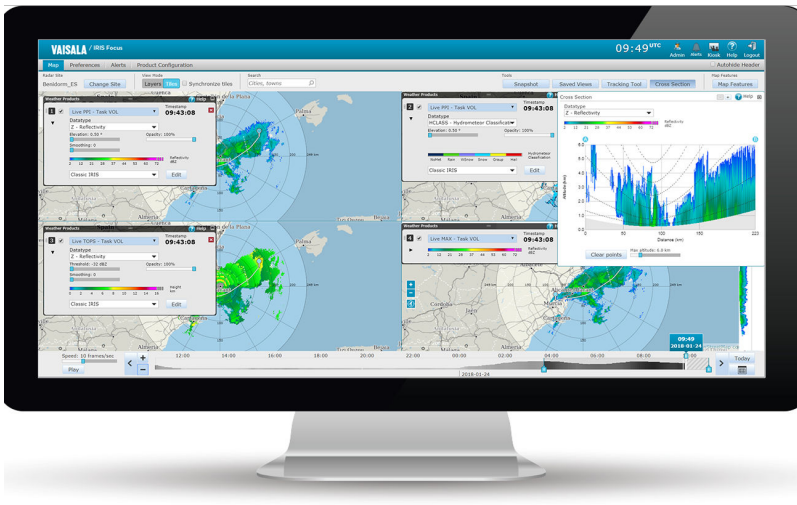


Administrator Guide

IRIS Focus

Version 4.0



PUBLISHED BY

Vaisala Oyj

Street address: Vanha Nurmijärventie 21, FI-01670 Vantaa, Finland

Mailing address: P.O. Box 26, FI-00421 Helsinki, Finland

Phone: +358 9 8949 1

Visit our Internet pages at www.vaisala.com.

© Vaisala 2018

No part of this manual may be reproduced, published or publicly displayed in any form or by any means, electronic or mechanical (including photocopying), nor may its contents be modified, translated, adapted, sold or disclosed to a third party without prior written permission of the copyright holder. Translated manuals and translated portions of multilingual documents are based on the original English versions. In ambiguous cases, the English versions are applicable, not the translations.

The contents of this manual are subject to change without prior notice.

Local rules and regulations may vary and they shall take precedence over the information contained in this manual. Vaisala makes no representations on this manual's compliance with the local rules and regulations applicable at any given time, and hereby disclaims any and all responsibilities related thereto.

This manual does not create any legally binding obligations for Vaisala towards customers or end users. All legally binding

obligations and agreements are included exclusively in the applicable supply contract or the General Conditions of Sale and General Conditions of Service of Vaisala.

This product contains software developed by Vaisala or third parties. Use of the software is governed by license terms and conditions included in the applicable supply contract or, in the absence of separate license terms and conditions, by the General License Conditions of Vaisala Group.

This product may contain open source software (OSS) components. In the event this product contains OSS components, then such OSS is governed by the terms and conditions of the applicable OSS licenses, and you are bound by the terms and conditions of such licenses in connection with your use and distribution of the OSS in this product. Applicable OSS licenses are included in the product itself or provided to you on any other applicable media, depending on each individual product and the product items delivered to you.

Table of Contents

1.	About This Document	5
1.1	Version Information.....	5
1.2	Related Documents.....	5
1.3	Trademarks.....	5
1.4	Documentation Conventions.....	5
2.	IRIS Focus Overview	7
2.1	IRIS Product Family.....	8
2.2	Licensing.....	9
3.	Requirements	11
3.1	IRIS Focus Hardware Requirements.....	11
3.2	Software Requirements.....	11
3.3	IRIS Focus Network Requirements.....	13
4.	Installation	14
4.1	Downloading Installation Packages.....	14
4.1.1	Verifying MD5 hashes.....	15
4.2	Prerequisites for Installation.....	15
4.3	Installing CentOS.....	16
4.3.1	Setting the Root Password.....	23
4.3.2	Creating CentOS User Accounts and Finalizing the Installation.....	24
4.3.3	Configuring the Network for CentOS.....	24
4.4	Upgrading Existing CentOS 7 Setups.....	25
4.4.1	Online CentOS 7 Upgrade.....	25
4.4.2	Offline CentOS 7 Upgrade.....	25
4.5	Installing IRIS Focus Components.....	26
4.6	Running OS Hardening Scripts.....	28
4.7	Configuring IRIS for IRIS Focus.....	29
4.7.1	Setting or Changing the Socket Server.....	29
4.7.2	Activating the Socket Server in IRIS Radar.....	29
4.7.3	Setting up Data Manager.....	30
4.8	Verifying IRIS Focus Installation.....	34
4.9	Activating License – Online.....	34
4.10	Activating License – Offline.....	36

5.	Configuration	39
5.1	Adding/Removing Radars.....	39
5.2	Configuring Composites.....	39
5.2.1	Setting-up Pre-defined Composites.....	39
5.2.2	Editing Pre-defined Composites.....	40
5.2.3	Deleting Pre-defined Composites.....	40
5.2.4	IRIS Focus Composite Methods.....	40
5.2.5	Max Time Span.....	41
5.2.6	Viewing a List of IRIS Analysis Composites.....	43
5.3	Configuring Nowcasting.....	43
5.3.1	Configuring MVF.....	43
5.3.2	Enabling the Nowcast Server.....	45
5.3.3	Starting the Nowcast Server.....	46
5.3.4	Stopping the Nowcast Server.....	46
5.3.5	Restarting the Nowcast Server.....	46
5.4	Managing Alerts for Significant Weather.....	47
5.4.1	WARN: Warning/Centroid Product.....	47
5.4.2	Setting-up Public Key Authentication for WARN Products.....	50
5.4.3	Configuring WARN Products.....	51
5.4.4	Scheduling WARN Products.....	54
5.4.5	Configuring an IRIS Output Device for WARN Products.....	56
5.4.6	Sending WARN Products from IRIS to IRIS Focus.....	57
5.5	Importing Historical Data to IRIS Focus.....	58
6.	Upgrade	60
6.1	Upgrading IRIS Focus 3.0 to IRIS Focus 4.0.....	60
6.2	Upgrading IRIS Focus 2.1 to IRIS Focus 3.0.....	61
6.3	Upgrading IRIS Focus 2.0 to IRIS Focus 2.1.....	62
7.	System Administration	64
7.1	User Management.....	64
7.1.1	Managing User Accounts.....	65
7.1.2	Creating User Accounts After First Install.....	65
7.1.3	Removing User Accounts.....	66
7.2	Map Management.....	66
7.2.1	Working with Map Layers.....	67
7.2.2	Map View Context.....	67
7.2.3	Adding External Map Layers.....	68
7.3	systemd.....	69
7.4	Monit.....	70
7.5	HAProxy.....	70
7.6	IRIS Focus Web Application.....	70
7.7	GeoServer.....	70
7.8	Data Manager.....	70
7.9	Stopping, Starting, and Restarting Services.....	71
7.10	Logging.....	71
7.10.1	Reading System Service Logs.....	72
7.10.2	Reading Nowcast Server Logs.....	72

7.11	Installing a CA Certificate.....	72
7.12	Backing-up System Configuration.....	73
7.12.1	Making a Manual Back-up.....	73
7.13	Restoring from Backup.....	74
7.14	Server Management Software.....	75
7.15	Licensing on Server Restart.....	75
7.16	Licensing on Systems with Mirrored HDDs (RAID 1 or RAID 5).....	75
7.17	Reactivating the License After Server Upgrade.....	76
8.	Troubleshooting.....	77
8.1	Lightning Layer Empty.....	77
8.2	Lightning Layer Missing.....	77
8.3	Nowcasting is Unavailable.....	79
8.4	Taking a Snapshot Gives Server Error.....	80
8.5	Online Help Does Not Display Correctly in Internet Explorer.....	81
8.6	Uninstalling IRIS Focus.....	81
9.	IRIS Focus Architecture.....	82
9.1	Map Layers.....	82
9.2	GeoServer and Maps.....	83
9.3	Live Radar Products.....	84
9.4	Pre-configured Radar Products.....	86
9.5	Lightning Layer.....	87
9.6	Web Application.....	88
10.	Security.....	89
10.1	Encryption.....	89
10.2	Certificates.....	89
10.3	Security Settings.....	89
	Appendix A: File Locations.....	91
	Appendix B: Map Layer Configuration Options.....	92
	Appendix C: Nowcasting Configuration Files.....	93
C.1.	nowcast.ini.....	93
C.2.	vsoweb-override.ini.....	95
	Glossary.....	99
	Index.....	101
	Warranty.....	105
	Technical Support.....	105
	Recycling.....	105

List of Figures

Figure 1	IRIS Focus Main View.....	7
Figure 2	IRIS Focus Data Flow.....	8
Figure 3	Generating Live IRIS Products.....	12
Figure 4	IRIS Focus Delivery Options.....	14
Figure 5	Creating User Accounts.....	24
Figure 6	IRIS Radar Status Menu.....	29
Figure 7	Radar Data Delivery Paths.....	30
Figure 8	Composite Settings.....	39
Figure 9	Max Time Span.....	42
Figure 10	HAIL Warning/Centroid.....	48
Figure 11	Editing the Map Context.....	68
Figure 12	IRIS Focus Architecture.....	82
Figure 13	IRIS Focus Product Data Layers.....	83
Figure 14	Base Map From GeoServer.....	84
Figure 15	Live Product Components.....	85
Figure 16	Radar Product Visualized.....	85
Figure 17	Pre-configured Radar Product Components.....	86
Figure 18	Live and Pre-configured Product Settings.....	87
Figure 19	Lightning Layer and Controls.....	87

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-E	December 2017	This document. Fifth version of this document.
M211850EN-D	February 2017	Fourth version of this document.
M211850EN-C	June 2016	Third 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

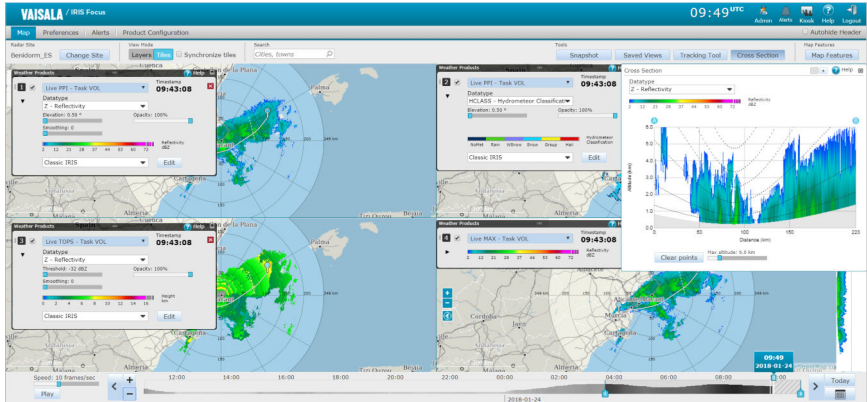


Figure 1 IRIS Focus Main View

IRIS Focus provides user-friendly, browser-based tools for viewing and analyzing weather data received from weather radars.

