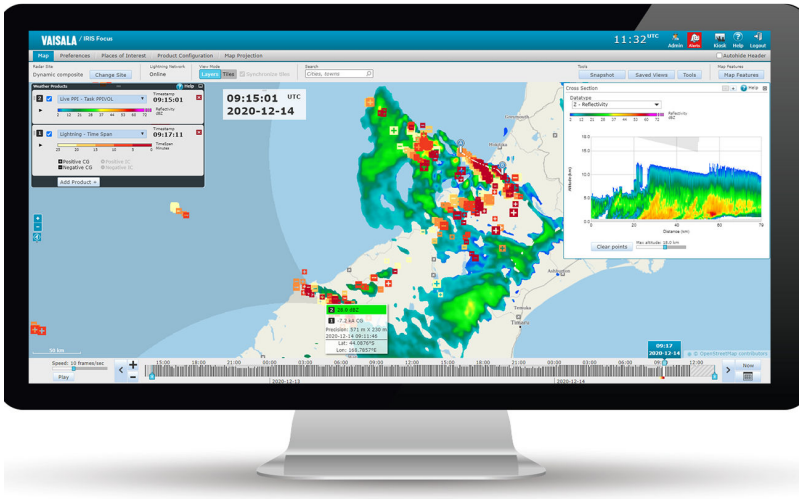
M212545EN-A

CONFIDENTIAL

Administrator Guide

IRIS Focus Lightning

Version 6.0



VAISALA

PUBLISHED BY

Vaisala Oyj
Vanha Nurmijärventie 21, FI-01670 Vantaa, Finland
P.O. Box 26, FI-00421 Helsinki, Finland
+358 9 8949 1

Visit our Internet pages at www.vaisala.com.

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1. About this document

1.1 Version information

This document provides information for installing, operating, and maintaining IRIS Focus Lightning software.

Table 1 Document versions

Document code	Date	Description
M212545EN-A	November 2020	First version of this document. For IRIS Focus 6.0.

1.2 Related documents

Table 2 Related documents

Document code	Name
M211850EN	*IRIS Focus Administrator Guide*
M211849EN	*IRIS Focus User Guide*
M212545EN	*IRIS Focus Lightning Administrator Guide*
M212544EN	*IRIS Focus Lightning User Guide*
M211904EN	*IRIS Focus Release Notes*
M211315EN	*IRIS and RDA Software Installation Guide*

1.3 Trademarks

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Firefox® is a registered trademark of Mozilla Foundation.

Edge® is a trademark of Microsoft Corporation in the United States and other countries.

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1.4 Documentation conventions

WARNING! Warning alerts you to a serious hazard. If you do not read and follow instructions carefully at this point, there is a risk of injury or even death.

CAUTION! Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.

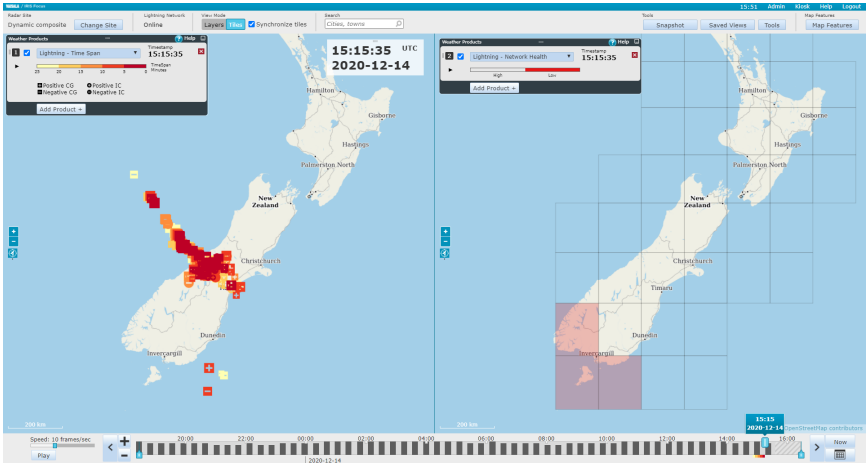
Note highlights important information on using the product.

Tip gives information for using the product more efficiently.

Lists tools needed to perform the task.

Indicates that you need to take some notes during the task.

2. IRIS Focus overview



1) Lightning data: courtesy of Transpower New Zealand Ltd.

Figure 1 IRIS Focus main view

IRIS Focus provides user-friendly, browser-based tools for viewing and analyzing lightning data received from a sensor network.

Lightning data is overlaid on a customizable geographical map. The data is visualized through products such as the **TimeSpan**, which provides information about recent lightning events.

With the zoomable animation timeline, you can easily visualize and animate recent data.

IRIS Focus can also be used to visualize weather radar data from a weather radar network. The application was initially designed for handling weather data, but it is suitable for visualizing any remotely sensored map-based data.

2.1 Lightning product generation

The data for lightning products in IRIS Focus originates from a Vaisala Lightning Detection System which uses multiple, remote sensors to detect signals emitted by lightning discharges, while filtering out the signals from non-lightning sources. Each sensor sends its data to the central processor (the **Total Lightning Processor**, TLP) where lightning locations are determined.

To ensure that the data set applies to the same lightning event, the TLP compares the time at which the event was recorded by each sensor, and then calculates the precise location of the lightning event. The TLP also records several other descriptive characteristics of each lightning event.

The data from the TLP is delivered to IRIS Focus. The data is ingested to the system in real time, after which it can be requested across specific time frames by lightning products.

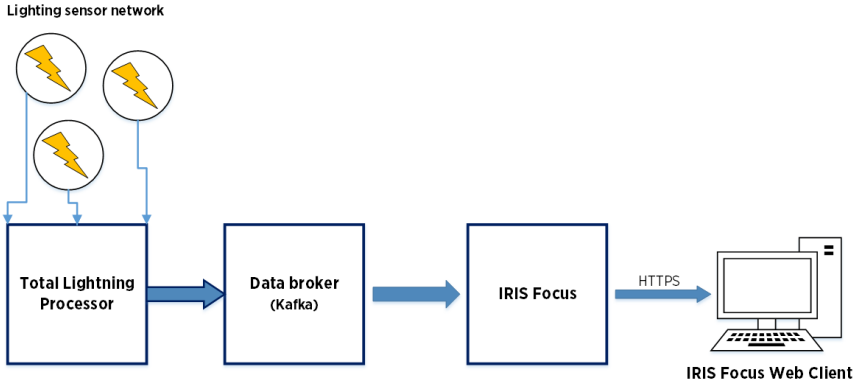
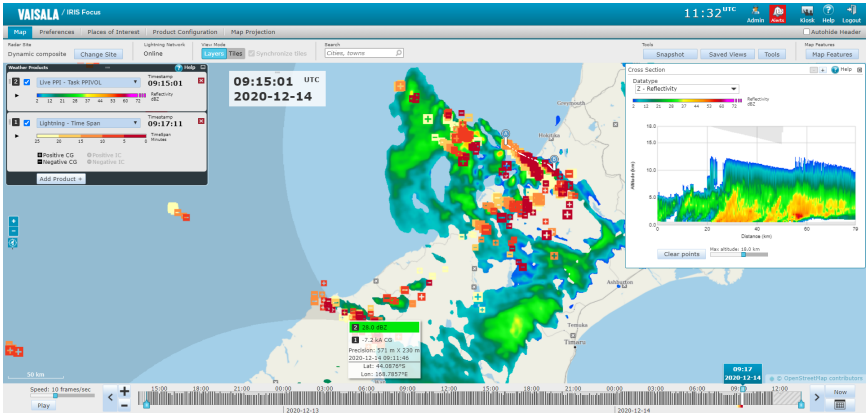


Figure 2 IRIS Focus lightning architecture

2.2 Weather radar data visualization



1) *Weather radar data: courtesy of Meteorological Service of New Zealand Ltd. Lightning data: courtesy of Transpower New Zealand Ltd.*

Figure 3 IRIS Focus main view with weather products

IRIS Focus can also be used to visualize weather radar data. The data comes from a single radar or a network of radar sites. With the zoomable animation timeline, you can easily visualize and animate recent or nowcasted data.

Nowcasting performs advection calculations on motion data from radar products to predict weather movement and severity up to 2 hours in the future.

Significant weather events such as hail, wind shear, or heavy rain are automatically detected when they enter a pre-defined area of interest.

2.3 Licensing

IRIS Focus requires a software license to run. To activate the license, you need a product key.

Vaisala delivers the product key when you purchase the software. If you have purchased the software and you have not received the product key, please contact Vaisala.

For server deliveries, Vaisala activates the product key in the factory, and a Vaisala representative sends you the key for future reference.

The license is mapped to the hardware of your IRIS Focus server or the ID of your virtual environment. If your hardware configuration changes and you need to re-install IRIS Focus, you must request a replacement license from your Vaisala representative, unless you have a USB license key.

If you have a USB license key, IRIS Focus runs when the USB drive is inserted in the server. If you install IRIS Focus on another server, you can move the USB license key to that server.

To view information about the license version, login to IRIS Focus as `admin`, and select **Admin > System > Licensing Management**.

License options

IRIS Focus has a basic license called *IRIS Focus Light*. This license enables users to view certain weather data on the map, but gives limited interaction with the tools. The full license is called *IRIS Focus*. This license provides access to the interactive features of IRIS Focus. The *IRIS Focus* license includes all the features of *IRIS Focus Light*.

There are separate licenses for weather radar data visualization and for lightning data visualization, but users can have access to both licenses. Access to licenses is defined in the user profile.

IRIS Focus Light

IRIS Focus Light licenses have an unlimited number of seats. If there are no *IRIS Focus* license seats available, the user will be logged in with an *IRIS Focus Light* license. If the license is missing, users cannot log in. Administrators can log in even when the license is missing, but they have no access to the map view.

There are two variants of the *IRIS Focus Light* license:

- ***IRIS Focus Light_LGT***
  This license is for viewing lighting data. It enables users to view lightning data visualization in real time and the TimeSpan product, use map search and other map options, and edit user preferences.

- ***IRIS Focus Light_WR***
  This license is for viewing weather radar data. It enables users to view IRIS Analysis products, use map search and other map options, and edit user preferences.
  The *IRIS Focus Light_WR* licenses apply for a defined number of radar sites. If a new radar is added to the radar network, a new license needs to be acquired for this site.

IRIS Focus

IRIS Focus licenses are based on a floating seat pool.

There are two variants of the *IRIS Focus* license:

- ***IRIS Focus Lightning***
  This license enables users to view visualizations of lightning network sensor data, and to use related interactive tools.
- ***IRIS Focus Weather Radar***
  This license enables user to view visualizations of weather radar data, and to use related interactive tools.

Advanced feature licenses

In addition to the *IRIS Focus light* and *IRIS Focus* licenses, the following advanced feature licenses are available. The seat pool does not apply to these licenses; if the advanced feature license is present in the system, users can access these features when they have an IRIS Focus seat.

- ***IRIS WMS layer***
  With the *IRIS WMS layer* license, external WMS layers can be added to the system. Users can then access the layers through the weather product panel.
- ***IRIS Lightning Network Health***
  With the *IRIS Lightning Network Health* license you can get the network performance information from the **Total Lightning Processor** and display it as a product in the product pane. Using this feature requires the *IRIS Focus Lightning* license.
- ***IRIS Radar Nowcast***
  With the *IRIS Radar Nowcast* license you get access to the nowcast algorithm for creating forecasts based on weather radar data up to 2 hours into the future. Using this feature requires the *IRIS Focus Weather Radar* license.

Seat-based license pool

IRIS Focus licenses are available in different configurations. To increase your seat count, you must replace the current license with a new one by contacting your Vaisala representative.

The seat count defines how many users can access IRIS Focus at the same time. When logged in, each user occupies a seat. When a user logs out, the seat is released, and the next user can take it. If a user logs in when all the licenses are reserved, the user is given the *IRIS Focus Light* license until an *IRIS Focus* license is released.

Seat counts within a workstation are browser-based. For one license reservation, users may view IRIS Focus in as many instances or tabs of one browser, such as Firefox®, as they like. If a user opens IRIS Focus in a different browser, such as Google Chrome™, they reserve one license for each browser.

3. Requirements

3.1 IRIS Focus hardware requirements

Table 3 Hardware Requirements

Minimum	Recommended[1)]
• Modern 4-core CPU (Intel Xeon E5 series or similar) • 24 GB RAM • 1 TB HDD • 1400 x 1050 minimum screen resolution	• Modern 8-core CPU (Intel Xeon E5 series or similar) • 32 GB RAM • 2x 1 SAS TB HDD in RAID 1 configuration • 1920 x 1200 screen resolution

1) *The pre-installed IRIS Focus system delivery option uses the Dell PowerEdge R440 rack server unit, which meets the recommended hardware setup. See the Dell product data sheet for full specifications.*
2) *For a small installation with only a few users, 16 GB of RAM is sufficient.*

The hardware capacity directly affects the performance of IRIS Focus. Multiple users can be logged in to IRIS Focus, and each user can have multiple weather and terrain layers rendered on screen at the same time. Each weather and terrain layer requires some resources from the system.

