

# FLEDGE - Stage 2 - 2022-07-26

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**Submitted to TAC Mail List:** 2022/07/26

**Presented on TAC Weekly Call:** 2022/07/27 (Meeting Recording)



Below is a self-assessment submitted by the TSC Chair/Maintainers of the Project. Comments/questions/feedback is welcome either a) in the Comments at the bottom of the page or b) during the TAC call when information is presented.

## stage 1: At Large Projects

Stage 2 and Stage 3 Projects also requested to complete this section, as PLD acceptance criteria requires meeting current as well as prior stage requirements

Stage 1 Criteria (from the <a href="#">PLD</a> )	Meets / Needs Improvement / Missing / Not Applicable	Supporting Data (if needed, include links to specific examples)
2 TAC Sponsors, if identified (Sponsors help mentor projects) - See full definition on <a href="#">Project Stages: Definitions and Expectations</a>	Meets	<a href="#">Mark Riddoch</a> <a href="#">Daniel Lazaro</a>
The typical IP Policy for Projects under the LF Edge Foundation is Apache 2.0 for Code Contributions, Developer Certificate of Origin (DCO) for new inbound contributions, and Creative Commons Attribution 4.0 International License for Documentation. Projects under outside licenses may still submit for consideration, subject to review/approval of the TAC and Board.	Meets	Apache 2.0, DCO, CCA4.0 - <a href="#">Technical Charter</a>
Upon acceptance, At Large projects must list their status prominently on website/readme	Meets	<a href="#">Fledge</a>

Stage 1 Projects, please skip to **Additional Information Requested from All Projects**

## Stage 2: Growth Stage

Stage 3 Projects also requested to complete this section

Stage 2 Criteria (from the <a href="#">PLD</a> )	Meets / Needs Improvement / Missing / Not Applicable	Supporting Data (if needed, include links to specific examples)
Development of a growth plan (to include both roadmap of projected feature sets as well as overall community growth /project maturity), to be done in conjunction with their project mentor(s) at the TAC.	Meets	See <a href="#">Roadmaps</a> for the projected feature sets.  The community growth and project maturity are discussed in the goals below.

Document that it is being used in POCs.	Meets	<p>There have been many PoCs and commercial deployments using Fledge, some are stated publicly. Some of the PoCs can be gleaned from various public commitments and event participation, such as:</p> <p>Fledge has a production deployment at</p> <ul style="list-style-type: none"> <li>• <a href="#">Neuman Aluminum</a></li> </ul> <p>Fledge has two new public uses cases that have been announced in 2021 and 2022:</p> <ul style="list-style-type: none"> <li>• <a href="#">NIST Team SmartIoT</a></li> <li>• <a href="#">UC Davis Winery of the future - Opus One/UC Davis</a></li> </ul> <p>Fledge had three public use cases fully deployed and announced in 2020.</p> <ul style="list-style-type: none"> <li>• <a href="#">JEA</a></li> <li>• <a href="#">General Atomics</a></li> <li>• <a href="#">Honda Pro Racing</a></li> <li>• Some commercial deployments that can be mentioned by name but not yet announced include: <ul style="list-style-type: none"> <li>◦ <a href="#">BRP/Rotax</a> - OPC-UA Robots and CNC machines connected to MS Azure and OSIsoft PI for realtime part quality inspections with track and trace</li> <li>◦ <a href="#">Neuman Aluminum</a></li> <li>◦ <a href="#">FLIR</a> - embedded Fledge in FLIR Bridge connected up to 10 IR cameras with integrated UI.</li> </ul> </li> <li>• Some commercial deployments that went through a vigorous PoV process and have since got deployed but are not yet public include: <ul style="list-style-type: none"> <li>◦ A major US Food Processor using vibration and PLC data on the edge to optimize centrifuge operations</li> <li>◦ A major Oil, Chemical, and Paper company using Fledge to: <ul style="list-style-type: none"> <li>▪ Connect data streams from 2 different cloud service offers back to historians/plant</li> <li>▪ Connect MQTT LoRa Wan infrastructure to historians /plant</li> </ul> </li> </ul> </li> <li>• Interesting PoCs underway <ul style="list-style-type: none"> <li>◦ A top 5 pharma company connecting S7 PLCs to historians using the HA failover of Fledge to ensure no data loss.</li> <li>◦ Major Oil Pipeline company using Fledge to monitor remote battery-operated measuring stations.</li> <li>◦ Major glass manufacturer using FLIR, Google, and Fledge for "hot" quality inspection using computer vision techniques.</li> </ul> </li> </ul> <p>The <a href="#">Fledge Growth stage announcement</a> also outlined partner, contributor, and user activity.</p> <ul style="list-style-type: none"> <li>• Google has contributed IoT Core Plugin, completing AutoML and Edge ML plugins.</li> <li>• Google offered a Fledge <a href="#">QwikLAB</a> in August, training users on how to use Fledge as an Industry 4.0 Edge to Google cloud.</li> <li>• Nokia has completed a Fledge NDAC integration for private LTE.</li> <li>• Wago has completed a Fledge Wago PLC integration/offer.</li> <li>• <a href="#">Nexcom</a> offers a Fledge preloaded gateway and has contributed two south plugins to the project.</li> </ul>
Demonstrate a substantial ongoing flow of commits and merged contributions.	Meets	<a href="https://insights.lfx.linuxfoundation.org/projects/fledge%2Ffledge/dashboard;quicktime=time_filter_1Y">https://insights.lfx.linuxfoundation.org/projects/fledge%2Ffledge/dashboard;quicktime=time_filter_1Y</a>

