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Switch Abstraction Interface

Change Proposal

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**Contents**

[List of Changes i](#_Toc440458011)

[1 Overview 1](#_Toc440458012)

[2 Specification 1](#_Toc440458013)

[2.1 Changes to sai.h 1](#_Toc440458014)

[2.2 Change to sainexthop.h 1](#_Toc440458015)

[2.3 Change to sainexthopgroup.h 1](#_Toc440458016)

[2.4 New definitions in saiipmc.h 2](#_Toc440458017)

[3 Examples 5](#_Toc440458018)

[3.1 Create nexthop 5](#_Toc440458019)

[3.2 Create nexthop group 5](#_Toc440458020)

[3.3 Create IPMC entry 5](#_Toc440458021)

# List of Changes

|  |  |  |  |
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# Overview

IP Multicast provides a solution to eliminate traffic redundancy and reduce server and CPU loads. This document covers details of IP multicast object –IP multicast group creating, IP multicast group removing, IP multicast group attributes setting and getting, RPF interface adding to IP multicast group, and RPF interface removing from IP multicast group.

# Specification

This section describes the details of the proposed interface/API

## Changes to sai.h

typedef enum \_sai\_api\_t {

SAI\_API\_IPMC= 29, /\* sai\_ipmc\_api\_t \*/

} sai\_api\_t;

## Change to sainexthop.h

/\*

\* Next hop type

\*/

typedef enum \_sai\_next\_hop\_type\_t

{

SAI\_NEXT\_HOP\_IP,

SAI\_NEXT\_HOP\_ROUTER\_INTERFACE,

/\*

Tunneling to be added later

\*/

} sai\_next\_hop\_type\_t;

## Change to sainexthopgroup.h

/\*

\* Next hop group type

\*/

typedef enum \_sai\_next\_hop\_group\_type\_t

{

/\* Next hop group is ECMP \*/

SAI\_NEXT\_HOP\_GROUP\_ECMP,

/\* Next hop group is IP multicast \*/

SAI\_NEXT\_HOP\_GROUP\_IPMC,

/\* Other types of next hop group to be defined in the future, e.g., WCMP \*/

} sai\_next\_hop\_group\_type\_t;

## New definitions in saiipmc.h

/\*

\* IP multicast entry key

\*/

typedef struct \_sai\_ipmc\_entry\_t

{

sai\_object\_id\_t vr\_id;

sai\_ip\_prefix\_t destination;

sai\_ip\_prefix\_t source;

} sai\_ipmc\_entry\_t;

/\*

\* Attribute Id for IP multicast entry

\*/

typedef enum \_sai\_ipmc\_entry\_attr\_t

{

/\* READ \*/

/\* READ-WRITE \*/

/\* Packet action [sai\_packet\_action\_t]

(default to SAI\_PACKET\_ACTION\_FORWARD) \*/

SAI\_IPMC\_ATTR\_PACKET\_ACTION,

/\* Packet priority for trap/log actions [uint8\_t]

(default to 0) \*/

SAI\_IPMC\_ATTR\_TRAP\_PRIORITY,

/\* RPF router interface list [sai\_object\_id\_t] \*/

SAI\_IPMC\_ATTR\_RPF\_ROUTER\_INTERFACE\_LIST,

/\* Next hop group id for the packet [sai\_object\_id\_t]

\* The next hop id should be next hop group.

\* The next hop id type should be SAI\_NEXT\_HOP\_GROUP\_IPMC \*/

SAI\_IPMC\_ATTR\_NEXT\_HOP\_GROUP\_ID,

/\* Custom range base value \*/

SAI\_IPMC\_ATTR\_CUSTOM\_RANGE\_BASE = 0x10000000

} sai\_ipmc\_entry\_attr\_t;

/\*

\* IPMC event type

\*/

typedef enum sai\_ipmc\_event\_t

{

/\* IPMC entry aged \*/

SAI\_IPMC\_EVENT\_AGED,

} sai\_ipmc\_event\_t;

