ARIS SERVER
UPDATE INSTALLATION GUIDE

VERSION 10.0 - SERVICE RELEASE 24

NOVEMBER 2023

Contents

1 Update installation

The update installation setup is available for ARIS 10 servers that have been installed by a setup program. So each ARIS server is installed on one machine (single-node installation). If you currently run ARIS in version 10.0.11 or lower, you must update to version 10.0.21 first and then update to ARIS in the current version. The direct update to the current version is blocked in server setup, the agent setup, and via ACC **update** command.

From ARIS version 10.0.12 or higher, you can directly update to the current version.

CHECK WHETHER THE INTERMEDIATE ELASTICSEARCH 8 MIGRATION TO SERVICE RELEASE 21 IS FINISHED

Check the extended state of the ElasticSearch runnables using the ACC **list** command. There must not be an extended state **red** displayed anymore.

You can now continue with the update from ARIS service release 21 to ARIS in the current version.

ARIS PUBLISHER

From ARIS 10.0.13.0 on ARIS Publisher and IT Inventory are no longer delivered. This means that you can no longer install or update ARIS Publisher Server. You can still use your current ARIS Publisher installation, but since this component is no longer supported, no more features will be developed. We strongly recommend using the published content instead of ARIS Publisher in the future. As of October 2023, neither ARIS Publisher, IT Inventory, nor HTML export functionality will be available.

Locally installed ARIS clients can be updated as described in the ARIS client Installation Guide.

ARIS RISK AND COMPLIANCE

The update setup also updates ARIS Risk and Compliance installations with customizing. If the customizing contains unsupported changes or additional files, the warning **Update/patch setup not supported** and a list containing the affected files are output in the log file. To ensure that all customized files are available, the customizing must be enhanced again. For detailed information, refer to **ARCM – Installation Guide > Installation of a customer-specific version (Customizing)**. The ARIS Risk and Compliance server update procedure is described in the ARIS Risk and Compliance Installation Guide.

On Linux systems you must first update ARIS Cloud Controller (ACC) and the ARIS agent. Then perform an update setup (page 13).

The **default** tenant will be updated and migrated automatically. All other tenant's system databases must be updated manually (page 13) to get the most current script and method update.

To update customized installations, for example, multi-node systems, when an ARIS installations spans across several computers, please contact your local Software AG sales organization (page 35).

When you update or uninstall ARIS by an ARIS setup, the current installation will automatically be backed up. This process takes additional time and requires additional disk space while the setup is running. Make sure that the size of the free disk space is at least 15 GB larger than the folder size of the working directories <ARIS installation path>\server\bin\work (Windows®) or /home/ARIS10/cloudagent/work (Linux). The update will fail if there is insufficient free disk space. If the update process fails, all ARIS components will be rolled back automatically.

If you use an external database management system backup these systems before running an update setup. In case of a failed update you will be able to restore the external database systems, too.

Before updating backup all tenant's data (page 7) (see: **ARIS Cloud Controller Command-Line Tool.pdf**) and read the **ARIS Release Notes.pdf** for last-minute information which couldn't be included in this document anymore. Documents can also be installed locally (see Technical Help: **ARIS client Installation Guide**). You can open or download documents and the Technical Help from the Documentation Web site (https://documentation.softwareag.com/). Documentation is also contained in the ARIS installation package that is available in the ARIS Download Center (https://aris.softwareag.com/).

Prerequisites

- You have downloaded the ARIS installation package to have access to the required files. To download the package, you need access to the ARIS Download Center (https://aris.softwareag.com/) where a login is required. You have received information on how to register and download the installation package from Software AG or your local Software AG sales organization (page 35).

- Due to the current Tomcat (Ghostcat) vulnerability, block (page 19) all ports except the load balancer HTTPPS port.

- In the highly unlikely event of running reports during an update, the system database might fail to be updated. Make sure to lock scheduled reports before starting the update.

- Use the **reconfigure** ACC command to change settings, such as ports.

- Make sure that no file in the installation directory is locked. Therefore, close all Command Prompts pointing into the ARIS installation folder. If the prerequisites are not met and files are not writable (page 4), the setup fails because files cannot be updated. In this case, your installation cannot be automatically restored and ARIS may no longer run. To restore your installation, you must take further action.

- Make sure to exit ACC before running the update setup.

- If the ARIS help link does not work anymore (404 error) after the update of a custom configuration, the help URL is broken. You can easily fix it by modifying the **useraction_default.xml** file (<ARIS installation directory>\server\bin\work\work_copernicus_<s, m or l>\base\webapps\ROOT\WEB-INF\config\<customization>\instances\UserAction\).

  In the broken URL the **/connect/** entry is missing, for example:

  `/static/help/{locale}/handling/ca/index.htm#52910.htm`
  Add **/connect/**. The URL must look like in this example:

- /static/help/{locale}/handling**/connect/**ca/index.htm#52910.htm.

1.1 How to prevent the setup to fail

If the prerequisites are not met and files are not writable (page 4), the setup fails because files cannot be updated. In this case, your installation cannot be automatically restored and ARIS may no longer run. To restore your installation, you must take further action.

It is a good idea to check whether all files stored in the ARIS server installation directory are not locked by other users or processes. You can also force all files to be writable. The user account running the **ARIS agent 10.0** Windows service must have the permission to delete and write files. This is the **system** user on **Windows** operating systems and the **ARIS10 user** on **Linux** operating systems.

1.1.1 Check all files

If you currently use ARIS 10.0.6 or a later ARIS version, the **check file system permissions** ARIS Cloud Controller command is executed automatically when you run the setup. This command checks whether all files in the ARIS server installation work directory can be deleted. This check takes quite a while if executed on a running ARIS system. As a result, the first 10 detected files causing a problem are listed. If more files were found not to be writable, they are listed in the **agent.log** file.

You can manually execute this command before you start the setup to discover possible problems. If you do so while all runnables are started, this check will take a long time and a lot of wrong warnings are reported. This is because some files are regularly locked when ARIS is running, such as files related to the **elastic** runnable.

