

VMware AirWatch Remote File Server Guide

AirWatch v9.3

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Table of Contents

Chapter 1: Overview	4
Overview for AirWatch Content Management Enterprise Integration Solution	5
Available AirWatch Content Management Enterprise Integration Solutions	5
Remote File Storage for Personal Content	6
Remote File Storage Procedural Overview	7
Chapter 2: RFS Architecture and Security	8
Architecture and Security Overview	9
Remote File Storage Architecture	9
Chapter 3: RFS Installation Preparation	10
Remote File Storage Requirements	11
Verify the Remote File Storage Path	13
Chapter 4: RFS Configuration	14
Configure Remote File Storage	15
Chapter 5: RFS Installation	16
Remote File Storage Compatibility Matrix	17
Installing RFS on Linux	17
Verify Remote File Storage Connectivity	18
Upgrade from Remote File Storage v2.4 and Above	18
Chapter 6: RFS Management	20
Add Remote File Storage Nodes	21
Regenerate Remote File Storage Certificates	21
Map User Groups to Remote File Storage Nodes	21
Remote File Storage Manual Utility	21
Upload a Regenerated Remote File Storage for Linux Certificate	22
Troubleshooting Resources for Remote File Storage	23
Set Logging Levels	24

Chapter 1: Overview

Overview for AirWatch Content Management Enterprise Integration Solution	5
Available AirWatch Content Management Enterprise Integration Solutions	5
Remote File Storage for Personal Content	6
Remote File Storage Procedural Overview	7

Overview for AirWatch Content Management Enterprise Integration Solution

The AirWatch Content Management solution provides a suite of enterprise integration components designed to address the unique challenge of securing the content on mobile devices. The available AirWatch Content Management components include Content Gateway, Remote File Storage (RFS), and Content Rendering Engine (CRE).

AirWatch Content Gateway

The AirWatch Content Gateway, together with VMware Content Locker, lets your end users securely access content from an internal repository. This means that your users can remotely access their documentation, financial documents, board books, and more directly from content repositories or internal fileshares. As files are added or updated within your existing content repository, the changes will immediately be reflected in VMware Content Locker, and users will only be granted access to their approved files and folders based on the existing access control lists defined in your internal repository. Using the AirWatch Content Gateway with VMware Content Locker allows you to provide unmatched levels of access to your corporate content without sacrificing security. Install the latest Content Gateway version to ensure compatibility with the latest AirWatch Console versions.

Remote File Storage

Remote File Storage provides an on-premise storage alternative for Personal Content. Personal Content refers to a repository consisting of files uploaded and managed by end users. End users add files on their devices with AirWatch Content Locker, from any supported web browser with the Self-Service Portal, and from their personal computer with AirWatch Content Locker Sync. By default, this content is stored in the AirWatch Database. For SaaS customers, that means Personal Content stores in the cloud by default. In some use cases, storing certain types of content in the cloud poses a security risk. Use Remote File Storage (RFS) to store Personal Content in a dedicated on-premise location. Install the latest RFS version to ensure compatibility with the latest AirWatch Console versions.

Content Rendering Engine

The Content Rendering Engine (CRE) integrates with Remote File Storage to secure shared Personal Content. When an end user shares Personal Content from the Self-Service Portal, CRE converts the shared content into a rendered image of the source file. These shared images eliminate the need to download shared content, and enforce read-only permissions. CRE enforces read-only permissions for the file types listed below:

- Word (doc, docx)
- Excel (xls, xlsx)
- BMP
- PDF
- Power Point (ppt, pptx)
- JPEG, JPG
- PNG
- Text

Available AirWatch Content Management Enterprise Integration Solutions

Before AirWatch v8.3, the Mobile Access Gateway (MAG) for Windows or VMware Tunnel for Linux products bundled enterprise proxy, per-app tunnel, and content services together. In AirWatch v8.3 and above, administrators looking to leverage the latest updates to content integration must migrate to the standalone content service known as Content Gateway.

