System Configuration

Version 5.12

Manual

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Content

1 General

ⓘ This manual assumes knowledge in the use of FORCAM FORCE IIOT.
If you do not have any knowledge of using FORCAM FORCE IIOT, take the time to familiarize yourself with the basics.

We recommend that you use our Academy.

The FORCAM Academy (https://forcam.com/academie/) provides the knowledge to effectively use the methods for digital transformation and the technologies for the Smart Factory.
Based on lean manufacturing and TPM methods, our institute team will guide you to initiate changes in the company and to use the technologies correctly.

The system configuration can be reached via the "Configuration" tile in the Workbench application.

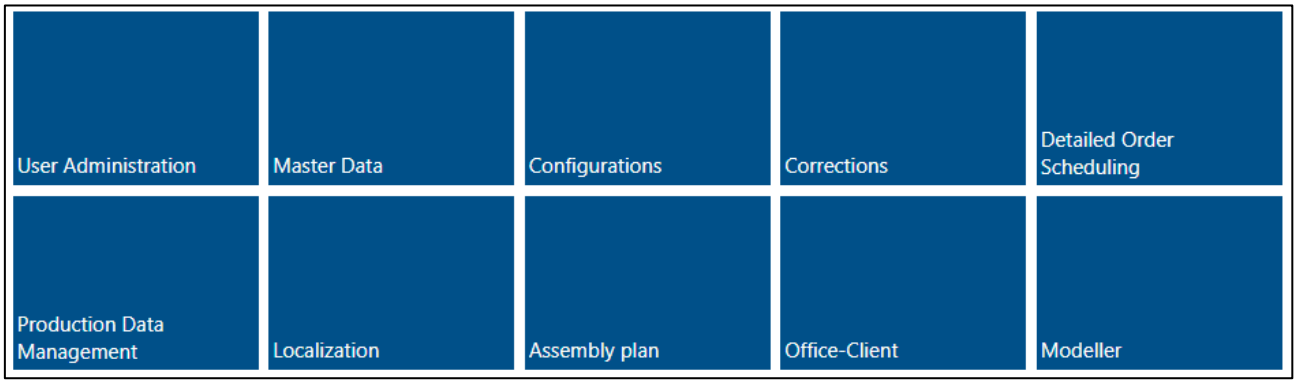


Figure 1: View of the Workbench

The **system configuration** consists of a collection of individual configurations. These can be selected in the hierarchy on the left side. On the right side the selected configuration can be edited. At the top is the icon bar with the functions for saving/discarding changes and exporting/importing configurations.

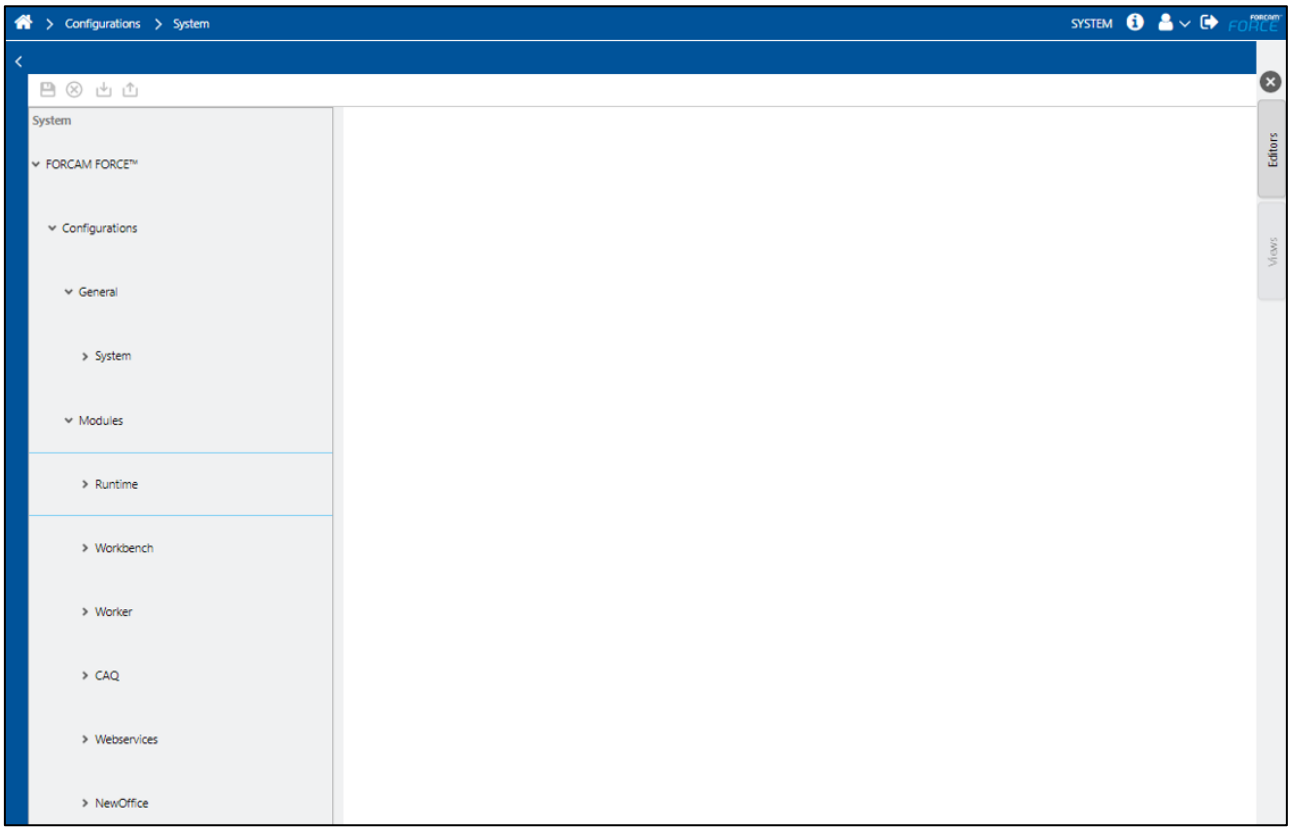


Figure 2: System configuration

These can be classified into two groups:

1. Configuration that affects more than one application can usually be found under
   Path: System > FORCAM FORCE IIOT > Configurations > General > System
2. Configuration that affect only one application can be found under its module name
   Path: System > FORCAM FORCE IIOT > Configurations > Modules > "Module name".

1.1 Cron expressions

Some configurations determine when a certain service should be executed. So-called "Cron expressions" are used for this purpose. For example, you can define that a service should always run every Sunday at 22:00. Cron expressions encode this information in a string.

Format
A Cron expression is a string consisting of 6 or 7 fields separated by spaces. The fields can contain any of the allowed values as well as various combinations of the special characters allowed for that field. The fields are structured as follows:

Field name	Required	Allowed values	Special characters
Seconds	Yes	0-59	, - * /
Minutes	Yes	0-59	, - * /
Hours	Yes	0-23	, - * /
Day of the month	Yes	1-31	, - * ? / L W
Month	Yes	1-12 or JAN-DEC	, - * /
Weekday	Yes	1-7 or SUN-SAT	, - * ? / L #
Year	No	Empty, 1970-2099	, - * /

Special characters

- * ("all values") - is used to select all values within a field. For example, "*" in the "Minute" field means "every minute".
- ? ("no specific value") - useful when you need to specify something in one of the two fields where the character is allowed, but not in the other. For example, if you want a service to trigger on a certain day of the month (e.g., the 15th), but don't care what day of the week it is, you will enter "15" in the "day of the month" field and "?" in the "day of the week" field.
- - used to specify ranges. For example, "9-11" in the hours field means "hours 9, 10 and 11".
- , - is used to specify additional values. Example: "MON, FRI" in the day of the week field means "the days Monday and Friday".
- / - is used to specify increments. For example, "0/15" in the seconds field means "the seconds 0, 15, 30 and 45". And "5/15" in the seconds field means "the seconds 5, 20, 35 and 50". You can also specify '/' after the '' character - in this case '' is equivalent to a '0' before the '/'. 1/3" in the "Day of the month" field means "every 3 days, starting from the first day of the month".
- L ("last") - has a different meaning in each of the two fields where it is allowed. For example, the value "L" in the "day of the month" field means "the last day of the month" - day 31 for January, day 28 for February in non-leap years. If it is used in the field for the day of the week itself, it simply means "7" or "SAT". However, if it is used in the day of the week field after another value, it means "the last xxx day of the month" - for example, "6L" means "the last Friday of the month". You can also specify a distance from the last day of the month, for example "L-3", which would mean the third last day of the calendar month. When using the

"L" option, it is important not to specify lists or ranges of values, otherwise you will get confusing/unexpected results

- W ("day of the week") - is used to specify the day of the week (Monday-Friday) closest to the specified day. For example, specifying "13W" as the value for the "Day of the month" field means: "the day of the week closest to the 13th of the month". So, if the 13th is a Saturday, the service will be triggered on Friday the 12th. If the 13th is a Sunday, the service will be triggered on Monday, the 14th. If the 13th is a Tuesday, the service will be triggered on Tuesday the 15th. However, if you specify "1W" as the value for the day of the month and the 1st is a Saturday, the service will be triggered on Monday the 3rd, since it cannot "jump" across the boundary of days in a month. The 'W' character can only be specified if the day of the month is a single day, not a range or list of days.

  The characters 'L' and 'W' can also be combined in the day of the month field to give 'LW', which translates to *"last day of the week of the month "*.
- # - is used to specify the "nth" XXX day of the month. For example, the value "2#3" in the day of the week field means "the third Monday of the month" (day 2 = Monday and "#3" = the third in the month).

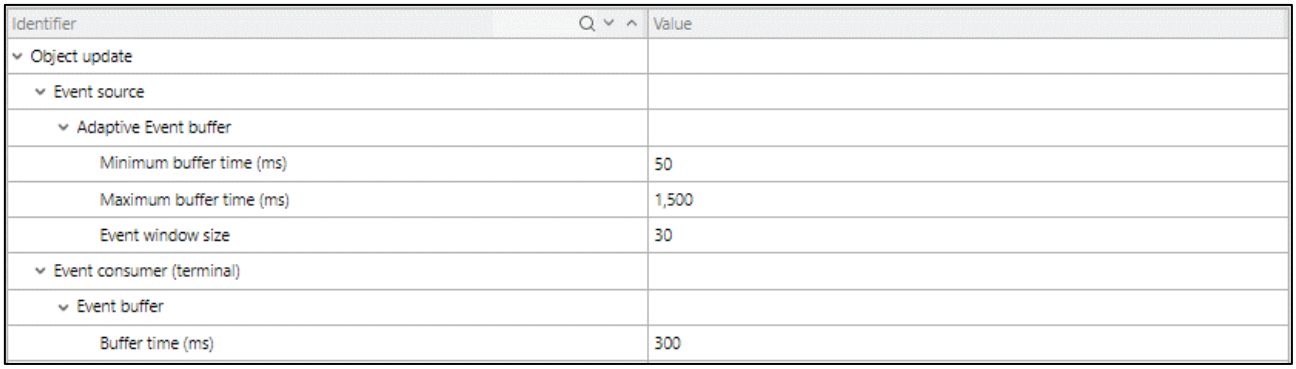
Examples

Cron expression	Meaning
0 0 12 * * ?	run the service every day at 12 o'clock (noon)
0 15 13 ? * *	run the service every day at 13:15
0 30 22 ? * SUN	run the service every Sunday at 22:30
0 15 10 L * ?	run the service at 10:15 on the last day of each month
0 15 10 ? * 6#3	every 3rd Friday of the month run the service at 10:15

2 Configuration system

2.1 Object update

Path: Configurations > General > System > Object Update



Identifier	Value
Object update	
Event source	
Adaptive Event buffer	
Minimum buffer time (ms)	50
Maximum buffer time (ms)	1,500
Event window size	30
Event consumer (terminal)	
Event buffer	
Buffer time (ms)	300

Figure 3: Object Update

This configuration controls a buffer mechanism when processing server events. These events notify about the update of certain data (e.g., certain events/change of state in the business logic). Since such events can occur very frequently, they are buffered, thus avoiding system overload. In addition, duplicates are removed.

