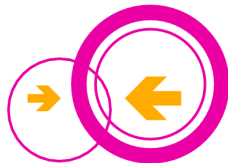


# Gluon

A Modular Framework for Your Wireless Mesh Community

Matthias Schiffer (neoraider),  
Linus Lüsing (T\_X)

June 2017



# Gluon

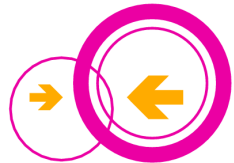
A Modular Framework for Your Wireless Mesh Community

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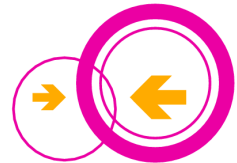
*Gluon Logo (scaled 1:1)*



# Gluon

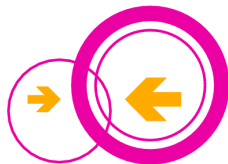
A Modular Framework for Your Wireless Mesh Community

Matthias Schiffer (neoraider),  
Linus Lüsing (T\_X)



# Outline

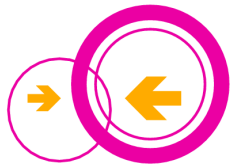
- 1 Introduction
- 2 Features
- 3 Demos



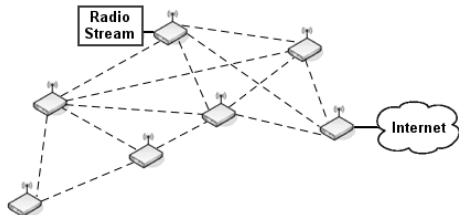
# What?



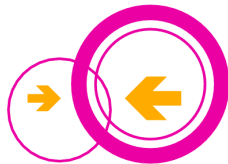
- Firmware Framework



# What?



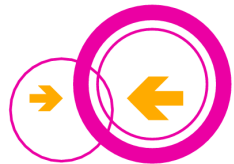
- Firmware Framework
- for Community Mesh Networks



# What?



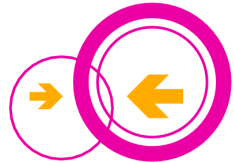
- On top of:  
⇒ OpenWrt/LEDE



# What?



- On top of:  
⇒ OpenWrt/LEDE

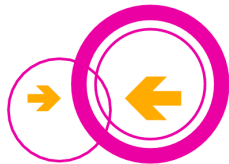




# History

## 2012:

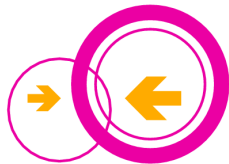
- Renewed interest in Freifunk
- Communities experimenting with batman-adv
- Wild forking



# History

## Gluon:

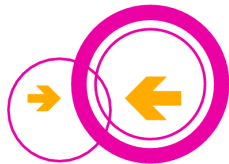
- Start: 2013
- Goal: (Re-)Connecting communities



# History

## Gluon:

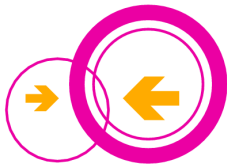
- Start: 2013
- Goal: (Re-)Connecting communities



# History

## Design principles:

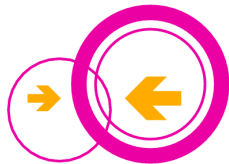
- Easy FW maintenance:
  - One generic base repository
  - Configuration in one place
  - No OpenWRT/LEDE knowledge required



# History

## Design principles:

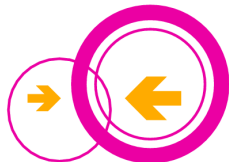
- Easy FW maintenance:
  - One generic base repository
  - Configuration in one place
  - No OpenWRT/LEDE knowledge required
- Modularity:
  - For FW maintainers (not: end-users)