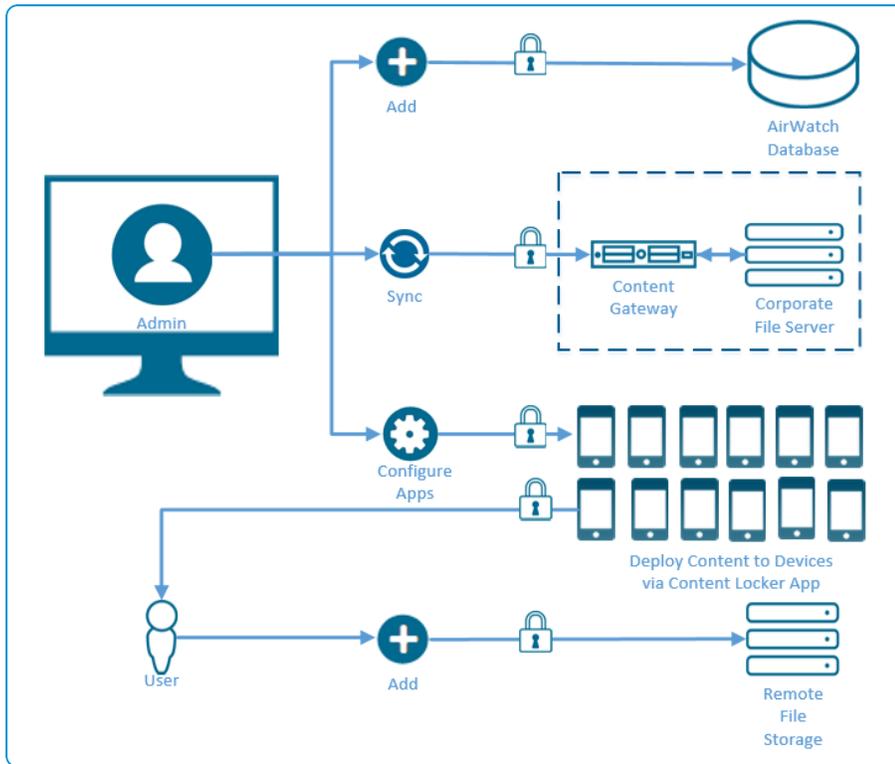
The table below overviews the different versions of Content Gateway and Remote File Storage (RFS) available for install, the corresponding AirWatch Console version, and the availability of combined services.

Component	AirWatch Console Version					
	7.3	8.0	8.1	8.2	8.3	8.4+
Content Gateway						
VMware Tunnel	✓	✓	✓	✓		
Content Gateway					✓	✓
Standalone RFS						
v1.0*	✓					
v2.0		✓				
v2.1			✓			
v2.2				✓		
v2.3					✓	
v2.4+						✓
RFS with CRE**						
		✓	✓	✓	✓	✓
RFS behind Content Gateway						
						✓
RFS with CRE behind Content Gateway**						
						✓
*No fresh installations - continued support only						
**Linux only						

Remote File Storage for Personal Content

Personal Content stores in the AirWatch database by default. However, SaaS and on-premise customers with concerns about security of personal data can install Remote File Storage to create a dedicated, on-premise storage solution for Personal Content.

Use the diagram to gain insight into how Remote File Storage works for Personal Content.



Remote File Storage Procedural Overview

Use the overview to gain insight about the overall structure of the Remote File Storage (RFS) installation procedure, as well as the purpose of the different pieces involved in the procedure.

- 
Configure Configure an RFS instance in the AirWatch Console and download the installer.
- 
Install Open the installation package on your server, and follow the prompts to install RFS.
- 
Verify Perform API healthchecks and other basic procedures to verify installation occurred successfully.

Chapter 2:

RFS Architecture and Security

- Architecture and Security Overview9
- Remote File Storage Architecture9

Architecture and Security Overview

The Remote File Storage is a product you can install on physical or virtual servers that reside in either the DMZ or a secured internal network zone.

Remote File Storage offers two architecture models for deployment: stand alone deployment or behind a AirWatch Content Gateway deployment for additional security. Both configurations support load-balancing for high availability and SSL offloading.