To reduce runtime and the number of warnings, you are recommended stopping all runnables before you execute the **check file system permissions** ARIS Cloud Controller command.

This is an example for the **check file system permissions** ARIS Cloud Controller command that was executed on a distributed ARIS server installation containing three nodes.

```
Node n1: Permission problems found in one runnable:
Permission problems found for runnable adsadmin_l:
        Found 1 file that is missing the permission WRITE:
      U:\ARIS10.0\server\bin\work\work_adsadmin_l\tools\bin\Documents.zi
p

Node n2: No permission problems found.
Node n3: No permission problems found.

Problems were found on node n1 regarding the file permissions of the runnable
adsadmin_l.
Command failed with exit code 100.
Elapsed Time : 0h 54min
```

1.1.2   Set write attribute to all files

To force all files to be writable, execute the following commands.

In **Windows** operating systems, this command sets the **write** attribute to all files:

```
attrib -r <Installation Directory>\bin\work\*.* /s
```

In **Linux** operating systems, the following commands are executed by the RPM package. The commands allow the **aris10** user accessing all files:

```
ARIS Version >= 10.2
. /etc/aris10.conf
cd $TARGETDIR
chown -R aris10 *

ARIS Version < 10.2
cd /home/ARIS10
chown -R aris10 *
```

1.1.3   Make files accessible that are used by other processes

Even if files are readable, they can be blocked when accessed by other processes. To release all locks make sure to:

- Close all ARIS command-line tools, such as **ARIS Cloud Controller**, **ARIS server Administrator**, **ARIS document storage Command-Line Tool**, or **Process Governance Command-Line Tool**.

- Close all command prompt boxes that you use to start command-line tools, such as **y-datadump.bat**, **y-elasticsearch.bat**, **y-ldapsync.bat**, **y-password.bat**, or **y-tenantmgmt.bat**. Use the task manager or the process explorer to identify processes accessing the files.

- Sign off all other users to release all possible file locks.

- Reboot the machine to assure that no user has access to any file.

1.1.4   Update from ARIS versions service relase 11 or older

If you currently run ARIS in version 10.0.11 or lower, you must update to version 10.0.21 first and then update to ARIS in the current version. The direct update to the current version is blocked in server setup, the agent setup, and via ACC **update** command.

From ARIS version 10.0.12 or higher, you can directly update to the current version.

CHECK WHETHER THE INTERMEDIATE ELASTICSEARCH 8 MIGRATION TO SERVICE RELEASE 21 IS FINISHED

Check the extended state of the ElasticSearch runnables using the ACC **list** command. There must not be an extended state **red** displayed anymore.

You can now continue with the update from ARIS service release 21 to ARIS in the current version.

1.2   Backup and restore data

Before you perform an update installation (page 1), please make sure to save all tenant's important data before starting the setup process. Administrators can save tenant data in different ways.

- Using the Tenant Management tool is a way to backup and restore the infrastructure tenant (master) as well as all productive tenants.

    By default, backups are stored in the ARIS server installation directory (..\server\bin\work\work_umcadmin_<s, m or l>**backup**). If you have not yet defined a different folder on a physical drive, make sure to save the backup folder. As the default **backup** folder is overwritten by the update, all backups are lost.

- Using the ACC command **backup tenant** will save all important data of a specific tenant at once. Tenants can be restored using the **restore tenant co**mmand.

If you use an external database management system, backup these systems before running an update setup. If the update process fails all ARIS runnables will be restored automatically. In case of a failed update you will be able to restore the ARIS content managed from the external database systems, too. We recommend making a backup of your ARIS related relational database management system.

You can also save data individually:

DATABASE

In ARIS Architect on the **Administration** tab, using the ⬇ **Backup** functionality.

On the command line tool ARIS Server Administrator, using the **backup** or **backupasn** commands.

In ARIS Server Administrator, use the **backupsystemdb** command to backup filters, method modifications (such as user-defined attributes, model types etc.), configuration, queries, report scripts, macros and semantic checks. Alternatively, you can back up the data mentioned before individually as follows.

FILTER

In ARIS Architect on the 'Administration' tab (../../handling/ba/#/home/58888/en/1), using the function ➡ **Export**.

METHOD AND CONFIGURATION

In ARIS Server Administrator, using the **backupsystemdb** command.

REPORT SCRIPTS AND MACROS

In ARIS Architect on the **Administration** tab individually backup scripts with the function **Export** in the pop-up menu for a script. If you have adapted standard scripts and standard files instead of copies the individual backup is mandatory. All standard scripts and standard files, except XML files, will be overwritten by an updated. Modifications will be lost.

In ARIS Server Administrator, using the **backupsystemdb** command.

QUERIES AND AD HOC ANALYSES

In ARIS Architect on the **Administration** tab with the **Back up analysis data** function.

When you perform an update installation, add languages, or uninstall a component, the relevant files and directories are backed up automatically. A selection of files is listed here to provide examples for server installations:

- <ARIS installation directory>\server\backup
- <ARIS installation directory>\server\data (saved databases after uninstallation)
- <ARIS installation directory>\server\sysconfig
- <ARIS installation directory>\server\templates

CONFIGURATION AND MODIFICATION SETS

You can back up the configurations that you configured via the graphical user interface in ARIS Administration on the **Configuration** tab with the **Backup** function (Publication settings > Manage configuration sets).

The **default** and the **classic** configuration set must not be modified. These sets, holding all new features, are used as template for all future modification sets. The **default** and the **classic** configuration sets are automatically updated.

If the **default** or the **classic** configuration set was modified on file level, all changes are lost after the update. To keep the modifications, proceed as follows:

Copy the folders of the modified default or custom configuration sets from <ARIS installation path>\server\bin\work\, for example:

- **work_copernicus_<s**, **m** or **l>**\base\webapps\ROOT\WEB-INF**config\default**
- **work_abs_<s**, **m** or **l>**\base\webapps\abs\WEB-INF**config\default**

- If a Heavy-duty Server (HDS) is in use, the related folder of the **hds_<s**, **m** or **l>** runnable must be copied as well.

