Unified-E SQL Adapter
User Manual

Configure SQL Endpoints and Datapoints

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Content

1 General

With the Unified-E SQL Adapter it is possible to read data from a database for an operator app or to write it to the database.

As with all adapters, data exchange is configured here in the Unified-E App Designer using datapoints. These datapoints can be used in the same way as the datapoints of other adapters.

Use cases:

- Display chart

- Display protocol list

- Display dropdown list for selecting a production order

- User input for production notes

Example: Communication with an ERP system:

The ERP system regularly exports the relevant data for the operator app visualization into a database. Often, a Microsoft Access database is used for data exchange with an ERP system.

Supported database systems:

The adapter already supports the following databases without additional client software from the database vendor:

- Microsoft SQL Server

- Oracle Database

- Microsoft Access Database File

- MySQL Database

Other database systems can be used. For this, a corresponding ODBC or ADO.NET driver must be installed. It can usually be downloaded from the database vendor.

2 Adapter Parameters

The parameters are used for connection configuration, for example the address of the database server or the name of the database.

2.1 Common Parameters

Connection type:

This parameter describes the protocol or to which database system the connection should be established. The specific parameters are documented in the following chapters.

Connection configuration:
- Standard:
  The configuration takes place with the typical connection parameters, which depend on the connection type.
- Connection string:
  The connection string is provider-specific and must be in ADO.NET format. This configuration type should only be used by people with database knowledge.

User ID:

The database user.

Password:

The password of the User ID. It is possible to use the wildcard {password} in the connection string to protect the password also within the connection string.

Database time zone:

The operator apps always receive all date/time values in UTC format (universal time zone) from the Unified-E App Manager. These are then converted to the local time of the operator device (smartphone). For correct representation, the time zone of the date/time values stored in the database must be known.
- Local time zone:
  The date/time values in the database tables are in the same time zone as the App Manager PC.
- Universal time zone:
  The date/time values in the database tables are interpreted as universal (UTC).

Timeout [s]:

The timeout value is used both when establishing a connection and when executing an SQL query.

2.2 Database specific Parameters

2.2.1 Microsoft SQL Server

Windows authentication:
- Yes:
  Login takes place with the Windows user.
- No:
  Login with database user.

Server address:

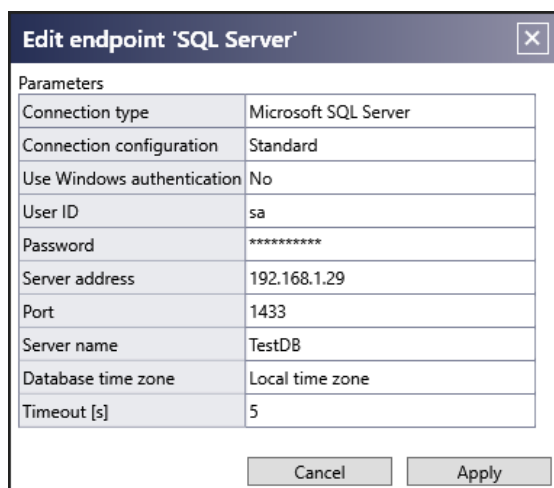The address of the server, e.g. B. URL, computer name, IP address.
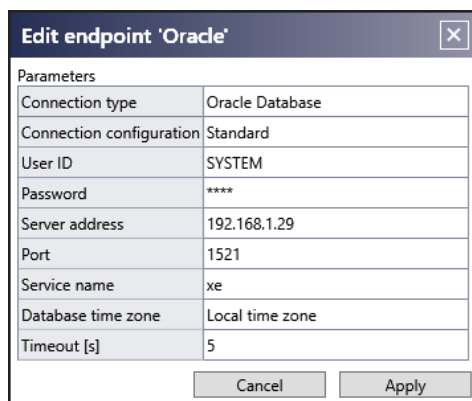

Port:

The TCP port through which the server can be reached.

Server name:

The name of the server instance to use.

Example:

2.2.2 Oracle Database

Server address:

The address of the server, e.g. B. URL, computer name, IP address.

Port:

The TCP port through which the server can be reached.

Server name:

The name of the server instance to use.

