LFNETWORKING

2021 Year in Review

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Executive Summary

Industry & Market Progress

Three Cs (Code, Collaboration, and Connectivity) proved therapeutic for the LF Networking community to fight global isolation from the pandemic and move the industry forward.

Industry Technology and Architecture

- 5G is now in deployment across the world
- Cloud native networking became real
- Enterprise and service providers are now friends at the edge

Process and Operations

- Virtual events are now commonplace
- Virtual hackfests provide a collaboration workspace
- Developers are more productive
- Networking skills are in demand

LFN Technical Community Metrics

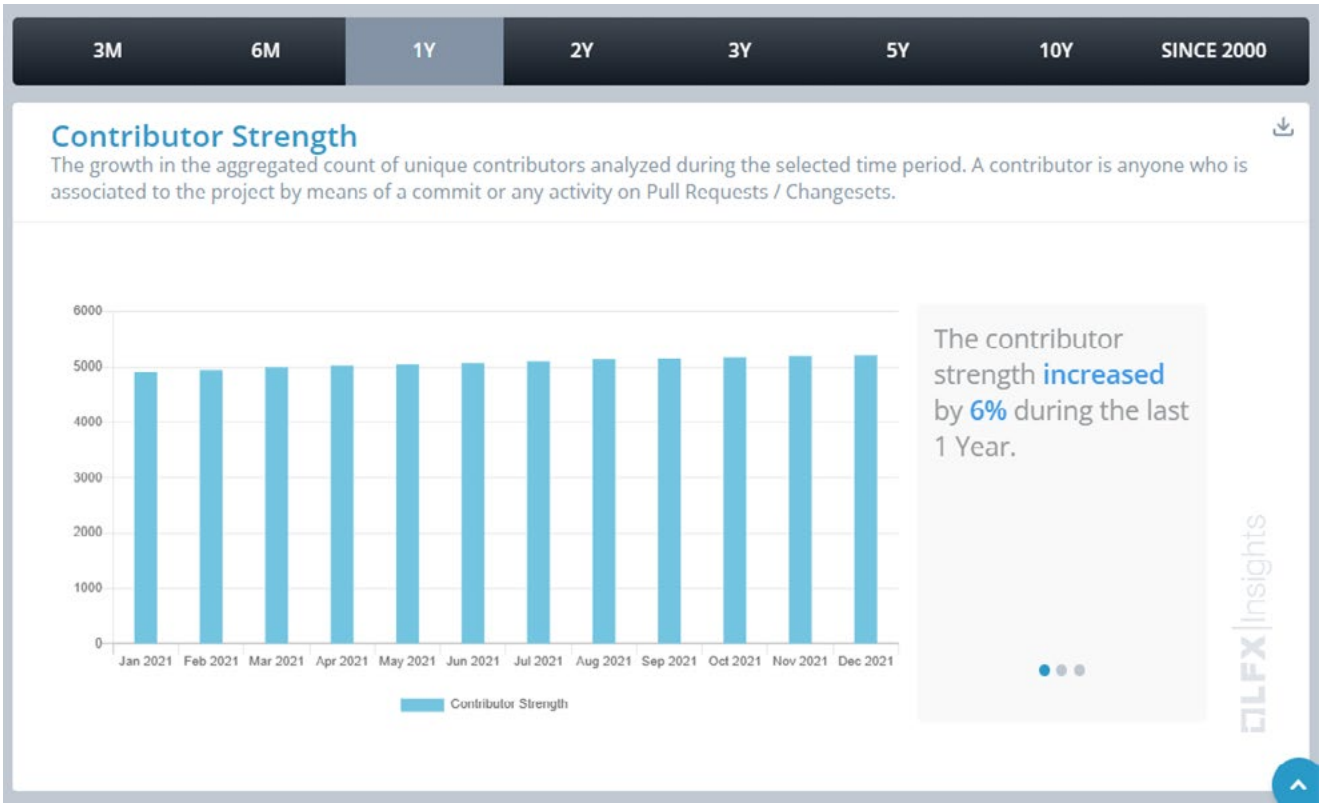
LF Networking Metrics on LFX

Open source fuels the world's innovation, yet building and sustaining engaged open source communities to deliver impactful, high-quality, and secure software at scale is challenging. From infrastructure to legal and compliance, from code security to marketing, quality to governance, the Linux Foundation has years of accumulated expertise and proven best practices, which we have spent the year productizing as the LFX Platform.

LFX is a suite of tools engineered to grow and sustain and grow the communities of today and build the communities of tomorrow.

The LFX platform provides our members with tools to support every stage of an open source project, from funding to community management to application security. LFX is built to support the needs of all community participants; maintainers, contributors, community managers, security professionals, marketers, and more.

