

Background to P802.1CQ/D0.2

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2019-07-15

P802.1CQ: Study Group Phase

- 802.1 Local Address Study Group (LASG): Nov 2014
- Chartered to:
 - Develop a PAR for a recommendation on Local Address usage
 - Led to IEEE Std 802c-2017
 - Develop one or more PARs on protocols for local address acquisition
 - Led to P802.1CQ
- LASG terminated in July 2015, with the work continuing in 802.1 Data Center Bridging Task Group.

P802.1CQ PAR

- P802.1CQ: “(Draft) Standard for Local and Metropolitan Area Networks: Multicast and Local Address Assignment”
 - Approved 2016-02-05; Times out 2020-12-31
 - <https://mentor.ieee.org/omniran/dcn/19/omniran-19-0033-00-00TG.pdf>
- CSD
 - <https://mentor.ieee.org/802-ec/dcn/15/ec-15-0105-01-ACSD-802-1cq.pdf>
- Scope: *This standard specifies protocols, procedures, and management objects for locally-unique assignment of 48-bit and 64-bit addresses in IEEE 802 networks. Peer-to-peer address claiming and address server capabilities are specified.*
- Need: *Currently, global addresses are assigned to most IEEE 802 end station and bridge ports. Increasing use of virtual machines and Internet of Things (IoT) devices could exhaust the global address space. To provide a usable alternative to global addresses for such devices, this project will define a set of protocols that will allow ports to automatically obtain a locally-unique address in a range from a portion of the local address space. Multicast flows also need addresses to identify the flows. They will benefit from a set of protocols to distribute multicast addresses. Peer-to-peer address claiming and address server capabilities will be included to serve the needs of smaller (e.g. home) and larger (e.g. industrial plants and building control) networks.*

P802.1CQ: Key Developments

- 2016-01
 - DCB drafted Table of Contents and named an Editor (Marks)
- 2016-02-16
 - Editor created D0.1 containing the draft Table of Contents
- 2018-03
 - 802.1 WG Chair closed DCB TG and moved P802.1CQ to OmniRAN TG
- 2019-07
 - 802.1 Acting WG Chair moved P802.1CQ to TSN TG
 - Editor established project web page under TSN (2019-07)
 - <https://1.ieee802.org/tsn/802-1cq/>
 - Editor developed Draft D0.2 based on contributions

Selected P802.1CQ Contributions

- Following is a list of all related P802.1CQ contributions, to the knowledge of and in the opinion of this contributor.
- Only the latest revision is included.
- A brief summary of each contribution is included
 - The summary is the opinion of the contributor alone.

Selected P802.1CQ Contributions: LASG

| | | | | |
|------------|---|---|---------------------|--|
| 2015-01-13 | lasg-cas-detection-of-duplicated-mac-addresses-0115-v00.pdf | Detection of duplicated MAC addresses | Hiroki (Cas) Nakano | 802 should have a systematic and coordinated method to detect and prevent duplication of MAC address. |
| 2015-01-14 | lasg-moskowitz-secure-moderated-random-mac-addresses-0115-v01.ppt | Secure Moderated Random MAC Addresses | Robert Moskowitz | cryptographically generated MAC address and other options |
| 2015-09-08 | dcb-thaler-local-address-claim-feasability-0915.pdf | Address claiming protocol feasibility exploration | Pat Thaler | FCoE (Fibre Channel over Ethernet) address allocation protocol enables end nodes claiming local addresses. |

