

M211850EN-D

Administrator Guide

IRIS Focus
Version 3.0



VAISALA

PUBLISHED BY

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1. About This Document

1.1 Version Information

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

Table 1 Document Versions

Document Code	Date	Description
M211850EN-D	February 2017	This document. Fourth version of this document
M211850EN-C	June 2016	Third version of this document.
M211850EN-B	May 2016	Second version of this document.
M211850EN-A	January 2016	First version of this document.

1.2 Related Documents

Table 2 Related Documents

Document Code	Name
M211850EN	<i>IRIS Focus Administrator Guide</i>
M211849EN	<i>IRIS Focus User Guide</i>
M211904EN	<i>IRIS Focus Release Notes</i>

1.3 Trademarks

HydroClass™ is a trademark of Vaisala Oyj.

IRIS™ is a trademark of Vaisala Oyj.

All other product or company names that may be mentioned in this publication are trade names, trademarks, or registered trademarks of their respective owners.

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

IRIS Focus provides tools for viewing and analyzing weather data received from weather radars through a web browser quickly and easily.

The displayed data consists of radar products, which are raw signal data from a radar receiver processed to provide information about current weather conditions. The radar products measure information such as radar signal reflectivity or rain intensity for analysis by meteorologists.

The weather data is overlaid on a geographical map that is centered on a selected radar site. Data is gathered from a single weather radar or a network of radar sites. All data is stored for 48 hours, and it can be animated on a time line.

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

IRIS Focus provides live and pre-configured radar products, which differ in how they are processed within the IRIS architecture, as well as how they are used by the system end user.

- *Live Radar Products*
Radar signal data that is processed into radar products and displayed in real-time. Live products allow more control over the weather data presentation in the IRIS Focus UI. For example, you can change the reflectivity threshold of a selected radar product in real-time.
- *Pre-configured Radar Products*
Preset radar products defined and produced in IRIS Analysis and displayed by IRIS Focus on request.

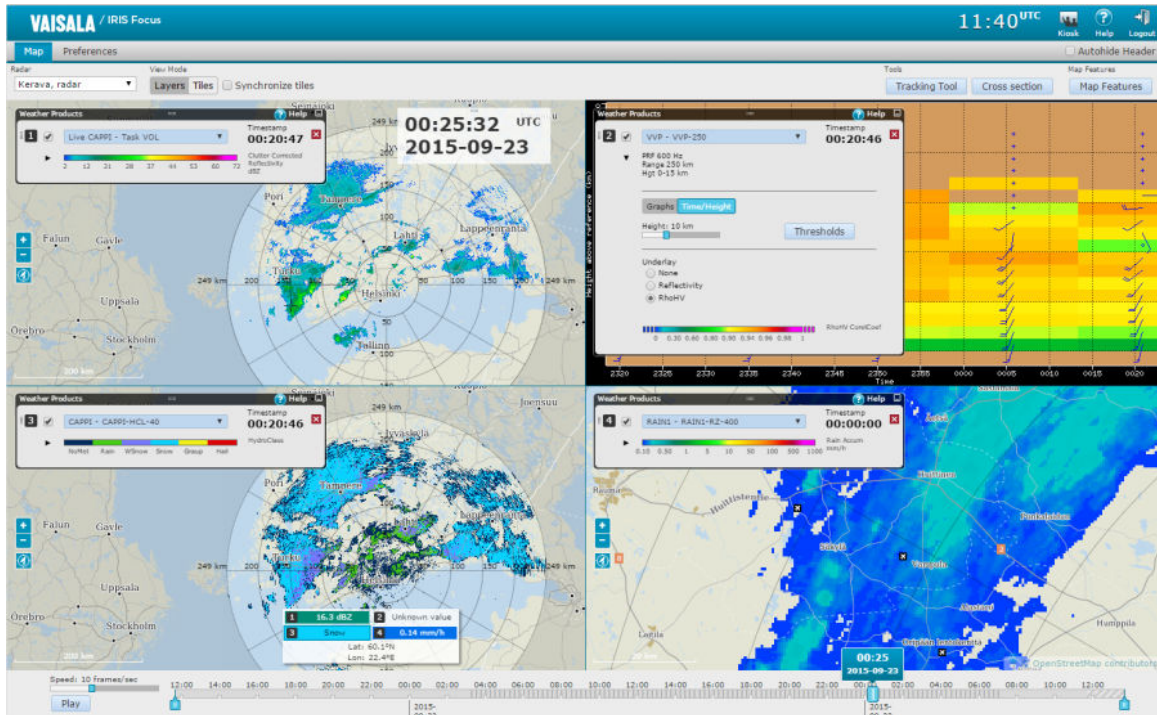


Figure 1 IRIS Focus Main View

More Information

- ▶ [Live Radar Products \(page 73\)](#)
- ▶ [Pre-configured Radar Products \(page 74\)](#)

2.1 IRIS Product Family

IRIS Focus provides an intuitive user experience for professional users, such as meteorologists and analysts. It is closely integrated with [Vaisala weather radar systems](#), where IRIS Focus forms the visualization front-end and other IRIS components handle radar control, radar product generation, and data distribution. IRIS Focus retains the proven quality of Vaisala IRIS back-end processing software, while adding a modern user interface.

IRIS Focus runs on a web server that users can connect to in an enterprise intranet or from an external location or the Internet. Network connections between the IRIS Focus web UI and the data processing back-end go through a socket server, a custom protocol over TCP/IP that delivers radar data from the IRIS back-end services to IRIS Focus. The IRIS Focus application polls the server for data and displays it on screen.

The following figure shows a setup where IRIS Focus is used as part of a complete Vaisala weather radar network consisting of 2 radar sites.

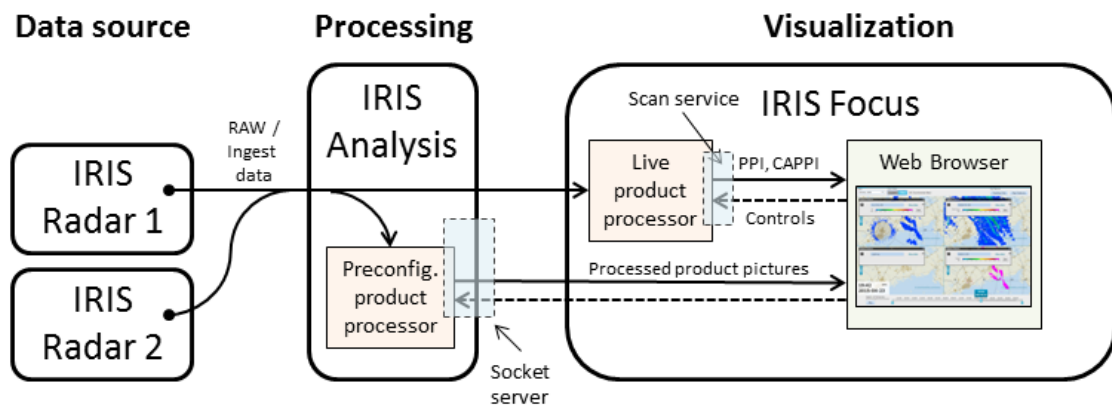


Figure 2 IRIS Focus Data Flow

In this case, IRIS Analysis and IRIS Radar can be considered back-end services for the IRIS Focus front-end interface. IRIS Focus communicates with IRIS Analysis through a secure socket server connection.

The components have the following functions:

- *IRIS Radar* - Operates the radar site and stores data gathered from the radar signals in RAW format.
- *IRIS Analysis* - Receives RAW data from IRIS Radar through secure connection and processes it into displayable radar products.
- *IRIS Focus* - Polls pre-configured radar products from IRIS Analysis and displays them on the web interface and generates live radar products from RAW data.

2.2 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. If your hardware configuration changes and you need to re-install IRIS Focus, you must request a replacement license from your Vaisala representative.

License Options

The IRIS Focus license includes the following:

- **IRIS Vision**
The IRIS Vision license has an unlimited number of seats.
If the license is missing, users cannot log in while admins can log in but cannot access the map view.

- **IRIS Focus**
The IRIS Focus license is required to use IRIS Focus features and products. IRIS Focus licensing is based on a floating seat pool.
- **Nowcasting**
The optional nowcasting feature requires a separate license in addition to an IRIS Focus license.

IRIS Focus Seat-based License

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 a user logs in, they occupy 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 shown IRIS Vision until an IRIS Focus license is released.

Nowcasting is only available to users with an IRIS Focus seat.

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.

More Information

- [User Management \(page 51\)](#)

3. Requirements

3.1 Hardware Requirements

Minimum Hardware Requirements

- Modern 4-core CPU (Intel Xeon E5 series or similar)
- 16GB RAM
- 1 TB HDD

Recommended Hardware Requirements

- Modern 8-core CPU (Intel Xeon E5 series or similar)
- 32GB RAM
- 2x 1 SAS TB HDD in RAID 1 configuration

The pre-installed IRIS Focus system delivery option uses the Dell PowerEdge R430 rack server unit, which meets the recommended hardware setup. See the Dell product data sheet for full specifications.

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

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

IRIS Network

IRIS network, such as an IRIS Analysis instance must be configured correctly to make data from at least one radar site available for IRIS Focus.

CentOS 7.1

CentOS 7.1 or later DVD/ISO image mounted on your server. The installation script verifies the version of several core system packages during the installation and updates them from the mounted media.

IRIS Analysis

The IRIS Analysis server set up provides radar products through a proprietary socket server connection. The socket server connection is enabled if at least one radar is connected to your IRIS Analysis server, and the IRIS Analysis server has IRIS software version 8.13.6 or newer installed. No further configuration is needed.

The map projection in the IRIS Focus web application depends on having a single radar or a group of radar sites to act as a center point to for map rendering.

In most IRIS Focus configurations, the radar product generator is an IRIS Analysis server that has been set up earlier on the radar site.

If you are unsure about the suitability of your IRIS Analysis server, please contact Vaisala.

For information on configuring IRIS Analysis, see *IRIS and RDA Software Installation Manual*.



Before beginning the IRIS Focus installation, make sure you know the hostname of your socket server.

Scan Service

Radar volume data is fetched from the proprietary Scan Service interface and processed into live radar products within the IRIS Focus application.

The Scan Service does not need to be active during installation.

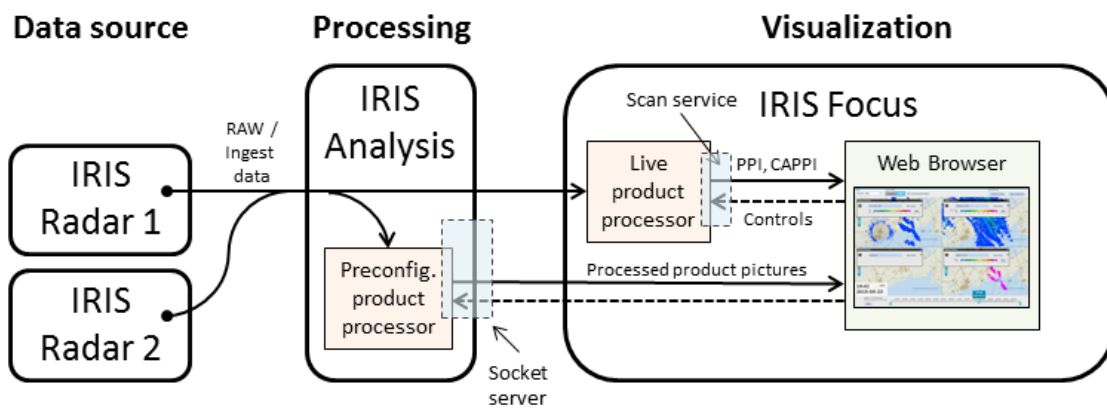


Figure 3 Generating Live IRIS Products

More Information

- [Setting up Scan Service \(page 28\)](#)

4. Installation

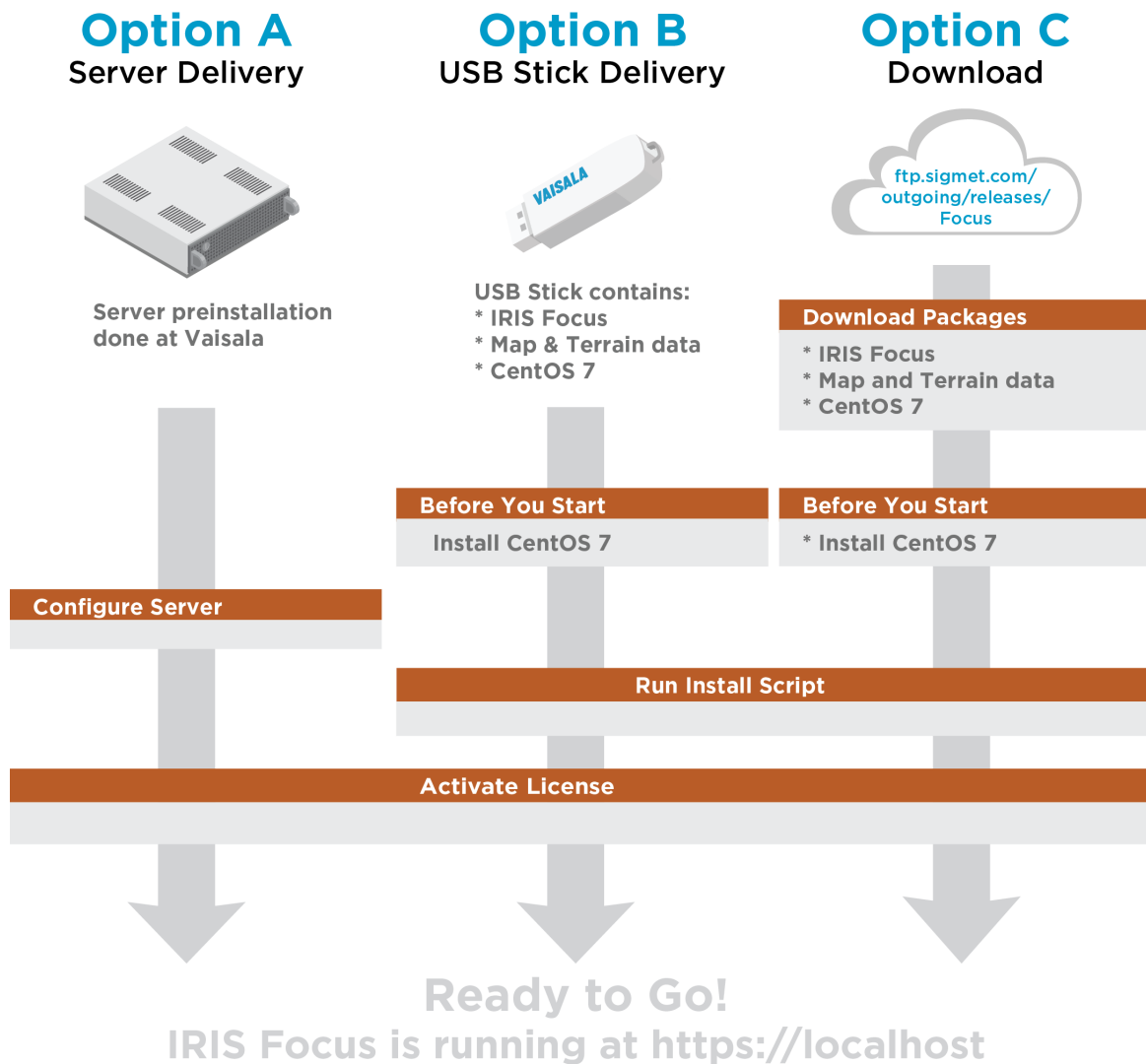


Figure 4 IRIS Focus Delivery Options

- 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.

4.1 Downloading Installation Packages

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

2. Navigate to `/outgoing/releases/IRIS/Focus/<latest version>`
3. Download the following files:



The files are very large. Use a download tool such as [CrossFTP](#) that allows resuming downloads to fetch the packages.

- a. IRIS Focus web application package: `Vaisala_IRIS_installer-<latest version>.tar`
 - b. Maps directory: `vaisala-iris-maps-v1.zip`
 - c. Terrain data directory: `vaisala-iris-terrain-v1.zip`
4. If you require the Centos installation image, download it from:
FTP://FTP.SIGMET.COM/OUTGOING/RELEASES/CENTOS/7.1/CENTOS-7-X86_64-Everything-1503-01.ISO



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

4.1.1 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
If you see any discrepancies, the downloaded file is likely corrupted.
3. If you see any discrepancies in the hashes, download the mismatching file again.

