

IoT Developer Survey 2019 Results

April 2019

Executive summary

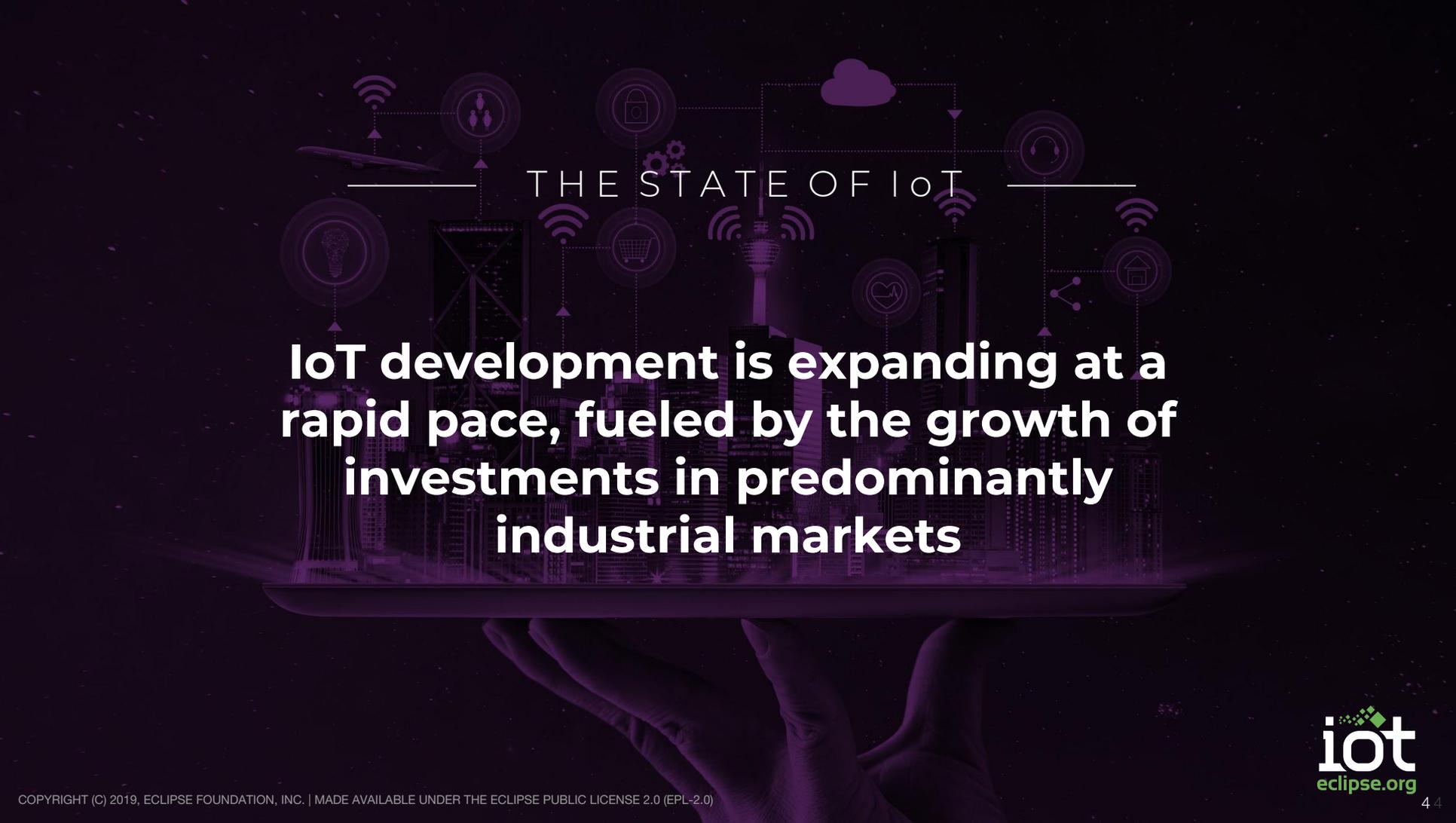
- > **IoT drives real outcomes today.** Two-thirds of respondents are currently working on IoT projects or will be in the next 18 months
- > **AWS, Azure, and GCP are the leading IoT cloud platforms**
- > IoT developers mostly use **C, C++, Java, JavaScript, and Python**
- > **MQTT is still the dominant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

