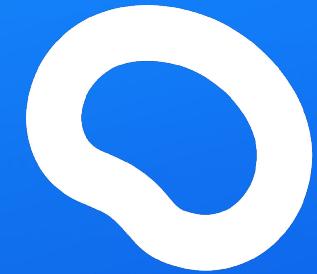




THE THINGS CONFERENCE



THE THINGS
CONFERENCE

Migrating your gateways to The Things Stack using balena.io

Xose Pérez | RAK Wireless

Marc Pous | balena.io

Outline

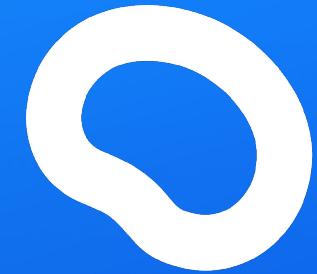
- Build LoRaWAN Gateway Basics™ Station.
- Move the LoRaWAN Gateway from V2 to V3 and back to V2.
- Migrate your fleet of LoRaWAN Gateways to V3

Wrap-up

The gateway managers [must be ready](#) before the migration day.

With balena.io you can test gateway migration 1-by-1 and [move the entire fleet to V3](#) at once.

The balena basicstation project is an open source project. [Feel free to contribute!](#)

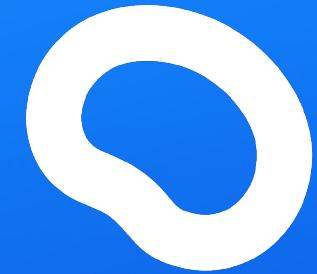


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How to manage your fleet of gateways

or, How balena can reduce the friction to manage
and scale your LoRaWAN gateways

Past TTN Conferences

We've already been here :-)

Workshop

Build your own Gateway with RAK831 and RESIN.IO

Your trainers:

Jac Kersing

Leonel Lopes Parente

Charles-Henri Hallard

Gergely Imreh (resin.io)

Shaun Mulligan (resin.io)

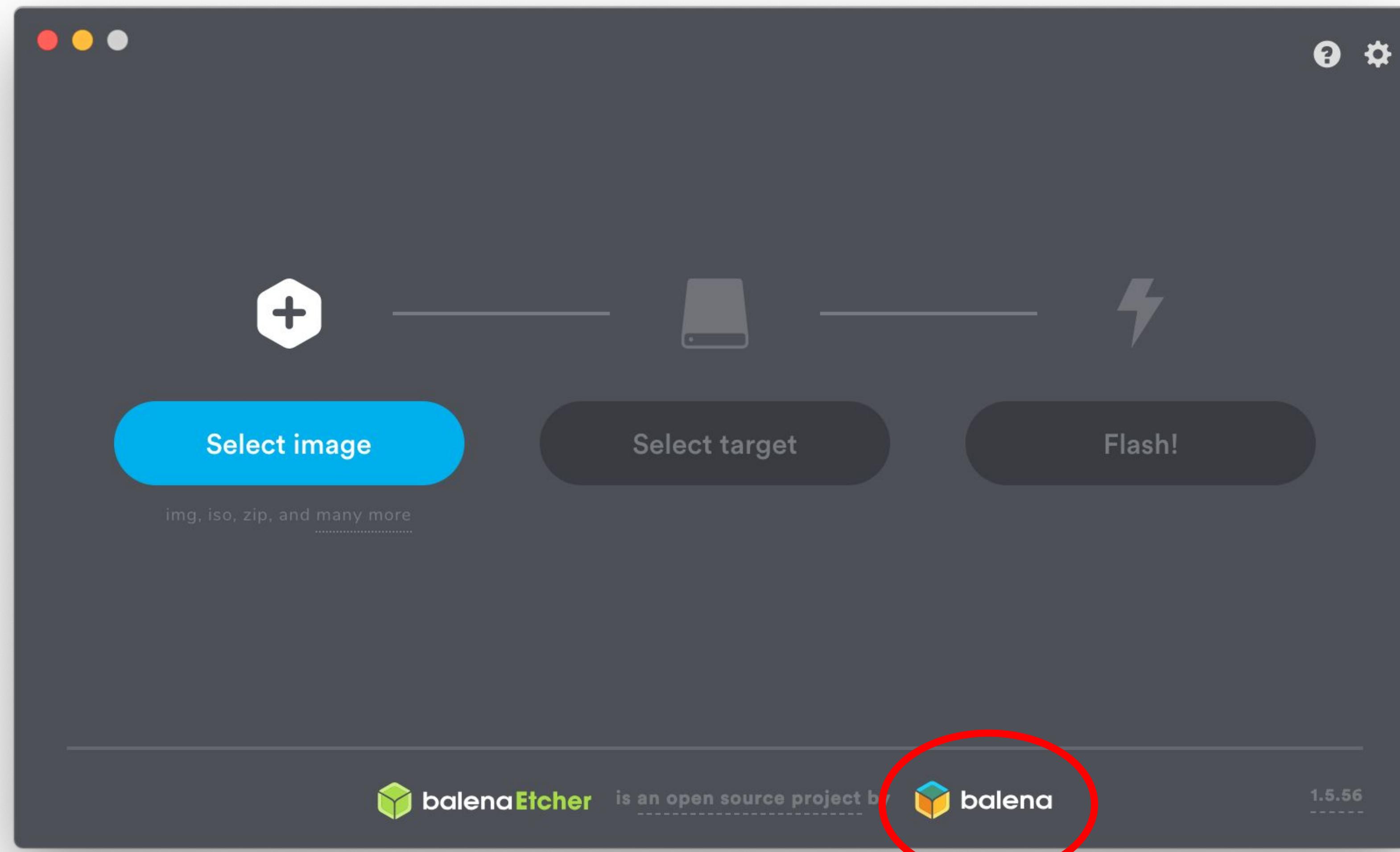
01-02-2018

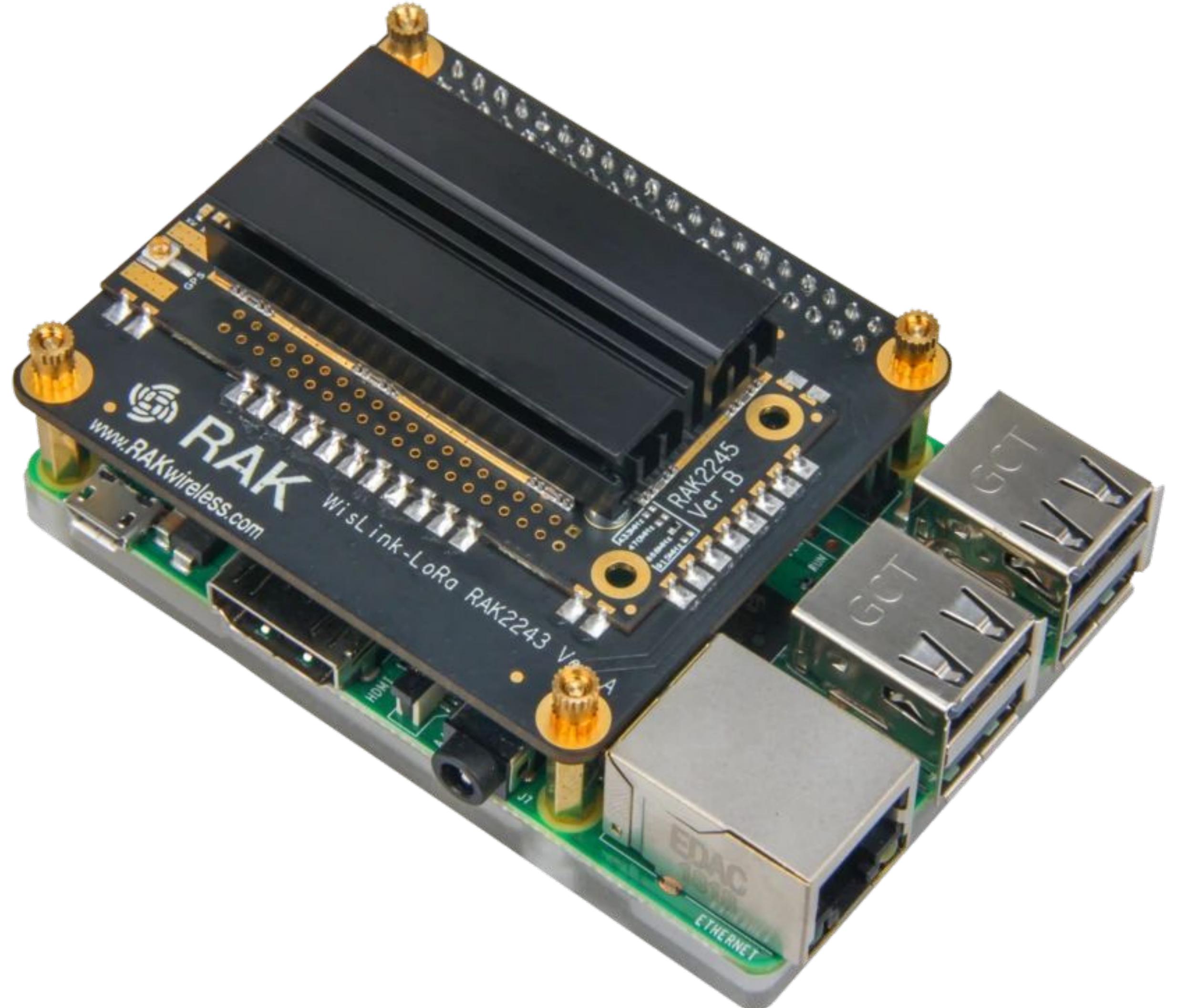


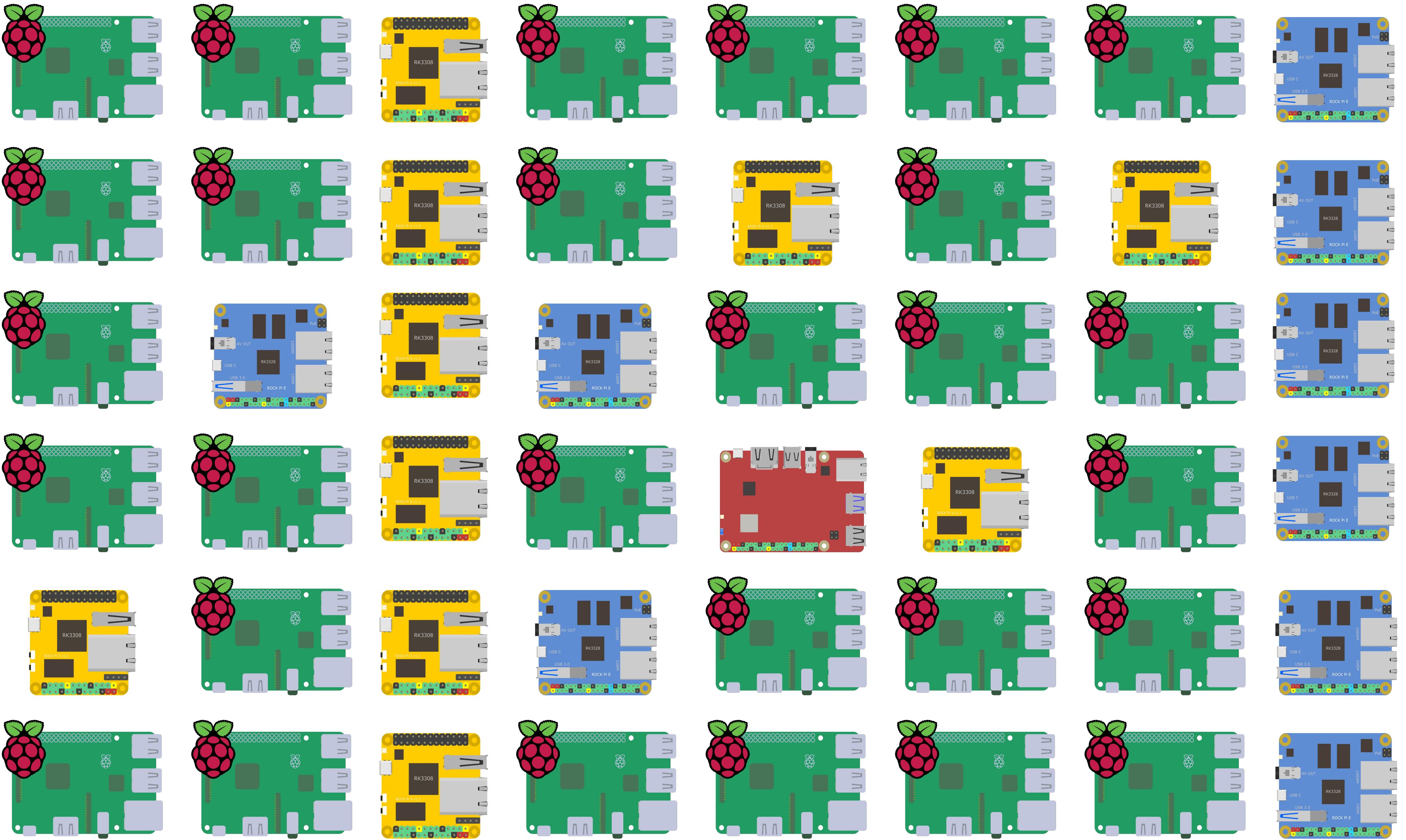


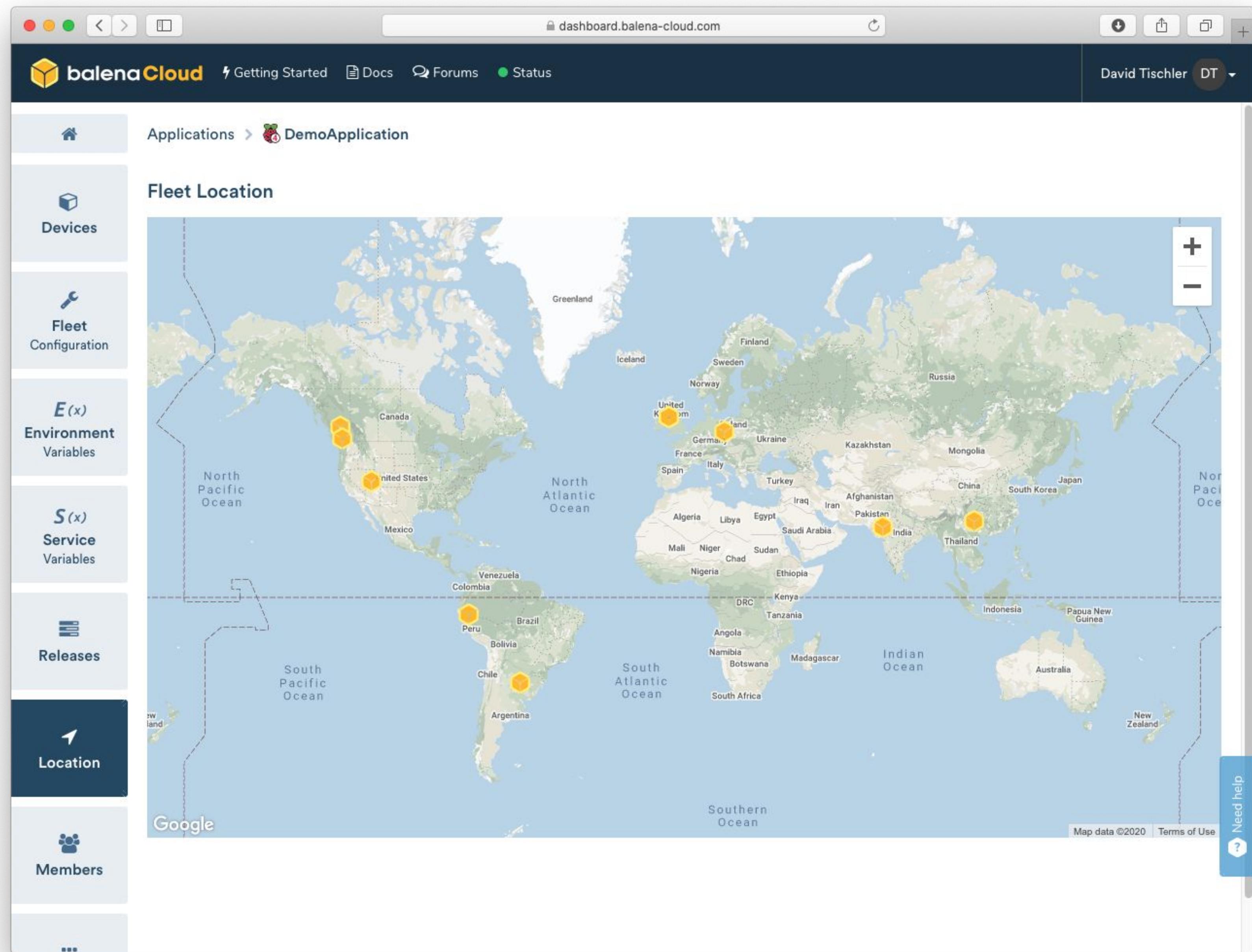
Remote Management of TTN Gateways

Pi Supply & Balena









balena - The complete IoT fleet management platform

We need your help! Find a spare computer and join the fight against COVID-19 from home. [Join the fight](#)

What is balena? balenaCloud More products Resources Pricing Customers About Login Sign up

Build your IoT project with balena

The infrastructure you need to develop, deploy, and manage fleets of connected devices at scale.

