software AG

webMethods Process Performance Manager

SIX SIGMA

Version 9.10

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Contents

1   Text conventions

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

- Menu items, key combinations, dialogs, file names, entries, etc. are displayed in **bold**.

- User-defined entries are shown in **<bold and in angle brackets>**.

- Single-line example texts (e.g., a long directory path that covers several lines) are separated by ↵ at the end of the line.

- File extracts are shown in this font format:

  `This paragraph contains a file extract.`

2   General

This guide provides you with an overview of how you can use PPM to successfully run your Six Sigma projects and monitor the results. PPM supports you in your process analyses and the statistical evaluations that are required as part of Six Sigma projects.

The PPM Six Sigma guide is aimed at PPM users who are a **Process owner** or **Business analyst**.

As a **process owner**, you can

- call predefined queries.

- interpret the results in Performance Dashboards, Management views and reports.

As a **business analyst**, you can

- create basic analyses by using measures, dimensions, filters, and various views.

- perform cause analyses for your processes and organizations.

3   Prerequisites

LICENSE KEY

Six Sigma is available in PPM if your PPM license includes the **Six Sigma** functionality.

For details on the corresponding PPM license key required, contact the system administrator in charge.

SOFTWARE

As Minitab® is a Windows-based software package, the PPM client that is accessing Minitab® must be installed on a Windows computer.

Prerequisites for accessing Minitab® from PPM:

1. In order to start Minitab® directly from the PPM user interface, Minitab® must be installed on the relevant client computer.

2. To use automated Minitab® evaluations using a remote command line program, the corresponding command line program and Minitab® must be installed on the same computer.

Detailed information on hardware and software requirements is available in the webMethods system requirements.

USE MINITAB® 16

By default, the Minitab® PlugIn for version **Minitab® 15** is installed. If you installed the version **Minitab® 16** you need to replace the file **runMinitabExport.exe** of version **15** with the file for version **16**, which is supplied.

The installed version **Minitab® 15** is located in the directory

<installation directory>\ppmmashzone\server\bin\agentLocalRepo\.unpacked\ppm-client-run-prod-<version>-runnable.zip\ppm\vb\SixSigma\exe

A backup copy of the file **runMinitabExport.exe** of version **Minitab® 15** is located in the directory

<installation directory>\ppmmashzone\server\bin\agentLocalRepo\.unpacked\ppm-client-run-prod-<version>-runnable.zip\ppm\vb\SixSigma\exe\Minitab15

The file **runMinitabExport.exe** of version **Minitab® 16** is located in the directory

<installation directory>\ppmmashzone\server\bin\agentLocalRepo\.unpacked\ppm-client-run-prod-<version>-runnable.zip\ppm\vb\SixSigma\exe\Minitab16

DEMO DATABASE

When you install PPM, the **UMG** demo database is available. The demo database contains a **Six Sigma** demo scenario, which you can use to gain a better understanding of the subsequent description with references to examples for configuring and creating analyses and incorporating Minitab® evaluations into Performance Dashboard.

More detailed information on installing a PPM demo database is available in the **PPM Installation** manual.

4   Introduction to Six Sigma

This chapter provides you with a brief overview of Six Sigma.

Six Sigma (**6σ**) is a statistical quality target and, at the same time, a quality management method based on a data-driven business strategy. It requires companies to focus all their processes on promoting the best possible quality for the customer.

OBJECTIVE

The core element of the method is carrying out data-based improvement projects drawing on proven quality management techniques.

The main objectives of the method are to improve processes, reduce variation and achieve cost savings.

METHOD

The most frequently used Six Sigma method is the so-called **DMAIC** control cycle (Define/Measure/Analyze/Improve/Control). The DMAIC approach is used to make existing processes measurable and achieve permanent improvements in those processes.

DMAIC method
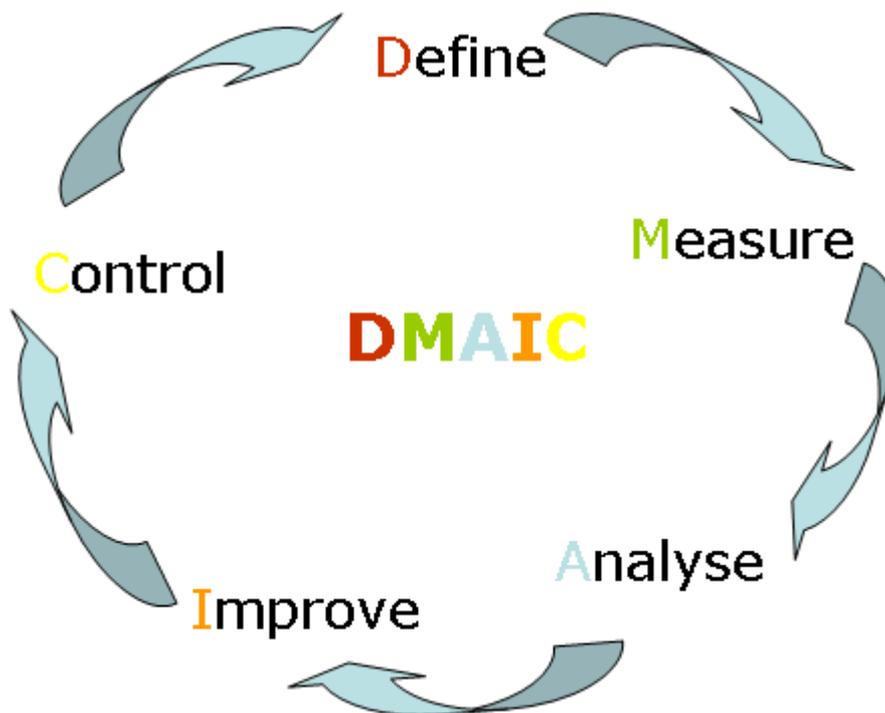
BASIC PRINCIPLE

Many processes that can be recorded stochastically are subject to statistical **normal distribution** (as defined by C.F. Gauß) and thus the **mean (μ)** and the **standard deviation** (sigma) can be uniquely defined for these processes.

Gaussian normal distribution
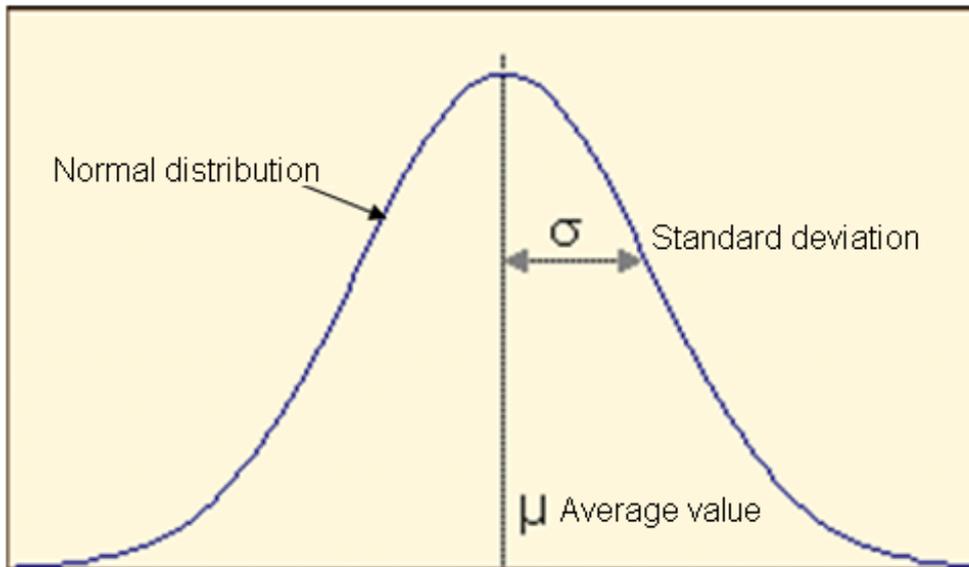
Normal distribution = Symmetrical distribution (dispersion) of values (variations) around a mean value

Measured values or observation results are plotted on the X-axis and probability values on the Y-axis.

Arithmetic mean (**μ**) = Average value (in general usage)

Standard deviation (**σ**) = Measure of deviations in the observed or measured values from the average value (or mean)

INTERPRETATION

In the Six Sigma method, the mean of the normal distribution represents a quality assurance objective, e.g., the planned value of a key measure (measure). The standard deviation **σ** can be used to determine the relevant range of observations or measurements for quality assurance purposes.

For a normal distribution, the following rules of thumb can be applied:

(**μ±σ**) includes approximately 70% of observations

(**μ±2σ**) includes approximately 95% of observations

(**μ±3σ**) includes more than 99% of observations

As deviations in measure values from a specified planned value are unavoidable, limit values are defined to specify the range in which the measured measure values are still acceptable from a quality management perspective.
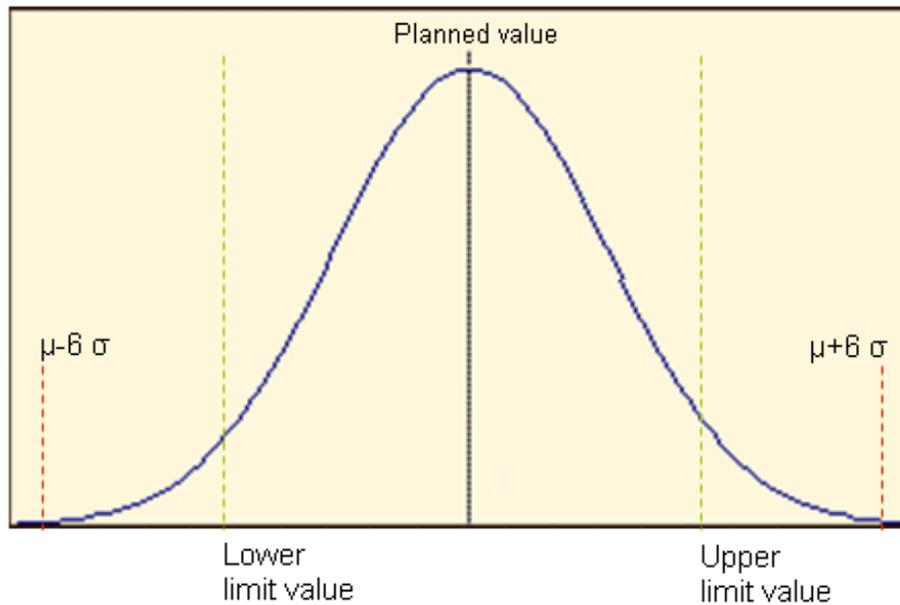
The aim of the Six Sigma method is for almost 100% (more precisely 99.99966%) of all results for a process to lie within a range that stretches from **μ-6σ** to **μ+6σ**. In other words, this means that out of a million executions only 3.4 results will have errors.