After the update, the content of the **default** and the **classic** folders are updated, and your modifications are lost. Paste the copied folders into the <ARIS installation path>\server\bin\work\ subfolders, for example:

- **work_copernicus_<s**, **m** or **l>**\base\webapps\ROOT\WEB-INF**config**\<name of the customized **default** configuration set>

- **work_abs_<s**, **m** or **l>**\base\webapps\abs\WEB-INF**config**\<name of the customized **default** configuration set>

- If a Heavy-duty Server (HDS) is in use, the related folder of the **hds_<s**, **m** or **l>** runnable must be copied as well.

To make the content update-proof, the folder must be named other than **default**, for example, **customized_default**.

New ARIS functionality will not be available in the copied configuration sets. You can manually copy additional lines from the updated **default** or **classic** configuration sets and paste them to the related customized configuration sets.

This advanced configuration requires high knowledge on XML configuration, that can be acquired in the 742-<ID> ARIS Portal Configuration training (https://knowledge.softwareag.com/). Errors in XML configuration files may cause strong impact. You might not be able to start ARIS again.

Depending to the level of customization, you are recommend using a prepared customization package obtained by the original customizer. If you need help, contact Software AG (https://empower.softwareag.com/) for a customization request. Customization and training services are not subject to the standard Software AG software maintenance agreement. Configuration changes can only be performed by Software AG if you requested and agreed on them.

1.3   Update ARIS server

To update the installed version run the most recent ARIS server installation program. If you currently run ARIS in version 10.0.11 or lower, you must update to version 10.0.21 first and then update to ARIS in the current version. The direct update to the current version is blocked in server setup, the agent setup, and via ACC **update** command.

From ARIS version 10.0.12 or higher, you can directly update to the current version.

CHECK WHETHER THE INTERMEDIATE ELASTICSEARCH 8 MIGRATION TO SERVICE RELEASE 21 IS FINISHED

Check the extended state of the ElasticSearch runnables using the ACC **list** command. There must not be an extended state **red** displayed anymore.

You can now continue with the update from ARIS service release 21 to ARIS in the current version.

When you update or uninstall ARIS by an ARIS setup, the current installation will automatically be backed up. This process takes additional time and requires additional disk space while the setup is running. Make sure that the size of the free disk space is at least 15 GB larger than the folder size of the working directories <ARIS installation path>\server\bin\work (Windows®) or /home/ARIS10/cloudagent/work (Linux). The update will fail if there is insufficient free disk space. If the update process fails, all ARIS components will be rolled back automatically.

Restrictions

- If you use an external database management system backup these systems before running an update setup. In case of a failed update you will be able to restore the external database systems, too.

- If you update ARIS make sure to exit ARIS Cloud Controller before running the update setup.

- During the update, you will in general need the following credentials:

  Usern ame/password of the ARIS agent (default values are **Clous**/**g3h31m**)

  The password of the **superuser** user (default: **superuser**), or alternatively, the password of a user with all functional privileges for each tenant.

> **Warning**
>
> Process Governance backup archives greater than 2 GB might lead to insufficient TEMP space issue when restoring them into ARIS with Oracle back end. For such large backups, extend the temp tablespace size before restoring operation executed.
>
> To avoid data inconsistencies and possible data loss, you must not perform any of the following activities in parallel, neither manually nor scheduled:
>
> - Deleting any Process Governance process instance, process version, or process
>
> - Archiving Process Governance process instances
>
> - Backup/restore tenant (containing Process Governance or ARIS document storage data)

Procedure

1. Back up all tenants data (page 7).

2. Exit ARIS Cloud Controller.

3. Start the update setup as the same administrator that has installed ARIS.

4. Enter the ARIS agent user's credentials. The update process starts. The **default** tenant's system database is updated automatically.

5. When the setup is completed

   a. Re-index modeling data for each tenant (page 16).

   b. Update the system databases for all additional tenants (page 13).

6. If you previously had added certificates to your current system in order to allow SSL connections between ARIS server and external systems, you must make these certificates available again after each update of the ARIS agent. Certificates stored in the JRE of the ARIS agent are used, for example, if you use SSL access and ARIS Aware Dashboards or LDAP. These certificates are overwritten by an update. If you update ARIS server, the latest JRE will be installed with its own cacert keystore.

7. If you use ARIS document storage, adjust timestamps manually.

    In previous ARIS versions, ARIS document storage stored timestamps, for example **Creation time** and **Update time**, referred to documents and folders in local server time and without any time zone information. If data was moved between ARIS servers or if a tenant was restored from a backup file, timestamps were likely adjusted using a wrong time offset.

    Since ARIS 10 SR6, **Coordinated Universal Time** (UTC) is mandatory for timestamps stored by ARIS document storage. Because time zone information in existing data is not available, the timestamps of existing documents and folders cannot be adjusted automatically. After the update to ARIS 10 SR6, you must manually adjust timestamps. In a Windows-based installation with local time UTC-2, for example, use the **y-admintool.bat** command-line tool and, considering UTC offset of your ARIS servers, enter the following:

    y-admintool.bat -s https://localhost -t default adjustTimestamps -offset "-120" -u system -p manager

    If you have restored a tenant from backup file created with ARIS 10 SR5 or earlier, you must adjust the timestamps as well.

8. Make sure that all fonts are available (page 28).

ARIS is up to date.

Make sure that you also update locally installed clients.

If the update process has failed all ARIS runnables will be restored automatically. Please restore your external database system using the backup.

1.4   Update Linux installation

To update one ARIS version to the next you must update ARIS Cloud Controller (ACC) and the ARIS agent. After ACC and the ARIS agent are up to date, you must run the update setup remotely from a Windows machine. If you currently run ARIS in version 10.0.11 or lower, you must update to version 10.0.21 first and then update to ARIS in the current version. The direct update to the current version is blocked in server setup, the agent setup, and via ACC **update** command.

