

# Open Source Networking & LFN

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GM, Linux Foundation

 **THE LINUX** FOUNDATION

The Linux Foundation is creating the **greatest shared technology investment in history** by enabling open source collaboration across companies, developers, and users.

# Today the Linux Foundation is much more than Linux



## Security

We are helping global privacy and security through a program to encrypt the entire internet.



## Networking

We are creating ecosystems around networking to improve agility in the evolving software-defined datacenter.



## Cloud

We are creating a portability layer for the cloud, driving de facto standards and developing the orchestration layer for all clouds.



## Automotive

We are creating the platform for infotainment in the auto industry that can be expanded into instrument clusters and telematics systems.



## Blockchain

We are creating a permanent, secure distributed ledger that makes it easier to create cost-efficient, decentralized business networks.



## Web

We are providing the application development framework for next generation web, mobile, serverless, and IoT applications.



We are regularly adding projects; for the most up-to-date listing of all projects visit [tlfprojects.org](https://www.linuxfoundation.org/projects)

# What is LF's role in projects?

Governance and Membership	<ul style="list-style-type: none"><li>• Incorporation, Tax status, Bylaws, Member Agreements, Anti-trust, etc.</li><li>• Ongoing business development and membership recruitment</li></ul>
Development Process	<ul style="list-style-type: none"><li>• Technical Decision Making</li><li>• Project Life Cycle</li><li>• Release Process</li></ul>
Infrastructure	<ul style="list-style-type: none"><li>• Custom infrastructure using open source best practices</li><li>• Security and reliability</li></ul>
Ecosystem Development	<ul style="list-style-type: none"><li>• Marketing</li><li>• Events</li><li>• Training</li></ul>
IP Management	<ul style="list-style-type: none"><li>• Code Provenance</li><li>• Trademark management</li><li>• Legal defense and Collaboration</li></ul>

# 142 years old Networking Industry – learnings in last 5 years



The Power of Open & Harmonized Community drives innovation and value



Networking is shaping adjacent communities: Cloud, Edge, AI, IOT, Access



Journey continues with best of both worlds: clouds and telecom with VNFs to CNFs



## The Power of Open & Harmonized Community drives innovation and value

- › Open Collaboration + Open Community
- › Open Standards + Open Source

We call it “Harmonization” & Results have been Amazing!  
We are seeing the impact in a Trillion dollar industry  
Thank you!

# Networking is the fabric for Growth & Innovation Across Industries



Automotive

## Connected Cars

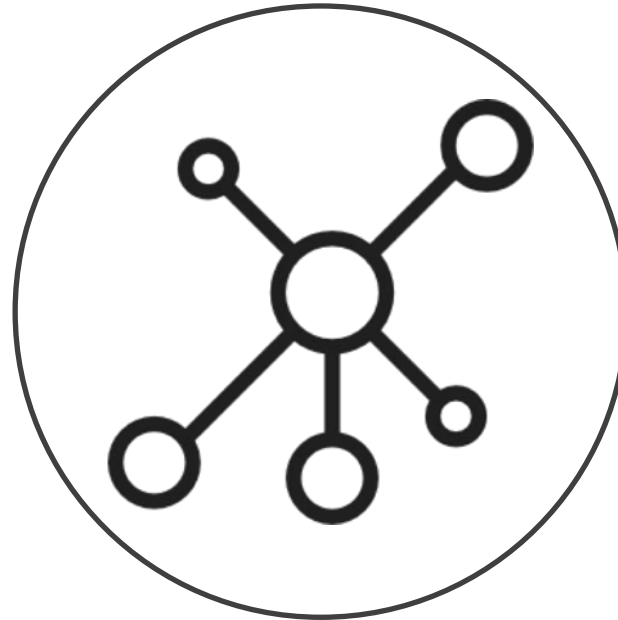
Connected cars market projected to reach USD \$219.21 billion by 2025\*



Retail

## Connected Stores

82% of smartphone user say they consult their phones for in-store purchases\*\*\*