View the full community health metrics for LF Networking here. In 1H 2022, we'll be rolling out the LFX project control center for all LFN members and we encourage you to start getting familiar with this powerful tool!



Message from the LF Networking Board

DR. JUNLAN FENG | *Chief Scientist & General Manager of AI and Intelligent Operation R&D Center, China Mobile; LFN Board Chair*

This has been another challenging year, but better than 2020.

Though we are still struggling with the COVID-19 pandemic, I'm stunned by the closeness that we are able to maintain in our community as well as our overall achievements. In 2021, LFN set its priorities as Deployment, Ecosystem construction, and Community building.

We collectively are determined to identify and tackle consumption barriers and accelerate POC to production. Key projects under LFN have been strengthening their muscles for easy and broad deployment. LFN formed a new project, Anuket, a merger of the Common iNfrastructure Telco Taskforce (CNTT) and Open Platform for NFV (OPNFV). Anuket combines various reference cloud infrastructure models and architectures to speed up deployments and improve reliability. ONAP this year defined a CNF/Cloud native roadmap, leveraged ONAP automation capabilities beyond the telecom domain, and formalized itself as a key player in open RAN. OpenDaylight optimized its infrastructures and implemented enhancements for scalability, stability, security, and performance. Other projects including FD.io, Tungsten Fabric, XGVela, ODIM, EMCO, and the 5G Super Blueprint initiative are all incrementally pushing away the barriers to deployment from various angles. Most projects have a focus on better documentation, which is key. Commercial deployments of LFN projects in top telecom network operators have greatly benefited from these efforts.

"LFN has been a leading community for network transformation and will continue to advance the overall automation and intelligence level of our networks."

LFN is a community of developers, users, technical leaders, business leaders, and researchers fostering ecosystem collaborations across cloud, telecom, and enterprise. In 2021, we facilitated close collaboration with CNCF, LF Edge, ORAN-SC, and OIF with emphasis on enterprise use cases. Contributors of LFN have also closely worked with research communities to bring in new insights to industries. LFN also organized influential events

such as the Open Networking & Edge Summit to bring together projects, insights, and individual contributors.

LFN has been a leading community for network transformation and will continue to advance the overall automation and intelligence level of our networks. We have witnessed this year the three stages of network automation development: virtualized network, cloud-based network, and intelligent network initialization. LFN has been playing a central role for layered network management architecture and aggregate industrial resources to enhance cloud native evolution for the network cloud infrastructure. The End User Advisory Group (EUAG) organized industry research and a whitepaper to study the current status and potential requirements for intelligent networks. ONAP added smart intent-driven service orchestration support for cloud private line services.

On behalf of the LFN board, I thank each individual member, every enterprise member, and all supporters and participants. We greatly appreciate your contribution to LFN projects and to the LFN community. Let's take a moment to celebrate our achievements in 2021. New opportunities and challenges lie ahead. There is no doubt we together will make a change. ■

LFN Governing Board

Koby Avital
Walmart

Rajesh Gadiyar
Intel

Ignacio Más
Ericsson

T. Sridhar
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Members

Silver Members

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General Manager Update

ARPIT JOSHIPURA | *General Manager, Networking, Edge & IOT, Linux Foundation*

Creating Opportunity from Adversity

In 2021, the world began emerging from the COVID-19 global pandemic. The recovery has been uneven across the globe, and while there has been significant progress made, we also solemnly recognize the hardship endured in many communities. Something that we've learned through the pandemic is that the distributed, open, and collaborative nature of open source software has proven especially resilient to global economic disruptions. Despite the many setbacks that COVID-19 has wrought, there are tangible signs that open source networking is creating opportunity from adversity and moving the industry forward.

"It's inspiring that the networking industry continues to attract many bright young minds as 31% of those surveyed in the Linux Foundation's Open Source Jobs Report rank networking skills as highly important, behind only Linux and cloud/container technologies."

In fact, there is an exciting convergence in the networking industry around open source, and the energy is palpable. At LF Networking, we have a unique perspective as the largest open source initiative in the networking space with the broadest set of projects that make up the diverse and evolving open source networking stack. LF Networking provides platforms and building blocks across the networking industry that enable rapid interoperability, deployment, and adoption, and is the nexus for 5G innovation and integration. In fact, we believe that only open source can provide the economy of scale required by 5G and the enterprise market. The dawn of 6G will require even greater speeds, scalability, and a whole new breed of applications and workloads.

