



# Installation Guide

**ARIS Risk & Compliance Manager**  
Version 9.7 - Service Release 1

**January 2015**

This document applies to ARIS Risk & Compliance Manager from version 9.7. Specifications contained herein are subject to change and these changes will be reported in subsequent release notes or new editions.

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## 1 ARIS Risk & Compliance Manager

ARIS Risk & Compliance Manager is a Web application. ARIS Risk & Compliance Manager uses Java Servlets and Java Server Pages (JSP) which, in addition to a Java environment (JDK), require a Web, i.e., Servlet container (Apache Tomcat) as runtime environment. The data is stored in a relational database system and is exchanged with the application via a JDBC interface. You can use ARIS Risk & Compliance Manager with the **Apache Derby** database for testing purposes. You need the **Oracle** database system or **Microsoft® SQL Server** for full productive operation.

If an updated version of this document is available, you will find it here:

<http://aris.softwareag.com/ARISDownloadCenter/ADCDocumentationServer>

(<http://aris.softwareag.com/ARISDownloadCenter/ADCDocumentationServer>)



## 2 Text conventions

Menu items, file names, etc. are indicated in texts as follows:

- Menu items, keyboard shortcuts, dialogs, file names, entries, etc. are shown in **bold**.
- Content input that you specify is shown in **<bold and within angle brackets>**.
- Single-line example texts are separated at the end of a line by the character ↵, e.g., a long directory path that comprises multiple lines.
- File extracts are shown in the following font:

`This paragraph contains a file extract.`



### 3 Important information for system installation

If you want to install the system technically and/or functionally without service support from Software AG, you need extensive knowledge about the systems to be installed, the target subject matter, as well as the target systems and their interdependencies. Due to the multitude of platforms and the hardware and software configurations that influence each other, it is only possible to describe specific installations. It is impossible to document all settings and dependencies.



## 4 ARIS Risk & Compliance Manager installation using an Oracle or Microsoft® SQL Server database

Use an Oracle or Microsoft® SQL Server database for the productive operation of ARIS Risk & Compliance Manager. Use of the Derby database is permitted for testing purposes only. Please note that a new database should be set up for production purposes. Please do not use test data in your productive system.

### Required components

To operate the application, the following components must be installed:

- Oracle or Microsoft® SQL Server database
- ARIS Risk & Compliance Manager database schema
- Database driver for Oracle or Microsoft® SQL Server
- Java environment
- TomEE server
- ARIS Risk & Compliance Manager (including required applications, such as Administration or ARIS document storage)

In the following, installation with automatic setup will be described. If you want to use Oracle or Microsoft® SQL Server as a DBMS you need to install the database and database schema first.

### 4.1 Installation of the database

Install the Oracle database with the Oracle installation program or the Microsoft® SQL Server database with the corresponding installation programs. Follow the instructions in the installation program, as well as the documentation provided by the manufacturers. During this step of the procedure, note the SID or the database names of the new database instance and also the account, i.e., the user name and the password of the system user.

### 4.2 Installation of the database schema (Oracle)

The supplied ARIS Risk & Compliance Manager package includes several database scripts that assist you in preparing the database for ARIS Risk & Compliance Manager. To execute them, you need to have an Oracle client installed (sqlplus).

Batch file and available scripts:

- **rebuild.bat**  
Main script for starting the installation.
- **rebuild.sql**  
To enter data.
- **init\_user.sql**  
To create the new Oracle user schema for ARIS Risk & Compliance Manager.





### Procedure

1. Edit the **rebuild.bat** file and the **rebuild.sql** script.
2. In the **rebuild.bat** file, enter the values for the password and the SID (Page 4) instead of the expressions in angle brackets.
3. In front of **@rebuild.sql**, a space is required: **sqlplus system/<password>@<SID> @rebuild.sql**.
4. Insert the SID in the **rebuild.sql** file: **connect &username/&password@<SID>**.
5. Start the **rebuild.bat** file.
6. Enter the user name and a password. Please note this information because you will need it later in the installation.

The remaining scripts will then be executed in the correct sequence. The database does not contain a database schema with tables yet. These will be automatically created when you start the ARIS Risk & Compliance Manager server for the first time. Observe any error messages while the scripts are running. The **drop user <user name> cascade** command may result in an error message the first time it is executed because the user does not yet exist at this point. When the script is executed again, the user is first deleted and then created again. All other commands must run without errors.

## 4.3 Installation of the database schema (Microsoft® SQL Server)

The supplied ARIS Risk & Compliance Manager package includes several database scripts that assist you in preparing the database for ARIS Risk & Compliance Manager. Run the scripts on the host computer of the SQL server.

- **install.bat**  
Main script for initializing an ARIS Risk & Compliance Manager database user and entering the data **database name**, **user name**, and **password**.
- **recreate\_database.bat**  
Runs the **recreate\_database.sql** SQL script.
- **recreate\_database.sql**  
Generates the database instance for ARIS Risk & Compliance Manager.
- **recreate\_dbuser.bat**  
Runs the **drop\_dbuser.sql** and **create\_dbuser.sql** SQL scripts.
- **drop\_dbuser.sql**  
Deletes the ARIS Risk & Compliance Manager database user.
- **create\_dbuser.sql**  
The generation of users by ARIS Risk & Compliance Manager and the assignment of privileges.



### Warning

If a database with the same name already exists, it will be deleted.

### Procedure

1. Edit the file **install.bat**.
2. In the **install.bat** file replace the expression enclosed in angle brackets with the current password **sa** (system user) of the SQL server user.
3. Also replace the path information **<pathinfo>**.
4. Run **install.bat**.
5. Enter a database name, user name, and password. Please note this information because you will need it later in the installation.

The database schema is installed.



## 5 Install and configure the application

The **Apache Derby** database is supplied with ARIS Risk & Compliance Manager. It can be installed during the ARIS Risk & Compliance Manager installation if required. Use an Oracle or Microsoft SQL database for the productive operation of ARIS Risk & Compliance Manager. Note that a new database should be set up for production purposes. Please do not use test data in your productive system.

Use of the Derby database is permitted for testing purposes only. If you run ARIS Risk & Compliance Manager with the **Apache Derby** database, the term **Demo version** is displayed in the ARIS Risk & Compliance Manager user interface.

### 5.1 Installation

Make sure that the port number is not used by any other software. This is particularly important if you have installed the Oracle database on the same computer. Under certain circumstances, a Web server may already be installed at port **80**, which is the preset port for the Apache Web server installed as a load balancer. The installation sources are available as a ZIP file via download or on installation media.