## Networking

Carrier, Cloud, Enterprise



Energy

## Connected Homes

Global Smart Home Market to Exceed \$53.45 Billion by 2022\*\*



Agriculture

## Connected Cows

Global Connected Cow and Farm Market Set to Exceed \$10 Billion in 2021\*\*\*\*

# Linux Foundation Leads Modern Networking Innovation



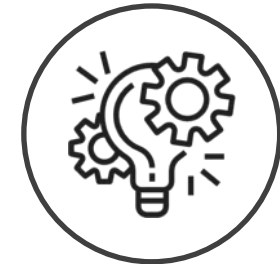
21

Open Source Networking Projects



10/10

Networking Vendors Active



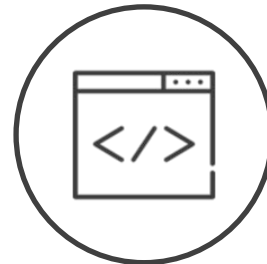
\$576 M

Shared Innovation



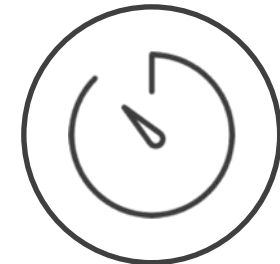
9/10

Most Important Projects



~70%

Global Subscribers Represented



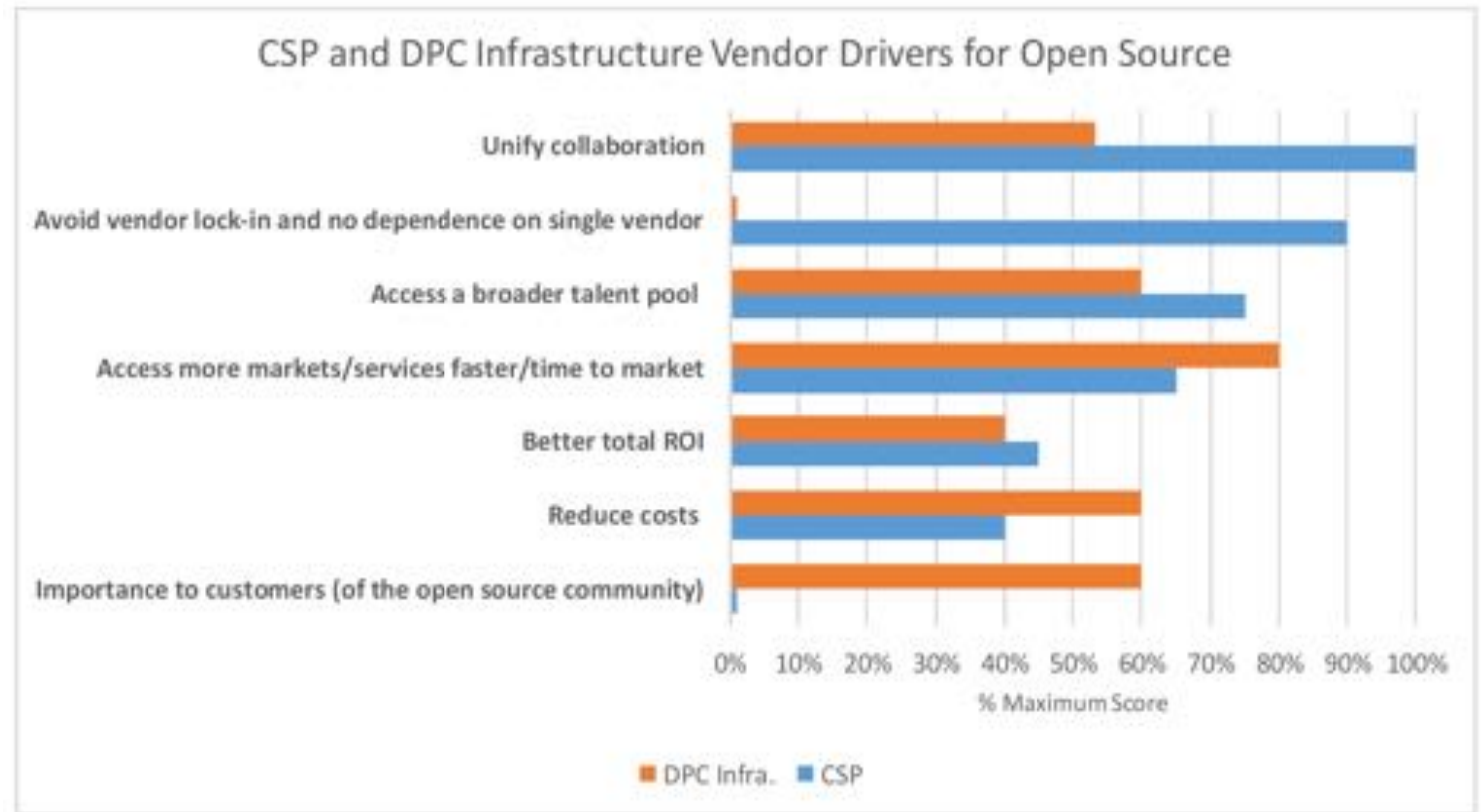
15 Minute

New Service Creation

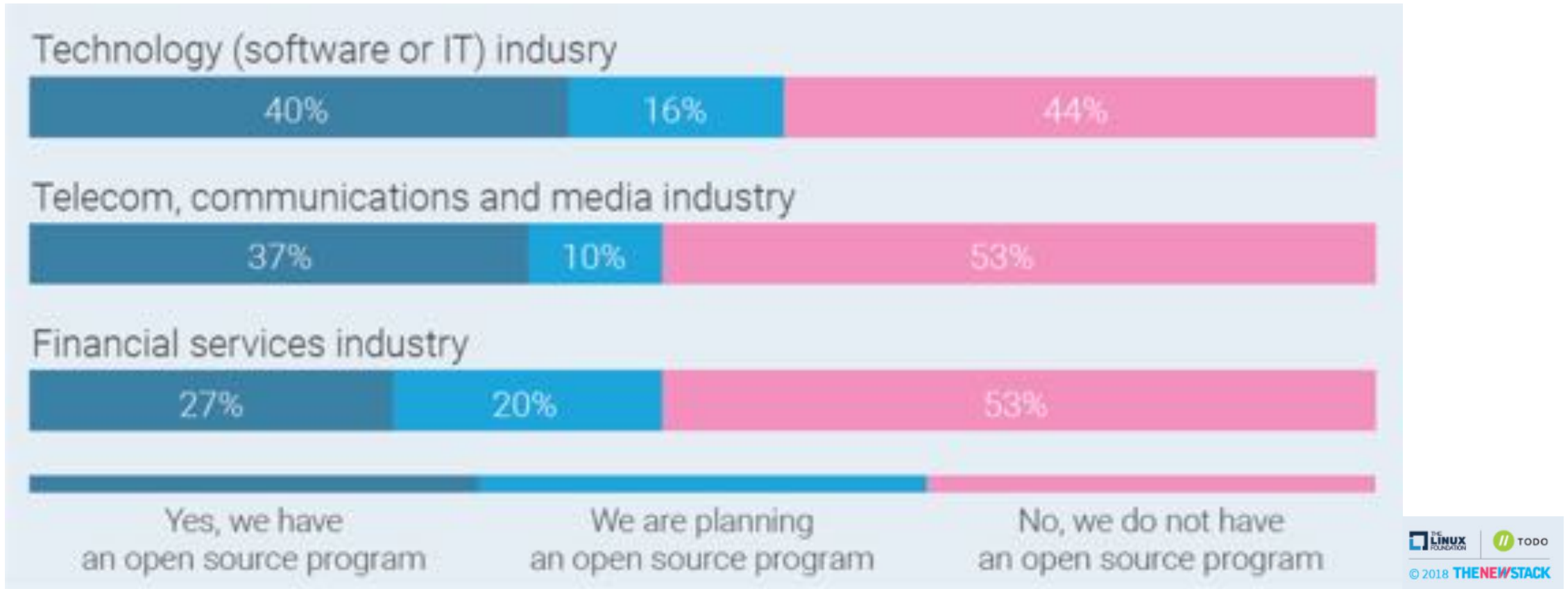


# Why Open Source Networking?

- › Choose each element of your networking stack, with assured interoperability
- › Improve efficiency & quality for development & implementation reduce risk & cost
- › Deliver exactly the network services you need, as you need them

