LF Networking
& Nephio Strategy Update

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LINUX
FOUNDATION

LF NETWORKING

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Agenda

- LFN – an overview and progress update
- Governing Board Strategy Updates (Nephio & AI)
- Marketing and Major Events
- 2024 Planning (SPC) & Budgets

Welcome to LF Networking

The largest set of open source networking projects in the world - formed by a broad industry coalition - with the goal of fostering a commercial-ready networking ecosystem.

Our Mission

Drive an open source ecosystem that revolutionizes the movement or communication of data on a network - including its data plane, control plane, analytic, orchestration, and automation technologies - for enterprise, cloud, and carrier network constituents.

The World of Open Source Software Has Shifted

A collage of **independent projects** is no longer the driving commercial force.

Today, leading organizations view open source software as a **disruptive ecosystem**.
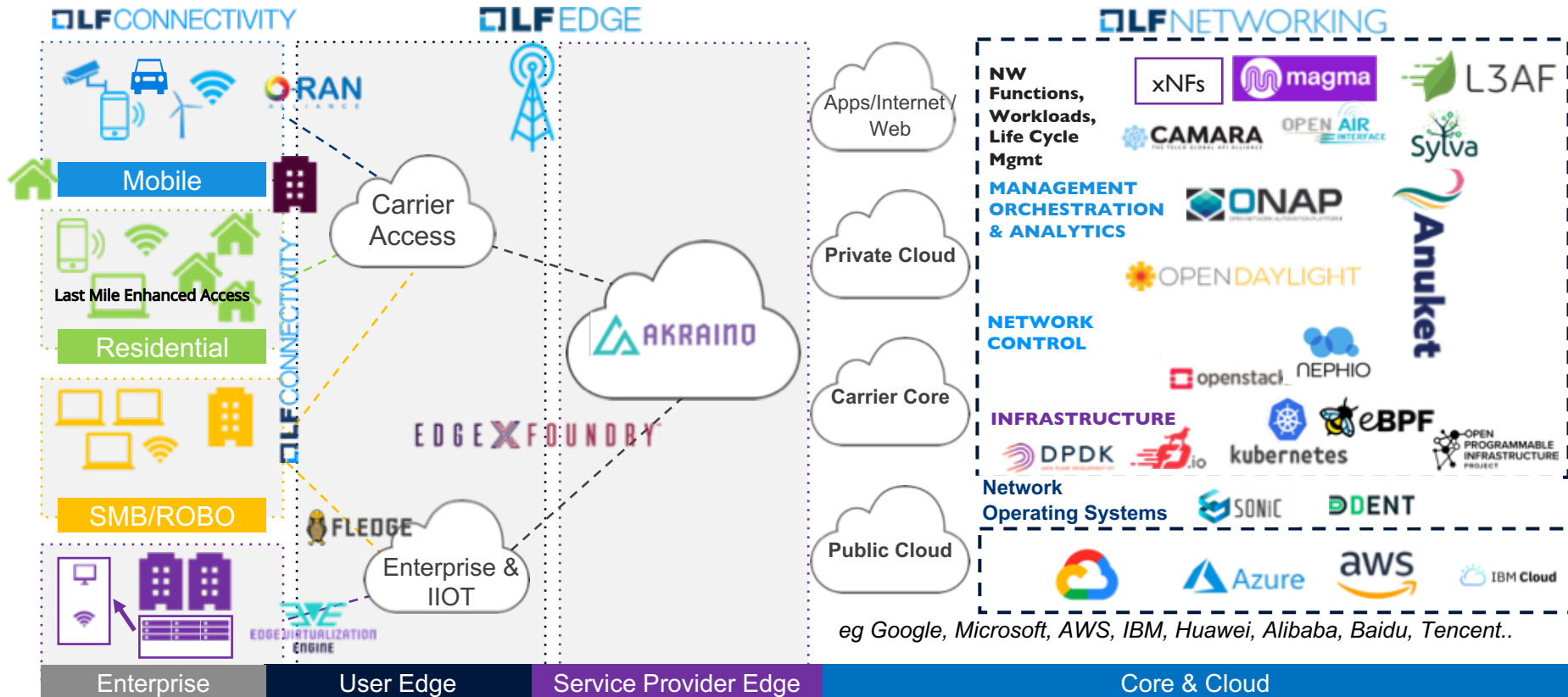
Cloud