From ARIS version 10.0.12 or higher, you can directly update to the current version.

CHECK WHETHER THE INTERMEDIATE ELASTICSEARCH 8 MIGRATION TO SERVICE RELEASE 21 IS FINISHED

Check the extended state of the ElasticSearch runnables using the ACC **list** command. There must not be an extended state **red** displayed anymore.

You can now continue with the update from ARIS service release 21 to ARIS in the current version.

Prerequisites

- Make sure to copy the new installer packages contained in the ARIS installation package (..\Linux setup) to the Linux system's hard drive that fit to your system:

  ARIS agent

  Red Hat: aris10-cloud-agent-<version>.x86_64.rpm

  SUSE: aris10-cloud-agent-SLES<version>.x86_64.rpm

  Optionally copy aris10adm-<number>-1.x86_64 and aris10-scriptrunner-<number>-1.x86_64 and aris10-acc-<version>-1.x86_64.rpm

- Ensure that the virtual memory available on your Linux operating system is set to **262144** (page 15).

Procedure

1. Update ARIS Cloud Controller (ACC):

    rpm –Uvh aris10-acc-<version>-1.x86_64.rpm

2. When ACC is updated, run the commands depending on the Linux operating system.

    a. Using **Red Hat**, run:

    rpm –Uvh aris10-cloud-agent-<version>.x86_64.rpm

    b. Using **SUSE**, run:

    rpm –Uvh aris10-cloud-agent-SLES<version>.x86_64.rpm

    Due to changed paths warnings are logged. These warnings can be ignored, for example:

    ```
    Cleaning up / removing...
    2:aris10-cloud-agent-10.0.1.1168090warning: file
    /home/ARIS10/support.xml: remove failed: No such file or directory
    warning: file /home/ARIS10/jre/plugin/desktop/sun_java.png: remove
    failed: No such file or directory
    ...
    ```

3. If you updateARIS version **10.0.0** or **10.0.1**, start the ARIS agent, enter:

    service ArisCloudagent10 start

4. Start the update setup remotely from a Windows machine. Start the update setup as the same administrator that has installed ARIS.

5. Select the **Perform installation on a remote computer** option and enter the name of the remote server.

6. If you have changed the remote access credentials you must enter the new credentials using the **Enter changed credentials** option. Once after the installation process is completed, re-index modeling data for each tenant (page 16), update the system databases for all additional tenants (page 13), and configure the system if requires (see: **ARIS Cloud Controller (ACC).pdf**)

7. Make sure that all fonts are available (page 28).

1.4.1   How to check the virtual memory setting

From ARIS 10 SR4, the **elastic** runnable (elastic search) requires more virtual memory on your Linux operating system in order to prevent indices from causing out-of-memory exceptions. On the machine where the **elastic** runnable is installed, check which value the **vm.max_map_count** system parameter is currently set to.

For this, use the **sysctl vm.max_map_count** command. If the value is lower than **262144**, change it to **262144**.

To change the value for this session only, use the following command (root access permissions required):

sudo sysctl -w vm.max_map_count=262144

This command changes the value for the current session only. After a reboot, this change is undone.

To change the value persistently, add this line to the **sysctl.conf** configuration file that is available in the ARIS installation directory on your machine:

vm.max_map_count=262144

1.5   Re-index modeling data for each tenant (optional)

This step is optional, but highly recommended, when updating from ARIS **10.0.9** or an older version to an ARIS **10.0.10** service release or a newer ARIS **10** version.

By default, re-indexing is started automatically at the first login to each database. This causes some delay and the delayed login may bother users. Therefor we recommend you to re-index all databases on each tenant within the update maintenance window.

Warning

Do not use ARIS while databases are re-indexed using the **maintainAll** ACC command. Make sure that no scheduled tasks are running, such as, backups or reports. During **maintainAll** users cannot log into a database.

If you attempt an update without backing up your data, you run the risk of system outages and/or data loss, for which Software AG assumes no responsibility.

The syntax of the ACC command is as follows:

on <node name> invoke maintainAll on <abs instance ID> tenant.name="<tenant ID>" tenant.user.name="<user name>" tenant.user.pwd="<password>"

- **<node name>**: Name of a node that contains an ABS instance.

- **<abs instance ID>**: Iinstance ID of this ABS instance.

- **<tenant ID>**: ID of the related tenant.

- **<user name>** and **<password>**: User credentials of a user related to the specified tenant. This user must have ether have the Database administrator or the Server administrator function privilege. You can also enter the credentials of the superuser user. Make sure to use quotes to avoid any problems with special characters.

EXAMPLE (ACC)

If you want to re-index your databases contained in the **mycompany** tenant on node **n1** that contains the **abs_m** instance, and you use the **system** user (password is **1234ArisAdmin**), enter:

on n1 invoke maintainAll on abs_m tenant.name="mycompany" tenant.user.name="system" tenant.user.pwd="1234ArisAdmin"

EXAMPLE (ARISSERVER> ADMINISTRATOR)

As an alternative to the **maintainAll** ACC command, after login to each tenant, you can use the **maintain all** ARIS server Administrator command:

INTERACTIVE MODE

server <server name>:<port> <tenant> <user> <password> maintain all

BATCH MODE

arisadm.bat -s <server name>:<port> -t <tenant> -u <user> <password> maintain all

1.6   Update additional tenants

When you update (page 1) the ARIS server using the update setup, the **default** tenant's system database is updated automatically. For all additional tenants you must update the system databases with the provided database manually. If you do not update system databases, all updates, for example, ARIS method extensions, concerning scripts, filters and templates will not be available.

Prerequisites

- **ARIS Server Administrator** is installed.

- You know the credentials of the superuser, or you have the **Server administrator** function privilege.

- You have access to the most recent system database (**<downloaded installation package>/Content/SystemDB/<ADB file>**)

- You have backed up all data that will be overwritten during the update (page 7).

