



## API Reference

# KMS to SDN Agent API

API Version: 2.1.0

Messages the KMS sends to the SDN

### CONTACT

**URL:** <https://github.com/ait-crypto/kms-sdn-agent-interface-specification/discussions>

# INDEX

<b>1. API</b>	<b>4</b>
1.1 GET /version	4
<b>2. LINK</b>	<b>5</b>
2.1 GET /link/status	5
2.2 POST /link/registration	6
2.3 PATCH /link/registration	7
2.4 DELETE /link/{key_stream_id}	8
<b>3. NOTIFICATION</b>	<b>10</b>
3.1 POST /notification/registration	10
3.2 PATCH /notification/status	11
3.3 PUT /notification/event	11

# Security and Authentication

## SECURITY SCHEMES

KEY	TYPE	DESCRIPTION
https	mutualTLS	Connections must use TLS 1.3. The server enforces this at the transport layer.

# API

## 1. API

### 1.1 GET /version

#### Get this API version

State this SDN API version number which is implemented and supported by the KMS

#### REQUEST

No request parameters

#### RESPONSE

**STATUS CODE - 200:** Provided API version

##### RESPONSE MODEL - application/json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
version*	string	<b>PATTERN:</b> ^(0 [1-9]\d*)\.(0 [1-9]\d*)\.(0 [1-9]\d*)(?:-((?:0 [1-9]\d* \d*[a-zA-Z-][0-9a-zA-Z-]*)?(?:\.(?:0 [1-9]\d* \d*[a-zA-Z-][0-9a-zA-Z-]*)*)?)?(?:\+(?:[0-9a-zA-Z-]+(?:\.(?:0 [1-9]\d* \d*[a-zA-Z-][0-9a-zA-Z-]*)*)?)?)?)?\$ Version number in semantic versioning

**STATUS CODE - 400:** Bad request

##### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

**STATUS CODE - 500:** Internal error

##### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

## 2. LINK

### 2.1 GET /link/status

#### Get status of link

When an application queries the KMS for the status via ETSI GS QKD 014 /status message, the KMS has to provide the information how many keys are available on the link, but this involves remote peers, therefore the message is relied to the SDN to solve.

#### REQUEST

##### REQUEST BODY - application/json

NAME	TYPE	DESCRIPTION
master_sae_id*	string	
slave_sae_id*	string	

#### RESPONSE

**STATUS CODE - 200:** Successful path found and metrics available

##### RESPONSE MODEL - application/json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
source_KME_ID*	string	Source KMS ID, most likely the one which received the query.
target_KME_ID*	string	Remote peer KMS id.
key_size*	integer	$\geq 0$ Smallest number in bit given by KMS instances in the path stating their default key size, all other parameters use this for calculations.
stored_key_count*	integer	$\geq 0$ Currently available number of key entries which could be delivered to the application. Determined by the smallest number given by KMS instances in the path. Number of keys is based on the number of entries of the default key size.
max_key_count*	integer	$\geq 0$ Maximum possible key store in entries of default key sizes. Determined by the smallest number given by KMS instances in the path.
max_key_per_request*	integer	$\geq 0$ Maximum key batch allowed in one request. This is determined by the smallest number given by KMS instances in the path.
max_key_size*	integer	$\geq 0$ Maximum key size in bit, which KMS instances can handle. This is determined by the smallest number given by KMS instances in the path.
min_key_size*	integer	$\geq 0$ Minimum key size in bit, which can be handled. This is determined by the biggest number given by KMS instances in the path.
max_SAE_ID_count*	integer	$\geq 0$ Stating if group keys are supported and if so with how many additional participants. 0 means no additional SAE IDs. This is determined by the smallest number given by the specified source and destination KMS instances.

NAME	TYPE	DESCRIPTION
status_extension	object	

**STATUS CODE - 400:** Bad request

**RESPONSE MODEL - application/problem+json**

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

**STATUS CODE - 500:** Internal error

**RESPONSE MODEL - application/problem+json**

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

## 2.2 POST /link/registration

### Post new link registration

When a source APP registers with a KMS, the KMS sends the parameters supplied by the APP to the SDN. The SDN configures a path between the source and destination, verifies the QoS and returns the key stream id and adjacent node information