It's inspiring that the networking industry continues to attract many bright young minds as 31% of those surveyed in the Linux Foundation's Open Source Jobs Report rank networking skills as highly important, behind only Linux and cloud/container technologies. Per InfoWorld, these skills became even hotter for the industry for digital transformation efforts. In the 18 months since March 2020, developer productivity increased 22% from the previous 18 months. LF Networking specifically experienced growth in both contributors and code commits across its projects. These advancements track

in parallel to what we're seeing from our members; with AT&T, China Mobile, Deutsche Telekom, Orange, and Verizon all announcing significant commitments and deployments into production across their global networks.

New levels of transparency and accuracy around open source contributions are now made possible through the LFX platform, a tool currently under Beta that will formally launch across all the Linux Foundation project ecosystems in 2022. In parallel, we've made a concerted effort this year to collaborate around security and proliferate open security best practices across the LFN communities by migrating to more secure frameworks, addressing code quality issues, logging security issues, and more.

"LFN is dedicated to creating opportunities and new ways to innovate across the networking industry. Adversity has brought us closer together as we build the foundation to withstand the global challenges of today and tomorrow."

Just as exciting are the cross-project collaborations gaining traction as LFN is tapping the confluence of industry efforts to structure new initiatives. Major integrations between the building blocks are now underway — between ONAP and ORAN, Akraino and Magma, Anuket and Kubernetes, and others.

A great example of this is the 5G Super Blueprint initiative — a community-driven integration and proof of concept involving multiple open source initiatives in order to show end-to-end use cases demonstrating implementation architectures for end users. "Super" means that we're integrating multiple projects, umbrellas (such as LF Edge, Magma, CNCF, O-RAN Alliance, LF Energy) with an end-to-end framework for the underlying infrastructure and application layers across edge, access, and core. This end-to-end integration enables top industry use cases, such as fixed wireless, mobile broadband, private 5G, multi-access, IoT, voice services, network slicing, and more. In short, 5G Super Blueprints are a vehicle to collaborate and create end-to-end 5G solutions. At ONE Summit in the fall, we demonstrated an integration effort with Anuket, EMCO, and the ONAP project for network slicing. We encourage the industry to join us in 2022 as we look to fully integrate Magma, MEC, and O-RAN.

We're also excited about the tangible networking industry shift into the enterprise, evidenced by the L3AF project, donated to the Linux Foundation by Walmart with the support of Microsoft, Tech Mahindra, Wipro, and others, that enables Kernel Function as a Service with lifecycle management of eBPF networking application programs.

LFN is dedicated to creating opportunities and new ways to innovate across the networking industry. Adversity has brought us closer together as we build the foundation to withstand the global challenges of today and tomorrow. We welcome your participation in our open communities as we leverage the power of open source and collaborate for a better future. ■

End User Advisory Group Update

BETH COHEN | *SDN Product Strategist, Verizon; LFN End User Advisory Group Chair*

"Creating a common understanding of testing methodologies is a way to ... enable the building of more robust systems and infrastructure that will benefit everyone in the Telecom industry."

EUAG Mission Statement

The End User Advisory Group (EUAG) was established by the LFN Governing Board to provide the telecom industry's perspective to LFN projects and alignment with other Open Source and Industry Standards bodies. Its members are limited to representatives from the LFN telecom membership. This takes the form of advice, feedback, guidance, and requirements gathering activities that are shared with the community. The EUAG also is chartered with the identification of emerging trends in the industry highlighting new areas of opportunity for the developer community that might prove to be sources of new LFN projects. These goals are achieved through member surveys, research, and collaboration efforts with various LFN projects, such as Anuket and ONAP.

Thank You to Former Chair Lei Huang

I wish to extend a whole-hearted thank you to Lei Huang from China Mobile (CMCC), who served tirelessly as the Chair of the EUAG for the past two years. She was responsible for elevating EUAG's focus on research that helped identify emerging technology trends and gaps in the telecom industry. Under her tenure, the group published more position and research papers than it had previously its entire history.

Lei will continue to take the lead in this area by accepting the position of Chair of EUAG Research, where she will be focused on writing and publishing research that supports the EUAG's overall technology and business goals.

NFV Testing and Automation Whitepaper

Based on a survey of the EUAG members and fundamental changes in the telecom industry, it has become obvious that the telecom industry urgently needs to build smarter tooling and platforms to support testing of virtualized

network functions. Creating a common understanding of testing methodologies is a way to address these concerns and enable the building of more robust systems and infrastructure that will benefit everyone in the Telecom industry. The EUAG published a whitepaper to identify and highlight the latest thinking and recommendations for improving testing environments and some best practices for NFV and SDN (Software Defined Networking) platforms for the telecom industry.