Telecom

Enterprise

Open Source Networking, Edge and Access

LFCONNECTIVITY

LFEDGE

LFNETWORKING

Mobile

Last Mile Enhanced Access

Residential

SMB/ROBO

Enterprise

Carrier Access

EDGEX FOUNDRY

FLEDGE

Enterprise & IIOT

EDGE VIRTUALIZATION ENGINE

AKRAINO

Apps/Internet / Web

Private Cloud

Carrier Core

Public Cloud

NW Functions, Workloads, Life Cycle Mgmt
xNFs · magma · L3AF · CAMARA · OPEN AIR INTERFACE · Sylva

MANAGEMENT ORCHESTRATION & ANALYTICS
ONAP · Anuket · OPENDAYLIGHT

NETWORK CONTROL
openstack · NEPHIO

INFRASTRUCTURE
DPDK · .io · kubernetes · eBPF · OPEN PROGRAMMABLE INFRASTRUCTURE PROJECT

Network Operating Systems
SONiC · DENT

Google Cloud · Azure · aws · IBM Cloud

eg Google, Microsoft, AWS, IBM, Huawei, Alibaba, Baidu, Tencent..

Enterprise | User Edge | Service Provider Edge | Core & Cloud

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* Sample projects only

Open Source foundations + Standards + Alliances

Open Source Software Foundations

- ✓ Linux Foundation & its sub-foundations (LFN, LF Edge, CNCF, ORAN, LF Energy...)
- ✓ Open Infrastructure Foundation (Openstack, OAI)
- ✓ Eclipse Foundation (Edge)

- ● Others (Single Vendor/Open)

Standards/Specs/Ref Arch/API

- ✓ GSMA (LFN, OPG, CAMARA)
- ✓ ETSI (Edge, Core)
- ✓ 3GPP
- ✓ ORAN Alliance (RAN)
- ✓ NGMN (Disagg, Green, 6G)
- ✓ TMForum (API)
- ✓ MEF (API)
- ✓ TIP (Open hardware)
- ✓ IETF (Lower Layers)
- ✓ OCP (Co-Design hardware-software)

Open Alliances & Consortiums

- ✓ AECC
- ✓ IIC
- ✓ Digital Twin Consortium
- ✓ IOTA Foundation
- ✓ Open-IX
- ✓ Several Vertical specific

Collaboration has increased significantly across foundations, SDOs, Alliances and Consortiums

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LF Networking: Executive Summary

LFN is the largest open source networking community with 80% of Top 10 Telcos on the Board (by CAPEX spent) along with Top 5 Vendors - 1st umbrella fund created by LF

LFN's mission is to collaborate on networking technologies across Service Providers, Enterprises and Cloud Ecosystem.

Continued Momentum with 5G, Telecom + Cloud Networking and Enterprise Networking alignment

Strategy Updates in Q
› LFN Survey for AI completed for Board members. Key focus areas include Domain specific Models, Data and use cases in Networking. This is driving 2024+ strategy for LFN
› Nephio is now part of LFN (Process in place to accept it as a Stage 3 project)

Market & Business Environment
› Just announced: ONE summit 2024 returns to Silicon Valley, roots April 29-May1
› OSS Networking & AI: strategy & approach in progress
› Continued & growing integration with adjacent LF projects across the stack, such as Nephio, SONiC, O-RAN-SC, Magma, DPDK, CAMARA
› Thought Leadership: ETSI NFV at 10 years
› PR: MOU with IOWN to collaborate on future smart connected world

LFN Operations & Dev Support
› LFN Developer & Testing Forum (June 6-8, Virtual)
› 227 registrations, videos & slides available online
› ONE Summit Regional Days:
    › Spain, co-located with OSS EU, Sept. 18
    › China, co-located with OSS+ KubeCon & CloudNative Con China, Sept. 26
    › India (Nov 30)
› LFN Developer & Testing Forum (in person): Budapest, Hungary, Nov. 13-16

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Nephio Induction & Synergy

Approved by LF Networking Governing Board, Announced in Q3 2023

For LF Networking Members

Nephio Synergy with LF Networking Projects

1. Telecom Networking Automation – Nephio + LFN (ODL, ONAP)
2. Enterprise Automation – Nephio + LFN (L3AF)
3. End to End Use case (Enterprise + Cloud Native) – 5G Super Blueprint