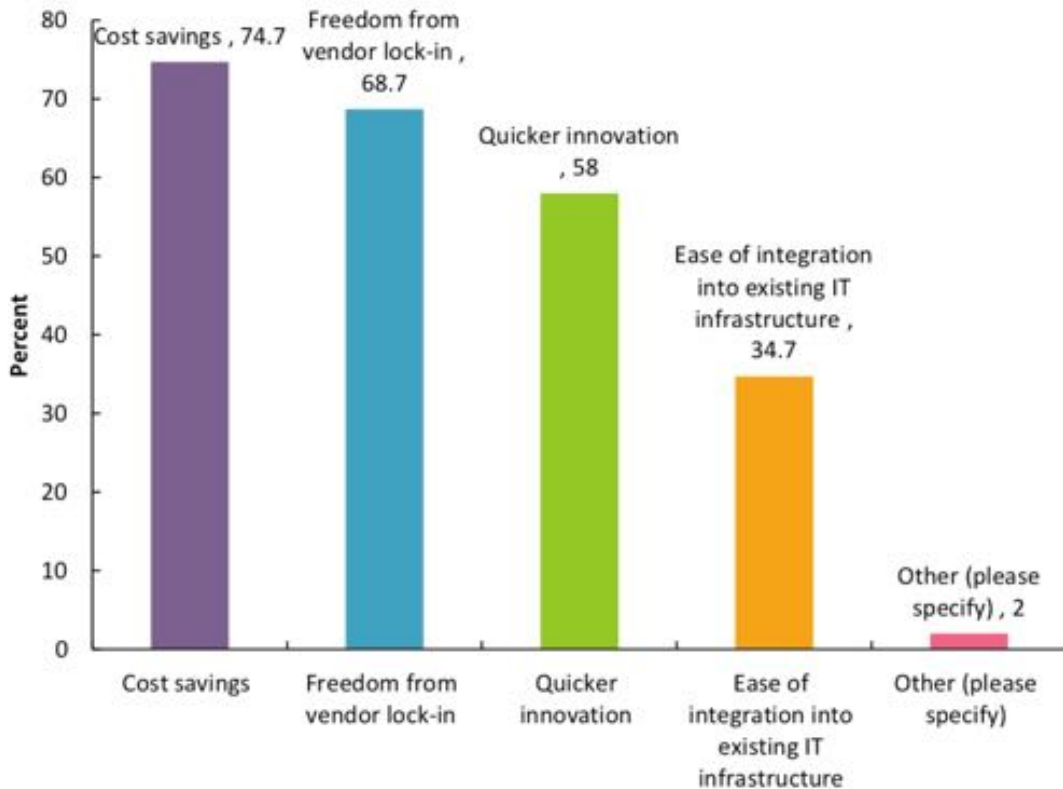


# Leading Surveys on Open Source & Networking

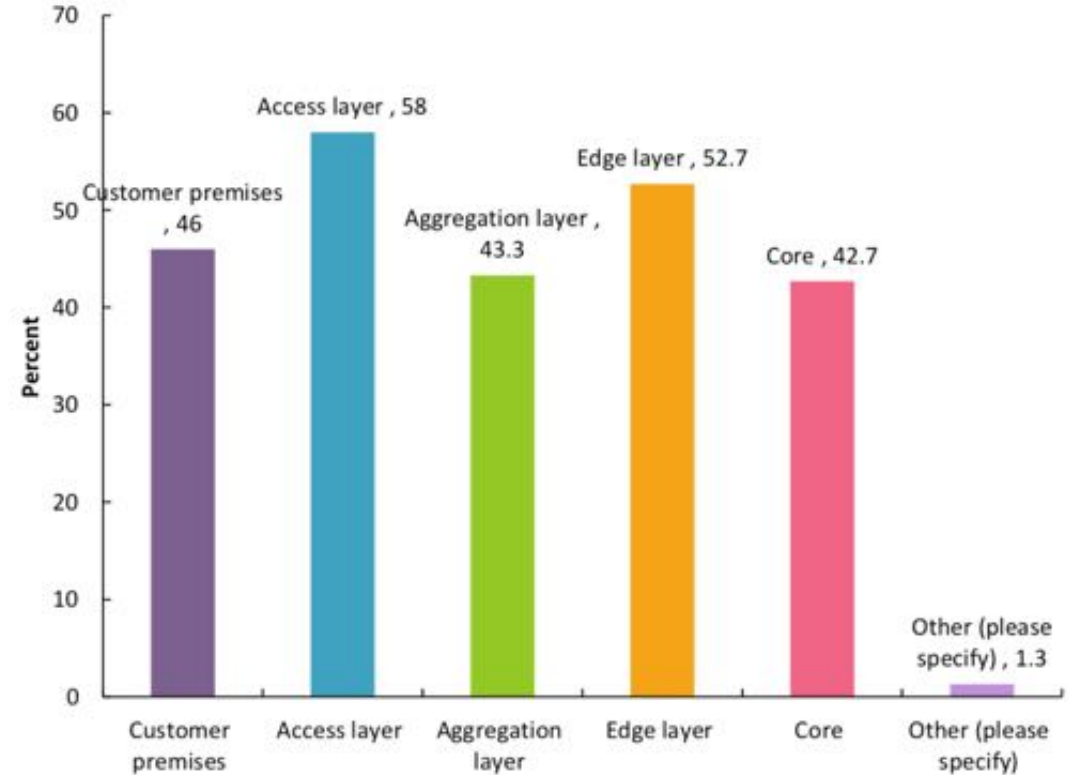


72% of companies rely on open source software across top verticals – technology, telecom and fintech