/\*

\* Routine Description:

\* Create IP multicast entry

\*

\* Arguments:

\* [in] ipmc\_entry - IP multicast entry

\* [in] attr\_count - number of attributes

\* [in] attr\_list - array of attributes

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_create\_ipmc\_entry\_fn)(

\_In\_ const sai\_ipmc\_entry\_t\* ipmc\_entry,

\_In\_ uint32\_t attr\_count,

\_In\_ const sai\_attribute\_t \*attr\_list

);

/\*

\* Routine Description:

\* Remove IP multicast entry

\*

\* Arguments:

\* [in] ipmc\_entry - IP multicast entry

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_remove\_ipmc\_entry\_fn)(

\_In\_ const sai\_ipmc\_entry\_t\* ipmc\_entry

);

/\*

\* Routine Description:

\* Set IP multicast entry attribute value

\*

\* Arguments:

\* [in] IP multicast - IP multicast entry

\* [in] attr - attribute

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_set\_ipmc\_entry\_attribute\_fn)(

\_In\_ const sai\_ipmc\_entry\_t\* ipmc\_entry,

\_In\_ const sai\_attribute\_t \*attr

);

/\*

\* Routine Description:

\* Get IP multicast entry attribute value

\*

\* Arguments:

\* [in] ipmc\_entry - IP multicast entry

\* [in] attr\_count - number of attributes

\* [inout] attr\_list - array of attributes

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_get\_ipmc\_entry\_attribute\_fn)(

\_In\_ const sai\_ipmc\_entry\_t\* ipmc\_entry,

\_In\_ uint32\_t attr\_count,

\_Inout\_ sai\_attribute\_t \*attr\_list

);

/\*

\* Routine Description:

\* add RPF interface list to IP multicast

\*

\* Arguments:

\* [in] ipmc\_entry - IP multicast entry

\* [in] router interface list - router interface list

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_add\_rpf\_interface\_to\_ipmc\_fn)(

\_In\_ const sai\_ipmc\_entry\_t\* ipmc\_entry,

\_In\_ const sai\_object\_list\_t \*router\_interface\_list

);

/\*

\* Routine Description:

\* remove RPF interface list from IP multicast

\*

\* Arguments:

\* [in] ipmc\_entry - IP multicast entry

\* [in] router interface list - router interface list

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_remove\_rpf\_interface\_from\_ipmc\_fn)(

\_In\_ const sai\_ipmc\_entry\_t\* ipmc\_entry,

\_In\_ const sai\_object\_list\_t \*router\_interface\_list

);

/\*

\* Routine Description:

\* IP multicast aging notifications

\*

\* Arguments:

\* [in] event\_type – IP multicast event type

\* [in] IPMC entry – IP multicast entry

\* [in] attr\_count - number of attributes

\* [in] attr - array of attributes

\*

\* Return Values:

\* None

\*/

typedef void (\*sai\_ipmc\_event\_notification\_fn)(

\_In\_ sai\_ipmc\_event\_t event\_type,

\_In\_ sai\_ipmc\_entry\_t \* ipmc\_entry,

\_In\_ uint32\_t attr\_count,

\_In\_ sai\_attribute\_t \*attr

);

/\*

\* IP multicast method table retrieved with sai\_api\_query()

\*/

typedef struct \_sai\_ipmc\_api\_t

{

sai\_create\_ipmc\_entry\_fn create\_ipmc\_entry;

sai\_remove\_ipmc\_entry\_fn remove\_ipmc\_entry;

sai\_add\_rpf\_interface\_to\_ipmc\_fn sai\_add\_rpf\_interface\_to\_ipmc;

sai\_remove\_rpf\_interface\_from\_ipmc\_fn sai\_remove\_rpf\_interface\_from\_ipmc;

sai\_set\_ipmc\_entry\_attribute\_fn set\_ipmc\_entry\_attribute;

sai\_get\_ipmc\_entry\_attribute\_fn get\_ipmc\_entry\_attribute;

} sai\_ipmc\_api\_t;

# Examples

Router interface should be created first, for example, router\_interface1\_object, router\_interface2\_object and rpf\_interface\_object.

