OPEN SOURCE AS A BUSINESS OPPORTUNITY

Simply. Connected.

Bosch Software Innovations GmbH
Dr. Steffen Evers
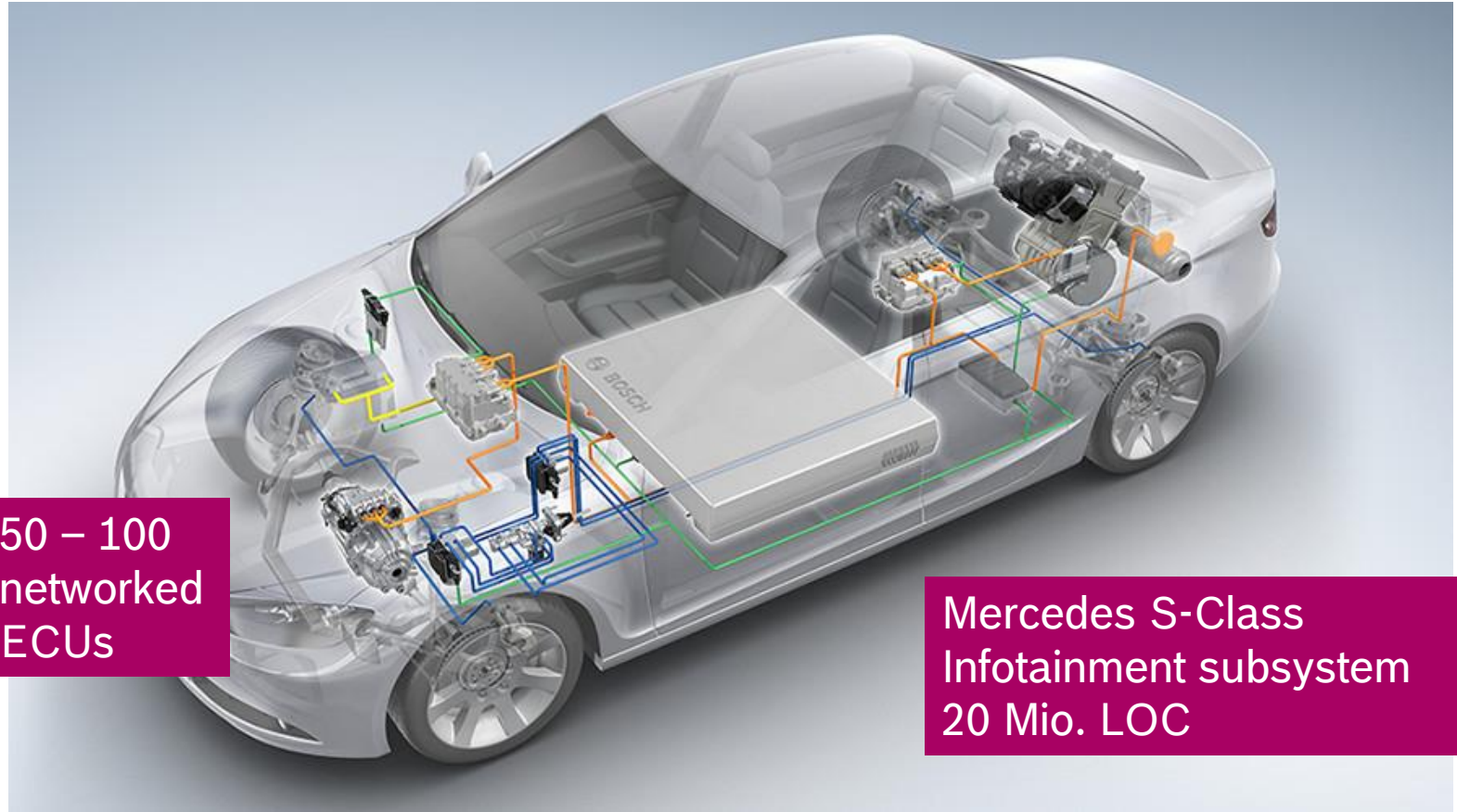Head of Open Source Services

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SOFTWARE BUSINESS

Software Is Eating the World

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Realized by Software
90% of Automotive Innovations

50 – 100 networked ECUs

Mercedes S-Class Infotainment subsystem 20 Mio. LOC

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"Every industrial company will become a software company."

Jeffrey R. Immelt
CEO, General Electric

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Today Software as a Product Is Hard to Sell

The Price of Software

Computer software is now 0.7% of its price in 1980

■ Computer software price index

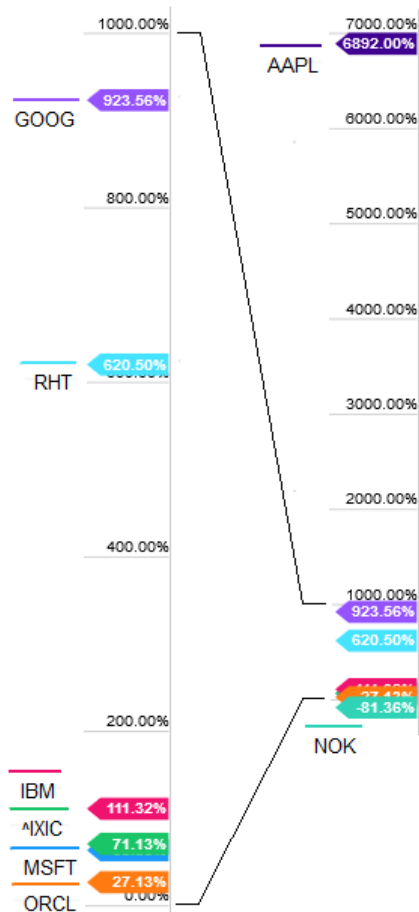Source: U.S. Bureau of Economic Analysis

Bloomberg

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Service-Based Products Are Promising
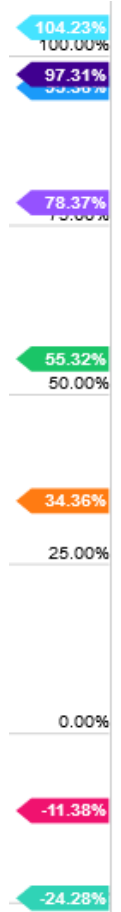## Smart Devices, Websites, Apps, and Clouds

© Cienpies Design | shutterstock

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Looking at the Numbers
Stock Development of IT Giants