The purpose of the paper published in March 2021, was to define a standard reference testing framework that can be used to build a fully automated continuous testing (CT) framework. This framework would provide the platform to perform vendor agnostic testing and benchmarking, yet be flexible enough to integrate vendor specific tools to realize the operators' visions for supporting their deployments. As operators NFV platforms evolve to meet cloud native requirements, there is a need to build platforms that support both VNF (Virtual Network Function) and CNF (Cloud Native Network Function) workloads as transparently as possible.

NFV Testing and Automation Research and Methodologies Paper

This white paper published in March 2021, is a companion to the White Paper: NFV Testing and Automation and takes a deeper dive into how the EUAG came to its conclusions and recommendations. It provides the supporting research and evaluation methods that were distilled into the recommendations made in the NFV testing whitepaper. It starts with a discussion of the evaluation criteria used to apply to the findings, followed by an analysis of the existing testing capabilities currently used in the industry and why it is unable to support the new testing requirements imposed by the NFV environments. The final section surveys the testing projects and resources available in the standards and open source communities to date.

An LFN webinar highlighting the findings was delivered in March 2021.

Intelligent Networking, AI and Machine Learning Whitepaper

Based on the results of a survey completed in January 2021, the EUAG published a whitepaper in November 2021 that identified and highlighted the latest thinking and recommendations for building and supporting intelligent networking. It touched on the state of automation and level of adoption of intelligent networking tools by telecom operators. This is a new area for many in the telecom industry, so the focus was on the requirements, tools and approaches that have been deployed, and some potential future scenarios for intelligent networking and AI/ML tools.

As a result of the survey and follow up research, several LFN projects were started to address the needs identified in the findings, including Anuket Thoth and activities in ONAP among others. An LFN webinar highlighting the findings was delivered in November 2021.

What's Ahead in 2022

Going into 2022 the EUAG will be reassessing its activities to make sure they are in alignment with its mission to guide and advise LFN projects. Some possible upcoming activities include:

- Surveying the LFN membership on various emerging technologies and business requirements to help set direction for the developer community.
- Increasing the number and types of readouts on findings to better communicate with the larger open source communities.
- Reestablish mechanisms for collaboration with Project communities to increase the EUAG visibility and perspectives in LFN project requirements.
- Continue research activities and the publication of whitepapers of interest to the broader telecom community. ■

Strategic Planning Committee Update

JONNE SOININEN | *Head of Open Source Initiatives, Nokia; LFN Strategic Planning Committee Chair*

We had high hopes that we would be able to see each other face to face in 2021 as the LFN community; and although the lingering pandemic and uneven global recovery did not allow for this, the LFN community continued to persevere through adversity and showed its mettle as a nexus for industry collaboration. The SPC continued in its charter to prepare strategy proposals for the LFN Board to help guide the umbrella and its projects.

We measure our progress through Key Performance Indicators (KPIs) and a slightly revised set of KPIs were the following:

- Onboarding & Collaboration
- Scalability & Effectiveness
- Facilitate Adoption of LFN Tech in the Industry
- 5G Super Blueprint
- Evolve IT Infrastructure — Collaborate w/LF IT

"We remain committed to our focus on developers and software development and ... were able to continue great development during two LFN Developer and Testing Forum events in January and June."

We remain committed to our focus on developers and software development and while we weren't yet able to meet in person, we were able to continue great development during two LFN Developer and Testing Forum events in January and June. These community-organized meetings continue to be well run and well attended (500+ registrations,~90% attendance rate), well-perceived (82% event satisfaction rate on average), and provide the time to focus diligently on moving the project forward.

We run an annual operations survey where we ask the community themselves how well LF Networking is achieving its aims and to look for areas for improvement. The survey remains geographically balanced from Asia, Europe, and North America with those from network operators making up

a plurality of responses. Good marks were received in terms of supporting a neutral, collaborative home for collaboration and also a desire expressed for more investment in infrastructure.

These findings underscore our focus on scalability and efficiency, which we're addressing with new support staff and a more efficient allocation of resources. In terms of facilitating adoption, we continue to emphasize cross-project collaboration and innovation which was on display at ONE Summit in the LF Demo Pavilion. A prominent example of this focus is the 5G Super Blueprint — a community-driven integration/illustration of multiple open source initiatives coming together to show end-to-end use cases demonstrating implementation architectures for end users.

"There continues to be significant work on IT infrastructure and tooling, focusing both on usability and cost."

There continues to be significant work on IT infrastructure and tooling, focusing both on usability and cost. Partnering with the TAC, we look to ensure that the LFN can grow and prosper in a scalable manner. Increased awareness and transparency on services available for the projects and how they are leveraged helps LF members maximize the value of their investments. The LFX tool should take this to the next level in 2022.

