

Multicast versus WiFi

Mike McBride, Charlie Perkins

draft-ietf-mboned-ieee802-mcast-problems-01

IETF101 London

20th March 2018

Why mboned?

mboned is chartered to

- receive regular reports on the current state of the deployment of multicast technology
- create "practice and experience" documents that capture the experience of those who have deployed and are deploying various multicast technologies
- provide feedback to other relevant working groups

Issues

- Low Bandwidth
 - Constrained by slowest local recipient
- Increased congestion
 - Due to longer occupancy of the physical medium
 - Also the need for higher power
 - Potentially hundreds of times as much interference
- Poor reliability
 - 802.11 products are optimized for unicast
 - Delivery is not acknowledged at layer 2
- IPv6 neighbor discovery easily saturates the wifi link
- Apps, like Bonjour, saturate with service discovery

These problems will not be fixed anytime soon

Merge with [intarea] document

- A lot of relevant material from parallel effort:
 - draft-perkins-intarea-multicast-ieee802
 - Also co-authors D. Stanley, J.C. Zuniga, W. Kumari
 - <https://mentor.ieee.org/802.11/dcn/15/11-15-1261-03-0arc-multicast-performance-optimization-features-overview-for-ietf-nov-2015.ppt>
- Issues at Layer 2 and Below
- Issues at Layer 3 and Above
- Multicast protocol optimizations
- Operational optimizations
- Multicast Considerations for Other Wireless Media

Multicast protocol optimizations

- Proxy ARP in 802.11-2012
- IPv6 Address Registration and Proxy Neighbor Discovery
- Buffering to improve Power-Save
- IPv6 support in 802.11-2012
- Conversion of multicast to unicast
- Directed Multicast Service (DMS)
- GroupCast with Retries (GCR)
 - Provide an L2 ack for mcast

Other workarounds

- Wifi traffic classes may help
- A reliable registration to L2 multicast groups and a reliable multicast operation at L2 could provide a generic solution.
- New approaches help save battery life -e.g., avoid waking up for some multicast packets.

Comments (on [mboned] ML, etc.)

- No need for separate [intarea] and [mboned] documents?
[merged]
- Who are the audience for the document?
 - Advice to implementers? [Yes]
 - IEEE? [Not specifically, but effectively probably Yes]
 - Operational advice [Yes]
 - Leading to further work based on conclusions? [Not sure – but not yet]
- What problems should be solved by the IETF versus IEEE?
- IETF may decide that broadcast is more expensive so multicast needs to be sent wired.

Comments (continued)

- Add a class of service (sensitivity to loss) to multicast packets?
- Multicast to unicast conversion is non-standard (but see GCR)
- The IETF has to decide if it wants to design IP over 802.11 (?)
- Determine performance requirements for L2 multicast
 - Multicast packets should be delivered with less than 1% packet loss
 - Multicast packets should be delivered within 200-500ms (for instance DAD requires answer within 1s)
- The solution space has been explored in the context of WPANs (802.15.4) and there is value in extending this to WLANs.

Next Steps

- Include text from comments by Joel Jaeggli
- Identify more problem areas in IETF protocols
- Identify additional workarounds
- Resolve issues arising during ML discussion
- Submit revised document for IETF 102, try to be ready for Last Call