

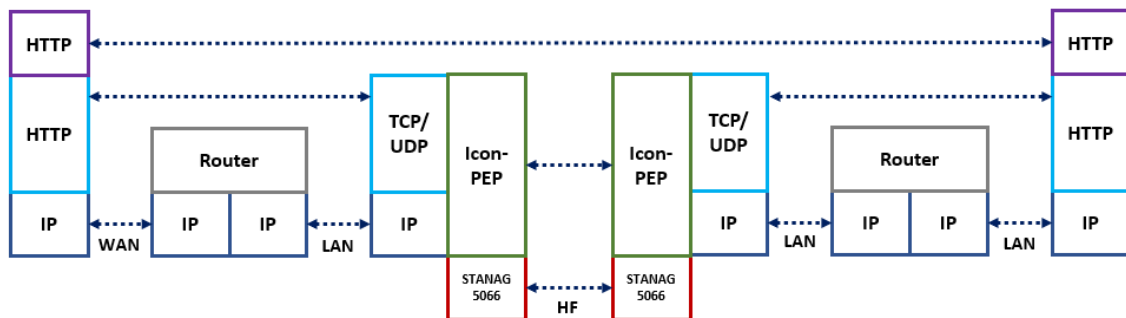
Icon-PEP 3.0 Evaluation Guide

Contents

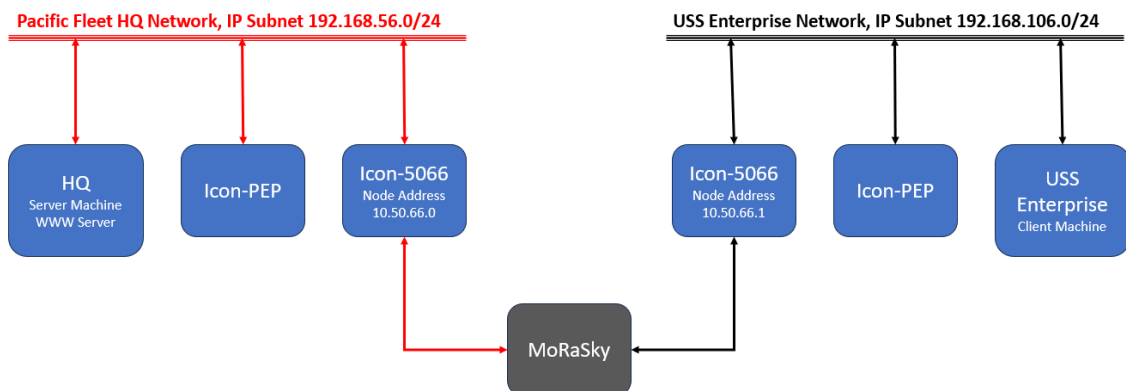
Introduction.....	3
Objectives	4
Using Isode Support.....	4
TAK Server Support.....	4
Preparation	5
Product Download	5
Product Activation Key	5
Installing Icon-PEP	6
Configuring Icon-PEP	11
Unit Configuration	13
HF Routes Configuration.....	16
Configure TCP Listeners	19
Add TLS root certs.....	26
Testing	29
Other Evaluations	35
Whitepapers	36
Copyright	37

Introduction

To provide IP services over HF in a reasonably efficient manner, a central challenge is to provide a mechanism to support TCP-based applications efficiently. This can be done with a TCP PEP (Performance Enhancing Proxy) as shown in the diagram below supporting HTTP. By using an optimized protocol over HF, the system inefficiencies of TCP over IP Client can be avoided. Isode's approach is to use [\[SIS Layer Extension Protocol \(SLEP\)\] \(S5066-APP3\)](#). Note that although this eliminates TCP inefficiency, it cannot address applications with short timeouts or significant hand shaking.



Icon-PEP can be deployed in one of three modes; “Direct”, “Tunnel” or “Simple”. Tunnel mode requires a router that supports a GRE Tunnel, while this can be achieved in a Virtual Environment using virtual pfSense routers it adds a level of complexity that is likely not necessary for an Evaluation. This guide will cover a “Direct” deployment. The schematic below gives an overview of what we will build.



The “HF Network” will be provided by Isode’s Modem, Radio, Sky simulator (MoRaSky).

If you do not have existing Icon-5066 Servers these will need to be configured prior to starting this evaluation.

Objectives

By the end of this evaluation, you will have:

- Installed and configured two Icon-PEP Servers
- Installed and configured two Windows Servers (HQ and MU) to act as WWW Server supporting both the http and https protocols.
- Sent IP Traffic over HF between the two Windows Servers

More information on Icon-PEP can be found at <https://www.isode.com/product/performance-enhancing-proxy/> . A comprehensive Administration Guide, which goes into far greater detail than this short document, can be found at <https://www.isode.com/support/>.

Using Isode Support

You will be given access to Isode support resources when carrying out your evaluation. Any queries you have during your evaluation should be sent to isode.support@isode.com . Please note that access to the Self-Service Portal for web-based ticket submission and tracking is not available to evaluators.

TAK Server Support

Icon-PEP can support TAK (<https://www.civtak.org/community-tak-server/>) Server Federation over HF. If you are interested in this please contact Isode Support isode.support@isode.com detailing what you would like to achieve as this requires additional configuration not covered in this manual.

Preparation

You should visit <https://www.isode.com/support/platform-support/> to discover which operating systems are supported for Isode evaluations. In addition to the server platforms listed, we support the use of Isode server products on Windows 11 for simple evaluations and demonstrations. However it should be noted that Icon-PEP is not supported on Windows platforms.

Isode supports the use of the latest versions of Google Chrome, Mozilla Firefox and Microsoft Edge browsers with the Icon-PEP Console. Internet Explorer is not supported.

Product Download

Product downloads are held in a password-protected section of the Isode website. If you have not already done so you should apply for a username/password by filling in the form located at <https://www.isode.com/request-an-evaluation/>. Products can be obtained by logging into the Isode Customer Portal (<https://www.isode.com/customer-portal/>) clicking on the Product required. The downloads page will give installation instructions specific to your platform.

Product Activation Key

Icon-PEP requires a valid Product Activation Key from Isode before it will run correctly. Keys are issued by Isode Customer Services. Once you have installed Icon-PEP you will need to request a Product Activation Key (PAK) from Isode Support by sending them the Generated Product Activation Request (PAR).

If you haven't already been sent a Key when requesting access to the evaluation files, please send a message to request one to isode.support@isode.com remembering to specify which Isode server products you need a Key for. Instructions for what to do with this Key can be found in the Installation section.

Installing Icon-PEP

Icon-PEP 3.0 is only available on Red Hat Linux 8, 9 & 10 (including Rocky Equivalents) and Ubuntu 24.04 & 26.06 you should use the installation method appropriate for your platform.

Icon-PEP can be started the with following command:

```
% sudo systemctl start iconpepd
```

To stop Icon-PEP run the command:

```
% sudo systemctl stop iconpepd
```

When you make some configuration changes to Icon-PEP you would need to restart Icon-PEP service, you can do so by running the command:

```
% sudo systemctl restart iconpepd
```

The directory where Activation and config files are stored on Linux is **/etc/isode/icon-pep**.

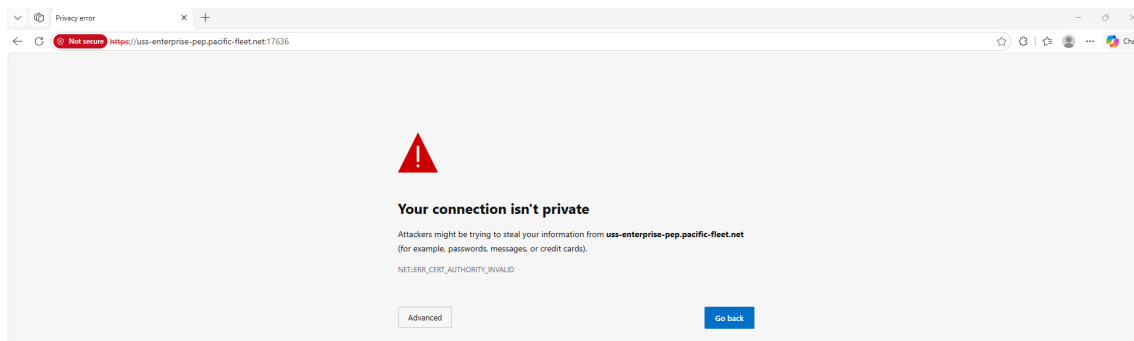
We will be installing in this guide on Rocky 9.

Use the command:-

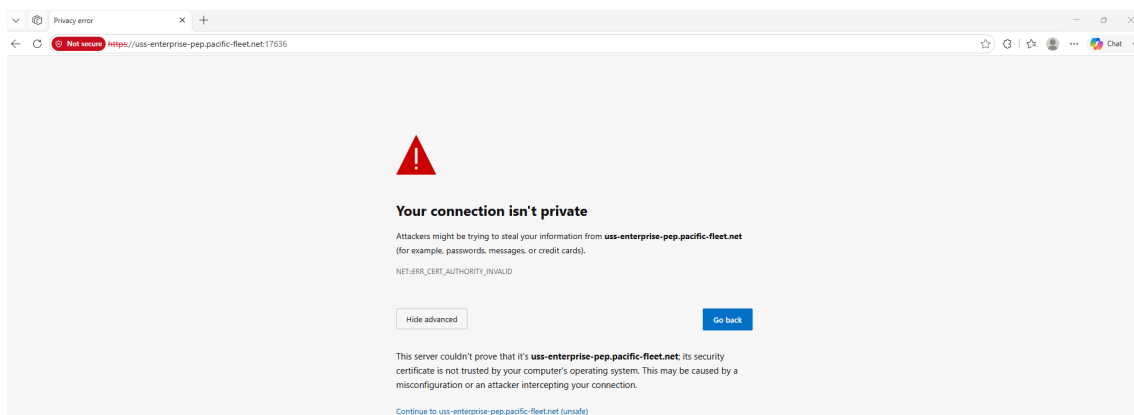
```
# rpm -i ISDiconpep-3.0v0-0.x86_64.rpm
```

Then point a browser at either the hostname (if it resolves) or the IP Address

<https://uss-enterprise-pep.pacific-fleet.net:17636> .



Click “Advanced...”



Click “[Continue to uss-enterprise-pep.pacific-fleet.net \(unsafe\)](https://uss-enterprise-pep.pacific-fleet.net:17636)” .

Create initial admin user

Configure initial admin user credentials

Admin username

Required

The login name of the initial admin user

Admin password

Required

The password of the initial admin user

Submit

Cancel

Enter an Admin username and password, we will use “Admin” and “secret”.



Icon-PEP

Username:

Required

Password:

Required



Login

Login with these credentials.

