



**A Hackable Network  
Management System for the  
21st Century**



# Hi! Call me Fede or Fed

## Who is Federico Capoano?

- Open Source Software Developer (github)
- Ninux contributor since 2011
- Cineca Public WiFi 2012-2017
- OpenWISP core developer since 2012
- Working on NetJSON spec since 2015

# **What is OpenWISP?**

**Open Source Network Management System**

**Aims to ease the deployment  
and management of networks  
and helps to keep the costs low**

# Keeps the costs low? How?

**Automates repetitive actions**

**Fully supports OpenWRT (runs on lots of hardware)**

**No licensing fees**

**No vendor lock-in**

# What else?

**Modular, Programmable, Hackable**

**Written in Python (very popular as of 2018)**

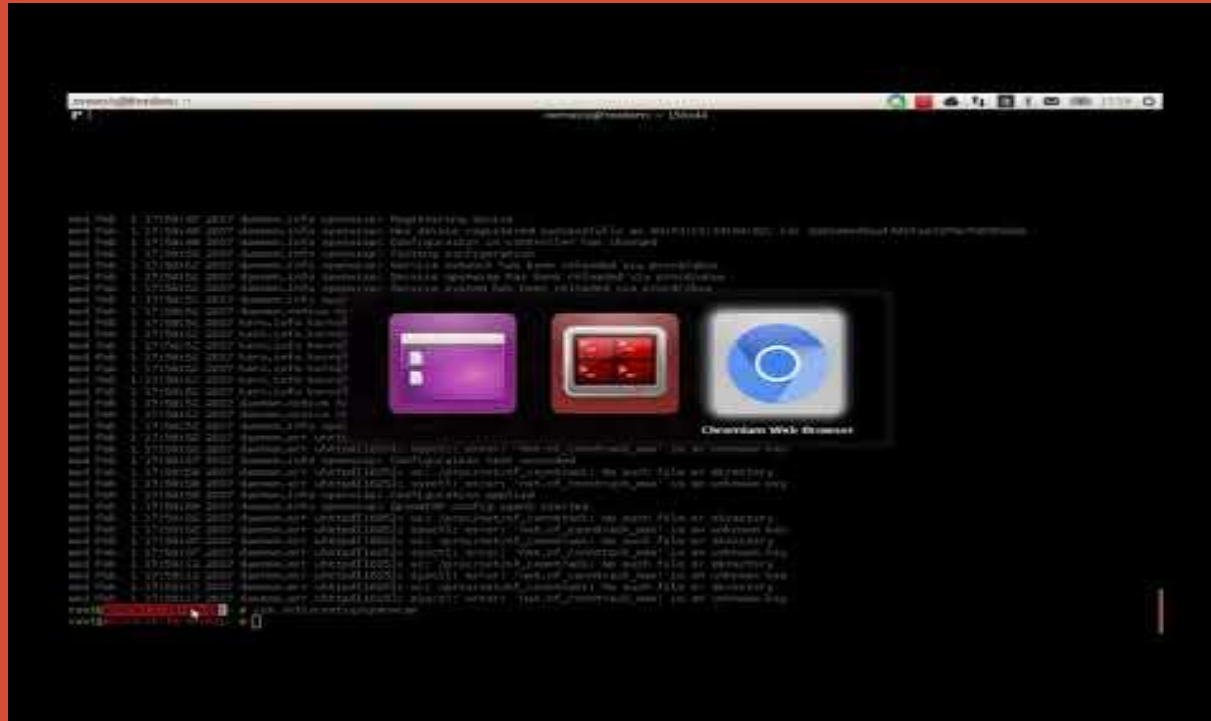
**Active and Growing Community**

**Becoming popular in emerging countries**

# **What can OpenWISP do?**

**(quick summary and overview)**

# Auto-registration



## Change device

[DOWNLOAD CONFIGURATION](#)
[HISTORY](#)
[Delete](#)
[Preview configuration](#)
[Save and continue editing](#)
[Save and add another](#)
[SAVE](#)

**Name:**

**Organization:**   

**Mac address:**

primary mac address

**UUID:**

**Key:**

unique device key

**Last ip:**

indicates the IP address logged from the last request coming from the device

**Management ip:**

ip address of the management interface, if available

**Model:**

device model and manufacturer

**Operating system:**

operating system identifier



## DEVICE CONFIGURATION DETAILS

Configuration: IMPERIAL-OPPIDO

☐ Delete

Backend:

OpenWRT/LEDE

Select [netjsonconfig](#) backend

Configuration status:

applied

"modified" means the configuration is not applied yet;

"applied" means the configuration is applied successfully;

"error" means the configuration caused issues and it was rolled back;

Templates:



Filter



- ☒ Timezone (Europe/Rome)
- ☒ OLSRd2 in VPN
- ☒ OLSRd2 common
- ☒ [Basilicata] Topologia
- ☒ OpenVPN
- ☒ [Basilicata] SSH keys
- ☒ /etc/profile
- ☒ openwisp-config (management\_interface)
- ☒ Monitoring
- ☒ Banner
- ☒ Captive Portal (chilli)
- ☐ olsr2-generic
- ☐ Dual Radio
- ☐ Firenze
- ☐ [Palermo] Topologia

Choose items and order by drag & drop.

configuration templates, applied from first to last

## CONFIGURATION:

Configuration Menu

Advanced mode (raw JSON)

### General

Object Properties

maintainer

nemesis

description

ipv6 linklocal: fe80::c24a:ff:fe2d:5fc

description and notes

### Interfaces

Interface 1

Bridge interface ▼

Object Properties

name

lan

type

bridge ▼

#### Bridge Members

bridged interface 1

eth0.1

Delete bridged interface

Add bridged interface

Delete Last bridged interface



```
1 {
2   .... "general": {
3     .... "maintainer": "nemesis",
4     .... "description": "ipv6 linklocal: fe80::c24a:ff:fe2d:5fc"
5   },
6   .... "interfaces": [
7     .... {
8       .... "bridge_members": [
9         .... "eth0.1"
10      ],
11      .... "type": "bridge",
12      .... "addresses": [
13        .... {
14          .... "proto": "static",
15          .... "family": "ipv4",
16          .... "gateway": "",
17          .... "mask": 24,
18          .... "address": "10.40.0.11"
19        },
20        .... {
21          .... "proto": "static",
22          .... "family": "ipv6",
23          .... "mask": 64,
24          .... "address": "2001:4c00:893b:fede::1"
25        }
26      ],
27      .... "name": "lan"
28    },
29    .... {
30      .... "type": "ethernet",
31      .... "addresses": [
32        .... {
33          .... "proto": "static",
34          .... "family": "ipv4",
35          .... "gateway": "",
36          .... "mask": 16,
37          .... "address": "172.16.40.24"
38        },
39        .... {
40          .... "proto": "static",
41          .... "family": "ipv6",
42          .... "gateway": "",
43          .... "mask": 128,
44          .... "address": "2001:4c00:893b:1:40::24"
45        }
46      ],
47      .... "network": "vlan24",
48      .... "name": "eth0.24",
49      .... "description": "NanoBeam AC verso DiegoApriliana"
50    },
51    .... {
52      .... "type": "ethernet",
53      .... "addresses": [
```

## Change template

[DOWNLOAD CONFIGURATION](#)[HISTORY](#)[Delete](#)[Preview configuration](#)[Save and continue editing](#)[Save and add another](#)[SAVE](#)

Name:

Organization:

-----

Type:

VPN-client

template type, determines which features are available

Backend:

OpenWRT/LEDE

Select [netjsonconfig](#) backend

VPN:

Management VPN Server

☒ Auto certificate

whether x509 client certificates should be automatically managed behind the scenes for each configuration using this template, valid only for the VPN type

Tags:

A comma-separated list of template tags, may be used to ease auto configuration with specific settings (eg: 4G, mesh, WDS, VPN, ecc.)

☒ Enabled by default

whether new configurations will have this template enabled by default

## GEOGRAPHIC INFORMATION

Geographic information: DeviceLocation object (55483675-793b-407d-856f-4a3b6575ffbc)

☐ Delete

**Location:**  Santa Marta, Laboratorio di reti, stanza 509

**Type:**

indoor locations can have floorplans associated to them

☐ is mobile?

