UPDATE GUIDE

Version 1.11

Corresponding Software Version

Celonis 4.7

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REVISION HISTORY

VERSION NUMBER	VERSION DATE	SUMMARY OF REVISIONS MADE
1.1	FEB 16, 2017	Application Version 4.2
1.6	FEB 23, 2018	Updated version for application version 4.3
1.7	MAI 05, 2018	Updated version for application version 4.4
1.9	MAR 03, 2019	Updated version for application version 4.5
1.10	DEC 03, 2019	Updated version for application version 4.6
1.11	JAN 23, 2020	Updated version for application version 4.7

INTRODUCTION

ABOUT THIS GUIDE

Celonis is a powerful software for retrieving, visualizing and analyzing real as-is business processes from transactional data. It provides users with the possibility to create and share comprehensive process analyses giving them full transparency about the business processes at hand.

This guide provides a step-by-step instruction on how to update Celonis or apply a patch downloaded from my.celonis.de. An overview of the changes and new features can be found in the release notes.

TARGET AUDIENCE

This guide covers all relevant technical information about correctly updating Celonis environments and is meant to be consulted by the following target audiences:

- System Administrators
- Support Personnel
- Technical Staff

LIST OF ABBREVIATIONS

ABBREVIATION	EXPLANATION
ADFS	Active Directory Federation Service
ID	Identifier
OS	Operating System
SAML	Security Assertion Markup Language
SSO	Single Sign-On
URL	Uniform Resource Locator
ZIP	Zipper (Archive File Format)

SOFTWARE CHANGE MANAGEMENT

New releases and support packages are announced on my.celonis.de and can be retrieved from there. Regardless of the type of patch, you will be provided with a full installer file. The procedure for updating an installation is described in the next chapter: SOFTWARE UPDATE PROCEDURE. For detailed installation instructions, please refer to the Celonis Installation Guide to find the latest application prerequisites. For detailed operating instructions, please refer to the Celonis Operation Guide to understand the Celonis application in depth.

Please note:

- A Celonis Patch is a resolution or fix for one specific issue
- A Celonis Service Pack resolves multiple issues
- Patches or Service Packs may be available in advance, if critical
- A Celonis Release is a new version of the software, including new features

When you want to promote configurations and artifacts to production, there is a built-in export/import mechanism for all transportable artifacts in the web interface of Celonis; for usage instructions, please refer to the Celonis Manual (help.celonis.de). Technical configurations can be copied on a file level.

SOFTWARE UPDATE PROCEDURE

LATEST CELONIS VERSION

The Celonis software is shipped as an installer. The installer type depends on the Operating System it is going to be installed on. Verify the correct Celonis software version before you deploy any update. The latest Celonis software version can be downloaded from my.celonis.de.

The general update procedure is described below, however there may be several other instructions specific to a certain release. If any specific instructions should apply, they will be shipped out together with the release.

There will be a short downtime of the Celonis Application for the duration of steps 2 to 6.

COMPATIBILITY VERIFICATION FOR SYSTEM UPDATES

With every major release, we introduce a variety of new features that often require database migrations and other structural changes. Therefore, a sequential upgrade path for major release versions is required to avoid issues.

From application version 4.7 onward, we enforce a **version compatibility verification** during the installation process. In case the currently installed version is not compatible with the version a user is trying to install, the installation process will cancel. The version compatibility verification is not included in installers previous to 4.7!

MIGRATION FROM CELONIS PROCESS MINING 4.6.3.X TO 4.7

All new features can be found in the release notes for Celonis Process Mining 4.7. In the following section, migration and updates are described.

Preconditions

1. **You are updating an existing installation of Celonis Process Mining**
   This document is not applicable in case of a fresh installation. Please refer to the Installation Guide for new installations
2. **The currently installed version of Celonis Process Mining is 4.6.3.x**
   At this moment you have **installed, launched and verified** the 4.6.3.x version of CPM. If not please request an installer of version 4.6.3.x from the customer support and undergo the

whole cycle of software installation and verification. Otherwise the 4.7 installation process will be aborted by the version compatibility verification

3. **[Ubuntu servers only] The Ubuntu version is 18.** Support of Ubuntu 16 was deprecated with version 4.7. Thus, the OS must be upgraded to version 18 before the update. This concerns the server hosting the Central Application and the server(s) hosting Compute Services