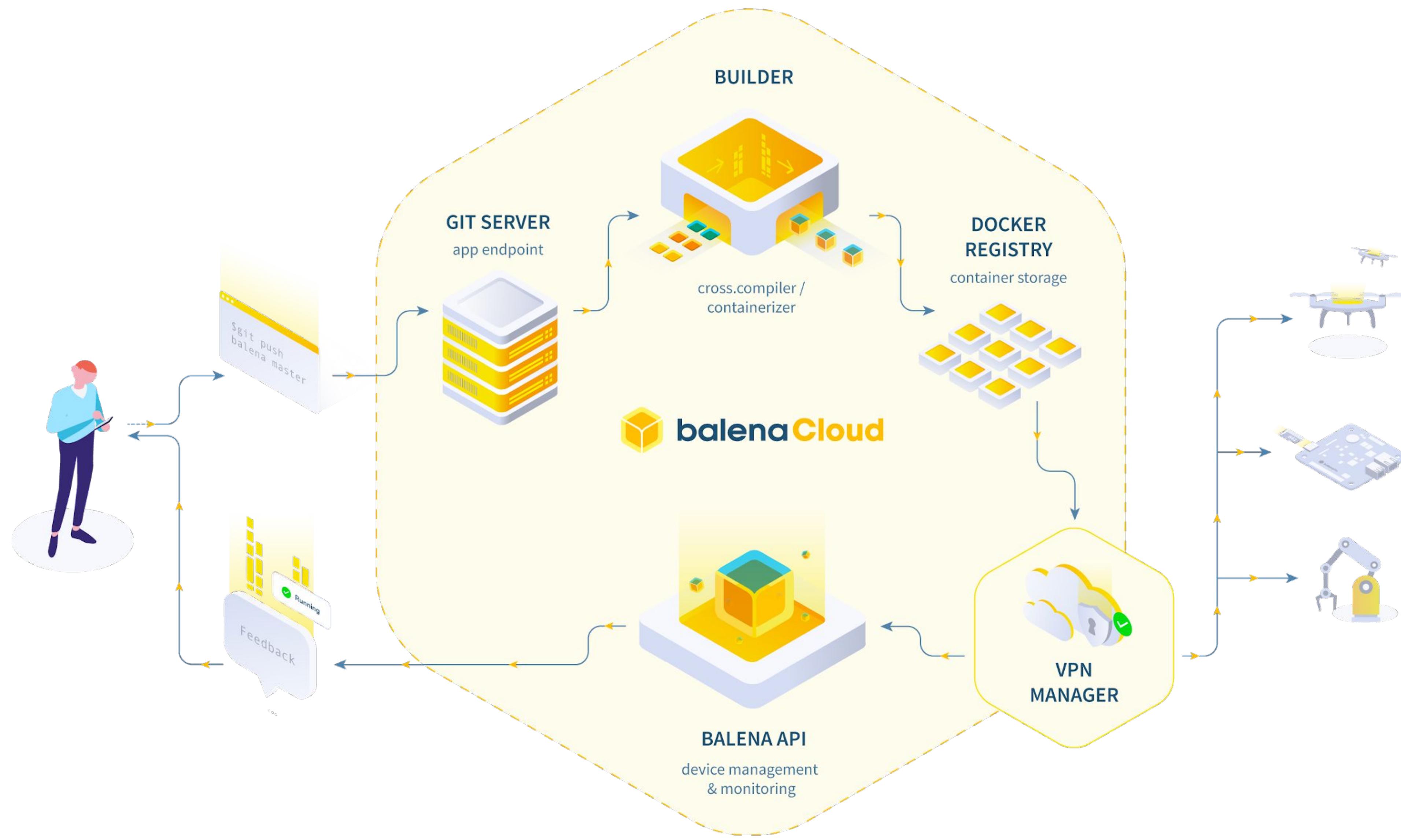
Learn more

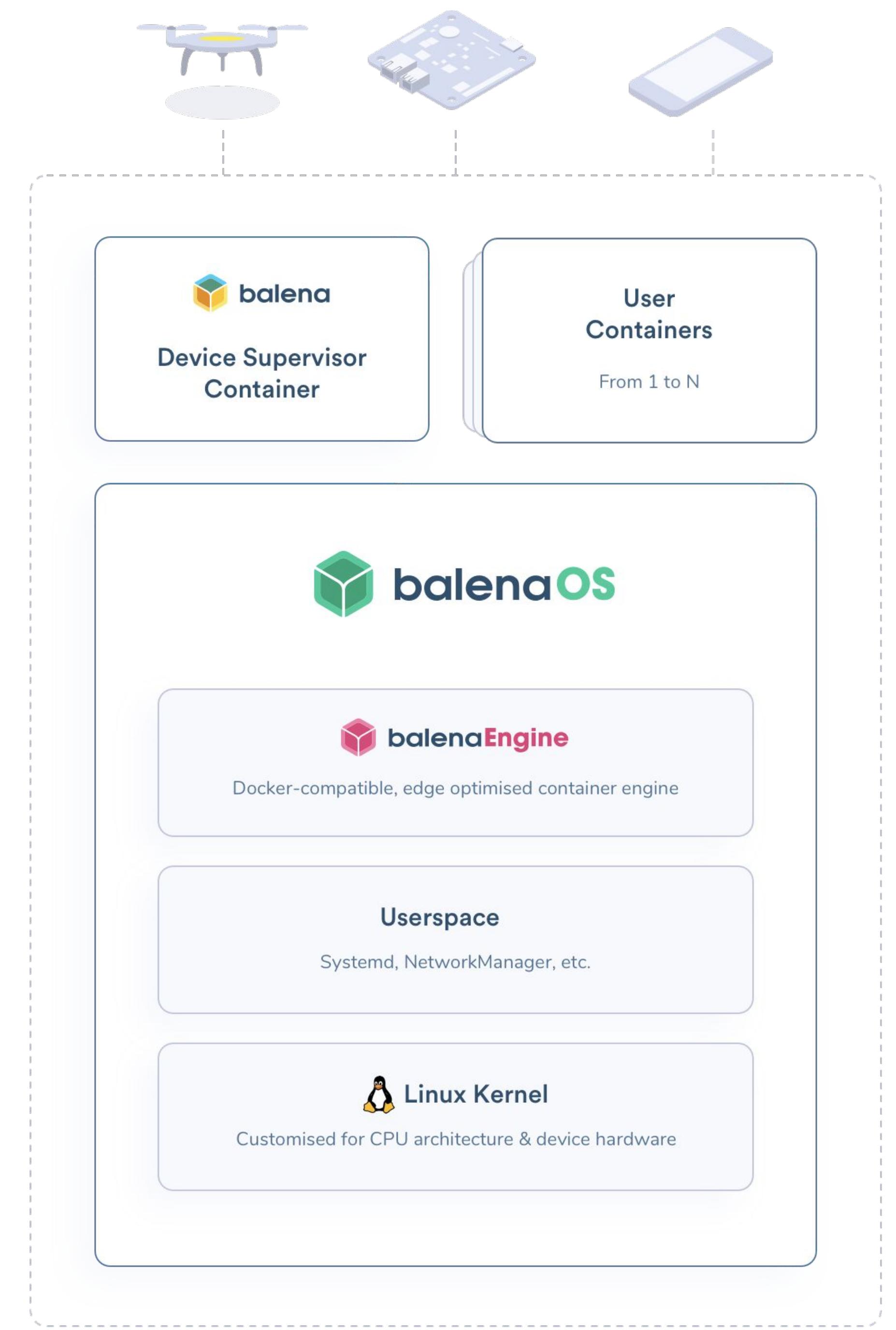
Your first 10 devices are always free and full-featured.

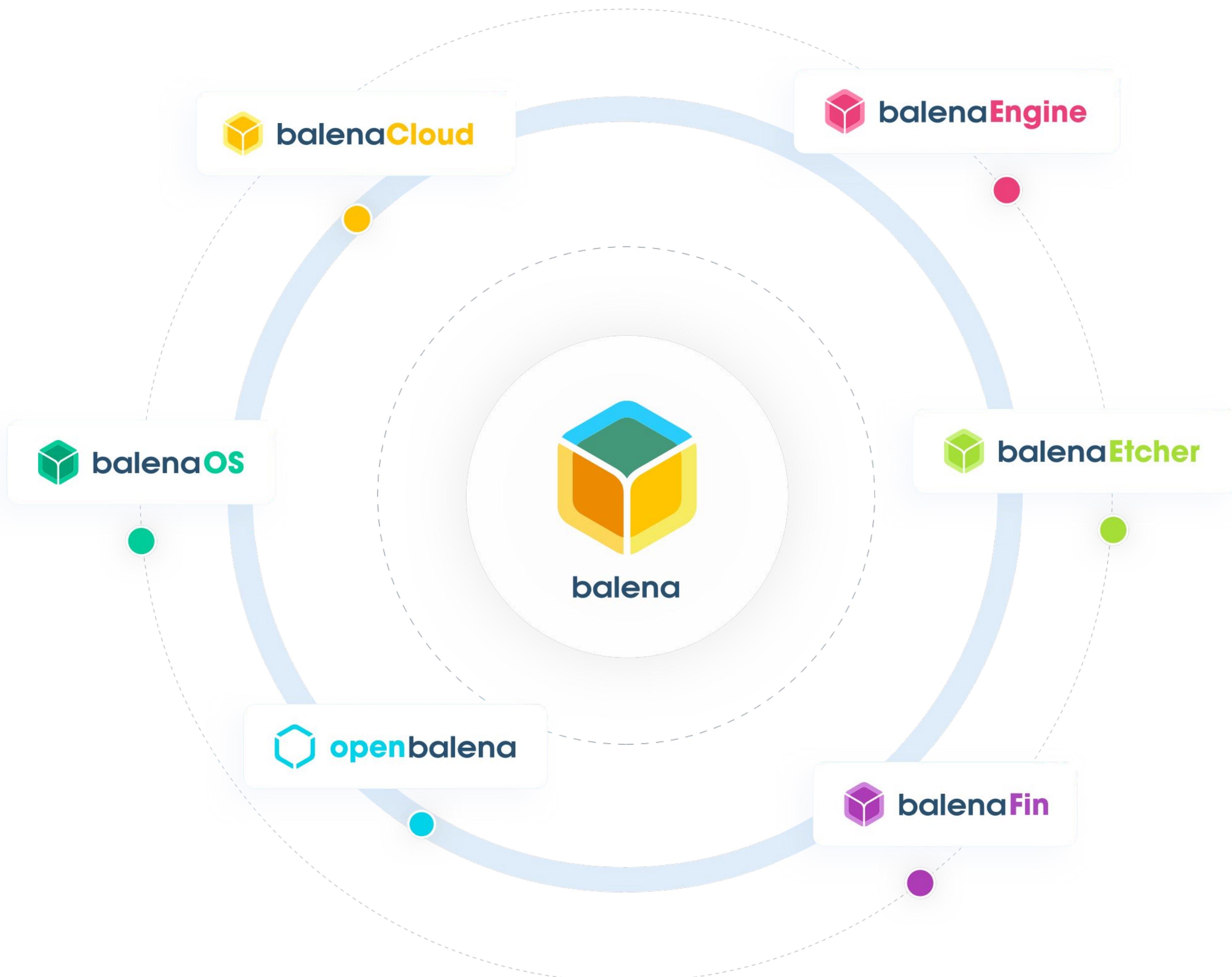
Email

Get started [Get started](#)