4.2 Prerequisites for Installation

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

More Information

- ▶ [Hardware Requirements \(page 11\)](#)
- ▶ [Software Requirements \(page 11\)](#)

4.3 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 7.2. We expect IRIS Focus to also work with later versions of CentOS 7.x.

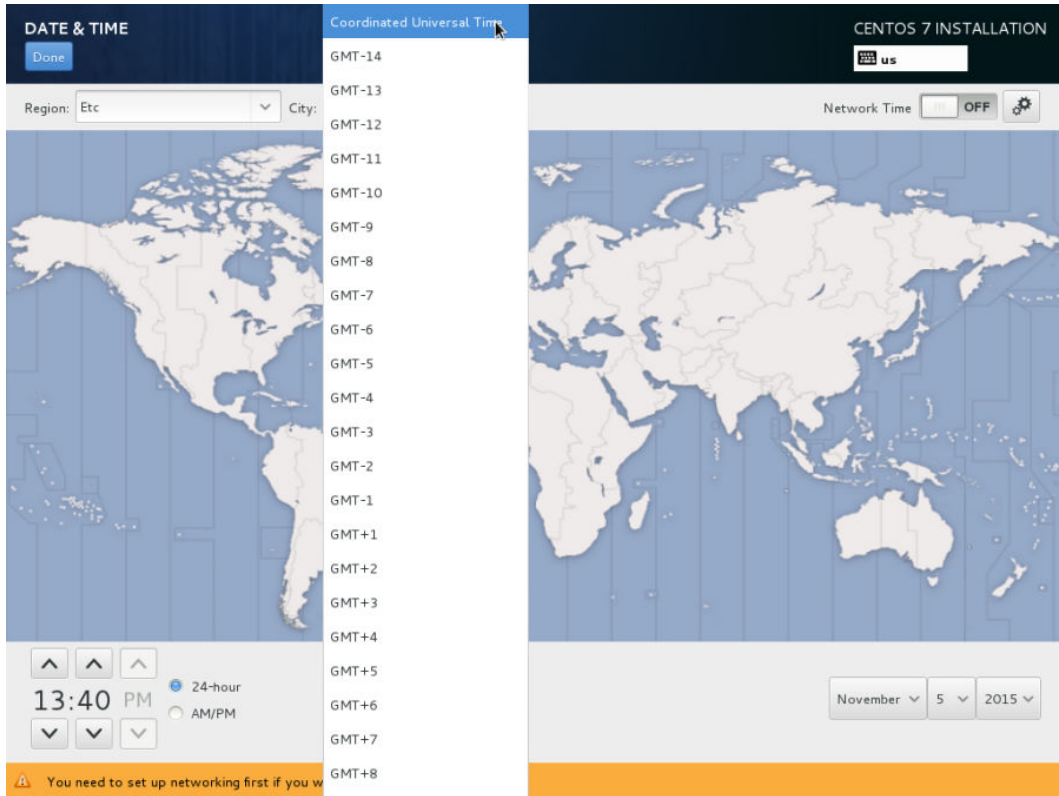
If you do not have a CentOS system running, select an installation image from [Vaisala Sigmet server \(ftp://ftp.sigmet.com/outgoing/releases/centos\)](ftp://ftp.sigmet.com/outgoing/releases/centos), and see instructions at [Tecmint Linux Guides \(http://www.tecmint.com/centos-7-2-installation/\)](http://www.tecmint.com/centos-7-2-installation/) on how to perform a CentOS installation.

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

- ▶ 1. Select your installation language.

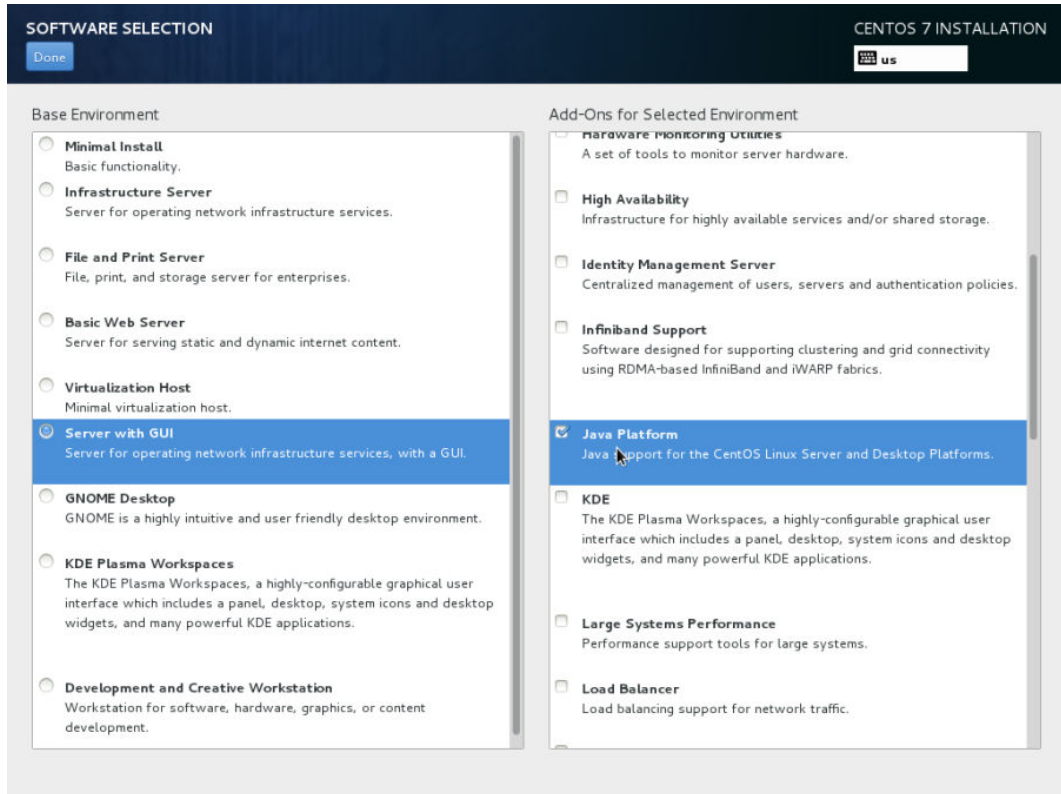
2. In **Date & Time**, set the system clock to Coordinated Universal Time (UTC) by choosing the following values:

- Region: **Etc**
- City: **Coordinated Universal Time**

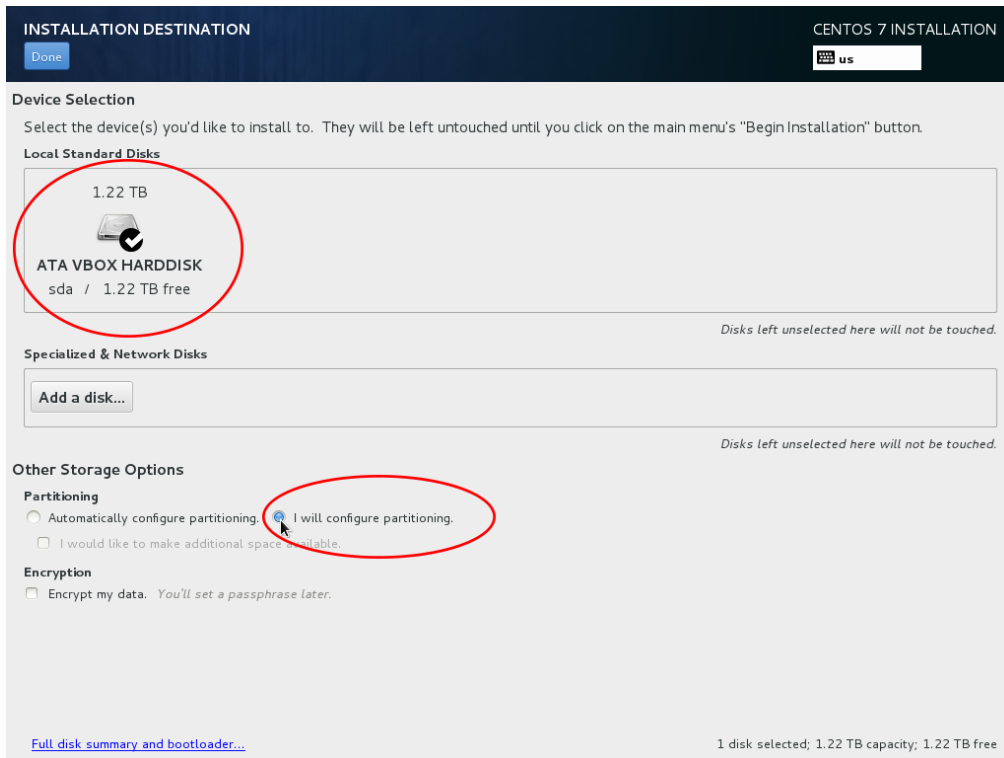


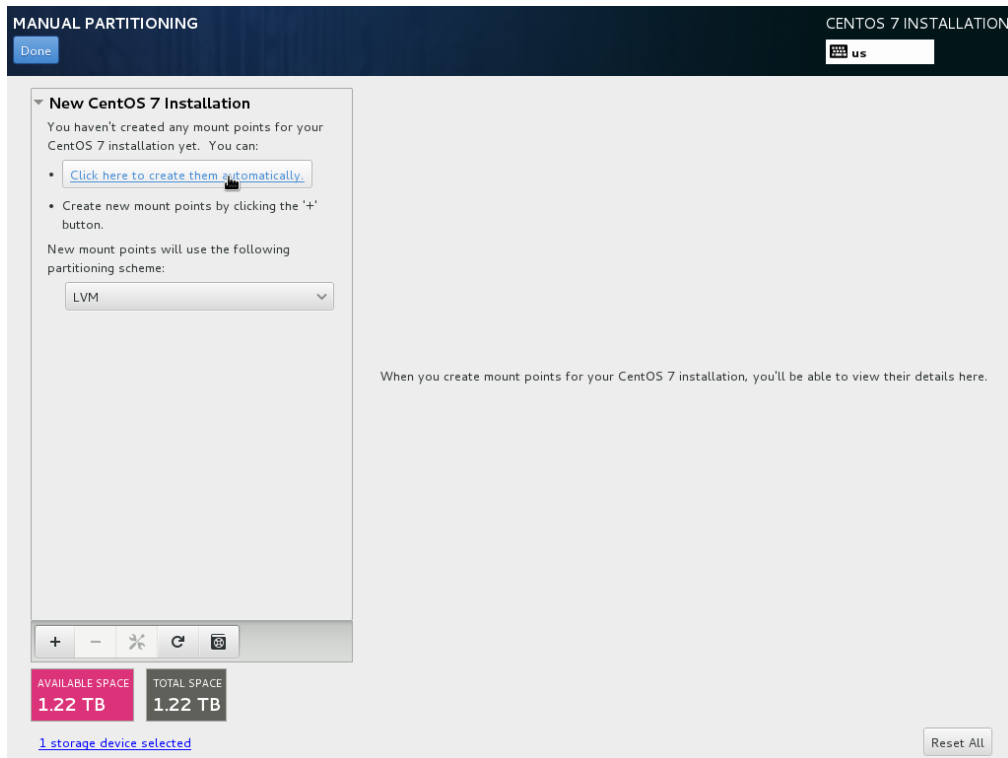
3. In **Software Selection**, set the server type by selecting the following software installation options:

- Base Environment type: **Server with GUI**
- Add-ons: **Java Platform**



4. In **Installation Destination**, start manual partitioning:
 - a. Select the hard disk.
 - b. Select **I will configure partitioning**.
 - c. Select **Done**.



5. Select **Click here to create them automatically.**6. Select the */home* partition:

- a. Under **Desired Capacity**, modify the size of the */home* partition by typing **50 GiB**.
- b. Select **Update Settings**.

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

ADD A NEW MOUNT POINT

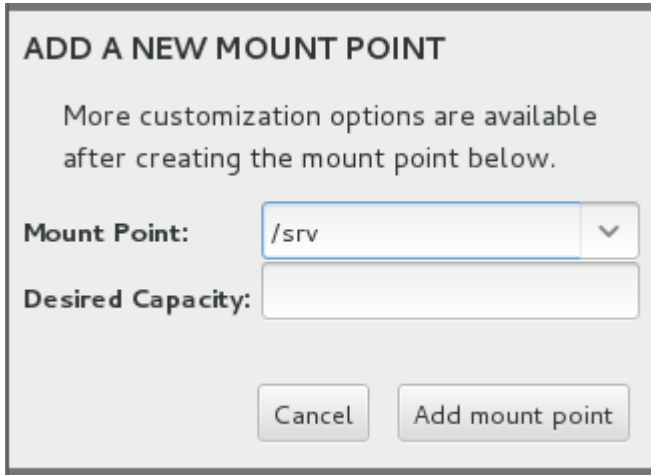
More customization options are available after creating the mount point below.

Mount Point: ▼

Desired Capacity:

- b. In **Mount Point**, type */var*
 - c. Under **Desired Capacity**, set the size of the */var* partition by typing **30 GiB**.
The user interface fills in the available server space.
 - d. Select **Add mount point**.
8. Select **/home**.
 - a. Under **Desired Capacity**, increase the size of the home partition (*/home*) by typing **50 GiB**.
 - b. Select **Update Settings**.
9. Select **/boot**.
 - a. Under **Desired Capacity**, increase the size of the */boot* partition (/) by typing **500 MiB**.
 - b. Select **Update Settings**.
10. Select **/**.
 - a. Under **Desired Capacity**, increase the size of the root partition (/) by typing **100 GiB**.
 - b. Select **Update Settings**.
11. Select **swap**.
 - a. Under **Desired Capacity**, increase the size of the swap partition by typing **32 GiB**.
 - b. Select **Update Settings**.

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



ADD A NEW MOUNT POINT

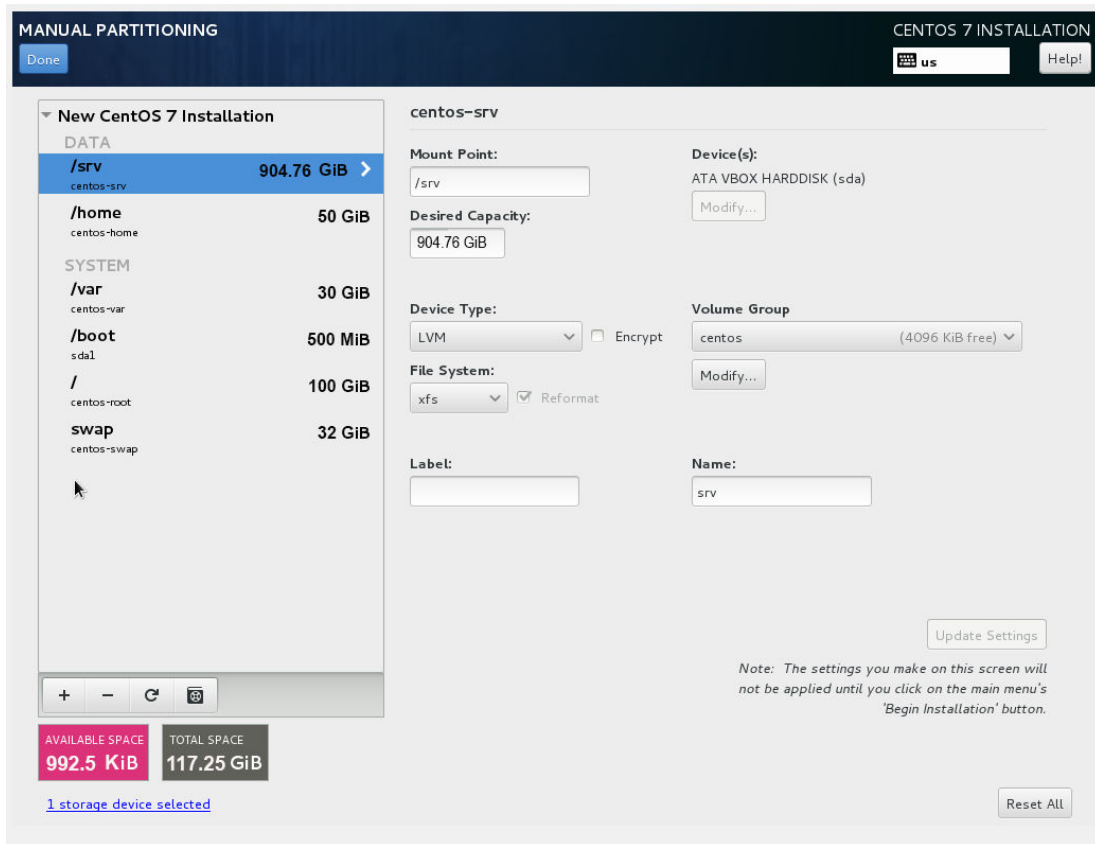
More customization options are available after creating the mount point below.