Backing up custom libraries

With version 4.7, we introduce a new folder in the installation directory to store custom libraries and JDBC drivers. With this change, custom drivers will no longer be overwritten when updating the application. Therefore, all custom drivers must be migrated to a new directory up before the installation:

1. **Prepare the directory**
   In the application installation directory create a folder called **"lib"**
2. **Copy all CUSTOM libraries (if applicable)**
   [Windows] Custom are all libraries that were introduced manually (e.g. jdbc drivers, CPM custom plugins, etc). They must be copied from "<installPath>/appfiles/app/WEB-INF/lib" to "<installPath>/lib". **IMPORTANT:** Do not include the application core libraries that are located in "<installPath>/appfiles/app/WEB-INF/lib". This might corrupt the installation. In doubt, please contact the customer support team

   [Linux] Custom are all libraries that were introduced manually (e.g. jdbc drivers, CPM custom plugins, etc). They must be copied from "<installPath>/root/app/WEB-INF/lib" to "<installPath>/lib". **IMPORTANT:** Do not include the application core libraries that are located in "<installPath>/root/app/WEB-INF/lib". This might corrupt the installation. In doubt, please contact the customer support team

[Windows] Custom Java Options in the Celonis CPM4 Service Properties

Another change introduced in 4.7 is the deprecation of the Celonis CPM4 Service Properties executable ("cbpd_svcw.exe"). Similar to the Compute Service, the Central Application now has two new shortcuts, one to start the service and one to stop the service.

To make sure no configuration is lost, custom parameters set in the Service Properties have to be migrated:

1. **Create a .vmoptions file**
   In the installation folder create a file called "cpm.user.vmoptions" with the following rules:

```
# Formatting rules:
```

```
# a) a comment starts with a #
# b) arguments must start with a leading dash (-)
# c) one argument per line, the whole line is treated as a single
#argument
# d) quotes, backticks, white spaces are allowed (except line
breaks!) #as argument values and treated literally, escaping in not
needed
# For example:
#-Dloader.path=C:\Program Files\Celonis 4 Enterprise\lib
# e) the paths are relative to the start script, or absolute if a
path #starts with <DISK>:\...
# f) a sequence of 3 dollar chars ($$$) is reserved and should not be
used!
-Xms512M
-Xmx2048M
```

2. **Copy Java Options (if provided earlier):**
   Copy all Java Options from Celonis CPM4 Properties (**-Djava.io.tmpdir must be excluded**) into the newly created file (mind following the formatting rules). Adjust the **-Xms** (Initial Memory) and **-Xmx** (Maximum Memory) values according to the values from Celonis CPM4 Properties:

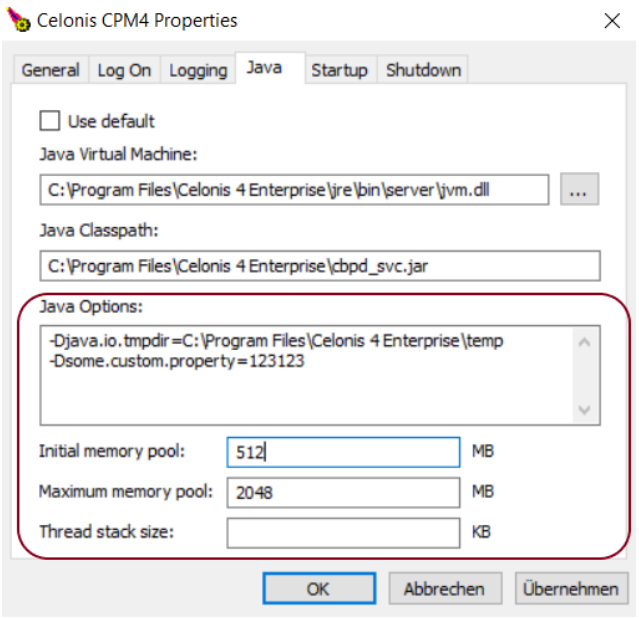

Figure 1: Java Options in the Celonis CPM 4 Properties

[Linux] Custom Java Options in the Celonis CPM4 Service Properties

An important point of the upgrade process on Linux operating systems is the depreciation of the specification of custom JVM options through the startup script ("start_application.sh").