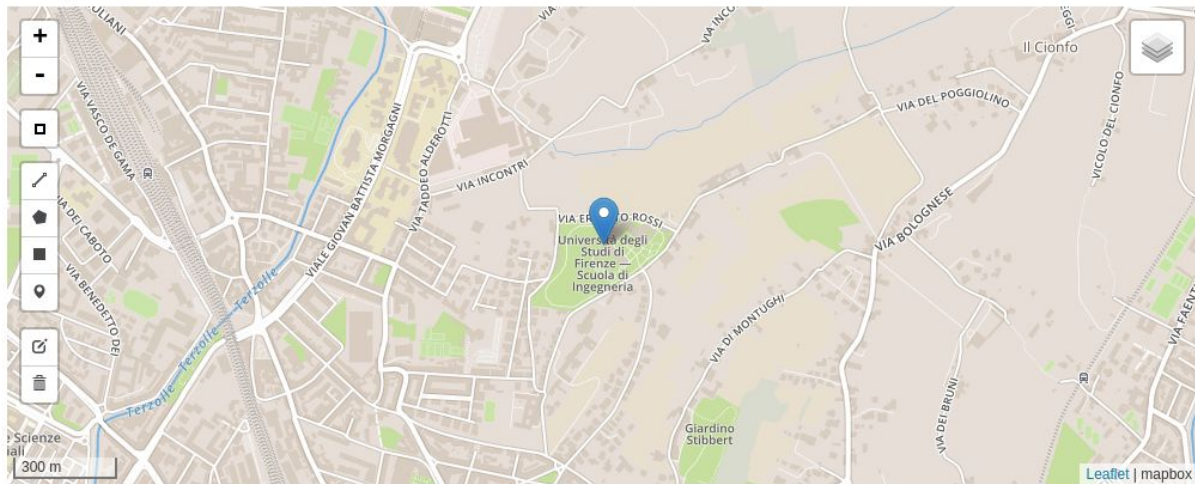
is this location a moving object?

**Location name:**

A descriptive name of the location (building name, company name, etc.)

**Address:**

**Geometry:**





# **Network Topology Monitoring**

**(indispensable in mesh networks)**

Basilicata (OLSRd2)



protocol: olsrv2

version: 0.14.1-1

metric: ff\_dat\_metric

nodes: 23

links: 18

Close

Topology

View Topology Details

Export

Export as CSV

Link and Link Details

Save

Label

Organization

Format

Strategy

Key

Expiration time

Network id

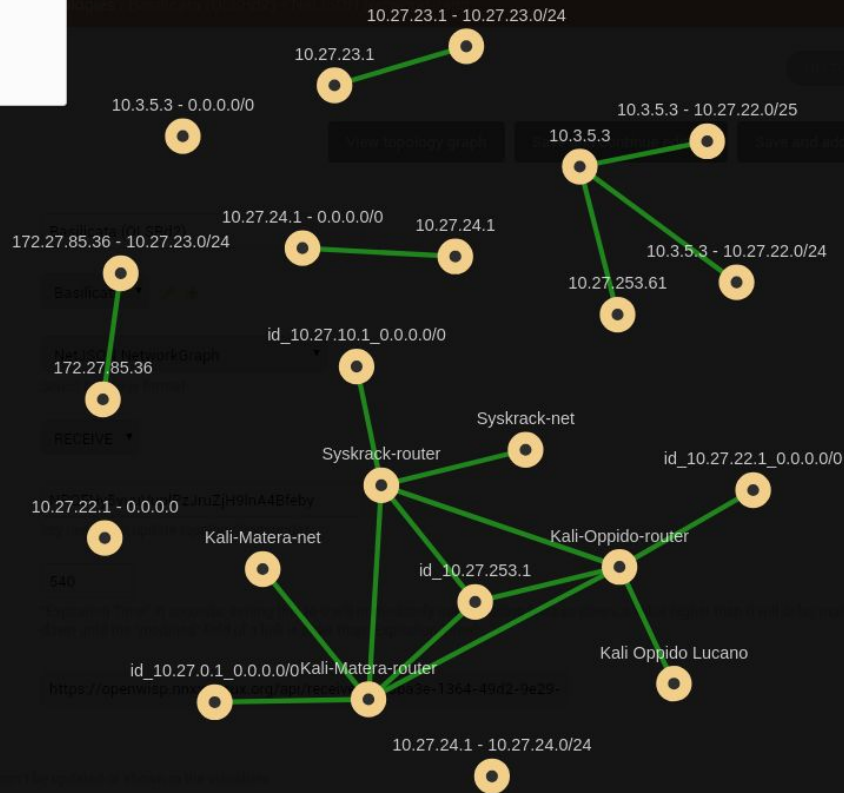
Published

Updated up to date to be updated in the database

link up

link down

date: 05/11/2018





Basilicata (OLSRd2)



protocol: olsrv2

version: 0.14.1-1

metric: ff\_dat\_metric

nodes: 23

links: 20

Close

Delete

Label:

Basilicata (OLSRd2)

Organization:

Basilicata

Format:

NetJSON NetworkGraph

Strategy:

RECEIVE

Key:

NPGEHy5yauVupIPzJruZjHelnA48fey

Expiration time:

540

Received at:

https://openwisp-nnxx.ninux.org/api/receive/36d5ba3e-1364-49d2-9e29-

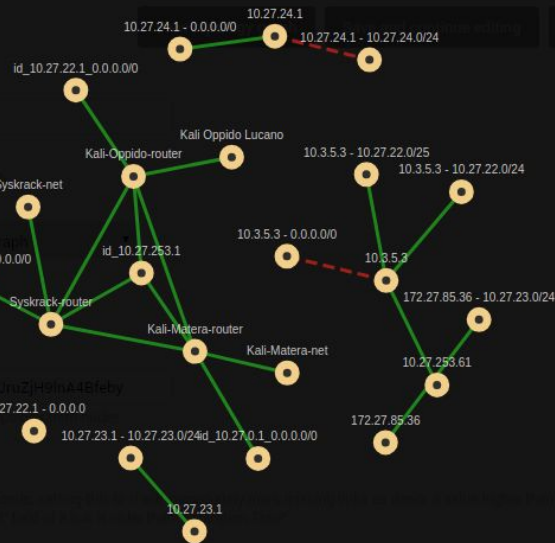
Published:

Unpublished topology. Will be saved in the database.

link up

link down

olsrv2



September 2018						
SU	MO	TU	WE	TH	FR	SA
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						













date: 11/09/2018

# **Freeradius administration**

**(indispensable for ISPs)**

## Freeradius administration

### FREERADIUS

Accountings		 Change
Batch user creation operations	 Add	 Change
Checks	 Add	 Change
Groups	 Add	 Change
NAS	 Add	 Change
Post auth log		 Change
Replies	 Add	 Change

*free***RADIUS**

## GROUP CHECKS

Group check: oxdev-users

☐ Delete

Attribute:

Max-Daily-Session

Operator:

:= ▼

Value:

1800

Created:

15 Oct 2018, 10:48 a.m.

Modified:

15 Oct 2018, 10:48 a.m.

Group check: oxdev-users

☐ Delete

Attribute:

Max-Daily-Session-Traffic

Operator:

:= ▼

Value:

1000000000

Created:

15 Oct 2018, 10:49 a.m.

Modified:

15 Oct 2018, 10:49 a.m.

[+ Add another Group check](#)

## Change accounting

[HISTORY](#)

Organization: oxynet dev

Id: 29

Session ID: 153967809000000001

Accounting unique ID: a61a726b7f18a45a673c5b02b673b0e2

Username: atsdemo

Group name: -

Realm:

NAS IP address: 192.168.182.1

NAS port ID: 1

NAS port type: Wireless-802.11

Start time: 16 Oct 2018, 1:51 p.m.

Update time: 16 Oct 2018, 2:21 p.m.

Stop time: 16 Oct 2018, 2:21 p.m.

Interval: -

Session time: 1803

Authentication:

# **What's next?**

**(you are going to see some  
prototypes and mock-ups)**

## MONITORING GRAPHS

1 day

3 days

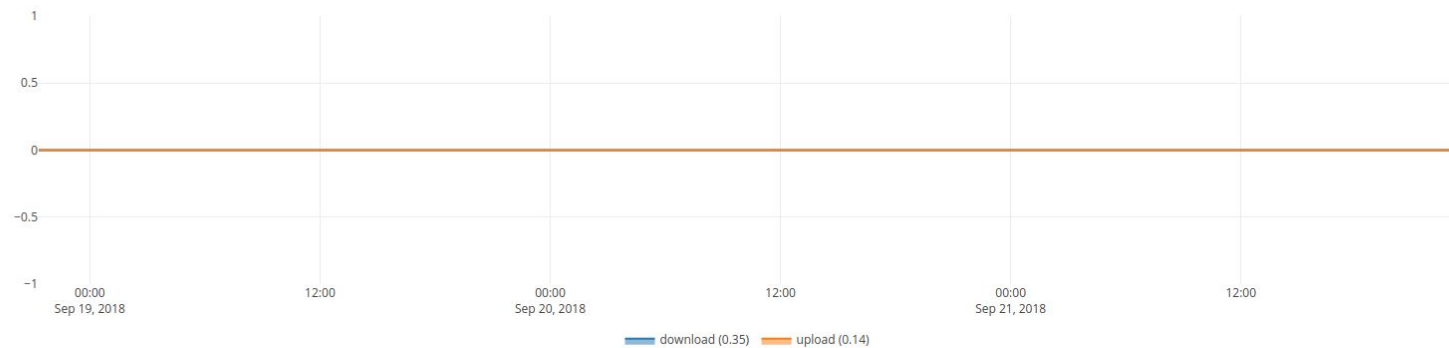
1 week

1 month

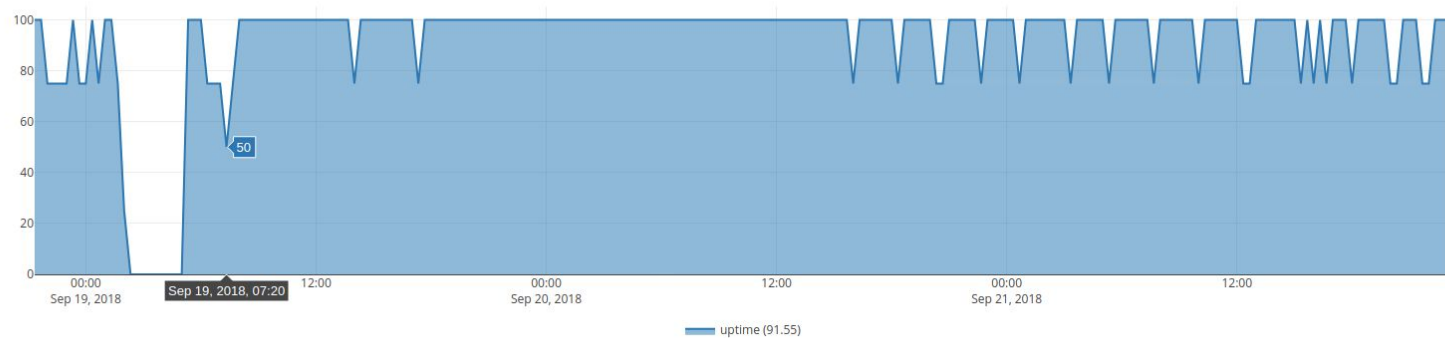
1 year

export data

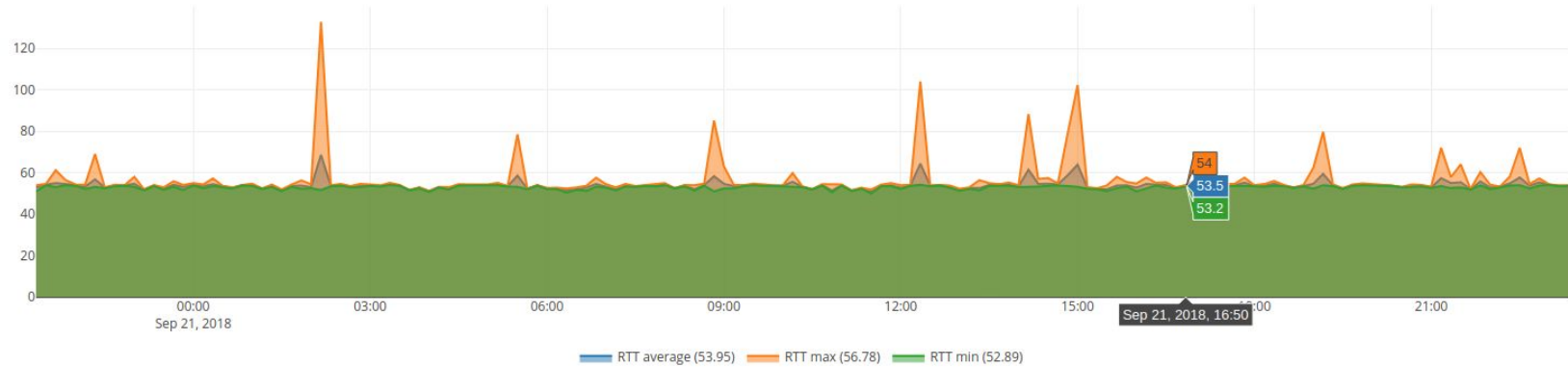
vpnbas traffic (GB)



