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Release 24.7

NetOps Development Kit Reference

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1 About this guide

The NetOps Development Kit (NDK) allows operators to program high-performance, integrated agents that run alongside the Nokia Service Router Linux (SR Linux). This document provides programming gRPC APIs used with the NDK.

This document is intended for users who plan to program high-performance, integrated agents for SR Linux.

**Note:**

This manual covers the current release and may also contain some content that will be released in later maintenance loads. See the *SR Linux Release Notes* for information on features supported in each load.

Configuration and command outputs shown in this guide are examples only; actual displays may differ depending on supported functionality and user configuration.

1.1 Precautionary and information messages

The following are information symbols used in the documentation.



DANGER: Danger warns that the described activity or situation may result in serious personal injury or death. An electric shock hazard could exist. Before you begin work on this equipment, be aware of hazards involving electrical circuitry, be familiar with networking environments, and implement accident prevention procedures.



WARNING: Warning indicates that the described activity or situation may, or will, cause equipment damage, serious performance problems, or loss of data.



Caution: Caution indicates that the described activity or situation may reduce your component or system performance.



Note: Note provides additional operational information.



Tip: Tip provides suggestions for use or best practices.

1.2 Conventions

Nokia SR Linux documentation uses the following command conventions.

- **Bold** indicates a command that the user must enter.
- Input and output examples are displayed in Courier text.
- An open right angle bracket indicates a progression of menu choices or simple command sequence (often selected from a user interface). Example: **start > connect to**

- A vertical bar (|) indicates a mutually exclusive argument.
- Square brackets ([]) indicate optional elements.
- Braces ({ }) indicate a required choice. When braces are contained within square brackets, they indicate a required choice within an optional element.
- *Italic* indicates a variable.

Generic IP addresses are used in examples. Replace these with the appropriate IP addresses used in the system.

2 What's new

Topic	Location
BfdmgrGeneralSessionKey Pb.SbfdechoKey.SrpolicyUserType	BfdmgrGeneralSessionKeyPb.SbfdechoKey.SrpolicyUserType
BfdmgrGeneralSessionKey Pb.SbfdechoKey (policy_name and user_type)	BfdmgrGeneralSessionKeyPb.SbfdechoKey
PortOperDownReason	PortOperDownReason
PortWarningReason	PortWarningReason

3 Introduction

SR Linux provides a NetOps Development Kit (NDK), with a suite of libraries to assist operators with developing agents that run alongside SR Linux applications.

Agents built with the gRPC NDK function similar to other applications provided with SR Linux. SR Linux applications share state details with each other using a publish/ subscribe (pub/sub) architecture. Agents have their own table space within the IDB and can subscribe and receive a notification to events occurring on the device, or create their own table space and publish data to it. This data can be read by other applications within SR Linux, allowing route modifications by publishing routes to the IDB for selection by the FIB manager.

3.1 Datastore

The gRPC NDK allows you to add your own configuration to the system in a non-persistent manner. An NDK-added configuration is considered short-term, and its state is bound to the state of the agent. If an agent fails, the configuration added by the agent using the NDK is removed.

Agents can also add configurations through normal APIs (gNMI/JSON-RPC/CLI). This configuration persists across an agent failure, and the only way to remove it is to overwrite it with a commit command. The short-term datastore is used for agent route injection, while traditional methods for configuring the device are persistent.

3.2 gRPC

SR Linux uses gRPC for inter-process communication. gRPC is a client application that directly calls methods on a server application on a different machine as if it was a local object. The supported external APIs (CLI, gNMI, and JSON-RPC) communicate with the SR Linux and retrieve state information using gRPC.

On the server side, the server implements the interface and runs a gRPC server to handle client calls. On the client side, the client has a stub (or client) that provides the same methods as the server.

gRPC clients and servers can run and talk to each other in a number of environments and can be written in any supported gRPC language. Clients can be created in Go, Python, Ruby, or any other language with gRPC support.

3.3 Protocol buffers

SR Linux's gRPC NDK uses protocol buffers. Protocol buffers are automated mechanisms for serializing structured data. You define how you want your data to be structured once, then you can use special generated source code to easily write and read your structured data to and from a variety of data streams using a variety of languages. You can also update a data structure without breaking deployed programs that are compiled against an old format.

When working with protocol buffers, structure is defined for serialized data in a proto file (a regular text file with a .proto extension). Each protocol buffer message is a small logical record of information containing a series of name-value pairs. Each message type has one or more uniquely numbered fields, and each field has a name and value type.

Messages also have optional arguments that specify if fields are optional, required, or repeated. New fields can be added to message formats without breaking backwards compatibility, and old binaries ignore any new fields when parsing the message. This allows the gRPC NDK to evolve over time without impacting current deployments.

Once the data structure is specified, a protocol buffer compiler (protoc) generates data access classes from the proto definition. These provide simple accessors for each field (like `ConfigData()` and `set_ConfigData()`) and methods to serialize and parse the complete structure to and from raw bytes.

4 Protocol Documentation

4.1 appid_service.proto

4.1.1 AppIdentData

Represents appid data.

Table 1: AppIdentData

Field	Type	Label	Description
name	string		Application name
author	string		Author name
is_connected	bool		Connected to IDB or not
version	string		Version string

4.1.2 AppIdentKey

Represents appid key.

Table 2: AppIdentKey

Field	Type	Label	Description
id	uint32		Application id

4.1.3 AppIdentNotification

Represents appid notification.

Table 3: AppIdentNotification

Field	Type	Label	Description
op	SdkMgrOperation		Operation such as create, delete, or update
key	AppIdentKey		AppIdent key

Field	Type	Label	Description
data	AppldentData		Appldent data

4.1.4 AppldentSubscriptionRequest

Represents appid subscription request.