Procedure

1. Click **Start > Programs > ARIS > Administration > ARIS Server Administrator 10.0** if you accepted the program group suggested by the installation program. Under a Linux operating system, execute the **arisadm.sh** shell script instead. To do so, enter: **su -c arisadm.sh aris10**. The command prompt opens and ARIS Server Administrator is launched in interactive mode.

2. Establish a connection to the ARIS server and tenant:

    Syntax: **server <ARIS server name>:<port number> <tenant> <user name> <password>**

    Example: **server arissrv:1080 default system manager** or **server arissrv:443 default system manager -ssl**

3. Enter **updatesystemdb <name of ADB file>**.

The system configuration of this tenant, managing, for example, ARIS method extensions, report scripts, scheduled reports, macros, filters, and templates, will be updated. Default semantic checks will no longer be updated except of the following: **Allocation rules**, **Model attribute rules**, **Object attribute rules**, **Relationship attribute rules**, **Existence rules**, and **Rules for a BPMN diagram (BPMN 2.0)**. For these six rule types, the code is updated. The configuration of the rules stays untouched. User-defined modifications made in the configuration will not be overwritten. You can import the latest semantic checks from the ARIS installation package (<ARIS installation package>/ARIS_Installation_and_Documentation-<patch>**Content\Reports\Common_fil es** and../**Semantic Checks**).

1.7   Security advice

Due to the Tomcat (Ghostcat) vulnerability, you are recommended to block (page 19) access to all **AJP** ports if you use an ARIS version prior to **10.0.12.0**.

1.7.1   Safety recommendation: Block AJP ports

The **Apache JServ Protocol** (AJP) is a binary protocol that can proxy incoming requests from a web server to an application server behind the web server. AJP is a highly trusted protocol. It must not be made available to untrusted clients because they could gain access to confidential information or execute code on the application server.

ARIS uses AJP for communication between the **loadbalancer** runnable that bases on Apache HTTPD and ARIS applications that base on Apache Tomcat. The vulnerable Tomcat AJP connector is mandatory and must stay active for ARIS applications.

If you have installed ARIS server according to our recommendations, you can block access to the ports of all runnables except the HTTP and HTTPS ports used by the **loadbalancer** runnable by setting appropriate firewall rules. By default these HTTP and HTTPS ports are **80** and **443** on Windows operating systems and **1080** and **1443** on Linux operating systems.

To prevent unauthorized access, check that the **AJP** ports of your ARIS installations are only accessible from networks from which users access ARIS (page 20). The **show node** ACC command gives an overview of open **AJP** ports. It lists all ports used by ARIS runnables. The **connector.ajp.port** parameter (in former ARIS versions called **CATALINA_AJP_PORT**) identifies **AJP** ports. If any of these ports are accessible from an external network, you must block access immediately by your firewall.

Important: If your ARIS system is a multiple node installation, the **AJP** ports must remain open for data transfer between multiple nodes. These open **AJP** ports do not represent a security gap, because distributed ARIS installations must always be protected by a firewall.

1.7.2   Check open AJP ports (Ghostcat vulnerability)

To prevent unauthorized access, check that the **AJP** ports of your ARIS installations are only accessible from networks from which users access ARIS (page 20).

Procedure

1. Start ARIS Cloud Controller (ACC) (page 31).

2. To check ports used by runnables, enter: **show node**

    The list is displayed. Navigate to the **Known used ports section**.

```
Port   Runnable        Port Parameter
443    loadbalancer_m HTTPD.ssl.port                           Set
explicitly
1080   loadbalancer_m HTTPD.port                               Set
explicitly
14200  cloudsearch_m  zookeeper.application.instance.port      Set
explicitly
14201  cloudsearch_m  JAVA-DCSHTTPPORT                         Set
explicitly
14206  cloudsearch_m  JAVA-Dcom.sun.management.jmxremote.port  Set
explicitly
14220  elastic_m      ELASTICSEARCH.http.port                  Set
explicitly
14226  elastic_m      JAVA-Dcom.sun.management.jmxremote.port  Set
explicitly
14230* elastic_m      ELASTICSEARCH.transport.tcp.port         Set
explicitly
14240  postgres_m     postgresql.port                          Set
explicitly
14250  cdf_m          connector.http.port                      Set
explicitly
14251  cdf_m          connector.ajp.port                       Set
explicitly
14256  cdf_m          JAVA-Dcom.sun.management.jmxremote.port  Set
explicitly
14281  zoo_m          clientPort                               DEFAULT
14296  zoo_m          JAVA-Dcom.sun.management.jmxremote.port  Set
explicitly
14400  abs_m          connector.http.port                      Set
explicitly
14401  abs_m          connector.ajp.port                       Set
explicitly
14406  abs_m          JAVA-Dcom.sun.management.jmxremote.port  Set
explicitly
14410  adsadmin_m     connector.http.port                      Set
explicitly
14411  adsadmin_m     connector.ajp.port                       Set
explicitly
14416  adsadmin_m     JAVA-Dcom.sun.management.jmxremote.port  Set
explicitly
14420  apg_m          connector.http.port                      Set
explicitly
```

```
14421  apg_m           connector.ajp.port                       Set
explicitly
14426  apg_m           JAVA-Dcom.sun.management.jmxremote.port   Set
explicitly
14430  copernicus_m    connector.http.port                      Set
explicitly
14431  copernicus_m    connector.ajp.port                       Set
explicitly
14436  copernicus_m    JAVA-Dcom.sun.management.jmxremote.port   Set
explicitly
14440  ecp_m           connector.http.port                      Set
explicitly
14441  ecp_m           connector.ajp.port                       Set
explicitly
14446  ecp_m           JAVA-Dcom.sun.management.jmxremote.port   Set
explicitly
14450  hds_m           connector.http.port                      Set
explicitly
14451  hds_m           connector.ajp.port                       Set
explicitly
14456  hds_m           JAVA-Dcom.sun.management.jmxremote.port   Set
explicitly
14460  octopus_m       connector.http.port                      Set
explicitly
14461  octopus_m       connector.ajp.port                       Set
explicitly
14466  octopus_m       JAVA-Dcom.sun.management.jmxremote.port   Set
explicitly
14470  simulation_m    connector.http.port                      Set
explicitly
14471  simulation_m    connector.ajp.port                       Set
explicitly
14476  simulation_m    JAVA-Dcom.sun.management.jmxremote.port   Set
explicitly
14480  umcadmin_m      connector.http.port                      Set
explicitly
14481  umcadmin_m      connector.ajp.port                       Set
explicitly
14486  umcadmin_m      JAVA-Dcom.sun.management.jmxremote.port   Set
explicitly
14490  dashboarding_m  connector.http.port                      Set
explicitly
14491  dashboardging_m connector.ajp.port                       Set
explicitly
14496  dashboarding_m  JAVA-Dcom.sun.management.jmxremote.port   Set
explicitly
14497  dashboarding_m  JAVA-Xrunjdwp\:transport                 Set
explicitly
```

