



CIVIL
INFRASTRUCTURE
PLATFORM

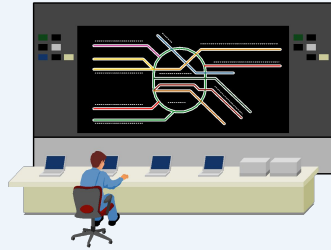
Time is ready for the Civil Infrastructure Platform

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Our Civilization is Run by Linux

An aerial photograph of San Francisco, California, taken during the golden hour of sunset. The city's dense urban landscape is filled with numerous skyscrapers and buildings, their surfaces reflecting the warm, low-angle light. The Golden Gate Bridge is visible in the distance, spanning across the water. The sky is a mix of soft pinks, oranges, and blues. A semi-transparent blue rectangular box is overlaid on the upper left portion of the image, containing the text 'Our Civilization is Run by Linux' in white, bold, sans-serif font.

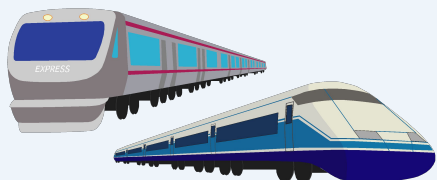
Transport



Rail automation

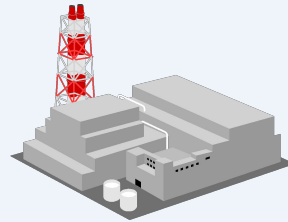


Automatic ticket gates

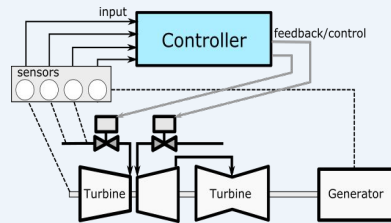


Vehicle control

Energy

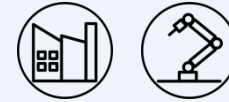


Power Generation



Turbine Control

Industry



Industry automation



Industrial communication



CNC control

Others



Healthcare



Building automation



Broadcasting

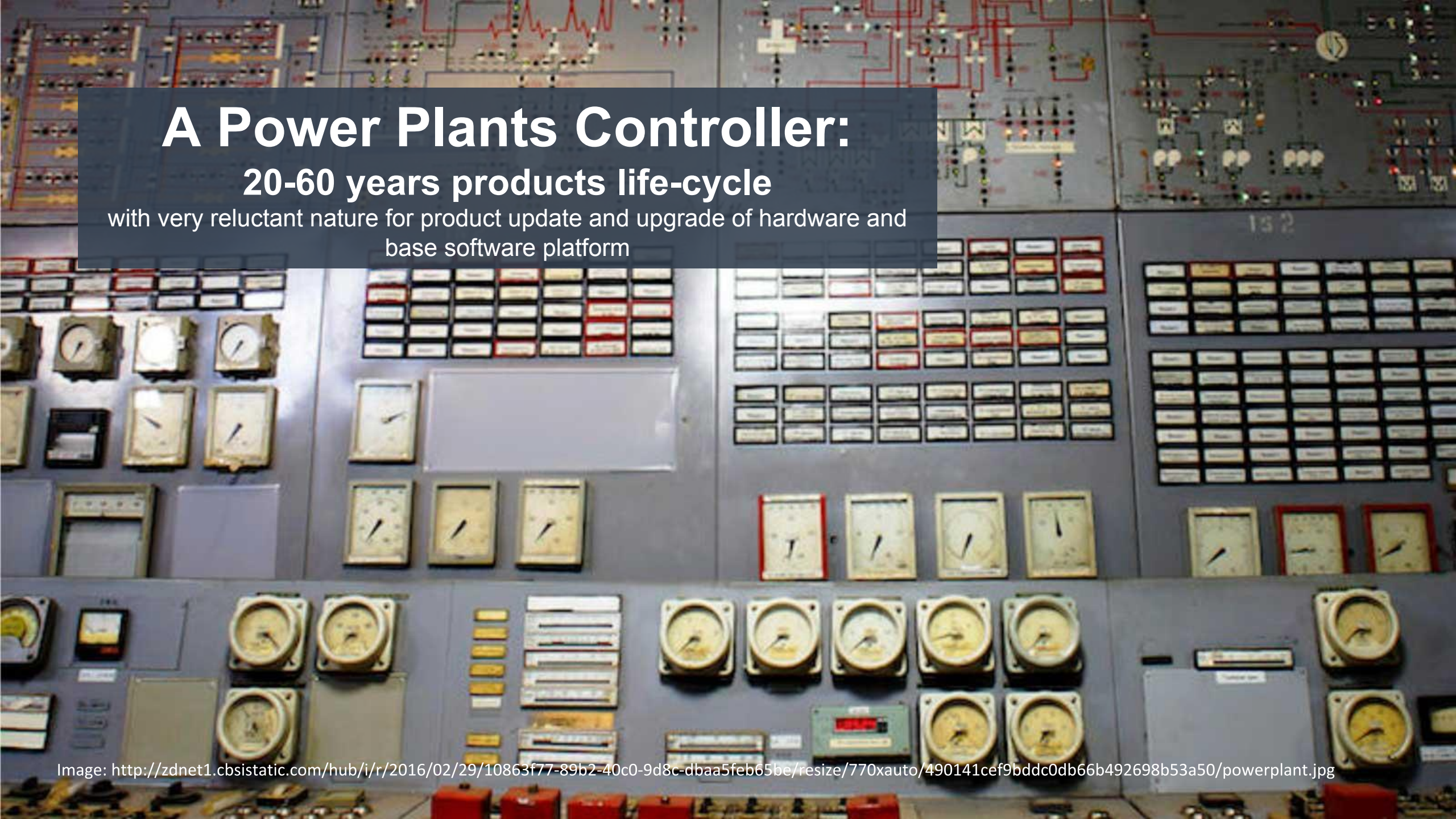
An aerial, black and white photograph of San Francisco, California. The image shows a dense urban landscape with numerous skyscrapers and buildings. In the background, the Golden Gate Bridge is visible, spanning across the water. The sky is clear, and the overall scene is captured from a high-angle perspective. A semi-transparent blue rectangular box is overlaid on the upper left portion of the image, containing white text.

