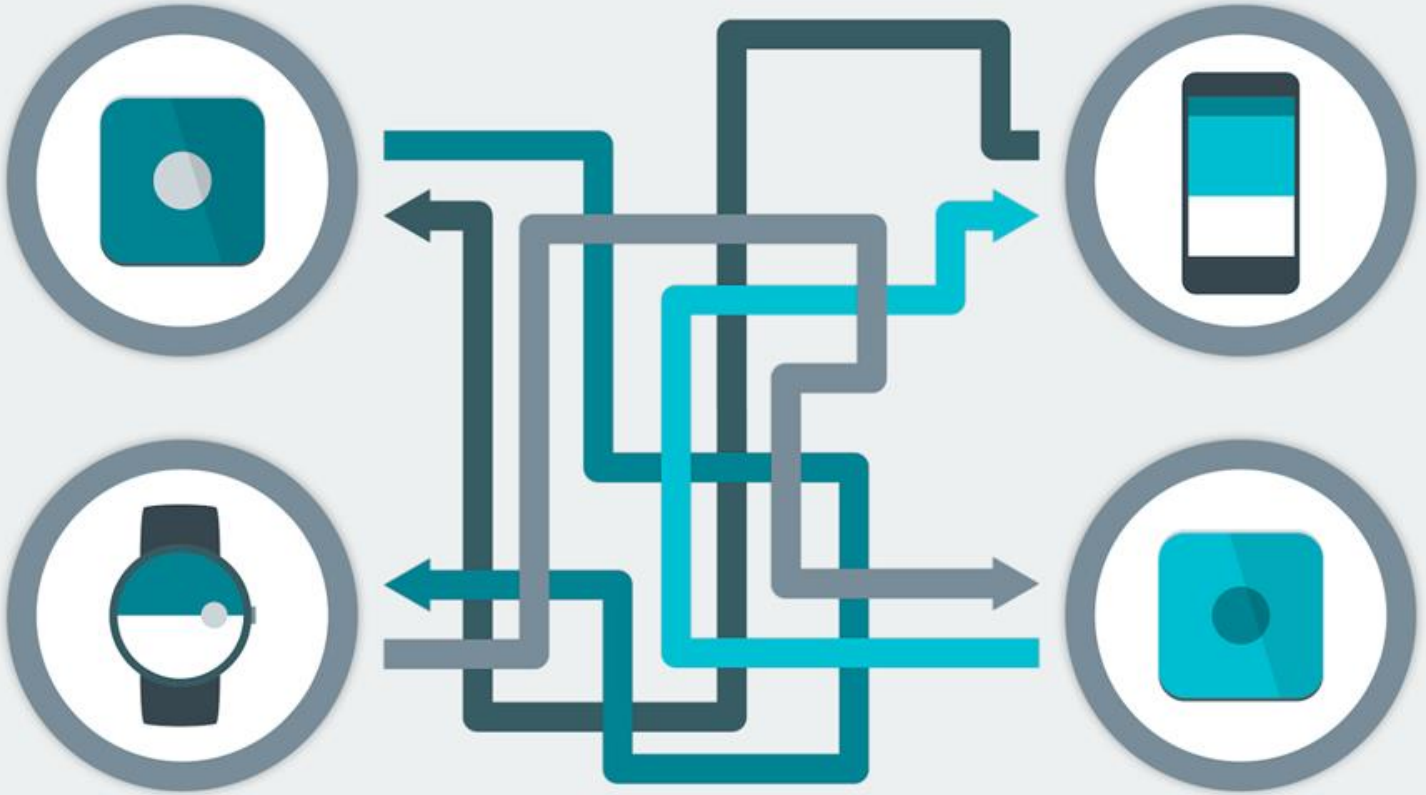
The IoT "brain" leverages multiple devices throughout the home to keep Jim asleep.

An IoT device notifies Mom that Jim is awake.

