COPADATA
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zenon Analyzer manual

Release Notes zenon Analyzer 3.20

v.3.20
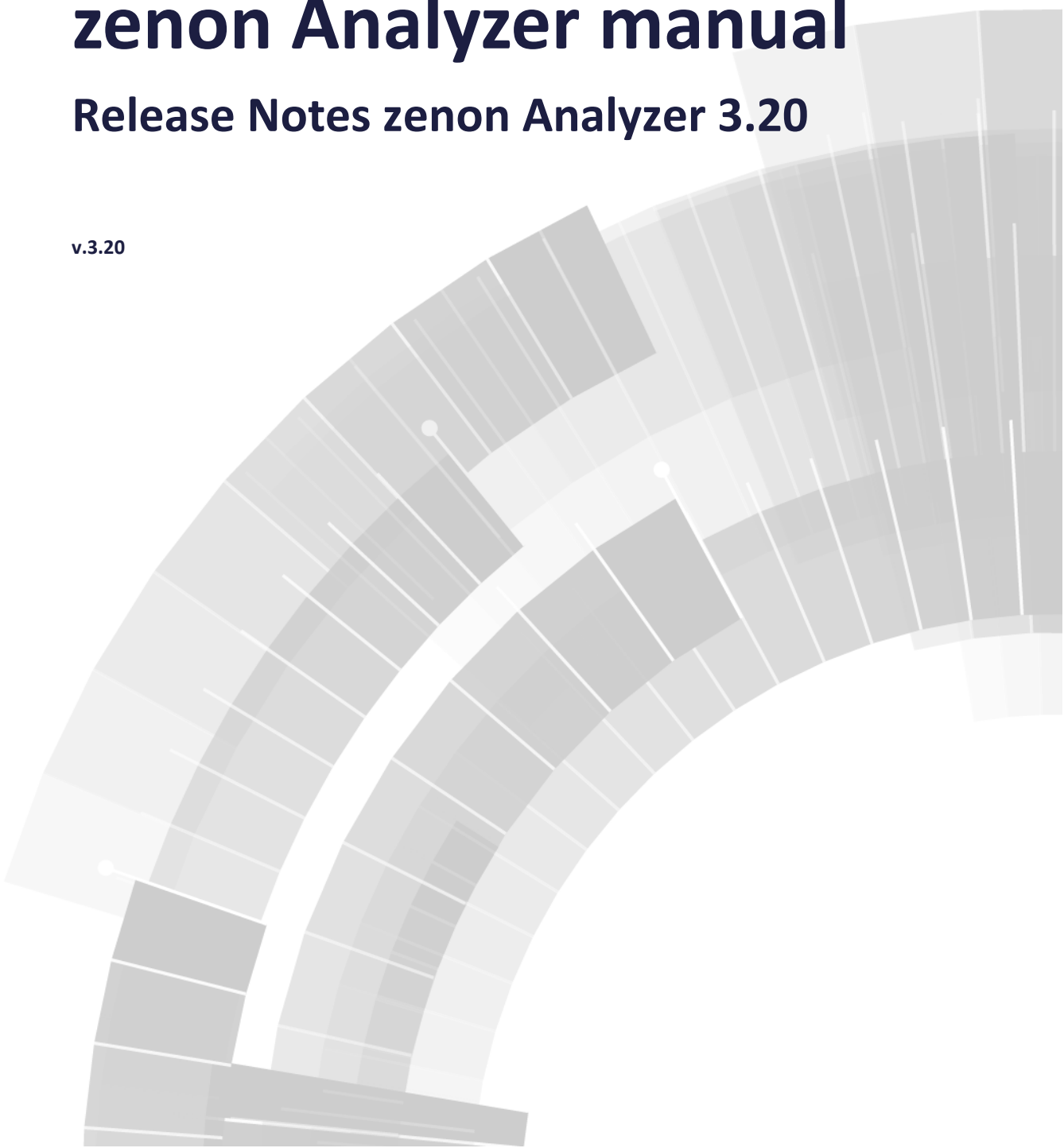
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Contents

1. Welcome to zenon Analyzer help

PROJECT SUPPORT

You can receive support for any real project you may have from our Support Team, who you can contact via email at support@copadata.com.

LICENSES AND MODULES

If you find that you need other modules or licenses, our staff will be happy to help you. Email sales@copadata.com.

2. New features and changes in version 3.20:

3. Requirements

The following prerequisites are applicable for work with the zenon Analyzer:

ANALYZER SERVER HARDWARE AND SOFTWARE

HARDWARE

Analyzer Server:

Parameter	Recommended	Minimum
CPU	Quad-Core Server CPU (maximum 24 cores/4 sockets)	Quad-core
RAM	Up to 128 GB	12 GB
Free memory	200 GB	10 GB

Engineering computer:

Parameter	Recommended	Minimum
CPU	Dual Core	Pentium IV
RAM	4 GB	1 GB
Free memory	200GB	2 GB
Monitor (pixels)	1920 x 1080	1024 x 768

SOFTWARE

Analyzer Server:

A 64-bit operating system is required for the database server. The following are supported:

- ▶ Windows Server 2012 R2
- ▶ Windows Server 2012
- ▶ Windows Server 2016
- ▶ Windows 8.1 64-Bit
- ▶ Windows 8.1 Pro 64-Bit
- ▶ Windows 8.1 Enterprise 64-Bit
- ▶ Windows 8 64-Bit
- ▶ Windows 8 Pro 64-Bit
- ▶ Windows 8 Enterprise 64-Bit
- ▶ Windows 10 Home 64-Bit
- ▶ Windows 10 Professional 64-Bit
- ▶ Windows 10 Enterprise 64-Bit

Note: An installed IIS service is required for the installation of the server.