As we turn the page on another difficult year for our globe, we're energized by what we see happening in open source networking and a sense of responsibility to continue providing world-class project support for this dynamic community. ■

JASON HUNT | *Distinguished Engineer, IBM; LFN TAC Chair*

RANNY HAIBY | *Director, Open Source Software, Samsung; LFN TAC Vice Chair*

Technical Advisory Council Update

LFN's Technical Advisory Council (TAC) comprises senior technical leaders from our member companies as well as a representative from each of the TAC projects (Anuket, FD.io, ONAP, OpenDaylight). Our goal is to facilitate communication and collaboration among all the projects that comprise LFN.

2021 was an exciting year as the TAC was happy to review and recommend for induction 3 new sandbox projects to LFN — XGVela, ODIM, and EMCO. Each bring innovative technology to different parts of the networking ecosystem. The induction guidelines set by the TAC were extremely useful to the new projects, ensuring a successful launch with all governance and tooling in place. The TAC looks forward to working with these new projects and helping them mature within LFN.

In open source, recruiting and retaining developers is always a challenge. This year the TAC spent time looking into what motivates developers to contribute to open source. One area that we're looking to lead is in publicly recognizing those contributors. As a first step, we will be rolling out in early 2022 a badging program that will highlight the work of contributors, committers, and project technical leaders. These badges can be displayed on social media profiles and serve as a validation by LFN of the work that these developers have done.

One of the goals of the TAC is to identify common areas of interest across all LFN projects and provide opportunities for knowledge sharing and synergies. This year the TAC launched the "LFN Security Forum" as a platform for advancing topics related to the growing concern about software security and supply chain vulnerabilities. Security experts from across the LFN projects share security best practices for preventing and mitigating cybersecurity attacks. This is an open forum that welcomes contributions from LFN members and non-members. LFN communities can easily access the information shared by the forum and use it to improve the cybersecurity aspects of their projects.

Ensuring that LFN projects are well supported is a key mission of LFN. This year the TAC examined all LFN services provided to help identify how to best support the projects while maintaining fiscal responsibility. We identified which services should be made available at different project lifecycle levels, with a tendency toward encouraging community self-service where possible and practical. We welcome the community's input on what is working well and where items could be improved.

The TAC is looking forward to a strong 2022 as our projects continue to grow. We hope to see you virtually or in-person at a future event! ■

LFN Project Updates

Anuket Project

In 2021, the Anuket Community achieved its project goals, including a successful merger and project establishment, all while delivering two full Anuket releases: Kali (June 2021) and Lakelse (December 2021). Collaboration with GSMA has strengthened allowing publishing Kali versions of Reference Model and Reference Architecture 1 (OpenStack based) specifications as GSMA Permanent Reference Documents. A new development sub-project, Thoth, was established to cover for the AI/ML for NFV use cases (starting with failure prediction). We also developed an experiment using the ViNePERF test tool resulted in the Globecom 2021 Conference Paper, "Benchmarking Kubernetes Container-Networking for Telco Usecases."

Looking to next year, we plan to continue to grow the Anuket technical community in 2022, deliver two releases on a 6-month cadence (Moselle and Nile), and validate the value of Anuket's products with the industry End Users. We will continue to influence the telecommunication industry by promoting innovation in areas such as Hybrid Multi-Cloud and Edge, Infrastructure Security, and AI/ML-based Automation.

— AL MORTON, TSC CO-CHAIR

Edge Multi-Cluster Orchestrator (EMCO)

2021 was an exciting "launch year" for the EMCO project as key community stakeholders had been clamoring for a stand alone project for some time. An early version was born in the ONAP project and EMCO has now rejoined LF Networking as an official Sandbox project. We charged out of the gate with 12 companies across the service provider, TEM, SI and ISV space who rallied to get the project rolling. We released the first LFN code in December, after the seed code from Intel and Aarna Networks was populated in September.

EMCO has documented use cases already in the ONAP and Akraino projects, in the 5G Super Blueprint, and is tied to the strategic OPS-5G collaboration between the Linux Foundation and the US DoD. The ONAP CNF working group is exploring further collaboration and we are planning to now expand the developer base with committers from the participating companies. In 2022, we plan a quarterly release cadence collaborating across multiple communities.

— BOB MONKMAN, COMMUNITY MEMBER

The Fast Data Project (FD.io)

FD.io strives to follow best practices for secure solution deployment. The project's secure networking data plane software, Vector Packet Processing (VPP), is firmly built with security in mind. In fact, from inception, FD.io established a clear focus on security (see https://wiki.fd.io/view/Security). As well, the VPP environment exposes a number of security features usable by developers, including extensive white-box testing, image segment base address randomization, shared-memory segment base address randomization, stack bounds checking, and static analysis (via Coverity). The project's security framework helps developers create high-quality, secure software for use in commercial solutions.

