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About this Book

The Repo Agent Installation guide has been designed for users and describes the system requirements and installation procedure for Repo Agent. Repo Agent enables you to synchronize user data from on-premise AD repository and Advanced Authentication hosted on the cloud environment.

Intended Audience

This book provides information for individuals responsible for understanding administration concepts and implementing a secure, distributed administration model.
Overview

The Repo Agent acts as a middleware between the Advanced Authentication server and the organizational repositories. Repo Agent pulls the user data from the LDAP repository and makes this data available to Advanced Authentication based on periodic or on-demand requests. This eases the communication between the Advanced Authentication server and LDAP servers in a hybrid cloud-based environment, during the authentication of users.

Why Repo Agent?

Previously, Advanced Authentication communicated directly with the LDAP servers to fetch the data of users and groups from the LDAP repository. However, during the authentication, this caused performance issues because of the delays that were caused every time Advanced Authentication interacted with the LDAP repository.

Also, if the Advanced Authentication server is to be hosted on cloud and if an organization may not want to expose their data to the cloud, then an agent is required that can run on-premise and communicate to the Advanced Authentication server on cloud.

To overcome these issues, Advanced Authentication provides the Repo Agent that acts as a middleware between the LDAP repository and Advanced Authentication. The Repo Agent stores the data in an internal database and makes the data available to Advanced Authentication.

Figure 1-1 Illustrates working of Repo Agent
You must have the administrator privileges to install and configure the Repo Agent.

- Linux host with docker and docker-compose.
  - Minimum Requirement: docker-compose version 1.23.2
  - Minimum Requirement: docker version 18.09.1
- CPU
  - Minimum requirement: 2 Cores CPU
- Memory
  - Minimum requirement: 4 GB of RAM
  - Recommended requirement: 8 GB of RAM
- Hard disk space
  - Minimum requirement: 40 GB
  - Recommended requirement: 60 GB
- IP Ports
  Ensure that the firewall uses the default port 9443
- LDAP Repositories
  The following LDAP repositories are supported:
  - Microsoft Active Directory Services
  - Microsoft Active Directory Lightweight Directory Services
  - NetIQ eDirectory
  - OpenLDAP
  - OpenDJ

**NOTE:** Repo Agent does not support the SQL repositories.
3 Installing and Configuring the Repo Agent

This chapter contains the following sections:

- “Installing the Repo Agent” on page 11
- “Configuring the Repo Agent” on page 13
- “Uninstalling the Repo Agent” on page 18

Installing the Repo Agent

1 Create a folder, for example, AuCoreRepoAgent in any valid directory:

   mkdir AuCoreRepoAgent

2 After you create the AuCoreRepoAgent, you must create the following script files to run the Repo Agent:

   2a Create a file dockompose with the following content:

      #!/bin/bash
      pushd config >/dev/null
      docker-compose $*
      popd >/dev/null

      NOTE: If you create the files on Windows, ensure that you remove the Windows line ending symbol (^M) in the end of each line.

   2b Create a file, for example, aurepa_docker_stats.sh with the following content:

      #!/bin/bash
      TMP=/tmp/docker-stats
      docker stats --no-stream --format "table
      {{.Name}}	{{.CPUPerc}}	{{.MemUsage}}"
      | grep aurepa
      | tail -n +2
      >$TMP
      echo " SORT BY NAME"
      cat $TMP | sort -k 1
      echo " SORT BY CPU"
      cat $TMP | sort -k 2
      echo " SORT BY MEM"
      cat $TMP | sort -k 3 -h
      echo " if you want interactive montor, run 'docker stats'"

   2c Create a file repo.sh with the following content:

      This file helps to start, stop, or restart the services (db, sync, and http) of the Repo Agent.
#!/bin/bash
CMD=$1
shift
REPO_NAME=$1
shift
[ -z $REPO_NAME ] && echo "Usage: repo.sh <start|stop|restart> REPO_NAME" && exit 2
./dockompose $CMD $REPO_NAME-aurepa-sync
./dockompose $CMD $REPO_NAME-aurepa-http
./dockompose $CMD $REPO_NAME-aurepa-db

2d Create a file run_sync.sh with the following content:

This file helps to manually sync the data of the LDAP repositories. It can be a full sync or a fast sync.