Designation	Explanation
Adaptive event buffer: Minimum buffer time (ms)	minimum buffer time for sending updates via server events
Adaptive event buffer: Maximum buffer time (ms)	Maximum buffer time for sending updates via server events
Adaptive event buffer: window size for events	Window size of the moving average of updates, which can be used to internally adjust the minimum and maximum buffer time to adjust the frequency of updates.
Event buffer: Buffer time (ms)	Buffer time (time window) to detect identical server events

2.2 Logging

Path: Configurations > General > System > Logging

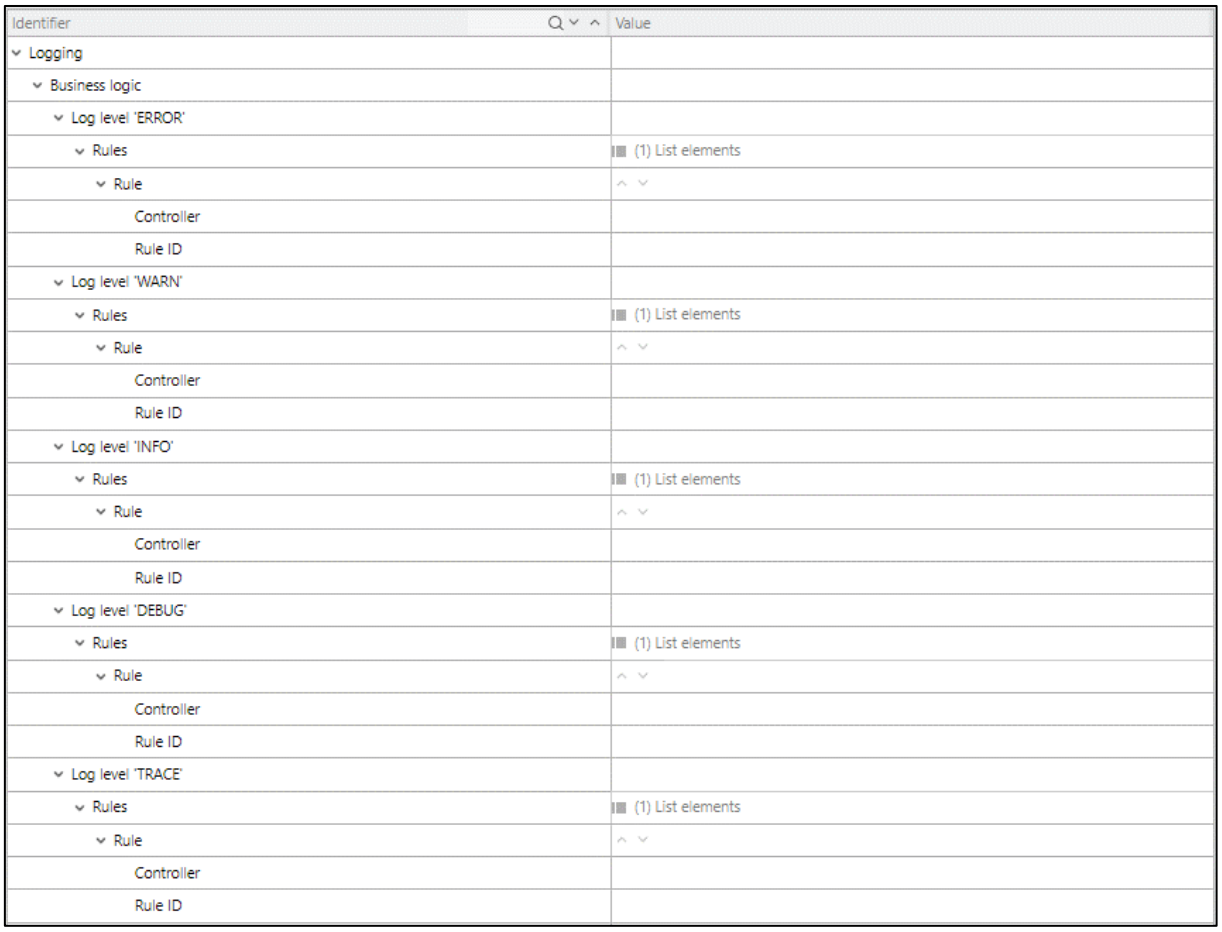


Figure 4: Logging

The configuration regulates the **logging of** the various applications.

Currently, only the logging of the business logic is controlled here. For each log level (ERROR, WARN, INFO, DEBUG, TRACE) the logging can be adjusted. If there are no entries, the general logging settings of the runtime (logback.xml) apply to all logic components of the business logic. The logging can be filtered by the configuration, so that only certain logic components of a certain controller output information in the log. Multiple controllers can be configured per log level (by adding another rule for this log level).

Designation	Explanation
Controller	Name of the controller for which logging is still to take place
Rule ID	Logging ID of a specific logic component (specified in the description of the component in the Business Logic Modeler). If nothing is specified, all logic components output log information.

2.3 Time synchronization

Path: Configurations > General > System > Time Synchronization

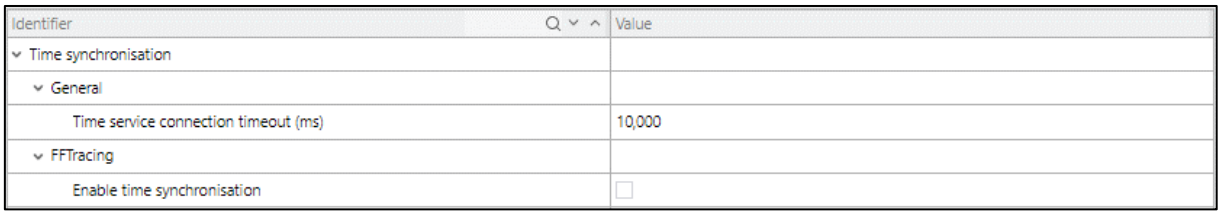


Figure 5: Time Synchronization

The **Time synchronization** configuration controls the time synchronization of the runtime with other applications. These can query the current time from the runtime and then use it for themselves.

Designation	Explanation
Connection timeout of the time service (ms)	Timeout for the response time of the runtime time service
Enable use of the remote time service	Flag: Should the FFTracing application request the runtime's time service?

2.4 Decimal format

Path: Configurations > General > System > Decimal Format

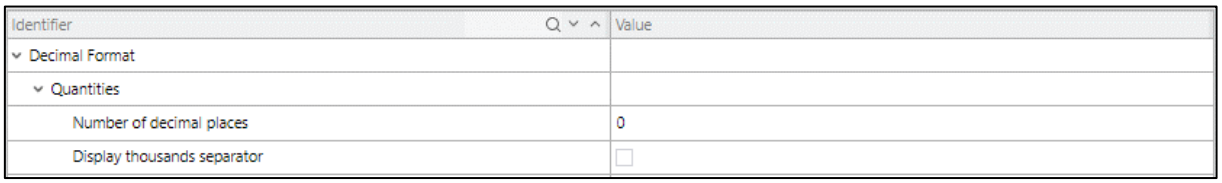


Figure 6: Decimal Format

The **Decimal format** configuration controls the representation of quantities on a global level. The setting can be overwritten by other configuration (e.g., in the unit's management number of decimal places).

Designation	Explanation
Number of decimal places	Number of decimal places HAS TO BE REMOVED
Display thousands separator	Flag: Should thousands separator be used?

2.5 Import/Export

Path: Configurations > General > System > Import/Export

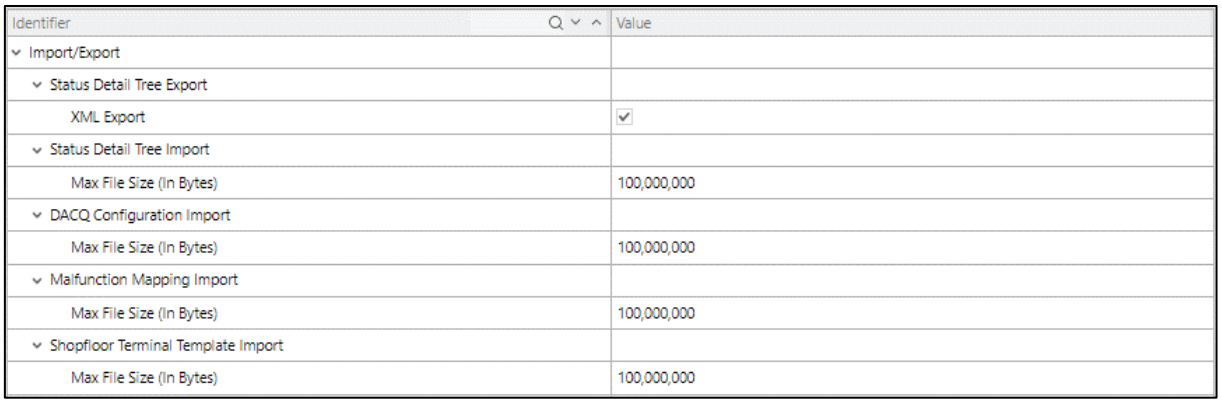


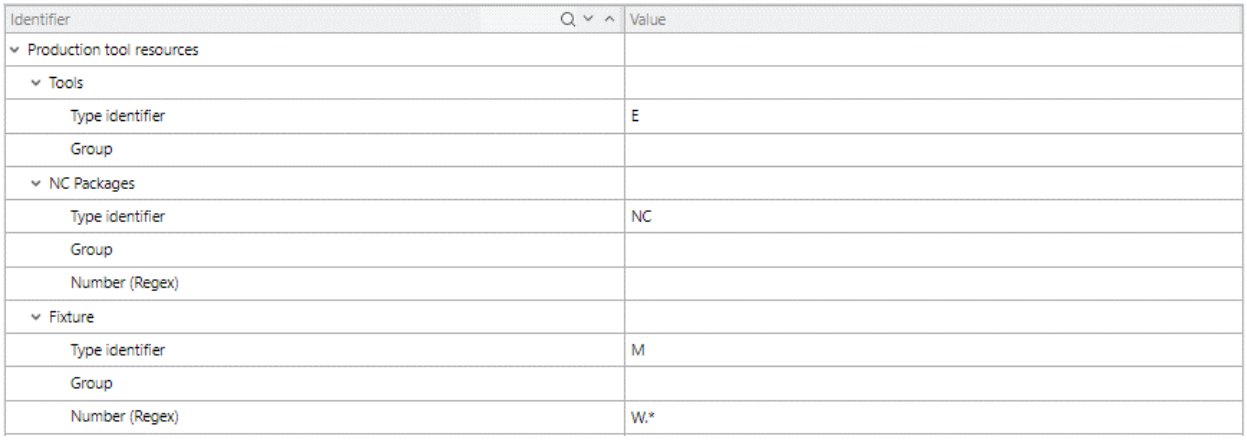
Figure 7: Import/Export

The **Import/Export** configuration contains settings for importing/exporting specific configurations. These mostly refer to the maximum file size. If this size is exceeded, the import/export is denied to ensure application stability.