https://www.balena.io





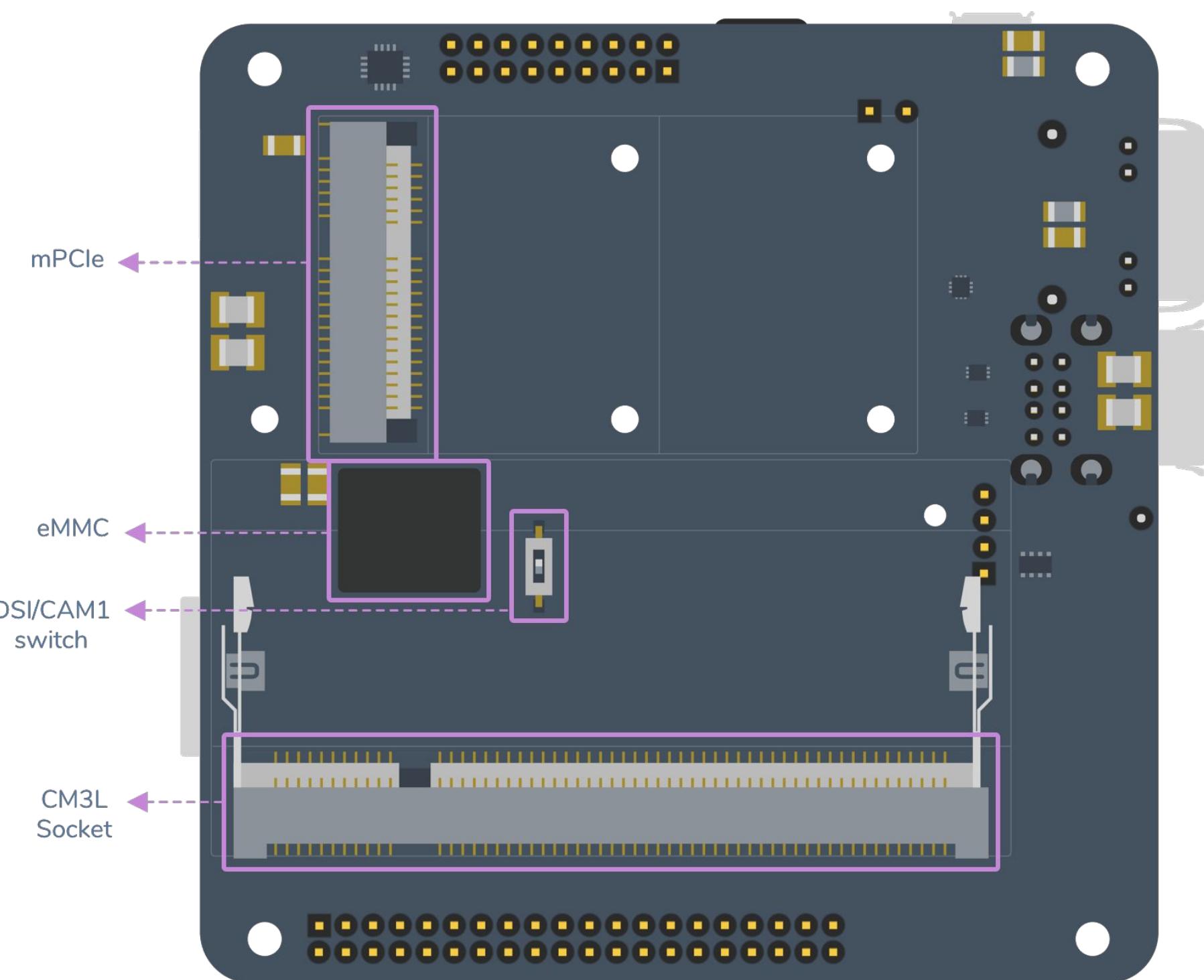
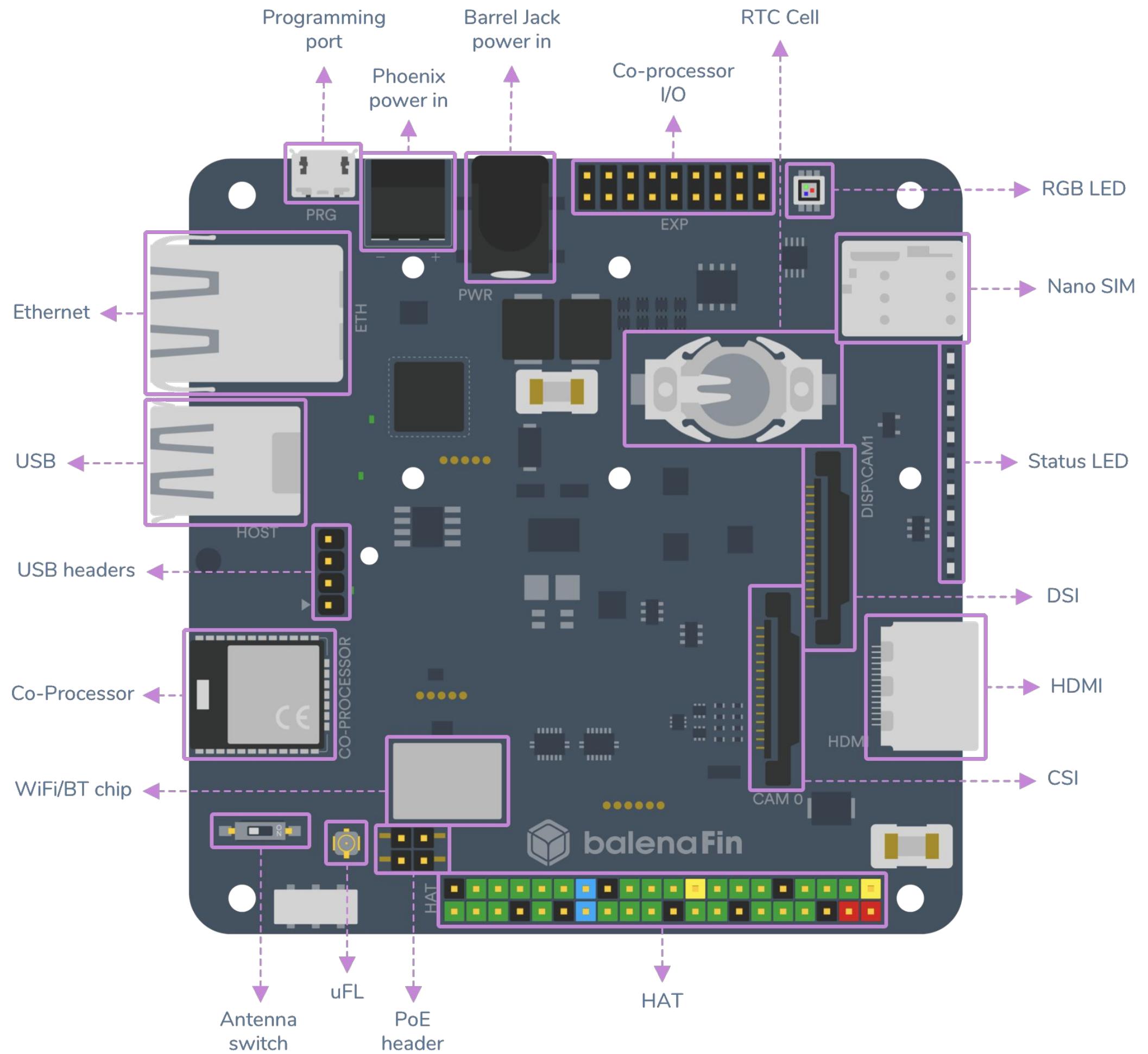


Let's create your first gateway

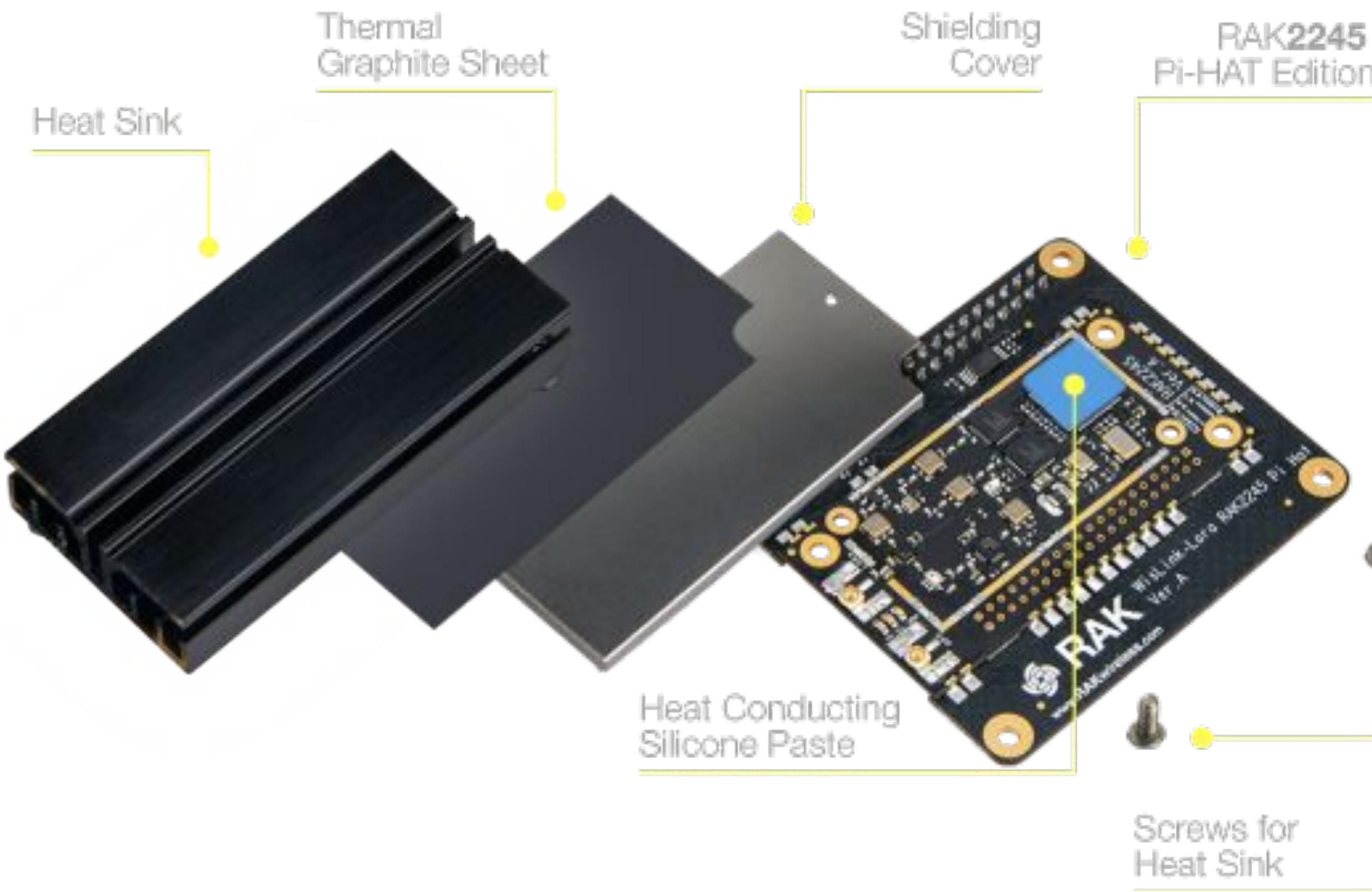
Get your hardware ready!



balenaFin

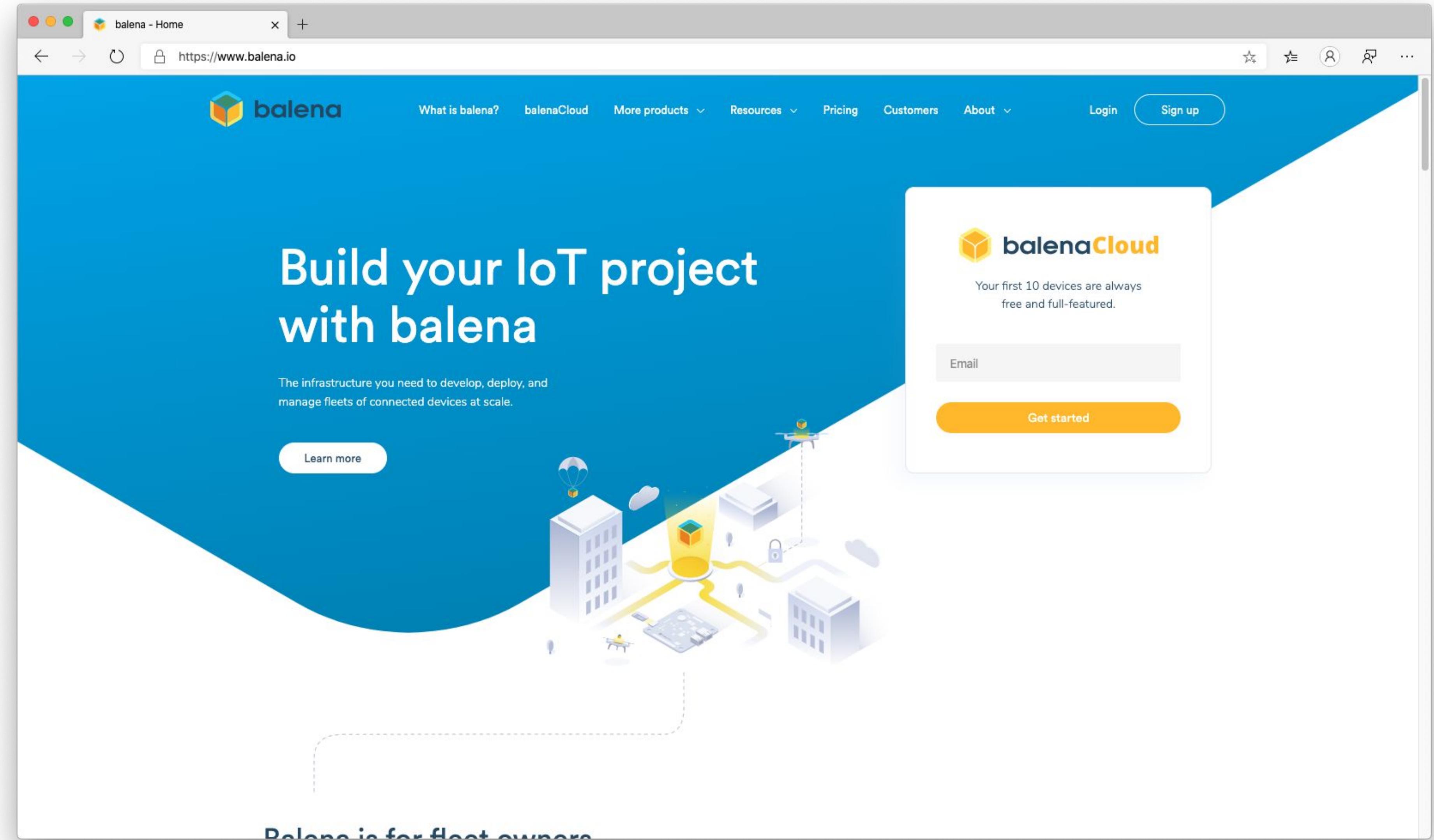


RAK2245



Before cooking

- 1 Create a [balena.io](#) account
- 2 Deploy a Basics™ Station Gateway on The Things Stack
- 3 Add the WiFi-Connect container into the Gateway
- 4 What's next?



<https://balena.io>

balena dashboard | Organization X +

https://dashboard.balena-cloud.com/orgs/138288/apps

Getting Started Docs Forums Status Marc Pous MP

Warning! You are using a support agent account. You should only use this account while you are on support and not for regular projects.

Tip: Use an incognito window or container tabs so that nothing is preserved after your support shift is over.