Selected P802.1CQ Contributions: DCB

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|------------|--|---|--------------------------------------|--|
| 2016-03-15 | cq-cas-assignment-and-validation-0316-v00.pptx | P802.1CQ Assignment and Validation of Unicast Address | Hiroki (Cas) Nakano | 802 should have a single validation (DAD) protocol |
| 2016-11-09 | cq-ao-local-address-assignment-1116-v00.pptx | Proposal for the MAC address assignment protocol | Ting Ao | hierarchically structured Local MAC address |
| 2016-11-10 | cq-thaler-objectives-1116.pdf | 802.1CQ Proposed Objectives | Pat Thaler | peer-to-peer address acquisition and address server; duplicate detection; allow acquiring multiple addresses and proxy |
| 2017-03-15 | cq-ao-LAAP-proposal-0317-v02.pptx | Local MAC Address Assignment Protocol (LAAP) -- Thought on 802.1CQ | Ting Ao | messaging structure and information for client-server and peer-to-peer; multicast frames; message ID |
| 2017-05-15 | cq-seaman-trusted-addresses-0517-v0.pdf | Trusted MAC Addresses – Making MAC Address filtering and authorization meaningful | Mick Seaman | device address identified per authenticated 802.1AR IDevID enrollment |
| 2017-11-05 | cq-ao-LAAP-Proposal-1117-V1.pptx | Local MAC Address Protocol | Ting Ao | Update of cq-ao-LAAP-proposal-0317-v02.pptx adding coordination among servers/proxies |
| 2018-01-24 | cq-Marks-Perkins-802dot11dot10-0118-v00.pdf | Short Address Assignment in IEEE 802.15.10 | Roger Marks and Charlie Perkins | IEEE 802.15.10 uses 64-bit “extended addresses” but can also assign 16-bit “short addresses”. Takes advantage of the fact that the device has a unique routable address before it is assigned a local address. |
| 2018-01-24 | cq-Marks-flow-zone-addressing-0118-v00.pdf | Address Assignment for Stateless Flow-Zone Switching in the Data Center | Roger Marks | algorithm for assessing hierarchical addresses |
| 2018-01-25 | cq-aoliva-proposal-LAAP-0118-v1.pdf | Proposal for IEEE 802.1CQ LAAP | Antonio de la Oliva and Robert Gazda | Claiming and server-based, based on DHCPv6; advertised via LLDP System Capabilities TLV |
| 2018-03-05 | cq-aoliva-proposal-selfassignmenttext-0318.pdf | Proposal for IEEE 802.1CQ (Self-Assignment part) | Antonio de la Oliva and Robert Gazda | Initial draft of specification, mainly for claiming |

Selected P802.1CQ Contributions: OmniRAN (1/3)

| | | | | |
|------------|--------------------|---|---|--|
| 2018-03-29 | omniran-18-0035-00 | Proposal for IEEE 802.1CQ (LAAP) | Antonio de la Oliva (UC3M, IDCC), Robert Gazda (IDCC) | Something like omniran-19-0034-02. |
| 2018-05-15 | omniran-18-0044-00 | Link Layer Addresses Assignment Mechanism for DHCPv6 | Bernie Volz (Cisco), Tomek Mrugalski (ISC) | IETF DCH WG is developing DHCPv6 to assign MAC as well as IP addresses. |
| 2018-05-21 | omniran-18-0034-02 | Proposal for IEEE 802.1CQ (Self-Assignment part) | Antonio de la Oliva (IDCC, UC3M) | Slide set with key points of earlier text. |
| 2018-07-10 | omniran-18-0059-00 | Address Assignment for Stateless Flow-Zone Switching in the Data Center | Roger Marks (EthAirNet Associates) | An address assignment algorithm suitable for a data center environment. Supports stateless Layer 2 routing, without the need for stored forwarding tables. |
| 2018-07-11 | omniran-18-0060-00 | IEEE 802.1CQ Discussions in San Diego | Antonio de la Oliva (UC3M, IDCC) | Scenario summary. |
| 2018-09-13 | omniran-18-0074-00 | Current Status IEEE 802.1CQ | Antonio de la Oliva (UC3M, IDCC) | Discussion summary. |
| 2018-09-13 | omniran-18-0071-01 | Proposal for MAC address distribution in IEEE 802.11 networks using the mechanisms of IEEE 802.11aq (Pre-association discovery) | Antonio de la Oliva (UC3M, IDCC) | Distribution of MAC addresses in IEEE 802.11 networks using the pre-association discovery mechanism specified in IEEE 802.11aq. |
| 2018-09-13 | omniran-18-0058-01 | Enabling PAD of LAAP using IEEE 802.11aq | Antonio de la Oliva (UC3M, IDCC), Robert Gazda (IDCC) | Slide presentation summary of omniran-18-0071-01. |