To make sure no configuration is lost, custom JVM arguments have to be migrated from the startup script.:

1. **Create a .vmoptions file**
   In the installation folder create a file called "cpm.user.vmoptions" with the following rules:

```
# Formatting rules:
# a) a comment starts with a #
# b) arguments must start with a leading dash (-)
# c) one argument per line, the whole line is treated as a single
#argument
# d) quotes, backticks, white spaces are allowed (except line
breaks!) #as argument values and treated literally, escaping in not
needed
# For example:
#-Dloader.path=/cpm4 dev/lib
# e) the paths are relative to the start script, or absolute if a
path #starts with /

-Xms512M
-Xmx2048M
```

2. **Copy Java Options (if provided earlier) from the startup script:**
   Copy all Java Options from the startup script ("start_application.sh") into the newly created file (mind following the formatting rules). Adjust the **-Xms** (Initial Memory) and **-Xmx** (Maximum Memory) values according to the values manually specified in java startup command:

```
#!/usr/bin/env bash

cd "$(dirname "$0")"

sudo -u ${USER} sh -c 'export JAVA_HOME="$PWD/jre";
 cd "$PWD"; mkdir -p logs run;
 nohup "./../jre/bin/java" -Xms1024M -Xmx2048M  -jar  cpm.jar
 >> logs/stdout 2>> logs/stderr & echo "$!" > cpm.pid'
```

Figure 2: Java Options in the startup script (*start_application.sh*)

Custom Java Options of the Compute Service(s)

To prevent the loss of Java Options of the Compute Service, a separate vmoptions file has to be created for every Compute Service:

[Windows]:

1. **Create a .vmoptions file**

   In the compute folder (“<installPath>/compute”) create a file called “compute.user.vmoptions”:

```
# Formatting rules:
# a) a comment starts with a #
# b) arguments must start with a leading dash (-)
# c) one argument per line, the whole line is treated as a single
#argument
# d) quotes, backticks, white spaces are allowed (except line
breaks!) #as argument values and treated literally, escaping in not
needed
# For example:
#-Dloader.path=C:\Program Files\Celonis 4 Enterprise\lib
# e) the paths are relative to the start script, or absolute if a
path #starts with <DISK>:\...
# f) a sequence of 3 dollar chars ($$$) is reserved and should not be
#used!
-Xms512M
-Xmx2048M
```

2. **Copy Java Options (if provided earlier):**

   Copy all custom Java Options from “<installPath>/compute/compute_svc.xml” (**-Djava.io.tmpdir and -Dspring.profiles.active must be excluded**) into the newly created file (mind following the formatting rules)

[Linux]:

1. **Create a .vmoptions file**

   In the compute folder (“<installPath>/compute”) create a file called “compute.user.vmoptions”:

```
# Formatting rules:
# a) a comment starts with a #
# b) arguments must start with a leading dash (-)
# c) one argument per line, the whole line is treated as a single
#argument
# d) quotes, backticks, white spaces are allowed (except line
breaks!) #as argument values and treated literally, escaping in not
needed
# For example:
#-Dloader.path=/cpm4 dev/lib
# e) the paths are relative to the start script, or absolute if a
path #starts with /
-Xms512M
-Xmx2048M
```

2. **Copy Java Options (if provided earlier through the startup script):**
   Copy all custom Java Options from "<installPath>/compute/start_compute.sh" into the newly created file (mind following the formatting rules). Adjust the **-Xms** (Initial Memory) and **-Xmx** (Maximum Memory) values according to the values from the script

PDF Export and Stories

In order to avoid unexpected configuration issues related to the PDF Export functionality, another layer of validation was incorporated. Make sure that the server.url and server.external parameters (if specified in "config-custom.properties" file) point to the installation host of the Celonis application. **Otherwise the server will fail to start.**

Clean-up Operations

In order to free up disk space after an upgrade to 4.7, the following directories can be safely removed or archived, if existent:

- "./appfiles/accelerator"

Multi-Server Deployment

The Compute Nodes are now managed within the new Compute Management UI (*System Settings → Compute nodes*). The following properties within the "config-custom.properties" file will no longer affect the configuration (they are migrated with the first startup of 4.7):

- "compute.names"
- "compute.urls"
- "compute.sharedResources"
- "compute.ssl.enabled"
- "compute.ssl.trust-store"
- "compute.ssl.trust-store-password"

During the upgrade, existing settings should be migrated automatically from the "config-custom.properties" to the new frontend. Please make sure to verify the settings are correct after version 4.7 is installed.