# Leading Surveys on Open Source & Networking



**Motivators of Open Networking**  
End User Driven Innovation



**All Layers of Open Network**  
Core to CPE, Edge & Access next

# LF Networking Vision: Automating Cloud, Network, & IOT Services

Services

**Cloud Services**

**Residential Services**

**Enterprise Services**

**IOT Services**

Software &  
Automation

**Cloud  
Automation**

**LF NETWORKING**

(ONAP, OPNFV, ODL, FD.io,  
SNAS, PNDA, Tungsten Fabric)

**IOT Automation**

Infrastructure

Enterprise  
Software Defined  
Data Centers  
(SDDC)

**Data  
Centers**

**Carrier  
Network**

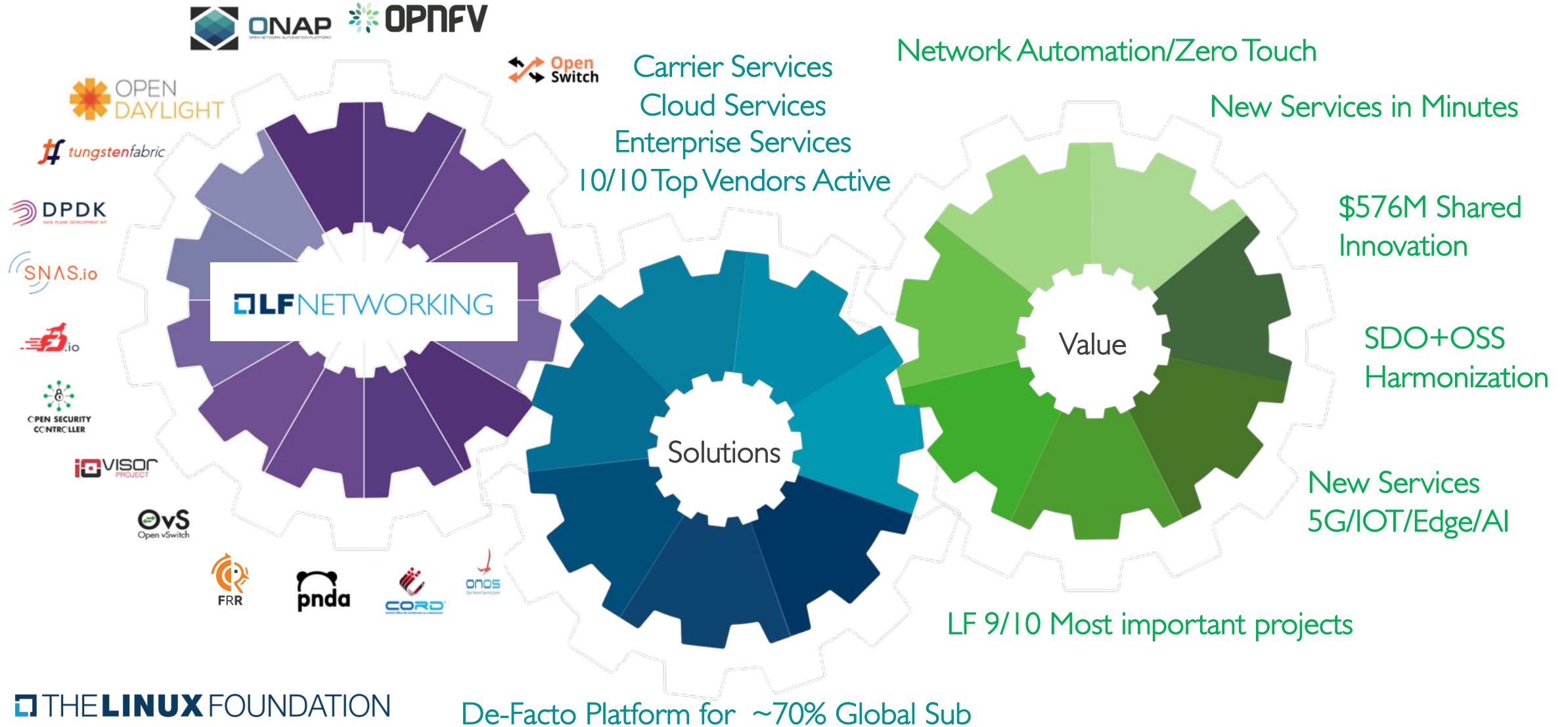
**Cloud  
Network**

Public/Hybrid  
Cloud Service Providers  
Cloud Hosting  
Private Cloud Providers  
Web Service Providers

Service Providers  
MSO/CableCo

# Sustainable Innovation: Open Source Networking

Creating *De-Facto* Platforms to Enable Next Generation Solutions in Telecom, Enterprise & Cloud

