LF EDGE

2023 YEAR IN REVIEW

Expanding Edge Deployments and Global Influence

Contents

Executive Summary

Edge computing, as defined by **Sharpening the Edge II: Diving Deeper Into the LF Edge Taxonomy and Projects**, is the delivery of computing capabilities to the logical extremes of a network to improve the performance, security, operating cost, and reliability of applications and services. As the world becomes more interconnected, data-driven, and reliant on real-time decision-making, edge computing has become a pivotal technology to meet the demands of the digital era.

As an open ecosystem, the LF Edge project umbrella meets those evolving demands.

Now in its fourth year as an organization, LF Edge represents the center of gravity for some of the world's most impactful open source edge computing initiatives (including Akraino, EdgeX Foundry and Fledge projects, among others) building an open, modular framework for edge computing. The common governance and collaborative resources unify the open edge market, with global industry support to speed the adoption and deployment of edge applications across sectors, including telecommunications, Cloud, IoT, industrial IoT, retail, AI / ML, factory floor, smart home, and more.

As data gravity continues to shift away from the centralized cloud to a distribution from edge to cloud, most organizations benefit from edge computing due to the lower latency, reduced bandwidth costs, and maximized security and privacy. This means the work of LF Edge is more crucial than ever.

> IDC expects the global market for edge computing will reach $317B by 2026, growing at a compounded annual growth rate of 17.6% between 2022 and 2026.

Compelled by the robust set of Akraino blueprints in deployment; EdgeX's 10M+ container downloads and growing IIoT platform, the project's tenet publication, the State of the Edge Report, and a diverse set of new deployment stories and technical white papers that provide strategic guidance on how to scale, 2023 was a banner year. Some of LF Edge's progress in 2023 includes new deployment stories across Security, Gaming, Retail, and Industrial verticals as well as continued collaboration with other industry organizations, including ETSI, Open Compute Foundation, GSMA, Open Grid Alliance, and more.

- **Security** The Akraino community published an **Akraino Platform Security White Paper** to define the security requirements of its Akraino blueprints.
- **Gaming** Members Arm, Tencent, Zenlayer, YSEMI, Genymotion, and Alicon

EXECUTIVE SUMMARY

SE investigated how to leverage Akraino blueprints to improve gaming scenarios across user experience, cost, operation, and maintenance to help improve the commercial feasibility of cloud games.

- **Retail:** Deployments from IBM, Intel, and Scale Computing leverage EdgeX Foundry's Open Retail Reference Architecture project, Open Horizon, and Secure Device Onboard to build commercial solutions that have applications across multiple industries to address how to rapidly scale actionable insights at the point of interaction — i.e., delivering AI at the Edge (see Using Open Source to Scale Retail Applications at Edge Locations).

- **Industrial:**

  - The Fledge project graduated to Stage 3 in 2023. IIoT widely uses Fledge in applications across industries, and it continues to evolve with contributions from a thriving community of developers and adopters. Focused on industrial data pipelines to and from industrial assets and systems, edge applications, and edge machine learning, Fledge users and contributors are suppliers and integrators to industrial markets as well as industrial companies and work in process and discrete manufacturing to help produce drone military aircraft, engines, aluminum car parts, food processing, chemical polymers, energy, oil and gas, paper products, premium wines, professional auto racing digital twins, and more.

  - EdgeX Foundry outlined how Eaton, a global leader in electrical power management, adopted EdgeX Foundry as its common edge platform, with EdgeX empowering their engineers to accelerate product development, code reuse, and more.

- **Continued collaboration with industry alliances & projects**

  - Along with ETSI and Open Compute Project, we once again co-hosted the Edge-Native AI Hackathon that XYZ placeholder.

  - The Fledge project has expanded into LF Energy's Project FledgePower with 67 energy companies and suppliers and OSDU (an Open Group Project) with 167 oil and gas companies and suppliers, all working toward a common goal.

