

Overview of LF AI

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 THE **LINUX** FOUNDATION

 **LF** AI

Agenda

- › The Linux Foundation and sustainable open source
- › Challenges in the current open source AI landscape
- › LF AI: Mission, structure, efforts, hosting projects, getting involved

The Linux Foundation and Sustainable Open Source

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.



Web

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



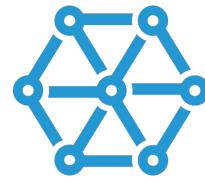
Blockchain

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



Automotive

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

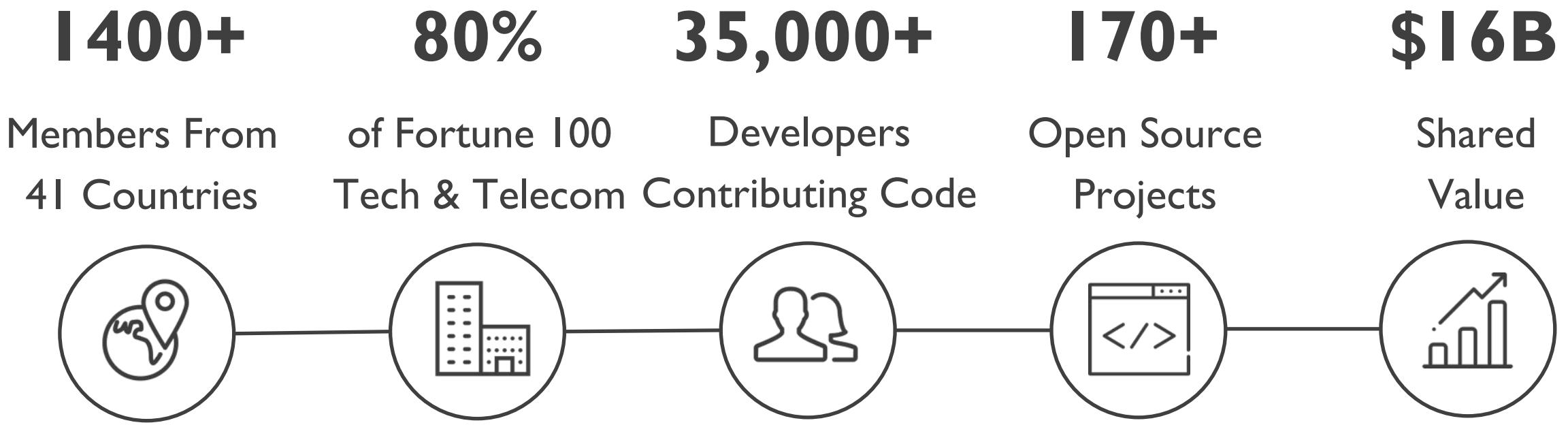


AI

We are creating a sustainable open source AI ecosystem that makes it easier to create AI products and services using open technologies.