#!/bin/bash
# stop parallel sync, if any. run manual sync and start scheduler again
cat <<EOT >/tmp/run_sync_usage
Usage: run_sync.sh REPO_NAME [command] (command is aurepa.full sync by default)
Examples:
 run_sync.sh MOON
 run_sync.sh MOON aurepa.fast_sync
 run_sync.sh EARTH aurepa.recreate_db (wipe all data)
 run_sync.sh EARTH aurepa.print_ldap_users (check LDAP connectivity)
EOT
REPO_NAME=$1
[ -z $REPO_NAME ] && cat /tmp/run_sync_usage && exit 2
COMMAND=$2
[ -z $COMMAND ] && COMMAND=aurepa.full_sync
./dockompose stop $REPO_NAME-aurepa-sync
./dockompose run --rm $REPO_NAME-aurepa-sync $COMMAND
./dockompose start $REPO_NAME-aurepa-sync

2e Create a file setup_config_production.sh with the following content:

This file generates the self-signed certificates, nginx.conf, and the docker-compose files.
#!/bin/bash
export AUREPA_IMG="mfsecurity/aaf-aurepa:6.2.0.0"
export DOCKER_CONTENT_TRUST=1
export SSL_HOSTNAME=${SSL_HOSTNAME}
# Generate docker-compose.yml, nginx and ini file. Generate SSL
certificate, if not provided
[ -z $SSL_HOSTNAME ] && [ ! -f config/etc.nginx/cert.pem ] && \
  echo "Usage: SSL_HOSTNAME=your-server.com ./$(basename \
  $(basename $(basename $(pwd))))" && \
  exit 2
MYDIR=`cd `dirname "$柯BASH_SOURCE[0]柯)"` && pwd`
CONF_DIR=$MYDIR/config
docker run --rm \
  -e PYTHONUNBUFFERED=1 \
  -e SSL_HOSTNAME=${SSL_HOSTNAME} \n  -e AUREPA_IMG=${AUREPA_IMG} \n  -v $CONF_DIR:/mnt/config/ $AUREPA_IMG \
  python /opt/AuRepa/auconfig/setup_config.pyc $CONF_DIR

**NOTE:** Run the command `sudo chmod 755` to set permissions for the above files.

**2f** Create the following folders in the AuCoreRepoAgent folder:

- `mkdir -p config/etc.nginx`
- `mkdir -p config/EXAMPLE1.repo`

### Configuring the Repo Agent

To configure Repo Agent, perform the following:

- “Setting Up the Config Folder of Repo Agent” on page 13
- “Setting Up the Repo Agent for Certificates and Services” on page 15
- “Starting or Stopping the Services of the Repo Agent” on page 16
- “Syncing the Repository Data to the Repo Agent” on page 16
- “Creating an External Repository on Advanced Authentication” on page 17

### Setting Up the Config Folder of Repo Agent

The `$AuCoreRepoAgent/config` folder contains the following files:

- `EXAMPLE1.repo`
- `etc.nginx`

You must rename `EXAMPLE1.repo` with the repo name of your repository.

For example, `mv EXAMPLE1.repo/ FOCUS.repo`

**NOTE:** Repo Name must be same as the NETBIOS name for the Active Directory.
Create the following three files in the `FOCUS.repo`:

- **cron.py**: This file allows you to configure the LDAP synchronization. For example, the file contains the following format:

```python
import schedule, aurepa.scheduler as au
run = au.run

# Schedule, please customize
schedule.every(10).minutes.do(run, command='aurepa.fast_sync')
schedule.every().saturday.at('00:15').do(run, command='aurepa.full_sync')
schedule.every(3).days.do(run, command='aurepa.full_sync')
KILL_TIMEOUT_MINUTES = 60 * 4  # 4 hours, increase if your full sync may run longer
au.kill_timeout_seconds = KILL_TIMEOUT_MINUTES * 60
au.main_loop()
print(f"This message must not appear. File {__name__} must run aurepa.scheduler.main_loop() forever")
```

- **repo.json**: This file helps you configure the LDAP parameters. For example, the file contains the following format:

```json
{
    "user": "CN=Administrator,CN=Users,DC=focus,DC=com",
    "base_dn": "cn=users,dc=focus,dc=com",
    "password": "sample@12345",
    "ldap_type": 1,
    "ldap_type_help": "(1, 'AD'), (2, 'AD LDS'), (3, 'eDirectory'), (4, 'Other'). This field is ignored",
    "paged_enabled": true,
    "nested_enabled": true,
    "base_dn_one_level": false,
    "group_dn_one_level": false,
    "user_mail_attrs": ["mail", "otherMailbox"],
    "user_name_attrs": ["sAMAccountName", "userPrincipalName"],
    "group_name_attrs": ["sAMAccountName"],
    "user_lookup_attrs": ["sAMAccountName", "userPrincipalName"],
    "group_lookup_attrs": ["sAMAccountName"],
    "user_mobile_phone_attrs": ["mobile", "otherMobile"],
    "custom_attrs": ["info", "pager"],
    "servers": [
        {"name": "1.1.1.1", "port":389,"use_ssl": false},
        {"name": "1.1.1.4", "port":389,"use_ssl": false}
    ]
}
```