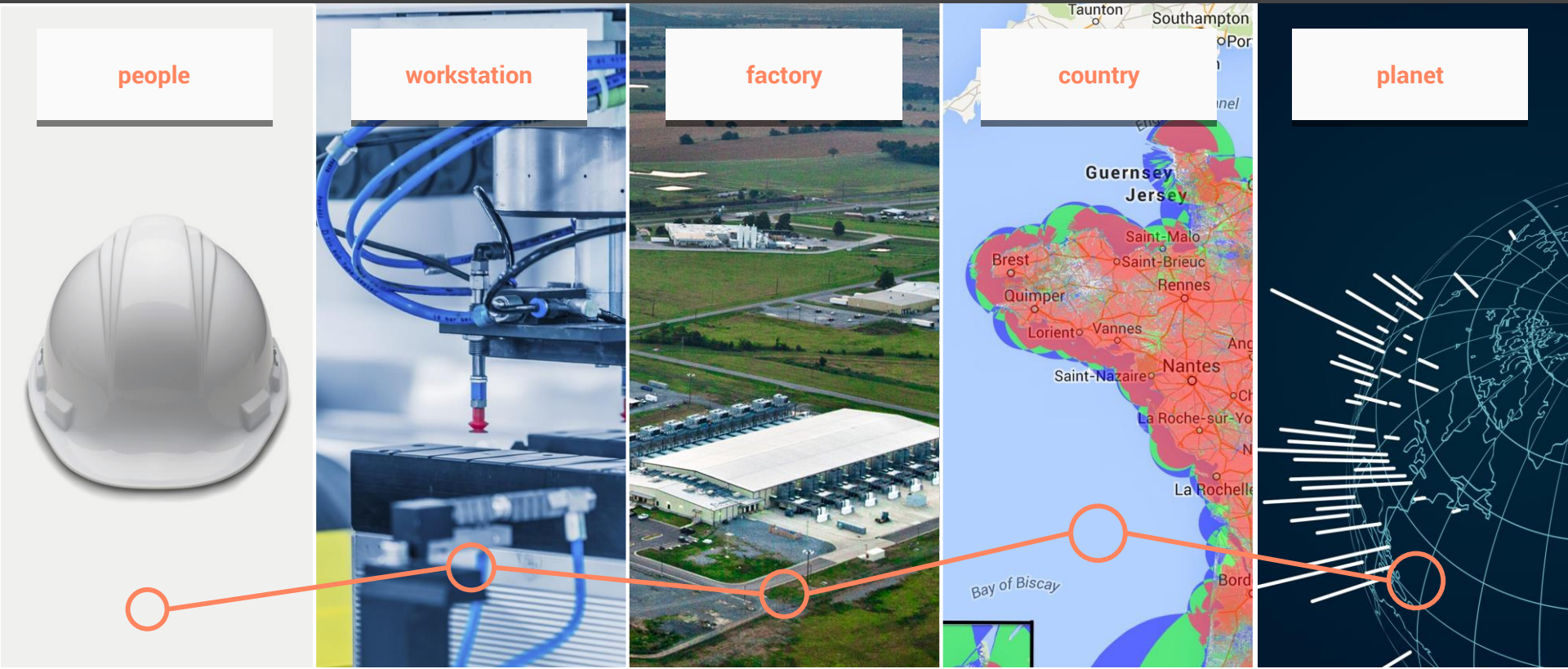
# FRAGMENTED CONNECTIVITY SOLUTIONS

| | | | | |
|---|---|---|---|---|
| Transport | Custom | Weave | Custom | Custom + Zigbee |
| Protocol | Custom | Custom | Custom | Zigbee LightLink |

