IoT Developer Survey

April 2015

Survey Introduction

The Eclipse IoT Working Group solicited feedback for the IoT Developer Survey. The intent of the survey is to better understand the trends and attitudes toward developing IoT solutions.

The survey was opened for input on February 9, 2015 and closed March 26, 2015. A total of 394 individuals responded to the survey but 38 were disqualified due to lack of experience in IoT. The survey was promoted through a variety of channels, including Eclipse Foundation social media and web sites, Eclipse IoT WG member promotions to their communities, various IoT Meetups, and other IoT organizations (OMA, OASIS, IIC).

The results of this survey have inherit biases due to the sample communities involved. The results should be viewed as one data point and snapshot of the IoT developer community.

Key Findings

➢Developers are engaged with IoT: 33% of respondent are building IoT solutions today. Over 50% are in learning and discover mode.

➢Top 3 Influencers of IoT Technology: 1) Hardware vendors, 2) Semi-conductor manufacturers and 3) Cloud Providers

➢IoT Leaders: Intel, Google, Cisco, IBM, and Bosch

➢Important IoT Consortiums: Eclipse IoT, IEEE, IETF

Key Findings

➢Top 3 IoT Concerns: Security, Interoperability and Hardware Integration

➢Open Source Is Pervasive in IoT: 81% claim open source is used for IoT solutions

➢Key IoT Technology: HTTP and MQTT for messaging, Linux for OS

➢Top 3 IoT languages: Java, C, JavaScript

Who responded to the survey?

Role

WHAT IS YOUR JOB TITLE?

Legend:
- Developer
- Architect
- Tester
- Development Manager
- Product Manager
- Role in sales and/or business development
- Executive
- Student
- Researcher
- Other (please specify)

Pie chart values: 46%, 12%, 5%, 3%, 9%, 8%, 6%, 6%
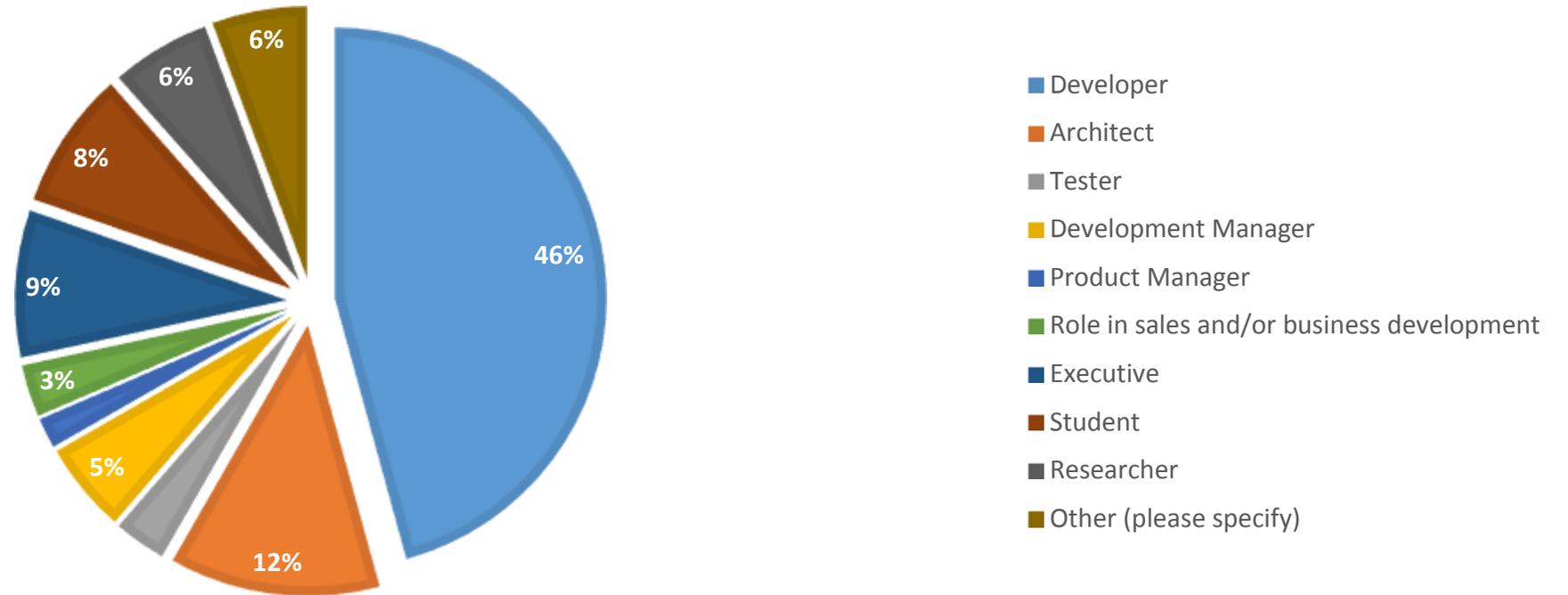
Organization Size

HOW MANY EMPLOYEES ARE THE ORGANIZATION YOU WORK FOR?