Engineering computer:

The following are supported for ZAMS, the manual data editor, metadata editor and migration tool:

- ▶ Windows Server 2012 R2
- ▶ Windows Server 2012

- ▶ Windows Server 2016

- ▶ Windows 8.1 32-Bit and 64-Bit

- ▶ Windows 8.1 Enterprise 32-Bit and 64-Bit

- ▶ Windows 8 32-Bit and 64-Bit

- ▶ Windows 8 Pro   32-Bit and 64-Bit

- ▶ Windows 8 Enterprise 32-Bit and 64-Bit

- ▶ Windows 10 Home 32-Bit and 64-Bit

- ▶ Windows 10 Professional 32-Bit and 64-Bit

- ▶ Windows 10 Enterprise 32-Bit and 64-Bit

Web browser:

- ▶ Internet Explorer 11 (normal view only)

- ▶ Internet Explorer 10 (normal view only)

- ▶ Chrome

- ▶ Firefox

  Note: Zoom in the report is only possible with Chrome.

Recommended HMI/SCADA system:

- ▶ zenon 7.60.

.NET Framework 4.6.2:

- ▶ .NET Framework 4.6.2 has to be already run capable on the target computer in order to end the installation successfully.

CONNECTORS

The following is applicable for the SCADA Runtime connector:

- ▶ Timeout: is independent of the report timeout.
  Default: 5 minutes (can be configured)

- ▶ Variables: Only variables that are listed in metadata are requested

- ▶ String variable: maximum of 4000 characters

The performance of a connector depends on the:

- ▶ Performance of the Analyzer server

- ▶ Performance of the Runtime server

- ▶ Load of the Runtime servers (connector runs with low priority)

▶   Network performance and network load

PROJECTS AND FILTERS

Reports can generally be created throughout several projects.

> ⚠️   **Attention**
>
> *Only archive data with variables from its own project can be evaluated.*
>
> *This means: For example, in an integration project, if a variable from a subproject is archived in an archive, then zenon Analyzer cannot access this variable.*

SCHEDULES

▶   **Calendar days in months** are limited to `1 - 28` (corresponds to February in non-leap years)

▶   The "`Month end`" event is not available

ANALYZER EXPORT WIZARD

The   Analyzer Export Wizard works, depending on the version, with different zenon Analyzer versions and different zenon versions. For details, read the **Analyzer wizard compatibility** chapter.

> 💡   **Information**
>
> *Do not use zenon color palettes for dynamic limit values for zenon projects whose data is to be exported for zenon Analyzer. Limit values cannot be dynamically amended in zenon Analyzer. Information from color palettes can therefore not be evaluated. This can lead to illegible graphics.*

4. Licensing (F 68108)

In order to be able to use zenon Analyzer, all components must be licensed using a serial number. Licensing has been newly implemented for version 3.20:

▶   Customers get licenses for hardware dongles, computer-bound for software dongles and for VM dongles.

▶   Licenses can now also be returned and transferred.

▶ The new license management makes it possible to obtain, administer, update and activate licenses.

▶ Licenses can be obtained as a software dongle or hardware dongle, each either locally or in the network. The licensing of products for use on VMs is possible. The licensed modules and the structure of these is shown in the license information for the products.

5. Analyzer Wizards

The Analyzer Export Wizard has been amended to version 3.20.

The following wizards are available for the following versions of zenon:

Wizard \ zenon version	8.00	7.60	7.50	7.20	7.11	7.10	7.00
Meaning and Waterfall Chart Wizard	X	X	X	X	X	X	––
Sankey Wizard	X	X	X	X	X	X	––
Export Wizard for Analyzer 3.10 and 3.20	X	X	X	X	––	––	––
Export Wizard for Analyzer 3.00	X	X	X	X	X	––	––
Export Wizard for Analyzer 2.20	X	X	X	X	X	X	––
Export Wizard for Analyzer 2.10	X	X	X	X	X	X	X
Export Wizard for Analyzer 2.00	––	––	––	––	––	X	X

Key:

▶ X: available

▶ ––: not available

6. Connectors

6.1 Autostart Connector Container (F 66286)

The connector container can be started automatically using the **Startup Tool** if a user logs on at the computer. Autostart is activated via **Application -> Options** in the **Startup** tab.

7. Reports and Report templates (F 23096, F 24006)

With zenon Analyzer - depending on the licensing - pre-configured report templates are supplied for the creation of reports with ZAMS. Report templates are configured in ZAMS. You can find details on the input elements at the respective report template and in the Elements in the report area   chapter.

Note for developers of reports: These reports use stored procedures and user-defined function blocks, that are described in the documentation for developers.

> 💡 **Information**
>
> *Handling with time interval for archive aggregation and display in the report:*
>
> ▶ Interval less or equal to 60 minutes:
>   The correct time interval in UTC is noted for aggregation.
>
> ▶ Interval greater than 60 minutes:
>   The correct time interval in the server's local time is noted for aggregation.
>
> ▶ Local time is always used for the display. If the user and server are in different time zones, there may be differences.

LICENSE REPORT TEMPLATES

Report templates must be licensed in order to be able to use them. Different license packages are available. You can find details on licenses for report themes and report templates form the price list or contact your COPA-DATA contact partner.

SUPPLIED REPORT TEMPLATES

The following report templates are available:

ALARM AND EVENT ANALYSIS

Report templates for the evaluation of alarms and events.