# Assuming we can get the devices to talk, why does it matter?



# The Internet of Things is here and it touches and helps us all in different ways



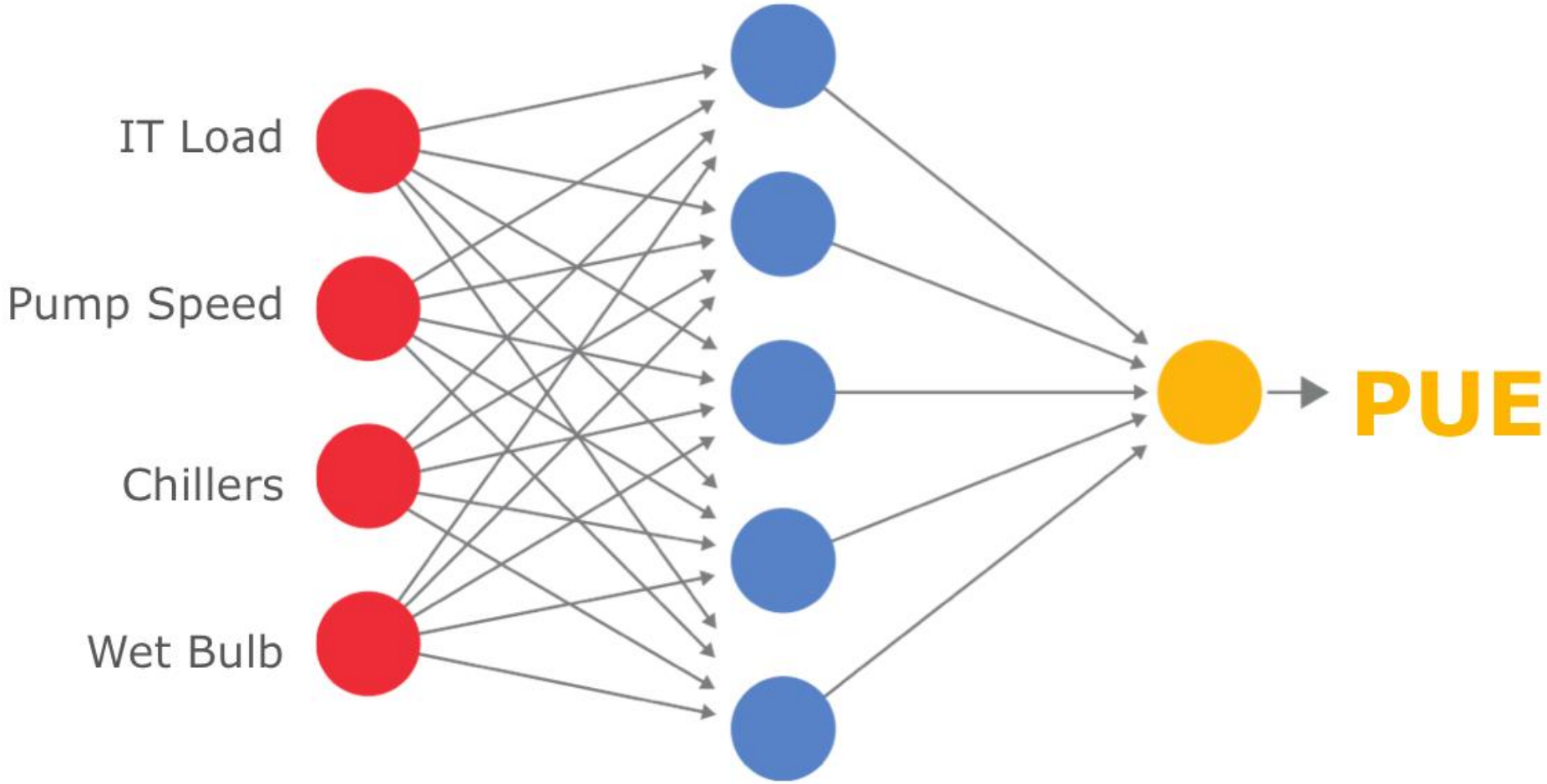

*Increased safety, machines better serving people*

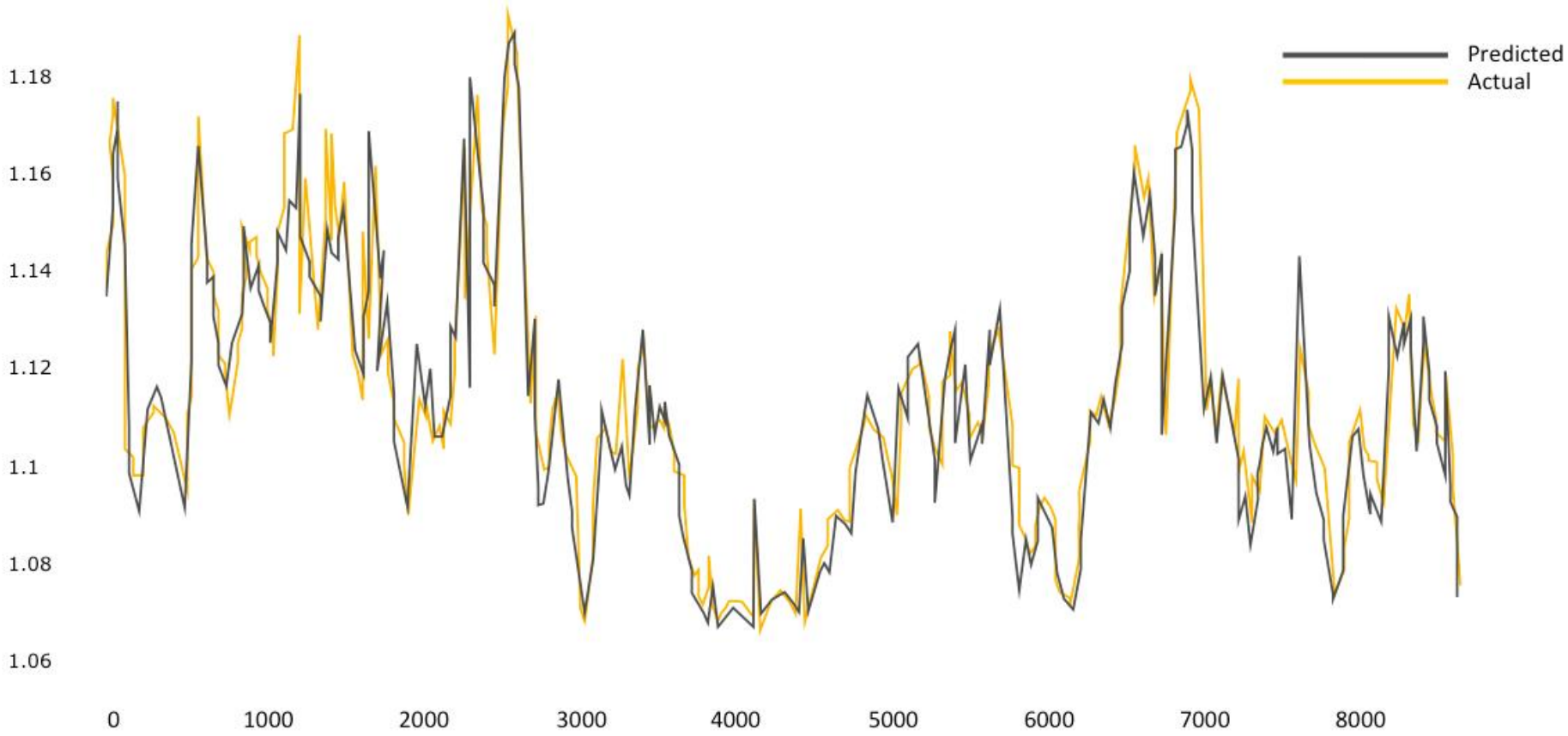