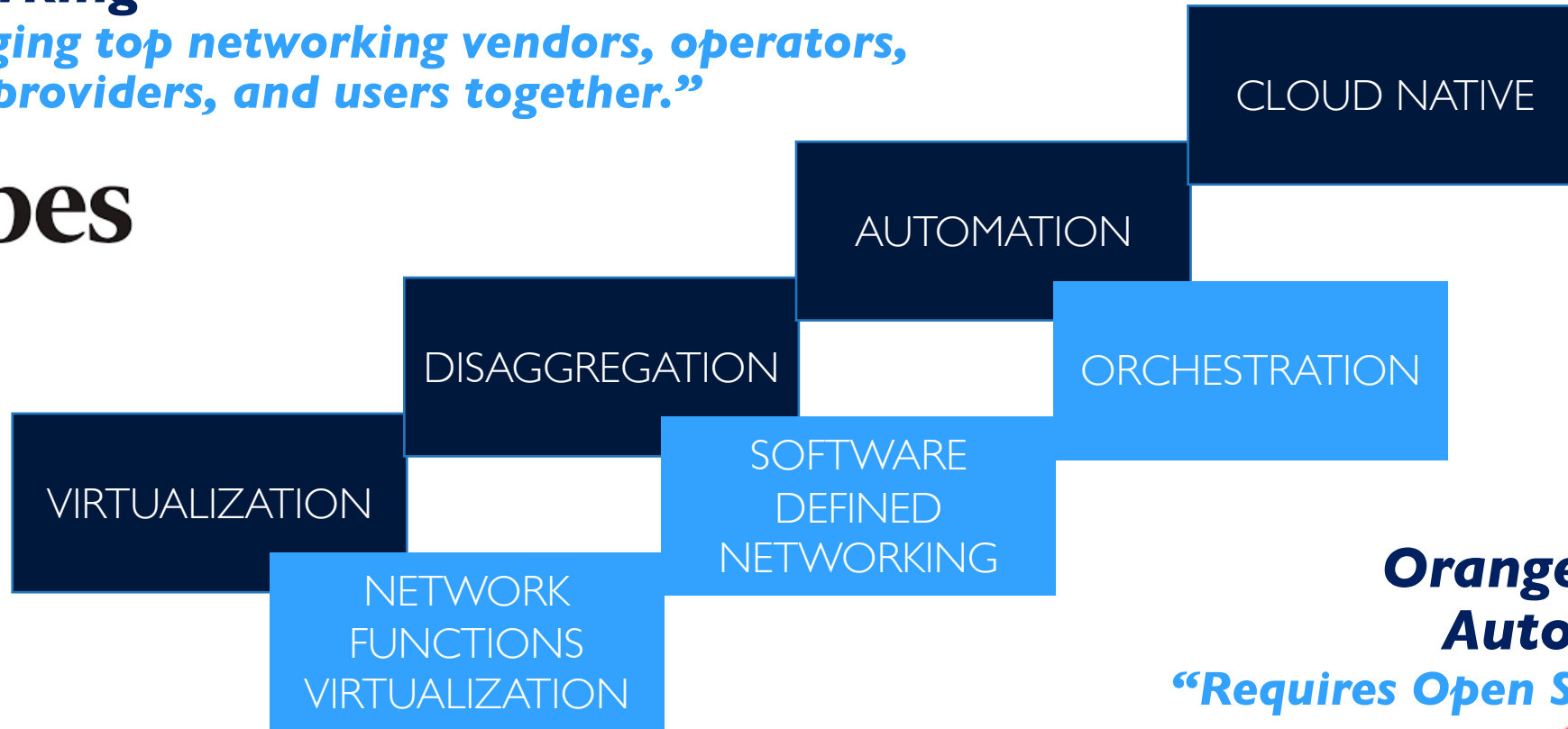


Leading media and analysts support our leadership

## **The LF is Changing the Fabric of Networking**

*“...bringing top networking vendors, operators, service providers, and users together.”*