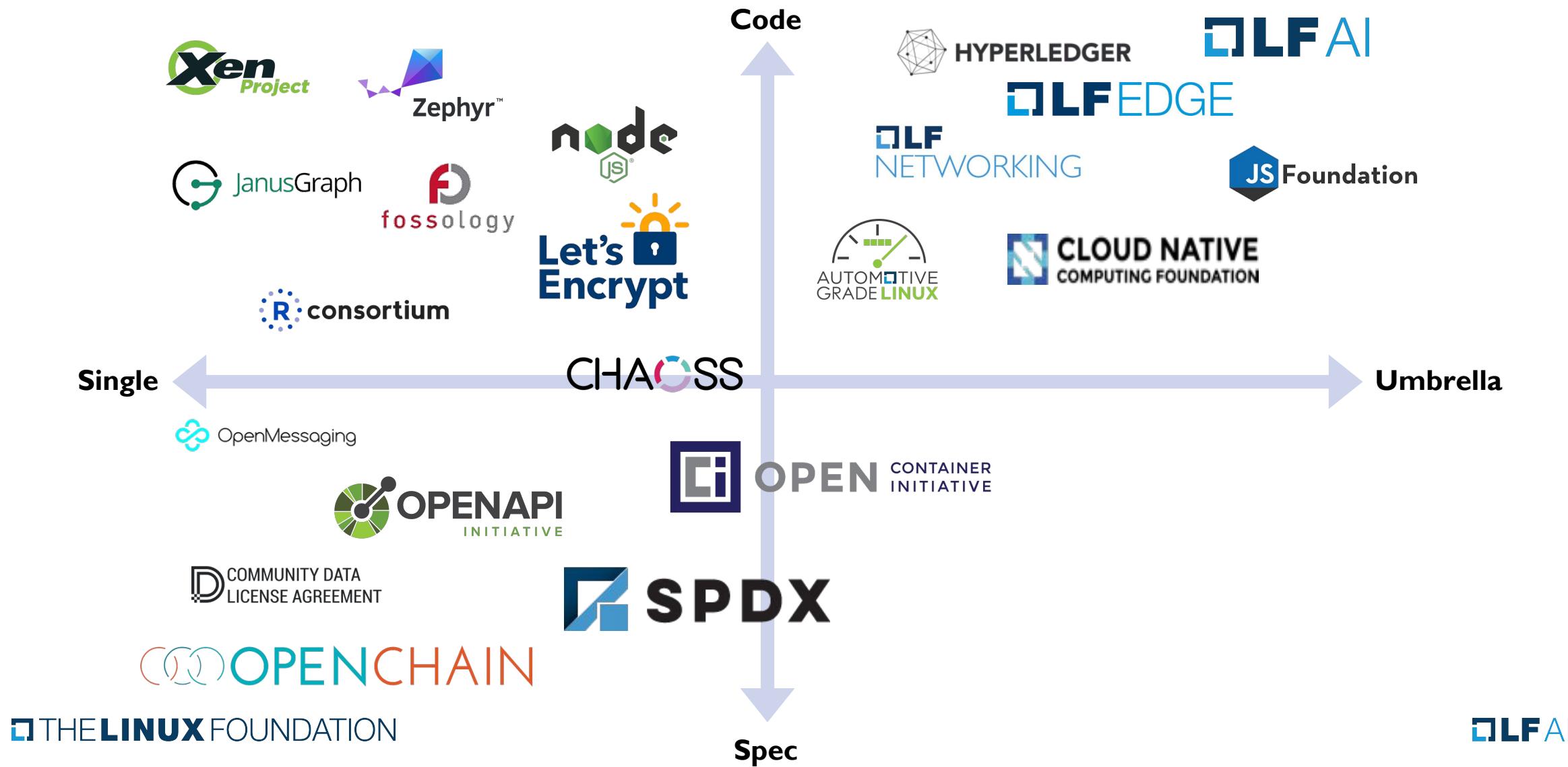


The Linux Foundation continues to grow

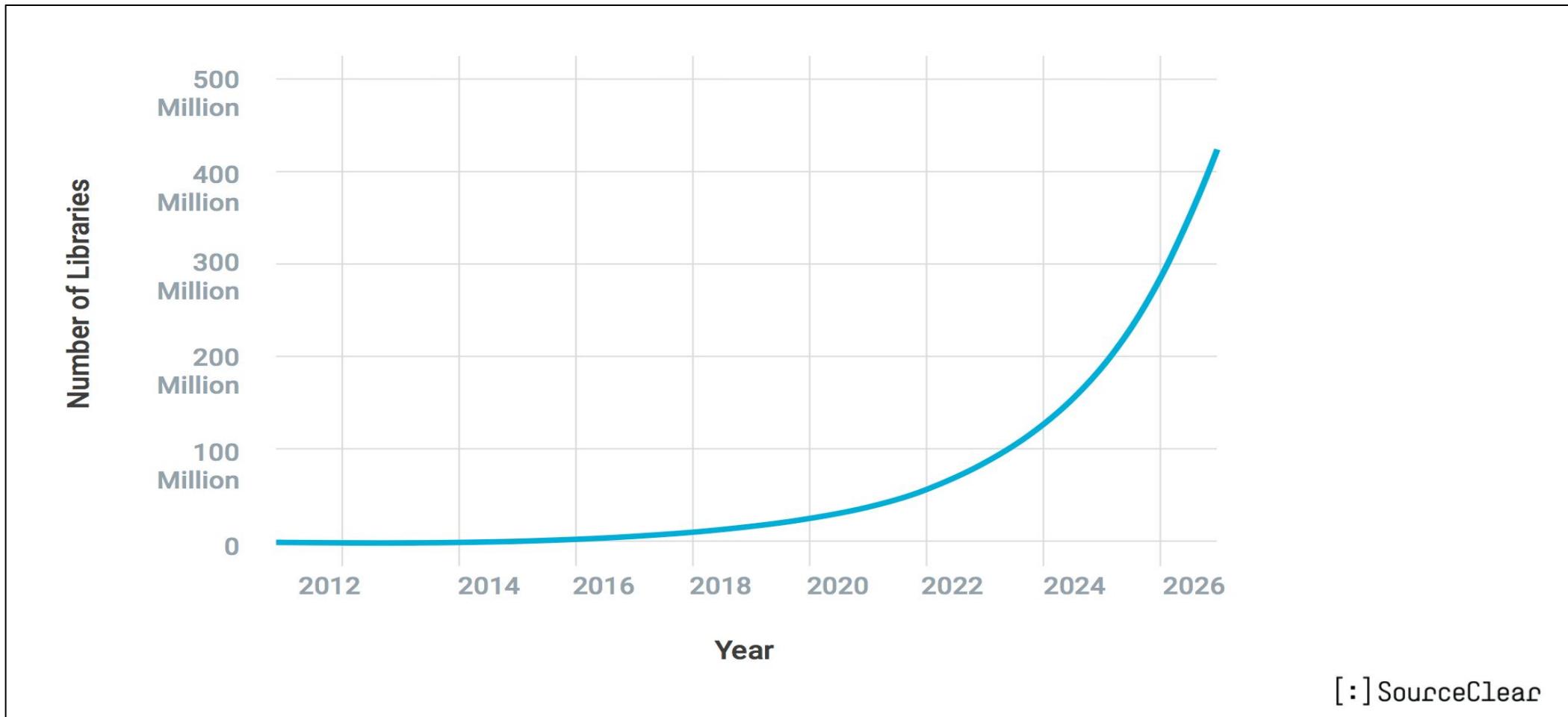


We have seen unprecedented growth in our projects

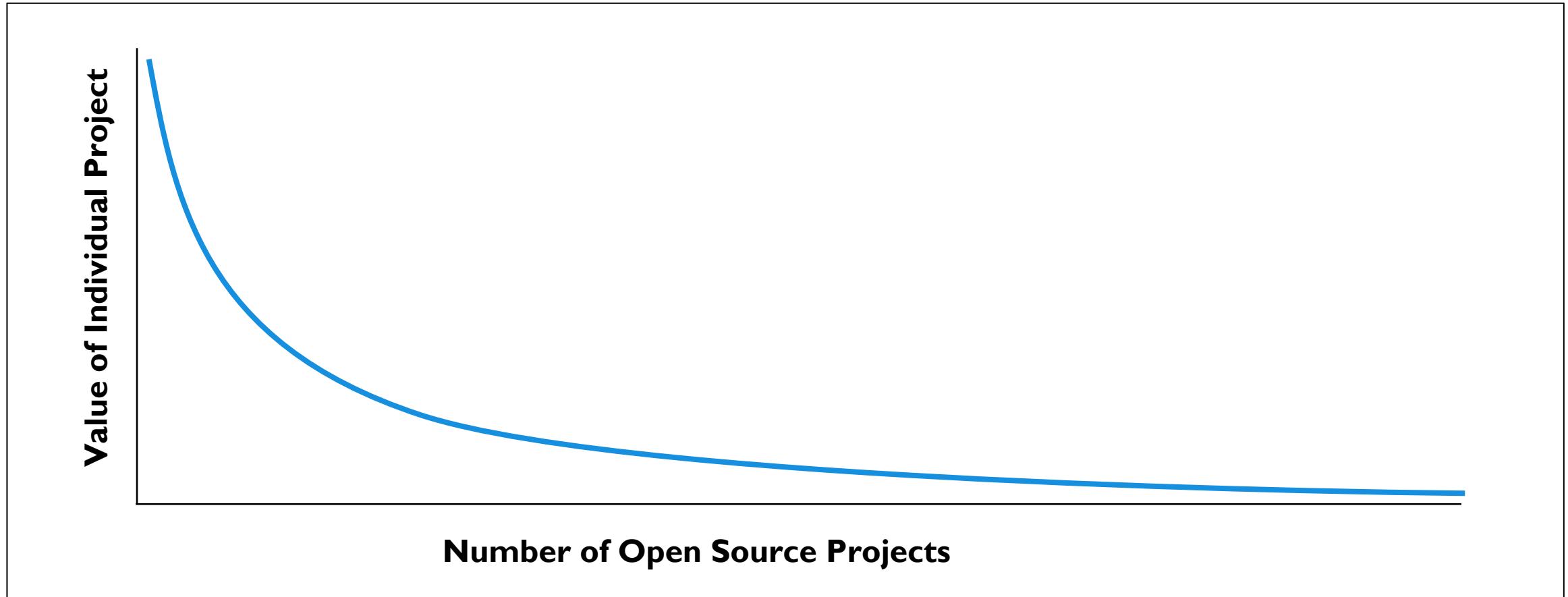
Linux Foundation project types (examples)



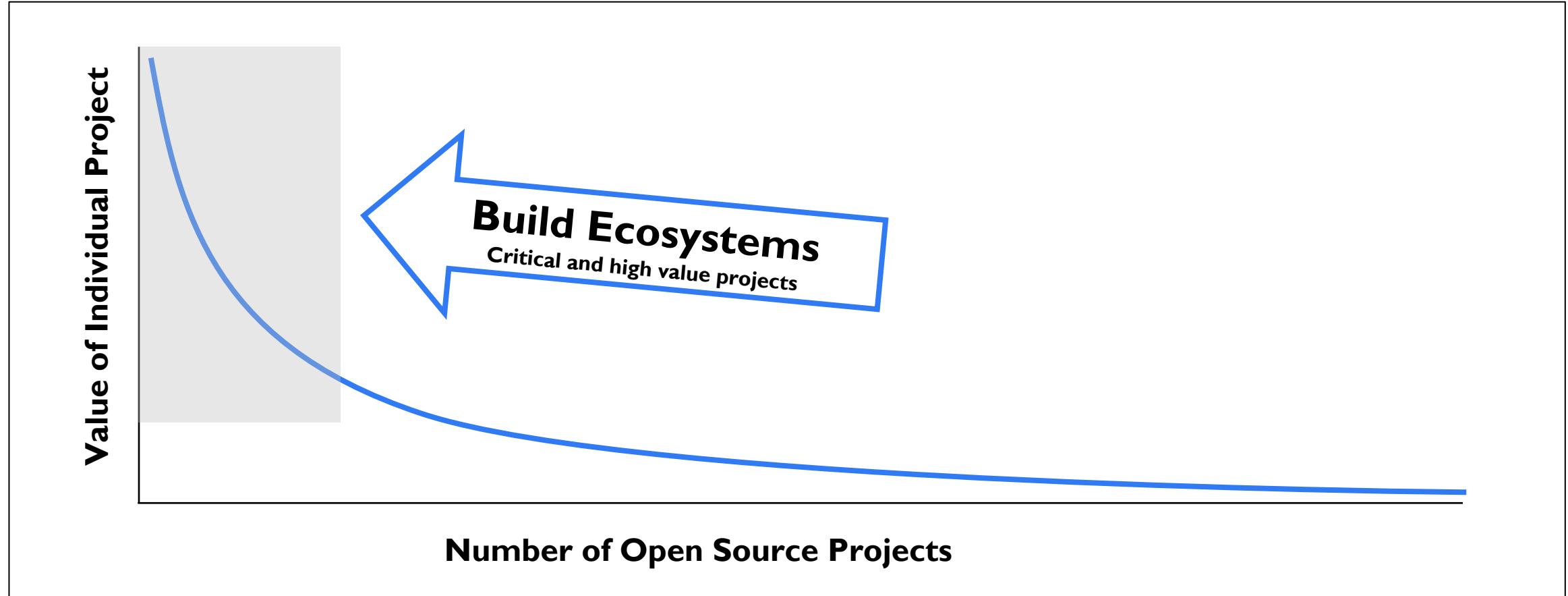
Open source isn't slowing down anytime soon



The real question is: Which projects really matter?