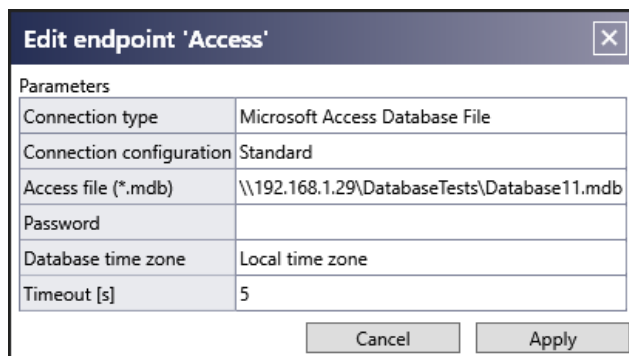Example:

2.2.3 Microsoft Access Database File

The Microsoft Access file (*.mdb) is accessed via OLE DB. The required drivers are preinstalled on Windows operating systems.

Specific parameters:

Access file (* .mdb):

The path to the Access file. Make sure that it is also accessible from the Unified-E Windows service. If the Windows service is running as a Local System user, then mapped drives must not be used.

Example:

2.2.4 MySQL Database

Server address:
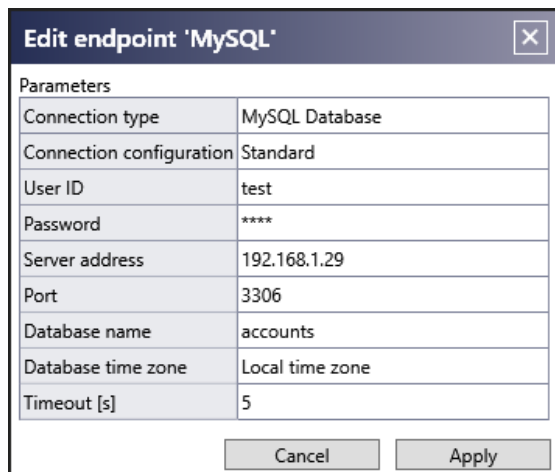
The address of the server, e.g. B. URL, computer name, IP address.

Port:

The TCP port through which the server can be reached.

Database name:

The name of the server instance to use.

Example:

2.2.5 ODBC Data Source

Procedure:

Setting up a connection to an ODBC database is done by the following steps:
1. Install ODBC driver for the database system
2. Define the connection configuration
    a. File DSN (via Control Panel -> ODBC Data Source Administrator)
    b. System DSN (via Control Panel -> ODBC Data Source Administrator)
    c. Directly
3. Set connection parameters in Unified-E

Specific parameters:

Connection configuration:
- System DSN:
  The configuration is read from an existing system DSN. This can be set up using the ODBC Data Source Administrator of the Windows Control Panel.
- File DSN:
  The configuration is read from an existing file DSN. This can be set up using the ODBC Data Source Administrator of the Windows Control Panel.

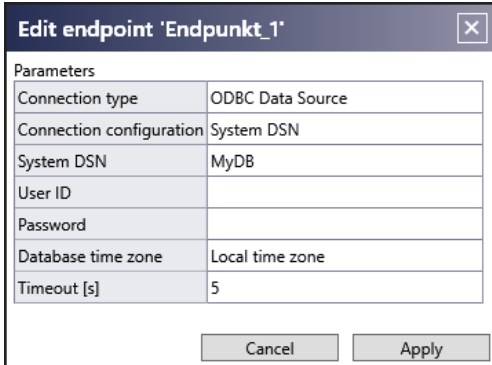Connection string: Enter the connection string manually (see example below).

System DSN:

The system DSN to be used should be selected.

DSN file (* .dsn):

The file DSN to be used is to be selected.

Examples:

2.2.6 Other ADO.NET Data Source

Provider name:

Select the desired ADO.NET provider from the drop-down list.

Connection string:

The specific connection string for the ADO.NET provider. The exact structure of the string is provider-specific and can be found in the corresponding documentation.

3 Addressing of Datapoints

3.1 Read Values

The datapoint value can be addressed using a SELECT command.

Example: Address of a table datapoint:

SELECT TOP 100 CreatedOnTimeStamp, CreatedByUser, IsUrgent, NoteText FROM Notes ORDER BY createdontimestamp DESC

Name	Address		Access	Data type
NotesList	select top 100 CreatedOnTimeStamp, CreatedByUser, IsUrgent, NoteText from Notes order by createdont	Read		Data table
NoteText	name=NoteText; defaultvalue=; datatype=String	...	Write, Read	Text
IsUrgent	name=IsUrgent; defaultvalue=0; datatype=Boolean	...	Write, Read	Yes/No

The data type must be set to "Data table" to use the table in a list or chart panel.