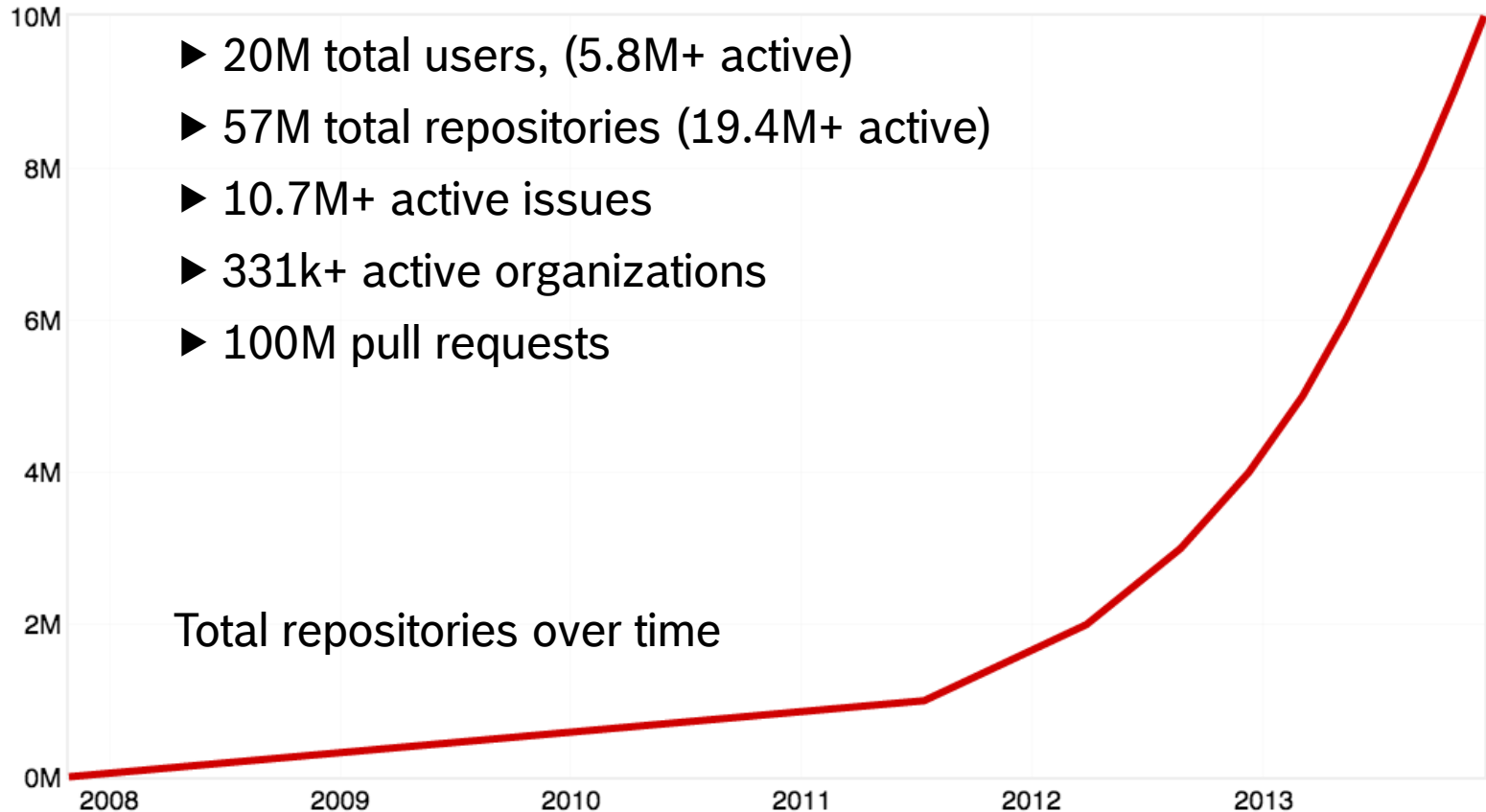| Company	Stock Change in Given Period	
	2001-01-01 - 2013-11-01	2013-11-01 - 2017-05-01
Apple	+6892%	+97.3%
Google	+923.6%	+78.4%
Red Hat	+620.5%	+104.2%
IBM	+111.3%	-11.4%
NASDAQ	+71.1%	+55.3%
Microsoft	+70%	+93,1%
Oracle	+27,1%	+34.4%
Nokia	-81.4%	-24.3%

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Software as a product business models are getting out of fashion.

Service based products are on the rise!

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GETTING THE SOFTWARE FOR YOUR SERVICE

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# Github: Leading Open Source Hoster
Software Already There?

- ▶ 20M total users, (5.8M+ active)
- ▶ 57M total repositories (19.4M+ active)
- ▶ 10.7M+ active issues
- ▶ 331k+ active organizations
- ▶ 100M pull requests

Total repositories over time

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Open Source: A Tool to Reach Business Goals

How OSS Works for Companies

Partition into Differentiating and Commodity SW
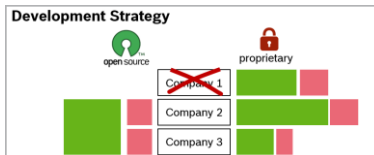
Product Strategy	Differentiating	Commodity
open source	?	X
proprietary	X	?

Identify Commodity for Relevant Point in Time

Commoditization over Time

Shared Development
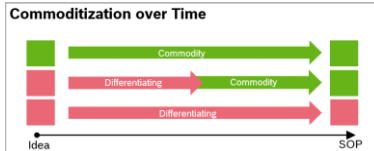
Shared Development
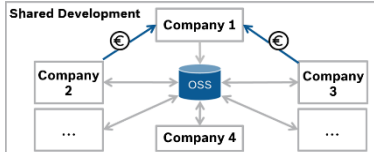
Shared Commodity Is Competitive Advantage

Development Strategy

What They Gain from OSS

Efficient Technology Development
- **Agile Collaboration**
- **Increase Quality**
- **Gain Speed**
- **Share Risks**
- **Reduce Costs**

Higher Independence
- **Minimize dependency** on Suppliers
- Break/prevent a **proprietary monopoly**

Accelerate Market Penetration
- **Viral marketing**
- **Establish a new market** in technology
- **Standardization**

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Comparison of Software Procurement Approaches

+ Advantage   ~ Neutral   − Disadvantage

Scenarios	Internal Dev.	Use Proprietary 3rd Party	Consortium Co-Dev.	Open Source Co-Dev.
Standardization	−	−	~	+
Independence	+	−	~	~
Market Penetration	~	−	~	+
Technology Developm.	−	~	+	+
Customer Needs	−	~	~	+

Shared Development Cost Estimates				
Total Cost	100%	60% Lic. + 20% Dev.	100% + 60% Coord.	100% + 40% Coord. − 20% Int.
Bosch Cost [%] with 4 Partners (Bosch + 3)	100%	80%	40%	30%
Productization Cost	+20%			

Coord.: Coordination, Dev.: Development, Prod.: Productization, Int.: Integration, Lic.: License

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Effort for Strategic Open Source Development