▶ **Alarm List**: Creates a list of alarms in table form for a time range.

▶ **Top N Alarms**: Gets a defined number (N) of alarms that occur most frequently in a time range or have been active for the longest.

▶ **Top N Alarms grouped**: Gets all alarms in the time period, groups them according to the set criteria (alarm class, for example) and displays the N groupings with the most alarms or the longest sum of duration pending.

▶ **Alarm Aggregation**: Creates graphical and tabular representations of aggregated alarm data.

▶ **Event list**: Creates a list of events in table form for a time range.

▶ **Top N Events**: Gets a defined number (N) of events that occur most frequently in a time range.

▶ **Top N Events grouped**: Gets all events in the time period, groups them according to the set criteria (event class, for example) and displays the N groupings with the most events.

CUSTOM FORMULA ANALYSIS

Report templates for custom formulas.

▶ Custom Formula Trend: Trend display of user-defined formulas for a time range.

▶ Custom Formula Aggregated Trend: Trend display of aggregated user-defined formulas for a time range.

▶ Custom Formula Aggregation: Trend display of aggregated, user-defined formulas for a time range.

HISTORIAN ANALYSIS

Report templates for the evaluation and direct or aggregated display of archive data.

▶ **Historian Trend**: Gets archive data for a time range and displays this without aggregation in a trend

▶ **Historian Aggregated Trend**: Gets archive data for a time range, aggregates this in intervals in the time range and displays it as a trend.

▶ **Historian Aggregation**: Gets archive data for a time range, aggregates this and displays each of the aggregation results separately

▶ **Historian Distribution**: Gets archive data for a variable, rounds this up to a configurable rounding factor and displays the distribution of the values.

EFFICIENCY CLASS ANALYSIS

Report templates for efficiency analyses based on efficiency class models in conjunction with archives, equipment or user-defined formulas.

▶ **Archive based efficiency report**: Carries out an efficincy analysis based on archive data for a certain time period.

▶ **Equipment group based efficiency report**: Carries out an efficiency analysis based on equipment groups for a time period.

▶ **Formula based efficiency report**: Carries out a formula-based efficiency analysis for a certain time period.

ENERGY DATA MANAGEMENT

Report templates from the themes **Historian analysis**, **efficiency class analysis**, **Extended Historian analysis** and **ISO 50001** for the analysis of energy data management systems.

Historian Analysis:

- ▶ Historian Trend
- ▶ Historian Aggregation

Efficiency Class Analysis

- ▶ **Archive based efficiency report**: Carries out an efficincy analysis based on archive data for a certain time period.

- ▶ **Equipment group based efficiency report**: Carries out an efficiency analysis based on equipment groups for a time period.

Extended Historian Analysis:

- ▶ Historian Aggregation with Equipment Group and Variable Selection
- ▶ Historian Aggregated Trend per Equipment Group
- ▶ Historian Aggregated Trend with Equipment Group and Variable Selection
- ▶ Distribution per Variable
- ▶ Cost Distribution per Equipment Model

ISO 50001:

- ▶ Load Duration Curve with Variable Selection
- ▶ Load Duration Curves for Equipment Groups

EXTENDED HISTORIAN ANALYSIS

Report templates for archive aggregation or archive distribution, taking into account prices, norm values and production counters.

- ▶ Historian Trend with Equipment Group and Variable Selection: Creates a trend analysis without aggregation for a time period with a trend for each variable.

- ▶ Historian Trend per Equipment Group: Creates a trend analysis without aggregation for a time period with a trend for each equipment group.

- ▶ Historian Aggregated Trend with Equipment Group and Variable Selection: Creates an aggregated trend analysis for a time period with a trend for each variable.

- ▶ Historian Aggregated Trend per Equipment Group: Creates an aggregated trend analysis for a time period with a trend for each equipment model.

▶ Historian Trend with Equipment Group and Variable Selection: Calculates, for each variable, aggregated archive data for a time period with the aggregation functions sum, average, minimum and maximum.

▶ Historian Aggregation per Equipment Group: Calculates, for each equipment group, aggregated archive data for a time period with the aggregation functions sum, average, minimum and maximum.

▶ Historian Trend with Limits with Variable Selection: Evaluates trends with limit values and limit value violations for trends.

▶ Historian Aggregated Trend with Limits with Variable Selection: Evaluates aggregated trends with limit values and limit value violations for aggregated trends.

▶ Relative Historian Aggregated Trend with Equipment Group and Variable Selection: Creates a relative aggregated trend analysis for a time period with a trend for each variable.

▶ Relative Historian Aggregated Trend with Equipment Group and Variable Selection to Standard: Creates a relative aggregated trend analysis for a time period for a variable with a comparison with standard values.

▶ Relative Historian Aggregation with Equipment Group and Variable Selection: Calculates the aggregated cost distributions for a time period that is based on variables.

▶ Relative Historian Aggregation per Equipment Group: Calculates aggregated distribution data for equipment groups for a time period.

▶ Cost Aggregation with Equipment Group and Variable Selection: Calculates the aggregated cost distributions for a time period that is based on variables.

▶ Cost Aggregation per Equipment Group Calculates the aggregated cost distributions for a time period that is based on equipment models.

ISO 50001

Report templates for **ISO 50001**:

▶ Load Duration Curve with variable selection: Creates a load duration curve that is based on variable selection.

▶ Load Duration Curve for Equipment Groups: Creates a load duration curve that is based on variable selection per equipment group.

▶ Carpet Plot: Gets and aggregates data for a carpet plot.