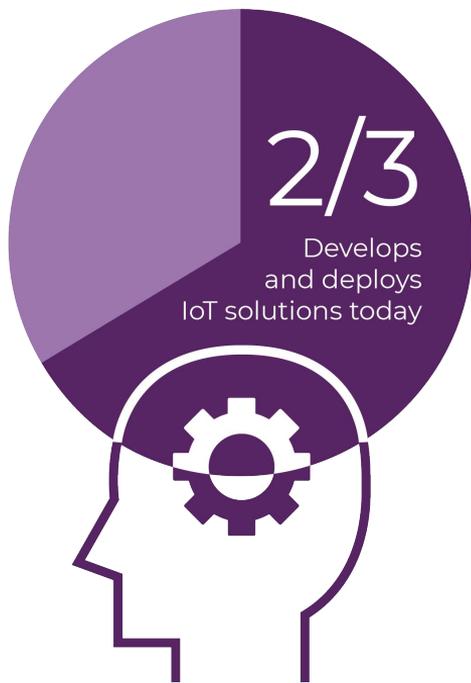
———— 2019 SURVEY ————

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

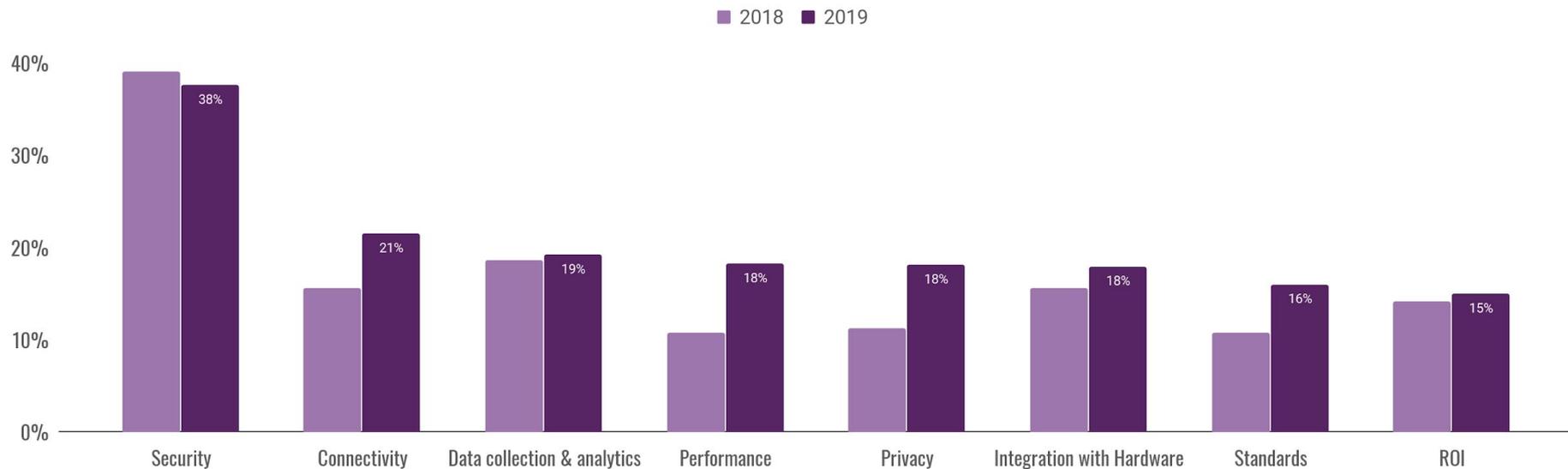
19%

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



Windows



FreeRTOS



No OS

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

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%)