These instructions assume a local installation. This means that ARIS Risk & Compliance Manager is installed on the server on which the setup is run. In addition to local installation, you can install ARIS Risk & Compliance Manager via remote installation on another server. To do so, please read chapter **3.4 ARIS remote installations (Windows operating system)** in the **Server Installation and Administration Guide**.

#### Procedure

1. If you have the installation sources as a ZIP file, first unpack the file for ARIS Risk & Compliance Manager to a new directory. To do so, enter the password for the ZIP file that you have received from Software AG. Ensure that the path data is applied when you unpack the file. In WinZip, for example, this is done by selecting the **Use folder names** option. You can also put the ARIS Risk & Compliance Manager installation media into the CD-ROM drive.
2. Open the **Setup** directory, and run the **setup.exe** file.
3. Click **Next**. The license agreements are displayed.
4. To accept the license agreements, click **Next**. The **Installation scenario** dialog is displayed.
5. Select the installation scenario **Perform installation on this active computer** and click **Next**.
6. Enter the directory in which you want to install ARIS Risk & Compliance Manager and click **Next**.
7. To use the suggested path, you do not need to make any changes.
8. In the next dialog, do not make any changes and click **Next**.
9. Select an existing license file used automatically by setup. Alternatively, you can do so after installation in Administration.



10. Click **Next**.
11. Activate the relevant modeling approach for ARIS Risk & Compliance Manager and click **Next**. You cannot change the modeling approach after installation is complete.
12. Specify the port number for the connection to the Web application server and click **Next**.
13. Enter the name of the mail server and the default e-mail address, if this information is already available. If the mail server request authentication enter an e-mail account plus password.
14. Click **Next**.
15. If required, activate event enabling (Page 22). Then specify event server and port.
16. Click **Next**. The **Select database system** dialog is displayed.
17. Select the relevant database. The **Standard database system** option installs an Apache Derby database. If you select Oracle or MS SQL Server you need to select a matching database driver, which will be installed by setup, as well.
18. Enter the name of the database server.
19. Enter the port number of the database server.
20. Enter the service name of the database (Page 4) box (Oracle SID) or the database name (MS SQL Server) of the database instance.
21. Enter the name and password of the database (Page 4) user.
22. Click **Next**. The **System settings** dialog is displayed.
23. Select the installation size in order to determine the memory allocated for ARIS Risk & Compliance Manager: **Small** = 1GB, **Medium** = 4GB, **Large** = 8GB.
24. Click **Next**.
25. Click **Install** to start the installation.

ARIS Risk & Compliance Manager is installed.

You can use the entries **Start ARIS Risk & Compliance Manager** and **Stop ARIS Risk & Compliance Manager** in the installed program group to start and stop the Tomcat server of ARIS Risk & Compliance Manager. To open ARIS Risk & Compliance Manager, enter the address **http://<server name>/arcm** in the browser.

## 5.2 Migrate from the test installation to a productive system

We recommend that you keep the server (Apache TomEE) of the test system and productive system separate. Depending on the load on the production and test system, it may also be necessary to separate the system hardware. Switching from a test installation to a productive system requires a new installation of ARIS Risk & Compliance Manager on the productive hardware.

It is also possible to redirect ARIS Risk & Compliance Manager to the productive database by adjusting the parameters for the database connection. To do this, you have to adjust the **dbms** parameter list of the **runtimeconfig.xml** file. The file is located under **<ARIS Risk &**



## Compliance Manager installation

**path>** \server\bin\work\work\_arcm\_m\base\tomcat\webapps\arcm\WEB-INF.

The following examples explain the configuration for an Oracle and Microsoft® SQL Server connection. Please insert the specific parameters of your DBMS system for your connection.

### Oracle

```
<parameter name="dbms.system" value="oracle"/>
<parameter name="dbms.driver" value="oracle.jdbc.driver.OracleDriver"/>
<parameter name="dbms.url" value="jdbc:oracle:thin:@dbserver:1521:ARCM"/>
<parameter name="dbms.user" value="arcm_db"/>
<parameter name="dbms.pwd" value="arcm_db"/>
```

### Microsoft® SQL Server

```
<parameter name="dbms.system" value="MSSQL"/>
<parameter name="dbms.driver" value="net.sourceforge.jtds.jdbc.Driver"/>
<parameter name="dbms.url"
value="jdbc:jtds:sqlserver://tlabarcm:1433;DatabaseName=arcm"/>
<parameter name="dbms.user" value="arcm_db"/>
<parameter name="dbms.pwd" value="arcm_db_password"/>
```

Once you have made these changes, the term **Demo version** is no longer displayed in the ARIS Risk & Compliance Manager user interface.

After you have created the database, you can install ARIS Risk & Compliance Manager. If you are using the installation program, all the required software components will be installed on the target server. For licensing reasons, the Oracle JDBC database drivers and the Microsoft® SQL Server database drivers are not included in the delivery scope.

## 5.3 Integrate ARIS Risk & Compliance Manager in an existing ARIS installation

Integrate ARIS Risk & Compliance Manager in the ARIS Design Server installation because from version 9.5, users can no longer be created in ARIS Risk & Compliance Manager. User management is now handled centrally in Administration. Administration for all ARIS products, which is not to be confused with the **Administration** tab in ARIS Risk & Compliance Manager, serves to manage users, user groups, function and license privileges, licenses, documents, and configurations. This enables single sign-on for various ARIS products.

### Warning

Do not install ARIS Risk & Compliance Manager on a server on which an ARIS Design Server or ARIS Connect server is already installed. The ARIS Risk & Compliance Manager installation would overwrite the infrastructure of the existing ARIS installation.



## Procedure

1. Install ARIS Design Server via setup on a server. Information on the installation is available in the **ARIS Server Installation and Administration Guide**.
2. Start and configure ARIS Design Server.
3. Install (Page 7) ARIS Risk & Compliance Manager on another server via setup.
4. Start the ARIS Cloud Controller of the ARIS Risk & Compliance Manager installation via **Start > ARIS > ARIS Cloud Controller**.
5. Enter the command **reconfigure arcm\_m +zookeeper.connect.string="<ARISDesignServer>\\:2181"** in the console. You must use the + sign in front of the parameter **zookeeper.connect.string**. With it only this parameter is replaced by the new value.
6. As the placeholder for **<ARISDesignServer>**, enter the name of the server that you used in step 1 for ARIS Design Server.
7. If you did not change the port keep the default settings.
8. Use the **list** command to check if all runnables have the status **STOPPED**.
9. Start ARIS Risk & Compliance Manager with the command **start arcm\_m**. The suffix **\_m** changes depending on the installation size (small, medium, large) you selected for the memory.