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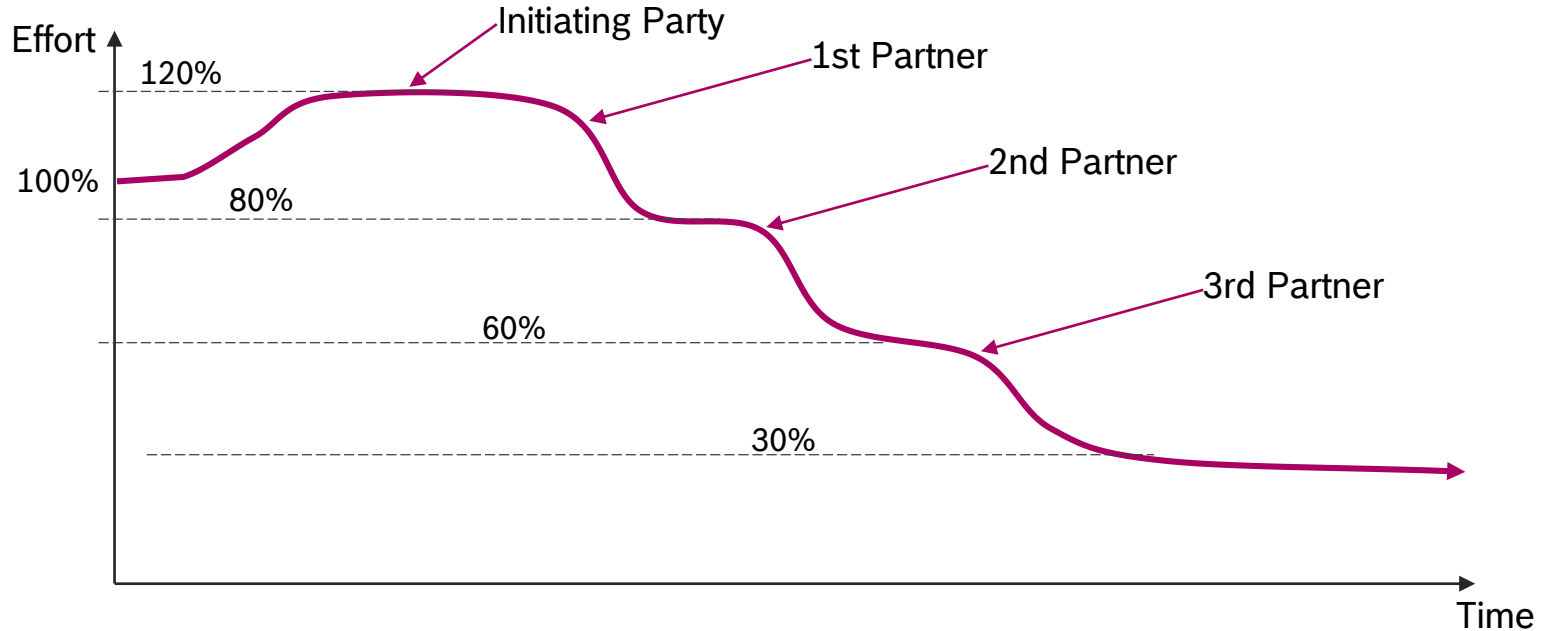
BUILDING ECOSYSTEMS

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Major Changes in Doing Business
for Established Industries

Value chain

Business ecosystem

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Developer Recruitment Is Strategic

It's the developer community that will make the IoT happen.

VisionMobile estimates, 2014

Year	Developers
2014	300k
2015	813k
2016	1.5m
2017	2.2m
2018	2.8m
2019	3.5m
2020	4.5m
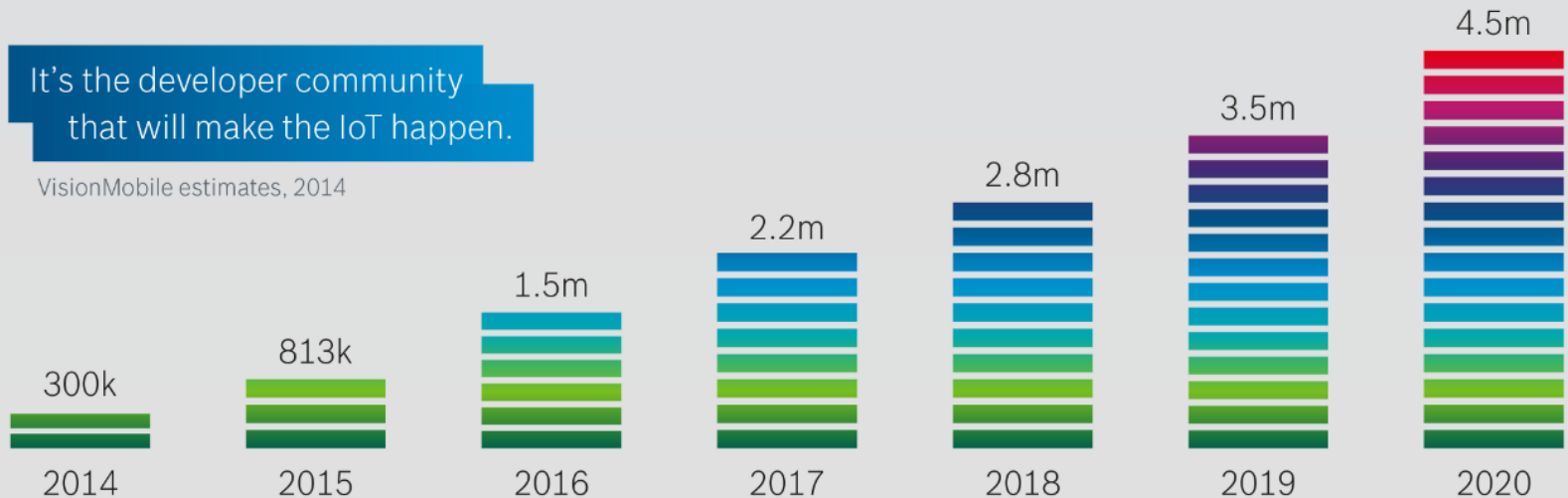
Source: Report: IoT: Breaking Free From Internet And Things | vmob.me/IoT
©Vision Mobile | June 2014 | Licensed under BY ND

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Playing the Platform Game
... and Win

Big fish eat small fishes
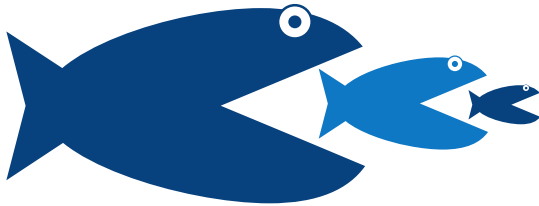
... but small fishes
can build swarms
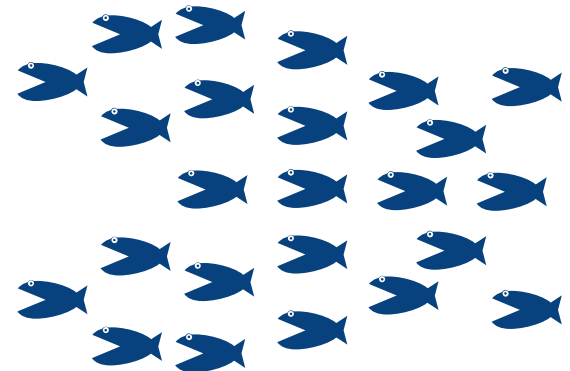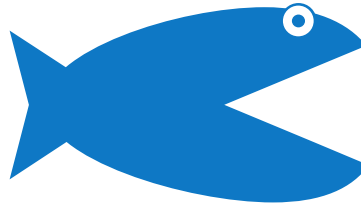
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OPEN
IOT PLATFORM

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Real Bosch!
Real Professional!

