



# IoT Developer Survey 2019 Results

April 2019

# Executive summary

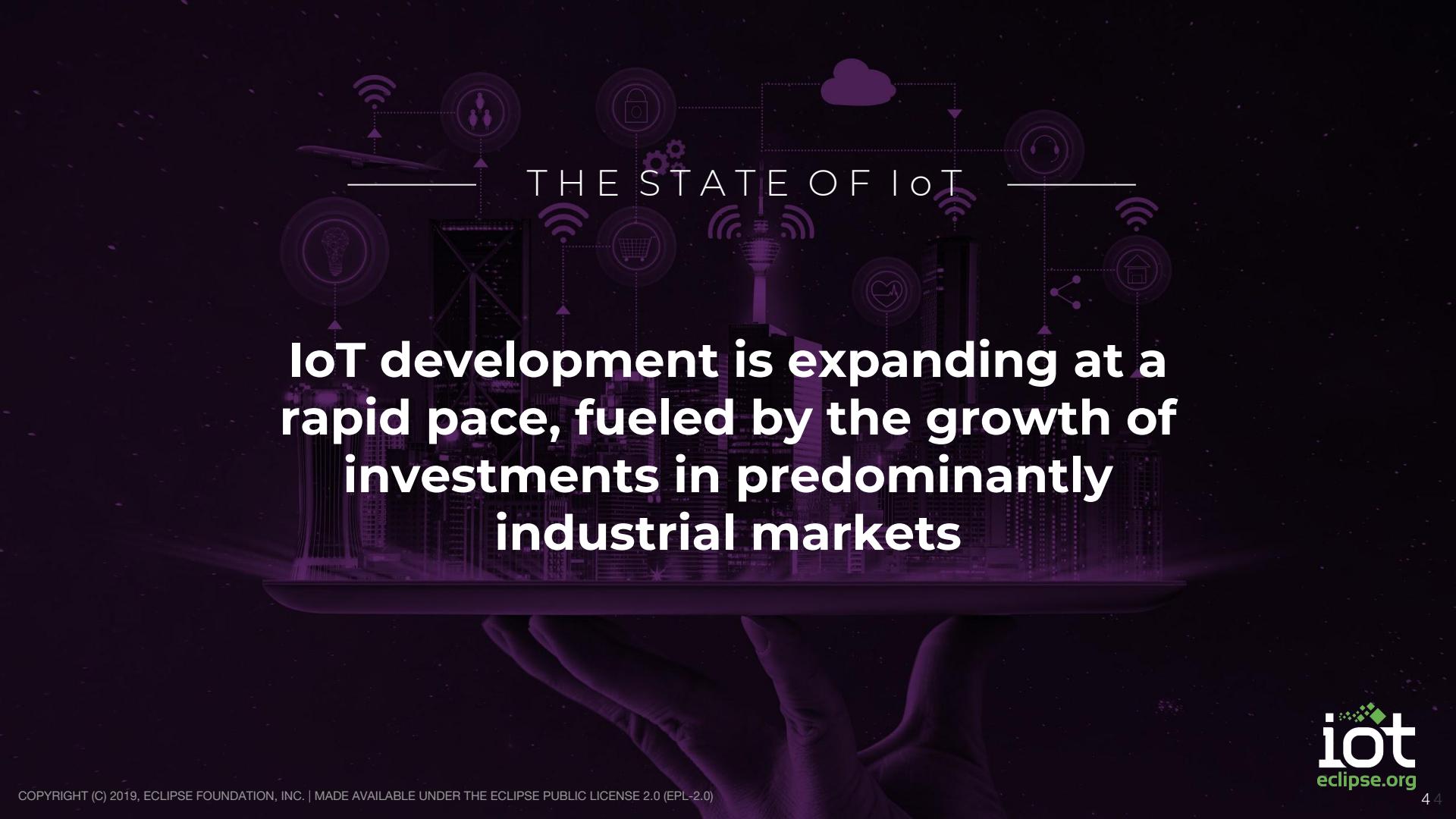
- > **IoT drives real outcomes today.** Two-thirds of respondents are currently working on IoT projects or will be in the next 18 months
- > **AWS, Azure, and GCP are the leading IoT cloud platforms**
- > IoT developers mostly use **C, C++, Java, JavaScript, and Python**
- > **MQTT is still the dominant communication protocol leveraged by** developers
- > **The Eclipse Desktop IDE is the leading IDE** for building IoT applications

# Introduction

The objective of this IoT Developer Survey was to gain a better **understanding of the requirements, priorities, and perceptions of IoT developer communities.** From February 11, 2019 to March 8, 2019, **1,717 individuals participated in an online survey.**

The survey was heavily promoted on the Eclipse Foundation's various social media channels, the Eclipse Foundation and Eclipse IoT Working Group websites, as well as on the Eclipse IoT member company websites, social media platforms, and communication streams.