ARIS Risk & Compliance Manager is connected to the ARIS Design Server environment and can access both Administration and ARIS document storage.

To open ARIS Risk & Compliance Manager in a browser, enter the name of the ARIS Design Server followed by **/arcm**.

Since ARIS Risk & Compliance Manager no longer needs the other runnables on the server you can either delete (Page 10) them or configure them so that they will not run automatically upon starting the server.

## See also

ARIS Cloud Controller

([http://documentation.softwareag.com/aris/aris95e/ARIS\\_Server\\_Installation\\_and\\_Administration\\_Guide.pdf](http://documentation.softwareag.com/aris/aris95e/ARIS_Server_Installation_and_Administration_Guide.pdf))

### 5.3.1 Delete runnables that are no longer needed

Delete runnables that are no longer needed.

#### Warning

Deleting the runnables has the disadvantage that you will not be able to update this installation using a setup. In that case, you would need to update the ARIS Risk & Compliance Manager runnable manually by means of an update command.



### Procedure

1. Please ensure that the ARIS Risk & Compliance Manager runnable has started. To do so, open ARIS Cloud Controller of the ARIS Risk & Compliance Manager installation via **Start > ARIS > ARIS Cloud Controller**.
2. Use the **list** command to check whether the **arcm\_s** runnable is in status **STARTED** and that all others are in status **STOPPED**.
3. Enter the command **deconfigureall** and confirm with **Y**. This command deletes all runnables in the status STOPPED.

The runnables that are no longer needed have been deleted.

## 5.3.2 Prevent the start of runnables that are no longer needed

Prevent the start of the runnables that are no longer needed.

### Procedure

1. To do so, open ARIS Cloud Controller of the ARIS Risk & Compliance Manager installation (**Start > ARIS > ARIS Cloud Controller**).
2. Enter the command **set autostart.mode=autostart.flag**.
3. For the runnables that are no longer needed set **autostart property** to **false**:
  - a. **set zoo\_m property autostart="false**
  - b. **set postgres\_m property autostart="false**
  - c. **set couchdb\_m property autostart="false**
  - d. **set elastic\_m property autostart="false**
  - e. **set postgres\_m property autostart="false**
  - f. **set adsadmin\_m property autostart="false**
  - g. **set umcadmin\_m property autostart="false**
  - h. **set loadbalancer\_m property autostart="false**
  - i. **set postgres\_m property autostart="false**

The runnables that are no longer needed will no longer run automatically upon server restart. However, the command **startall** in ARIS Cloud Controller still starts all runnables.

## 5.4 Configuration parameters

Most parameters that can be used to influence the behavior of ARIS Risk & Compliance Manager are provided in the file **<ARIS Risk & Compliance Manager installation directory >%\server\bin\work\work\_arcm\_m\base\webapps\arcm\WEB-INF\runtimeconfig.xml** They have the following format:



```

<parameterList name="applicationlayer">
  <!--entries per page in a list-->
  <parameter name="application.view.entriesPerPage" value="20"/>
  <!-- edit only in consultation of Software AG -->
  <parameter name="application.batchserver.enable.remotecconnection"
value="false"/>
  <!-- edit only in consultation of Software AG -->
  <parameter name="application.batchserver.resend.trails" value="5"/>
</parameterList>

```

The most important parameters are described in detail below. All parameters not specified are used internally and should not be changed. Preset values are listed in brackets.

### Application.view.entriesPerPage

param-value	Description
20	Specifies how many list entries are to be output per page (20 in this example).

### serverURL

param-value	Description
http://<host>:<port>/<Context>	To ensure that the specified link to the application is correct in the notifications (internal or e-mail), you must adapt this entry to your requirements.

### whistleBlowEmail

param-value	Description
adminpleaseChangeEmail_at_your_server	Specifies the e-mail address to which whistle-blow e-mails are sent.

### application.password.protection

param-value	Description
weak -> MD5	The method used for encrypting passwords can be changed from MD5 (standard) to SHA-256.
strong -> SHA-256	

### Warning

We recommend that you select the parameter immediately after installation is complete. You cannot change it at a later point in time.





### Scheduler settings

In the following, the various scheduler settings are explained. Schedulers run time-controlled jobs. The two most important parameters are only listed once as they are identical for subsequent jobs for this type of configuration:

- generatorJobTestcases
- monitorJobTestcases
- generatorJobRiskAssessment
- monitorJobRiskAssessment
- generatorJobSOPProcess
- monitorJobSOPProcess
- generatorJobSurvey
- monitorJobQuestionnaire
- monitorJobSurvey
- monitorJobIssue
- generatorJobAudit
- monitorJobAudit
- generatorJobPolicy
- monitorJobPolicy
- updaterJobPolicy
- cleaningJob
- jobListCleaningJob

### startScheduler

Switch for the time control. Test cases are generated and checked using a kind of Cronjob. The Quartz scheduler is used.

param-value	Description
false	Disables time control.
true	Enables time control.

### executionTime

Here, you can enter the execution times for the Quartz scheduler (see **Scheduler settings**). They are specified as **Cron Expressions!**. More information on the Quartz scheduler (<http://www.quartz-scheduler.org/documentation/quartz-2.1.x/tutorials/tutorial-lesson-06>) is provided on the Website.



### clientexcludinglist

Here, you can enter clients that are to be excluded from a job. Separate the clients by comma.

### clientincludinglist

Here, you can enter clients that are to be included in a job. Separate the clients by comma. All other clients will be ignored by the jobs.

## 5.5 Configuration of the e-mail functionality

For ARIS Risk & Compliance Manager to automatically send e-mails (e.g. e-mail to a tester to whom a test case has been assigned), the mail functionality must be configured. To send mails, an external mail server with SMTP support is used, which is normally already set up and available. No SMTP mail server is included with ARIS Risk & Compliance Manager.