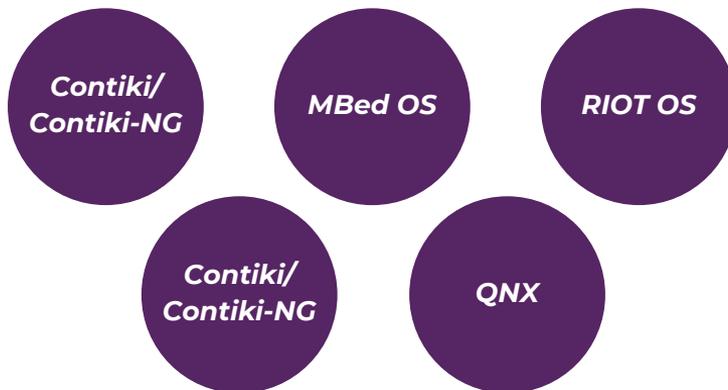


Top device operating systems

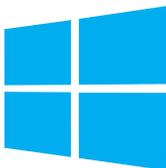


dominates constrained devices (along with its Amazon derivation)

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



Top Edge / Gateway operating systems



Linux dominates
Gateways and
Edge nodes

Linux

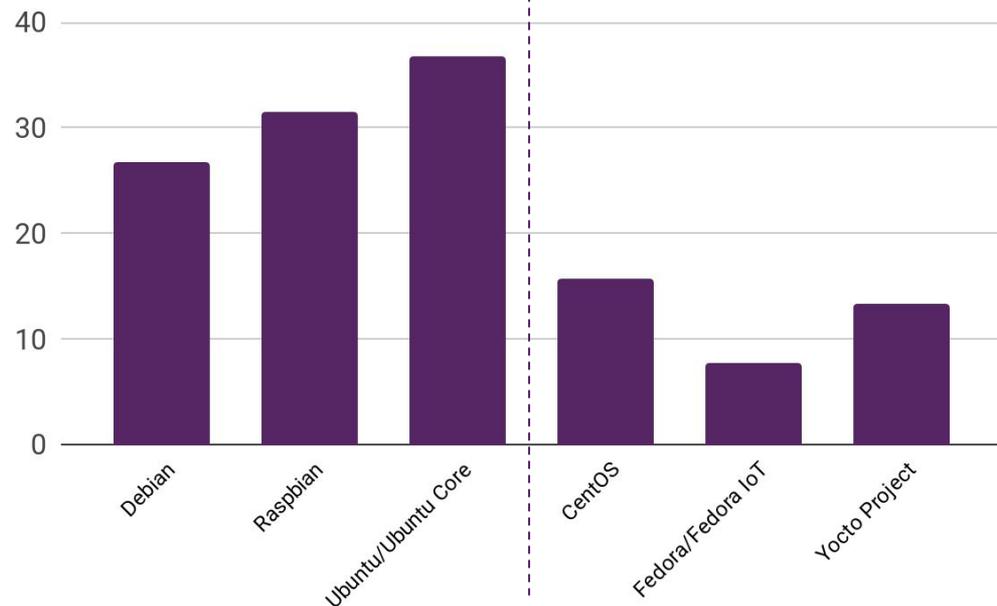
76% Edge/Gateway

Windows

52% Edge/Gateway

Linux distributions

It's a Debian World...