Mount Point: ▼

Desired Capacity:

- b. In **Mount Point**, type */srv*
 - c. Under **Desired Capacity**, use the remainder of the server space for the */srv* partition by typing **99999**.
The user interface fills in the available server space.
 - d. Select **Add mount point**.
 - e. Select any other dialog box.
The partition size changes to cover the available space.
13. Select **Done**.

- Check that the partitions are defined as follows:



- Select **Done > Accept Changes**.
- Select **Begin Installation**.

4.3.1 Setting the Root Password

The default password is xxxxxxxx.

- Select **ROOT PASSWORD**.
The **Root Password** window opens.
- 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.
- In the confirm text box, re-enter your root password.
- 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.

In the **Installation Summary/Initial Settings** page, the text under **Root Password** says Root password is set.

4.3.2 Creating CentOS User Accounts and Finalizing the Installation

After you have started the CentOS installation, you are prompted to create a non-root user account.

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

The screenshot shows the 'CREATE USER' screen in the CentOS 7 installation environment. The title bar includes 'CREATE USER' and 'CENTOS 7 INSTALLATION'. A 'Done' button is in the top left. The main form has the following fields and options:

- Full name:** Radar Operator
- Username:** radarop
- Tip:** Keep your username shorter than 32 characters and do not use spaces.
- Make this user administrator
- Require a password to use this account
- Password:** [masked with dots]
- Confirm password:** [masked with dots]
- Password Strength:** Strong (indicated by a green bar)
- Advanced...** button at the bottom.

Figure 5 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.

4.3.3 Configuring the Network for CentOS

- ▶ 1. In the CentOS installation screen, select **NETWORK & HOSTNAME**.
2. Configure the network according to your organization's requirements.

4.4 Upgrading Existing CentOS 7 Setups

If you have an existing CentOS 7 system running, you do not have to install a new system from scratch. Updating the necessary packages to support IRIS Focus is enough.

Take a backup of the system before upgrading so that you can restore it in case anything goes wrong.

More Information

- ▶ [Backing-up System Configuration \(page 61\)](#)

4.4.1 Online CentOS 7 Upgrade

If the server is online, upgrade it to the required CentOS 7.1 level.

- ▶ 1. Login as root
- 2. Enter the following commands:
 - a. To clean the yum package manager cache directory: **yum clean all**
 - b. To list the lists packages that will be updated: **yum check-update**
 - c. To download and install the packages: **yum update**
This takes some time depending on the amount of packages and network speed.
- 3. Reboot the system.

4.4.2 Offline CentOS 7 Upgrade

Use a USB stick with CentOS 7.1 on it or a mounted CentOS 7.1 ISO to upgrade a system offline.

- ▶ 1. Login as root.
- 2. Modify the file `/etc/yum.repos.d/CentOS-Base.repo` and comment out all lines under the `[base]` repository by entering a `#` mark at the beginning of each line.

3. Add the following lines under the `[base]` repository:

```
[base]
name=CentOS- Base-Offline
baseurl=file:///mnt/centos71/
enabled=1
gpgcheck=0
```



Make sure `file://` is in front of the mount point in this file. The path `file:///mnt/centos71/` is the mount point of the CentOS 7.1 ISO image. If you use an auto-mounted USB stick, use the `lsblk` command to find the mount point.

4. Run the update steps in [4.4.1 Online CentOS 7 Upgrade \(page 24\)](#).

4.5 Installing IRIS Focus Components

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.

All IRIS Focus components are installed at the same time. You must have the IRIS Focus application installer, map data package, and terrain data package available before you start the installation.

- ▶ 1. Mount the CentOS 7.1 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.
2. Login as **root**.
3. Unpack the contents of the IRIS Focus installation file on the server, for example to the `/root/IRIS` directory.
These files occupy approximately 40Gb of space unpacked.
4. Navigate to the directory where you downloaded the files.

5. Launch the `./rsw-installer` script.

The install script requires the following parameters:

```
./rsw-installer --offline --gis-db-dump [maps directory] --terrain-dir  
[terrain directory] -s [socket server hostname]
```

- `--gis-db-dump` - location for the map data
- `--terrain-dir` - location for the terrain data
- `-s` - hostname of the socket server that provides radar product data from IRIS Analysis



If the computer is connected to the internet, you can run the installer with the `--online` flag.

Any additionally required CentOS 7 packages are then fetched from the internet

The script proceeds automatically and installs all necessary services, user accounts and modules required for running IRIS Focus.

Note that 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.

During installation, the following services are created and started:

- `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
- `vaisala-radarsw-nowcast-server` - Nowcasting server
- `vaisala-radarsw-scan-updater-service` - Listener for Scan service
- `vaisala-radarsw-scan-http-service` - HTTP server for Scan service
- `vaisala-radarsw-warn-reader` - HTTP server for the receiving **WARN** products from IRIS

The following users are created:

- `radarweb` - Restricted user account for running the IRIS Focus web application
- `radarscan` - Restricted user account for running the Scan Service database
- `radargeo` - Restricted user account for running the GeoServer map engine
- `warnreader` - Restricted user account for running the warn service

4.6 Security Settings

IRIS Focus server has a pre-configured firewall.

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

- SSH can be used for configuration
- HTTP port is used 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.

Firewall is configured through CentOS firewalld system. For more information, see https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/html/Security_Guide/sec-Using_Firewalls.html.

4.7 Configuring IRIS for IRIS Focus

4.7.1 Activating the Socket Server in IRIS Radar

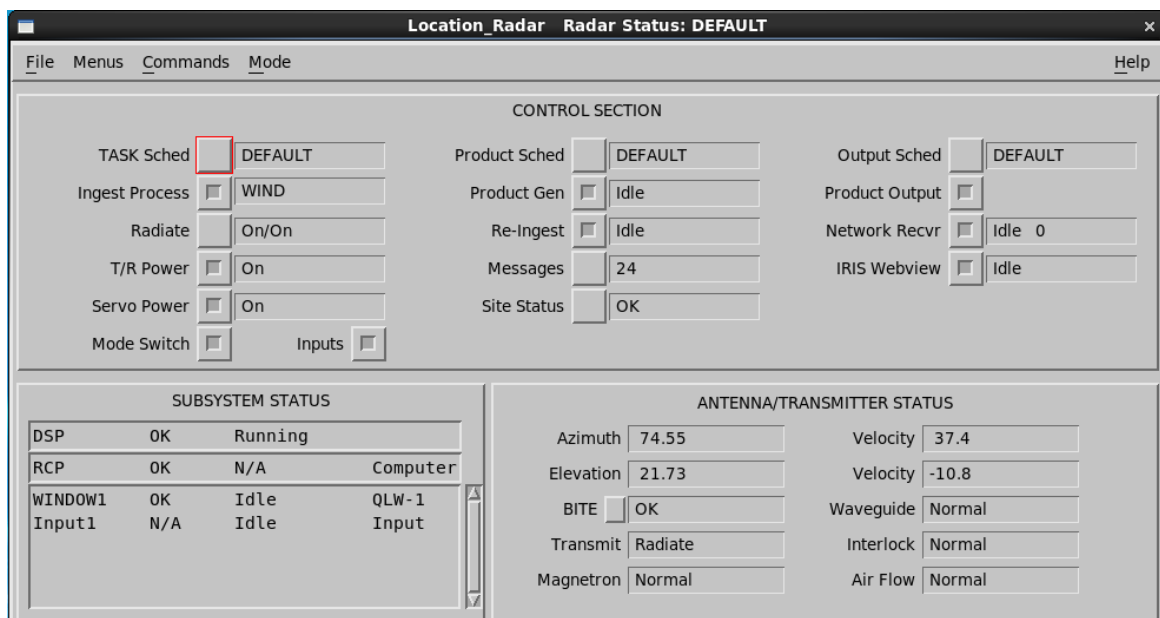


Figure 6 IRIS Radar Status Menu

If your system is running IRIS Focus server, you must enable the **IRIS Webview** option in IRIS Radar. For more information, see *IRIS Radar User Guide*.

1. Make sure IRIS has started.
2. In IRIS Radar, select **Menus > Radar Status**.
3. Enable Select **IRIS Webview**.
When enabled, the field shows the status of the server process, as **Idle**, **Running**, or **Stopped**.

4.7.2 Setting up Scan Service

Scan Service is a service running on the IRIS Focus server that receives radar scan volume data (stored in RAW file format) from the IRIS Analysis server and generates live radar products from the data in real-time. Scan Service is not required for IRIS Focus to function, but all IRIS Analysis installations support creating radar product data streams for Scan Service so you should always also configure the Scan Service when you install IRIS Focus.

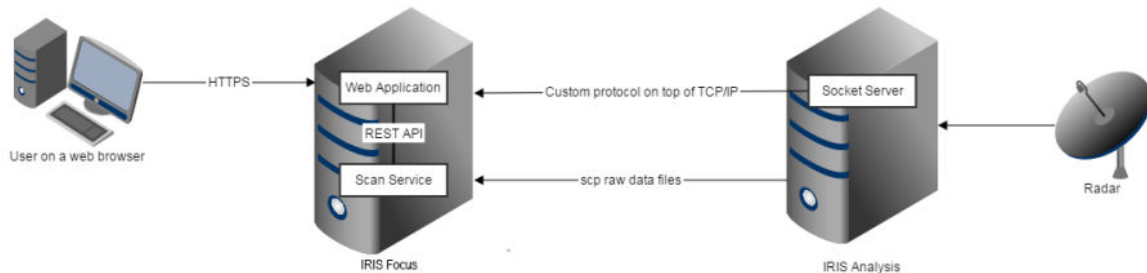


Figure 7 Radar Data Delivery Paths

Setting up the Scan Service connection requires that you have root access to both the IRIS Focus and the IRIS Analysis server. During installation, IRIS Focus sets up all necessary services, databases and user accounts for processing RAW data, but IRIS Analysis must be configured to send the RAW files to the correct location before IRIS Focus can use them. This is done by setting the target location on IRIS Focus server as a network Output Device in IRIS Analysis. The target location on IRIS Focus server is `/srv/vaisala/radarsw/product_raw` directory, owned by the radarscan user.

As the RAW files on the IRIS Analysis server are handled by the local root user and RAW files on the IRIS Focus server by the local radarscan user, you must add the IRIS Analysis root account's public SSH key to the IRIS Focus radarscan accepted keys list.

4.7.2.1 Setting up Scan Service On IRIS Analysis server

- ▶ 1. Log on to IRIS Analysis server as **root**.
2. In the terminal window, type: **setup&**
The IRIS **Setup** utility opens
3. Select **Output**.
4. Create a new output device:
 - a. In **Number of output devices**, increase the number of output devices by 1.
 - b. Press ENTER.
A new configurable output device is added to the end of the **Output Device** list.

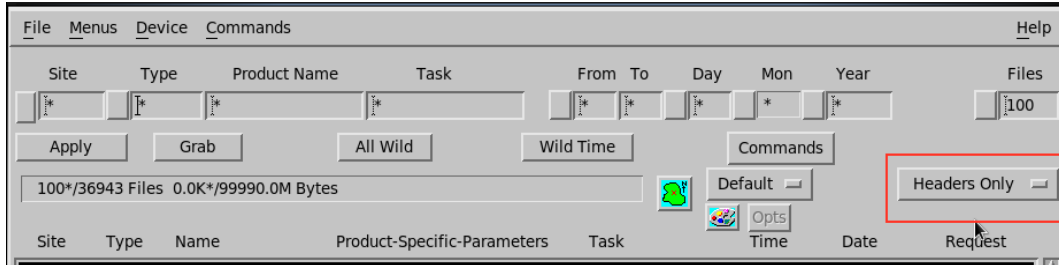
5. In the configuration pane for the new output device, configure the new output device with the following settings:

The screenshot shows a configuration window titled "Output Device #3" with a "Help" button. The window has a menu bar with "File" and "Help". The settings are as follows:

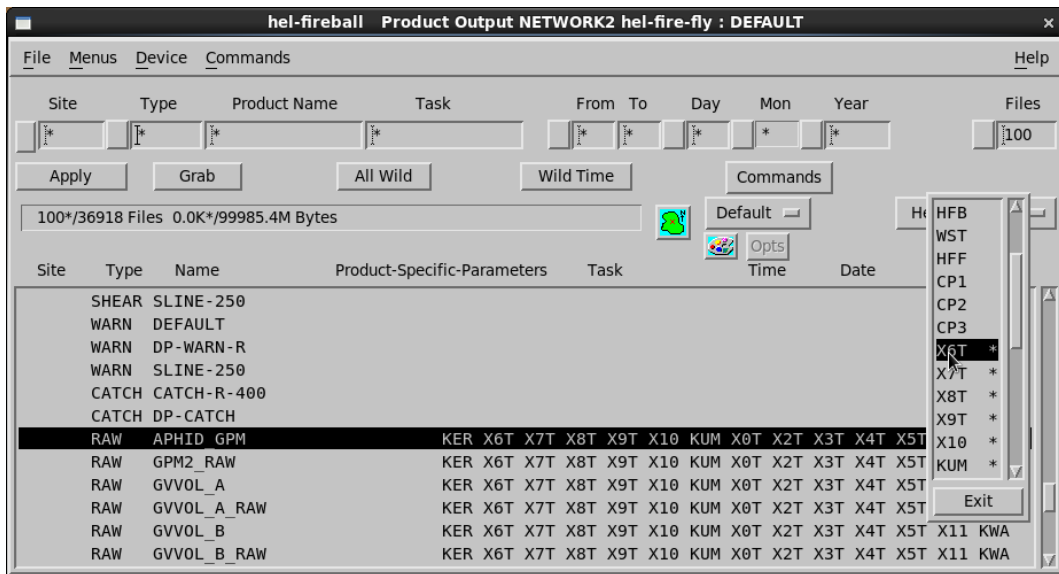
Display Name	1.0
Device type	Network
Menu alias	scan-service
Min time between output	0 sec
File format	IRIS (Def)
Filename format	Native
Compression scheme	None
Notification scheme	None
Target directory	/srv/vaisala/radarsw/product_raw/
Copy scheme	SCP
User name	radarscan
Recipient host name	[[target-hostname]]

- Device type:** Network
- Filename format:** Native
- Target directory:** */srv/vaisala/radarsw/product_raw*
- User name:** radarscan
- Host name: [IRIS Focus server]
- Select **File > Save**.
- Select **File > Exit**.

6. In the terminal window, type: **iris &**
The IRIS menu options.
 - a. Select **Menus > Product Output > Device**.
 - b. Select the device you configured in the **Setup** utility.
 - c. In the drop down box on the far right of the window, select **Headers Only**.



- d. In the product list, select any RAW product.
- e. Right-click the far right of the product name and select a radar site.
If needed, deselect any radar sites you do not want to include in the device configuration.



- f. Select **Apply**.
- g. Select **File > Save As**.
Define a name for the new Product Output or use the **DEFAULT** option.
- h. Select **OK**.
- i. Select **Close**.