Create application Add filter Search entries... Views Actions Tags

App name: TTN-basicstation-fin

Organization: marc6's Organization Application: TheThingsStack-Gateway

Default device type: Balena Fin (CM3)

Application type: Starter Advanced

Create new application

Cancel

Applications

Members Teams Billing

Raspberry Pi 4 (using 64bit OS) Nov 20th 2020, 11:33 am 0 Starter 6580838 aarch64 0 marc6's Organization administrator

Raspberry Pi 2 Jul 2nd 2020, 11:40 am 0 Microservices No release armv7hf 0 marc6's Organization administrator

Raspberry Pi 4 (using 64bit OS) May 19th 2020, 1:08 am 1 Microservices 626f56a aarch64 0 marc6's Organization administrator

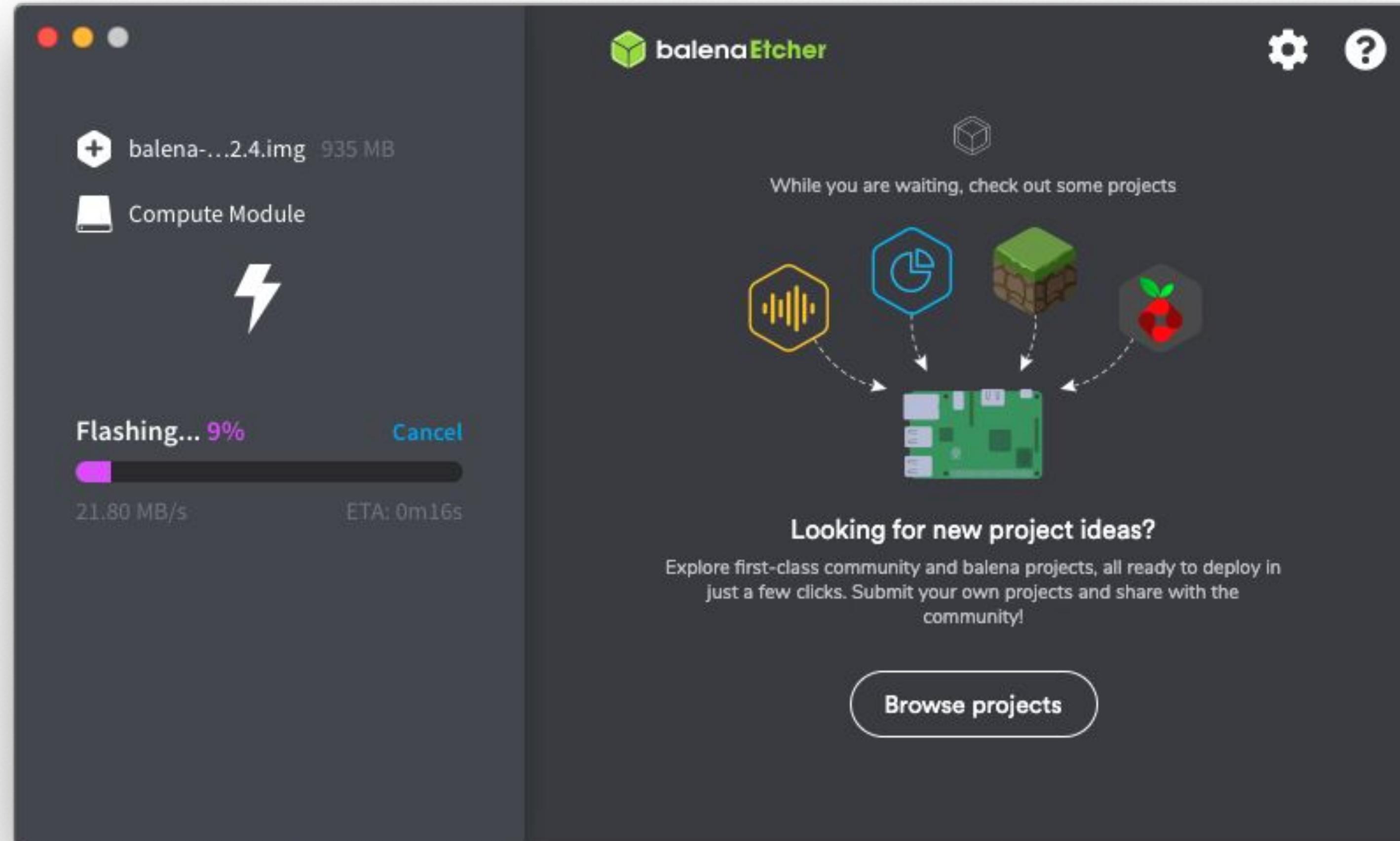
Raspberry Pi 4 (using 64bit OS) Apr 17th 2020, 8:30 pm 2 Microservices 7d26f96 aarch64 0 marc6's Organization administrator

Raspberry Pi 4 (using 64bit OS) Dec 16th 2020, 1:56 pm 0 Microservices 02766e8 aarch64 0 marc6's Organization administrator

Need help

The screenshot shows the balenaCloud dashboard interface. A modal window titled "Create application" is open in the center. Inside the modal, there are fields for "Organization" (set to "marc6's Organization"), "Application" (set to "TheThingsStack-Gateway"), "Default device type" (set to "Balena Fin (CM3)", with a note about CM3 being deprecated), and "Application type" (set to "Starter"). There is also an "Advanced" toggle switch. At the bottom right of the modal is a blue button labeled "Create new application". In the background, the main dashboard shows a list of other applications under "marc6's Organization", all with "administrator" access role. The sidebar on the left includes sections for "Organizations", "Summary", "Create application", "Add filter", "Search entries...", "Views", "Actions", "Tags", and links for "Members", "Teams", and "Billing". The top navigation bar includes links for "Getting Started", "Docs", "Forums", "Status", and a user profile for "Marc Pous". A warning message at the top of the page states: "Warning! You are using a support agent account. You should only use this account while you are on support and not for regular projects. Tip: Use an incognito window or container tabs so that nothing is preserved after your support shift is over."

The screenshot shows the balena dashboard interface for adding a new device. The left sidebar is dark-themed and includes sections for Organizations, Applications, TheThingsStack..., Devices (selected), Releases, Environment Variables, Service Variables, Fleet Variables, Actions, Members, and Location. The main content area has a light background and displays the 'Add new device' form for a 'Balena Fin (CM3)' device. The form includes dropdowns for 'Select device type' (Balena Fin (CM3)) and 'Select OS type' (balenaOS ESR), a dropdown for 'Select version' (v2020.07.2 (next, recommended)), and radio buttons for 'Development' (Recommended for first time users) and 'Production' (selected). Below these are fields for 'Network Connection' (Ethernet only or Wifi + Ethernet selected) and 'Wifi SSID' and 'Wifi Passphrase'. An 'Advanced' section is partially visible at the bottom. To the right of the form is a 'Instructions' section with 7 numbered steps for device setup, a note about the 'Getting Started Guide', and a 'Need help?' button. The top navigation bar shows the URL https://dashboard.balena-cloud.com/apps/1782954/devices and the user 'Marc Pous'.



On Fin 1.0 use both the microUSB cable and the barrel jack at the same time for flashing the eMMC.

The screenshot shows the balena dashboard interface for managing devices. On the left, a sidebar menu includes 'Organizations', 'Applications', and 'TheThingsStack...'. Under 'TheThingsStack...', there are sections for 'Devices', 'Releases', 'Environment Variables', 'Service Variables', 'Fleet Variables', 'Actions', 'Members', and 'Location'. The main content area displays a table of device information. The device listed is 'delicate-wind', which is online and connected via Ethernet (IP address: 192.168.10.132). The table columns include Status, Name, Last seen (VPN), UUID, OS version, OS variant, Supervisor version, IP address, Current release, Target release, and Release policy. A search bar at the top right allows filtering entries.

On Fin 1.0 disconnect the microUSB and the barrel jack. Now connect again only the barrel jack and Ethernet cable if you said only Ethernet.

balenalabs/basicstation: LoRa E X +

https://github.com/balenalabs/basicstation

Search or jump to... / Pull requests Issues Marketplace Explore

babenalabs / basicstation

forked from lorabasics/basicstation

Code Issues 1 Pull requests Actions Projects Wiki Security Insights Settings

master 4 branches 4 tags Go to file Add file Code

This branch is 42 commits ahead, 1 commit behind lorabasics:master.

Pull request Compare

mpous Update balena.yml 9217cf5 28 days ago 49 commits

deps Corecell last changes 4 months ago

examples Corecell last changes 4 months ago

pysys Release 2.0.4-9-g3d5c686 7 months ago

regr-tests Release 2.0.4-9-g3d5c686 7 months ago

src-linux Release 2.0.4-9-g3d5c686 7 months ago

src Release 2.0.4-9-g3d5c686 7 months ago

.gitignore Added instructions for balena.io deployment 6 months ago

.travis.yml Release 2.0.4-9-g3d5c686 7 months ago

CHANGELOG.md Release 2.0.5 7 months ago

Dockerfile Added instructions for balena.io deployment 6 months ago

Dockerfile.template Use separate start scripts 4 months ago

README.md Update README.md 4 months ago

VERSION.txt Release 2.0.5 7 months ago

balena.yml Update balena.yml 28 days ago

https://github.com/balenalabs/basicstation/actions

About LoRa Basics™ Station - The LoRaWAN Gateway Software

doc.sm.tc/station

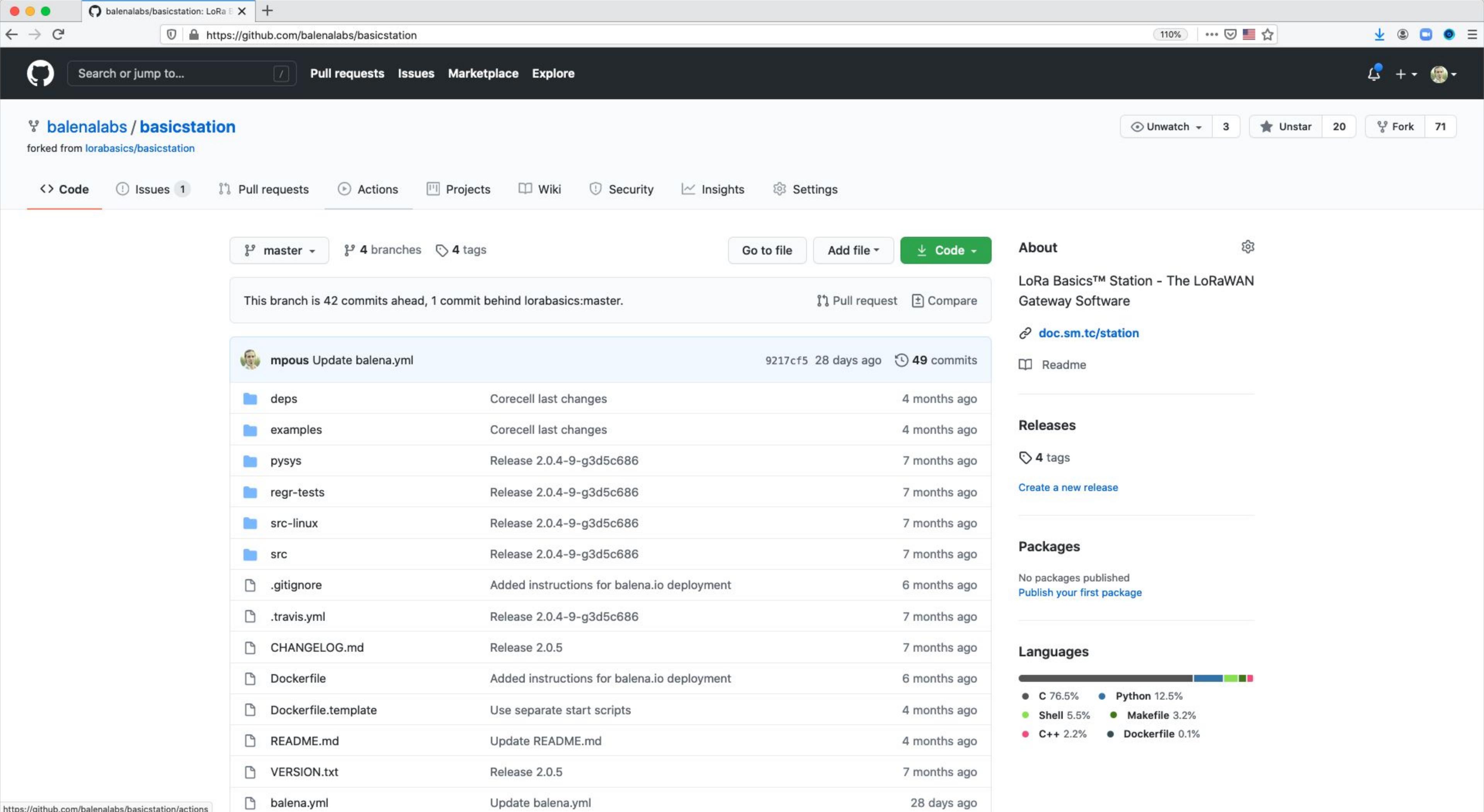
Readme

Releases 4 tags Create a new release

Packages No packages published Publish your first package

Languages

C 76.5%	Python 12.5%
Shell 5.5%	Makefile 3.2%
C++ 2.2%	Dockerfile 0.1%



<https://github.com/balenalabs/basicstation>

The screenshot shows a web browser window with the URL <https://github.com/balenalabs/basicstation>. The page is titled "Deploy the code". It contains two main sections: "Via Balena Deploy" and "Via Balena-Cli".

Via Balena Deploy

Running this project is as simple as deploying it to a balenaCloud application. You can do it in just one click by using the button below:

 Deploy with balena

Follow instructions, click Add a Device and flash an SD card with that OS image dowloaded from balenaCloud. Enjoy the magic 🌟 Over-The-Air 🌟!

Via Balena-Cli

If you are a balena CLI expert, feel free to use balena CLI.

- Sign up on [balena.io](#)
- Create a new application on balenaCloud.
- Clone this repository to your local workspace.
- Using [Balena CLI](#), push the code with `balena push <application-name>`
- See the magic happening, your device is getting updated 🌟 Over-The-Air 🌟 !

Configure the Gateway

Define your MODEL

In case that your LoRa concentrator is a `RAK2287` , it's important to change the Device Variable with the correct `MODEL` . The default `MODEL` on the balena Application is the `RAK2245` .

1. Go to balenaCloud dashboard and get into your LoRa gateway device site.
2. Click "Device Variables" button on the left menu and change the `MODEL` variable to `RAK2287` .

That enables a fleet of LoRa gateways with both `RAK2245` and `RAK2287` together under the same app.

Before starting check the region where you are going to deploy the gateway, de facto configuration is for EU gateways. Change the `TC_URI` if you are in a different zone than European.

<https://github.com/balenalabs/basicstation>

balena dashboard | Application X +

https://dashboard.balena-cloud.com/apps

Getting Started Docs Forums Status Marc Pous MP

Applications Organizations

Warning! You are using a support agent account. You should only use this account while you are on support and not for regular projects.
Tip: Use an incognito window or container tabs so that nothing is preserved after your support shift is over.