Weather data is overlaid on a geographical map that is centered on a selected radar site or site composite. Data is gathered from a single weather radar or a network of radar sites.

With the zoomable animation timeline, users can easily visualize and animate current, nowcasted, or historical data.

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.

Significant weather events such as hail, wind shear, or heavy rain are automatically detected when they enter a protected area.

Radar Products

The displayed data consists of radar products, which are raw signal data from a radar receiver processed to provide information about current weather conditions.

Radar products measure information such as radar signal reflectivity or rain intensity for analysis by meteorologists.

<p><i>Live Radar Products</i></p>	<p>Live radar products are radar signal data that is processed into radar products and displayed on-demand, in real-time.</p> <p>Live products provide control over the presentation of weather data in the IRIS Focus user interface. For example, users can change the reflectivity threshold of a selected radar product on the fly.</p> <p>IRIS Focus users can create composites of live products on-demand by selecting multiple radar sites from the radar site selector.</p>
<p><i>Pre-configured Radar Products</i></p>	<p>Pre-configured products are defined and produced in IRIS Analysis and displayed by IRIS Focus on request.</p>

More Information

- [Live Radar Products \(page 84\)](#)
- [Pre-configured Radar Products \(page 86\)](#)

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.

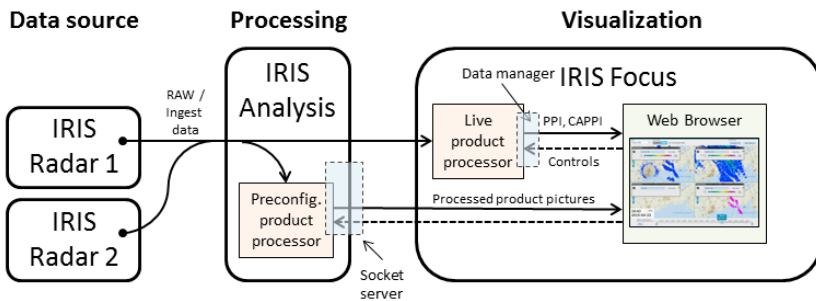


Figure 2 IRIS Focus Data Flow

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 Focus Light**
IRIS Focus Light has an unlimited number of seats and provides access to the map view. 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 Focus Light 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 \(page 64\)](#)

3. Requirements

3.1 IRIS Focus Hardware Requirements

Minimum Hardware Requirements

- Modern 4-core CPU (Intel Xeon E5 series or similar)
- 16GB RAM
- 1 TB HDD
- 1280 x 800 minimum screen resolution

Recommended Hardware Requirements

- Modern 8-core CPU (Intel Xeon E5 series or similar)
- 32GB RAM
- 2x 1 SAS TB HDD in RAID 1 configuration
- 1920 x 1200 screen resolution

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.x

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

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

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. For more information, please contact Vaisala.

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



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

Data Manager

Radar volume data is fetched from the data manager interface and processed into live radar products in the IRIS Focus application.

The data manager does not need to be active during installation.

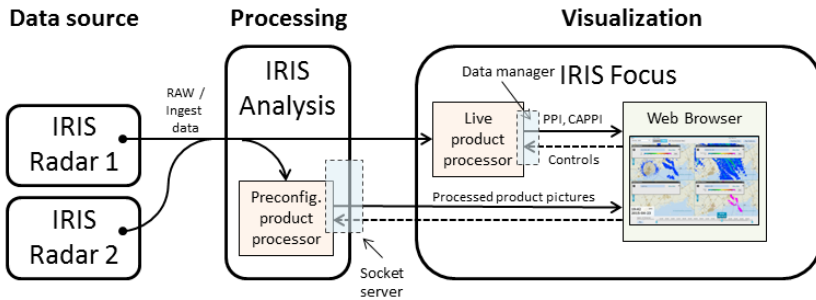


Figure 3 Generating Live IRIS Products

More Information

- ▶ [Setting up Data Manager \(page 30\)](#)

3.3 IRIS Focus Network Requirements

Table 3 IRIS Focus Network Requirements

Item	Specification	
Communication from IRIS Analysis to IRIS Focus		
Network data transfer	>100 Mbit/s (1000 Mbit/s recommended)	
Communication from IRIS Focus to IRIS Analysis		
Single user (1 seat)	Network Data Transfer	> 450 kbit/s
	Latency	~150 ms
Multiple simultaneous users	5 seats	> 2.5 Mbit/s
	10 seats	> 5 Mbit/s
	20 seats	> 10 Mbit/s

4. Installation

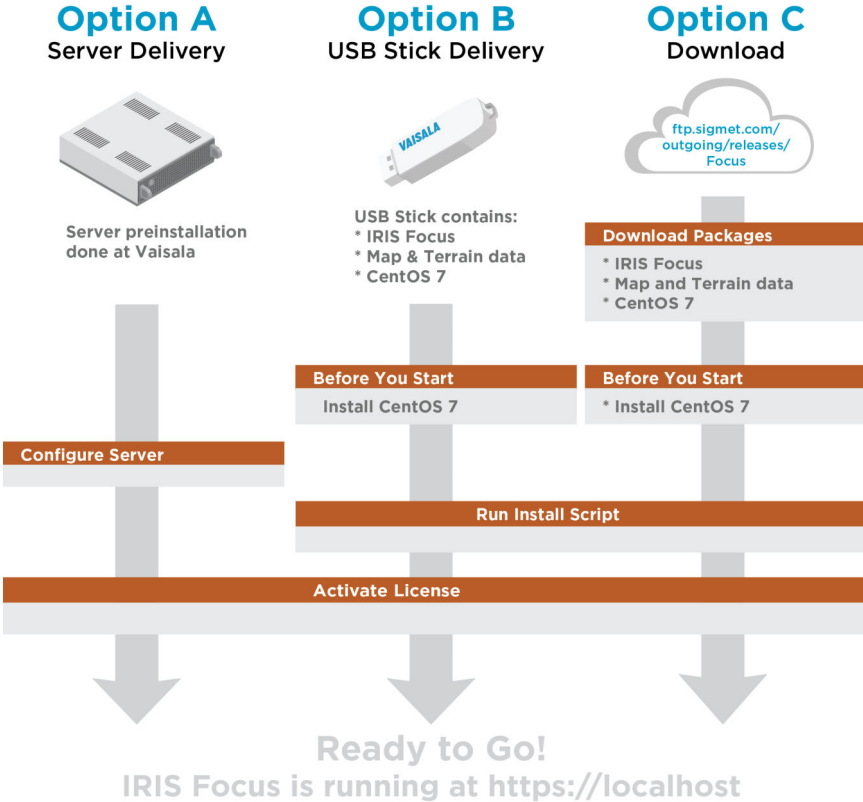


Figure 4 IRIS Focus Delivery Options

- 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>) 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-v2.zip`
 - c. Terrain data directory: `vaisala-iris-terrain-v2.zip`
4. If you require the Centos installation image, download it from: ftp://ftp.sigmet.com/outgoing/releases/CentOS/7.3/CentOS-7-x86_64-Everything-1611.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

- ▶ [IRIS Focus 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.



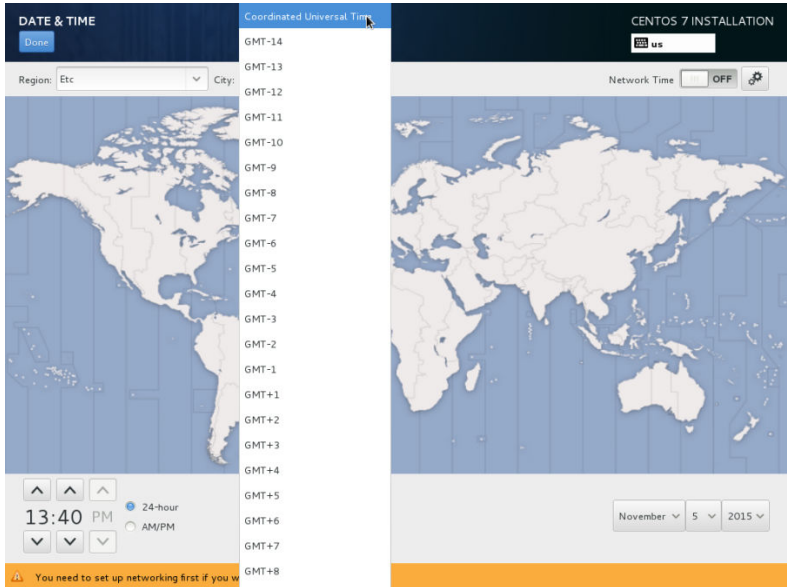
This version of IRIS Focus has been tested with CentOS 7.3. We expect IRIS Focus to also work with later versions of CentOS 7.x.

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 \(http://www.tecmint.com/centos-7-3-installation/\)](http://www.tecmint.com/centos-7-3-installation/) on how to perform a CentOS installation.

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

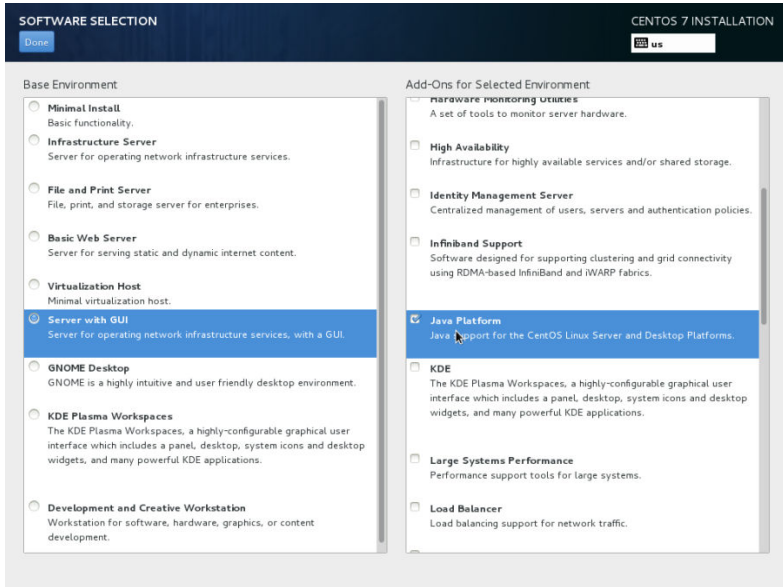
- ▶ 1. Select your installation language.

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**.

INSTALLATION DESTINATION CENTOS 7 INSTALLATION

[Done](#) us

Device Selection
Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

Local Standard Disks

1.22 TB
ATA VBOX HARDDISK
sda / 1.22 TB free

Disks left unselected here will not be touched.

Specialized & Network Disks

[Add a disk...](#)

Disks left unselected here will not be touched.