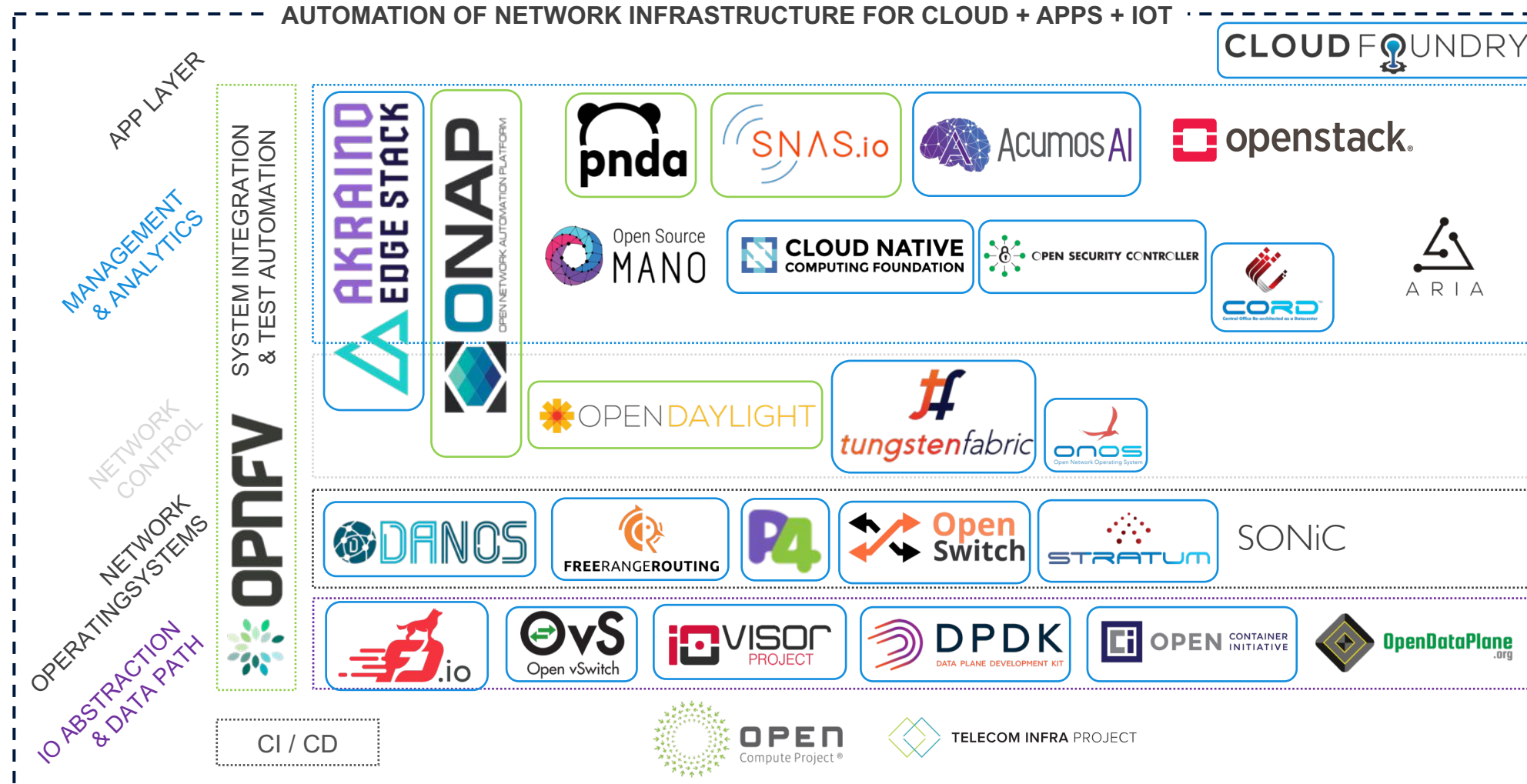
**Forbes**



**Orange plans 5G + Automation RFP**  
*“Requires Open Source/ONAP”*



# Open Source Networking / SDO Landscape



**STANDARDS**

**LF HOSTED**

**LFN**

\* ALL OTHER PROJECTS HOSTED OUTSIDE LF

# Open Source Data Plane and NOS Projects

Rapid feature iteration independent of hardware lifecycle

## What

Innovative features that may not exist in commercial offerings.

## Why

NFV options enable near-instant delivery of new network services.

## How Consume

May be OEM'd in commercial offerings, or implemented in white box environments



SONiC





# Open Source Control Plane Projects

The backbone of modern network management

## What

Execute the detailed network requirements of larger orchestration and automation frameworks (ONAP, OpenStack, CORD).

## Why

Assume multi-vendor, mixed P/V environments.

## How Consume

Range of open source and/or packaged distribution options.



# Management Plane, Monitoring and Analytics Projects

Translate business layer intent to network - ensure healthy operations

## What

Capture large amounts of real-time data, cut down weeks/months of big data stack integration effort for network analytics to *just 1 hour*.

## Why

Cloud & carrier focus on network automation = **doubling** of investment in orchestration layer in the next 5 years.

## How Consume

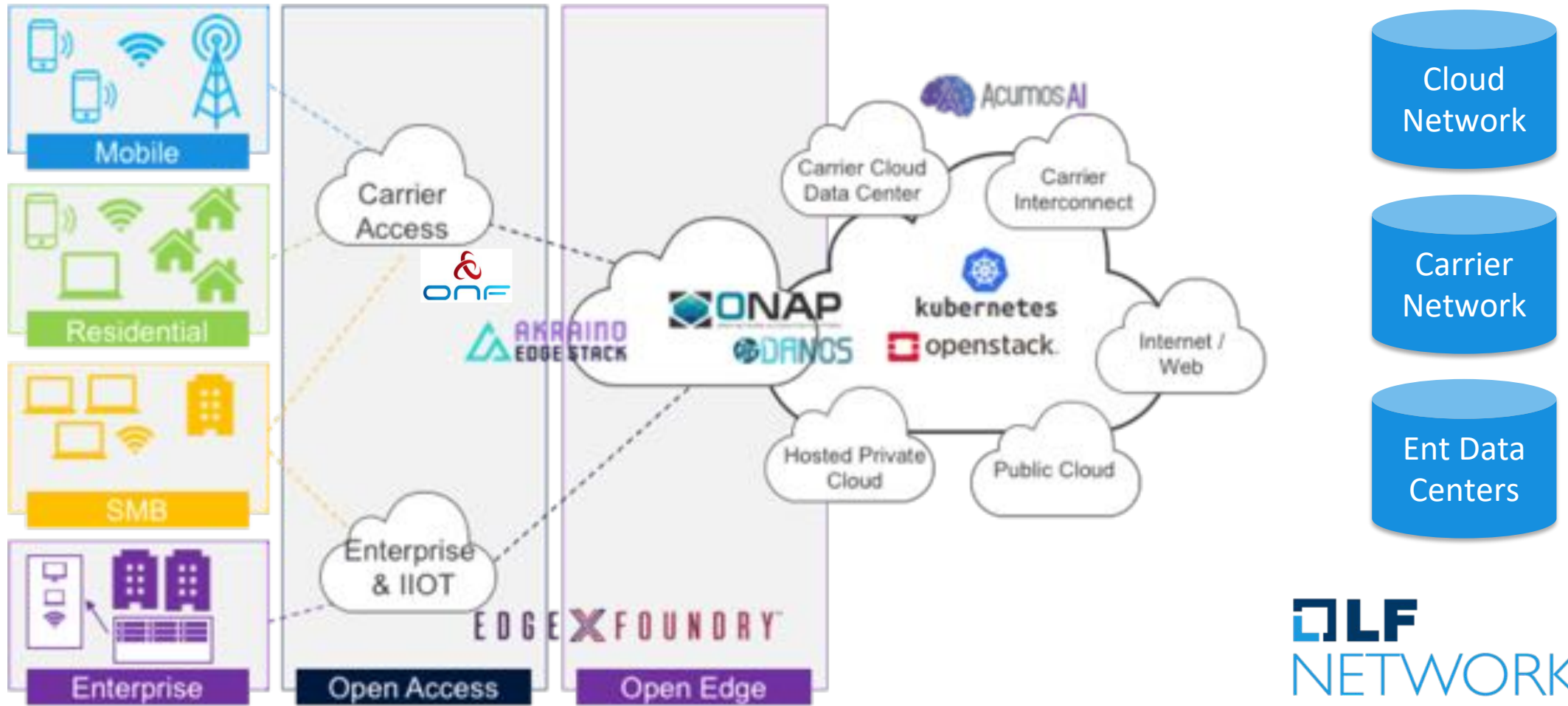
Multi-team design, implementation efforts

Open source platforms + custom development + integration services.