**But there are issues to be
solved...**

A Power Plants Controller:

20-60 years products life-cycle

with very reluctant nature for product update and upgrade of hardware and base software platform



A photograph of a railway signaling or control room rack. The rack is filled with electronic equipment, including various modules and components. The equipment is organized into rows and columns, with a complex network of cables and wires connecting them. The rack is made of metal and has a light-colored finish. The background shows a wall with colorful panels (red, orange, green, blue) and a grid of lights. The overall scene is a technical and industrial environment.

A Railway System:

25-50 years products life-cycle

with, again, very reluctant nature for product update and upgrade of hardware and base software platform

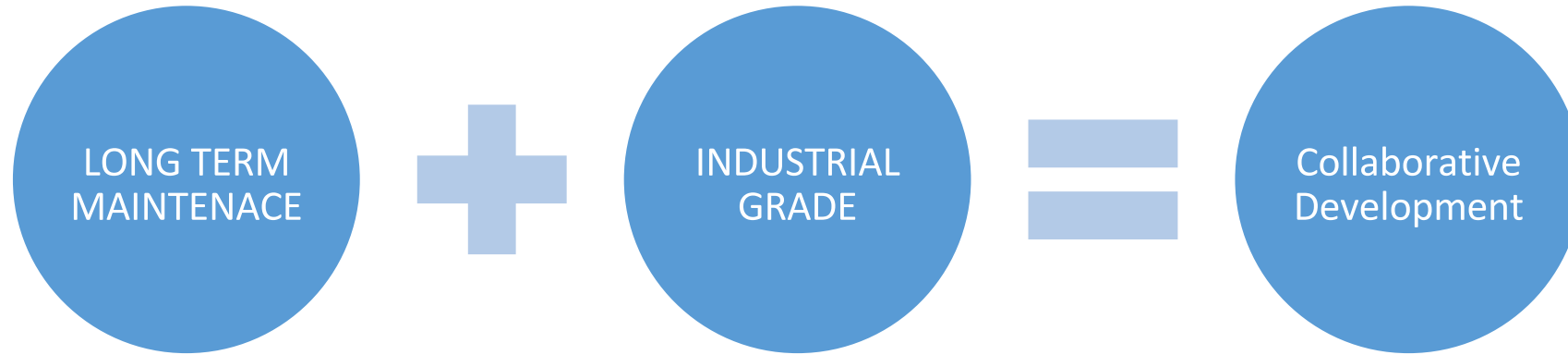
We have a problem...