### Procedure

1. Open the **runtimeconfig.xml** file. This file is located under **<ARIS Risk & Compliance Manager installation directory>%\server\bin\work\work\_arcm\_m\base\webapps\arcm\WEB-INF**.
2. In the **mailing** section you have to adapt the parameters **smtp.host** (IP address or valid DNS name of the mail server), **smtp.account** (user name of the SMTP account, if SMTP authentication is enabled on the mail server), **smtp.password** (password of the SMTP account, if SMTP authentication is enabled on the mail server), and **default.sender.address** (fallback sender for the case that no valid e-mail address is defined when an automatic e-mail is sent).
3. Restart the Apache TomEE server for the changes of the mail configuration to take effect. The e-mail function is configured.

In ARIS Risk & Compliance Manager, e-mails and internal messages are sent in the language defined for the client if the corresponding object in the message is client-specific. For general messages, such as the request for a new password, the language set for the system is used.



## 5.6 Change system e-mail addresses

After installing ARIS Risk & Compliance Manager all e-mail addresses of the predefined users (such as the system user) are set to the invalid e-mail address

**adminpleaseChangeEmail\_at\_your\_server**. For productive operation you must replace them with valid addresses as follows.

### **runtimeconfig.xml**

- **parameter name="WhistleBlowEmail"**  
value="adminpleaseChangeEmail@example.com"/>
- **WhistleBlowAnonymousSender (<parameter name="WhistleBlowAnonymousSender"**  
value="adminpleaseChangeEmail@example.com"/>
- **<parameter name="default.sender.address"**  
value="changeEmail@example.com"/>

In ARIS Risk & Compliance Manager, you must change the e-mail addresses of the following users:

- System administrator (system)
- Internal system (internal system user)
- Job user (jobUser)



## 6 Installation of a customer-specific version (Customizing)

ARIS Risk & Compliance Manager can be extensively customized to fulfill customer requirements. These adjustments are made in XML and Java files and later combined in a ZIP file. This ZIP file must be imported with the ARIS Cloud Controller after installing ARIS Risk & Compliance Manager.

### Procedure

1. Install (Page 7) ARIS Risk & Compliance Manager.
2. Start the ARIS Cloud Controller after installing via **Start > ARIS > Administration**.
3. Stop ARIS Risk & Compliance Manager with **Start > ARIS > Stop ARIS Risk & Compliance Manager**.
4. Enter this command in the console **enhance arcm\_s with customizing local file <Path\\to\\Customizing\\Zip>**. The name of the ARIS Risk & Compliance Manager runnable depends on the type of installation. The names **arcm\_s**, **arcm\_m** or **arcm\_l** are possible. Please make sure that you always use two sets of quotes („“) to state the path to the ZIP file.
5. Start ARIS Risk & Compliance Manager with **Start > ARIS > Start > ARIS Risk & Compliance Manager**

ARIS Risk & Compliance Manager was extended with customer-specific adjustments.



## 7 Install a new version of ARIS Risk & Compliance Manager

From ARIS Risk & Compliance Manager version 9.5 new versions can be updated via update setup. It is no longer necessary to uninstall the existing installation first in order to install the new version. However, you should note a few of the settings from the existing installation so that you can reconfigure them after the update.

All of the settings configured in the setup during the initial installation are automatically transferred. The settings that were changed after the installation in the runtimeconfig.xml are not transferred. The download folder that contains all of the created PDF and Excel reports, as well as client and database backups is saved

The following parameters can be set in the setup and are automatically transferred during the update setup:

- Modeling approach (risk-based or control-based)
- Mail server configuration (ARIS Risk & Compliance Manager and Administration)
- Event processing (event server, port and EventTypeStore)
- Database configuration

All other subsequent changes that you may have made in the runtimeconfig.xml (e. g. job settings) must be transferred to the current runtimeconfig.xml after the update.

### 7.1 Database migration from ARIS Risk & Compliance Manager

You need to migrate your existing database for use in a newer ARIS Risk & Compliance Manager version. This also applies for migrating within a main release, for example, from version 4.0.0.2 to 4.0.0.6. Back up the database before carrying out the migration. We recommend carrying out the migration in an ARIS Risk & Compliance Manager test system so that productive operation is not affected. An independent ARIS Risk & Compliance Manager server should be used for this.

The database migration can only migrate databases from ARIS Risk & Compliance Manager version 3.1 SR4 to the new database schema. You cannot export the existing data pool of ARIS Risk & Compliance Manager 3.1 and import it without migration in version 9.5. The import would fail. If you want to migrate a version older than 3.1 SR4, please contact Global Support <\_aris> (Page 36).

#### Warning

The migration cannot be undone.



## Procedure

1. Back up the data in your productive database. If you use Oracle, please use **dataPump**.
2. Create a new database user and import the data backup for this user.
3. Configure ARIS Risk & Compliance Manager for the migration.
  - a. Set the **autoStartMigration** parameter in the **runtimeconfig.xml** file to **true**.
  - b. Set the **application.scheduler.startup** parameter in **runtimeconfig.xml** file to **false**.
  - c. Set the log level in the **log4j.properties** file for the **log4j.logger.com.idsscheer.webapps.arcm** and **log4j.logger.com.idsscheer.webapps.arcm.dl.framework** parameters to **DEBUG**.
4. Save the **runtimeconfig.xml** file and start the ARCM server. The migration starts automatically.
5. After the migration, log into ARIS Risk & Compliance Manager as the "system" user.
6. In **Administration**, carry out a database export and stop the ARCM server.
7. Create a new database user (Page 4), configure the database connection in the **runtimeconfig.xml** file and start the ARCM server.
8. Import the database you previously exported.
9. Stop the ARCM server, back up the database and then restart the ARCM server.
10. Compare the database from version 3.1 SR4 randomly with the migrated database.
  - a. Log in with different roles and check some of the lists and objects.
  - b. Log in as a tester and check some of the lists and objects.
  - c. Log in as the system user. Create a test manager group. Assign a user, log in with this user and check the test case list.
  - d. Check your company's use cases.
11. After the tests were carried out successfully, reimport the database backup into the tested database to remove the test data.
12. Configure the productive server.
  - a. Set the **autoStartMigration** parameter in the **runtimeconfig.xml** file to **false**.
  - b. Set the **application.scheduler.startup** parameter in the **runtimeconfig.xml** file to **true**.
  - c. Set the log level in the **log4j.properties** file for the **log4j.logger.com.idsscheer.webapps.arcm** and **log4j.logger.com.idsscheer.webapps.arcm.dl.framework** parameters to **ERROR**.
13. Start the productive server:

The database was migrated to ARIS Risk & Compliance Manager version 9.5.