  - LF Edge partnered with LF Networking, CAMARA, the GSMA, and TMForum to outline

  - Additional work with ETSI included the publication of How to Build Edge Solutions with LF Edge Akraino Blueprints & ETSI MultiAccess Edge Computing (MEC) APIs, which detailed the impact of the collaborative, award-winning PCEI blueprint.

  - There was a new collaboration with Open Grid Alliance.

Driven partially by the growing demand for AI applications, we expect the next 12 months to be a significant turning point for the edge market. Please join us along the journey!

Update from the LF Edge Board

TINA TSOU

Director Infra Ecosystem, Arm and LF Edge Governing Board Chair

Edge computing remains pivotal in our rapidly evolving digital landscape, decentralizing data processing to enable quicker, real-time decisions. With the rise of AI, edge computing becomes even more critical, offering efficient AI inference right where the data originates. As Chair of the LF Edge Board, I am incredibly proud of the progress the community has made and eager to see where things go moving forward.

Some of LF Edge's 2023 highlights include:

- **AI Edge:** LF Edge has played a vital role in incorporating AI at the edge, ensuring faster data processing and enhancing applications across various sectors.
- **Computing-Aware Networking / Computing Force Networks:** This year, a major focus was laid on ensuring that networks are not just communication mediums but are also computation-aware. This translates into networks that are smarter, more efficient, and optimized for edge computing tasks.
- **LF Edge Showcase:** A significant highlight that demonstrated edge-specific verticals such as Oil & Gas, Manufacturing, and Retail.
- **Akraino, EdgeX Foundry, and Fledge Projects:** These projects showcased LF Edge's commitment to an open, modular framework for edge computing. Notably, the Fledge project has expanded its applications, reflecting its growing influence in edge computing ecosystems.
- **Global Community Engagement:** LF Edge adopted a global approach, forging ties with communities in North America, Europe, China, and India, further emphasizing the universal relevance of edge computing.
- **Collaborations and Alliances:** Collaboration remained at the forefront, with partnerships with entities like ETSI and the Open Compute Project. These collaborations cement LF Edge's commitment to advancing edge computing technologies through collective efforts.
- **The Horizon Ahead:** As edge computing and AI continue to intertwine,

UPDATE FROM THE LF EDGE BOARD

LF Edge is committed to ensuring that these technologies find harmony, offering enhanced solutions for modern-day challenges. The journey forward is filled with promise, and LF Edge is poised to lead the way.

Please join us in congratulating the community for all it's accomplished in 2023! We look forward to continued collaboration and success (and challenges) in 2024, and invite anyone interested in being a part of the open Edge and AI ecosystem to join us as a member.

"We look forward to continued collaboration and success (and challenges) in 2024, and invite anyone interested in being a part of the open Edge and AI ecosystem to join us as a member."

LF Edge Governing Board

SAM ARMANI
mimik

TOM ARTHUR
Dianomic

MARILYN BASANTA
Intel

LISA CAYWOOD
Red Hat

WENJING CHU
Futurewei Technologies

DAVE DENISON
Emerson

JUSTIN DUSTZADEH
Equinix

EDWARD KNAPP
American Tower

DANIEL LAZARO
AVEVA

ANDREW LINDSAY
Flexnode

MICHAEL MAXEY
ZEDEDA

JOE PEARSON
IBM, TAC representative

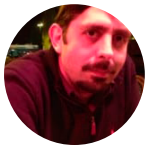
KEESANG SONG
AMD

HAKAN SONMEZ
IBM

YUJI TAZAKI
Fujitsu Ltd.