Create application Add filter Search entries... Views Actions Tags

App name	Device type	Created on	Total devices	App type	Release	Architecture	Status: Online	Organization	Access role
rosetta-at-home-arm							Online	balenalabs's Organization	administrator
rosetta-at-home-amd64							Online	balenalabs's Organization	administrator
Inkyshot2020							Online	balenalabs's Organization	administrator
First-App-BalenaFin							Online	hori's Organization	developer
TTN-basicstation-fin							Online	marc6's Organization	administrator
TheThingsStack-Gateway							Online	marc6's Organization	administrator
helium							Online	marc6's Organization	administrator
WiFiConnect							Online	marc6's Organization	administrator
uptime-robot-dashboard	Raspberry Pi 3	Dec 23rd 2020, 4:25 pm	0	Starter	0214888	armv7hf	Online	balenalabs's Organization	administrator
uk-train-departure-display	Raspberry Pi (v1 / Zero / Zero W)	May 26th 2020, 4:07 pm	0	Microservices	3cc4a5a	rpi	Online	balenalabs's Organization	administrator
TTN-Stack	Raspberry Pi 4 (using 64bit OS)	Dec 21st 2020, 9:52 pm	1	Microservices	0322283	aarch64	Online	marc6's Organization	administrator
TTN-basicstation-2287-fin10	Balena Fin (CM3)	Nov 3rd 2020, 1:31 pm	3	Starter	adb274d	armv7hf	Online	marc6's Organization	administrator
test-gsm	Balena Fin (CM3)	Oct 19th 2020, 1:04 pm	0	Microservices	No release	armv7hf	Online	marc6's Organization	administrator
testFin	Balena Fin (CM3)	Apr 8th 2020, 4:35 pm	1	Starter	956b8aa	armv7hf	Online	marc6's Organization	administrator

Deploy to existing application

Create a new application instead

Organization: marc6's Organization / Application: TheThingsStack-Gateway

Advanced

Cancel Deploy to application

Need help

The screenshot shows the balena dashboard interface for managing devices. On the left, a sidebar lists organizations, applications, and the current stack ('TheThingsStack...'). The main area displays a table of devices. One device, 'delicate-wind', is highlighted with a red circle. The device details are as follows:

Status	Name	Last seen (VPN)	UUID	OS version	OS variant	Supervisor version	IP address	Current release	Target release	Release policy
Online	delicate-wind	Online (for 10 minutes)	0523fc6	balenaOS 2020.07.2	production	11.12.4	192.168.10.132	Factory build	Factory build	Default

A message 'Building release 98f5411...' is displayed above the device table, indicating an ongoing build process. The top right corner shows user information 'Marc Pous MP'.

balena dashboard | TheThingsS X +

https://dashboard.balena-cloud.com/apps/1782954/releases

Getting Started Docs Forums Status Marc Pous MP

Release policy track latest

Add release

git remote add balena marc6@... ? Tags

Commit	Status	Release track	Source	Created by	Build duration	Completed	Devices on release
98f5411	Succeeded	default	cloud	marc6	0:02:29	a minute ago	0

Releases

Ex Environment Variables

Sx Service Variables

Fleet Variables

Actions

Members

Location

Need help

The screenshot shows the balena dashboard interface for managing releases. On the left, there's a sidebar with navigation links for Organizations, Applications, Devices, and a specific application named 'TheThingsStack...'. Below that is a 'Releases' section with various configuration options like 'Release policy' set to 'track latest'. A prominent 'Add release' button is available. The main area displays a table of releases. One release is listed: commit '98f5411' has a status of 'Succeeded', was built on the 'default' track from 'cloud', created by 'marc6', took 0:02:29, completed 'a minute ago', and has 0 devices on the release. The sidebar also includes links for Environment Variables, Service Variables, Fleet Variables, Actions, Members, and Location.

balena dashboard | TheThingsX X +

https://dashboard.balena-cloud.com/apps/1782954/devices

Getting Started Docs Forums Status Marc Pous MP

Release policy track latest

git remote add balena marc6@... ?

+ Add device Add filter Search entries... Views Actions Tags

Status Name Last seen (VPN) UUID OS version OS variant Supervisor version IP address Current release Target release Release policy

Updating delicate-wind Online (for 13 minutes) 0523fc6 balenaOS 2020.07.2 production 11.12.4 192.168.10.132 Factory build 98f5411 Default

1 - 1 of 1 < >

Releases Environment Variables Service Variables Fleet Variables Actions Members Location

Need help

Status	Name	Last seen (VPN)	UUID	OS version	OS variant	Supervisor version	IP address	Current release	Target release	Release policy
Updating	delicate-wind	Online (for 13 minutes)	0523fc6	balenaOS 2020.07.2	production	11.12.4	192.168.10.132	Factory build	98f5411	Default

The screenshot shows the balena dashboard interface for a device named "delicate-wind".

Device Summary:

- Status:** Online
- UUID:** 0523fc6
- Type:** Balena Fin (CM3)

Hardware:

- Last Seen (VPN): Online (for 19 minutes)
- Host OS Version: balenaOS 2020.07.2
- Supervisor Version: 11.12.4
- Current Release: 98f5411 (green checkmark)
- Target Release: 98f5411
- IP Address: 192.168.10.132
- MAC Address: B8:27:EB:87:95:76, 48:A4:93:03:0C:0E, 48:A4:93:03:0B:0E

Tags: (1) [EUI: b827ebFFFFE879576](#) (circled in red)

Notes: Add device notes...

Services:

Service	Status	Release
main	Running	98f5411

Logs: No logs yet

Terminal: Select a target ▾ Start terminal session

Copy the EUI of your gateway

balena dashboard | delicate-wi X Overview - Console - The Thing X +

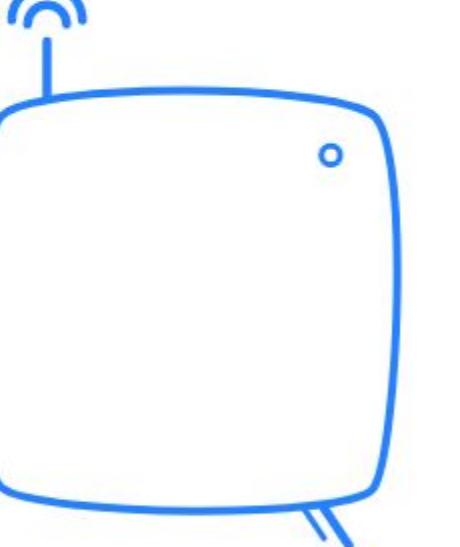
https://ttc.eu1.cloud.thethings.industries/console/

THE THINGS CONFERENCE THE THINGS STACK Cloud Overview Applications Gateways Organizations eu1 Cloud Marc Pous

Welcome back, Marc Pous! 🙌

Walk right through to your applications and/or gateways

 Go to applications

 Go to gateways

Version info Component status

Application Server • Gateway Server

balena dashboard | delicate-wi X Add gateway - Console - The T X +

https://ttc.eu1.cloud.thethings.industries/console/gateways/add

THE THINGS CONFERENCE THE THINGS STACK Cloud Overview Applications Gateways Organizations eu1 Cloud Marc Pous

Add gateway

General settings

Owner*
marc-balena

Gateway ID*
my-new-gateway

Gateway EUI®
Gateway EUI

Gateway name
My new gateway

Gateway description
Description for my new gateway

Optional gateway description; can also be used to save notes about the gateway

Gateway Server address
ttc.eu1.cloud.thethings.industries

The address of the Gateway Server to connect to

Gateway status

Public

The status of this gateway may be publicly displayed

Attributes

+ Add attributes

Attributes can be used to set arbitrary information about the entity, to be used by scripts, or simply for your own organization



balena dashboard | delicate-wi X Overview - Vilallonga de Ter - T X +

https://ttc.eu1.cloud.thethings.industries/console/gateways/balenafin-rak2287

THE THINGS CONFERENCE THE THINGS STACK Cloud Overview Applications Gateways Organizations eu1 Cloud Marc Pous

Vilallonga de Ter

Overview Live data Location Collaborators API keys General settings

Vilallonga de Ter
ID: balenafin-rak2287

Disconnected 1 Collaborator 1 API key

Created 2 days ago

General information

- Gateway ID: balenafin-rak2287
- Gateway EUI: B827EBFFFFE04F09
- Gateway description: balenaFin 1.0 with RAK2287 and 5.8dbi antenna at Vilallonga de Ter
- Created at: Jan 11, 2021 15:48:26
- Last updated at: Jan 11, 2021 23:03:36
- Gateway Server address: ttc.eu1.cloud.thethings.industries

LoRaWAN information

- Frequency plan: EU_863_870_TTN
- Global configuration: Download global_conf.json

Live data See all activity → Waiting for events from balenafin-rak2287...

Location Change location settings → catalanes Parc Natural de les Cappelletes del Ter i del Freser Alta Garrotxa Massís de les Salines Ripoll Olot A-26 Leaflet © OpenStreetMap contributors

< Hide sidebar

Everything you need to build enterprise grade, private LoRaWAN networks - [The Things Industries](#)

v3.10.5 ? Get Support

The screenshot shows the 'Overview' page for the gateway 'Vilallonga de Ter'. The 'Gateway Server address' field is highlighted with a red circle, and the 'API keys' section is also highlighted with a red circle. The map on the right shows the location of the gateway in the 'catalanes' region of Spain.

balena dashboard | Marc-fin111 X +

https://dashboard.balena-cloud.com/devices/3f9c7c30dec511226971f5f6290fdce8/envvars

Getting Started Docs Forums Status Marc Pous MP

Device environment variables ?

+ Add variable

Name	Whole fleet	Marc-fin111 (current device)	Actions
GW_GPS	false	override	
GW_ID	0	override	
GW_KEY	0	override	
GW_RESET_PIN	11	override	
MODEL	RAK2245	override	
TC_KEY	not defined	NNSXS.NWDV0B2CPR4TXXI4B42D0GXM4DOCEORIGWRNBY.E2YODRJQPDHDNQSWQF6WNHY3QZZWEFCDJW...	edit delete
TC_URI	wss://lns.eu.thethings.network:443	wss://ttc.eu1.cloud.thethings.industries:8887	edit delete

Device Variables Device service Variables Device Configuration Actions Diagnostics Experimental Location

Need help ?

Overview - fin111-rak2245 - The Things Stack Cloud

https://ttc.eu1.cloud.thethings.industries/console/gateways/fin111-rak2245

THE THINGS CONFERENCE THE THINGS STACK Cloud Overview Applications Gateways Organizations eu1 Cloud Marc Pous

fin111-rak2245

fin111-rak2245 ID: fin111-rak2245

Last seen 1 second ago ↑ 34 ↓ 0 1 Collaborator 1 API key Created 1 hour ago

General information

Gateway ID	fin111-rak2245
Gateway EUI	B827EBFFE77082F
Gateway description	None
Created at	Jan 21, 2021 22:27:36
Last updated at	Jan 21, 2021 22:27:36
Gateway Server address	ttc.eu1.cloud.thethings.industries

Live data See all activity →

↑ 23:54:01	Forward uplink message
↑ 23:54:00	Forward uplink message
↑ 23:54:00	Receive uplink message DevAddr: 26 08 B0 30 FPort: 2 FCnt:
↑ 23:53:41	Forward uplink message
↑ 23:53:40	Forward uplink message
↑ 23:53:40	Receive uplink message DevAddr: 26 08 B0 30 FPort: 2 FCnt:

Collaborators

API keys

General settings

Location

LoRaWAN information

Frequency plan	EU_863_870_TTN
Global configuration	Download global_conf.json

Location Change location settings →

No location information available

Hide sidebar

Everything you need to build enterprise grade, private LoRaWAN networks - [The Things Industries](#)

v3.10.5 [Get Support](#)

Gateway data - fin11-rak2245 X +

https://ttc.eu1.cloud.thethings.industries/console/gateways/fin11-rak2245/data

THE THINGS CONFERENCE THE THINGS STACK Cloud Overview Applications Gateways Organizations eu1 Cloud Marc Pous

fin11-rak2245 Gateways > fin11-rak2245 > Live data

Time	Type	Data preview	Pause	Clear
↑ 23:54:01	Forward uplink message			
↑ 23:54:00	Forward uplink message			
↑ 23:54:00	Receive uplink message	DevAddr: 26 08 B0 30 FPort: 2 FCnt: 120 MAC payload: 8A C9 DC E0 93 99 0E A1 B8 A1 90 52 85 Bandwidth: 125000 SNR: 14.25 Raw payload: 40 30 B0 08 26 00 78 00 02 8A C9 DC E0 93 99 0E A1 B8 A1 90 52 85		
↑ 23:53:41	Forward uplink message			
↑ 23:53:40	Forward uplink message			
↑ 23:53:40	Receive uplink message	DevAddr: 26 08 B0 30 FPort: 2 FCnt: 119 MAC payload: 13 3A 8E 77 55 87 9F B9 2B 7E 83 29 14 Bandwidth: 125000 SNR: 11 Raw payload: 40 30 B0 08 26 00 77 00 02 13 3A 8E 77 55 87 9F B9 2B 7E 83 29 14		
↑ 23:53:21	Forward uplink message			
↑ 23:53:20	Forward uplink message			
↑ 23:53:20	Receive uplink message	DevAddr: 26 08 B0 30 FPort: 2 FCnt: 118 MAC payload: A1 2F 8B A0 C9 80 34 8F 40 B9 A2 83 03 Bandwidth: 125000 SNR: 8.75 Raw payload: 40 30 B0 08 26 00 76 00 02 A1 2F 8B A0 C9 80 34 8F 40 B9 A2 83 03		
↑ 23:53:01	Forward uplink message			
↑ 23:53:00	Forward uplink message			
↑ 23:53:00	Receive uplink message	DevAddr: 26 08 B0 30 FPort: 2 FCnt: 117 MAC payload: D7 31 51 F9 DC 2E 35 9E 45 C7 D3 D7 DF Bandwidth: 125000 SNR: 10.5 Raw payload: 40 30 B0 08 26 00 75 00 02 D7 31 51 F9 DC 2E 35 9E 45 C7 D3 D7 DF		
↑ 23:52:41	Forward uplink message			
↑ 23:52:40	Forward uplink message			
↑ 23:52:40	Receive uplink message	DevAddr: 26 08 B0 30 FPort: 2 FCnt: 116 MAC payload: 6B 65 35 3B 42 F9 A9 3C 88 75 41 A5 0F Bandwidth: 125000 SNR: 11 Raw payload: 40 30 B0 08 26 00 74 00 02 6B 65 35 3B 42 F9 A9 3C 88 75 41 A5 0F		
↑ 23:52:21	Forward uplink message			
↑ 23:52:20	Forward uplink message			
↑ 23:52:20	Receive uplink message	DevAddr: 26 08 B0 30 FPort: 2 FCnt: 115 MAC payload: EC 27 56 97 CD DB B3 B6 1A C2 35 75 14 Bandwidth: 125000 SNR: 10 Raw payload: 40 30 B0 08 26 00 73 00 02 EC 27 56 97 CD DB B3 B6 1A C2 35 75 14		
↑ 23:52:01	Forward uplink message			

< Hide sidebar

Everything you need to build enterprise grade, private LoRaWAN networks – [The Things Industries](#)

v3.10.5 ? Get Support

The screenshot shows the balena dashboard interface for a device named "delicate-wind".

Device Summary:

- Status:** Online
- UUID:** 0523fc6
- Type:** Balena Fin (CM3)

Hardware & Software:

- Last Seen (VPN):** Online (for an hour)
- Host OS Version:** balenaOS 2020.07.2
- Supervisor Version:** 11.12.4
- Current Release:** 98f5411
- Target Release:** 98f5411
- IP Address:** 192.168.10.132
- MAC Addresses:** B8:27:EB:87:95:76, 48:A4:93:03:0C:0E, 48:A4:93:03:0B:0E

Tags: EUI: b827ebFFFFE879576

Notes: Add device notes...