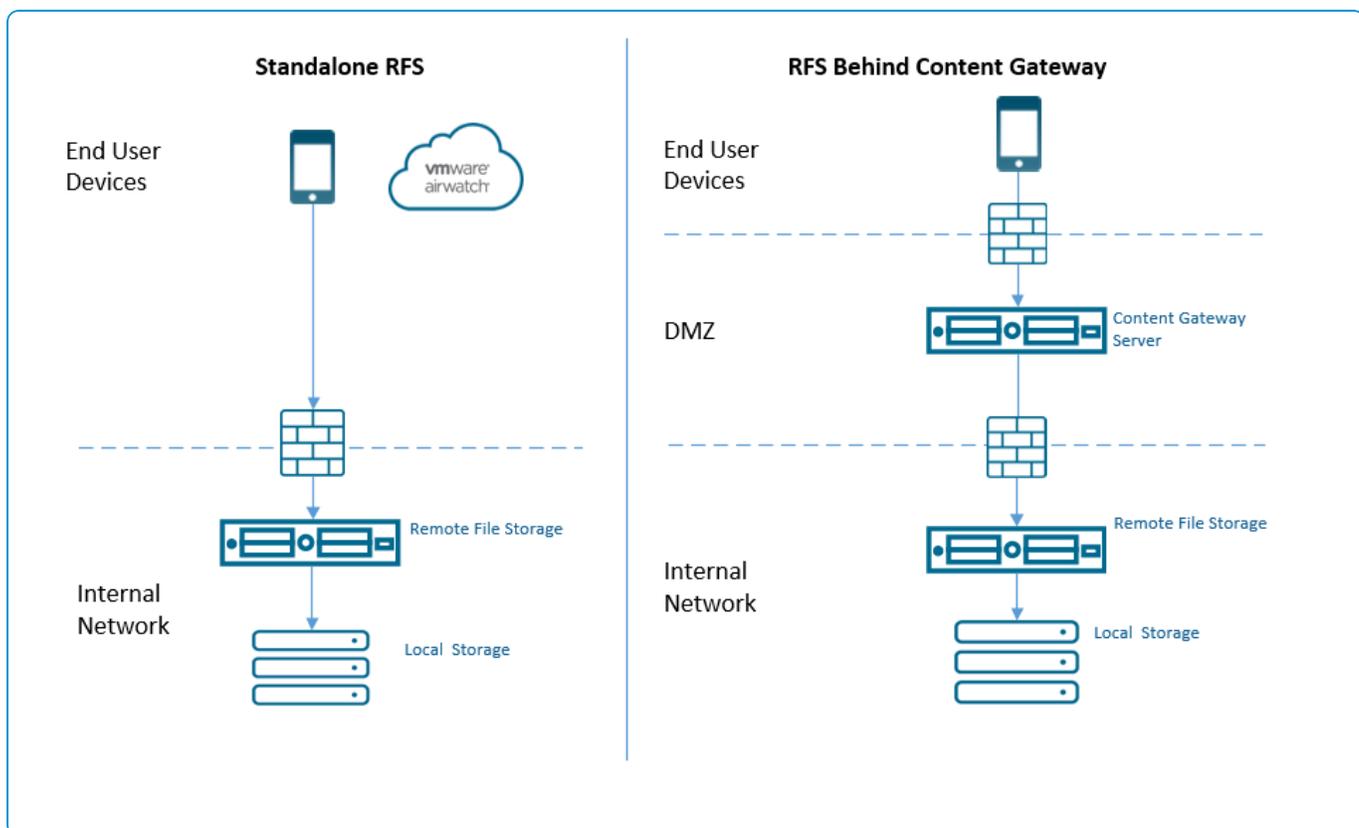
Configure your Remote File Storage deployment in a way that best addresses your security needs and existing setup. The variety of available options provides administrative flexibility when deciding on solution architecture.

Consider using a load balancer in the DMZ to forward traffic on the configured ports to an AirWatch component. Also consider using dedicated servers to eliminate the risk of other web apps or services causing performance issues.

Remote File Storage Architecture

Implement Remote File Storage as a standalone Personal Content storage solution, or integrate it with your Content Gateway solution for additional security. RFS connects directly with the internal resources over non-standard ports, which might raise concerns for administrators who do not want those ports exposed. Directing device traffic to Content Gateway makes RFS an internal only resource by passing off the external exposure to Content Gateway.

Review the basic setup, benefits, and considerations for scalable architecture.



Chapter 3:

RFS Installation Preparation

Understand the hardware, general, and software requirements for RFS to ensure a successful installation. You can also verify the RFS path before starting the installation.

Remote File Storage Requirements	11
Verify the Remote File Storage Path	13

Remote File Storage Requirements

Meet the minimum requirements to ensure a successful installation.

Hardware Requirements

Requirement	CPU Cores	RAM (GB)	Disk Space	Notes
VM or Physical Server (64-bit)	2 CPU Core (2.0+GHz)	4 GB+	20+ GB	Sizing is an estimate and may vary based on your concurrent usage. Consider adding more resources or servers when CPU, RAM, or I/O utilization approaches 70-80%.