TINA TSOU
Infra Ecosystem, Arm, LF Edge

REN "BILL" XUDONG
Huawei Technologies



MOHAMMAD ZEBETIAN
Charter

GAVIN ZHANG
Thundersoft

LF Edge Members

Premier Members

"LF Edge has long been a leader in a years-long effort to define the network and support how stakeholders across the value chain can creatively and effectively collaborate in the edge market"

— ANDREW LINDSEY, CHIEF EXECUTIVE OFFICER AND CO-FOUNDER OF FLEXNODE

LF EDGE MEMBERS

General Members

ALLEGRO
Beechwoods
Canonical
国数集联 Clussys
DELL Technologies
edgenesis
EMQ
IOTech
MARVELL
mimik
NETFOUNDRY SPIN UP YOUR NETWORK
Open Nebula
QUALCOMM
ROBIN
Section
QiANY
spectro cloud
SUPERMICRO
ThunderSoft
UNIBERG Creating the Future of Connectivity
veea

Associate Members

AECC AUTOMOTIVE EDGE COMPUTING CONSORTIUM
BEIJING UNIVERSITY OF POSTS AND TELECOMMUNICATIONS
ECLIPSE FOUNDATION
ETRI
gradiant Connectivity · Intelligence · Security for your business
ITRI Industrial Technology Research Institute
INFRASTRUCTURE MASONS
IOTA FOUNDATION
AIST
OPEN-IX
openstack
PennState
Project Haystack
shopen 上海开源信息技术协会
RITSUMEIKAN
University of New Hampshire

Update from the General Manager

ARPIT JOSHIPURA
General Manager, Networking, Edge & IoT, the Linux Foundation

As we enter into 2024, I wanted to take a moment to reflect on the great progress we made as a community last year. 2023 was a year of remarkable achievements, driven by our community's unwavering commitment to innovation in edge computing, especially in the realm of Artificial Intelligence (AI), and our sustained efforts in addressing the evolving needs of technology.

The integration and advancement of AI in edge computing have been a standout feature of our journey in 2023. Our projects are playing pivotal roles in bringing efficient AI inferences to the very edge of our networks, where data originates. This not only expedites data processing but also significantly enhances application performance across various sectors. Our focus on AI at the edge is just one example of how LF Edge remains at the forefront of real-time transformation.

The growth and vitality of the LF Edge community is also evident in the substantial increase in commits and contributors across the board. This surge in engagement underscores the dynamism and expansion of our ecosystem. The introduction of innovative projects, Nexoedge, NanoMQ and LF Edge Sandbox, and the progression of code deployments are more examples of the excellent work our community is doing to further open edge computing.

As we look back at these achievements, it's clear that 2023 was a year of not just growth but also of building on our existing foundation for even more future innovation. The activity and progress spearheaded by our global community play a crucial role in shaping the direction and impact of LF Edge.

Here's to 2024 and beyond!

Update from the Technical Advisory Council

JOE PEARSON

LF Edge TAC Chair and Technology Strategist at IBM Software Networking and Edge Computing

DANIEL LAZARO

LF Edge TAC Vice-Chair and R&D Technologist at AVEVA

LF Edge projects and the Technical Advisory Council (TAC) ushered in 2023 realizing that edge computing had not yet become a go-to tool in the CTO's toolbox as they tackled the twin challenges of application modernization and subsequent workload repatriation. Throughout the year, there were various successes and industry setbacks in the area of Software Defined Vehicles (SDV) as our projects made incremental progress on targeted solutions while pundits predicted the demise of electric vehicle (EV) mass adoption. After the runaway success of ChatGPT, Large Language Models (LLMs), and Foundation Models, the year ended with our projects beginning to tackle the challenges of machine learning (ML) model deployment and optimization for on-premises and field-deployed use cases, pushing the limits of commercial off-the-shelf (COTS) compute and constrained devices to tackle visual inferencing and acoustic analytics tasks. Here's a human-generated summary of our notable milestones, achievements, and community growth.

Events

The year began with a completed Industry Solutions Showcase. This joint effort between the LF Edge Governing Board and TAC was created to demonstrate how solutions based on our projects are being deployed to solve current technical challenges. Along the way, these collaborations help projects to identify potential feature gaps and generate repeatable patterns and reference architectures.