7. In the terminal window, restart IRIS:

```
service iris start
service iris stop
```

8. Read the contents from the **root** account's public SSH key: `cat /root/.ssh/id_dsa.pub`
9. Store the printed key string on a file or on the computer clipboard for later use.
10. Launch a one-time SSH connection to the IRIS Focus server.
This saves IRIS Focus server's hostname in the IRIS Analysis server's `known_hosts` file. `ssh [IRIS Focus server IP address]`

4.7.2.2 Setting up Scan Service On IRIS Focus server

- ▶ 1. Log in to IRIS Focus server as root.
- 2. If the `/srv/vaisala/radarsw/product_raw` directory does not exist, create it with the command:
`mkdir /srv/vaisala/radarsw/product_raw`
- 3. Set directory owner as `radarscan` in the `radarsw` user group with the command:
`chown radarscan:radarsw /srv/vaisala/radarsw/product_raw`
- 4. Edit the `radarscan` user's authorized SSH keys store with the command:
`nano /var/lib/radarscan/.ssh/authorized_keys`
- 5. Append contents you copied from the IRIS Analysis server root account's public key to `authorized_keys`, after the last entry.
This enables file transfer from IRIS Analysis root account to IRIS Focus `radarscan` user.
- 6. Check that the RAW files appear in the `/srv/vaisala/radarsw/product_raw` directory on the IRIS Focus server.
A Scan Service updater service records metadata of the files in an SQLite database, which is in turn accessed by the IRIS Focus web UI when it generates live radar products from the data.

4.7.3 Managing Alerts for Significant Weather

In IRIS Focus, a weather *event* is an occurrence of a pre-configured **WARN** product appearing in the display.

A weather *event* becomes an *alert* when the pre-configured **WARN** product moves into a protected area in the display.

To use IRIS Focus alerts, you must define **WARN** products in IRIS Radar and then draw protected areas in IRIS Focus.

Perform the steps in the following sections.

- ▶ 1. Learn about IRIS **WARN** products.
See [4.7.3.1 WARN: Warning/Centroid Product \(page 32\)](#).
- 2. [4.7.3.2 Setting-up Public Key Authentication \(page 35\)](#).
- 3. [4.7.3.3 Configuring WARN Products \(page 36\)](#).
- 4. [4.7.3.4 Scheduling WARN Products \(page 39\)](#).
- 5. [4.7.3.5 Configuring an IRIS Output Device for WARN Products \(page 40\)](#).
- 6. [4.7.3.6 Sending WARN Products from IRIS to IRIS Focus \(page 42\)](#).

When you have configured the **WARN** products that are displayed as events in IRIS Focus, draw protected areas in IRIS Focus so you are alerted when an event enters that area.

See *IRIS Focus User Guide*.

4.7.3.1 WARN: Warning/Centroid Product

The **WARN** product uses other IRIS products to detect significant weather.

Example: Detecting Hail

The occurrence of 45 dBZ at 1.5 km above the freezing level is a good indicator of hail in many mid-latitude locations. Assuming that the freezing level is at 4 km, and you run an echo **TOPS** product for the 45 dBZ contour, your pre-configured warning could check if:

- The **TOPS** product shows 45 dBZ tops at heights greater than 5.5 km. If yes, there is a high probability of hail.
- So you do not issue an alarm based on a single pixel, a "threshold region" parameter checks if the region of hail signature at least 10 km².
- The **VIL** for the same region (1 ... 10 km) is greater than 5 mm (or a value determined from the local climatology of hail).

The **WARN** product automates this procedure in real time by searching the products for significant weather, and alerts the operator when an event is detected. The following figure shows how the **WARN** product works.

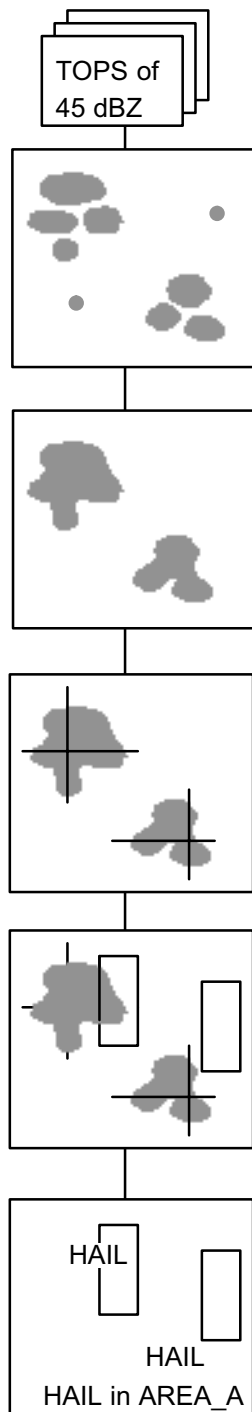


Figure 8 HAIL Warning/Centroid

- 1 Threshold the input product (45 dBZ TOPS in the example) so that only points greater than the threshold are considered (for example, $>>5.5$ km (3.4 mi)). The result is a 2-D binary array.
- 2 Smooth and connect the regions that are almost touching, and eliminate any isolated bins.
- 3 Contiguous regions are identified by a region finder procedure. The centroid location and area of each region is computed. Regions below the threshold size are discarded.
- 4 Determine whether any part of any region is in a protected area.
- 5 Display the **WARN** product as an event outside protected areas or as an alert within protected areas.

Warning Message

You can define the content of the message. For example:

```
2 HAIL Warnings at 11:30:00 in: AREA_A AREA_B
```

In this case, **HAIL** is the user-selected warning text and **AREA_A** is the user-selected name of the protected area.

The names and locations of protected areas are defined in the IRIS **Setup** utility.

The messages are added to the IRIS **Message Summary** menu.

Warning Criteria

The automatic warning feature can provide alerts for a wide variety of weather phenomena, such as the approach of a severe storm, turbulence, lightning hazard, or flood potential.

Up to 3 criteria can be used. The thresholding and smoothing is performed separately for each, then the results are **ANDed** together so that centroid definition is performed on the combined field. For example, the additional criterion of the 1 ... 10 km (0.6 ... 6.2 mi) **VIL** >>5 mm (0.2 in) could be added to reduce a **HAIL** warning false alarm rate.

The following table shows some examples of warning criteria. Each criterion, surrounded by square brackets above, is one task. The results of multiple tasks are **ANDed** together.

Table 3 Warning Criteria Examples

Criteria	Example
Wind shear detection	<pre>[Shear >10 m/s/km at 0.5° EL] AND [... at 0.7° EL]</pre> <p>over an area of 3 km² (1.2 mi²)</p>
Storm turbulence detection	<pre>[Spectrum Width >6 m/s (>19 ft 8 in / s)] AND [Reflectivity >20 dBZ]</pre> <p>over an area of 10 km² (3.9 mi²)</p>
Hail detection	<pre>[45 dBZ TOPS >1.5 km (>0.9 mi) above freezing level]</pre> <p>over an area of 10 km² (3.9 mi²)</p>
Precipitation surveillance detection	<pre>[1.5 to 14 km (0.9 to 8.7 mi) VIL >1 mm (>0³/₆₄ in)]</pre> <p>over an area of 10 km² (3.9 mi²)</p>

Criteria	Example
Severe storm detection or lightning hazard	<p>[1.5 to 15 km (0.9 to 9.3 mi) VIL >10 mm (>0²⁵/₆₄ in)] AND [10 dBZ TOPS >8 km (>5.0 mi)]</p> <p>over an area of 10 km² (3.9 mi²)</p>
Flash flood warning	<p>[Hourly Rainfall or N-Hour Rainfall >5 mm (>0¹³/₆₄ in)]</p> <p>over an area of 25 km² (9.7 mi²)</p>



To function effectively, a **WARN** product must be based on the local climatology and experience. Vaisala can work with you to develop such a climatology or to better understand the capabilities and limitations of the **WARN** product. Vaisala makes no warranty, either express or implied, that the **WARN** product can detect all hazardous weather situations. In no event can Vaisala be held liable for damages of any kind for failure of the **WARN** product to issue a warning, or for false alarms that may be issued by the **WARN** product.

4.7.3.2 Setting-up Public Key Authentication

To support sending **WARN** products from IRIS to IRIS Focus, you must add the public key of the root user of the IRIS machine to the authorized keys list on the IRIS Focus machine.

This allows the files to transfer over the network securely, automatically, and without passwords.

- ▶ 1. On the IRIS machine, copy the contents of: `/root/.ssh/<public_key_file>` (for example `id_rsa.pub`)
- 2. On the IRIS Focus machine, copy the key file to: `/var/lib/warnreader/authorized_keys`

4.7.3.3 Configuring WARN Products

File Menus Type Help

Warning Symbol

Area in Sq Km

Type	Product Name	Time	Threshold
VIL	VIL_130		> 30.00
1 TOPS	45Z_150	00:00:00	> 5.00
2 VIL	VIL 130	00:00:00	> 30.00
3			

Apply Clear

PROTECTED AREAS FOR WARNING ALERT

TDWR Style Say/Beep Warning Make Diagnostic

If you wish to be alerted to events entering protected areas you draw in IRIS Focus, you must configure a **WARN** product for each tracked event in IRIS Radar.

For more information, see *IRIS Focus User Guide*.

Use the **WARN** product configuration menu to specify the message, the area of the threshold region, and up to 3 products to use as criterion for the warning.













IRIS Focus does not include a **WARN** product of its own. You must configure **WARN** products in IRIS.

- ▶ 1. In the main menu bar, select **Menus > Product Configuration**.
2. In the main menu bar, select **Type > WARN**.
The **WARN Product Configuration** menu opens.

3. In **Warning Symbol**, specify the text used in the warning messages.
 For example, the text may be, **HAIL** or **MBW, S++**, or **TRW+**.
 If you define the **Warning Symbol** with a predefined IRIS Focus **Warning Symbol**, IRIS Focus displays the weather with as an icon. If you use a different **Warning Symbol**, IRIS Focus displays the weather with the **UNKNOWN** icon.

Table 4 IRIS Focus Warning Symbols

IRIS Warning Symbol Label	IRIS Focus Event Icon	IRIS Focus Alert Icon
DOWNBURST		
HAIL		
THUNDERSTORM		
WINDSHEAR		
Other Warning Symbol value		

4. Enter the minimum size of a thresholded region in the **Area in Sq Km** field.
 Areas that do not meet or exceed this size are discarded. Enter the desired value in square km.
 For example, for a 3 km by 3 km (1.9 × 1.9 mi) size area, enter **9**.

5. Select the button next to **Product Type** and **Product Name**, select up to 3 products to be examined by the **WARN** product.



- Products must have the same maximum product range per the respective Product Configuration menus.
- Products must have the same resolution per the respective Product Configuration menus.
- Products must be of a supported data type: **dBT**, **dBZ**, **dBZc**, **Height**, **Kdp**, **LDRH**, **LDRV**, **R**, **Rain**, **RhoH**, **RhoV**, **RhoHV**, **Shear**, **SQI**, **Time**, **VIL**, **Width**, and **ZDR**.

Errors are reported at run time in the **Radar Status** menu.

- a. Select the product type.

The **Product Name** information is filled in automatically. You can edit the name if you wish.

- b. Select the product name.



The list of product names shows products currently in your system. If the product you want does not show, run your system until it does show. Alternatively, choose a different product of the desired type and override the product name.

- c. For each product, use **Time** values to use products from different tasks or different runs of the same task.

Use the plus and minus buttons to increase or decrease the hours, minutes, or seconds or type a time value in the window.

This field applies only when there is more than one criterion. For example, if the second criterion has a time of 00:10:00, when the first product becomes available, the scheduling algorithm searches back in time as far as 10 minutes to find a version of the second product.

You must know your task schedule. If you use products based on different tasks, you must set the **Time** field to some nonzero number or the product does not run. In general, if all of your product criteria are based on the same task, set all the times to 00:00:00 so that only data from the same run are used.

- d. For each product, enter the warning threshold in **Threshold**.

The **WARN** product considers only those values that meet or exceed the threshold. The units of measure depend on the selected product. For example

- **TOPS** thresholds are specified in km
- **VIL** thresholds are specified in mm.



Check the appropriate **Product Configuration** menu if you are uncertain about the units of measure.

For the **VVP** product, the threshold refers to the divergence in units of m/s per km (10^{-3} s^{-1}). When the **WARN** product is run for the **VVP**, a warning is generated if the divergence exceeds this value at any height in the **VVP**. Strong low-level divergence over the radar could be an indicator of a microburst. To properly set for microburst alerts, you must know the local characteristics of the phenomena.

6. Do not configure **Protected Areas for Warning Alert**. You do this later in the IRIS Focus display.
7. In IRIS Radar, schedule the **WARN** product.
 - a. Select **Menus > Product Scheduler**.
 - b. In **Add for**, select the radar site for which you want to schedule the **WARN** product.
 - c. In the list, right-click the **WARN** product header.
A list of all available **WARN** product configurations appears.
 - d. In the list of **WARN** product configurations, select the **WARN** product you just configured.
The new product appears in the list in a stopped state.
 - e. To schedule the **WARN** product indefinitely, right-click the **Status** column for that row and select **All**.

For more information, see *IRIS Radar User Guide*.

4.7.3.4 Scheduling WARN Products

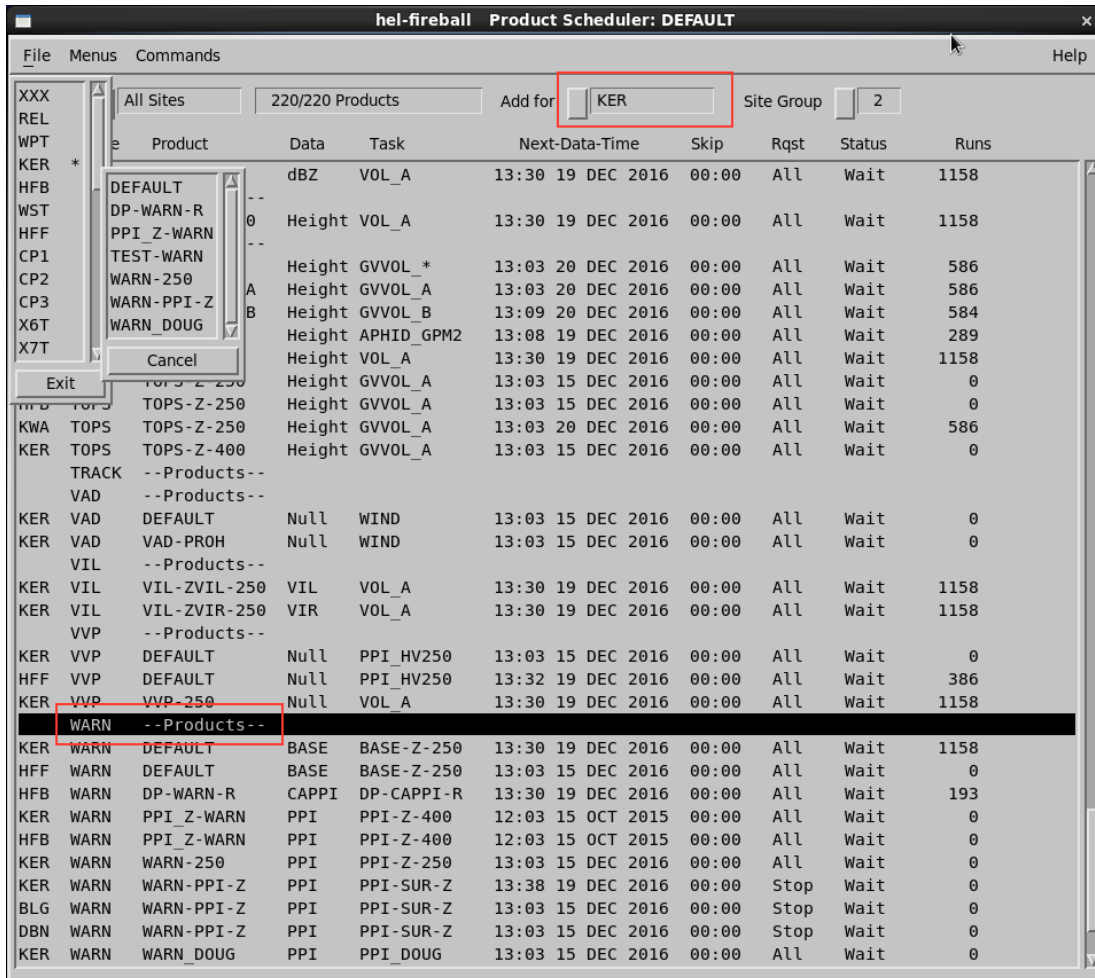


You must configure **WARN** products before you can schedule them.