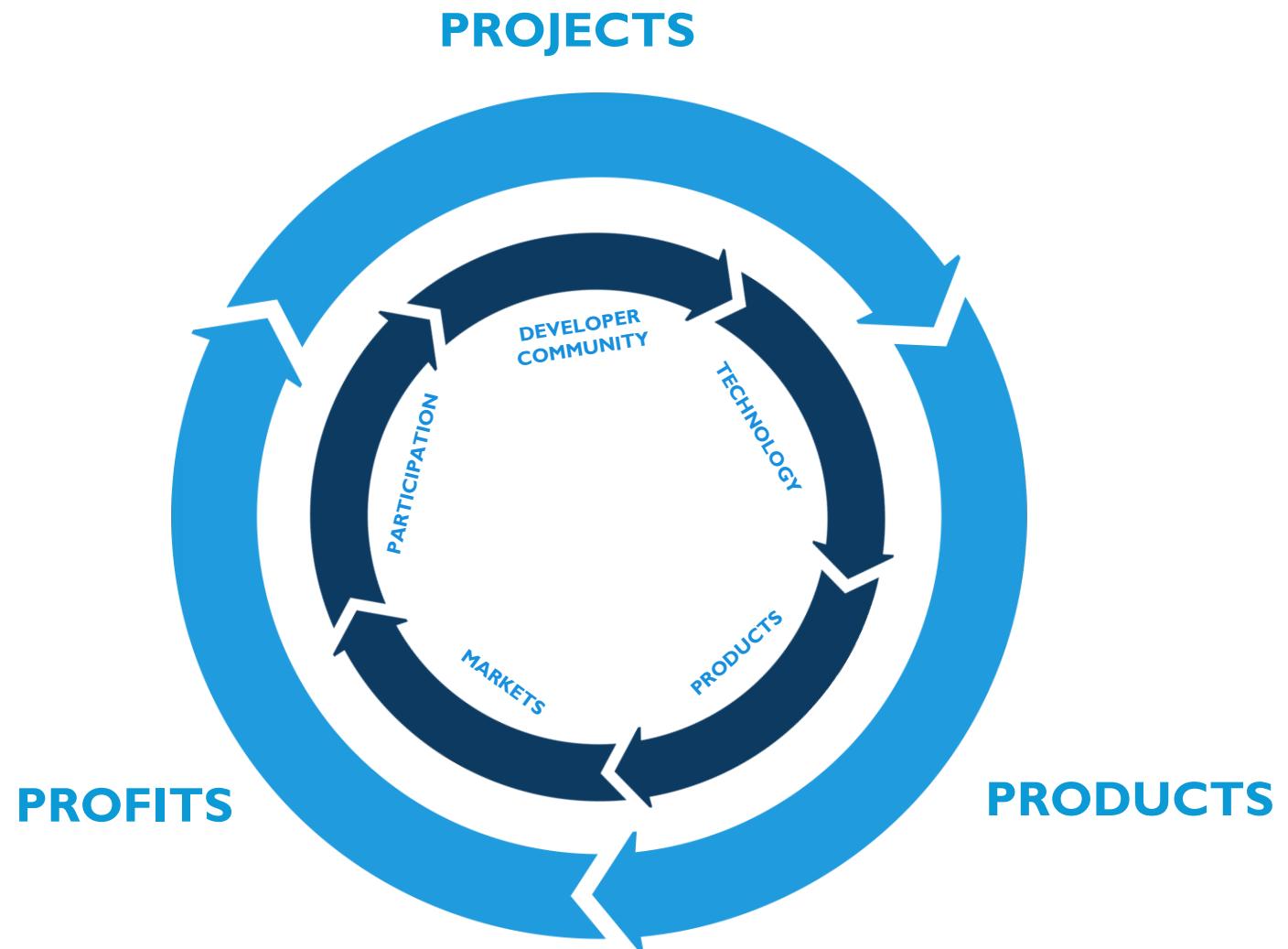
LF seeks to accelerate new projects to adoption and sustainability



The answer: projects with sustainable ecosystems

Sustainable projects have a developer community

- (1) whose technology is used in commercial solutions,
- (2) that profit businesses,
- (3) who in turn participate and reinvest back into the project and hire developers to work in the community



Creating sustainable oss projects requires hard work

Governance and Membership

- Incorporation, Tax status, Bylaws, Member Agreements, Antitrust, etc
- Ongoing business development and membership recruitment

Development Process

- Technical Decision Making
- Project Life Cycle
- Release Process

Infrastructure

- Custom infrastructure using open source best practices
- Security and reliability

Ecosystem Development

- Marketing
- Events
- Training

IP Management

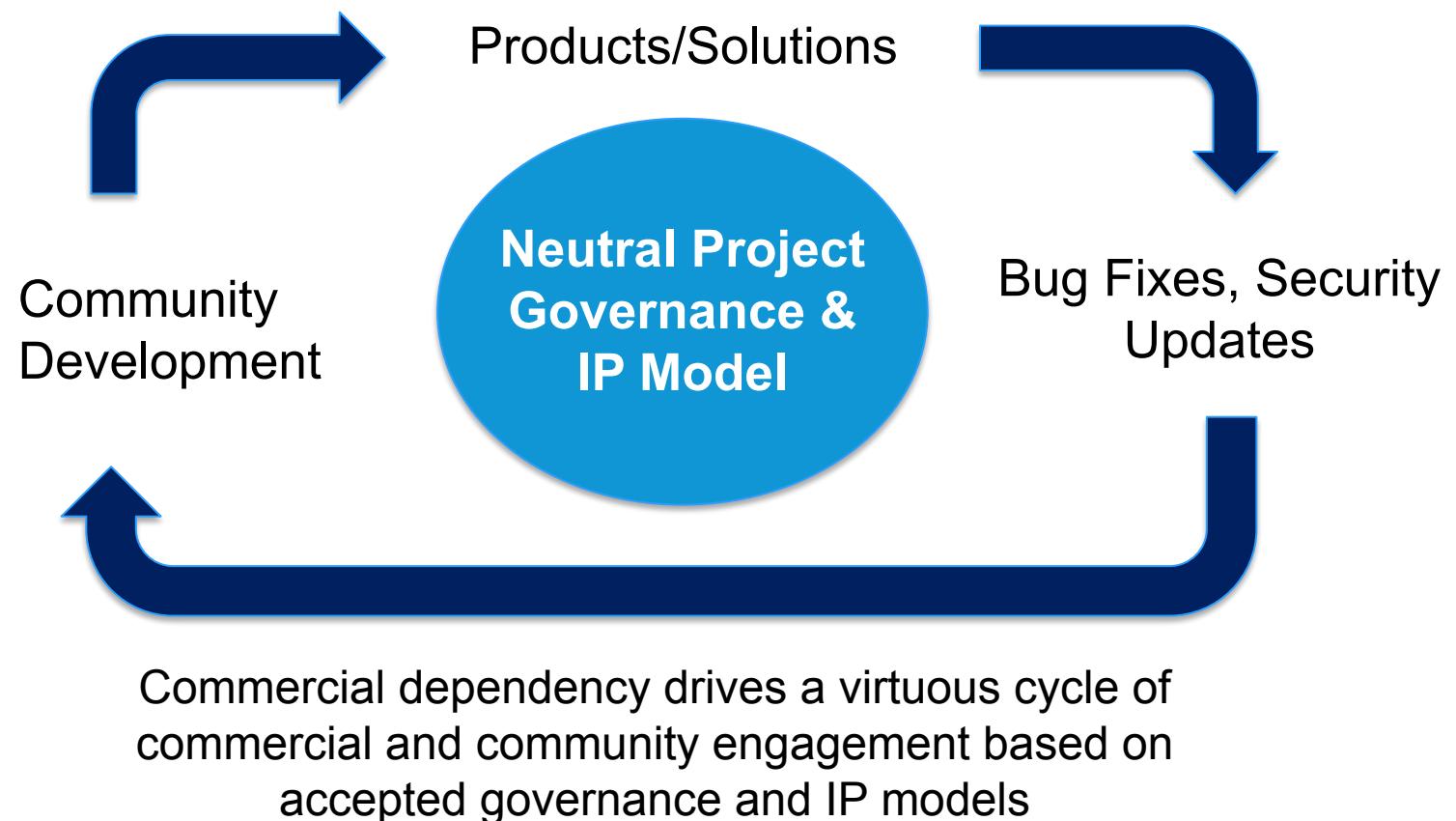
- Code Provenance and License compliance
- Trademark management
- Legal defense and Collaboration

Building successful open collaboration ecosystems usually comes down to 4 core factors

1. Neutrality
 - › No one company or organization can “take it away” from the community that forms around a project
2. Open Governance Do-ocracy
 - › The most successful projects that have stood the test of time have neutral, open governance models where those who do the work make the decisions in a defined governance model
3. IP Clarity
 - › Removal of IP uncertainty enables anyone to get involved as a contributor or implement as a user
4. Commercial Support Ecosystem
 - › Encouraging commercial engagement in the project leads to jobs, faster adoption, new contributions and features that address new use cases

When the 4 core factors are present the project becomes part of a continuous, sustainable ecosystem model