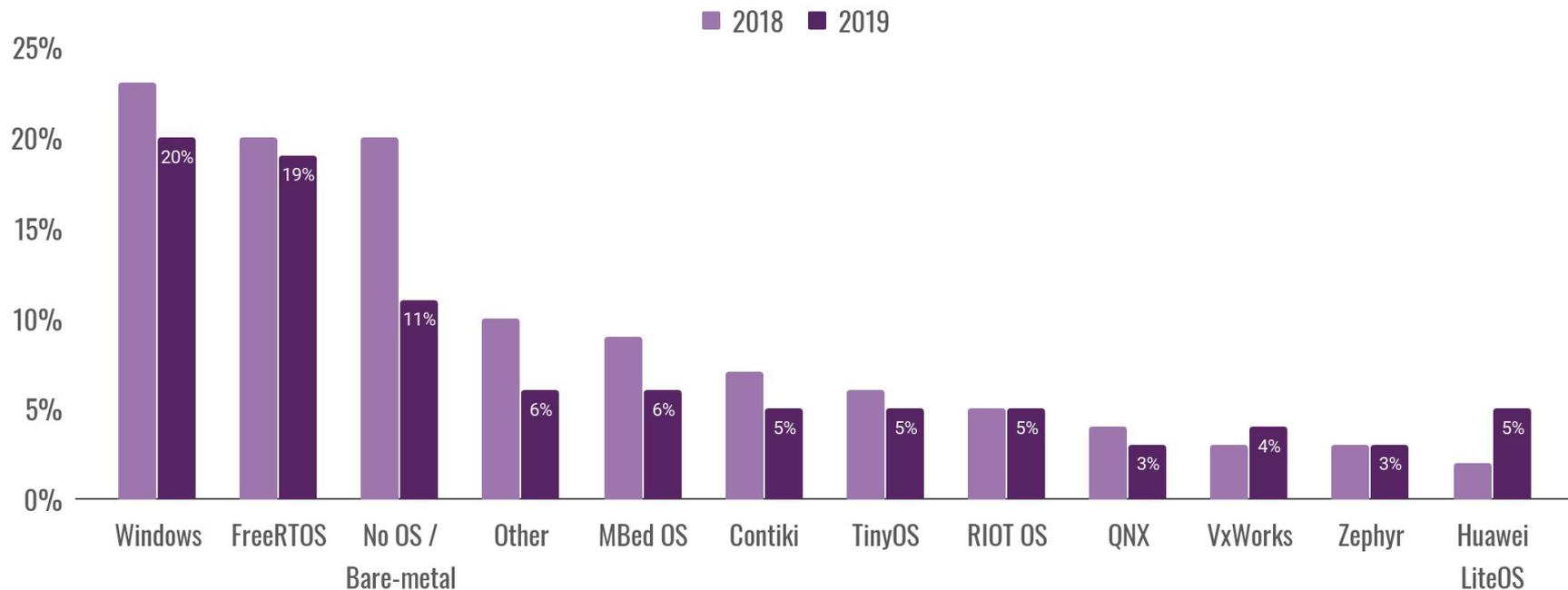


Debian and derivatives (Raspbian, Ubuntu / Ubuntu Core) were picked by at least **a third** of respondents.