— ED WARNICKE, TSC CHAIR

OpenDaylight (ODL)

2021 has been a year full of news for OpenDaylight with the arrival of new contributors, mostly around a regain of activity in OpenFlow, and as usual, the publication of two new releases.

During the Silicon and Phosphorus cycles, hard work has been made to propose new features and consolidate the current code base — especially in NetCONF and kernel projects and in the transport domain with TransportPCE and BGPCEP.

These efforts of the community reinforce OpenDaylight's position as a reference implementation for the development of network controllers. I am convinced the result will please developers as well as end users.

— GUILLAUME LAMBERT, TSC CHAIR

Open Distributed Infrastructure Management (ODIM)

2021 was a year of getting wind in our sails after forming in late 2020. We celebrated our first code release in Q1 and continued our engagement with the Airship project, with whom we held several meetings as well as undertook basic integration of ODIM in their labs.

The TSC documented proposals for DMTF Redfish Profiles, Telemetry Service, and gRPC support in ODIM with new code contributions for DMTF Redfish profiles and the Telemetry service. Other contributions include a BMC Simulator, Kubernetes based build and deploy and plugins for Dell and Cisco ACI infrastructure.

Much of our outreach this year is intended to drive participation from new stakeholders and achieve active participation in code contribution. The 4th quarter has been focused on outreach in the OCP community where open hardware management discussions are growing. We continue to seek consensus and growing collaboration in this area.

— BOB MONKMAN, COMMUNITY MEMBER

Open Network Automation Platform (ONAP)

On behalf of the ONAP TSC, I want to thank our highly engaged ONAP Community for their outstanding contributions.

We have delivered two major releases (Honolulu and Istanbul) and two maintenance releases this year enabling new Cloud Native capabilities across several fronts including Orchestration and robust ONAP/O-RAN Interworking. We have extended our 5G SON and Network Slicing functions to support RAN, Core, and Transport domains, developed our next generation of control loop automation architecture, introduced Intent based networking (IBN), which simplifies interaction and network configuration using Control Loop and Smart AI, and added flexibility in resource onboarding with a choice of modeling (SDC AID, ETSI SOL001), plus much more.

We are constantly enhancing our platform robustness with 'Pick and Choose' modular functions. Security continues to be part of the ONAP DNA as the community improved the security of the ONAP components significantly.

Orange and Deutsche Telekom have announced that they are using ONAP in their production networks.

Additionally, the ONAP Community recognizes the value of ONAP in the Enterprise/Vertical markets. A new task force has been created this year to explore future use cases and to support the 5G Super Blueprint initiative.

The Jakarta release will provide new functionalities for CNF standard based packaging, streamlined architecture for CNF orchestration, Intent Based Networking (IBN) applied to CCVPN, additional control loop automation use cases, and much more.

— CATHERINE LEFÈVRE, TSC CHAIR

Tugsten Fabric

In 2021, Tungsten Fabric continued the path taken in 2020 focused on delivery and documentation. We released new versions at the beginning and end of the year that included/expanded support for Netronome SmartNIC router, enhanced DPDK vRouter performance, vRouter-DPDK integration with Intel PAC N3000 board and L3 multihoming.

Because of rich and well established functionalities, Tungsten Fabric allows us to collaborate with other communities like Akraino, Anuket, and the 5G Super Blueprint initiative. In 2022, we plan on increasing cross-project collaboration and are focused on growing the number of contributors, which will be important for future development."

— SZYMON GOLEBIEWSKI, TSC CHAIR

XGVela

2021 was a big year for XGVela. We entered the LFN family as a sandbox project, which gives us a good environment to collaborate with other telecom open source projects. We delivered an XGVela Architecture Document and Anuket + XGVela Joint PaaS Survey to clarify the architecture and functions of PaaS in the telecom network cloud, and provide an integration reference. We also established a use case working group to explore the role of PaaS for telecoms. Here, we appreciate all the work and support from the community.

For 2022, we look to improve governance, operations documentation, and processes for better participation, collaboration, and release delivery. We'll continue developing use cases and new Telco PaaS functions, and investigating possibilities to apply cloud native in real telecom cloud and network environments.