Product Activation

This product is not activated.

- If Isode has sent you an Activation Key, you may enter it now.
- If not, or you require different features, please request one.

Request Activation Key

Enter Activation Key

This is where we generate the “PAR” using the “Request Activation Key” button.

Product Activation

Please provide a reference identifying this server, which will be displayed as part of the product activation information.

Reference:

Icon-PEP 3.0 Evaluation

Generate Activation Request

Back

Enter a suitable Reference of your choice and click “Generate Activation Request”.

Product Activation

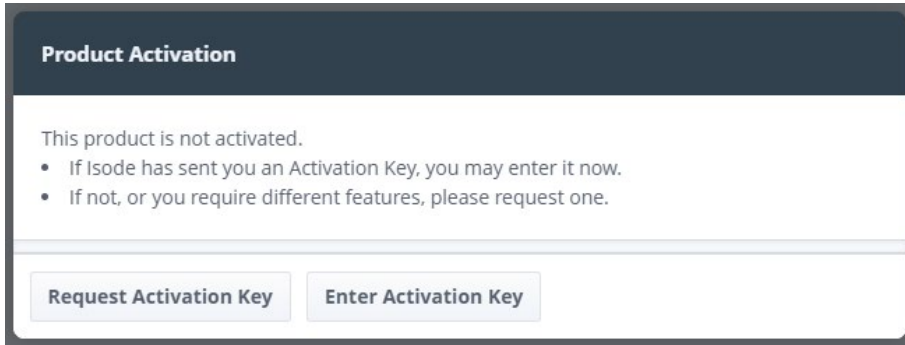
Please send the following Activation Request code to the Isode Product Activation Service isode.support@isode.com, explaining your requirements for this server.

ZmVhdHVyZT0iSWNvbi1QRVAiIGN1c3RvbWVyLXJlZj0iSWNvbi1QRVAgMy4wIEV2YWx1YXRpb24iIGhvc3Rpd0iVVVJRDSzYjE1OWM4ZTFhNGYxZmYxMjA0N2IyN2NjY2N1N2Y4YWU4MTFjZmRmNmE4Njc1NmM3NTJjZmFlNmMyODJiOTEzOWI4YjY1MjQ2ZDE3NDZjNWQ2MmVmMDBjMDJmMjkzMWVjODg0MjJkNWE3NTA2NzQyMjMyMDVkdzUzNjI5NTIzNyI=

Back

Use the  to copy this request that can then be sent to isode.support@isode.com noting the product you require a Key for and any Project Reference.

When you have received your PAK from Isode Support click the “Back” button.



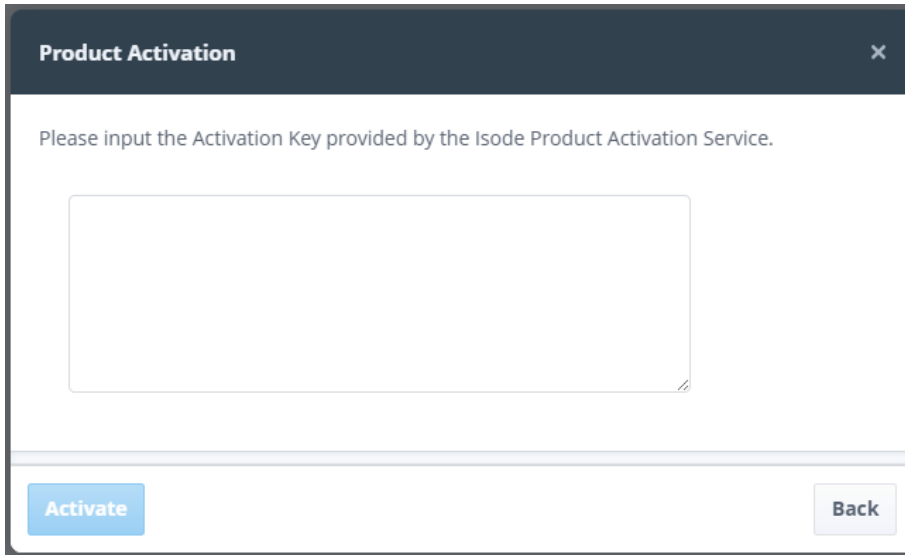
Product Activation

This product is not activated.

- If Isode has sent you an Activation Key, you may enter it now.
- If not, or you require different features, please request one.

Request Activation Key **Enter Activation Key**

Click “Enter Activation Key”



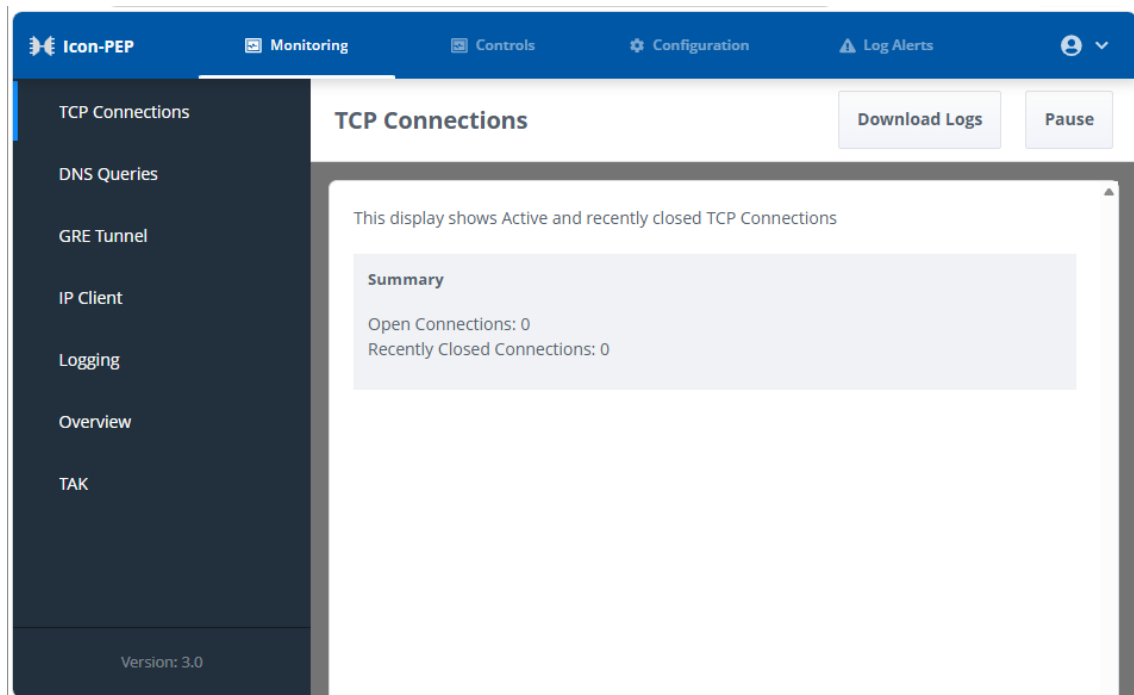
Product Activation ×

Please input the Activation Key provided by the Isode Product Activation Service.

Activate **Back**

Paste in your PAK, then click “Activate”.

If successfully activated you will see this screen.



You can now start to configure Icon-PEP.

Below are some important IP Addresses, you should note these down for your system.

Icon-PEP USPF HQ	192.168.56.183
Windows Server/Client USPF HQ	192.168.56.100
Icon-5066 USPF HQ	192.168.56.101
Icon-PEP USS Enterprise	192.168.106.189
Windows Server/Client USS Enterprise	192.168.106.120
Icon-5066 USS Enterprise	192.168.106.120

Note that the Icon-5066 USS Enterprise & Windows Server/Client USS Enterprise have the same IP because in this setup they are the same server. That may well not be the case in your setup.

Configuring Icon-PEP

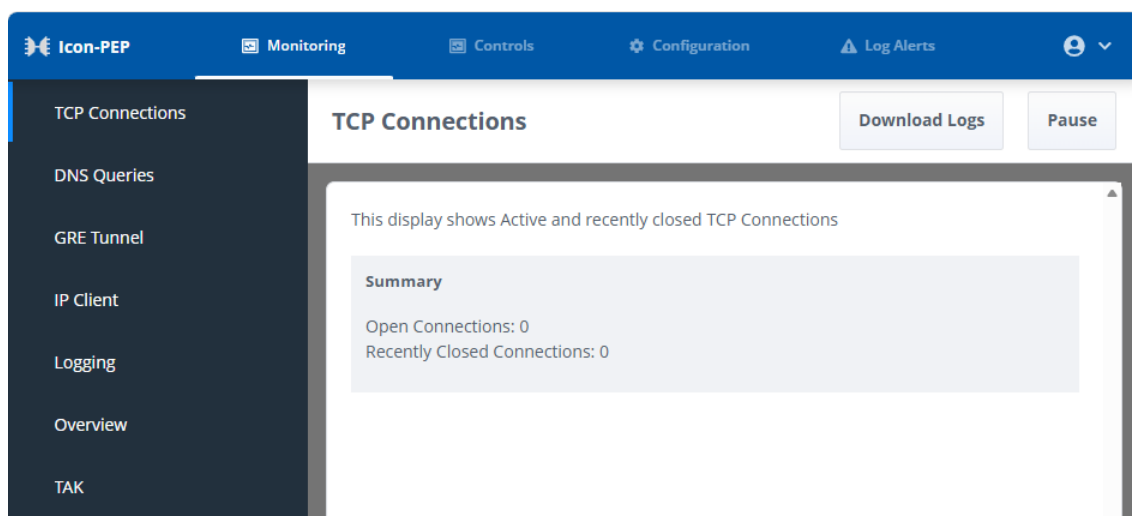
More information on Icon-PEP can be found on the Isode website at <https://www.isode.com/product/performance-enhancing-proxy/>.

