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Switch Abstraction Interface

Change Proposal

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| **Title** | **New Changes for 802.1X** |
| **Authors** | **DELL** |
| **Status** | **In Review** |
| **Type** | **Standards Track** |
| **Created** | **03/04** |
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# List of Changes

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| --- | --- | --- | --- |
| Version | Changes | Name | Date |
| 0.9.2 | Proposal for 802.1x |  | 03/04/15 |
|  | Addressing comments on entry type, learning mode and move attribute |  | 03/06/15 |

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# 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 remove all Authenticated FDB entries on a port:

Modify sai\_flush\_all\_fdb\_entries\_by\_port\_fn as below. This is to remove all the authenticated entries. Currently static entries would not be flushed by this API. To flush them add another parameter.

/\*

\* Routine Description:

\* Remove all FDB entries by port

\*

\* Arguments:

\* [in] port\_id - port id

\* [in] remove\_static – Specifies whether static entries should be deleted too.

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_flush\_all\_fdb\_entries\_by\_port\_fn)(

\_In\_ sai\_port\_id\_t port\_id,

**\_In\_ bool flush\_static\_entries,**

);

## 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 learn as pending should be introduced apart from existing two learning modes in sai\_port\_fdb\_learning\_mode\_t.

The difference between the two modes is in learn by CPU if a stream from a single unknown MAC address comes, then the entire stream would be sent to CPU until the software installs the entry. In the pending mode, only one packet from the stream would be sent to CPU. This is done by creating a hardware entry with pending flag which would make sure only one packet is sent and also forwarding does not happen. Once the pending flag is cleared by CPU normal forwarding would occur.

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

**SAI\_PORT\_LEARN\_MODE\_PENDING** can be used to specify pending learn on a port.

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

{

/\* Learning diaable. Do not learn new mac address \*/

SAI\_PORT\_LEARN\_MODE\_DISABLE,

/\* Hardware learning \*/

SAI\_PORT\_LEARN\_MODE\_HW,

**/\* CPU learning \*/**

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

**/\* CPU Pending learn \*/**

**SAI\_PORT\_LEARN\_MODE\_PENDING,**

} 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

*sai\_set\_port\_attribute\_fn*

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

This would trap the unknown unicast packets to CPU. It is better to clear the port of any existing MAC addresses. This can be done by normal delete call or with the delete port API with true set for static. It is important to note that if deleting static entries is not desired, then flush\_static\_entries can be set to false.

*sai\_flush\_all\_fdb\_entries\_by\_port\_fn(port\_id,true)*

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.*

All the authenticated entries can be removed at one shot using the following API

*sai\_flush\_all\_fdb\_entries\_by\_port\_fn(port\_id,true)*

where port\_id is the 802.1x enabled port which is desired to be cleared of authenticated entries.

## 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