Nephio and LFN Synergy
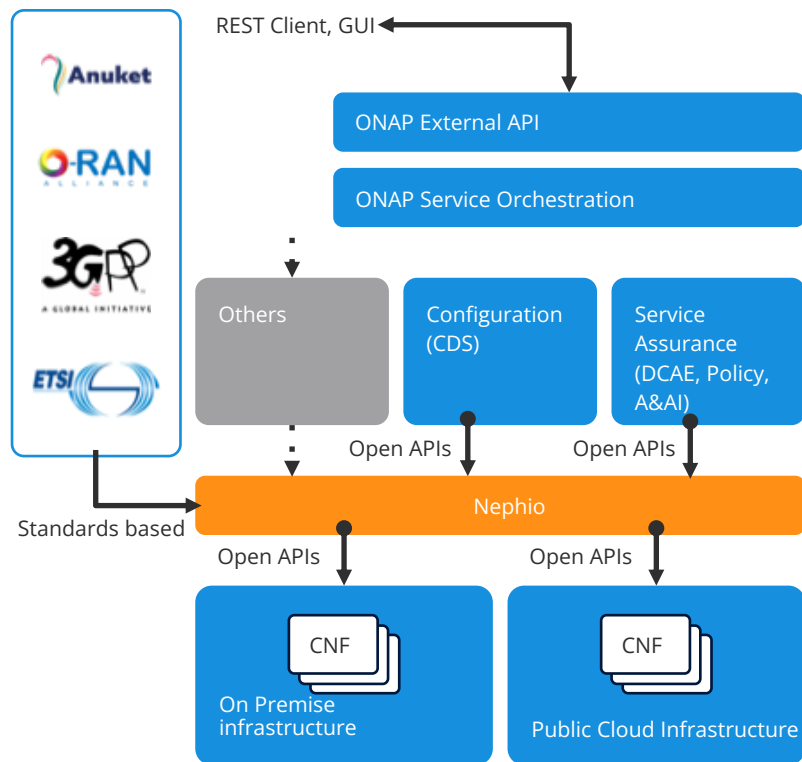
- ONAP end-to-end service orchestration layer can interface with Nephio using open APIs for domain automation for a) cloud infrastructure b) Network function automation using Kubernetes Resource model (KRM) /Configuration-as-Data based automation.

- Kubernetes is part of CNCF and fundamental to Nephio. Nephio further expands K8s CRDs/Operators for telecom automation use cases.

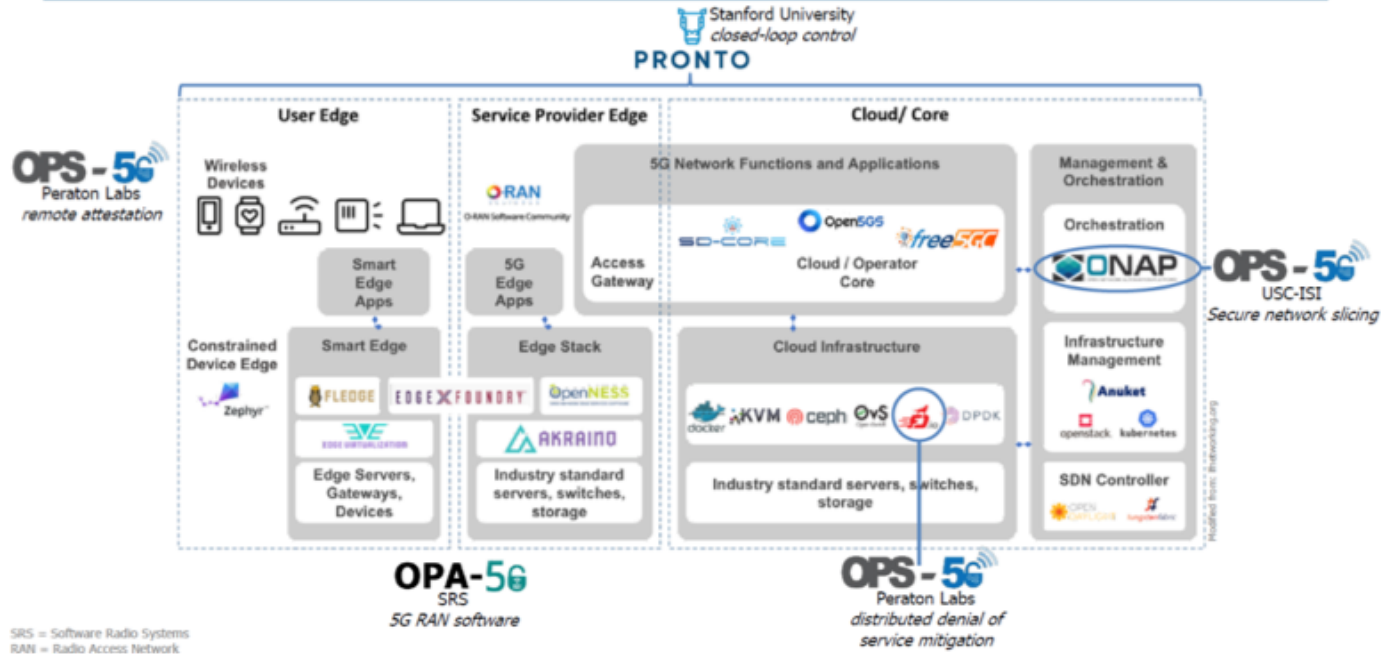- Nephio CRDs are in conformance with O-RAN and 3GPP specifications.