Detailed configuration and operational information on Icon-PEP can be found in the Admin Guide available from the Isode website at

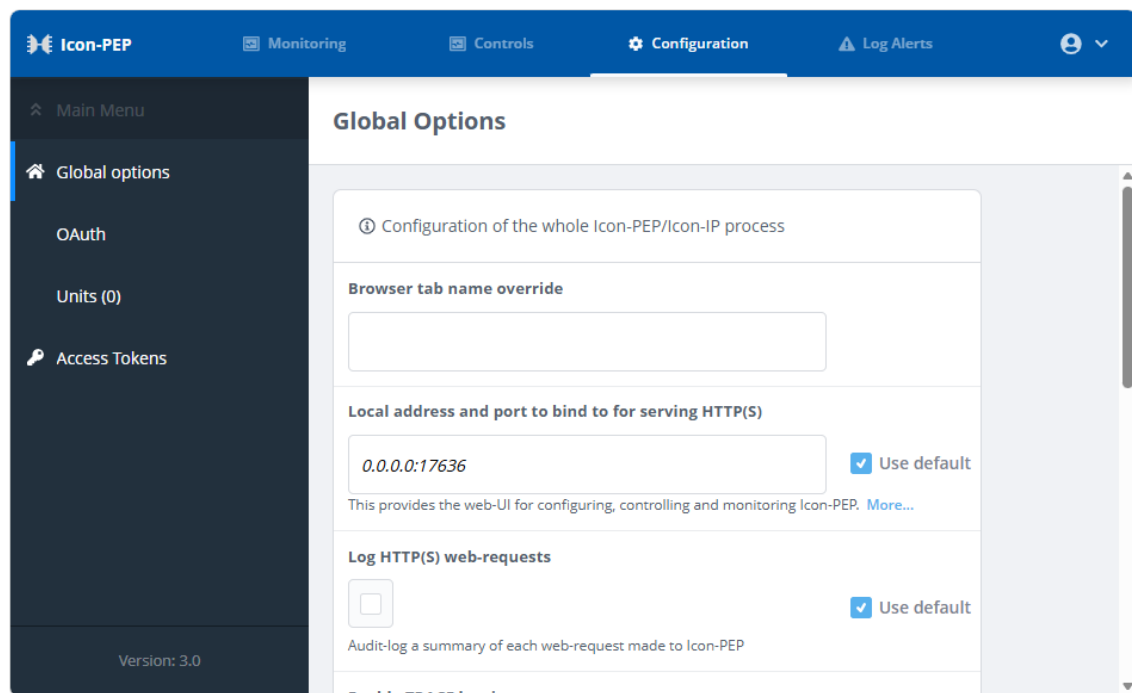
<https://www.isode.com/wp-content/uploads/2023/08/Icon-PEP-3.0-Admin-Guide.pdf>

Icon-PEP is configured using a Web GUI that is accessed at <https://ip-address-or-hostname:17636>. I will show screens from the USS Enterprise below with notes on what should be different on the USPF HQ.

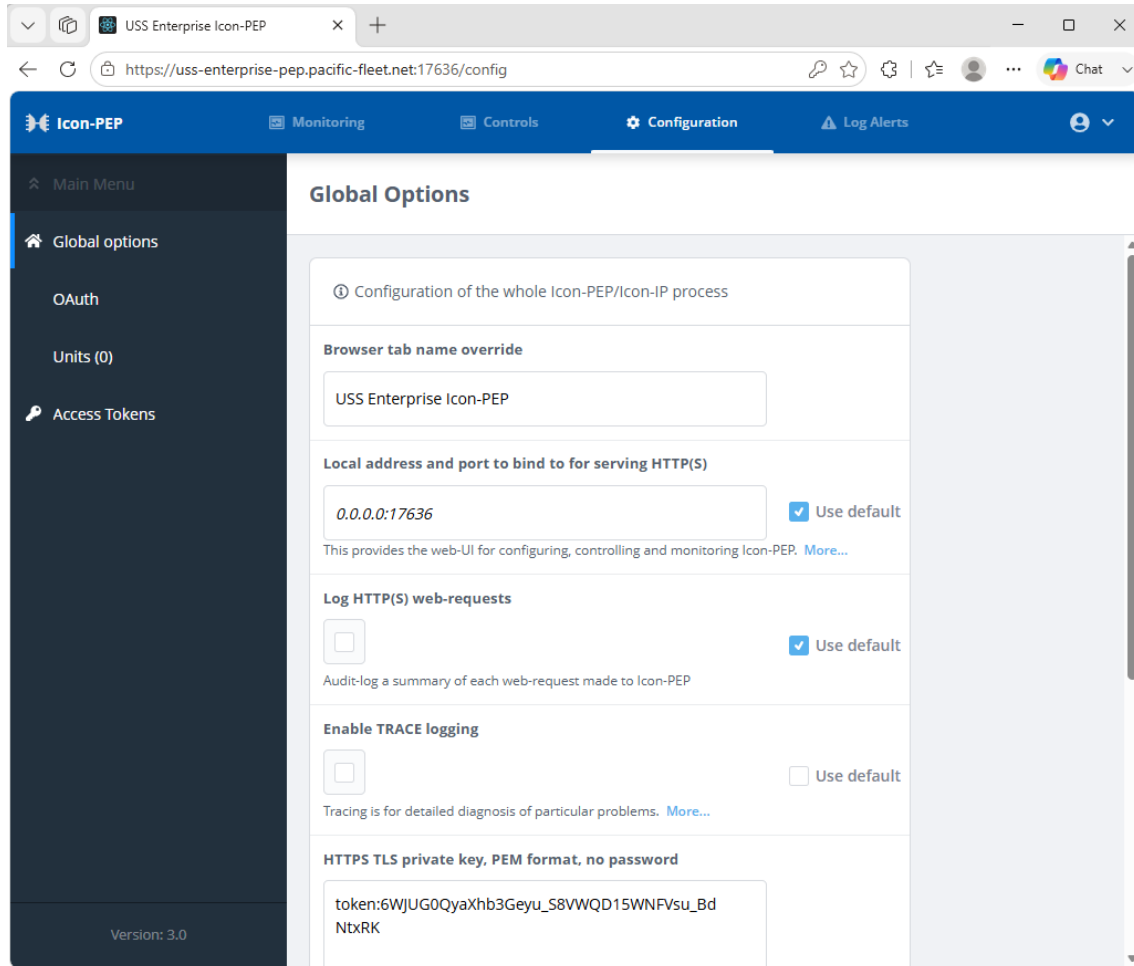
Below is the initial screen.



Select Configuration.



The server comes with an “Autogenerated TLS Certificate”, hence the warnings on the initial screen after installation. If you want a certificate that matches the fully qualified hostname of the server then you need to use some tools to generate a Private Key with no Password and Certificate Chain, both in .pem format. That you load into this initial screen. Setting the “Browser tab name override” is useful if you have multiple Icon-PEP servers so you can see which one you are on. We have configured both the TLS and “Browser tab name override”, as you can see below.

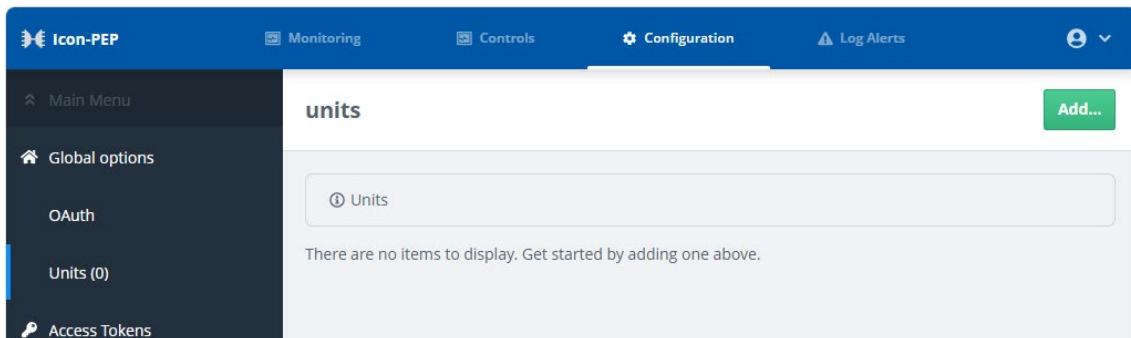


For the USPF HQ you would likely give it a “Browser tab name override” of “USPF HQ Icon-PEP” and load appropriate TLS configuration.

Click the [Submit](#) button after all changes have been made.

Unit Configuration

Select “Units”.



Click “Add...”

The screenshot shows the 'Add new item' form for an Icon-PEP unit. The form is titled 'Add new item' and contains the following fields:

- Icon-PEP unit** (header)
- Label to identify unit** (text input, Required)
- S'S066 server IP address** (text input, Required)
- S'S066 server SIS port number** (text input, Required)
- Mode of operation** (dropdown menu, Required)

The dropdown menu for 'Mode of operation' shows the option 'Please select an option'. Below the form, there is a note: 'Modes: Tunnel mode supports all protocols in both directions by passing traffic over a GRE tunnel to/from an IP router. [More...](#)'

Enter the details below, selecting the “Mode of operation” from the drop down.

The screenshot shows the 'Add new item' form in the Icon-PEP Configuration section. The form includes the following fields:

- Icon-PEP unit**: A required field with the value 'USS Enterprise'.
- S'5066 server IP address**: A required field with the value '192.168.106.120'.
- S'5066 server SIS port number**: A required field with the value '5066'.
- Mode of operation**: A required dropdown menu with the selected value 'Direct: Use NAT and/or listeners'.

Below the dropdown, a note states: 'Modes: Tunnel mode supports all protocols in both directions by passing traffic over a GRE tunnel to/from an IP router. [More...](#)'

The screenshot shows the 'Add new item' form in the Icon-PEP Configuration section, continuing from the previous page. The form includes the following fields:

- Node address**: A required field with the value '10.50.66.1'. Below the field, it says 'S'5066 node address of this node'.
- Configure UDP+ping NAT proxy**: A checkbox that is unchecked, with a 'Use default' option checked.
- Configure UDP listener**: A checkbox that is checked, with a 'Use default' option unchecked.
- Configure TCP NAT proxy**: A checkbox that is checked, with a 'Use default' option unchecked.
- Configure TCP listener**: A checkbox that is checked, with a 'Use default' option unchecked.

Continued on next page.

The screenshot shows the 'Icon-PEP' configuration interface. The top navigation bar includes 'Monitoring', 'Controls', 'Configuration' (active), and 'Log Alerts'. A left sidebar contains 'Main Menu' and 'Units (0)'. The main content area is titled 'Add new item' and contains several configuration options, each with a checked checkbox and a 'Use default' checkbox:

- ☒ Forwards UDP connections initiated from the LAN to HF. ☐ Use default
- Configure TCP NAT proxy**
☒ ☐ Use default
Receives remote-initiated TCP connections and forwards to LAN.
- Configure TCP listener**
☒ ☐ Use default
Forwards TCP connections initiated from the LAN to HF.
- Disk cache maximum total size in kilobytes**
10000 ☒ Use default
- Disk cache maximum storage per stream in kilobytes**
1000 ☒ Use default

At the bottom of the dialog are 'Add' and 'Cancel' buttons. The version 'Version: 3.0' is displayed in the bottom left corner of the interface.

Click “Add”.

For the USPF HQ the following details are different.