Demonstrate that the current level of community participation is sufficient to meet the goals outlined in the growth plan.	Meets	<p>We are thrilled to say Fledge's community is scaling out and up. The Fledge project is maintained under LF Edge with a single TSC, branch and roadmap. However, the marketing and use of Fledge has expanded to two new open-source communities.</p> <ul style="list-style-type: none"> <li>• <b>LF Energy</b> <ul style="list-style-type: none"> <li>◦ Fledge has been adopted to be their IIoT 4.0 Edge Project</li> <li>◦ Over 30 energy companies</li> <li>◦ Fledge has a new LF Energy project name - <b>Fledge Power</b></li> <li>◦ RTE and Swissgrid are contributing to Fledge</li> <li>◦ Fledge Power continues to develop plugins and maintain progress on its roadmap <ul style="list-style-type: none"> <li>▪ <a href="https://wiki.lfenergy.org/display/FLED/FledgePower+Roadmap">https://wiki.lfenergy.org/display/FLED/FledgePower+Roadmap</a></li> </ul> </li> </ul> </li> <li>• <b>OSDU</b> - part of the Open Group <ul style="list-style-type: none"> <li>◦ OSDU has over 167 Oil, Gas, and supply chain members</li> <li>◦ Fledge and EVE have been adopted as the OSDU 4.0 Edge solution</li> <li>◦ The combined edge is under testing now <ul style="list-style-type: none"> <li>▪ Show OPC-UA to OSDU cloud</li> <li>▪ Show edge-based vibration data signal processing</li> <li>▪ Show edge-based ML</li> <li>▪ Show multi-pipeline egress, each with different roots of trust</li> <li>▪ Show EVEOS - container, VM, and HW mgt</li> <li>▪ Show HW root of trust</li> </ul> </li> </ul> </li> <li>• <b>Timelords Online Community</b> <ul style="list-style-type: none"> <li>◦ Online community of OSIsoft PI system users, developers, and enthusiasts <ul style="list-style-type: none"> <li>▪ High level of experience in IO/OT integration space</li> </ul> </li> <li>◦ Sharing demonstrations, ideas, and tutorials</li> <li>◦ Examples of content created by Timelords: <ul style="list-style-type: none"> <li>▪ <a href="https://raesemann.com/fledge-iiot-quick-start/">https://raesemann.com/fledge-iiot-quick-start/</a></li> <li>▪ <a href="https://www.youtube.com/watch?v=2rXRPMLTKtQ">https://www.youtube.com/watch?v=2rXRPMLTKtQ</a></li> <li>▪ <a href="https://youtu.be/GpSq1kgTTMg?t=4224">https://youtu.be/GpSq1kgTTMg?t=4224</a></li> </ul> </li> </ul> </li> </ul>
Demonstrate evidence of, or a plan for, interoperability, compatibility or extension to other LF Edge Projects. Examples may include demonstrating modularity (the ability to swap components between projects).	Meets	<p>Joint <b>Demo with Fledge and Akraino Blueprint family</b> and Blueprint(s)</p> <p>See OSDU above</p> <p>Outreach EVE to LF Energy PoCs</p> <p>Completed EdgeX South plugin and testing</p>

Stage 2 Projects, please skip to **Additional Information Requested from All Projects**