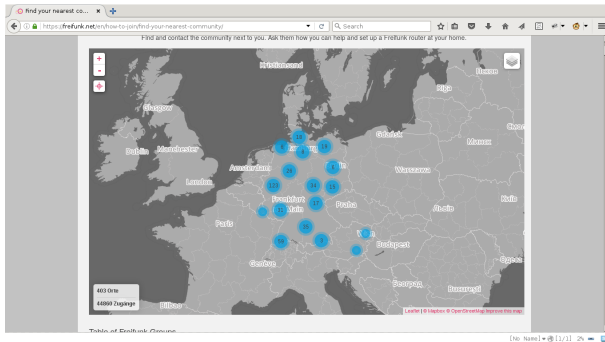
# History

## Design principles:

- Easy FW maintenance:
  - One generic base repository
  - Configuration in one place
  - No OpenWRT/LEDE knowledge required
- Modularity:
  - For FW maintainers (not: end-users)
- Easy FW usage:
  - No networking knowledge needed
  - No user configuration required!

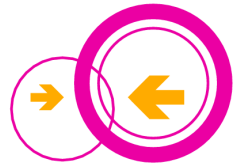


# Present



2017

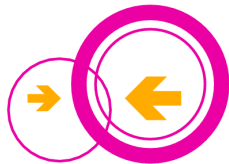
- Used by > 300 Freifunk communities
- Runs on > 35k nodes



# Meshing



- Protocol:  
⇒ batman-adv (+ batman-adv-legacy)

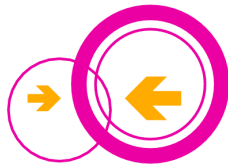




# Meshing



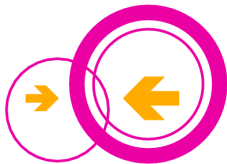
- Protocol:  
⇒ batman-adv (+ batman-adv-legacy)



# Meshing



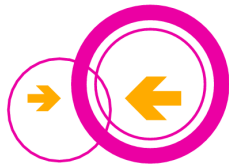
- Protocol:  
⇒ batman-adv (+ batman-adv-legacy)
- Experiments with:  
⇒ babeld + I3roamd



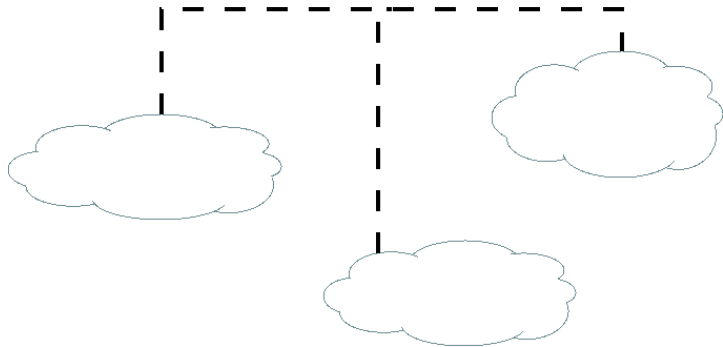
# Meshing



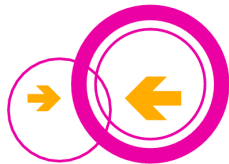
- Meshing via Wifi  
(Adhoc-Mode or 802.11s)



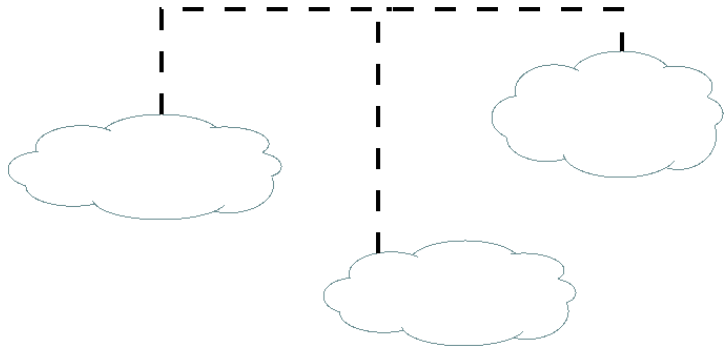
# Meshing



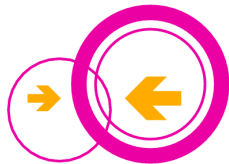
- Meshing via VPN (fastd)