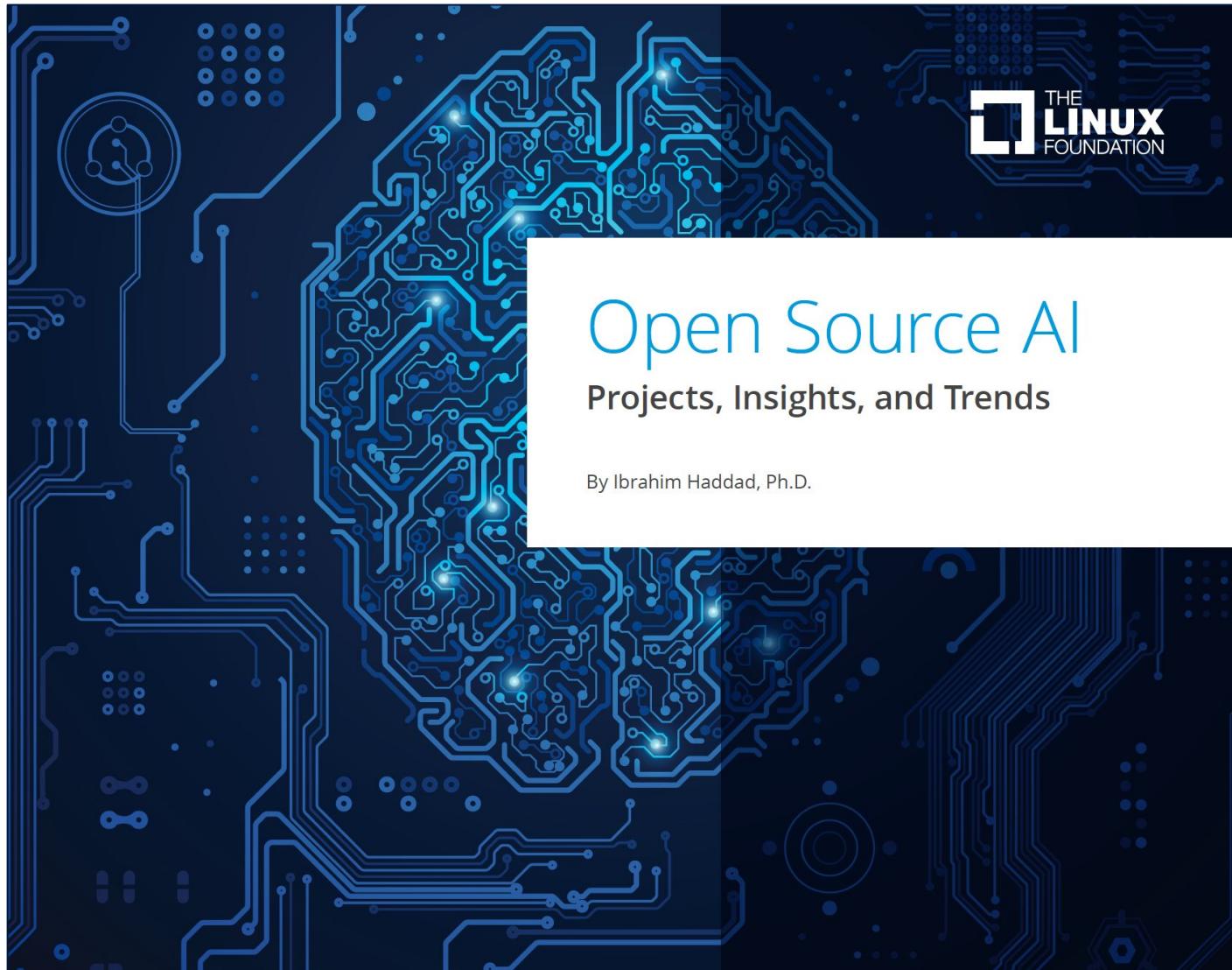
Sustainable projects have a developer community whose technology is used in commercial solutions that profit businesses, who in turn participate and reinvest back into the project and hire developers to work in the community.



Challenges in the Current Open Source AI Landscape

Published May 2018

Available for [download](#)



AI is dominated
by open source
software!

166

Projects Over 1,000,000 GitHub Stars

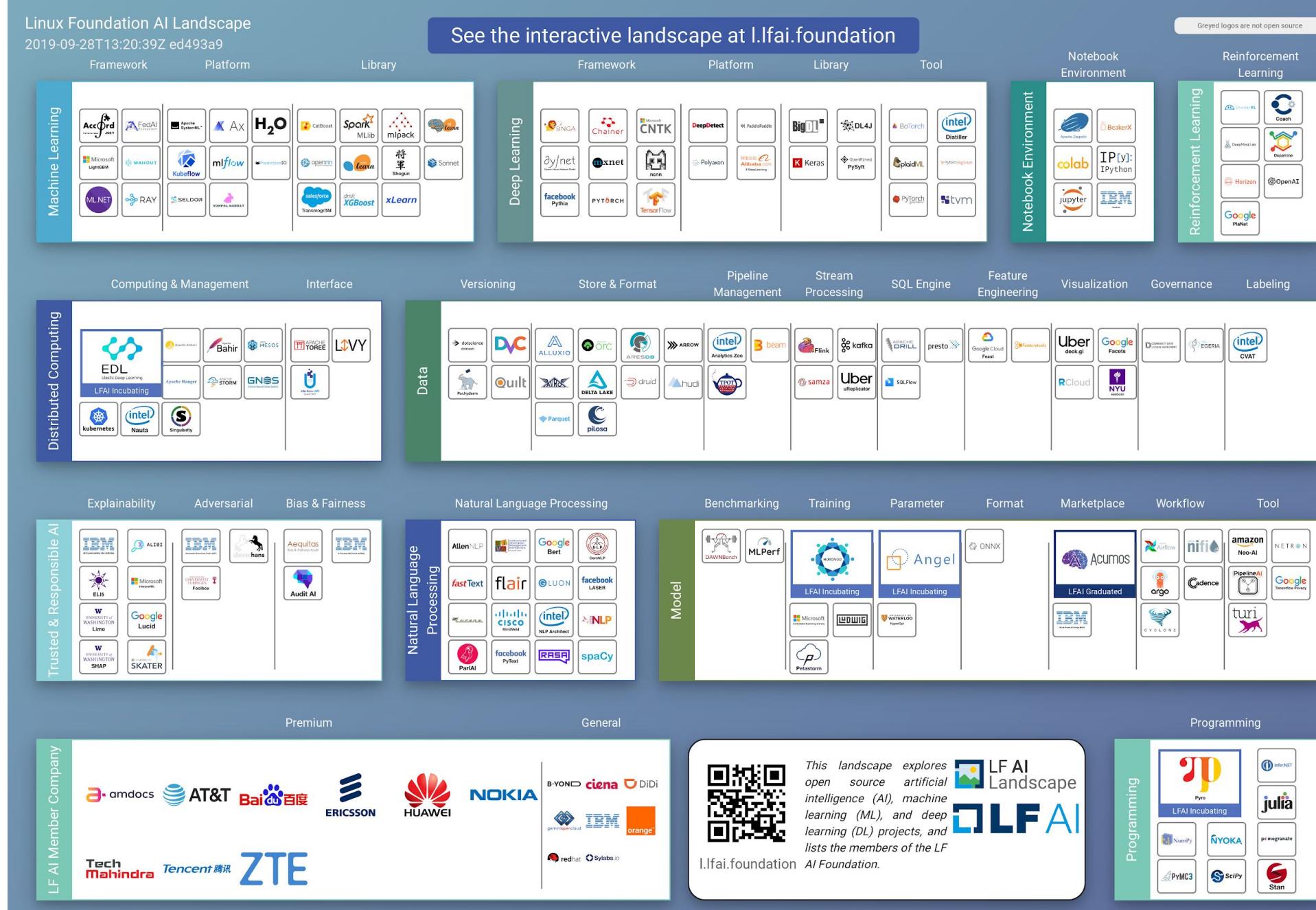
10

Categories

70

Organizations

Market cap of \$6.49T



You are currently tracking **355,762,809 lines of code**,
committed by **30,204 developers**,
from 282 known organizations,
working in 240 repos, on 178 projects
over the last 5 years, 7 months, and 14 days.