▶ Sankey Diagram: Reads the Sankey definitions, gets data and aggregates it, integrates dynamic loss detection if required and displays the result as a diagram or table.

Plus all report templates from the **efficiency class analysis**, **Extended Historian analysis** and **custom formula analysis** themes**.**

PRODUCTION ANALYSIS LINE BASED

Report templates for Production Analysis Line Based.

- ▶ **Gantt Chart**: Analyzes lots, shifts and variables - specified through meanings, from AML, CEL or archive - and displays the results as a Gantt chart and as a table.

- ▶ **Gantt chart with area assignment**: Analyzes lots, shifts and variables and displays the result as a Gantt chart and in table form. Variables are specified through meanings from AML, CEL or archive. Numerical values are assigned from classes derived from **REMA**-**STATENAMES**.

- ▶ **Line Losses Analysis** (with lot tracking) Evaluates loss times on lines with lot tracking and provides the lot trends to the line machines.

- ▶ **Line Productivity Indicators Analysis** (with lot tracking): Evaluates productivity indicators on lines with lot tracking and provides the lot trends to the line machines.

- ▶ **Comprehensive Line Productivity Analysis** (with lot tracking) Combines the **Line Losses Analysis** (with lot tracking) and **Line Productivity Indicators Analysis** (with lot tracking) templates. Analyzes archive data and calculates aggregated loss times and productivity indicators for a time period, based on an equipment group.

- ▶ **Line Losses Analysis** (without lot tracking): Analyzes archive data and calculates aggregated loss times for a time period, based on an equipment group and a waterfall model.

- ▶ **Line Productivity Indicators Analysis** (without lot tracking) Analyzes archive data and calculates aggregated productivity indicators for a time period, based on an equipment group.

- ▶ **Comprehensive Line Productivity Analysis** (without lot tracking) Combines the **Line Losses Analysis (without lot tracking)** and **Line Productivity Indicators Analysis (without lot tracking)** templates. Analyzes archive data and calculates aggregated loss times and productivity indicators for a time period, based on an equipment group.

- ▶ **Line Losses Lot History** (with lot tracking): Analyzes archive data and calculates aggregated loss times for each lot, based on an equipment group.

- ▶ **Line Productivity Indicators Lot History** (with lot tracking) Analyzes archive data and calculates aggregated production indicators for each lot in a time period, based on an equipment group.

- ▶ **Comprehensive Line Productivity Lot History** (with lot tracking) Combines the **Line Losses Lot History** (with lot tracking) and **Line Productivity Indicators Lot History** (with lot tracking) templates. Analyzes archive data and calculates the aggregated loss times and aggregated productivity indicators for a time period, based on an equipment group.

PRODUCTION ANALYSIS MACHINE BASED

Report templates for the analysis of loss times and productivity, based on standards.

- ▶ Losses Analysis: Analyzes archive data and calculate aggregated loss times for a time period, based on an equipment group and a waterfall model.

- ▶ Productivity Indicators Analysis: Analyzes archive data and calculates aggregated productivity indicators for a time period, based on an equipment group.

- Comprehensive Productivity Analysis: Combines the **Losses Analysis** and **Produktivity indicators Analysis** report templates.

- Losses Lot History: Analyzes archive data and calculates aggregated loss times for each lot, based on an equipment group.

- Productivity Indicators Lot History: Analyzes archive data and calculates aggregated production indicators for each lot in a time period, based on an equipment group.

- Comprehensive Productivity Lot History: Combines the **Losses Lot History** and **Productivity Indicators Lot History** templates.

OEE ANALYSIS

Report templates for the calculation and display of OEE key figures:

- OEE Indicator: Calculates the OEE performance figures for a selected equipment model in a time period and displays the performance figures in graphic form

- OEE Indicator Lot History: Calculates the OEE indicators for a selected equipment model for each lot in a period of time and displays the performance figures in graphic form and table form

PREDICTIVE ANALYTICS

Report templates for predictions:

- **Prediction Trend per Variable**: Shows historical data and predictive data as a trend per variable.

- **Prediction Trend per Equipment Group**: Shows historical data and predictive data as a trend per equipment group.

- **Aggregated Prediction Trend per Variable**: Shows aggregated historical data and aggregated predictive data as a trend per variable.

- **Aggregated Prediction Trend per Equipment Group**: Shows aggregated historical data and aggregated predictive data as a trend per equipment group.

- **Prediction Aggregation per Variable**: Shows aggregated historical data and aggregated predictive data per variable.

- **Prediction Aggregation per Equipment Group**: Shows aggregated prediction data per equipment group.

- **Relative Prediction Aggregation per Variable**: Shows aggregated historical relative data and aggregated predictive relative data per variable.

- **Relative Prediction Aggregation per Equipment Group**: Shows aggregated historical relative data and aggregated predictive relative data per equipment group.

- **Cost Prediction Aggregation per Variable**: Shows aggregated historical cost data and aggregated predictive data per variable.

▶ **Cost Prediction Aggregation per Equipment Group**: Shows aggregated historical cost data and aggregated predictive cost data per equipment group.

▶ **Prediction Scatter Plot**: Creates a scatter plot of 2 indicators and show their predicted values.

▶ **Prediction Scatter Plot with Reference Curve**: Creates a scatter plot with reference curves of 2 indicators and shows their predicted values.

▶ **Prediction Model Trainings History**: Creates a report training history and diagnosis.

TARGET ACTUAL ANALYSIS

Report templates for the comparison of any desired machine-related measured sizes.