Other Storage Options

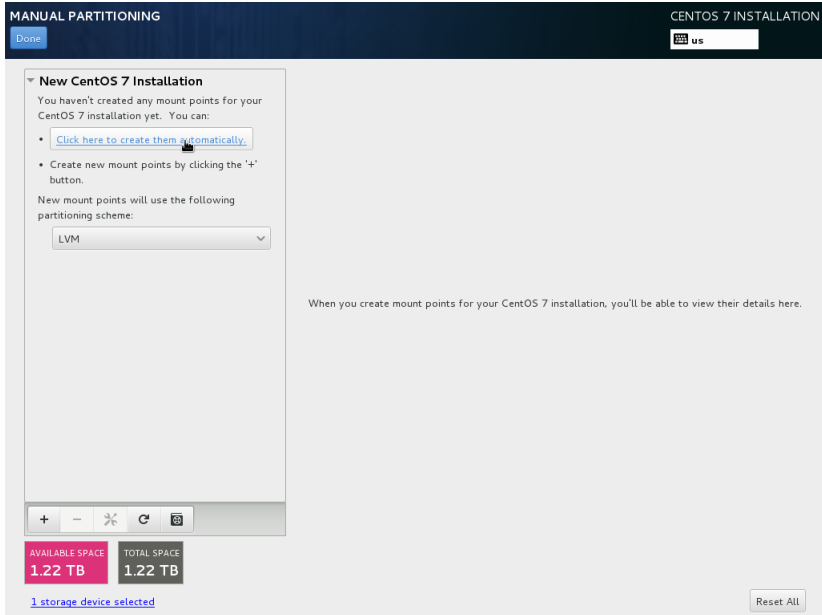
Partitioning

Automatically configure partitioning. **I will configure partitioning.** I would like to make additional space available.

Encryption

Encrypt my data. You'll set a passphrase later.

[Full disk summary and bootloader...](#) 1 disk selected; 1.22 TB capacity; 1.22 TB free

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

- a. Under **Desired Capacity**, increase the size of the home partition (*/home*) 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

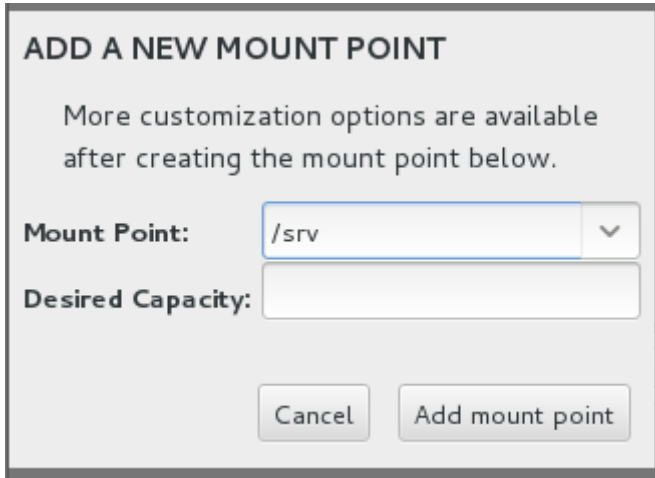
More customization options are available after creating the mount point below.

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**.
 - d. Select **Add mount point**.
8. Select **/boot**.
 - a. Under **Desired Capacity**, increase the size of the */boot* partition (/) by typing **500 MiB**.
 - b. Select **Update Settings**.
9. Select **/**.
 - a. Under **Desired Capacity**, increase the size of the root partition (/) by typing **100 GiB**.
 - b. Select **Update Settings**.
10. Select **swap**.
 - a. Under **Desired Capacity**, increase the size of the swap partition by typing **32 GiB**.
 - b. Select **Update Settings**.

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



ADD A NEW MOUNT POINT

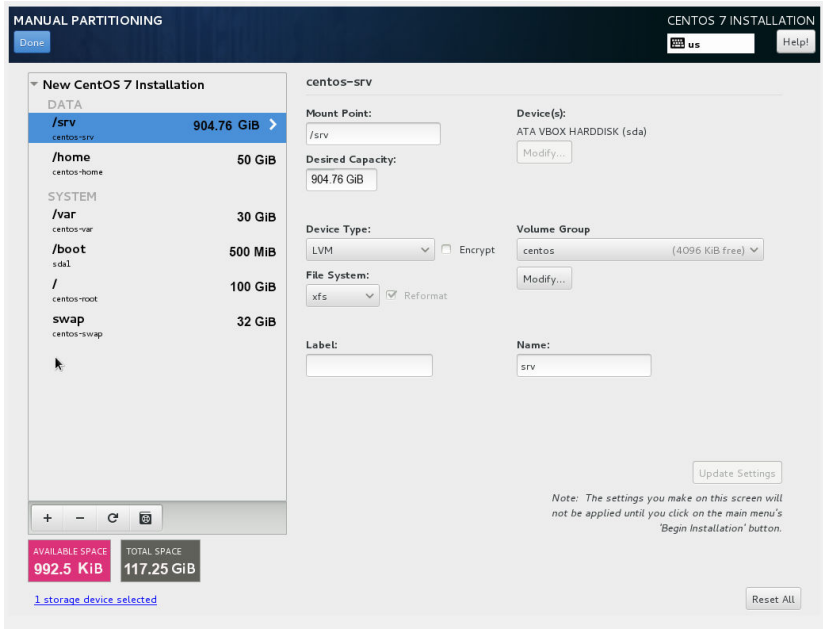
More customization options are available after creating the mount point below.

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 `9999999`.
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.
12. Select **Done**.

13. Check that the partitions are defined as follows:



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

4.3.1 Setting the Root Password

The default password is xxxxxxxx.

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

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**]

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 \(page 73\)](#)

4.4.1 Online CentOS 7 Upgrade

If the server is online, upgrade it to the required CentOS 7.x 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.x 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. 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.
5. Reboot the system.

4.5 Installing IRIS Focus Components

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

Table 4 IRIS Focus Services

Service	Description
<code>monit</code>	Monitoring tool for Unix systems and processes.
<code>HAProxy</code>	Encodes outgoing traffic with HTTPS encryption.
<code>vaisala-radarsw-webapp</code>	IRIS Focus web application.
<code>vaisala-radarsw-geoserver</code>	Map engine for caching and generating base map layers.
<code>vaisala-radarsw-nowcast-server</code>	Nowcasting server.
<code>vaisala-radarsw-data-manager-service</code>	Data manager application.
<code>vaisala-radarsw-data-manager-input-service</code>	Listener for incoming IRIS RAW files.
<code>vaisala-radarsw-warn-reader</code>	Listener for incoming WARN products from IRIS Analysis.

Table 5 IRIS Focus Users

User	Description
<code>radardm</code>	Restricted user account for running the data manager application.
<code>radardminput</code>	Restricted user account for running the data manager input service.
<code>radargeo</code>	Restricted user account for running the GeoServer map engine.
<code>radarweb</code>	Restricted user account for running the IRIS Focus web application.

User	Description
warnreader	Restricted user account for running the warn service.

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

```
./rsw-installer --offline --gis-db-dump [maps directory] --terrain-dir [terrain directory] -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.
This fetches any additionally required CentOS 7 packages from the internet



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.

More Information

- ▶ [Security Settings \(page 89\)](#)
- ▶ [Uninstalling IRIS Focus \(page 81\)](#)

4.6 Running OS Hardening Scripts

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

Table 6 Hardened Areas

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

1. Type the command: **`/release/rsw-harden-os`**
The command executes the bash scripts in the `/release/security-scripts` directory.

4.7 Configuring IRIS for IRIS Focus

4.7.1 Setting or Changing the Socket Server

1. If needed, use the following commands to set or change the socket server:

```
/usr/vaisala/radarsw/configuration/bin/configure-iris-host
<socket_server_host_name>
rsw-basemap-site-setup --socket-server <socket_server_host_name>
service vaisala-radarsw-webapp restart
```

4.7.2 Activating the Socket Server in IRIS Radar

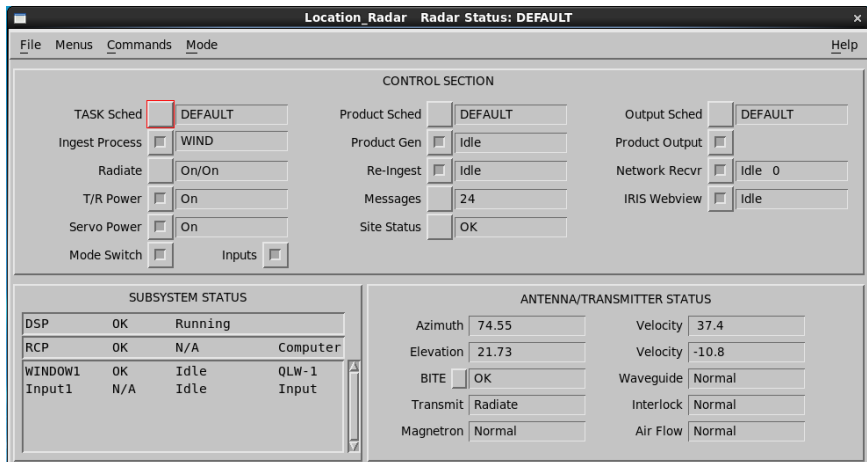


Figure 6 IRIS Radar Status Menu

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**.

4.7.3 Setting up Data Manager

The data manager service runs 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.

During installation, IRIS Focus sets up all necessary services, databases, and user accounts for processing data. IRIS Focus features such as live products and dynamic composites require **RAW** files.

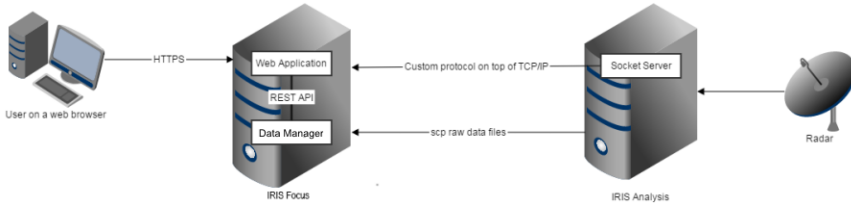


Figure 7 Radar Data Delivery Paths

4.7.3.1 Setting up Data Manager On IRIS Analysis server

You must configure IRIS Analysis to send the **RAW** files to the correct location before IRIS Focus can use them 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.

- ▶ 1. Log in to the 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 #6" with a "Help" button. The settings are as follows:

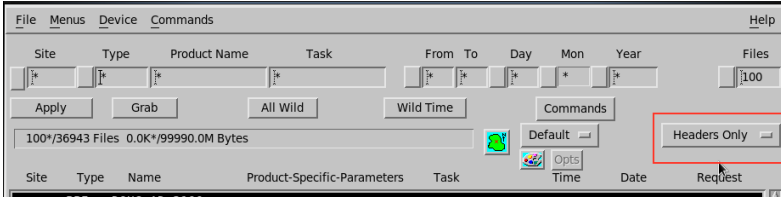
Device type	Network
Menu alias	/data-manager
Min time between output	0 sec
File format	IRIS (Def)
Filename format	Native
Compression scheme	None
Notification scheme	None
Target directory	/srv/vaisala/radarsw/datamanager/input
Copy scheme	SCP
User name	/radardminput
Recipient host name	[target-hostname]

- a. **Device type:** Network
 - b. **Filename format:** Native
 - c. **Target directory:** */srv/vaisala/radarsw/datamanager/input*
 - d. **User name:** radarscan
 - e. Host name: [IRIS Focus server]
 - f. Select **File > Save**.
 - g. Select **File > Exit**.
6. Restart IRIS:

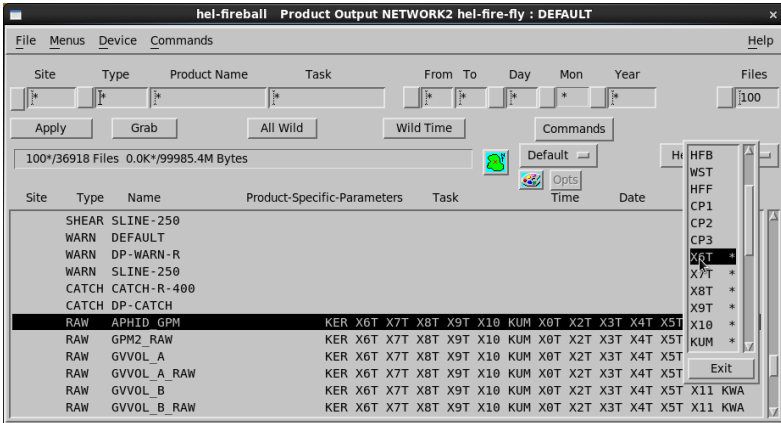
```
service iris start
service iris stop
```

7. 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**.

8. Log in to the IRIS Focus server as **root**.

9. Read the contents from the **root** account's public SSH key:

```
cat /root/.ssh/id_rsa.pub
```

10. Store the printed key string on a file or on the computer clipboard for later use.
11. Launch a one-time SSH connection to the IRIS Focus server.

```
ssh [IRIS Focus server IP address]
```

This saves IRIS Focus server's hostname in the IRIS Analysis server's `known_hosts` file.

4.7.3.2 Setting up Data Manager On IRIS Focus server

Because 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 **radardminput** user, you must add the IRIS Analysis root account's public SSH key to the IRIS Focus **radardminput** accepted keys list.

1. Log in to the IRIS Focus server as **root**.
2. If it does not exist already, create the following `.ssh` file:

```
# mkdir /var/lib/radarscan/.ssh
# chown radardminput:radarsw /var/lib/radardminput/.ssh
# chmod 644 /var/lib/radardminput/.ssh/authorized_keys
```

3. Edit the **radardminput** user's authorized SSH keys store with the command:

```
nano /var/lib/radardminput/.ssh/authorized_keys
```

4. After the last entry, append contents you copied from the IRIS Analysis server root account's public key to `authorized_keys`.
This enables file transfer from the IRIS Analysis root account to IRIS Focus **radardminput** user.
5. Check that the **RAW** files appear in the `/srv/vaisala/radarsw/datamanager/input` directory on the IRIS Focus server.
A data manager updater service records metadata of the files in an PostgreSQL database, which is accessed by the IRIS Focus web UI when it generates live radar products from the data.

4.8 Verifying IRIS Focus Installation

- ▶ 1. Restart the server.
IRIS Focus web application is set to launch automatically when the server starts. Check that the web user interface is running at the default HTTPS port, and the following default user accounts have been created in IRIS Focus during installation:
 - Username: **admin** / password: **admin123**
 - Username: **user** / password: **user123**
2. Access the IRIS Focus web UI by opening a browser on the IRIS Focus server and navigating to `https://localhost`.
You should see the login screen for IRIS Focus web application.
3. Log in with the default IRIS Focus user account.
Make sure the application loads, and the map view is displayed.
4. Verify that **Tracking Tool** and **Cross Section** buttons are visible in the application UI.
This verifies that IRIS Focus features are enabled.
5. Enable the grid lines by selecting **Map Features Lat/lon grid**.
Depending on where the map view is centered, you should see slightly distorted grid lines that are leading away from the equator. This verifies that the map projection is correct.
6. Confirm that data manager is running:
 - a. Select **Weather Products > Add Product**.
 - b. Add a new Live **PPI** or Live **CAPPI** product.
 - c. Make sure you 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.

- 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-43cee6aba62	IR15 2.0	3e667d27-dfc3-454d-afcb-3c6cb668f90d	1	0

License String

```
'E
WLynnQhM4bu27hvFNEW.3y22kDpWYJWd8R0f6WTUhvL0Bh6iAFHDqjmiBnkqz.rLwdmimOALF2fnAeoRgS9a0LA.pI0L
Ok5TR79ouP3EAWWt7leoW45kqShN9ofI7z2h35Sd3ZjPjWgseRnEz80Gvfo#1RIS_Focus"version", expires Midnight
of Jan 1, 2011, exclusive##AID=3e667d27-dfc3-454d-afcb-3c6cb668f90d
```

4

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.

- 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-b4f39a0edc59

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-43cee6aba62	IRIS 2.0	3e667d27-dfc3-454d-afcb-3c6cb668f90d	1	0

License String

```
'E
WLYnnQhM4bu27hvFNEW.3y22kDpWYJWd8R0f6WTUhvL0Bh6iAFHDqjmiBnkqz.rLwdmimOALF2fnAeRgS9a0LA.pI0L
Ok5TR79ouP3EAWWt7ieoW45kqSkhN9of07z2H35Sd3ZjPjwGseRnEz80Gvfo#1RIS_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. 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. Configuration

5.1 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**

5.2 Configuring Composites

IRIS Focus administrators can set up and manage pre-defined composites.

Configuring pre-defined composites provides more control over settings such as the combining algorithm and **Max Time Span**.

IRIS Analysis Composites are set up in IRIS Analysis as IRIS **COMP** products and sent to IRIS Focus much like other pre-configured products.

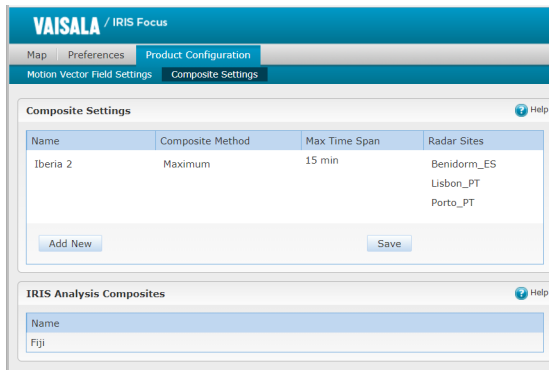


Figure 8 Composite Settings

5.2.1 Setting-up Pre-defined Composites

- ▶ 1. Log in to IRIS Focus as **admin**.
- 2. Select **Product Configuration > Composite Settings**.
- 3. Select **Add New**.

4. Give the composite site a name.
5. Under **Composite Method**, select the algorithm applied to overlapping data.
See [IRIS Focus Composite Methods \(page 40\)](#).
6. Define the **Max Time Span** for the composite.
See [Max Time Span \(page 41\)](#).
7. Under **Radar Sites**, select the sites you want to include in the composite.
8. Select **Save**.

5.2.2 Editing Pre-defined Composites

- ▶ 1. Log in to IRIS Focus as **admin**.
- 2. Select **Product Configuration > Composite Settings**.
- 3. Select a composite on the list.
- 4. Adjust the composite method or time interval as needed.
- 5. Under **Radar Sites**, select the sites you want to include in the composite.
- 6. To remove a site from the composite, select the **X** next to the site you want to remove.
- 7. Select **Save**.

5.2.3 Deleting Pre-defined Composites

- ▶ 1. Log in to IRIS Focus as **admin**.
- 2. Select **Product Configuration > Composite Settings**.
- 3. Select a composite on the list and then select **Delete**.
- 4. Select **Save**.

5.2.4 IRIS Focus Composite Methods

For regions where radars overlap, you can select one of the following methods for combining radar data:

- *Maximum*
Maximum uses the maximum value to combine the data. This is the most common setting.
- *Average*
Average uses the average of the available data. This is a poor choice if you are trying to cover blocked regions.

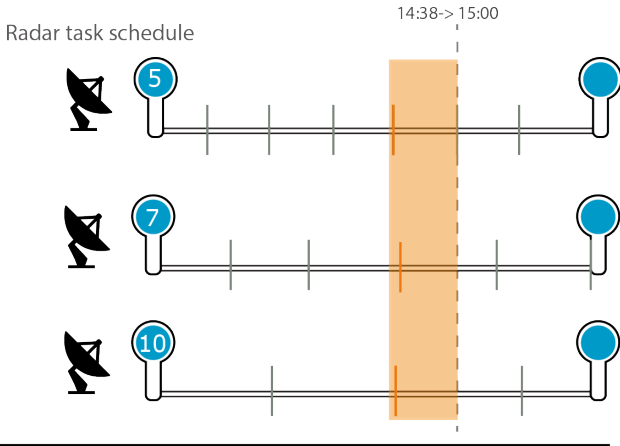


IRIS Analysis supports an expanded set of composite methods. For more information, see *IRIS Product and Display Guide*.

5.2.5 Max Time Span

Max Time Span is the maximum time (minutes) allowed between the newest and oldest points of data. When new data is processed, points that are older than the specified time span are removed.

5 Minute Max Time Span



15 Minute Max Time Span

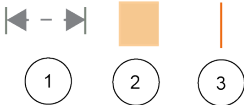
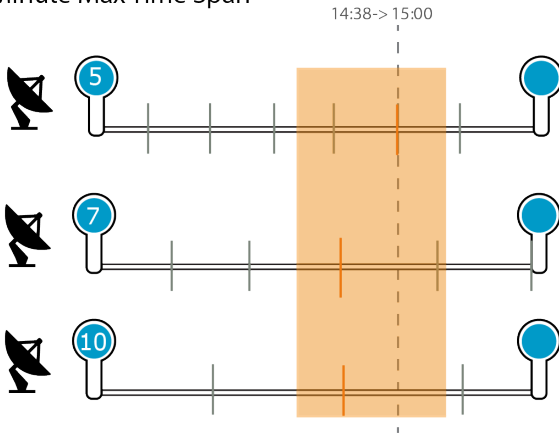


Figure 9 Max Time Span

- 1 Each radar has a different schedule with tasks 5, 7, and 10 minutes apart.
- 2 **Max Time Span** indicates which volumes are available for the composite calculations.
- 3 The composite calculation chooses which volumes to use.