Intel worked with university teams around the world on an EdgeX Coding Challenge where school-based teams competed to build innovative solutions using the Matter protocol. This approach to a distributed competition took the event directly to the university classrooms to give a timely hands-on experience with the latest technology. We hope to see this type of event replicated and used more widely in 2024.

UPDATE FROM THE TECHNICAL ADVISORY COUNCIL

Announcements and Accomplishments

In a significant accomplishment this year, the Fledge project became the first LF Edge project to organically mature through all of the stages to Stage Three. Along the way, the TAC learned about and refined the maturation process as abstract ideals encountered the reality of IRL. Congratulations to the Fledge team and their TAC Sponsors Mark Riddoch and Daniel Lazaro for their pioneering work and paving the way for other projects to follow along in their footsteps and reap the benefits of their hard work. As Jim Zemlin mentioned in his keynote at LF Member Summit, Fledge(POWER) (same project and same repo), was used to reduce operating costs by 50% and it is going in production in substations across France. Fledge joins Akraino and EdgeX Foundry to the ranks of our mature At-Large projects.

With LF Edge growing from a core group of five projects to twelve over the last few years, it was time for the TAC to revisit our expectations of, and requirements for, projects desiring to demonstrate their growth and maturity. Subsequently, we spent a few months proposing, debating, and ultimately documenting new requirements for Stage Two (Growth) and Stage Three (At-Large) project requirements. A significant addition included requirements for security issue reporting, collection, and response items.

LF Edge also marked the first project to reach Stage Four (Emeritus) status as the Home Edge project was archived. This acknowledged that the project did not add new features, and the community was no longer sustainable. The code will continue to be publicly available, but will no longer be maintained.

LF Edge also added two new projects in 2023. The first was NanoMQ, a new take on message queueing that both supports existing protocols as well as adding support for a new approach. This innovative project comes to LF Edge as the second contribution from member EMQX. The second addition was Nexoedge from the Chinese University of Hong Kong (CUHK) based on research incubated there. It implements edge-based storage transparently distributed to cloud locations.

And last, Project EVE, with sponsorship from member Zededa, worked with the Board and TAC to create the LF Edge Sandbox solution. This platform will allow LF Edge projects to provide a simple-to-use interface to deploy both projects and solutions based on our projects to the LF Edge Community Lab and potentially other user-defined locations. This allows the public and our community to more easily evaluate, test, and ultimately develop solutions based on our projects.

Growth and Adoption

And as a way of documenting and publicizing how our projects are being implemented, LF Edge Marketing began compiling LF Edge Case Studies. These thumbnail sketches introduced readers to:

- UC Davis and Opus One used Fledge in both teaching and research to create safer wine production conditions and to reduce costs
- How Alvarium and Project EVE were used in a solution to monitor a BioGas facility
- An Open Retail solution approach with pluggable components using FIDO Device Onboard (FDO), Open Horizon, and EdgeX Foundry from partners including Scale Computing, IOTech Solutions, Intel, and IBM
- Electrical Power Management solutions and specifications with Eaton and EdgeX Foundry

LF Edge Project Updates

AKRAINO

A SET OF OPEN INFRASTRUCTURES AND APPLICATION BLUEPRINTS FOR THE EDGE, SPANNING A BROAD VARIETY OF USE CASES

In 2023, Akraino successfully completed its seventh release with five blueprints. To enable and promote edge computing, the community has published examples of social implementations using Akraino Blueprints and collaborated with other communities to research use cases. The Akraino community has also held Spring and Fall technical meetings and discussed 2024 activities and collaboration with other communities with further focus on AI at the Edge. 2023 highlights include:

- Akraino Release 7 included 5 blueprints.
- Presentations of PoC and social implementations of edge computing using Akraino's blueprints onsite at ONE Summit Regional Day, co-located with Open Source Summit China + KubeCon+CloudNativeCon Chinas, as well as onsite at OCP Global Summit in San Jose.
- Successful joint Hackathon with OCP and ETSI.
- Started discussions on collaboration based on MOU between LF and IOWN GF.