For optimal performance, Vaisala recommends running IRIS Focus on a dedicated hardware server and not in a virtualized environment.

3.2 Software requirements

IRIS Focus supports current Microsoft Edge®, Mozilla Firefox®, and Google Chrome™ browsers.

Before installing IRIS Focus, your environment must meet the following software requirements.

CentOS 7.x

CentOS 7.1 or later DVD/ISO image mounted on your server (offline installation) or a functional internet connection (online installation).

The installation script verifies the version of several core system packages during the installation and updates them from the mounted media or Internet.

This version of IRIS Focus has been tested with CentOS 7.4 and 7.6. We expect IRIS Focus to also work with other versions of CentOS 7.x.

3.3 Network requirements

Table 4 IRIS Network requirements

Item	Specification	
Communication from the TLP to IRIS Focus		
Network data transfer	Minimum of 100 Mbit/s	
Communication from IRIS Focus to the TLP		
Single user (1 seat)	Network data transfer	> 650 kbit/s
	Latency	~150 ms
Multiple simultaneous users	5 seats	> 3.5 Mbit/s
	10 seats	> 7 Mbit/s
	20 seats	> 14 Mbit/s

4. IRIS Focus architecture

Architecture for lightning products

The data for lightning products in IRIS Focus originates from a Vaisala Lightning Detection System which uses multiple, remote sensors to detect signals emitted by lightning discharges, while filtering out the signals from non-lightning sources. Each sensor sends its data to the central processor (the **Total Lightning Processor**, TLP) where lightning locations are determined.

To ensure that the data set applies to the same lightning event, the TLP compares the time at which the event was recorded by each sensor, and then calculates the precise location of the lightning event. the TLP also records several other descriptive characteristics of each lightning event. The data from the TLP is delivered to IRIS Focus. The data is ingested to the system in real time, after which it can be requested across specific time frames by lightning products.

Visualization of products on the map

Each weather product is displayed on top of a map view, which is rendered by a GeoServer instance that is installed during the IRIS Focus installation. The map terrain and detail layers are always on the background, and the weather products are drawn on top of them. The user can change the order of weather product layers in real-time.

IRIS Focus can also display data received through WMS protocol, for example, satellite data. This data is also displayed as product layers over the map layer.

Most weather products have editable color scales. Color scales are stored as JSON objects on the IRIS Focus server and can be reused.

4.1 Map layers

The background map and the weather data visualizations are drawn as individual layers and then combined to form an overview of current weather conditions.

You can also view WMS layers from external sources, such as satellite image layers, as layers on the map.

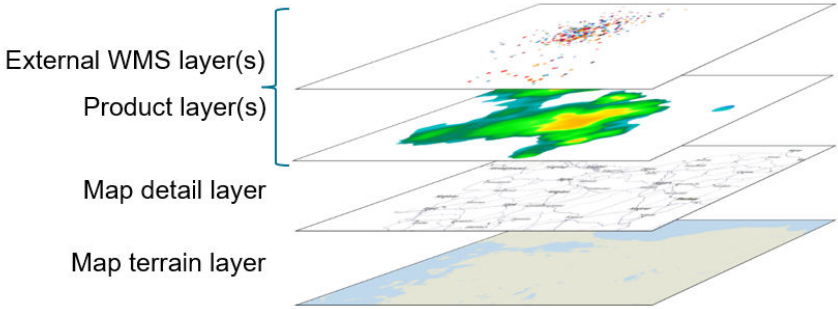


Figure 4 IRIS Focus product layers

Base layers

The background (also known as base) consists of a number of non-interactive layers. At the bottom is a terrain map that can be enhanced with additional layers containing roads, province boundaries, and other similar terrain features.

Lightning product layers

The interactive lightning product layers are drawn on top of the background layers.

External WMS layers

You can add WMS layers from external sources to the map. They are shown as product layers.

4.2 GeoServer and maps

The map engine in IRIS Focus uses GeoServer architecture.

The terrain data in IRIS Focus consists of a detailed vector map of Earth, separated into multiple layers. The base map content is licensed from the collaborative OpenStreetMap project, which provides all vector shapefiles for the base terrain.

Figure 5 Base map from GeoServer

To save system resources, the shapefiles are combined into different map detail levels that are rendered as a single layer where possible. For example, selecting the **Full detail** map level does not draw separate layers for terrain, roads, map labels, and other map features. Instead, all the content has been precompiled into a single layer in the IRIS Focus map package and then drawn on screen.

When a user opens the map view in IRIS Focus, GeoServer processes the vector data in the current view area into 256×256 PNG tiles that are displayed in the browser window. New tiles are calculated and generated every time the user pans or zooms on the map, so moving on the map may feel a bit sluggish in the beginning. To improve performance, GeoServer runs a caching component called GeoWebCache that stores the tiles for faster retrieval in the future.

GeoServer has a management web interface that runs at `http://localhost:34180/geoserver`. The default management account name is admin and the password can be found in the file `/etc/vaisala/radarsw/configuration/gis-override.ini`. The password is generated automatically during IRIS Focus installation.

The base map data is stored in a PostgreSQL database, which also stores all web application data.

4.3 Web application

IRIS Focus supports current Microsoft Edge®, Mozilla Firefox®, and Google Chrome™ browsers.

IRIS Focus only accepts HTTPS connections. All requests to the standard HTTP port are redirected to the HTTPS port 443.

All application settings are stored in a PostgreSQL database on the IRIS Focus server.

Map and terrain data are stored in the same database.

5. Installation

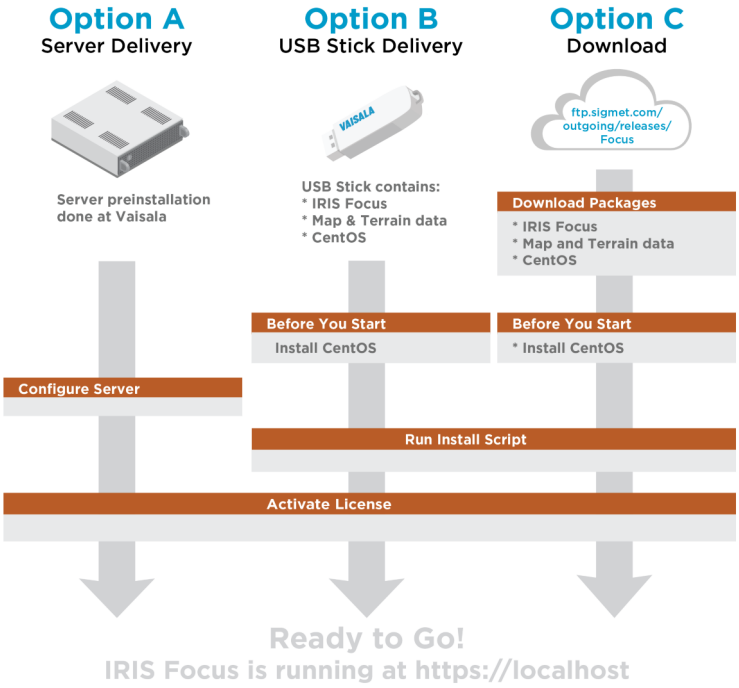


Figure 6 IRIS Focus Delivery Options

Option A Pre-installed system delivery from Vaisala. The "turnkey" option. Place an order and wait for delivery by Vaisala.

Option B Preconfigured USB stick containing the CentOS operating system and all required files for installing IRIS Focus.

Option C Downloadable installation packages. Download the required packages to install IRIS Focus on your server.

5.1 Downloading installation packages

1. Connect to Vaisala Sigmet server (ftp://ftp.sigmet.com) using an FTP client. The host server allows read access for anonymous FTP connections.

2. If you require the Centos installation image, download it from:

> You can skip the CentOS installation image if you already have an appropriately configured CentOS installed.

5.1.1 Verifying MD5 hashes

Each file has an associated ***md5sum*** file located in the same download directory.

After downloading the file(s), verify their integrity by checking each file's MD5 hash against the one provided at the installation site.

1. Do one of the following:
   - In CentOS – Use the pre-installed **md5sum** command line tool:
     md5sum [filename]
   - In Microsoft Windows – Use the pre-installed **CertUtil** utility:
     certutil –hashfile [filename] MD5
2. Check that the hashes match completely with the reference hashes at the download source.
3. If you see any discrepencies in the hashes, download the mismatching file again.

5.2 Prerequisites for installation

Before installing IRIS Focus, make sure your environment meets the necessary hardware and software requirements.

5.3 Installing CentOS

A prerequisite for installing IRIS Focus is that CentOS is installed on your intended IRIS Focus system.

> This version of IRIS Focus has been tested with CentOS 7.4 and 7.6. We expect IRIS Focus to also work with other versions of CentOS 7.x.

If you do not have a CentOS system running, select an installation image from Vaisala Sigmet server (ftp://ftp.sigmet.com/outgoing/releases/centos), and see instructions at Tecmint Linux Guides (https://www.tecmint.com/centos-7-installation/) on how to perform a CentOS installation.

Table 5 Vaisala-recommended disk partitioning

Partition	Size
/home	50 GB
/boot	500 MB
/var	100 GB
/	100 GB
swap	size of RAM + 2 GB
/srv	100% of the remaining disk space

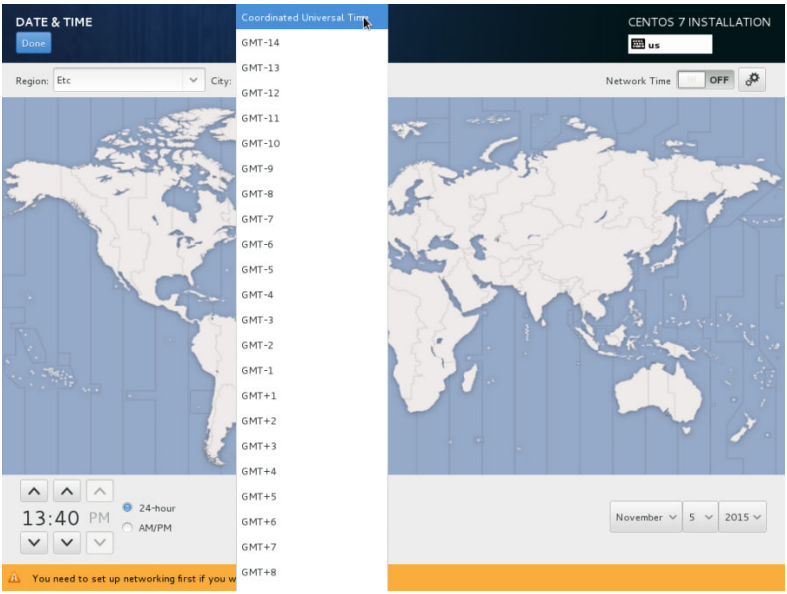
If there is only a little disk space, you can decrease the size of the */home*, */var*, and */* partitions by 10-20 GB.

When you are only installing IRIS Focus on the server (and not IRIS Analysis), do not create a */usr/iris_data* partition. Instead, allocate all remaining diskspace to the */srv* partition.

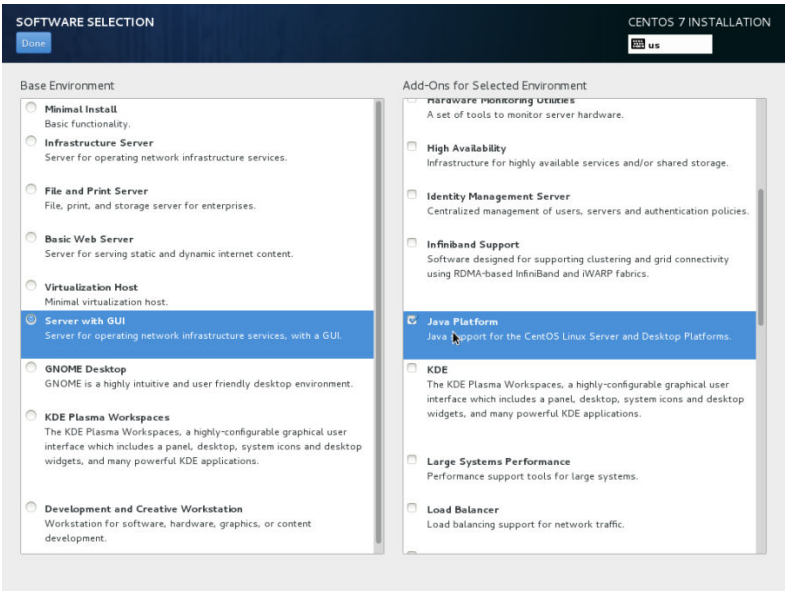
Install CentOS according to the standard instructions, with the following changes.