Table 4: *AppldentSubscriptionRequest*

Field	Type	Label	Description
key	AppldentKey		Optional, to filter on name

4.2 bfd_service.proto

4.2.1 BfdmgrGeneralSessionDataPb.BfdmgrSessionSubType

Represents BFD session subtype.

Table 5: *BfdmgrGeneralSessionDataPb.BfdmgrSessionSubType*

Name	Number	Description
SESSION_SUB_TYPE_UNKNOWN	0	Session subtype unknown
SESSION_SUB_TYPE_SINGLE_HOP	1	Single-hop session
SESSION_SUB_TYPE_MULTI_HOP	2	Multi-hop session
SESSION_SUB_TYPE_MICROBFD	3	microbfd session
SESSION_SUB_TYPE_SBFDECHO	4	microbfd session

4.2.2 BfdmgrGeneralSessionKeyPb.SbfdechoKey.SrpolicyUserType

Table 6: *BfdmgrGeneralSessionKeyPb.SbfdechoKey.SrpolicyUserType*

Name	Number	Description
TYPE_LOCAL	0	
TYPE_PCEP	1	

4.2.3 BfdmgrSessionStatus

Represents BFD session status.

Table 7: *BfdmgrSessionStatus*

Name	Number	Description
INVALID	0	Session invalid
ADMIN_DOWN	1	Admin down
DOWN	2	Status down
INIT	3	Status initializing
UP	4	Status up and running

4.2.4 BfdmgrSessionType

Represents BFD session type.

Table 8: *BfdmgrSessionType*

Name	Number	Description
SESSION_TYPE_UNKNOWN	0	Unknown session type
SESSION_TYPE_P2P	1	Peer-to-peer session type
SESSION_TYPE_MICROBFD	2	microbfd session type
SESSION_TYPE_SBFDECHO	3	seamless BFD session type, echo initiator

4.2.5 BfdSessionNotification

Represents BFD session notification.

Table 9: BfdSessionNotification

Field	Type	Label	Description
op	SdkMgrOperation		Operation such as session create, delete, or update
key	BfdmgrGeneralSessionKeyPb		Session key
data	BfdmgrGeneralSessionDataPb		Session data

4.2.6 BfdSessionSubscriptionRequest

Represents BFD session subscription request.

Table 10: BfdSessionSubscriptionRequest

Field	Type	Label	Description
key	BfdmgrGeneralSessionKeyPb		Optional, to filter on name

4.2.7 BfdmgrGeneralSessionDataPb

Represents BFD session data.

Table 11: BfdmgrGeneralSessionDataPb

Field	Type	Label	Description
status	BfdmgrSessionStatus		Status of the session
sub_type	BfdmgrSessionSubType		Subtype of the session
src_if_id	uint32		src_if_id is only populated for P2P type Source interface ID

4.2.8 BfdmgrGeneralSessionKeyPb

Represents BFD session key.

Table 12: BfdmgrGeneralSessionKeyPb

Field	Type	Label	Description
type	BfdmgrSessionType		type is always present, other key field presence is determined by type Session type

Field	Type	Label	Description
p2p	P2pKey		
microbfd	MicrobfdKey		
sbfdecho	SbfdechoKey		

4.2.9 BfdmgrGeneralSessionKeyPb.MicrobfdKey

Table 13: BfdmgrGeneralSessionKeyPb.MicrobfdKey

Field	Type	Label	Description
interface_name	string		

4.2.10 BfdmgrGeneralSessionKeyPb.P2pKey

Table 14: BfdmgrGeneralSessionKeyPb.P2pKey

Field	Type	Label	Description
src_ip_addr	IpAddressPb		Source IP address of the session
dst_ip_addr	IpAddressPb		Destination IP address of the session
instance_id	uint32		Network instance identifier
ipv4_unnum_or_ipv6_ll_if_id	uint32		Global if id for ipv4 unnumbered or ipv6 link local session, otherwise 0
specified_discr	bool		True if discriminators are specified

4.2.11 BfdmgrGeneralSessionKeyPb.SbfdechoKey

Table 15: BfdmgrGeneralSessionKeyPb.SbfdechoKey

Field	Type	Label	Description
instance_id	uint32		Network instance identifier
sr_policy_segment_list_id	uint32		
policy_name	string		

Field	Type	Label	Description
user_type	SrpolicyUserType		
sr_policy_endpoint	IpAddressPb		

4.3 config_service.proto

4.3.1 AcknowledgeConfigRequest

Represents configuration acknowledgment request; Each config notification requires its own acknowledgement.

Table 16: AcknowledgeConfigRequest

Field	Type	Label	Description
infos	AcknowledgeConfigRequestInfo	repeated	

4.3.2 AcknowledgeConfigRequestInfo

Represents configuration acknowledgment request information.

Table 17: AcknowledgeConfigRequestInfo

Field	Type	Label	Description
js_path_with_keys	string		JSON path formatted string from YANG; for example, interface{.name==ethernet1/1}.my_field
error	string		
warning	string		
output	string		

4.3.3 AcknowledgeConfigResponse

Represents configuration acknowledgement response.

Table 18: AcknowledgeConfigResponse

Field	Type	Label	Description
status	SdkMgrStatus		Status of acknowledge config request operation
error_str	string		Detailed error string

4.3.4 ConfigData

Represents configuration data.

Table 19: ConfigData

Field	Type	Label	Description
json	string		Entire configuration fragment as JSON string
data	bytes		Entire configuration fragment as binary data

4.3.5 ConfigKey

Represents configuration key.

Table 20: ConfigKey

Field	Type	Label	Description
js_path	string		JSON path formatted string from YANG; for example, interface.my_field
keys	string	repeated	Value for keys
js_path_with_keys	string		JSON path formatted string from YANG; for example, interface{.name==ethernet1/1}.my_field

4.3.6 ConfigNotification

Represents configuration notification message to subscribe to configuration events

Table 21: ConfigNotification

Field	Type	Label	Description
op	SdkMgrOperation		Operation indicating create, delete, or update
key	ConfigKey		Configuration key
data	ConfigData		Configuration data

4.3.7 ConfigSubscriptionRequest

Represents configuration subscription request.