— QIHUI ZHAO, TSC CHAIR

LINDSEY SECH | *Technical Assistant and Chief of Staff for Intel Network Platforms Group; Intel, LFN Marketing Chair*

SANDEEP PANESAR | *EVP, Strategic Engagement, Turnium; LFN Marketing Vice Chair*

Marketing Advisory Council Update

The last year has been challenging in countless ways. While it's not the "normal" many of us hoped for, we are fortunate that we have continued to connect, collaborate and communicate, in both our personal and professional lives. At LFN, we have continued to innovate with full force. Our vision — to provide platforms and building blocks for network infrastructure that enable rapid interoperability, deployment, and adoption — is perhaps even more meaningful during a time when we all long to be more connected.

LFN projects continue to mature and grow, and it's exciting to see the tremendous collaboration in our developer communities. Perhaps one of the best examples of this is the 5G Super Blueprint that was launched in 2021 and pulls together multiple open source initiatives. It relies on industry collaboration, is driven by community innovation, and showcases how networking can play a pivotal role in enterprise digital transformation.

In the Marketing Advisory Council, we have a collective desire to spotlight the amazing innovations within LFN and encourage companies to consume these innovations. Our marketing programs and messaging are inspired by our core beliefs:

- Networking technology plays a pivotal role in digital transformation across every single industry.
- Open source is the only true path to rapidly scale software, to achieve operational and revenue value in a timely and cost-effective manner.
- The LFN is a center of gravity in networking innovations.

Any company, any size, anywhere in the value chain, in any sector — can leverage the breadth of LFN's commercially-ready ecosystem offerings.

Over the past year, the MAC took time to reflect and think carefully about our purpose and where we can drive impact. We revamped our messaging

"In the Marketing Advisory Council, we have a collective desire to spotlight the amazing innovations within LFN and encourage companies to consume these innovations."

and marketing strategy to reflect the broader range of projects, capabilities, and members in LFN.

The MAC is thinking bolder (in our marketing strategy), talking bolder (in our messaging), and acting bolder (in our marketing programs). Expect to see this across our content and communications. We want to motivate all company types to boldly INNOVATE in our communities, to want to COLLABORATE in advancing networking, and to fundamentally TRANSFORM businesses with LFN innovations.

With our rejuvenated direction, we are re-energized to find new ways to engage our communities and help broaden our membership. This upcoming year is our time to shine — to put a spotlight on LFN's projects and innovators, to recognize our members, and boldly show how companies can rely on LFN innovations for digital transformation.

Join us and take part in the next revolution in networking technology! ■

Industry Impact

By the Numbers

10
PRESS RELEASES

21K
PRESS CLIP MENTIONS

25+
MEDIA/ANALYST BRIEFINGS

2.2B
POTENTIAL AGGREGATE REACH

241K
TWITTER IMPRESSIONS

Summary

At a new stage of maturity, LFN and its projects are de facto standards being deployed in production as telcos, vendors, and SIs and enterprises further embrace open source. The narrative we are seeing in LFN's fourth year as an umbrella project is one of deep integration, production deployments, and cross-stack collaboration. The 5G Super Blueprint is at the helm of the ship, as organizations like Orange, Verizon, Deutsche Telekom, AT&T and more are using ONAP-based solutions in production and deployments. As 5G continues to evolve (and we begin to embrace 6G on the horizon), we expect to see even greater use of integrated open source components as a strong driver of network innovation.

TOP QUOTES

"Walmart has bought into open networking in a big way. The company recently joined LF Networking, the collaboration ecosystem for Open Source Networking projects that is part of the Linux Foundation…. 'It's almost impossible to run an extremely large organization without the latest, greatest technology, which is why Walmart is a "huge consumer of open source technology."

—JEFF PAINE, PICA8

Industry Impact

Top Headlines

sdxcentral

AT&T CEO Reaffirms Commitment to Open Source Infrastructure

TELECOM TV

LFN Merges CNTT and OPNFV, Creates New Body for Cloud Native Telcos

capacity

Linux to Work with NGMN on Priorities for 5G and 6G Mobile

LightReading

Orange is Building a Network That Will Run Itself

telecompaper

ONAP Expands Cloud-Native Functions in Honolulu Release

TOP QUOTES

"...what we're talking about here [with Anuket] is the development of blueprints, of common approaches to rolling out telco cloud platforms and adopting new processes and applications, that can help the industry follow common paths that reduce planning and development time and help technology developers focus on specific industry requirements – currently, fragmentation in the area of telco cloud developments is still too great. What the industry needs is consensus."

—RAY LE MAISTRE, TELECOMTV

"The alignment between the Linux Foundation and NGMN represents the latest in a long-standing effort to integrate open source and open standards across the industry."

