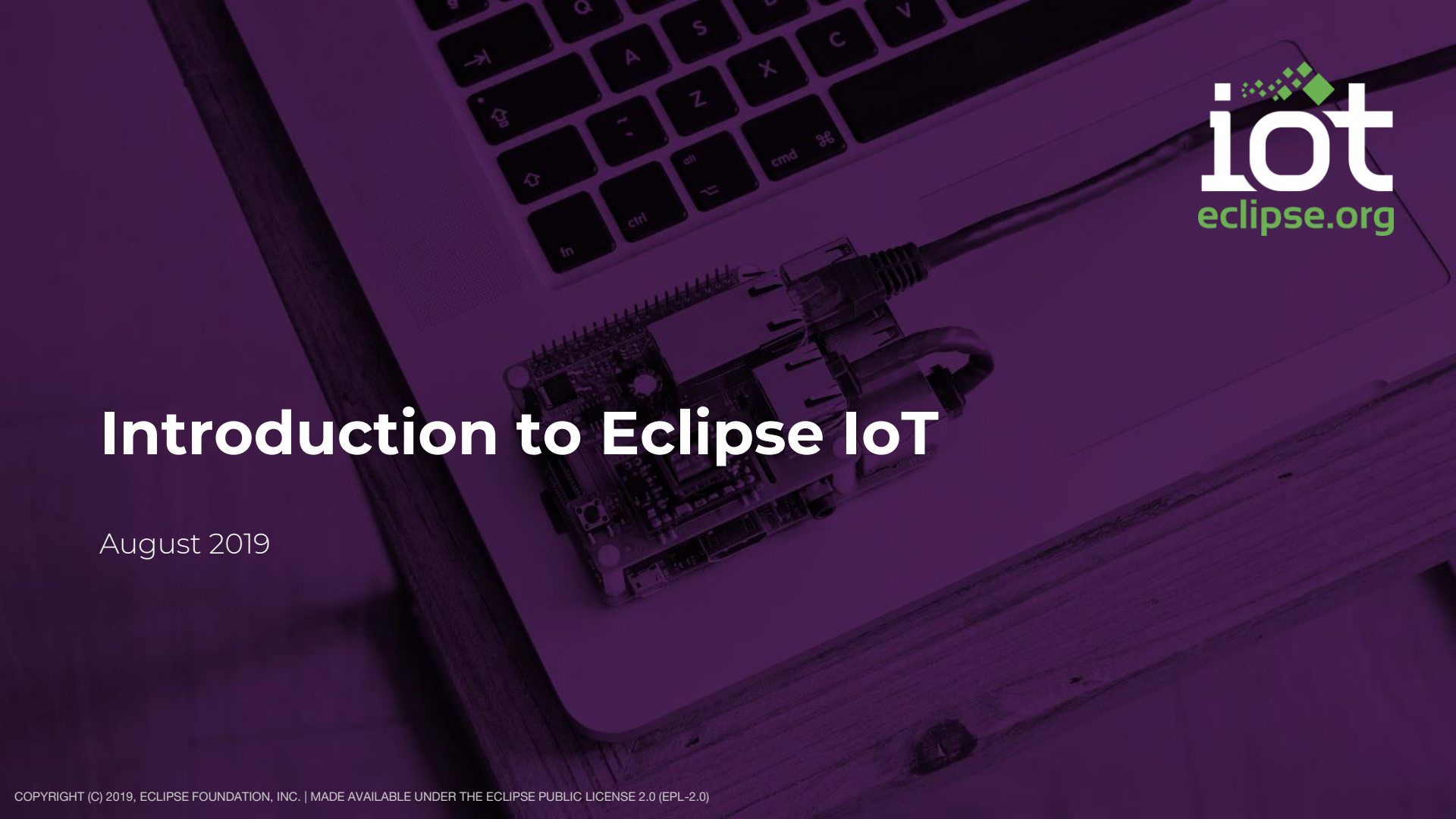

Introduction to Eclipse IoT

August 2019

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The combined markets of the Internet of Things will grow to about $520 billion in 2021, more than double the $235 billion spent in 2017.

Source: Bain & Company, 2018

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Top IoT developer concerns

Security
38%

Connectivity
21%

Data Collection & Analytics
19%

Source: Eclipse IoT Developer Survey 2019

Top three concerns remain the same as last year, with Connectivity moving into second place

Standards, ***Performance*** *and* ***Privacy*** *increased in importance.*

The Eclipse IoT portfolio is uniquely positioned to address ***all three*** *developer concerns.*

iot eclipse.org

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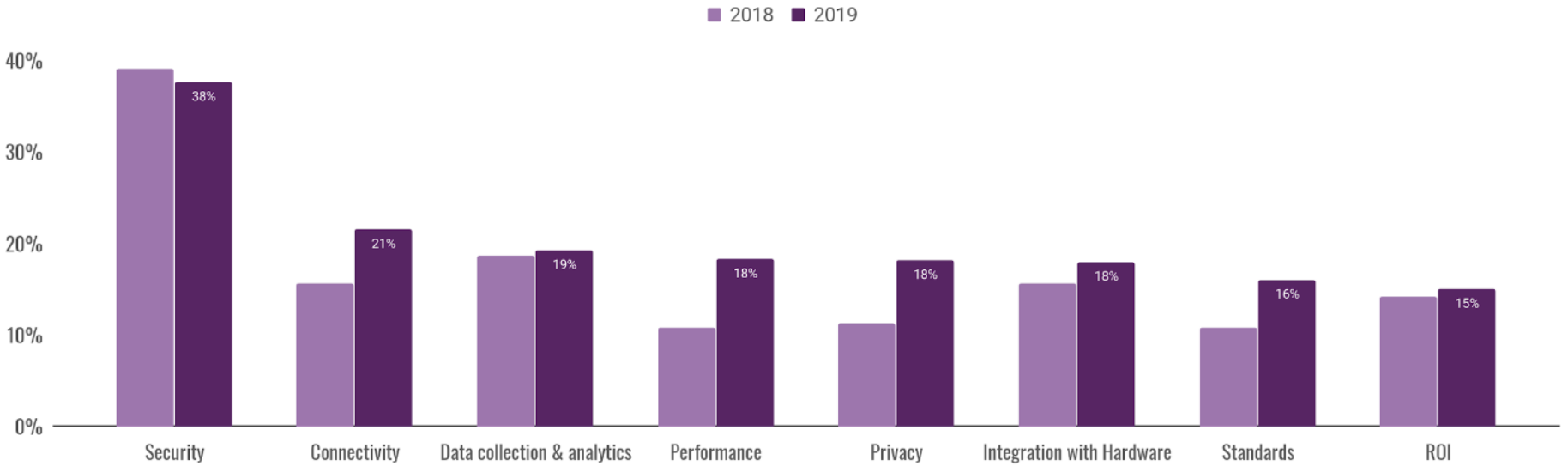
Top developer concerns over time



