

ARIS PROCESS PERFORMANCE MANAGER DATABASE SYSTEM MYSQL

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This document applies to ARIS Process Performance Manager Version 10.5.3 and to all subsequent releases.

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 Text conventions

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

- Menu items, key combinations, dialogs, file names, entries, etc. are displayed in **bold**.
- User-defined entries are shown as **<bold text in angle brackets>**.
- Example texts that are too long to fit on a single line, such as a long directory path, are wrapped to the next line by using ↵ at the end of the line.
- File extracts are shown in this font format:
This paragraph contains a file extract.
- Warnings have a colored background:

Warning

This paragraph contains a warning.

2 General

This guide describes the database-related context pertaining to ARIS PPM server and the MySQL database system used. You should have basic knowledge of database technology and ARIS Process Performance Manager.

ARIS PPM uses an SQL RDBMS as a repository where all configurations and data are stored. ARIS PPM has been developed in Java as a client-server application.

This user guide help you to identify and optimize performance-critical scenarios. It does not provide installation or customizing instructions for any of the database systems supported by ARIS Process Performance Manager.

3 PPM database schema

ARIS PPM uses the database for the persistent storage of all configurations, administrative settings, and imported data. It is the counterpart of the volatile, main-memory based analysis server that contains the analysis structures. In case of data loss in the analysis server, you can completely restore the analysis server from the database. Therefore, for an ARIS PPM system backup it is sufficient to back up only the ARIS PPM database schema or user.

3.1 Measure and dimension names

The internal names of measures and dimensions are also used for internal allocation of configuration elements in the database. Therefore, these names are subject to the restrictions posed by the underlying database system.

The measure and dimension names displayed on the ARIS PPM user interface are specified in the measure configuration (<**description**> XML elements) and depend on the interface language.

Please take the following information into account when assigning internal measure and dimension names:

- Names must begin with a letter.
- Please use capital letters only.
- The only special character allowed is the underscore (no umlauts).
- Assign brief names and avoid long names. The maximum name length allowed depends on the database. We recommend a maximum name length of 25 characters.

Example

The following table shows a few measure and dimension names:

Type	Name	Description
Measure	PNUM	Number of processes
Dimension	D_MATERIAL	Material, two-level
Dimension	TIME	Time dimension

3.2 Database tables

ARIS PPM differentiates between database tables with a fixed name and tables whose names are specified by the measure configuration. The following two tables provide a few examples.

CONFIGURATION-BASED TABLE NAMES

Table name	Description
ATTR_INFO	Imported attributes
DBVERSIONNUMBER	Version number of the database schema
XML_CONFIGS	Imported configurations (runinitdb or runppmconfig)
EPK_IMPORT_TBL	Imported fragments
EPK_TBL	Consolidated process instances

CONFIGURATION-BASED TABLE NAMES

Table name	Description
PC_UMG_DASHBOARD	Imported data of the process instance-independent measure series of Performance Dashboard

Database table names for ARIS PPM need to be stored in lower case and will be case insensitive using the following setting for the MySQL instance.

lower_case_table_names = 1

3.3 ARIS PPM and database interaction

This chapter describes the types of database access that the ARIS PPM software performs when importing and analyzing data. To grasp the content of this chapter, you should be familiar with the basic functions and operation of ARIS PPM.

3.3.1 ARIS PPM server access to the database

To access the database, the ARIS PPM server uses the standardized JDBC (Java DataBase Connectivity) database interface. Therefore, the database type used is almost completely transparent for the ARIS PPM server. However, database manufacturer-specific differences can lead to the ARIS PPM server generating different database queries for the same task.

3.3.1.1 Connection to the database

Each database supported by ARS PPM can be accessed using JDBC. The JDBC driver consists of one or multiple Java archives. The relevant Java archive files (jar) must be copied manually to **<installation directory>\ppm\server\bin\work\data_ppm\drivers**.