1. Select your installation language.

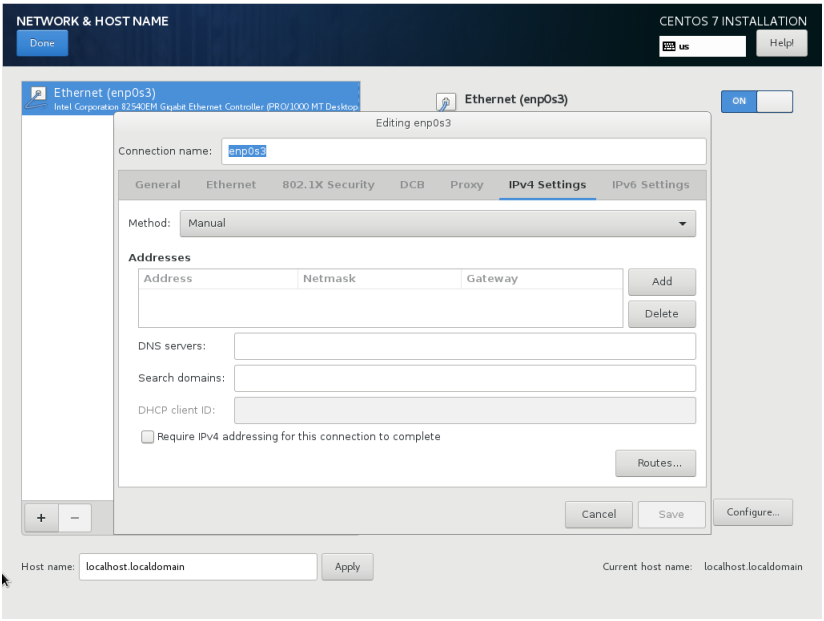
2. In **DATE & TIME**, set the system clock to Coordinated Universal Time (UTC) by choosing the following values:
   - Region: **Etc**
   - City: **Coordinated Universal Time**



3. In **SOFTWARE SELECTION**, set the server type by selecting the following software installation options:
   - Base Environment type: **Server with GUI**
   - Add-ons: **Java Platform**

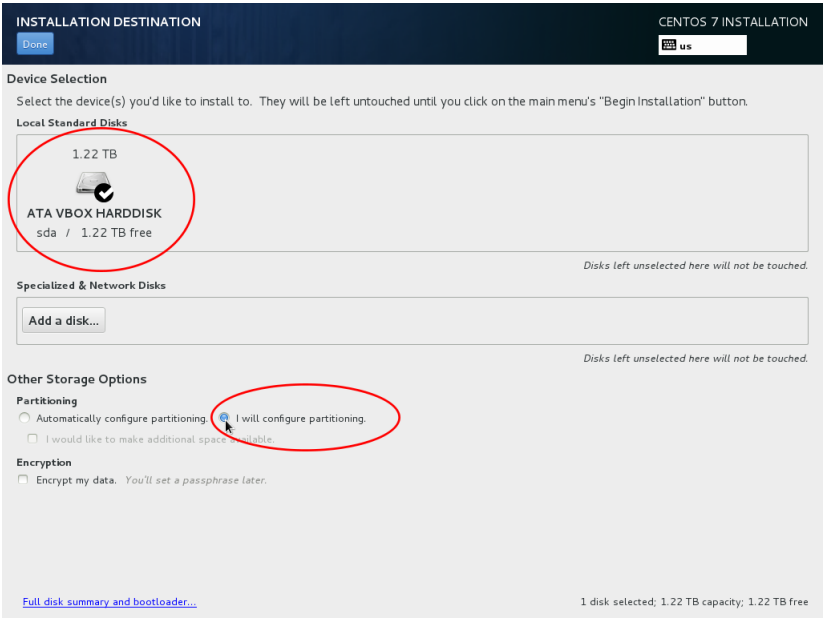


4. In the CentOS installation screen, select **NETWORK & HOSTNAME**.

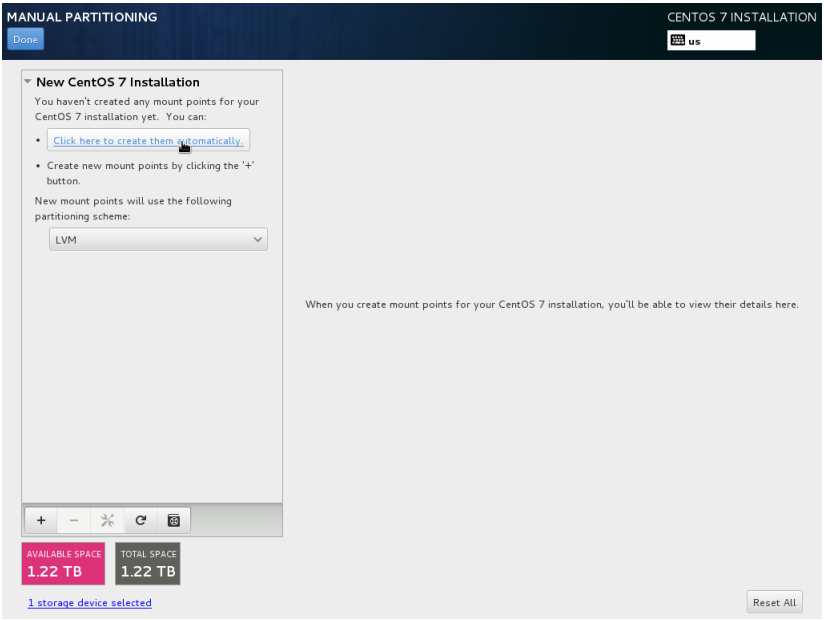


a. Turn the network **ON**.
b. Select **Configure**.
c. In the **General** tab, select **Automatically connect to the network when it is available**.
d. In the **IPv4 Settings** tab, select **Method > Manual**.
e. In the **IPv4 Settings** tab, select **Add** to add your network IP address, Netmask, Gateway, and DNS servers.
f. Select **Save**.
g. In **Host name**, type a name for this server.
h. Select **Apply**.

5. In **INSTALLATION DESTINATION**, start manual partitioning:
   a. Select the hard disk.
   b. Select **I will configure partitioning**.
   c. Select **Done**.

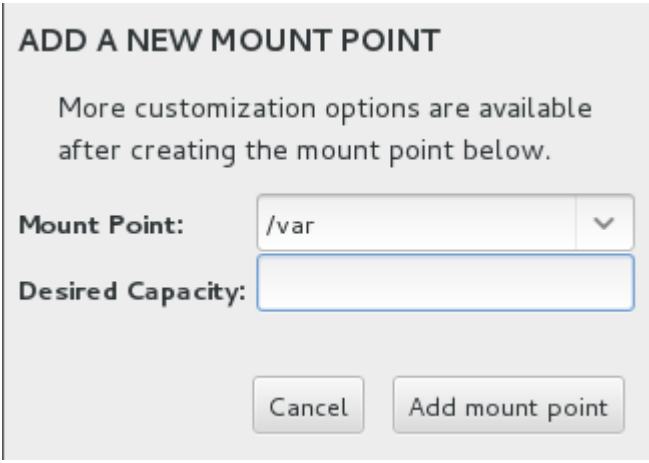


6. Select **Click here to create them automatically**.



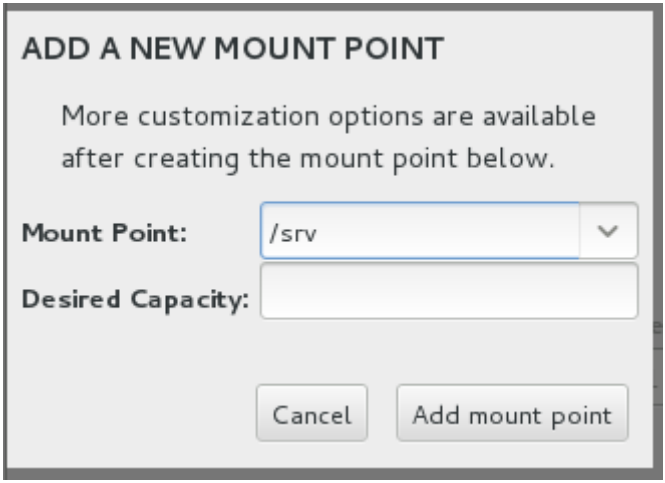
7. Create the **/home** partition.
   a. Select the plus (**+**) icon.
      The **ADD A NEW MOUNT POINT** dialog appears.
   b. Under **Desired Capacity**, set the size of the home partition (*/home*) by typing **`50 GiB`**.
   c. Select **Update Settings**.

8. Create the */var* partition:
   a. Select the plus (**+**) icon.
   The **ADD A NEW MOUNT POINT** dialog appears.



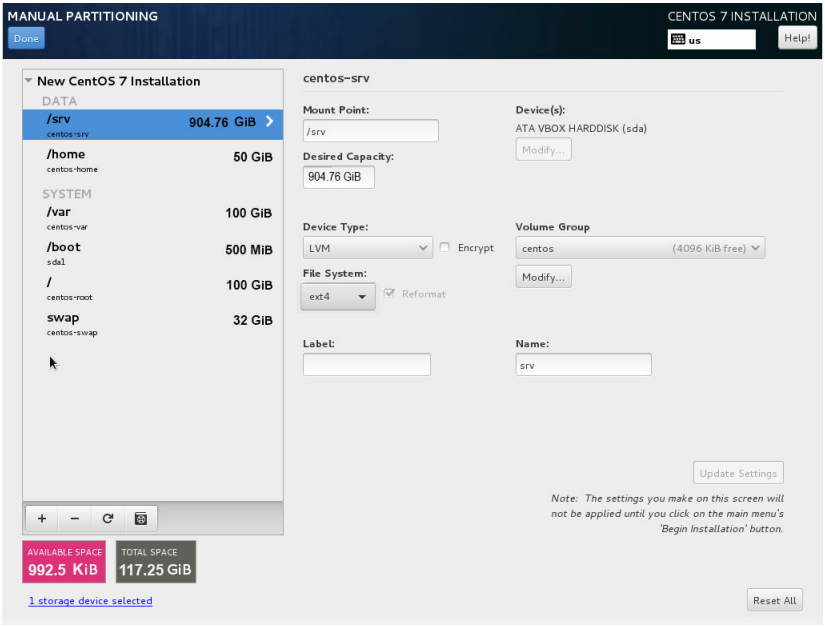
   b. In **Mount Point**, type */var*
   c. Under **Desired Capacity**, set the size of the */var* partition by typing **`100 GiB`**.
   d. Select **Add mount point**.
9. Select **/boot**.
   a. Under **Desired Capacity**, set the size of the */boot* partition by typing **`500 MiB`**.
   b. Select **Update Settings**.
10. Select **/**.
   a. Under **Desired Capacity**, set the size of the root partition (/) by typing **`100 GiB`**.
   b. Select **Update Settings**.
11. Select **swap**.
   a. Under **Desired Capacity**, set the size of the swap to the size that corresponds to RAM + 2 GB.
   b. Select **Update Settings**.

12. Create the */srv* partition:
    a. Select the plus (**+**) icon.
    The **ADD A NEW MOUNT POINT** dialog appears.



    b. In **Mount Point**, type */srv*
    c. Under **Desired Capacity**, use the remainder of the server space for the */srv* partition by typing **9999999**.
    The user interface fills in the available server space.
    d. Select **Add mount point**.
13. Select **Done**.

14. Check that the partitions are defined as follows:



15. Select **Done > Accept Changes**.
16. Select **Begin Installation**.

5.3.1 Setting the Root Password

If your system was pre-installed in Vaisala, the default password is `xxxxxxxx`.

When you have started the CentOS installation, configure the `root` and one non-`root` user account.

1. Select **ROOT PASSWORD**.
   The **Root Password** window opens.
2. Enter your root password.
   Check the password strength meter. While Vaisala recommends a strong password, the software does not stop you from entering a weak one.
3. In the confirm text box, re-enter your root password.
4. In the upper left hand corner, select **Done** to return to the main configuration page.
   If your password is weak, you are prompted to select **Done** a second time.