Source: Eclipse IoT Developer Survey 2019

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Characteristics of an IoT Solution

Long lifespan

Spans multiple years, if not decades

Heterogenous

Nobody can deliver an end-to-end solution alone

Constraints

Power, compute, environmental and many others

Connectivity

Connectivity is a given, but stability and reliability are not

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Open source: the solution

- Proven to be the most viable way to deliver complex platform software
- Encourages wide scale industry collaboration
- Accelerates innovation through joint development
- Enables rapid adoption and innovation from a committed community
- Drives open standards for maturity and interoperability
- Fosters an open ecosystem to maximize adoption and monetization

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Our Impact: Open Innovation at Scale

Requirements & Use Cases

Competition Layer

Commercial Adopters focus resources on rapidly building differentiating features

Value Line

Collaboration Layer

Technology Producers jointly **define roadmap** and **build core capabilities**

Governance Layer

The Eclipse Foundation provides an **open, vendor-neutral platform** to enable collaboration

Product-Ready Technologies

$10 billion

of shared investment to date

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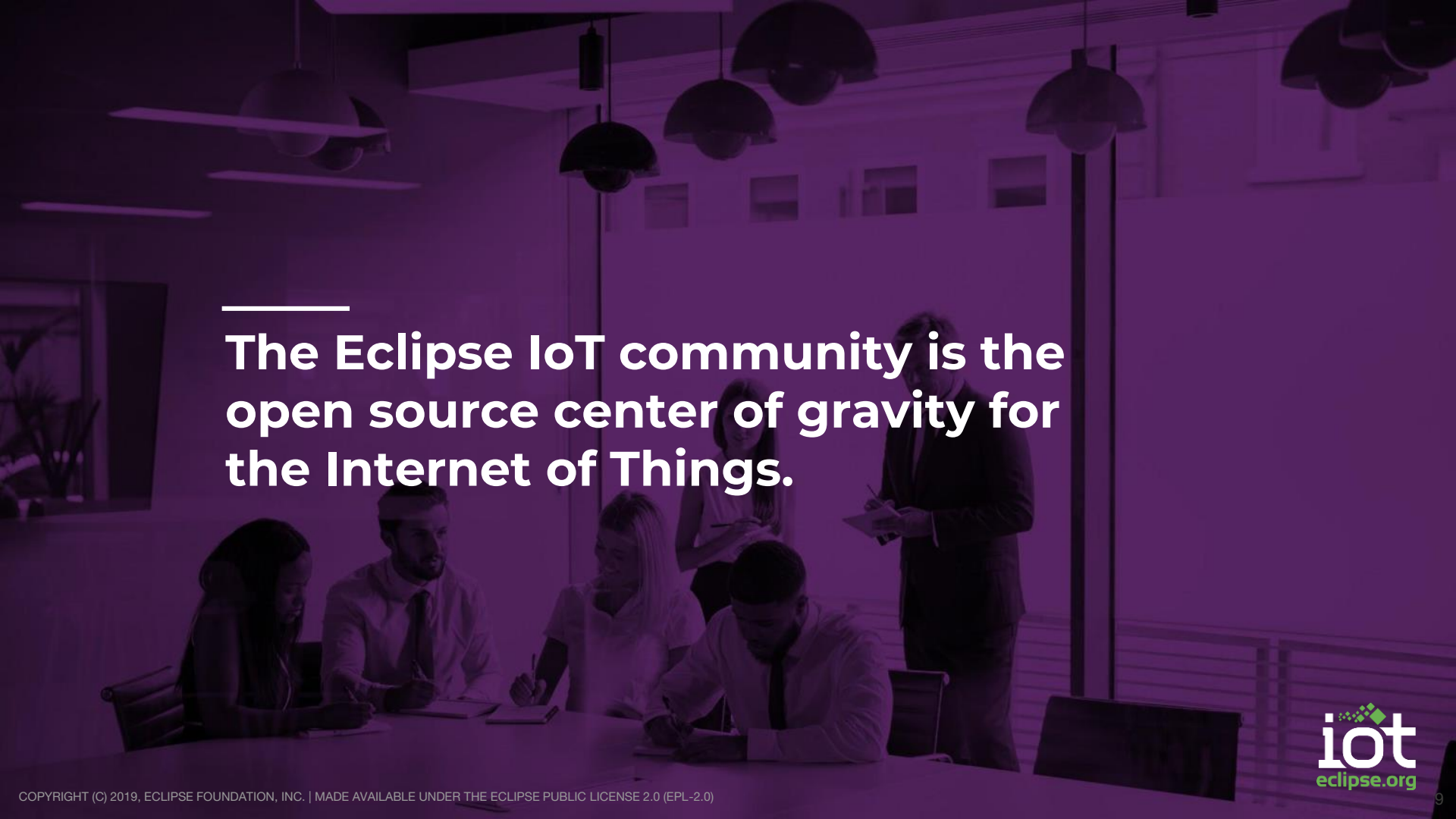

The Eclipse IoT community is the open source center of gravity for the Internet of Things.

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The Eclipse Foundation - By the Numbers

370+
Projects

275+
Members

1550+
Committers

195M+
Lines of Code

30
Staff Members

10+
Working Groups

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Strategic Focus Areas

Cloud Native Java

We provide a collaborative environment for the world's leading Java ecosystem players to advance open source enterprise Java technologies for the cloud.

