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Switch Abstraction Interface

Change Proposal

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| **Authors** | **DELL** |
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# List of Changes

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| --- | --- | --- | --- |
| Version | Changes | Name | Date |
| 0.9.2 | Proposal for LAG, HASH – Base Version |  | 1/23/15 |

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# Overview

The document covers details of LAG object – Creation, deletion, update. Currently, LAG is defined as a container for the SAI ports. There is no attributes defined for the LAG object. We would define the get/set attribute API’s for future use.

The LAG ID returned is from the SAI Port range space. We may want to support the LAG ID being used for get/set select port attributes in future.

The document also defines hash attributes that can be used to configure LAG.

# Specification

## LAG

typedef enum \_sai\_api\_t {

SAI\_API\_LAG= 12, /\* sai\_lag\_api\_t \*

}

/\*

\* Routine Description:

\* Create LAG interface.

\* Port type (sai\_port\_type\_t) of LAG interface will be  SAI\_PORT\_TYPE\_LAG

\* Arguments:

\* [out] lag\_id - LAG id

\* [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\_lag\_interface\_fn)(**

**\_Out\_ sai\_port\_id\_t\* lag\_id,**

**\_In\_ int attr\_count,**

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

**);**

/\*

\* Routine Description:

\* Remove LAG interface

\*

\* Arguments:

\* [in] lag\_id - lag id

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

**typedef sai\_status\_t(\*sai\_remove\_lag\_interface\_fn)(**

**\_In\_ sai\_port\_id\_t lag\_id**

**);**

/\*

\* Routine Description:

\* Remove LAG interfaces (remove all LAG interfaces).

\*

\* Arguments:

\* None

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

**typedef sai\_status\_t (\*sai\_remove\_all\_lags\_fn)(**

**void**

**);**

/\*

\* Routine Description:

\* Add Port to LAG

\*

\* Arguments:

\* [in] lag\_id - LAG id

\* [in] port\_count - number of ports

\* [in] port\_list - pointer to membership structures

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

**typedef sai\_status\_t (\*sai\_add\_ports\_to\_lag\_fn)(**

**\_In\_ sai\_port\_id\_t lag\_id,**

**\_In\_ uint32\_t port\_count,**

**\_In\_ const sai\_port\_id\_t\* port\_list**

**);**

/\*

\* Routine Description:

\* Remove Port from LAG

\*

\* Arguments:

\* [in] lag\_id - LAG id

\* [in] port\_count - number of ports

\* [in] port\_list - pointer to membership structures

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

**typedef sai\_status\_t (\*sai\_remove\_ports\_from\_lag\_fn)(**

**\_In\_ sai\_port\_id\_t lag\_id,**

**\_In\_ uint32\_t port\_count,**

**\_In\_ const sai\_port\_id\_t\* port\_list**

**);**

/\*

\* Routine Description:

\* Set LAG interface attribute

\*

\* Arguments:

\* [in]lag\_id– lag id

\* [in] attr - attribute

\*

\* Return Values:

\* SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

**typedef sai\_status\_t (\*sai\_set\_lag\_interface\_attribute\_fn)(**

**\_In\_ sai\_port\_id\_t lag\_id,**

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

**);**

/\*

\* Routine Description:

\* Get LAG interface attribute

\*

\* Arguments:

\* [in] lag\_id- lag\_id

\* [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\_lag\_interface\_attribute\_fn)(**

**\_In\_ sai\_port\_id\_t lag\_id,**

**\_In\_ int attr\_count,**

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

**);**

/\*

\* LAG methods table retrieved with sai\_api\_query()

\*/

**typedef struct \_sai\_lag\_api\_t**

**{**

**sai\_create\_lag\_interface\_fn   create\_lag\_interface;**

**sai\_remove\_lag\_interface\_fn remove\_lag\_interface;**

**sai\_set\_lag\_attribute\_fn set\_lag\_attribute;**

**sai\_get\_lag\_attribute\_fn get\_lag\_attribute;**

**sai\_add\_ports\_to\_lag\_fn add\_ports\_to\_lag;**

**sai\_remove\_ports\_from\_lag\_fn remove\_ports\_from\_lag;**

**sai\_remove\_all\_lags\_fn remove\_all\_lags;**

**} sai\_lag\_api\_t;**

## HASH

ECMP and LAG shall use the system wide hash logic for flow distribution over the links. Hash configuration is defined per switch for each application like ECMP and LAG. Hash calculation will use following attributes for flow distribution over LAG and ECMP

* Hash Seed
* Hash algorithm
* Packet hash fields

Since Hash by itself is not an object and does not have a handle, we cannot have set/get API’s for hash using the Hash Type(LAG, ECMP) as an handle. Hence we would add these to the switch attributes duplicating entries for LAG and ECMP