Developed internally to address specific product requirements

- › AI systems are usually created as proprietary technologies with a specific product or service in mind
- › They involved high cost due to the cost of human capital and the time required to develop such a complex technologies
- › The open source spinoff is a consequence of wanting to build an ecosystem and a desire to collaborate with others on constructing a platform

Most AI related open source projects are the results of years of investment and talent acquisition

Little contributor cross-pollination

- › Most large companies have open sourced their own AI related projects (platform code, frameworks, libraries) as early as 2014
- › We continue to witness almost weekly such announcements
- › Given the specific product focus (niche), these same large companies are little invested outside of their own open source projects

This situation has created a limited cross-pollination across projects and has led most projects to have very few major contributors

Pytorch

Tensorflow

Stats as of Sept 1, 2019,
using [Facade](#)

All contributions

Patches landed by all authors, by affiliation

	2014	2015	2016	2017	2018	2019	Total
Facebook	15	53	721	3,520	2,946	2,140	9,395
(Unknown)	95	106	925	2,460	2,845	847	7,278
Google	11	233	46	3	2	8	303
(Academic)	0	12	3	144	504	130	793
NVidia	0	10	68	116	73	42	309
Idiap Research	20	0	0	0	0	0	20
Intel	0	0	0	2	37	38	77
AMD	0	0	0	0	25	36	61
Microsoft	0	0	0	0	22	31	53
Twitter	1	12	9	27	0	0	49
Instagram	0	0	7	5	6	11	29
University of Cambridge	0	0	3	0	0	0	3
Uber	0	0	0	2	11	6	19
Qualcomm	0	0	0	0	8	1	9
Yandex	0	0	0	0	3	5	8
IBM	0	0	0	7	29	9	45
Computer Vision Center	0	0	0	5	0	0	5
Virginia Tech	0	0	3	2	0	0	5
Samsung	0	0	0	1	2	1	4
Cloudera	0	0	0	0	1	0	1
Allen Institute for Artificial Intelligence	0	0	0	2	0	0	2
Baidu	0	0	0	1	1	1	3
SAS	0	0	0	0	0	1	1
Oak Ridge National Laboratory	0	0	0	0	0	1	1
Netflix	0	0	0	0	1	0	1
Freelance	0	0	0	0	0	1	1
ACM	0	0	0	1	0	0	1
Mozilla	0	0	0	0	1	0	1
Fujitsu	0	0	0	0	0	1	1
Total from all contributors	142	426	1,785	6,298	6,517	3,310	18,478

All contributions

Patches landed by all authors, by affiliation

	2014	2015	2016	2017	2018	2019	Total
Google	0	413	10,306	11,646	15,708	9,207	47,280
(Unknown)	0	65	1,386	1,691	2,578	1,358	7,078
Intel	0	0	4	132	448	302	886
NVidia	0	0	0	13	302	439	754
Infoblox	0	0	0	196	628	154	978
(Academic)	0	0	56	116	117	24	313
Codeplay	0	0	51	57	1	0	109
Uptake	0	49	136	0	0	0	185
IBM	0	0	2	47	99	100	248
Huawei	0	0	15	0	11	243	269
Graphcore	0	0	0	22	39	23	84
Microsoft	0	0	40	59	20	0	119
ARM	0	0	0	0	0	22	22
Alibaba	0	0	0	0	17	31	48
AMD	0	0	0	0	5	51	56
minds.ai	0	0	0	7	0	1	8
Pics Art	0	0	0	0	6	0	6
KTH Royal Institute of Technology	0	0	2	0	14	0	16
Mellanox	0	0	0	12	7	0	19
Yandex	0	0	1	0	2	0	3
Julia Computing	0	0	0	0	4	0	4
Facebook	0	0	0	0	1	6	7
Apache Software Foundation	0	1	33	0	0	1	35
Spreadtrum Communications	0	0	0	3	1	0	4
Clarifai	0	0	1	0	8	0	9
H2O.ai	0	0	0	0	12	1	13
RStudio	0	0	0	7	0	0	7
Spotify	0	0	0	0	1	0	1
Amazon	0	0	0	0	1	1	2
Allen Institute for Artificial Intelligence	0	0	0	2	0	0	2
Baidu	0	0	1	1	0	0	2
Caicloud	0	0	0	1	1	0	2
Adobe	0	0	0	0	0	9	9
Novell	0	0	0	0	1	0	1
Samsung	0	0	0	1	1	0	2
Uber	0	0	0	1	1	2	4
Mozilla	0	0	0	0	1	0	1
China Mobile	0	0	0	1	0	0	1
ZTE Corporation	0	0	0	3	0	0	3
LinkedIn	0	0	0	0	0	1	1
Virginia Tech	0	0	1	0	0	0	1
Red Hat	0	0	0	0	1	0	1
Senseta	0	0	0	0	1	0	1
Howard Hughes Medical Institute	0	0	0	1	0	0	1
Dropbox	0	0	0	0	1	0	1
Minio	0	0	0	0	1	0	1
Tencent Technology	0	0	0	0	1	0	1
Total from all contributors	0	528	12,045	Screenshot	20,040	11,976	58,598

Development and governance is dominated by a single large entity or the original creators of the project

- › Some of the most popular projects are heavily influenced by few large entities or their tightly coupled with their original authors.
- › When the original authors move on to other projects because of changing affiliations (i.e. having a new employer, or leaving academia to industry), the projects slow down drastically, and in many cases, development has halted in favor of other AI projects supported by the new employer.

Contributing factors to this phenomenon is that AI platform development requires a very narrow band of specialized knowledge

Governance matters

- › Open source AI projects have a wide variety of governance models
 - › Some projects are tightly coupled to a single host
 - › Others have a more diverse contributor base with a broader focus
- › Based upon historical patterns, open source projects with more diverse contributor patterns last longer and are more likely to survive when a major contributor changes strategy

Projects benefit greatly from focused momentum of a single large host, but the lack of contributor diversity is a continuous existential risk for most projects

Open source and its network effect

Why do we continue to see companies open source their AI related technologies?

- › The realization that the true value is in the models, training data, and the apps
- › By open sourcing a platform, the host has an opportunity to recruit other contributors, particularly if other organizations can be incentivized to integrate the platform into their own products

As with any technology where talent premiums are high, the network effects of open source are very strong

Challenges, Summary

Fragmentation,
lack of integration and
harmonization,
lack of projects's cross
pollination

Developed for specific
product needs. The
open source spinoff is a
result of wanting to
build an ecosystem and
collaborate on building
a platform

no formal governance,
governance favors the
creators of the project,
or project backer
dominating dev and
governance

Glass ceiling for
project investment
and adoption in the
absence of a fair
governance

As project grows, it
is unclear who
should own legal
and administrative
tasks that are
essential to the
health of the project

The promise of AI open source ecosystem

Unique reasons to AI that favor the open source model and ecosystem

Fairness

Methods to detect and mitigate bias in datasets and models, including bias against known protected populations

Robustness

Methods to detect alterations/tampering with datasets and models, including alterations from known adversarial attacks

Explainability

Methods to enhance understandability/interpretability by persona/roles in process of AI model outcomes/decision recommendations, including ranking and debating results/decision options

Lineage

Methods to ensure provenance of datasets and AI models, including reproducibility of generated datasets and AI models

(Open) Data - Requires cleaning, sorting, tagging and provenance tracking, and a governance structure for doing these things

The LF AI Foundation

Web site: <https://lfdl.io>

Landscape: <http://l.lfdl.io>

GitHub: <https://github.com/LFDLFoundation>

Wiki: <https://wiki.deeplearningfoundation.org>

What is the LF AI Foundation?

- LF AI is a an LF umbrella foundation founded in March 2018 to support collaboration and open source innovation in the AI, ML, and DL domains
- LF AI members are collaborating to create a neutral environment with an open governance for harmonization and acceleration of separate technical projects focused on AI, ML, and DL technologies

Governance

- › LF AI is a single funding effort to support technical projects hosted under the Foundation
- › Technical projects have their own technical governance following our principle of separation of technical governance from funding governance
- › The Foundation's Charter is available from <https://lfaifoundation>

Members

Premier	a· amdocs	AT&T	Baidu 百度	ERICSSON	HUAWEI
	NOKIA	Tech Mahindra	Tencent 腾讯	ZTE	
General	B-YOND	ciena	DiDi	geminiopencloud	
	IBM	orange™	redhat	Sylabs.io	
Associate	ETL ETHICAL ML INSTITUTE	<p><i>The Associate membership category is limited to academic and nonprofit institutions respectively and requires approval by the Governing Board.</i></p>			

Mission

Build and support an open AI community, and drive open source innovation in the AI, ML and DL domains by enabling collaboration and the creation of new opportunities for all the members of the community

Structure

Funding Governance

Governing Board

Project Coordination

Technical
Advisory
Council
(TAC)