However, it is normal for every quality feature to have unwanted dispersion (deviations from the mean) in the process results. The mean (or average value) is often not exactly equal to the planned value. (From experience, most companies do not achieve more than 3 to 4 sigma on average.)

Tip

Further information on how Six Sigma works, its methods and tools is available in the book **Six Sigma for Dummies** by Craig Gygi, Bruce Williams and Neil DeCarlo; Publisher: Wiley-VCH; 1st edition (October 2005).

5   PPM Six Sigma

Software AG products support you in implementing the **DMAIC** method (see chapter **Introduction to Six Sigma** (Page 5)) at all stages of your Six Sigma project. The various products support you in determining the scope of a Six Sigma project, identifying problematic areas in your corporate processes, and rendering key success factors measurable.

PPM provides you with all necessary methods and tools, in particular for the Measure, Analyze, and Control phases of the DMAIC cycle.

PPM automatically measures and analyzes the performance of your processes and evaluates them statistically. The results of your process analyses can be integrated into Performance Dashboard, providing an easy way of continuously monitoring and publishing them during your Six Sigma project. This enables you to embed the results of Six Sigma initiatives directly in the process environment and process controlling system in your company and use them for process optimization.

The specific methods that PPM provides you with for your Six Sigma projects include **process mining**, **outlier analysis**, comprehensive chart types, particularly the **distribution chart**, a special **Six Sigma operator** and a dedicated **Six Sigma plug-in** to integrate the **Minitab**® statistics software.

PROCESS MINING

You can use **Process mining** to identify suspected deviations and weak spots in your processes. Process mining automatically identifies conspicuous fluctuations in measure values for particular dimensions.

OUTLIER ANALYSIS

With the **outlier analysis**, you can identify process instances with a certain measure value above or below the average value or a defined limit value. You can use the **runppmanalytics** command line program to automatically identify all process instances with critical behavior (i.e., whose measure values lie outside a range of +/- 3 sigma).

DISTRIBUTION CHART

In a distribution chart, you can display the frequency distribution of a distributable measure's values for a number of process or function instances. This can be used to display the average value, standard deviation, median and percentiles, for example.

SIX SIGMA OPERATOR

The Six Sigma operator is available for defining user-defined measures. It calculates the sigma value for the relevant success rate, e.g., 30.8% success rate = > sigma = 1, 93.32% success rate = > sigma = 3.

PERFORMANCE DASHBOARD

Performance Dashboard provides an overview of the performance of all the main processes in your company. Based on an analysis of various measures and user-defined planned values,

Performance Dashboard uses performance indicators to show the extent to which your processes are actually achieving the defined objectives.

MINITAB®

PPM provides an interface to the leading statistics software **Minitab**®, which is used for statistical evaluations in Six Sigma projects. Various options are available to you for evaluating your PPM data statistically in Minitab®. You can call up Minitab® from the PPM user interface or from the command line. In addition, you have the option of automatically running Minitab® macros using the PPM user interface or batch files. In Performance Dashboard, you can display graphics of the Minitab® evaluations and thus monitor the sustainability of Six Sigma projects.

Tip

The **PPM Help topics** section of the online help contains further information, e.g., how to perform process mining and an outlier analysis in PPM, how to create a distribution chart and configure user-defined measures.

Information on using the **ppmanalytics** command line program is provided in the **PPM Customizing** user guide.

A detailed description of how to use Performance Dashboard is available in the **Performance Dashboard User Guide**.

Details of how to use the Minitab® application in PPM are provided from chapter Use **Minitab** (Page 28)® **in PPM** (Page 28) onwards.

6   Use case - Six Sigma

A complete use case provides you with an overview of how you can use PPM to run your Six Sigma projects.

Scenario

The management decides to improve the billing process flows using the Six Sigma method and to subsequently monitor them regularly using appropriate means. The process analysis is based on the current billing data from the 2006 fiscal year.

The implementation of the Six Sigma project with PPM is described using the following examples.

USE CASE OVERVIEW

PROJECT PHASE: MEASURE PROCESSES

- You carry out an analysis of the actual situation to establish the average **process cycle time** for **billing**.

PROJECT PHASE: ANALYZE PROCESSES

- You then analyze the distribution of the corresponding process instances in a **distribution chart**.

- An **outlier analysis** returns the process instances with the longest process cycle times.

- You can use **Process mining** to identify particular suspected deviations in terms of selected dimensions in the affected processes.

- In an **EPC benchmark**, you can perform a detailed comparison of the process instances with the longest and shortest process cycle time. This enables you to derive possible actions to reduce the cycle times.

- A **boxplot** chart in **Minitab** enables you to verify your analyses from PPM.

- An analysis of the **process capability** in **Minitab** provides you with information about how reliably the specified targets can be achieved.

PROJECT PHASE: CONTROL PROCESSES

- You can then use a **time series chart** and a **control chart** from **Minitab** to monitor whether the improvement measures have brought about the desired results.

- To achieve sustainable control, you integrate your analyses in Performance Dashboard and regularly query the analysis results.

Tip

The examples described below are based on the UMG demo database (see chapter **Prerequisites** (Page 3)). The corresponding favorites are available in the **Demo path Six Sigma** shared favorites folder of the demo database.

6.1 Project phase - Measure processes

6.1.1 Process view

PPM automatically measures and calculates the required measure and dimension values based on individual process instances and aggregated processes. The individual process instances (i.e., actual specific completed processes) are combined into an overall process and displayed in the form of an EPC. The aggregated EPC reflects the performance of the relevant overall business process.

Example

In this example, all of the billing processes running in the company are combined into an overall process. This forms the basis for calculating the average process cycle time across all processes.

Overall billing process in the form of an EPC
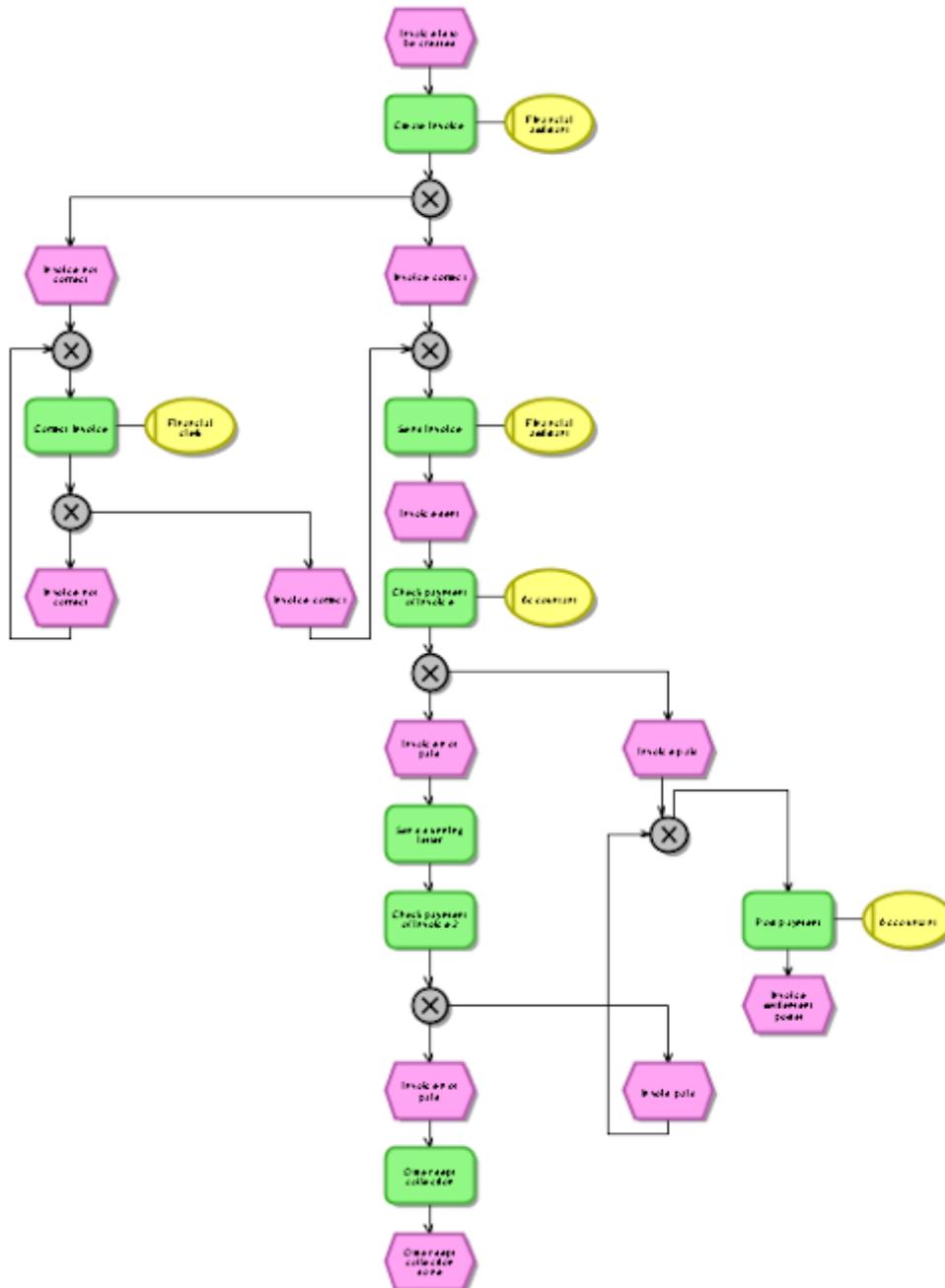
6.1.2   Speedometer chart

Based on the overall **billing** process, you want to determine whether the average **process cycle time** deviates from the specifications for **2006** or whether it is in the green range. To do this, you compare the calculated actual **Process cycle time** for the **Billing** process type with the defined **Planned value 1** (10.4 days) and **Planned value 2** (12 days) and display the analysis in a **speedometer chart**.