- 1-49 employees
- 50-500
- 501-5000
- Greater than 5000
- Student
- Independent Consultant

35%
21%
13%
19%
6%
6%

Current Technology Focus

What is your current technology focus within your organization? (Pick top 2)

Category	Percentage
Embedded Software	35.1%
Hardware Design	13.1%
Networking Infrastructure	9.5%
Enterprise Software	29.2%
Web Development	30.3%
Mobile	15.4%
Big data, data analytics	12.8%
Cloud Computing	15.4%
Other (please specify)	8.5%

Individual Experience with IoT

WHAT IS YOUR EXPERIENCE BUILDING IOT SOLUTIONS?

Legend:
- I participate in the development of IoT solutions for my company
- I am researching the IoT industry and technology for my company
- I develop IoT solutions in my personal time
- I am learning about IoT technology in my personal time
- No experience
- Other (please specify)

Pie chart values: 33%, 14%, 15%, 22%, 9%, 7%
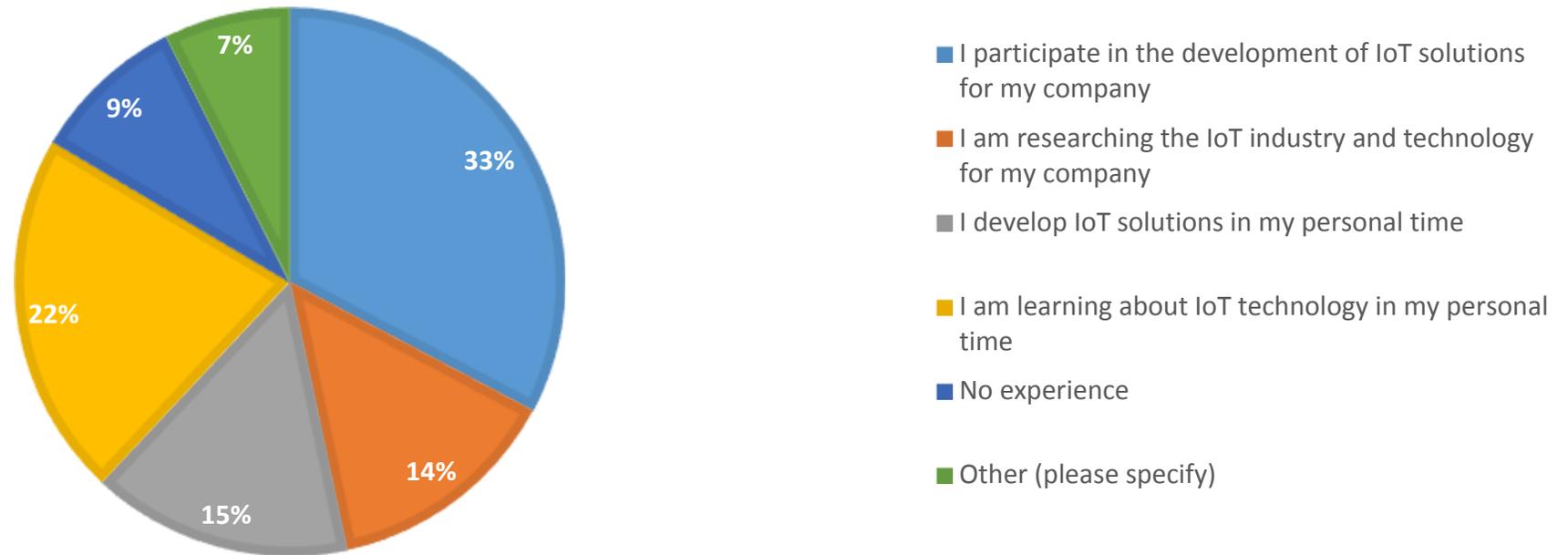
IoT Experience

Organization Plans for IoT

WHAT IS YOUR COMPANY'S PLAN FOR IOT SOLUTIONS?

- My company develops and deploys IoT solutions today
- My company plans to develop and deploy IoT solutions in the next 6 months
- My company plans to develop and deploy IoT solutions in the next 6-18 months
- My company has no plans to develop IoT solutions
- Don't know
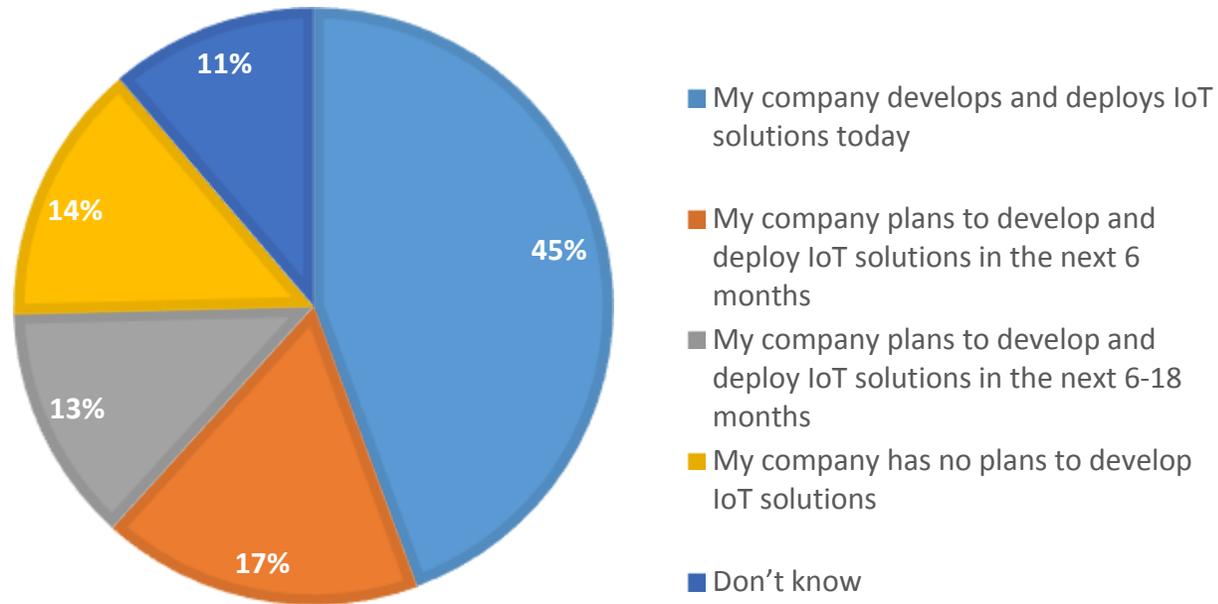
If respondent has a Embedded Software focus, deploys IoT solution today jumps to 53%, Enterprise Software (35%) and Web Dev (31%)