€600+
lost/stolen/forgotten

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≤ 4.5km

distance driven to find a parking space

Connected Cars
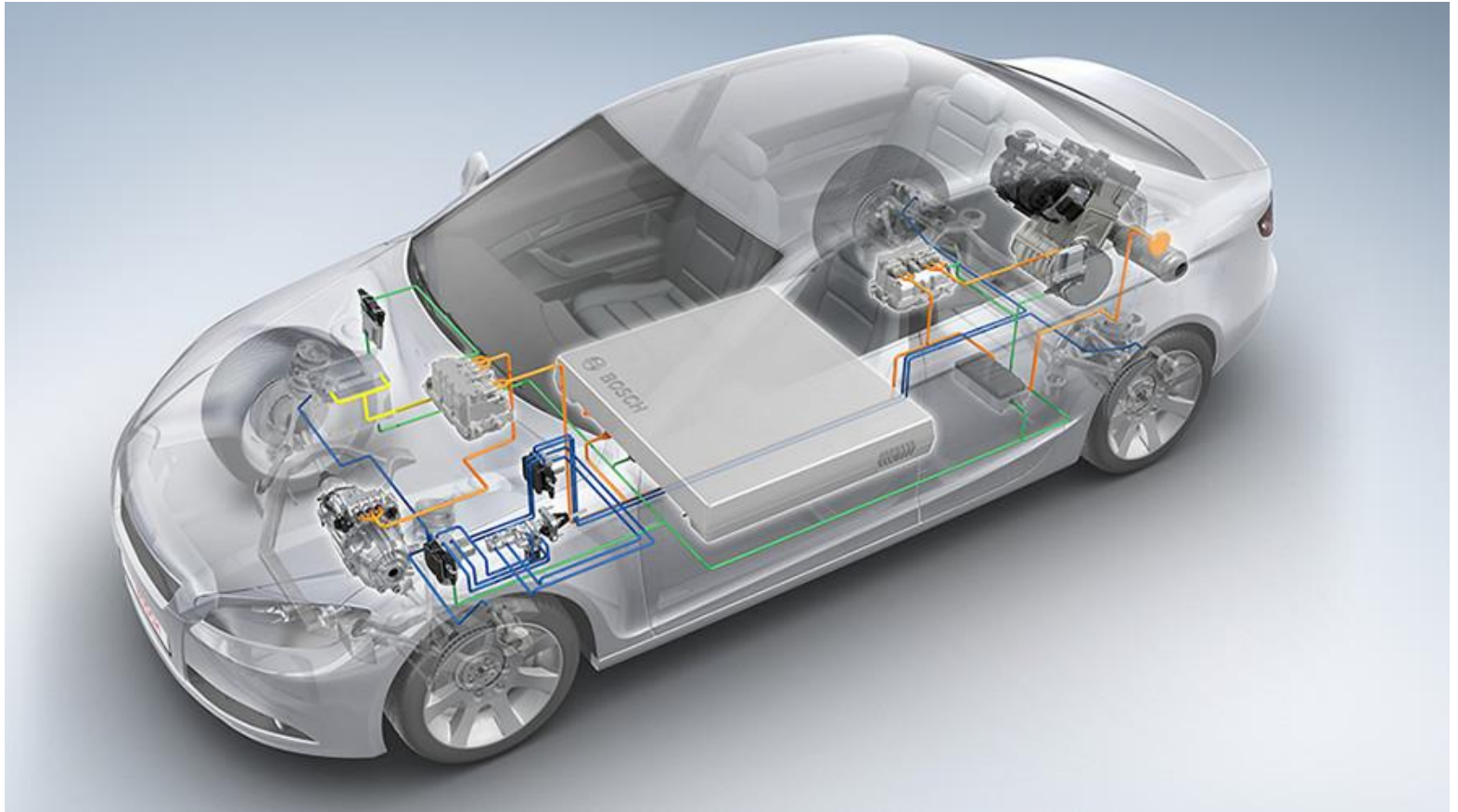
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1.000.000

number of things produced
by Bosch (per day)

Current IoT
Isolated Solutions

Industrial Manufacturers

| IoT Solution A | IoT Solution B | IoT Solution C | IoT Solution D | IoT Solution E |