*Ability to monitor and control all tools of production, predictive maintenance, avoid breakdowns*

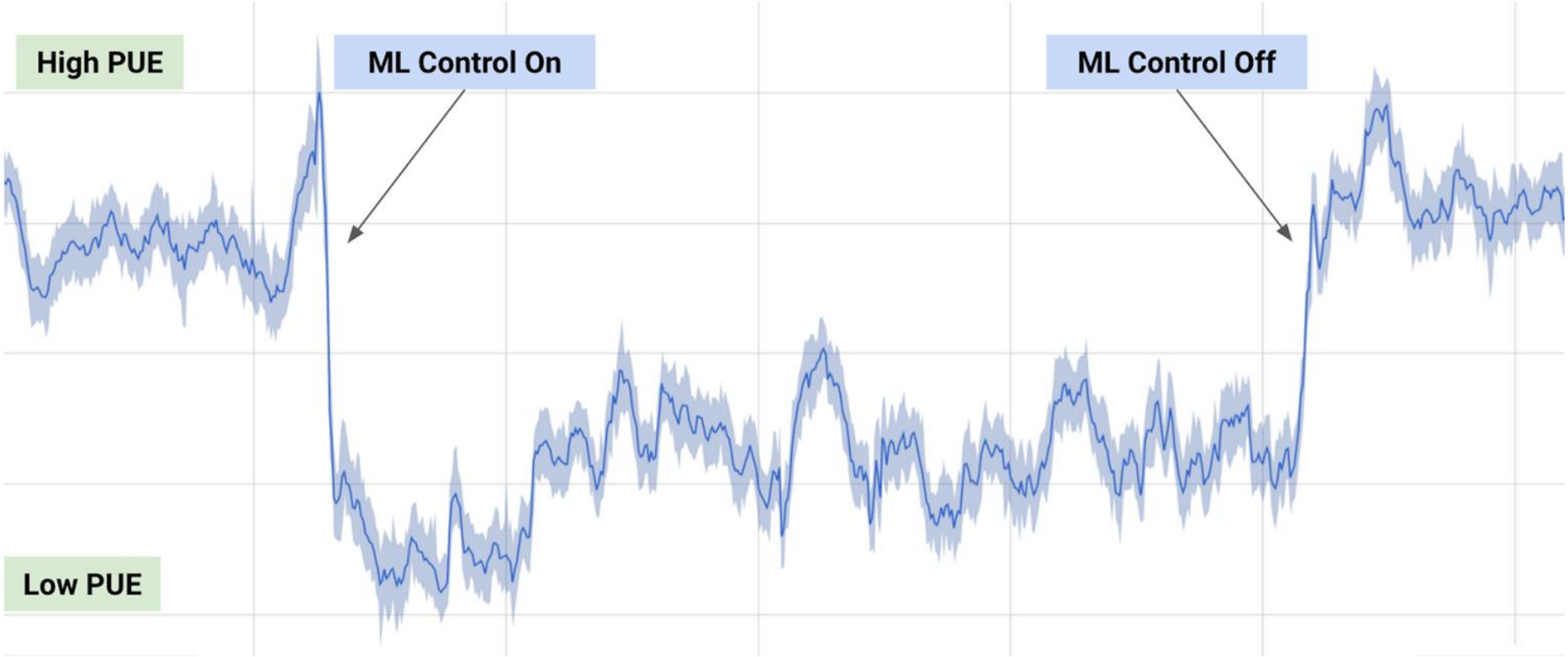
*Better energy management, less downtime, increased efficiency, quality, productivity, like Tesla Gigafactory*