5.3.2 Creating CentOS user accounts and finalizing the installation

1. Select **USER CREATION**.
2. Create an account with the following properties:
   - User name: `radarop`
   - Password: `[chosen password]`

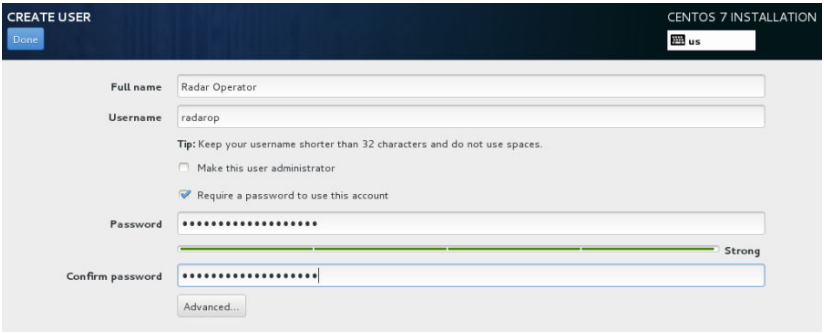


Figure 7 Creating user accounts

3. In the upper left hand corner, select **Done** to return to the main configuration page.
   If your password is weak, you are prompted to select **Done** a second time.
   The installation continues for a few minutes.
4. When prompted, select **Reboot**.
5. Select **LICENSE INFORMATION**.
   Accept the license agreement.
6. Select **Done**.
7. Select **FINISH CONFIGURATION**.

The CentOS installation is now complete. You are ready to install IRIS Focus.

5.4 Installing IRIS Focus from a USB stick

In these instructions, `x.x` is the number of the version/patch.

The IRIS Focus installation USB contains the following file structure for the main version installation:

```
Focus_install
-----vaisala-iris-maps-v2
-----vaisala-iris-terrain-v2
-----Vaisala_IRIS_installer-6.x.x.tar
-----documentation
```

In the case of a patch release, the USB stick may also include an additional .tar file for the patch.

To install IRIS Focus from the USB stick, you must copy the files to the CentOS server and prepare the files for installation.

1. Reboot the system.
2. Log in as **`root`**.
3. Insert the USB stick.
   If it is already plugged-in, remove and re-insert the stick.
4. In the pop-up dialog, select **Open With Files**.
5. Right-click a blank area and select **Open in Terminal**.
6. In the terminal, type **pwd** and press **ENTER**.
   The result is usually `/run/media/root/IRIS`.
7. Copy the *`Focus_install`* directory to the CentOS server:

   ```
   mkdir /srv/Focus_install
   cp -r /run/media/root/IRIS/Focus_install/* /srv/Focus_install
   ```

8. Change to the */`Focus_install`* directory and unpack the *`.tar`* file:

   ```
   cd /srv/Focus_install
   tar -xvf Vaisala_IRIS_installer-6.x.x.tar
   ```

9. Change to the */srv/Focus_install/vaisala-iris-terrain-v2* directory:

```
cd /srv/Focus_install/vaisala-iris-terrain-v2
```

   a. Join the fileparts:

```
cat vaisala-iris-terrain-v2-part* > vaisala-iris-terrain-v2.zip
```

   b. Unzip the resulting terrain zip file:

```
unzip vaisala-iris-terrain-v2.zip
```

   c. Remove the extra files:

```
rm -rf vaisala-iris-terrain-v2-part*
rm -rf vaisala-iris-terrain-v2.zip
```

10. Change to the */Focus_install* directory.
11. Run the IRIS Focus installation script:

```
/Focus_install/Vaisala-IRIS-Focus-v6.0.0--23/rsw-installer --offline --gis-
db-dump vaisala-iris-maps-v2 --terrain-dir vaisala-iris-terrain-v2 --
lightning -cow <root application URL>
```

    To limit access to port 9092 (kafka) to the TLP, if you know the IP address of your **Total Lightning Processor** (TLP), you can include `--tlp IP_ADDRESS` in the command line. If this option is omitted, port 9092 will be opened to all systems on the network.

5.5 Installing IRIS Focus components

The script automatically installs all necessary services, user accounts, and modules required to run IRIS Focus. The services start automatically.

Table 6 IRIS Focus services

Service	Description
`monit`	Monitoring tool for Unix systems and processes.
`HAProxy`	Encodes outgoing traffic with HTTPS encryption.
`vaisala-radarsw-webapp`	IRIS Focus web application.
`vaisala-radarsw-geoserver`	Map engine for caching and generating base map layers.

Service	Description
`vaisala-iris-lightning-ws`	The lightning WebSocket service
`kafka`	Kafka data broker service for lightning
`kafka-zookeeper`	A manager service required by kafka data brokers

Table 7 IRIS Focus users

User	Description
`radardm`	Restricted user account for running the Data Manager application.
`radardminput`	Restricted user account for running the Data Manager input service.
`radargeo`	Restricted user account for running the GeoServer map engine.
`radarweb`	Restricted user account for running the IRIS Focus web application.
`warnreader`	Restricted user account for running the warn reader service.
`iris-lightning-ws`	Restricted user account for the lightning WebSocket service.
`kafka`	Restricted user account for the Kafka data broker service and Kafka-zookeeper.

1. Make sure you have a CentOS 7 server system set up, and that you have received the IRIS Focus installation files either as a USB delivery or as a download.
2. Make sure you have the IRIS Focus application installer, map data package, and terrain data package available.
   These are required because all IRIS Focus components are installed at the same time.
3. Mount the CentOS 7 USB stick or DVD.
   Although CentOS 7 is already set up, the IRIS Focus installer relies on some packages that are provided by the CentOS repository.
4. Login as **`root`**.
5. Unpack the contents of the IRIS Focus installation file on the server, for example to the */root/IRIS* directory.
   These files occupy approximately 40 Gb of space unpacked.
6. Navigate to the directory where you downloaded the files.

7. Launch the **./rsw-installer** script.
   The install script requires the following parameters:

```
./rsw-installer --offline --gis-db-dump [maps directory] --terrain-dir
[terrain directory] --lightning
```

   - **--gis-db-dump** – location for the map data
   - **--terrain-dir** – location for the terrain data
   - **--lightning** – use this parameter if you are connecting a Total Lightning Processor system to IRIS Focus

The install process can take a significant amount of time, especially as the application database is first populated with map data.
Do not abort the installation if you do not see progress in a single step for up to 1 hour.

5.6 Running OS hardening scripts

When the IRIS Focus installation is complete, run the OS hardening scripts.

Table 8 Hardened areas

Hardened area
Install AIDE (Advanced Intrusion Detection Environment)
Restrict core dumps
Set permissions for **grub** configuration
Set default Message of the Day
Configure Chrony NTP
Configure TCP Wrappers
Strengthen log file permissions
Strengthen **Cron** configuration
Lockout for failed login attempts
Password suffiency
Strengthen file permissions
Enable SSH issue banner
Disable IPv6
Remove support for unneeded file system types: **cramfs**, **freevxfs**, **jffs2**, **hfs**, **hfsplus**, **squashfs**, **udf**, **vfat**, **dccp**,**sctp**, **rds**, **tipc**, **cups**, **avahi-daemon**

1. Navigate to the directory where you downloaded the installation files.
2. Type the command:

   ```
   ./rsw-harden-os
   ```

   The command executes the bash scripts in the */release/security-scripts* directory.

5.7 Activating license

IRIS Focus provides several ways to activate the IRIS Focus software license on the server: with a USB license key, online, or offline without the USB license key.

5.7.1 Activating License from a USB Drive

The IRIS Focus license key can be provided on a USB drive. If you are using this option, after installing IRIS Focus, activate the license by linking the USB drive to the license file provided by Vaisala.

For the license to remain active, the USB drive must remain in the server after completing this procedure.

1. Insert the USB in the server machine.
2. Install the license with the following command:

   ```
   rsw-install-license <license.txt>
   ```

3. Stop and restart the IRIS Focus web application service:
   a. Type the command:

      ```
      systemctl stop vaisala-radarsw-webapp
      ```

   b. Wait until the process has stopped and the command prompt is ready for the next command.
   c. Type the command:

      ```
      systemctl start vaisala-radarsw-webapp
      ```

4. Log in to IRIS Focus using an administrator account.
5. Select **Admin > System > Licensing Management** to view information about the license (seats, end date, and start date).

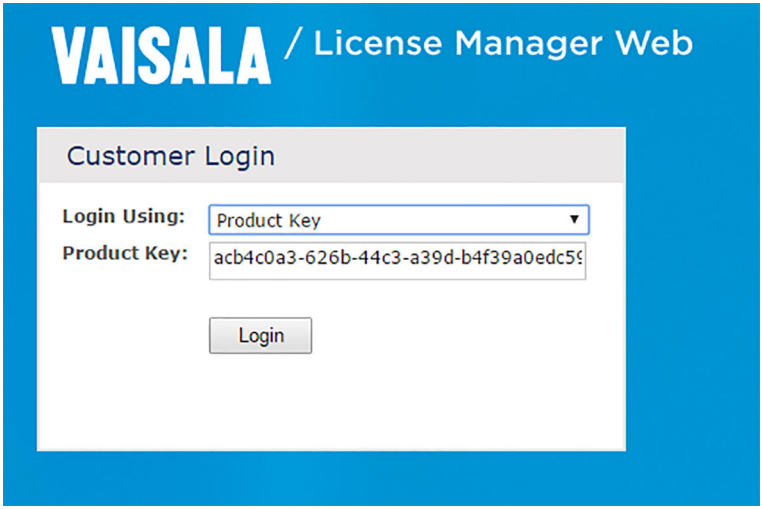
The license has now been activated on the IRIS Focus server and will remain active as long as the USB drive is in the server. If you remove the USB from the server, IRIS Focus will not run properly. To run IRIS Focus on the server, insert the USB drive again.

If you must replace the server, perform the same procedure on the new server.

5.7.2 Activating license – online

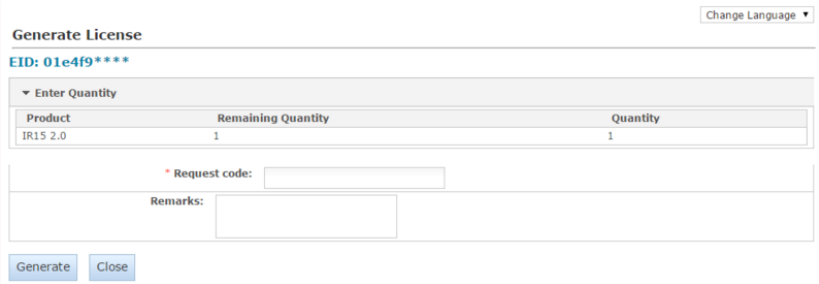
If you are using a USB license key, first insert the USB drive in the server for the license to work. See Activating License from a USB Drive (page 35).

1. Login as **`root`**.
2. Run the **`rsw-show-machine-code`** command on the IRIS Focus server to get the locking code specific to the server hardware.
3. Go to Vaisala License Manager Web at https://licensing.vaisala.com and select **Product Code** in the **Login Using** field.

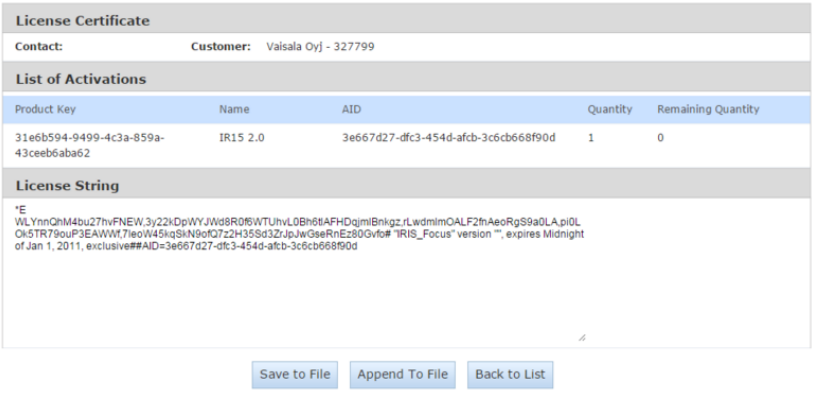


4. Enter your product code and select **Login**.

5. Enter the locking code in the **Request Code** field.



6. Select **Generate**.
   A popup window with the license string opens.



7. Select **Save to File** to save the license string to a file on disk.
   The file is saved by default with the name *`lservrc`*.

Alternatively, use an SSH client to copy and paste the license string to a *`.txt`* file on the server.

8. Install the license with the **`rsw-install-license <location-of-the-license-file>`** command.

9. Stop and restart the IRIS Focus web application service:
   a. Type the command:

      ```
      systemctl stop vaisala-radarsw-webapp
      ```

   b. Wait until the process has stopped and the command prompt is ready for the next command.
   c. Type the command:

      ```
      systemctl start vaisala-radarsw-webapp
      ```

10. Log in to IRIS Focus using an administrator account.
11. Select **Admin > System > Licensing Management** to view information about the license (seats, end date, and start date).