IoT & Edge

We enable industry leaders to collaborate on an end-to-end IoT architecture that is secure, flexible, and fully based on open source and open standards.

Automotive

We provide leading automotive OEMs, their suppliers, and partners with a sustainable, transparent, and vendor-neutral platform to collaborate on open technologies and standards.

Tools

The Eclipse IDE is the critical development environment for more than 4 million active users. Our community is innovating on the next generation of cloud native developer tools.

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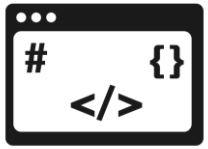
Eclipse IoT Community



3.9M

lines of code

38

projects

350+

contributors

40

member companies

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Protocols & Standards

Protocol or standard	Projects
MQTT	Paho, Mosquitto
Sparkplug	Tahu
CoAP	Californium
LWM2M	Wakaama, Leshan
DDS	Cyclone
DTLS	TinyDTLS
PPMP	Unide
W3C Web of Things	ThingWeb
oneM2M	OM2M
OPC-UA	Milo

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Sustained Growth

9

NEW PROJECTS
Since April 2018

16

RELEASES
Since April 2018

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Our mission

To provide a forum for individuals and organizations to build and promote **open source** software, open **standards** and open **collaboration** models needed to create a scalable and open Internet of Things

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IoT Working Group Member Organizations

Strategic members

BOSCH Invented for life

EUROTECH Imagine. Build. Succeed.

Red Hat

Members

ADLINK Leading EDGE COMPUTING

AZUL SYSTEMS

ca technologies

Calypso Networks Association

CANONICAL

list

Cirrus Link SOLUTIONS

cloudera

COMPEX

CONTACT Software

DB

DC square

edgeworx

ENGINEERING proud sponsor of KNOWAGE

FONDAZIONE BRUNO KESSLER

fortiss

GENERATIVE SOFTWARE

HUAWEI

IBM

IncQueryLabs

inductive automation

influxdata

Innoopract

intel

itemis

kynetics

LAAS-CNRS

THE LINUX FOUNDATION

m2m alliance

MICROEJ

NOKIA

orange

SAP

SIEMENS

SIERRA WIRELESS

V2COM

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Eclipse IoT Ecosystem

	OEMs	Software Vendors	IoT HW Manufacturers
	• Achieve **interoperability** in **Industry 4.0** thanks to open source technology • Enable **on-premise** deployments of IoT platforms	• Provide **commercial support** for Eclipse IoT technologies • Promote the value of open IoT ecosystems through **testbeds**	• **Device Management** • Establish Eclipse IoT projects as **reference implementations** of IoT standards (e.g. LWM2M)
Examples	BOSCH Invented for life SIEMENS	Red Hat, CANONICAL influxdata, cloudera CONTACT Software, AZUL SYSTEMS	SIERRA WIRELESS, EUROTECH Imagine. Build. Succeed. intel

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Eclipse IoT Ecosystem

	Telcos	IT Services Companies	Research Institutes
	• Promote IoT cloud **interoperability** through open standards (ex. **OneM2M**)	• Provide **support and services** around Eclipse IoT technology	• Partner with Eclipse IoT member companies on **IoT research projects** (ex. Smart Cities) • **Disseminate** the results though Eclipse IoT projects
Examples	orange™	itemis V2COM	FONDAZIONE BRUNO KESSLER fortiss LAAS-CNRS list CEA tech

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New Case Study

http://bit.ly/2WDlZyJ

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Validated by Industry Leaders

"No company can realize the IoT on its own… Within the Eclipse Community, through the contribution of many IoT developers, tools and standards are created on an open platform that many companies can benefit from for their IoT applications."

Stefan Ferber

CEO, Bosch Software Innovations

BOSCH

Invented for life

- **Governance & Process**
- **IP Management & Licensing**
- **Community Development**
- **Infrastructure**

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From Idea to Solution the Eclipse Way

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The Idea

I want to install **sensors** on the machines we sell to offer a preventive maintenance **service** to our customers.

Business drivers:

- Improve customer satisfaction
- Better utilization of field technicians

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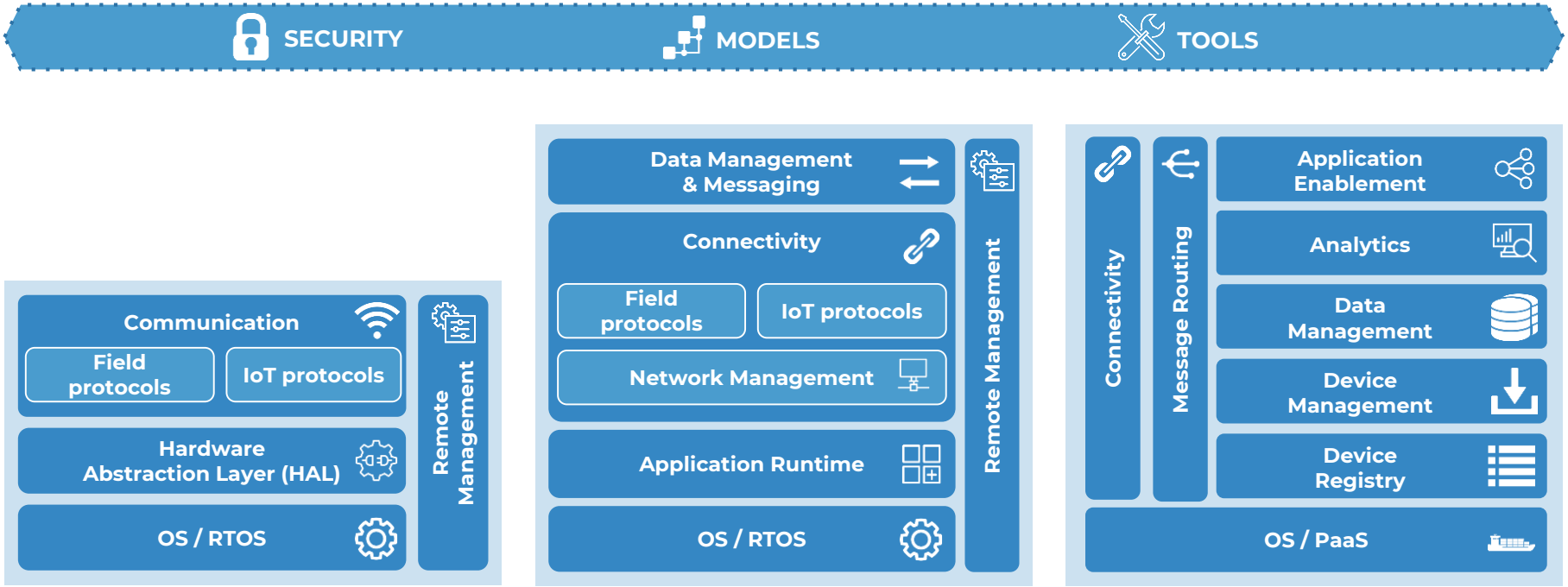
IoT Functional Concerns