Welcoming LF Edge's Newest Projects

nexoedge

EFFICIENT MULTI-CLOUD DISTRIBUTED STORAGE FOR EDGE APPLICATIONS

Nexoedge is a reliable and efficient multi-cloud distributed storage which enables applications and devices at the edge to store data into one or more clouds. The result of research from LF Edge Associate member, the Chinese University of Hong Kong (CUHK), Nexoedge offers reliable edge-cloud storage using Network Coding communication algorithms by sharding data into a number of coded components. Additionally, it applies Secret Sharing keyless encryption algorithms before data transmission from edge to cloud, offering privacy protection to data that's only readable on the edge side.

PROJECT ALVARIUM

BUILDS A FRAMEWORK AND SDK FOR TRUST FABRICS THAT DELIVER DATA FROM DEVICES TO APPLICATIONS WITH MEASURABLE CONFIDENCE

In 2023, Project Alvarium expanded the notion of "data confidence" to include the underlying stack, not just data captured from applications. Our confidence score has so far been built on metadata generated at the top of the stack through applications integrated with our SDK, but we realized that confidence in application data is conditioned by the attributes of the platform running the application. This could include firmware integrity guarantees around secure boot and attestation as well as provenance captured during an auditable CI/CD process. To that end we have expanded our Java SDK to integrate with Jenkins in order to demonstrate confidence annotations recorded from a build pipeline. We are collaborating with other LF Edge projects such as EVE-OS, EdgeX Foundry and Open Horizon to demonstrate this new full stack approach in 2024.

BAETYL

SEAMLESSLY EXTENDS CLOUD COMPUTING, DATA AND SERVICES TO EDGE DEVICES, ENABLING DEVELOPERS TO BUILD LIGHT, SECURE AND SCALABLE EDGE APPLICATIONS

- Baetyl's latest release includes features on Edge gateway for protocol conversion and data collection for single-purpose devices and optimized performance of Biz Logic APIs.
- Baetyl has been collaborating with eKuiper and integrating eKuiper and optional module and enhanced edge stream processing.
- The project has created a business template, which consists of multiple template applications and multiple template configurations, used to deploy applications and configurations as a whole. It simplifies application configuration for complex scenarios.

Welcoming LF Edge's Newest Projects

NanoMQ

AN ULTRA-LIGHTWEIGHT AND BLAZING-FAST MQTT BROKER FOR IOT EDGE

NanoMQ is an ultra-lightweight and blazing-fast Message Queuing Telemetry Transport (MQTT) broker for IoT Edge. It helps users unify critical data in motion and data in use between Edge and Cloud in an efficient manner. NanoMQ has started to play an important role in scenarios such as Connected Cars, and is a good supplement to existing LF Edge projects like EdgeX Foundry, eKuiper, and more.

EDGE X FOUNDRY™

A HIGHLY FLEXIBLE AND SCALABLE OPEN SOURCE EDGE PLATFORM THAT FACILITATES INTEROPERABILITY BETWEEN DEVICES AND APPLICATIONS AT THE LOT EDGE

"During 2023, EdgeX Foundry continued its commitment to the open source edge software community with its 12th and 13th releases of the project. This includes a new major release with redesigned and simplified configuration. That was followed by a stabilization release and new Long-Term Support (LTS) version. Wider EdgeX adoption and increased growth of the user base continues, while it's great to have Oracle added to the TSC leadership which already includes Intel, IOTech, Canonical and Eaton."