If respondent has Enterprise Software focus, no plans to develop IoT solutions jumps to 32%

Solution Area
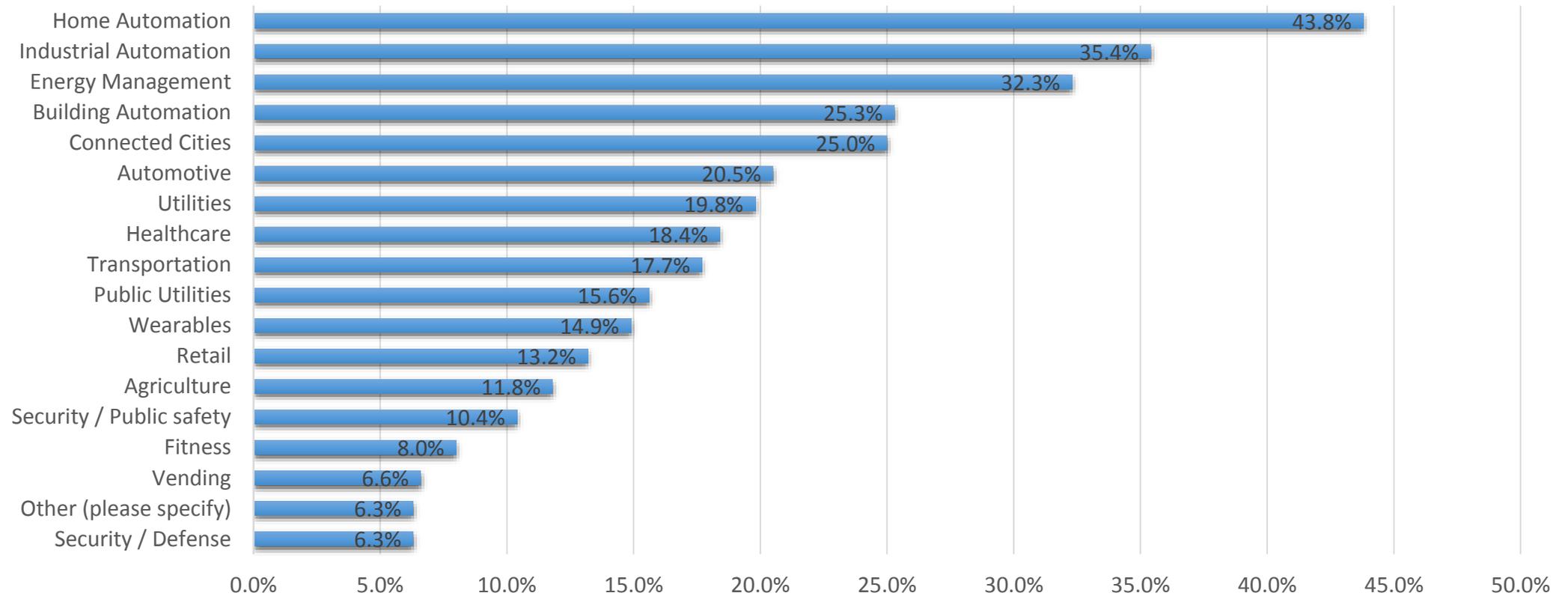
Key Concerns for IoT

What are the top 2 concerns for developing IoT solutions? (Pick 2)