DIFFERENT DATABASES IN ONE PPM INSTALLATION

In an ARIS PPM installation, you can address database systems of different manufacturers for different clients. The relevant Java archive files (jar) must be copied manually to **<installation directory>\ppm\server\bin\work\data_ppm\drivers**.

Only one JDBC driver can be specified for a particular database type. It is impossible to address different versions of a database type, for example, MySQL 8 and MySQL 5 with different JDBC driver versions.

3.3.1.2 Database user

For each ARIS PPM client, you need a single schema of a dedicated database user. The database user requires unrestricted access to the objects of their schema. Furthermore, the database user and schema name must be identical.

In the database-specific **<RDBMS>_USE_CASE_SENSITIVE_USERNAME** key of the client-specific **Database_settings.properties** configuration file, you can specify if the database system is to consider case-sensitive spelling of user names (value **true**) or not (value **false**). The default value for MySQL is **false**.

Warning

The value configured in **Database_settings.properties** must not be changed by the customer. We recommend using usernames in upper case letters only.

3.3.2 Database objects

Regardless of the database system used, the ARIS PPM server needs the following database objects:

- Tables and constraints
- Sequences (if supported by DB system, otherwise the ARIS PPM server simulates a similar functionality)
- Indices
- Foreign keys

The database/schema used for ARIS PPM must be set to the collation **UTF8MB4_BIN**. Other values are not supported. The collation needs to be specified while creating the database/schema. The collation cannot be changed afterwards.

3.4 Tablespaces

All database systems supported by ARIS PPM use particular areas on a data carrier for permanent data storage. These areas are called **tablespaces** for MySQL. Tablespaces for MySQL are only supported for MySQL 8 and later.

The ARIS PPM system uses different classes of data:

- Imported fragment instances and process instances (binary data objects)
- Administration and structure information
- Database indices

The first step in optimizing the performance of your ARIS PPM installation is assigning individual tablespaces to the various data classes.

3.4.1 Tablespace types

In the client-specific **Database_settings.properties** configuration file, you specify which tablespaces are to save which ARIS PPM data.

The **Database_settings.properties** configuration file is stored in the following client-specific directory.

<ARIS PPM installation>\server\bin\work\data_ppm\config\<client>\

ARIS PPM differentiates between the following types of tablespaces:

Tablespace name	Description
STDBLOB	All database tables with binary data are saved in this tablespace, for example, the table of calculated process instances.
STDTABLE	Standard tablespace. In this tablespace, all data is saved that uses default data types of the database system.
STDINDEX	This tablespace is not needed for MySQL, as MySQL does not support storing indices in a separate tablespace. This parameter does not need to be set.

Tablespace memory requirements strongly depend on the configuration and imported data of the ARIS PPM client.

If you do not change the default configuration after creating a client, all data of the ARS PPM client is saved in the system tablespace of the MySQL installation.

3.4.2 Tablespace configuration

The assignment of database tables to tablespaces is specifically indicated in the **Database_settings.properties** client configuration file. General syntax:

<Database type>_TBLCONF_<Tablespace name> = Value

- Database type specifies one of the database types supported. Valid values: **MYSQL_8**
- Tablespace name specifies the name of the tablespace in the MySQL instance. It must be created beforehand and is not bound to the user or schema used for ARIS PPM.

Example:

On a Linux-based operating system, two tablespaces with the names PPMDATA and PPMBLOB were created in the folder */opt/mysql/data/PPM_DATA.ibd* and */opt/mysql/data/PPM_BLOB.ibd*.

The entry in the **Database_settings.properties** looks like this:

```
MYSQL_8_TBLCONF_STDTABLE=TABLESPACE PPMDATA
MYSQL_8_TBLCONF_STDINDEX=
MYSQL_8_TBLCONF_STDBLOB=TABLESPACE PPMBLOB
```

4 MySQL Database support

4.1 MySQL 8 CE

ARIS PPM only supports the version **MySQL 8 Community Edition**.