The highlighted **connector.ajp.port** Port parameter indicates all open AJP ports.

3. If any of these ports are accessible from an external network, you must block access immediately by your firewall.

You have secured the system.

Important: If your ARIS system is a multiple node installation, the **AJP** ports must remain open for data transfer between multiple nodes. These open **AJP** ports do not represent a security gap, because distributed ARIS installations must always be protected by a firewall.

1.8 Database connection

This chapter provides information on configuring the ARIS server in order to use an external database management system.

1.8.1 Configure the database connection for additional schemes

ASSIGN TENANT TO DATABASE SCHEMA

During the setup process you have created an empty Oracle or Microsoft SQL schema for an additional tenant (see Technical Help:**ARIS server Installation - Windows** or **ARIS server Installation Linux)**. You can open or download documents and the Technical Help from the Documentation Web site (https://documentation.softwareag.com/). Documentation is also contained in the ARIS installation package that is available in the ARIS Download Center (https://aris.softwareag.com/). Additionally created tenants must be assigned to the database schema. Replace values in angle brackets, such as **<tenant name>** with your own values, such as new **tenant1**.

1. Start ARIS Cloud Controller (ACC) (page 31).

2. To discover the database service ID (<dbserviceID>, such as db000000000), enter:

    list external services

    assign tenant <tenant name> to service <dbserviceID> com.aris.cip.db.schema =<schema name>

    For tenant names please only use up to 25 lowercase ASCII characters and numbers. The name must begin with a character. Special characters, such as _ and characters, for example, in Chinese, Cyrillic or Arabic cannot be used.

3. To create a new tenant, enter:

    create tenant <tenant name>

The new tenant is available on ARIS server.

ADDITIONAL SETTINGS

To enable **validationQuery** for external database connections (Oracle & Microsoft SQL) please use the correct validation query for the DBMS.

For Oracle use:

validationQuery="select 1 from dual" and testOnBorrow=true

For Microsoft SQL use:

validationQuery="select 1" and testOnBorrow=true

For better readability, the parameters of the command are shown with line-wraps. For execution you must enter a single-line command.

During registration of external service add parameters, for example, for Oracle:

```
register external service db
url="jdbc:oracle:thin:@<target_host>:<target_port>:<oracle_sid>"
driverClassName="oracle.jdbc.OracleDriver"
username="<cip_app_user>
password="<cip_app_pwd>"
maxIdle=15
maxActive=100
maxWait=10000
removeAbandoned=false
removeAbandonedTimeout=600
defaultAutoCommit=false
rollbackOnReturn=true
host=<target_host>
port=<target_port>
jmxEnabled=true
validationQuery="select 1 from dual"
testOnBorrow="true"
```

After the external service was already registered, for example, for Oracle:

```
update external service <dbserviceID>
url="jdbc:oracle:thin:@<target_host>:<target_port>:<oracle_sid>"
driverClassName="oracle.jdbc.OracleDriver"
username="<cip_app_user>"
password="<cip_app_pwd>"
maxIdle=15
maxActive=100
maxWait=10000
removeAbandoned=false
removeAbandonedTimeout=600
defaultAutoCommit=false
rollbackOnReturn=true
host=<target_host>
jmxEnabled=true
validationQuery="select 1 from dual"
testOnBorrow="true"
```

1. Enter: **stopall**

2. Enter: **reconfigure <postgres_runnable> dbsp.validationQuery="select 1" dbsp.testOnBurrow=true**

3. Enter: **startall**

The database connection is configured.

1.8.2 Update external service (database clusters)

If you have performed an installation using an Oracle or Microsoft SQL database cluster you need to reconfigure the external service after the installation process.

This procedure shows an example for an Oracle database.

Procedure

1. Start ARIS Cloud Controller (ACC) (page 31).

2. To connect to an Oracle cluster using a JDBC URL you may use this example:

   update external service <dbserviceID> url="jdbc:oracle:thin:@(DESCRIPTION=ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP) (HOST=<virtual-ip-oracle-cluster>)(PORT = <target port>)))(CONNECT_DATA=(SERVICE_NAME=cluster-database-name)))" driverClassName="oracle.jdbc.OracleDriver" username="<cip_app_user>" password="<new_cip_app_pwd>" maxIdle=15 maxActive=100 maxWait=10000 removeAbandoned=false removeAbandonedTimeout=600 logAbandoned=true defaultAutoCommit=false rollbackOnReturn=true host=<target_host> jmxEnabled=true validationQuery="select 1 from dual" testOnBorrow=true

ARIS server can be started using the Oracle cluster.

1.8.3 Encrypt passwords

You can encrypt passwords, such as the **superuser** password. The command line tool **ARIS Server Administrator** is available if you have installed ARIS server or the ARIS Administrator Tools (see Technical Help ARIS client Installation Guide. You can open or download documents and the Technical Help from the Documentation Web site (https://documentation.softwareag.com/). Documentation is also contained in the ARIS installation package that is available in the ARIS Download Center (https://aris.softwareag.com/).

If you have installed ARIS server, navigate to **ARIS installation path>\server\bin\work\work_abs_<s, m,** or **l>\tools\arisadm** and run the batch file.