## THE STATE OF IoT

**IoT development is expanding at a rapid pace, fueled by the growth of investments in predominantly industrial markets**

---

2019 SURVEY

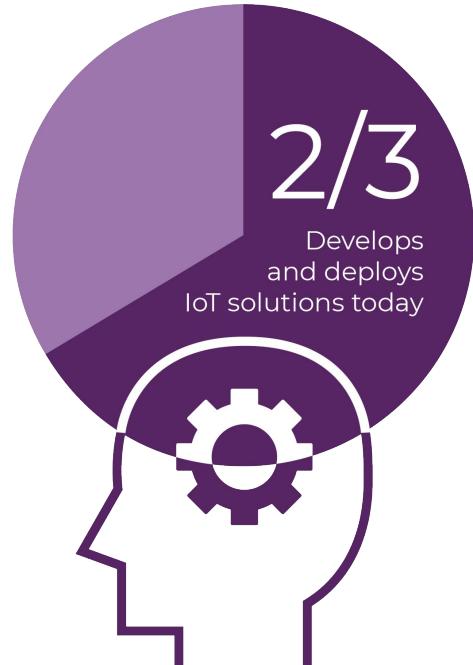
---

**The Eclipse IoT Working Group surveyed  
developers to gain on-the-ground  
understanding and insights into how  
IoT solutions are being built**

April 2019 | 1,717 Participants



# IoT drives real outcomes



**Two thirds** of respondents say their organization develops and deploys IoT solutions today or will do so in the next **18 months**.

*Only **9%** answered that their organization has no plans to develop IoT solutions*



# Top IoT developer concerns



## Security

38%



## Connectivity

21%



## Data Collection & Analytics

19%

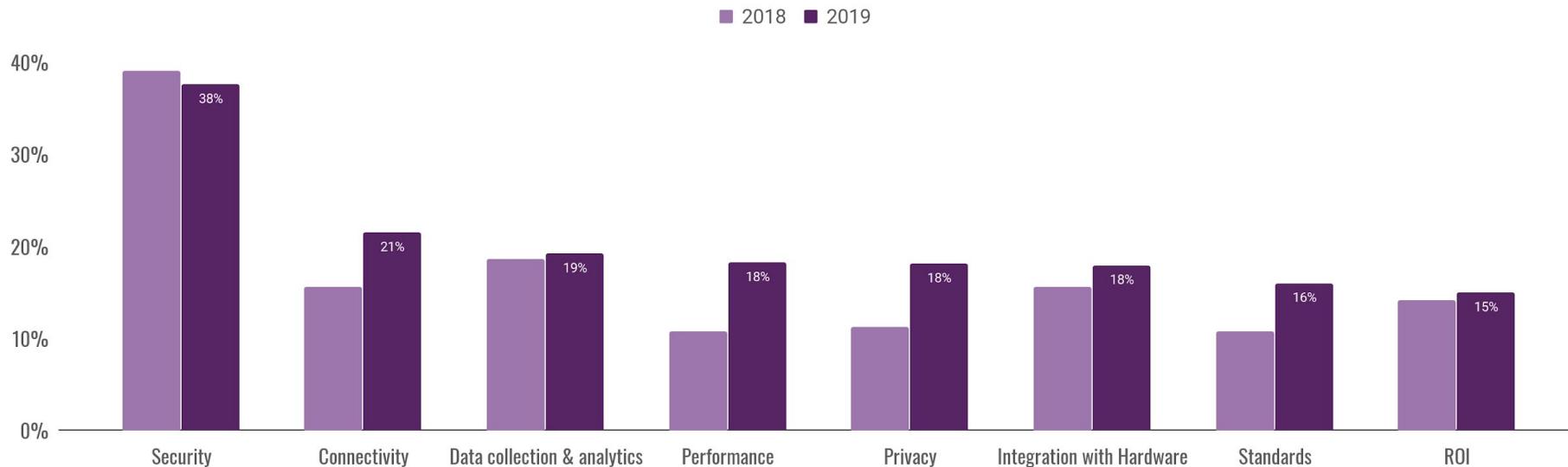
Top three concerns remain the same as last year, with Connectivity moving into second place

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

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



# Top developer concerns over time



---

## IoT industry focus.



# Key industry focus areas



## Platform

34%



## Home Automation

27%



## Industrial Automation

26%

*is breaking the silos between Information Technology (IT) and Operational Technology (OT)*

Top three industries remain the same as last year, with **Automotive**, **Education** and **Building Automation** increasing

**Education** had the biggest year on year percentage increase

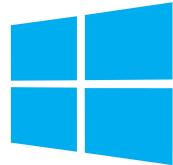
---

# Operating systems: A diverse landscape.



# The operating system landscape

## Top Three



Aggregating device and edge nodes data and excluding Linux...