Note: The "application-custom.properties" is still required to configure separated Compute Services. The new UI is only taking over the configuration part of the Central Application.

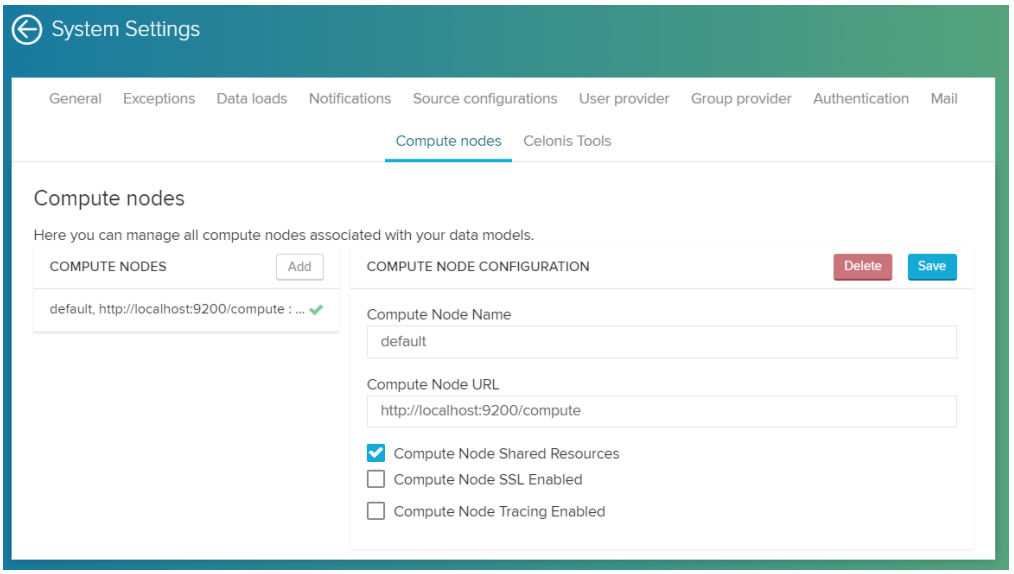

Figure 3: Compute Management UI

INTEGRITY OF CELONIS CONFIGURATION FILES

Celonis updates may require changes on configuration files. The following configuration files exist:

- “config.properties”
- “config-custom.properties”
- “config-custom.properties.sample”
- “compute/application.properties”
- “compute/application-custom.properties”
- “compute/application-custom.properties.sample”

The configuration files “config.properties”, “config-custom.properties.sample”, ”application.properties” , and ”application-custom.properties.sample” will be overwritten by the new version.

Your custom configuration files “config-custom.properties” and ”application-custom.properties” remain unchanged. Please check the new “config-custom.properties.sample” and ”application-custom.properties.sample” files for changed and updated parameters.

SAML configuration

If you are utilizing Single Sign-On (SSO) with ADFS (SAML authentication), please check if the SAML configuration in the “config-custom.properties” file is up to date. The parameters saml.url.scheme, saml.url.serverName, saml.url.serverPort, and server.url must be added to your SAML configuration. For details on how to set these parameters refer to “Celonis ADFS Setup Guide 1.10”.

BACKUP OF THE CELONIS SERVICES AND CONFIGURATION STORE

Step 1: Stop the Celonis services

- Windows: Stop the services “Celonis CPM 4 frontend” and “Celonis CPM4 compute” in the Windows Service Manager.
- Linux: Execute the “stop.sh” script to stop the application service and the Compute Service.

In the case of the above-mentioned Multi-Server Deployment, every Compute Service has to be stopped and backed up individually.

Verify that the Celonis processes have been terminated successfully.

- Windows: Investigate the currently running processes using the Task Manager
- Linux: Investigate the currently running processes by the Linux Process Table

Step 2: Create a backup of the Celonis application and application data:

Configuration Store (only in case of PostgreSQL or MSSQL)

In case you are already using the Celonis Configuration Store on an external database system, create a backup of the Celonis Configuration Store.