Concern	Percentage
Security	43.7%
Interoperability	30.7%
Integration with Hardware	22.9%
Connectivity	18.1%
Complexity	14.7%
Privacy	14.3%
Cost	14.0%
Performance	10.9%
Data Analytics	8.5%
Maintenance	7.8%
Certification/Conformance	6.5%
Other (please specify)	3.8%
Don't Know	1.0%
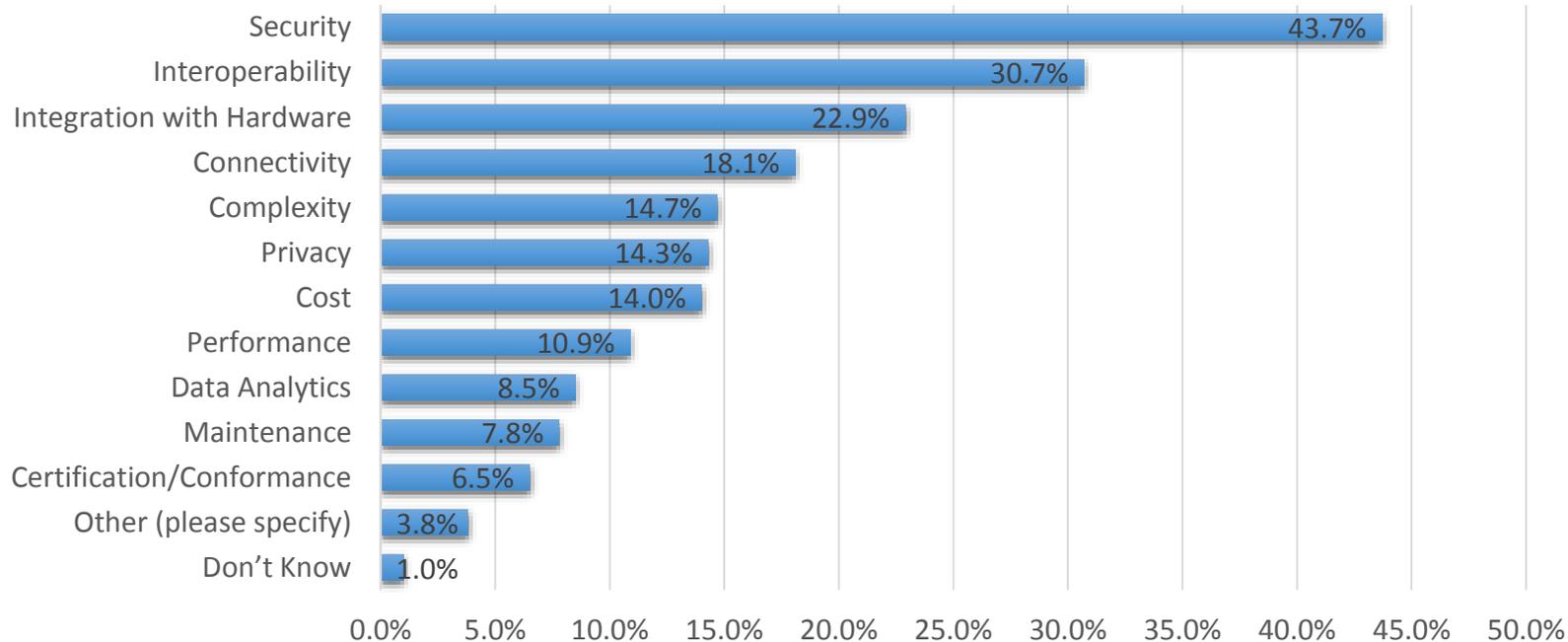
If respondent has Enterprise Software focus, Interoperability more of a concern (39%), vs Embedded (27%) and Web (21%)

If respondent has Embedded Software focus, Connectivity more important (26%)

If company deploys IoT solution today, Connectivity becomes more of a concern (25%)

Security more of a concern for companies planning to deploy in 6-18 months (60.5%)

Technology Influencers

What type of vendors will have the most influence in selecting IoT technology? (Pick 2)

Category	Percentage
Hardware vendors (ex. Eurotech, Sierra Wireless, etc)	31.1%
Semi-conductor manufacturers (ex. ARM, Intel, Qualcomm, etc)	24.2%
Cloud providers (ex. Amazon, Google, etc.)	24.2%
Mobile device manufacturers (ex. Apple, Google, Samsung)	18.4%
Industry solution providers	17.7%
All technology decisions are made in-house	16.0%
Enterprise software vendors (ex. IBM, SAP, Oracle, etc.)	11.3%
System Integrators (ex. Accenture, IBM, etc.)	10.6%
Network operators (ex. AT&T, Deutsche Telekom, Vodafone, etc)	9.9%
Don't know	9.2%
Other (please specify)	3.8%

Semi-conductor influence depends on technology focus:
Embedded Software: 35%
Enterprise Software: 13%
Web Development: 14%

Solution providers more influential with Enterprise Software focus (25%)

Semi-conductor influence depends on deployment stage:
Deploy today: 21.5%
Plan in 6 months: 27.5%
Plan in 8-18 months: 39.5%

Open Source Policy

What is your company's policy about using open source technology in IoT solutions?

