Introduction to Different IoT Tools

IoT development means combining hardware parts and software programs in such a way that the final product could monitor specific values, collect and transfer data, analyze given data and cause the physical device to act correspondingly. Creating such systems is a true challenge.

Moreover, the Internet of Things has already been transformed into an industry in its own right, so the need for reliable and comprehensive developer toolkits has also increased. IoT development tools needed to create complex applications are represented by IoT hardware devices (boards, SoM, SoC, sensors, gateways, trackers, and more), IoT app development platforms, IoT operating systems (e.g., Embedded Linux) and programming languages.

IoT Tools and Devices

The 15 most popular tools currently used for IoT projects are

- ✓ Arduino
- ✓ Flutter
- ✓ Kinoma
- ✓ Tessel 2
- ✓ M2MLabs Mainspring
- ✓ Raspberry Pi OS (ex. Raspbian)
- ✓ Node-RED
- ✓ Eclipse IoT
- ✓ SiteWhere
- ✓ DeviceHive
- ✓ Home Assistant

- ✓ OpenRemote
- ✓ ThingsBoard
- ✓ MilesightDeviceHub
- ✓ Zetta

1. Arduino

Arduino is the leading company on the IoT market that produces electronic devices and software for them. Arduino hardware offerings include microcontroller boards, modules, shields and kits. Hardware specifications are suitable for creating various projects, such as robotics and home automation.

Software products are represented by:

Arduino IDE — an open-source prototyping platform, which can be used to easily write code compatible with any Arduino board.

Arduino Cloud — a single platform that enables the wireless communication of IoT devices, as well as their remote control and data collection.

IoT Cloud Remote — an application for creating dashboards to control cloud-connected devices.

Web Editor — an application for coding from a browser.

2. Flutter

Another hardware product for IoT solutions is Flutter — a programmable processor core. The board is based on Arduino, has a powerful ARM processor, built-in battery charging and a security chip. A long-range wireless transmitter makes this board the perfect fit for wireless networks of sensors.

Flutter offers:

Basic control module,Pro control module,Complete kits (Quick Start Kit, Vehicle Control Kits)

accessory boards (the Bluetooth adapter, the Breakout, the Remote Control, the Explorer),

a solar panel, a cylindrical battery and other accessories.

3. Kinoma

A group of software engineers from Marvell Technology, Inc., a leading manufacturer of memory devices, microcontrollers, telecom equipment and semiconductor devices, has developed a line of open-source Kinoma software and hardware products for the Internet of Things and embedded solutions.

Kinoma Create — a hardware platform for prototyping IoT devices. It's powered by JavaScript and has an integrated SD card, speaker, microphone, Bluetooth and Wi-Fi. It enables the interaction of devices with cloud platforms via the WebSocket internet protocol.

Kinoma Studio — an integrated development environment (IDE) that provides the hardware simulator and sensor library, allowing developers to create robust applications.

Kinoma Connect — an application for Android and iOS supporting IoT devices.

4. Tessel 2

To create connected devices, you can also use Tessel 2 — a programmable microcontroller supporting JavaScript, Node.js libraries and other languages. It runs Linux and provides access to many NPM modules with all their capabilities.

Tessel 2 can be extended by external hardware (sensors, peripherals) due to a built-in module and USB ports. It also provides Wi-Fi and Ethernet connectivity, a MediaTek router, 64MB of RAM and 32MB of Flash. Convenient command-line tools simplify prototyping.

5. M2MLabs Mainspring

The development of machine-to-machine applications is easy with the M2MLabs Mainspring framework. This open-source Java-based framework is widely used for building fleet management apps and remote monitoring projects. It enables flexible device configuration and supports the reliable connection between machines. App prototyping is very quick with M2MLabs Mainspring. Moreover, it ensures long-term data storage and retrieval thanks to a scalable Apache Cassandra database.