5.2.6 Viewing a List of IRIS Analysis Composites

IRIS Analysis Composites are set up in IRIS Analysis as IRIS **COMP** products and sent to IRIS Focus much like other pre-configured products.

- ▶ 1. Log in to IRIS Focus as **adm i n**.
- 2. Select **Product Configuration > Composite Settings**.
- 3. Scroll down to the **IRIS Analysis Composites** pane.

5.3 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 \(page 43\)](#)
- ▶ [nowcast.ini \(page 93\)](#)

5.3.1 Configuring MVF

To use nowcasting, for each radar site you must enable motion vector field (**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*.

VAISALA / IRIS Focus

Map | Preferences | **Product Configuration**

Motion Vector Field Settings ? Help

Motion vector calculations are the first step in nowcasting calculations.

Site	Reference Product	MVF Generation
KER (Kerava, radar)	CAPPI - 1KM_REFL_ADV ▼	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> On
PLA (Philippines_A)	PPI - SURVEILLANCE ▼	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> On
PLB (Philippines_B)	▼	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Off
PLC (Philippines_C)	▼	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Off
X2T (X2_Argentina)	▼	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Off
PHP (Philippines)	PPI - SURVEILLANCE ▼	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Off

- ▶ 1. Log in to IRIS Focus as **admin**.
2. Select **Product Configuration > Motion Vector Field Settings**.
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 **MVF** products.
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 \(page 43\)](#)
- › [File Locations \(page 91\)](#)
- › [vsoweb-override.ini \(page 95\)](#)

5.3.2 Enabling the Nowcast Server



You must have a nowcasting license to use nowcasting in IRIS Focus. See [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)
```

5.3.3 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)
```

5.3.4 Stopping the Nowcast Server

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

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

5.3.5 Restarting the Nowcast Server

- ▶ 1. Login as **root**.

- Restart the nowcast server by typing:

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

5.4 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 [WARN : Warning/Centroid Product \(page 47\)](#).
- 2. [Setting-up Public Key Authentication for WARN Products \(page 50\)](#).
- 3. [Configuring WARN Products \(page 51\)](#).
- 4. [Scheduling WARN Products \(page 54\)](#).
- 5. [Configuring an IRIS Output Device for WARN Products \(page 56\)](#).
- 6. [Sending WARN Products from IRIS to IRIS Focus \(page 57\)](#).

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.

5.4.1 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.
- To avoid issuing 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 10 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 **AND**ed 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 **AND**ed together.

Table 7 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 (>0³/₁₆ 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.

5.4.2 Setting-up Public Key Authentication for WARN Products

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, if it does not exist already, create the following `.ssh` file:

```
# mkdir -m 700 /var/lib/warnreader/.ssh
# chown warnreader:radarsw /var/lib/warnreader/.ssh
```



Make sure the `authorized_keys` file in the `.ssh` directory is owned by the `warnreader` user and the `radarsw` group and that the permissions is 644.

3. On the IRIS Focus machine, copy the key file to:
`/var/lib/warnreader/.ssh/authorized_keys`

4. Check that the ownerships are as follows:

User or Group	Required Setting
<i>warnreader</i> user	user
Group	radarsw

5. Check that the permissions are as follows:

Directory or File	Permission
<i>.ssh</i>	700
<i>authorized_keys</i>	644

5.4.3 Configuring WARN Products

File Menus Type Help

Warning Symbol

Area in Sq Km

Type	Product Name	Time	Threshold
<input type="checkbox"/> VIL	<input type="text" value="VIL_130"/>	<input type="text"/>	<input type="text" value="> 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.











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 8 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.

- Select the product type.
The **Product Name** information is filled in automatically. You can also edit the name.
- 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, chose a different product of the desired type and override the product name.

- 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.
- 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*.

5.4.4 Scheduling WARN Products

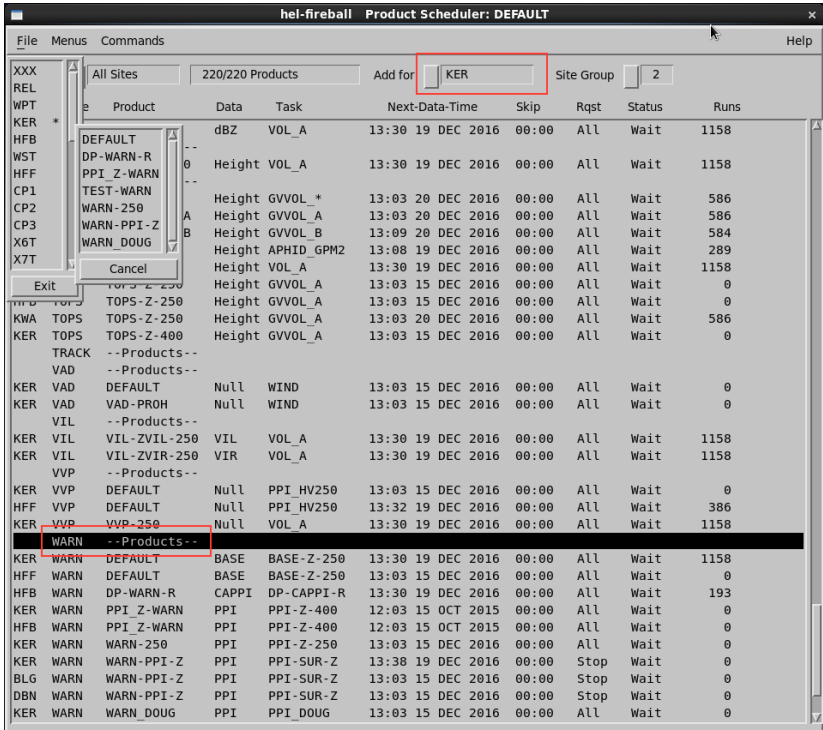


You must configure **WARN** products before you can schedule them.

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.

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



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

5.4.5 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.

The screenshot shows a configuration window titled "Output Device #5" with a "Help" button. The configuration fields are as follows:

Device type	Network
Menu alias	FIRE-FLY
Min time between output	0 sec
File format	IRIS (Def)
Filename format	Default
Compression scheme	None
Notification scheme	None
Target directory	/srv/vaisala/radarsw/product/warn
Copy scheme	SCP
User name	warnreader
Recipient host name	172.24.114.45

Below the configuration fields, there is a section for "Output Device #6" with a "Help" button.


- 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.

5.4.6 Sending WARN Products from IRIS to IRIS Focus

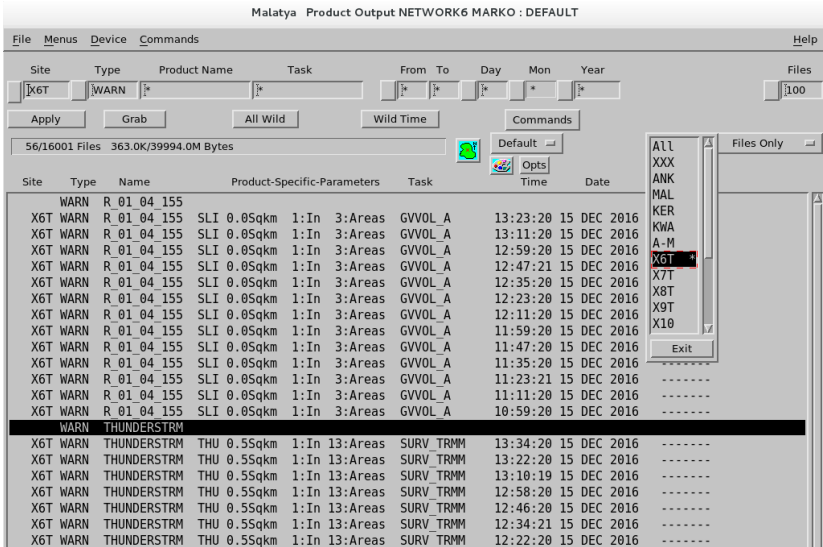
When you have configured and scheduled the **WARN** product, you can start sending **WARN** products over the network to IRIS Focus.

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 [Configuring an IRIS Output Device for WARN Products \(page 56\)](#).

4. Filter the list of output products:



- 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.

5.5 Importing Historical Data to IRIS Focus

You can import historical data into IRIS Focus to use the same IRIS Focus visualization and analytical tools available for current data.

To import the data, use one of the following import methods:

- Transfer **RAW** product data from IRIS Analysis on the IRIS back-end to the IRIS Focus machine. See [IRIS Focus Architecture \(page 82\)](#).
 - Import a data archive by sending a collection of IRIS **RAW** products over the network using an SCP command. See the following steps.
- ▶ 1. Set up public key authentication for the machine you are copying from:
On the `_my.iris.focus.server` machine, add the key from the source machine to the `radaradmininput` user's `~/.ssh/authorized_keys` file.
2. Use SCP to copy all the files from `/storage/raw/archive/` to the IRIS Focus Server. For example:

```
find "/storage/raw/archive" -type f -exec scp {}
radaradmininput@my.iris.focus.server:/srv/vaisala/radar-sw/datamanager/input;
```



The Data Manager input service expects only IRIS **RAW** files. Make sure you do not copy a directory or zip file.

3. To monitor the data import, or troubleshoot if the data does not appear on the IRIS Focus web interface, check the Data Manager input service log:

```
journalctl -u vaisala-radar-sw-data-manager-input-service -f
```

The Data Manager input service imports the files to Data Manager for use in IRIS Focus.

6. Upgrade

6.1 Upgrading IRIS Focus 3.0 to IRIS Focus 4.0

The following instructions assume you are upgrading from IRIS Focus 3.0 to IRIS Focus 4.0.



If you have previous versions of IRIS Focus, you must upgrade through each previous version before you can upgrade to IRIS Focus 4.0.



IRIS Focus 4.0 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 [Making a Manual Back-up \(page 73\)](#).
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-v2.zip*
 - c. Terrain data directory: *vaisala-iris-terrain-v2.zip*
4. Insert the upgrade USB stick.
 5. Copy the file *Vaisala_IRIS_installer-4.0.tar* from the USB stick to the server's hard disk drive, for example to the */root* directory.
 6. Extract the following files:

```
tar -xvf Vaisala_IRIS_installer-4.0.tar
unzip vaisala-iris-maps-v2.zip
unzip vaisala-iris-terrain-v2.zip
```

7. Change to the directory created in the previous step:

```
cd Vaisala-IRIS-Focus-v4.0.0--xx
```

- Run the upgrade script.

Online upgrade:

```
./rsw-upgrade --gis-db-dump [maps directory] --terrain-dir [terrain
directory] --online
```

Offline upgrade:

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

When running the upgrade script, replace `[maps directory]` and `[terrain directory]` with the correct paths.



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

- Verify the upgrade by running: `rpm -qa | grep vaisala`

Check that the `rpm` name is version 4.0.

- Activate the IRIS Focus license.