The Problems we face ...



- The systems that support our modern civilization needs to survive for a VERY LONG TIME, and currently, the industrial grade super long term maintenance has been done by each individual companies.
- The systems not only have to survive for a long time, it has to be an “INDUSTRIAL GRADE”, that is robust, secure and reliable, and while doing so the industry will also require to catch up with the latest technology trends

The Solutions we need ...



- **We need a Collaborative framework** to maintain one same open source based system for many, many, many years to keep it secure, robust and reliable.
- AND most importantly, we need to do this collaboratively in the upstream communities, not locally.

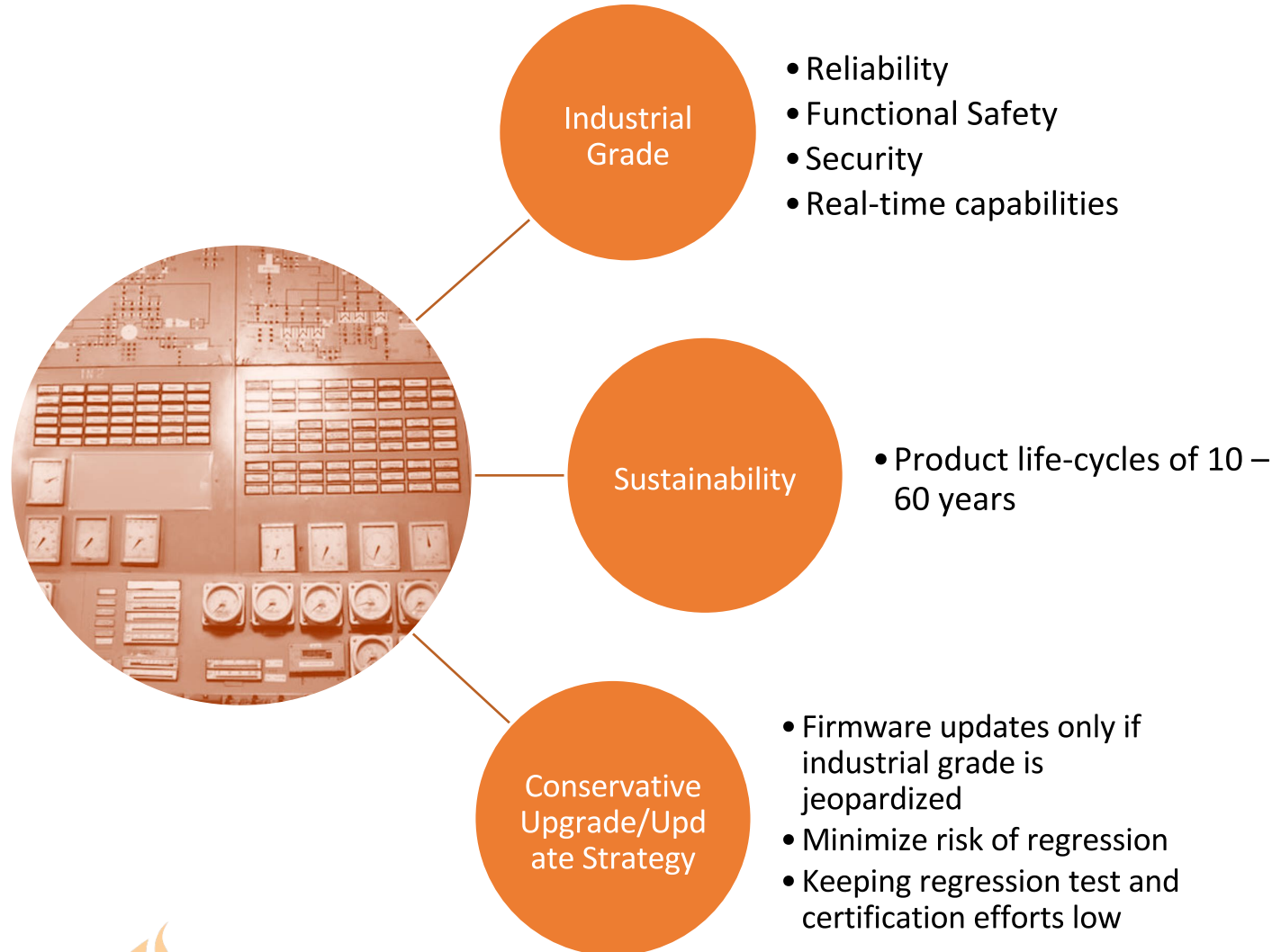
CIP is our solution...

