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Switch Abstraction Interface

Change Proposal

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| **Authors** | **Mellanox , metaSwitch** |
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| Version | Changes | Name | Date |
| 0.9.4 | Proposal for uniform tunnel |  | 8/1/15 |

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# Overview

## Uniform tunnel object



## Uniform tunnel encap

## 

## IPinIP tunnel

### IPinIP encap



### IPinIP decap



## Vxlan tunnel

### Vxlan encap



### Vxlan decap



## MPLS tunnel

### MPLS encap



### MPLS decap



# Specification

New object needed:

Next hop:

Tunnel decap,

Tunnel encap,

MPLS next-hop(NHLFE)

Generic Tunnel object

## Next hop

/\*\*

\* @brief Next hop type

\*/

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

{

SAI\_NEXT\_HOP\_IP,

/\*MPLS(NHLFE) next hop \*/

SAI\_NEXT\_HOP\_MPLS,

/\*tunnel next hop \*/

SAI\_NEXT\_HOP\_TUNNEL\_DECAP,

SAI\_NEXT\_HOP\_TUNNEL\_ENCAP,

} sai\_next\_hop\_type\_t;

typedef enum \_sai\_next\_hop\_attr\_t

{

/\*\* READ-ONLY \*/

/\*\* READ-WRITE \*/

/\*\* Next hop entry type [sai\_next\_hop\_type\_t] (MANDATORY\_ON\_CREATE|CREATE\_ONLY) \*/

SAI\_NEXT\_HOP\_ATTR\_TYPE,

/\*\* Next hop entry ipv4 address [sai\_ip\_address\_t]

\* (MANDATORY\_ON\_CREATE when SAI\_NEXT\_HOP\_ATTR\_TYPE = SAI\_NEXT\_HOP\_IP)

\* (CREATE\_ONLY) \*/

SAI\_NEXT\_HOP\_ATTR\_IP,

/\*\* Next hop entry router interface id [sai\_object\_id\_t] (MANDATORY\_ON\_CREATE|CREATE\_ONLY) \*/

SAI\_NEXT\_HOP\_ATTR\_ROUTER\_INTERFACE\_ID,

/\* -- \*/

/\*\* Next hop entry tunnel-dst [sai\_object\_id\_t]

\* (MANDATORY\_ON\_CREATE when SAI\_NEXT\_HOP\_ATTR\_TYPE=SAI\_NEXT\_HOP\_TUNNEL\_ENCAP)

\* (CREATE\_ONLY) \*/

SAI\_NEXT\_HOP\_ATTR\_TUNNEL\_DST,

/\*\* Next hop entry tunnel-id [sai\_object\_id\_t]

\* (MANDATORY\_ON\_CREATE when SAI\_NEXT\_HOP\_ATTR\_TYPE = SAI\_NEXT\_HOP\_TUNNEL\_DECAP | SAI\_NEXT\_HOP\_TUNNEL\_ENCAP)

\* (CREATE\_ONLY) \*/

SAI\_NEXT\_HOP\_ATTR\_TUNNEL\_ID,

/\*\* Custom range base value \*/

SAI\_NEXT\_HOP\_ATTR\_CUSTOM\_RANGE\_BASE = 0x10000000

} sai\_next\_hop\_attr\_t;

} sai\_next\_hop\_api\_t;

## Tunnel object

typedef enum \_sai\_tunnel\_type\_t

{

SAI\_TUNNEL\_IPINIP,

SAI\_TUNNEL\_IPINIP\_GRE,

SAI\_TUNNEL\_IPINIP\_GRE\_AND\_KEY

SAI\_TUNNEL\_VXLAN,

SAI\_TUNNEL\_MPLS,

…

} sai\_tunnel\_type\_t;

typedef enum \_sai\_tunnel\_ttl\_mode\_t

{

SAI\_TUNNEL\_TTL\_COPY\_FROM\_INNER,

SAI\_TUNNEL\_TTL\_USER\_DEFINE

} sai\_tunnel\_ttl\_mode\_t

typedef enum \_sai\_tunnel\_dscp\_mode\_t

{

SAI\_TUNNEL\_DSCP\_COPY\_FROM\_INNER,

SAI\_TUNNEL\_DSCP\_USER\_DEFINE

} sai\_tunnel\_dscp\_mode\_t

typedef enum \_sai\_tunnel\_encap\_t

{

/\*\* READ-WRITE \*/

/\*\* tunnel ip verssion ipv4/ipv6 (MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_ATTR\_TYPE=SAI\_TUNNEL\_IPINIP,SAI\_TUNNEL\_IPINIP\_GRE,SAI\_TUNNEL\_IPINIP\_GRE\_AND\_KEY)