The calculated average **process cycle time** is 10.5 days, just outside the green range above planned value 1.

Example: Deviation from planned value for billing process cycle time

Process cycle time [Days]
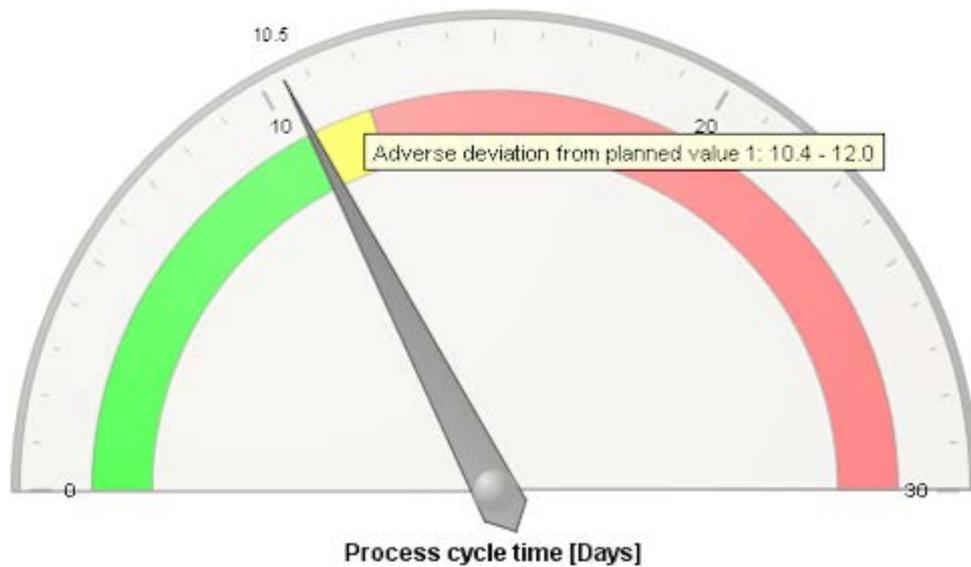
6.2 Project phase - Analyze processes

Various analysis methods can provide information about the causes of the deviation from the planned value.

6.2.1 Distribution chart

You want to use the calculated planned value deviation to determine how the process instances are distributed between the different process cycle times.

The distribution chart clearly indicates that more than half of the process instances (**Number of processes**) lie in the yellow and red range above planned value 1 and the **Average value** for the **Process cycle time**.

Example: Distribution of process instances to process cycle time with planned values displayed
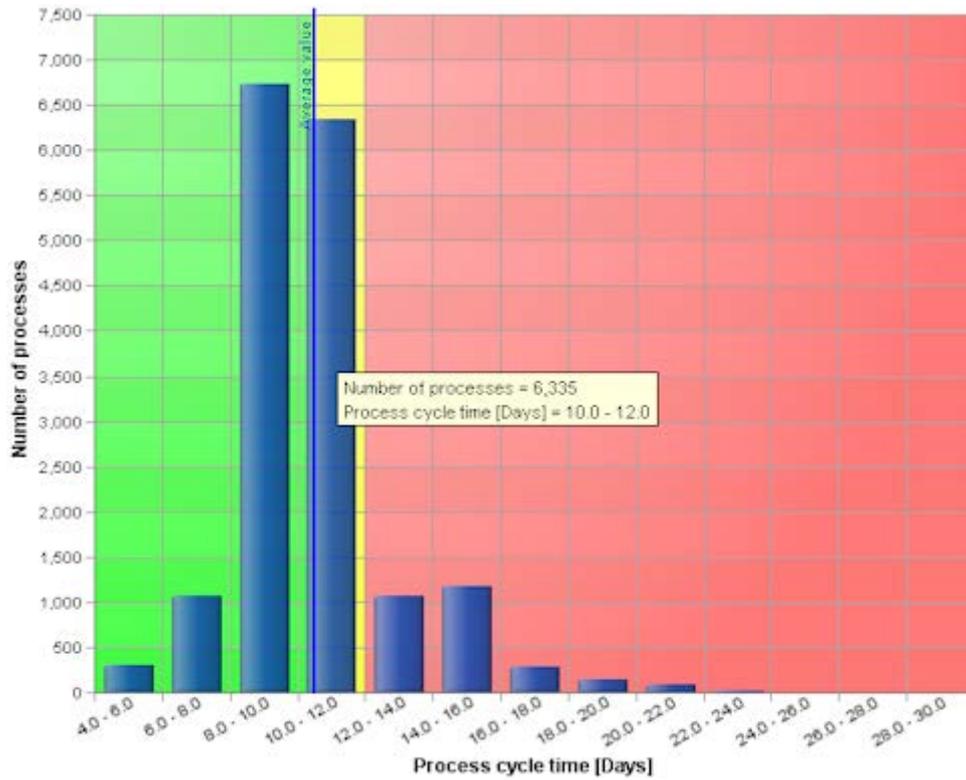
6.2.2   Process mining

The suspected deviation analysis carried out using **Process mining** for the period of January to December 2006 shows that the average **Process cycle time** for the **Dealer** dimension has a significant fluctuation of 14.124% between the dimension values (2nd level, step width (detailed)). The unusually high process cycle time in San Francisco (USA) and the very low cycle time in Munich (Germany) are particularly noticeable.

Example: Process mining for process cycle time
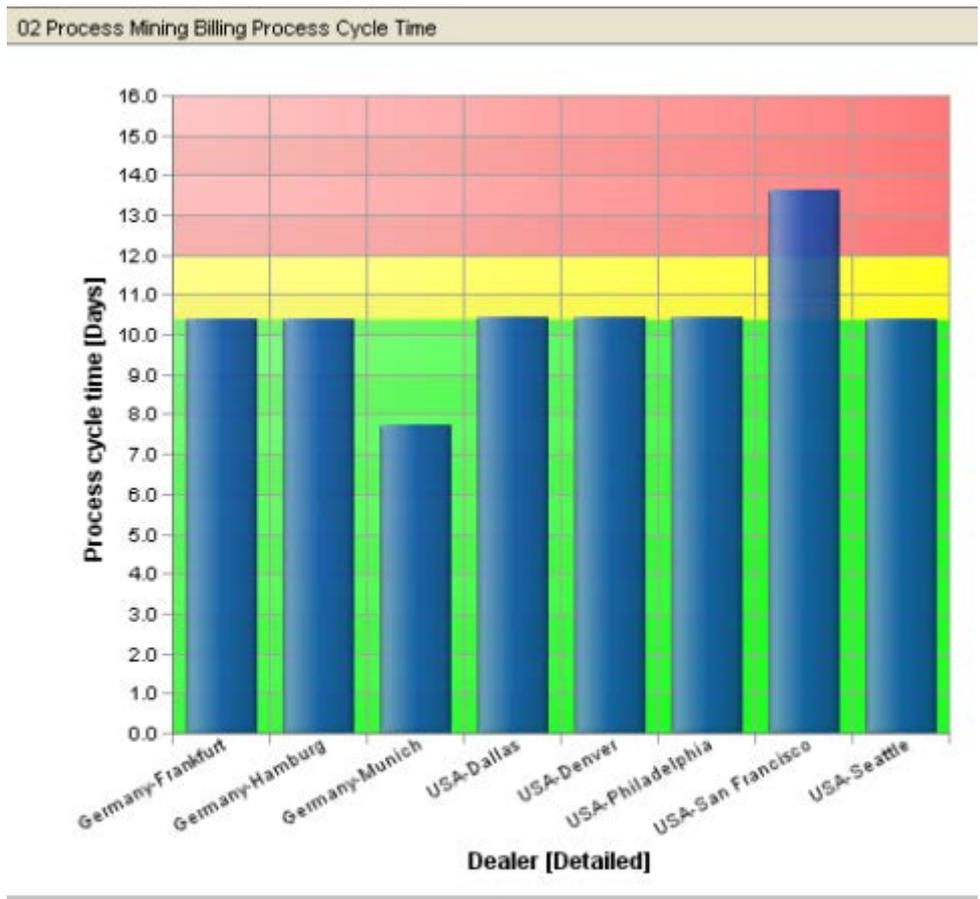
02 Process Mining Billing Process Cycle Time

KPI	Dimension	Variation limits in %	Max. variation coefficient [%]
Process cycle time	Dealer	14.124	24.739

6.2.3   Outlier analysis

You want to use an **outlier analysis** to reveal the individual process instances with the longest process cycle times. The analysis shows that the greatest deviations from the average process cycle time occur at your dealer in San Francisco.

Outlier analysis for process cycle time

6.2.4   EPC benchmark

To find the causes of the considerable differences in the process cycle time deviations for the dealers, you want to compare the process flows for the dealers in Munich and San Francisco in detail.

A direct comparison of the two EPCs shows that the process flow for the dealer in San Francisco is significantly longer than that in Munich.