◄ Future Products

◄ Required IoT Middleware

a1 a2 a3 — Device type A

b1 b2 b3 — Device type B

c1 c2 c3 — Device type C

d1 d2 d3 — Device type D

e1 e2 e3 — Device type E

◄ Products Today
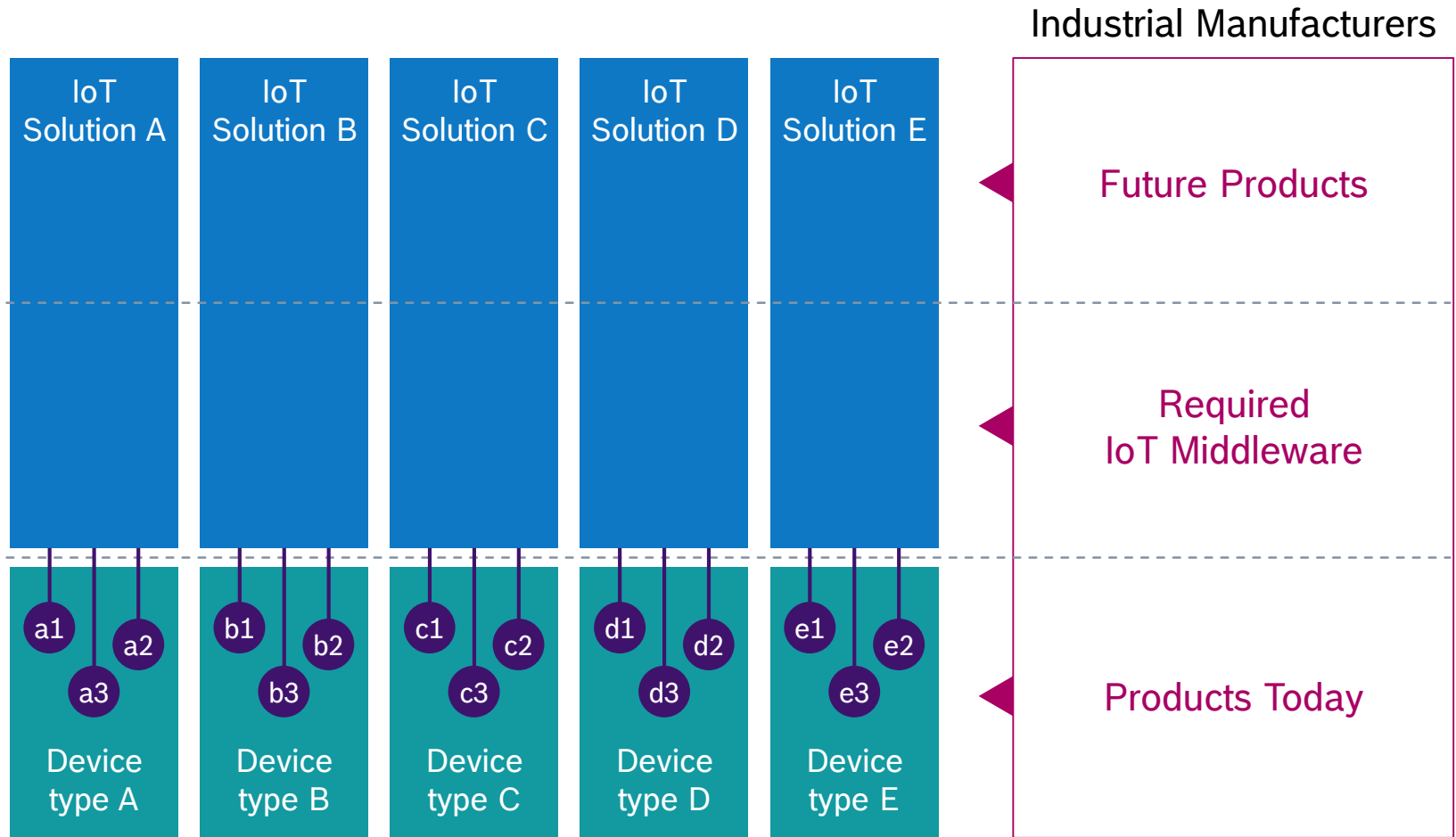
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IoT Vision: Cross Vendor, Cross Domain
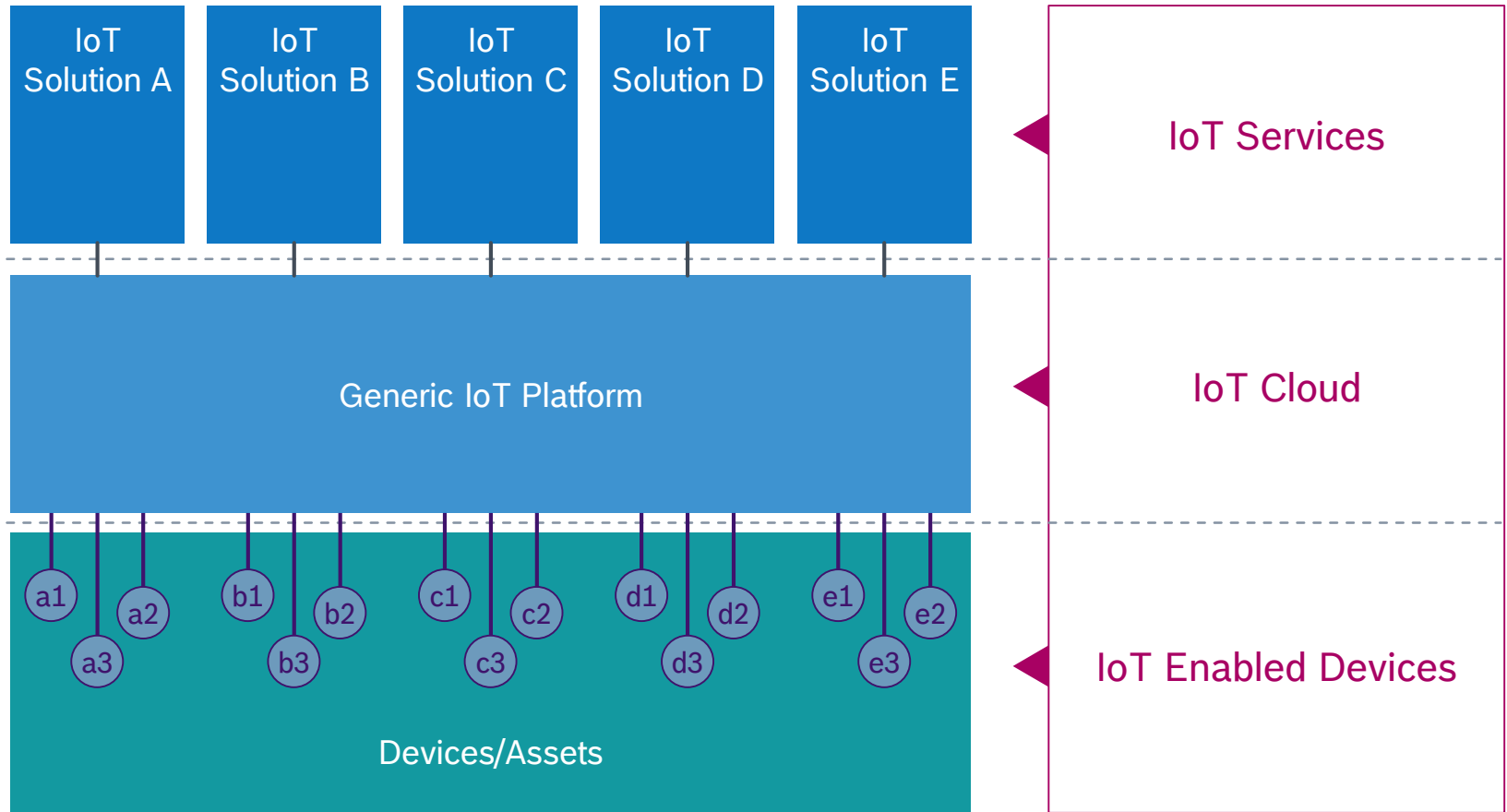
Expanding Business in the IoT Market
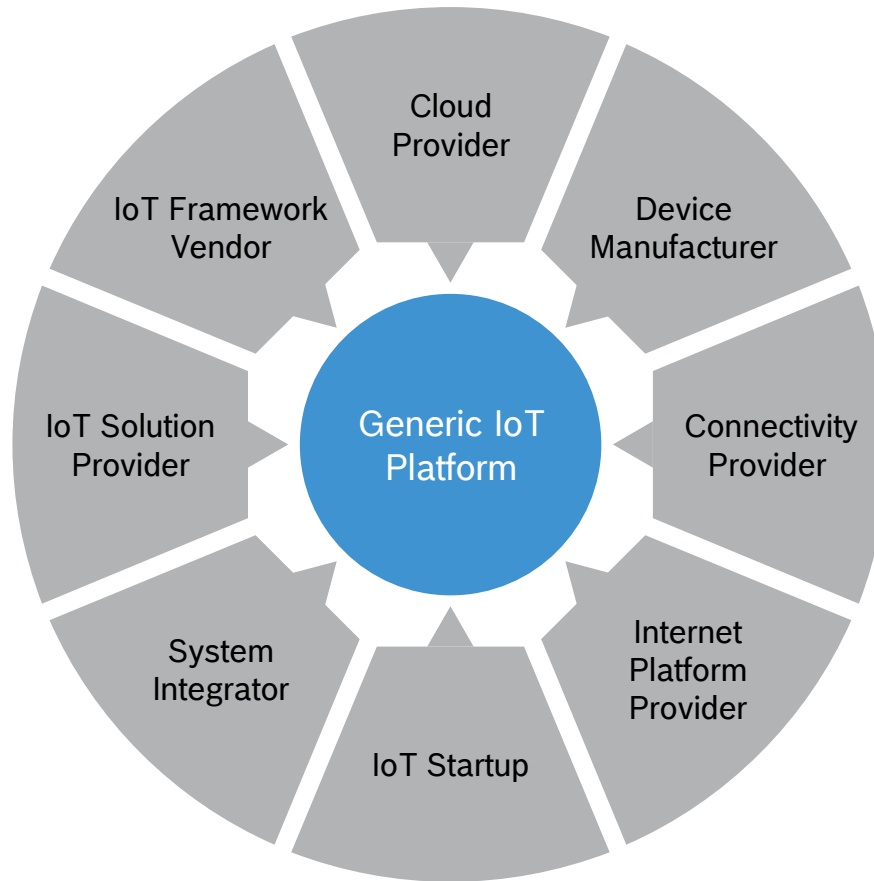
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Closed Third Party IoT Platform
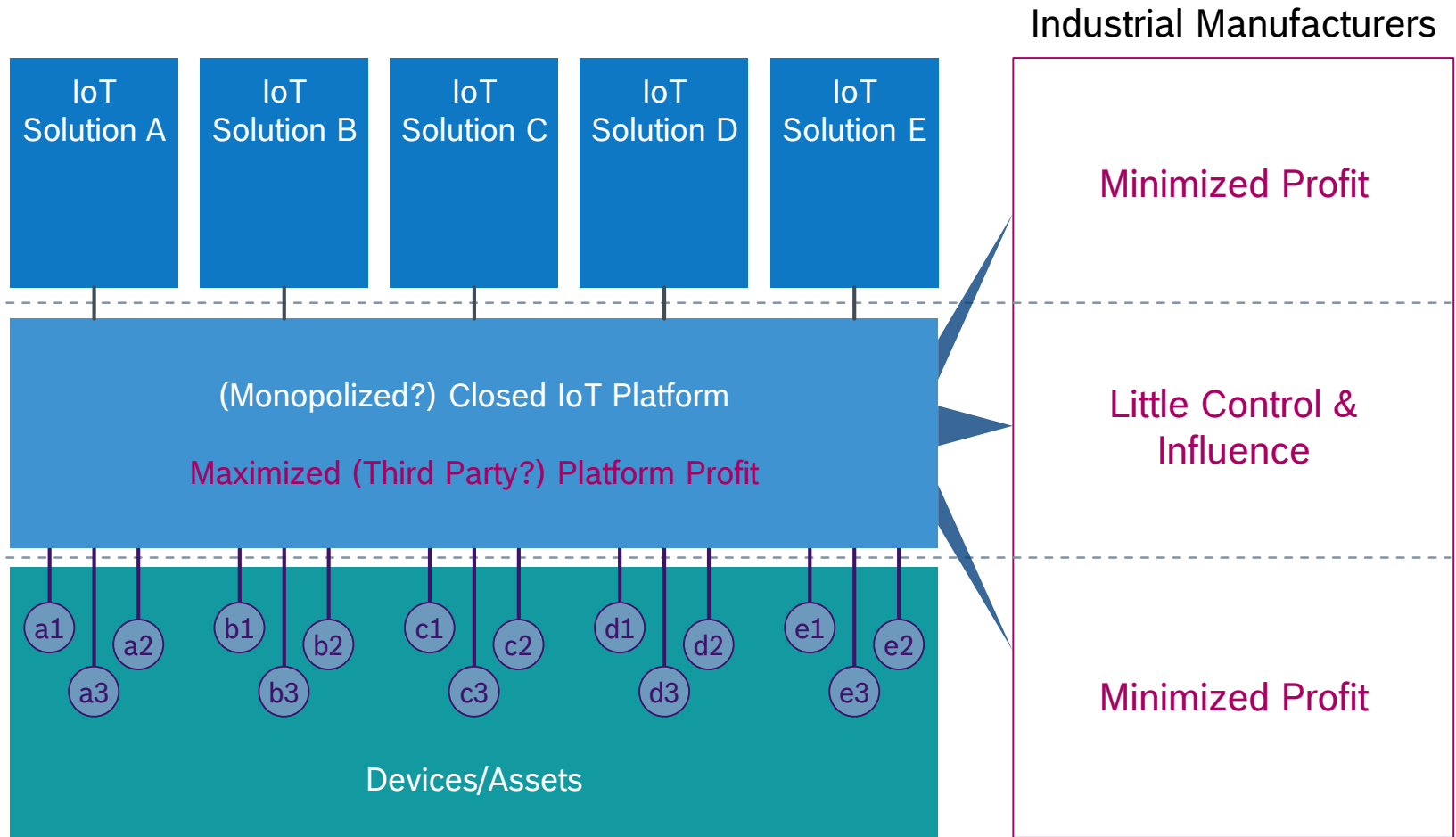
Open IoT Platform