Label to identify unit:	USPF HQ
S'5066 server IP address:	192.168.56.101
Node address:	10.50.66.0

The screenshot shows the 'Configuration' tab in the Icon-PEP interface. The left sidebar has 'USS Enterprise' selected under 'Units (1)'. The main content area is titled 'USS Enterprise' and contains several configuration fields, each with a 'Required' label:

- Icon-PEP unit**: A label field containing 'USS Enterprise'.
- S'5066 server IP address**: A text field containing '192.168.106.120'.
- S'5066 server SIS port number**: A text field containing '5066'.
- Mode of operation**: A dropdown menu set to 'Direct: Use NAT and/or listeners'. Below it, a note states: 'Modes: Tunnel mode supports all protocols in both directions by passing traffic over a GRE tunnel to/from an IP router. [More...](#)'.
- Node address**: A partially visible field at the bottom.

Buttons for 'Delete...' and 'Add another...' are located at the top right of the configuration area.

HF Routes Configuration

We now need to add two HF Routes, one for each subnet, these will be the same on both nodes. Select “HF Routes.

The screenshot shows the 'Configuration' tab in the Icon-PEP interface. The left sidebar has 'HF routes (0)' selected under 'Units (1)'. The main content area is titled 'HF routes' and contains a green 'Add...' button at the top right. Below the button, there is an information box with the text: 'Mappings between IP subnets and S'5066 nodes. This must include the local node. This list would normally be identical at all the different sites, and would be synchronized across the HF network.' At the bottom, a message states: 'There are no items to display. Get started by adding one above.'

Click “Add...”

Icon-PEP Monitoring Controls **Configuration** Log Alerts

Main Menu Units (1) USS Enterprise HF routes (0)

Add new item to HF routes

① Any outgoing IP packet which matches the given subnet is sent to the given HF node address. Similarly, incoming IP packets received from the HF node address are expected to be from one of the subnets associated with it (this is so that misrouted IP packets will be detected quickly). A default route may be specified using a subnet of "default".

IP subnet, or "default" Required

HF node-address Required

Notes ☒ Use default

Add Cancel

Version: 3.0

You should enter the Subnet associated with each S'5066 Node Address. The Notes section is optional, but in the example below you could have entered USPF HQ.

Icon-PEP Monitoring Controls **Configuration** Log Alerts

Main Menu Units (1) USS Enterprise HF routes (0)

Add new item to HF routes

① Any outgoing IP packet which matches the given subnet is sent to the given HF node address. Similarly, incoming IP packets received from the HF node address are expected to be from one of the subnets associated with it (this is so that misrouted IP packets will be detected quickly). A default route may be specified using a subnet of "default".

IP subnet, or "default" Required

192.168.106.0/24

HF node-address Required

10.50.66.1

Notes ☒ Use default

Add Cancel

Version: 3.0

Click "Add..."

The screenshot shows the 'Configuration' tab of the Icon-PEP interface. On the left, a sidebar menu lists 'Main Menu', 'Units (1)', 'USS Enterprise', and 'HF routes (1)'. The 'HF routes (1)' section is expanded, showing a list with the entry '192.168.106.0/24'. The main content area displays the configuration form for this specific route. At the top right of the form are 'Delete...' and 'Add another...' buttons. The form includes a descriptive paragraph, input fields for 'IP subnet, or "default"' (containing '192.168.106.0/24') and 'HF node-address' (containing '10.50.66.1'), a 'Notes' field, and a 'Use default' checkbox which is checked. 'Submit' and 'Cancel' buttons are at the bottom.

Click “Add another...” and enter the details below.

This screenshot shows the 'Add new item to HF routes' form in the Icon-PEP Configuration page. The sidebar menu is identical to the previous screenshot. The main content area features a form with the same descriptive text as before. The 'IP subnet, or "default"' field now contains '192.168.56.0/24' and the 'HF node-address' field contains '10.50.66.0'. The 'Use default' checkbox remains checked. The 'Add' button is highlighted in green at the bottom left of the form, while the 'Cancel' button is at the bottom right.

Click “Add”.

The new route will appear on the left-hand side.

You have now configured the Icon-PEP server such that any traffic it receives for either of the Subnets will be directed to the local S'5066 server. In the case of traffic it receives over the HF Network for the local Subnet this will be routed to the local LAN.

Now click on your "Unit" on the left-hand side, in this example USS Enterprise.

The screenshot shows the Icon-PEP Configuration interface. The left sidebar contains a menu with options: Main Menu, Units (1), USS Enterprise, HF routes (2), IP client, UDP listeners, TCP NAT proxy, TCP listener, SLEP for TCP, TLS root certs (0), and Auth-IDs (0). The main area displays the configuration for the 'USS Enterprise' unit. The configuration fields include: 'Label to identify unit' (USS Enterprise), 'S'5066 server IP address' (192.168.106.120), 'S'5066 server SIS port number' (5066), and 'Mode of operation' (Direct: Use NAT and/or listeners). Each field has a 'Required' label. The 'Mode of operation' dropdown is set to 'Direct: Use NAT and/or listeners'. Below the dropdown, a note states: 'Modes: Tunnel mode supports all protocols in both directions by passing traffic over a GRE tunnel to/from an IP router. More...'. The bottom of the form shows 'Node address' with a 'Required' label.

You will note that we now have a "2" next to "HF Routes".

Configure TCP Listeners

The next thing we need to configure is the TCP Listeners for each protocol we want to send over HF. What you do is map the Icon-PEP IP Address to the actual IP Address on the Remote HF Subnet. The Local Client will have the Icon-PEP IP Address as that of the remote IP Address either by DNS or a local "hosts" file.

We will configure this for the "http" and "https" protocols. You can only configure this for one remote Website as Icon-PEP can only map it's IP Address to one Remote IP Address per Local Port.

Here is the relevant information for this Icon-PEP (USS Enterprise).

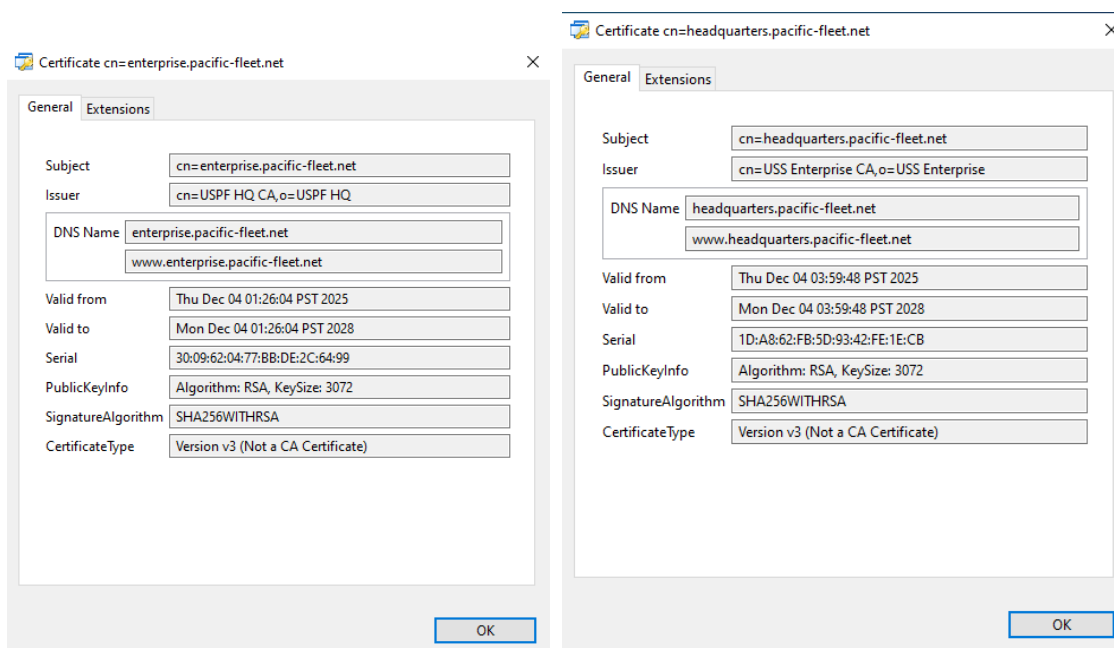
Client Hostname	Protocol	Local IP	Destination address	Remote Node
headquarters.pacific-fleet.net	http	192.168.156.189	192.168.56.100:80	10.50.66.0
headquarters.pacific-fleet.net	https	192.168.156.189	192.168.56.100:443	10.50.66.0

This is the relevant information for the USPF HQ Icon-PEP.

Client Hostname	Protocol	Local IP	Destination address	Remote Node
enterprise.pacific-fleet.net	http	192.168.56.183	192.168.156.100:80	10.50.66.1
enterprise.pacific-fleet.net	https	192.168.56.183	192.168.156.100:443	10.50.66.1

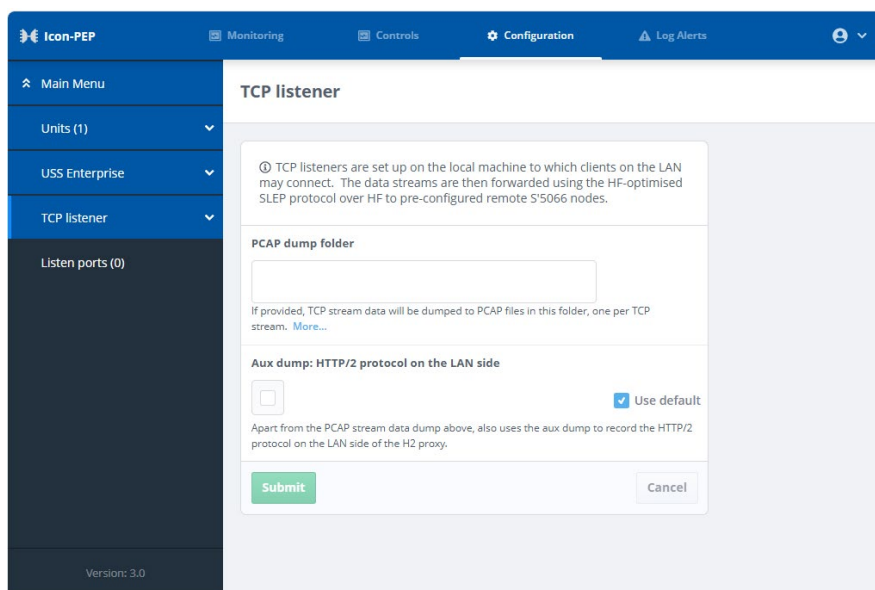
For any protocol requiring TLS you will need to create a Certificate representing that Remote Hostname and issued by a Certificate Authority accessible on the Local LAN. This considerably reduces the traffic over HF as the TLS handshaking is done over the local LAN. You will need both the Certificate Chain and Private key (with no password) for the TLS connection.

These are examples of the Certificates.