EPC benchmark for the billing process
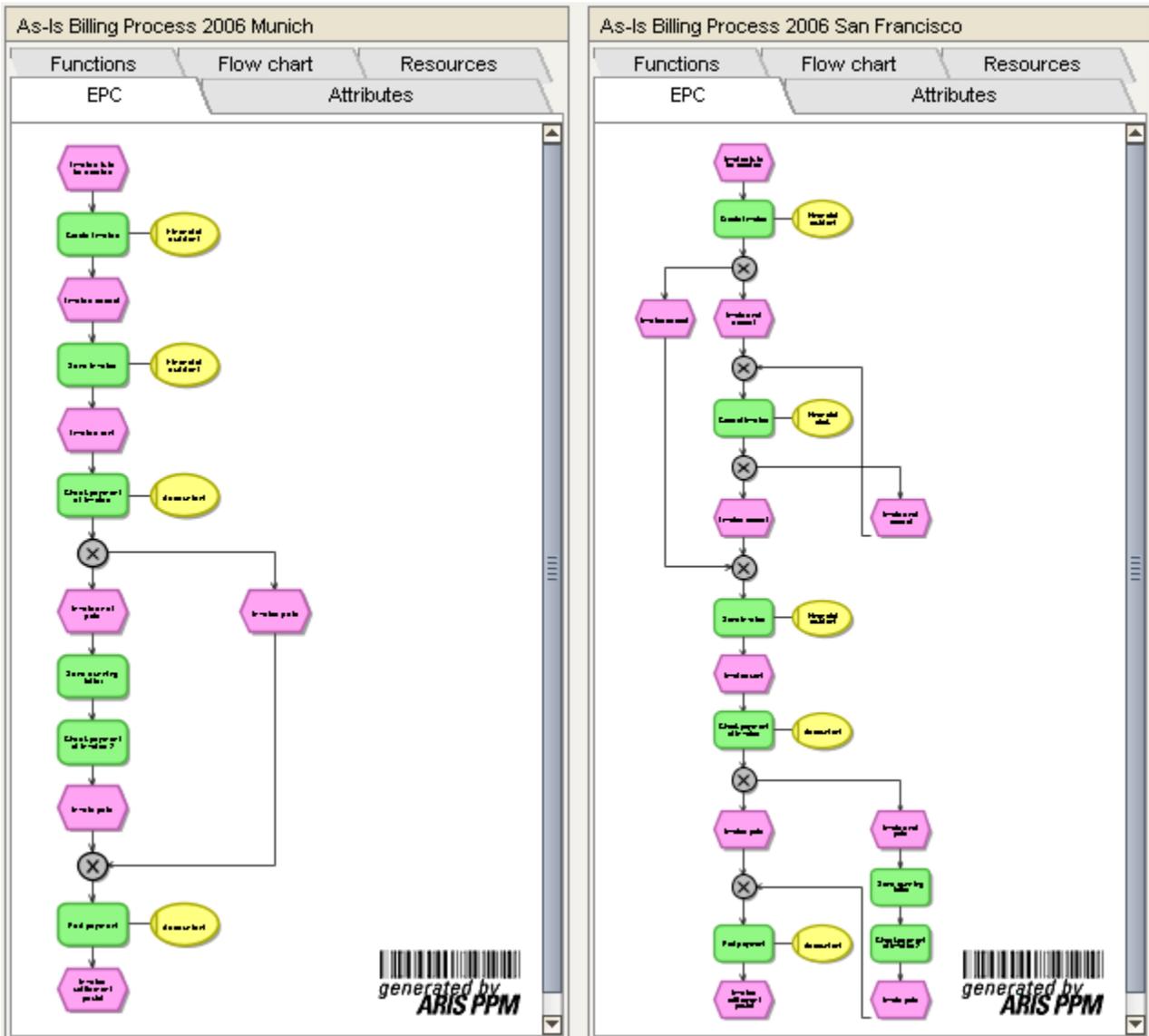
6.2.5   Evaluating PPM data in Minitab®

You can use the **Minitab**® application to verify the results from PPM and perform further specific Six Sigma evaluations.

You want to use the data from the process cycle time analysis described in the chapter on **Process mining** (Page 14) for further analysis in Minitab®. You decide to display the results of your evaluation using a **boxplot** chart.

Prerequisite

You have configured the Minitab (Page 28)®connection (Page 28).

Procedure

3. Display the Process mining analysis for the process cycle time described in the chapter on **Process mining** (Page 14).

4. Start the **Minitab**® application from PPM.

    a. Display the **Plug-ins** tab bar.

    b. Click ▶Start **Minitab**® **without macro** in the tab bar.

The data is automatically transferred to Minitab® and the application is launched. The transferred data is displayed as a table in Minitab®.
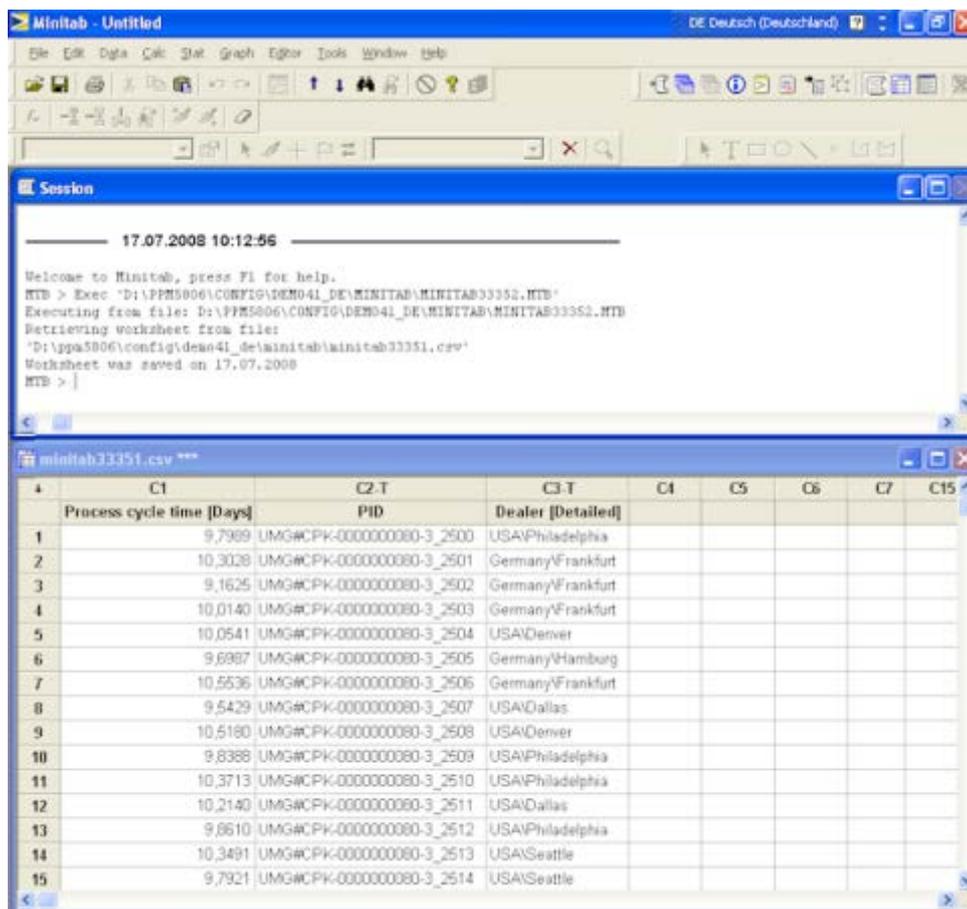
5. Create a **boxplot** chart with the **With Groups** option by selecting **Graph/Boxplot** in the main menu.

A boxplot chart is displayed based on your settings.

The boxplot chart confirms the significant variation between the dealers in San Francisco and Munich in terms of process cycle time, as has already been identified in the suspected deviation analysis.

Example: Boxplot chart in Minitab®
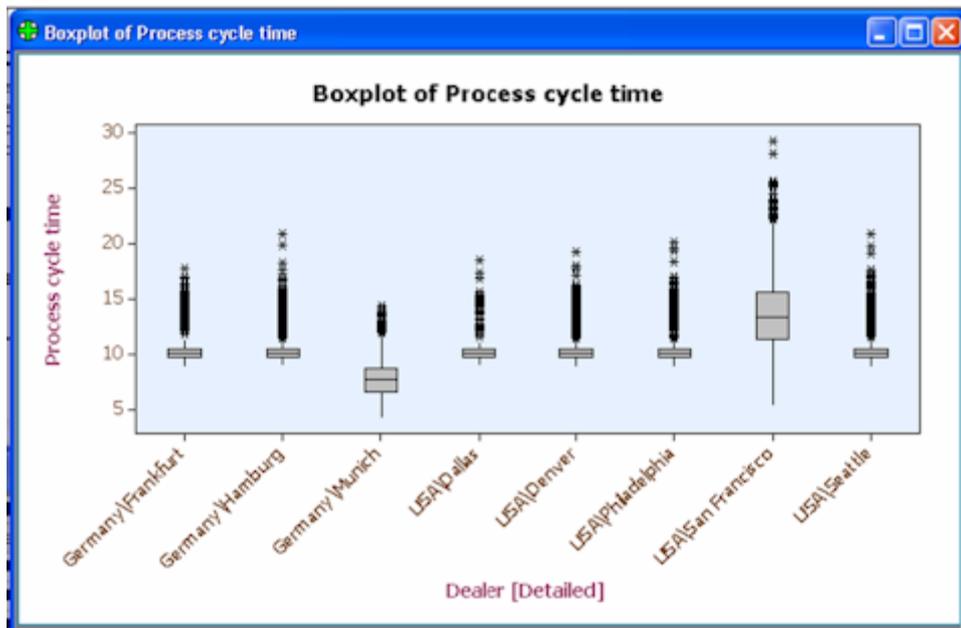
See also

Chapter **Use Minitab** (Page 28)® **in PPM** (Page 28)

6.2.5.1   Assign a Minitab® macro to the PPM analysis

You want to be able to evaluate the data from your Process mining analysis from PPM using the **boxplot** chart in Minitab® again in the future. To save you having to repeat the individual steps for each evaluation in Minitab®, you can assign a Minitab® macro to your Process mining analysis.