Services:

Service	Status	Release
main	Running	98f5411

Logs:

```
- running server auth only
13.01.21 17:29:39 (+0100) [main] 2021-01-13 16:29:39.024 [TCE:INFO] Connecting to INFOs: wss://ttc.eui.cloud.thethings.industries:8887
13.01.21 17:29:40 (+0100) [main] 2021-01-13 16:29:40.256 [TCE:ERRO] Infos error: ::0 Failed to fetch gateway: error:pkg/gatewayserver@gateway_eui_not_registered (gateway EUI 'B827EBFFFFE879576' is not registered)
13.01.21 17:29:40 (+0100) [main] 2021-01-13 16:29:40.256 [AIO:DEBU] [3] ws_close reason=1000
13.01.21 17:29:40 (+0100) [main] 2021-01-13 16:29:40.257 [AIO:ERRO] Recv failed: SSL - The peer notified us that the connection is going to be closed
13.01.21 17:29:40 (+0100) [main] 2021-01-13 16:29:40.257 [AIO:DEBU] [3] WS connection shutdown...
13.01.21 17:29:40 (+0100) [main] 2021-01-13 16:29:40.257 [TCE:INFO] INFOs reconnect backoff 60s (retry 17)
```

Terminal:

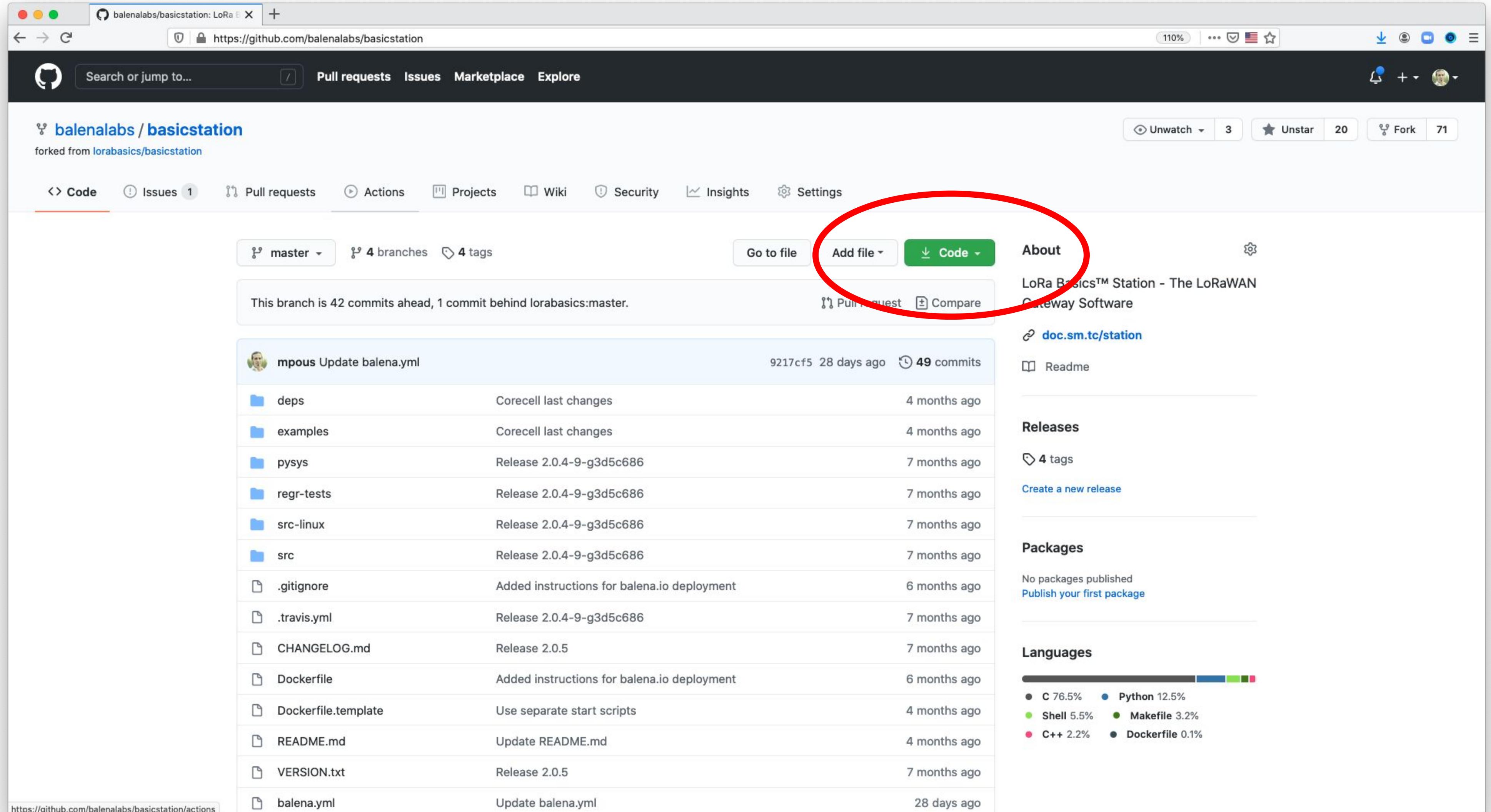
Select a target ▾

Start terminal session ➔

Let's add more features

BasicsStation Gateway + wifi-connect

What if you move your gateway or change the WiFi credentials?



The screenshot shows the GitHub repository page for `balenalabs/basicstation`. The repository is a fork of `lorabasics/basicstation`. The main navigation bar includes links for Pull requests, Issues, Marketplace, and Explore. The repository name is displayed prominently at the top left, followed by a search bar and user profile icons.

Key UI elements visible include:

- Code tab:** Active tab, showing the repository's code structure.
- Issues:** 1 issue.
- Pull requests:** 1 pull request.
- Actions:** 4 actions.
- Projects:** 1 project.
- Wiki:** Wiki link.
- Security:** Security link.
- Insights:** Insights link.
- Settings:** Settings link.

The repository summary indicates it has 4 branches and 4 tags. A message states: "This branch is 42 commits ahead, 1 commit behind lorabasics:master." Below this, a list of files and their commit history is shown:

File	Description	Commit
<code>deps</code>	Corecell last changes	4 months ago
<code>examples</code>	Corecell last changes	4 months ago
<code>pysys</code>	Release 2.0.4-9-g3d5c686	7 months ago
<code>regr-tests</code>	Release 2.0.4-9-g3d5c686	7 months ago
<code>src-linux</code>	Release 2.0.4-9-g3d5c686	7 months ago
<code>src</code>	Release 2.0.4-9-g3d5c686	7 months ago
<code>.gitignore</code>	Added instructions for balena.io deployment	6 months ago
<code>.travis.yml</code>	Release 2.0.4-9-g3d5c686	7 months ago
<code>CHANGELOG.md</code>	Release 2.0.5	7 months ago
<code>Dockerfile</code>	Added instructions for balena.io deployment	6 months ago
<code>Dockerfile.template</code>	Use separate start scripts	4 months ago
<code>README.md</code>	Update README.md	4 months ago
<code>VERSION.txt</code>	Release 2.0.5	7 months ago
<code>balena.yml</code>	Update balena.yml	28 days ago

On the right side of the repository page, there are sections for About, Releases, Packages, and Languages. The 'About' section contains a brief description: "LoRa Basics™ Station - The LoRaWAN Gateway Software". The 'Languages' section shows a chart where C is the dominant language at 76.5%.

<https://github.com/balenalabs/basicstation>

balena-io/wifi-connect: Easy WiFi setup for Linux devices from your mobile phone or laptop

Search or jump to... Pull requests Issues Marketplace Explore

balena-io / wifi-connect

Code Issues Pull requests Actions Projects Wiki Security Insights

master 22 branches 55 tags Go to file Add file Code

balena-ci and VersionBot v4.4.4 ac333eb on 29 Oct 2020 347 commits

.circleci	Replace UI with React and Rendition	9 months ago
.github	Add CODEOWNERS	2 years ago
.versionbot	v4.4.4	3 months ago
docs	Configurable listening port	3 years ago
scripts	Support Buster and future Raspbian versions in the installer	15 months ago
src	Terminate dnsmasq gracefully and wait for its exit	3 months ago
ui	Allow toggling "show password" on password input	5 months ago
.gitignore	Replace UI with React and Rendition	9 months ago
.travis.yml	Rust language reimplementation	3 years ago
CHANGELOG.md	v4.4.4	3 months ago
Cargo.lock	v4.4.4	3 months ago
Cargo.toml	v4.4.4	3 months ago
Dockerfile.template	target correctly the arch dockerfile template var	3 months ago
LICENSE	resin-wifi-connect is now WiFi Connect	3 years ago
ManualTests.md	Backwards compatibility	4 years ago
README.md	readme: Add balenaOS multicontainer app example.	13 months ago

About

Easy WiFi setup for Linux devices from your mobile phone or laptop

wifi-hotspot rpi raspberrypi
resin-io balena wifi-ap iot

Readme Apache-2.0 License

Releases 55

v4.4.4 Latest on 29 Oct 2020 + 54 releases

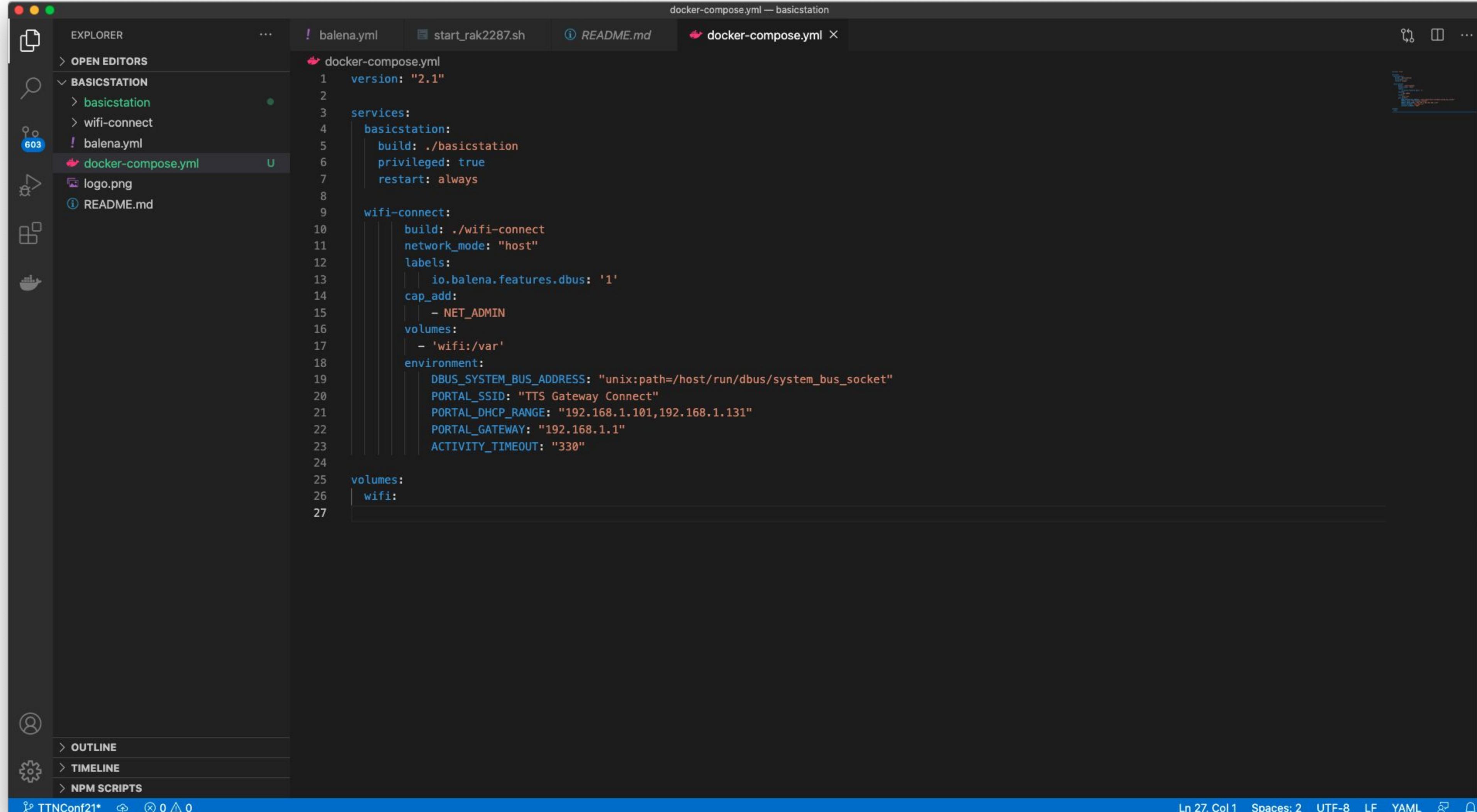
Packages

No packages published Publish your first package

Contributors 21

https://github.com/balena-io/wifi-connect/projects

Clone <https://github.com/balena-io/wifi-connect>



The screenshot shows a dark-themed code editor interface, likely Visual Studio Code, displaying a `docker-compose.yml` file for a `basicstation` application. The file defines two services: `basicstation` and `wifi-connect`. The `basicstation` service uses the `basicstation` image from the current directory, runs with elevated privileges, and restarts always. It also specifies environment variables for DBUS and network settings. The `wifi-connect` service uses the `wifi-connect` image from the current directory, runs in host mode, and has specific labels and volumes. The `volumes:` section maps the `wifi` volume to the `/var` directory.

```
version: "2.1"
services:
  basicstation:
    build: ./basicstation
    privileged: true
    restart: always
  wifi-connect:
    build: ./wifi-connect
    network_mode: "host"
    labels:
      - io.balena.features dbus: '1'
    cap_add:
      - NET_ADMIN
    volumes:
      - 'wifi:/var'
    environment:
      DBUS_SYSTEM_BUS_ADDRESS: "unix:path=/host/run/dbus/system_bus_socket"
      PORTAL_SSID: "TTS Gateway Connect"
      PORTAL_DHCP_RANGE: "192.168.1.101,192.168.1.131"
      PORTAL_GATEWAY: "192.168.1.1"
      ACTIVITY_TIMEOUT: "330"
volumes:
  wifi:
```

Create a [docker-compose.yml](#) to build a multi-container balena app

The screenshot shows a GitHub repository page for `balena-io / balena-cli`. The page displays the `INSTALL.md` file. At the top, there are navigation links for `Pull requests`, `Issues`, `Marketplace`, and `Explore`. Below the header, there are statistics: `Used by 4`, `Unwatch 32`, `Star 200`, and `Fork 52`. The main content area shows the file's history, with a commit by `grahammcculloch` adding Windows-specific hints to the output. The file contains 212 lines (173 sloc) and is 12.7 KB in size. The content of the file is as follows:

balena CLI Installation Instructions

There are 3 options to choose from to install balena's CLI:

- [Executable Installer](#): the easiest method, using the traditional graphical desktop application installers for Windows and macOS (coming soon for Linux users too).
- [Standalone Zip Package](#): these are plain zip files with the balena CLI executable in them. Recommended for scripted installation in CI (continuous integration) environments.
- [NPM Installation](#): recommended for developers who may be interested in integrating the balena CLI in their existing Node.js projects or workflow.

Some specific CLI commands have a few extra installation steps: see section [Additional Dependencies](#).

Windows users:

- There is a [YouTube video tutorial](#) for installing and getting started with the balena CLI on Windows. (The video uses the standalone zip package option.)
- If you are using Microsoft's [Windows Subsystem for Linux](#) (WSL), the recommendation is to install a balena CLI release for Linux rather than Windows, like the Linux standalone zip package. An installation with the graphical executable installer for Windows will not run on WSL.

Install balena CLI <https://www.balena.io/docs/reference/balena-cli/>

The screenshot shows the balena dashboard interface for a device named "delicate-wind".

Device Summary:

- Status:** Online
- UUID:** 0523fc6
- Type:** Balena Fin (CM3)
- Last Seen (VPN):** Online (for 2 hours)
- Host OS Version:** balenaOS 2020.07.2
- Supervisor Version:** 11.12.4
- Current Release:** 2e6ce06
- Target Release:** 2e6ce06
- IP Address:** 192.168.10.132
- Mac Address:** B8:27:EB:87:95:76, 48:A4:93:03:0C:0E, 48:A4:93:03:0B:0E
- Tags:** EUI: b827ebFFFFE879576
- Notes:** Add device notes...

Services:

Name	Status	Release	Actions
basicstation	Running	2e6ce06	▶ ⚡ ⏪ ⏴
wifi-connect	Running	2e6ce06	▶ ⚡ ⏪ ⏴

A red circle highlights the "basicstation" service row.