CONSTRAINED DEVICES

EDGE NODES / GATEWAYS

IOT CLOUD PLATFORM

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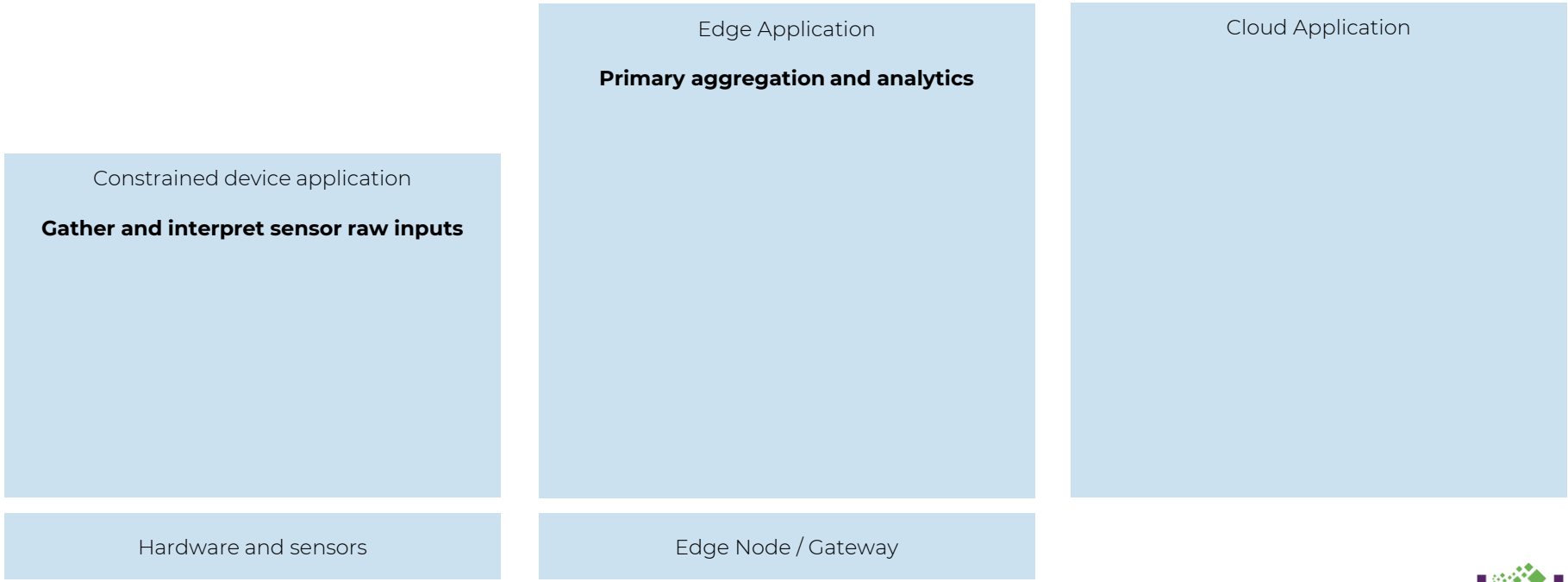
Architecture: High-Level View



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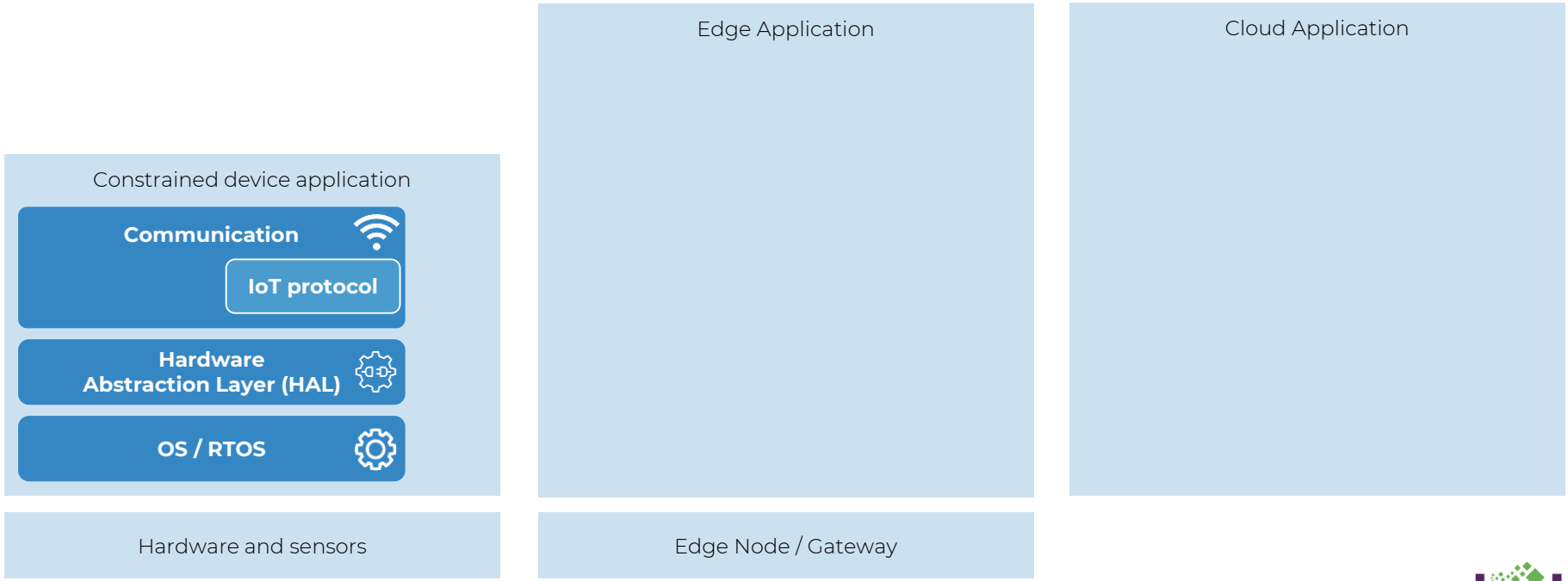
Architecture: Detailed View