Procedure

1. In the Minitab® main menu, click **Window** and select **Project manager**.
2. Open the **History** folder.

All analyses you have performed in the current Minitab® session are logged here.
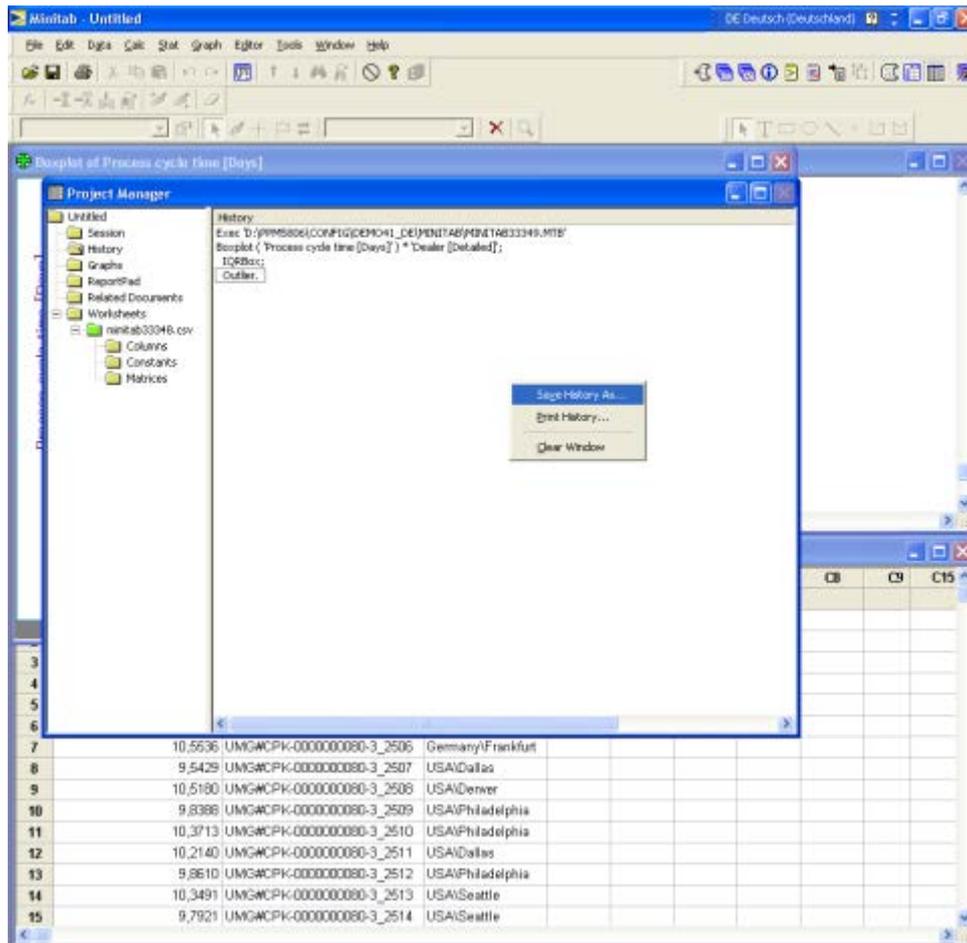
3. Open the pop-up menu and select **Save History As**.

4. Save the analysis history as a macro in the local directory of your choice as an executable file in **mtb** format.

5. Assign the Minitab® macro to your Process mining analysis in PPM using the **Minitab® options** dialog (located in the **Plugins** tab bar).

6. Save the current analysis as a new favorite.

When you call up the favorite and start Minitab® with the macro (**Start Minitab® with <macro name>**), the assigned macro is automatically executed in Minitab® and the evaluation is displayed as a boxplot chart with the current data.

See also

Chapter **Use Minitab** (Page 30)® **macros in PPM** (Page 30)

6.2.5.2 Process capability analysis

As part of your Six Sigma analyses, you can use Minitab® to determine the special Process Capability (Cpk) measure, which can be calculated based on the data supplied by PPM. Process capability describes the stability and reproducibility of a process, i.e., the **Cpk** value specifies how reliably the specified objectives are achieved.

Procedure

1. Create a process capability analysis for the PPM data exported to Minitab®.

    You can create such an analysis in Minitab® by selecting **Stat/Quality Tools/Capability Analysis/Normal** in the main menu.

    To provide the Cpk measure for data export from Minitab®, it must be stored in the Minitab® worksheet. To set the analysis parameters, click the Storage button and select the **Cpk** option in the dialog box that is displayed.
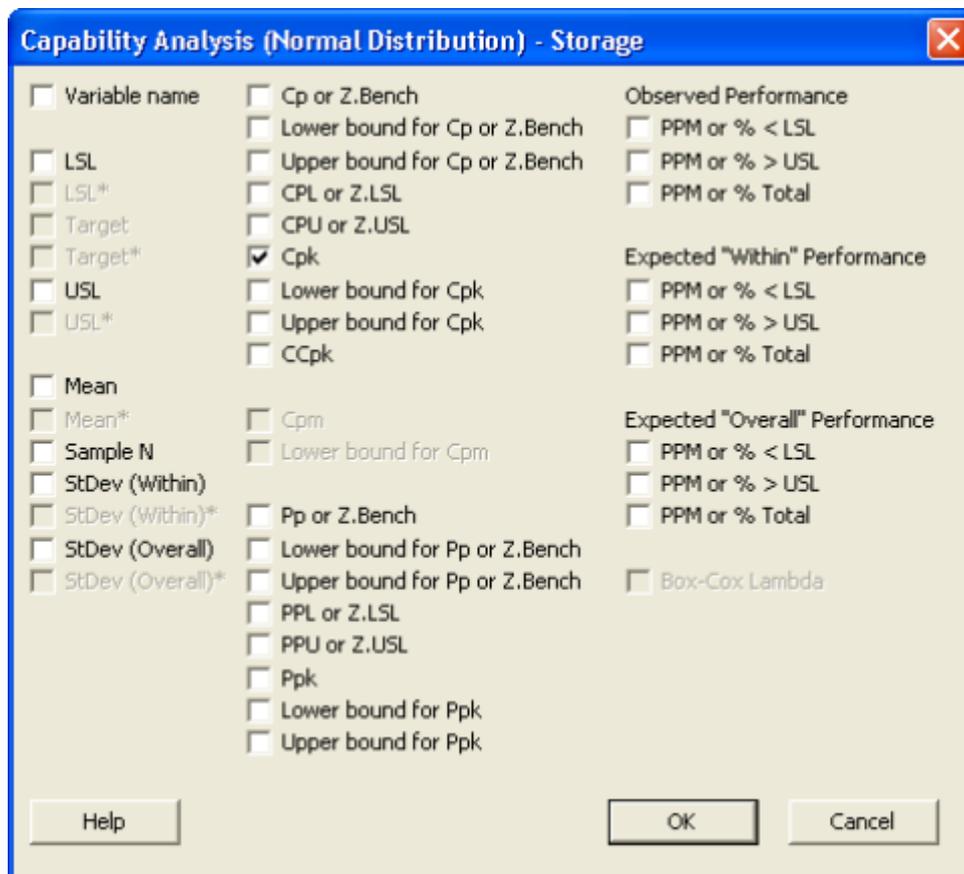
The **Cpk** measure is added to the data table from PPM.

2. Create a macro for the current analysis as described in chapter **Assign a Minitab® macro to the PPM analysis** (Page 19) and save it as a Minitab® file in **mtb** format.

3. Assign this macro to the corresponding current analysis in PPM.

4. Save the current settings as a separate favorite.

You can then use the favorite to easily start the Minitab® evaluation again from PPM.

Example: Process capability analysis for billing
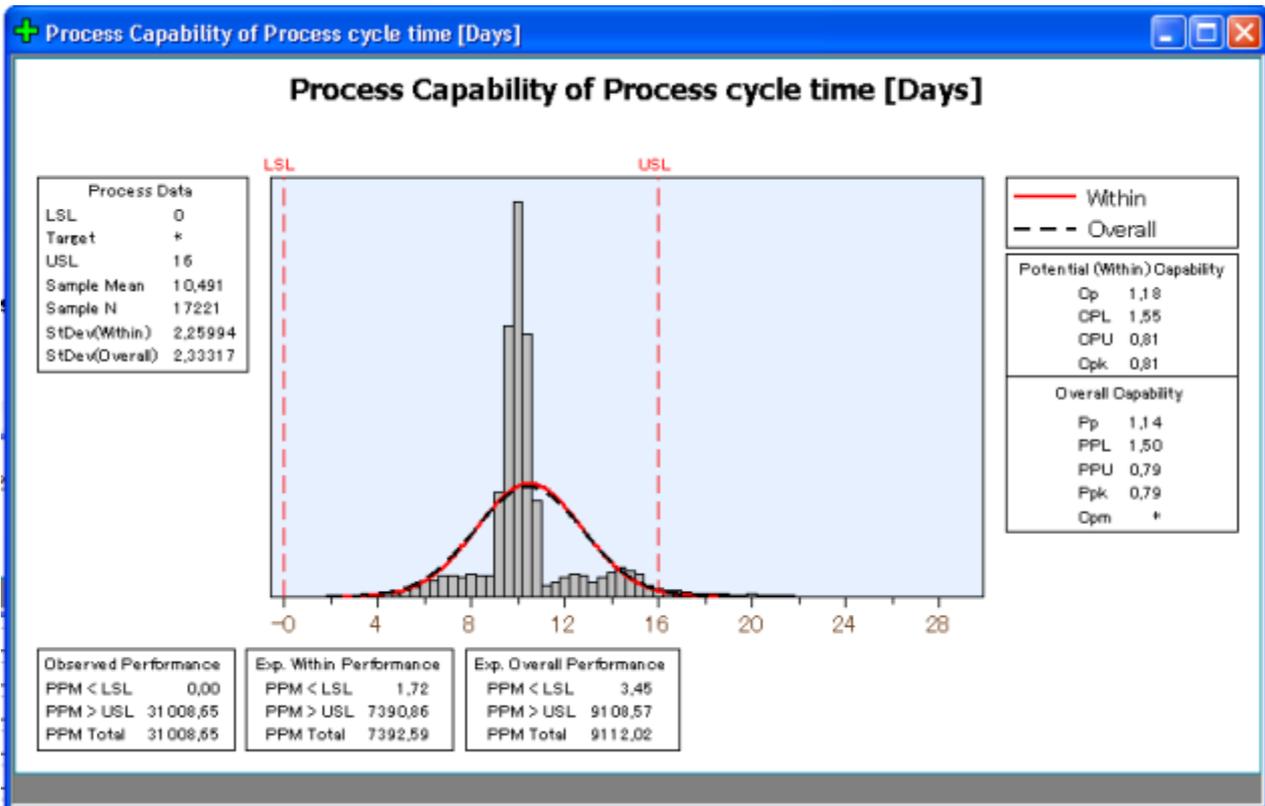
6.2.6 Using a Minitab® measure in PPM

You want to use the results of the Minitab® evaluations for the **Cpk** measure for your analyses in PPM.

To do this, you need to export the evaluation results of the **Cpk** measure, convert them to a PPM PIKI format and then import the data to PPM as user-defined process instance-independent measure values.

You can use the **Xalan** conversion program to convert the XML output file to a user-defined process instance-independent measure import file. Alternatively, for the purposes of this example, you can use the **minitabpikitransformer** command line program created for the UMG demo database.

You also require a project-specific xslt script to perform the conversion.

The xslt script **Template.xslt** is located in the directory **custom\umg\xslt** of the installed UMG demo database of your PPM installation.

Prerequisite

You have defined a favorite for the Minitab® Cpk measure as described in chapter **Process capability analysis** (Page 20) and saved it in the Demo path Six Sigma favorites folder.