Network Service that Includes L3AF - EBPF
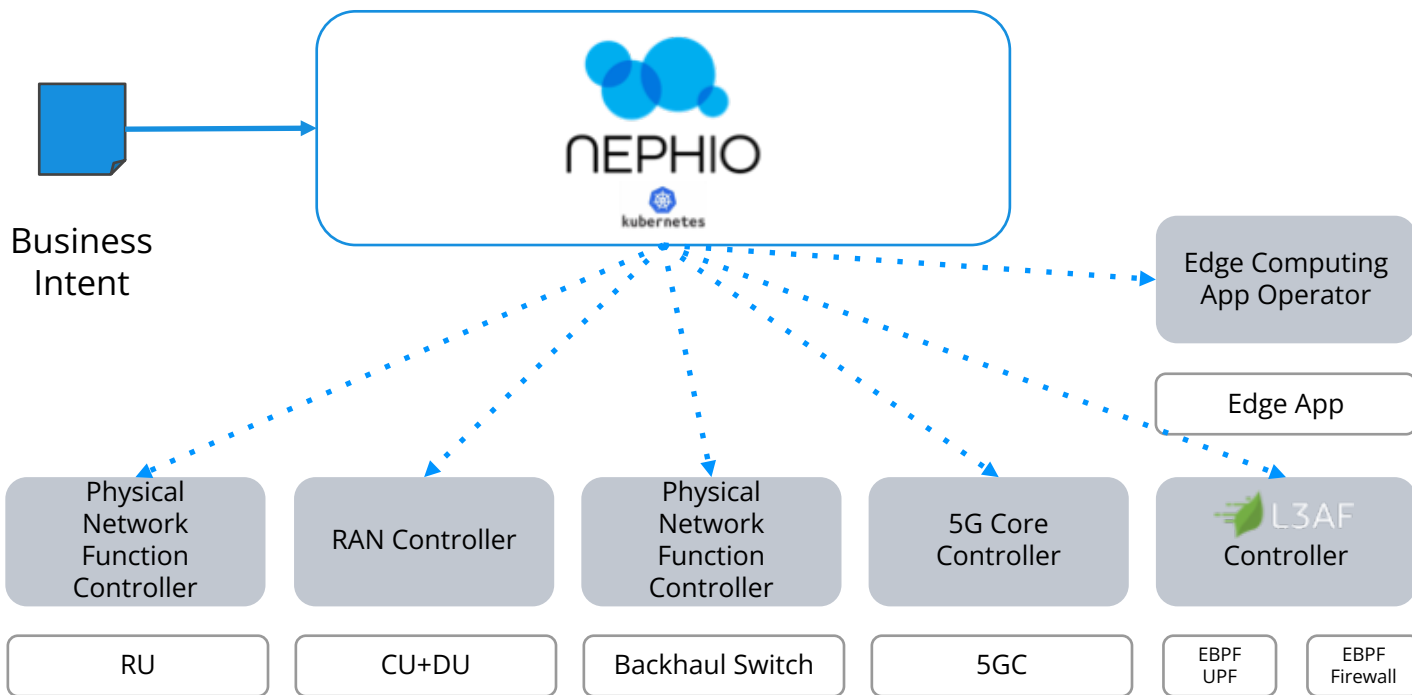
Example Private 5G Deployment e.g. LFN 5G Super Blueprint
(hypothetically, assume Firewall & UPF use EBPF)