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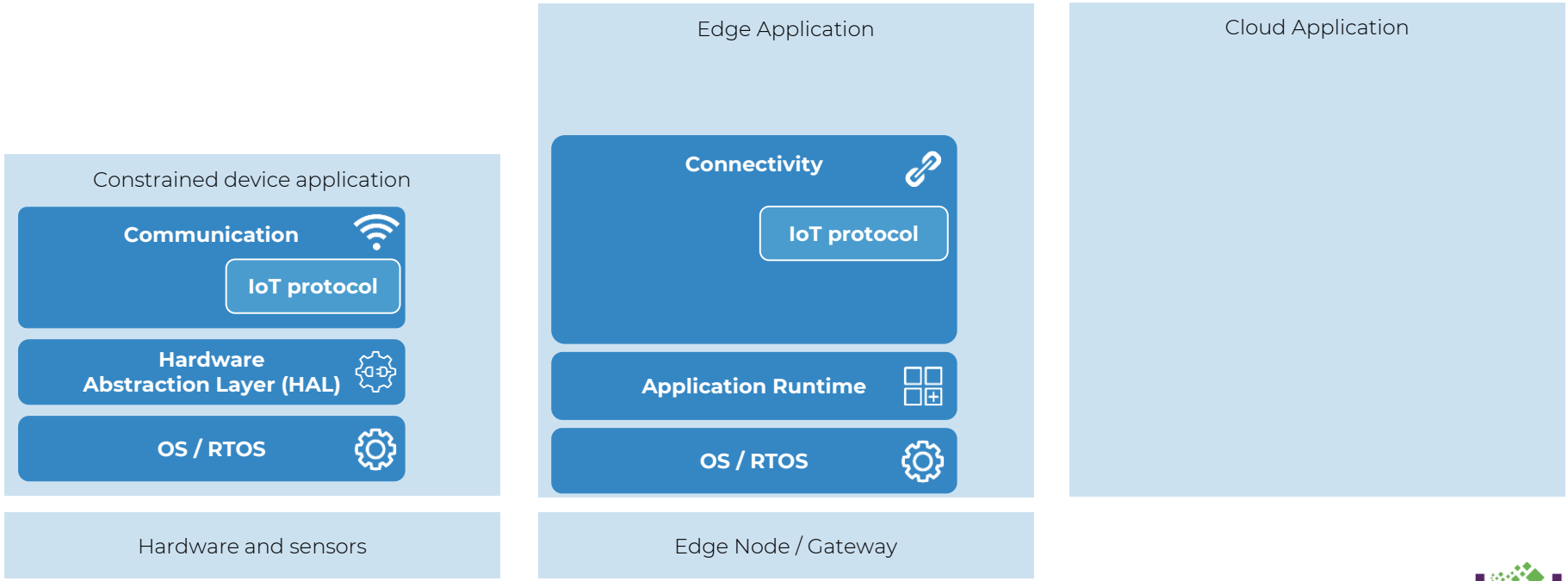
Architecture: Detailed View



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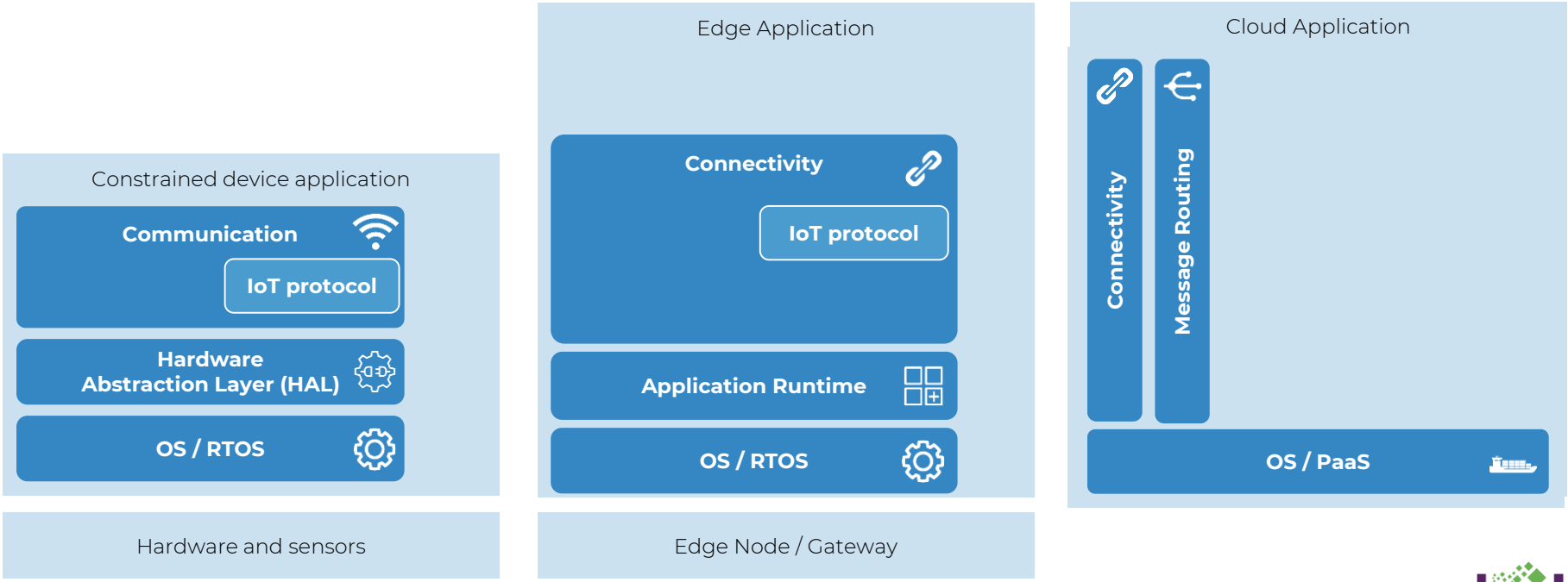
Architecture: Detailed View