The **Cpk** measure has already been created in PPM and assigned to the **Billing** process type in the process tree.

1. Use the runppmminitab command line program to create an XML output file containing the calculated Cpk value.

    Example
    ```
    runppmminitab -user system -password manager -client umg -favoritefolder "Demo
    Path SixSigma"
    ```
    (See chapter **Run Minitab® using the command line** (Page 31))

2. Use the Minitab® XML output file containing the Cpk value to create a PIKI import file (XML file).

    To do this, enter the paths to the Minitab® XML output file, the xslt script, and the PIKI import file (in this case the XML output file) in the **Xalan** conversion program.

3. Import the PIKI import file into PPM using the runpikidata command line program.

The values of the Minitab® **Cpk** measure will then be available to you for further analysis in PPM. You can display the values of the **Cpk** measure as a list in the **Configuration** module under **Data input**.

Tip

Please refer to the PPM data import technical reference for information on how to create measures in PPM and how to import data.

6.3   Project phase - Control processes

The results of your process analyses show that the planned value deviations are predominantly caused by the poor process performance of the dealer in San Francisco. Therefore, your company's management introduces appropriate measures designed to significantly improve process flows, particularly for the dealer in San Francisco. The procedure adopted by the dealer in Munich is defined as a Best Practice and is successively rolled out to other dealers, particularly San Francisco, from January 2008.

6.3.1   Time series chart

Regular checks are intended to monitor whether the measures introduced have led to the desired improvements in the process flows and to guarantee that future deviations from the specified planned values will be detected in good time.

Process capability has proved to be a suitable means of verifying the performance and stability of a process. In PPM, you can display a history of the process capability, which you can use to demonstrate the (short-term) success of your Six Sigma project and, at the same time, to monitor the sustainability of the success with recurring evaluations and respond to even minor deviations.

To do this, create a **time series chart** for the Minitab® **Cpk** measure in PPM with the data for the period from January 2007 to December 2008.

The required data for the time series analysis is available to you if you carry out the operations described in steps 1 and 2 on a regular basis, e.g., once a month, for the required period.

Procedure

1. Perform a process capability analysis using the **runppmminitab** command line program.

    Example

    ```
    runppmminitab –user system –password manager –client umg –favoritefolder "Demo
    Path SixSigma"
    ```

    See chapter **Run Minitab® using the command line** (Page 31).

2. Import the values of the Minitab® **Cpk** measure to PPM.

    See chapter **Use a Minitab® measure in PPM** (Page 22).

3. Define two planned values for the **Cpk** measure - **Planned value 1** at 1.230 and **Planned value 2** at 1.330.

    Assign the planned values to the **Billing** process type.

4. Display a **2D line chart** with the set values.

It can be clearly seen that the process capability has constantly increased since the introduction of the improvement measures and has been in the green range since around April 2007.

Example: Time series chart for monitoring process capability (Cpk)
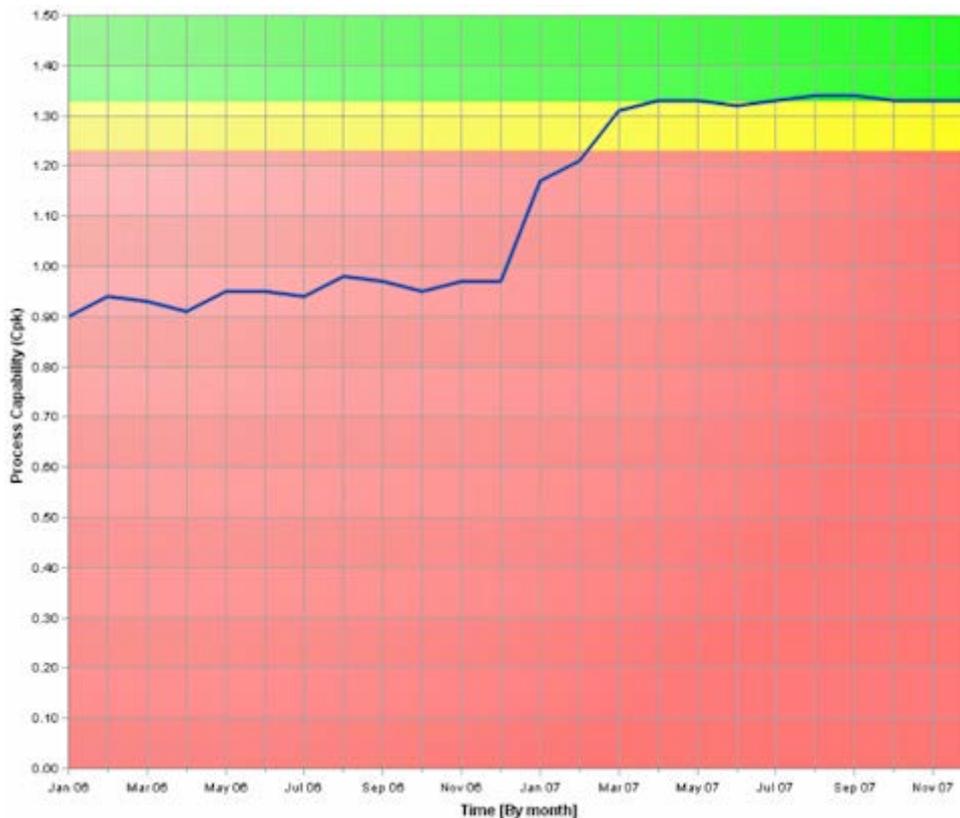
6.3.2   Control chart

Another very useful analysis option during the control phase and beyond is provided by a **control chart**. This enables you to identify at a glance whether or not the existing process fluctuations are staying within set limits. It represents the average, maximum and minimum value of a process graphically.

To do this, create a control diagram for the process cycle time as described in chapter **Evaluating PPM data in Minitab®** (Page 17).

Procedure

1. Display the Process mining analysis for the process cycle time described in the chapter on **Process mining** (Page 14).

2. Start the **Minitab®** application from >_ppm>.

    c. Display the **Plug-ins** tab bar.

    d. Click ▶ **Start Minitab® without macro** in the tab bar.

3. In Minitab®, create a control chart by selecting **Stat > Control Chart** in the main menu.

    A control chart is displayed based on your settings.

4. Create a macro for the Minitab® evaluation and assign it to the current analysis in PPM.

    See also chapter **Assign a Minitab® macro to the PPM analysis** (Page 19).

5. Save the current settings as a separate favorite.

You can then use the favorite to easily start the Minitab® evaluation again from PPM.

Example: Control chart for process cycle time
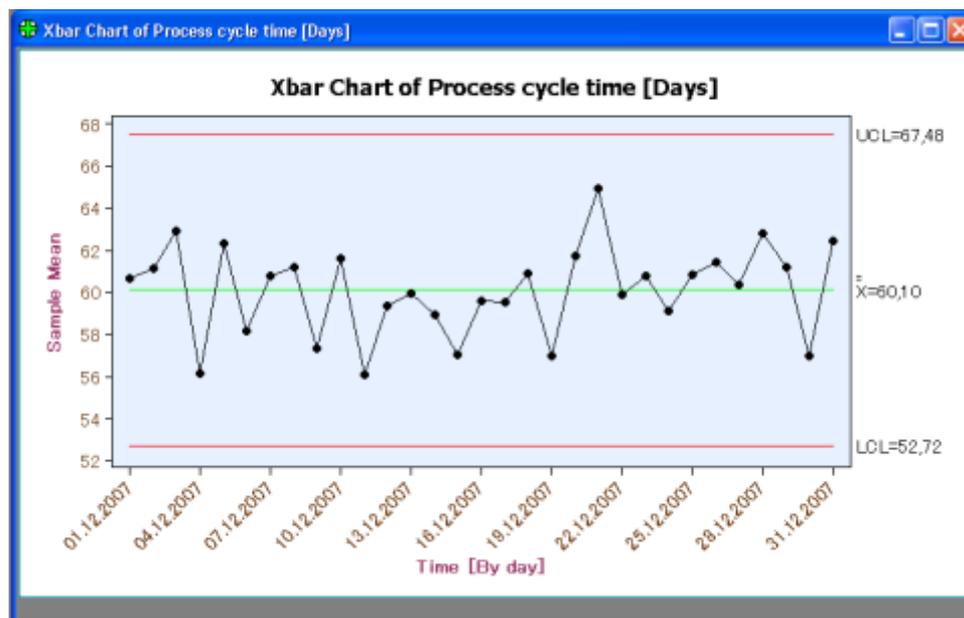
6.3.3   Display evaluations in dashboards

The results of your analysis in PPM and Minitab® can be integrated into Performance Dashboard. Particularly in the control phase, the automatic measurement of data that this brings ensures that the improvements resulting from the Six Sigma project can be continuously verified, e.g., by calling up current control charts to evaluate the process. This allows the Six Sigma results to be communicated throughout the company.

The procedure for integrating the calculated Cpk measure into Performance Dashboard is as follows.

Prerequisite

You have defined a favorite for the Minitab® Cpk measure as described in chapter **Process capability analysis** (Page 20) and saved it in the Demo path Six Sigma favorites folder.

Procedure

1. Use the runppmminitab command line program to create an XML output file containing the calculated Cpk value.

   Example

   ```
   runppmminitab –user system –password manager –client umg –favoritefolder "\Demo
   Path SixSigma"
   ```

   (See chapter **Run Minitab® using the command line** (Page 31))

2. Import the values of the Minitab® **Cpk** measure to PPM.

   See chapter **Use a Minitab® measure in PPM** (Page 22).

3. In Performance Dashboard Builder, create another measure query for the Minitab® Cpk measure under the **Billing** process and link it to the corresponding favorite.

4. Assign the Minitab® evaluation graphics created to this measure query, i.e., the process capability analysis chart and the control chart.

The Minitab® measure and the selected evaluation graphics will then be available for displaying in Performance Dashboard.

For continuous monitoring, you should carry out steps **1.** to **3.** described here at regular intervals and create the required current evaluation graphics.

When you query evaluations in Performance Dashboard, the corresponding measure values and graphics are automatically updated and displayed.

Example: Minitab® evaluations in Performance Dashboard

Please refer to the Performance Dashboard User Guide for detailed information on how to use PPM as a source data system for Performance Dashboard and how to configure Performance Dashboards.