*Socio economic impact, increase in production, trade, innovation jobs*

*Waste reduction, reduced environmental impact, disaster prevention*

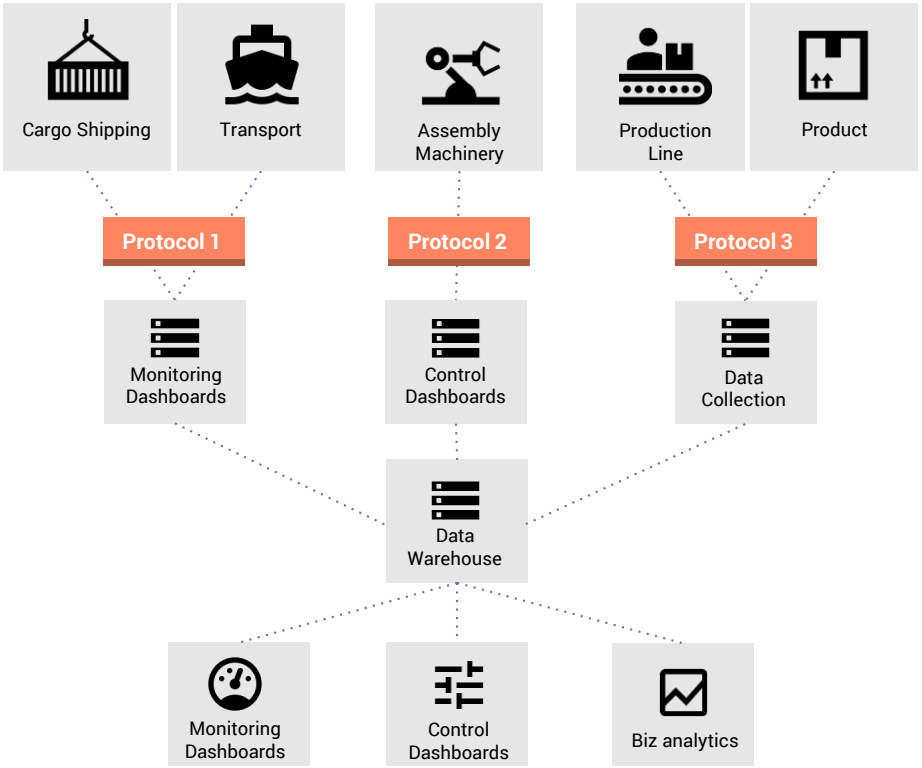

IT Load
Pump Speed
Chillers
Wet Bulb
PUE


Predicted
Actual
1.18
1.16
1.14
1.12
1.1
1.08
1.06
0
1000
2000
3000
4000
5000
6000
7000
8000

