

|  |
| --- |
|  |

Switch Abstraction Interface

Change Proposal

|  |  |
| --- | --- |
| **Title** | **New Changes for 802.1X** |
| **Authors** | **DELL** |
| **Status** | **In Review** |
| **Type** | **Standards Track** |
| **Created** | **03/04** |
| **SAI-Version** | **V0.9.2** |

**Contents**

[List of Changes i](#_Toc416092322)

[1 Overview 1](#_Toc416092323)

[2 Specification 1](#_Toc416092324)

[2.1 To add Authenticated FDB entry: 1](#_Toc416092325)

[2.2 To remove Authenticated FDB entry: 1](#_Toc416092326)

[2.3 To authenticate unknown MAC by trapping them to CPU 1](#_Toc416092327)

[3 Appendix 2](#_Toc416092328)

[3.1 Enable/Disable 802.1x functionality in a port 2](#_Toc416092329)

[3.2 Install authenticated entries 2](#_Toc416092330)

[3.3 Remove authenticated entries 3](#_Toc416092331)

[3.4 OCP review comments 3](#_Toc416092332)

# List of Changes

|  |  |  |  |
| --- | --- | --- | --- |
| Version | Changes | Name | Date |
| 0.9.2 | Proposal for 802.1x |  | 03/04/15 |
| 0.9.2 | Addressing comments on entry type, learning mode and move attribute |  | 03/06/15 |
| 0.9.2 | Addressing comments on EAPOL and MAB. Added new port learn mode for MAB and removed port learn mode PENDING. Removed bulk delete |  | 04/07/15 |

License

© 2014 Microsoft Corporation, Dell Inc., Facebook, Inc, Broadcom Corporation, Intel Corporation, Mellanox Technologies Ltd.

As of September 9, 2014, the following persons or entities have made this Specification available under the Open Web Foundation Final Specification Agreement (OWFa 1.0), which is available at <http://www.openwebfoundation.org/legal/the-owf-1-0-agreements/owfa-1-0>

Microsoft Corporation, Dell Inc., Facebook, Inc, Intel Corporation, Mellanox Technologies Ltd.

You can review the signed copies of the Open Web Foundation Agreement Version 1.0 for this Specification at <http://opencompute.org/licensing/>, which may also include additional parties to those listed above.

Your use of this Specification may be subject to other third party rights. THIS SPECIFICATION IS PROVIDED "AS IS." The contributors expressly disclaim any warranties (express, implied, or otherwise), including implied warranties of merchantability, noninfringement, fitness for a particular purpose, or title, related to the Specification. The entire risk as to implementing or otherwise using the Specification is assumed by the Specification implementer and user. IN NO EVENT WILL ANY PARTY BE LIABLE TO ANY OTHER PARTY FOR LOST PROFITS OR ANY FORM OF INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER FROM ANY CAUSES OF ACTION OF ANY KIND WITH RESPECT TO THIS SPECIFICATION OR ITS GOVERNING AGREEMENT, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), OR OTHERWISE, AND WHETHER OR NOT THE OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

THE FOLLOWING IS A LIST OF MERELY REFERENCED TECHNOLOGY: Microprocessor technology, semiconductor manufacturing technology, operating system technology (including without limitation networking operating system technology), emulation technology, graphics technology, video technology, integrated circuit packaging technology and the like, compiler technologies, object oriented technology, optical/RF communications technology including chip I/O and driver technology, bus technology, memory chip technology (including, without limitation, NAND memory, NOR memory, resistive RAM (RRAM), seek scan probe (SSP) memory, nonvolatile memory (including without limitation, memory based on chalcogenide materials, phase change memory (PCM), one or more stacked layers of memory cells, embedded PCM memories, non-volatile cache memory, solid state drives, SRAM, embedded DRAM, ferro-electric memory, and polymer memory)) and/or health-related and medical technology. IMPLEMENTATION OF THESE TECHNOLOGIES MAY BE SUBJECT TO THEIR OWN LEGAL TERMS.

# Overview

This document describes the changes that is required in SAI to support 802.1x

# Specification

Using existing FDB and port modules and adding few attributes can help to provide the support for 802.1X.

Below are the requirements.

## To add Authenticated FDB entry:

Existing sai\_create\_fdb\_entry\_fn can be used to add authenticated MAC addresses. If aging is not required the attribute for type can be **SAI\_FDB\_ENTRY\_STATIC**, while **SAI\_FDB\_ENTRY\_DYNAMIC** can be used in case if aging for the entries is required.

## To remove Authenticated FDB entry:

Existing sai\_remove\_fdb\_entry\_fn API can be used.

## To authenticate unknown MAC by trapping them to CPU

To trap unknown MAC addresses to CPU that are received on a 802.1x enabled port, two new learning modes for learn by CPU and drop unknown MAC should be introduced apart from existing two learning modes in sai\_port\_fdb\_learning\_mode\_t.