### New Definitions

typedef uint32\_t  sai\_switch\_hash\_seed\_t; /\* hash seed value\*/

typedef enum \_sai\_switch\_hash\_fields\_t  
{  
    SAI\_HASH\_SRC\_IP         = (1 << 0),  
    SAI\_HASH\_DST\_IP         = (1 << 1),  
    SAI\_HASH\_VLAN\_ID      = (1 << 2),  
    SAI\_HASH\_IP\_PROTOCOL       = (1 << 3),  
    SAI\_HASH\_ETHERTYPE      = (1 << 4),  
    SAI\_HASH\_L4\_SOURCE\_PORT = (1 << 5),  
    SAI\_HASH\_L4\_DEST\_PORT   = (1 << 6),  
    SAI\_HASH\_SOURCE\_MAC      = (1 << 7),  
    SAI\_HASH\_DEST\_MAC        = (1 << 8),  
 SAI\_HASH\_DEST\_PORT     = (1 << 9),  
    SAI\_HASH\_SOURCE\_PORT   = (1 << 10),  
     
     
} sai\_switch\_hash\_fields\_t;

typedef enum \_sai\_switch\_hash\_algo\_t {

SAI\_HASH\_XOR16 ,

SAI\_HASH\_CRC16\_BISYNC,

SAI\_HASH\_CRC16\_CCITT,            
SAI\_HASH\_CRC32\_LOWER ,            
SAI\_HASH\_CRC32\_UPPER ,  
SAI\_HASH\_CRC16\_BISYNC\_AND\_XOR8  = 1,

SAI\_HASH\_CRC16\_BISYNC\_AND\_XOR4 ,  
SAI\_HASH\_CRC16\_BISYNC\_AND\_XOR2 ,  
SAI\_HASH\_CRC16\_BISYNC\_AND\_XOR1    
} sai\_switch\_hash\_algo\_t;

### New attributes added to existing SWITCH attributes

typedef enum \_sai\_switch\_hash\_attr\_t  
{  
    SAI\_SWITCH\_ ATTR\_LAG\_HASH\_ALGO ,   /\*value sai\_switch\_hash\_algo\_t\*/

SAI\_SWITCH\_ATTR\_LAG\_HASH\_ SEED ,   /\*value sai\_switch\_hash\_seed\_t \*/

SAI\_SWITCH\_ ATTR\_LAG\_HASH\_FIELDS\_IPV4,      /\*value sai\_switch\_hash\_fields\_t\*/

SAI\_SWITCH\_ ATTR\_LAG\_HASH\_FIELDS\_IPV6,      /\*value sai\_switch\_hash\_fields\_t\*/

SAI\_SWITCH\_ ATTR\_LAG\_HASH\_FIELDS\_MAC,       /\*value sai\_switch\_hash\_fields\_t\*/

    SAI\_SWITCH\_ ATTR\_ECMP\_HASH\_ALGO ,   /\*value sai\_switch\_hash\_algo\_t\*/

SAI\_SWITCH\_ATTR\_ECMP\_HASH\_ SEED ,   /\*value sai\_switch\_hash\_seed\_t \*/

SAI\_SWITCH\_ ATTR\_ECMP\_HASH\_FIELDS\_IPV4,      /\*value sai\_switch\_hash\_fields\_t\*/

SAI\_SWITCH\_ ATTR\_ECMP\_HASH\_FIELDS\_IPV6,      /\*value sai\_switch\_hash\_fields\_t\*/

SAI\_SWITCH\_ ATTR\_ECMP\_HASH\_FIELDS\_NON\_IP,       /\*value sai\_switch\_hash\_fields\_t\*/

}

### Definitions to be removed from existing header file

ECMP hashing type [sai\_switch\_ecmp\_hash\_type\_t] \*/

SAI\_SWITCH\_ATTR\_ECMP\_HASH\_TYPE,

/\* ECMP hashing fields [sai\_switch\_ecmp\_hash\_fields\_t] \*/

SAI\_SWITCH\_ATTR\_ECMP\_HASH\_FIELDS,

/\*

\* Attribute data for SAI\_SWITCH\_ECMP\_HASH\_TYPE

\*/

typedef enum \_sai\_switch\_ecmp\_hash\_type\_t

{

SAI\_SWITCH\_ECMP\_HASH\_TYPE\_XOR,

SAI\_SWITCH\_ECMP\_HASH\_TYPE\_CRC,

} sai\_switch\_ecmp\_hash\_type\_t;

typedef enum \_sai\_switch\_ecmp\_hash\_fields\_t

{

SAI\_SWITCH\_ECMP\_HASH\_SRC\_IP = (1 << 0),

SAI\_SWITCH\_ECMP\_HASH\_DST\_IP = (1 << 1),

SAI\_SWITCH\_ECMP\_HASH\_L4\_SRC\_PORT = (1 << 2),

SAI\_SWITCH\_ECMP\_HASH\_L4\_DST\_PORT = (1 << 3),

} sai\_switch\_ecmp\_hash\_fields\_t;