## Create nexthop

sai\_api\_query(SAI\_API\_NEXT\_HOP, &sai\_nexthop\_api);

sai\_object\_id\_t nexthop1\_object;

sai\_attribute\_t attr[2] = {0};

attr[0].id = SAI\_NEXT\_HOP\_ATTR\_TYPE;

attr[0].value.oid = SAI\_NEXT\_HOP\_ROUTER\_INTERFACE;

attr[1].id = SAI\_NEXT\_HOP\_ATTR\_ROUTER\_INTERFACE\_ID;

attr[1].value.oid = router\_interface1\_object;

sai\_nexthop\_api-> create\_next\_hop (&nexthop1\_object, 2, attr);

sai\_api\_query(SAI\_API\_NEXT\_HOP, &sai\_nexthop\_api);

sai\_object\_id\_t nexthop2\_object;

sai\_attribute\_t attr[2] = {0};

attr[0].id = SAI\_NEXT\_HOP\_ATTR\_TYPE;

attr[0].value.oid = SAI\_NEXT\_HOP\_ROUTER\_INTERFACE;

attr[1].id = SAI\_NEXT\_HOP\_ATTR\_ROUTER\_INTERFACE\_ID;

attr[1].value.oid = router\_interface2\_object;

sai\_nexthop\_api->create\_next\_hop (&nexthop2\_object, 2, attr);

## Create nexthop group

sai\_api\_query(SAI\_API\_NEXT\_HOP\_GROUP, &sai\_nexthop\_group\_api);

sai\_object\_id\_t nexthop\_group\_object;

sai\_object\_id\_t nexthop\_list\_obj[2] = {0};

sai\_attribute\_t attr[2] = {0};

attr[0].id = SAI\_NEXT\_HOP\_GROUP\_ATTR\_TYPE;

attr[0].value.oid = SAI\_NEXT\_HOP\_GROUP\_IPMC;

attr[1].id = SAI\_NEXT\_HOP\_GROUP\_ATTR\_NEXT\_HOP\_LIST;

nexthop\_list\_obj [0] = nexthop1\_object;

nexthop\_list\_obj [1] = nexthop2\_object;

attr[1].value.objlist.count = 2;

attr[1].value.objlist.list = nexthop\_list\_obj;

sai\_nexthop\_group\_api->create\_next\_hop\_group(&nexthop\_group\_object, 2, attr);

## Create IPMC entry

sai\_api\_query(SAI\_API\_IPMC, &sai\_ipmc\_api);

sai\_ipmc\_entry\_t ipmc\_entry;

sai\_object\_id\_t rpf\_interface\_list\_obj[2] = {0};

sai\_attribute\_t attr[2] = {0};

ipmc\_entry.vr\_id = vr\_id\_obj;

ipmc\_entry.destination.addr\_family = SAI\_IP\_ADDR\_FAMILY\_IPV4;

ipmc\_entry.destination.addr.ip4 = 0xE0000201;

ipmc\_entry.destination.mask.ip4 = 0xFFFFFFFF;

ipmc\_entry.source.addr\_family = SAI\_IP\_ADDR\_FAMILY\_IPV4;

ipmc\_entry.source.addr.ip4 = 0xE0000301;

ipmc\_entry.source.mask.ip4 = 0xFFFFFFFF;

attr[0].id = SAI\_IPMC\_ATTR\_NEXT\_HOP\_GROUP\_ID;

attr[0].value.oid = nexthop\_group\_object;

attr[1].id = SAI\_IPMC\_ATTR\_RPF\_ROUTER\_INTERFACE\_LIST;

rpf\_interface\_list\_obj[0] = rpf\_interface\_object;

attr[1].value.objlist.count = 1;

attr[1].value.objlist.list = rpf\_interface\_list\_obj;

sai\_ipmc\_api->create\_ipmc\_entry(&ipmc\_entry, 2, attr);