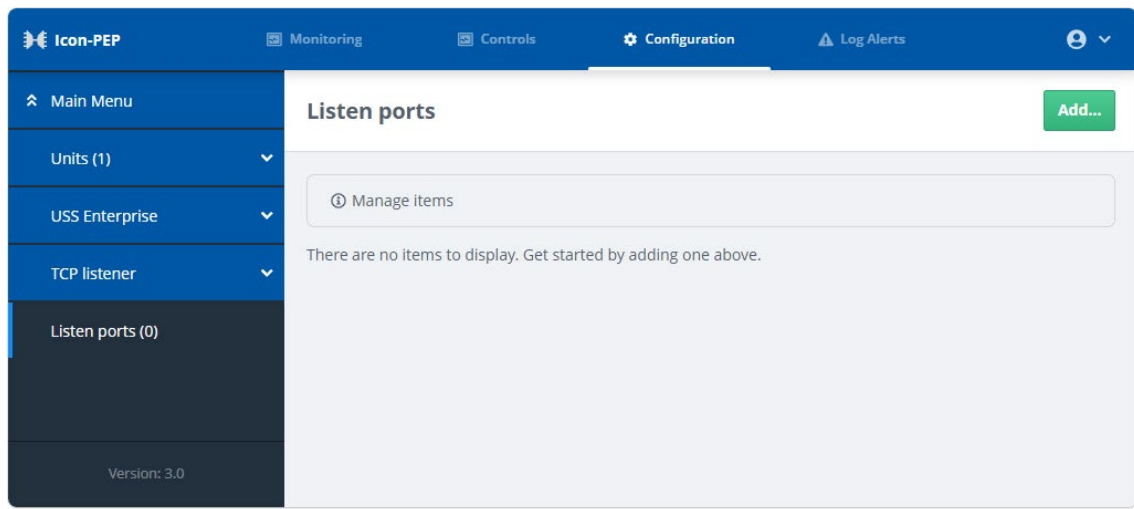


We will start with the http protocol.

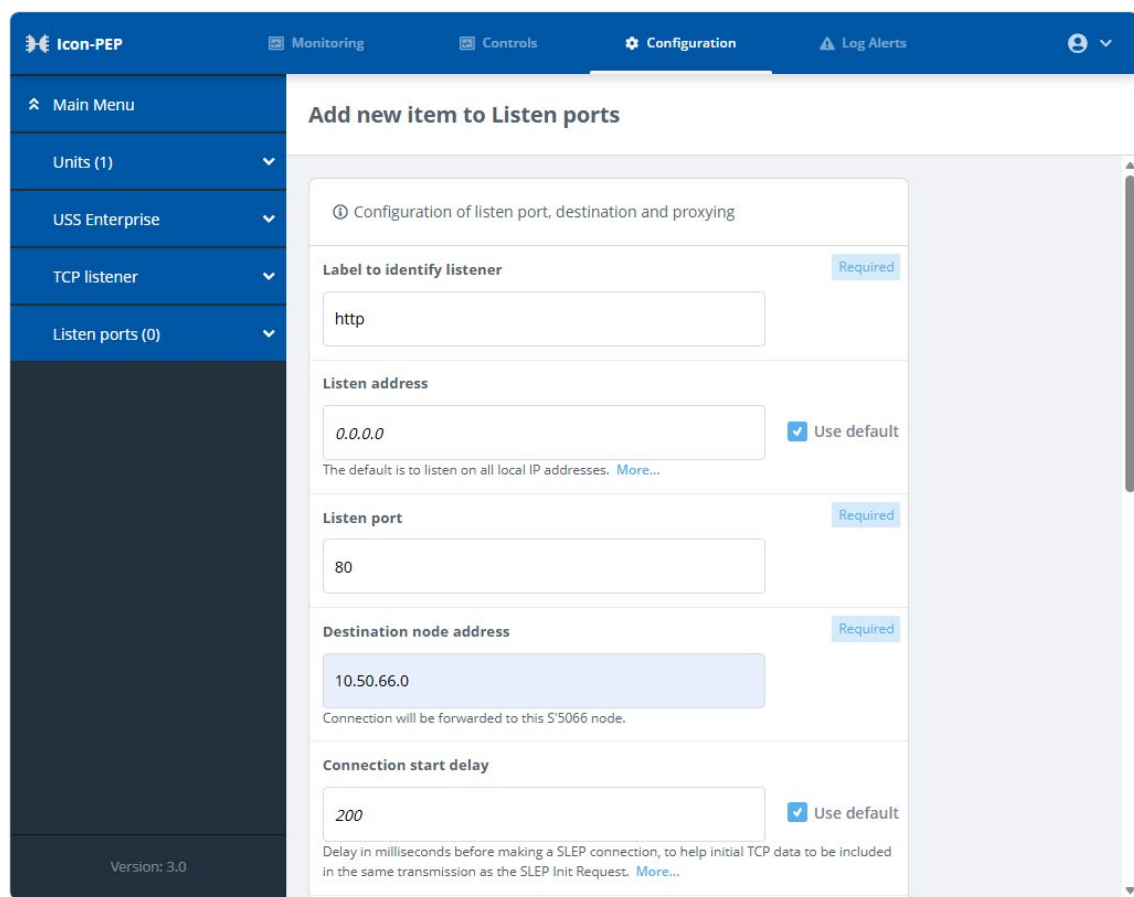
Click "TCP listener".



Click “Listen Ports”.



Click “Add...”, for the USS Enterprise Complete as follows.



...continued on next page.

Icon-PEP Monitoring Controls **Configuration** Log Alerts

Main Menu

Units (1)

USS Enterprise

TCP listener

Listen ports (0)

Add new item to Listen ports

SIS priority to use

8 ☒ Use default

Enable compression

☒ ☒ Use default

This compression setting only applies to outgoing data from the initiating side.

Quality of service level

Interactive: Web browsing

Used with S'5066 Ed5 to give a hint to the S'5066 server about how responsive the traffic needs to be

Map directly to Auth-ID

☐ ☒ Use default

Use this to associate a connection without client authentication to an S'5066 Annex X Auth-ID. [More...](#)

Enable TLS proxy

☐ ☒ Use default

Causes the local Icon-PEP to act as a TLS server and the remote Icon-PEP to act as a TLS client. [More...](#)

Destination address Required

192.168.56.100:80

If auth-ID is not used, then a destination IP address and port must be provided. [More...](#)

Add **Cancel**

Version: 3.0

Click Add.

Use the following Values for USPF HQ.

Label to identify listener:	http
Listen port:	80
Destination node address:	10.50.66.1
Destination address:	192.168.106.120:80

When you have entered this information click “Add” and you will see this.

Icon-PEP Monitoring Controls **Configuration** Log Alerts

http Delete... Add another...

SIS priority to use

8 ☒ Use default

Enable compression

☒ ☒ Use default

This compression setting only applies to outgoing data from the initiating side.

Quality of service level

Interactive: Web browsing

Used with S'5066 Ed5 to give a hint to the S'5066 server about how responsive the traffic needs to be

Map directly to Auth-ID

☐ ☒ Use default

Use this to associate a connection without client authentication to an S'5066 Annex X Auth-ID. [More...](#)

Enable TLS proxy

☐ ☒ Use default

Causes the local Icon-PEP to act as a TLS server and the remote Icon-PEP to act as a TLS client. [More...](#)

Destination address Required

192.168.56.100:80

If auth-ID is not used, then a destination IP address and port must be provided. [More...](#)

Submit Cancel

Version: 3.0

Note the “1” next to the “listen ports”.

Icon-PEP Monitoring Controls **Configuration** Log Alerts

http Delete... Add another...

③ Configuration of listen port, destination and proxying

Label to identify listener Required

http

Listen address

Before you Click “Add another...” make sure you have the “.pem” files, examples are shown on the next pages.

Click “Add another...”

Use the following Values for USS Enterprise.

Label to identify listener:	https
Listen port:	443
Destination node address:	10.50.66.0
Destination address:	192.168.56.100:443

Use the following Values for USPF HQ.

Label to identify listener:	https
Listen port:	443
Destination node address:	10.50.66.1
Destination address:	192.168.106.120::443

When you have entered this information click “Add” and you will see this.

You will also need to check the “Enable TLS proxy”

Enable TLS proxy

☒

☐ Use default

Causes the local Icon-PEP to act as a TLS server and the remote Icon-PEP to act as a TLS client. [More...](#)

This will expose these Fields.

TLS server private key, PEM format, no password

Required

This item is write-only; when this is submitted, it will be saved and replaced by a token.

TLS server public certificate chain, PEM format

Required

This item is write-only; when this is submitted, it will be saved and replaced by a token.

Paste in your Private Key and Certificate Chain .pem files.

TLS server private key, PEM format, no password
Required

```

XtnHVLHgjMo43SU9XLCZCG
Gv84EMNirtHB+BiIfyk5vAjdR9P8AYUG6IKQoppiyS
C/FeIG3HPRT7DJr/uhqF
+0Zb/PLD7i9sB2k5C7VBuNq9gD66yaS3qruUEFesrc
okSnqOXiA=
-----END RSA PRIVATE KEY-----

```

This item is write-only; when this is submitted, it will be saved and replaced by a token.

TLS server public certificate chain, PEM format
Required

```

WWCgmKHciDXeXiTV4RnCKRf8RUYKXXGNH2U55Wb
+CGmPWjIwaX88kBJWyVm0riP7
JQvCEDInRSqe+p9ZwPqfgJBBJO/pmU/8FTgDHwnzhS
a2JU4ylzgOHpzkTcBX2/4f
RkzRfA==
-----END CERTIFICATE-----

```

This item is write-only; when this is submitted, it will be saved and replaced by a token.

Click “Add”.

Icon-PEP
Monitoring
Controls
Configuration
Log Alerts

Main Menu
Units (1)
USS Enterprise
TCP listener
Listen ports (2)
http
https
Version: 3.0

https
Delete...
Add another...

☐ Use default

This decodes the HTTP/2 stream into request streams, and then encodes them into an HF-optimized protocol. [More...](#)

TLS server private key, PEM format, no password
Required

token:IA78zsiWjaLLuF127RHGK5LQam348ZRIzPcC5G5

This item is write-only; when this is submitted, it will be saved and replaced by a token.

TLS server public certificate chain, PEM format
Required

token:IKGNrA6K1pzNDD-d6h23307Ya9gbMhQ_bTdwQChV

This item is write-only; when this is submitted, it will be saved and replaced by a token.

Destination address
Required

192.168.56.100:443

If auth-ID is not used, then a destination IP address and port must be provided. [More...](#)

Submit
Cancel

Note you now have “Listen ports” as “2” and the Private Key and Certificate Chain have been replaced with a “token”, this is correct behaviour.

Add TLS root certs

Select your Unit (USS Enterprise in this example).