Category	Percentage
Open source is used, and we have developers who work on open source projects	32.5%
Open source is used, but we do not participate or contribute to open source projects	26.8%
Open source is used, and we contribute bug fixes to open source projects	21.7%
Don't know	11.5%
Other (please specify)	2.7%
Open source is not allowed on the device, but allowed on the server-side	2.4%
Open source is not allowed in any part of our IoT solution	2.4%

0.0% 5.0% 10.0% 15.0% 20.0% 25.0% 30.0% 35.0%

Open source is used and developer work on project depends on company deployment stage:
Deployed today: 50%
In 6 months: 27.5%
In 6-18 months: 10.5%

Technology Used

Programming Languages
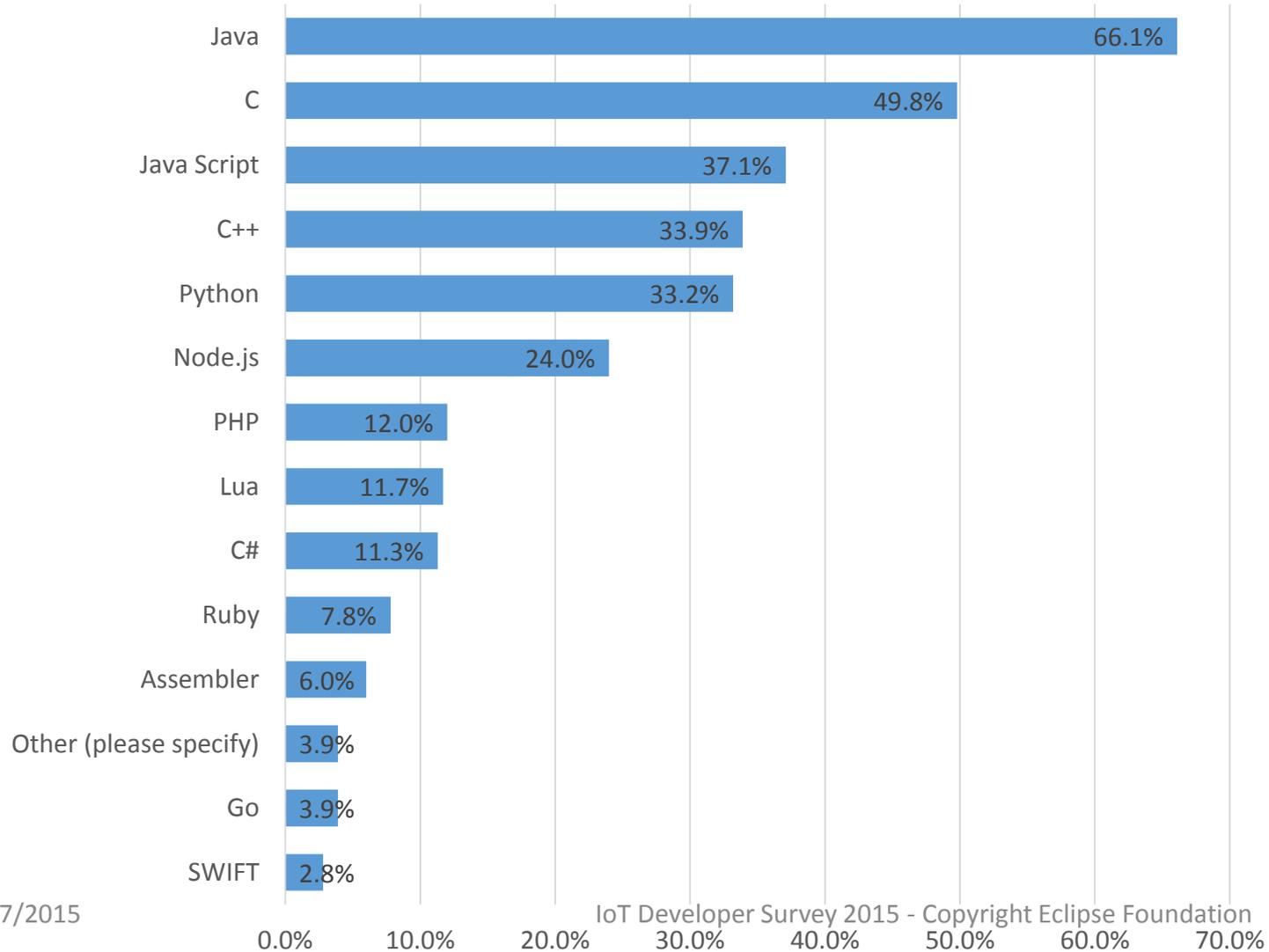
For Embedded Software developers C is #1 language (64%) and then Java (58%)

| Language	Percentage
Java	66.1%
C	49.8%
Java Script	37.1%
C++	33.9%
Python	33.2%
Node.js	24.0%
PHP	12.0%
Lua	11.7%
C#	11.3%
Ruby	7.8%
Assembler	6.0%
Other (please specify)	3.9%
Go	3.9%
SWIFT	2.8%