▶ **Target Actual Aggregated Trend (absolute)**: Compares two variables or one variable (actual) with a standard (target). Calculates absolute counter and displays it.

▶ **Target Actual Aggregated Trend (relative)**: Compares two variables or one variable (Ist) with a standard (Soll). Calculates relative counter and displays it.

▶ **Scatter Plot**: Creates a scatter plot of a value pair for a time period.

▶ **Scatter Plot with Reference Curve**: Creates a scatter plot for the comparison of any desired machine-related measured sizes with set values.

STATISTICAL ANALYSIS

Report templates for the statistical analysis of data:

▶ **Process Capability**: Calculates the process capability index (**Cp**) and the critical process capability index (**Cpk**) from the archived average values and standard deviations.

▶ **Process Capability based on raw data**: Calculates the process capability index (**Cp**) and the critical process capability index (**Cpk**) from the archived measured values.

▶ **Process Capability Trend**: Calculates the process capability (**Cp**) and the critical process capability index (**Cpk**) from the archived average values and standard deviations, and displays the results as a trend. The calculation of the trend display for **Cp** and **Cpk** can be either over a time interval or a random spot-check sample.

▶ **Process Capability Trend based on raw data**: Calculates the process capability (**Cp**) and the critical process capability index (**Cpk**) from the archived measured and displays **Cp**- and **Cpk** results as a trend. The calculation of the trend display for **Cp** and **Cpk** can be either over a time interval of a random spot-check sample.

▶ **Control Chart**: Displays a control chart, based on the archived average values and standard deviations of a measured size.

▶ **Control Chart based on raw data**: Displays a control chart based on an archived measured size.

▶ **Boxplot**: Evaluates archived values statistically. The variables can be addressed by means of either archives or equipment groups.

▶ **XY Trend Variable Based**: Displays an XY trend with selection of the variables for **X** and **Y**.

▶ **XY Trend based on meanings**: Displays an XY trend for several equipment groups. The variables for **X** and **Y** are searched for on the basis of meanings.

▶ **Histogram**: Create histograms for archived variables.

HYDROELECTRIC POWER PLANT ANALYSIS

Report templates that determine and display various counters for hydroelectric power plants.

▶ **Operating Time per Operation Mode and Machine Component**: Calculates operating times for the individual operating modes of a machine and machine components.

▶ **Operating Time per Operation Mode or Frequency Control Mode**: Calculates operating times for a machine including times in which the machine is running in either operating or frequency regulation mode.

▶ **Operating Time per Machine Component**: Analyzes absolute operating times of components of an item of equipment or several items of equipment since they were last replaced and since they were last inspected.

▶ **Operating Time per Power Range**: Calculates operating times for a machine per power range.

▶ **Circuit Breaker Switching Cycles (Switchyard single selection)**: Calculates switching cycles for circuit breakers with individual selection of equipment models.

▶ **Circuit Breaker Switching Cycles (Circuit Breaker multiple selection)**: Calculates switching cycles for circuit breakers with multiple selection of equipment models.

▶ **Active and Reactive Energy Meters (Parent Machine single selection)**: Calculates counter values for active and reactive power on the basis of an equipment group with subgroups.

▶ **Active and Reactive Energy Meters (Machine multiple selection)**: Calculates counter values for active and reactive power on the basis of selected equipment groups.

▶ **Power Line Frequency**: Calculates time counters for different frequency bands of the network frequency of a machine.

▶ **Machine Event Counters (Machine single selection)**: Calculates counters for different events that may occur for a machine.

▶ **Set Point Change Event Counters (Machine multiple selection)**: Determines counters for different machine events: Switching on and off as well as changes to the set value.

▶ **Nozzle Mode Change Event Counters (Machine multiple selection)**: Determines counters for different machine events: Switching on and off as well as changes to the nozzle mode.

▶ **Load Shedding Active Power Ranges Event Counters (Machine multiple selection)**: Determines counters for different machine events: Switching on and off as well as load shedding in configurable active power ranges.

▶ **Load Shedding Turbine Speed Ranges Event Counters (Machine multiple selection)**: Determines counters for different machine events: Switching on and off as well as load shedding in configurable turbine speed ranges.

▶ **Machine Start Counters**: Show starts of the machine sets for turbine and pump operation.

From Target Actual Analysis theme:

▶ **Scatter Plot**: Creates a scatter plot for the comparison of any desired machine-related measured sizes with set values.

Scatter Plot with Reference Curve: Creates a scatter plot of a value pair for a time period.

WIND POWER PLANT ANALYSIS

Reports with this theme provide report templates that determine and display various counters for wind power plants.

▶ Wind Rose: Displays aggregated indicator values of equipment groups, grouped according to wind direction.

From Target Actual Analysis theme:

▶ **Scatter Plot**: Creates a scatter plot for the comparison of any desired machine-related measured sizes with set values.

▶ **Scatter Plot with Reference Curve**: Creates a scatter plot of a value pair for a time period.

NOTE ON REPORTS AND ACTIONS WITH SP/UDF

When an SP or UDF of ZAMS is overwritten in the database, it is not present for the duration of this process. This can lead to errors when executing existing reports, if these access the SP or UDF at precisely the moment between deletion and recreation.

Recommendation: Do not execute any reports whilst actions are being carried out with ZAMS that relate to these reports. Most of all if ZAMS:

▶ is deploying reports

▶ is updating the connector functions in the database

▶ is creating the SQL connector

7.1 Calculated fields (58417)

The columns of the main data sets can be configured individually. In doing so, calculated fields can be added to the fields that are already present.