(CREATE\_ONLY) \*/

SAI\_TUNNEL\_IP\_VER,

/\*\* tunnel src ip (MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_ATTR\_TYPE=SAI\_TUNNEL\_IPINIP,SAI\_TUNNEL\_IPINIP\_GRE,SAI\_TUNNEL\_IPINIP\_GRE\_AND\_KEY)

(CREATE\_ONLY) \*/

SAI\_TUNNEL\_SRC\_IP,

/\*\* tunnel TTL mode (copy from inner or user define [sai\_tunnel\_ttl\_mode\_t] MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_ATTR\_TYPE=SAI\_TUNNEL\_IPINIP,SAI\_TUNNEL\_IPINIP\_GRE,SAI\_TUNNEL\_IPINIP\_GRE\_AND\_KEY)

(CREATE\_ONLY) \*/

SAI\_TUNNEL\_TTL\_MODE,

/\*\* tunnel TTL value MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_TTL\_MODE = SAI\_TUNNEL\_TTL\_USER\_DEFINE)

SAI\_TUNNEL\_TTL\_VAL,

/\*\* tunnel dscp mode (pipe or uniform model ) [sai\_tunnel\_dscp\_mode\_t] MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_ATTR\_TYPE=SAI\_TUNNEL\_IPINIP,SAI\_TUNNEL\_IPINIP\_GRE,SAI\_TUNNEL\_IPINIP\_GRE\_AND\_KEY)

(CREATE\_ONLY) \*/

SAI\_TUNNEL\_DSCP\_MODE,

/\*\* tunnel DSCP value MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_DSCP\_MODE = SAI\_TUNNEL\_DSCP\_USER\_DEFINE)

SAI\_TUNNEL\_DSCP\_VAL,

/\*\* tunnel ECN mapping \*/

SAI\_TUNNEL\_ENCAP\_ECN\_MAPPING,(TBD)

/\*\* tunnel GEP key (MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_ATTR\_TYPE=SAI\_TUNNEL\_IPINIP\_GRE\_AND\_KEY)

(CREATE\_ONLY) \*/

\*/

SAI\_TUNNEL\_GRE\_KEY,

} sai\_tunnel\_encap\_t;

typedef enum \_sai\_tunnel\_decap\_t

{

/\*\* READ-WRITE \*/

/\*\* enable decap src ip validation check MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_ATTR\_TYPE=SAI\_TUNNEL\_IPINIP,SAI\_TUNNEL\_IPINIP\_GRE,SAI\_TUNNEL\_IPINIP\_GRE\_AND\_KEY)

\*/

SAI\_TUNNEL\_DECAP\_SIP\_CHECK,

/\*\* expected tunnel src ip (MANDATORY\_ON\_CREATE when SAI\_TUNNEL\_DECAP\_SIP\_CHECK is enabled)

(CREATE\_ONLY) \*/

SAI\_TUNNEL\_EXPECTED\_SRC\_IP,

/\*\* tunnel decap ECN mapping \*/

SAI\_TUNNEL\_DECAP\_ECN\_TABLE,(TBD)

} sai\_tunnel\_decap\_t;

typedef enum \_sai\_tunnel\_id\_t

{

/\*\* READ-WRITE \*/

/\*\* tunnel type [sai\_tunnel\_type\_t] (MANDATORY\_ON\_CREATE|CREATE\_ONLY) \*/

SAI\_TUNNEL\_ATTR\_TYPE;

/\*\* tunnel underlay interface [sai\_object\_id\_t] \*/

SAI\_TUNNEL\_UNDERLAY\_INTERFACE;