2023 EdgeX Foundry highlights include

- EdgeX 3.0 (codenamed Minnesota) was released in May 2023
- EdgeX 3.1 LTS (codenamed Napa) was released in November 2023
- The Eaton use case for EdgeX was published here
- Intel hosted a successful international University EdgeX Coding Challenge with the winning team utilizing Matter device connectivity and computer vision for a finger skeletal rehabilitation use case

eKuiper

A LIGHTWEIGHT IOT DATA ANALYTICS AND STREAM PROCESSING ENGINE RUNNING ON RESOURCE-CONSTRAINT EDGE DEVICES

eKuiper thrived with a dedicated community, achieving quarterly releases, successfully participating in events like OSPP and Hacktoberfest, and fostering mentorship programs to attract more contributors. eKuiper's impact surged in the IIoT sector, marked by increased adoptions. With new successful deployments in the automotive sector this year, we anticipate further advancements, especially in in-vehicle applications, in the future.

- Dynamic Development: Achieved 4 new releases and delivered 20+ fix packs, enhancing analytics, connectivity, and user experience for eKuiper.
- Growing Community: Doubled contributors to 75+, showcasing a strong and expanding community engagement.
- Industry Impact: Increased adoption in the IIoT sector; New adoptions in the automotive sector for in-vehicle applications.

"LF Edge differs from the old-school open-source groups where big companies argue about taxonomy. Instead, its group of projects aligns and overlaps in a way that allows platform architects to build robust edge deployments. Its diverse membership brings out experts from OT and IT, addressing the needs across the edge spectrum from individual devices to edge data centers,"

— MICHAEL MAXEY, VICE PRESIDENT OF BUSINESS DEVELOPMENT AT ZEDEDA

LF EDGE PROJECT UPDATES

EDGE VIRTUALIZATION ENGINE (EVE) BUILDS EVE-OS, A UNIVERSAL, OPEN LINUX-BASED OPERATING SYSTEM FOR DISTRIBUTED EDGE COMPUTING

2023 was a year of significant growth for Project EVE, with an uptick in production deployments across industries such as energy, automotive and manufacturing. This increase has also brought a 23% growth in contributors who are driving increased commit growth.

Project EVE provides the base of the new LF Edge Sandbox, easing the process of getting started with other projects within LF Edge individually or as part of joint solutions. We continue to validate new hardware models able to run EVE-OS, including a focus on enabling new Arm devices.

On the technology front, we have begun to move toward storage clustering by leveraging Longhorn, and have made additional advancements around a configuration services API, TPM-based security policies in air-gapped environments, and an interactive installer for on-the-fly changes during EVE-OS installation.

AN OPEN INDUSTRIAL INTERNET OF THINGS (IIOT) EDGE PLATFORM DESIGNED TO MAKE COLLECTING, FILTERING, PROCESSING AND USING OPERATIONAL DATA SIMPLER AND MORE OPEN

- Fledge released version 2.2 with various bug fixes and feature improvements
- Added control pipeline feature to enable setpoint information to flow from north to south
- FledgePower - RTE. the largest electric grid operator in Europe, rolled out its first production instances of Fledge
- Fledge has retired CentOS 7

New LF Edge Sandbox

ACCELERATE THE DEPLOYMENT OF LF EDGE COMPUTING PROJECTS

The **LF Edge Sandbox** is a free self-service centralized platform designed to help developers quickly learn about and test open-source projects to develop proof of concepts, demonstrations, and end-user experiences. Provided by LF Edge and ZEDEDA, this service leverages **EVE-OS**, a universal, open Linux-based operating system for distributed edge computing that enables secure device management and application orchestration at scale. Enjoy faster deployments of LF Edge projects via the **LF Edge Sandbox Marketplace**, a catalog of software solutions that can be deployed in seconds via a few clicks. Beyond the included open-source catalog, you can also securely test private applications on real-world use cases.

A PLATFORM FOR MANAGING THE SERVICE SOFTWARE LIFECYCLE OF CONTAINERIZED WORKLOADS AND RELATED MACHINE LEARNING ASSETS.

