



The Problem

The Internet of Things is growing at an exponential rate and unique new devices are added to the connected world every day. However, each unique device poses a new challenge. Software developers need to build operating systems and applications for each of these devices, often from scratch. Coding for a simple sensor and a critical gateway require completely different knowledge. This hampers the growth of the IoT—developers need a framework that can be built upon to fit the variety of IoT projects they manage.

The Solution

Developers need a framework solution designed specifically for IoT. This framework needs to address the unique challenges posed by programming for edge devices, including interoperability between the variety of operating systems in the ecosystem, the flexibility to fit on different sized devices, and the ability to run on the low memory and energy afforded to an edge device. Soletta was built to do just that.



Enter Soletta

Soletta is a development framework that makes writing software for IoT edge devices easier. By abstracting hardware and operating system details from a program, Soletta allows developers to easily write software for controlling actuators and sensors and communicating using standard technologies. Both portable and scalable, Soletta enables developers to reuse their code and knowledge in all stages of development and across different platform sizes, including even the smallest smart devices.

Soletta utilizes flow-based programming (FBP) to streamline the development process. Applications are defined as networks of “black box” processes that

exchange data. These black box processes can be reconnected endlessly to form different applications without having to be changed internally, which makes FBP perfect to carry code from one IoT project to the next.

Soletta supports multiple operating systems including Riot, Contiki and Linux. Soletta received its first external contributions, including patches and feedback, from Pengutronix, the company that has been testing Soletta to use in their industrial use cases.



How Soletta Works

Three key features of the Soletta project make it easier to write software for IoT edge devices.

Development Application

Soletta Development Application provides a web-based environment where developers can write, visualize, modify, run, test and debug their Soletta FBP programs. The Soletta Development Application is supposed to run on your target board and it then exposes the development environment through a web server application based on node.js.

Visual Editor

Soletta consists of a runtime, installed on a device, which can load a program defined as a graph: a set of nodes representing data operations, and connections between those nodes

describing the flow of data between them. The underlying syntax for these graphs is (broadly-speaking) **FBP**, as used by **NoFlo**.

The Soletta Visual Editor (SLV) helps developers create these graph structures in a browser-based application. One output from SLV is an FBP-like file which can be loaded into the Soletta runtime.

Machine Learning

Soletta Machine Learning is an open source machine learning library for development of IoT devices. It provides APIs to handle with client side AI and an easy to use flow-based Soletta module. Initially supporting neural networks and fuzzy logic learning, using well established open source libraries, it could be easily extended to support others.