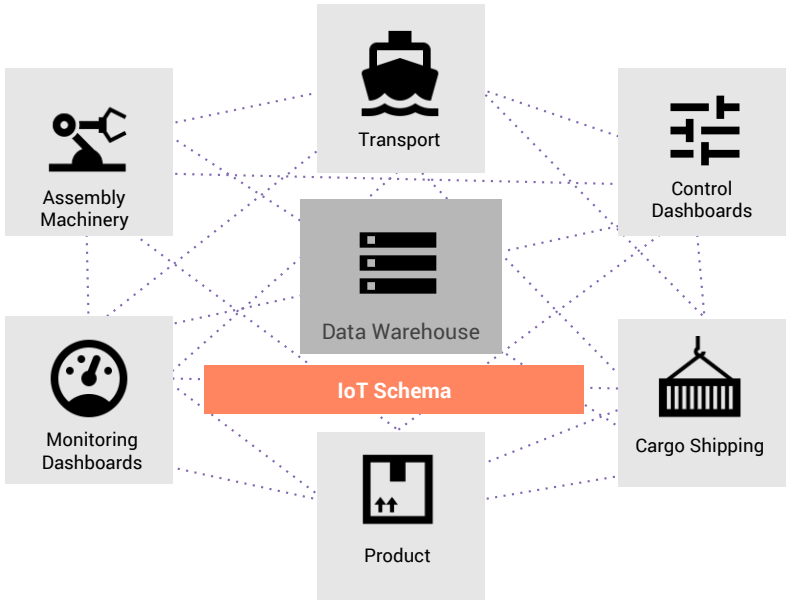

High PUE
ML Control On
ML Control Off
Low PUE

# Systems, protocols and IoT schema are based on open standards

## Walled Garden Approach




## Interoperable, open IoT



# CHALLENGES

Ease of configuration

and use at scale

Safe and secure

update of software

Common information

formats and semantics

Avoiding App-endicitis

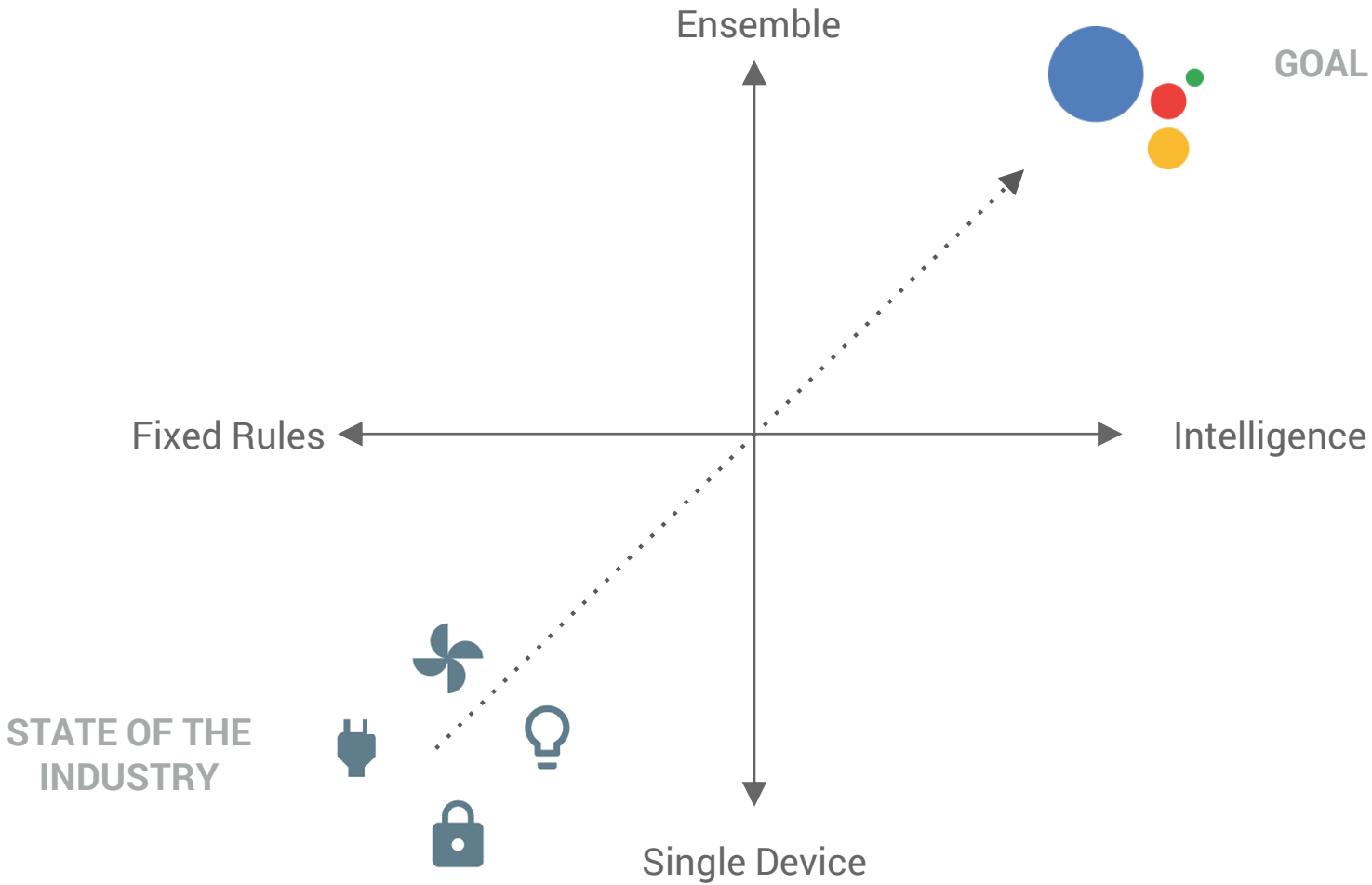
(too many apps!)