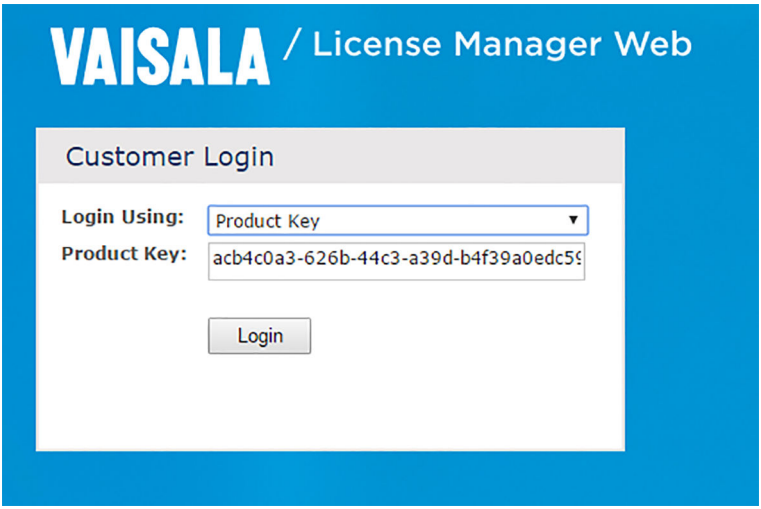
5.7.3 Activating license – offline

If the server running IRIS Focus is not connected to internet, you must activate the license by entering the IRIS Focus server locking code in **Vaisala License Manager Web** using an online computer. Then transfer the license file to the IRIS Focus server.

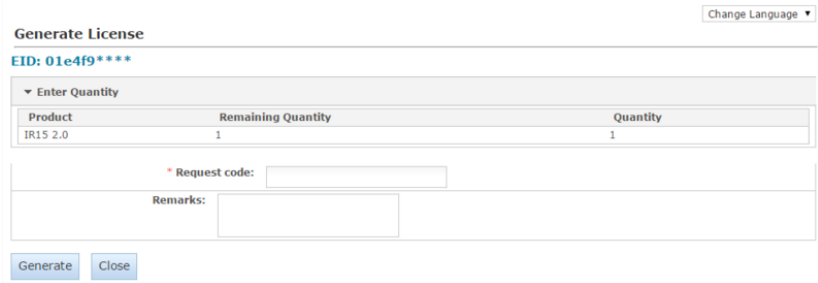
If you are using a USB license key, first insert the USB drive in the server for the license to work. See Activating License from a USB Drive (page 35).

1. Run `rsw-show-machine-code > [filename]` command on the IRIS Focus server to get the product code specific to the server hardware.
   This stores the product code string in a file.
2. Copy the file to a removable media, such as a USB stick, and transfer it to the online computer.

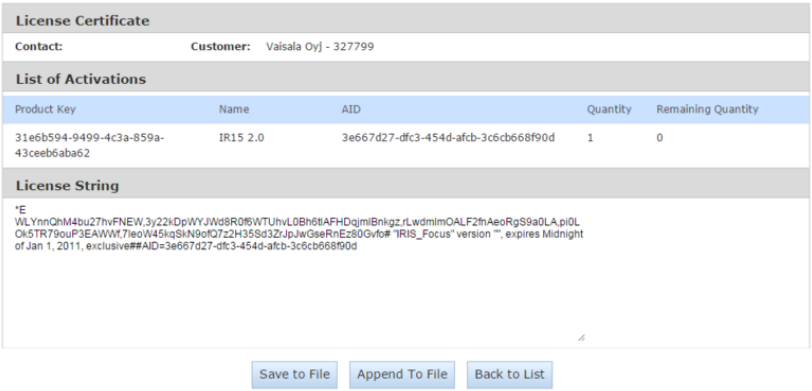
3. Go to Vaisala License Manager Web at https://licensing.vaisala.com and select **Product Code** in the **Login Using** field.



4. Enter your product code and select **Login**.
5. Enter the locking code in the **Request Code** field.



6. Select **Generate**.
   A popup window with the license string opens.



7. Select **Save to File** to save the license string to a file on disk.
   The file is saved by default with the name *`lservrc`*.

> Alternatively, use an SSH client to copy and paste the license string to a *`.txt`* file on the server.

8. Copy the license file to a removable media and transport the file to the IRIS Focus server.
9. Install the license with the **`rsw-install-license <location-of-the-license-file>`** command.

5.8 Connecting the TLP system

Follow this procedure to add the **Total Lightning Processor** system to the IRIS Focus system to retreive lightning data.

> These steps are typically done automatically by the **`./rsw-installer`** script when you include the **`--lightning`** option. You only need to perform these steps if you have upgraded an older IRIS Focus system, or you did not include the **`--lightning`** option when running **`./rsw-installer`**. Otherwise, you can skip to section Configuring the TLP for IRIS Focus (page 41).

1. Enable the necessary services:

```
systemctl enable --now kafka-zookeeper
systemctl enable --now kafka
systemctl enable --now vaisala-iris-lightning-ws
```

2. To enable lightning in the Web application, edit the *vsoweb-override.ini* configuration file in the */etc/vaisala/radarsw/configuration* directory. Change (or create, if not present) the **[PROVIDERS]** section to the following:

```
[PROVIDERS]
lightning.enabled = true
```

3. Restart the Web application by typing:

```
systemctl restart vaisala-radarsw-webapp
```

4. Configure the firewall.
   The **Total Lightning Processor** connects to the Kafka data broker on port **9092** on the IRIS Focus system. If you are running the **firewalld** service, configure the firewall to allow this connection.
   Example: If the TLP system IP address is **10.55.11.2**, run the following firewall commands on the IRIS Focus system to allow **10.55.11.2** access to port **9092**:

```
firewall-cmd --permanent --zone=public --add-rich-rule='
rule family="ipv4"
source address="10.55.11.2/32"
port protocol="tcp" port="9092" accept'

firewall-cmd --reload
```

5. Configure the **Total Lightning Processor**.
   At this point, the IRIS Focus system should be set up and ready for lightning data provided by the Total Lightning Processor. Follow the instructions in Configuring the TLP for IRIS Focus (page 41) to start the flow of lightning data from the TLP to IRIS Focus.

5.9 Configuring the TLP for IRIS Focus

If you have the **Total Lightning Processor** (TLP) system that will be providing lightning data to IRIS Focus, you need to add a new service to the TLP system to push the lightning data into the kafka data broker service running on the IRIS Focus system. Your TLP must be running version 1.2.7 or later.

5.9.1 Changing `regstatd2` report frequency

The **`regstatd2`** service generates a regional network health report periodically that is used to provide the **Network Health** product layer on IRIS Focus. In a default installation, the **`regstatd2`** service updates this report once an hour. It is recommended that you configure **`regstatd2`** on the TLP to produce this report at a more frequent 10-minute interval.

1. Go to the *`regstatd2.cfg`* file in the */opt/vai/tlp/etc* directory.
2. Edit the file to set the **`updateIntervalMinutes`** parameter to 10 minutes by typing:

```
updateIntervalMinutes   10
```

3. Stop the **`regstatd2`** service by typing:

```
lpstart stop regstatd2
```

4. Start the **`regstatd2`** service again by typing:

```
lpstart start regstatd2
```

5.9.2 Adding the `tlp-to-kafka` service

1. Log into your TLP system using the **`vops`** user account.
2. Go to the *`startup.cfg`* file in the */opt/vai/tlp/etc directory*.
3. Add the following line to the file:

```
core n java tlp-to-kafka -jar /opt/vai/tlp/lib/tlp-to-kafka.jar
```

4. Edit the *`tlp-to-kafka.cfg`* file in the */opt/vai/tlp/etc* directory according to how you want the lightning events to be sent to IRIS Focus:
   - If you want the lightning events sent to IRIS Focus to be composite flash events produced by the TLP, set the **`lp.tokafka.smqLightning`** parameter to **`"smq://fdata"`**.
   - If you want the lightning events sent to IRIS Focus to include the individual lightning strokes produced by the TLP, set the **`lp.tokafka.smqLightning`** parameter to **`"smq://RLFxStrokeData"`**.

   To set the value, type:

```
lp.tokafka.smqLightning <parameter-value>
```

   For example:

```
lp.tokafka.smqLightning "smq://RLFxStrokeData"
```

5. Edit the *kafka-producer.properties* file in the */opt/vai/tlp/etc* directory to update the **bootstrap.servers** parameter with the IP address or host name of your IRIS Focus server.
   For example, if your IRIS Focus server IP address is **10.55.11.2**, set it by typing:

```
bootstrap.servers=10.55.11.2:9092
```

6. Start the **tlp-to-kafka** service by typing:

```
lpstart start tlp-to-kafka
```

The **tlp-to-kafka man** page provides more information on configuring and running the **tlp-to-kafka** service on a TLP system.

5.10 Verifying IRIS Focus installation

1. Check that the web user interface is running at the default HTTPS port, and the following default user accounts have been created in IRIS Focus during installation:
   - Username: **admin** / password: **admin123**
   - Username: **user** / password: **user123**
2. Access the IRIS Focus web UI by opening a browser on the IRIS Focus server and navigating to *https://localhost*.
   You should see the login screen for IRIS Focus web application.
3. Log in with the default IRIS Focus user account.
   Make sure the application loads, and the map view is displayed.
4. Verify that **Tracking Tool** button is visible in the application UI.
   This verifies that IRIS Focus features are enabled.
5. Enable the grid lines by selecting **Map Features Lat/lon grid**.
   Depending on where the map view is centered, you should see slightly distorted grid lines that are leading away from the equator. This verifies that the map projection is correct.
6. Verify that you can add the lightning-related **TimeSpan** and **Network Health** products to the map. If there is lightning occurring, check that you can see lightning data appearing on the map, as well as the regional health of your lightning network.

If you have just completed the installation, it may take a while until the first network health report arrives.

6. System administration

6.1 User roles

Access to IRIS Focus features depends on the roles enabled for each user account. Each user account belongs to one or more organizations.

For example, the administration features are available to user accounts with the **administrator** role.

Table 9 IRIS Focus user roles

Role	Description
administrator	Can access administration features. Users with an **administrator** role must belong to the **root** organization.
Focus Lighting User	Can access the full IRIS Focus feature set for visualizing lighting data.
Focus Weather Radar User	Can access the full IRIS Focus feature set for visualizing weather radar data.
User	Can access the limited set of features available with *IRIS Focus Light*.
Poweruser	Can access the full IRIS Focus feature set. Can select an organization-level map projection.
Kiosk user	Can only access the non-interactive full-screen mode.

To enable all IRIS Focus features for an account, set both **user** and **focus** roles for that account.

Seat Allocation and Restrictions

Each logged-in user account with a **focus** or **poweruser** role reserves one IRIS Focus seat from the license pool. When the user logs out, the seat is released.

A user account that has **user** or **administrator** role, or another role without a **focus** role, enters IRIS Focus Light, which has a map view with limited features and does not provide access to features such as cross-section or on-demand radar products.

If a user with a **focus** role logs in and there are no IRIS Focus seats available, the user enters IRIS Focus Light. When a seat is available, the user is provided with an opportunity to switch to IRIS Focus.

To avoid reserving an IRIS Focus license when performing administration tasks, the default administrator account does not have the `focus` role.

6.1.1 Managing user accounts

1. Log in as **`admin`**.
2. Select **Admin** in the upper right corner.
3. Select **Users** to add, edit, or delete users.
4. If you change the user's role, the change won't take effect while the user is logged in. To log out the user, go to the **Logged In Users** tab, and in the **Actions** column, select **Log out user**.

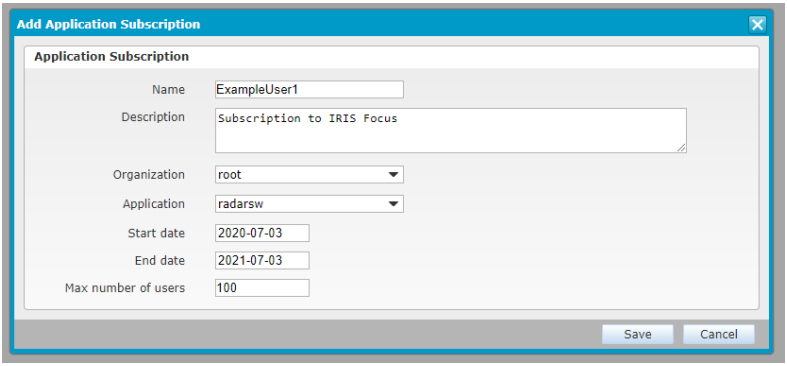
6.1.2 Creating user accounts after first install

After a fresh installation, create the user accounts.