In case you are using the integrated Celonis Configuration Store powered by HSQLDB, consider migrating the Celonis Configuration Store to an external database system. For more information, please refer to the Celonis Configuration Store Setup Guide.

Application files

The following directories and files should be backed up:

- **[Windows]** <installPath>/appfiles/**
- **[Windows]** <installPath>/compute/compute_svc.xml
- **[Linux]** <installPath>/root/**
- <installPath>/lib/**
- <installPath>/component_configurations/**
- <installPath>/config_custom.properties
- <installPath>/cpm.user.vmoptions
- <installPath>/compute/root/**
- <installPath>/compute/application-custom.properties
- <installPath>/compute/compute.user.vmoptions

Optional: Perform a file system level backup of the installation and appfiles folder using customer specific backup solution (e.g. Tivoli Storage Manager, Symantec/Veritas Backup Exec, etc.).

GENERAL UPDATE PROCEDURE

AFTER A BACKUP WAS CREATED, PLEASE ADHERE TO THE FOLLOWING STEPS:

Step 1: Download the new release from my.celonis.de

Download the correct installer for your host OS. If you cannot find the installer matching your OS and version, please contact the Celonis Servicedesk.

Step 2: Stop the Celonis services

- Windows: Stop the services “Celonis CPM 4 frontend” and “Celonis CPM4 compute” in the Windows Service Manager.
- Linux: Execute the “stop.sh” script to stop the application service and the compute service.

In the case of a Multi-Server Deployment, every Compute Service has to be stopped (Linux: using the “stop_compute.sh” script) and then updated individually.

Verify that the Celonis processes have been terminated successfully:

- Windows: Investigate the currently running processes using the Task Manager
- Linux: Investigate the currently running process by the Linux Process Table

Make sure to close any other applications afterwards (esp. the Windows Service Manager on Windows and any Windows Explorer windows or Linux command line locations inside the installation/application path).

Step 2a: Rotate log files (Linux only – optional)

In general there are two options: manual or with logrotate. In order to set up log rotate it is not necessary to stop the Celonis service.

Option 1: Manually

For information on how to manually rotate log files, please consult the chapter “Celonis Log Files” in the Celonis Operations Guide.

Option 2: Logrotate

For information on how to set up Logrotate, please consult the chapter “Celonis Log Files” in the Celonis Operations Guide.

Step 3: Run the Celonis Installer

On Windows, the installer will recognize your current setup and keep your system configuration settings. The installer will automatically update Celonis to the latest version.

Continue only if the installation finished successfully. On Linux, you will have to re-enter the initial configuration parameters even for an update.

Step 3a (Multi-Server Deployment only): Update the Compute Services individually

- **Windows**
    1. Execute “compute_svc.exe uninstall” inside of the “compute” folder as an administrator on the Celonis Compute Server.
    2. Copy the folder “jre” as well as the folder “compute” from the install directory of the Central Application into a **newly created** directory on the respective Compute Server.
    3. Copy the **“application-custom.properties”, the “log” folder, the “root” folder, and the “temp” folder** from the previous installation directory of the Compute Service into the newly-created directory. This step ensures that custom configurations are preserved.
    4. Copy the files “vcredist_2015_x64.exe”, “vcredist_2010_x64.exe” and “vcredist_2008_x86.exe” from the install directory to the Celonis Compute Server and execute each of them.
    5. Execute “compute_svc.exe install” inside of the **newly created** “compute” folder as an administrator on the Celonis Compute Server.
- **Linux**
    1. Copy the folder “jre” as well as the folder “compute” from the install directory of the Central Application into a **newly created** directory on the respective Compute Server.
    2. Copy the “**application-custom.properties”, the “log” folder, the “root” folder, and the “temp” folder** from the previous installation directory of the Compute Service into the newly-created directory. This step ensures that custom configurations are preserved.

Step 4: Start the Celonis services

- Windows: Start the “Celonis CPM 4 frontend” service for the Central Application and the “Celonis CPM4 compute” service for the Compute Service from the Windows Service Manager. Additionally the Compute Service of every separate Compute Server has to be started as well.

- Linux: Execute the “start.sh” script to start the Central Application service and the local Compute Service. Execute the “start_compute.sh” to start the Compute Service on separated Compute Servers.