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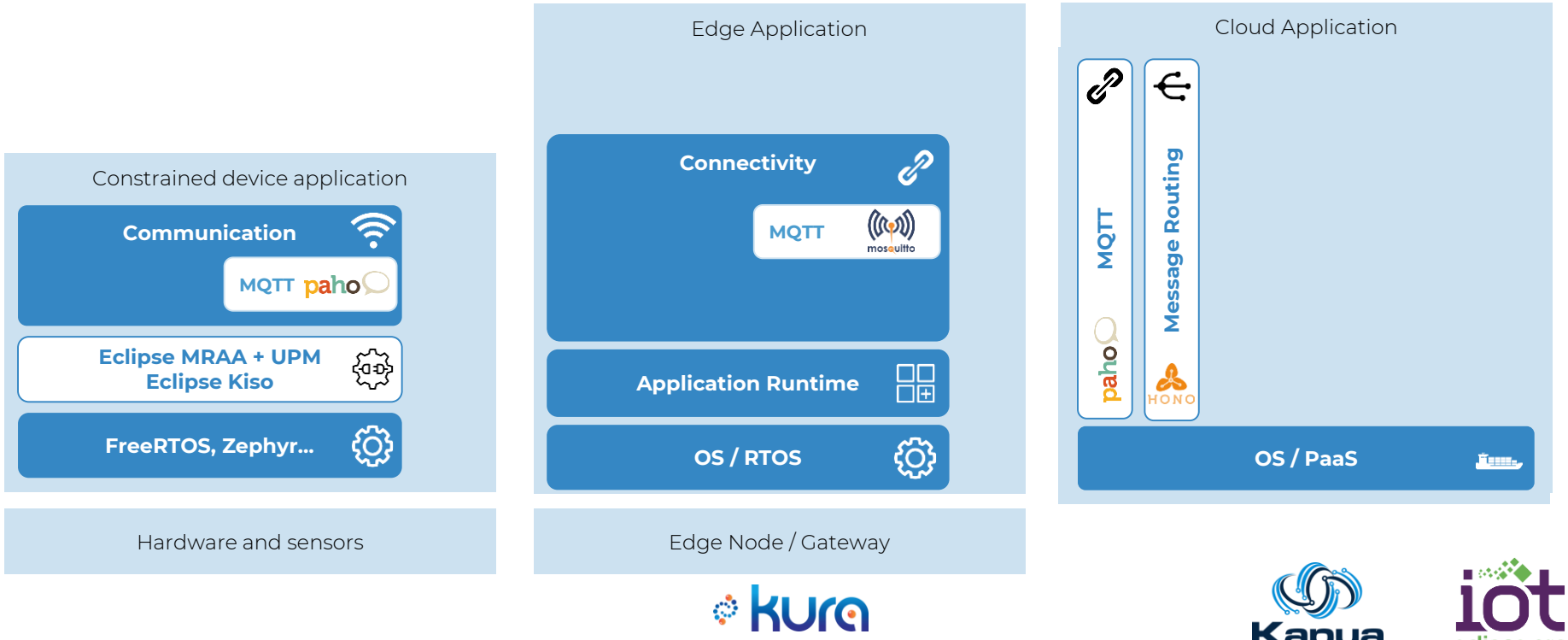
The basic solution: MQTT



kura

Kapua

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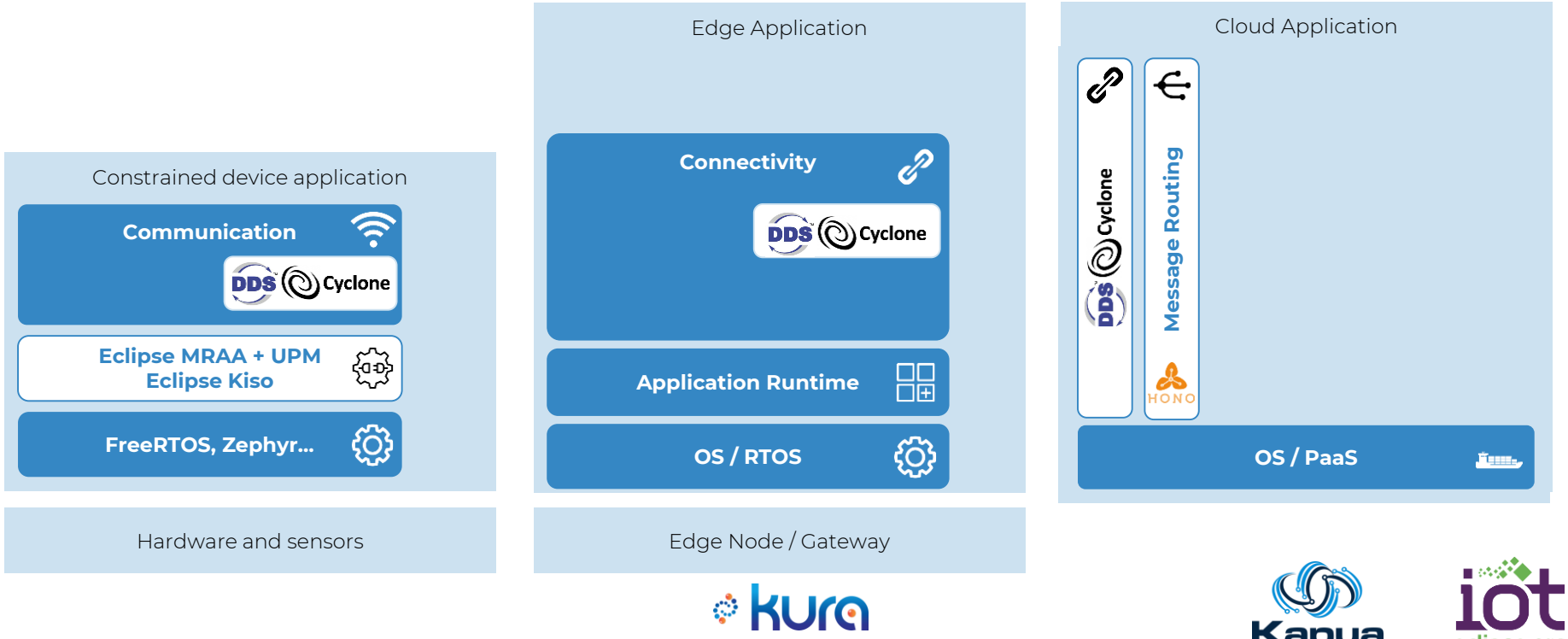
The basic solution: DDS