Multi-Collaboration in an Open World Takes Center Stage With 5G Super Blueprints

Learn more: https://www.lfnetworking.org/5g-super-blueprint/

Read the FAQ: https://wiki.lfnetworking.org/display/LN/5G+Super+Blueprint+FAQ

AI in Open Networking/LFN

LF AI+Data and LF Networking synergies

LF Connectivity	LF Edge	Service Provider Vertical (telecom+cloud) & Enterprise Networking	Other Verticals (eg Finance, Energy, automotive..)
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- Vertical Specific Use cases & applications, data sharing governance (CDLA based), OSS/BSS/NMS integration with AI systems and Infrastructure
- End to end solution testing and interop

□LF AI & DATA
CLOUD NATIVE COMPUTING FOUNDATION

- LF AI+Data focuses on **core Enabling Technologies** in relation to ML, Models and Data
- CNCF is a horizontal layer for all Cloud Native software specifically K8s irrespective of vertical integration

1. OpenSSF is also another horizontal sub-foundation that helps with security across all umbrellas.

2. LF AI+Data focuses on any **Horizontal (cross domain, cross vertical AI and Data open source software)**

3. LF Connectivity and AI focuses on Access (RAN, Broadband, Satellite etc) alternative and enhanced access layer

4. LF Edge and AI includes Edge and IOT specific use cases and solutions specific to Edge Verticals like Manufacturing, Automotive, Industrials etc…

Four Key Areas in AI for Networking

1- Applications/AI Use Cases in Networking

The new functionality that is made available using AI

2a. AI Models (Domain Specific)

The AI capabilities, specific to Networking and Domain

2b. AI Models (Generic)

The AI capabilities, such as prediction, content generation, anomaly detection, etc.

3- Data and AI infrastructure (computing elements) (Sharing, Governance, Processing)

How data is collected and stored. The resources used for processing, running and training the models

4- Network Infrastructure (Open Source Projects + Vendor solutions) + Domain Data sets

The network itself and the data it provides and acts on the learnings from the above layers

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For LF Networking Members

Establishment of an LFN AI Taskforce

- SPC proposes the creation of a group of experts from the community to provide guidance to the GB, TAC and individual projects
- Not directly reporting to any committee but as a taskforce of the TAC
- Focus on specific questions defined by the above bodies. Some potential questions to be addressed (Based on Survey Results):
  - Identify "low hanging fruits" that can be achieved in reasonable time
  - Determine what use cases and applications should be prioritized
  - Identify the necessary types of data required to implement the use cases
- Method of operation
  - Mailing list, Periodic meetings, Confluence, Shared documents
  - Lightweight and flat administrative structure
  - Deliverables in milestones/sprints focused around a specific question at hand

Call for Participation - AI Task force

- KICKOFF MEETING: October 4 at 07:00 PT / 14:00 UTC ([Registration link](#))

- Need the GB's help to identify AI + Networking experts in your organization to participate in the task force

- Some minimal commitment of time and effort will be expected

- Why participate?
  - Be part of the future of AI for networking
  - Demonstrate your company's thought leadership
  - Influence the direction of technology
  - Exchange ideas with experts from other organizations
  - Open ideation not limited by constraints of your own organization

- Additional details in Sep. 18th email to the GB, SPC & TAC https://lists.lfnetworking.org/g/lfn-board/message/1257

Marketing & Events

ONE Summit Regional Day India, Bangalore

Nov. 30, 2023

- Hosted by Infosys (first event hosted by a Member)
- Theme: "AI Powered Networks"
- Venue: Infosys Electronics City in Bangalore, india
- Capacity 150 + overflow (TBC)
- LF Networking represented by Arpit; keynote speaker
- Agenda is TBD (tentative schedule next slide)
- Registration pending info from Infosys

Call to Action: Please reach out to LF Marketing (Jill Lovato) for speaking and participation from your local R&D teams in India.

ONE Summit Regional Day Bangalore Tentative Agenda

	Session Details	Duration	Time Slots	Anchor
1	Welcome & Intro	30 min	9:00	Priya
2	Keynote 1: Open-Source Networking & Edge Vision (Projects summary, AI survey and plans further including 6G, NTN)	30 min	9:30	LFN (Arpit)
3	Keynote 2: Infosys (AI first Enterprise, Gen AI for Open-Source Contributions, building foundation models)	30 min	10:00	Infosys (Rafee)
4	Tea Break	15 min	10:30	
5	LFN Projects (20 min per session), sample list (5 to 6 topics) •Nephio •AI for Closed Loop Control – ONAP •LF AI & Data (Data & AI, Gen AI Commons) •LF Edge (enterprise speakers) | LFN (L3AF, Walmart) •5G SBP for AI specific projects •Anuket (infra) -> Infra and Data for AI •Security	2 hrs 45 min	10:45 – 12:40 1:40 – 2:00 PM	LFN project leaders