Messaging Protocol

What general messaging protocols do you use in your IoT solution?
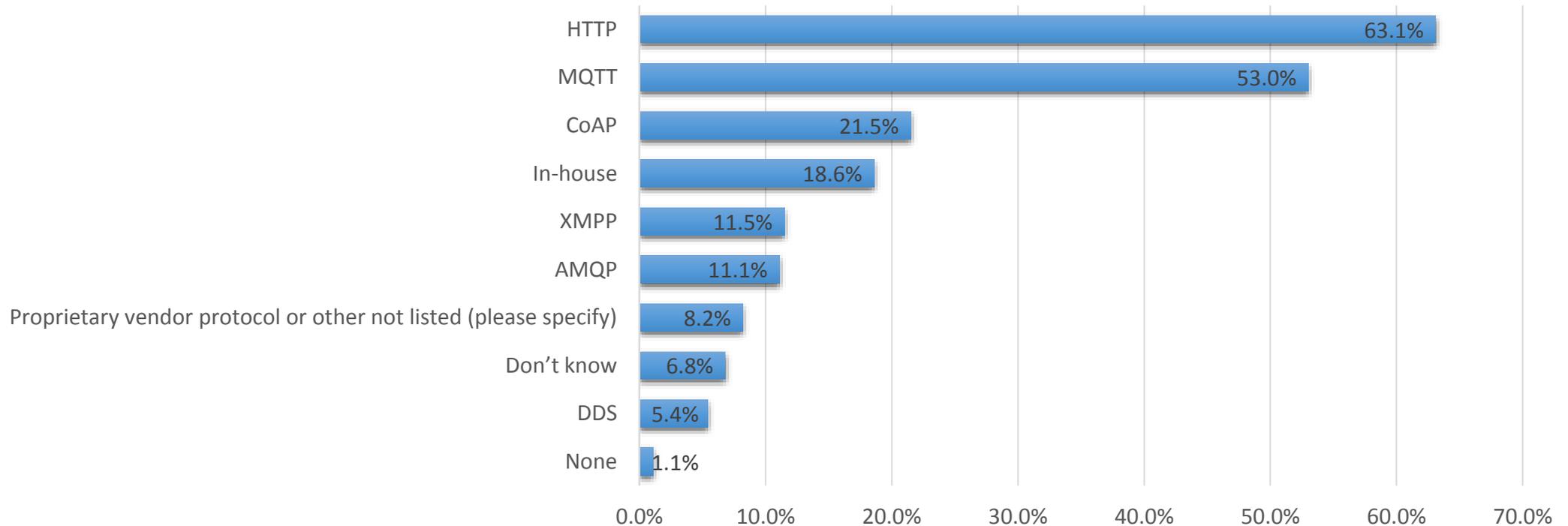
Industrial Protocols

## Which industrial protocols do you use in your IoT solution?

Protocol	Percentage
None	24.2%
Modbus	23.8%
Don't Know	23.0%
Common Industrial Protocol (EtherNet/IP, ControlNet, DeviceNet)	21.9%
CAN	20.0%
KNX	7.5%
Other (please specify)	6.8%
OPC-UA (IEC 62541)	5.7%
Profibus, Profinet	5.3%
EtherCat	3.8%
BACNet	3.4%
DNP3	2.6%
IEC 60870, 61850	2.3%
Sercos	1.1%
FOUNDATION fieldbus	0.8%
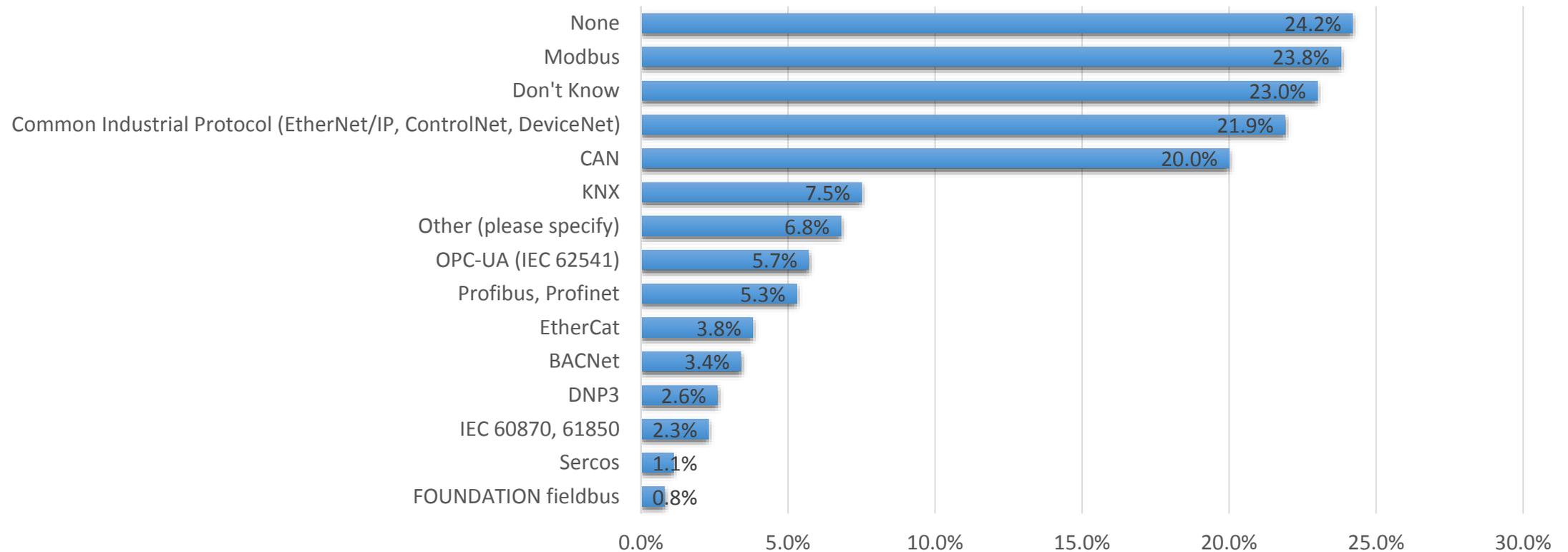
Connectivity

What connectivity protocol(s) do you use in your IoT solution?