Technical Projects

Acumos

EDL

Angel

Horovod

Pyro

Adlik

Committees

Outreach

Legal

Budget

Strategy

Trusted
AI

Developer
Community

Developer
Community

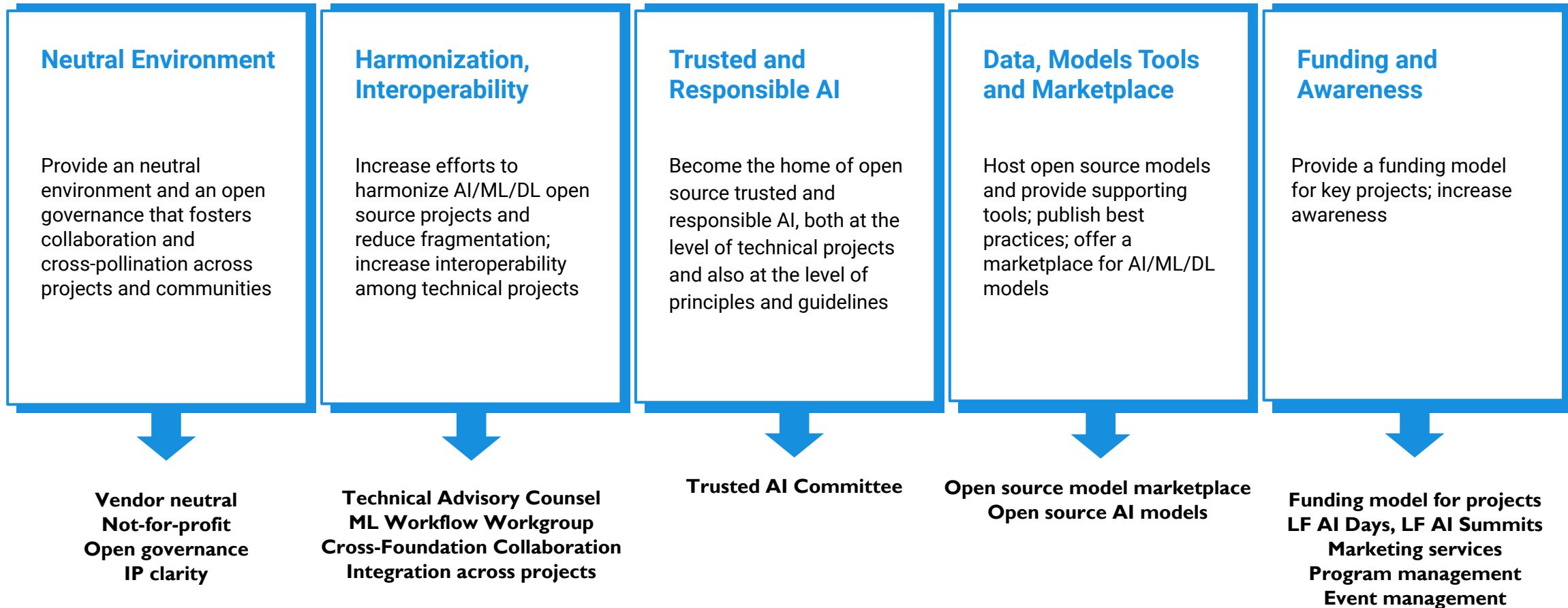
Developer
Community

Developer
Community

Developer
Community

Developer
Community

Goals



Why join LF AI?

- › Partner with LF AI members to collaborate on existing projects or create new projects
- › Support the efforts to harmonize stacks and minimize fragmentation
- › Share the cost of development as it relates to specific AI technologies
- › Solve technical problems that can only be solved by fostering collaboration among many players
- › Support LF AI hosted projects and want to make sure they continue to evolve
- › Support that open ecosystem
- › Provide financial support to LF AI to create programs and services in support of long term growth
- › Integrate your efforts (proprietary or open source) with LF AI hosted projects
- › Promote your open source AI projects and efforts

LF AI hosted projects



Machine learning platform and distributed marketplace for ML models.

Contributed by AT&T and Tech Mahindra - April 2018

<https://github.com/acumos>

7K+ commits

89 contributors

License: Apache-2.0



A high-performance distributed ML platform based on Parameter Server, running on YARN and Apache Spark.

Contributed by Tencent - August 2018

<https://github.com/Angel-ML/angel>

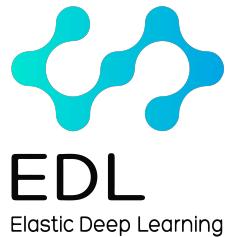
2K+ commits

39 contributors

4K+ stars

License: Apache-2.0

Projects



A framework designed to help DL cloud service providers to build cluster cloud services using different DL frameworks.

Contributed by Baidu - August 2018

<https://github.com/paddlepaddle/edl>

900+ commits

15 contributors

License: Apache-2.0



Distributed training framework for TensorFlow, Keras, and PyTorch. The goal of Horovod is to make distributed Deep Learning fast and easy to use.

Contributed by Uber - December 2018

<https://github.com/horovod/horovod>

400+ commits

57 contributors

>7K stars

License: Apache-2.0

Projects



Pyro is a universal probabilistic programming language written in Python and supported by PyTorch on the backend.

Contributed by Uber - January 2019

<https://github.com/pyro-ppl/pyro>

1,600+ commits

62 contributors

5,595 stars

License: Apache-2.0

Adlik

Adlik is an end-to-end optimizing framework for DL models. The goal of Adlik is to accelerate DL inference process both on cloud and embedded environment.

Contributed by ZTE - Septmber 2019

<https://github.com/Adlik/Adlik>

License: Apache-2.0

Universities Contributing to LF AI Projects

- › Georgia Tech
- › University of British Columbia
- › Stanford University
- › MIT
- › Harvard University
- › Oxford University
- › Penn University
- › NYU
- › Florida State University
- › University of Copenhagen

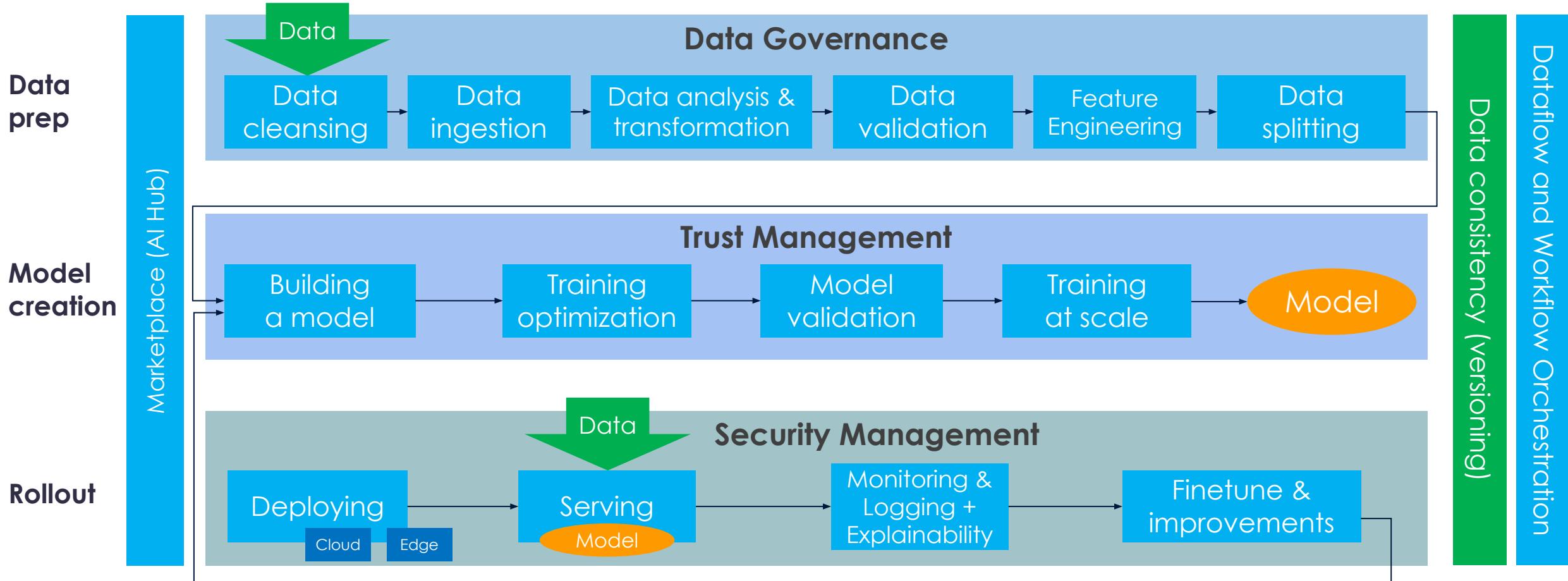
LF AI 2019 Major Milestones

Pyro becomes LF AI incubation project	February	IBM joins LF AI	August
Ericsson joins LF AI	February	LF AI Track, OSS NA	August
SyLabs joins LF AI	April	Horovod releases 0.17	August
LF Deep Learning becomes LF AI	May	Angel releases 3.0	August
Establish Trusted AI Committee	June	ML Workflow Published v1	August
Acumos releases Boreas	June	LF AI Day, Paris	September
LF AI Track, OSS/KubeCon China	June	LF AI Day, Shanghai	September
Gemini Open Cloud joins LF AI	June	Updated Project Proposal & Lifecycle	September
Orange AI Marketplace	June	Adlik becomes LF AI Incubation project	September
TechM launches GAiA 2.0	August	LF AI Seminars in Yokohama	October
		LF AI Summit, OSS EU	October