Table 22: ConfigSubscriptionRequest

Field	Type	Label	Description
key	ConfigKey		Optional, to filter on name

4.3.8 SdkMgrConfigService

Represents service for config operations.

Table 23: SdkMgrConfigService

Method Name	Request Type	Response Type	Description
AcknowledgeConfig	AcknowledgeConfigRequest	AcknowledgeConfigResponse	Acknowledge received configuration. When agent is registered with `wait_config_ack` flag set to true, it needs to acknowledge received configuration.

4.4 interface_service.proto

4.4.1 InterfaceData

Represents interface data.

Table 24: InterfaceData

Field	Type	Label	Description
admin_is_up	uint32		Admin state
mtu	uint32		Maximum transmission unit
if_type	IfMgrIfType		Interface type; for example, loopback, physical, or LAG
port_id	PortIdPb		Port identifier
description	string		Interface description
mac_addr	MacAddressPb		MAC address
aggregate_id	string		associated aggregate id
oper_is_up	uint32		Operational state

4.4.2 InterfaceKey

Represents interface key.

Table 25: InterfaceKey

Field	Type	Label	Description
if_name	string		Interface name; for example, ethernet 1/1

4.4.3 InterfaceNotification

Represents interface notification.

Table 26: InterfaceNotification

Field	Type	Label	Description
op	SdkMgrOperation		Operation such as create, delete, or update
key	InterfaceKey		Interface key
data	InterfaceData		Interface data

4.4.4 InterfaceSubscriptionRequest

Represents interface subscription request.

Table 27: InterfaceSubscriptionRequest

Field	Type	Label	Description
key	InterfaceKey		Optional, to filter on name

4.5 lldp_service.proto

4.5.1 LldpNeighborDataPb.PortSubType

Represents port subtype.

Table 28: LldpNeighborDataPb.PortSubType

Name	Number	Description
RESERVED	0	Reserved for future use
INTERFACE_ALIAS	1	Alias of the interface
PORT_COMPONENT	2	Port identifier based on a locally defined port component
MAC_ADDRESS	3	MAC address
NETWORK_ADDRESS	4	Network address
INTERFACE_NAME	5	Name of the interface
AGENT_CIRCUIT_ID	6	Port identifier based on the circuit ID in the DHCP relay agent information option
LOCALLY_ASSIGNED	7	Port identifier based on a locally defined alphanumeric string

4.5.2 LldpNeighborKeyPb.ChassisIdType

Represents chassis type.

Table 29: *LdpNeighborKeyPb.ChassisIdType*

Name	Number	Description
RESERVED	0	Reserved for future use
CHASSIS_COMPONENT	1	Chassis identifier based on a locally defined chassis component
INTERFACE_ALIAS	2	Alias of the interface
PORT_COMPONENT	3	Chassis identifier based on a locally defined port component
MAC_ADDRESS	4	MAC address
NETWORK_ADDRESS	5	Network address
INTERFACE_NAME	6	Name of the interface
LOCALLY_ASSIGNED	7	Chassis identifier based on a locally defined value

4.5.3 LdpNeighborDataPb

Represents LLDP neighbor data.

Table 30: *LdpNeighborDataPb*

Field	Type	Label	Description
port_id	string		Port identifier
port_type	PortSubType		Port type
source_mac	MacAddressPb		Port MAC address
bgp_peer_address	IpAddressPb	repeated	LLDP BGP autodiscovered addresses
bgp_group_id	uint32		BGP group identifier
system_name	string		System name
system_description	string		System description

4.5.4 LdpNeighborKeyPb

Represents LLDP neighbor key.

Table 31: *LdpNeighborKeyPb*

Field	Type	Label	Description
interface_name	string		Local interface name
chassis_id	string		Chassis identifier
chassis_type	ChassisIdType		Chassis type

4.5.5 LdpNeighborNotification

Represents LLDP neighbor notification.

Table 32: *LdpNeighborNotification*

Field	Type	Label	Description
op	SdkMgrOperation		Operation such as create, delete, or update
key	LdpNeighborKeyPb		LLDP neighbor key
data	LdpNeighborDataPb		LLDP neighbor data

4.5.6 LdpNeighborSubscriptionRequest

Represents LLDP neighbor subscription request.

Table 33: *LdpNeighborSubscriptionRequest*

Field	Type	Label	Description
key	LdpNeighborKeyPb		Optional, to filter on name

4.6 networkinstance_service.proto

4.6.1 NetworkInstanceData.NetInstType

Represents network instance type.

Table 34: *NetworkInstanceData.NetInstType*

Name	Number	Description
DEFAULT	0	Default network instance type

Name	Number	Description
L3VRF	1	L3VRF network instance type

4.6.2 NetworkInstanceData

Represents network instance data.

Table 35: NetworkInstanceData

Field	Type	Label	Description
net_inst_id	uint32		Network instance identifier
base_name	string		Base name
oper_is_up	bool		Operation status
router_id	string		Router identifier
inst_type	NetInstType		Network instance type

4.6.3 NetworkInstanceKey

Represents network instance key.

Table 36: NetworkInstanceKey

Field	Type	Label	Description
inst_name	string		Network instance name

4.6.4 NetworkInstanceNotification

Represents network instance notification.

Table 37: NetworkInstanceNotification

Field	Type	Label	Description
op	SdkMgrOperation		Operation such as create, delete, or update
key	NetworkInstanceKey		Network key
data	NetworkInstanceData		Network data

4.6.5 NetworkInstanceSubscriptionRequest

Represents network instance subscription request.