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

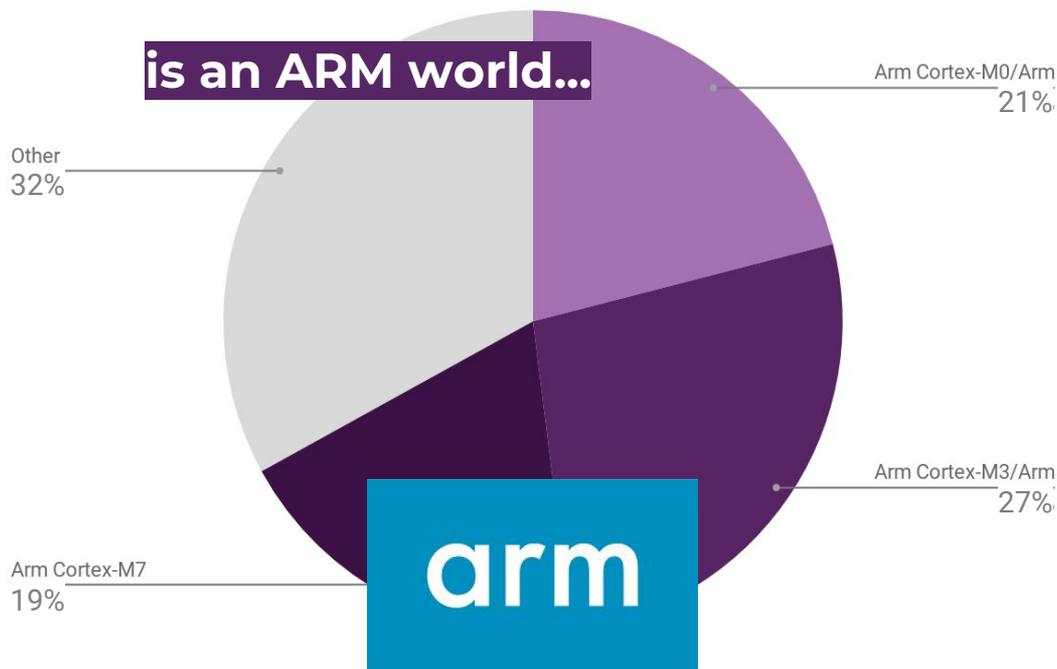


Non-Linux operating systems over time



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%

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

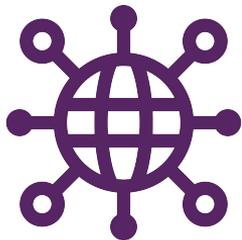
Constrained devices	Gateways and edge nodes	IoT Cloud
C	Java	Java
C++	Python	Javascript
Java	C++	Python
Javascript	C	PHP