The screenshot shows the 'USS Enterprise' configuration page in the Icon-PEP interface. The left sidebar contains a navigation menu with options: Main Menu, Units (1), USS Enterprise (selected), HF routes (2), IP client, UDP listeners, TCP NAT proxy, TCP listener, SLEP for TCP, TLS root certs (0), and Auth-IDs (0). The main content area is titled 'USS Enterprise' and includes a 'Delete...' button and an 'Add another...' button. The configuration options are as follows:

- Configure UDP listener:** A checkbox is checked. Description: 'Receives remote-initiated UDP and ICMP ping traffic and forwards to LAN.' A 'Use default' checkbox is unchecked.
- Configure TCP NAT proxy:** A checkbox is checked. Description: 'Forwards UDP connections initiated from the LAN to HF.' A 'Use default' checkbox is unchecked.
- Configure TCP listener:** A checkbox is checked. Description: 'Receives remote-initiated TCP connections and forwards to LAN.' A 'Use default' checkbox is unchecked.
- Configure TCP listener:** A checkbox is checked. Description: 'Forwards TCP connections initiated from the LAN to HF.' A 'Use default' checkbox is unchecked.
- Disk cache maximum total size in kilobytes:** A text input field contains '10000'. A 'Use default' checkbox is checked.
- Disk cache maximum storage per stream in kilobytes:** A text input field contains '1000'. A 'Use default' checkbox is checked.

At the bottom of the configuration area are 'Submit' and 'Cancel' buttons. The version 'Version: 3.0' is displayed at the bottom left of the sidebar.

Click “TLS root certs (o)”.

The screenshot shows the 'TLS root certs' configuration page in the Icon-PEP interface. The left sidebar is the same as in the previous screenshot, with 'TLS root certs (0)' selected. The main content area is titled 'TLS root certs' and includes an 'Add...' button. The configuration area contains the following information:

- A note: "On the responder side, these are additional root certificates for proxy TLS clients to trust when validating the certificate provided by a TLS server."
- A message: "There are no items to display. Get started by adding one above."

Here you need to add the CA Certificate that issued the Certificate of the Website on your local LAN, in our example (USS Enterprise) this is the enterprise.pacific-fleet.net CA and on the USPF HQ the headquarters.pacific-fleet.net CA.

Click “Add...”

Icon-PEP

Monitoring

Controls

Configuration

Log Alerts

Main Menu

Units (1)

USS Enterprise

TLS root certs (0)

Add new item to TLS root certs

Additional root certificate

Label to identify certificate

Required

Root public certificate, PEM format

Required

Any TLS server contacted by a proxy TLS client connection that presents a certificate derived from this root will be trusted. [More...](#)

Add

Cancel

Give it a Label e.g. "USS Enterprise CA" and paste in the .pem of that Certificate.

Icon-PEP

Monitoring

Controls

Configuration

Log Alerts

Main Menu

Units (1)

USS Enterprise

TLS root certs (0)

Add new item to TLS root certs

① Additional root certificate

Label to identify certificate

USS Enterprise CA

Root public certificate, PEM format

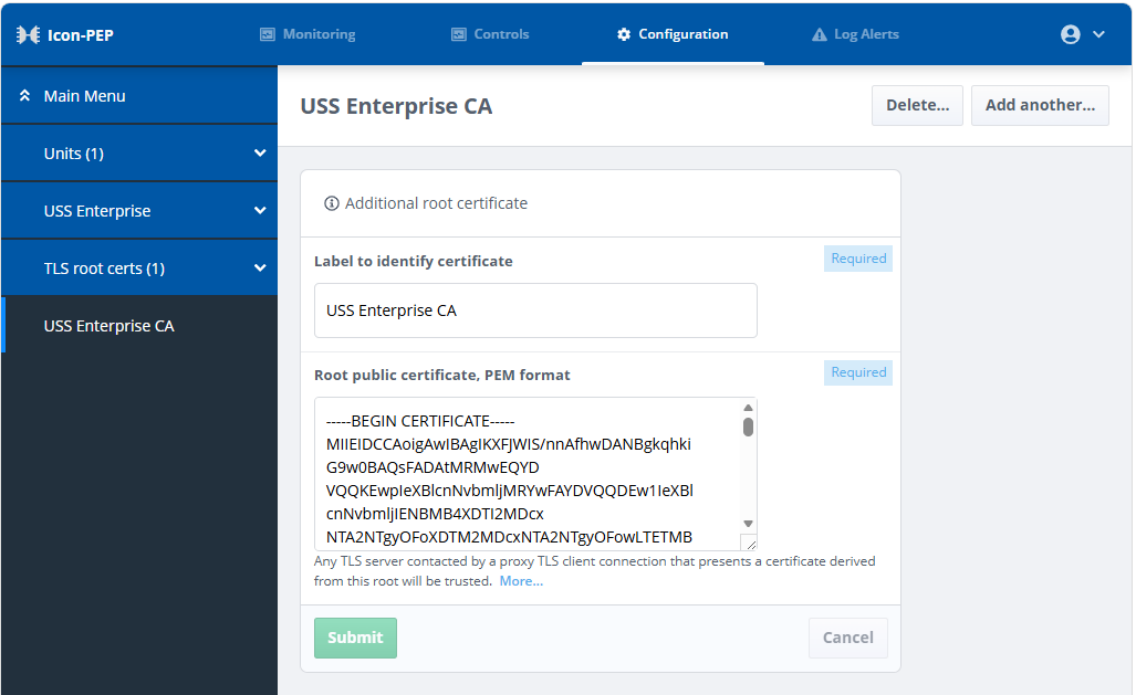
wwwCgmkHClDXeITV4RlCKTF8DyKXXGNH2U5SW6
+CGmPWJlwaX88kBJWYVm0riP7
JQVCEDlnRSqe+p9ZwPqfgjBBJO/pmU/8FTgDHwnzhS
a2JU4ylzgOHpzKtCBX2/4f
RkzRfA==
-----END CERTIFICATE-----

Any TLS server contacted by a proxy TLS client connection that presents a certificate derived from this root will be trusted. [More...](#)

Add

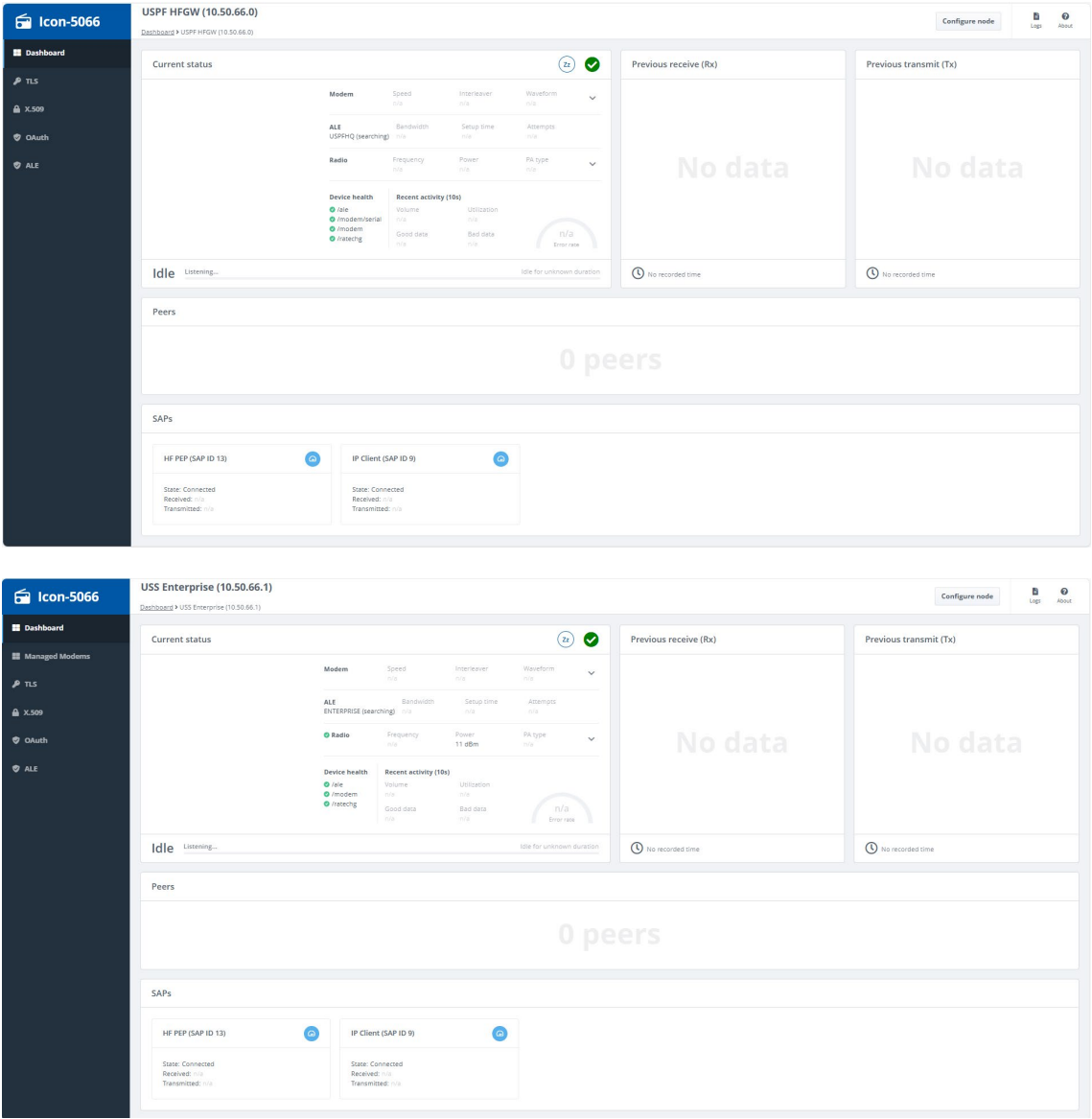
Cancel

Click “Add”.