4.7 nexthop_group_service.proto

4.7.1 NextHop.ResolutionType

Represents resolution type.

Table 38: NextHop.ResolutionType

Name	Number	Description
INVALID	0	Invalid resolution
REGULAR	1	Regular resolution
MPLS	2	MPLS resolution

4.7.2 NextHop.ResolveToType

Represents resolve-to type.

Table 39: NextHop.ResolveToType

Name	Number	Description
LOCAL	0	Resolve to local routes
DIRECT	1	Resolve to direct routes
INDIRECT	2	Resolve to indirect routes

4.7.3 MplsNextHop

Represents MPLS next hop.

Table 40: MplsNextHop

Field	Type	Label	Description
ip_nexthop	IpAddressPb		Next-hop IP address
label_stack	MplsLabel	repeated	MPLS label stack

4.7.4 NextHop

Represents next-hop.

Table 41: NextHop

Field	Type	Label	Description
resolve_to	ResolveToType		Resolve-to type
type	ResolutionType		Resolution type
ip_nexthop	IpAddressPb		IP next-hop address
mpls_nexthop	MplsNextHop		MPLS next-hop

4.7.5 NextHopGroup

Represents next-hop group.

Table 42: NextHopGroup

Field	Type	Label	Description
next_hop	NextHop	repeated	Next-hops

4.7.6 NextHopGroupDeleteRequest

Represents next-hop group delete request.

Table 43: NextHopGroupDeleteRequest

Field	Type	Label	Description
group_key	NextHopGroupKey	repeated	Next-hop group key details

4.7.7 NextHopGroupDeleteResponse

Represents next-hop group delete response.

Table 44: NextHopGroupDeleteResponse

Field	Type	Label	Description
status	SdkMgrStatus		Response for next-hop group request
error_str	string		Detailed error string

4.7.8 NextHopGroupInfo

Represents next-hop group information.

Table 45: NextHopGroupInfo

Field	Type	Label	Description
key	NextHopGroupKey		Next-hop group key
data	NextHopGroup		Next-hop group data

4.7.9 NextHopGroupKey

Represents next-hop group key.

Table 46: NextHopGroupKey

Field	Type	Label	Description
name	string		Next-hop group name
network_instance_name	string		Next-hop group network instance name

4.7.10 NextHopGroupNotification

Represents next-hop group notification.

Table 47: NextHopGroupNotification

Field	Type	Label	Description
op	SdkMgrOperation		Operation such as create, delete, or update
key	uint64		Next-hop group key
data	NextHopGroup		Next-hop group data

4.7.11 NextHopGroupRequest

Represents next-hop group request.

Table 48: NextHopGroupRequest

Field	Type	Label	Description
group_info	NextHopGroupInfo	repeated	Next-hop group details

4.7.12 NextHopGroupResponse

Represents next-hop group response.

Table 49: NextHopGroupResponse

Field	Type	Label	Description
status	SdkMgrStatus		Response for next-hop group request
error_str	string		Detailed error string

4.7.13 NextHopGroupSubscriptionRequest

Represents next-hop group subscription request.

Table 50: NextHopGroupSubscriptionRequest

Field	Type	Label	Description
key	NextHopGroupKey		Optional, to filter on name

4.7.14 SdkMgrNextHopGroupService

Represents service for next-hop group operations.

Table 51: SdkMgrNextHopGroupService

Method Name	Request Type	Response Type	Description
NextHopGroupAdd OrUpdate	NextHopGroupRequest	NextHopGroup Response	Add or update one or more next-hop groups.
NextHopGroupDelete	NextHopGroupDeleteRequest	NextHopGroup DeleteResponse	Delete next-hop group.
SyncStart	SyncRequest	SyncResponse	Synchronization start to open synchronization operation.
SyncEnd	SyncRequest	SyncResponse	Synchronization end to close synchronization operation.

4.8 route_service.proto

4.8.1 IpRouteNotification

Represents IP route notification.

Table 52: IpRouteNotification

Field	Type	Label	Description
op	SdkMgrOperation		Operation such as create, delete, or update
key	RouteKeyPb		IP route key
data	RoutePb		IP route data

4.8.2 IpRouteSubscriptionRequest

Represents IP route subscription request.

Table 53: IpRouteSubscriptionRequest

Field	Type	Label	Description
key	RouteKeyPb		Optional, to filter on name

4.8.3 RouteAddRequest

Represents route add request; can contain more than one route.

Table 54: RouteAddRequest

Field	Type	Label	Description
routes	RouteInfo	repeated	IP routes

4.8.4 RouteAddResponse

Represents route add response.

Table 55: RouteAddResponse

Field	Type	Label	Description
status	SdkMgrStatus		Status of route add operation
error_str	string		Detailed error string

4.8.5 RouteDeleteRequest

Represents route delete request; can contain more than one route.

Table 56: RouteDeleteRequest

Field	Type	Label	Description
routes	RouteKeyPb	repeated	IP routes

4.8.6 RouteDeleteResponse

Represents route delete response.

Table 57: RouteDeleteResponse

Field	Type	Label	Description
status	SdkMgrStatus		Status of route delete operation
error_str	string		Detailed error string

4.8.7 RouteInfo

Represents route information.

Table 58: RouteInfo

Field	Type	Label	Description
key	RouteKeyPb		Route key
data	RoutePb		Route data

4.8.8 RouteKeyPb

Represents route key.

Table 59: RouteKeyPb

Field	Type	Label	Description
net_inst_name	string		Network instance name
ip_prefix	IpAddrPrefLenPb		IP prefix

4.8.9 RoutePb

Represents route data.

Table 60: RoutePb

Field	Type	Label	Description
nexthop_group_name	string		Next hop group name
preference	uint32		Preference
metric	uint32		Metric
nexthop	NextHop	repeated	List of next hops
owner_id	uint32		Next hop owner identifier returned only on notification.
nhg_id	uint64		Next-hop group identifier returned only on notification.