/\*\* tunnel overlay interafce [sai\_object\_id\_t] \*/

SAI\_TUNNEL\_OVERLAY\_INTERFACE;

/\*\* tunnel encap attribute [sai\_tunnel\_encap\_t] (MANDATORY\_ON\_CREATE|CREATE\_ONLY) \*/

SAI\_TUNNEL\_ENCAP\_ATTR;

/\*\* tunnel dencap attribute [sai\_tunnel\_decap\_t] (MANDATORY\_ON\_CREATE|CREATE\_ONLY) \*/

SAI\_TUNNEL\_DECAP\_ATTR;

} sai\_tunnel\_id\_t;

/\*\*

\* @brief Attribute id for next hop

\*/

typedef enum \_sai\_next\_hop\_attr\_t

{

/\*\* READ-ONLY \*/

/\*\* READ-WRITE \*/

/\*\* Next hop entry type [sai\_next\_hop\_type\_t] (MANDATORY\_ON\_CREATE|CREATE\_ONLY) \*/

SAI\_NEXT\_HOP\_ATTR\_TYPE,

/\*\* Next hop entry ipv4 address [sai\_ip\_address\_t]

\* (MANDATORY\_ON\_CREATE when SAI\_NEXT\_HOP\_ATTR\_TYPE = SAI\_NEXT\_HOP\_IP)

\* (CREATE\_ONLY) \*/

SAI\_NEXT\_HOP\_ATTR\_IP,

/\*\* Next hop entry router interface id [sai\_object\_id\_t] (MANDATORY\_ON\_CREATE|CREATE\_ONLY) \*/

SAI\_NEXT\_HOP\_ATTR\_ROUTER\_INTERFACE\_ID,

/\* -- \*/

/\*\* Custom range base value \*/

SAI\_NEXT\_HOP\_ATTR\_CUSTOM\_RANGE\_BASE = 0x10000000

} sai\_next\_hop\_attr\_t;

/\*\*

\* Routine Description:

\* @brief Create next hop

\*

\* Arguments:

\* @param[out] tunnel\_id - tunnel id

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

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

\*

\* Return Values:

\* @return SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*

\* Note: IP address expected in Network Byte Order.

\*/

typedef sai\_status\_t (\*sai\_create\_tunnel\_fn)(

\_Out\_ sai\_object\_id\_t\* tunnel\_id,

\_In\_ uint32\_t attr\_count,

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

);

/\*\*

\* Routine Description:

\* @brief Remove next hop

\*

\* Arguments:

\* @param[in] tunnel\_id – tunnel id

\*

\* Return Values:

\* @return SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_remove\_tunnel\_fn)(

\_In\_ sai\_object\_id\_t tunnel\_id

);

/\*\*

\* Routine Description:

\* @brief Set Next Hop attribute

\*

\* Arguments:

\* @param[in] tunnel\_id - tunnel id

\* @param[in] attr - attribute

\*

\* Return Values:

\* @return SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_set\_tunnel\_attribute\_fn)(

\_In\_ sai\_object\_id\_t tunnel\_id,

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

);

/\*\*

\* Routine Description:

\* @brief Get tunnel attribute

\*

\* Arguments:

\* @param[in] tunnel \_id - tunnel id

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

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

\*

\* Return Values:

\* @return SAI\_STATUS\_SUCCESS on success

\* Failure status code on error

\*/

typedef sai\_status\_t (\*sai\_get\_tunnel\_attribute\_fn)(

\_In\_ sai\_object\_id\_t tunnel\_id,

\_In\_ uint32\_t attr\_count,

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

);

/\*\*

\* @brief Next Hop methods table retrieved with sai\_api\_query()

\*/

typedef struct \_sai\_tunnel\_api\_t

{

sai\_create\_tunnel\_fn create\_tunnel;

sai\_remove\_tunnel\_fn remove\_tunnel;

sai\_set\_tunnel\_attribute\_fn set\_tunnel\_attribute;

sai\_get\_tunnel\_attribute\_fn get\_tunnel\_attribute;

} sai\_tunnel\_api\_t;

# Examples

## VXlan

TBD

## IPinIP

TBD