Example: Reading a numerical value:

SELECT max(Id) FROM notes WHERE IsUrgent=true and (createdbyuser <> {system:currentuser})

Name	Address		Access	Data type
NotesList	select top 100 CreatedOnTimeStamp, CreatedByUser, IsUrgent, NoteText from Notes order by createdont	Read		Data table
NoteText	name=NoteText; defaultvalue=; datatype=String	...	Write, Read	Text
IsUrgent	name=IsUrgent; defaultvalue=0; datatype=Boolean	...	Write, Read	Yes/No
AddNoteTrigger	insert into Notes (CreatedOnTimestamp, Createdbyuser, isUrgent, notetext) Values (Now(), {system:curren	...	Write, Read	Numeric
LastUrgentNote	SELECT max(Id) from notes where IsUrgent=true and (createdbyuser <> {system:currentuser})	...	Read	Numeric

When reading a single value, the data type must be set accordingly, in this example to "Numeric".

3.2 Use of Query Parameters

Datapoints can be configured as query parameters. Query parameters can be used within an SQL queries like variables.

Query parameters are always user inputs, so these data points must be configured as "Write, Read".

Use cases:
- List filtering
- Set period of time chart
- User input for UPDATE or INSERT commands

Structure of address:

Example: name=NoteText; defaultvalue=; datatype=String

Name	Address	Access
NotesList	select top 100 CreatedOnTimeStamp, CreatedByUser, IsUrgent, NoteText from Notes order by createdont...	Read
NoteText	name=NoteText; defaultvalue=; datatype=String ...	Write, Read

Address Components:

Name:

The name as used in the placeholder of the SQL command within {}. If curly braces are not to be used for the placeholder in the SQL command (for example, in the string literal), they must be repeated.

Defaultvalue:

The initial value of the parameter.
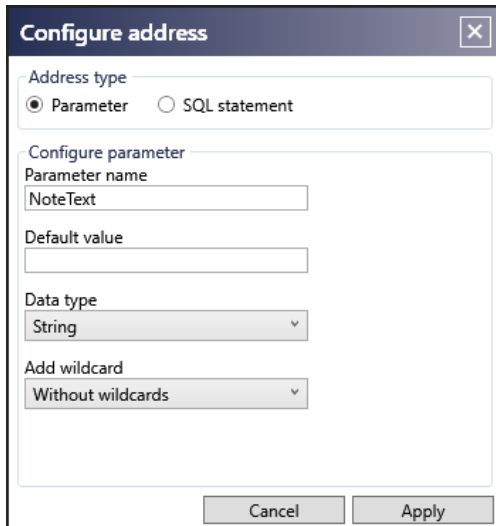

Datatype:

The parameter data type.

- Boolean: 0, 1

- Char: Unicode character

- SByte: Signed 8-bit integer

- Byte: Unsigned 8-bit integer

- Int16: Signed 16-bit integer

- UInt16: Unsigned 16-bit integer

- Int32: Signed 32-bit integer

- UInt32: Unsigned 32-bit integer

- Int64: Signed 64-bit integer

- UInt64: Unsigned 64-bit integer

- Single: IEEE 32-bit float

- Double: IEEE 64-bit double

- Decimal: Decimal

- DateTime: Date/time

- String: Unicode character string

Wildcardtype (optional):

This option is only possible for string parameters. Example: A list should be filtered by name. Then a tolerant filtering with wildcard (%) can be set.

- None: No wildcards

- Before: Wildcard before parameter value

- After: Wildcard after parameter value

- BeforeAndAfter: Wildcard before and after parameter value

Configure address in the editor:

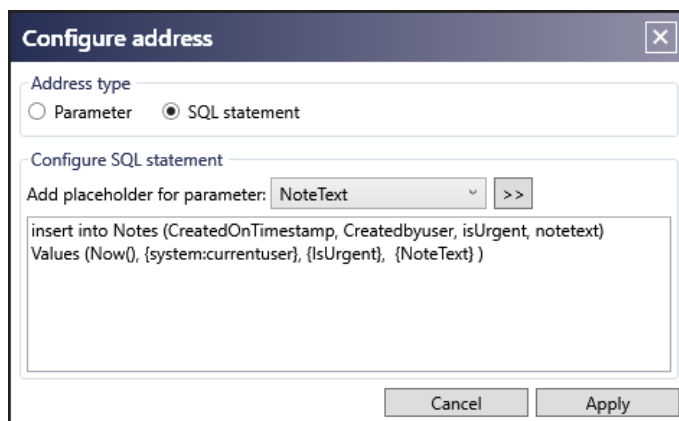

Built-In Parameter:

{system:currentuser}:

The placeholder value represents the name of the current operator app user as registered in the Unified-E App Manager.