Sizing Recommendations				
Number of Devices	1-1,000	1,000-5,000	5,000-25,000	25,000+
CPU Cores	2	4-8 or 2 load-balanced servers w/ 2 CPU cores	2 load-balanced servers w/8 CPU cores or 4 load-balanced w/ 4 CPU cores	4-8+ load-balanced servers with 4-8 CPU cores
RAM (GB)	4	8-16 total	16-32 total	32+ total

General Requirements

Requirements	Notes
Internally registered DNS record	Register the Endpoint server. Required for Standalone RFS and RFS with Content Gateway.
Externally registered DNS record	Required for Standalone RFS <i>only</i> .
SSL Certificate from trusted third party with subject name of server hostname	Requires a PKCS12 (.pfx) format and the trust of all device types in use. Keep in mind: <ul style="list-style-type: none"> Android does not natively trust all Comodo certificates. PKCS12 (.pfx) format includes the server certificate, private key, root chain, and password protection.
Dedicated storage location that supports NFS or CIFS	Serves as the location where RFS stores files.
Enable Multi-casting	Recommended, not required. Multi-casting is a network protocol that allows RFS servers to detect and communicate with one another.

Software Requirements

Requirement	Notes
SSH access to Linux Servers and an admin account with full write permissions.	Root permissions, or sudo access with the same privileges as root required. Once installation completes, you can put restrictions into place for these account types.
yum Enabled	Enable to allow the installer to request and install any missing prerequisites.
CentOS 7.1/7.2/7.3/7.4 RHEL 7.1/7.2/7.3/7.4 (Non-licensed servers are not supported for Content Gateway installation) SLES 12 (SP1/SP2/SP3)	UI-less recommended. Basic infrastructure type recommended.
Remove Java from server prior to install.	Java packaged with installer.

Network Requirements

For configuring the ports listed below, all traffic is uni-directional (outbound) from the source component to the destination component.

Standalone RFS Network Requirements					
Source Component	Destination Component	Protocol	Port	Configurable	Notes
AirWatch Console & DS Server	RFS Server	HTTPS	443	Yes	Post-installation, activate RFS in the AirWatch Console to verify connectivity.
Devices (from Internet and Wi-Fi)	RFS Server	HTTPS	443	Yes	Post-installation, use health API's to verify endpoint availability.
RFS Server	Other RFS Servers in cluster	TCP	5701, 5702	Yes	Installing files and tokens on the same server opens two Hazelcast ports. Hazelcast opens the port 5701 by default, and follows this +1 naming convention for all subsequent ports. Post-installation, use diagnostic endpoints to verify availability.
RFS Server	NFS storage component	TCP/UDP	2049, 111	No	Required if using a NFS share. Prior to installation, verify ports.
	-OR- CIFS storage component	TCP	137-139, 445	No	Required if using a CIFS share. Prior to installation, verify ports.

RFS Behind Content Gateway Network Requirements					
Source Component	Destination Component	Protocol	Port	Configurable	Notes
Content Gateway Endpoint	RFS Server	HTTPS/HTTP	443, 80	Yes	
RFS Server	Other RFS Servers in cluster	TCP	5701, 5702	Yes	Installing files and tokens on the same server opens two Hazelcast ports. Hazelcast opens the port 5701 by default, and follows this +1 naming convention for all subsequent ports. Post-installation, use diagnostic endpoints to verify availability.
RFS Server	NFS storage component	TCP/UDP	2049, 111	No	Required if using a NFS share. Prior to installation, verify ports.
	-OR- CIFS storage component	TCP	137-139, 445	No	Required if using a CIFS share. Prior to installation, verify ports.

Verify the Remote File Storage Path

Verify that the path to the drive you mounted to a NAS share functions properly.

Verify the Storage Path on Linux

1. Enter the following command to ensure the file system mounted:

```
df -h
```

2. Make sure the space you have available is greater than or equal to the storage quota you configured in the AirWatch Console for RFS in the values that return:

Filesystem	Size	Used	Available	Use%	Mounted On
/dev/sda	28G	3.8G	23G	15	/
10.43.22.185:/airwatch/rfs	500G	22G	478G	5	/mnt/rfs

Chapter 4: RFS Configuration

Configure Remote File Storage 15

Configure Remote File Storage

Download the Remote File Storage Server (RFS) executable from AirWatch Resource Portal. Once downloaded, install RFS by running the executable. Then, return to the AirWatch Console and verify the installation completed successfully.