Designation	Explanation
XML export	Flag: Are status detail trees allowed to be exported as XML?
Maximum file size (in bytes)	maximum file size of the respective import/export

2.6 Production resources and tools

Path: Configurations > General > System > Production resources/tools



Identifier	Value
Production tool resources	
Tools	
Type identifier	E
Group	
NC Packages	
Type identifier	NC
Group	
Number (Regex)	
Fixture	
Type identifier	M
Group	
Number (Regex)	W.*

Figure 8: Production resources/tools

The configuration of production resources/tools defines the properties of production resources/tools. The production resources/tools thus determined are typified and used within the scope of defined product functionalities.

Designation	Explanation
Tools: Type identifier	Restriction criterion (type), which tools can be used for the tool-based correction (customer-specific functionality)
Tools: Group	Restriction criterion (group), which tools can be used for the tool-based correction (customer-specific functionality)
NC Packages: Type identifier	Integration with TDM: Tool picking is only possible if production resources/tools with this type identifier exist. Production resources/tools with this type identifier are transferred to TDM as NC programs.
NC Packages: Group	Integration with TDM: Several production resource/tool groups can be specified, separated by commas. Tool picking is only possible if production resources/tools exist with one of these groups. Production resources/tools with one of these groups are transferred to TDM as NC programs.
NC Packages: Number (Regex)	Integration with TDM: Tool picking is only possible if production resources/tools whose number matches this Regular Expression exist. Production resources/tools whose number matches this regular expression are transmitted to TDM as NC programs.
Device: Type identifier	Integration with TDM: Production resources/tools with this type identifier are transmitted to TDM.
Device: Group	Integration with TDM: Several production resource/tool groups can be specified, separated by commas. Production resources/tools with one of these groups are transmitted to TDM.

Device: number (regex)	Integration with TDM: Production resources/tools whose number matches this regular expression are transmitted to TDM.
Status detail: Type identifier	Production resources/tools with this type identifier are created as StatusDetails during the ERP download.
Status detail: Group	Production resources/tools with one of these groups are created as StatusDetails during the ERP download.
Status detail: Number (Regex)	Integration with TDM: Tool picking is only possible if production resources/tools whose number matches this Regular Expression exist. Production resources/tools whose number matches this Regular Expression are transmitted to TDM as NC programs.

2.7 Allowed resources for Groovy Scripting

Path: Configurations > General > System > Allowed resources for Groovy Scripting

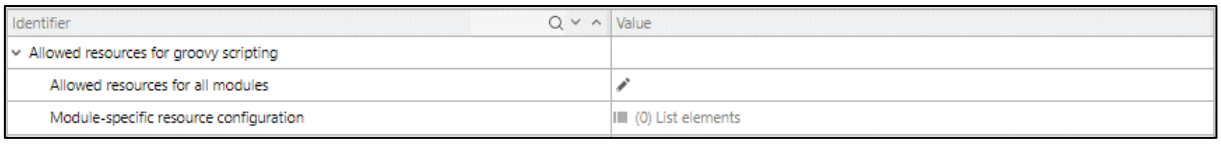


Figure 9: Allowed resources for Groovy Scripting

The configuration creates a list of allowed Java APIs that can be used in Groovy Scripting. The configuration consists of two parts. One part defines the list for all modules, the other part defines the list for specific modules.

Designation	Explanation
Allowed resources for all modules	Comma separated list of fully qualified class names of classes whose use is allowed (scope for all modules).
Configuration of module-specific resources	Comma separated list of fully qualified class names of classes whose use is allowed (scope for selected module).

2.8 Configuration of the cleanup command

Path: Configurations > General > System > Purge command configuration

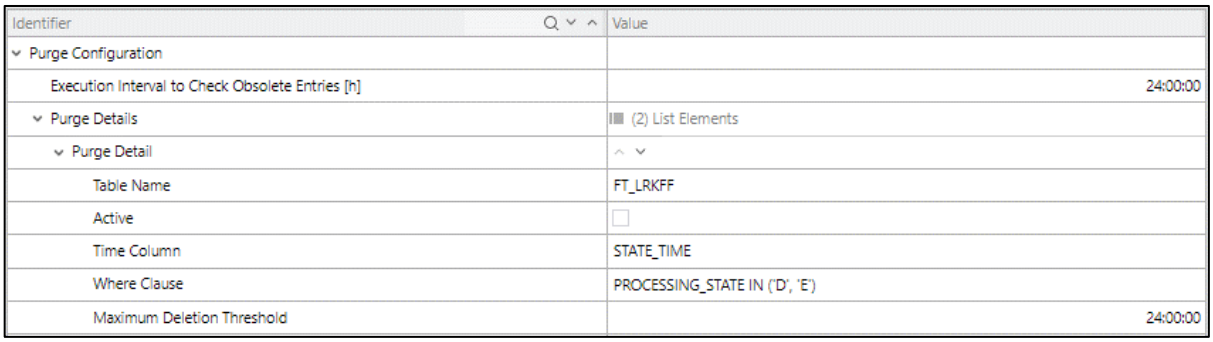


Figure 10: Purge command configuration

This configuration controls a service that can delete entries from any tables of the IIOT-DB that have exceeded a certain age.

Designation	Explanation
Execution interval for verification	After how many hours should the service search for entries to be deleted, like?
Details of the cleanup: Table name	Name of the table in which entries are to be searched for
Details of the cleanup: Active	Does the service take this table into account?
Details of the cleanup: Time column	Which column in the table contains the information about the age of the entry?
Details of the cleanup: Where-determination	Additional filtering via where condition to determine the entries whose age is checked, and which are deleted if necessary
Purge details: Maximum threshold for deletion	Entries (after where-filtering) older than the threshold (related to the time column) are deleted.

2.9 Single Sign-on (SSO)

2.9.1 LDAP naming scheme

Path: Configurations > General > System > Single Sign-on (SSO) > LDAP Naming Scheme

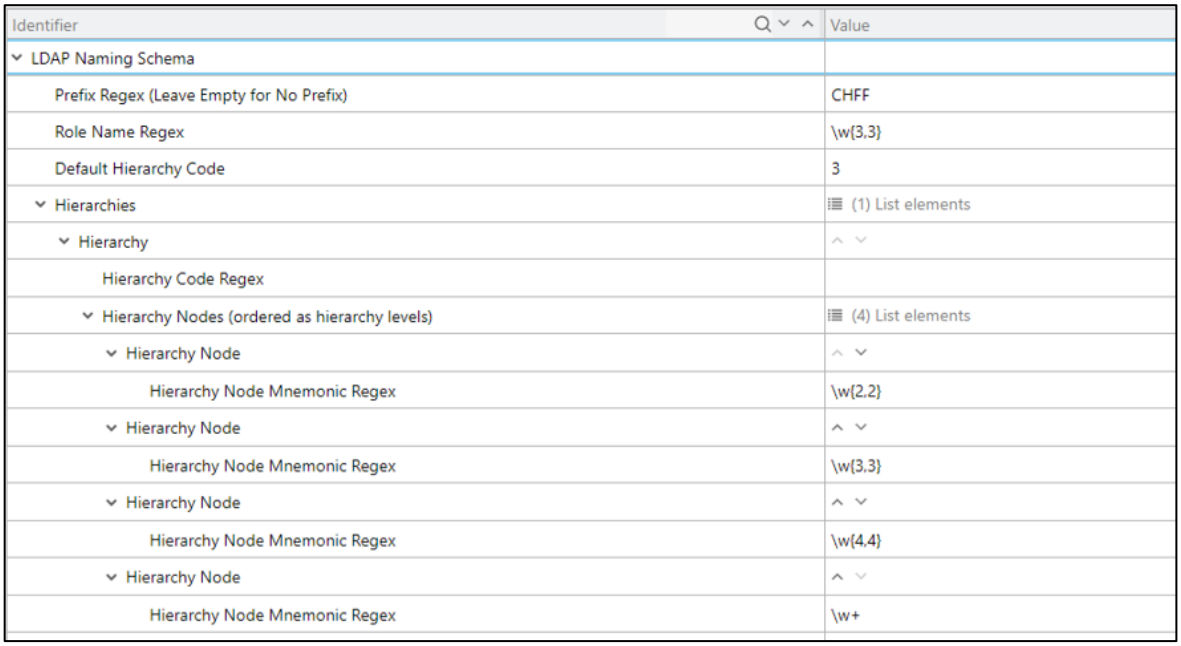


Figure 11: LDAP Naming Scheme

This configuration defines the mapping of external groups (e.g., LDAP groups) to FORCE roles and organizational entities used in the context of user authorization.

Designation	Explanation
Regular expression prefix (empty for no prefix)	external group prefix that is ignored when mapping to FORCE roles.
Regular expression roll name	Regex used to parse the role name from the external group.
Standard hierarchy code	Default hierarchy code used in mapping if no regular expression hierarchy code is defined, and the hierarchy code is not part of the external group.
Hierarchies: Regular Expression Hierarchy Code	optional regular expression used to parse the hierarchy code from the external group
Hierarchy Node: Regular Expression Hierarchy Node	Optional regular expression used to parse hierarchy node abbreviations from the external group. The abbreviations are used to define a specific path to a hierarchy node.

3 Configuration modules and applications

3.1 Runtime

3.1.1 ERP

3.1.1.1 ERP download

Path: Configurations > Modules > Runtime > ERP > ERP Download

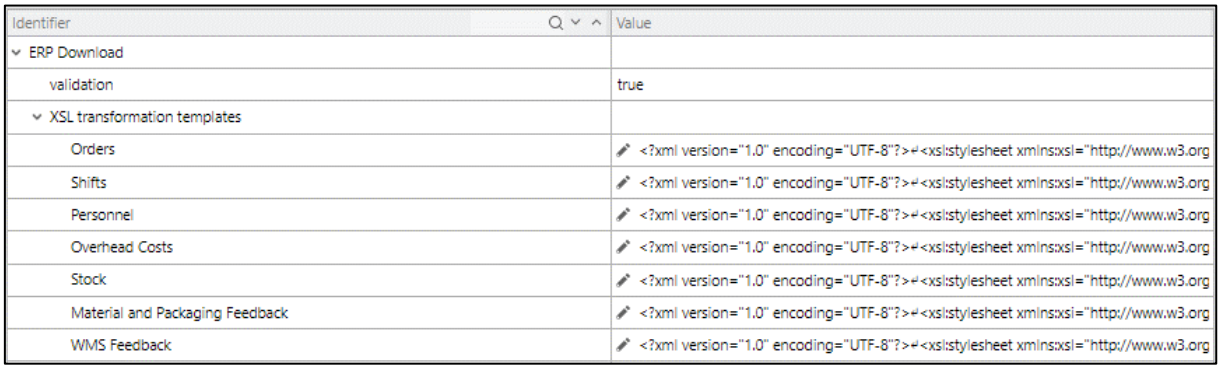


Figure 12: ERP Download

This configuration controls the mapping of messages to an ERP system from the specific SAP-IDOC format to the generic ERP XML format. The transformation is done via XSLT.