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%



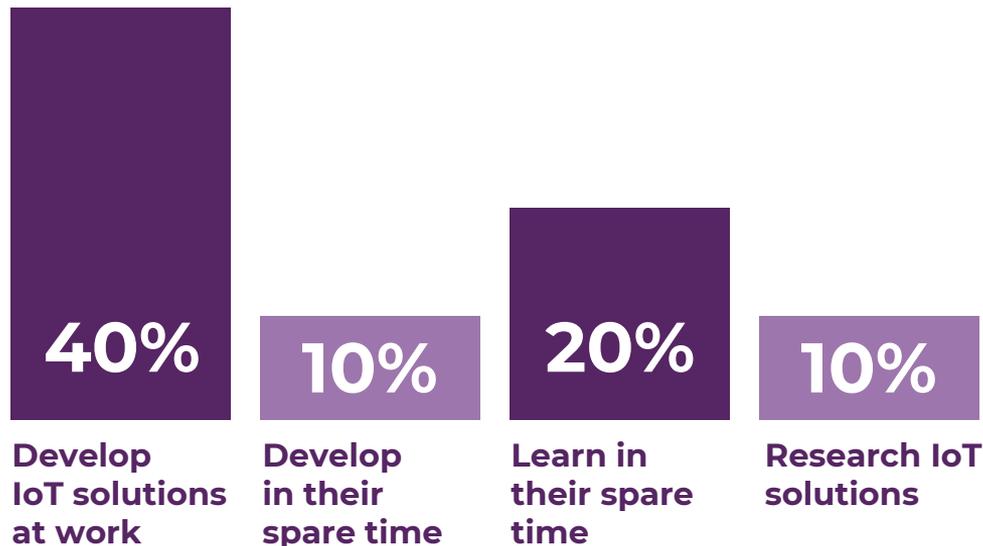
**Apache Software
Foundation**
52%

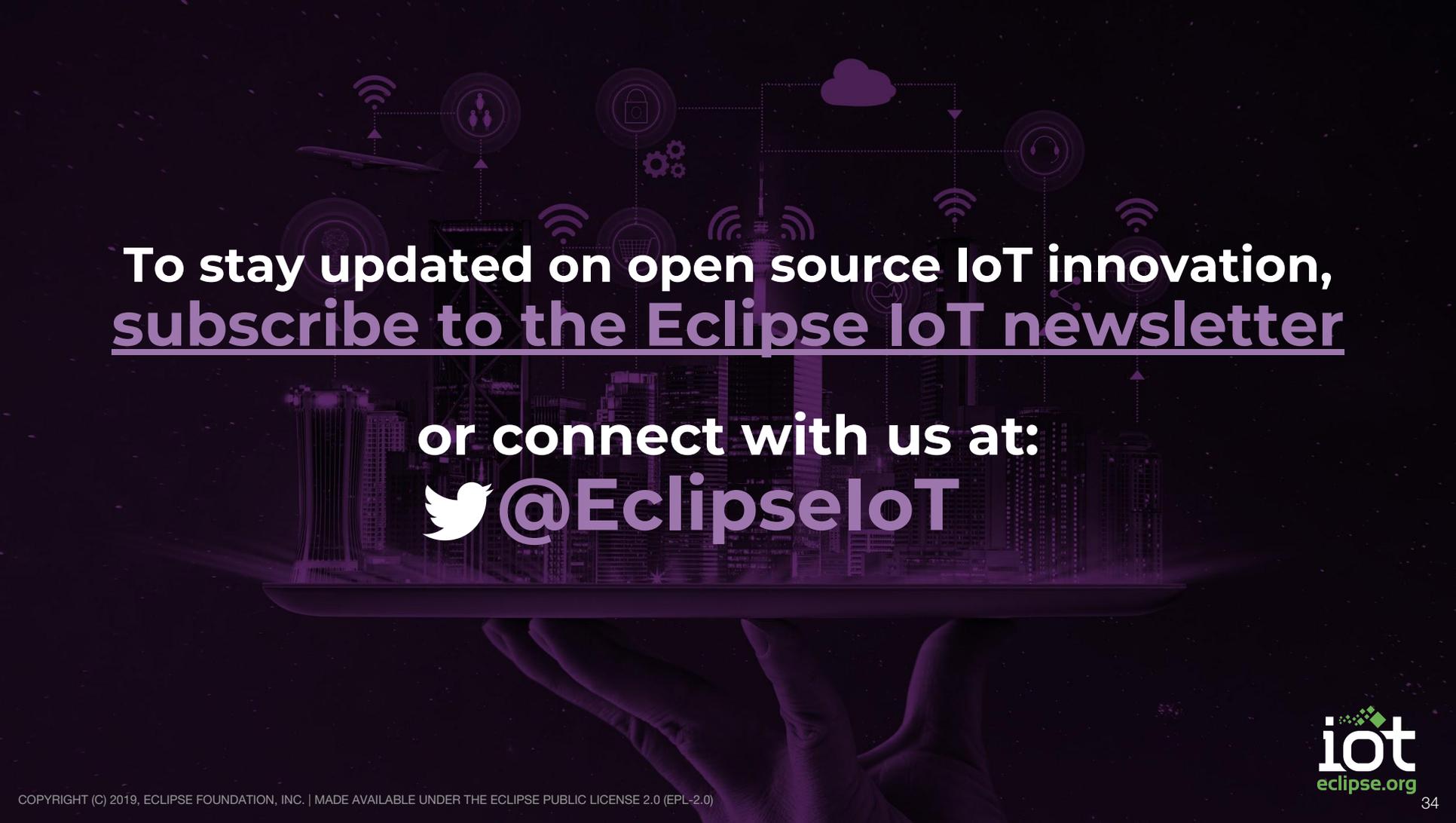


**Linux
Foundation**
43%

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

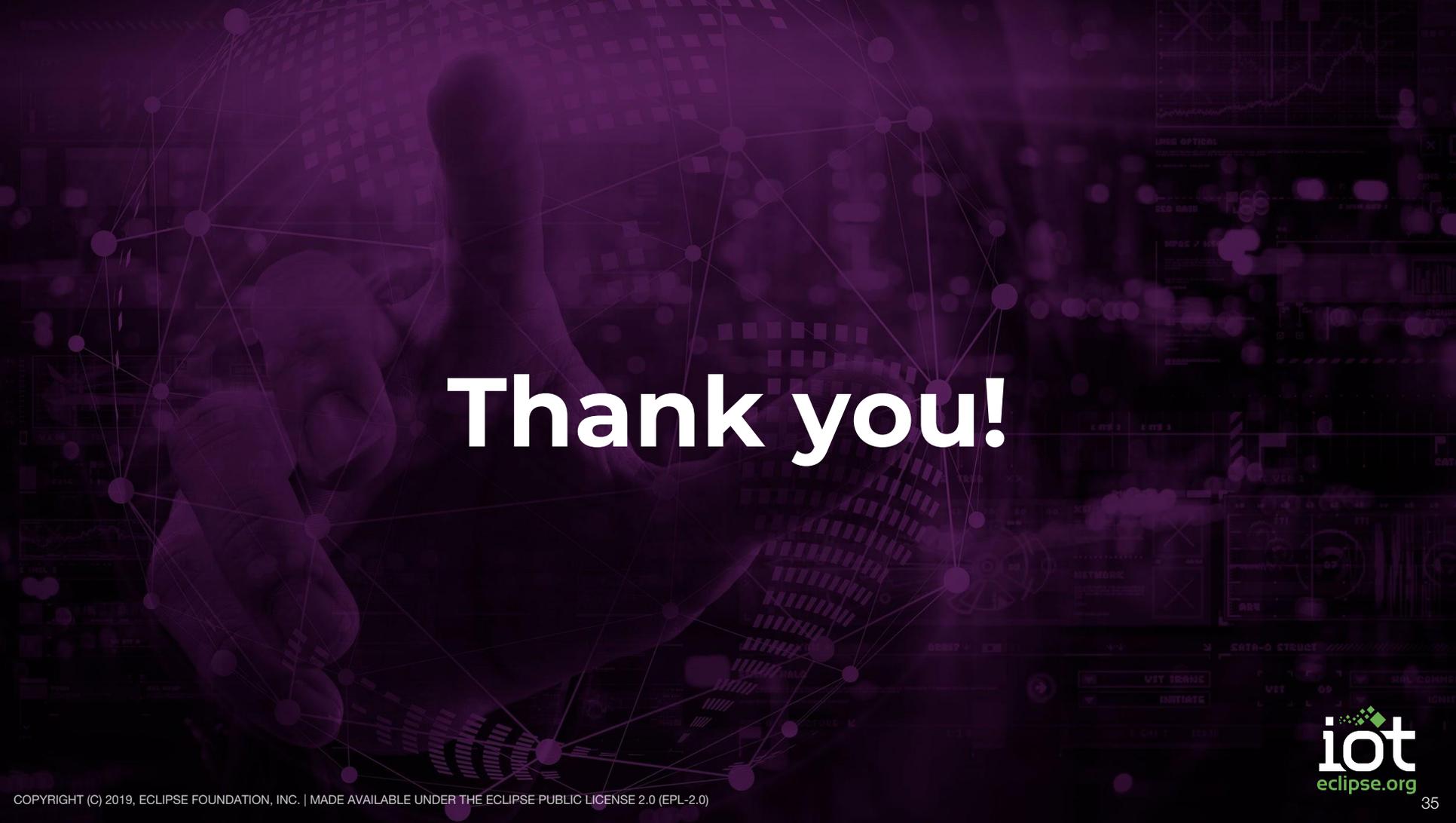




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 **@EclipseIoT**

A person's hand is shown pointing towards the right side of the frame. The background is a dark purple color with a network of white lines and dots overlaid on it. In the upper right corner, there are faint, semi-transparent images of data charts and graphs. The text "Thank you!" is centered in the middle of the image in a large, white, sans-serif font.

Thank you!