Logs:

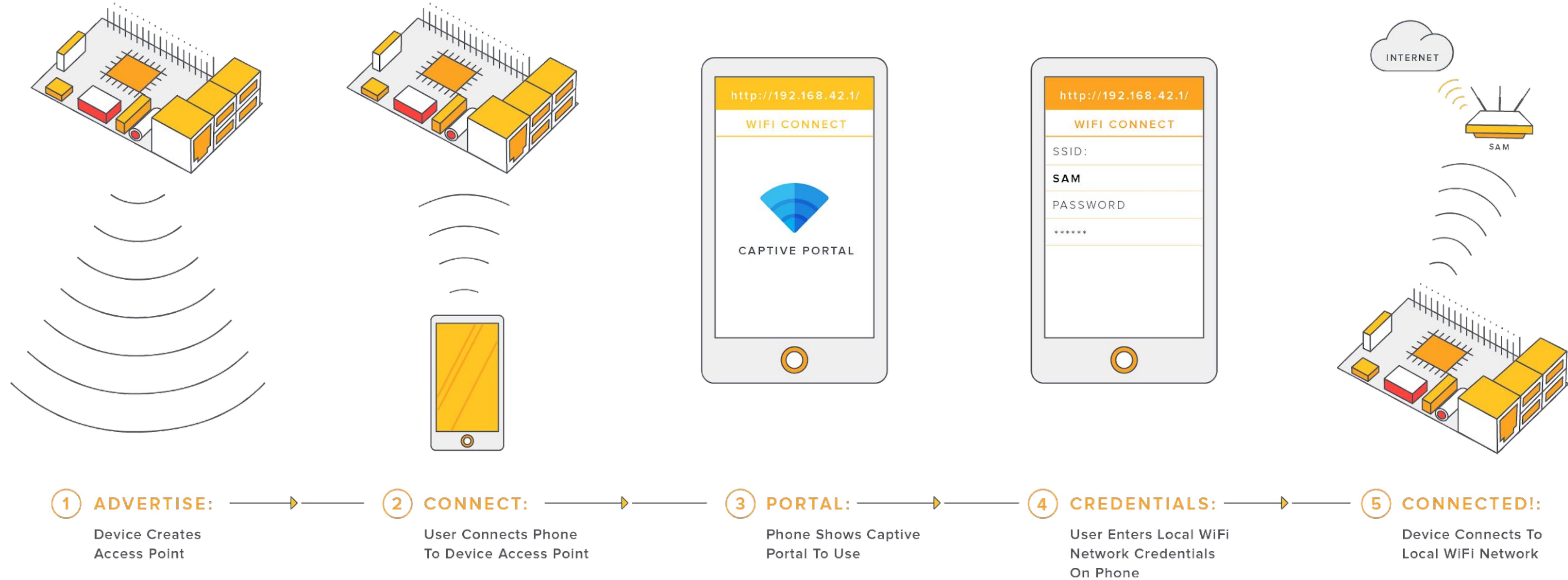
```
ss://ttc.eu1.cloud.thethings.industries:8887
13.01.21 17:52:26 (+0100) basicstation 2021-01-13 16:52:26.604 [TCE:ERRO] Infos error: ::0 Failed to fetch gateway: error:pkg/gatewayserver:gateway_eui_not_registered (gateway EUI '0242ACFFFE11002' is not registered)
13.01.21 17:52:26 (+0100) basicstation 2021-01-13 16:52:26.604 [AIO:DEBU] [3] ws_close reason=100
13.01.21 17:52:26 (+0100) basicstation 2021-01-13 16:52:26.604 [AIO:ERRO] Recv failed: SSL - The peer notified us that the connection is going to be closed
13.01.21 17:52:26 (+0100) basicstation 2021-01-13 16:52:26.604 [AIO:DEBU] [3] WS connection shutdown...
13.01.21 17:52:26 (+0100) basicstation 2021-01-13 16:52:26.605 [TCE:INFO] INFO reconnect backoff 60s (retry 9)
```

Terminal:

Select a target ▾

> Start terminal session

Now you can change the WiFi credentials of your gateway from your mobile phone



WiFi connect

Let's make something even funnier

BasicsStation Gateway + wifi-connect + Bird Nest Watcher

What if you want to put your LoRaWAN gateway inside a bird nest?

just4give/bird-watcher-fin X +

https://github.com/just4give/bird-watcher-fin

Search or jump to... Pull requests Issues Marketplace Explore

just4give / bird-watcher-fin Unwatch 2 Unstar 10 Fork 3

Code Issues Pull requests Actions Projects Wiki Security Insights

master 1 branch 0 tags Go to file Add file Code

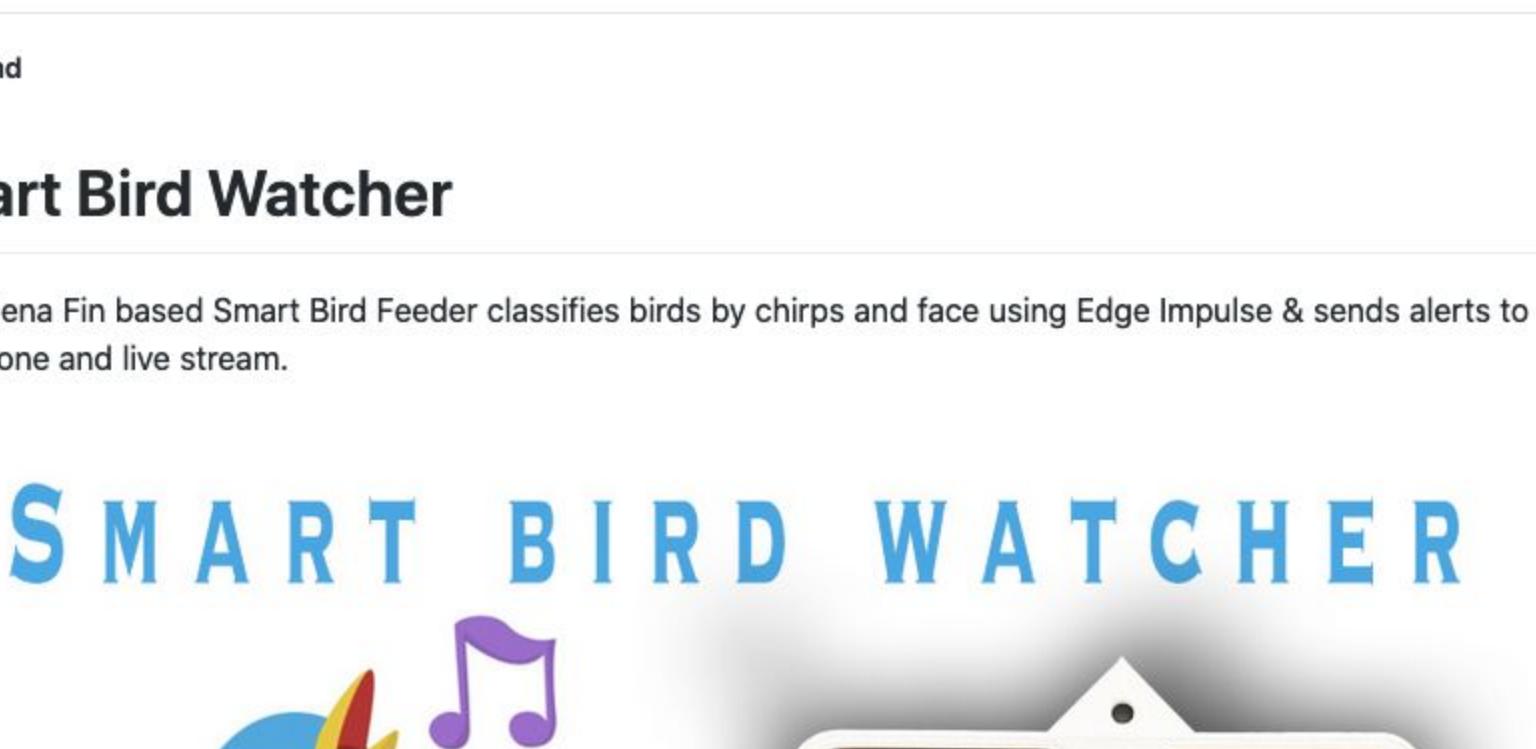
just4give Merge pull request #2 from shawaj/patch-1 eb5cc03 13 days ago 16 commits

- camera-dash added docker files for arch64 15 days ago
- face-ei-inference added docker files for arch64 15 days ago
- tweet-ei-inference added docker files for arch64 15 days ago
- .DS_Store first commit 19 days ago
- README.md Update deploy with balena 13 days ago
- balena.yml update repo for balenaHub 15 days ago
- docker-compose.yml image classification 18 days ago
- logo.png update repo for balenaHub 15 days ago

README.md

Smart Bird Watcher

This Balena Fin based Smart Bird Feeder classifies birds by chirps and face using Edge Impulse & sends alerts to your phone and live stream.



About

No description, website, or topics provided.

Readme

Releases

No releases published

Packages

No packages published

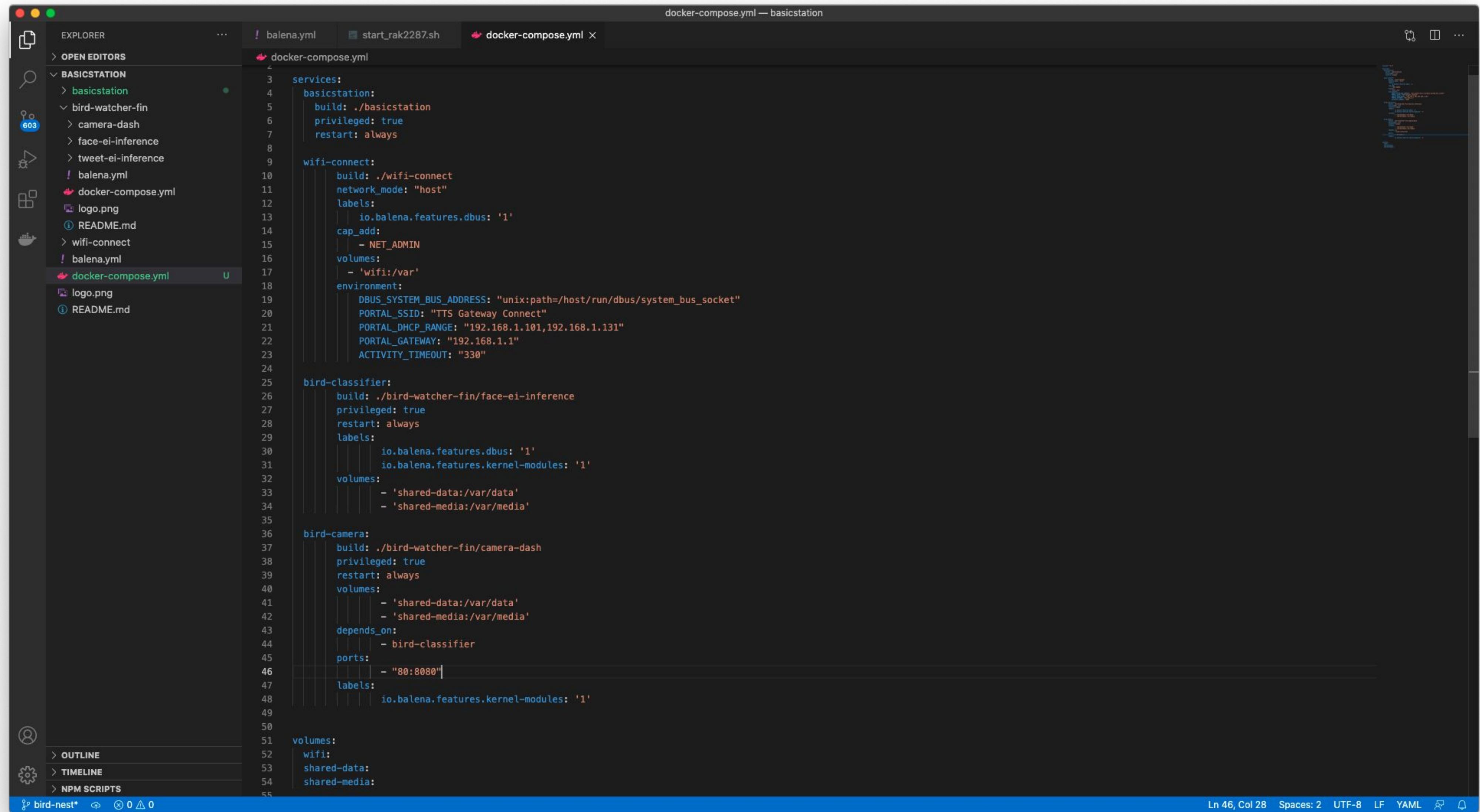
Contributors 3

- just4give Mithun Das
- mpous Marc Pous
- shawaj Aaron Shaw

Languages

- JavaScript 46.0%
- Python 26.7%
- CSS 13.5%
- HTML 12.0%
- Shell 1.8%

Clone <https://github.com/just4give/bird-watcher-fin>



```
docker-compose.yml — basicstation
EXPLORER          ...  balena.yml  start_rak2287.sh  docker-compose.yml
OPEN EDITORS
BASICSTATION
  > basicstation
  > bird-watcher-fin
  > camera-dash
  > face-ei-inference
  > tweet-ei-inference
  ! balena.yml
  docker-compose.yml
  logo.png
  README.md
  > wifi-connect
  ! balena.yml
  docker-compose.yml  U
  logo.png
  README.md

services:
  basicstation:
    build: ./basicstation
    privileged: true
    restart: always

  wifi-connect:
    build: ./wifi-connect
    network_mode: "host"
    labels:
      - io.balena.features.dbus: '1'
    cap_add:
      - NET_ADMIN
    volumes:
      - 'wifi:/var'
    environment:
      DBUS_SYSTEM_BUS_ADDRESS: "unix:path=/host/run/dbus/system_bus_socket"
      PORTAL_SSID: "TTS Gateway Connect"
      PORTAL_DHCP_RANGE: "192.168.1.101,192.168.1.131"
      PORTAL_GATEWAY: "192.168.1.1"
      ACTIVITY_TIMEOUT: "330"

  bird-classifier:
    build: ./bird-watcher-fin/face-ei-inference
    privileged: true
    restart: always
    labels:
      - io.balena.features.dbus: '1'
      - io.balena.features.kernel-modules: '1'
    volumes:
      - 'shared-data:/var/data'
      - 'shared-media:/var/media'

  bird-camera:
    build: ./bird-watcher-fin/camera-dash
    privileged: true
    restart: always
    volumes:
      - 'shared-data:/var/data'
      - 'shared-media:/var/media'
    depends_on:
      - bird-classifier
    ports:
      - "80:8080"
    labels:
      - io.balena.features.kernel-modules: '1'

volumes:
  wifi:
  shared-data:
  shared-media:

Ln 46, Col 28  Spaces: 2  UTF-8  LF  YAML  ⚙  ⌂
```

Merge the docker-compose from both projects (delete tweet container)

[Go up](#)

3. How do I create a bot?

There's a... bot for that. Just talk to [BotFather](#) (described [below](#)) and follow a few simple steps. Once you've created a bot and received your authorization token, head down to the [Bot API manual](#) to see what you can teach your bot to do.