Designation	Explanation
validation	Defines whether incoming data should be validated according to XSD schema and corresponding action (ADD, DELETE). If active, non-valid data will be rejected and not processed.
Templates: Orders	XSLT, which defines the mapping from IDOC to ERP XML for orders
Templates: Layers	XSLT, which defines the mapping from IDOC to ERP XML for layers
Templates: Personnel	XSLT, which defines the mapping from IDOC to ERP XML for personnel
Templates: Overhead costs	XSLT, which defines the mapping from IDOC to ERP XML for overhead costs
Templates: Bearing	XSLT, which defines the mapping from IDOC to ERP XML for warehouses
Templates: Response for material and packaging unit request	XSLT, which defines the mapping from IDOC to ERP XML for material and packaging unit
Templates: WMS Feedback	XSLT, which defines the mapping from IDOC to ERP XML for WMS Feedback

3.1.1.2 ERP upload

Path: Configurations > Modules > Runtime > ERP > ERP Upload

Identifier	Value
ERP Upload	
Mode	XSLT mapping
Upload authentication	Http basic authentication
Customer	
Infor	
Logical ID	mes
JSON of IONAPI	{"ti":"INTEGRATION_AX1","cn":"LNForcam","ci":"INTEGRATION_AX1~nkbusYz_bHyaBjd
Upload URL for Infor interface	https://mingle-integ02-ionapi.mingle.awsdev.infor.com/INTEGRATION_AX1/IONSERVICES/a
ERP upload connections	
Default connection	
ERP upload connection	
ERP Upload active	☐
Notification interface	
Notification URL	http://localhost:9996/confirmation
Client ID	100
Username	JCOTEST
Password	••••••••••••••••••••
Authentication	BASIC
Exclude list serializing	Ausgewählt (0), Verfügbar (20)
IDOC type	/FFMES/R
MES type	/FFMES/MESSAGE
Sender port	FORCAMFF
Sender type	LS
Sender number	FORCAMFF
Receiver port	SAPFOD
Receiver type	LS
Receiver number	FODCLNT100
IDOC Template	<?xml version="1.0" encoding="UTF-8"?><!-- XSL for transforming the internal erpUpl
Serialize interface	
Serialization active	☐
Serialize mode	Workplace mode
URL to synchronise the serialization	http://localhost:9998/synchronization
Username	JCOTEST
Password	••••••••••••••••••••
Authentication	BASIC
Synchronise. SOAP-Request template	<?xml version="1.0" encoding="UTF-8"?> <SOAP-ENV:Envelope x
Least channel number (inclusive)	1
Greatest channel number (inclusive)	9,999
Greatest counter number	999,999
Prefix	/FFMES/MSG
Other connections	(0) List elements

Figure 13: ERP Upload

This configuration defines the connection parameters to ERP systems for the ERP Upload.

Designation	Explanation
Mode	XSLT Mapping for SAP IDOC Upload Generic for XML Upload
Upload authentication	HTTP Basic Auth Infor specific authentication according to IONAPI definition
Customer: Infor: Logical ID	Logical ID for Infor Integration
Customer: Infor: JSON of IONAPI	IONAPI JSON for Infor Integration
Customer: Infor: Upload URL for Infor interface	URL of the upload endpoint for Infor Integration

3.1.1.2.1 ERP Upload Connection Configuration

The "default connection" initially applies to all ERP keys.

Designation	Explanation
ERP Upload active	Flag: Should ERP messages be sent?
Feedback interface: Feedback URL	URL of the upload endpoint for standard ERP integration
Feedback interface: Client ID	Client ID that is transmitted as value for MANDT in the IDOC header during SAP integration.
Feedback interface: Username	Username for BASIC authentication
Feedback interface: Password	Password for BASIC authentication
Feedback interface: Exclusion list	Configured IDOCs are not serialized
Feedback interface: IDOC type	Client ID, which is transmitted as value for IDOCTYP in the IDOC header during SAP integration.
Feedback interface: MES type	Client ID, which is transmitted as value for MESTYP in the IDOC header during SAP integration.
Feedback interface: Transmitter port	Client ID that is transmitted in the IDOC header as a value for SNDPOR during SAP integration.
Feedback interface: Transmitter type	Client ID that is transmitted as value for SNDPRT in the IDOC header during SAP integration.
Feedback interface: Transmitter number	Client ID that is transmitted as value for SNDPRN in the IDOC header during SAP integration.
Feedback interface: Receiver port	Client ID that is transmitted in the IDOC header as value for RCVPOR in case of SAP integration.
Feedback interface: Receiver type	Client ID that is transmitted as value for RCVPRT in the IDOC header during SAP integration.

Feedback interface: Receiver number	Client ID that is transmitted as value for RCVPNR in the IDOC header during SAP integration.
Feedback interface: IDOC Template	XSLT, which is used to generate the IDOC from the ERP XML
Serialization interface: Serialization active	Flag: Serialization active?
Serialization interface: Serialization mode	Transaction-based serialization or workstation-based serialization
Serialization interface: URL for serialization synchr.	URL to query channel/counter numbers from SAP via SOAP request
Serialization interface: Username	Username for Basic Authentication to retrieve channel/counter numbers from SAP via SOAP Request
Serialization interface: Password	Password for Basic Authentication to retrieve channel/counter numbers from SAP via SOAP Request
Serialization interface: Authentication	Authentication used (BASIC, NONE) to query channel/counter numbers from SAP via SOAP request
Serialization interface: Synchr SOAP Request Template	Template to query channel/counter numbers from SAP via SOAP request
Smallest channel number (included)	Smallest channel number for querying channel/counter numbers from SAP via SOAP request
Largest channel number (included)	Largest channel number to query channel/counter numbers from SAP via SOAP request
Largest counter number	Largest counter number used during serialization
Prefix	Prefix used for serial numbers

"Other connections" can be defined for specific ERP keys.

Designation	Explanation
ERP key: client	Client for which the connection is defined
ERP key: Company code	Company code for which the connection is defined
ERP key: plant	Plant for which the connection is defined
ERP key: System ID	System ID for which the connection is defined

3.1.1.3 Filter - Unused closed AVOs

Path: Configurations > Modules > Runtime > ERP > Filter > Unused closed AVOs

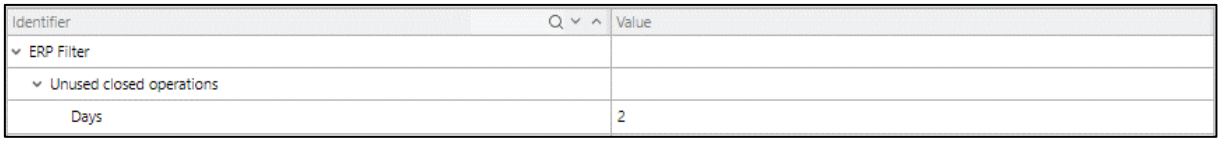


Figure 14: Unused closed AVOs

This configuration controls a filter that allows to change the technically (TABG) completed operations if their last status change occurred within the configured number of days.
Example: A transaction was completed two days ago and the configured value in the filter is 2 days, then the transaction cannot be changed in the ERP; at least the processing in the IIOT ERP interface will be rejected.

Designation	Explanation
Days	Number of days in the past that TABG transactions can be updated from the ERP

3.1.2 Data Lifecycle Management

Path: Configurations > Modules > Runtime > Data Lifecycle Management

Identifier	Value
Data Lifecycle Management	
Archiving	
Archive Points	
Activate Service	☑
Cron Expression	0 0 0 ? * *
Activate Service	☐
Start of archiving	01/01/70 00:00
End of archiving	01/01/70 00:00
Cron Expression	0 0 3 ? * *
Blocking Period (in days:hours:minutes:seconds)	180:00:00:00
Operation Auto Closing	
Activate Service	☐
Cron Expression	0 0 2 ? * *
Blocking Period (in days:hours:minutes:seconds)	180
Batch Size	50
Maximal Number of Commands	5,000
Data Garbage Collection	
Activate Service	☐
Cron Expression	0 45 23 ? * SUNL
Blocking Period (in days:hours:minutes:seconds)	10,950
Operation Detail Cleanup	
Activate Service	☐
Cron Expression	0 0 4 ? * *
Blocking Period (in days:hours:minutes:seconds)	31
Cache Snapshot Thinning	
Activate Service	☐
Cron Expression	0 0 4 ? * *
Blocking Period (in days:hours:minutes:seconds)	31
Limited correction timeframe	
Active	☐
Maximum time window for corrections (in days)	14

Figure 15: Data Lifecycle Management

This configuration controls the various services within the scope of data lifecycle management.
For further information see "***Data Lifecycle Management Manual***" Release 5.11 dated 17.09.2020.

Archiving

Archiving compresses report data after a certain period of time. This compression is lossy. Information on individual events is deleted and aggregated according to certain criteria.

Designation	Explanation
Archive points Activate service	Flag: Should archiving points be set (is a prerequisite for archiving)?
Archive Points Cron Printout	When should archiving points be created (Cron expression)? (The creation of the archive points creates an additional load on the runtime. Therefore, should happen at a time of low system load).
Activate service	Flag: Should archiving service run?
Cron expression	When should archive run always run (Cron expression)?
Start archiving	From when should archiving runs (according to the Cron expression) be performed? Default value corresponds to as of now.
End of archiving	Until when should archiving runs (according to the Cron expression) be performed? Default value corresponds to forever.
Blocking period	Data older than the lock period (floating time window) is taken into account by archiving. Data in the lock period is protected from archiving.

Automatic transaction closure

This service regulates the handling of unused (i.e., not previously started) terminated AVOs. If these are not reported as completed by an ERP system, they still leave data behind and thus cause an unnecessary load on the system. Therefore, they can be automatically closed by the system.

Designation	Explanation
Activate service	Flag: Should the automatic process closure be active?
Cron expression	When should the automatic operation closure run (Cron expression)? (The creation of the automatic transaction closure creates an additional load on the runtime. Therefore, it should happen at a time of low system load).
Blocking period	Blocking period during which no AVOs are closed.
Batch size	If there are many AVOs to be closed, the necessary commands (AVO phase change) are sent in groups. A pause is left between the groups to avoid overloading the runtime.
Maximum number of commands	Maximum number of AVOs fetched from the database (0: unlimited, default: 5000; further measure to avoid system overload).

Data cleansing

⚠ This service deletes all AVO related data including reporting data. Activate only (and for the time period) from when the data is no longer needed.

Designation	Explanation
Activate service	Flag: Should the delete service be active?
Cron expression	When should the delete service run (Con expression)? (The creation of the automatic transaction closure creates an additional load on the runtime. Therefore, it should happen at a time of low system load).
Blocking period	Data older than the blocking period (floating time window) is deleted.

Clean up operation details

⚠ This service deletes operation details (i.e., data dependent on the AVO), but leaves the main AVO data and reporting data in place. Only activate (and for the time period) when the operation details are no longer needed. The following operation details are deleted by the service: Production resources/tools (+ Userdata fields + literals), AVO components (+ UserData fields + literals).

Designation	Explanation
Activate service	Flag: Should the operation details deletion service be active?
Cron expression	When should the operation details deletion service run (Cron expression)? (The creation of the automatic transaction closure creates an additional load on the runtime. Therefore, it should happen at a time of low system load).
Blocking period	Data older than the blocking period (floating time window) is deleted.

Cache snapshot thinning
Cache snapshots are needed as attachment points for correction runs. The more densely they are created along the time axis, the more efficiently the correction runs can be calculated. However, since cache snapshots consume a lot of memory (in the database), the memory requirement can be reduced by increasingly deleting cache snapshots for time ranges in which no or infrequent correction runs take place. There are then fewer cache snapshots available for these time ranges, i.e., a correction run could still be calculated (but not as efficiently).