Possible use of calculated fields:

▶ Operations on different variables in a pivoted data set, in order to put the variables in relation to one another.
Example: `=Fields!TEMPERATURE1.Value – Fields!TEMPERATURE2.Value`

- ▶ Pivoted tables to generate grouped columns for report templates of the themes **archive analysis**, **Extended Historian analysis** and **Custom formula analysis**.

- ▶ Operations on the values of variables in different time periods when comparing time periods.

- ▶ Changing variable names.
  Example: Remove **Project/Archive** variable prefix
  For example `=Fields!VARIABLE_NAME.Value.Split("-"c)(1).Trim()` removes the text before the first minus.

- ▶ Special display or formulation of values or date values.

- ▶ Value conversions.

- ▶ Combination of information, i.e. displaying the content of several columns in one column.

UPDATE STRUCTURE DURING DEPLOYMENT

Amended structures can now be updated for prepared reports without having to intervene in the layout. All report elements, as well as headers and footers, are retained as in the report saved on the server. To replace only the structures, during deployment, click on the **Update structure** or **Update structure for all** symbol in the **Report** ribbon.

7.2 Add report template dialog updated (F 57077)

The dialog to update report templates has been updated.

It now offers themes and report templates in lists. Report templates are sometimes grouped in order to make it easier to find things.
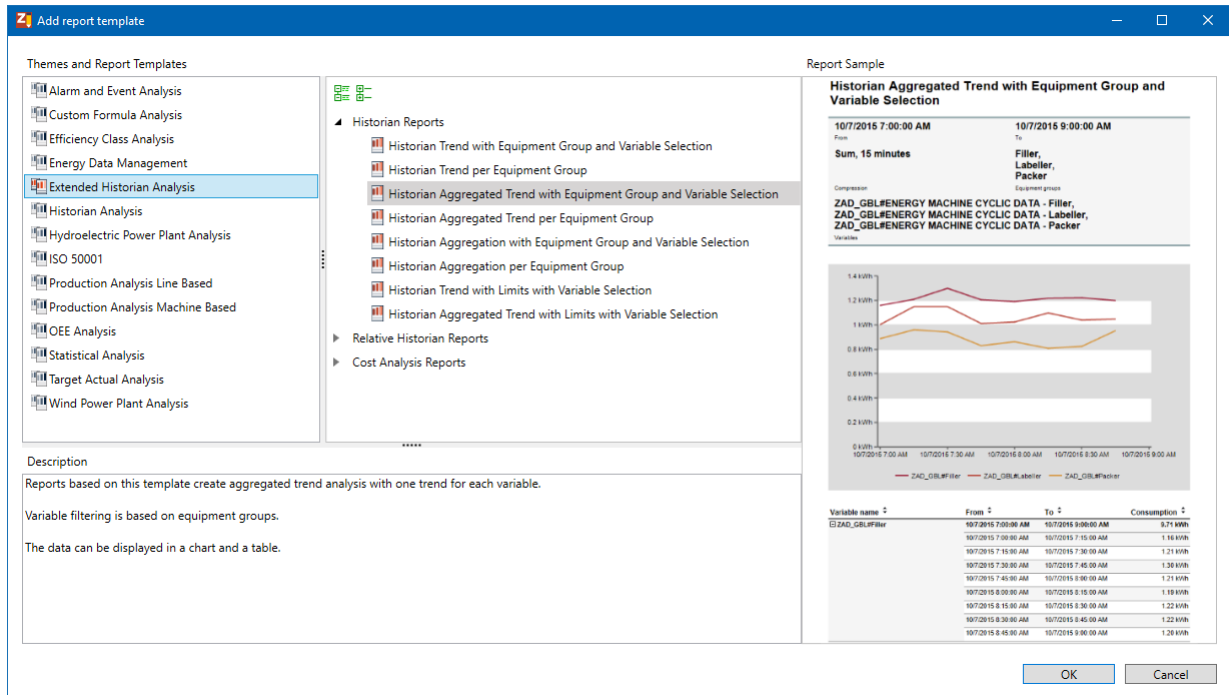
The dialog is now always opened with the settings last selected by the user.

7.3 New report templates (F 52556)

zenon Analyzer 3.20 now has new report templates with:

▶ Theme Alarm and Event Analysis

- Top N Alarms grouped: Gets all alarms in the time period, groups them according to the set criteria (alarm class, for example) and displays the N groupings with the most alarms or the longest sum of duration pending.

- Top N Events grouped: Gets all events in the time period, groups them according to the set criteria (event class, for example) and displays the N groupings with the most events.

▶ Extended Historian Analysis theme:

- **Historian Trend with Limits with Variable Selection**: Evaluates trends with limit values and limit value violations for trends.

- **Historian Aggregated Trend with Limits with Variable Selection**: Evaluates aggregated trends with limit values and limit value violations for aggregated trends.

▶ Statistical Analysis theme:

- **Process Capability**: Calculates the process capability index (**Cp**) and the critical process capability index (**Cpk**) from the archived average values and standard deviations.

- **Process Capability based on raw data**: Calculates the process capability index (**Cp**) and the critical process capability index (**Cpk**) from the archived measured values.

- **Process Capability Trend**: Calculates the process capability (**Cp**) and the critical process capability index (**Cpk**) from the archived average values and standard deviations and displays the results as a trend. The calculation of the trend display for **Cp** and **Cpk** can be either over a time interval of a random spot-check sample.

- **Process Capability Trend based on raw data**: Calculates the process capability (**Cp**) and the critical process capability index (**Cpk**) from the archived measured and displays **Cp**- and **Cpk** results as a trend. The calculation of the trend display for **Cp** and **Cpk** can be either over a time interval of a random spot-check sample.