Protocol	Percentage
Wi-Fi	71.0%
TCP/IP	65.2%
Ethernet	57.0%
Bluetooth / Bluetooth Smart	35.8%
Cellular	33.0%
Zigbee	28.3%
Serial RS-232/RS-485	23.7%
6LowPAN	12.9%
UPnP	7.9%
Other (please specify)	6.1%
Don't know	4.3%
Satellite	2.2%
Thread	1.8%
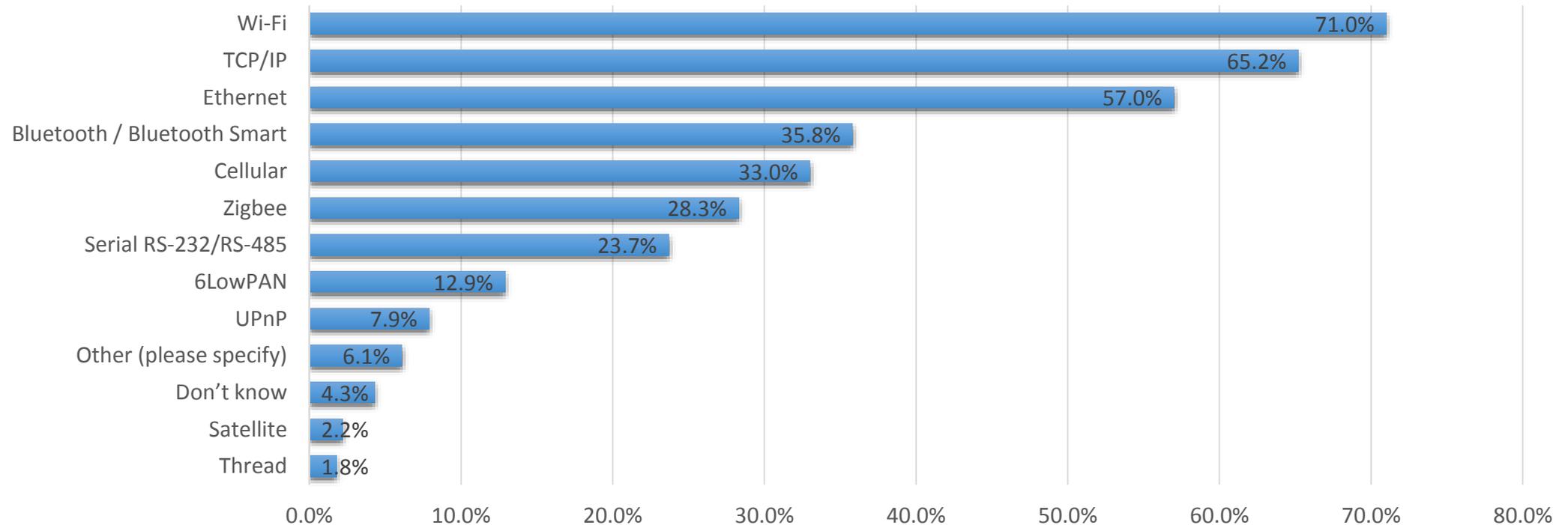
Operating System

Which operating systems do you use for your IoT devices?

Operating System	Percentage
Linux	78.2%
No OS / Bare-metal	20.0%
Other (please specify)	11.4%
Windows Embedded	11.4%
FreeRTOS	11.4%
Contiki	7.5%
Don't know	7.1%
mbed	6.8%
TinyOS	6.1%
RIOT	2.1%
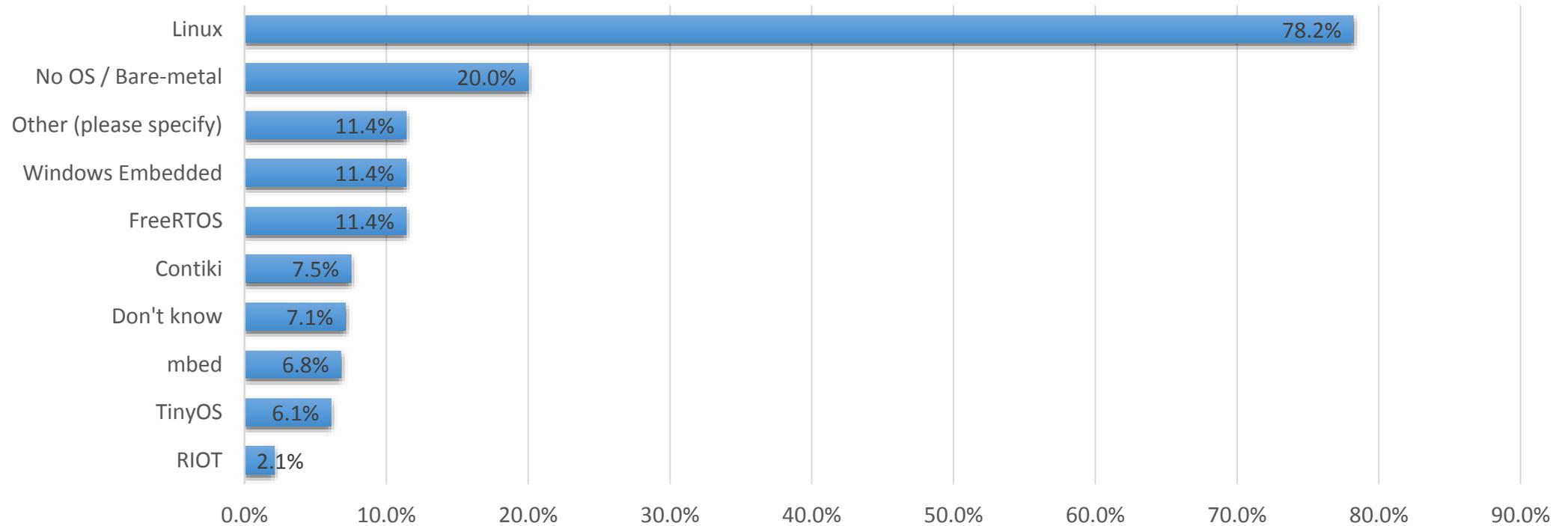
Accessible Hardware