Designation	Explanation
Activate service	Flag: Should the thinning service be active?
Cron expression	When should the thinning -delete service run (Cron expression)? (The creation of the automatic transaction closure creates an additional load on the runtime. Therefore, it should happen at a time of low system load).
Blocking period	Cache snapshots that are older than the lockout period (sliding time window) are increasingly deleted.

Restricted correction time window
If enabled, the specified value is used for the maximum correction time. Otherwise, the value from the archiving service configuration is taken.

Designation	Explanation
Active	Flag: Should the mechanism be active?
Maximum retroactive effect of the correction (in days)	Definition of the correction time window

3.1.3 ERP control key

Path: Configurations > Modules > Runtime > ERP Control Key

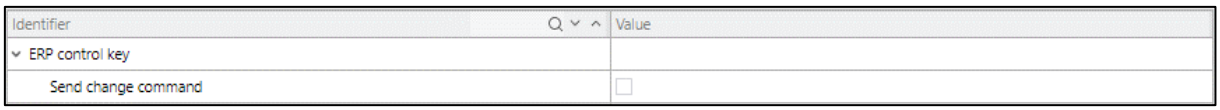


Figure 16: ERP Control Key

Each AVO has a control key defined for it and when a change is made to an AVO, a DomainAttributeChangeCommand is generated for the control key. This command is used to send an OperationRescheduleERPDTO to ERP.
The configuration controls whether this functionality is active.

Designation	Explanation
Send change command	Flag: Should change commands be sent out for AVO changes?

3.1.4 Free layer generation

Path: Configurations > Modules > Runtime > Free Layer Generation

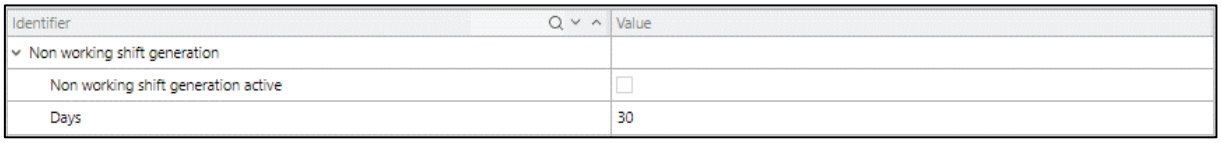


Figure 17: Free Layer Generation

This configuration controls the automatic creation of free shifts so that there are no gaps between explicitly defined shifts.

Designation	Explanation
Open layer generation active	Flag: Should free shifts be created?
Days	For how many days in the future should free shifts be created?

3.1.5 Layer generation

Path: Configurations > Modules > Runtime > Layer generation

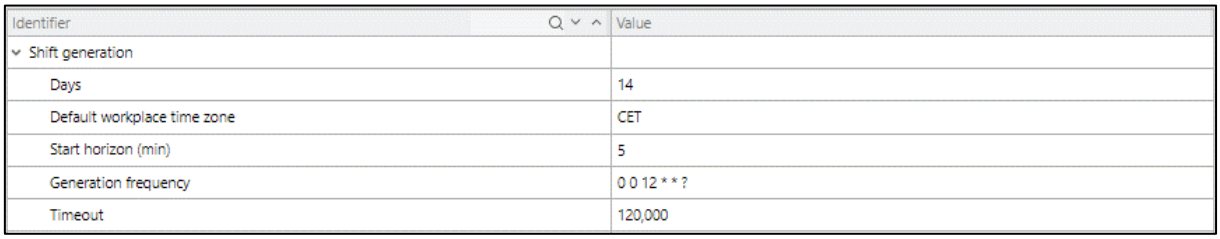


Figure 18: Layer generation

This configuration controls the automatic creation of layers (according to the configured layer model).

Designation	Explanation
Days	For how many days in the future should shifts be created?
Default workplace time zone	Fallback, if no time zone is defined for a workstation (time zone is needed to determine start and end of shift exactly)
Start horizon (min)	Blocking range related to the present, from when shifts are created
Generation rhythm	Cron expression when the service should run
Timeout	Timeout of the workbench for the processing (persistence and consistency checks) of the generated layers in the runtime.

3.1.6 Layer deletion

Path: Configurations > Modules > Runtime > Layer Deletion

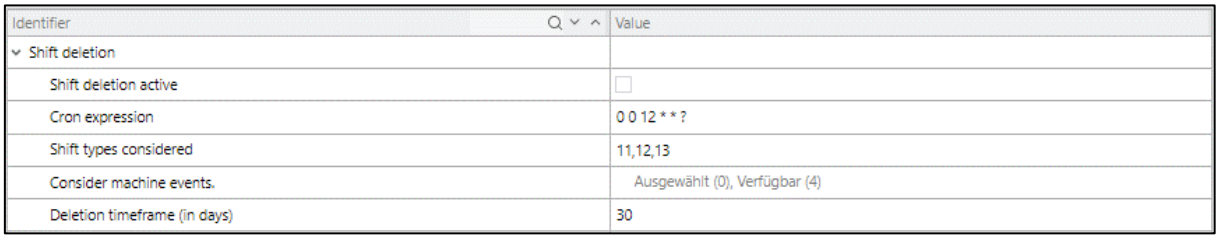


Figure 19: Layer Deletion

This configuration controls the automatic deletion service for unused shifts. These are defined as shifts in whose period and assigned work center no bookings have been created (e.g., quantity booking, phase change booking). It can still be decided whether automatic machine bookings are taken into account.

Designation	Explanation
Layer deletion active	Flag: Should the service be active?
Cron expression	Cron expression when the service should run.
Shift types considered	Which shift types should be considered? The codes of the shift types must be entered as a comma-separated list. The codes of the shift types can be found in the master data management (Shift calendar: Shift type definitions).
Consider machine events	List to select which machine bookings should be taken into account (i.e., if they occur in a shift, it will not be deleted). The following are available for selection: Stroke, Quantity, Status and Counter
Deletion time window (in days)	How many days into the past should we look for unused shifts?

3.1.7 Database connections

Path: Configurations > Modules > Runtime > Database connections

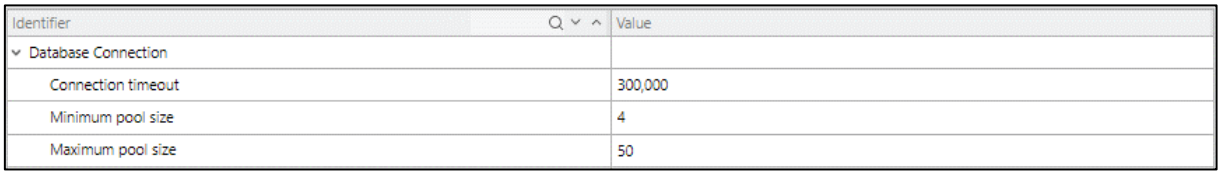


Figure 20: Database connections

The Database Connection configuration controls the behavior of the database connection management.

Designation	Explanation
Connection timeout	Specifies the duration how long waited for a response after a request to the database. After that it is assumed that the database is not available.
Minimum Pool Size	Minimum number of database connections held simultaneously
Maximum Pool Size	Maximum number of database connections held simultaneously

3.1.8 Deployment

Path: Configurations > Modules > Runtime > Deployment

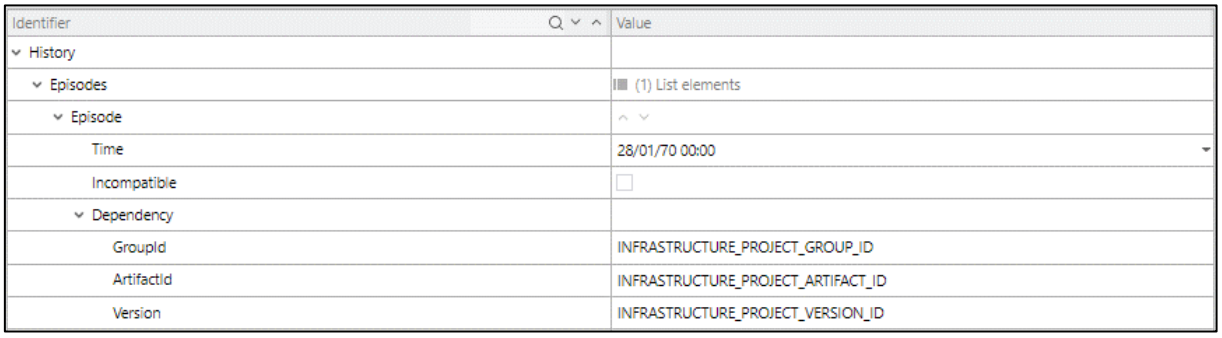


Figure 21: Deployment

The configuration counteracts with which business logic the runtime runs. Currently no complete change of the booking logic is supported. Therefore, the history (episodes) is always only one entry, and the compatibility flag is set to FALSE. Decisive are currently only the deployment coordinates of the business logic (group, artifact, version). The deployment coordinates can be found in the business logic modeler for the used logic project in the project information.

Designation	Explanation
Time	Currently not used
Incompatible	Currently not used
Dependency: Group ID	Group ID (INFRASTRUCTURE_PROJECT_GROUP_ID default for standard project)
Dependency: Artifact ID	Artifact ID (INFRASTRUCTURE_PROJECT_ARTIFACT_ID default for standard project)
Dependency: Version	Version of the logic project (INFRASTRUCTURE_PROJECT_VERSION_ID default for standard project)

3.1.9 Rule Engine and Controller

Path: Configurations > Modules > Runtime > Rule Engine and Controller

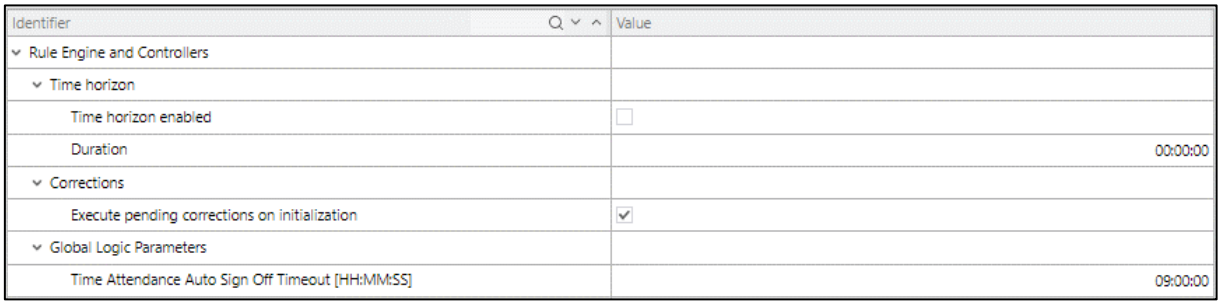


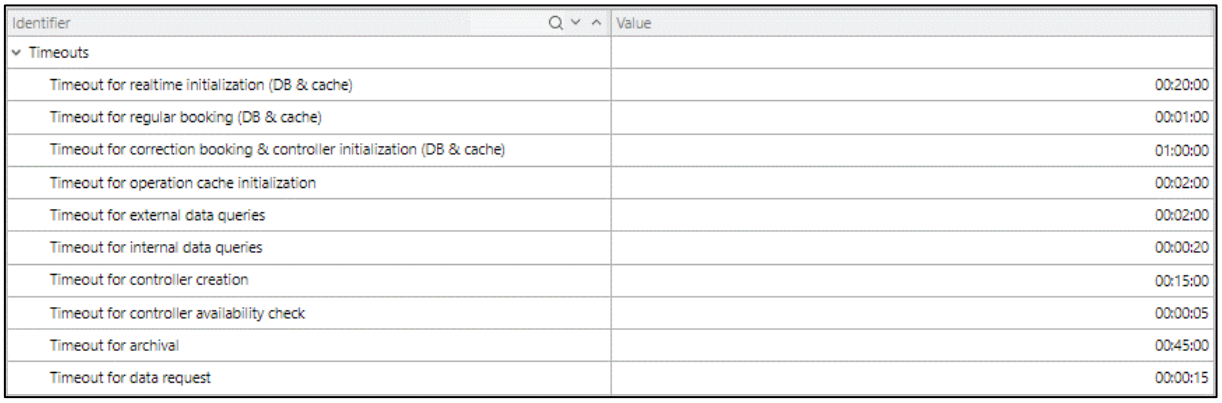
Figure 22: Rule Engine and Controller

This configuration controls various aspects of the controllers in the rule engine.