- **Control Chart**: Displays a control chart, based on the archived average values and standard deviations of a measured size.

- **Control Chart based on raw data**: Displays a control chart based on an archived measured size.

- **Boxplot**: Evaluates archived values statistically. The variables can be addressed by means of either archives or equipment groups.

- **XY Trend Variable Based**: Displays an XY trend with selection of the variables for **X** and **Y**.

- **XY Trend based on meanings**: Displays an XY trend for several equipment groups. The variables for **X** and **Y** are searched for on the basis of meanings.

- **Histogram**: Creates histograms for archived variables.

7.4   Pareto diagram enhanced (F 52556, F61905)

The Pareto diagram has been enhanced for the **Alarm and event analysis** theme.

This Pareto diagram provides the following information for this theme, depending on the columns available in the Stored Procedure:

▶ Left Y-axis: from 0 up to the maximum of the absolute value sums

▶ Right Y-axis: from 0% up to the maximum of the relative values sums

▶ 10 stages on both Y-axes

▶ Bars with absolute values of the groups are marked and bound to the left Y-axis

▶ Line with relative value sums of the groups are marked (with markings for the individual points) and bound to the right Y-axis

The following columns must be present in the SP for this:

▶ Absolute value of a group

- Relative value of a group

- Sum of the absolute value of this group and all previous groups

- Sum of the relative value of this group and all previous groups

The display for **Machine-based production analysis** and **line-based production analysis** is unchanged.

ENHANCED USE

The Pareto diagram is now also available in the following report templates:

- **Historian Trend**

- Historian Aggregated Trend

- Historian Aggregation

- Historian Trend with Equipment Group and Variable Selection

- Historian Trend per Equipment Group

- Historian Aggregated Trend with Equipment Group and Variable Selection

- Historian Aggregated Trend per Equipment Group

- Historian Aggregation with Equipment Group and Variable Selection

- Historian Aggregation per Equipment Group

- Relative Historian Aggregation with Equipment Group and Variable Selection

- Relative Historian Aggregation per Equipment Group

- Cost Aggregation with Equipment Group and Variable Selection

- Cost Aggregation per Equipment Group

- Custom Formula Trend

- Custom Formula Aggregated Trend

- Custom Formula Aggregation

7.5   Predictive Analytics (F 64239)

The new theme of report templates has been added: **Predictive Analytics**.

This theme contains the following report templates:

- **Prediction Trend per Variable**: Shows historical data and predictive data as a trend per variable.

- **Prediction Trend per Equipment Group**: Shows historical data and predictive data as a trend per equipment group.

▶ **Aggregated Prediction Trend per Variable**: Shows aggregated historical data and aggregated predictive data as a trend per variable.

▶ **Aggregated Prediction Trend per Equipment Group**: Shows aggregated historical data and aggregated predictive data as a trend per equipment group.

▶ **Prediction Aggregation per Variable**: Shows aggregated historical data and aggregated predictive data per variable.

▶ **Prediction Aggregation per Equipment Group**: Shows aggregated prediction data per equipment group.

▶ **Relative Prediction Aggregation per Variable**: Shows aggregated historical relative data and aggregated predictive relative data per variable.

▶ **Relative Prediction Aggregation per Equipment Group**: Shows aggregated historical relative data and aggregated predictive relative data per equipment group.

▶ **Cost Prediction Aggregation per Variable**: Shows aggregated historical cost data and aggregated predictive data per variable.

▶ **Cost Prediction Aggregation per Equipment Group**: Shows aggregated historical cost data and aggregated predictive cost data per equipment group.

▶ **Prediction Scatter Plot**: Creates a scatter plot of 2 indicators and show their predicted values.

▶ **Prediction Scatter Plot with Reference Curve**: Creates a scatter plot with reference curves of 2 indicators and shows their predicted values.

▶ **Prediction Model Trainings History**: Creates a report training history and diagnosis.

NEW DATABASE TABLES

New tables have been added to the database for **Predictive Analytics**:

▶ **Prediction_Model**

▶ **Prediction_Model_Training_History**

7.6 Report configuration: Undo and restore actions (F 54488)

Actions can now be undone and restored when configuring reports.

To do this, there are the **Undo** and **Restore** buttons available in the **Design** ribbon and in the **quick-access** bar. Only steps in the report configuration can be undone or restored. Actions in dialogs are not recorded.

Both buttons contain drop-down lists with the number of steps. The steps are not named, but are grouped into powers of 10. So steps of 1 - 10, 20 - 100, 200 - 1000 etc.

7.7 Sankey diagram value display (B 109114)

For the Sankey diagram type report, the display of values can now be selected individually in the report. Available values:

▸ As defined in the Sankey diagram

▸ Absolute values

▸ Relative values

7.8 Amalgamate time periods (F 24026)

Several time periods can now be amalgamated into one time period in a main data set. Requirements:

▸ The main data set supports time period harmonization.
  If time period harmonization is not supported, the property is hidden.

▸ At least 2 time filters are included.

Note on scatter plots: Here, each time period is added to the output separately without links.

8. Report Launcher

8.1 Display of filter lists enlarged (F 58229)

The filter lists in Report Launcher are now shown wider and higher:

▸ Width: plus 50%

▸ Height: plus 100%

8.2 Time filter: Future range enlarged

The entry for time filter elements for absolute and relative time filters have been enlarged to 10 years in the future. This means that they now allow time entries in the range of 01.01.1970 00:00:00 to 31.12.[current year + 10] 23:59:59.