### Windows



### FreeRTOS



### No OS

IoT developers see value in operating systems, which implement **common features** and let them concentrate on their **business outcomes**

Huawei's **LiteOS** is making inroads (2% to 5%)  
Biggest year on year drop: **no OS** (20% to 11%)

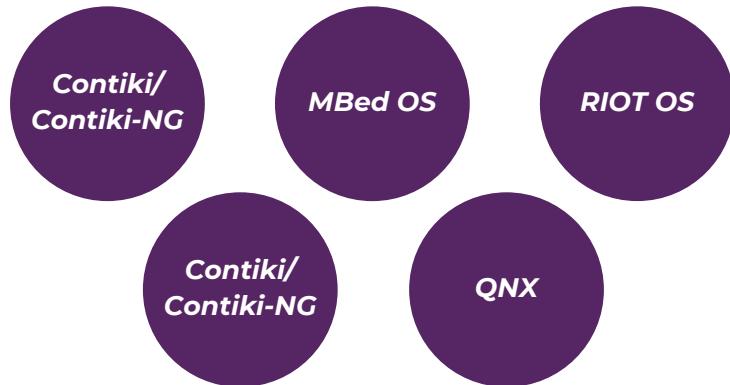


# Top device operating systems



dominates constrained devices (along with its Amazon derivation)

Other **standouts** (75%+) include





# Top Edge / Gateway operating systems



## Linux

76% Edge/Gateway



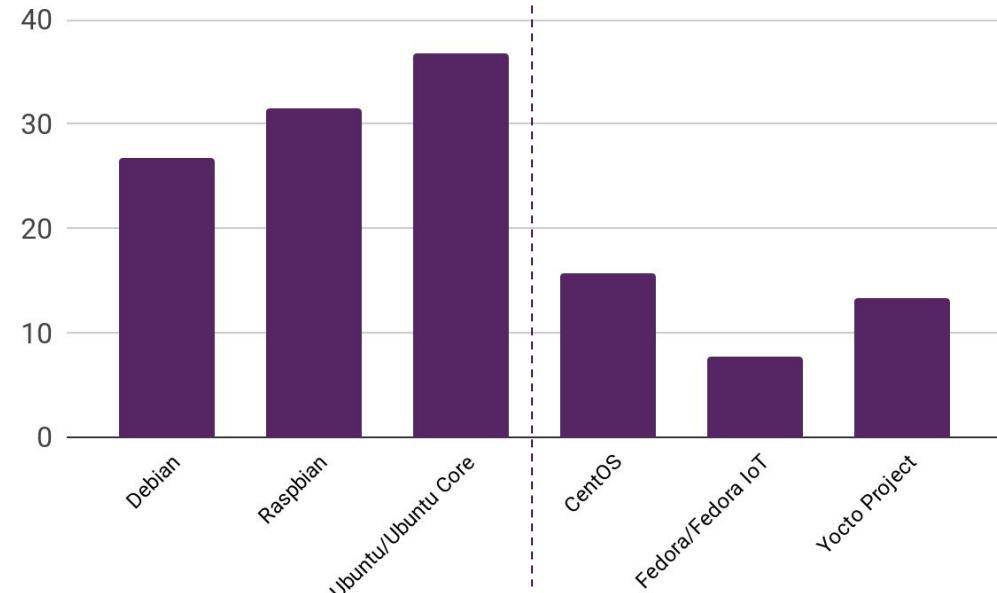
## Windows

52% Edge/Gateway

**Linux dominates**  
Gateways and  
Edge nodes

# Linux distributions

It's a Debian World...

