Messages for the Masses

State of Multicast in batman-adv and Gluon

Linus Lüssing (T_X)

Wireless Battlemesh v16, Cyprus

May, 2024

What is batman-adv

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- Encapsulates ethernet frames
- Network protocol agnostic
- Supports/requires multicast

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- Popular in Freifunk communities

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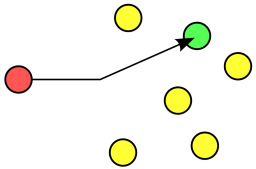

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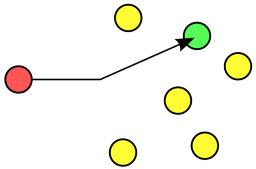

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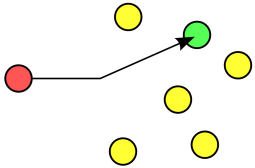

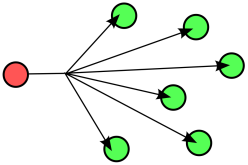

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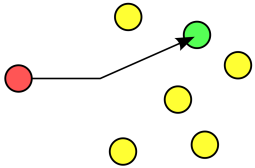

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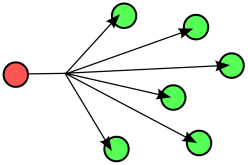

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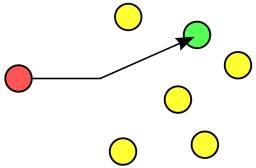

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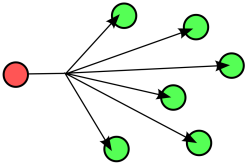

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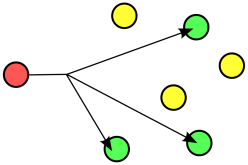

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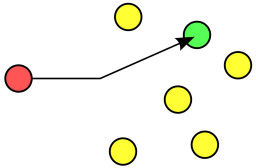

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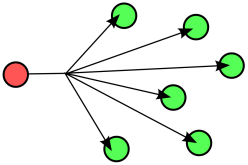

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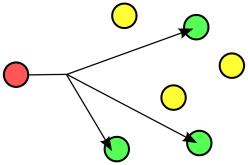

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  - decentral service discovery (mDNS, SAP, ...)

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- Since v0.2 (2009): 3x rebroadcasts

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- Also applied to: OGMv2/BATMAN V

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  - DHCP from client: to "best" gateway via unicast

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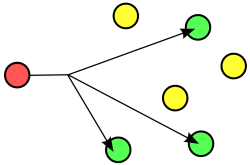
  - $\Rightarrow$ via unicast, no broadcasting

Generic Multicast Optimizations: Learning



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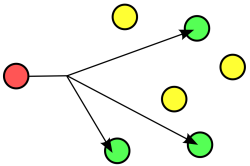

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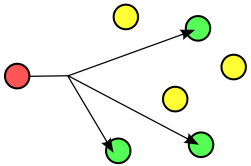

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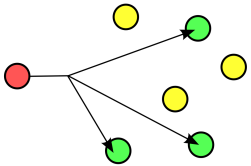

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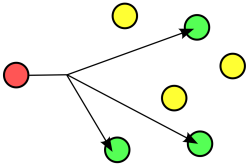

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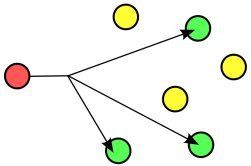

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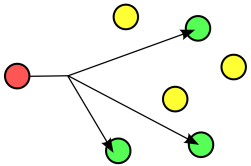

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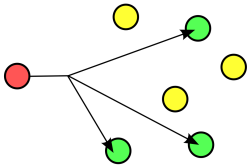

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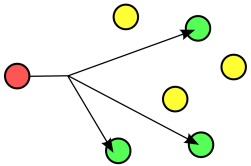

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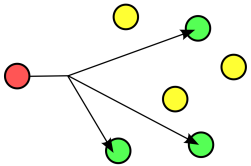

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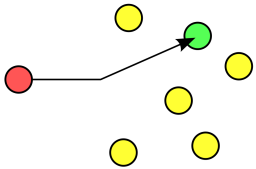

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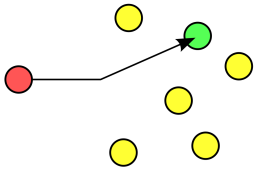

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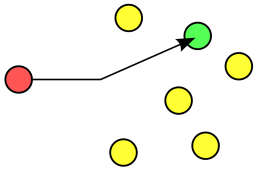

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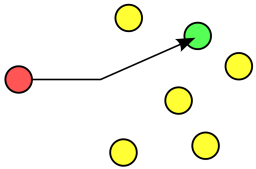