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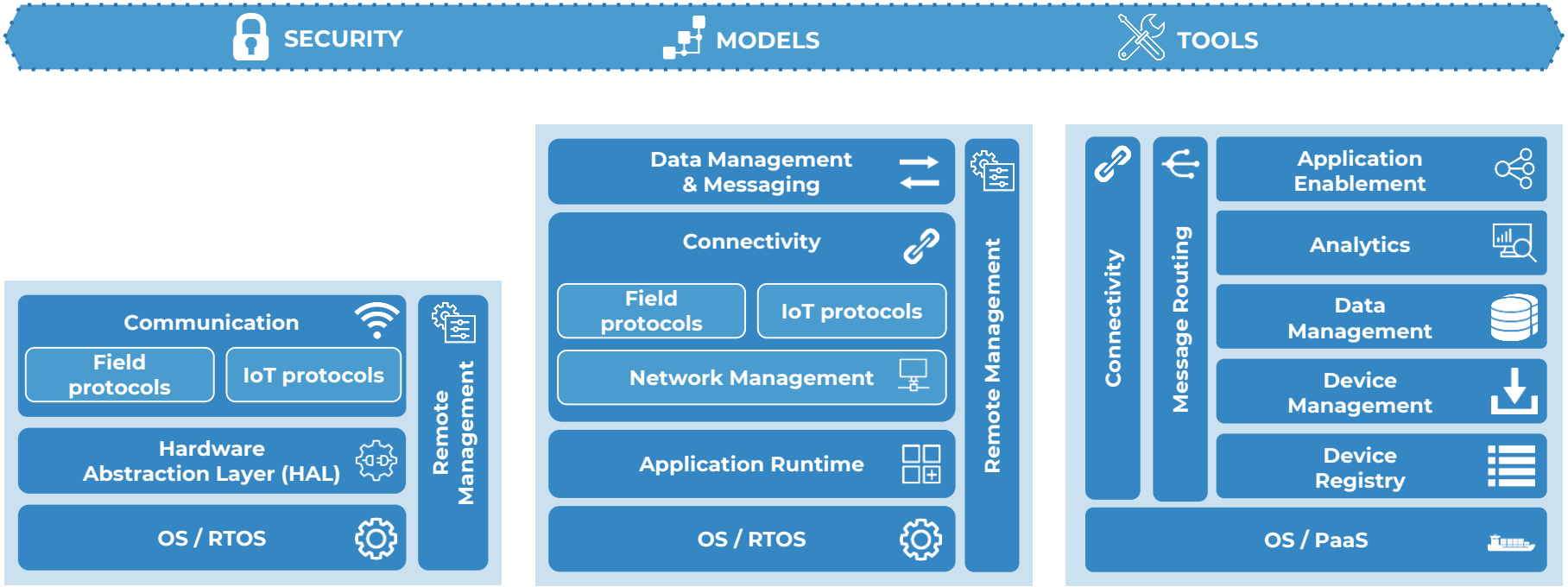
IoT Functional Concerns



CONSTRAINED DEVICES

EDGE NODES / GATEWAYS

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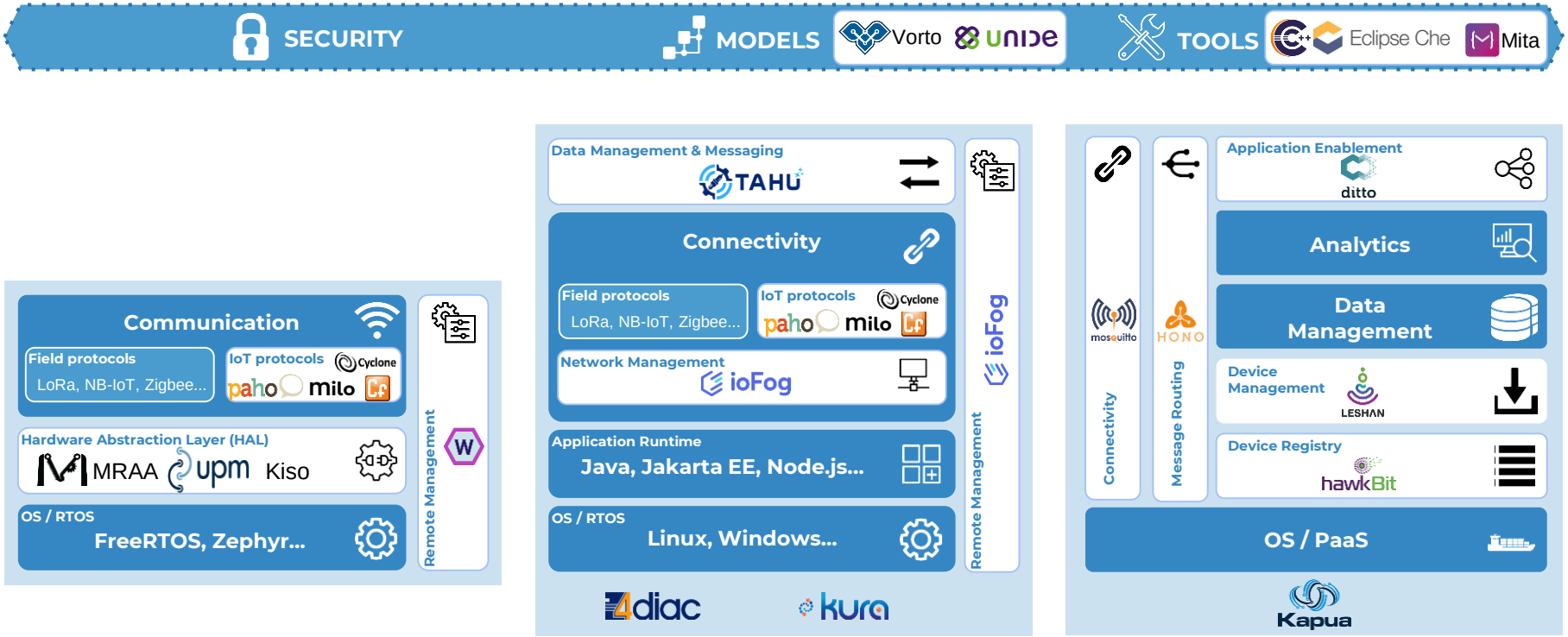
Where Eclipse IoT Projects Fit