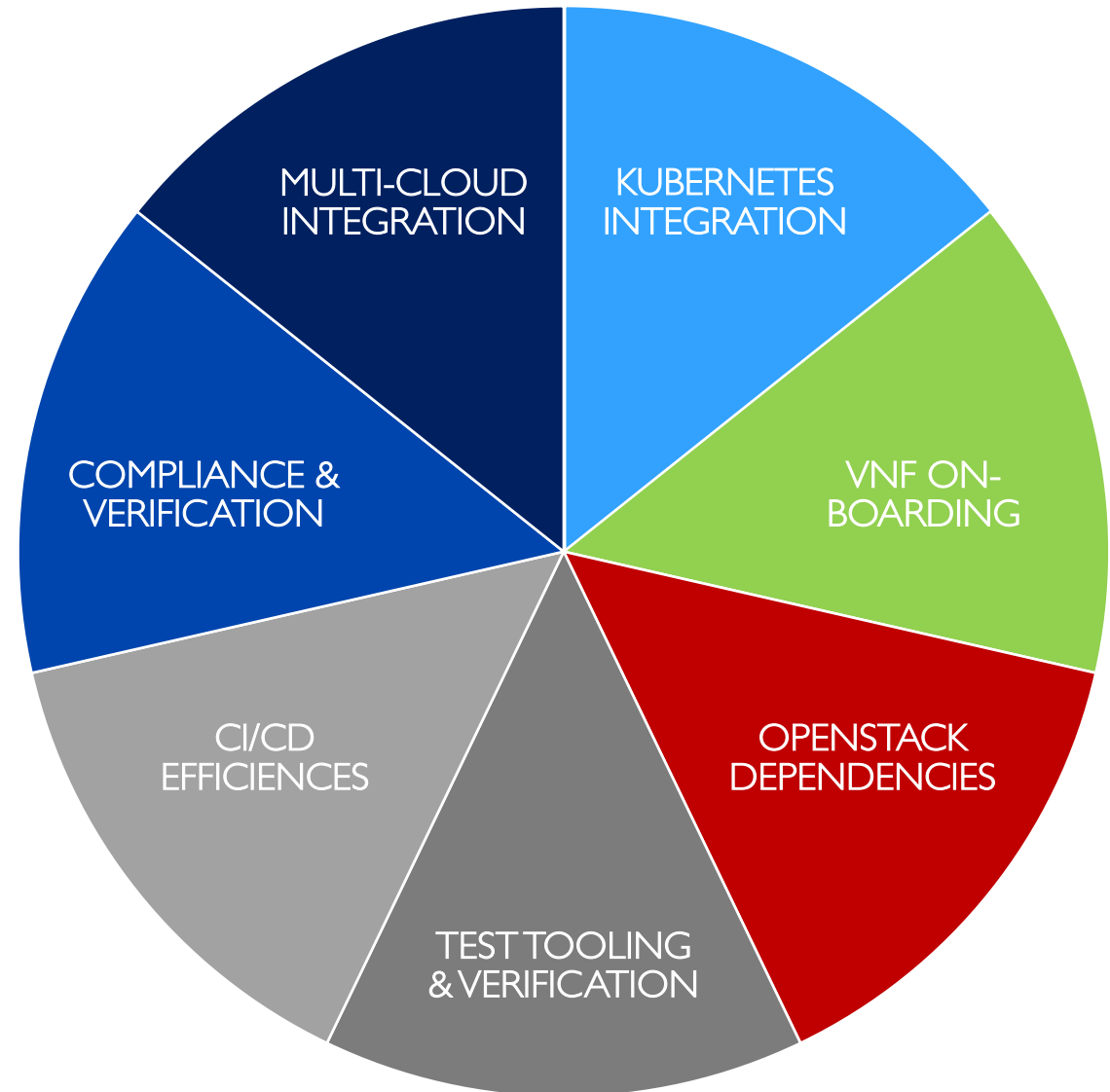
# 2

## Networking is shaping adjacent communities Cloud, Edge, AI, IOT, Access

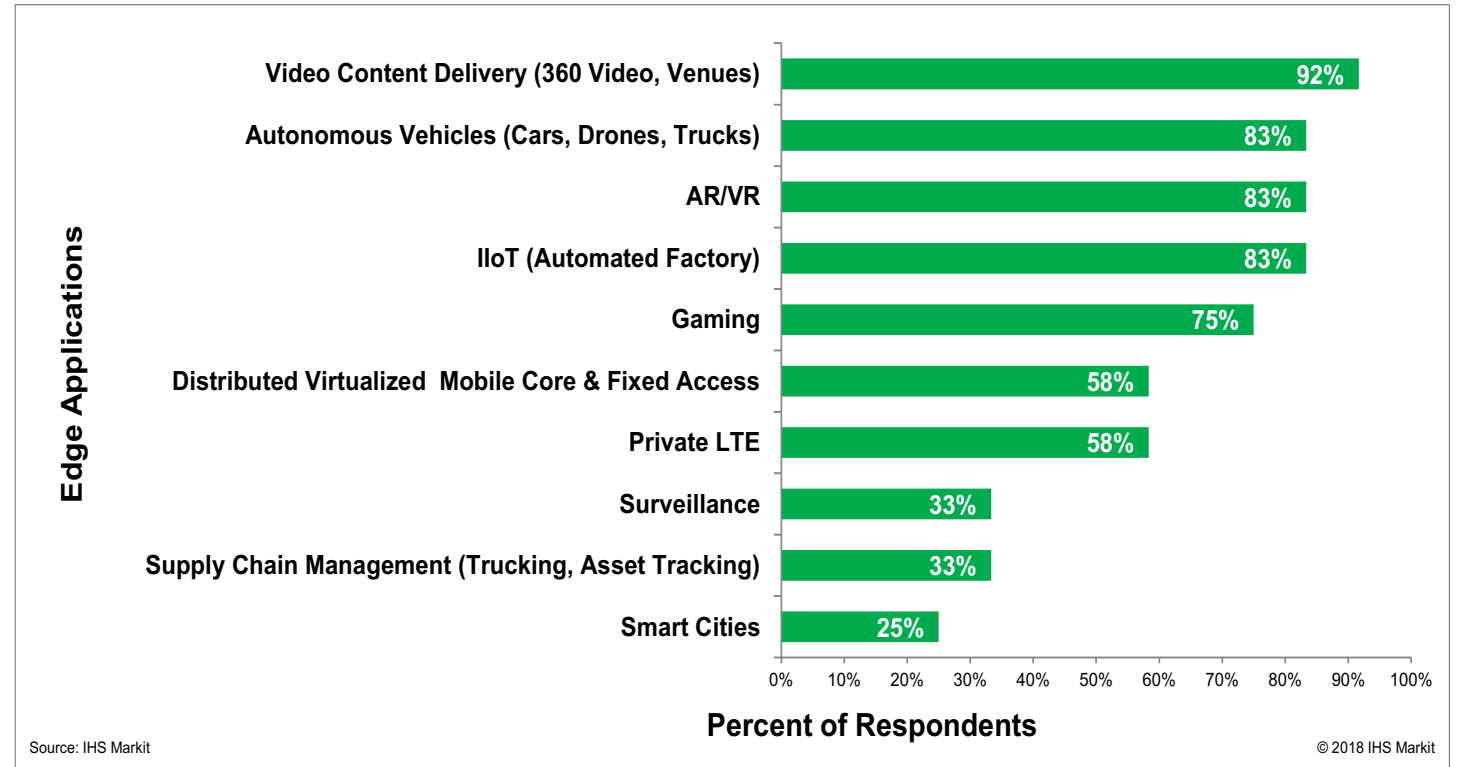


# LF Networking X-Project Collaboration Areas

Projects crossing boundaries to interoperate and create more value



# Edge is Hot and IHS survey confirms the need



*Non-traditional video & connected things are the killer apps for Edge*

# 3

## Journey continues with best of both worlds Clouds and Telecom with VNFs to CNFs

### **The Linux Foundation Brings Network Automation and Cloud Native Communities Together as Network Functions evolve to CNFs**

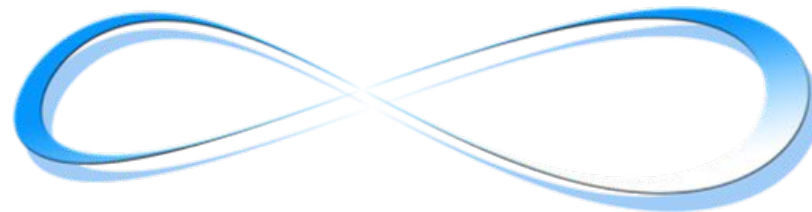
*Leading open source communities spearhead migration from Virtual Network Functions to Cloud-native Network Functions*

**AMSTERDAM - Open Networking Summit Europe - Sept. 25, 2018** - The Linux Foundation, the nonprofit organization enabling mass innovation through open source, today announced further collaboration between telecom and cloud industry leaders enabled by the Cloud Native Computing Foundation (CNCF) and LF Networking (LFN), fueling migrations of Virtual Network Function (VNFs) to Cloud-native Network Functions (CNFs).

# Commercialization of Open Source

Engagement across the ecosystem and commercialization of products and services are required to create and sustain a vibrant ecosystem

- › **Vendors:** Invest in the future by leveraging open source for non-differentiated R&D
- › **Integrators:** Provide end-to-end integration and deployment solutions
- › **Operators:** Consume, collaborate and help shape the supply chain
- › **Developers:** Join projects, start projects, fail fast, lead, innovate, transform



# Training News

## 3 new FREE courses live in 2018:

- › Intro to Open Source Networking, Intro to NFV, Intro to ONAP
- › Over 10,000 registrations to date