## 7.2 Migrate data from ARIS document storage

Also migrate the ARIS document storage data when changing from version 4.x/4.1.x to version 9.5. In the 4.x versions, there were separate ARIS document storage installations for ARIS Business Server with a connection to ARIS Governance Engine and ARIS Risk & Compliance Manager. In version 9.x, there is only one common ARIS document storage which internally manages the data separately. To migrate the data, copy the couchDB data from ARIS Business Server 7.2 and ARIS Risk & Compliance Manager 4.x to a directory of the server on which ARIS Risk & Compliance Manager version 9.x is installed.

### Procedure

1. Start ARIS Cloud Controller (Start > ARIS > Administration > ARIS Cloud Controller).
2. Stop all components with the command **stopall**.
3. Start the components ZooKeeper, ElasticSearch, and Administration with the following commands:
  - a. **start zoo\_s**
  - b. **start elastic\_s**
  - c. **start umcadmin\_s**
4. Copy the **couchdb** folder located at **<ARIS Governance Engine installation directory>\ads\adsdata** to any directory.
5. Copy the **couchDB** folder located at **<ARCM installation directory>\couchdb\var\lib\couchdb** to any directory. This directory must not be the same as the one in step 1.
6. Open a command line and navigate to the directory **<ARIS Risk & Compliance Manager installation directory>%\server\bin\work\work\_adsadm\_m\tools\bin** and execute the following command for the migration of the CouchDB data from ARIS Governance Engine:
 

```
y-admintool.bat migrate -s <couchDB path from step 1> -t <ARCM installation directory>%\server\bin\work\work_couchdb_m\data
```
7. Execute the following command for the migration of the CouchDB data from ARIS Risk & Compliance Manager:
 

```
y-admintool.bat migrate -r arcm -s <couchDB path from step 2> -t <ARCM installation directory>%\server\bin\work\work_couchdb_m\data
```

The migration of data from ARIS document storage is complete. Start all ARIS Risk & Compliance Manager components. Check the migration by opening a linked document in ARIS Risk & Compliance Manager.

The documents from the CouchDB of ARIS Governance Engine are available. The documents from the CouchDB of ARIS Risk & Compliance Manager must be checked in ARIS Risk & Compliance Manager.



## 7.3 Import modeled users into Administration

After the import of a database export from ARIS Architect and subsequent import into ARIS Risk & Compliance Manager, all imported users are deactivated. You activate them by creating them manually in Administration and then synchronize them. The report **ARCM user export for Administration** does this automatically by exporting all modeled users of a database (**Person** object type). The following attributes of a user are exported:

- Login
- First name
- Last name
- E-mail address

The report also identifies the license privileges a user needs. The following rules apply:

- If a user is not assigned to any user group, the user is assigned the **Contribute** license privilege. Users without group assignment are authorized to perform tasks in issue management.
- If a user is assigned to a user group with the Incident owner or Policy addressee role, this user is assigned the **Contribute** license privilege.
- For all other role assignments, the user is assigned the **Operate** license privilege.

### 7.3.1 Export modeled users from ARIS Architect

Export the modeled users from ARIS Architect.

#### Procedure

1. Open ARIS Architect.
2. Open the database whose modeled users you want to export for the import into Administration.
3. Right-click the main group.
4. Click **Evaluate > Start report**.
5. Select the ARIS Risk & Compliance Manager category.
6. Select the report **ARCM user export for Administration**.
7. Select the output settings.
8. Click **Finish**.

A text file with the attributes Login, First and Last name, and E-mail address is exported.





### 7.3.2 Import modeled users into Administration

Import the modeled users into Administration.


#### Procedure

1. Insert the ARIS Risk & Compliance Manager installation media into the CD-ROM drive.
2. Copy the file **create\_user.bat** from the **Content** folder to the folder **<ARCM installation folder>\server\bin\work\work\_umcadmin\_s\tools\bin**.
3. Copy the text file you created using the **ARCM user export for Administration** report into the same folder.
4. In the file **create\_user.bat**, replace the entry **set INPUTFILE** with the name of the export file.
5. Save the change.
6. Run the file **create\_user.bat**. If so desired, you can assign a password for all imported users. If you do not want to assign a password, press the Enter key without specifying a password.

The modeled users are imported into Administration.

### 7.3.3 Update users in ARIS Risk & Compliance Manager

Update the users in ARIS Risk & Compliance Manager with the data from Administration.

1. Log in to ARIS Risk & Compliance Manager as system administrator.
2. Click  **Administration**.
3. Under **Actions**, click **Synchronize with administration**. User data in ARIS Risk & Compliance Manager is replaced by data from Administration. This updates function and license privileges, names, passwords, e-mail addresses, etc., and users are deactivated or deleted.

The dialog closes. **Monitoring > Jobs and imports/exports** is displayed. The job is output under **Waiting jobs and imports/exports**. When complete, the job is listed under **Completed jobs and imports/exports**. The imported users are activated in ARIS Risk & Compliance Manager.

## 7.4 Connection to a directory service (LDAP)

In contrast to previous versions, LDAP is no longer directly connected with ARIS Risk & Compliance Manager. The LDAP connection must be configured in Administration instead. Information on this is available in the **ARIS Server Installation and Administration Guide**, chapter **Set up ARIS for LDAP server operation**.



## 7.5 Password encryption in runtime configuration

User IDs, passwords, or other security-sensitive information always used to be plain text in the runtime configuration of ARIS Risk & Compliance Manager (**runtimeconfig.xml**). Now a new option is available that allows this information to be encrypted during server startup. For this, the **encrypted="false"** XML attribute must be inserted into the required parameter line. As a consequence, the contents of the **value** attribute is encrypted during server startup and the **encrypted** flag is set to **true**. For this to work, the XML attributes **encrypted** and **value** must be written in the same line.

### Example

Before: `<parameter name="dbms.pwd" encrypted="false" value="sox"/>`

After: `<parameter name="dbms.pwd" encrypted="true" value="72a5e995b3996dc0ca5882bf42dafd1e"/>`

To increase data safety it is recommended that you mark the configuration file as read-only after encryption.