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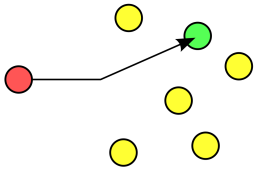

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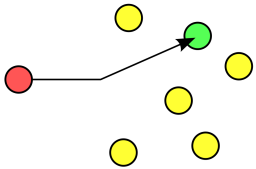

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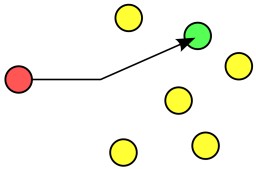

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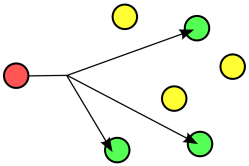
Generic Multicast Optimizations: Multicast Packet Type (v2024.0, NEW)



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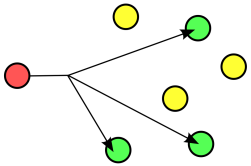

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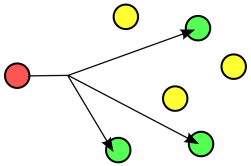

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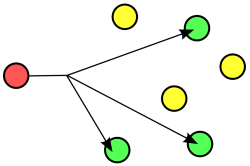

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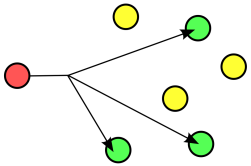

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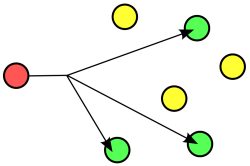

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- $\Rightarrow$ reduced overhead / more throughput

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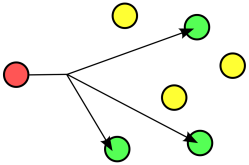

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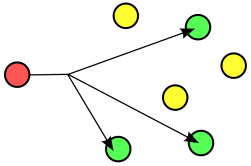

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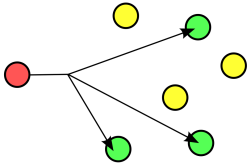

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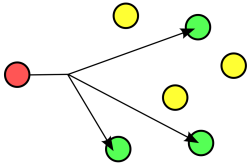

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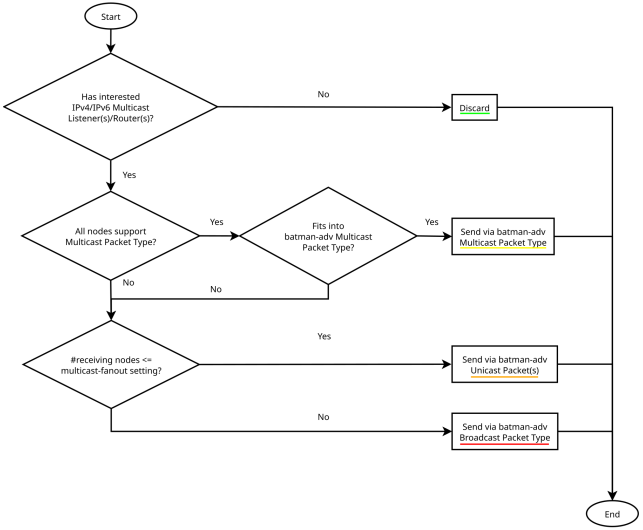
- maximum (depending on payload size):
  2 to 196 destination nodes

Generic Multicast Optimizations: Fallbacks



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- now with MRD support, to detect multicast routers
  $\Rightarrow$ thanks to OpenWrt 23.05 (batman-adv v2023.1, Linux bridge v5.15) $\Rightarrow$ IPv6 routeable multicast address support
  (ffXY::..., with Y $>$ 2)

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- ACK'd + retried transmissions $\Rightarrow$ reliability

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  - Babel, OSPF, RIPng

Firewall: gluon-ebtables-limit-arp

- issues with IP range/port scanning apps
- solution: rate-limit ARP
- unless: in batman-adv DAT cache

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- (gluon-ebtables-)brmldproxy PR pending at Gluon

Demo

- mDNS (avahi-discover)
- gstreamer/VLC:
  - RTP multicast audio
  - Freifunk Vogtland ⇔ Freifunk Lübeck: PIM, MRD
  - SAP (Session Announcement Protocol)

- VLC 4 nightly: https://nightlies.videolan.org/
- $ ip -6 route add ff0e::/16 dev wlp1s0 table local
- $ ip -6 route add ff7e::/16 dev wlp1s0 table local

Thx, Questions?

- *https://github.com/freifunk-gluon/gluon*
- *https://www.open-mesh.org/*
- Matrix: #gluon:hackint.org, #batadv:hackint.org
- IRC: #gluon / #batadv on hackint.org
- Mailinglist: gluon@luebeck.freifunk.net, b.a.t.m.a.n@lists.open-mesh.org

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