1. Navigate to **Groups & Settings > All Settings > Content > Remote Storage**.
2. Select **Add** and provide the following details and select **Next** to continue.

Settings	Descriptions
Details	
Name	Provide a unique name to identify the RFS server. When installing multiple RFS nodes, provide each with a name specific to the region of installation.
RFS URL	Supply the full URL to the externally accessible RFS. Specify http or https in URL and include the Port if not using 443 or 80.
Access via Content Gateway	Leave disabled to implement standalone RFS. Enable to utilize RFS behind Content Gateway.



For more information about configuring ICAP Proxy, see <https://support.airwatch.com/articles/115001675368>.

3. Complete the fields in the **Storage** screen that appears. Select **Next** to continue.

Settings	Descriptions
Storage Quota	Set the maximum amount of storage in GB that the RFS node accepts. AirWatch ensures the storage quota does not exceed the storage location's limits.
Maximum File Size	Set the maximum individual file size allowed for upload to the RFS node. AirWatch supports files up to 8 GB in size.

4. Upload the **Public SSL Certificate** associated with RFS URL from the authentication screen.
5. Enter the certificate's password and select **Upload** to continue.
6. Select **Next** and save the RFS configuration Node.
7. Select **Download Configuration File (.zip)** and provide a password (six characters or more) to download the RFS node configuration. This password must be kept safe as you have to provide the same password during RFS installation. If it is an HTTPs configuration, your zip file contains an .xml file and a certificate.
8. Select **Download Linux Installer** and you are redirected to the AirWatch Resource portal for downloading the RFS installer.
9. Download and save the RFS installer.

Chapter 5:

RFS Installation

- Remote File Storage Compatibility Matrix17
- Installing RFS on Linux17
- Verify Remote File Storage Connectivity18
- Upgrade from Remote File Storage v2.4 and Above18

Remote File Storage Compatibility Matrix

The following table provides information about the compatibility of Remote File Storage (RFS) with the current and previous versions of the AirWatch Console and Content Gateway.

RFS for Linux

Console Version	Content Gateway Version	RFS Version
9.3	2.3.1	2.7
9.2.3	2.3.1	2.7

Installing RFS on Linux

Complete the following steps to install RFS on the Linux Server. AirWatch recommends utilizing the GUI-less method outlined in these instructions. Install the latest RFS version to ensure compatibility with the latest AirWatch Console versions.

1. Copy the RFS Linux installer and the RFS configuration file into a folder in the Linux server.
2. Navigate to the folder you copied the file to in the Linux box.
3. Make the **RemoteFileStorage.bin** an executable using the following commands:

```
sudo chmod +x RemoteFileStorage.bin
```

```
sudo ./RemoteFileStorage.bin
```

4. Select **Continue** and accept the licensing agreement. Press **Y** to accept.
5. Provide the path to the RFS configuration file on the server and select **Y** to confirm.
6. Select **Y** if this is your initial installation to establish trust or if enter **N**. Select **Y** to utilize automatic communication using multi-casting .
Alternatively, enter **N** to cluster RFS servers by host name, and provide the IP addresses for the servers.
7. Enter the password you provided when downloading the configuration file from the AirWatch Console.
8. Configure the **RFS Storage** file path:
 - Enter the **absolute path** where RFS stores files, which should match the path created when RFS was configured.
 - Review your entry.
 - Press **Y** to confirm.

9. (optional) If your server is behind a load balancer (f5/HAProxy) that is SSL Offloaded, enter **Y** or enter **N** as per your environment.
10. Review the **Summary** information for accuracy. Press **Enter** to continue.
11. Press **Enter** to begin installation. Any install errors display in an error message, and in the installation log which saves to:

```
opt/airwatch/rfs/_RemoteFileStorage_installation/logs
```

12. Run the command to check that all the services run properly:

```
$ sudo service AirWatchRfs status
```

13. Verify RFS [installed successfully](#).

Verify Remote File Storage Connectivity

Post-installation, perform checks to verify the installation completed successfully.

1. Verify the RFS installation completed successfully by checking the `\\<servername>\<path>` for the trust store folder.
2. Use a browser on a different machine within the same network to check the health API endpoint availability.