	Session Details	Duration	Time Slots	Anchor
7	Open-Source Hardware Networking & Edge | Chip Design, Board Design	30 min	2 – 2:30 PM	
8	Panel Discussion: Network Ecosystem	45 min	2:30 – 3:15 PM	OEM, TSPs, SIs
9	Tea Break	15 min	3:15 – 3:30 PM	
10	Panel Discussion: Open-Source adoption & drives in India | Skills Development	45 min	3:30 – 4.15 PM	DoT / CDOT, TSDSI, TSPs, Nasscom
11	Lightning Talks / Demos – (AI powered TCA) , 10 min per session •AI powered Telco Cloud Network Automation •Edge Orchestration for Autonomous stores •Private 5G orchestration •Multi Cloud 5G Orchestration	1 hr	4 .15– 5 PM	Infosys + Recruited speakers
12	Wrap & Vote of Thanks	30 min	5 – 5:30 PM	

ONE Summit 2024

Creating the next decade of open networking and edge innovation

April 29 - May 1 * San Jose, CA

Hosted By **THE LINUX FOUNDATION** | **LF NETWORKING** | **LF EDGE**

#onesummit   @twitter

Content: Breakout Tracks - CFP LIVE!

Track Name	Track Description	Keywords
The Future of Open Innovation	Come shape what open networking and edge look like in the coming decades. This track will answer that question with presentations on non-traditional and non-terrestrial networks, Industry 4.0 & 5.0, sustainability and green energy innovations. How should end users and operators approach our future going forward?	• IIOT / Industry 5.0 • 6G • Non-Terrestrial Networks (NTN)
AI Implementation Across Telecom, Cloud and Enterprise & Edge	Discuss your successes and challenges in deploying AI with peers from around the world. Whether you're taking your first steps in building "AI for Network" or "Network for AI," or whether you have implemented successfully, this track will be a platform for to explore what our industry's focus should be.	• Generative AI / LLM • Data pre-processing • Public Data Sets • Governance and base models
Securing and Automating the Open End-to-End Network	Securing your network and cloud/edge infrastructure is no longer an option. Cyber security threats are on the rise and, with continued geopolitical tensions, cyber security hardening is becoming mandatory for enterprise and infrastructure operators. Come learn from security experts as they share strategies from across the ecosystem.	• Zero Trust • SBOM • Supply Chain Security • Vulnerability Mgmt
Next-Gen Access and Connectivity	Options in open connectivity continue to expand – help make sense of the options in this area. We will approach lessons learned from developing access technologies, gap analysis of existing solutions, and proposals and business models for future areas.	• ORAN-SC, OAI, startups • C bands • FWA • 60 GHz • Optical Fiber
Deployment Use Stories: Where Slides Meet the Real World	Accelerate your open source journey by learning from end users and the vendors who support them. Hear about the good, the bad, and even the ugly from those who have implemented networks, their experience in on-going operations, and ROI. (Mobile Networks and Edge)	• Open Source Software • Consulting/SI/Vendors • Cloud Native & Edge/IOT • Interoperability

2024 Direction
LFN Hub of Industry Collaboration
Together, explore new areas of innovation

Strategic Planning - Key Areas

- Deepen collaboration with partner organizations
  - OSS projects, standards bodies, consortia, etc
- Expand support for edge networking
  - Partner more closely with LF Edge
- AI/ML
- Orchestration & automation
  - Nephio ++
- Rebuild community ties "post"-pandemic

How Members Engage: LFN

Co-promotion of project related updates, releases, and news via LFN social media accounts	Attend Marketing Committee meetings and participate in LFN-driven marketing initiatives	Publish & promote use cases, case studies, white papers, and deployment insights	Promotional support for demos at meetups and industry events
Host vendor- neutral content, industry insights on the LFN blog, LF blog or Linux.com	Get support for artwork, web site, content creation, etc., related to LFN and its projects	Get featured in the LFN Member Spotlight or Developer Spotlight series	Industry event support– speaking proposals, booth content, demos, etc.
Volunteer for planning initiatives such as developing annual marketing plan, preparing for major event, etc.	Identify LFN speaking opportunities in your region and help secure speakers from the LFN community	Help secure & develop user stories about LFN based deployments	Participate in video testimonials for social media, web and other promotional use