4.8.10 SdkMgrRouteService

Represents service for IP route operations.

Table 61: SdkMgrRouteService

Method Name	Request Type	Response Type	Description
RouteAddOrUpdate	RouteAddRequest	RouteAddResponse	Add or update IP routes.
RouteDelete	RouteDeleteRequest	RouteDeleteResponse	Delete IP routes.
SyncStart	SyncRequest	SyncResponse	Synchronization start for IP routes
SyncEnd	SyncRequest	SyncResponse	Synchronization end for IP routes

4.9 sdk_common.proto

4.9.1 IfEthernetDuplexModeType

Represents interface ethernet duplex mode. Corresponds to yang values

Table 62: IfEthernetDuplexModeType

Name	Number	Description
IF_ETH_DUPLEX_MODE_UNSET	0	duplex mode not supported
IF_ETH_DUPLEX_MODE_FULL	1	
IF_ETH_DUPLEX_MODE_HALF	2	

4.9.2 IfEthernetPortSpeedType

Represents interface ethernet port speed. Corresponds to yang values

Table 63: IfEthernetPortSpeedType

Name	Number	Description
IF_ETH_PORT_SPEED_UNSET	0	Speed unknown
IF_ETH_PORT_SPEED_10M	1	
IF_ETH_PORT_SPEED_100M	2	
IF_ETH_PORT_SPEED_1G	3	
IF_ETH_PORT_SPEED_10G	4	
IF_ETH_PORT_SPEED_25G	5	
IF_ETH_PORT_SPEED_40G	6	
IF_ETH_PORT_SPEED_50G	7	
IF_ETH_PORT_SPEED_100G	8	
IF_ETH_PORT_SPEED_200G	9	

Name	Number	Description
IF_ETH_PORT_SPEED_400G	10	
IF_ETH_PORT_SPEED_1T	11	
IF_ETH_PORT_SPEED_800G	12	

4.9.3 IfLoopbackModeType

Represents interface loopback mode. Corresponds to yang values

Table 64: IfLoopbackModeType

Name	Number	Description
IF_LOOPBACK_MODE_UNSET	0	loopback mode not supported
IF_LOOPBACK_MODE_NONE	1	
IF_LOOPBACK_MODE_FACILITY	2	
IF_LOOPBACK_MODE_TERMINAL	3	

4.9.4 IfMgrIfType

Represents interface type.

Table 65: IfMgrIfType

Name	Number	Description
ETHERNET	0	Ethernet interface
LOOPBACK	1	Loopback interface
MANAGEMENT	2	Management interface
AGGREGATE	3	Aggregate(LAG) interface
IRB	4	Integrated Routing and Bridging (IRB) interface
SYSTEM	5	System interface

Name	Number	Description
LIF	6	linux interface
NIC	7	linux nic interface (bus/dev/fn)
VHOST	8	vhost-net interface, vhn-<name> name for sock-path
KKLIF	9	temp name for new style of lif interface
KKVHOST	10	temp name for new style of vhost interface
SYNC	11	1588 sync interface
IF_TYPE_MAX	12	

4.9.5 IfOperDownReason

Table 66: IfOperDownReason

Name	Number	Description
IF_OPER_DOWN_NONE	0	
IF_OPER_DOWN_PORT_ADMIN_DISABLED	1	
IF_OPER_DOWN_MDA_ADMIN_DISABLED	2	
IF_OPER_DOWN_TRANS_LASER_DISABLED	3	
IF_OPER_DOWN_MDA_NOT_PRESENT	4	
IF_OPER_DOWN_TRANS_NOT_PRESENT	5	
IF_OPER_DOWN_PHY_INIT	6	
IF_OPER_DOWN_LOWER_LAYER_DOWN	7	
IF_OPER_DOWN_MTU_RESOURCES	8	
IF_OPER_DOWN_UNSUPPORTED_SPEED	9	

Name	Number	Description
IF_OPER_DOWN_UNSUPPORTED_TRANS_FEC	10	
IF_OPER_DOWN_OTHER	11	
IF_OPER_DOWN_PORT_NOT_PRESENT	12	used internally by chassis mgr only - xdp never publish to IDB!
IF_OPER_DOWN_FABRIC_AVAILABILITY	13	used internally by chassis mgr only - xdp never publish to IDB!
IF_OPER_DOWN_NO_ACTIVE_LINKS	14	lag interface only
IF_OPER_DOWN_MIN_LINK_THRESHOLD	15	lag interface only
IF_OPER_DOWN_9_12_SPEED_MISMATCH	16	Vodka port 9-12 must all be same speed as port 9
IF_OPER_DOWN_LAG_RESOURCES	17	lag interface only
IF_OPER_DOWN_LAG_MEMBER_RESOURCES	18	lag member interface only
IF_OPER_DOWN_STANDBY_SIGNALING	19	ESM multihoming
IF_OPER_DOWN_HOLD_TIME_UP_ACTIVE	20	interface hold-time up is actively holding the interface down
IF_OPER_DOWN_RELOAD_TIME_ACTIVE	21	interface reload time is actively holding the interface down
IF_OPER_DOWN_CONNECTOR_DOWN	22	parent connector oper down forces breakout port oper down
IF_OPER_DOWN_AUTO_NEG_MISMATCH	23	
IF_OPER_DOWN_EVENT_HANDLER	24	used internally by chassis mgr only - xdp never publish to IDB!
IF_OPER_DOWN_UNSUPPORTED_BREAKOUT	25	interface doesn't support breakout config
IF_OPER_DOWN_CFM_CCM_DEFECT	26	

Name	Number	Description
IF_OPER_DOWN_CRC_MON_FAIL_THRESH	27	crc-monitor signal failure threshold exceeded
IF_OPER_DOWN_SYMBOL_MON_FAIL_THRESH	28	symbol-monitor signal failure threshold exceeded
IF_OPER_DOWN_LINK_LOSS_FORWARDING	29	related to evpn-vpws mpls
IF_OPER_DOWN_TRANS_DOWN	30	

4.9.6 IfOperStateType

Represents interface operational state.