—ALAN BURKITT-GRAY, CAPACITY

Top Headlines

phoronix

Walmart Pushes Open Source L3AF to Help out eBPF Ecosystem

DevOps.com

LF Networking (LFN) Adds to Open Source Portfolio

Forbes

AT&T Puts its 5G Future in the Azure Cloud

PICA8

Welcoming Walmart to the Open Networking Community

TOP QUOTES

"AT&T has a long track record of [... sharing its significant SDN intellectual property developed over the last several years and built on open standards], given its contributions to several Linux Foundation networking projects."

— WILL TOWNSEND, FORBES

LFN On "Stage" at Industry Events

Global Open Technology Conference

Open Source Conference (Samsung & IEEE)

Open Networking & Edge Summit

Open Networking & Edge Executive Forum

SDNLabs

TelecomTV Summit

University of Delhi + Government of India Tech Conference

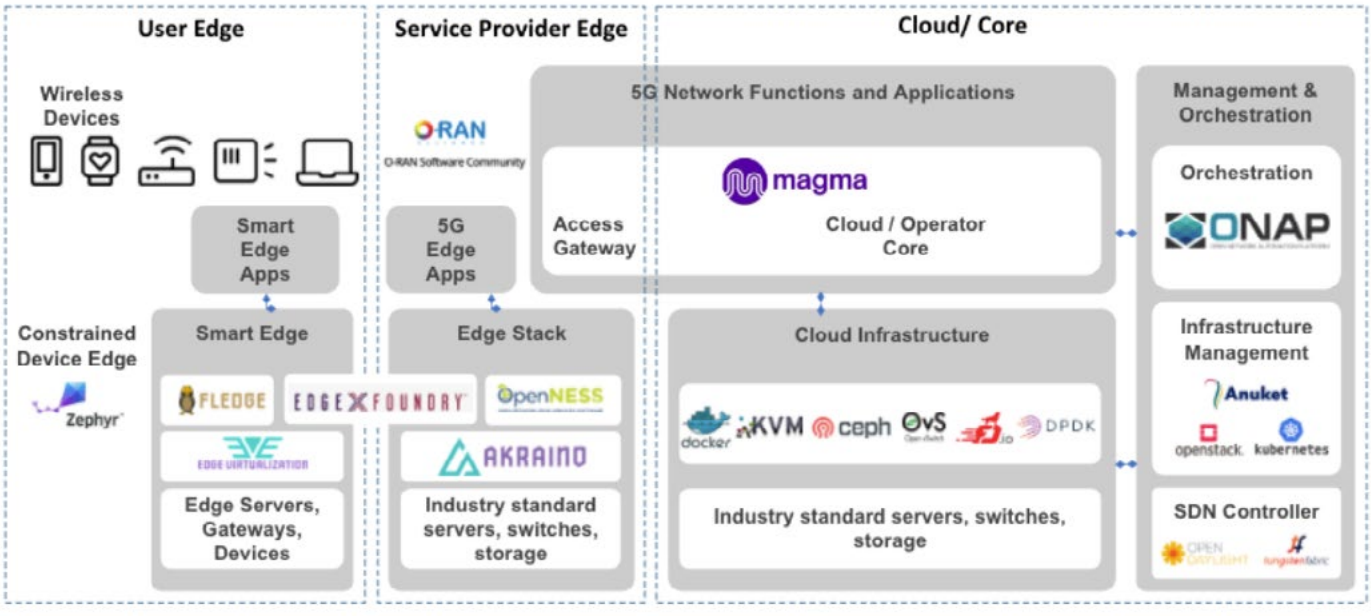
5G Super Blueprint

As global communications providers prepare to deliver high-speed connectivity to support new services and use cases, the need for low-latency, high-bandwidth, scalable networks is more important than ever. Conventional industry hardware won't sustain next-generation mobile technology; software-defined infrastructure and cloud native approaches are essential for delivering the performance, capabilities, and automation 5G requires.

The Linux Foundation networking stack continues to evolve and expand into additional projects due to an increased desire to innovate and commoditize across key technology areas through shared investments among its members. Leveraging a convergence of major initiatives in the 5G space, and building on a long-running 5G Cloud Native Network demo work stream, LF Networking is leading a community-driven integration and proof of concept involving multiple open source initiatives to demonstrate end-to-end implementation architectures for end users covering RAN, Edge, and Core.

The latest 5G Super Blueprint Demo was shown at ONE Summit North America in October featuring network slicing. Over 120 industry leaders are now following and participating in the initiative. Plans for 2022 include Multi-access edge computing (MEC) and O-RAN integration. Join us!

LF Open Source Component Projects for 5G



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Thank you for a successful 2021!

Learn more and get involved:
www.lfnetworking.org