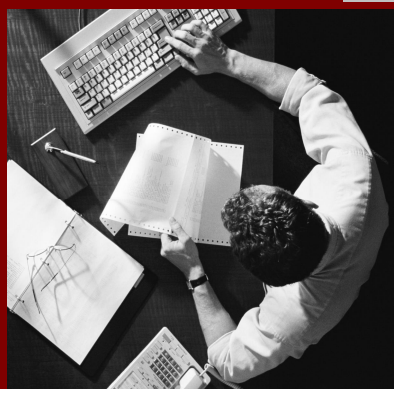

How-To Guide: Performance

SAP® CRM 7.0

Target Audience

- System administrators
- Technology consultants

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Type Style	Description
Example Text	Words or characters quoted from the screen. These include field names, screen titles, pushbuttons labels, menu names, menu paths, and menu options. Cross-references to other documentation
Example text	Emphasized words or phrases in body text, graphic titles, and table titles
EXAMPLE TEXT	Technical names of system objects. These include report names, program names, transaction codes, table names, and key concepts of a programming language when they are surrounded by body text, for example, SELECT and INCLUDE.
`Example text`	Output on the screen. This includes file and directory names and their paths, messages, names of variables and parameters, source text, and names of installation, upgrade and database tools.
`Example text`	Exact user entry. These are words or characters that you enter in the system exactly as they appear in the documentation.
`<Example text>`	Variable user entry. Angle brackets indicate that you replace these words and characters with appropriate entries to make entries in the system.
`EXAMPLE TEXT`	Keys on the keyboard, for example, F2 or ENTER.

Icons

Icon	Meaning
	Caution
	Example
	Note
	Recommendation
	Syntax

Additional icons are used in SAP Library documentation to help you identify different types of information at a glance. For more information, see *Help on Help → General Information Classes and Information Classes for Business Information Warehouse* on the first page of any version of *SAP Library*.

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1 Front-end

1.1 JavaScript, HTML and CSS

To reduce the CPU time used by the browser when rendering pages, you need to optimize your JavaScript, and make sure that your HTML and CSS are as simple as possible. The descriptions in the following sections typically affect rendering performance.

1.1.1 JavaScripts Executed Onload

These scripts always add their runtime to the front-end rendering time, as they are carried out consecutively after the normal rendering has finished. Thus, "onload" scripts should only be used in rare cases and definitely should only leave a "footprint" after roundtrips where their execution is needed.

1.1.2 DOM Operations in JavaScript

Both read and write access to DOM elements can affect front-end runtime in a more negative way than meets the eye. While normally read accesses are quite fast, you need to check your code for accesses that take a long time. Especially in browsers of an older generation there are read accesses to elements or element attributes which take 50 ms for no apparent reason.

While for read accesses we cannot predict a long runtime, one can take more measures when it comes to write accesses. Inserting new visible elements in the DOM cause the browser to repaint some weird sections again. Be aware that sometimes the neighboring sections of the changed DOM also need to be repainted.

You should be especially cautious with style changes on DOM elements. Changing a style on a `<table>` element, where this table has a high number of lines, causes the browser to repaint the whole table.

1.1.3 New, Duplicate, Conflicting, or Obsolete CSS Rules

The more CSS code there is for a page, the more rules the browsers have to consider for each new HTML element. Every time the browser renders an HTML element, the browser needs to know which of the many styles defined in the numerous style sheets is applicable for the current element. If there is more than one, the browser also needs to determine which one "wins". This shows that new style sheets worsen the rendering performance. Thus, refrain from adding too many new styles and especially get rid of the surplus ones which are duplicate or obsolete.

1.1.4 Errors in HTML Code

HTML 4 allows the use of unclosed tags like `<input>`. However, cannot count on the fact that each tag is not closed, it needs to make more assumptions which causes a performance decrease. Web Client UI tells the browser that the HTML created is "XHTML transitional", meaning the browser banks on tags being closed. If you use your own custom HTML, make sure you close all tags even if it is unfamiliar for you. So, instead of just specifying `<br>` instead specify `<br></br>`.

1.1.5 Complex HTML Code

Avoid complex HTML structures in your code. A good example is not using nested `<table>` tags. By default, the up most table can only be rendered if the widths of all its children tables

are determined. So, the browser needs some iterations to find a balance of the boundary conditions imposed from the elements which wrap the parent table and the demands of its children tables.

1.2 Inline Script Blocks in BSP Views

Try to avoid using script blocks in BSP views whose content changes frequently. As the Web Client UI usually works with Automatic Delta Handling (ADH) in case of a screen area being changed, the included script blocks are also be included in the change. ADH's logic takes such inline script blocks and puts them into the HTML header. This causes performance decrease. If you need to introduce script blocks, make sure that they are introduced on a view which stays stable for a long time, i.e. where the content of the view stays unchanged from one roundtrip to another.