**SAI\_PORT\_LEARN\_MODE\_CPU** can be used for CPU based software learning.

**SAI\_PORT\_LEARN\_MODE\_DROP** can be used to drop unknown MAC addresses on a port.

typedef enum \_sai\_port\_fdb\_learning\_mode\_t

{

**/\* Drop unknown Source MAC. Do not learn too\*/**

**SAI\_PORT\_LEARN\_MODE\_DROP,**

/\* Learning disable. Do not learn new mac address but forward \*/

SAI\_PORT\_LEARN\_MODE\_DISABLE,

/\* Hardware learning \*/

SAI\_PORT\_LEARN\_MODE\_HW,

**/\* Trap the unknown source MAC to CPU \*/**

**SAI\_PORT\_LEARN\_MODE\_CPU,**

} sai\_port\_fdb\_learning\_mode\_t;

# Appendix

This section is used to describe how to use the above defined SAI specifications to achieve 802.1x functionality.

## Enable/Disable 802.1x functionality in a port

To enable 802.1x functionality in a port, the following calls should be made

**For MAB**

*sai\_set\_port\_attribute\_fn*

*ID= SAI\_PORT\_ATTR\_FDB\_LEARNING value = SAI\_PORT\_LEARN\_MODE\_CPU*

This would trap the unknown unicast packets to CPU.

**For EAPOL**

*sai\_set\_port\_attribute\_fn*

*ID= SAI\_PORT\_ATTR\_FDB\_LEARNING value = SAI\_PORT\_LEARN\_MODE\_DROP*

This would drop any unknown source MAC. Only EAPOL packets can be received. (This can be done using ACL rules)

To disable 802.1x functionality and move back to normal hardware learning the following changes can be made

*sai\_set\_port\_attribute\_fn*

*ID= SAI\_PORT\_ATTR\_FDB\_LEARNING value = SAI\_PORT\_LEARN\_MODE\_HW*

## Install authenticated entries

Using step 1 the authenticated entries can be taken to CPU and sent for authentication. Once authenticated is done the installation of authenticated FDB entri can be can be done as follows using the below API

*sai\_create\_fdb\_entry\_fn*

With following parameters

*fdb\_entry – The authenticated FDB entry.*

The following attributes are set

*port – 802.1x enabled port where the FDB entry was identified*

*type - SAI\_FDB\_ENTRY\_STATIC | SAI\_FDB\_ENTRY\_DYNAMIC*

*action - SAI\_PACKET\_ACTION\_FORWARD*

## Remove authenticated entries

The authenticated entries can be removed one at a time by using the following API

*sai\_remove\_fdb\_entry\_fn*

*Parameters – FDB Entry.*

## OCP review comments

Hi Arun,

Thanks, I agree on the first point.

Regards,  
Atit

**From:** [Arunsubash\_Manickam@Dell.com](mailto:Arunsubash_Manickam@Dell.com) [<mailto:Arunsubash_Manickam@Dell.com>]   
**Sent:** Friday, March 06, 2015 11:57 AM  
**To:** Jain, Atit; [opencompute-networking@lists.opencompute.org](mailto:opencompute-networking@lists.opencompute.org)  
**Subject:** RE: API Proposal for 802.1X support

Hi Atit,

Comments inline

**From:** Jain, Atit [<mailto:Atit.Jain@caviumnetworks.com>]   
**Sent:** Thursday, March 05, 2015 11:09 PM  
**To:** Manickam, Arunsubash; [opencompute-networking@lists.opencompute.org](mailto:opencompute-networking@lists.opencompute.org)  
**Subject:** RE: API Proposal for 802.1X support

Hi Arun,

Few thoughts:

**SAI\_FDB\_ENTRY\_STATIC**

1. When added as static, the aging will not happen. There should be a way to indicate it. Consider adding an attribute.

2. 802.1x has a config to enable/disable aging. Same is true for the blocked mac addresses.

[Arun]

If we want the authenticated MAC to go thru aging why cannot we add a dynamic entry. If aging is needed for an authenticated MAC add as a dynamic entry else static

**SAI\_PORT\_LEARN\_MODE\_CPU**

Some device have learn with pending where learning happens in HW with as pending and once host resets pending the entry is enabled for forwarding. Consider adding it (**SAI\_PORT\_LEARN\_MODE\_PENDING**), I think it’s an important feature for 802.1x

Same options should be available on switch level also for the devices that do not support per port option

[Arun]

Yes we can support this

**1)Prevent MAC move to the authorized port**

**2)Restrict port move by having a new port attribute.**

1. I think once the port is put in CPU learning mode(**SAI\_PORT\_LEARN\_MODE\_CPU**), the mac move also should be through CPU so we might not need separate option.

2. In case we need separate option, 1) looks better as it covers the 1 and provides more flexibility.

[Arun]

Yes agreed we will remove the attribute

-Arun

Same is updated in attached doc.

Thanks & Regards,  
Atit

**From:** [opencompute-networking-bounces@lists.opencompute.org](mailto:opencompute-networking-bounces@lists.opencompute.org) [<mailto:opencompute-networking-bounces@lists.opencompute.org>] **On Behalf Of** [Arunsubash\_Manickam@dell.com](mailto:Arunsubash_Manickam@dell.com)  
**Sent:** Thursday, March 05, 2015 4:39 PM  
**To:** [opencompute-networking@lists.opencompute.org](mailto:opencompute-networking@lists.opencompute.org)  
**Subject:** [Opencompute-networking] API Proposal for 802.1X support

Hi All,

To support 802.1X, have proposed changes to some existing objects. Please review and give your feedback

<https://github.com/arunsubash/OCP-Networking-Project-Community-Contributions/blob/master/sai/doc/SAI-Proposal-10-802.1x-Ver1.docx>

Thanks,

Arun