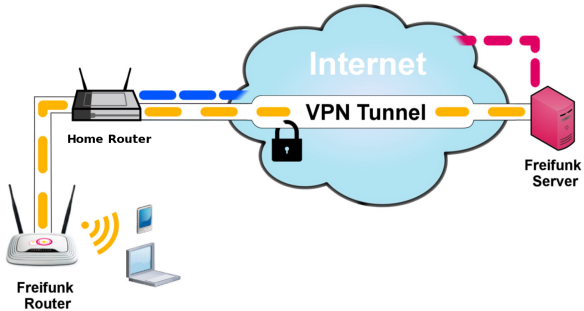
# Meshing



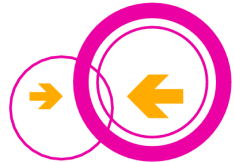
- Meshing via VPN (fastd)
  - to interconnect clouds



# Meshing



- Meshing via VPN (fastd)
  - to interconnect clouds
  - to ease sharing of internet bandwidth

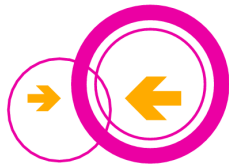


# Meshing

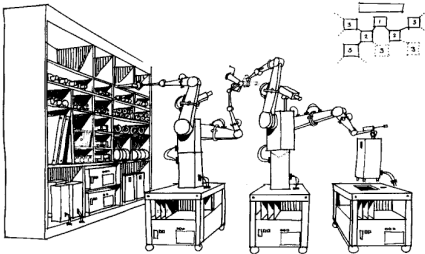


- Meshing via Ethernet wire

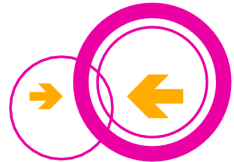
*"Our internet connection at the #Breminale is so stable that even bikes are connected securely!"*  
– @FreifunkHB



# Autoupdater



- n-of-m signatures
- Branches





# Status Page

**64665-SAS2-Lippert**

**Übersicht**

- Knotenname**  
64665-SAS2-Lippert
- Kontakt**  
mmb42@gmx.de
- Modell**  
TP-Link TL-WR1043N/ND v2
- Primäre MAC**  
14:cc:20:97:fc:34
- IP-Adresse**  
2001:67c:2e08:6100:16cc:20ff:fe97:fc34  
1601:67c:2e08:6100:16cc:20ff:fe97:fc34  
fe80:16cc:20ff:fe97:fc34
- Firmware**  
0.9.6
- Mesh-VPN**  
true
- Automatische Updates**  
true
- Branch**  
stable

**Statistik**

- Laufzeit**  
7 Tage, 21:42
- Systemlast**  
0,83
- RAM**  
37,5% belegt
- NVRAM**  
6,78% belegt
- Gateway**  
da:ff:61:00:02:05
- Clients**  
3
- Traffic**
- Gesendet**  
14 Pakete/s  
47,6 kbps  
176 MB
- Empfangen**  
258 Pakete/s  
124 kbps  
6,92 GiB
- Weitergeleitet**  
38 Pakete/s  
31,0 kbps  
8,53 GiB
- Mesh-VPN**
- gw01** nicht verbunden
- gw02** verbunden (3 Tage, 9:26)
- gw03** nicht verbunden
- gw04** nicht verbunden
- gw05** nicht verbunden
- gw06** nicht verbunden