Table 67: IfOperState Type

Name	Number	Description
IF_OPER_STATE_UP	0	Interface operational state up
IF_OPER_STATE_DOWN	1	Interface operational state down
IF_OPER_STATE_TESTING	2	Interface operational state testing
IF_OPER_STATE_UNKNOWN	3	Interface operational state unknown
IF_OPER_STATE_DORMANT	4	Interface operational state dormant
IF_OPER_STATE_NOT_PRESENT	5	Interface operational state not present
IF_OPER_STATE_LOWER_LAYER_DOWN	6	Interface operational state lower layer down

4.9.7 IfTransceiverFecType

Represents interface transceiver fec. Corresponds to yang values

Table 68: IfTransceiverFecType

Name	Number	Description
IF_TRANS_FEC_UNSET	0	Fec unknown
IF_TRANS_FEC_DISABLED	1	

Name	Number	Description
IF_TRANS_FEC_RS528	2	
IF_TRANS_FEC_RS544	3	
IF_TRANS_FEC_BASER	4	
IF_TRANS_FEC_RS108	5	

4.9.8 IpAddressState

Represents IP address state.

Table 69: IpAddressState

Name	Number	Description
IPADDR_STATE_UNKNOWN	0	IP address state unknown
IPADDR_STATE_TENTATIVE	1	IP address state tentative
IPADDR_STATE_DUPLICATED	2	IP address state duplicated
IPADDR_STATE_INACCESSIBLE	3	IP address state inaccessible
IPADDR_STATE_DEPRECATED	4	IP address state deprecated
IPADDR_STATE_PREFERRED	5	IP address state preferred

4.9.9 PortOperDownReason

Various reasons for port being operationally down.

Table 70: PortOperDownReason

Name	Number	Description
PORT_OPER_DOWN_NONE	0	
PORT_OPER_DOWN_PORT_ADMIN_DISABLED	1	Admin disabled (out of service). E.g lanes not created in physical layer devices
PORT_OPER_DOWN_PORT_OPER_DISABLED	2	Admin enabled but operationally disabled. E.g lanes created but serdes are off

Name	Number	Description
PORT_OPER_DOWN_MDA_DISABLED	3	Parent MDA is disabled
PORT_OPER_DOWN_MDA_FAILED	4	Parent MDA failed
PORT_OPER_DOWN_LINK_DOWN	5	Operationally enabled but link/carrier down
PORT_OPER_DOWN_TRANS_NOT_PRESENT	6	Transceiver is not plugged in or is dead (undetected)
PORT_OPER_DOWN_TRANS_LASER_DISABLED	7	Transceiver laser is disabled
PORT_OPER_DOWN_INCOMPATIBLE_CONNECTOR	8	Parent connector configuration does not match with this breakout port
PORT_OPER_DOWN_PHY_UNSUPPORTED_FEC_CFG	9	A physical layer device on the port does not support configured FEC
PORT_OPER_DOWN_PHY_UNSUPPORTED_TRANS_FEC	10	A physical layer device on the port does not support FEC configured on the transceiver
PORT_OPER_DOWN_PHY_INTERNAL_FEC_ISSUE	11	A physical layer device has internal/hardware problem on employing FEC

4.9.10 PortWarningReason

Various warnings on port while it stays operational.

Table 71: PortWarningReason

Name	Number	Description
PORT_WARNING_NONE	0	
PORT_WARNING_TRANS_RX_LOS	1	Transceiver reported RxLos
PORT_WARNING_TRANS_UNSUPPORTED_SYNCE_CFG	2	Transceiver does not support synce configuration (e.g cannot do clock squelching on RxLos)
PORT_WARNING_PHY_UNSUPPORTED_SYNCE_CFG	3	A physical layer device does not support synce configuration

Name	Number	Description
PORT_WARNING_PHY_UNSUPPORTED_PTP_CFG	4	A physical layer device does not support PTP configuration

4.9.11 SdkMgrOperation

Represents enumeration value for operation in subscription.

Table 72: SdkMgrOperation

Name	Number	Description
Create	0	Create operation; returned if caching is enabled
Update	1	Update operation; returned if caching is enabled
Delete	2	Delete operation
CreateOrUpdate	3	returned if caching is disabled; App can cache streaming data, if needed.

4.9.12 SdkMgrStatus

Represents status of network programming service calls.

Table 73: SdkMgrStatus

Name	Number	Description
kSdkMgrSuccess	0	Successful service call
kSdkMgrFailed	1	Failed service call

4.9.13 AgentReply

Empty message from agent.

4.9.14 EvpnEthSegIdPb

Table 74: *EvpnEthSegIdPb*

Field	Type	Label	Description
es_id	bytes		Type 0 for now. hard-coded id

4.9.15 GlobalIfId

Represents global interface identifier.

Table 75: *GlobalIfId*

Field	Type	Label	Description
global_if_id	uint32		Global interface identifier

4.9.16 IpAddrPrefLenPb

Represents IP prefix.

Table 76: *IpAddrPrefLenPb*

Field	Type	Label	Description
ip_addr	IpAddressPb		IP address
prefix_length	uint32		IP address prefix length

4.9.17 IpAddressPb

Represents IP address.

Table 77: *IpAddressPb*

Field	Type	Label	Description
addr	bytes		IP address

4.9.18 IpInterfaceAddrPrefixPb

Represents IP prefix state.