Depending upon whether or not your server is connected to the internet, see:

- [Activating License – Online \(page 34\)](#)
- [Activating License – Offline \(page 36\)](#)

6.2 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.

- ▶ Login as `root`.
- Backup the system configuration.
See [Making a Manual Back-up \(page 73\)](#).
- Insert the upgrade USB stick.
- 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. Depending on whether you are performing an online or an offline upgrade, run one of the following: Run: **`./rsw-upgrade`**

```
./rsw-upgrade --online
```

```
./rsw-upgrade --offline
```



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:
 - [Activating License - Online \(page 34\)](#)
 - [Activating License - Offline \(page 36\)](#)

6.3 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 [Making a Manual Back-up \(page 73\)](#).
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:
 - [Activating License – Online \(page 34\)](#)
 - [Activating License – Offline \(page 36\)](#)

7. System Administration

7.1 User Management

Access to IRIS Focus features depends on the roles enabled for each user account.

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

Table 9 IRIS Focus Roles

Role	Description
<i>administrator</i>	Can access administration features.
<i>focus</i>	Can access the full IRIS Focus feature set.
<i>kiosk</i>	Can only access the non-interactive, full-screen Kiosk mode.
<i>user</i>	Can access the limited set of features available with IRIS Focus Light.
<i>poweruser</i>	Not used.



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

Seat Allocation and Restrictions

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

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

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



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

Users and Organizations

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.

You can also use organizations to manage license availability to subgroups with separate license pools.

More Information

- ▶ [Licensing \(page 9\)](#)

7.1.1 Managing User Accounts

- ▶ 1. Log in with an *administrator* account
- 2. Select **Admin** in the upper right corner.
- 3. Select **Users** to add, edit, or delete users.

7.1.2 Creating User Accounts After First Install

After a fresh installation, start creating user accounts.



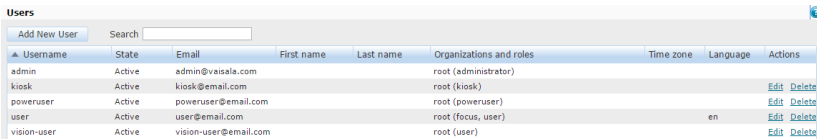
To enable IRIS Focus features for a user account, you must select both the **user** and **focus** roles.

- ▶ 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:
 - Select the *radarsw* organization.
 - Enter the validity period.
 - Enter the maximum allocated users (licenses).

Application Subscription	
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

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.



The screenshot shows a web interface titled 'Users' with a search bar and a table of user accounts. The table has columns for Username, State, Email, First name, Last name, Organizations and roles, Time zone, Language, and Actions.

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

7.1.3 Removing User Accounts

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

7.2 Map Management

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

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

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

Administrators can add add custom map layers or edit existing layers.

IRIS Focus users can view map layers in the **Map** view by selecting **Map Features**.

7.2.1 Working with Map Layers

- ▶ 1. Login as **admin**.
2. Select **Admin > Map > Map Layers**.
The **Map Layers** view lists the available map data layers. Each layer has the following properties:
 - **Base layer** - Enable to set this layer as a base layer
 - **Title** - Layer name
 - **Type** - WMS layers
 - **URL** - Address for the WMS server
 - **Layer** - Title of the layer on the server
3. To add a new layer, select **Add New Layer**.
 - a. Type the layer information, including **Title**, **URL**, and **Layer**.
 - b. Define map layer properties such as:
 - **Transparent** - Enable to use PNG or GIF alpha channel for transparency
 - **MIME type** - Select image type
4. To edit a layer, select **Edit** for that layer and make your changes
The **Map Layer Information** window for that layer opens.
5. Select **Save**.

More Information

- ▶ [Map Layer Configuration Options \(page 92\)](#)

7.2.2 Map View Context

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

Only the default **TheMap** context is available.



You perform all map layer customization in the default **TheMap** context, you do not create new map contexts for custom map layers.

- To set which layers are enabled and which are disabled for users in the map view, edit **TheMap**.
- To set the order in which multiple map layers are rendered on screen, change the **Z level** of map layers.
The lowest number is rendered first, and higher numbers rendered on top of that.

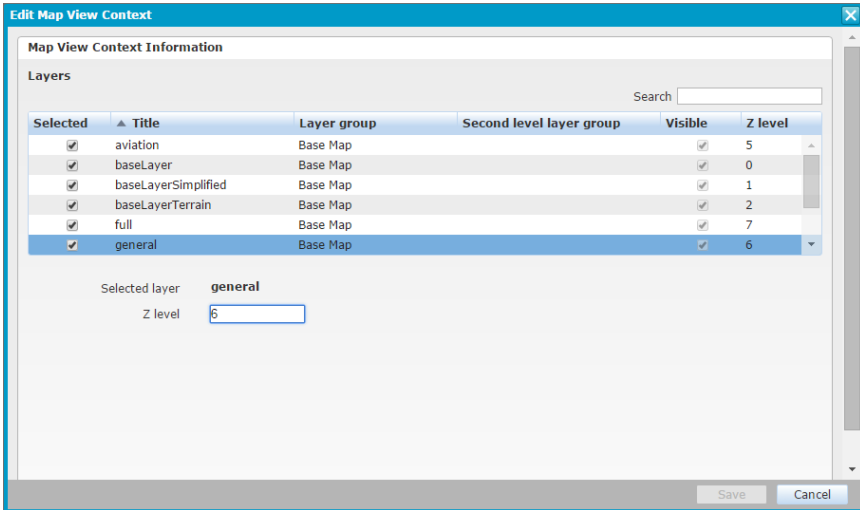


Figure 11 Editing the Map Context

7.2.3 Adding External Map Layers



To perform these steps you must be familiar with Web Map Server (WMS) and Geoserver



IRIS Focus displays single radar products in azimuthal equidistant projection. Because most external Geoservers and WMS providers do not support azimuthal equidistant projection, you must use a proxy to dynamically reproject the external layer's projection to Azimuthal Equidistant projection.

Using IRIS Focus administrator tools, you can import an external map layer from Geoserver to IRIS Focus for display in a composite radar view.

To add a layer to a radar AZEQ view, you must configure a Web Map Server (WMS) proxy to the IRIS Focus Geoserver.

- ▶ 1. Open the file: `/etc/vaisala/radarsw/configuration/gis-override.ini`
2. Copy the `geoserver` admin password.
This password is autogenerated during installation.
3. Login to IRIS Focus Geoserver at: <http://<server>:34180/geoserver/web/>
Login using the username `admin` and the password you copied earlier.

4. Add the new external WMS store. See the Geoserver documentation: <http://docs.geoserver.org/latest/en/user/data/cascaded/wms.html>. The following features are NOT supported:
 - Styling layers with **Styled Layer Descriptor** (SLD).
 - Alternate (local) styles.
 - Extra request parameters such as **time**, **elevation**, or **cql_filter**.
 - **GetLegendGraphic** requests.
 - Specifying the image format. GeoServer attempts to request PNG images. If that fails, it uses the remote server's default image format.
 - Authentication for the remote WMS. The remote WMS must be unsecured.
5. Publish the layers you want to display in IRIS Focus.
6. Login to IRIS Focus as admin user:
 - a. Select **Admin > Map > Map Layers**.
 - b. Select **Add New Layer**.
 - c. Add the layer with the information you entered in the previous step.
 - d. Add the new layer to the map view context **TheMap**.
Choose an appropriate **Z level**, most likely an integer one higher than the others is good. This means that the layer will be displayed on top all the other layers.
7. In Geoserver, enable tile caching for the new layer.
 - a. Edit the new layer.
 - b. Navigate to **Tile Caching**.
 - c. Add a grid subset to all codes starting with **EPSG:741xxx**.
This requires quite a bit of manual clicking.



Instead of adding all the EPSG codes, you can go straight to the next step and observe from browser network status which WMS requests fail. From these requests, you can see the EPSG codes that your radar(s) use. You can only use the EPSG codes currently used by the system.

8. Login to IRIS Focus as a user:
 - a. In the upper right corner, select **Map Features**.
 - b. Enable the new layer.

7.3 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.

7.4 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`.

7.5 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`.

More Information

- [Encryption \(page 89\)](#)

7.6 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`

7.7 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`

7.8 Data Manager

Data manager is the HTTP/REST interface that provides raw data for live radar products.

Table 10 Data Manager Services

Service	Description
<code>vaisala-radarsw-data-manager</code>	Listener.
<code>vaisala-radarsw-data-manager-input-service</code>	HTTP server for live radar products that are queried from the IRIS Focus web application.

More Information

- ▶ [Live Radar Products \(page 84\)](#)

7.9 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 a logged in as the root user.

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

Stopping the service

- **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**

7.10 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`.

7.10.1 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)

7.10.2 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
```

7.11 Installing a CA Certificate

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

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

- ▶ 1. Acquire a certificate that has been signed by a trusted authority
This is usually done by an IT department or an external organization, who purchase the certificate from an external certificate authority (CA).

2. Back-up your current configuration by running:

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

This backs up all the configuration files as a `.tar` file to `/srv/vaisala/radarsw/backup/configuration`.

3. Go to the default certificate folder:
`/etc/vaisala/radarsw/webapp-proxy/certificates/cert.pem`
 - a. Back up the file locally by running:

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

- b. Replace the certificate in the file with the new, signed certificate.

More Information

- ▶ [Web Application \(page 88\)](#)
- ▶ [Certificates \(page 89\)](#)

7.12 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`

7.12.1 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`

7.13 Restoring from Backup

1. Login as root.
2. Stop the Monit service:

```
service monit stop
```

3. Stop the IRIS Focus web application:

```
service vaisala-radarsw-webapp stop
```

4. Take a backup of the current configuration:

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

5. Drop the current database with the rsw-db-tool utility:

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

6. Recreate an empty database:

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

7. Switch to the database user account postgres:

```
su - postgres
```

8. 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
```

9. Exit the postgres user shell:

```
exit
```

10. Start the IRIS Focus web application and Monit service:

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

7.14 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.