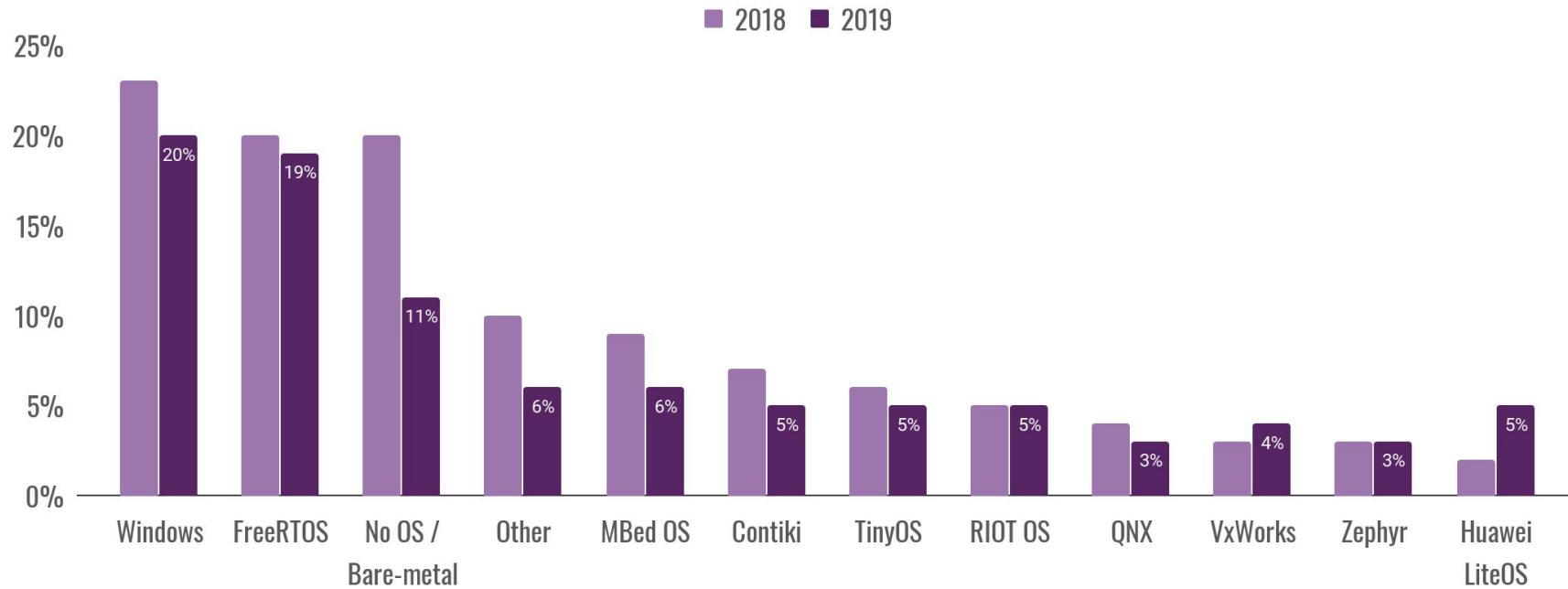


**Debian and derivatives (Raspbian, Ubuntu / Ubuntu Core)** were picked by at least **a third** of respondents.

**CentOS & Fedora / Fedora IoT** came in second place, with a strong showing by **Yocto**



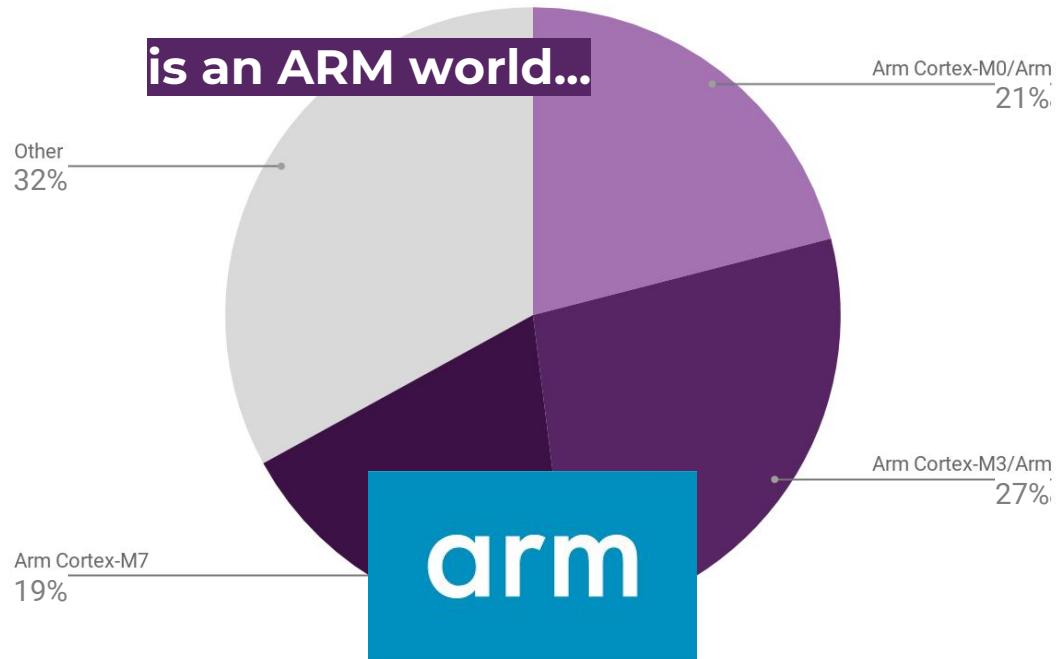
# Non-Linux operating systems over time



---

## Key hardware architectures.

# Constrained devices



The **top three CPU architectures** for constrained devices used by respondents are **ARM-based**, with significant use of niche 8-bit, 16-bit and 32-bit MCUs

## Hardware architectures used for IoT gateways

arm

70%

Use gateways and edge nodes with **ARM Variants**



42%

Use gateways and edge nodes with **Intel x86 and x86\_64 CPUs**

ARM and Intel Dominate

---

## Top security technologies.



# Top 3 security technologies



**Communication  
Security**  
38%



**Data  
Encryption**  
38%



**JSON Web Token  
(or equivalent)**  
26%

Top three remain the same as last year, with **Virtualization starting to play a stronger role** in IoT security

---

## Key IoT cloud platforms.



# Top 3 IoT cloud platforms



**AWS**

34%



**Azure**

23%



Google Cloud Platform

**GCP**

20%

Top three remain the same as last year, this reflects the wider  