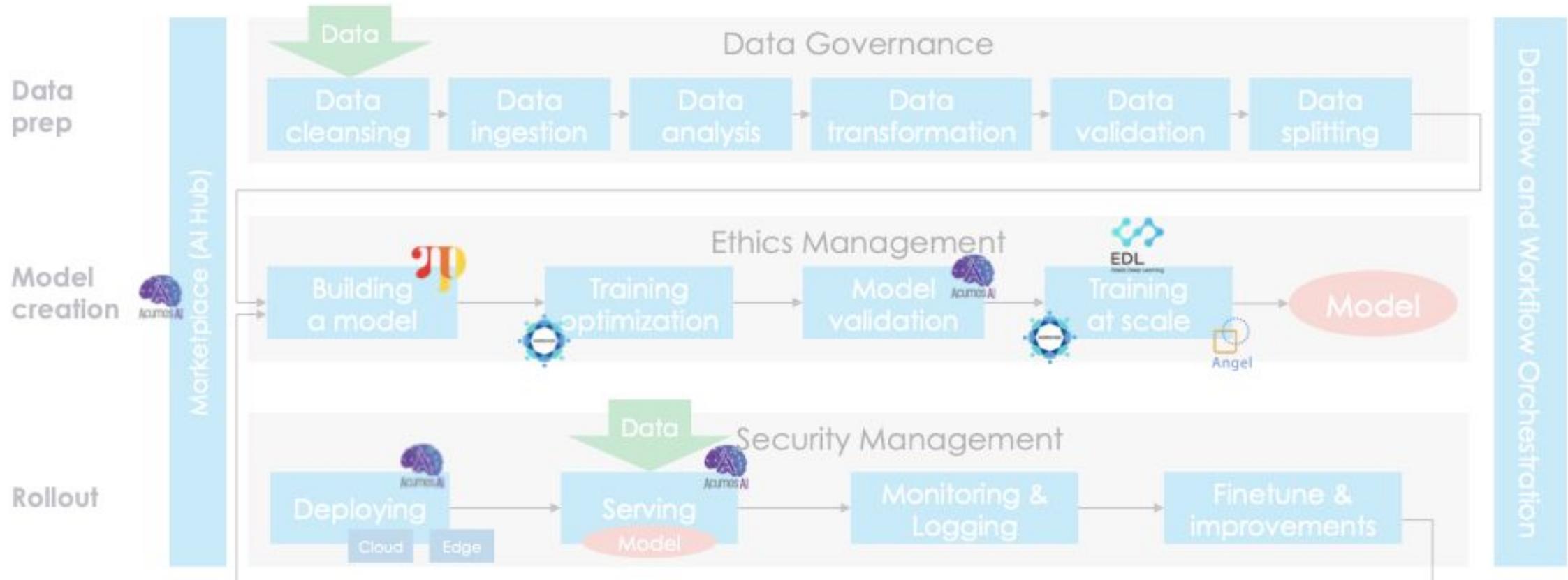
Work Groups and Ongoing Efforts

LF AI - ML Workflow

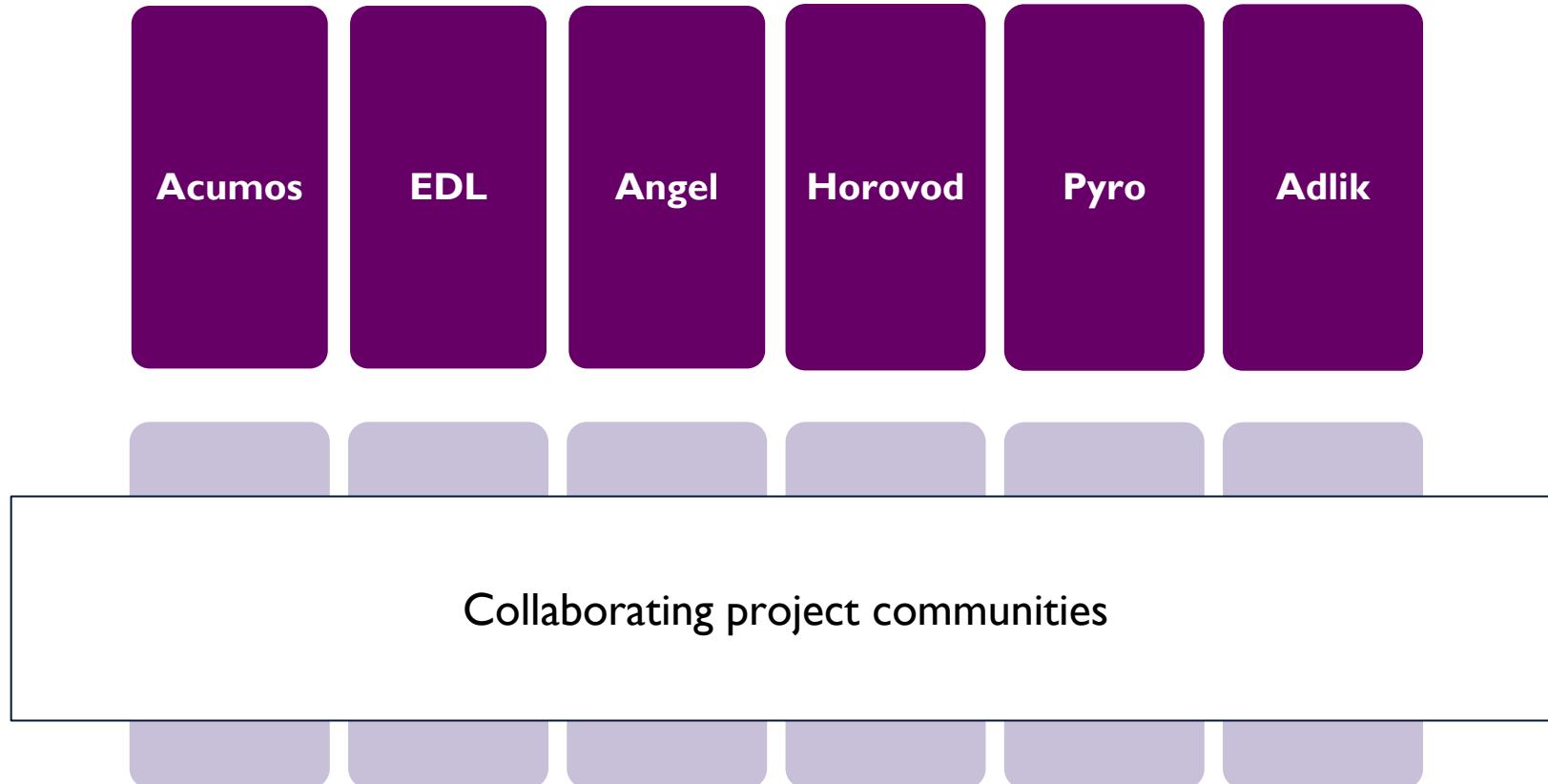
Reference workflow and implementation; integration and harmonization



LF AI - Project Fit in ML Workflow



ML Workflow Effort - Foster collaboration and integration across LF AI hosted projects



LF AI - Trusted AI Committee

- › **Focus** - Policies, guidelines and tooling
- › **Threads** - Fairness, robustness, explainability, and lineage
- › **Documentation** - Content that describes the basic concepts and definitions in relation to Trusted AI in an effort to standardize the vocabulary and terminology
- › **Badging Program** - Targeted for open source projects that meet the Trusted AI Ethics policies and guidelines as defined by LF AI
- › **Training** - edX courses in collaboration with the LF training organization

LF AI Strategy Committee

- › Revisit and redefine the scope/mission of LF AI
- › Define, document and promote the key value propositions of LF AI
- › Define scope and inter-working of LF AI with other LF communities

Cross Collaboration Opportunities

[LF Edge](#): Trusted AI is needed in edge devices, from driverless vehicles to smartphones to automated factories and farms. Industry fragmentation is a major challenge for edge development. LF Edge brings together projects across Internet of Things (IoT), cloud, and enterprises to increase unity across platforms, communities, and ecosystems. LF Edge fosters collaborations with end users, vendors, and developers to transform all aspects of edge technology and speed open source development.