7.15 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 \(page 9\)](#)

7.16 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 \(page 9\)](#)

7.17 Reactivating the License After Server Upgrade

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

- ▶ 1. Contact Vaisala and request a new server key.
- 2. Set-up your new server by performing the steps in the following sections:
 - a. [Installing CentOS \(page 16\)](#).
 - b. [Installing IRIS Focus Components \(page 26\)](#).
 - c. [Setting up Data Manager \(page 30\)](#).
 - d. [Verifying IRIS Focus Installation \(page 34\)](#).
- 3. Reactivate the license.
Depending upon whether or not your server is connected to the internet, see:
 - [Activating License - Online \(page 34\)](#)
 - [Activating License - Offline \(page 36\)](#)

8. Troubleshooting

8.1 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



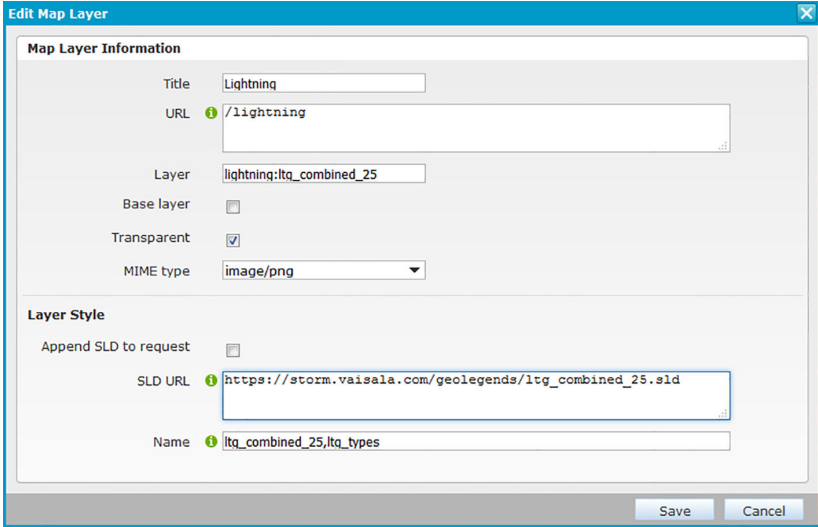
If you modify the configuration file, you must restart the `vaisala-radarsw-webapp` service with the **service vaisala-radarsw-webapp restart** command.

8.2 Lightning Layer Missing

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

- ▶ 1. Log in to IRIS Focus with an administrator account and select **Admin**.
- 2. Select **Map > Map Layers**.
- 3. Select **Add New Layer**.

4. In **Map Layer Information**, enter the following values on the layer properties:



The screenshot shows the 'Edit Map Layer' dialog box with the following fields and values:

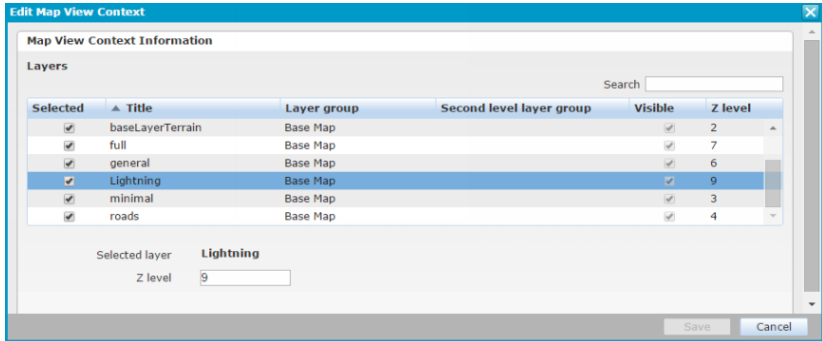
- Title:** Lightning
- URL:** /lightning
- Layer:** lightning:ltq_combined_25
- Base layer:**
- Transparent:**
- MIME type:** image/png
- Append SLD to request:**
- SLD URL:** https://storm.vaisala.com/geolegends/ltg_combined_25.sld
- Name:** ltq_combined_25.ltq_type

Buttons: Save, Cancel

- URL:** /lightning
 - Layer:** lightning:ltg_combined_25
 - Transparent:** Checkbox selected
 - SLD URL:** https://storm.vaisala.com/geolegends/ltg_combined_25.sld
 - Name:** ltq_combined_25.ltq_type
- Select **Save**.
 - Select **Map > Map View Contexts**
 - Edit the default map context **TheMap**.

8. Select the newly created lightning layer and set its **Z level** higher than all base map layers in the map context.

Z level defines the drawing order of the layers on the map. Higher values are always drawn on top.



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

8.3 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 [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 [Configuring MVF \(page 43\)](#).
3. Login as **root**.
4. Go to `/etc/vaisala/radarsw/configuration/vsoweb-override.ini`.

- 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**).

- Restart the `vaisala-radar-sw-webapp` service by typing:

```
service vaisala-radar-sw-webapp restart
```

- Start the nowcast server by typing:

```
service vaisala-radar-sw-nowcast-server start
```

- To verify that the server starts, type:

```
systemctl status vaisala-radar-sw-nowcast-server.service
```

- Check for the status:

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

8.4 Taking a Snapshot Gives Server Error

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

- ▶ 1. Check that the application log shows the error:

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

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

8.5 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. Deselect **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**.

8.6 Uninstalling IRIS Focus

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



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



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

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

More Information

- ▶ [Installing IRIS Focus Components \(page 26\)](#)

9. 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.

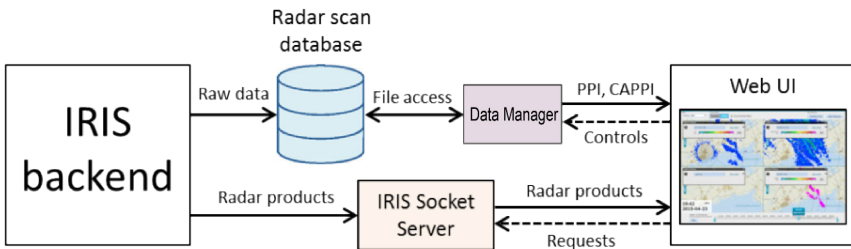


Figure 12 IRIS Focus Architecture

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.

9.1 Map Layers

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

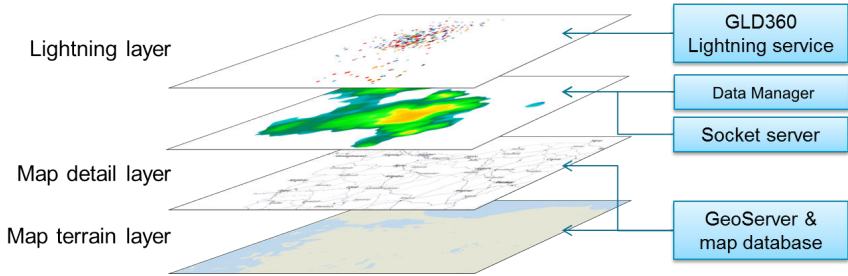


Figure 13 IRIS Focus Product Data Layers

Base Layers

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

Radar Product Layers

The interactive radar product layers (1 to 4) are drawn on top of the background layers.

9.2 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 14 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.

9.3 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.

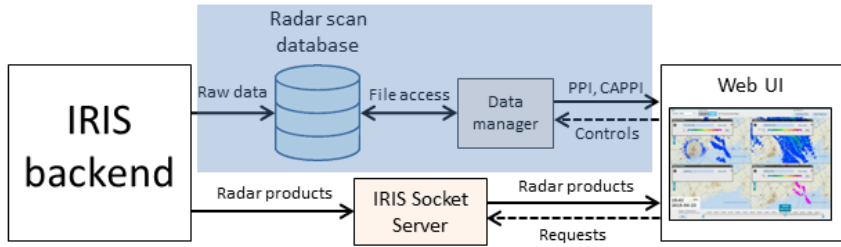


Figure 15 Live Product Components

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

IRIS Focus reads the **RAW** data through the data manager.

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.

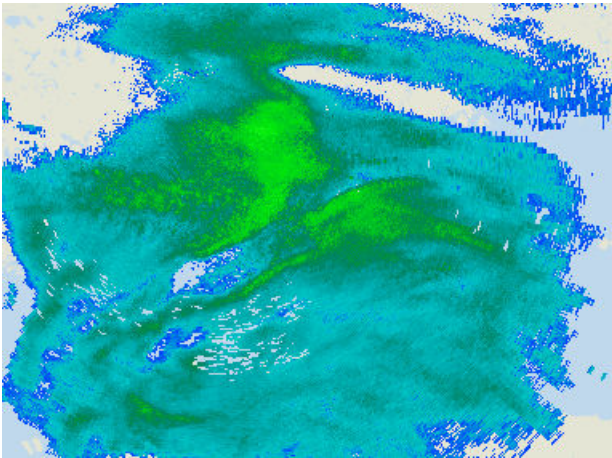


Figure 16 Radar Product Visualized

More Information

- ▶ [Data Manager \(page 70\)](#)

9.4 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.

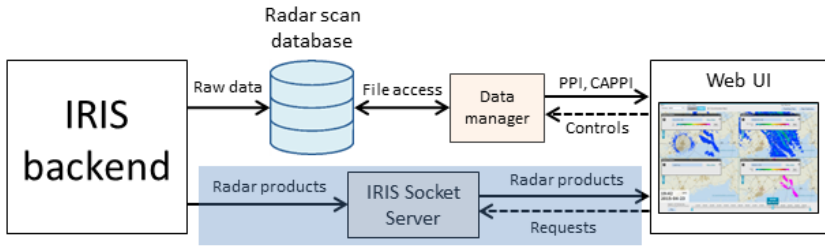


Figure 17 Pre-configured Radar Product Components

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

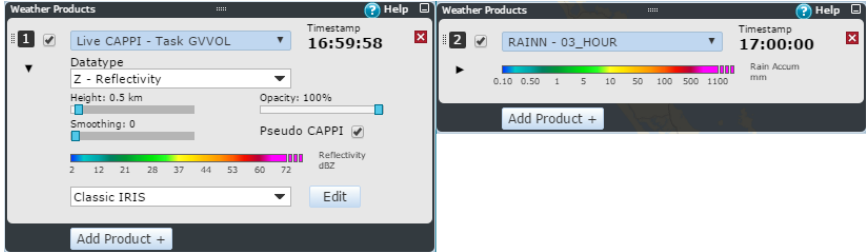


Figure 18 Live and Pre-configured Product Settings

9.5 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.

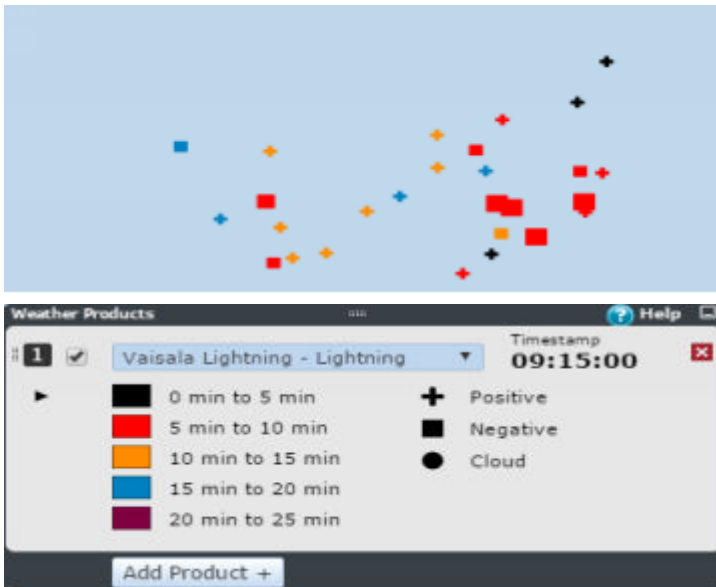


Figure 19 Lightning Layer and Controls

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:
**rsync-lightning-configure -r [admin username] -p [admin password]
-s https://storm.vaisala.com/geolegends/lrg_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

9.6 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. All requests to the standard HTTP port are redirected to the HTTPS port 443.