Civil infrastructure systems require a super long-term maintained industrial-grade embedded Linux platform for a smart digital future



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Requirements for the Civil infrastructure systems



This has to be achieved with ...

Maintenance costs

- Low maintenance costs for commonly used software components
- Low commissioning and update costs

Development costs

- Don't re-invent the wheel

Development time

- Shorter development times for more complex systems

Railway Example

3 – 5 years development time

2 – 4 years customer specific extensions

1 year initial safety certifications / authorization

**3 – 6 months safety certifications / authorization for follow-up releases
(depending on amount of changes)**

25 – 50 years lifetime

Power Plant Control Example

3 – 5 years development time

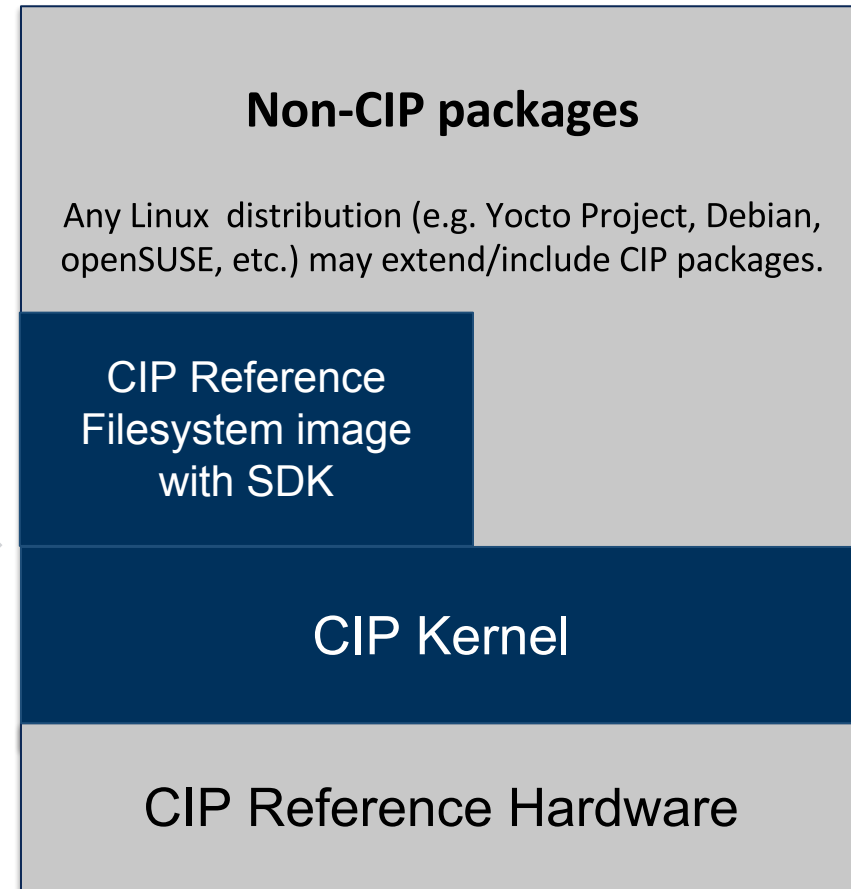
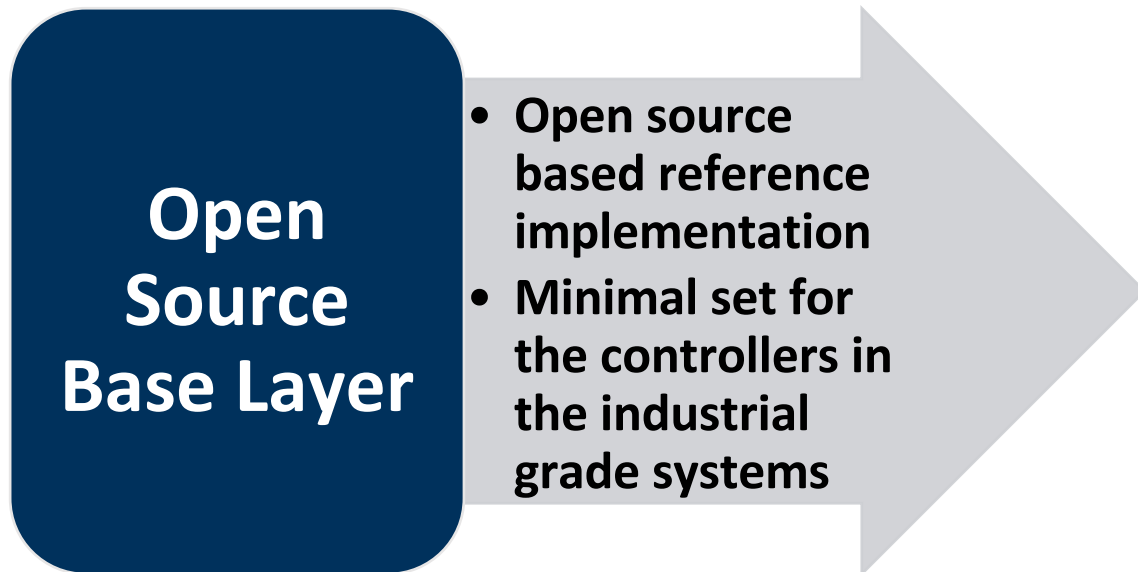
0.5 – 4 years customer specific extensions