	HTTP GET request to	Return HTTP status	Service Status
RFS Tokens	<RFS_HOSTNAME>:<PORT>/awhealth	200 status with the RFS version	UP
Hazelcast	http://localhost:60010/diagnostics	200 status with cluster details	UP

3. Navigate to **Groups & Settings > All Settings > Content > Remote Storage** in the AirWatch Console.
4. Check the **Active** column for the appropriate RFS node. The color that displays in the column indicates the node's connectivity status.

Color	Meaning
Blank	Indicates default node status. The blank status appears regardless of connectivity.
Green	Indicates active status.
Red	Indicates an inactive status. Troubleshoot before proceeding.

Upgrade from Remote File Storage v2.4 and Above

Upgrade Remote File Storage(RFS) to access the most current version of the installer.

1. Navigate to **Groups & Settings > All Settings > Content > Remote Storage**.
2. Select the **Download** hyperlink for the RFS node you want to upgrade.
3. Enter and confirm a certificate password and select **Download**.
4. Open the file you downloaded from the AirWatch Console and run the installer.
If upgrading **Remote File Storage for Linux**, follow the Linux [installation procedure](#).

Opt Out of an Upgrade

Opt out of an upgrade to continue use of the existing implementation without disruption. To opt out, simply leave the installer configurations the same, and do not download the installer available in AirWatch v9.3.

Chapter 6:

RFS Management

Add Remote File Storage Nodes	21
Regenerate Remote File Storage Certificates	21
Map User Groups to Remote File Storage Nodes	21
Remote File Storage Manual Utility	21
Upload a Regenerated Remote File Storage for Linux Certificate	22
Troubleshooting Resources for Remote File Storage	23
Set Logging Levels	24

Add Remote File Storage Nodes

Use multiple RFS instances to store Personal Content in multiple regions.

1. Navigate to **Groups & Settings > All Settings > Content > Remote Storage** in a *Customer Level* Organization Group.
2. Select **Add** (RFS 2.0+).
3. Follow the steps for [configuring RFS](#).

Regenerate Remote File Storage Certificates

Regenerate certificates in the AirWatch Console. Save the certificate as a .pem file to convert it into the format required when uploading to the RFS-Web server.

1. Select the **Edit** icon  from the actions menu for the RFS node.
2. Select the **Advanced** tab.
3. Under the AirWatch Client Certificate section, select the **Regenerate** button.
4. Copy and record the **Client ID**
5. Select **Generate PEM**. Copy and paste the text into a text editor, saving it as a .pem file.

Example: Save the text as **RfsClientCertificate.pem**.

Map User Groups to Remote File Storage Nodes

By default, your Remote File Storage (RFS) instance stores personal content for the organization group you configured it in. Assign user groups to distinguish assignment within an organization group. Unassigned user groups map to the primary RFS instance.

1. Navigate to **Groups & Settings > All Settings > Content > Remote Storage**.
2. Select **Edit User Group Assignments**.
3. Select **Add Assignment**.
4. Assign a **User Group** and an **RFS Node** from the drop-down menus. Select the **Add** icon to add additional entries if you need to.
5. Select **Save**.

Remote File Storage Manual Utility

Use the Remote File Storage (RFS) manual utility, pre-packaged within the RFS-Web module, to manually upload certificates. Client and regenerated certificates for Content Rendering Engine (CRE) as well as regenerated RFS certificates require the use of the manual utility.

Review the commands and the explanation of the command's components to gain insight about the information needed to manually add an RFS or CRE certificate to the the RFS-Web server.

Command Line and Components		
OS	Command	
Linux	<pre>sh /opt/airwatch/rfs/rfs-web/etc/unix/rfs-cert-util.sh -cn ALIAS_NAME -cp CLIENT_CERTIFICATE_FILE -fp TRUSTSTORE_PATH -t yes</pre>	
Component	Description	Notes
ALIAS_NAME	The Client ID for the certificate.	Do not use spaces.
CLIENT_CERTIFICATE_FILE	The uploaded .pem file's location.	
TRUSTSTORE_PATH	The path to the directory that contains the truststore folder, located by default under the RFS file storage path at subdirectory: /truststore/ .	Verify the file storage or truststore path by reviewing the aw.filesystem.root and aw.truststore.path values found at /opt/airwatch/rfs/rfs-web/config/rfs.properties on Linux .