In 2023, Open Horizon continued to grow the community and mature as an organization. One of the challenges encountered was swapping out critical software dependencies when projects we relied on migrated their software licenses from open source Apache or MPL to the source-available BSL 1.1. In both instances, the open source community stepped up and forked the open source codebase to create a new project. And in one of those instances, Open Horizon has led the effort by incubating that forked project internally. Here are some key accomplishments:

- Added support for RHEL 8.8, 9.1, 9.2, 9.3, Fedora 38, and Debian Bookworm
- Ported our agent to arm64 for Mac M1/M2 and s390x (mainframes on the edge)
- Community-led feature requests: realtime metrics, runtime security
- New Adopters: Mainsail, LiquidPrep
- RCOS Spring 2023 mentorships
- Open Horizon used in IBM Edge Application Manager 4.5.x, Falcon Tactical Edge
- Earned OpenSSF Best Practices badge

AN AUTOMATED "ZERO-TOUCH" ONBOARDING SERVICE, PROVIDING EASIER, FASTER, LESS EXPENSIVE, AND SECURE ONBOARDING OF DEVICES

FIDO Device Onboard (FDO) provides a production-ready implementation for the FDO v1.1 Proposed Standard published by the FIDO Alliance. FDO is an automatic onboarding protocol for devices. Device onboarding is the process of installing secrets and configuration data into a device so that the device is able to connect and interact securely with a management platform. The management platform is used by the device owner to manage the device by: patching security vulnerabilities; installing or updating software; retrieving sensor data; interacting with actuators; etc. 2023 highlights include:

- Originally the FDO project was named Secure Device Onboard(SDO), but in 2023 the SDO project was renamed FDO in favor of the current FIDO compliant implementation.
- Also this year the latest implementation FDO was integrated into the LF Edge Open Horizon project making it easy to use FDO-enabled edge devices with Horizon by simply importing their associated ownership vouchers and then powering on the devices.
- In addition, Dell Native Edge leverages FDO for its automated onboarding process and ASRock has integrated FDO into products like its iEP-5000G Iot Industrial gateway.

In 2024, the FDO project plans to continue to support current and future versions of the FDO specification as well as add support for integration with various OS deployment methods.

Update from the LF Edge Outreach Committee

SARAH BEAUDOIN

LF Edge Outreach Committee Chair and Sr. Director of Marketing Communications and Partner Marketing, ZEDEDA

This year we've seen an evolution within edge computing, driven by a maturing market that has in turn led to a focus on solution-building and real world implementation. Within LF Edge, we've seen field deployments leveraging LF Edge projects increase, which also has driven growth within the broader LF Edge community.

As a committee, we've worked hard to respond to this maturation and showcase real-world use cases, including a particular focus on cross-collaboration among projects. These efforts help us to remove the barrier for getting started with LF Edge projects, and included blogs, case studies, and webinars. These efforts go hand-in-hand with a strong global events presence this year, where we've built presentations and demos that illustrate these solutions, while introducing our efforts to new audiences. From Bilbao to Shanghai to San Jose, our members have gotten into the field and illustrated the power of open source and community.

For 2024, we look forward to continuing to highlight the work across the entire LF Edge collective. As edge computing becomes more mainstream, we need to drive education and demonstrate the importance of building a flexible edge architecture that removes siloes, simplifies solution building, and makes it possible to unlock the benefits that each of the individual LF Edge projects can provide. Providing blueprints that illustrate best practices, educating on the challenges and potential drawbacks of different approaches, and showcasing the solutions in use among our community will help those just getting started while also guiding those expanding their own projects from a single use case to many more.

"LF Edge's dedication to openness, inclusivity, and standards has not only fueled technological advancements but has also created a vibrant ecosystem where industry leaders, developers, and enthusiasts converge. The collaborative spirit within LF Edge is not just about code; it's about building a foundation for a more interconnected and intelligent world,"

— SAM ARMANI, SVP, BUSINESS DEVELOPMENT AT MIMIK TECHNOLOGY

Major Project Publications

State of the Edge Report

The community's flagship annual publication (and considered an official LF Edge project), State of the Edge report, takes an in-depth look at the edge computing ecosystem each year as it evolves across verticals, growing more rapidly than the cloud market has in the past.