Industrial Manufacturers

| IoT Solution A | IoT Solution B | IoT Solution C | IoT Solution D | IoT Solution E |

Open IoT Platform

Minimized (Third Party) Platform Costs

Maximized Profit

More Control & Influence

a1 a2 a3 b1 b2 b3 c1 c2 c3 d1 d2 d3 e1 e2 e3

Devices/Assets

Maximized Profit
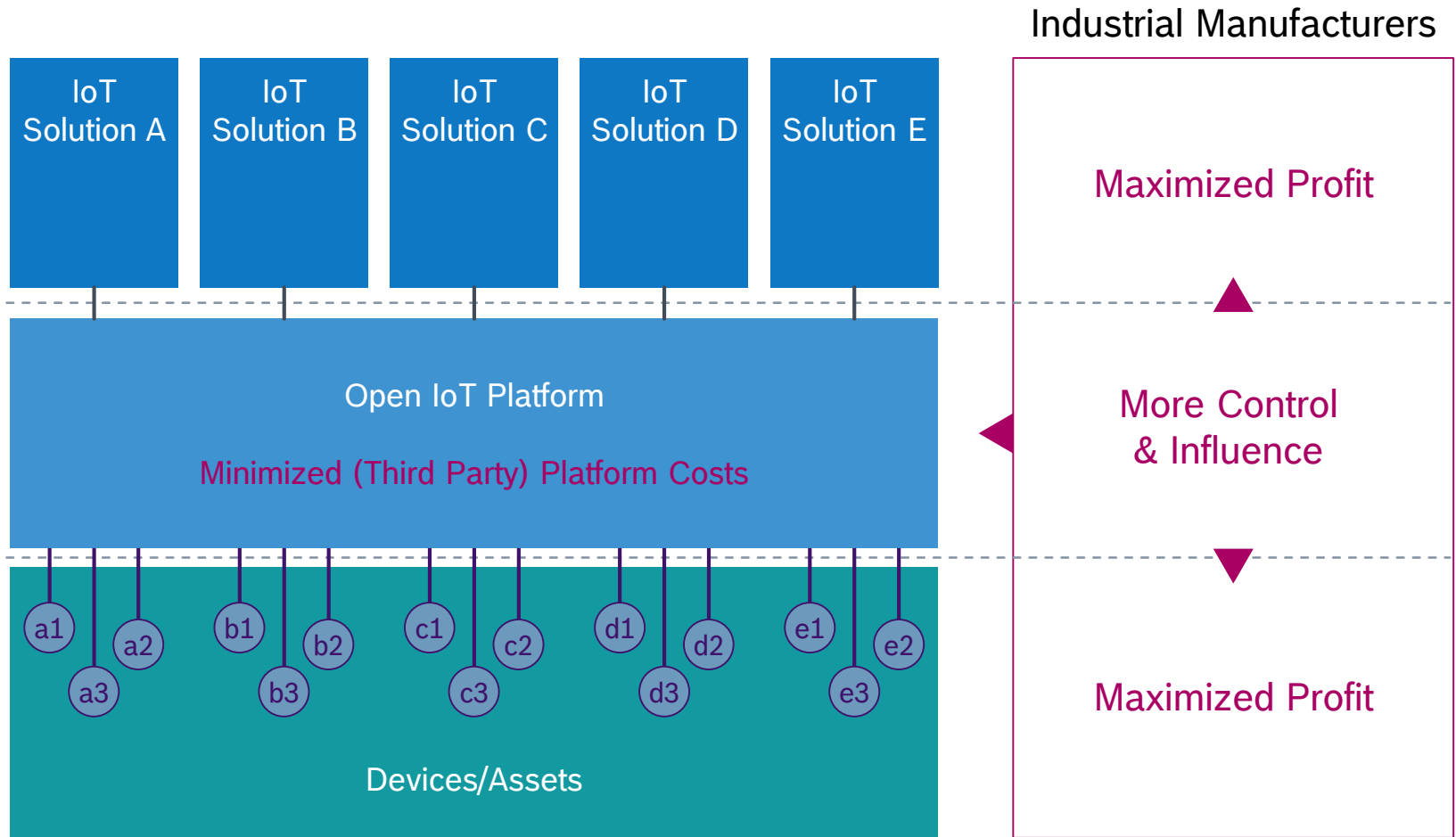
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Open IoT Platform with OSS