**NOTE**: With `custom_attrs`, it is possible to return any LDAP attribute from Active Directory. These attributes provide additional information that can be displayed on RADIUS client if the corresponding RADIUS result specification rule exists in the Administration portal.
Installing and Configuring the Repo Agent

**secret.json**: This file helps you to configure the username and password that you must specify during the creation of an external repository in the Advanced Authentication server at Administration portal > Repositories > Add External repo.

For example, the secret.json file contains the following format:

```
{
    "user": "focus",
    "password": "focus"
}
```

Setting Up the Repo Agent for Certificates and Services

You must set up the Repo Agent for generating the self-signed certificates and docker-compose services.

1. To generate a self-signed certificate, run the following command:

   ```
   export SSL_HOSTNAME=<host_server>.
   ./setup_config_production.sh
   ```

   This generates the self-signed certificates, nginx.conf, and docker-compose files that are stored in the $AuCoreRepoAgent/config and $AuCoreRepoAgent/config/etc.nginx folders.

   A certificate is generated in the following format:

   ```
   -----BEGIN CERTIFICATE-----
   MIIDjjCCAnagAwIBAgIJALEEogxd1k/tMA0GCSqGSIb3DQEBCwUAMFwxFzAsgwczA7BqNV
   BAYTAKVVMRkwFwYDVQQIDBBT2ZwcmVzLVpZ251ZC1QMQwCzA7BqNVAYDVQQIDBBT2ZwcmVz
   LVpZ251ZC1QMQwCzA7BqNVAYDVQQIDBBT2ZwcmVzLVpZ251ZC1QMQwCzA7BqNVAYDVQQIDBBT
   ------END CERTIFICATE-----
   ```

   **NOTE:** You must upload this certificate in the Administration portal > Repositories > Add External repo while “Creating an External Repository on Advanced Authentication”.

2. If you want to upload your own CA certificate, you must place it as cert.pem in the etc.nginx folder before running the setup_config_production.sh file.
NOTE: When the SSL_HOSTNAME is not passed and setup_config_production.sh is executed, a script picks the custom certificates from etc-config file and consumes it for nginx. This also creates the two files: docker-compose.yml and aurepa.ini.

Starting or Stopping the Services of the Repo Agent

Run the following command under the AuCoreRepoAgent directory to start the docker compose services of the Repo Agent:

```
./dockompose up -d
```

Based on the number of repos that are configured, the services are started. Typically, for each repo, the Repo Agent starts three services: db, sync, and http.

The following services are created for FOCUS, which is a repository running in the Repo Agent and one single nginx service as a front web-server:

- config_nginx_1
- config_FOCUS-aurepa-db_1
- config_FOCUS-aurepa-http_1
- config_FOCUS-aurepa-sync_1

To stop and remove the services of the Repo Agent, run the following command:

```
./dockompose down $* --remove-orphans
```

This cleans or removes the Repo Agent docker services from the host machine.

Syncing the Repository Data to the Repo Agent

To manually sync the data from the LDAP repositories, run the following command:

```
$AuCoreRepoAgent/run_sync.sh <REPO_NAME> [aurepa.fast_sync | aurepa.full_sync]
```

For example, to do a manual Fast sync for the FOCUS repository, run the following command:

```
$AuCoreRepoAgent/run_sync.sh FOCUS aurepa.fast_sync
```

$AuCoreRepoAgent/run_sync.sh FOCUS performs a full sync of the Repo Agent.

NOTE: The Repo Agent fails to sync data with Advanced Authentication when the Repo Name contains spaces.