Procedure

1. Start **ARIS Server Administrator**. This command line tool is available, if you have installed ARIS server, or the ARIS Administrator Tools (see Technical Help ARIS client Installation Guide. You can open or download documents and the Technical Help from the Documentation Web site (https://documentation.softwareag.com/). Documentation is also contained in the ARIS installation package that is available in the ARIS Download Center (https://aris.softwareag.com/).

    If you have installed ARIS server, navigate to **ARIS installation path>\server\bin\work\work_abs_<s, m,** or **l>\tools\arisadm** and run the batch file. Under a Linux operating system, execute the **arisadm.sh** shell script instead. The command prompt opens and ARIS Server Administrator is launched in interactive mode.

    If you accepted the program group suggested by the installation program, click **Start > Programs > ARIS > Administration > ARIS Server Administrator 10.0**.

2. Establish a connection to the server using the server command:

    syntax: server <server name>:<port number> <tenant> <user name> <password>

    example: server localhost:80 default system manager

3. Enter command: **encrypt <pwd_to_be_encrypted>**

    Example:

    encrypt databaseuser

    encrypted password:{crypted}123456789abcdefg

4. Copy the encrypted password, such as **{crypted}123456789abcdefg** to a text editor file.

You can paste the encrypted password to related fields.

1.9 How to adjust timestamps related to ARIS document storage

In previous ARIS versions, ARIS document storage stored timestamps, for example **Creation time** and **Update time**, referred to documents and folders in local server time and without any time zone information. If data was moved between ARIS servers or if a tenant was restored from a backup file, timestamps were likely adjusted using a wrong time offset.

Since ARIS 10 SR6, **Coordinated Universal Time** (UTC) is mandatory for timestamps stored by ARIS document storage. Because time zone information in existing data is not available, the timestamps of existing documents and folders cannot be adjusted automatically. After the update to ARIS 10 SR6, you must manually adjust timestamps. In a Windows-based installation with local time UTC-2, for example, use the **y-admintool.bat** command-line tool and, considering UTC offset of your ARIS servers, enter the following:

y-admintool.bat -s https://localhost -t default adjustTimestamps -offset "-120" -u system -p manager

If you have restored a tenant from backup file created with ARIS 10 SR5 or earlier, you must adjust the timestamps as well.

1.10   How to make fonts available

Fonts define how text attribute values are displayed, such as names or descriptions in models, tables, output files, print outs and PDF outputs. These fonts are related to languages used in ARIS. The fonts used are taken from different sources, such as the operating system (OS), the JRE used and the system database of the tenant.

Since ARIS version 10.0.6, **Azul Zulu** JRE is used as an internally used JRE. This JRE provides no fonts anymore.

Make sure that all needed fonts are available on the operating system of the machine were by ARIS server is installed or in the related tenant.

- To make fonts available server wide, use the tools and procedures related to the operating system in use.

  If you add fonts to the operating system or delete fonts, you must restart ARIS server so that the changes take effect.

- To make fonts available tenant wide, you must add (page 29) the missing fonts to the system database of each tenant.

  Adding fonts to the system database has the advantages that font sets are update-prove and there is no need restarting ARIS server to make changes available.

1.11   Add fonts

Fonts define how text attribute values are displayed, such as names or descriptions in models, tables, output files, print outs and PDF outputs. These fonts are related to languages used in ARIS. The fonts used are taken from different sources, such as the operating system (OS), the JRE used and the system database of the tenant.

When ARIS server is installed on a Windows® operating system, all fonts saved in the **Fonts** folder of the operating system are available for report and model graphic generation. Linux operating systems usually provide a smaller set of fonts.

If you use additional fonts in report scripts or in models, you must add the missing fonts to the system database of this tenant. If a used font is missing, unreadable content appears in report output files or incorrect line breaks show up in model graphics. This can occur, for example, in Japanese, if the default attribute font **MS UI Gothic** is missing. In this case, add at least the **msgothic.ttc** font file.

> **Warning**
>
> If ARIS server is installed on a Linux operating system, usually no Windows® standard fonts are available. To prevent unreadable content or incorrect line breaks, make sure to add all used fonts from your Windows® operating system to the system database of the tenant.

Prerequisite

- You are script administrator for this tenant.
- You have access to the required font file (***.ttf** or ***.ttc**).

Procedure

1. In ARIS Architect, click **ARIS >** 🔧 **Administration**.
2. Click ⚙ **Navigation** in the bar panel if the **Navigation** bar is not activated yet.
3. In the navigation tree, click the folder 📊 **Evaluations >** F **Fonts**. All additional fonts available in the system database of this tenant are listed. If no fonts are displayed, only the fonts of the Windows® operating system are in use. These fonts are not displayed here.
4. Click F₊ **Add font**. The dialog for file selection opens.

5. Navigate to the required **ttf** or **ttc** file.

   If you want to add fonts, such as the **msgothic.ttc** font file from your **Windows/Fonts** folder, you must first copy them to a different folder. The **Windows/Fonts** folder cannot be used as source folder because the Windows® operating system does not allow direct access.

6. Select the font files and click **Open**.

The fonts are added to the system database of this tenant. They are available for reports and model graphic generation.

If you want to delete a font, move the mouse pointer to the required font, right-click, and click 🗑 **Delete**.

1.12   How to start ARIS Cloud Controller (ACC)

ACC is a command-line tool for administrating and configuring an ARIS installation. ACC communicates with the ARIS agents on all nodes. You can use it in multiple modes (see Technical Help ARIS Cloud Controller Command-Line Tool). You can open or download documents and the Technical Help from the Documentation Web site (https://documentation.softwareag.com/). Documentation is also contained in the ARIS installation package that is available in the ARIS Download Center (https://aris.softwareag.com/).

Warning

Using ACC commands will deeply affect your system. This requires profound knowledge of the technical ARIS infrastructure and environment. The required know-how can be acquired only by attending related training courses, available via Global Education Services (https://softwareag.com/training). If you use ACC commands without this knowledge or without the services of Software AG, according to the standard Software AG software maintenance agreement, we cannot guarantee proper functioning.