The 2023 State of the Edge Report focused on key areas such as the taxonomy of edge computing, the inseparable relationship between data and AI at the edge and the critical synergy between networking and edge technologies.

White Paper: Akraino Edge Cloud Gaming Based on Arm Architecture's High Performance CPU

A collaboration among LF Edge's Akraino project and member companies Arm, Tencent and Zenlayer, as well as YSEMI, Genymotion and Alicon SE, this white paper investigates the architecture, feasibility, and use cases of Akraino Edge Cloud Gaming. The paper explores options for leveraging Akraino edge blueprints to improve gaming scenarios Download the report.

White Paper: Akraino Platform Security Architecture

Developers creating blueprints for LF Edge's Akraino take time and effort to analyze potential security threats to implement needed features. Developers may mistakenly assume the blueprint execution environment is well protected, potentially exposing their blueprints to attacks via platform-level vulnerabilities that interfere with the blueprint functionality and cause the loss of private or critical data. Learn how Akraino Platform Security Architecture (PSA helps developers secure blueprints and features. Download the report in English or Japanese.

LF Edge Deployment Case Studies

In 2023, LF Edge showcased impactful case studies of LF Edge project depoloyments, including Eaton's product development with EdgeX Foundry, and IBM, Intel, and Scale Computing demonstrating retail scalability. Akraino's PCEI blueprint facilitated multi-domain infrastructure orchestration. LF Edge's Alvarium and EVE projects improved carbon footprint monitoring at a BioGas Plant, while Fledge enhanced winery conditions with a wireless sensor network. These studies highlight LF Edge's role in advancing edge computing solutions across industries.

Industry Impact

By the Numbers

13K
PRESS CLIP MENTIONS

5
PRESS RELEASES

2.8B
POTENTIAL AGGREGATE REACH

8
MEDIA/ANALYST BRIEFINGS

400K
TWITTER & LINKEDIN IMPRESSIONS

8% LINKEDIN ENGAGEMENT RATE

On Stage at Industry Events

National Retail Federation

Mobile World Congress Barcelona

Cloud Native Telco Day

Kubernetes on Edge Day

KubeCon + CloudNativeCon Europe

OCP Regional Summit

ONE Summit Regional Day: North America

ONE Summit Regional Day: Europe

ONE Summit Regional Day: China

ONE Summit Regional Day: India

Red Hat Summit

LF Energy Summit

Automotive Open Source Summit

Flock to Fedora

KubeCon + CloudNativeCon & Open Source Summit China

OCP Global Summit

Project events

Akraino Spring Technical Meeting

Akraino Fall Technical Meeting

EdgeX "Napa" 3.1 Planning Meetings

EdgeX "Odessa" 3.2 Planning Meetings

EdgeX Coding Challenge

Top Headlines

IoT Evolution: LF Edge of The Linux Foundation is Debuting its New Sandbox SaaS to Enable Secure Edge Applications

VentureBeat: Dell's VC arm backs industrial edge software maker IOTech's expansion to North America

LightReading: Linux Foundation, NGMN team for 5G and beyond

Oil and Gas Journal: Navigating the Future of the Oil and Gas Industry: Insights and Strategies for Success

TFIR: LF Energy's FledgePOWER Forges Ahead | Benoît Jeanson – RTE

STL Partners: 7 Open Source Projects Shaping Edge Computing

Crypto News Flash: IOTA and Dell to conquer billion-$-market with 30 billion devices and 2.5M apps connected for a sustainable future

LF EDGE

Thank you to the entire
LF Edge global community
for a successful 2023!

Learn more and get involved:
www.lfedge.org