## 7.6 The configuration of event enabling in ARIS Risk & Compliance Manager

With ARIS Risk & Compliance Manager you can subscribe to events from a JMS provider (Universal Messaging is the default) and use them as a basis for generating defined objects in ARIS Risk & Compliance Manager, such as test cases. You configure the control via events using two files in the ARIS Risk & Compliance Manager installation directory:

- `<ARCM installation directory>\WEB-INF\com.softwareag.eda.nerv.properties`
- `<ARCM installation directory>\WEB-INF\runtimeconfig.xml`

### `com.softwareag.eda.nerv.properties`

In this file, the connection to the associated JMS provider is specified. For this, the name of the server and broker and its port must be known.

### Example

```
com.softwareag.eda.nerv.default.jms.provider=nsp://localhost:9000
```

The connection to the locally available Event Type Store is entered under the **com.softwareag.eda.nerv.eventtypestore.location** property key in the form of a path ([event type store path]).

### Example

```
com.softwareag.eda.nerv.eventtypestore.location=C:/SoftwareAG/common/EventTypeStore
```

### `runtimeconfig.xml`

Each available JMS provider can be incorporated via a parameter list in the **runtimeconfig.xml** in ARIS Risk & Compliance Manager.



### Example

A typical parameter list for the event connection looks like this:

```
<section id="eventenabling">
  <parameterList name="provider_1">
    <parameter name="active" value="true"/>
    <parameter name="edaConfigUri"
      value="com.softwareag.eda.nerv.properties"/>
  </parameterList>
</section>
```

Meaning of the parameters:

- **active**  
Information as to whether the event service is available. If **false** is specified, the service will not start.
- **edaConfigUri**  
Path to **com.softwareag.eda.nerv.properties** of the JMS provider configuration. If only the file name is specified this file is searched for in the same directory as the **runtimeconfig.xml**. This is also the predefined default setting.

### Support event types

Specific predefined event types are provided in order to generate defined objects from the events in ARIS Risk & Compliance Manager. They need to be copied into the local Event Type Store and the Event Type Store of the event-generating system. The associated files for the Event Type Store are located in the main directory of the ARIS Risk & Compliance Manager installation media in the Event Type Store folder. The content of this folder is then copied into the main directory of the respective Event Type Store.

The sending of events with the event types provided in ARIS Risk & Compliance Manager is part of Complex Event Processing. Further information on this can be found in the Complex Event Processing documentation.



## 8 Install ARIS Architect components

To use these functions, you need to install the macros and reports on the relevant ARIS server.

### 8.1 Install macro ARCM attribute maintenance

You can use the macro **ARCM attribute maintenance** in ARIS Architect to maintain the relevant attributes for ARIS Risk & Compliance Manager.

#### Procedure

1. Start **ARIS Architect**.
2. Click **ARIS > Administration**. **Administration** opens.
3. Establish a connection to the server on which you want to provide the macro.
4. Open the folder **Evaluations > Macros** in the server's folder structure.
5. Create the **ARCM** category if it does not already exist. To do so, right-click **Macro**, and then on **New > Category**, enter the name and click **OK**.
6. Right-click the category **ARCM** and then **Import script**. The **Open** dialog is shown.
7. Insert the ARIS Risk & Compliance Manager installation media into the CD-ROM drive.
8. Navigate in the **Open** dialog to the data from the installation media. The components are located under **Content > ARISReports**.
9. Click the file **ARCM attribute maintenance\_90\_RBA.amx** for the risk-based modeling approach or **\*\_CBA\*** if you are using control-based modeling.
10. Click **Open**.

The macro is provided on the server.

The macro can be started for test management objects (risks, controls, test definitions), survey management objects (questionnaire templates, sections, questions, option sets, answer options), audit management objects (project), or policy management objects (policy). After starting, a dialog opens that you can use to maintain the attributes required by ARIS Risk & Compliance Manager.

If you call the attribute maintenance macro on a risk, control, or test definition the current object attributes are displayed in the dialog. If you start the macro for a risk that was assigned controls and test definitions, the controls and test definitions are also provided in the dialog's tree view. As soon as you click the name of one of these objects in the tree view, you can maintain its attributes.



## 8.2 Install macro ARCM question creation helper

To create questions (**Survey management**), the macro **ARCM question creation helper** is available. This macro copies the suggested name of the question to the description attribute, too.

### Procedure

1. Start **ARIS Architect**.
2. Click **ARIS > Administration**. **Administration** opens.
3. Establish a connection to the server on which you want to provide the macro.
4. Open the folder **Evaluations > Macros** in the server's folder structure.
5. Create the **ARCM** category if it does not already exist. To do so, right-click **Macro**, and then on **New > Category**, enter the name and click **OK**.
6. Right-click the **ARCM** macro category and then on **Import**. The **Open** dialog opens.
7. Insert the ARIS Risk & Compliance Manager installation media into the CD-ROM drive.
8. Navigate in the **Open** dialog to the data from the installation media. The components are located under **Content > ARISReports**.
9. Click the file **ARCM question creation helper\_RBA.amx** for the risk-based modeling approach or **\*\_CBA\*** if you are using control-based modeling.
10. Click **Open**.

The macro is now available on the server.

## 8.3 Install macro ARCM import

Use the **ARCM import** macro to import risks generated in ARIS Risk & Compliance Manager into ARIS Architect.

### Procedure

1. Start **ARIS Architect**.
2. Click **ARIS > Administration**. **Administration** opens.
3. Establish a connection to the server on which you want to provide the macro.
4. Open the folder **Evaluations > Macros** in the server's folder structure.
5. Create the **ARCM** category if it does not already exist. To do so, right-click **Macro**, and then on **New > Category**, enter the name and click **OK**.
6. Right-click the **ARCM** macro category and then on **Import**. The **Open** dialog opens.
7. Insert the ARIS Risk & Compliance Manager installation media into the CD-ROM drive.
8. Navigate in the **Open** dialog to the data from the installation media. The components are located under **Content > ARISReports**.
9. Click the file **ARCM import\_RBA.amx** for the risk-based modeling approach or **\*\_CBA\*** if you are using control-based modeling.
10. Click **Open**.



The macro is now available on the server.

## 8.4 Install ARCM report export

With the report **ARCM Export** you can export data from ARIS Architect into an XML file that you can then import into ARIS Risk & Compliance Manager.

### Provide JavaScript files for the export

Import the JavaScript files required for the export.