Designation	Explanation
Time horizon: Time horizon activated	Flag: Shall only process pulse events within a certain period of time when starting up the Rule Engine. This is an optimization of the startup time when further processing of the pulse events would no longer cause any change. This is useful if the Rule Engine has not been running for a long time and is then started up again.
Time horizon: Duration	Time window, how long pulse events should be processed
Corrections: Execute pending corrections during initialization	Flag: Should pending corrections (i.e., corrections that could not yet be successfully processed) be calculated through during startup?
Global logic parameter: Timeout for auto logout during time recording [HH: MM:SS]	Global parameter (i.e., workstation-independent) for the logic that controls automatic logoff related to time recording.

3.1.10 Timeouts

Path: Configurations > Modules > Runtime > Timeout



Identifier	Value
Timeouts	
Timeout for realtime initialization (DB & cache)	00:20:00
Timeout for regular booking (DB & cache)	00:01:00
Timeout for correction booking & controller initialization (DB & cache)	01:00:00
Timeout for operation cache initialization	00:02:00
Timeout for external data queries	00:02:00
Timeout for internal data queries	00:00:20
Timeout for controller creation	00:15:00
Timeout for controller availability check	00:00:05
Timeout for archival	00:45:00
Timeout for data request	00:00:15

Figure 23: Timeout

This configuration defines various timeouts within the runtime. If the timeout is exceeded, an error is assumed, the action is aborted, and appropriate error handling is performed.

Designation	Explanation
Timeout for initialization realtime (DB & cache)	How long may the initialization of the realtime area of the runtime take?
Timeout for normal update (DB & cache)	How long may an update (not an adjustment update) take?
Timeout for correction update & initialization of controllers (DB & cache)	How long may a correction posting, or initialization of a controller take?
Timeout for initialization AVO cache	How long may the initialization of the AVO cache take?
Timeout for external data queries	How long may external data queries take?
Timeout for internal data queries	How long may internal data queries take?
Timeout for controller creation	How long may the creation of a controller take?
Timeout for controller availability check	How long may the controller availability check take?
Timeout for archiving	How long may the archiving last?
Timeout for data query	How long may data queries take?

3.1.11 Administration notification

Path: Configurations > Modules > Runtime > Administration Notification

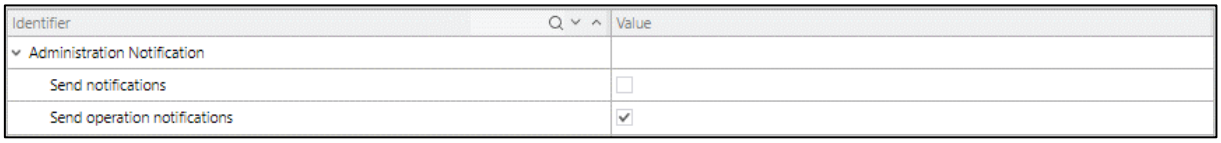


Figure 24: Administration Notification

This configuration enables/disables the possibility to inform interested applications (FLS or Shop Floor Terminal) about the changes in orders, AVOs, persons, stocks via two different options. Otherwise, these applications would not be aware of these changes, because they are made in the runtime.

Designation	Explanation
Send notifications	Flag: Should messages about orders, AVOs, persons, stocks be sent by the administration service (These changes are performed by the Runtime master data management service)?
Send AVO notifications	Flag: Should server event notifications about the changes in AVOs be sent to the server event listeners (these changes are performed by the runtime business logic)?

3.1.12 Corrections

Path: Configurations > Modules > Runtime > Corrections

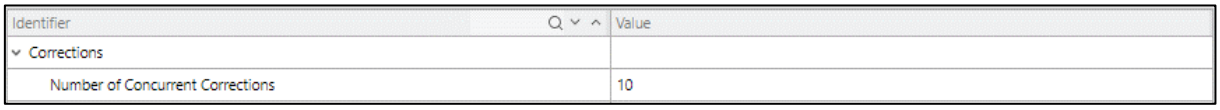


Figure 25: Corrections

This configuration controls the number of simultaneous correction runs and thus protects against runtime overload.

Designation	Explanation
Number of concurrent corrections	Number of concurrent corrections

3.1.13 Monitoring

Path: Configurations > Modules > Runtime > Monitoring

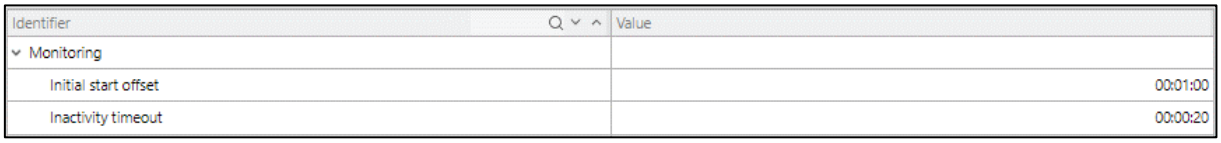


Figure 26: Monitoring

This configuration controls a monitoring service that monitors the active actuators (i.e., the processing processes) of the runtime. The service calculates the expected number of actors based on the business logic and then checks if the same number of actors are running in the runtime. Reports when a discrepancy in the number of actors is detected.

Designation	Explanation
Start offset	initial delay for the start of the monitoring (avoids the load during the start of the runtime)
Inactivity timeout	Time until the next check of the active actuators

3.1.14 Generation planned maintenance

Path: Configurations > Modules > Runtime > Generation scheduled maintenance

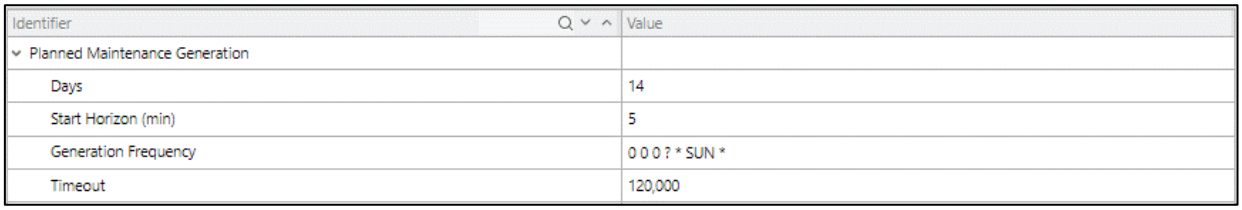


Figure 27: Generation scheduled maintenance

This configuration controls the generation of planned maintenance

Designation	Explanation
Days	For how many days should scheduled maintenance be generated?
Start horizon (min)	From when should scheduled maintenance be generated (blocking range around the present)?
Generation rhythm	When should the generation run always take place (Cron expression)?
Timeout	Timeout for persisting created maintenance intervals

3.2 Workbench

3.2.1 Database connections

Path: Configurations > Modules > Workbench > Database Connections

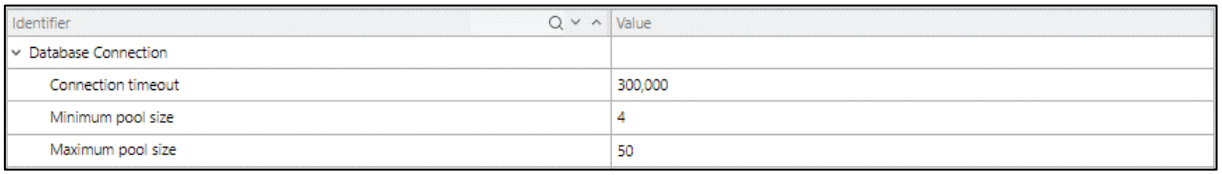


Figure 28: Database Connections

The Database Connection configuration controls the behavior of the database connection management.

Designation	Explanation
Connection timeout	Specifies the duration how long waited for a response after a request to the database. After that it is assumed that the database is not available.
Minimum Pool Size	Minimum number of database connections held simultaneously
Maximum Pool Size	Maximum number of database connections held simultaneously

3.2.2 Tile navigation

Path: Configurations > Modules > Workbench > Tile Navigation

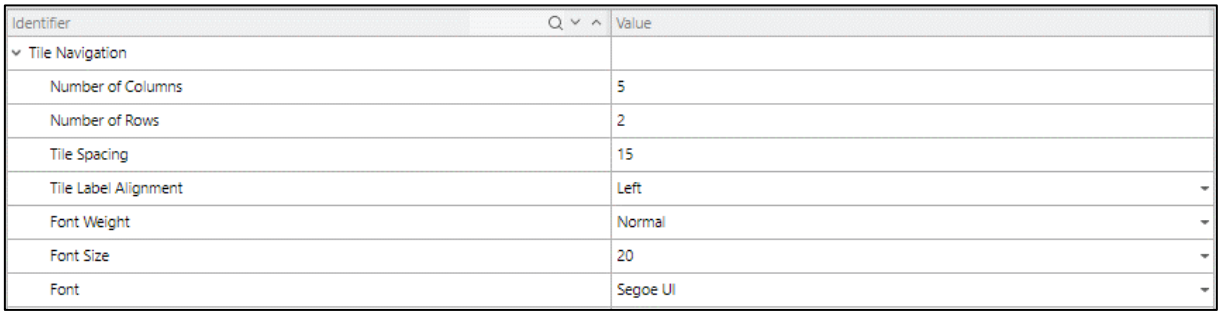


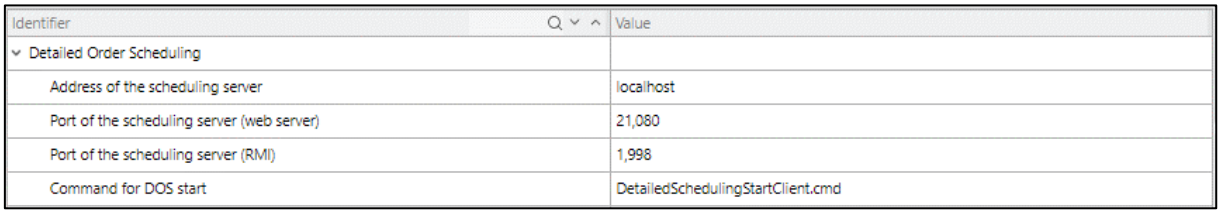
Figure 29: Tile Navigation

This configuration controls the arrangement of the tiles and their labels.