7 Use Minitab® in PPM

This chapter describes how to configure the connection to Minitab®, set the data to be evaluated and start the **Minitab®** application from the PPM user interface.

7.1 Configure the Minitab® connection

In order to be able to start the **Minitab**® software from the PPM user interface, the path to the Minitab® installation must be known in PPM and a temporary directory must be specified for storing interim results when transferring data from PPM to Minitab®.

By default, PPM saves the Minitab® installation path using the java.util.prefs.Preference API in the Windows registry under \HKEY_LOCAL_MACHINE\SOFTWARE\JavaSoft\Prefs. If the **JavaSoft\Prefs** directory under \HKEY_LOCAL_MACHINE\SOFTWARE does not exist, you need Windows administration privileges to create the Minitab® installation path.

Prerequisite

The **\HKEY_LOCAL_MACHINE\SOFTWARE\JavaSoft\Prefs** directory exists in the Windows registry or you have Windows administration privileges.

Procedure

1. Start PPM.

2. Click **PPM > Plug-ins**.

   The **Plug-ins** dialog box is displayed.

3. Activate the **Minitab**® plug-in.

   The **Configure Minitab**® **integration** dialog box opens.

4. Check the settings or specify the required settings.

5. Click **Close**.

The Minitab® connection is available in PPM.

You can now set the **Minitab**® **options** for the current analysis. To do so, click the **Minitab**® **options** button in the **Plug-ins** tab bar.

7.2 Configure data for Minitab®

In order to evaluate the relevant data in Minitab®, you must first set the query criteria (measures, dimensions, scaling, etc.) for your analysis in PPM. The data calculated in PPM is then exported to Minitab® for further evaluation.

Regardless of your current analysis view, e.g., chart or list table, the data is output as a process instance table by default. Alternatively, you can use the **Minitab® options** (Page 28) to set the data to be exported from PPM to Minitab® as a list table.

If you have not set a sort direction in your list table view or process instance table view, the data is automatically sorted when it is exported; first all measures, then all dimensions, in each case in ascending alphabetical order of their key.

Prerequisite

You have configured the Minitab®connection for PPM (see chapter **Configure the Minitab® link** (Page 28)).

Procedure

1. To export the analysis data as a list table, click **Minitab® options** in the **Plug-ins** tab bar.

2. Disable the **Export PPM data as an instance list** option.

    The data for your analysis is exported to Minitab® as a list table.

3. Click **OK**.

4. Enter all settings required for your analysis or call up an analysis using a favorite.

5. If necessary, set your preferred sort direction in the list table view or process instance table view.

The data is configured and can be evaluated in Minitab®.

The analysis data is exported from PPM in a special **csv** format, similar to the format of the **csv** import files for the **CSV-2-PPM process extractor**. In addition to the default **csv** format, with a comma as the separator and a full stop as the decimal separator, the column names displayed in PPM for the set query criteria are also exported. The formatting settings are transferred to Minitab® when it is called up, which enables Minitab® to read the **PPM CSV** format correctly, regardless of its settings.

Table columns with date format are transferred to Minitab® in a fixed format for the set step width regardless of their labeling in the user interface. The PPM interface language converts the date into the relevant language for your computer's regional settings, as these are the settings used by Minitab®. If conversion to this language is not possible (e.g., Croatian, Polish, etc.), the English date format is used.

7.3   Call up Minitab® from PPM

You can call the **Minitab®** application from PPM and statistically evaluate your PPM data in Minitab®.

You can call Minitab® from the following views in PPM:

- Process analysis: All chart and table views plus Process mining

- Organizational analysis: All views except Relation Explorer

- Instance controlling: All views

- Data analytics and Cross analytics

Prerequisite

You have configured the Minitab® connection for PPM (Page 28).

You have configured the data to be evaluated (Page 28).

Procedure

1. Open the relevant analysis realm.

2. Display the **Plug-ins** tab bar.

3. Click ▶ **Start Minitab without macro**.

The **Minitab®** application is launched.

You can now evaluate the data transferred from PPM in Minitab®.

If a macro for evaluating data in Minitab® has been created and assigned to the current PPM analysis, you can start Minitab® using that macro. To run Minitab® with the available macro, click ▶ **Start Minitab® with <macro name>** (chapter Use Minitab® macros (Page 30)).

7.4   Use Minitab® macros in PPM

You can record Minitab® evaluations that you want to run frequently as a macro and assign this to an analysis in PPM. When running Minitab® from PPM, the exported analysis data is automatically evaluated using the assigned macro in Minitab®.

The content of the assigned Minitab® macro is stored under its name in the **<plugin>** XML element in the XML query for the current PPM analysis. The Minitab® macro dynamically loads the corresponding analysis data.

The name of the assigned Minitab® macro is displayed in the **Minitab® options** (Page 28), and the **Plug-ins** tab bar includes an additional button ▶ **Start Minitab® with <macro name>**. Use this button to start Minitab® with the macro assigned.

Prerequisite

You have created a macro in the **Minitab®** application and saved it locally as an mtb file.

Procedure

1. Set up your analysis as described in the chapter on **Configure data for Minitab®** (Page 28).

2. Display the **Plug-ins** tab bar.

3. Click 🔧 **Minitab® options**.

4. Assign a Minitab® macro to your current analysis by clicking the **Open file** button and selecting the file containing the relevant Minitab® macro.

5. Click **OK**.

The Minitab® macro is assigned to the current analysis.

To permanently save this assignment, create or overwrite the relevant favorite. When starting Minitab® from PPM (Page 29) with analysis data to which a macro is assigned, the evaluations saved in the macro are automatically run and displayed in Minitab®.

If the analysis has already been assigned a Minitab® macro, you can delete this assignment or overwrite it with a new macro. You can save a Minitab® macro that is already assigned to an analysis in a separate file (***.mtb**) so that it can be used in other analyses, for example. However, in this case you must ensure that query criteria and settings for the current PPM analysis match the information in the macro.

We recommend saving the settings for your analysis, including the assigned Minitab® macro, as a favorite.

When naming the file, you should note that Minitab® evaluations are not overwritten in the dashboard if favorites and Minitab® macros have the same name.

Warning

To ensure correct evaluation of the data in Minitab®, check the compatibility of the data structure (e.g., the data types of the columns) of your analysis with the settings for the assigned Minitab® macro.

Example: Result of running a Minitab® macro
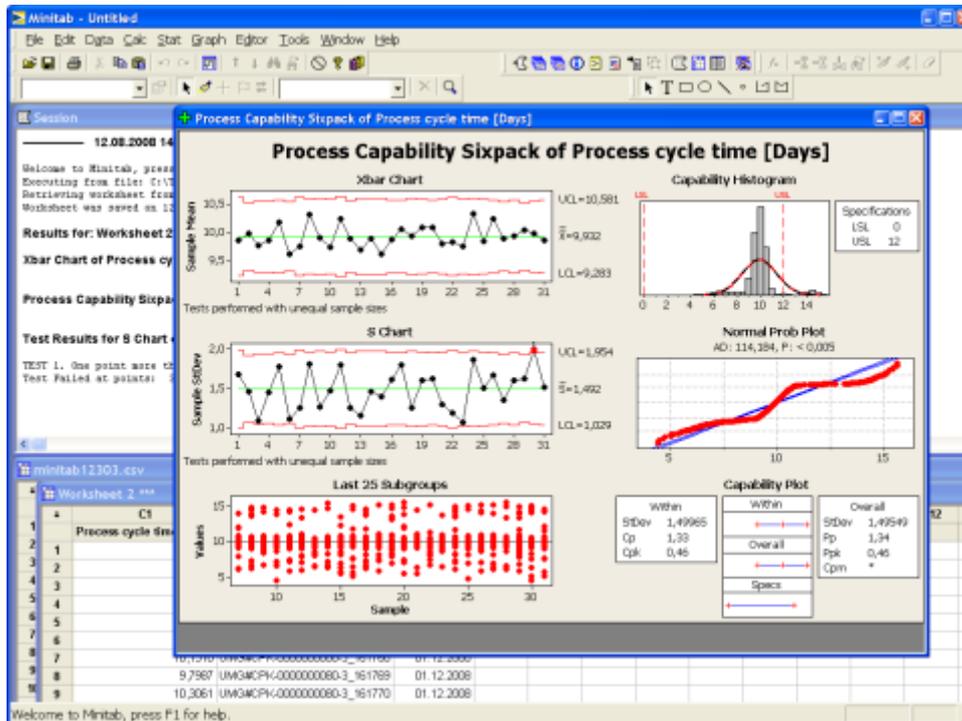
7.5 Run Minitab® from the command line

You can use the batch file **runppmminitab.bat** to run the Minitab® application from the command line independently of the PPM user interface.

The **runppmminitab** program evaluates all PPM favorites from a specified favorites folder and transfers all the required data and settings to Minitab®. Minitab only evaluates the data for PPM analyses to which a corresponding Minitab® macro has previously been assigned in PPM (chapter **Use Minitab® macros** (Page 30)).

As a result of the Minitab® evaluation using **runppmminitab**, the graphics for the Minitab® evaluations are exported and an **xml** file containing Minitab® measure values and filter settings for the command line call and the favorites is created.

You can use the graphics, particularly for publication in Management views in Performance Dashboard. The **xml** file enables you to import the Minitab® measures to PPM as process-independent measures (PIKI).

If you only want to run a particular favorite, specify the path for the name of that favorite.

Example

```
runppmminitab –user <name> –password <password> –client <name> –favorites folder
<favorite path>\<favorite name>
```

See also chapter Configure Minitab® measures (Page 35).