#### Procedure

1. Start **ARIS Architect**.
2. Click **ARIS > Administration**. **Administration** opens.
3. Open the **Evaluations** folder and right-click **Common files**.
4. Select **Import files**. The **Open** dialog is shown.
5. Insert the ARIS Risk & Compliance Manager installation media into the CD-ROM drive.
6. Navigate in the **Open** dialog to the data from the installation media. The components are located under **Content > ARISReports**.
7. Open the folder **ARIS-Reports > SemanticsReports**.
8. Hold down the **Shift key** and select the following files.
  - **ARCM-Semantics\_BaseDataFunctions.js**
  - **ARCM-Semantics\_BaseReportAndOutputFunctions.js**
  - **ARCM-Semantics\_Properties.js**
  - **ARCM-Export\_ObjectClassification.js**
  - **ARCM-Util.js**
9. Click **Open**.

The JavaScript files are imported.

You can start the report for groups, organizational charts, technical terms models, risks, and questionnaire templates. You can export to an XML file all objects and models for which the **Export relevant** attribute of the **ARIS Risk & Compliance Manager attributes** attribute type group is enabled. You can import this XML file into ARIS Risk & Compliance Manager.



## Install report

Install the required report.

### Procedure

1. Start **ARIS Architect**.
2. Click **ARIS > Administration**. **Administration** opens.
3. Establish a connection to the server on which you want to provide the report.
4. Open the folder **Evaluations > Reports** in the server's folder structure.
5. Create the **ARCM** category if it does not already exist. To do so, right-click **Reports**, and then on **New > Category**, enter the name and click **OK**.
6. Right-click the category **ARCM** and then **Import script**. The **Open** dialog is shown.
7. Insert the ARIS Risk & Compliance Manager installation media into the CD-ROM drive.
8. Navigate in the **Open** dialog to the data from the installation media. The components are located under **Content > ARISReports**.
9. Click the file **ARCM export\_RBA.amx** for the risk-based modeling approach or **\*\_CBA\*** if you are using control-based modeling.
10. Click **Open**.

The report is installed.

## 8.5 Install ARCM user export for Administration report

Use the report **ARCM user export for Administration** to export modeled users from an ARIS Architect database and import them into Administration (Page 20).

### Procedure

1. Start **ARIS Architect**.
2. Click **ARIS > Administration**. **Administration** opens.
3. Establish a connection to the server on which you want to provide the report.
4. Open the folder **Evaluations > Reports** in the server's folder structure.
5. Create the **ARCM** category if it does not already exist. To do so, right-click **Reports**, and then on **New > Category**, enter the name and click **OK**.
6. Right-click the category **ARCM** and then **Import script**. The **Open** dialog is shown.
7. Insert the ARIS Risk & Compliance Manager installation media into the CD-ROM drive.
8. Navigate in the **Open** dialog to the data from the installation media. The components are located under **Content > ARISReports**.
9. Click the file **ARCM user export for Administration\_RBA.amx** for the risk-based modeling approach or **\*\_CBA\*** if you are using control-based modeling.
10. Click **Open**.

The report is installed.



## 9 Connection to ARIS Publisher

The master data (users, risks, controls, etc.) should be modeled in ARIS Architect according to the recommended procedure. After modeling, this data can be exported from ARIS Risk & Compliance Manager with the export report and imported to ARIS Risk & Compliance Manager. In addition, you can publish the ARIS Architect database with ARIS Publisher. After importing the master data into ARIS Risk & Compliance Manager, the connection to ARIS Publisher can be configured via the clients. This way, you can, for example, create a link from a risk form in ARIS Risk & Compliance Manager to an object in the published model in order to display the process in ARIS Publisher.

### Requirement

ARIS Risk & Compliance Manager and ARIS Publisher use the same Administration to manage users. Administration for all ARIS products, which is not to be confused with the **Administration** tab in ARIS Risk & Compliance Manager, serves to manage users, user groups, function and license privileges, licenses, documents, and configurations. This enables single sign-on for various ARIS products.

### Procedure

#### Administration

1. Open Administration.
2. Create a user group and a user in Administration.
3. Assign the user group to the user.
4. Assign the function privilege **Publisher administrator** to the user group.

#### ARIS Architect


1. Start **ARIS Architect**.
2. Click **ARIS > Administration**. **Administration** opens.
3. Log in to the database you want to export.
4. Click **Users** in the navigation. Users and user groups are displayed.
5. Right-click the previously created user group.
6. Click **Properties**.
7. Click **Function privileges**.
8. Enable the check box for the **Database export** privilege. (The product-specific privileges are not centrally assigned in Administration but in the respective ARIS product.)
9. Click **Access privileges**.
10. Assign the user group at least the access privilege **Read** for the main group.
11. Click **Pass on privileges** to apply the privileges to all subgroups.
12. Click **OK**.





13. Publish the relevant database.
14. After the export, change the status to **Activated**.


### ARIS Publisher

1. Open ARIS Architect.
2. Log in using the **root** user and the password **root**.
3. Open the **Groups** module. The user group you created is displayed.
4. In the row of the group, click **Assign**. The dialog opens.
5. Assign the group previously created in Administration to ARIS Publisher.
6. Click  **Save**.

### ARIS Risk & Compliance Manager

1. Open ARIS Risk & Compliance Manager.
2. Open the client you imported the master data into.
3. Enter the ARIS Publisher link in the **Object link** row in the following form:
4. `http://<BusinessPublisherServer>:19990/businesspublisher/link.do?login=<user name>&password=<password>&localeid=1033&ph=<exportID>&objectguid={GUID}`
5. Replace the placeholders in the following manner:
  - a. **<BusinessPublisherServer>** = Name or IP address of the ARIS Publisher server.
  - b. **<User name>** = Name of the user that was previously created.
  - c. **<Password>** = Password of the user that was previously created.
  - d. **<exportID>**
    1. Open a model in ARIS Publisher.
    2. Right-click an object.
    3. Click **Copy link**.
    4. Copy the parameter **ph** with its value in the link displayed and replace **<exportID>** with it.

The **{GUID}** placeholder must not be replaced. It is replaced dynamically by ARIS Risk & Compliance Manager.

6. Enter the link you created previously in the **Model link** box.
7. Replace the **objectguid** parameter with **modelguid**:
8. `http://<BusinessPublisherServer>:19990/businesspublisher/link.do?login=<user name>&password=<password>&localeid=1033&ph=<exportID>&modelguid={GUID}`
9. Click  **Save**.
10. Perform a test.
11. Log into ARIS Risk & Compliance Manager with the **Test manager** role.
12. Open a risk that was generated by the master data import.