6 – 8 years supply time

15+ years hardware maintenance after latest shipment

20 – 60 years product lifetime

Things to be done: Creation of “Open Source Base Layer”





What is the CIP initiative doing

CIP key actions



1. Establish an Open Source Linux based system that meets the Industrial Grade requirements.
2. Fill the gap between capabilities of the existing OSS and industrial requirements.
3. Provide reference implementations.
4. Trigger development of an emerging ecosystem including tools and domain specific extensions.

Establish a FOSS Linux based system that meets the Ind. Grade req.



1. Select the first CIP kernel and initial maintainer
 - a. 4.4 as first CIP kernel. Maintenance expected for above 10 years (SLTS).
 - b. Ben Hutchings as initial CIP-kernel maintainer.
 - c. Kernel maintenance policies (WIP).

2. Define initial board platforms and provide support for it.
 - a. Beaglebone Black and (RENESAS BOARD) as initial boards.
 - b. BB upstream kernel support backported to CIP kernel.

Establish a FOSS Linux based system that meets the Ind. Grade req.



3. CIP kernel testing (WIP)

- a. Adapt kernelci.org project to CIP use case: board @ desk - single developer.
- b. kernelci VM to test kernels on a board connected to the dev. Machine.
- c. Shared tests and logs.
- d. CIP kernel tested on Beaglebone Black.

4. Add LAVA support to Fuego

5. Other

- a. KSPP patches backported to CIP-kernel.
- b. CIP whitepaper (WIP)



Next steps

Next steps by CIP



- Board @desk - Single dev
 - Release kernelci VM and test CIP kernel in the open within CIP group.
 - Increase test coverage.
 - Define milestone 2.
- Finish LAVA support to Fuego.
- Kernel maintenance: define next steps.
- Analysis: select additional software as part of CIP base system.
- Collaboration: kernelci.org, y2038, KSPP, RTL...



Please Join us!

Why join CIP?



- **Steer:** become a decision maker “by doing”.
- **Participate:** bring your use cases and ideas into the right forum.
- **Learn:** by working on daily basis in the open with others with common interest.
- **Collaborate:** share effort and knowledge. Stand on the shoulders of giants.

Contact Information and Resources



To get the latest information, please contact:

- Noriaki Fukuyasu: fukuyasu@linuxfoundation.org
- Urs Gleim: urs.gleim@siemens.com
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- Agustín Benito Bethencourt: agustin.benito@codethink.co.uk

Other resources

- CIP Web site: <https://www.cip-project.org>
- CIP Mailing list: cip-dev@lists.cip-project.org
- CIP Wiki: <https://wiki.linuxfoundation.org/civilinfrastructureplatform/>
- Collaboration at CIP: <http://www.gitlab.com/cip-project>
- CIP kernel: [git://git.kernel.org/pub/scm/linux/kernel/git/bwh/linux-cip.git](https://git.kernel.org/pub/scm/linux/kernel/git/bwh/linux-cip.git)

Call for new participants!



Provide a super long-term maintained industrial-grade embedded Linux platform.

Current members

Platinum Members



Silver Members