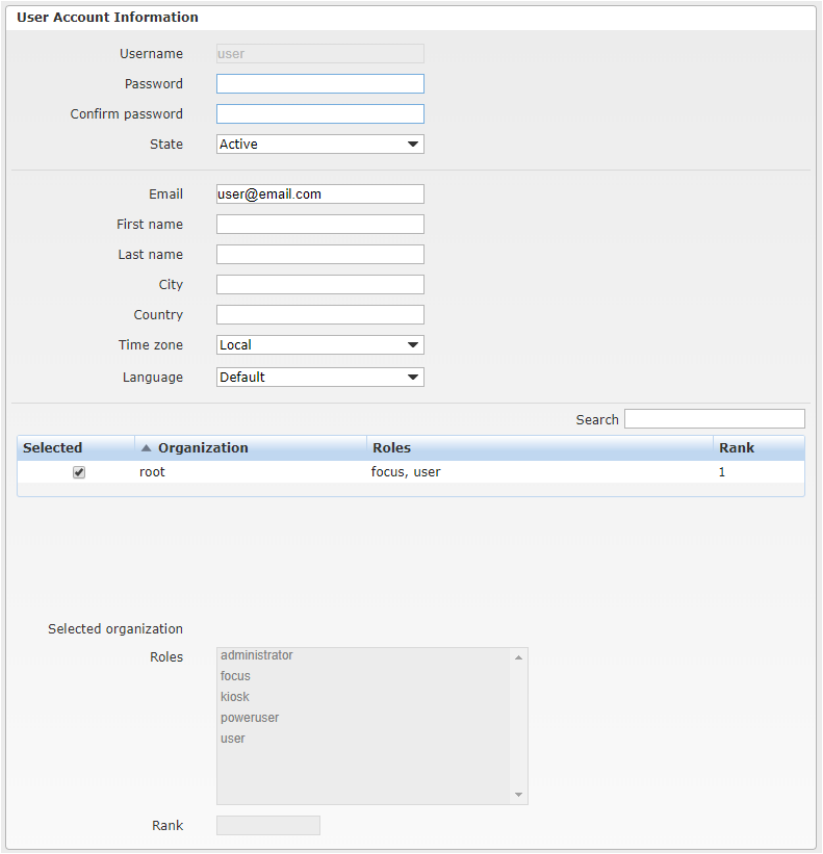
1. Log in to IRIS Focus as **`admin`**.
2. Select **Admin > Organizations**.
3. Choose which organization you want to create your users in:
   - Use the default `root` organization.
   - If you require more control over license seat allocation, create a new organization in the **Organizations** tab.

   Users with an `administrator` role must belong to the `root` organization.

4. In the **Application Subscriptions** tab, subscribe the organization to a license pool.
   a. Select the `radarsw` organization.
   b. Enter the validity period.
   c. Enter the maximum allocated users (licenses).



5. To add users to the organization, select **Admin > Users > Add New User**.



a. Add user details.

b. Select an organization for user.
   If a user account belongs to multiple organizations, the user roles are applied according to the organization that has the highest **Rank**.

6. Assign roles to the user.

To avoid reserving an IRIS Focus license when performing administration tasks, the default administrator account does not have the `focus` role.

   a. In the organization list pane, make sure the organization is highlighted.
   b. In the **Roles** pane, select the role.
      To assign multiple roles to a user account, press **SHIFT**+**CTRL** and select roles from the list.
   c. To enable IRIS Focus features for a user account, select both the `user` and `focus` roles.
   d. To enable advanced IRIS Focus features such as creating event criteria and organization-level places of interest for an account, select the `poweruser` role.

6.1.3 Removing user accounts

1. Log in as `admin`.
2. Select **Admin > User > Users**.
3. Select a user and then **Delete**.
   The user is no longer listed as a user in IRIS Focus. However, the user name of the deleted account remains in the system database. This keeps log files intact, as references to deleted users remain in the audit logs.
   IRIS Focus does not allow you to create a new user with the same username as an existing one. This applies even when the account has been removed earlier, because the account name remains in the database.

6.1.4 Unlocking administrator account

If an `administrator` account is accidentally locked, unlock it as follows:

1. Login as `root`.
2. Run the following command:

```
rsw-db-tool reset-admin-password
```

6.2 Managing organizations

Each user account belongs to one or more organizations. You can use organizations to manage:

- Subscriptions to selected software to a selected number of users.
- License availability for subgroups with separate license pools.

Users with an **`administrator`** role must belong to the **`root`** organization.

6.3 Map management

The standard installation of IRIS Focus includes a complete world map that is suitable for most scenarios.

The map consists of separate layers that are further separated into base layers and non-base layers. One base layer and one non-base layer are always rendered on the screen. Typically, base maps contain the underlying terrain and the non-base layers contain additional details that can be displayed on top of the base map.

Map data is served to the IRIS Focus web interface by GeoServer map server using Web Map Service (WMS) protocol. To improve performance, instead of calling for new map data each time the map view changes, the maps are cached in pre-rendered PNG tiles using GeoWebCache.

Administrators can add custom map layers or edit existing layers.

IRIS Focus users can select which map layers they see in the **Map** view, and edit the view by selecting **Map Features**.

6.3.1 Adding and editing map layers

1. Log in as **`admin`**.
2. Select **Admin > Map > Map Layers**.
   The **Map Layers** view lists the available map data layers. Each layer has the following properties:
   - **Base layer** - Enable to set this layer as a base layer
   - **Title** - Layer name
   - **Type** - WMS layers
   - **URL** - Address for the WMS server
   - **Layer** - Title of the layer on the server

3. To add a new layer, select **Add New Layer**.
   a. Type the layer information, including **Title**, **URL**, and **Layer**.
   b. Define map layer properties such as:
      - **Transparent** - Enable to use PNG or GIF alpha channel for transparency
      - **MIME type** - Select image type

   When you are adding a WMS layer from an external source, note the following:
   - Get the URL from the layer provider.
   - You can set any values for **Realtime offset** and **Refresh rate**, but if the exact value is not available from the layer provider, the system will give you a time closest what you defined.
   - In order for the system to query for the cursor tool data, check the **Usable in map cursor** checkbox.
   - **Layer style** defines the availability of the color legend in the map view. IRIS Focus supports both `.sld` files and WMS methods of providing the legend.
   - If you do not want the layer to be visible to users, after adding a layer, go to the **Map View Contexts** screen, and uncheck the **Visibility** checkbox.
   - The user can see the added external WMS layer in the **Add Product** drop-down list of the **Weather Products** pane.
4. To edit a layer, select **Edit** for that layer and make your changes.
   The **Map Layer Information** window for that layer opens.
5. Select **Save**.

6.3.2 Map View Context

The **Map View Contexts** view lists all defined maps.

Only the default `TheMap` context is available. Perform all map layer customization in the default `TheMap` context. Do not create new map contexts for custom map layers.

To edit `TheMap`, select **Edit**.

- To make a map layer available for users in the map view, select the **Selected** checkbox in the **Edit Map View Contexts**.
- To set the order in which multiple map layers are rendered on screen, change the **Z level** of map layers.
  The lowest number is rendered first, and higher numbers rendered on top of that.

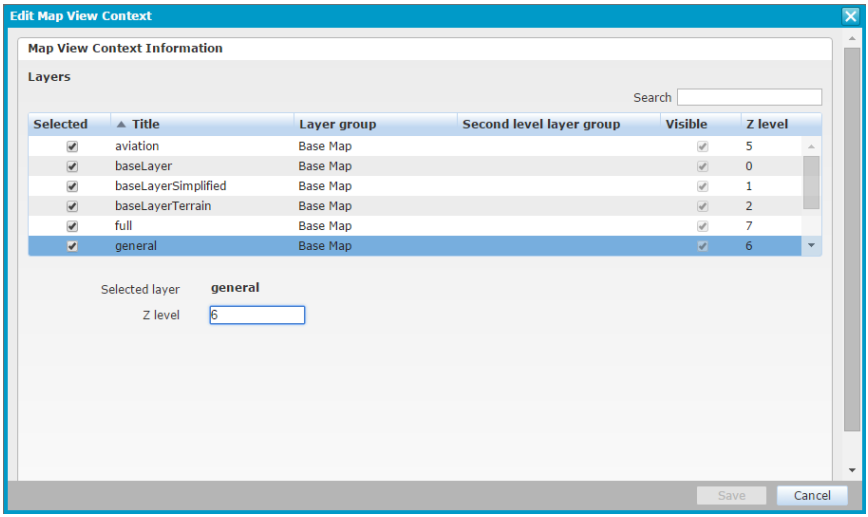


Figure 8 Editing the Map Context

6.3.3 Adding external map layers

You can import an external map layer, such as a shapefile, into Geoserver for IRIS Focus to display on the map.

For information on adding WMS layers from external sources, see Adding and editing map layers (page 49).

1. Make sure you have a shapefile (`.shp`) available.
   For an example resource with shapefiles available for download, see the WGS84 projection examples at:
   https://osmdata.openstreetmap.de/data/coastlines.html
2. Use an `scp` client or similar application to copy the shapefile to a directory on the IRIS Focus server such as `/srv/`.
3. Login to the server as `radarop`.
4. Open the file: `/etc/vaisala/radarsw/configuration/gis-override.ini`
5. Copy the `geoserver.admin.password` .
   This password is autogenerated during installation.

6. Using a browser, login to IRIS Focus Geoserver at:
   http://<IRIS_Focus_server_name>:34180/geoserver/web/
   Login using the username **admin** and the password you copied earlier.

   Depending on your own network configuration you may need to do this at the server, over a remote console, or by using your local browser.

7. Add a new **Store**:
   a. Select **Stores > Add New Store**.
   b. Choose the data source: **Shapefile - ESRI(tm) Shapefiles (*.shp)**
   c. Select the following (the following list shows example values).
      - **Workspace**: `Vaisala`
      - **Data Source Name**: `coastlines`
      - **Description**: leave blank
      - **Shapefile location**: browse to the shapefile
        For example: `\files\lines.shp`
   d. Leave the other fields as default.
   e. Select **Save**.
8. Publish the layer:
   a. Check that the **New Layer** menu opens.
   b. If the **New Layer** menu does not open automatically, select **Layers > Add New Layer**.
   c. In the **Add layer from** list, find the new layer.
   d. Select **Publish**.

   The **Edit Layer** menu shows the new layer name. For example, `vaisala:coastlines`.
9. In the **Edit Layer** menu:
   a. Leave all inputs as they are except:
      - **Name**: `coastlines`
      - **Title**: `coastlines`
      - **Coordinate Reference Systems > Declared SRS**
      - Select **Find** and search for `4326 (WSG 84)`.
   b. To fill the bounding boxes, select **Compute from data** and **Compute from native bounds**.
   c. Select **Save**.
10. Select **Layer Groups**.
    a. Select an existing layer group (for example, `vai_full_en`) and then select **Add Layer**.
    b. Find the new layer and add it.
       The layer is now listed in the **Layers** table.
    c. Select **Save**.

11. Login to IRIS Focus as a user.
12. To confirm that the new layer is visible, select **Map Features > Map Detail > Full Detail**.

6.4 Scheduling image exports from IRIS Focus

If you want to share interesting weather events on, for example, your website, use a `REST POST` method to schedule image exports from IRIS Focus saved views.

CAUTION! Depending on setup of the target website, the image export can be a bit slow. Take this into account when planning your export volumes and schedules.

1. In the IRIS Focus **Map** view, set-up the view you want to save.
   For example, you can save the settings for:
   - **Weather Products**
   - Map tools such as the cross-section and tracking tools
   - Zoom level
2. Select **Saved Views > Save**.
3. Name the view and select **Save**.
   The new view is added to the **Saved Views** list for your future use.
4. Configure your web server to access the IRIS Focus image export service:

```
@Request: POST <your IRIS Focus URL>/focus-webapp/api/v2/image-export/
getImage
@Produces: "image/png"
```

5. Configure the following parameters:

Parameter	Description
`username`	A valid IRIS Focus username.  For security reasons, Vaisala recommends that you configure a specific user for exporting images.
`password`	IRIS Focus password for the user.
`time`	Time, in ISO-8601 format: `2019-01-18T17:55:23.000Z`
`widthPx`	Width of the exported image, in pixels.
`heightPx`	Height of the exported image, in pixels.
`savedViewName`	The name of the saved view you created in step 3.
`savedViewUser`	Optional value. Used if you configure a specific user for exporting images (recommended).

6. Instead of step 4 and step 5, you can run the export from the command line by creating a script and setting-up a **cron** job. For example:
   a. Create a Python script for the image export such as the following:

```
#!/usr/bin/python
# -*- coding: utf-8 -*-
```

```
from requests_futures.sessions import FuturesSession
import datetime
```

```
APP_URL = "your_url_here"
IMAGE_EXPORT_LOC = "/focus-webapp/api/v2/image-export/getImage"
FILE_PATH = "/path/to/image.png"
USERNAME = "username_here"
PASSWORD = "password_here"
TIME = datetime.datetime.utcnow().isoformat()
WIDTH = "1000"
HEIGHT = "700"
VIEW = "view_name_here"
```

```
def main():
    session = FuturesSession()

    req_params = {"username": USERNAME, "password": PASSWORD, "time":
TIME, "savedViewName": VIEW, "widthPx": WIDTH, "heightPx": HEIGHT}

    future_one = session.post(APP_URL + IMAGE_EXPORT_LOC,
params=req_params)

    # wait for the request to complete, if it hasn't already
    res = future_one.result()
    print('{0}  response status: {1}'.format(TIME, res.status_code))

    if res.status_code == 200:
      with open(FILE_PATH, 'wb') as f:
          f.write(res.content)

if __name__ == '__main__':
    main()
```

   Although the example **image-export.py** script saves only one snapshot, you can edit it to loop a set number of times and get multiple snapshots at a time.

   b. Type **crontab -e** in the terminal and add, for example, the following line to the *crontab* file (add your own paths and arguments).

```
*/15 * * * * /usr/bin/python
        /path/to/script/image-export.py >> /path/to/log/export.log 2>&1
```

   This executes the **image-export.py** script every 15 minutes and saves a single snapshot as a PNG file to the server.