Upload a Regenerated Remote File Storage for Linux Certificate

Use the Remote File Storage (RFS) manual utility, pre-packaged within the RFS-Web module, to manually upload certificates to a shared truststore instance. The manual utility handles client certificates for Content Rendering Engine (CRE) as well as regenerated RFS and CRE certificate uploads.

Process Overview

1. Transfer the .pem file to the truststore path on the appropriate RFS-Web server.
2. Run the appropriate command from a server with the RFS-Web component installed.
3. If the notification **Certificate was added to keystore** appears, restart all services to complete the process.
If the notification **<name> truststore ... does not exist. Creating <name> truststore path** appears, delete the newly created truststore folder, adjust the `-fp` path, and rerun the command.

Linux Components

Use the specified component values and associated instructions to gain insight into how the manual certificate upload process works. Do not view the provided values as recommendations. The example defines the components as absolute paths for the sake of clarity.

Component	Linux
Manual Certificate Utility Name	rfs-cert-util.sh
Manual Certificate Utility File Location	/opt/airwatch/rfs/rfs-web/etc/unix/

Component	Linux
ALIAS_NAME	98cfa7ef-4e2f-14d2-8134-efa03e34748c
CLIENT_CERTIFICATE_FILE	/mnt/RFS_Storage/RfsClientCertificate.pem
TRUSTSTORE_PATH	/mnt/RFS_Storage/truststore/
.pem File Name	RfsClientCertificate.pem

Upload Process

1. Transfer the **RfsClientCertificate.pem** file to the **/mnt/RFS_Storage/truststore/** on the RFS-Web servers.
2. Run the command from a Linux server with the RFS-Web component installed.

```
sh /opt/airwatch/rfs/rfs-web/etc/unix/rfs-cert-util.sh -cn 98cfa7ef-4e2f-14d2-8134-efa03e34748c -cp /mnt/RFS_Storage/truststore/RfsClientCert.pem -fp /mnt/RFS_Storage/
```

3. Review the **Certificate was added to keystore** notification that appears, indicating the certificate uploaded successfully. Restart all RFS Services to complete the process.

Troubleshooting Resources for Remote File Storage

Use the available installation logs, server logs and configuration files to troubleshoot Remote File Storage (RFS). Access these resources from their directory location or by entering server commands on the vi editor or WinSCP.

Name	Details
Directories	
Post-Installation Log	/opt/airwatch/rfs/_RemoteFileStorage_installation/Logs/
Server Log	/var/log/airwatch/rfs
RFS Configuration Files Default Directory	rfs_web/config
RFS-Web Property File	/opt/airwatch/rfs/rfs-web/config/rfs.properties
RFS Files Property File	/opt/airwatch/rfs/rfs-files/config/rfs.properties
Commands	
Read a Log File	<pre>[root@localhost ~]\$ cd /log/airwatch/rfs/ [root@localhost vpnd]\$ tail -f rfs-web.log</pre>

Name	Details
View a Directory Listing	<pre>[root@localhost ~]\$ cd /opt/airwatch/rfs [root@localhost vpnd]\$ ls -l</pre>
RFS Service Commands	<pre>sudo service AirWatchRfs {start/stop/restart/status}</pre>

Set Logging Levels

Follow the steps below to change logging levels.

1. Access the **logback.xml** file contained in the [RFS Configuration Folder](#).
2. Edit the file on using the Linux vi editor or on WinSCP:
3. Write text in the logback.xml file:
 - Enter **i** to begin writing text.
 - Change the **logging level** XML attribute value in both logger and root XML elements.
 - Press **Esc** to exit edit.
 - Press **:wq!** to write and quit.
4. **Restart** each service after saving changes.

Service	Command
Restart RFS	<pre>sudo service AirWatchRfs restart</pre>

Accessing Other Documents

While reading this documentation you may encounter references to documents that are not included here.

The quickest and easiest way to find a particular document is to navigate to https://my.air-watch.com/help/9.2/en/Content/Release_Notes/Doc_List_PDFs.htm and search for the document you need. Each release-specific document has a link to its PDF copy on AirWatch Resources.

Alternatively, you can navigate to AirWatch Resources on myAirWatch (resources.air-watch.com) and search. When searching for documentation on Resources, be sure to select your AirWatch version. You can use the filters to sort by PDF file type and AirWatch v9.3.