13. Click in the **Function** box on **Object link** and **Model link**.

ARIS Publisher opens in a new window. The corresponding object or model opens if the connection was configured correctly.



## 10 Common errors

Many problems can only be identified and eliminated by analyzing the corresponding error messages. To do so, use the log files located in the directory **<ARIS Risk & Compliance Manager installation folder>%\server\bin\work\work\_arcm\_m\base\logs**.

### 10.1 Database problems

#### Symptom 1

When starting Tomcat, the error message **java.lang.ClassNotFoundException: oracle.jdbc.driver.OracleDriver** is displayed in the DOS box.

##### Cause

No JDBC driver is available.

##### Workaround

Copy the JDBC driver to **%CATALINA\_HOME%\webapps\arcm\WEB-INF\lib**.

#### Symptom 2

When starting Tomcat, the error message **java.sql.SQLException: E/A-Exception: The Network Adapter could not establish the connection** is displayed in the DOS box.

##### Cause

The database was not started or the Address, Port and/or SID connection parameters are not set correctly.

##### Workaround

Start the database or correct the connection parameters.

#### Symptom 3

When starting Tomcat, the error message **java.sql.SQLException: ORA-01017: invalid username/password; logon denied** is displayed in the DOS box.

##### Cause

The user account for the database connection has not been configured correctly.

##### Workaround

Correct the user data.



## 11 System requirements

### 11.1 Oracle system and settings

The following configuration is a minimal configuration. It should be adjusted to the requirements of your ARIS Risk & Compliance Manager system. The configuration of the Oracle system depends on the number of users logged into ARCM at one time.

When installing the ARCM server the configuration of the Oracle system and that of the ARIS Risk & Compliance Manager connection pool must match. In addition, a firewall may not be installed between the ARCM server and the Oracle DBMS. If this is unavoidable, enable the **dead connection detecten** of the Oracle DBMS system.

#### System

- Oracle 12c Enterprise Edition (12.1.0.1.0)

#### General

- Create the ARCM instance as a shared server instance
- `shared_servers` = Processes/10 (minimum 20)
- `open_cursors`: 500
- `session_cached_cursors`: 100
- `sessions`: (1.1 \* Processes) + 5
- `processes`: number of users logged in at once (minimum 1000)
- `checkpoint_interval`: 40000
- `checkpoint_timeout`: 0

#### SGA

- SGA MAX SIZE: Generally 2/3 of the available physical memory

#### Tablespace settings

- SYSTEM: 500 MB (autoextend on)
- TEMP: 300 MB (autoextend on)
- USERS: 3 GB (autoextend on)
- ARCMDATA: 3 GB (autoextend on)
- ARCMINDEX: 8 GB (autoextend on)
- Next-extent: 100 MB

#### Redo log files

At least 20 MB for each Redo log file. A Redo log file should be able to contain change data collected during half an hour.



### JDBC driver

A JDBC-internal cursor cache can be enabled in the configuration file **runtimeconfig.xml** of ARIS Risk & Compliance Manager. The parameter for this is **dbms.statement.cache.size**. We recommend you set this parameter to 0 and disable this cache. Instead use the **session\_cached\_cursors** database system setting of the Oracle instance.

### Application server (recommended configuration)

- Processor: CPU with 8 cores
- Server:
  - Microsoft® Windows Server 2008 R2 Enterprise
  - Microsoft® Windows 2012
- Main memory: 8 GB RAM or more
- Controller: SAS (RAID0)
- Hard disks: in RAID array (example: RAID0, 2x146 GB (SAS 15000 RPM))
- Software:
  - JDK 1.7.0 (64-bit)

### Database server

- Processor: Intel Xeon X56xx, 2.4 GHz
- Server:
  - Microsoft® Windows Server 2008 R2 Enterprise
  - Microsoft® Windows Server 2008 R2 Enterprise (64-bit)
  - Microsoft® Windows Server 2012 (64-bit)
- Main memory: 24 GB RAM or more
- Controller: Dual Channel Ultra320 SCSI (RAID5)
- Hard disks: in RAID array (example: RAID5, 4x146 GB (SAS 15000 RPM))

### Client computer

- Screen resolution: At least 1024 x 768 pixel. 1600x800 pixel is recommended.
- Software: Microsoft® Internet Explorer versions 10.0 and 11.0, Mozilla Firefox version 23.x or higher, Google Chrome.

Although newer versions have not been approved by Software AG, they can probably be used.



## 11.2 Microsoft® SQL Server system and settings

### System

- Microsoft® SQL Server 2008 R2 Enterprise Edition
- Microsoft® SQL Server 2012

### Database server

- Processor: Intel Xeon X56xx, 2.4 GHz
- Server:
  - Microsoft® Windows Server 2008 R2 Enterprise
  - Microsoft® Windows 2003 Server Enterprise Edition with PAE option (5.2.3790)
- Main memory: 24 GB RAM or more
- Controller: Dual Channel Ultra320 SCSI (RAID5)
- Hard disks: in RAID array (example: RAID5, 4x146 GB (SAS 15000 RPM))

## 11.3 Acrobat Reader

The Adobe Reader must be installed in order to display PDF reports.

## 11.4 Microsoft Office/Excel

A Microsoft® Excel version 2003 or higher must be installed for displaying Excel reports.



## 12 Glossary

Click a letter to display associated entries.

### **Global Unique Identifier (GUID)**

Unique, cross-database identifier for ARIS elements.

### **Java Database Connectivity (JDBC)**

Interface facilitating communication between a Java application and a database.

### **Multi-purpose Internet Mail Extension mapping (MIME mapping)**

Links a file name extension with the data file type, e.g. text, audio, image.

### **Oracle service ID (SID)**

Unique identifier required by Oracle to identify the database instance.

### **Simple Mail Transfer Protocol (SMTP)**

Transfer protocol specifically designed for exchanging mails. It specifies, for example, how two mail systems interact and what control messages are used for this purpose.



## 13 Software AG support

### On the Web

With a valid support contract you can access the solution database.

Click <https://empower.softwareag.com/> (<https://empower.softwareag.com/>).

For questions about special installations that you cannot carry out yourself, please contact your local Software AG sales organization.

### By phone

With a valid support contract you can reach Global Support ARIS at:

**+800 ARISHelp**

The "+" stands for the respective prefix for making an international connection in this land.

An example of the number to be dialed within Germany using a land line: 00 800 2747 4357





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