6.5 systemd

`systemd` and its logging daemon `journald` are CentOS 7 components that manage system services.

`systemd` manages more functionality than its predecessors, and some of the mechanisms, such as accessing certain log files, have changed.

In CentOS 7, system logs are not directly accessible as files. Instead, they are read with the `journalctl` command.

6.6 Monit

Monit is a watchdog tool for monitoring Unix systems and processes. IRIS Focus uses Monit to automatically restart the application or a related process or service if it becomes unstable.

If you do maintenance work that requires you to take the application down, you must first stop Monit before proceeding further, and restart it after maintenance.

In the command line, the Monit service is called `monit`.

6.7 HAProxy

HAProxy is a proxying tool that IRIS Focus uses for traffic forwarding within the system and HTTPS encryption for outgoing traffic.

In the command line, the HAProxy service is called `haproxy`.

6.8 Kafka manager

The Kafka data broker supports running in a cluster configuration where multiple systems are interconnected. The Kafka manager service is used to manage all of the Kafka data broker service instances in a cluster. This service is required even if you are running a single instance of the Kafka data broker, which is typical for IRIS Focus.

In the command line, the Kafka manager service is called `kafka-zookeeper`.

6.9 Kafka data broker

The Kafka data broker is used by the external **Total Lightning Processor** system to push lightning data into the IRIS Focus system so that local services (for example, `vaisala-iris-lightning-ws`) can access it.

In the command line, the Kafka data broker service is called `kafka`.

6.10 Lightning WebSocket service

Lightning WebSocket service is responsible for pushing lightning data to the user's browsers when connected to the IRIS Focus web application.

In the command line, the IRIS Focus web application service is called `vaisala-iris-lightning-ws`.

6.11 IRIS Focus web application

This is the main web UI of the IRIS Focus system.

In the command line, the IRIS Focus web application service is called `vaisala-radarsw-webapp`.

6.12 GeoServer

GeoServer is used for caching and generating the base map layers.

In the command line, the GeoServer service is called `vaisala-radarsw-geoserver`.

6.13 Stopping, starting, and restarting services

You should only need to start or stop a service during certain troubleshooting cases. These cases are described step-by-step in the *Troubleshooting* section. In normal circumstances the services are always running.

In CentOS 7, services are stopped, started, and restarted with the **`systemctl stop / start / restart [servicename]`** command.

To use the **`systemctl`** command, you must be a logged in as the `root` user.

The following example shows how to stop, start and restart the IRIS Focus web application service. Note that the Monit service starts along with the web application.

Stopping the service

- **`systemctl stop monit`**
- **`systemctl stop vaisala-radarsw-webapp`**

Starting the service

- **`systemctl start vaisala-radarsw-webapp`**
- **`systemctl start monit`**

Restarting the service

- **`systemctl restart vaisala-radarsw-webapp`**

6.14 Logging

IRIS Focus log files are stored in directory */var/log/vaisala/radarsw/webapp*, which contains:

- Application error log: ***`webapp.log`***
- Information about application performance: ***`webapp-metrics.log`***

Older logs are rolled over to separate files and zipped automatically in **`.gz`** files. No log files are deleted automatically.

The logging configuration file is in */etc/vaisala/radarsw/configuration/logback.xml*.

6.14.1 Reading system service logs

When diagnosing issues with the IRIS Focus server, you may need to access the log files from system services using the CentOS 7 Journal tool:

```
journalctl -u [service-name] -l -f --no-pager
```

Some useful options for **`journalctl`** are:

- **`-u`** for showing log entries for a given service
- **`-n`** for showing only a given number of recent log lines
- **`-f`** for following new log entries being logged
- **`--no-pager`** for not using a pager program such as less for the output
- **`-l`** to print out full log lines and not ellipsize (shorten) them.

The typical logs to check in a troubleshooting situation are ***`webapp.log`*** and ***`input-service.log`***. When you contact Technical support (page 79), please send these files to the service personnel.

To retrieve these logs, run the following commands:

- ***`webapp.log`***:

  ```
  journalctl -u vaisala-radarsw-webapp
  ```

- ***`input-service.log`***:

  ```
  journalctl -u vaisala-radarsw-data-manager-input-service
  ```

For more information, type **`man journalctl`** in CentOS 7.

6.15 Installing a CA certificate

The web application comes with a temporary, self-signed SSL certificate that secures the connection between the IRIS Focus server and the user's web browser.

Consider acquiring and using a trusted certificate from a certificate authority (CA), especially if you plan to offer access to IRIS Focus outside your organization.

1. Acquire a certificate that has been signed by a trusted authority.
   This is usually done by an IT department or an external organization, who purchase the certificate from an external certificate authority (CA). You can use any trusted certificate authority.
   a. Create a certificate signing request (CSR).
      - The CN (Common Name) attribute is currently neither required and nor sufficient, so the certificate signing request must include the SAN attribute, with the DNS name of the service.
      - For details, contact the certificate authority that you are going to use.
   b. Send the CSR to the certificate authority to be signed.
   c. The certificate authority provides the certificate.
2. Back-up your current configuration by running:

   ```
   run /usr/vaisala/radarsw/backup/bin/do-backups
   ```

   This backs up all the configuration files as a *.tar* file to */srv/vaisala/radarsw/backup/configuration*.
3. Go to the default certificate folder:
   /etc/vaisala/radarsw/webapp-proxy/certificates/cert.pem
   a. Back up the file locally by running:

      ```
      cp /etc/vaisala/radarsw/webapp-proxy/certificates/cert.pem /etc/vaisala/
      radarsw/webapp-proxy/certificates/cert.pem.bkp
      ```

   b. Replace the certificate in the file with the new, signed certificate.
      Install also the private key that was created during the CSR creation.

6.16 Backing-up system configuration

IRIS Focus is backed up automatically using a daily configuration and database backup job that are run at 02:30 AM server time. On factory settings, the server uses UTC as the time zone.

The backup script stores the server configuration and application settings database.

Automatic back-up

Backup is done by the cron job **/etc/cron.d/vaisala-radarsw-backup-cron** that launches the **/usr/vaisala/radarsw/backup/bin/do-backups** script.

The created backup files are zipped and stored in the following directories:

- **/srv/vaisala/radarsw/backup/configuration**
- **/srv/vaisala/radarsw/backup/database**

Backups are kept for 180 days, after which they are deleted.

Each backup file includes a timestamp in the format:

```
radarsw-configuration-2019-09-05T06-48-26.tar.gz
```

6.16.1 Making a manual back-up

1. Log in as **root**.
2. Run: **/usr/vaisala/radarsw/backup/bin/do-backups**
3. Check that new files are created in the following directories:

   ```
   /srv/vaisala/radarsw/backup/configuration/radarsw-configuration-
   <timestamp>.tar.gz
   ```

   ```
   /srv/vaisala/radarsw/backup/database/database-wx-<timestamp>.gz
   ```

   ```
   /srv/vaisala/radarsw/backup/database/database-vsp-<timestamp>.gz
   ```

   Each backup file includes a timestamp in the format:

   ```
   radarsw-configuration-2019-09-05T06-48-26.tar.gz
   ```

6.17 Restoring from backup

1. Log in as **root**.
2. Stop the Monit service:

   ```
   systemctl stop monit.service
   ```

3. Stop the IRIS Focus web application:

```
systemctl stop vaisala-radarsw-webapp.service
```

4. (Optional) Run the backup script:
   /usr/vaisala/radarsw/backup/bin/do-backups
   a. Copy the current configuration files to a remote host.
   b. Copy the resulting configuration file to your own machine: */srv/vaisala/radarsw/backup/configuration/radarsw-configuration-2019-10-12T09-42-18.tar.gz*
5. Copy the current database passwords from */etc/vaisala/radarsw/configuration/vsoweb-override.ini*.
   Save them in a text file.

```
[DATASOURCE]
datasource.password = xsGzN3ZK6kMqvaH6dzJQqAg1KwTMLnJL

[VSP_DATASOURCE]
datasource.password = AgbBWtR0XqDh64DgklkK6XqLXsnQP08U
```

6. Copy the current Data Manager password from */etc/vaisala/radarsw/data-manager/data-manager-override.properties*.

```
/etc/vaisala/radarsw/data-manager/data-manager-override.properties
spring.datasource.password = bFKNUQ5fvFMfmsU3vWP3CEYJHVTuOJ2Z
```

   Save it in a text file.
7. Drop the current database with the **rsw-db-tool** utility:

```
rsw-db-tool drop-db
```

8. Recreate an empty database:

```
rsw-db-tool create-db
```

9. Switch to the database user account **postgres**:

```
su - postgres
```

10. Copy your backup files back to the Focus server and restore the database contents by reading the file contents into thestandard output stream and inserting them in the IRIS Focus databases:

```
gzip --decompress --to-stdout /radarsw-database-vsp-2019-10-12T07-54-50.gz
| psql vsp_v1
gzip --decompress --to-stdout /radarsw-database-wx-2019-10-12T07-54-50.gz
| psql wxdb2
```

11. Exit the postgres user shell:

```
exit
```

12. Using the password you stored in step 5, replace the database password I the file:

```
/etc/vaisala/radarsw/configuration/vsoweb-override.ini
```

13. Start the IRIS Focus web application:

```
systemctl start vaisala-radarsw-webapp.service
```

14. Start the Monit service:

```
systemctl start monit.service
```

6.18 Server management software

If you are running server management software on your IRIS Focus server, make sure the management software's settings do not interfere with your intended network settings.

For example, in Dell PowerEdge servers, the integrated Dell Remote Access Controller (iDrac) sets a default static IP address for the server when it is first deployed.

On Vaisala preconfigured IRIS Focus systems, iDrac is disabled by default.

6.19 Licensing on server restart

Active sessions and their licenses are not stored when the IRIS Focus server is shut down.

When the server restarts, the licensing seats are allocated from scratch to users who log in. The total number of seats in the license pool is unaffected.

6.20 Licensing on systems with mirrored HDDs (RAID 1 or RAID 5)

IRIS Focus licenses are mapped, among other parameters, to hard disk IDs. Removing or replacing one hard disk in a RAID array can cause unexpected behavior. When doing so, renew your license. Contact your Vaisala customer representatives for further instructions.

6.21 Reactivating the license after server upgrade

The product key in the IRIS Focus license is server-specific. If you upgrade your server, you must request a new service key and activate the new license.

1. Contact Vaisala and request a new server key.
2. Set-up your new server by performing the steps in the following sections:
   a. Installing CentOS (page 20).
   b. Installing IRIS Focus components (page 32).
   c. Verifying IRIS Focus installation (page 43).
3. Reactivate the license.
   Depending upon whether or not your server is connected to the internet, see:
   - Activating license – online (page 36)
   - Activating license – offline (page 38)

7. Security

7.1 Encryption

Communication between the browser and the web application is encrypted.

Other data traffic within the IRIS Focus application server is unencrypted.

IRIS Focus uses Jetty as web server software, and HAProxy for handling HTTPS encryption. SSL encryption has been disabled in HAProxy, and only TLS encryption is supported.

7.2 Certificates

The web application comes with a temporary, self-signed SSL certificate that secures the connection between the IRIS Focus server and the user's web browser.

Although the browser displays a security warning in the browser when you try to access the web application, you can use the application normally even with the warning.

Consider acquiring and using a trusted certificate from a certificate authority (CA), especially if you plan to offer access to IRIS Focus outside your organization.

More information

- Installing a CA certificate (page 59)

7.3 Security settings

The IRIS Focus server has a pre-configured firewall.

Ports for SSH access (22), HTTP (80), HTTPS (443), and Kafka (9092) are intentionally open.

- Use SSH for configuration.
- HTTP port is for redirecting to HTTPS.
  The application is always used over HTTPS.

The server requires access to HTTP and HTTPS for end users. If the system is accessed through the internet, you should restrict internet access to the SSH port from the internet to improve system security.

The firewall is configured through the CentOS firewall system.

Port 9092 is only opened if the Kafka service is running. The **Total Lightning Processor** uses this port when pushing lightning data into the Kafka data broker running on the IRIS Focus Server. See Connecting the TLP system (page 40) for details on configuring the `firewalld` rule so that only the TLP system is allowed access to this port.