## Stage 3: Impact Stage

Criteria	Meets / Needs Improvement / Missing / Not Applicable	Supporting Data (if needed, include links to specific examples)
Have a defined governing body of at least 5 or more members (owners and core maintainers), of which no more than 1/3 is affiliated with the same employer. In the case there are 5 governing members, 2 may be from the same employer.		
Have a documented and publicly accessible description of the project's governance, decision-making, and release processes.		
Have a healthy number of committers from at least two organizations. A committer is defined as someone with the commit bit; i.e., someone who can accept contributions to some or all of the project.		
Demonstrate evidence of interoperability, compatibility or extension to other LF Edge Projects. Examples may include demonstrating modularity (ability to swap in components between projects).		
Adopt the Foundation Code of Conduct.		
Explicitly define a project governance and committer process. This is preferably laid out in a <b>GOVERNANCE.md</b> file and references a <b>CONTRIBUTING.md</b> and <b>OWNERS.md</b> file showing the current and emeritus committers.		

Have a public list of project adopters for at least the primary repo (e.g., [ADOPTERS.md](#) or logos on the project website).

## Additional Information Requested from All Projects

Additional Information Requested from All Projects	Supporting Data (if needed, include links to specific examples)
Intention for the upcoming year (Remain at current stage OR advance towards the next Stage)	Advance to Stage 3
Include a link to your project's <a href="#">LFX Insights</a> page. We will be looking for signs of consistent or increasing contribution activity. Please feel free to add commentary to add color to the numbers and graphs we will see on Insights.	<p>Total commits 13.64k, 63 submitters, and 103 Repos.</p> <p>Significant to the community are major industries and their system integrators contributing for their operations.</p> <p>Sebastion (Austrian Center for Digital Production) - Neuman Aluminum</p> <p>Raesemann Enterprises - JEA</p> <p>Kapsch - BRP/Rotax</p> <p>RTE and Swissgrid for themselves and LF Energy</p> <p>Nexcom for their transportation IoT solution</p> <p>Teledyne/FLIR for their IIoT gateway</p> <p>Aveva for their PI Historian</p>
How many maintainers do you have, and which organizations are they from? (Feel free to link to an existing MAINTAINERS file if appropriate.)	<p>Maintainers</p> <p><a href="#">Mark Riddoch</a> - Dianomic</p> <p><a href="#">Bill Hunt</a> - Dianomic</p> <p><a href="mailto:ashwin@dianomic.com">ashwin@dianomic.com</a> - Dianomic</p> <p><a href="#">Daniel Lazaro</a> - AVEVA</p> <p>Sebastian Kropatschek - Austrian Centre for Digital Production</p> <p>Praveen Garg - Noida Labs</p> <p>Massimiliano Pinto - Dianomic</p>

What do you know about adoption, and how has this changed since your last review / since you joined the current Stage? If you can list companies that are end users of your project, please do so. (Feel free to link to an existing ADOPTERS file if appropriate.)

There have been many PoCs and several commercial deployments using Fledge; some are stated publicly. Some of the PoCs can be gleaned from various public commitments and event participation, such as:

Fledge has new public use cases announced in 2021 and 2022.

- Koch Industries

Fledge had three public use cases fully deployed and announced in 2020.

- JEA
- General Atomics
- Honda Pro Racing
- Some commercial deployments that can be mentioned by name but not yet announced include:
  - [BRP/Rotax - OPC-UA Robots and CNC machines connected to MS Azure and OSIsoft PI for real-time part quality inspections with track and trace](#)
  - [Neuman Aluminum](#)
  - [FLIR - embedded Fledge in FLIR Bridge connected up to 10 IR cameras with integrated UI.](#)
- Some commercial deployments that went through a vigorous PoV process and have since got deployed but are not yet public include:
  - [A major US Food Processor using vibration and PLC data on the edge to optimize centrifuge operations](#)
  - [A major Oil, Chemical and Paper company using Fledge to:](#)
    - [Connect data streams from 2 different cloud service offers back to historians/plant](#)
    - [Connect MQTT LoRa Wan infrastructure to historians /plant](#)
  - [A major theme park is using to monitor their solar array trackers](#)
- Interesting PoCs underway
  - [Top 5 pharma company connecting S7 PLCs to historians using the HA failover of Fledge to ensure no data loss.](#)
  - [Major Oil Pipeline company using Fledge to monitor remote battery-operated measuring stations.](#)
  - [Major glass manufacturer using FLIR, Google, and Fledge for "hot" quality inspection using computer vision techniques.](#)