Designation	Explanation
Number of columns	Number of columns in the tile matrix
Number of lines	Number of rows in the tile matrix
Distance between tiles	Distance between tiles (in pixels)
Label alignment	Label orientation (left, center, right)
Font thickness	Font weight (Normal, Bold)
Font size	Font size (16,18,20,22,24)
Font	Font (Arial, Courier New, Segoe UI, Times New Roman)

3.2.3 Detailed Order Scheduling

Path: Configurations > Modules > Workbench > Detailed Order Scheduling



Identifier	Value
Detailed Order Scheduling	
Address of the scheduling server	localhost
Port of the scheduling server (web server)	21,080
Port of the scheduling server (RMI)	1,998
Command for DOS start	DetailedSchedulingStartClient.cmd

Figure 30: Detailed Order Scheduling

The Detailed Order Scheduling (DOS) is a client-server application. The configuration contains the connection parameters to the DOS server, so that the associated FLS client with the batch file can be started with it and establish a connection to the server.

Designation	Explanation
Address of the DOS server	Address of the DOS server
Port of the DOS server (web server)	Port of the DOS server for web communication
Port of the DOS server (RMI)	Port of the DOS server for RMI communication
Command for DOS start	Start file for DOS client (batch file on the client)

3.3 Worker

3.3.1 Database connections

Path: Configurations > Modules > Worker > Database Connections

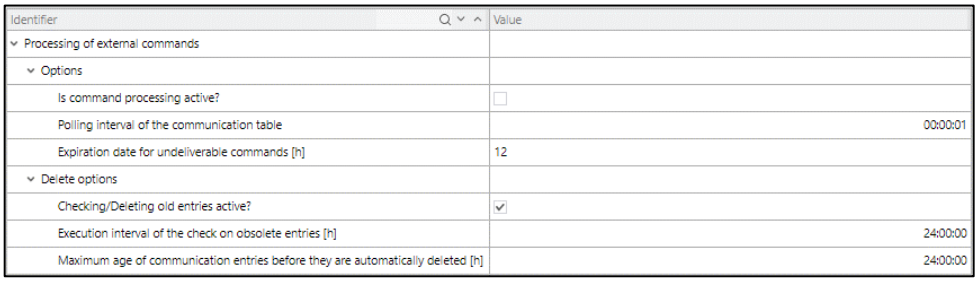


Figure 31: Database Connections

The **Database connection** configuration controls the behavior of the database connection management.

Designation	Explanation
Connection timeout	Specifies the duration how long waited for a response after a request to the database. After that it is assumed that the database is not available.
Minimum Pool Size	Minimum number of database connections held simultaneously
Maximum Pool Size	Maximum number of database connections held simultaneously
Latency [ms]	If the database connection is checked regularly and lost, a popup with an error message is displayed. The parameter determines after what time the check will be performed again (if the database connection works).
Tolerance time [ms] for sporadic errors	If the database connection is checked regularly and lost, a popup with an error message is displayed. The parameter determines after what time the check will be performed again (if the database connection does **not** work).

3.3.2 External command processing

Path: Configurations > Modules > Worker > External Command Processing

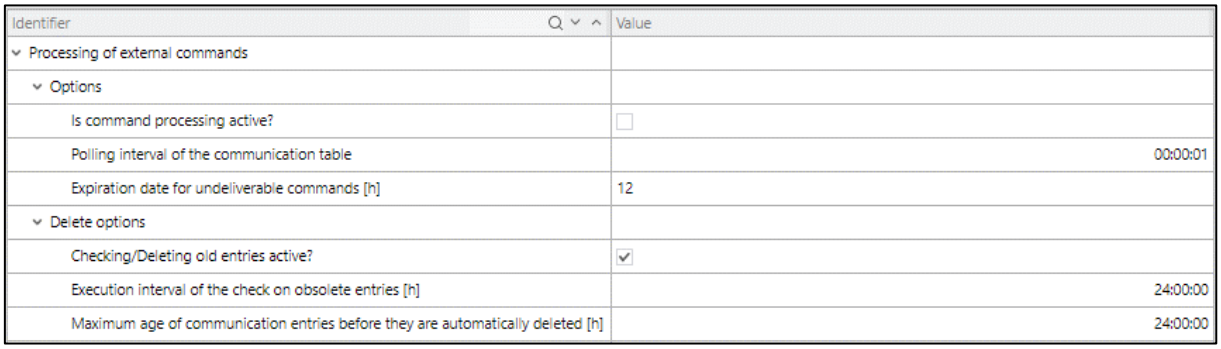


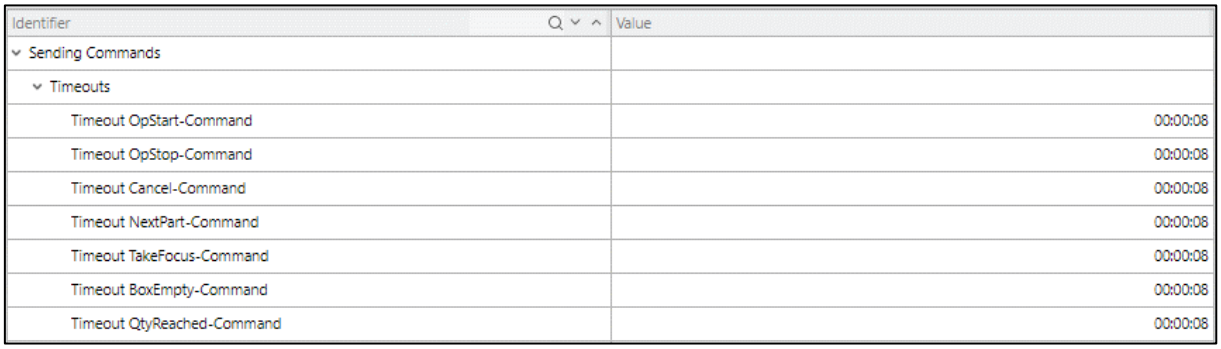
Figure 32: External Command Processing

This configuration controls an integration software for a customer-specific integration (Turbo PCS). The external system is connected via a database table. Both the external system and the IIOT write entries into the table, which are then read by the respective other system and then lead to certain actions. The configuration handles the cleanup for obsolete entries and for entries that led to errors in the follow-up actions.

Designation	Explanation
Options Is the command processing active?	Flag: Is service active?
Options: Polling interval of the communication table	Polling interval for checking new entries in the communication table
Options: Expiration date for undeliverable commands (hr.)	Expiration date for undeliverable commands
Delete options: Check/delete obsolete entries [h].	Flag: Should obsolete entries be deleted?
Delete options: Execution interval of the check for obsolete entries [h].	How often should you search for obsolete entries?
Delete options: Maximum age of communication entries before they are automatically deleted [h].	Maximum age at which entries are not yet deleted

3.3.3 Sending commands

Path: Configurations > Modules > Worker > Sending Commands



Identifier	Value
Sending Commands	
Timeouts	
Timeout OpStart-Command	00:00:08
Timeout OpStop-Command	00:00:08
Timeout Cancel-Command	00:00:08
Timeout NextPart-Command	00:00:08
Timeout TakeFocus-Command	00:00:08
Timeout BoxEmpty-Command	00:00:08
Timeout QtyReached-Command	00:00:08

Figure 33: Sending Commands

This configuration defines timeouts for various interaction commands of the customer-specific integration solution Turbo PCS (see previous description for External Command Processing).

Designation	Explanation
Timeout times: Timeout at OpStart command	Timeout for interaction command: Start an operation
Timeout times: Timeout at OpStop command	Timeout for interaction command: Stop an operation
Timeout times: Timeout for Cancel command	Timeout for interaction command: Explicit abort of an operation
Timeout times: Timeout for NextPart command	Timeout for interaction command: Next piece
Timeout times: Timeout for TakeFocus command	Timeout for interaction command: Focus changes
Timeout times: Timeout for BoxEmpty command	Timeout for interaction command: Component container is empty
Timeout times: Timeout for QtyReached command	Timeout for interaction command: Target quantity was reached

3.3.4 ERP - ERP object query

Path: Configurations > Modules > Worker > ERP > ERP Object Query

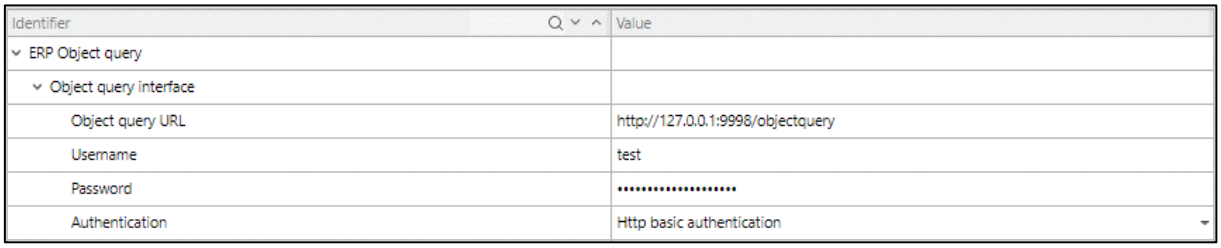


Figure 34: ERP Object Query

This configuration contains the connection parameters for a generic SOAP interface of an external service (used, for example, for component queries against the SAP system). The interface connects the external system to the worker.

Designation	Explanation
Object query URL	URL of the target system
Username	Username of the target system login
Password	Password of the target system login
Authentication	Authentication (No authentication or Http basic authentication)

3.3.5 Terminal Template Merge

Path: Configurations > Modules > Worker > Terminal Template Merge

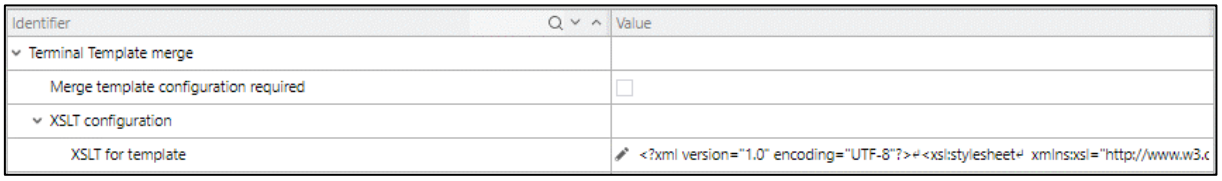


Figure 35: Terminal Template Merge

This configuration contains the SFT template merge XSLT. It is needed for migrating SFT template configurations from a lower version to a higher version.

Designation	Explanation
Terminal template merge: Merge template configuration required	Flag: Is the template merge enabled?
XSLT configuration: XSLT for the template	XSLT for the SFT Template Merge

3.3.6 Computer name

Path: Configurations > Modules > Worker > Computer name

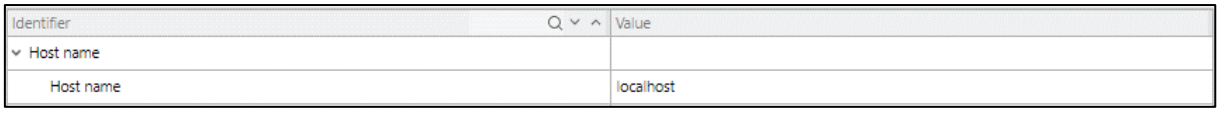


Figure 36: Computer name

This configuration sets the hostname that replaces the placeholder for the static URLs configured in SFT templates.

Designation	Explanation
Computer name	Computer name

3.4 CAQ

3.4.1 Quantity interface

Path: Configurations > Modules > CAQ > Quantity interface

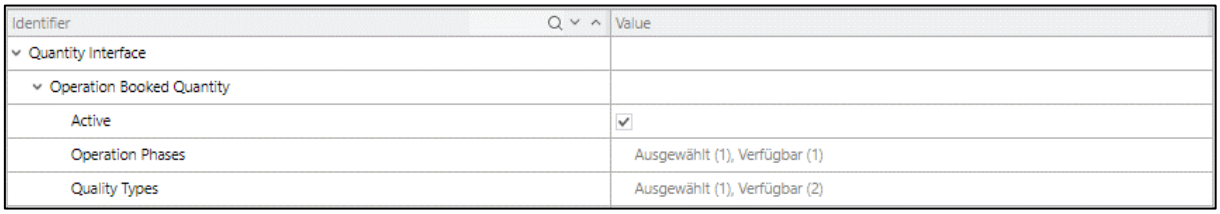


Figure 37: Quantity interface

Configuration of the integration solution for CAQ. After a certain number of quantities, a previously created trigger is triggered, the information of the trigger is made available in a callback in the Bridge API and everyone who has registered to this callback receives this information.