Table 78: *IpInterfaceAddrPrefixPb*

Field	Type	Label	Description
prefix	IpAddrPrefLenPb		IP prefix
state	IpAddressState		IP prefix state

4.9.19 MacAddressPb

Represents MAC address.

Table 79: *MacAddressPb*

Field	Type	Label	Description
mac_address	bytes		MAC address

4.9.20 MplsLabel

Represents MPLS label.

Table 80: *MplsLabel*

Field	Type	Label	Description
mpls_label	uint32		MPLS label

4.9.21 NetInstanceld

Represents network instance identifier.

Table 81: *NetInstanceld*

Field	Type	Label	Description
instance_id	uint32		Network instance identifier

4.9.22 PortIdPb

Represents port identifier.

Table 82: PortIdPb

Field	Type	Label	Description
port_id	uint64		Port identifier

4.9.23 SyncRequest

Empty message for synchronization request.

4.9.24 SyncResponse

Empty message for synchronization end.

Table 83: SyncResponse

Field	Type	Label	Description
status	SdkMgrStatus		Error code
error_str	string		Detailed error string

4.10 sdk_service.proto

4.10.1 NotificationRegisterRequest.Operation

Represents notification stream subscription request operation.

Table 84: NotificationRegisterRequest.Operation

Name	Number	Description
Create	0	Create a subscription
Delete	1	Delete all subscriptions
AddSubscription	2	Add subscription to existing subscriptions
DeleteSubscription	3	Delete one subscription from existing subscriptions

4.10.2 AgentRegistrationRequest

Represents registration request message used in agent register and unregister.

Table 85: AgentRegistrationRequest

Field	Type	Label	Description
js_path	string	repeated	Optional, JSON path formatted strings, which are used in telemetry. Format of js_path follows hierarchical YANG. for example: .interface{.name=*}.my_app. .my_app.tunnel{.name==*} "*" needs to be replaced with a specific key.
agent_liveliness	uint32		Kill this agent unless a keepalive is received within this many seconds. Value of 0 means do not monitor this agent for liveliness.
wait_config_ack	bool		Indicate if SRLinux should wait for explicit ack from app after delivering configuration.
enable_cache	bool		Indicate if SRLinux should cache streaming notification response in ndk mgr. By default, caching is disabled.
auto_telemetry_state	bool		Indicate if SRLinux should automatically push configs as state. By default, auto_telemetry_state is disabled.

4.10.3 AgentRegistrationResponse

Represents registration response in reply to registration request.

Table 86: AgentRegistrationResponse

Field	Type	Label	Description
status	SdkMgrStatus		Status of the register; for example: kOk, kFailed
error_str	string		Detailed error text
app_id	uint32		Application ID assigned by SDK manager.

4.10.4 AppldRequest

Represents application identifier request from agent. All applications are assigned an identifier by IDB.

Table 87: AppldRequest

Field	Type	Label	Description
name	string		Application name

4.10.5 AppldResponse

Represents application identifier response to agent.

Table 88: AppldResponse

Field	Type	Label	Description
status	SdkMgrStatus		Status of the call; for example, kOk, kFailed
id	uint32		Identifier for the given application name

4.10.6 KeepAliveRequest

Represents keep alive request from agent to refresh liveliness of the agent.

4.10.7 KeepAliveResponse

Represents keepalive response.

Table 89: KeepAliveResponse

Field	Type	Label	Description
status	SdkMgrStatus		Status of keepalive; for example, kOk or kFailed

4.10.8 Notification

Represents notification stream response.

Table 90: Notification

Field	Type	Label	Description
sub_id	uint64		Subscription identifier
intf	InterfaceNotification		Interface details
nw_inst	NetworkInstanceNotification		Network instance details
lldp_neighbor	LldpNeighborNotification		LLDP neighbor details
config	ConfigNotification		Configuration notification
bfd_session	BfdSessionNotification		BFD session details
route	IpRouteNotification		IP route details
appid	AppldentNotification		App identification details
nhg	NextHopGroupNotification		Next-hop group details

4.10.9 NotificationQueryRequest

Represents notification query to return specific subscription details.

Table 91: NotificationQueryRequest

Field	Type	Label	Description
stream_id	uint64		Stream identifier, in Notification RegisterResponse

4.10.10 NotificationQueryResponse

Represents notification query response.

Table 92: NotificationQueryResponse

Field	Type	Label	Description
subscriptions	NotificationQuerySubscription	repeated	List of subscription details
status	SdkMgrStatus		Status of the query

4.10.11 NotificationQuerySubscription

Represents notification subscription.

Table 93: NotificationQuerySubscription

Field	Type	Label	Description
sub_id	uint64		Subscription identifier
description	string		Subscription description

4.10.12 NotificationRegisterRequest

Represents notification request from agent. Agent uses this message to subscribe to router events such as interface create, delete, or update, as well as LLDP neighbor create, delete, or update, and so on.

Table 94: NotificationRegisterRequest

Field	Type	Label	Description
stream_id	uint64		Unset on create, set otherwise
op	Operation		Specific operation in the notification register request
sub_id	uint64		Set for delete subscription, unset otherwise
intf	InterfaceSubscriptionRequest		Interface subscription request
nw_inst	NetworkInstanceSubscriptionRequest		Network instance subscription request
lldp_neighbor	LldpNeighborSubscriptionRequest		LLDP neighbor subscription request
config	ConfigSubscriptionRequest		Configuration subscription request
bfd_session	BfdSessionSubscriptionRequest		BFD session subscription request
route	IpRouteSubscriptionRequest		IP route subscription request
appid	AppIdentSubscriptionRequest		App identification subscription request
nhg	NextHopGroupSubscriptionRequest		Nexthop Group subscription request

4.10.13 NotificationRegisterResponse

Represents notification response.