6. Raspberry Pi OS (ex. Raspbian)

Raspberry Pi OS, formerly known as Raspbian, is the official operating system for the Raspberry Pi hardware. A 32-bit version is available currently, with a 64-bit version in active development. This is a free, Debian-based system. Raspberry includes basic programs and utilities to make the hardware run, but it also compiles thousands of packages and pre-compiled software for easy installation.

7. Node-RED

Node-RED is a free programming tool based on Node.js and designed to integrate distributed IoT hardware and software systems and automate their interaction. It works primarily in Linux environments but can be installed on Android and Windows as well (you'll only need a Linux subsystem for WIndows). Node-RED offers out-of-the-box repositories, interfaces for connecting to MQTT, logic sets and format parsers, as well as the ability to write custom components.

8. Eclipse IoT

A wide range of open-source projects for IoT development is gathered under the Eclipse umbrella. They include software development platforms, frameworks, services, standards, tools for building digital twins, fog computing and edge computing solutions, and many more. Eclipse IoT projects focus on working with the Lua programming language, which is considered a good fit for Internet of Things projects.

9. SiteWhere

SiteWhere is an open-source multi-tenant platform for building, deploying and supporting IoT applications at the industrial level. The platform uses technologies such as the Docker framework, Kubernetes, microservices and Apache Kafka. SiteWhere facilitates big data transfer, storage, processing and integration, device management and event handling. You can deploy SitePlatform locally or to the cloud platforms, including Azure, AWS, GCP.

10. DeviceHive

The DeviceHive platform covers end-to-end IoT services, including:

- ✓ Prototyping and production at scale

- ✓ Connection of any devices via MQTT, REST API, WebSockets

- ✓ Integration with cloud platforms and third-party systems

- ✓ Real-time data analytics using the best data solutions such as Apache Spark and Kafka.

DeviceHive offers public, private, or hybrid cloud deployment models, a container-based architecture managed by Kubernetes, and support to libraries written in various languages. You can use this scalable and device-agnostic platform for implementing IoT projects of any complexity.

11. Home Assistant

Home Assistant is a comprehensive home automation software system. This single center integrates smart home devices, providing local control and security. Home Assistant offers convenient mobile applications that enable the remote management of your devices and send notifications if something goes wrong. You can also extend the functionality of this tool by integrating it with additional apps.

12. OpenRemote

Open Remote is a platform you can use to create and manage IoT monitoring applications. The primary domains leveraging the tool are smart city and mobility, energy management and asset management.

OpenRemote is offered under an open-source or a commercial license. The team behind it also provides a range of services from concept development to implementation and product maintenance.

13. Things Board

The Things Board IoT platform uses MQTT, CoAP and HTTP protocols to connect devices and handle data from them. Out-of-the-box configurable dashboards, charts, maps and widgets

provide you with robust real-time visualization of your data, which you can share with partners. In addition, you can create custom widgets using the built-in editor.

Things Board Rule Engine allows you to create rule chains and event-based workflows for the perfect match with your use case requirements. The platform can support multiple tenants and millions of devices. Cloud and on-prem deployment is available. You can choose a monolithic architecture for a small project or a microservices architecture for a highly scalable project.

14. MilesightDeviceHub

Milesight is a leading global provider of surveillance cameras, AI systems, IoT hardware and software products. DeviceHub is among the company's key software solutions. This is a connectivity suite that enables the deployment of multiple devices, their real-time monitoring and remote upgrading. With DeviceHub, you get comprehensive reports on monitored devices and take insightful actions. Both the cloud and on-premises versions of the platform are available.

15. Zetta

Zetta is a platform for designing APIs for IoT devices. The platform is based on Node.js and combines reactive programming, WebSockets and REST APIs. A Zetta server can run in the cloud or locally on hardware such as Raspberry Pi or Intel Edison.

The development process is simplified due to abstractions and direct access to protocols and conventions. Visualization tools ensure the continuous monitoring of device behavior and timely reaction to abnormalities. With Zetta, you can create data-intensive mobile, device and cloud applications and integrate smaller systems into one coherent system.