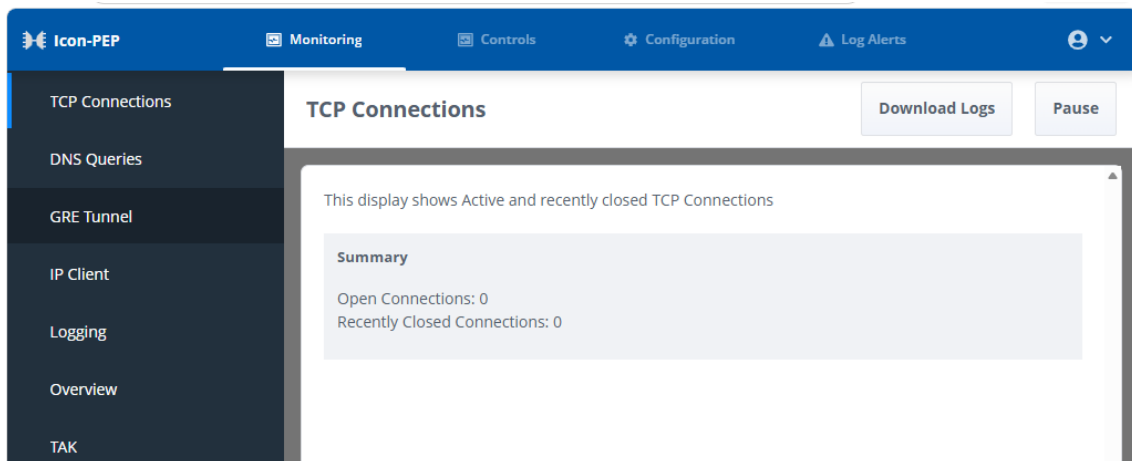


Testing

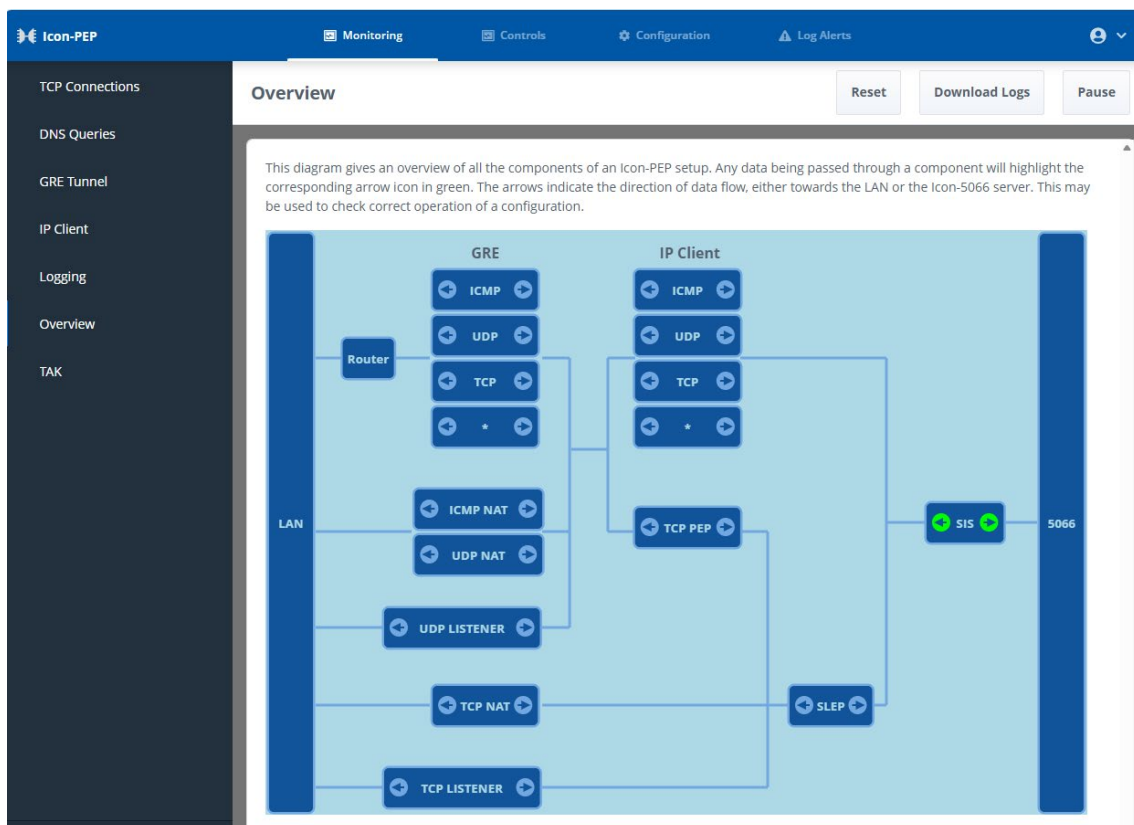
First check that both your S5066 servers are showing the IP Client and HF PEP connected as below.



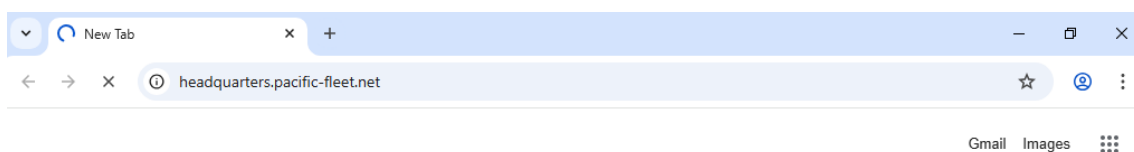
Now look at the Monitoring on your Icon-PEP servers.



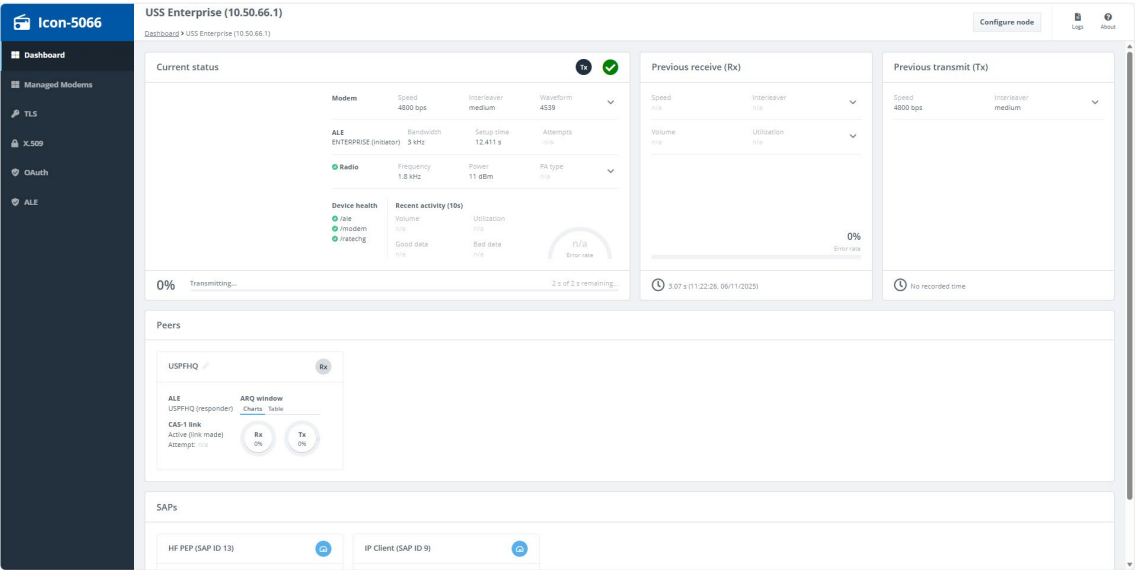
Initially there should be nothing showing for the TCP Connections on either, the “Overview” should show this.



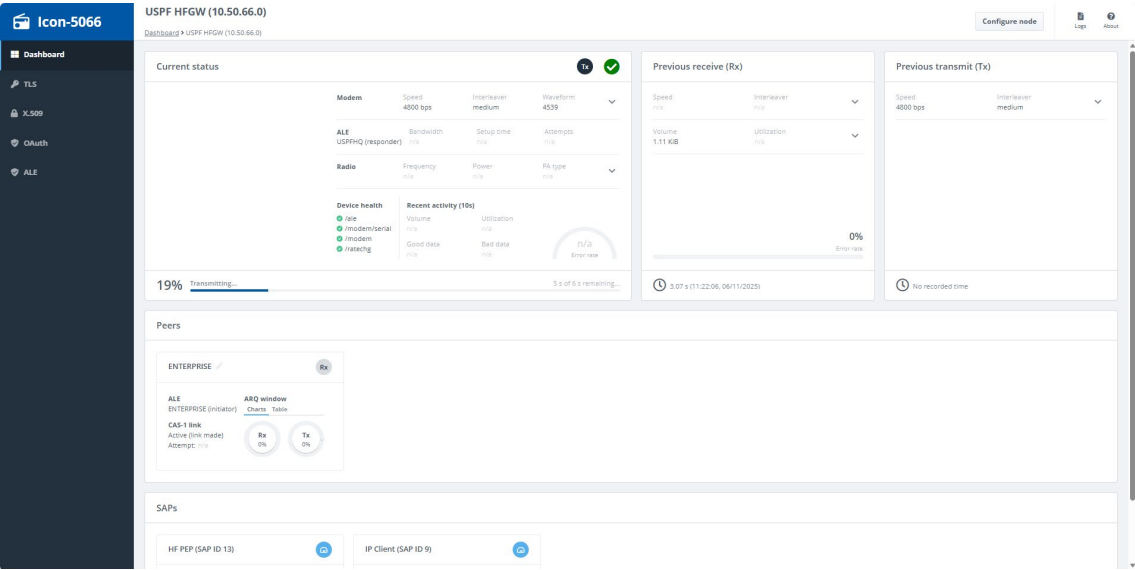
We are now going to browse from the USS Enterprise to the USPF HQ using the URL <https://headquarters.pacific-fleet.net>.