Verify that the Celonis processes have been started successfully:

- Windows: Investigate the currently running processes using the Task Manager
- Linux: Investigate the currently running process by the Linux Process Table

Step 5: Verify that logs files are written

Login to the Celonis application. Verify if the log files are written:

- Windows: Log-files are separated per service start and can be found in “<installPath>\logs” and “<installPath>\compute\logs”.
- Linux: Log-files are combined in “<installPath>/logs” and “<installPath>/compute/logs”.

Step 6: Verify the Celonis release ID

Login to the Celonis application and access the “About” page in the bottom left corner of the start screen. Validate that the displayed version ID equals the new release.

If you want to check the version of Celonis while the software is not running, you can do so by viewing the “config.properties” file in the root directory of the Celonis application (parameter “application.version”).

PERFORM CLEAN-UP OPERATIONS

1. We recommend keeping at least the latest backup archive
2. Delete obsolete backup archives
3. Verify and update the integrity of Celonis configuration files

POST UPDATE STEPS

Query caching

After the update to 4.7, please verify the settings for the query cache. With application version 4.7, the Data Model pre-caching has been discontinued in favor of query caching which proves to be a

better alternative. In order to ensure that Data Models and analysis benefit from the performance improvements, query caching is now enabled by default.

Long running queries with an execution time of over one second will be executed and cached while loading the actual Data Model. Multiple executions of a query are accelerated as well. Note that you must reload the Data Model for the setting to become active/inactive upon change. Please also note that the query cache allocates memory in the according heap of the application server.

Best practices

- Query cache size: 150MB
- Warm Up Time: 15-30 minutes

The setting can be enabled or disabled in the Data Model under *Loading* (see Figure3).

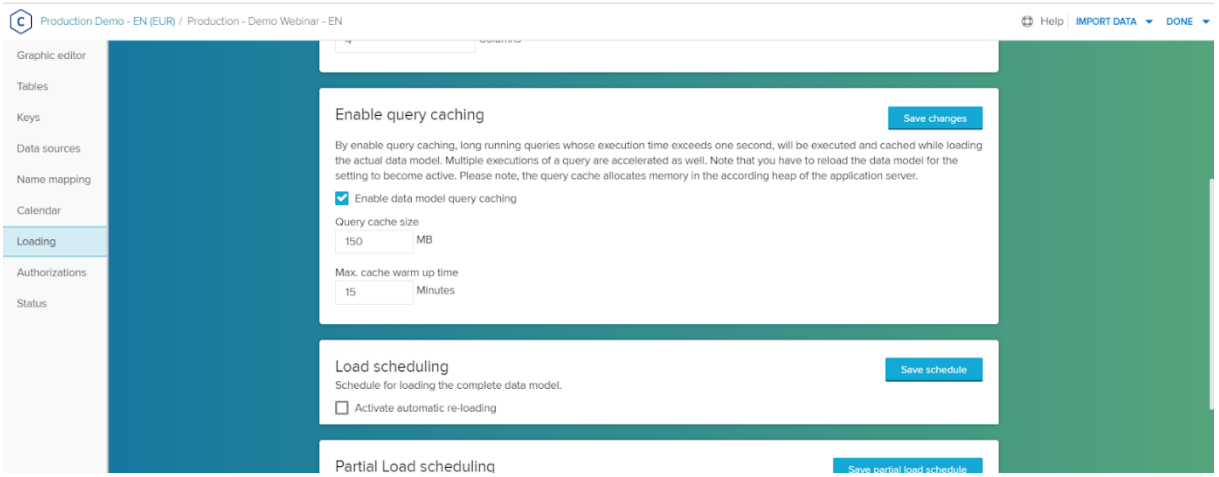

Figure 4: Query Caching Settings in Data Model

MIGRATION OF CELONIS PROCESS MINING FROM A VERSION BELOW 4.6 TO A VERSION INCLUDING AND ABOVE 4.6

For the migration from older versions to Celonis 4.6, please consider the *Celonis Process Mining - Update Guide 1.10*. During the upgrades, additional details have to be taken into consideration.

Enhanced application service design

With Celonis Process Mining 4.6, the Celonis Services on the application server were split into the Celonis Central Application Service and the Compute Service. This new Compute Service manages the resource-heavy engine processes (which load and subsequently hold all Data Model data and

calculate and provide the response to PQL queries). The Celonis 4.6 Central Application Service handles all UI resources as well as the data integration, which includes the orchestration of Data Model loads.

