prplMesh
open source Wi-Fi mesh
Solving home Wi-Fi

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Mind

Based on prior presentations by Arnout Vandecappelle, Mind
Who is Frederik Van Bogaert?

- Embedded software developer
- Project manager
- Mind consultant since 2013
- PM for prpl Foundation since 2020
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What is the prpl Foundation?

- Who's who of the telecom industry
- Sponsoring development of router firmware
  - prplOS, based on openWrt
  - prplMesh
  - Life Cycle Management
    - app-store infrastructure
- Security
- Collaboration with Broadband Forum
  - Data models (collab)
  - Remote management

The prpl Foundation is an open-source, community-driven, collaborative, non-profit foundation that strives to enable the security and interoperability of embedded devices.
What is prplMesh?

- IEEE1905.1 stack
- Based on open sourced Intel code
- Fully functional Easymesh implementation
  - Both Agent and Controller roles supported (individual or combined)
  - Extensive API standardized in collaboration with Broadband Forum
  - Tested daily on Wi-Fi Alliance spec test beds
  - Passes Easymesh R2 certification
    - parts of R3 and R4 also supported
- https://gitlab.com/prpl-foundation/prplmesh/prplMesh
What is Easymesh?

• Wi-Fi Alliance standard
• Also called Multi-AP
• Meant to simplify Wi-Fi management
• Network discovery, Onboarding, Configuration, Metrics
What is prplMesh?

• Portable to the openWrt, prplOS and RDK-B router operating systems
  – Dependency on a software bus (ubus or rbus; dbus support possible)
  – Needs good Wi-Fi drivers
    • only a few are "good enough" for prplMesh
    • Most hardware is not compatible :-(
    • We hope to spur innovation in open source Wi-Fi chipset drivers
    • Proprietary drivers also still supported (for now)
• Strong focus on code review, CI with automated tests
Why develop prplMesh?

- Community of operators coming together to develop a single solution
- Independence from SoC vendors
- Stress test for wireless drivers
- Encourage development of open source Wi-Fi drivers
  - Based on cfg80211 and nl80211
  - prpl's Low Level API group
- Encourage development of a common API for Easymesh
  - remote management
  - network diagnostics
  - router "apps" to configure Wi-Fi
What is Easymesh?

- Based on IEEE1905.1
  - L2 based protocol
  - Very extensible
  - fixed multicast address
  - device “AL MAC” address

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WFA EasyMesh architecture
WFA Easymesh Discovery
WFA Easymesh Metrics
WFA Easymesh Steering
WFA EasyMesh Onboarding
WFA Easymesh Onboarding

Diagram showing the process of onboarding with a controller and agents responding.
WFA EasyMesh Onboarding
Conclusions

• Wi-Fi networks are getting smarter
• Open source is critical for vendor independence
• There are open ecosystems out there, even where you might not expect it
  – https://gitlab.com/prpl-foundation
• You can make good money developing open source code
  – We're hiring!