9. ZAMS

9.1 Enter domain user offline (F 24678)

Users of domains can also now be entered online. The Analyzer can thus, for example, be configured by an integrator locally and later be integrated into the customer's domain.

To do this, in the **Search for users and groups** dialog, the **direct input** of user names option has been added. This allows the addition of users from a domain by ZAMS users who do not have access to these domains. The computer must be connected to the domain.

Configuration is carried out with validation.

9.2 Deployment: Define report name and folder (F 54488)

The folder and the report name for deployment can now be pre-defined in the settings in the Deployment tab. There are three possibilities available:

▶ **Report Launcher root folder**:
Reports are saved in the root folder of the Report Launcher.

▶ **Read from first added report template**:
The folder is determined by the first selected report template.
The report name is taken from the selection of the report template.
These settings are applicable for each language.

▶ **User-defined path**:
A name given by the user is used for the folder. It is automatically created on the server if it is not present.
The report name is entered into the report template.

Note: The report name cannot consist of more than 126 characters. Report name and report path have a maximum of 252 characters.

9.3 Default layout amended (F 54488)

The default layout in ZAMS resets the configuration of the ZAMS user interface to the default status. Only the main user interface has been reset up to now. Other elements are also reset now.

The following are reset:

▶ Dialogs, the size of which can be changed and/or can be moved

- ▶ The window size
- ▶ Column widths too, depending on the dialog
- ▶ Settings for separators
- ▶ Expanded states

9.4   Progress display (F 54488)

The progress display for operations in ZAMS has been enhanced.

- ▶ If operations in ZAMS last for longer than 2 seconds and no progress bar is available, a general progress bar is now shown in the form of a loading progress bar.
- ▶ There is now a progress display available when loading several report templates. File names and loading progress are displayed.

9.5   Comments for report template and report (F 54488)

Comments can be added to report templates and reports.

- ▶ in ZAMS
- ▶ in Report Launcher

The project configuration for this is carried out using the report name properties in ZAMS.

9.6   Open configuration dialog for tables and diagrams by means of double-clicking (F 55715)

The configuration dialogs for tables and diagrams can now be opened by double-clicking on the respective element. Double-clicking on the entry for the **Table configuration** or **Chart configuration** property opens the dialog.

The **Table configuration** property is now at first place in the properties of the tables. This was also previously the case for diagrams.

9.7 List of last-saved report definitions can be edited (F 54488)

The list of the last-saved report definitions is shown on the start page. This list can be edited.
It is possible:

- ▶ To remove individual entries from the list:
- ▶ To delete the complete list

9.8 Predictive Analytics (F 64239)

zenon Analyzer now has a module for Predictive Analytics.

Prediction models can be created, edited, trained and used in reports.

SERVER ACTION RENAMED

The **Update connector functions** server action in the **SQL server** ribbon has been renamed for the implementation of **predictive analytics** in **Update SQL server enhancements**.

9.9 Configure report output (F 54488)

For each report, size, edges, templates and styles for printing and browser can now be configured individually:

- ▶ Settings for templates and styles have an effect on the display in print-out and in the browser.
- ▶ The size can also be set differently for print-out and browser.
- ▶ Side edges only have an effect on print-outs.

9.10 Report styles replace color schemes (F 52871)

The previous color scheme has been replaced with report styles.

Report styles give you the possibility to configure graphical elements individually and to assign reports. Report styles are constructed in a modular fashion and are defined centrally. They allow the central configuration of fonts, lines, frames, colors, color gradients and markers.

zenon Analyzer is supplied with the **Analyzer Initial** report style as standard. This is pre-defined and initially assigned to all reports. A many individual styles as desired can also be created and assigned. The assignment of report styles can generally be carried out for all reports or specifically for individual reports. Report styles can be exported and imported via XML.

When updating to version 3.20, ZAMS color schemes that have already been defined are automatically transferred to the new structure. Color schemes can also be integrated into version 3.20 by means of XML import.

9.11   Add SCADA projects (F 63503)

With the Metadata Editor, SCADA projects can now be added to zenon Analyzer independently of zenon. These can, for example, be used for the use of third-party databases.

9.12   Server action renamed (F 64239)

The **Update connector functions** server action in the **SQL server** ribbon has been renamed for the implementation of **predictive analytics** in **Update SQL server enhancements**.

9.13   Language table enhanced (F 52557)

The language table has been enhanced:
- ▶ It is now possible:
    - • To hide and show languages
    - • To add languages
    - • To delete languages (with the exception of system languages)
    - • To export all entries into an XML file (previously only amended entries)
- ▶ The filters of the language table have been updated.

9.14   Tooltips enhanced in ZAMS (F 54488)

In the report configuration area, further tooltips were added for:
- ▶ Adding a subordinate time filter

- ▶ Adding an independent time filter

- ▶ Deleting a time filter

- ▶ Grouping of report settings

- ▶ De-grouping report settings

9.15 Validation display (F 54488)

The tab for the report template now also contains, in addition to the file name, a symbol for the validation of the configuration:

- ▶ Exclamation mark: Validation error in the report template

- ▶ Green check mark: Successful validation

10. New filter possibilities for Sankey wizard (F 9051)

There are now new filter possibilities available in the Sankey wizard lists. The filter is set to "**Contains**" by default. The sorting of the list content is alphabetical by default, but can be inverted.

11. Analyzer Server

zenon Analyzer of versions 2.XX and 3.XX can be operated at the same time. components that can only be installed once per computer, such as Connector Container or the Licensing Service, work throughout all versions.