8. Troubleshooting

8.1 Sending logs to Technical support

When you contact Technical support (page 79), be ready to send IRIS Focus logs to the technical support personnel. For instructions for retrieving logs, see Logging (page 58).

8.2 No connection/data from the TLP

If there are problems in the TLP data connection, try the following troubleshooting procedures.

1. Check the status of the IRIS Focus related services.
   a. Log in to IRIS Focus as the **root** user.
   b. Check the status of the services related to the incoming TLP lightning data with the following commands:

```
systemctl status vaisala-iris-lightning-ws
systemctl status kafka
systemctl status kafka-zookeeper
```

2. Check the status of the TLP related services:
   a. Log into the TLP system as the **vops** user.
   b. Use the **lpstart** command to verify that the **tlp-to-kafka** service is running:

```
lpstart details tlp-to-kafka
```

3. Check services and processes with the **netstat** command:
   a. Use the **netstat** command on the IRIS Focus system and **grep** on port 9092:

      ```
      netstat -tnap | grep 9092
      ```

      You should see the Kafka process listening on port 9092, and an established connection to port 9092 with the IP address of your TLP system.

   b. If you do not see an established connection from the TLP system, verify that the **tlp-to-kafka** service is running on the TLP system, and that the ***kafka-producer.properties*** file in the */opt/vai/tlp/etc* directory has the correct IP address for your IRIS Focus server set in the **bootstrap.servers** parameter.

   c. Use the **netstat** command on the IRIS Focus system and **grep** on port 34081.

      ```
      netstat -tnap | grep 34081
      ```

      You should see the **vaisala-iris-lightning-ws** service listening on port 34081, and an established connection to port 34081 with the proxied IP address **127.0.0.1** for each user connected to the IRIS Focus web application.

8.3 Network Health updates missing

If you are getting infrequent updates of the **Network Health** product, or no updates at all, try the following troubleshooting procedures.

1. Check that the **regstatd2** service is running on the TLP system.
2. Check that the ***regstatd2.cfg*** configuration file in the */opt/vai/tlp/etc* directory has the **updateIntervalMinutes** parameter set to 10 minutes.

8.4 Check disk space usage of Kafka

The Kafka service keeps an archive of historical data in the */var/lib/kafka* directory. Use the**df** command to check that the partition has space left.

```
df -h /var/lib/kafka
```

8.5 Identifying IRIS Focus software version

Before contacting Vaisala technical support about an issue, check which version of IRIS Focus you have on your system.

1. In the terminal window, run:

```
rpm -qa --qf '%{NAME} %{VERSION}\n' | grep 'vaisala-radarsw-webapp'
```

8.6 Taking a snapshot gives server error

If, when taking a snapshot or requesting an image via URL, the server times out or gives server error, there may be a problem with the **image-export** user account.

1. Check that the application log shows the error:

```
Login failed for username image-export
```

2. Log in as **admin**.
3. Check that the **image-export** user password matches the password listed in *vsoweb-override.ini*.

8.7 GLD360 lightning layer empty

If you have subscribed to Vaisala AviCast GLD360 lightning detection service, and the layer exists in your IRIS Focus application, but you do not see any lightning strikes, verify the following requirements:

1. Check that lightning strikes have occurred at the time of observation.
2. Check that the configuration file */etc/vaisala/radarsw/configuration/vsoweb-override.ini* contains the following line:

```
lightning.wms.url = [URL received from Vaisala]
```

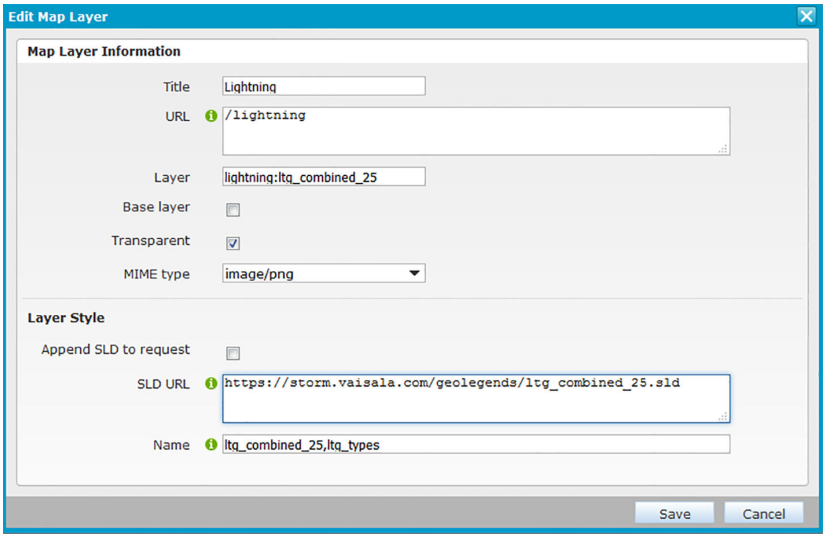
3. Check that your subscription to Vaisala AviCast GLD360 service is active.

> If you modify the configuration file, you must restart the vaisala-radarsw-webapp service with the **service vaisala-radarsw-webapp restart** command.

8.8 GLD360 lightning layer missing

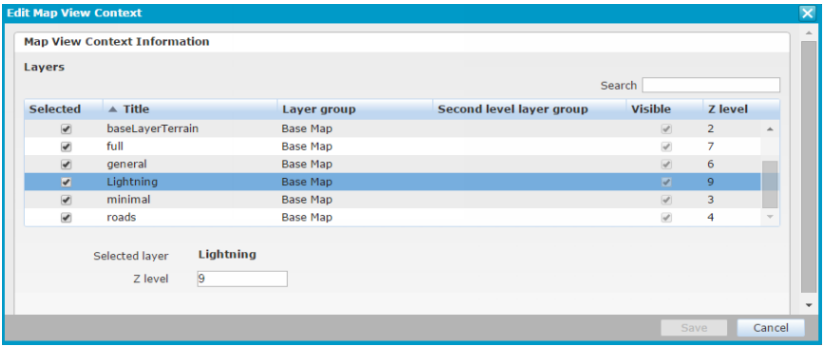
If you have subscribed to Vaisala AviCast GLD360 lightning detection service, and you do not see the lightning layer in the IRIS Focus user interface after running the **rsw-lightning-configure** script, add the lightning layer manually.

1. Log in to IRIS Focus with an administrator account and select **Admin**.
2. Select **Map > Map Layers**.
3. Select **Add New Layer**.
4. In **Map Layer Information**, enter the following values on the layer properties:



   a. **URL**: `/lightning`
   b. **Layer**: `lightning:ltg_combined_25`
   c. **Transparent**: Checkbox selected
   d. **SLD URL**: https://storm.vaisala.com/geolegends/ltg_combined_25.sld
   e. **Name**: `ltg_combined_25.ltg_type`
5. Select **Save**.
6. Select **Map > Map View Contexts**
7. Edit the default map context **TheMap**.

8. Select the newly created lightning layer and set its **Z level** higher than all base map layers in the map context.
   Z level defines the drawing order of the layers on the map. Higher values are always drawn on top.



In the web application, the new layer is listed at the bottom of the radar product selection list.

8.9 Uninstalling IRIS Focus

Use this procedure to recover from a failed installation that is stuck in a state where it cannot be resumed.

CAUTION! The `rsw-uninstaller` script completely removes IRIS Focus, including all data and configurations.

CAUTION! The `rsw-uninstaller` script removes `Postgres` and all databases.
If you share the system with other software that uses `PostgreSQL`, do not run the script -- it also removes `PostgreSQL` databases not related to IRIS Focus.

1. Navigate to the directory containing the IRIS Focus installation files.
2. Run: **`./rsw-uninstaller`**
   When prompted, confirm that you want to run the script.
   The script removes all users, configurations, and data from the system so that you can rerun the installation.

Appendix A. File locations

Table 10 IRIS Focus application and configuration files

File or directory	Description
/etc/vaisala/radarsw/configuration • *gis-override.ini* GeoServer database settings. • *logback.xml* Logging level settings. • *radar_centers.properties* List of stored radar site center points.	Configuration files for IRIS Focus module settings. The files listed here are the most important. **CAUTION!** Some settings have a default config file and an override file. For example: • *gis-config.ini* • *gis-override.ini* When needed, edit the override file.
/etc/vaisala/radarsw/configuration/vsoweb-override.ini	Connection settings for socket server, lightning layers, and so on.
/etc/vaisala/lightning/iris-lightning-ws.properties	Main configuration file for the **vaisala-iris-lightning-ws** service. It will be set to use a Kafka data broker as its source of data during installation. Can be modified to use a simulated data source.
/etc/vaisala/lightning/iris-lightning-ws-env-override.conf	The **systemd** environment file used by **systemd** when launching the **vaisala-iris-lightning-ws** service. Normally, the user does not need to adjust this.
/etc/vaisala/lightning/iris-lightning-ws.logback.xml	Configuration file used to control the **vaisala-iris-lightning-ws** service logs.
/etc/vaisala/lightning/iris-lightning-ws.kafka.properties	The configuration file used by the **vaisala-iris-lightning-ws** when configured to connect to a Kafka data broker for its data. The default configuration will connect to the Kafka data broker running on the IRIS Focus system. Normally, the user does not need to adjust this.
/etc/vaisala/lightning/lightning.simu.properties	Used to configure how simulated lightning events are produced when the **vaisala-iris-lightning-ws** service is configured in simulation mode.
/etc/vaisala/lightning/regionstatus.simu.properties	Used to configure how much to vary the simulated **Network Health** when the **vaisala-iris-lightning-ws** service is configured in simulation mode.

File or directory	Description
/etc/vaisala/lightning/regionstatus.template.json	Template network health report used when the **vaisala-iris-lightning-ws** service is configured in simulation mode.
/usr/vaisala/radarsw/configuration	Configuration files for helper applications used in IRIS Focus maintenance.
/var/lib/radarweb	Home directory of the **radarweb** user. The IRIS Focus Web Application is deployed here.
/var/lib/radardm	Home directory of the **radardm** user.
/var/lib/radardminput	Home directory of the **radardminput** user.
/srv/vaisala/radarsw/datamanager/input	Files sent from an IRIS Analysis machine are copied here. The data manager input service processes files copied here.
/srv/vaisala/radarsw/datamanager/storage	This is where data manager stores polar or **RAW** data.
/var/log/vaisala/radarsw	Log files from IRIS Focus web application

Appendix B. Map layer configuration options

Table 11 Map layer configuration options

Option	Description	WMS layer only
Map Layer Information	Defines basic map settings, such as the title and the URL address of the Web Map Service (WMS).	--
Title	Title of the layer. Visible in the layer selection list.	--
Type	• `wms`: generic GIS services such as base maps or raster-type forecast data • `google`: Google base maps • `marker`: observations from stations configured using the JX source service on the map.	--
URL	Address of the WMS service.	✔
Layer	Name of the layer in the map server. If using GeoServer, usually `workspace:layer`.	--
Base layer	Select if the layer is a base map.	--
Transparent	Select for WMS to request a transparent background for the layer.	✔
Request as Tiles	Use if the map layer should be requested as tiles. Usually selected for base maps.	✔
MIME type	Map image type. Change if the service does not support the default *`image/png`*.	✔
Default opacity	Not used in IRIS Focus.	--
Layer query settings		--
Supported Coordinate Reference Systems	Select supported coordinate reference systems for the layer.	--
Time Support	Configure for layers using time dimensions.	✔
Coverage	Maximum bounding box for the layer.	✔
Layer style	For advanced configurations, add SLD (Styled Layer Descriptor) parameters.	--

Option	Description	WMS layer only
Realtime offset	Defines the offset from the current time in which to make the request for the latest data. Sometimes, when requesting the latest time from a WMS service, there is no data available because the WMS service provider is collecting and processing the data for the latest time, so it is useful to set an offset. Supported values are 0...3600 seconds. To use this parameter, set the system to always use time parameter support.	
Refresh rate	Defines the interval of the time ticks on the histogram. This defines how often the system makes data requests. The interval always starts on the hour. Supported values are 10...86400 seconds. To use this parameter, set the system to always use time parameter support.	
Request width	Controls the legend graphic request parameters.	✔
Request height	Controls the legend graphic request parameters.	✔
Display height	Defines the size of the color legend graphic on the display in case the original graphic is too large.	✔

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Warranty

For standard warranty terms and conditions, see www.vaisala.com/warranty.
Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or Conditions of Sale for details of the warranty for each product.

Technical support

Contact Vaisala technical support at helpdesk@vaisala.com. Provide at least the following supporting information as applicable:

- Product name, model, and serial number
- Software/Firmware version
- Name and location of the installation site
- Name and contact information of a technical person who can provide further information on the problem

For more information, see www.vaisala.com/support.

Recycling

Recycle all applicable material.

Follow the statutory regulations for disposing of the product and packaging.

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