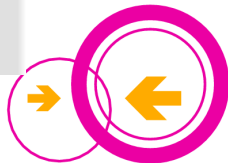
**Nachbarknoten**

mesh0

Knoten	TQ	dBm	Entfernung	Inaktiv
be3a:0c:0b:cf:f1	-	-80		0 s
64665-SAS2	88 %	-62	6 m	0 s
64665-BS40	53 %	-74	23 m	0 s
4a:e6:f0:1d:b5:d1	-	-70		0 s
64665-BS33a	-	-73	24 m	1 s
62:f6:0d:c0:4f:39	-	-79		1 s
64665-SAS4	-	-80	21 m	0 s
64665-BS33	84 %	-49	18 m	0 s
46:20:7c:07:0d:09	-	-85		88 s

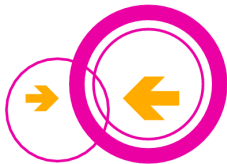
mesh-vpn

- Node status
- Live neighbor statistics



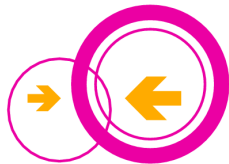
# respondd

- Node information collector
- Generates JSON
  - Queried through alfred
  - Or custom UDP based protocol



# Demos

- Demo 1:  
⇒ Firmware Build Configuration
- Demo 2:  
⇒ Web-based Node Setup



# Demos 3: Users (You?)

Karte - Freifunk Darm... x +

https://darmstadt.freifunk.net/karte/

Freifunk Darmstadt

News Mitmachen Was ist Freifunk? Karte Forum Chat Wiki Kontakt Impressum

**Freifunk Darmstadt**

804 Knoten (655 online, 149 offline, 23 neu, 81 verschwunden), 1254 Clients, 5 Gateways  
Diese Daten sind von Freitag, 2. Juni 2017 01:49.

● Neuer Knoten ● Knoten ist online ● Knoten ist offline

AKTUELLES KNOTEN VERBINDUNGEN STATISTIKEN ÜBER

**Neue Knoten**

<a href="#">64285-jefferson-4082-sued-3og</a>	vor 2 Stunden
<a href="#">64331-Zyklonias</a>	vor 9 Stunden
<a href="#">64283-H55_Offloader</a>	vor einem Tag
<a href="#">64331-WallE</a>	vor 2 Tagen
<a href="#">63225-Chicken-Two</a>	vor 4 Tagen
<a href="#">63128-Higgs-Boson</a>	vor 9 Tagen
<a href="#">64293-luelistan4</a>	vor 10 Tagen
<a href="#">64285-jefferson-4082-nord-eg</a>	vor 12 Tagen
<a href="#">64289-room237</a>	vor 15 Tagen
<a href="#">64347-draustraße</a>	vor 17 Tagen
<a href="#">63225-Testbed</a>	vor 18 Tagen

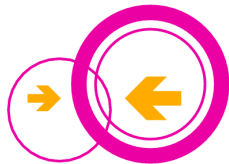
https://darmstadt.freifunk.net/karte/ @ [1/1] ALL

Connect to: *darmstadt.freifunk.net*

# Questions

*<https://github.com/freifunk-gluon/gluon>*

- Questions?



*Thanks!*

- License: CC-BY-SA

- External Image Sources:

- [https://en.wikipedia.org/wiki/Toy\\_block#/media/File:Toyblocks.JPG](https://en.wikipedia.org/wiki/Toy_block#/media/File:Toyblocks.JPG)
- [https://de.wikipedia.org/wiki/Ad-hoc-Netz#/media/File:Freifunk\\_mesh\\_cloud.png](https://de.wikipedia.org/wiki/Ad-hoc-Netz#/media/File:Freifunk_mesh_cloud.png)
- <https://github.com/osziloskop/ffm-freifunk-faltblatt-6-seiten>  
<https://github.com/rubo77/freifunk-faltblatt-6-seiten/tree/freifunk.net>
- [https://en.wikipedia.org/wiki/File:Advanced\\_Automation\\_for\\_Space\\_Missions\\_figure\\_5-29.gif](https://en.wikipedia.org/wiki/File:Advanced_Automation_for_Space_Missions_figure_5-29.gif)