The **runppmminitab** application includes the following parameters:

runppmminitab [-client <name>] -user <user> -password <password> -favoritepath <favorite path>   [-globalfilter <filter>] [-globalfilterfavorite <favorite folder> [ignoreproctypefilter]] [-registry <host:port> [-usessl <true|false|default>]] [-publish <yes|no> [-vbmakro <vbmacro path>] [-outputprefix] [-language] [-resultfolder <abs. path>] –h [protocoloptions]

Parameter	Meaning
-client	Client whose data is to be used as a basis for running the evaluation. If no client is specified, the default client is used.
-user	PPM user who is running the evaluation.
-password	The password of the relevant user
-favoritefolder <path>	Path in the favorites tree The path information always refers to a directory in the shared favorites tree. All favorites stored in the specified directory are evaluated in turn, and their query criteria and the associated values are imported to **Minitab®**. When assigning directory names, do not use backslashes (****) as this would lead to incorrect interpretation of the path.
-publish <yes|no>	This parameter can be used to control whether the files exported from **Minitab®** are to be stored on the server for publication in Performance Dashboard. If the parameter is not specified, the default setting **yes** applies, i.e., all result files are stored on the PPM server in the directory configured by the entry for **ManagementViews2.FileBitmapBaseDirectory** in **Template_settings.properties** and removed from **–resultfolder**.
-vbmakro <path>	This option allows other VB scripts to be used than that provided by PPM by default.
-globalfilter	Settings for a global filter. To specify a filter, you must use the same syntax that was used for filtering the Management views, e.g., **TIME=Jan.05&PRINCIPAL=DEUTSCHLAND (DE)** See Performance Dashboard User Guide, chapter Management views. PPM does not check whether the filter returns plausible results.

Parameter	Meaning
-globalfilterfavorite \<favorite\> [-ignoreproctypefilter]	The following notation is used for the first parameter, which is used to specify a filter favorite: **\<path\>\<favorite name\>** - **\<path\>** begins with a \ followed by the directory name. Additional subdirectories are added in the same way. - **\<favorite name\>** is the name under which the favorite is stored in the shared favorites tree. **Example** **\Details\Sales\CycleTime_1** refers to the shared favorite CycleTime_1 in the **Shared favorites\Details\Sales** directory. The second parameter (**-ignoreproctypefilter**) is optional. If it is applied, the process type specified in the filter favorite is not used for filtering. If the parameter is not applied, the process type in the filter favorite is used for filtering. The **-globalfilter** and **-globalfilterfavorite** parameters are mutually exclusive. The command line program outputs an error message if both parameters are specified in the same call.
-registry \<host:port\>	In order to access an installation on a different computer, the optional **–registry** parameter must be used to specify the computer name including the port that can be used to access the computer's registry.
-usessl \<true|false|default\>	If the **-registry** parameter is specified, it is also possible to specify whether or not SSL is to be used. In this case, **true** and **false** respectively indicate that SSL will or will not be used. In addition, the value **default** specifies that SSL will be used (or not) depending on the configuration in the local installation.
-outputprefix	This parameter is used to specify a prefix for the file names of the Minitab® evaluation files (XML file, PNG graphics file). This allows the file names for the evaluations to be identified, e.g., in terms of the filter settings. **Example** **-outputprefix Region_South** All Minitab® evaluations are given this prefix: **MT_Region_South_\<favorite name\>_\<macro name\>_\<lfd\>.xml/.png**

Parameter	Meaning
-resultfolder	This parameter is used to specify the directory in which the PPM data (CSV file), the Minitab® macro file for calling up Minitab®, and the result files from Minitab® are to be stored on the client. If this parameter is not specified the files are automatically stored under **<installation directory>\ppmmashzone\server\bin\work\data_ppm\config\<ppmclient>\minitab**.
-language	Language for output in the log file and the console. If no language is specified, the server language is used.
-h	Online help
[protocoloptions]	Log settings

8 Display Minitab® evaluations in dashboards

This chapter describes how you can use evaluation results from Minitab® in Performance Dashboard. The Minitab® measures (e.g., Cpk, Ppk) can be displayed with their goal accomplishment in the same way as PPM measures and they can be assigned to the created Minitab® evaluation graphics. The Minitab® graphics are integrated into dashboards using Management views.

The following overview describes the steps required to display Minitab® evaluations in Management views.

Procedure

1. A Minitab® macro is used to provide the measures and graphics to be exported (see chapter **Use Minitab® macros in PPM** (Page 30)).

2. Run the **runppmminitab** command line program (see chapter **Run Minitab® using the command line** (Page 31)).

3. Expand the measure and process tree configuration with Minitab® PIKI measures and import the PIKI data file created containing Minitab® measures.

4. In PPM, the planned and threshold values for Minitab® measures are defined and favorites are created for Performance Dashboard.

5. In Performance Dashboard, Management views are created.

6. In Dashboard Builder, the Minitab® measures are incorporated into the process environment and they are assigned the associated Minitab® evaluation graphics using Management views.

8.1 Configure Minitab® measures

In order to display Minitab® measures in Performance Dashboard with measure indicators and goal accomplishment, they must first be imported into PPM as process instance-independent measures (**PIKI**) and configured for use in Performance Dashboard.

During the evaluation, Minitab® writes the created measures to an xml file containing all measure/value pairs. The XML file complies with **queryapiresult.dtd**. The data of the Minitab® XML file are transformed to the required PIKI import file using an **xslt** script. To create a relationship between the Minitab® measure values and the associated PPM data, in addition to the Minitab® measures some or all of the filter criteria used for the evaluation can be specified as additional dimensions in the PIKI cube.

When specifying the filter settings (**-globalfilter**, **-globalfilterfavorite**) to be used as dimension values for the Minitab® evaluations in PPM, note that it must be possible to use them as PIKI dimension values. This means that they must not contain time intervals or combined filters (only discrete filters).

The XSL transformation script for creating the PIKI import file is defined on a project-specific basis.

In PPM, the Minitab® measures must be configured in such a way that they can be used in Performance Dashboard. This means that planned or threshold values must be assigned and corresponding favorites defined for a dashboard.

In Dashboard Builder, these measures can then be integrated into the process environment in the same way as other PPM measures, and they are assigned the corresponding Minitab® evaluations using Management view links.

Tip

Detailed information on dashboard configuration is available in the Performance Dashboard User Guide.

8.2   Minitab® evaluations in Management views

In order to display Minitab® evaluation graphics in a dashboard, a Management view (.html) must be created in a corresponding directory in the Web application, e.g., **<installation directory>\ppmmashzone\server\bin\work\data_ppm\webapp\WEB-INF\config\umg_en\managementviews**. In this Management view, the graphics supplied by the PPM server are referenced by a relative path. The root directory of the path is set in the file **Template_settings.properties** using the key **ManagementViews2.FileBitmapBaseDirectory**.

Example: Referencing Minitab® graphics in Management views

```
…
function initMVComponents() {
      mv1.init("mvParent1", "Umsatzanalyse.png", "FILE", "BITMAP", "100%", "260",
[]);
                                }
…
```

Detailed information on integrating image files in Management views is available in the Performance Dashboard User Guide.

Integrating Minitab® evaluations into Management views means that the authorization concept for the Management views is also applied to Minitab® evaluations. This means that by default, all users specified in the **userlist** XML element in the file **_default_managementview_conf.xml** are authorized to view Management views with Minitab® evaluations. If you do not want this, you must create a separate configuration file for the relevant Minitab® Management view. The naming conventions correspond to those for the default Management views.

It is possible to display any graphic using the path information for image files in the **Template_settings** and in the Management view, regardless of user and access privileges. There is no authorization concept for displaying images in Management views, unlike displaying favorite queries in Management view components.

9   Appendix

9.1   Minitab® file

As well as the **csv** file containing the analysis data from PPM, a file of the **mtb** type is stored in the specified temporary directory (see chapter **Configure the Minitab® link** (Page 28)). The **mtb** file contains the path information for the associated **csv** file and the content of the Minitab® macro, if a macro has been assigned to the corresponding PPM analysis.

All **csv** and **mtb** files created in this way by calling up Minitab® from the PPM user interface (GUI) are given a unique name, assigned by the operating system.

Warning

The **csv** and **mtb** files from the **resultfolder** directory are automatically deleted when **runppmminitab** is called up.

To save the exported data, it is recommended that you manually save the files to another directory.

9.2   Record Minitab® macros

You can use macros to record frequently used data evaluations in the **Minitab®** application and re-use them for your different PPM analyses.

The recorded Minitab® macro is saved in an **mtb** file.

You can edit **mtb** files using a text editor. **Mtb** files must not contain TAB separators.

The chapter **Assign a Minitab® macro to the PPM analysis** (Page 19) describes an example of how to create macros in Minitab®. For more detailed information about recording macros in Minitab®, refer to the Minitab® user guide.

9.3   Minitab® macro requirements

In order to export all of the required data from Minitab®, Minitab® macros must meet certain requirements.

1. Measure values to be displayed in a dashboard must not merely be contained in the analysis graphics, they must also be accessible independently, so that they can be exported from Minitab® as individual measures. Exporting individual measure values is only possible using the Minitab® worksheet. This means that analysis results must be inserted into the worksheet using the Minitab® macro. Minitab® analyses provide an option to explicitly save measure values. When running evaluations, the measure values are automatically saved in the current worksheet and the columns are given the name of the relevant measure. During a session, renaming the column is recorded using the **Name <column no.> ,'<measure name>'**, e.g., Name c14 'Cpk' and saved by a sub-command within the analysis in the form **<measure> '<column name>'**; , e.g., CPK 'Cpk;'

2. The associated graphics to be displayed in dashboards must have been created.

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3. The macro must not contain hard-coded saving of Minitab® analyses. Saving is carried out automatically when exporting.

The macros created are language-specific in most cases. This dependency is based on the use of the column headers in the analysis descriptions.

In order for the macros to be used in different PPM login languages in PPM, when inserting the macros into the current analysis the current PPM interface language is saved as a parameter in the plug-in. If this macro is then called up from an interface with a different language than the saved one, the data is still exported in the language specified in the plug-in. Otherwise, it would not be possible to run the macro in Minitab®.

Please note that when calling up Minitab® to record the macro and when assigning the macro to a current paramset, the same PPM login language must be used. Compliance with this condition cannot be supported by the system - it is up to the user.

9.4   Restrictions for table content

The following restrictions apply to importing data into Minitab®; the PPM data must be adapted accordingly, if necessary.

- Column names can be a maximum of 31 characters long.

- For some analyses, it is necessary for the first eight characters of the column names to be unique. PPM displays a corresponding error message.

- Column names must not contain the **#** and ***** characters.

- The length of the column content is limited to 80 characters.

- The format/type of a column is defined by the first value in the column. For example, if an **A** appears in the first row and the subsequent rows contain a figure, this column will be viewed as a text column in Minitab®.

- In Minitab®, non-numerical values in numerical columns are replaced with the ***** character (symbol for zero values).