You may also like to check out some [code examples](#) [here »](#)

4. How are bots different from humans?

- Bots have no online status and no last seen timestamps, the interface shows the label 'bot' instead.
- Bots have limited cloud storage — older messages may be removed by the server shortly after they have been processed.
- Bots can't initiate conversations with users. A user **must** either add them to a group or send them a message first. People can use t.me/<bot_username> links or username search to find your bot.
- Bot usernames always end in 'bot' (e.g. [@TriviaBot](#), [@GitHub_bot](#)).
- When added to a group, bots do not receive all messages by default (see [Privacy mode](#)).
- Bots never eat, sleep or complain (unless expressly programmed otherwise).

5. Bot perks

Telegram bots are unique in many ways — we offer [two kinds](#) of keyboards, additional interfaces for [default commands](#) and [deep linking](#) as well as [text formatting](#) and much, much more.

Inline mode

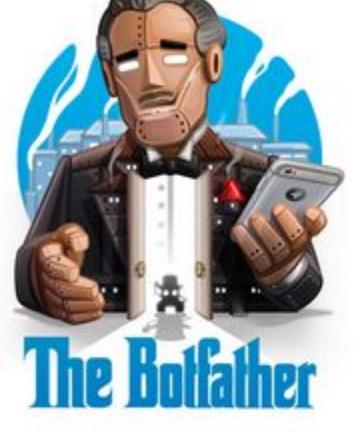
Users can interact with your bot via [inline queries](#) straight from the [text input field](#) in any chat. All they need to do is start a message with your bot's username and then type a query.

Having received the query, your bot can return some results. As soon as the user taps one of them, it is sent to the user's currently opened chat. This way, people can request content from your bot in any of their chats, groups or channels.

Check out this [blog](#) to see a sample inline bot in action. You can also try the [@sticker](#) and [@music](#) bots to see for yourself.



The Bolfather



Inline Bots

<https://core.telegram.org/bots>

We need to create a Telegram bot and download Telegram on our phone

[Go up](#)

3. How do I create a bot?

There's a... bot for that. Just talk to [BotFather](#) (described [below](#)) and follow a few simple steps. Once you've created a bot and received your authorization token, head down to the [Bot API manual](#) to see what you can teach your bot to do.

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The Botfather



1. What can I do with ...
2. How do bots work?
3. How do I create a b...
4. How are bots differ...
5. Bot perks
6. BotFather

Get the Chat ID and Token from your bot

```
marcpous@Marc-macbook basicstation % balena push TheThingsStack-Gateway
[Info] Starting build for TheThingsStack-Gateway, user marcpous
[Info] Dashboard link: https://dashboard.balena-cloud.com/apps/1782954/devices
[Info] Building on arm03
[Info] Pulling previous images for caching purposes...
[Success] Successfully pulled cache images
[bird-camera] Step 1/8 : FROM balenalib/fincm3-debian:stretch-20190612
[wifi-connect] Step 1/7 : FROM balenalib/fincm3-debian
[bird-classifier] Step 1/8 : FROM balenalib/fincm3-node:build
[basicstation] Step 1/11 : FROM balenalib/fincm3-debian:buster-build as builder
[wifi-connect] ---> 9b5d8655c5d4
[wifi-connect] Step 2/7 : RUN install_packages dnsmasq wireless-tools
[bird-classifier] ---> ab65a21ec322
[bird-classifier] Step 2/8 : RUN apt-get update && apt-get install -yq wget && apt-get clean && rm -rf /var/lib/apt/lists/*
[wifi-connect] Using cache
[wifi-connect] ---> cbae8761a4ec
[wifi-connect] Step 3/7 : WORKDIR /usr/src/app
[wifi-connect] Using cache
[wifi-connect] ---> 08119efbd06b
[wifi-connect] Step 4/7 : ARG VERSION="4.4.0"
[wifi-connect] Using cache
[wifi-connect] ---> 88bdbca458b7
[wifi-connect] Step 5/7 : RUN curl -Ls "https://github.com/balena-io/wifi-connect/releases/download/v$VERSION/wifi-connect-v$VERSION-linux-armv7hf.tar.gz" | tar -xvz -C /usr/src/app/
[wifi-connect] Using cache
[wifi-connect] ---> e786920e258f
[wifi-connect] Step 6/7 : COPY scripts/start.sh .
[wifi-connect] Using cache
[wifi-connect] ---> fbcd3e687556
[wifi-connect] Step 7/7 : CMD ["bash", "start.sh"]
[wifi-connect] Using cache
[wifi-connect] ---> da10ea12e90c
[wifi-connect] Successfully built da10ea12e90c
[basicstation] ---> b99c99ee0220
[basicstation] Step 2/11 : WORKDIR /usr/src/app
[basicstation] Using cache
[basicstation] ---> 4f5b1c3d914e
[basicstation] Step 3/11 : COPY .
[basicstation] ---> Running in 6e841ef8ff06
[basicstation] Using cache
[basicstation] ---> 9c6dba8204b6
[basicstation] Step 4/11 : RUN make platform=rpi variant=std arch=armv7hf
[basicstation] Using cache
[basicstation] ---> 32554587f28d
[basicstation] Step 5/11 : RUN make platform=corecell variant=std arch=armv7hf
[basicstation] Using cache
[basicstation] ---> 15a1523d31f9
[basicstation] Step 6/11 : FROM balenalib/fincm3-debian:buster
[basicstation] ---> 9b5d8655c5d4
[basicstation] Step 7/11 : RUN install_packages jq
[basicstation] Using cache
[basicstation] ---> 0e853e740db2
[basicstation] Step 8/11 : WORKDIR /usr/src/app
[basicstation] Using cache
[basicstation] ---> e355f0b54fb5
[basicstation] Step 9/11 : COPY --from=builder /usr/src/app/ ./
[basicstation] Using cache
```

Picture fin + rak2245 + camera

Access to the Public URL (port 8080)

18:44 | 0,2KB/s ☺ ☷ ☷ ☷



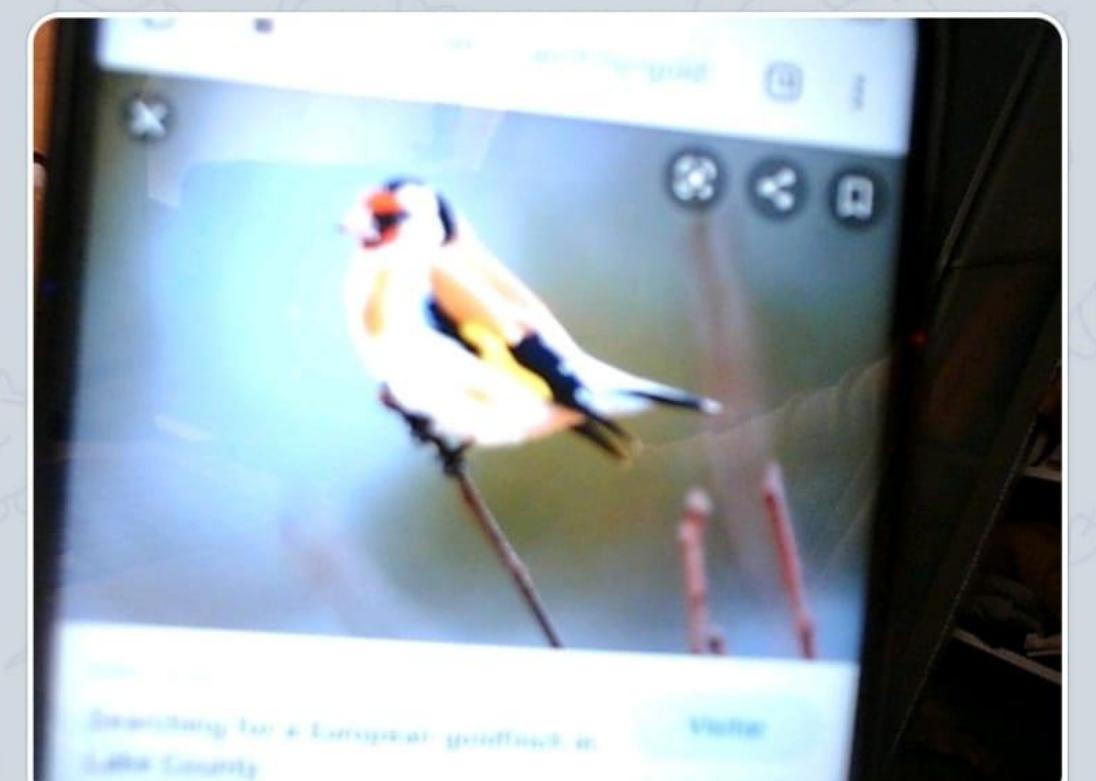
birdFeeder
bot



29 de desembre

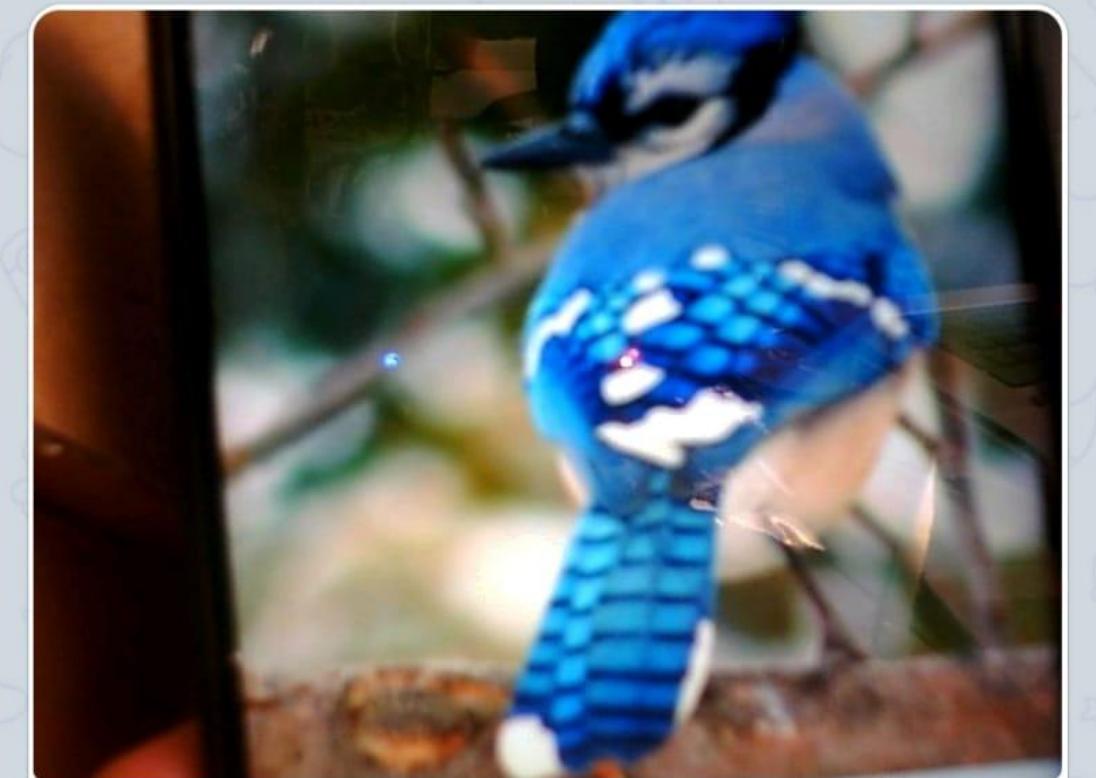
/start 10:45 ✓✓

Hello 10:45 ✓✓



Goldfinch

10:51



Cardinal

11:18



Message



LoRaWAN gateway with 4G (LTE Cat M1) → blues (?)

Add your App to balenaHub







Q & A

What would you like to learn more?



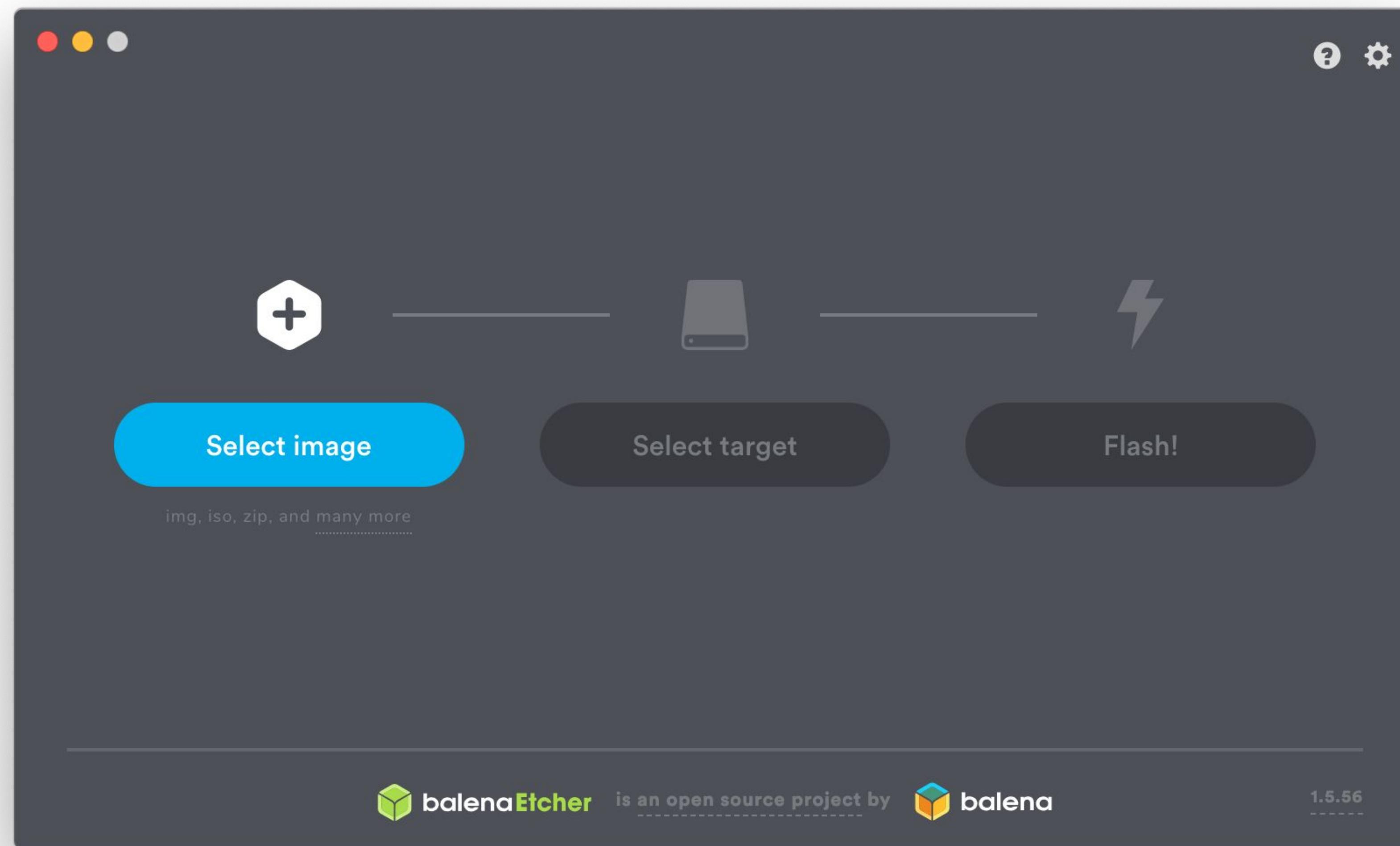
THE THINGS
CONFERENCE

| Thank you.



THE THINGS
CONFERENCE

| Thank you.









THE THINGS
CONFERENCE

| Thank you.