

Requirements

1. python 3.x
2. Selenium 3.141.0 or higher (python lib)
'pip install selenium'
3. webdriver for Selenium (<https://www.seleniumhq.org/download/>)
 - a. install one of the followings and add to PATH depending on the browser to use.
 - Mozilla GeckoDriver
 - Google Chrome Driver
 - Microsoft Edge Driver
 - Windows IE
4. IDQ KEMS up and running

Features

Add Provider Address

Node Management > Provider → Provider Address Information :

Automation to add QKD-KMS logical sessions for key delivery.

The screenshot displays the KMS web interface. The breadcrumb navigation at the top reads 'Home > Node Management > Provider'. The 'Provider Name' search bar is set to 'PM'. The 'List' table shows two providers: KMSM (PM) and KMSS (PS), both using SKT as a vendor. The 'Detail information' section for the selected provider (PM) includes:

- Associated KMS Info:** KMSM, Any(all), 192.168.56.10.
- Provider Info:** Agent Location (Inside Provider), Provider Name (PM), Vendor (SKT), and IP for KMS connection (192.168.56.101).
- Network Interface List:** A table with one entry: Interface type (Any(all)) and IP Address (192.168.56.101).
- Provider Port Information:** Internal Broker Port (9000), External Broker Port (9001), Admin Broker Port (9002), and Agent Comm Port (60025).
- Provider Address Information:** A table with one entry: KMS Address (dummy), Provider Address (dummy), APP (PAGTS), and Status.

At the bottom of the interface are buttons for 'New', 'Save', and 'delete'.

Add Provider Link

Link Management > Provider Link → Detail Information > Basic Information :

Automation to add links between Providers.

Home > Link Management > Provider Link

Read

Link name [Search](#)

List

Link name	Source	Source VID	Destination	Destination VID	Operational Mod	Status
No Record						

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Detail information

* Basic Information

Session name Operational Mode

Source		Destination	
Name	<input type="text"/>	KMS Address	<input type="text"/>
Vendor	<input type="text"/>	KMS VID	<input type="text"/>

* Q key Store Info

Max Key Count Max Key Count Per Request Max Key Size Min Store Rate

Default Key Size Key Request Interval Min Key Size Maj Store Rate

Crt Store Rate

How-to

Prerequisites

1. IDQ KEMS up & running
2. Group must be ready

Home > Node Management > Group

Read

Group name [Search](#)

List

	Group name	Description	Modified date
1	G1	test	2019-08-08 16:44:38

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Detail information

Group name

Description

Modified date

[New](#) [Save](#) [delete](#)

3. KMSs must be ready for provider link source and destination, respectively.

[Home](#) > [Node Management](#) > [KMS](#)

[Read](#)

KMS name [Search](#)

[List](#)

KMS name	Group name	Internal Broker Port	External Broker Port	Admin Broker Port	KEMS Comm Port
KMSM	G1	9000	9001	9002	9004
KMSS	G1	9000	9001	9002	9004

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[Detail information](#)

[* KMS Information](#)

Group [Select a group](#)

KMS name

[Network Interface List](#) [Register](#) [Delete](#)

<input type="checkbox"/>	Interface type	IP Address
<input type="checkbox"/>	Any(all)	192.168.56.101

[* KMS Port Info](#)

Internal Broker Port External Broker Port Admin Broker Port KEMS Comm Port

[* Authentication Info](#)

KMS Unique ID X.509 Certificate [Select a certificate](#)

KEMS Key pair : Default KEMS Key pair

4. Providers must be ready for provider link source and destination, respectively.

[Home](#) > [Node Management](#) > [Provider](#)

[Read](#)

Provider Name [Search](#)

[List](#)

KMS name	Provider Name	Vendor	Internal Broker Port	External Broker Port	Admin Broker Port	Agent Comm Port
KMSM	PM	SKT	9000	9001	9002	60025
KMSS	PS	SKT	9000	9001	9002	60025

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[Detail information](#)

[* Associated KMS Info](#)

KMS Any(all) [Select](#)

[* Provider Info](#)

Agent Location

Provider Name

Vendor IP for KMS connection

[* Provider Port Information](#)

Internal Broker Port External Broker Port Admin Broker Port Agent Comm Port

[* Provider Address Information](#)

[Provider Address Info](#) [Register](#) [Modify](#) [Delete](#)

<input type="checkbox"/>	KMS Address	Provider Address	APP	Status
<input type="checkbox"/>	dummy	dummy	PAGTS	

Set up 'config' file

1. copy 'config.template' to 'config' in kems root.
2. update 'config' file in accordance with test environment

* Refer to '[config details](#)' section

Run

'python main.py'

config details

* file format : strict json file plus commenting is possible.

configuration items

server_url

KEMS web server URL

server_account

KEMS admin account id & pwd

node_provider_address

configuration to add logical KMS-QKD connections

<format>

```
"node_provider_address" : {  
  <Provider Name> : {  
    "op" : <operation>,  
    "prv_addr" : <any ID to give to provider>,  
    "kms_addr_spec" : {  
      "fmt" : <python style format string>,  
      "range" : <python style 2-dimension tuple>  
    },  
  },  
}
```

```

    "prv_agt" : "PAGTS"

    },
    ...

}