Integration into useful

ensembles

Resistance to intrusion

and attack


Ensemble
GOAL
Fixed Rules
Intelligence
STATE OF THE INDUSTRY
Single Device

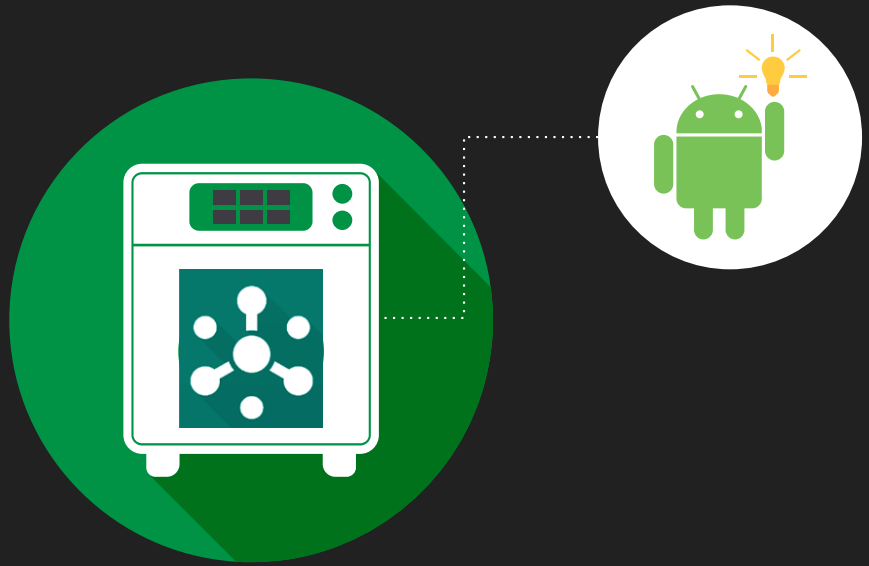
# Brillo

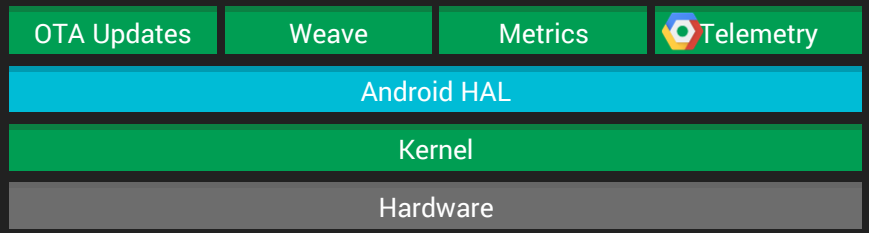
Brillo is a free OS, tightly integrated with Android, tailored for IoT.