You can perform the following to validate the syncing of repositories:

- “Checking the Repository LDAP Connectivity Before Syncing” on page 17
- “Checking Repository Information is Synced to the Repo Agent Database” on page 17
- “Cleaning the Repo Agent Database” on page 17
Checking the Repository LDAP Connectivity Before Syncing

Before syncing the repository data, to check the LDAP connectivity and print the users to be synced, run the following command:

$AuCoreRepoAgent/run_sync.sh <REPO_NAME> aurepa.print_ldap_users

For example, $AuCoreRepoAgent/run_sync.sh FOCUS aurepa.print_ldap_users

Checking Repository Information is Synced to the Repo Agent Database

To check all the users and groups information is synced to the Repo Agent database, run the following command:

**NOTE:** Replace the **REPO_NAME** with the repo name provided in the $AuCoreRepoAgent/config directory.

For users:

```
docker exec config_<REPO_NAME>-aurepa-db_1 psql -U postgres -d aurepa -P pager=off -c "select count(lookup_names) from repa_user"
```

For groups:

```
docker exec config_<REPO_NAME>-aurepa-db_1 psql -U postgres -d aurepa -P pager=off -c "select count(lookup_names) from repa_group"
```

Cleaning the Repo Agent Database

To delete an invalid user or group information in the Repo Agent database and clean the database without reconfiguring the Repo Agent, run the following command:

$AuCoreRepoAgent/run_sync.sh <REPO_NAME> aurepa.recreate_db

**NOTE:** After clean up, you must sync the data for the repositories.

Creating an External Repository on Advanced Authentication

After you install and configure the Repo Agent, you must map the Repo Agent as the external repository on Advanced Authentication.

To add the external repository in Advanced Authentication:

1. Open the Advanced Authentication Administration portal.
2. Click **Repositories > Add External repo**.
3. Specify the following details:
   - **Name**: Name of the repository.
     Name of the repository must be the same as what is defined in the Repo Agent.

**NOTE:** Ensure that the repository name does not contain spaces.
Installing and Configuring the Repo Agent

- **Username**: Name of the user using the repository.
- **Password**: Password of the repository.

**NOTE**: The **Username** and **Password** are defined in the `secret.json` file of the Repo Agent. For information about the `secret.json` file, see “Setting Up the Config Folder of Repo Agent”.

4 Add the external repository server configurations:
   4a Click **Add Server**.
   4b Specify the IP address of the Repo Agent in **Address**.
   4c Specify the port number of the external repository server in **Port**. For example, 9443.
   4d Save the server credentials.

5 Click **Choose File** to upload the CA certificate for the agent.
   - This is the self-signed certificate `cert.pem` generated in the `etc.nginx` folder or your own CA certificate used during the configuration of the Repo Agent.

6 Click **Save**.

**NOTE**: You can perform the synchronization of an external repository only from a Global Master server.

Checking Repository is Synced to the Advanced Authentication Database

After creating the external repository in the Advanced Authentication Administration portal and syncing, to validate whether all user and group information is synced, perform the following steps:

1 Log in to the Advanced Authentication terminal.
2 Run the following commands:
   - To check users:
     ```
     docker exec aaf_audb_1 psql -U root -d aucore_prod -P pager=off -c "select * from external_user"
     ```
   - To check groups:
     ```
     docker exec aaf_audb_1 psql -U root -d aucore_prod -P pager=off -c "select * from external_group"
     ```

Uninstalling the Repo Agent

To uninstall the Repo Agent, run the following commands:

```
./dockompose down -v --remove-orphans
docker container prune -f
docker network prune -f
```
NOTE: The above commands removes the unused networks and containers.
This chapter contains the following topics:

- “Collecting Logs for Debugging” on page 21
- “Collecting Statistical Information” on page 21
- “Regenerate Self-Signed Certificate or Custom Certificates Used for Repo Agent” on page 21
- “Starting or Stopping Repo Agent Services Specific to a Repository” on page 22

Collecting Logs for Debugging

Run the following command to collect logs of all the Repo services that are configured in the $AuCoreRepoAgent/config directory:

```
$AuCoreRepoAgent/dockompose logs -f $*
```

Collecting Statistical Information

To list the statistical information of Repo Agent docker container, for example, the CPU usage, memory, and so on, run the following command:

```
$AuCoreRepoAgent/aurepa_docker_stats.sh
```

Regenerate Self-Signed Certificate or Custom Certificates Used for Repo Agent

To regenerate a new self-signed certificate or use custom certificates for the nginx container, perform the following steps:

1. Delete the existing certificates and nginx configuration files:
   ```
   sudo rm $AuCoreRepoAgent/config/etc.nginx/.*.
   ```
2. Reconfigure the Repo Agent:
   ```
   SSL_HOSTNAME=<Repo_Agent_IP_Hostname>
   ./setup_config_production.sh
   ```
3. Restart the nginx container:
   ```
   $AuCoreRepoAgent/dockompose restart nginx
   ```

**NOTE:** You must name the custom certificate as `cert.pem`. 

Starting or Stopping Repo Agent Services Specific to a Repository

To manage the services of a specific repository, run the following command:

\$AuCoreRepoAgent/repo.sh <start|stop|restart> REPO_NAME