ARIS Cloud Controller (ACC) can be used in three modes:

INTERACTIVE MODE (DEFAULT)

ACC runs with an interactive shell, allowing you to manually issue commands.

BATCH MODE

Activated by specifying a command file with the **-f** command line parameter (see ACC command line parameters below). ACC will execute the commands in the file in the given sequence and exit after execution or if one of the commands fails.

A command file line starting with **#** will be interpreted as a comment line and ignored by ACC.

COMMAND MODE

You can directly pass a single command to ACC as a command line parameter. The command will be executed and ACC will exit afterwards.

When passing commands directly as a command line parameter, you must be careful when escaping strings in your command, for example, double-quote-delimited parameters. The operating system command shell will consume the double quotes, leaving your string parameter un-escaped. So please escape the quote characters and special characters.

Examples

If you issue the command in command mode, for example:

```
set remote.repository.url="http://something.com/repo"
```

You must enter:

```
acc.bat -h localhost -u <user name> -pwd <remoteAccessPassword> set
remote.repository.url=\"http://something.com/repo\"
```

If you enter:

```
acc.bat -h localhost -u <user name> -pwd <remoteAccessPassword> set
remote.repository.url="http://something.com/repo"
```

ACC will return an error message, for example:

```
line 1:52 mismatched character '<EOF>' expecting '\n'
Invalid or erroneous command "set
remote.repository.url=http://something.com/repo ": line 1:30 extraneous
input ':' expecting EOF
Use "help" to display a list of available commands.
```

This also affects passwords and names containing special characters. If you try to back up your tenants using the following command, make sure to escape the quote characters and the special character **&** used in the password **User&12345**.

If your username or password includes any special character, add a backslash (****) before the character for ACC to process the special character as a string. That is, if there is an ampersand (**&**), in your password, add a backslash before the ampersand.

```
./acc.bat -h localhost -u Clous -pwd g3h31m -p 18011 -c
../generated.apptypes.cfg backup tenant default username=\"admin\"
password=\"User\&12345\"
```

To get information about the usage of ACC commands, enter **help** or **help <command>**.

WINDOWS OPERATING SYSTEM

To start ACC under a Windows operating system click **Start > All Programs > ARIS > Administration > Start ARIS Cloud Controller**. If you have changed agent user credentials you must enter the user name and/or the password.

LINUX OPERATING SYSTEM

To start ACC under a Linux operating system, execute the **acc10.sh** shell script instead. To do so, enter: **su -c acc10.sh aris10**. After the ARIS server installation has completed on a Linux operating system, the **aris10** user is locked and has no password. Command-line tools (**sh** files), such as **ARIS server Administrator** or **ARIS Cloud Controller** can only be started by the **aris10** user related to the ARIS agent.

- To unlock the **aris10** user, enter: **passwd -u aris10**

- To interactively enter a password, enter: **passwd aris10**

- To start the command-line tools, enter: **su -c acc10.sh aris10** or **su -c arisadm.sh aris10**

- To execute these command-line tools as an ARIS user that has no **root** privileges, you must enter the password of the **aris10** user.

- To copy files manually into the **ARIS** directory, as the **aris10** user use the commands: **su aris10** and **sudo aris10**

  As an ARIS user that has no **root** privileges, you must make sure that the files have the correct ownership (**aris10**).

- To lock the **aris10** user again enter: **passwd -l aris10**

2 Legal information

2.1 Documentation scope

The information provided describes the settings and features as they were at the time of publishing. Since documentation and software are subject to different production cycles, the description of settings and features may differ from actual settings and features. Information about discrepancies is provided in the Release Notes that accompany the product. Please read the Release Notes and take the information into account when installing, setting up, and using the product.

If you want to install technical and/or business system functions without using the consulting services provided by Software AG, you require extensive knowledge of the system to be installed, its intended purpose, the target systems, and their various dependencies. Due to the number of platforms and interdependent hardware and software configurations, we can describe only specific installations. It is not possible to document all settings and dependencies.

When you combine various technologies, please observe the manufacturers' instructions, particularly announcements concerning releases on their Internet pages. We cannot guarantee proper functioning and installation of approved third-party systems and do not support them. Always follow the instructions provided in the installation manuals of the relevant manufacturers. If you experience difficulties, please contact the relevant manufacturer.

If you need help installing third-party systems, contact your local Software AG sales organization. Please note that this type of manufacturer-specific or customer-specific customization is not covered by the standard Software AG software maintenance agreement and can be performed only on special request and agreement.

2.2 Support

If you have any questions on specific installations that you cannot perform yourself, contact your local Software AG sales organization (https://www.softwareag.com/corporate/company/global/offices/default.html). To get detailed information and support, use our Web sites.

If you have a valid support contract, you can contact **Global Support ARIS** at: **+800 ARISHELP**. If this number is not supported by your telephone provider, please refer to our Global Support Contact Directory.

For issues regarding the product documentation, you can also send an e-mail to documentation@softwareag.com (mailto:documentation@softwareag.com).

ARIS COMMUNITY

Find information, expert articles, issue resolution, videos, and communication with other ARIS users. If you do not yet have an account, register at ARIS Community**.**

PRODUCT DOCUMENTATION

You can find product documentation also on our documentation Web site.

In addition, you can also access the cloud product documentation. Navigate to the desired product and then, depending on your solution, go to **Developer Center**, **User Center** or **Documentation**.

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You can find helpful product training material on our Learning Portal.

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You can collaborate with Software AG experts on our Tech Community Web site. From here you can, for example:

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- Ask questions and find answers in our discussion forums.

- Get the latest Software AG news and announcements.

- Explore our communities.

- Go to our public GitHub and Docker repositories and discover additional Software AG resources.

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- Download products, updates and fixes.
- Add product feature requests.
- Search the Knowledge Center for technical information and tips.
- Subscribe to early warnings and critical alerts.
- Open and update support incidents.

PRODUCT SUPPORT