**Cloud market share**

*Public Cloud seems to be making gains at the expense of private Cloud and on-premise deployments of **Openstack**, **Kubernetes** and **Cloud Foundry***

---

## Programming languages and communication protocols.

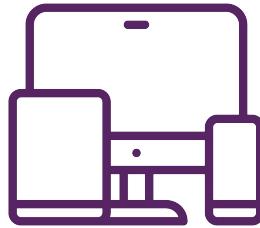
# Top programming languages

Constrained devices	Gateways and edge nodes	IoT Cloud
C	Java	Java
C++	Python	Javascript
Java	C++	Python
Javascript	C	PHP

**C dominates constrained devices. Java leads on Edge/Gateway and for Cloud applications**

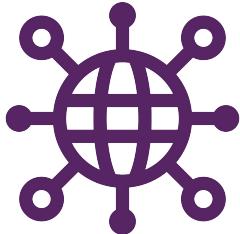


# Top 3 communication protocols



**HTTP**

49%



**MQTT**

42%



**Websockets**

26%

**Almost 50% of participants use HTTP**  
(likely for RESTful web services) with MQTT strongest of the IoT-specific protocols

*Websockets and HTTP/2 are also strong (around 25%) with CoAP usage significantly lower at 15%*

---

# Connectivity



# Top 3 connectivity protocols



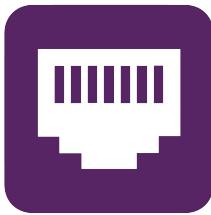
**TCP/IP**

54.1%



**WiFi**

48.2%



**Ethernet**

41.1%

TCP/IP, WiFi and Ethernet dominate usage with **Satellite and Thread more than doubling** year over year

*Usage of specialized connectivity solutions (LPWA, Zigbee, 6LoWPAN, Z-Wave, Satellite) hovers between 8 and 15% each*



---

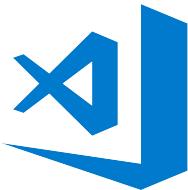
## Eclipse is the leading IoT IDE.