Table 95: NotificationRegisterResponse

Field	Type	Label	Description
stream_id	uint64		Stream identifier. This needs to be passed to the SDK manager for further notification subscription changes specific to the current subscription
sub_id	uint64		Subscription identifier. Each subscription gets an identifier, which can be used to delete a subscription
status	SdkMgrStatus		Status of subscription

4.10.14 NotificationStreamRequest

Represents notification stream request.

Table 96: NotificationStreamRequest

Field	Type	Label	Description
stream_id	uint64		Stream identifier

4.10.15 NotificationStreamResponse

Represents notification stream response that contains one or more notification.

Table 97: NotificationStreamResponse

Field	Type	Label	Description
notification	Notification	repeated	Notification details

4.10.16 SdkMgrService

Represents base service that defines agent registration, unregistration, notification subscriptions, and keepalive messages.

Table 98: SdkMgrService

Method Name	Request Type	Response Type	Description
AgentRegister	AgentRegistrationRequest	AgentRegistrationResponse	Register agent
AgentUnRegister	AgentRegistrationRequest	AgentRegistrationResponse	Unregister agent
NotificationRegister	NotificationRegisterRequest	NotificationRegisterResponse	Register for event notifications
NotificationQuery	NotificationQueryRequest	NotificationQueryResponse	Returns current or specific notification subscription details
KeepAlive	KeepAliveRequest	KeepAliveResponse	Send periodic keepalive message
GetAppld	AppldRequest	AppldResponse	Get application name from application identifier

4.10.17 SdkNotificationService

Represents service for handling notifications.

Table 99: SdkNotificationService

Method Name	Request Type	Response Type	Description
NotificationStream	NotificationStreamRequest	NotificationStreamResponse	Send stream of event notifications based on the agent subscriptions

4.11 telemetry_service.proto

4.11.1 TelemetryData

Represents telemetry data.

Table 100: TelemetryData

Field	Type	Label	Description
json_content	string		Structured JSON telemetry data

4.11.2 TelemetryDeleteRequest

Represents telemetry delete request.

Table 101: TelemetryDeleteRequest

Field	Type	Label	Description
key	TelemetryKey	repeated	Telemetry key

4.11.3 TelemetryDeleteResponse

Represents telemetry delete response.

Table 102: TelemetryDeleteResponse

Field	Type	Label	Description
status	SdkMgrStatus		Status of delete request
error_str	string		Detailed error message

4.11.4 TelemetryInfo

Represents telemetry information.

Table 103: TelemetryInfo

Field	Type	Label	Description
key	TelemetryKey		Telemetry key
data	TelemetryData		Telemetry data

4.11.5 TelemetryKey

Represents telemetry key.

Table 104: TelemetryKey

Field	Type	Label	Description
js_path	string		JSON path referencing the key for telemetry data

4.11.6 TelemetryUpdateRequest

Represents telemetry update request.

Table 105: TelemetryUpdateRequest

Field	Type	Label	Description
state	TelemetryInfo	repeated	State of application

4.11.7 TelemetryUpdateResponse

Represents telemetry update response.

Table 106: TelemetryUpdateResponse

Field	Type	Label	Description
status	SdkMgrStatus		Status of telemetry update request
error_str	string		Detailed error message

4.11.8 SdkMgrTelemetryService

Represents service for telemetry service to store state data.

Table 107: SdkMgrTelemetryService

Method Name	Request Type	Response Type	Description
TelemetryAdd OrUpdate	TelemetryUpdateRequest	TelemetryUpdate Response	Add or update telemetry data
TelemetryDelete	TelemetryDeleteRequest	TelemetryDelete Response	Delete telemetry data

4.12 Scalar Value Types

4.12.1 Scalar

Scalar description

Table 108: Scalar

.proto Type	Notes	C++	C#	Go	Java	PHP	Python	Ruby
double		double	double	float64	double	float	float	Float
float		float	float	float32	float	float	float	Float
int32	Uses variable-length encoding. Inefficient for encoding negative numbers – if your field is likely to have negative values, use sint32 instead.	int32	int	int32	int	integer	int	Bignum or Fixnum (as required)
int64	Uses variable-length encoding. Inefficient for encoding negative numbers – if your field is likely to have negative values, use sint64 instead.	int64	long	int64	long	integer/string	int/long	Bignum
uint32	Uses variable-length encoding.	uint32	uint	uint32	int	integer	int/long	Bignum or Fixnum (as required)
uint64	Uses variable-length encoding.	uint64	ulong	uint64	long	integer/string	int/long	Bignum or Fixnum (as required)
sint32	Uses variable-length encoding. Signed int value. These more efficiently encode negative numbers than regular int32s.	int32	int	int32	int	integer	int	Bignum or Fixnum (as required)
sint64	Uses variable-length encoding. Signed int value. These more efficiently encode negative numbers than regular int64s.	int64	long	int64	long	integer/string	int/long	Bignum

.proto Type	Notes	C++	C#	Go	Java	PHP	Python	Ruby
fixed32	Always four bytes. More efficient than uint32 if values are often greater than 2 ²⁸ .	uint32	uint	uint32	int	integer	int	Bignum or Fixnum (as required)
fixed64	Always eight bytes. More efficient than uint64 if values are often greater than 2 ⁵⁶ .	uint64	ulong	uint64	long	integer/string	int/long	Bignum
sfixed32	Always four bytes.	int32	int	int32	int	integer	int	Bignum or Fixnum (as required)
sfixed64	Always eight bytes.	int64	long	int64	long	integer/string	int/long	Bignum
bool		bool	bool	bool	boolean	boolean	boolean	TrueClass/False Class
string	A string must always contain UTF-8 encoded or 7-bit ASCII text.	string	string	string	String	string	str/unicode	String (UTF-8)
bytes	May contain any arbitrary sequence of bytes.	string	Byte String	[]byte	Byte String	string	str	String (ASCII-8BIT)

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