```

1. <Provider Name> : any existing provider name to add addresses to

Home > Node Management > Provider

Read

Provider Name

List

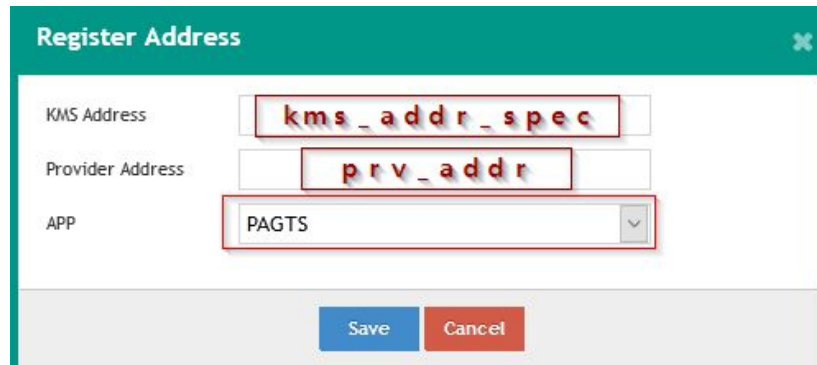
	KMS name	Provider Name	Vendor	Internal Broker Port	External Broker Port	Admin Broker Port	Agent Comm Port
KMSM		PM	SKT	9000	9001	9002	60025
KMSS	KMSM	PS	SKT	9000	9001	9002	60025

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2. <operation> : one of the following
 - add : to add addresses specified by "prv_addr" & "kms_addr_spec".
 - del : to delete addresses specified by "prv_addr" & "kms_addr_spec".
 - whatever else (e.g. "skip" or "ignore" or "no" ...) : to ignore this provider's action for expediency rather than commenting out all the lines for the provider setting.
3. "prv_addr" : any ID as provider end to give to this logical connection between QKD and KMS.
4. "kms_addr_spec" : any ID as KMS end to give to this logical connection between QKD and KMS.
 - "fmt" : python expandable string format composed of constant and variable
 - constant : fixed string in KMS address
 - variable : expandable part in KMS address denoted by '{ }' that will be replaced by "range" spec.
 - "range" : python style series of tuples, (start, end). Must end with comma(,) for one entry like "(100,103)".

e.g. {"fmt" : "101_{ }", "range" : "(100,102), (200,201)"} will expand KMS address into 5 instances.

- 101_100
- 101_101
- 101_102
- 101_200
- 101_201



The image shows a 'Register Address' dialog box with a teal header and a close button. It contains three input fields: 'KMS Address' with the value 'kms_addr_spec', 'Provider Address' with the value 'prv_addr', and 'APP' with a dropdown menu showing 'PAGTS'. At the bottom are 'Save' and 'Cancel' buttons.

5. "prv_agt" : PAGTS only. (other values are future reserved)

link_provider

configuration to add links for registered provider addresses by node_provider_address.

<format>

```
"link_provider" : {
    <connection name format> : {
        "op" : <operation>,
        "conn_name_type" : <name build type>,
        "conn_src" : {
            "prv_name" : <provider name>,
            "kms_addr_spec" : {
                "fmt" : <python expandable string composed of constant
and variable>,
                "range" : <python style series of tuples>
            },
            "conn_dst" : {
                ...
            }
        }
    }
}
```

Home > Link Management > Provider Link

Read

Link name

List

Link name	Source	Source VID	Destination	Destination VID	Operational Mod	Status
<div> <div>Page 1 / 0</div> <div>5</div> </div> <div>No Record</div>						

Detail information

* Basic Information

Session name Operational Mode

Source

Name KMS Address

Vendor KMS VID

Destination

Name KMS Address

Vendor KMS VID

* Key Store Info

Max Key Count Max Key Count Per Request Max Key Size Min Store Rate

Default Key Size Key Request Interval Min Key Size Maj Store Rate

Crt Store Rate

1. <connection name format> : python string composed of prefix and variable that will decide "connection name" together with "conn_name_type".
e.g. "PLink_{}"
 - o PLink_ : prefix
 - o {} : variable
2. "conn_name_type" : how to compose the variable part of <connection name format>.
 - o order : append ordering number starting from 1.
e.g. PLink_1, PLink_2, PLink_3, ...
 - o combi : append combination of "prv_name" and "kms_address" in the format of
<Prefix>_<Src Prv Name>.<KMS addr>:<Dst Prv Name>.<KMS addr>
e.g. PLink_PM.101_100:PS.102_100, PLink_PM.101_101:PS.102_101, ...
3. <operation> : add, del or else (see node_provider_address → [<operation>](#) for details)
4. "prv_name" : existing provider name for either source or destination. (see node_provider_address → [<Provider Name>](#) for details)
5. "kms_addr_spec" : expandable KMS address spec. (see node_provider_address → ["kms_add_spec"](#) for details)

note: conn_src & conn_dst must have one-to-one bijection of address range to complete the connection list.