[LF ODPi](#): Data is at the heart of building open source trusted AI systems – and data governance is especially needed. ODPi provides one of the only vendor neutral, open source standards to enable best practices for data governance, connectivity, business intelligence, analytics, and AI systems.

[LF Energy](#): The energy industry needs open source trusted AI across a wide range of business processes, from predicting demand to predictive maintenance of equipment and more. LF Energy provides a vendor-neutral, collaborative environment to “enable the electrification of everything to scale,” thereby transforming the world’s relationship to the important resource of energy.

[LF ONAP](#): Trusted AI embedded in the network is a priority for the communications industry. The Open Network Automation Platform (ONAP) is ready to be infused with AI to enhance real-time, policy-driven orchestration and automation of physical and virtual network functions. Communication industry providers and developers can use open source to rapidly automate new services and support complete lifecycle management.

[LF CNCF](#): The need for trusted AI In the cloud is the dominate way AI capabilities will be accessed for enterprise business processes. The Cloud Native Computing Foundation (CNCF) hosts critical components of the global technology infrastructure.

Hosting a Project in LF AI

Why host a project under an open source foundation?

- › A neutral hosting environment without any commercial interest. Its primary interest is the success of the open source project
- › An open and fair governance model to help the project gain wider community adoption
- › Unite several companies working on similar projects under a common project, and transferring management of the project to the foundation
- › The foundation would fund raise for the project and provide services required by the project

LF AI Project Hosting Requirements

1. Use an approved OSI open source license
2. Be supported by a LF AI member
3. Fit within the mission and scope of LF AI
4. Allow neutral ownership of project assets such as a trademark, domain or GitHub account (the community can define rules and manage them)
5. Have a neutral governance that allows anyone to participate in the technical community, whether or not a financial member or supporter of the project

On-boarding Projects into LF AI

Projects are on-boarded and progress pursuant to the LF AI Foundation's Project Lifecycle and Contribution Process.

- › Three stages: Incubation, Graduation and Emeritus.
- › These documents can be found on [GitHub](#) or on <https://lfai.foundation>

LF AI Project Maturities

Incubation

Projects join LF AI as incubation by meeting the requirements set forth in the “Project Process and Lifecycle Document”.

TAC Vote.

Graduation

Incubation requirements.

Additional requirements as set in the “Project Process Lifecycle Document”.

TAC Vote + GB Vote.

Emeritus

Emeritus projects are projects which the maintainers feel have reached or are nearing end-of-life. Emeritus projects have contributed to the ecosystem, but are not necessarily recommended for modern development as there may be more actively maintained choices.

TAC Vote + GB Vote.

Criteria to Accept Incubation Project Under LF AI

1. The project uses an OSI-approved open source license
2. The project does not have dependencies on components that are either proprietary or licensed under a non OSI-approved license
3. Submit a completed Project Contribution Proposal to the TAC via a Github pull request (<https://github.com/lfai/proposing-projects/tree/master/proposals>) along with a short and a short email notification to info@lfai.foundation
4. Provide any additional information as the TAC or GB may reasonably request
5. Demonstrate a substantial ongoing flow of commits and merged contributions
6. Have a healthy number of committers. A committer is defined as someone with the commit bit; i.e., someone who can accept contributions to some or all of the project
7. Be deemed by the TAC and GB to add value to the artificial intelligence, machine learning and/or deep learning space and to fall within the mission and scope of LF AI
8. Agree to transfer any relevant trademarks to The Linux Foundation

Benefits to Hosting with LF AI 1/2

- › Offers a neutral home for the project which increases the willingness of developers from other enterprise software companies, start-ups and independent developers to collaborate, contribute, and become committers
- › Leverage the expertise of the parent organization, The Linux Foundation, which hosts over 180 successful large scale open source projects
- › Access to dedicated Foundation staff who are eager to assist in a myriad of ways to help the project be successful
- › Access to a larger community, larger pipeline of potential users and adopters
- › Integration opportunities with other LF AI hosted projects
- › Scalable and neutral governance – the Foundation supports projects in documenting their technical governance or to adopt a new neutral governance
- › Neutral hosting of the project's trademark
- › Support in marketing, PR, communication, and awareness – generate positive media and analyst coverage to create greater awareness of project milestones, community growth, and developer engagement

Benefits to Hosting with LF AI

2/2

- › Collaboration opportunities with other LF AI hosted projects
- › Compliance scans for source code repos on an ongoing basis
- › IT enablement – supporting projects with their IT infrastructures
- › Refer to the project as an “LF AI Foundation {Incubation | Graduation} Project”
- › Appointment of an existing TAC member that will act as a sponsor of the project and provide recommendations regarding governance best practices
- › Access to LF AI booth space at various events for demo purposes
- › Promote project news and milestones through various communication channels
- › Event support via LF AI Day, LF AI Summit, and across LF events
- › Graduation Projects get a voting seat on the TAC
- › Graduation projects are eligible to request and receive funding support contingent on the approval of the Governing Board

LF Data Related Projects

Community Data License Agreement

[cdla.io]

A framework for collaborative sharing of data

CDLA Sharing

Designed to embody the principles of copyleft in a data license. In general, if someone shares their data, the CDLA-Sharing agreement puts terms in place to ensure that downstream recipients can use and modify that data, and are also required to share their changes to the data.

CDLA Permissive

Similar to permissive open source licenses in that the publisher of data allows anyone to use, modify and do what they want with the data with no obligations to share any of their changes or modifications.



Data Values & Principles

These values and principles, taken together, describe the most effective, ethical, and modern approach to data teamwork.



Data Practices Courseware

Consume and collaborate on free and open courses designed to help everyone from the novice to the expert data practitioner.

Getting Involved in LF AI

Get Involved with LF AI Technical Projects

Participate in the development: Review and submit patches, report bugs, request features, test, etc.

Contribute to project documentation

Join the projects' mailing lists and participate in the discussions

Attend developer events for LF AI projects

Provide your testing and deployment feedback via appropriate project channel

Start a local User Group Meetup

Get Involved with the LF AI Technical Advisory Council

Support TAC leadership in inviting speakers to present for the LF AI technical community

Share success stories, opportunities and challenges with the broader technical community

Support technical leadership for integration and harmonization efforts with other oss projects

Support TAC in evaluating new projects for inclusion in LF AI; recommend new projects

Participate in the ML Workflow effort aiming to
 provide a reference workflow and support integration across LF AI projects

Attend TAC Bi-weekly calls, participate in the discussions

Identify opportunities for collaboration on common interests and initiatives, seek input from peers

Support TAC in hosting and sponsoring intra-project and inter-project developer events

Support TAC Chair working with the GB to highlight opportunities and needed resources

Participate in the effort to enable collaboration
 with other LF umbrella foundations and external communities

Get Involved with LF AI Outreach Committee (OC)

Promotion of project updates, releases, and news via LF AI social media accounts

Marketing and PR support for demos at meetups and events

Contribute to the LF AI landscape, promote in talks

Identify speaking opportunities and help secure speakers from the LF AI community

Attend Outreach Committee meetings and participate in ongoing activities

Host vendor neutral content via LF AI blog site

Coordination at events, speaking proposals, booth attendance, demos, etc.

Help secure user stories about LF AI based deployments

Publish use cases, case studies, white papers, and deployment insights

Get support for artwork, web site, content creation, etc., for LF AI projects

Volunteer to host an LF AI Day and Project developer events

Support LF AI marketing and PR staff

Get Involved with the LF AI Trusted AI Committee

Join the committee as a representative of your company

Join the Trusted AI bi-weekly conference calls and contribute to ongoing efforts

Promote the work of the Trusted AI committee, invite your collaborators to participate

Contribute to the LF AI landscape, promote in talks

Coordination at events, speaking proposals, booth attendance, demos, etc.

Subscribe to the mailing list and participate in discussions

Host your Ethics related projects in the LF AI Foundation

Help secure user stories about LF AI based deployments

Invite prominent researchers and developers in the space to speak to the LF AI community



We are creating a sustainable open source AI ecosystem that makes it easier to create AI products and services using open source technologies

Joining LF AI Foundation is easy!

Please follow up with Ibrahim Haddad

Web site <https://lfai.foundation>
Email info@lfai.foundation
Landscape <https://l.lfai.foundation>
GitHub <https://github.com/lfai>
Wiki <https://wiki.lfai.foundation>
Mailing lists <https://lists.lfai.foundation/groups>