If you wish to use alerts and protected areas in IRIS Focus, you must schedule a **WARN** product in IRIS Radar.

- ▶ 1. Select **Menu > Product Scheduler**.
A list of available product types appears.
2. On first line of the menu, select the button next to **Add For** and select the code for your local radar.

3. In the list, right-click the **WARN** product header. A window appears listing the available **WARN** product configurations.



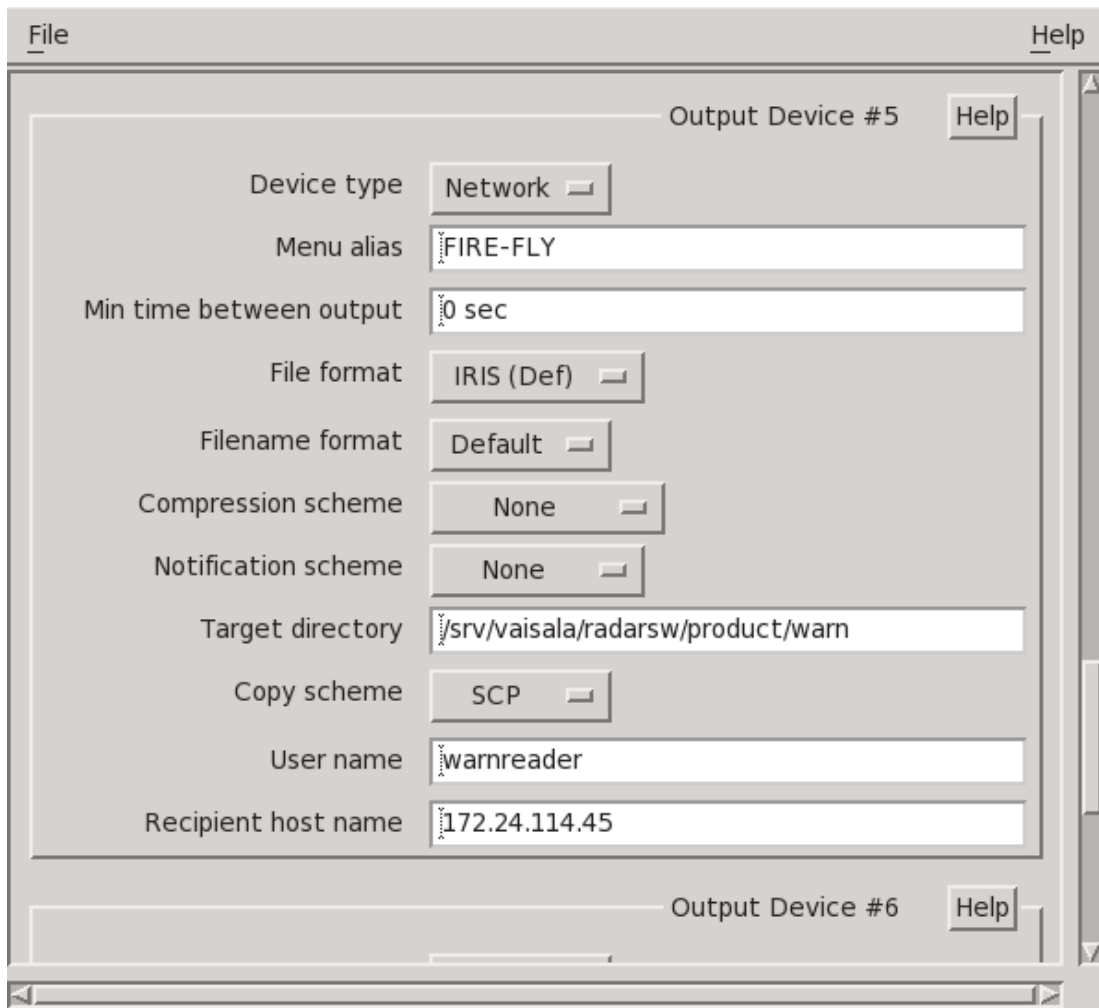
4. Right click the **WARN** product header. A window appears listing the available **WARN** product configurations.
 - a. Select the **WARN** configuration you created earlier. The product appears on the list of scheduled products in a stopped state.
 - b. Schedule the **WARN** indefinitely by right-clicking the **Status** column for that row and selecting **All**.

4.7.3.5 Configuring an IRIS Output Device for WARN Products

In IRIS, you must configure the IRIS Focus server as an output device to which IRIS copies **WARN** product files. The output device configuration would look something like the following, except the *Menu alias* and *Recipient host name* fields would be filled in with a name for the output device and with the network address of the FIRE server (don't forget to save and restart IRIS after making changes to output device configurations):

- ▶ 1. In the IRIS terminal window, type: **setup&**
The IRIS **Setup** utility starts.

2. In the IRIS **Setup** utility, select **Output**.
3. In **Number of Output Devices**, raise the number of devices by 1.
4. Scroll down to the first unconfigured output device and begin configuring the device for IRIS Focus **WARN** products.




- a. For **Device type**, select **Network**.
 - b. For **Menu alias** type the name of the output device.
The image shows an example.
 - c. **Recipient host name** type the network address of the IRIS Focus Server.
The image shows an example.
5. Save your changes and restart IRIS to take the changes into effect.

4.7.3.6 Sending WARN Products from IRIS to IRIS Focus

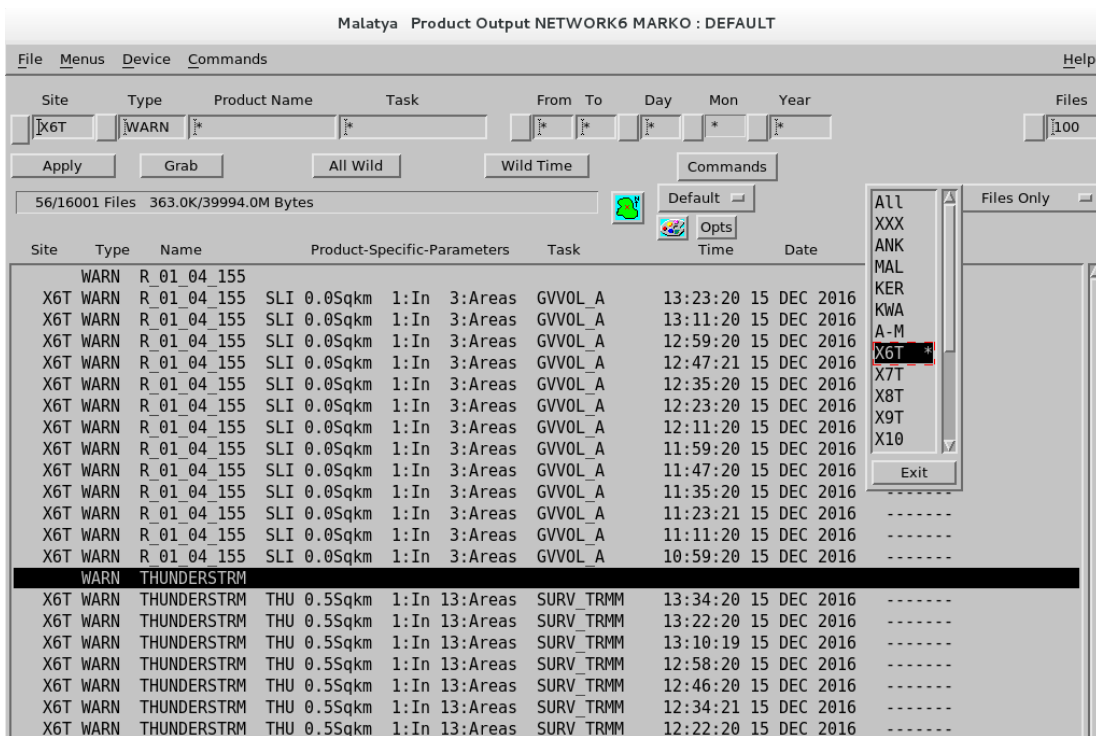
When you have configured and scheduled the WARN product, you can start sending WARN products over the network to IRIS Focus.

- ▶ 1. In the IRIS terminal window, type: **iris&**
The IRIS Radar application starts.
2. Select **Menus > Product Output**.
3. In the **Device** menu, select the IRIS Focus device you want to send products to.



This is the device you configured in [4.7.3.5 Configuring an IRIS Output Device for WARN Products \(page 40\)](#).

4. Filter the list of output products:



Site	Type	Name	Product-Specific-Parameters	Task	Date
WARN	R	01_04_155			
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	13:23:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	13:11:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	12:59:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	12:47:21 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	12:35:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	12:23:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	12:11:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	11:59:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	11:47:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	11:35:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	11:23:21 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	11:11:20 15 DEC 2016
X6T	WARN	R_01_04_155	SLI 0.0Sqkm	1:In 3:Areas GVVOL_A	10:59:20 15 DEC 2016
WARN		THUNDERSTRM			
X6T	WARN	THUNDERSTRM	THU 0.5Sqkm	1:In 13:Areas SURV_TRMM	13:34:20 15 DEC 2016
X6T	WARN	THUNDERSTRM	THU 0.5Sqkm	1:In 13:Areas SURV_TRMM	13:22:20 15 DEC 2016
X6T	WARN	THUNDERSTRM	THU 0.5Sqkm	1:In 13:Areas SURV_TRMM	13:10:19 15 DEC 2016
X6T	WARN	THUNDERSTRM	THU 0.5Sqkm	1:In 13:Areas SURV_TRMM	12:58:20 15 DEC 2016
X6T	WARN	THUNDERSTRM	THU 0.5Sqkm	1:In 13:Areas SURV_TRMM	12:46:20 15 DEC 2016
X6T	WARN	THUNDERSTRM	THU 0.5Sqkm	1:In 13:Areas SURV_TRMM	12:34:21 15 DEC 2016
X6T	WARN	THUNDERSTRM	THU 0.5Sqkm	1:In 13:Areas SURV_TRMM	12:22:20 15 DEC 2016

- a. For the **Site** field, select the correct radar site.
- b. For the **Type** field, select **WARN**.
- c. Select **Apply**.

The **WARN** products that are generated for this radar site are shown.

5. Right-clicking the **Request** column and select the site you want to start sending the product to.
In the example above, the **THUNDERSTRM** **WARN** product will be sent to the **X6T** site.

4.8 Verifying IRIS Focus Installation

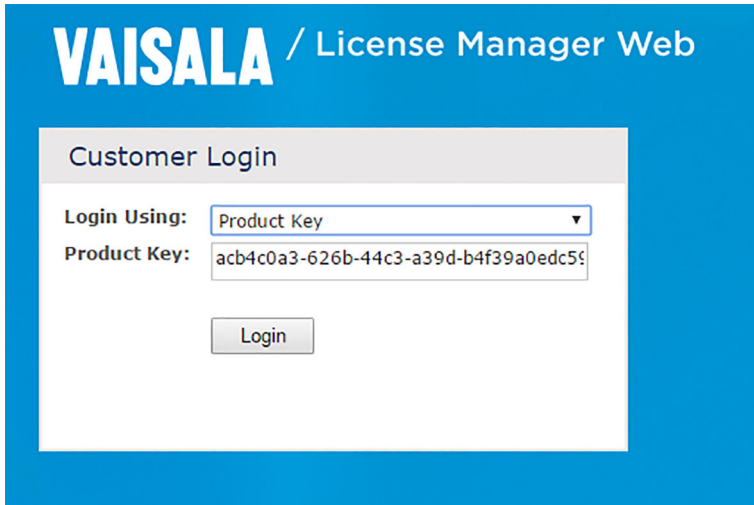
After the installation steps are complete, verify the installation.

- ▶ 1. Restart the server.
IRIS Focus web application is set to launch automatically when the server starts. The web UI 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** and **Cross Section** buttons are visible in the application UI.
This verifies that IRIS Focus features are enabled.
5. Enable the grid lines from **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. (optional) If you also configured Scan Service, select **Add Product** and add a new Live PPI or Live CAPPI product.
You should see weather data from the selected time on the screen.

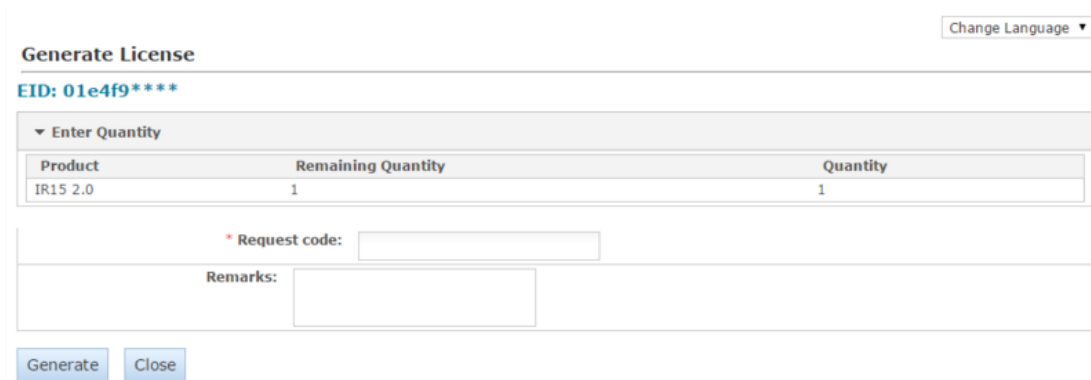
4.9 Activating License – Online

- ▶ 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.

License Certificate

Contact: **Customer:** Vaisala Oyj - 327799

List of Activations

Product Key	Name	AID	Quantity	Remaining Quantity
31e6b594-9499-4c3a-859a-43ceeb6aba62	IR15 2.0	3e667d27-dfc3-454d-afcb-3c6cb668f90d	1	0

License String

```
*E
WLynnQhM4bu27hvFNEW.3y22kDpWYJWd8R0f6WTUhvL0Bh6tAFHDqjmlBnkgzrLwmdmOALF2fhAeoRgS9a0LA.pI0L
OISSTR79ouP3EAWWf7leoW45kqSkN9ofQ7z2H35Sd3ZrJpJwGseRnEz80Gvfo# "IRIS_Focus" version "", expires Midnight
of Jan 1, 2011, exclusive##AID=3e667d27-dfc3-454d-afcb-3c6cb668f90d
```

/

Save to File Append To File Back to List

7. Select **Save to File** to save the license string to a file on disk.

The file is saved by default with the name `lserverc`.

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

9. Restart IRIS Focus services with the following command:

```
service vaisala-radarsw-webapp restart
```

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).**More Information**

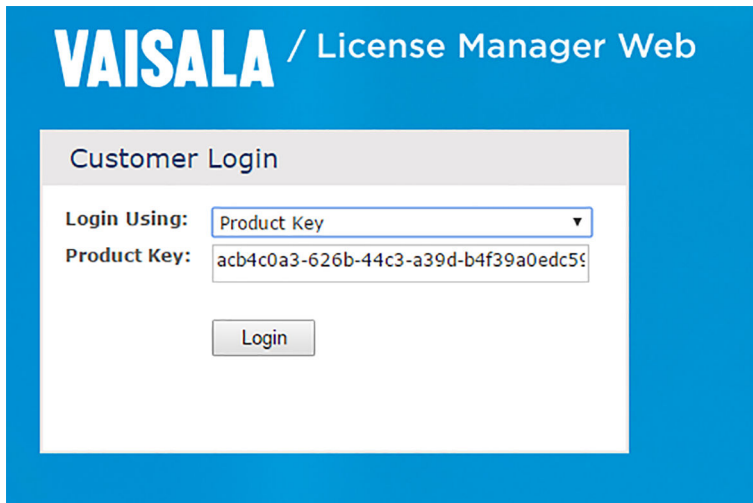
▸ [Licensing \(page 9\)](#)

4.10 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 another online computer and then transfer the license file to the IRIS Focus server.

- ▶ 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 and transfer it to the online computer.