# Top 3 IDEs or text editors



**Eclipse  
Desktop IDE**  
46%



**Visual  
Studio Code**  
32%



**Notepad ++**  
26%

**45% of respondents use the Eclipse Desktop IDE** and close to 10% also use Eclipse Che, the Eclipse Cloud IDE

*Other top choices are Visual Studio Code (32%) and Notepad++(26%). Visual Studio Code's year on year surge is remarkable (23% to 32%)*



---

**Eclipse is perceived as the most influential IoT organization.**



# Most influential IoT organizations



**Eclipse  
Foundation**  
57%



**Apache Software  
Foundation**  
52%



**Linux  
Foundation**  
43%

The **Eclipse Foundation**, the **Apache Software Foundation** and the **Linux Foundation** deemed the three most important organizations for IoT

**80%**  
of respondents  
are active in IoT

**40%**

Develop  
IoT solutions  
at work

**10%**

Develop  
in their  
spare time

**20%**

Learn in  
their spare  
time

**10%**

Research IoT  
solutions

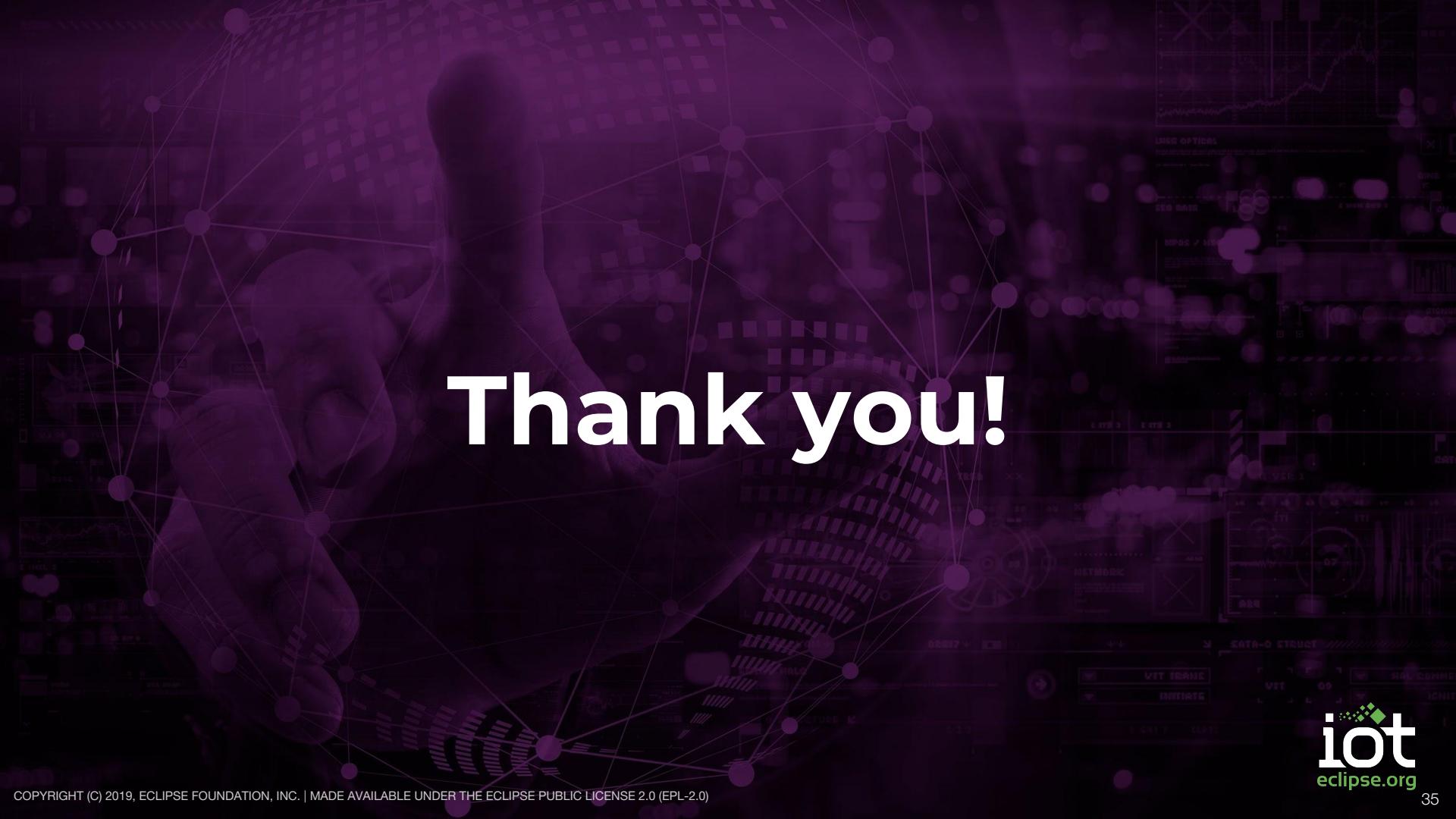


**To stay updated on open source IoT innovation,  
subscribe to the Eclipse IoT newsletter**

or connect with us at:



**@EclipseIoT**



# Thank you!