3.3 Execute SQL Manipulation Commands

When the data point value of an SQL command is set to "1", the manipulation command is executed.
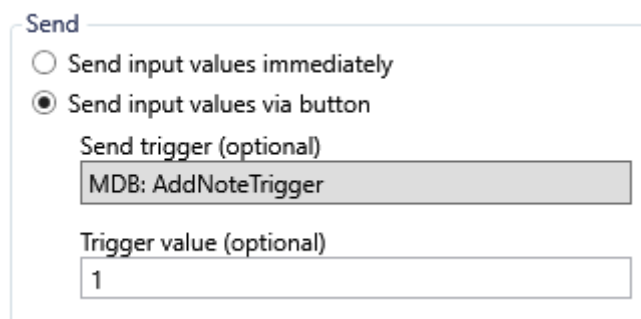
The manipulation command usually also contains placeholders for the parameter data points.

Example address:

Example: trigger manipulation command in the value input panel:

In the properties of an input value panel, pressing the Apply button triggers the INSERT command as follows:

Similarly, a trigger can be triggered when a button is pressed in the button panel.

3.4 Use of Stored Procedures

For stored procedure calls or script calls, a distinction must be made as to whether its return value or the return table should be used in a view, or whether the call changes the data in the database in a similar way like SQL manipulation commands.

Query scripts:

Query scripts assume that the return value is used and that no data is changed in the database. For the SQL command, therefore, the datapoint address must be preceded by the QUERY keyword. For these data points, the access must be set to "Read".

Example of Datapoint Address in MS SQL Server:

QUERY EXEC <procedure name>

Command scripts:

For command scripts, that is, scripts that do not provide a table for display but only modify data in the database, the COMMAND keyword must be prepended to the data point address. For example, you can start a script with parameters when a button clicks in the operator app. Logically, command scripts are always configured with "Write, Read" and are executed by setting the value to "1".

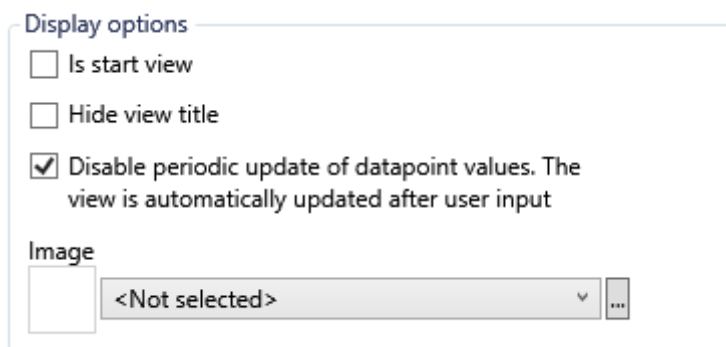Example of Datapoint Address in MS SQL Server:

COMMAND EXEC <procedure name>

4   Performance Hints

View display optimization:

When displaying a view in the operator app, all relevant data are polled in an interval of about 1 to 3 seconds from the endpoint via Unified-E App Manger and the view is updated accordingly.

For a list view or chart view with large tables, this can lead to performance problems. To deactivate the regular update, this must be explicitly deactivated using the view properties.

Optimize evaluation rate for push notification triggers:

By default, it is checked every second if the trigger condition for sending a push message is fulfilled. Each time the current value is read from the endpoint (performance).

The evaluation rate can be adjusted in the "Evaluation rate [s]" column in the push messages table to reduce the database load.

5   Security Hints

Passwords in connection strings should be set via wildcards. Use the string {Password} as the password placeholder and set the password in the password parameter.

Example:

Adapter parameters	
Connection type	Microsoft SQL Server
Connection configuration	Connection string
Connection string	Data Source=tcp:192.168.1.29,1433;Initial Catalog=TestDB;Integrated Security=False;User ID=sa;Password={Password};Connect Timeout=5
Password	**********
Database time zone	Local time zone

Test connection...