## 2 new paid eLearning courses live in 2018:

- › ONAP Fundamentals & OPNFV Fundamentals
- › Hundreds of enrollments each

## 2 courses in active development

- › DevOps for Networking Engineers, Software Defined Networking



**Don't get left behind: SDN, programmable networks change how net...**

The rise of programmable networks and software-defined networking has changed the role of the network engineer, and accepting those changes i...

[networkworld.com](http://networkworld.com)

**Introduction to Open Source  
Networking Technologies (LFS165) –  
2,114 total enrollments PRIOR to  
Aug 9 launch!**



# It Pays to Give Back



It is a competitive advantage for companies to allow developers to contribute.

*"New research by Assistant Professor Frank Nagle, a member of the Strategy Unit at Harvard Business School, shows that paying employees to contribute to such software boosts the company's productivity from using the software by as much as 100 percent, when compared with free-riding competitors."*

<https://hbswk.hbs.edu/item/the-hidden-benefit-of-giving-back-to-open-source-software>

# There are lots of ways to get involved!



Join TSC calls and subscribe to project mailing lists



Attend Hackfests, Plugfests and developer events



Contribute to release documentation



Provide your deployment feedback through the EUAG



Search for Open Bugs, or Report a New One, in the project JIRAs



Start or join a local OSN User Group [Meetup](#)



Define compliance and verification test cases



Review and submit code patches

# Learn. Plan. Engage.

- › Join the Linux Foundation and LFN
- › Invest in your personnel
- › Participate in the technical communities
- › Take a training course
- › Follow best practices and develop your own
- › Empower yourself with knowledge
- › Begin Anywhere
- › [LFN-info@linuxfoundation.org](mailto:LFN-info@linuxfoundation.org)