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

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.

# Who Does the Autopsy?

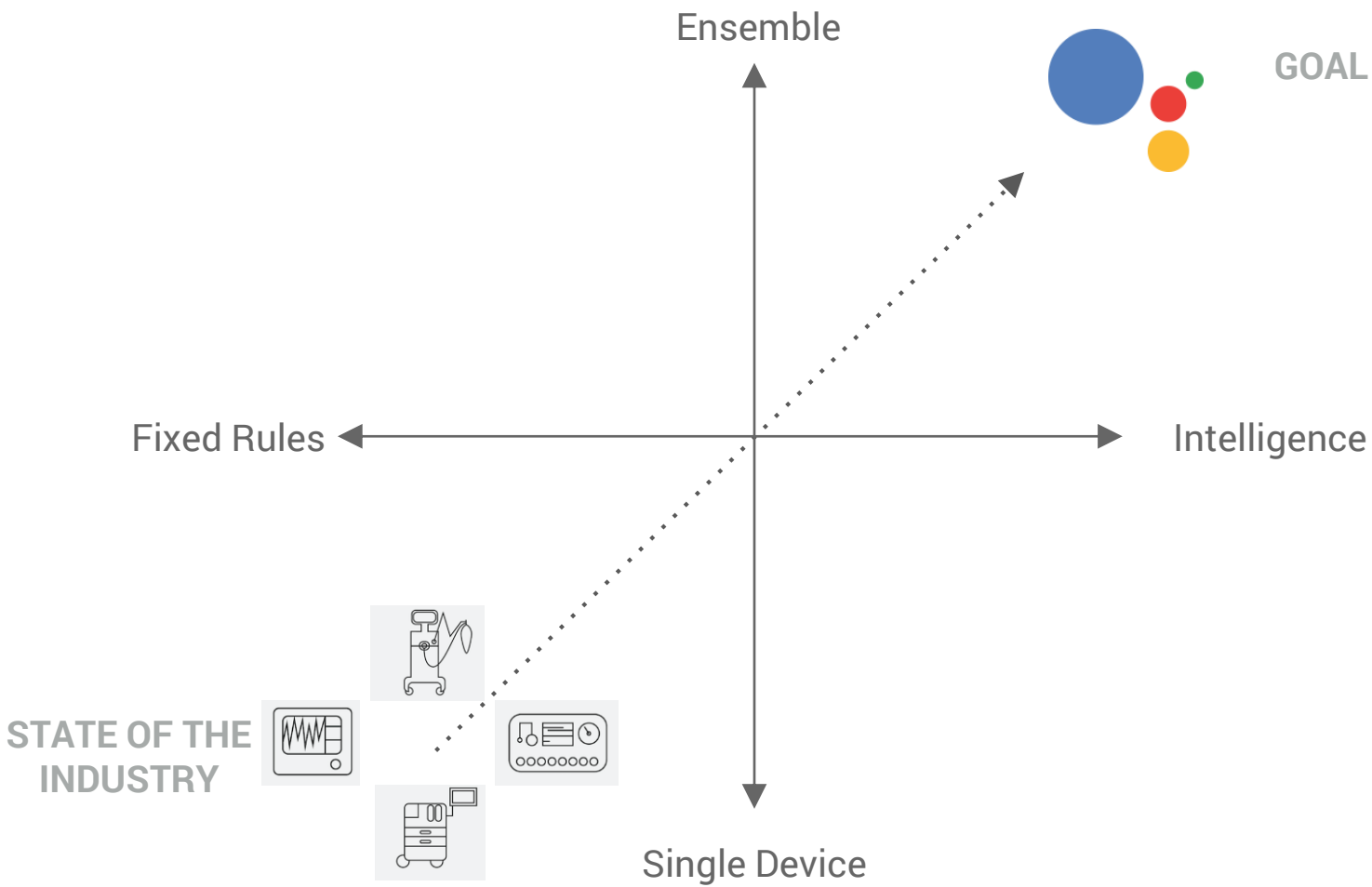
The criminal implications of implantable medical devices.

94 11

*By Marc Goodman*

Illustration by Rob Donnelly

Implantable devices are starting to get hacked, but at least it’s read only right now.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# IoT, Google Cloud and Machine Learning helping Japanese Cucumber farmers