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



VAISALA / License Manager Web

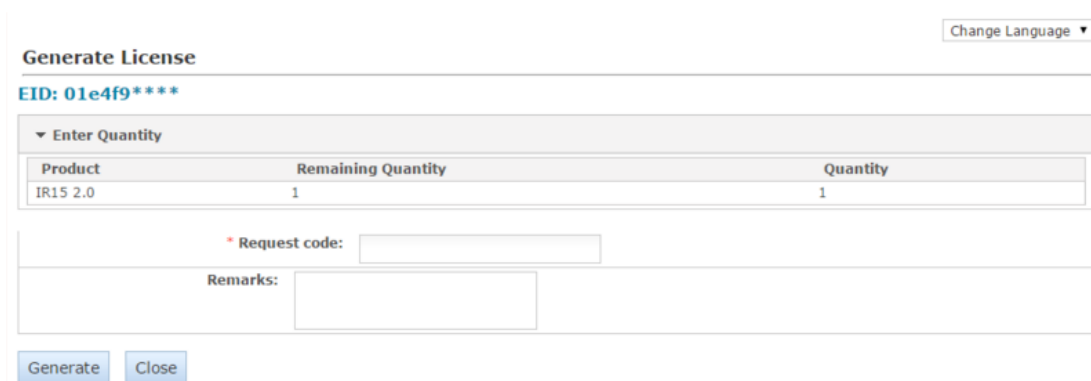
Customer Login

Login Using: Product Key

Product Key: acb4c0a3-626b-44c3-a39d-b4f39a0edc5

Login

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



Change Language ▾

Generate License

EID: 01e4f9****

▼ Enter Quantity

Product	Remaining Quantity	Quantity
IR15 2.0	1	1

* Request code:

Remarks:

Generate Close

6. Select **Generate**.

A popup window with the license string opens.

License Certificate

Contact: **Customer:** Vaisala Oyj - 327799

List of Activations

Product Key	Name	AID	Quantity	Remaining Quantity
31e6b594-9499-4c3a-859a-43ceeb6aba62	IR15 2.0	3e667d27-dfc3-454d-afcb-3c6cb668f90d	1	0

License String

```
*E
WLYnnQhM4bu27hvFNEW.3y22kDpWYJWd8R0f6WTUhvL0Bh6tAFHDqjmlBnkgz_rLwdmimOALF2fhAeoRgS9a0LA.p0L
OIS5TR79ouP3EAWWf.7leoW45kqSkN9ofQ7z2H35Sd3Zr.JpJwGseRnEz80Gvfo# "IRIS_Focus" version "", expires Midnight
of Jan 1, 2011, exclusive##AID=3e667d27-dfc3-454d-afcb-3c6cb668f90d
```

/

7. Select **Save to File** to save the license string to a file on disk.

The file is saved by default with the name `lserverc`.

8. Copy the license file to a removable media, such as a USB stick, and transport the file to the IRIS Focus server.

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

10. Restart IRIS Focus services with the following command:

```
service vaisala-radarsw-webapp restart
```

More Information

- ▶ [Licensing \(page 9\)](#)

5. Upgrade

5.1 Upgrading IRIS Focus 2.1 to IRIS Focus 3.0

The following instructions assume you are upgrading from IRIS Focus 2.1 to IRIS Focus 3.0.



If you have IRIS Focus 2.0, you must upgrade to IRIS Focus 2.1 before you can upgrade to IRIS Focus 3.0.



IRIS Focus 3.0 requires a new license. If you do not yet have a license, please contact your Vaisala sales representative.

- ▶ 1. Login as **root**.
2. Backup the system configuration.
See [6.13.1 Making a Manual Back-up \(page 61\)](#).
3. Insert the upgrade USB stick.
4. Copy the file *Vaisala_IRIS_installer-3.0.tar* from the USB stick to the server's hard disk drive, for example to the */root* directory.
5. Extract the file: `tar -xvf Vaisala_IRIS_installer-3.0.tar`
6. Change to the directory created in the previous step:
`cd Vaisala-IRIS-Focus-v3.0.0--xx`
7. Run: **./rsw-upgrade**



To view installation command line options, run: **./rsw-upgrade -h**

8. Verify the upgrade by running: **rpm -qa | grep vaisala**
Check that the rpm name is version 3.0.
9. Activate the IRIS Focus license.
Depending upon whether or not your server is connected to the internet, see:
 - [4.9 Activating License – Online \(page 43\)](#)
 - [4.10 Activating License – Offline \(page 45\)](#)

5.2 Upgrading IRIS Focus 2.0 to IRIS Focus 2.1

The following instructions assume you are upgrading from IRIS Focus 2.0 to IRIS Focus 2.1



IRIS Focus 2.1.0 requires a new license. If you do not yet have a license, please contact your Vaisala sales representative.

1. Login as **root**.
2. Backup the system configuration.
See [6.13.1 Making a Manual Back-up \(page 61\)](#).
3. Insert the upgrade USB stick.
4. Copy the file *Vaisala_IRIS_installer-2.1.tar* from the USB stick to the server's hard disk drive, for example to the */root* directory.
5. Extract the file: `tar -xvf Vaisala_IRIS_installer-2.1.tar`
6. Change to the directory created in the previous step:
`cd Vaisala-IRIS-Focus-v2.1.0--55`
7. Run: **`./rsw-upgrade`**



To view installation command line options, run: **`./rsw-upgrade -h`**

8. Verify the upgrade by running: **`rpm -qa | grep vaisala`**
Check that the rpm name is version 2.1.
9. Activate the IRIS Focus license.
Depending upon whether or not your server is connected to the internet, see:
 - [4.9 Activating License - Online \(page 43\)](#)
 - [4.10 Activating License - Offline \(page 45\)](#)

6. Administration

6.1 User Management

Access to different features in IRIS Focus depends on what roles have been enabled for a user account. For example, the administration features are available to user accounts with administrator role.

IRIS Focus uses the following roles:

- *administrator* - Can access administration features
- *focus* - Can access the full IRIS Focus feature set
- *kiosk* - Can only access the non-interactive full screen Kiosk mode
- *poweruser* - Not used
- *user* - Can access limited application features



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

IRIS Focus builds on earlier Vaisala IRIS software. The release preceding IRIS Focus was IRIS Vision, which is included in IRIS Focus as a limited environment that users without a *focus* role or a valid IRIS Focus license can use. A user account that has *user administrator* or role without *focus* role set enters the IRIS Vision mode. IRIS Vision does not include features such as cross-section or live radar products.

Each logged-in user account with *focus* role reserves one IRIS Focus seat from the license pool. When the user logs out, the seat is released. If a user with *focus* role logs in and there are no IRIS Focus seats left, the user enters the restricted IRIS Vision mode. When a seat is again available, the user receives a pop-up message that offers the option to switch to IRIS Focus.

Each user account belongs to one or more organizations. Each organization can have a subscription to a selected software for a selected number of users. However, you can use organizations to create subgroups that have separate license pools and manage the license availability that way.



By default, an *administrator* account does not have the *focus* role set to avoid reserving an IRIS Focus license when performing administration tasks.

More Information

- [Licensing \(page 9\)](#)

6.1.1 Managing User Accounts

- ▶ 1. Log in with an *administrator* account

2. Select **Admin** in the upper right corner.
The **Users** window opens with tools for adding, editing, and deleting users.

6.1.2 Creating User Accounts After First Install

After a fresh installation, start creating user accounts.

- ▶ 1. Choose which organization you want to create your users in:
 - Use the default **root** organization.
 - For more control over license seat allocation, create a new organization in the **Organizations** tab.
2. Subscribe the organization to a license pool in the **Application Subscriptions** tab:
 - a. Select the *radarsw* organization.
 - b. Enter the validity period.
 - c. Enter the maximum allocated users (licenses).

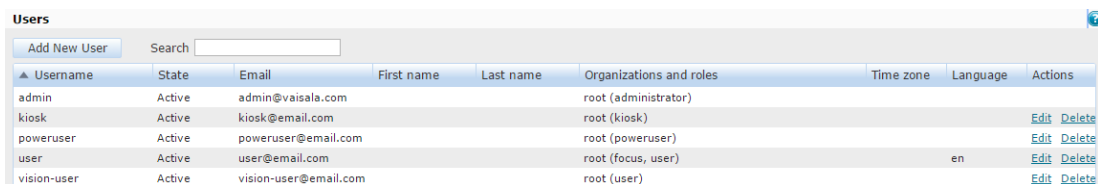
The screenshot shows a dialog box titled "Add Application Subscription". The dialog contains the following fields and values:

Field	Value
Code	IRIS Focus
Description	Subscription to IRIS Focus
Organization	Example Inc.
Application	radarsw
Start date	2015-10-21
End date	2016-10-21
Max number of users	5

At the bottom right of the dialog, there are two buttons: "Save" and "Cancel".

3. Add users to the organization in the **Users** tab:
 - a. Add user details.
 - b. Select an organization for user.
 - c. Add roles to user
 - d. Add both focus and user roles to make IRIS Focus features available.
 - e. To select multiple roles, press **CTRL**.

The default administrator account does not have the focus role set. This is to avoid reserving an IRIS Focus license when performing administration tasks.



Username	State	Email	First name	Last name	Organizations and roles	Time zone	Language	Actions
admin	Active	admin@vaisala.com			root (administrator)			
kiosk	Active	kiosk@email.com			root (kiosk)			Edit Delete
poweruser	Active	poweruser@email.com			root (poweruser)			Edit Delete
user	Active	user@email.com			root (focus, user)		en	Edit Delete
vision-user	Active	vision-user@email.com			root (user)			Edit Delete

Figure 9 Users List

6.1.3 Removing User Accounts

When IRIS Focus user accounts are removed from the system database using the **Admin** user management functions, the user name of the deleted account remains in the system. 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 a similar user name as an existing one. This applies even when the account has been deleted earlier.

6.2 Adding/Removing Radars

When new radar sites are added or removed as data sources on the IRIS Analysis server, radar settings on the IRIS Focus server must be re-synchronized. Settings requiring updates include updating the radar site location in GeoServer and calculating new map projections.

- ▶ 1. Run radar site setup script: **rsw-basemap-site-setup --socket-server [socket_server_host_name]**
- 2. Restart the IRIS Focus web application service: **service vaisala-radarsw-webapp restart**

6.3 Configuring Nowcasting

Nowcasting is enabled by default. However, during installation or later, you can adjust the nowcasting configuration.

For information on using nowcasting, see *IRIS Focus User Guide*.

Configuring IRIS Focus for nowcasting includes

- Enabling nowcasting in the IRIS Focus web application and the nowcasting server.
- Configuring MVF and nowcasting criteria.
- Fine-tune the algorithms.
Most users do not need to adjust the nowcasting algorithms.

More Information

- [Configuring MVF \(page 54\)](#)
- [nowcast.ini \(page 79\)](#)

6.3.1 Configuring MVF

To use nowcasting, for each radar site you must enable MVF generation and pre-configure the MVF product to define a product type and product name.



IRIS Focus generates one MVF product per site. If meteorological conditions vary across your radar sites, you may wish to use different products for each radar site.

For information on radar products and product codes, see *IRIS Focus User Guide*.

1. Log in to IRIS Focus as **admin**
2. Select **Product Configuration**.

The screenshot shows the 'Product Configuration' page in the VAISALA / IRIS Focus web application. The 'Motion Vector Field Settings' section is active, displaying a table of radar sites and their configurations. The table has three columns: 'Site', 'Reference Product', and 'MVF Generation'. The 'MVF Generation' column includes a green progress bar, a 'Help' icon, and a toggle switch. A 'Save' button is located at the bottom right of the settings panel.

Site	Reference Product	MVF Generation
KER (Kerava, radar)	CAPPI - 1KM_REFL_ADV	On
PLA (Philippines_A)	PPI - SURVEILLANCE	On
PLB (Philippines_B)		Off
PLC (Philippines_C)		Off
X2T (X2_Argentina)		Off
PHP (Philippines)	PPI - SURVEILLANCE	Off

3. For each radar site, select whether MVF generation is enabled for that site. To minimize performance problems, do not enable MVF generation for sites that do not need the nowcasting feature.
4. For the sites with MVF generation enabled, select the product used to create MVFs. The product can be of any data type except **V** and **PHIDP**.



Minimize performance problems by avoiding:

- Products that generate too much data, for example, those with large resolutions.
Vaisala recommends using a **CAPPI** at 2km height at with a 480x480 resolution.
- Generating the MVF product too frequently.
Vaisala recommends using products that are configured to be created no less than 10 minutes apart.

For more information on pre-configuring products, see *IRIS Radar User Guide* and *IRIS Product and Display Guide*.

5. Select **Save**.

More Information

- [Configuring Nowcasting \(page 53\)](#)
- [File Locations \(page 60\)](#)
- [vsoweb-override.ini \(page 81\)](#)

6.3.2 Enabling the Nowcast Server



You must have a nowcasting license to use nowcasting in IRIS Focus.
See [2.2 Licensing \(page 9\)](#).

After a default installation, the nowcast server is running by default.

When troubleshooting nowcasting, check that the nowcasting is enabled and that the nowcast server is running.

If you change the configuration, you must restart the nowcast server.

- ▶ 1. Login as **root**.
2. Go to `/etc/vaisala/radarsw/configuration/vsoweb-override.ini`.
3. In the `[NOWCAST]` section of the `vsoweb-override.ini` file, check that the nowcast server is enabled:

```
nowcast.mvf.run: true
```

4. Check the nowcast server URL:

```
nowcast.http.server.url = http://localhost:34480/api/v1/mvf/
```



If you have not changed `vsoweb-override.ini`, you do not need to restart the `vaisala-radarsw-webapp` server. The nowcast server is running by default. If you have not changed `nowcast.ini`, you do not need to restart the nowcast server.

5. Restart the `vaisala-radarsw-webapp` service by typing:

```
service vaisala-radarsw-webapp restart
```

6. Start the nowcast server by typing:

```
service vaisala-radarsw-nowcast-server start
```

a. To verify that the server starts, type:

```
systemctl status vaisala-radarsw-nowcast-server.service
```

b. Check for the status:

```
Active: active (running)
```

6.3.3 Starting the Nowcast Server

- ▶ 1. Login as `root`.

2. Start the nowcast server by typing:

```
service vaisala-radarsw-nowcast-server start
```

- a. To verify that the server starts, type:

```
systemctl status vaisala-radarsw-nowcast-server.service
```

- b. Check for the status:

```
Active: active (running)
```

6.3.4 Stopping the Nowcast Server

- ▶ 1. Login as **root**.
2. Stop the nowcast server by typing:

```
service vaisala-radarsw-nowcast-server stop
```

6.3.5 Restarting the Nowcast Server

- ▶ 1. Login as **root**.
2. Restart the nowcast server by typing:

```
service vaisala-radarsw-nowcast-server restart
```

6.4 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.

6.5 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**.

6.6 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**.

6.7 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-radar-sw-webapp**

6.8 GeoServer

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

In the command line, the GeoServer service is called **vaisala-radar-sw-geoserver**

6.9 Scan Service

Scan Service is the HTTP/REST interface that provides raw data for live radar products.

In command line, Scan Service runs 2 separate services:

- **vaisala-radar-sw-scan-updater-service** - Listener for Scan service
- **vaisala-radar-sw-scan-http-service** - HTTP server for live radar products that are queried from the IRIS Focus web application

6.10 Stopping, Starting, and Restarting Services

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

To use the **service** command, you must be 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

- **service monit stop**
- **service vaisala-radarsw-webapp stop**

Starting the service

- **service vaisala-radarsw-webapp start**
- **service monit start**

Restarting the service

- **service vaisala-radarsw-webapp restart**

6.11 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`.

6.11.1 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.

For more information, type **man journalctl** in CentOS 7, or *Using the Journal* at [RHEL System Administrators Guide](https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/html/System_Administrators_Guide/s1-Using_the_Journal.html) (https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/html/System_Administrators_Guide/s1-Using_the_Journal.html)

6.11.2 Reading Nowcast Server Logs

The nowcast server logs are useful when diagnosing issues with the nowcast server.