HAVE YOU EVER USED ANY ACCESSIBLE HARDWARE PLATFORMS LIKE RASPBERRY PI, ARDUINO, BEAGLEBONE, ETC. ?
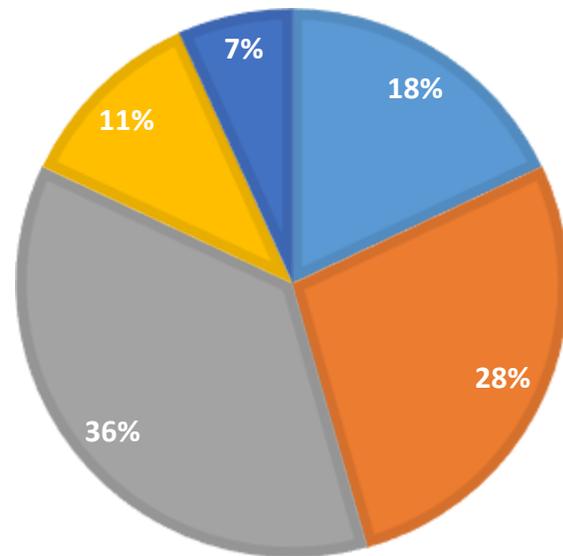
- Yes, my company deploys IoT solution using an accessible hardware platform.
- Yes, my company prototypes IoT solutions using an accessible hardware platform.
- Yes, I have experimented with accessible hardware in my spare time
- No, but I intent to experiment with accessible hardware in the next 6 months.
- Never used open hardware.

IoT Consortiums

How would you rank your organization's perceived importance of the
following IoT Consortiums to your IoT solutions?

	Very Important	Important	Neutral	Not Applicable	Never heard of them	Rating Average
AllSeen Alliance	9	37	69	15	100	3.70
Eclipse IoT	77	93	58	8	20	2.22
IEC	15	30	92	23	64	3.41
IEEE	46	61	105	18	10	2.52
IETF	34	61	79	19	43	2.90
Industrial Internet Consortium (IIC)	21	42	81	15	72	3.32
OASIS	27	50	91	18	56	3.11
Open Interconnect Consortium (OIC)	11	32	80	16	94	3.64
OMA	13	38	74	20	85	3.55
OneM2M	19	42	63	17	92	3.52
Thread	7	29	78	13	93	3.71

Partner Programs

Do you participate in any IoT partner program sponsored by a vendor? If so which ones? (ex. Work at Nest, Intel IoT Solutions Alliance, Apple Homekit)

Yes. Please specify the programs 8%

Don't know 15%

No 77%
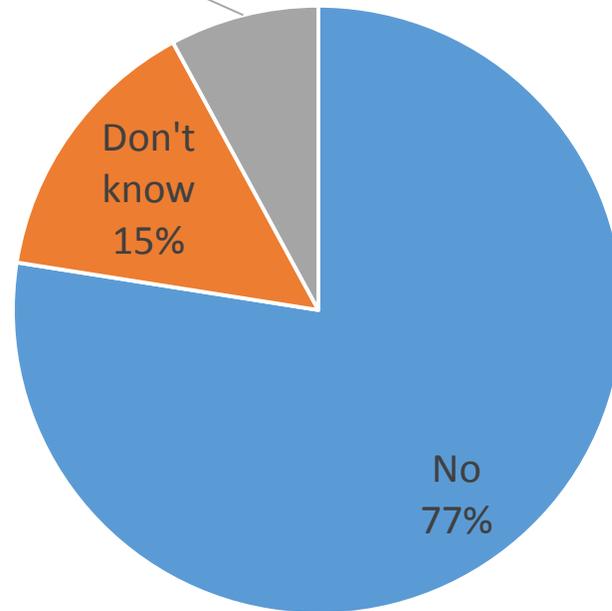
Top 5 IoT Corporate Leaders
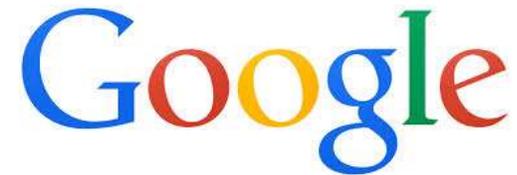
What company or companies do you see as being leaders in IoT?

Questions

Ian Skerrett
email: ian.Skerrett@eclipse.org
@ianskerrett
http://iot.eclipse.org/