Overall Goal

▶ Business success for Bosch Group in IoT with products and services in the verticals Mobility, Industry, Energy, Building

▶ Interconnections and interoperability of devices/services
(therefore Bosch should "bet on the right (platform) horse")

Assumption

▶ 2-5 major IoT platforms (in next 5-7 years)

▶ At least one of them will be Open Source

▶ Big industrial manufacturers not able to position proprietary platforms among top 5 and customers/partners would not accept it

▶ No risk/dependency on proprietary 3rd party platform

Conclusion

▶ Open platform strategy with OSS

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www.eclipse.org/paho

www.eclipse.org/hono

www.eclipse.org/vorto

www.eclipse.org/hawkbit

iot
eclipse.org

www.eclipse.org/kura

www.eclipse.org/mosquitto

www.eclipse.org/leshan

www.eclipse.org/californium

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Bosch IoT Suite
Open Source Basis
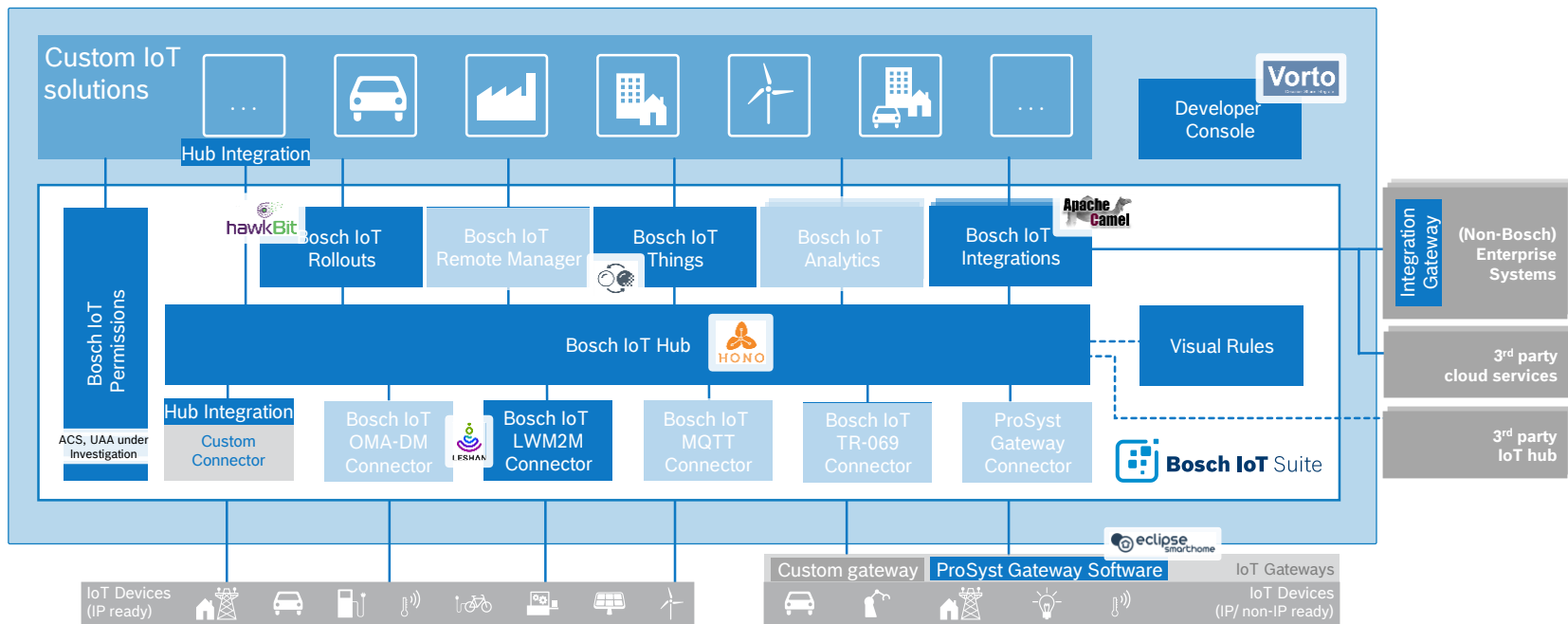
Current Members of Eclipse IoT WG

Source: http://iot.eclipse.org/working-group/

Eclipse IoT Community
Numbers

2.2
million
lines of code

26*
projects

210+
developers

110K
monthly
visitors

* and counting!

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Cloud Foundry Summit 2016 in Santa Clara, CA