## REQUEST

**REQUEST BODY - application/json**

NAME	TYPE	DESCRIPTION
source*	string	URI or UUID of the source APP
destination*	array	
qos_request*	object	
type*	enum	<b>ALLOWED:</b> etsi_004, etsi_014
<b>etsi_014</b>	object	
number*	integer	Number of keys
size*	integer	Size of keys in bit
<b>extensions</b>	array	
<b>etsi_004</b>	object	
key_chunk_size*	integer	length of key chunks in Byte.
max_bps*	integer	
min_bps*	integer	
jitter	integer	

NAME	TYPE	DESCRIPTION
priority	integer	
timeout	integer	
ttl*	integer	
metadata_mimetype	string	
<b>performance*</b>	array	
link_id	string	
current_kpi	{recursive}	kms-performance-entry
<b>options</b>	object	
multipath	boolean	In case of a multi-path establishment, specify 'true'.

## RESPONSE

**STATUS CODE - 201:** Successful registration

### RESPONSE MODEL - application/json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
key_stream_id*	string	
<b>next_node_info*</b>	array	
<b>qos</b>	object	

**STATUS CODE - 400:** Bad request

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

**STATUS CODE - 500:** Internal error

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

## 2.3 PATCH /link/registration

### Update link status by destination APP

When a destination APP registers with a KMS, the KMS informs the SDN of the destination APP registration. This indicates, that the path was closed.

## REQUEST

### REQUEST BODY - application/json

NAME	TYPE	DESCRIPTION
key_stream_id*	string	
destination*	string	Of type UUID or URI

## RESPONSE

**STATUS CODE - 200:** Successful registration

**STATUS CODE - 400:** Bad request

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

**STATUS CODE - 404:** Not found, API endpoint not found.

**STATUS CODE - 500:** Internal error

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

## 2.4 DELETE /link/{key\_stream\_id}

### Delete key stream

If the ETSI 004 application closes a key stream, this is reported to the SDN

## REQUEST

### PATH PARAMETERS

NAME	TYPE	EXAMPLE	DESCRIPTION
*key_stream_id	uuid		

## RESPONSE

**STATUS CODE - 200:** Link closed

**STATUS CODE - 400:** Bad request

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

**STATUS CODE - 404:** Not found, API endpoint not found.

**STATUS CODE - 500:** Internal error

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

# 3. NOTIFICATION

## 3.1 POST /notification/registration

### Post KMS added to network

Inform the SDN of a new KMS that has been added to the network. If local instance has information about connected QKD devices or links, specify in request body.

## REQUEST

### REQUEST BODY - application/json

NAME	TYPE	DESCRIPTION
kms_id*	string	
model*	object	
device_vendor*	string	Vendor of the KMS
device_model*	string	Device brand name
device_version*	string	version number in semantic versioning
qkd_device_ids	array	
link_ids	array	

## RESPONSE

**STATUS CODE - 201:** Registration received. Optionally additional config data provided in response. Config file data format or content not defined and expected to be vendor specific.

### RESPONSE MODEL - application/octet-stream

**STATUS CODE - 400:** Bad request

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

**STATUS CODE - 404:** Not found, API endpoint not found

**STATUS CODE - 500:** Internal error

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

## 3.2 PATCH /notification/status

### Update KMS status

Inform the SDN of when the KMS's status changes, e.g. the KMS goes into maintenance mode

#### REQUEST

##### REQUEST BODY - application/json

NAME	TYPE	DESCRIPTION
state*	string	
reason*	string	

#### RESPONSE

**STATUS CODE - 200:** Status received

**STATUS CODE - 400:** Bad request

##### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

**STATUS CODE - 404:** Not found, API endpoint not found

**STATUS CODE - 500:** Internal error

##### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

## 3.3 PUT /notification/event

### Update event at KMS

Inform the SDN of an event

#### REQUEST

##### REQUEST BODY - application/json

NAME	TYPE	DESCRIPTION
level*	enum	ALLOWED:debug, info, warning, error, critical
code	integer	
reason*	string	

## RESPONSE

**STATUS CODE - 200:** Event information received

**STATUS CODE - 400:** Bad request

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it

**STATUS CODE - 404:** Not found, API endpoint not found.

**STATUS CODE - 500:** Internal error

### RESPONSE MODEL - application/problem+json

NAME	TYPE	DESCRIPTION
<b>OBJECT WITH BELOW STRUCTURE</b>		
type	string	Webpage with information on this problem
title*	string	Brief description of the problem
status*	integer	Response code or status code
detail*	string	Information on the problem and hints on how to solve it