1. Check the status of the nowcast server by typing:


```
service vaisala-radarsw-nowcast-server status
```

2. Check the logs by typing:

```
journalctl -f
```

6.12 File Locations

Table 5 IRIS Focus Application and Configuration Files

File or Directory	Description
/etc/vaisala/radarsw/configuration <ul style="list-style-type: none"> • <i>gis-override.ini</i> GeoServer database settings. • <i>logback.xml</i> Logging level settings. • <i>radar_centers.properties</i> List of stored radar site center points. 	Configuration files for IRIS Focus module settings. The files listed here are the most important. <div style="border: 1px solid gray; padding: 10px; margin-top: 10px;">  <p>CAUTION! Some settings have a default config file and an override file. For example:</p> <ul style="list-style-type: none"> • <i>gis-config.ini</i> • <i>gis-override.ini</i> <p>When needed, edit the override file.</p> </div>
/etc/vaisala/radarsw/configuration/vsoweb-override.ini	Connection settings for socket server, lightning layers, nowcasting and so on.
/etc/vaisala/radarsw/nowcast/nowcast.ini	Configuration files for the nowcast server.
/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/radarscan	Home directory of the radarscan user. The RAW files for the Scan Service database are stored here.
/var/log/vaisala/radarsw	Log files from IRIS Focus web application

File or Directory	Description
<code>/var/lib/radarscan/scans.sqlite</code>	SQLite database that contains information on radar volume scans used in the Scan Service
<code>/var/lib/warnreader</code>	Configuration files for events and alerts.

6.13 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.

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 backup script stores the server configuration and application settings database. 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-2015-09-21 02-30-01.tar.gz`

6.13.1 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-<timestamp>.gz`

6.14 Restoring from Backup

1. Login as **root**.
2. Stop the IRIS Focus web application and Monit service: **`service vaisala-radarsw-webapp stop service monit stop`**
3. Take a backup of the current configuration: **`usr/vaisala/radarsw/backup/bin/do-backups`**
4. Drop the current database with the `rsw-db-tool` utility: **`rsw-db-tool drop-db`**

5. Recreate an empty database: **rsw-db-tool create-db**
6. Switch to the database user account postgres: **su - postgres**
7. Restore the database contents from a backup file by reading the file contents into the standard output stream and inserting them in the IRIS Focus database **wxdb2**:

```
gzip --decompress --to-stdout /srv/vaisala/radarsw/backup/database/  
database-<timestamp>.gz | psql --set ON_ERROR_STOP=on --single-transaction  
wxdb2
```

8. Exit the postgres user shell: **exit**
9. Start the IRIS Focus web application and Monit service:

```
service vaisala-radarsw-webapp start service monit start
```

6.15 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.

6.16 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.

More Information

- [Licensing \(page 9\)](#)

6.17 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, and you should renew your license as a precaution when doing so. Contact your Vaisala customer representatives for further instructions.

More Information

- ▶ [Licensing \(page 9\)](#)

6.18 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. [4.3 Installing CentOS \(page 15\)](#).
 - b. [4.5 Installing IRIS Focus Components \(page 25\)](#).
 - c. [4.7.2 Setting up Scan Service \(page 28\)](#).
 - d. [4.8 Verifying IRIS Focus Installation \(page 43\)](#).
3. Reactivate the license.
Depending upon whether or not your server is connected to the internet, see:
 - [4.9 Activating License – Online \(page 43\)](#)
 - [4.10 Activating License – Offline \(page 45\)](#)

7. Troubleshooting

7.1 Missing Or Broken Live Radar Products

If you encounter issues with live radar products, make sure the RAW files are delivered to the directory `/srv/vaisala/radarsw/product_raw` on the IRIS Focus server.

If you do not see any new files in the directory, it means that IRIS Analysis cannot push them to the directory. Make sure that the configuration in IRIS Analysis matches that described in [4.7.2 Setting up Scan Service \(page 28\)](#).

If there are recent files but corresponding live radar products are not displayed in the IRIS Focus web application, there may be errors in the Scan Service system services. Check their status with the following commands and restart the services if needed:

- **service vaisala-radarsw-scan-updater-service status**
- **service vaisala-radarsw-scan-http-service status**

If the services are healthy and running, but live radar products are still not displayed, stop the Scan Service system services and remove the radar scan information database. IRIS Focus automatically creates a fresh database and starts populating it with new data, starting from the most recent scan file.

- **service vaisala-radarsw-scan-updater-service stop**
- **service vaisala-radarsw-scan-http-service stop**
- **rm /var/lib/radarscan/scans.sqlite**
- **service vaisala-radarsw-scan-updater-service start**
- **service vaisala-radarsw-scan-http-service start**

7.2 Lightning Layer Empty

If the lightning 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.

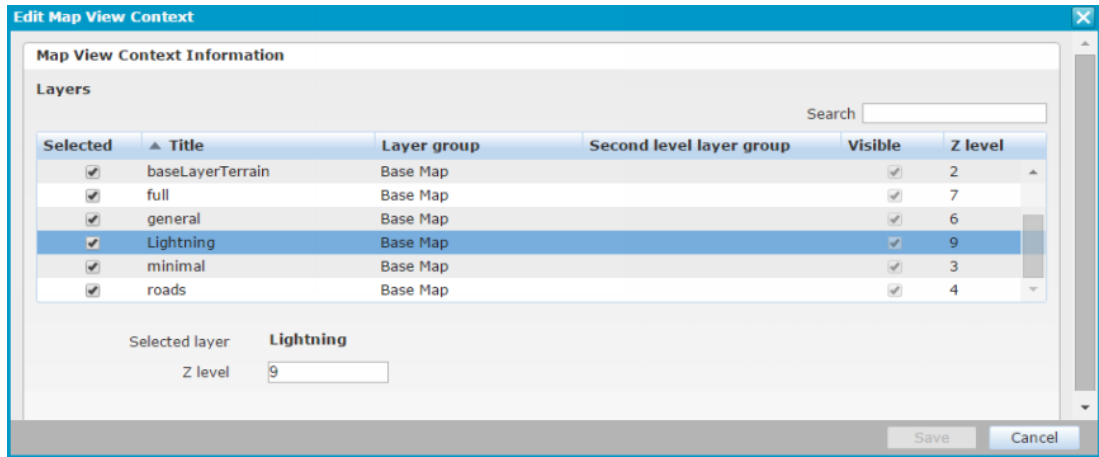
7.3 Lightning Layer Missing

If you have subscribed to Vaisala AviCast GLD360 lightning detection service, and you do not see the lightning layer available in the IRIS Focus application UI 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 checked
 - 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.

7.4 Nowcasting is Unavailable

If you cannot see nowcasting features on your display, it is likely because you either do not have a license or because nowcasting is disabled.

- ▶ 1. Check that you have a nowcasting license.
 - a. You must have an IRIS Focus seat to use nowcasting. If you see the IRIS Vision display, wait until an IRIS Focus seat is available and try again.
See [2.2 Licensing \(page 9\)](#).
 - b. Login to IRIS Focus as an administrator.
 - c. Select **Admin > Licensing Management**.
2. Check that MVF is configured for your site.
See [6.3.1 Configuring MVF \(page 54\)](#).
3. Login as **root**.
4. Go to `/etc/vaisala/radarsw/configuration/vsoweb-override.ini`.

5. In the `[NOWCAST]` section of the `vsoweb-override.ini` file, check that MVF creation is enabled in IRIS Focus:

```
[NOWCAST]
nowcast.mvf.run = true
```



By default, MVF generation is enabled (`true`).

6. Restart the `vaisala-radarsw-webapp` service by typing:

```
service vaisala-radarsw-webapp restart
```

7. Start the nowcast server by typing:

```
service vaisala-radarsw-nowcast-server start
```

- a. To verify that the server starts, type:

```
systemctl status vaisala-radarsw-nowcast-server.service
```

- b. Check for the status:

```
Active: active (running)
```

7.5 Online Help Does Not Display Correctly in Internet Explorer

If you run the software in Internet Explorer with the compatibility view enabled, the online help may not display correctly.

To fix the problem, turn off the **Display intranet sites in Compatibility view** setting.

- ▶ 1. To display the Internet Explorer menu, press **ALT**.
2. Select **Tools > Compatibility View settings**.
3. Deslect **Display intranet sites in Compatibility view**.

4. You may need manage the list under **Websites you've added to Compatibility View:**
 - a. Highlight the website address you want to remove.
 - b. Select **Remove**.

8. IRIS Focus Architecture

IRIS Focus reads data in the formats produced by weather radar signal processors.

Usually this data is relayed to IRIS Focus through the signal processing and analysis component, IRIS Analysis, either as pregenerated radar products or as radar scan source data files which are processed and displayed as radar products by IRIS Focus.

IRIS Focus only accepts a single data source as its socket server. IRIS Analysis can be connected to an unlimited number of radar sites and relay their radar products to IRIS Focus.

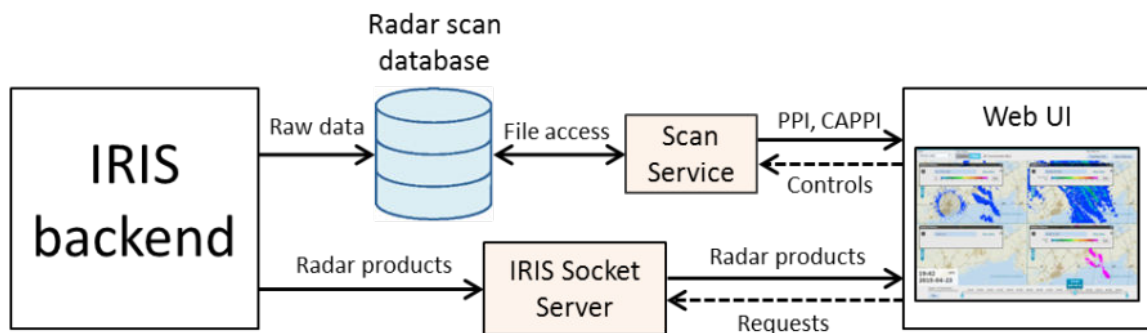


Figure 10 IRIS Focus Architecture

Each radar 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 radar products are drawn on top of them. The user can change the order of radar product layers in real-time.

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

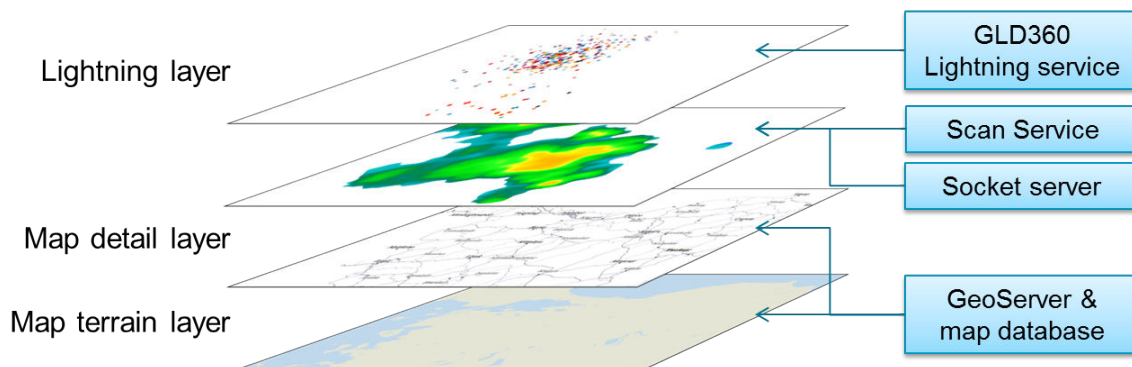


Figure 11 IRIS Focus Layers

8.1 GeoServer and Maps

The map engine in IRIS Focus uses GeoServer architecture. When reading data from a single radar site, GeoServer renders the map using Azimuthal Equidistant projection, which means that all directions and distances are correct when measured from the point of origin, which is the radar site in this case. When reading data from a composite of multiple radar sites, Web Mercator projection is used.

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.

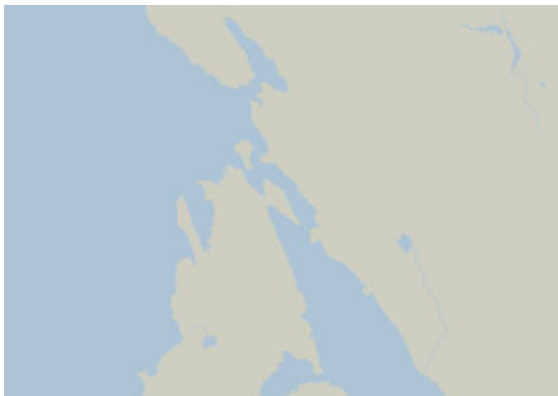


Figure 12 Base Map From GeoServer

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 256x256 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.

8.2 Live Radar Products

When displaying live radar products, IRIS Focus fetches raw radar measurement data from the back-end and processes it in real-time. This provides hands-on control over the radar product parameters.

The full raw radar volume data is stored for 48 hours and can be used for on-demand product generation later.

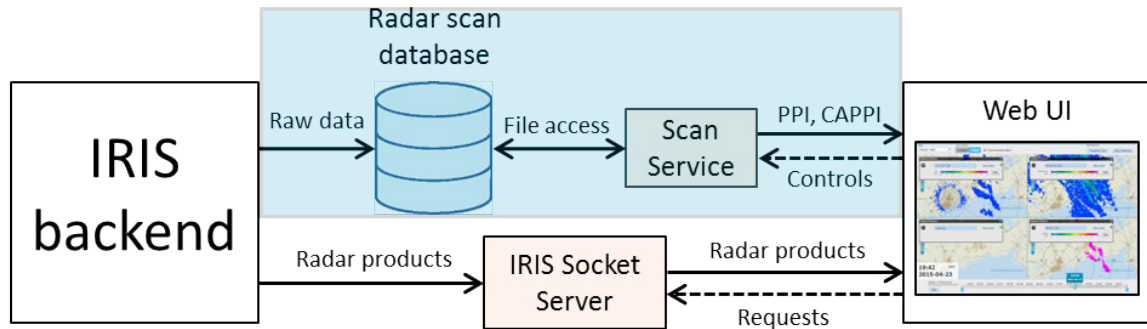


Figure 13 Live Product Components

Data for live products comes directly from the RAW format files produced by the IRIS backend.

IRIS Focus reads the RAW data through the Scan Service, which is a read-only HTTP/REST interface that operates on the IRIS Focus server in port 34280.

The data for the interface is read from a local sqlite3 database on the IRIS Focus server that contains the RAW data files for the configured live products.

When you select a live radar product in IRIS Focus, the web application accesses the database and fetches the required data, not only for the current situation but for the whole recorded segment up to 48 hours. The data is then processed live in IRIS Focus and can be animated similarly to pregenerated radar products.

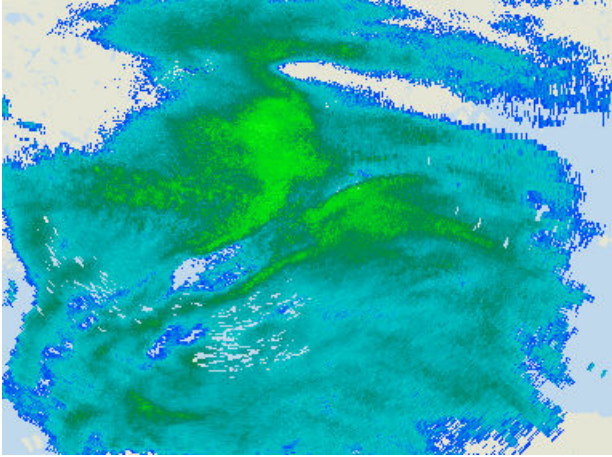


Figure 14 Radar Product Visualized

8.3 Pre-configured Radar Products

Pre-configured radar products are generated by the back-end signal processing components of IRIS Analysis. IRIS Focus reads the list of products, and allows you to select which one to display on the IRIS Focus map view.

The radar products and their settings are defined in the back-end, and only displayed in IRIS Focus. They cannot be edited in the IRIS Focus map view.

There is no upper limit to the number of pre-configured radar products that IRIS Focus can have.

The raw volume data is not stored for later processing. All the information that is not used in radar product generation is lost.