To access the MySQL database, ARIS PPM uses the JDBC Interface (type 4). Enter the access parameters for the MySQL database in the **URL** key of the client-specific **Database_settings.properties** configuration file.

```
jdbc:mysql://<host>:<port>/<database name>
```

Example

```
URL= jdbc:mysql//mysqlserver:3366/ARISPPM
```

You must manually enter this type of URL in the **Database settings** dialog in ARIS PPM Customizing Toolkit.

4.1.1 JDBC driver

JDBC drivers for older MySQL 5 and newer MySQL 8 versions are not compatible. Please refer to the notes provided by the manufacturer.

The JDBC driver for MySQL is not part of the installation directory of the MySQL server. It needs to be downloaded separately from the manufacturers download area.

Copy the driver to <installation directory>\ppm\server\bin\work\data_ppm\drivers.

When starting, the PPM server outputs the interface type used as well as the exact database version and JDBC driver version to a log file or in the command line.

4.1.2 Create a tablespace

You can easily create a tablespace (if needed) using the **mysql commandline tool** or the SQL editor in the **MySQL Workbench 8 CE**. Other tools might also be used, but were not tested.

The following script creates a tablespace named PPMDATA and also specifies the file name for the tablespace to be used.

```
-- TABLESPACE SQL
create tablespace PPMDATA add datafile '<store location>/PPM_DATA.ibd'
Engine=InnoDB;
```

The store location can be freely selected – you just must make sure, that the MySQL instance user has access rights there.

4.1.3 Create a database user and schema

You can easily create a database user and a schema for ARIS PPM using suitable administration components, such as **mysql commandline tool** or **MySQL Workbench 8 CE**.

Note that usernames are case insensitive in MySQL 8. We recommend using upper case usernames only.

Grant the database user the following schema privileges:

ALTER, CREATE, DROP, DELETE, INDEX, INSERT, LOCK TABLES, REFERENCES, SELECT, UPDATE

Alternatively, you can create the user with an SQL script. The following script is an example to create database schema and user for ARIS PPM:

```
-- SCHEMA and USER SQL
create database ARISPPM collate UTF8MB4_BIN;
create user ARISPPM identified by 'my-nēw-password!';

-- set Privileges
grant ALTER,CREATE,DROP,DELETE,INDEX,INSERT,LOCK TABLES,REFERENCES,SELECT,UPDATE
on ARISPPM.* TO ARISPPM;
```

5 Performance tuning

This chapter provides performance-relevant information pertaining to ARIS PPM server software and the database system.

5.1.1 Hardware-related

The hardware you use directly influences the overall performance of the ARIS PPM server system.

- ARIS PPM server and database system should be installed on the same computer or connected via a network with sufficient capacity.
- If possible, select a RAID 5 or RAID 10 array-based file system for tablespace file storage.
- You can further increase performance by distributing the tablespace of the ARIS PPM tablespace types to physically independent file systems.
- Hard drive space is limited and activating the binary logging (it is enabled by default) may cause some issues with full hard drives and MySQL instances being blocked by that issue. We recommend disabling binary logging (also see next chapter for details).

5.1.2 Configuration-related

- Register user-defined dimensions and measures at a particular process type or process type group so that these dimensions and measures will be calculated for process instances of this process type/process type group only.

Warning

The standard measures (number of processes and number of functions, time, function) and all data access dimensions must be registered at the process tree root because they are required for internal calculations.

- If possible, use process measures and process dimensions. Function measure queries and function dimension queries require more calculation capacity due to the significantly larger data volume. Normally, function measures are required only if a function exists multiple times in a process instance and if you want to analyze the functions individually.
- Disable binary logging by setting the configuration parameter **disable_log_bin** before starting the database instance for the first time. It will be set automatically as a startup parameter. Binary logging needs some CPU time and creates many files in the data directory of the MySQL instance and may influence the overall instance performance.

5.2 Import performance

When importing fragments and calculating process instances, large volumes of data are written into the database system's tablespaces. Therefore, the performance of the file system on which the tablespace files are saved determines the performance of the data import.

6 Legal information

6.1 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.

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