CLOUD FOUNDRY

2016 Progress

33,000+ Cloud Foundry meetup members

2,000+ Open-source contributors

25 Cloud Foundry platform releases

63 Foundation members

9 Certified Cloud Foundry distributions

1,500+ Summit attendees

Pivotal.
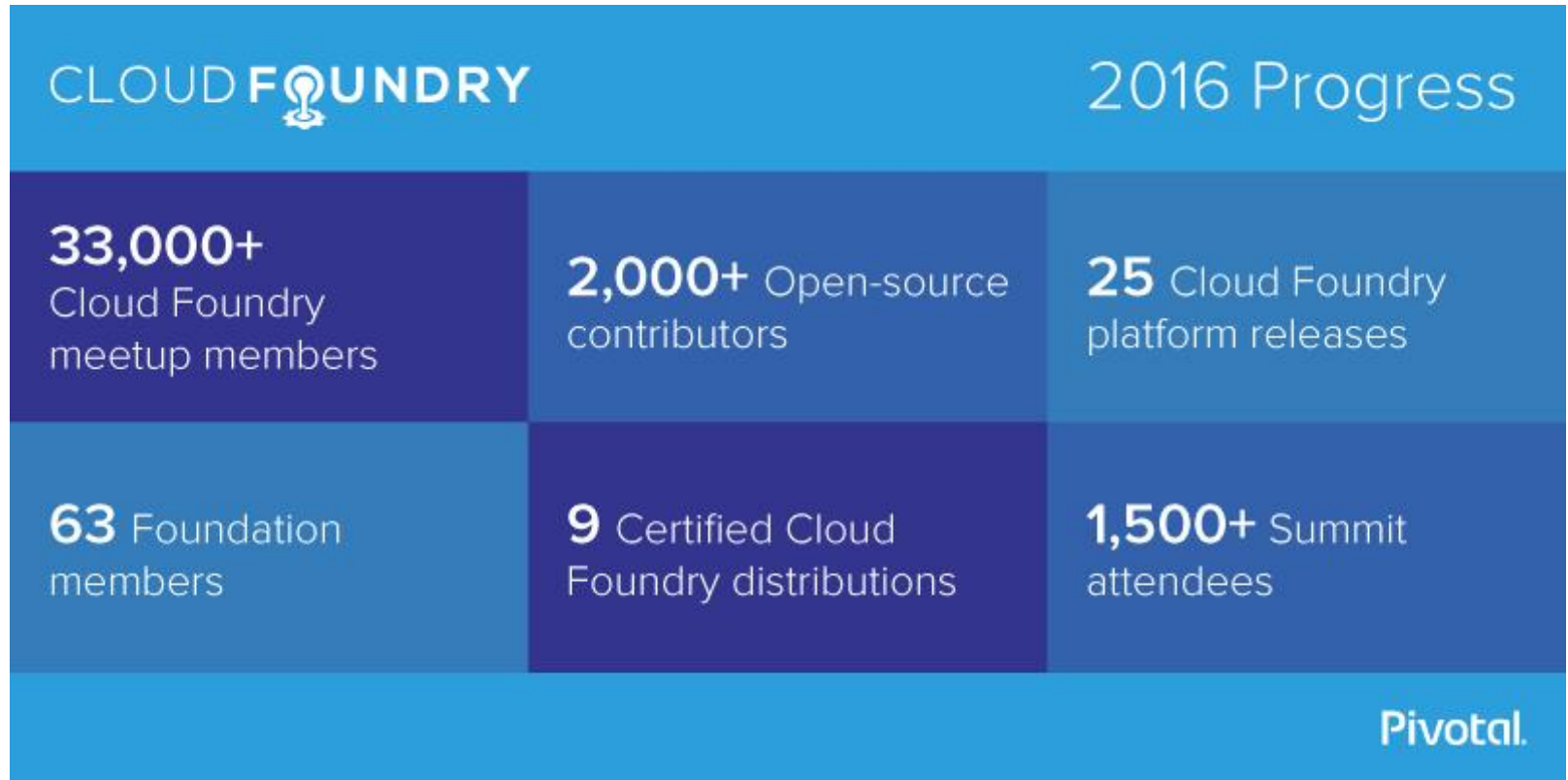
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NO-ONE CAN DO I(O)T ALONE.

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Bosch's Engagement
for an Open IoT

2014   **2015**   **2016**

Partnership with GE Digital
working together towards interoperability and open source collaboration

Eclipse unide
project

Eclipse Foundation
Strategic member

Cloud Foundry Foundation
Silver member

Eclipse Vorto
project

Eclipse hawkBit
project

Eclipse hono
project

BOSCH
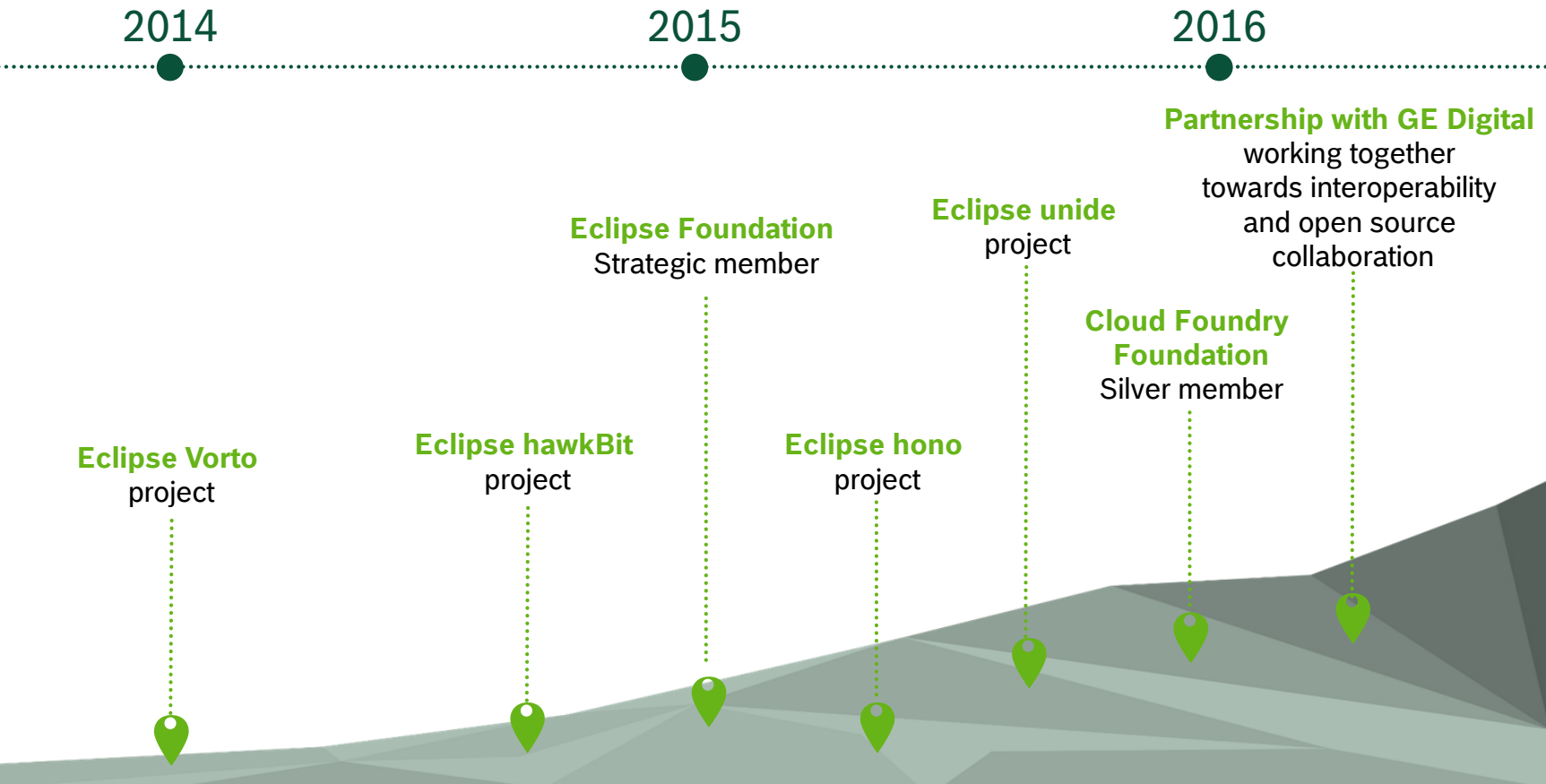
If You Need Help to Get Onboard ...
Open Source Services

Open Source Consulting

Services

▶ Open Source Management

▶ Strategy & Business Models

▶ Ecosystem Build-Up and Marketing

▶ Technology Scouting

▶ Methodology Training

▶ Technology Training

▶ Project Management

▶ Development & Support

Technology Scope

Eclipse IoT

▶ hawkBit, Hono, Vorto, Ditto, unide

▶ Californium, Leshan, Wakaama

Open Source Management Tools

▶ Eclipse SW360, Fossology

Strategic Technologies

▶ Deep Learning

▶ Cloud & Fog Computing

▶ Blockchain

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THANK YOU FOR YOUR ATTENTION!

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