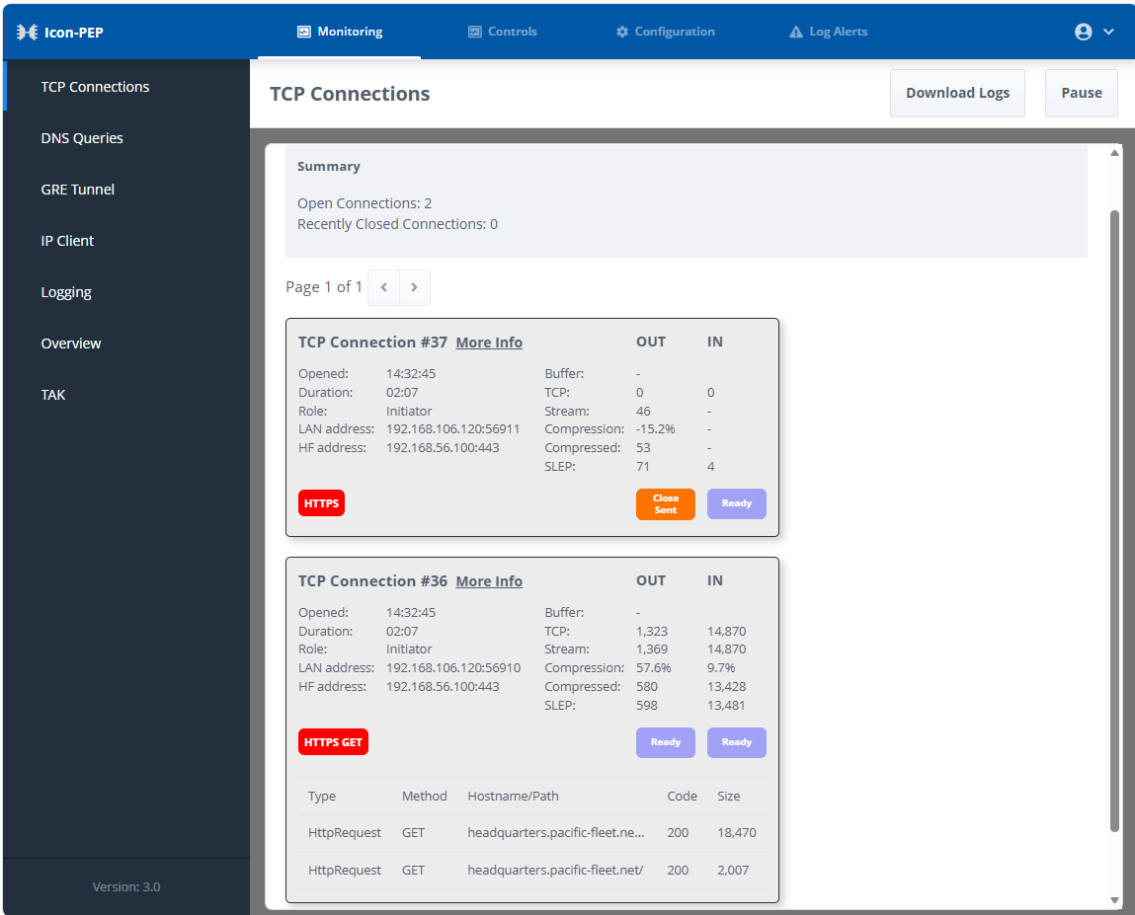
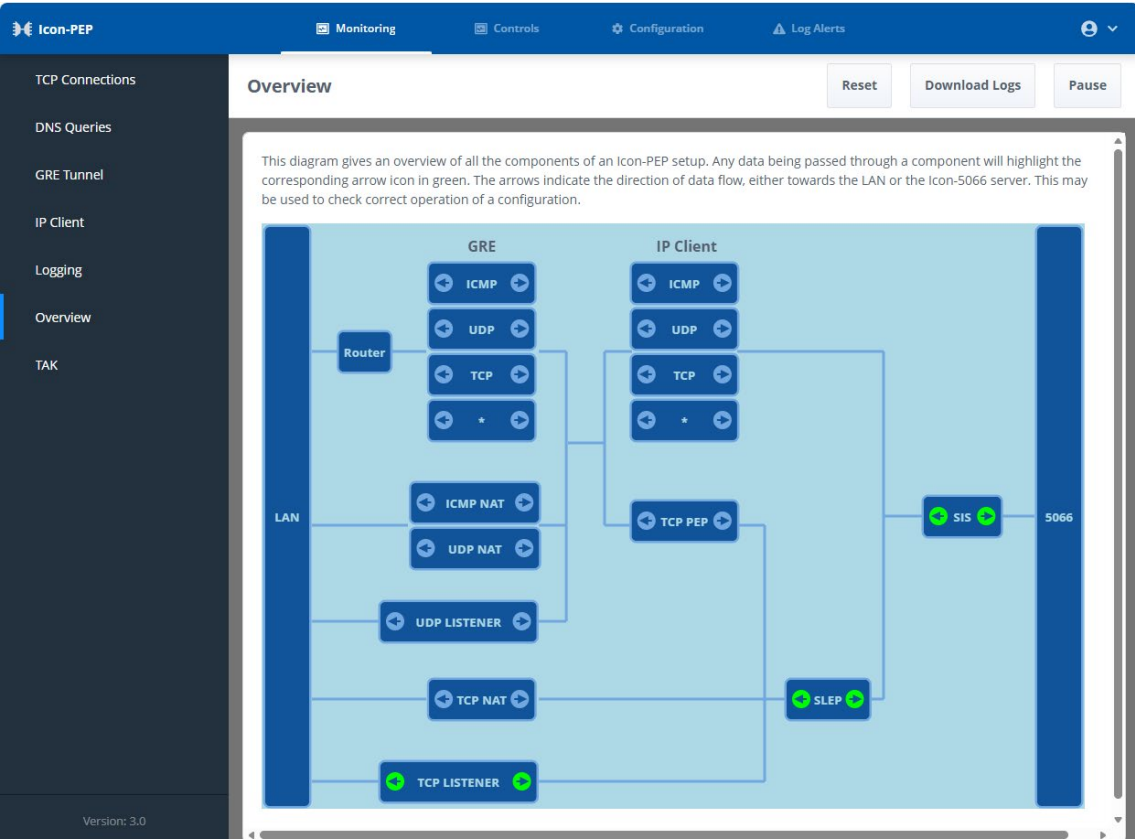
The USS Enterprise Icon-5066 Server will “Initiate” a connection.



The USPF HQ Icon-5066 Server will “Respond”.



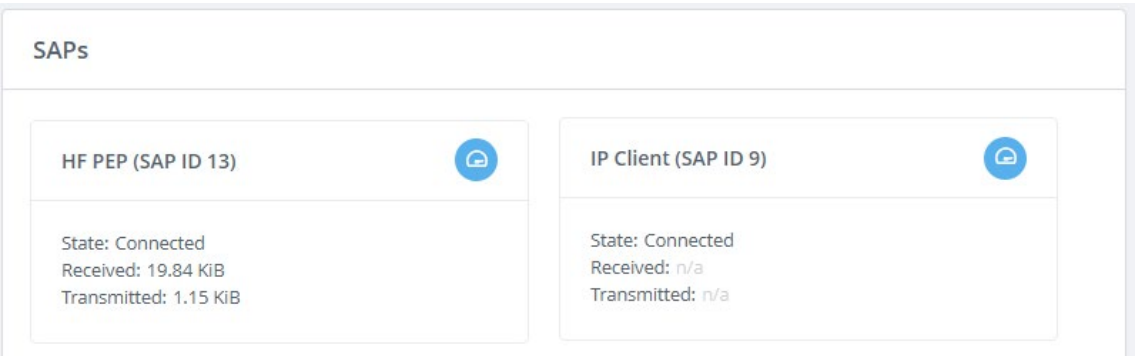
Here are the “Monitoring” Views



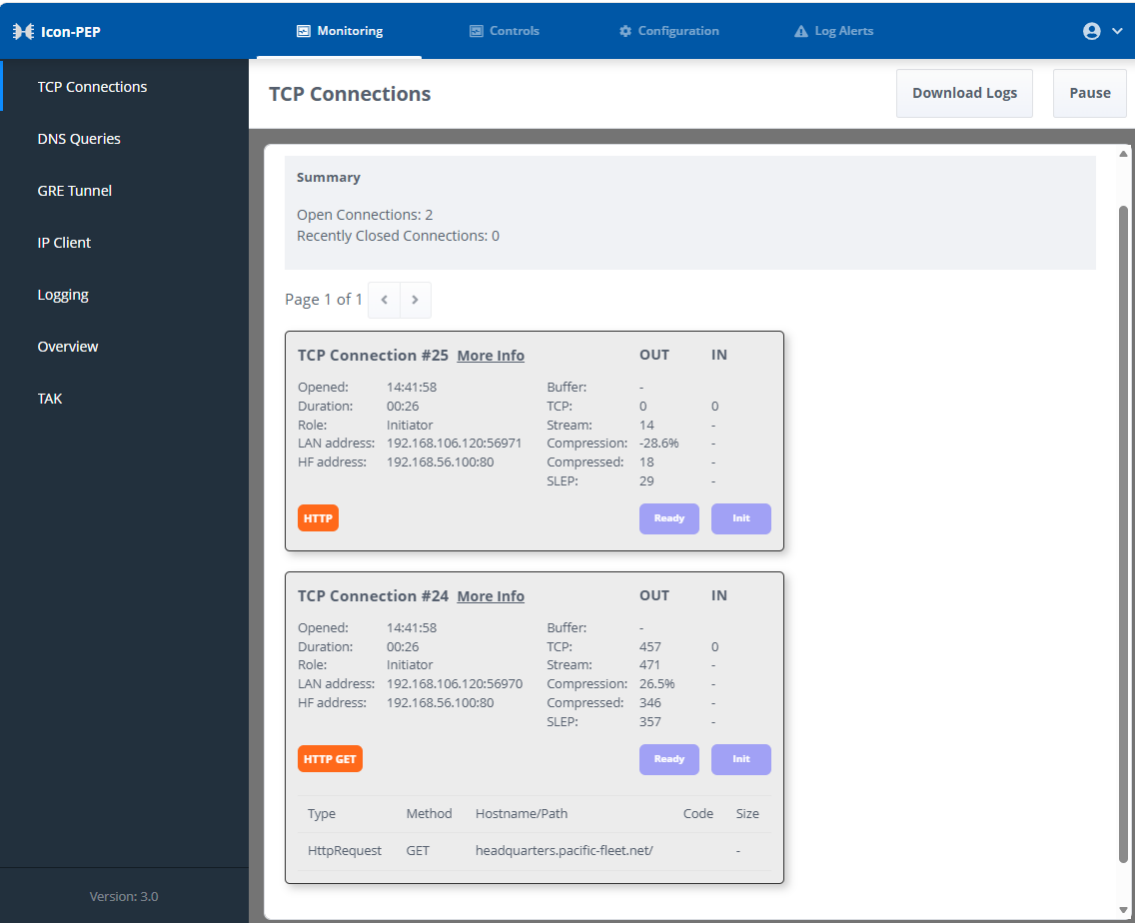
This is the page now displayed.



Icon-5066 also shows the data transferred.



Now repeat the process using the URL <http://headquarters.pacific-fleet.net> .



Note we are now on Port 80 not Port 443.

You will notice in the above screenshot on the left panel the word “TAK”. This is because Icon-PEP can support TAK (<https://www.civtak.org/community-tak-server/>) Server Federation over HF. If you are interested in this please contact Isode Support isode.support@isode.com detailing what you would like to achieve

Other Evaluations

This guide is one two relating to Isode's HF Products, the other guide is:

- Icon-5066

Information on all of this evaluation can be found at <https://www.isode.com/evaluations/>.

Whitepapers

Isode regularly publishes whitepapers on technical and market topics related to its products. A full list of these can be found at www.isode.com/whitepapers/.

Copyright

The Isode Logo and Isode are trade and service marks of Isode Limited.

All products and services mentioned in this document are identified by the trademarks or service marks of their respective companies or organizations, and Isode Limited disclaims any responsibility for specifying which marks are owned by which companies or organizations.

Isode software is © copyright Isode Limited 2002-2026, All rights reserved.

Isode software is a compilation of software of which Isode Limited is either the copyright holder or licensee. Acquisition and use of this software and related materials for any purpose requires a written licence agreement from Isode Limited, or a written licence from an organization licensed by Isode Limited to grant such a licence.

This manual is © copyright Isode Limited 2026.