The [Fledge Growth stage announcement](#) also outlined partner, contributor and user activity

- Google has contributed IoT Core Plugin, [completing AutoML and Edge ML](#) plugins.
- In August, Google offered a Fledge QwikLAB, training users to use Fledge as an Industry 4.0 Edge to Google cloud.
- Nokia has completed a Fledge NDAC integration for private LTE.
- Wago has completed a Fledge Wago PLC integration/offer.
- [Nexcom](#) offers a Fledge preloaded gateway and has contributed two south plugins to the project
- ACDP have contributed an Azure north plugin

How has the project performed against its goals since the last review? (We won't penalize you if your goals changed for good reasons.)

1. Grow the ecosystem of Cloud North support (beyond MQTT, REST, KAFKA)
  - a. Google - Pub/Sub and EdgeML
2. [Fledge roadmap](#)
  - a. Set Point Control

What are the current goals of the project? For example, are you working on major new features? Or are you concentrating on adoption or documentation?	<p>Goals for 2022</p> <ol style="list-style-type: none"> <li>1. Graduate to Stage 3</li> <li>2. Grow the number of project maintainers</li> <li>3. Grow the ecosystem of Cloud North support (beyond MQTT, REST, KAFKA) <ol style="list-style-type: none"> <li>a. AWS - Sitewise</li> <li>b. Google - AutoML and EdgeML</li> <li>c. MS Azure IoT</li> </ol> </li> <li>4. Provide full integration with existing: <ol style="list-style-type: none"> <li>a. LF Edge Projects - EVE, Open Horizon, EdgeX North and South, SDO?, Akraino IIoT blueprint</li> <li>b. LF Energy - IEC104, IEC61850, RTU Server Control</li> <li>c. OSDU - KAFKA, OPC-UA and Native OSDU N</li> </ol> </li> <li>5. <a href="#">Fledge roadmap</a> <ol style="list-style-type: none"> <li>a. HA capabilities</li> </ol> </li> </ol>
How can LF Edge help you achieve your upcoming goals?	<p>Market to industrial companies the virtues of open source in general.</p> <p>Market the virtues of Multi-cloud, Hybrid-cloud solutions to the OT market.</p> <p>Cooperate with LF Energy and OSDU in marketing and messaging</p> <p>Bring in more edge application and industrial equipment providers as members of LF Edge</p>
Do you think that your project meets the criteria for the next Stage?	<p><a href="#">Project Stages: Definitions and Expectations</a></p> <ol style="list-style-type: none"> <li>1. Have a TSC- want more diversity of companies</li> <li>2. Done</li> <li>3. Need to expand the diversity of companies - With LF Energy and OSDU now involved, we think this will occur shortly /naturally. Most exciting; most of these organizations are large industries intending to deploy Fledge.</li> <li>4. Done- Currently working with multiple projects.</li> <li>5. Done</li> <li>6. The <a href="#">CONTRIBUTING.md</a> file in the main repository has the process for both adding update/features to the core and plugins.</li> <li>7. Done - Need to add JEA, GA, RTE, BRP, and Neuman to <a href="#">Adop ers.md</a></li> </ol>
Please summarize Outreach Activities in which the Project has participated in (e. g. Participation in conferences, seminars, speaking engagements, meetups, etc.)	<p>Sample Project had a kiosk at IOT SWC as well as ONES NA. Also participated in the LF Edge "On the Edge" webinar series.</p> <p>Speakers at conferences about OSS, IoT, and IIoT such as:</p> <ul style="list-style-type: none"> <li>• PI World 2019</li> <li>• Zededa Transform</li> <li>• <a href="#">OSS EU 2019</a></li> <li>• ONES 2020</li> <li>• LF Energy</li> <li>• OSDU</li> </ul> <p>Work on the LF Edge user groups creation</p> <p>The LF Edge White paper</p>
Are you leveraging the <a href="#">Technical Project Getting Started Checklist</a> ? If yes, please provide link (if publicly available).	
Please review, and update if needed, your Project entry on the <a href="#">Existing Project Taxonomy</a> page, modifying the Last Updated / Reviewed date in the header.	
Please share an LFX security report for your project in the last 30 days.	<a href="https://security.lfx.linuxfoundation.org/#/a092M00001JWskWQAT/overview">https://security.lfx.linuxfoundation.org/#/a092M00001JWskWQAT/overview</a>