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

Map and terrain data are stored in the same database.

More Information

- [Certificates \(page 89\)](#)
- [Encryption \(page 89\)](#)
- [Installing a CA Certificate \(page 72\)](#)

10. Security

10.1 Encryption

Communication between the browser and the web application is encrypted.

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

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

More Information

- [Web Application \(page 88\)](#)
- [HAProxy \(page 70\)](#)

10.2 Certificates

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

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

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

More Information

- [Web Application \(page 88\)](#)
- [Installing a CA Certificate \(page 72\)](#)

10.3 Security Settings

The IRIS Focus server has a pre-configured firewall.

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

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

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


The firewall is configured through the CentOS firewall system. See https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/7/html/Security_Guide/sec-Using_Firewalls.html.

More Information

- [Installing IRIS Focus Components \(page 26\)](#)


Appendix A. File Locations

Table 11 IRIS Focus Application and Configuration Files

File or Directory	Description
<p><i>/etc/vaisala/radarsw/configuration</i></p> <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. 	<p>Configuration files for IRIS Focus module settings. The files listed here are the most important.</p> <div style="border: 1px solid gray; padding: 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>
<i>/etc/vaisala/radarsw/configuration/vsoweb-override.ini</i>	Connection settings for socket server, lightning layers, nowcasting and so on.
<i>/etc/vaisala/radarsw/nowcast/nowcast.ini</i>	Configuration files for the nowcast server.
<i>/usr/vaisala/radarsw/configuration</i>	Configuration files for helper applications used in IRIS Focus maintenance.
<i>/var/lib/radarweb</i>	Home directory of the radarweb user. The IRIS Focus Web Application is deployed here.
<i>/var/lib/radardm</i>	Home directory of the radardm user.
<i>/var/lib/radardminput</i>	Home directory of the radardminput user.
<i>/srv/vaisala/radarsw/datamanager/input</i>	Files sent from an IRIS Analysis machine are copied here. The data manager input service processes files copied here.
<i>/srv/vaisala/radarsw/datamanager/storage</i>	This is where data manager stores polar or RAW data.
<i>/var/lib/warnreader</i>	Configuration files for events and alerts.
<i>/var/log/vaisala/radarsw</i>	Log files from IRIS Focus web application

Appendix B. Map Layer Configuration Options

Table 12 Map Layer Configuration Options

Option	Description	WMS Layer Only
Map Layer Information	Defines basic map settings such as the title and the URL address of the Web Map Service (WMS).	--
Title	Title of the layer. Visible in the Layer Selector	--
Type	<ul style="list-style-type: none"> wms: generic GIS services such as base maps or raster-type forecast data google: Google base maps. marker: observations from stations configured using the JX source service on the map. 	--
URL	Address of the WMS service.	✓
Layer	Name of the layer in the map server. If using GeoServer, usually <code>workspace:layer</code> .	--
Base layer	Select if the layer is a base map.	--
Transparent	Select for WMS to request a transparent background for the layer.	✓
Request as Tiles	Use if the map layer should be requested as tiles. Usually selected for base maps.	✓
MIME type	Map image type. Change if the service does not support the default <code>image/png</code> .	✓
Default opacity	 Not used in IRIS Focus.	--
Layer query settings		--
Supported Coordinate Reference Systems	Select supported coordinate reference systems for the layer.	--
Time Support	Configure for layers using time dimensions.	✓
Coverage	Maximum bounding box for the layer.	✓
Layer style	For advanced configurations, add SLD (Styled Layer Descriptor) parameters.	--

More Information

- › [Working with Map Layers \(page 67\)](#)

Appendix C. Nowcasting Configuration Files

C.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 ( $\text{mgt} * \text{mean\_motion}$ ) above mean motion (applied only when
using global spatial filtering).
; Range:  $\geq 1.0$  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 \(page 43\)](#)

C.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 \(page 43\)](#)

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.

alarm

An alarm is an alert of highest severity.

alert

Alert is a state that requires user intervention or recognition. Different types of alerts include alarms, warning, and informational alerts.

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.

event

Event is a record of a momentary change of state or an occurrence produced by a source or some other entity. An event can indicate an error or a warning or can be just for information.

hydrometeor

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

Max Time Span

Max Time Span is the maximum time (minutes) allowed between the newest and oldest points of data. When new data is processed, points that are older than the specified time span are removed. Used in, for example, composites of radar data.

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 up to the next 2 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.

range folding

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

RAW product

Spherical coordinate data product obtained directly from the raw ingest data. The data are stored in compressed format so they can be recorded on tape or sent to a workstation for further processing.

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.

task

A set of instructions to the radar and signal processing systems including, but not limited to, the scan type (PPI or RHI), PRF, pulse width, signal processing data types, time and range averaging criteria. For example, a PPI volume scan at multiple elevation angles or an RHI at a single azimuth. Also called radar task.

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.

warning

A warning is an alert of medium severity.

Index

- A**
- alerts..... 47, 51, 54
 - weather..... 47
 - application files..... 91
- B**
- backup
 - automatic..... 73
 - manual..... 73
 - restore..... 74
 - system configuration..... 73
- C**
- CentOS.....11
 - configure network..... 24
 - installation..... 16
 - offline upgrade.....25
 - online upgrade..... 25
 - root password..... 23
 - upgrading setups..... 25
 - user accounts..... 24
 - composites
 - algorithm..... 40
 - IRIS Analysis..... 43
 - max time span.....41
 - method..... 40
 - pre-defined, delete..... 40
 - pre-defined, edit..... 40
 - pre-defined, set-up..... 39
 - set-up..... 41
 - composites, IRIS Analysis..... 39
 - composites, pre-defined
 - configure..... 39
 - configuration files.....91
- D**
- data manager..... 11, 30, 70
 - IRIS Analysis server..... 30
 - IRIS Focus server..... 33
 - output device.....30
- F**
- file locations.....91
- G**
- GeoServer..... 70, 83
- H**
- HAProxy.....70, 89
 - hardware requirements
 - minimum.....11
 - recommended..... 11
 - historical data.....58
 - history data.....7
- I**
- image request, URL
 - troubleshooting.....80
 - installation
 - CentOS.....16
 - components.....26
 - data manager.....30
 - delivery options.....14
 - licensing..... 34, 36
 - MD5 hashes..... 15
 - OS hardening.....28
 - packages..... 14
 - prerequisites..... 15
 - security settings.....89
 - troubleshooting..... 81
 - verify..... 34
 - Internet Explorer..... 81
 - IRIS
 - product family..... 8
 - IRIS Analysis.....11
 - configure.....29
 - IRIS Focus.....7
 - licensing..... 9

roles.....	64	maps.....	83
users.....	64	external layers.....	68
web application.....	70, 88	layer configuration.....	92
IRIS Focus architecture		layers.....	67
GeoServer.....	83	manage.....	66
lightning layer.....	87	TheMap context.....	67
live radar products.....	84	view context.....	67
maps.....	83	world map.....	66
web application.....	88	max time span.....	41
IRIS Radar		monit.....	70
configure.....	29	motion vector	
		configure.....	43
J		multiple radars.....	43
journal.....	69		
		N	
L		network	
licensing		CentOS.....	24
activate offline.....	36	network requirements	
activate online.....	34	IRIS Analysis.....	13
IRIS Focus.....	9	IRIS Focus.....	13
IRIS Focus Light.....	9	nowcasting.....	7
mirrored HDDs systems.....	75	advection, settings.....	95
nowcasting.....	9	configuration file.....	93, 95
seats.....	9	configure.....	43
server restart.....	75	configure MVF.....	43
server upgrade.....	76	enable.....	43, 45
lightning layer.....	87	MVF, settings.....	95
empty layer.....	77	server.....	45
missing layer.....	77	server logs.....	72
live radar products.....	84	server start.....	46
logging		server stop.....	46
application error log.....	71	TREC.....	93
logging configuration file.....	71	troubleshooting.....	79
web app metrics.....	71		
		O	
M		online help display.....	81
map layers		organization	
base.....	82	new.....	65
external.....	68		
product.....	82		

- root.....65
- organizations
 - users..... 64
- OS hardening.....28
- P**
- pre-configured products..... 86
 - WARN..... 47, 51, 54
- products
 - alerts..... 47
 - warnings..... 47
- protected areas.....7
- public key authentication
 - warnings and events..... 50
- R**
- radar data, import..... 58
- radars
 - add.....39
 - remove..... 39
- related documents.....5
- remove users.....66
- restore backup..... 74
- role
 - administrator..... 64
 - focus..... 64
 - kiosk.....64
 - user.....64
- S**
- security
 - browser.....89
 - encryption..... 89
 - HAProxy..... 89
 - OS hardening.....28
 - server.....89
 - SSL.....89
 - SSL certificate.....89
- TLS.....89
- security settings
 - HTTPS.....89
 - ports.....89
 - SSH access..... 89
- server management..... 75
- server upgrade
 - reactivate license..... 76
- services.....26
 - data manager.....70
 - GeoServer.....70
 - HAProxy..... 70
 - IRIS Focus web application.....70, 88
 - journald.....69
 - monit..... 70
 - restart..... 71
 - start..... 71
 - stop.....71
 - systemd..... 69
- snapshot
 - troubleshooting.....80
- socket server
 - change.....29
 - IRIS Radar..... 29
 - Radar Status menu.....29
 - set.....29
- software requirements
 - CentOS.....11
 - data manager.....11
 - IRIS Analysis.....11
- SSL certificate.....89
 - install.....72
- systemd..... 69
- system service logs..... 72
- T**
- trademarks.....5
- troubleshooting
 - empty lightning layer..... 77
 - failed installation..... 81

- image request, URL..... 80
- installation..... 81
- missing lightning layer..... 77
- nowcasting 79
- snapshot.....80

U

- uninstall.....81
- upgrade
 - 2.0 to 2.1..... 62
 - 2.1 to 3.0..... 61
 - 3.0 to 4.0..... 60
- user accounts..... 65
 - CentOS..... 24
 - create..... 65
- users..... 26
 - accounts..... 64, 65
 - administrator..... 64, 65
 - manage..... 64
 - organizations..... 64

V

- version information.....5

W

- WARN..... 47, 51
 - configure..... 51
 - output device..... 56
 - schedule..... 54
 - send from IRIS..... 57
- warnings
 - weather..... 47
- warnings and events..... 7
 - public key authentication..... 50
- web application..... 70, 72
 - SSL certificate..... 88

Warranty

For standard warranty terms and conditions, see www.vaisala.com/warranty.

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

Technical Support



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

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

Recycling



Recycle all applicable material.



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

VAISALA

www.vaisala.com