CONSTRAINED DEVICES

EDGE NODES / GATEWAYS

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Often used together

Gateway runtime and Cloud Platform

Tightly integrated components

Java / OSGi application runtime

Message routing, digital twins, device description and device management

Modular components

Integration through microservices

Pick your own runtime

Projects that are built and integration tested together

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In Short

IoT drives real outcomes
and will grow to about $520 billion in 2021.

Open Source is the solution
since it encourages collaboration and accelerates innovation.

Eclipse IoT
is the open source center of gravity for the Internet of Things.

Our community is still growing
38 projects and 43 member organizations are just the beginning.

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Call to action

- Learn about our projects by visiting iot.eclipse.org/projects
- Try our technology
- Subscribe to the Eclipse IoT newsletter
- Follow and engage with us on social media: @EclipseIoT
- Attend an Eclipse community event or join our Virtual IoT Meetup
  - **Eclipse Con Europe 2019**
    Ludwigsburg, Germany - October 21 - 24, 2019

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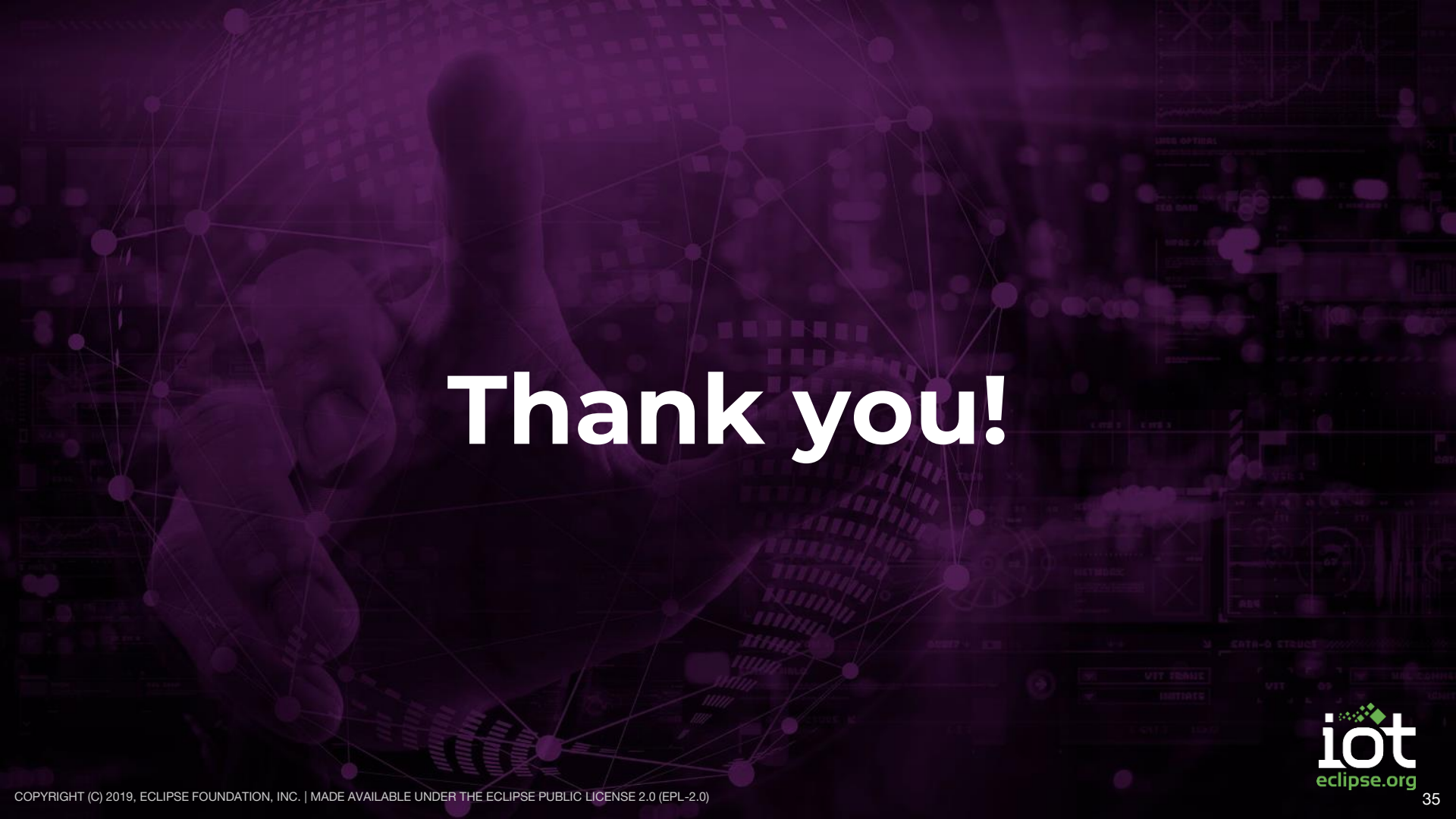

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