Designation	Explanation
AVO booked quantity: Active	Flag: Should the CAQ module register on a callback event (in the BridgeAPI) to receive the posted ones?
AVO posted quantity: Operation phases	At which operation phases should the posted quantities count for the counter of the trigger (to reach the target quantity (for triggering))?
AVO booked quantity: quality characteristics	For which quantity types should the posted quantities count for the counter of the trigger (to reach the target quantity (for triggering))?

3.5 Web services

3.5.1 URLs

Path: Configurations > Modules > Web Services > URLs

Identifier	Value
Webservice configuration	
TDM API	
URL	(URL
Username	SYSADMIN
Password	••••••••••••••••••••
Language	de_DE
Workplace User Field for the tool preparation time	1
CALLBACK API	
Username	
Password	
CAQ API	
CAQ System	Siemens: QSYS
Active	☐
URL	(URL
Authentication token	
Snooze time (minutes)	10
Trace URL configuration	
URL	(URL
External Serial Number Validation Service	
URL	(URL
Active	☐
CAQ Module	
URL	(URL
Active	☐

Figure 38: URLs

Web service configuration is used to configure web services from external systems and their usage.

Designation	Explanation
TDM API: URL	URL of the TDM system
TDM API: Username	Username for Basic Authentication
TDM API: Password	Password for Basic Authentication
TDM API: Language	language used for messages to TDM
TDM API: Workplace user field for the time of tool provisioning	Number of the workstation user field in which the time for tool provision is stored.
CALLBACK API: Username	Global username for basic authentication for callbacks
CALLBACK API: Password	global password for basic authentication for callbacks
CAQ API: CAQ System	Selection of external CAQ system (currently QSYS and CAQ.net)
CAQ API: Active	Is connection active?
CAQ API: URL	URL of the CAQ system
CAQ API: Authentication token	Token for authentication with the CAQ system
CAQ API: Snooze time (minutes)	Time interval for re-notification of the worker in case of negative check acknowledgement.
TRACE URL configuration: URL	URL of the trace system
External serial number validator service: URL	URL of the service for validating the track and trace serial numbers
External serial number validator service: Active	Should service be used?
CAQ module: URL	URL of the service for integration of external CAQ systems via Node-Red
CAQ Module: Active	Should service be used?

3.5.2 API clients

Path: Configurations > Modules > Web Services > API Clients

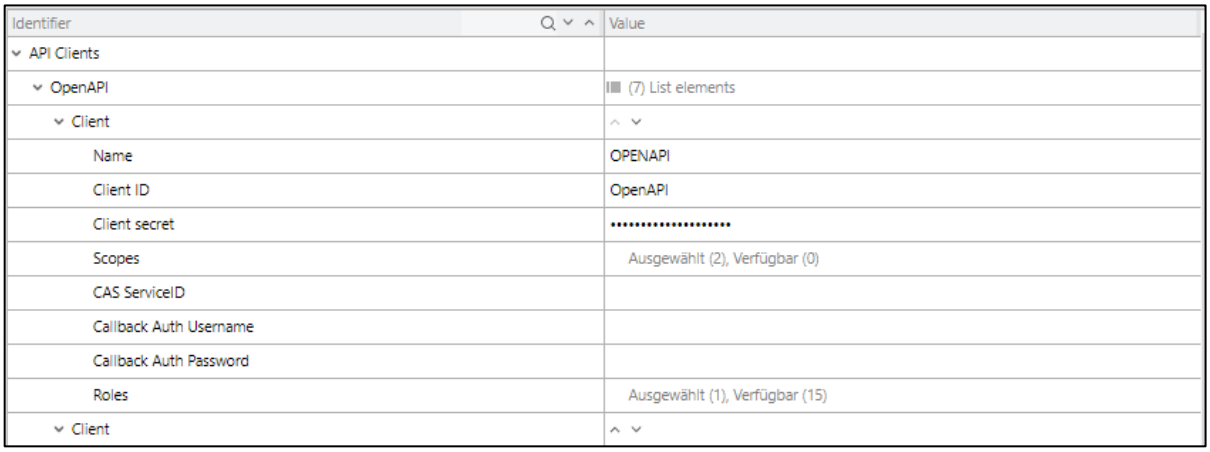


Figure 39: API Clients

Configuration of API clients and corresponding rights for using the Bridge API.

Designation	Explanation
Client - Name	speaking name of the API client
Client - Client ID	ID of the API client
Client - secret	Secret of the API client
Scopes	Scopes for which the API client is authorized
CAS Service ID	CAS Service ID when using OAuth 2 Authorization grant
Callback Auth Username	Client specific username for basic authentication for callbacks
Callback Auth Password	Client specific password for basic authentication for callbacks
Rollers	API client roles

3.5.3 Job Scheduling

Path: Configurations > Modules > Web Services > Job Scheduling

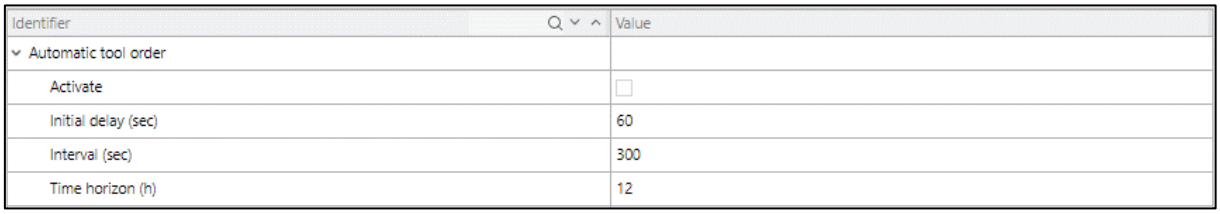


Figure 40: Job Scheduling

Configuration of jobs that run in the background and communicate with external systems.

Designation	Explanation
Activate	Flag: Activate automatic tool picking with TDM
Initial delay (sec)	Initial delay of Automatic Tool Picking after start of ffwebservices
Interval (sec)	Interval at which Automatic Tool Picking is executed
Time horizon (h)	Time horizon for operations for automatic tool picking

3.5.4 Customized settings

Path: Configurations > Modules > Web services > Custom settings

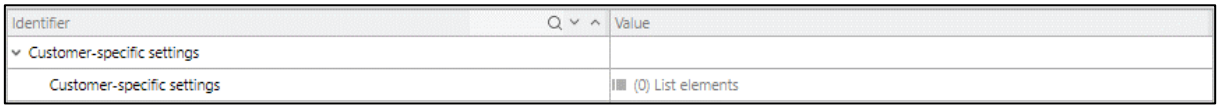


Figure 41: Custom settings

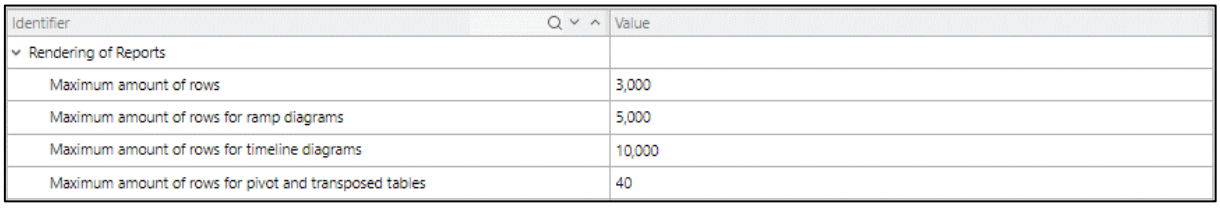
Configuration of user-specific settings that are provided via the corresponding APIs.

Designation	Explanation
UUID	Value for "ID" of the user-specific setting
Value	Value for "value" of the user-specific setting
Topic	Value for "topic" of the user-specific setting
Description	Value for "description" of the user-specific setting

3.6 NewOffice

3.6.1 Rendering reports

Path: Configurations > Modules > NewOffice > Render Reports



Identifier	Value
Rendering of Reports	
Maximum amount of rows	3,000
Maximum amount of rows for ramp diagrams	5,000
Maximum amount of rows for timeline diagrams	10,000
Maximum amount of rows for pivot and transposed tables	40

Figure 42: Render Reports

This configuration controls the maximum supported framework for rendering reports.
This is for system stability.

Designation	Explanation
Maximum number of lines	maximum number of results of the SQL query that forms the basis of a report
Maximum number of lines for ramp diagrams	maximum number of results of the SQL query, which form the basis of a ramp chart
Maximum number of lines for timeline diagrams	maximum number of results of the SQL query that form the basis of a timeline diagram
Maximum number of rows for pivot and transposed tables	maximum number of results of SQL query, which are the basis for pivot and transposed table reports

3.6.2 Report

Path: Configurations > Modules > NewOffice > Report

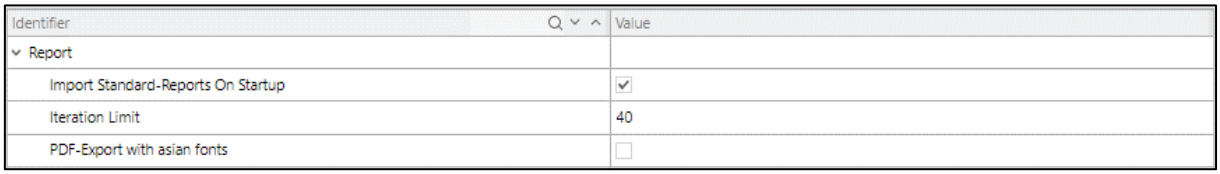


Figure 43: Report

This configuration controls certain aspects of the reports and PDF export.

Designation	Explanation
Import default report at startup	Flag: Should the standard reports be imported at startup? (The import overwrites existing reports with the same ID)?
Iteration limit	What is the maximum number of iteration steps that can be executed in an iterator report?
PDF export with Asian fonts	Flag: Should the PDF export be performed with an Asian font (this is independent of the selected language)?

3.6.3 Order management

Path: Configurations > Modules > NewOffice > Order management

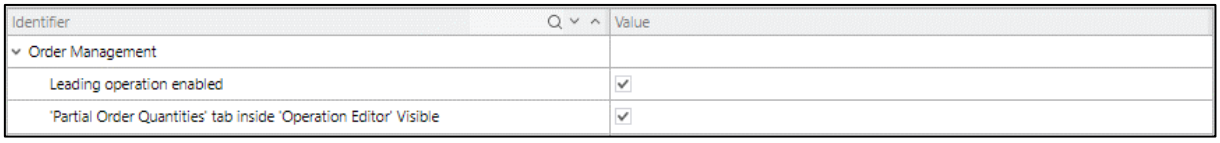


Figure 44: Order management

This configuration controls certain aspects of order management.

Designation	Explanation
Guide operation activated	Flag: Should a new operation be automatically created as a lead operation?
Partial Order Quantities' tab visible in Operation Editor	Flag: Should "Partial Order Quantities" tab be displayed?

4 Annex

4.1 Table of figures