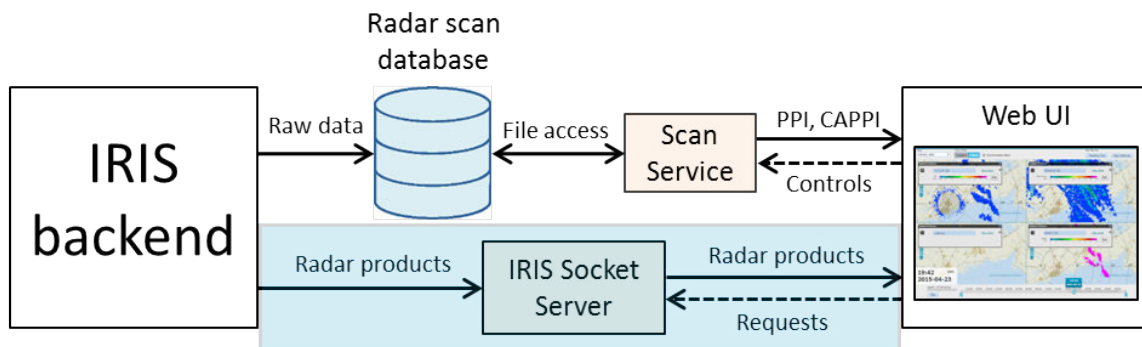


Figure 15 Pre-configured Radar Product Components

The radar products are rasterized into 2D bitmap images, based on the back-end signal processing settings. The images are sent to IRIS Focus web UI through the IRIS Socket Server interface. The Socket Server uses TCP port 30735 to communicate with IRIS Focus.

When you select a specific pre-configured product in IRIS Focus, IRIS Focus polls the Socket Server and loads the image.

The resolution of pre-configured radar products is limited by the capacity of the processing module that produces them. For example, IRIS Analysis has the following limitations:

- Max number of **bins** in any **ray** at any time: 4200
- Max number of **rays** in a sweep: 1024
- Max number of **moments** recorded in a **sweep**: 16
- Max number of **sweeps** per **scan**: 40

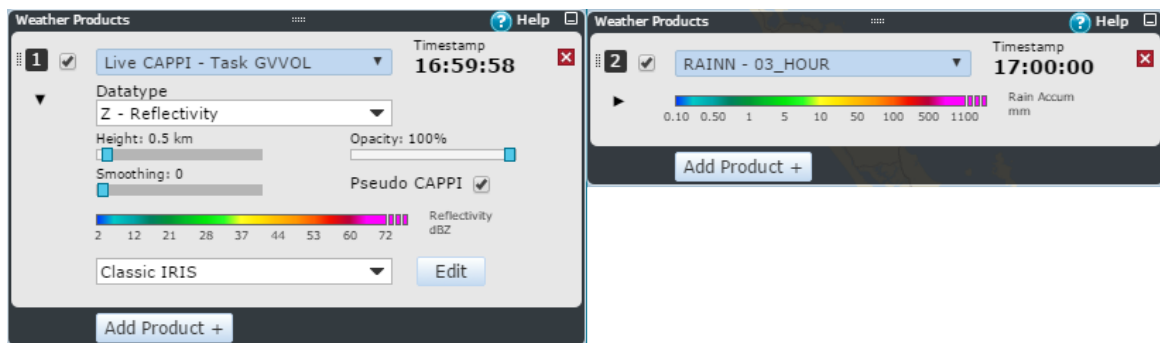


Figure 16 Live and Pre-configured Product Settings

8.4 Lightning Layer

Vaisala offers an optional subscription service for the Vaisala Global Lightning Dataset GLD360. GLD360 is a dedicated data stream that measures lightning strikes from the surface of the Earth, and its data is generated outside IRIS Focus.

GLD360 can be integrated with IRIS Focus and included as an additional selectable lightning layer in the web UI. From the user's perspective, the lightning layer is similar to other weather product layers.

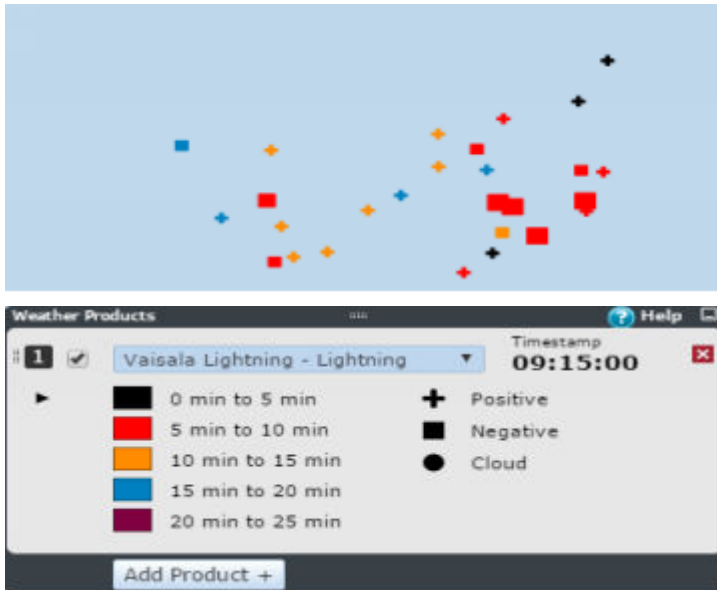


Figure 17 Lightning Layer and Controls

To take the lightning layer into use, IRIS Focus server must be online and your organization must have an active subscription for GLD360. For information on subscribing to the GLD360, contact Vaisala Lightning Data Services.

- ▶ 1. Log on to the IRIS Focus server as root.
2. Type the command:
rsw-lightning-configure -r [admin username] -p [admin password] -s https://storm.vaisala.com/geolegends/ltg_combined_25.sld
3. Edit the configuration file `vsoweb-override.ini:nano /etc/vaisala/radarsw/configuration/vsoweb-override.ini` to contain a reference to the Vaisala GLD360 URL you received:

```
lightning.wms.url = [URL from GLD360]
```

4. Restart the IRIS Focus web application service:
service vaisala-radarsw-webapp restart

8.5 Web Application

The IRIS Focus web application can be accessed with current Internet Explorer, Mozilla Firefox, and Google Chrome browsers.

It only accepts HTTPS connections, and all requests to the standard HTTP port are redirected to the HTTPS port 443.

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.

Settings

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

Map and terrain data are stored in the same database.

Certificates

The web application comes with a self-signed SSL certificate that secures the connection between the IRIS Focus server and the user's web browser. However, 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, but you should consider acquiring and using a trusted 3rd party certificate, especially if you plan to offer access to IRIS Focus outside your organization.

For information on installing SSL certificates, see [Jetty SSL Configuration](https://wiki.eclipse.org/Jetty/Howto/Configure_SSL) at the Eclipse wiki (https://wiki.eclipse.org/Jetty/Howto/Configure_SSL).

Appendix A. Nowcasting Configuration Files

A.1 nowcast.ini

The following example shows the *nowcast.ini* configuration file for configuring the nowcasting HTTP server.

```
; Algorithm to use.  
correlator=trec
```

TREC

```
[trec]  
; Number of decimals to keep in data when converting to integers.  
; Range: [0 ; 3]. Default: 2.  
input_precision=2
```

```
; The value in image that declares a missing/invalid value.  
; Default: -999.0.  
missing_value=-999.0
```

```
; The value in image that declares a not-scanned pixel, outside the aperture  
area.  
; Default: -900.0.  
not_scanned_value=-900.0
```

```
; Minimum measurement aperture coverage (%) in correlation region.  
; Range: [0.0 ; 1.0]. Default: 0.60.  
aperture_coverage_threshold=0.60
```

```
; Minimum signal value for the pixel to be 'active' and used.  
; Default: 10.0.  
signal_threshold=10.0
```

```
; Feature box size.  
; Range: > 0 Default: 14  
field_feature_box_width=14
```

```
; Amount of skip when calculating field values.  
; Range: > 0. Default: 1 (no skip).  
field_feature_box_spacing=1
```

```
; Minimum fraction (%) of active pixels in feature box needed to trigger  
correlation analysis.  
; Range: [0.0 ; 1.0] Default: 0.10  
field_signal_coverage_threshold=0.10
```

```
; Minimum allowable cross-correlation coefficient.  
; Range: [0.0 ; 1.0] Default: 0.55  
correlation_threshold=0.55
```

```
; Maximum storm movement between images, search region radius.  
; Range: > 0 Default: 15  
speed_limit=15
```

```
; Spatial smoothing factor,  $\exp(-d/\text{decay})$ . Used for spreading effect  
; of local motion vector to its surroundings.  
; Range:  $\geq 0$  (0 == no spatial smoothing) Default: 6  
field_spatial_decay=6
```

```
; Spatial filtering flag. Whether to discard points that differ from global  
average.  
; Range: 0 == NO; 1 == GLOBAL; 2 == LOCAL . Default: 1(GLOBAL)  
field_use_spatial_filtering=1
```

```
; Feature box size for local spatial thresholding (applied only when using  
local spatial thresholding).  
; Range: > 0 Default: 9  
field_spatial_filtering_box_width=9
```

```

; Maximum allowed direction difference from mean motion (applied only when
using spatial filtering).
; Range: [0 ; 180] Default: 90
field_spatial_direction_threshold=90

```

```

; Maximum allowed speed (mgt*mean_motion) above mean motion (applied only when
using global spatial filtering).
; Range: >= 1.0 Default: 3.0
field_spatial_magnitude_threshold=3.0

```

```

; Global vector weight applied to local values.
; Range: [0.0 ; 1.0] (0.0 = no global weighting). Default: 0.25
field_global_weight=0.25

```

```

; Method for temporal smoothing.
; Range: 0 == NO_TEMPORAL_SMOOTHING; 1 == HISTORY_WEIGHTING; 2 ==
CHANGE_WEIGHTING.
; Default: 1(HISTORY_WEIGHTING)
temporal_smoothing_method=1

```

```

; History weight factor (applied when temporal smoothing is made by using
HISTORY_WEIGHTING).
; Range: ]0.0 ; 1.0] Default: 0.25
temporal_smoothing_history_weight=0.25

```

```

; Change weight factor (applied when temporal smoothing is made by using
CHANGE_WEIGHTING).
; Range: ]0.0 ; 1.0] Default: 0.33
temporal_smoothing_change_weight=0.33

```

More Information

- [Configuring Nowcasting \(page 53\)](#)

A.2 vsoweb-override.ini

The *vsoweb-override.ini* configuration file contains setting for managing the MVF and advection used in nowcasting.



Vaisala has carefully chosen good defaults for the nowcasting configuration. The raster product, such as **PPI**, **CAPPI**, of any intensity moments like Z, R, KDP, or rhoHV that is used as an input for MVF generation should have:

- As little as possible of ground clutter and the near-radar clear air or particulates (such as dust) returns.
- The bounding box not smaller than any other raster product produced from this site's data.

Because the two conditions are contradictory, the easiest way to satisfy first condition is to use a true (not pseudo) **CAPPI** product with a height of 1.5 ... 2km , but the longest range (biggest bounding box) product is a raster product generated from the survey scans, which usually consist of just one **PPI** scan and cannot be used to generate true **CAPPI** products. You must balance these two conditions.



If there are not enough valid products to generate an MVF request, the iteration is skipped and the system waits for the next product to arrive from IRIS.

Basic Settings

`nowcast.mvf.run` defines if MVF generation is enabled in IRIS Focus. By default, MVF generation is enabled (`true`).

```
[NOWCAST]
nowcast.mvf.run = true
```

The `nowcast.server.url` defines identifies where the nowcast HTTP server runs. The default value is for a fully local installation, which is the default installation configuration.

```
nowcast.http.server.url = http://localhost:34480/api/v1/mvf/
```

The `netCDF` directory stores MVF generation requests and responses to the Nowcast HTTP Server in `netCDF` format as well as internal representations of MVF serialized to disk. This directory is cleaned periodically by default.

```
nowcast.netcdf.dir = /srv/vaisala/radarsw/product/nowcast/
```

Advanced Settings

`nowcast.mvf.request.num.rasters` defines the number of products sent to the nowcast server for generating the motion vector field (MVF). Default is 2.

```
nowcast.mvf.request.num.rasters = 2
```

nowcast.mvf.product.age.limit.minutes defines the maximum number of minutes (5 ... 1000) the system goes back in time to find valid products (of the type used to define MVF generation for a site) to use in generating the MVF. Default is 100.

```
nowcast.mvf.product.age.limit.minutes = 100
```

nowcast.mvf.max.gap.minutes defines the maximum acceptable gap in minutes (1 ... 1000) between products for MVF generation. Default is 30.

MVF is a shift in pixels per time interval between frames of the product which was used to generate MVF. The interval between advected products could easily be different from the interval between advected frames. For example, if MVF was generated from the product which was available every 5 minutes but the interval between advected frames has to me 10 minutes, the MVF shift should be doubled. That MVF scaling is taken into account by scaling shift in every iteration.

```
nowcast.mvf.max.gap.minutes = 30
```

nowcast.product.times.age.limit.minutes defines the time range for calculating advected product times (2 ... 2880 mininutes. 2880 is the entire two day range). Default is 100

Advected product times must be evenly spaced (due to the calculation). The time is derived by dividing the last number of minutes defined in this property by *n* products found in that period.

The spacing is used as the time gap between advected products. In most cases, you should set this value to match the value in **nowcast.mvf.product.age.limit.minutes**.

```
nowcast.product.times.age.limit.minutes = 100
```

nowcast.advection.mvf.age.limit.minutes is the maximum number of minutes to go back in time to find an MVF when generating advected products. If an MVF is not found in the time span given, the iteration is skipped and Focus waits for the next product to arrive from IRIS. Range: 5 ... 1000 minutes. Default is 30.

```
nowcast.advection.mvf.age.limit.minutes=30
```

nowcast.advection.time.span.minutes defines the time limit when extending nowcasted products into the future, in minutes. The normal range is 1 ... 3 hours. Default is 120.

You can raise the time span to as much as 6 hours but this is not recommended as accuracy becomes more vague as time is extended into the future.

```
nowcast.advection.time.span.minutes=120
```

More Information

- [Configuring MVF \(page 54\)](#)

Glossary

advection

The transfer of a property of the atmosphere, such as heat, cold, or humidity, by the horizontal movement of an air mass. Advection calculations are used to perform some of the nowcasting calculations.

Bin

A single sample of weather data detected at a known direction, altitude, and distance from the radar site. The radial size of a bin depends on decreases with distance, so bins further from the radar site cover a larger area than nearby bins.

Hydrometeor

A particle of condensed water vapor in the atmosphere. Rain, snow, and hail are examples of hydrometeors.

MSL

Mean sea level. An average level for the surface of the sea or ocean.

NDOP product

Dual-Doppler velocity product. Combines the velocity measurements from 2 or more radars to get the wind direction and speed.

Nowcasting

Weather forecasting within the next 6 hours.

NWP

Numerical weather prediction

PRF

Pulse Repetition Frequency measured in Hz (pulses per second). When measuring PRF, a *pulse* contains transmit, receive, and dead time phases. PRF affects *range folding* and *velocity folding* detection. Normal PRF values for Doppler radars are up to 1000 Hz. Vaisala radars generally operate around 400-700 Hz. In Vaisala IRIS products, PRF limits the area displayed in radar images and the maximum measurable wind speed.

Pulse

A short burst transmission signal sent by the radar, used to measure the weather activity in atmosphere. The reflection measurements from a pulse are sorted into bins. See also [Bin \(page 85\)](#).

Range folding

Radar signal echoes from outside the radar maximum range that are incorrectly displayed within the radar measurement area. Also called range aliasing.

Sweep

A collection of pulses at a constant elevation as the radar rotates around its axis 360°. After a sweep, the radar usually changes its elevation and starts a new sweep. Each sweep typically contains the same number of bins independent of the elevation. See also [Bin \(page 85\)](#).

Velocity folding

Erroneous readings due to particles in the measurement area exceeding the maximum velocity detection threshold of the radar system. The measured velocity "wraps around" to the other end of the scale, resulting in discontinuous readings. Also called velocity aliasing.

Volume

Complete set of raw measurement data collected from sweeps, that is used to calculate a model of the atmosphere. The maximum volume is half of a sphere (from 0° elevation upwards), but other shapes are more typical.

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Technical Support



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

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

For Vaisala Service Center contact information, see www.vaisala.com/servicecenters.

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.

Recycling



Recycle all applicable material.



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

VAISALA

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