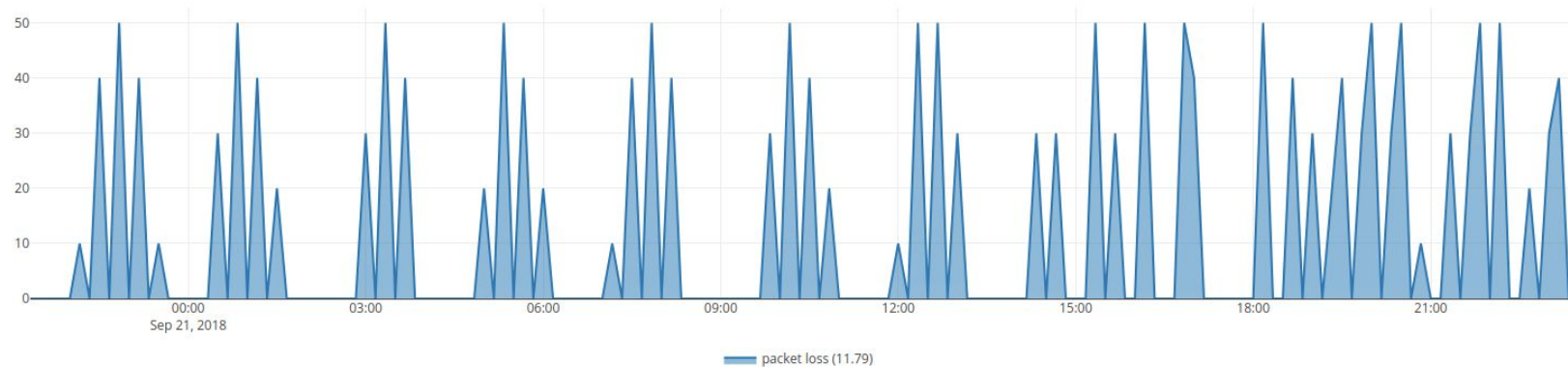
Uptime (%)



Round Trip Time (ms)



Packet loss (%)





## DEVICE STATUS

Local time: 22 Sep 2018, 12:20 a.m.

Uptime: 1 days, 6 hours and 21 minutes

## RAM STATUS

Total: 128.159744 MB

Free: 96.518144 MB

Buffered: 3.497984 MB

Shared: 0.487424 MB

## LOAD STATUS

Load average: 0, 0, 0

## INTERFACE STATUS: NINUX

Mode: adhoc

SSID: ninux.org

Channel: 36

Frequency: 5.18 GHz

Transmission Power: 14 dBm

Signal: -59 dBm

Noise: -92 dBm

## Change build

HISTORY

Delete

Save and continue editing

Save and add another

SAVE

Organization:

OpenWRT Summit



Category:

NNXX Basilicata



Version:

0.2

Change log:

descriptive text indicating what has changed since the previous version, if applicable

Created:

May 11, 2018, 1:12 p.m.

Modified:

May 16, 2018, 12:54 p.m.

## FIRMWARE IMAGES

Firmware image: NNXX Basilicata v0.2: lede-ar71xx-generic-tl-wdr4300-v1-squashfs-sysupgrade\_1.bin

☐ Delete

Version:

0.2

Change log:

descriptive text indicating what has changed since the previous version, if applicable

Created:

May 11, 2018, 1:12 p.m.

Modified:



May 16, 2018, 12:54 p.m.

#### FIRMWARE IMAGES

Firmware image: NNXX Basilicata v0.2: lede-ar71xx-generic-tl-wdr4300-v1-squashfs-sysupgrade\_1.bin

☐ Delete

Organization:


OpenWRT Summit  

File:

Currently: lede-ar71xx-generic-tl-wdr4300-v1-squashfs-sysupgrade\_1.bin

Change:  No file chosen

Type:

TP-Link WDR4300 v1 

firmware image type

Created:

May 11, 2018, 1:14 p.m.

Modified:

May 16, 2018, 12:54 p.m.

 Add another Firmware image

Select build to change

[ADD BUILD](#) +

 [Search](#)

Action:

Go

1 of 2 selected



BUI

Delete selected builds

CREATED

MODIFIED



NNXX Basilicata v0.1

May 1, 2018, 12:38 p.m.

May 16, 2018, 12:54 p.m.



NNXX Basilicata v0.2

May 11, 2018, 1:12 p.m.

May 16, 2018, 12:54 p.m.

2 builds

# Experimental features

- **Native Ubiquiti AirOS configuration backend**
- **Native Raspbian configuration backend**

**Big vendors seek vendor lock-in**

**We seek to make easier connecting the unconnected**

**do you like our goal?**

**Let's join forces!**

**Thank you!**

**Find out more at [OpenWISP.org](https://OpenWISP.org)**