Selected P802.1CQ Contributions: OmniRAN (2/3)

| | | | | |
|------------|--------------------|--|---|--|
| 2018-11-11 | omniran-18-0086-00 | Slides to be presented in ARC | Antonio de la Oliva (UC3M, IDCC) | Address assignment making use of Pre-Association Discovery |
| 2018-11-13 | omniran-18-0087-00 | 802.1CQ introduction to 802.15 WNG | Antonio de la Oliva (UC3M, IDCC) | overview for 802.15 Working Group |
| 2019-01-13 | omniran-19-0002-00 | MAC randomization impacts (WBA liaison to IEEE 802.11) | Max Riegel (Nokia) | Summary of WBA liaison to IEEE 802.11 and response |
| 2019-01-13 | omniran-19-0001-00 | IEEE 802.1CQ Threat Analysis | Antonio de la Oliva (UC3M) | Threat analysis, wired and wireless. Argues that most old threats are not exacerbated. Some new threats arise. |
| 2019-02-06 | omniran-19-0007-00 | Requirements from common network operation principles | Max Riegel (Nokia) | proposed text requirements related to addressing in a "common network", based on WBA statement to 802.11 |
| 2019-02-27 | omniran-19-0012-00 | Summary of .1CQ contribution to 802.11m | Antonio de la Oliva (UC3M), Roger Marks (EtherAirNet) | Summarizing proposal in 802.11 WG regarding ANQP for address assignment. |
| 2019-03-11 | omniran-19-0016-00 | Thoughts on ToC | Antonio de la Oliva (UC3M) | Proposed topics for P802.1CQ Table of Contents. |

Selected P802.1CQ Contributions: OmniRAN (3/3)

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|------------|--------------------|--|---|--|
| 2019-03-11 | omniran-19-0011-01 | MAAP_Introduction | Antonio de la Oliva (UC3M) | Summary of MAC Address Acquisition Protocol (MAAP) of IEEE Std 1722 |
| 2019-03-12 | omniran-19-0009-02 | Investigating the Multicast Usage Model for P802.1CQ | Roger Marks (EthAirNet Associates) | Asks TSN Task Group for its needs for a multicast address assignment protocol and inquires about the status of IEEE 1722 MAAP. |
| 2019-03-13 | omniran-19-0017-01 | Proposed liaison to IEEE 1722 Working Group | Roger Marks (EthAirNet Associates) | Proposed liaison regarding MAAP, calling out issues of claiming, OUI, and EtherType. |
| 2019-03-14 | omniran-19-0020-00 | IEEE 802.1CQ Table of Contents | Antonio de la Oliva (UC3M) | Proposed high-level IEEE 802.1CQ Table of Contents |
| 2019-04-26 | omniran-19-0026-00 | Multicast and Unicast MAC Address Assignment Protocol (MUMAAP) | Antonio de la Oliva (UC3M, IDCC), Robert Gazda (IDCC) | Proposes details of a protocol for the assignment of multicast and unicast addresses, both server-based and claiming-based. |
| 2019-07-04 | omniran-19-0030-01 | Slides explaining .1CQ protocol contribution | Antonio de la Oliva (UC3M, IDCC) | Slide presentation summary of omniran-19-0026-00. |

IEEE Std 1722 MAAP Issues

- 2019-03
 - Presented “Investigating the Multicast Usage Model for P802.1CQ” to TSN TG, requesting views on the role of IEEE 1722 “MAC Address Acquisition Protocol” (MAAP)
 - omniran-19-0009-02
 - Drafted liaison to IEEE 1722 Working Group
 - omniran-19-0017-01
- 2019-07
 - Response from IEEE 1722 WG
 - “During the development of MAAP, it was realized by the group, that IEEE 802.1 would be a better keeper of this standard if it ever needed to be enhanced and/or improved.”
 - P802.1CQ Editor has drafted a response to encourage an 802.1 response 2019-07-18

Overview of Draft D0.2

- Editor's Draft
- Considers IEEE1722 MAAP and liaison
 - Does not yet discuss relationship to IETF DHCPv6
- based significantly on omniran-19-0026-00-CQ00
 - Adopts many aspects of that contribution
 - Some less mature aspects omitted
 - Many technical changes
 - Claiming-based method based on MAAP
 - Server-based method inspired by DHCP
- This is a good start, but much more detail is needed.
- Extensive editor's notes included
 - Explanations of implementation; questions; comments

Proposed Schedule

- Difficult to complete work before PAR timeout (Dec 2020)
- Hope to gain more participation and interest from TSN
- Aim for:
 - TG ballot November 2019
 - WG ballot March 2020
 - SA ballot November 2020
 - and PAR extension
 - Conclude July 2021
- Schedule to be discussed in TSN
- Teleconferences to be scheduled