Both applications, the Central Application and the Compute Service can be started and stopped separately. One of the big advantages of this new design is that Celonis 4.6 application configurations can be enabled and effected by restarting the Central Application Service and without affecting the load status of all Data Models. The Data Models remain loaded until they are manually unloaded or the Compute Service is stopped.

After successful migration, you might see the following error message during Data Model loads. This is the error message for when the Compute Service has not been started yet.

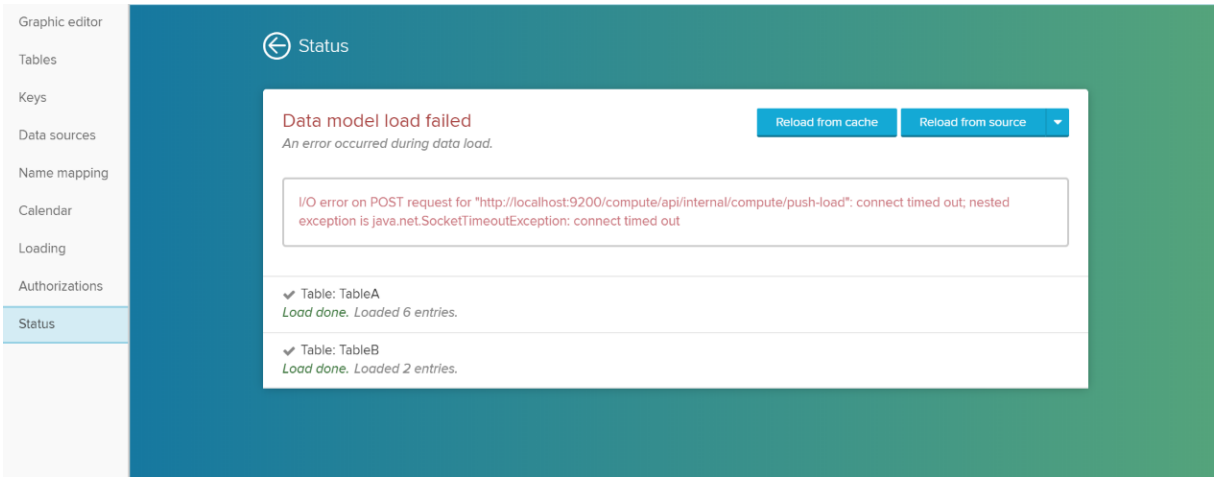

Figure 5: The compute service on port 9200 has not been started

Multi-Server Deployment

Since Celonis Process Mining 4.6, a Multi-Server Deployment is possible. It allows you to host the Compute Service on multiple servers. For this deployment, it is not necessary that the Compute Service is running on the Celonis Application Server. For future versions, every Compute Service needs to be updated independently. For a step-by-step guide on how to initially set up this architecture, please consult the Celonis Installation Guide as well as the Celonis Operation Guide.

JRE folder

Since Celonis Process Mining 4.6, the “jre” folder in the “Celonis 4 Enterprise” directory will be entirely deleted and recreated with every installation. Any non-system files inside this folder will be removed during this process. It is recommended not to modify any files other than the configuration files inside the Celonis installation folders.

SUPPORT DESK MANAGEMENT

To contact Celonis support, you have the following possibilities:

Hotline: **+49 (0)89 416 159 677**

Email: servicedesk@celonis.de

Support-Portal: https://servicedesk.celonis.com

Please include at least the following items in your issue description:

- Used browser including version (e.g. Google Chrome Version 64.0)
- Installation which you are trying to access (in case there is e.g. Dev and Prod)
- URL used to access the system (sometimes, there can be more than one URL to reach a single installation. This will also help to identify the installation you are trying to access)
- User name used to logon
- Screenshot of the error message/situation
- Log files of the application (if accessible on the server)

For additional information please refer to “Service Description For Celonis Support Services” available on the official Celonis website.

REFERENCES

- Celonis Installation Guide
- Celonis Operation Guide
- Celonis Manual
- Celonis Release Notes
- Celonis ADFS Setup Guide
- Celonis Migration Store Setup Guide