Unfortunately, at this point there is no predestined option in the WebClient Framework for placement of such inline scripts. Until there will be such an option, a work around is to "misuse" the concept of being able to introduce own UI components in the navigational bar. This has a couple of advantages especially for customers who want to include their own scripts:

One can introduce a new view which only contains the script and is not part of a view hierarchy that changes a lot, i.e. it even stays stable when there is navigation within the WebClient UI L-shape. If the script itself stays unchanged during roundtrips, ADH just picks it up once to put it into the document header and afterwards the view will is unlikely.

1.3 Inline Style Blocks in BSP Views

Inline Style Blocks cause the delta handling to shift the whole style block to the HTML header (similar to *Inline Script Blocks in BSP Views* [page 9]), which is very expensive. Standard procedure would be to create a new skin that introduces the styles or to put a custom style sheet in some upper view so it is not uploaded as an inline style. For the latter the same workaround can be used as in *Inline Script Blocks in BSP Views* [page 9].

1.4 Horizontal Scrollbar in a Table

Try to avoid setting the `chtmlb:configCellerator` (former `chtmlb:configTable`) to `scrollable` as this decreases performance. If you really need the table scrollable, use a `div` around the table with overflow in x direction instead.

1.5 Vertical Scrollbar in a Table

In case you are using vertically scrollable tables, make sure the code of SAP Note 1247380 is part of your system. This will drastically improve the front-end performance for such tables.

For more information, see SAP Note 1247380 - *THTMLB cellerator resizing performance enhancement*.

1.6 Table Size

Try to reduce the number of visible columns and the visible row count in a table. Large tables are bad for performance on both the front-end and the back-end.

1.7 Message Area

In case of a SAP CRM 2007 or earlier system the message area is located in a separated area above the work area. It can grow or shrink depending on the number of messages contained in it. Especially in CRM 2007 the message area dynamically grows to a customizable number of messages before the message area gets a vertical scrollbar.

Unfortunately, every change of the height of the message area triggers a recalculation of the height of the work area. This recalculation is expensive in terms of rendering time and gets more expensive the bigger the page gets, i.e. overview pages suffer most from this effect.

Performance can be improved in customer projects for those steps that contain messages which are not needed urgently. If one can get rid of a message like *More than 100 records were found in a search operation*, there is no message area introduced after a search at all. Thus, the rendering performance is much faster. Some 20 to 30 % of the front-end rendering time can be saved.

Another alternative is to keep the maximum number of visible lines in the message area in customizing low. If it is set to 1, the message area cannot grow in height bigger than one line and a change form, e.g. 5 messages after a first roundtrip to 3 ones after the next one, does not have a negative effect on performance.

As of release WEBCUIF 7.0 (SAP CRM 7.0), the message area is not a performance issue anymore as the message area's new design does not influence the size of the work area anymore.

Note

If you are using CRM release 2007, the new message area is available on a note basis. SAP Note 1307773 introduces it, but there are several caveats with respect to its handling and styling capabilities. First and foremost, the message cannot be invoked on a business role basis like in 7.0 and later, but only per user with a user parameter. For more information, see SAP Note 130773 - *FB01 Entering amt possible after 'Simulate documnt'*.

2 Back-end

2.1 Configurable Tables or Trees

SAP Note 1179315 improves the back-end rendering time for huge tables. In a lot of cases, UI components contain context nodes which do not have an implementation of a P-Getter method for every column that is used on the UI.

Sometimes a P-Getter method exists, but when it is called by the WebClient UI runtime to inquire about the field type for a certain attribute, it does not return any value. In such cases, the WebClient UI runtime itself determines the field type using a so-called heuristics. This heuristics is very expensive. If you have a large table where P-Getters are missing or do not return a field type, look into the following:

- Create P-Getter methods for all columns and pass back a field type for all columns. This ensures that the heuristic approach never needs to be taken by the UI runtime.
- Implement SAP Note 1179315 into your SAP CRM 2007 or 7.0 system (WEBCUIF EhP1 onwards already contains its code from the first version). After this note is applied, the UI runtime tries to invoke a P-Getter method for each column of the table/tree in its first line. For all the columns where this invocation does not return a field type and consequently, the heuristics needs to be called, the UI runtime buffers the heuristics result. For all rows from the second upwards, the field type of these columns that were buffered is applied and neither the P-Getter method nor the heuristics is carried out again.

For more information, see SAP Note 1179315 - *CRM Web UI: Backend performance of configurable tables/trees*.

If the context node has a redefined GET_P_T_TABLE method, refer to SAP Note 1277270 - *WEBCUIF: Wrong field types after note 1179315*.

3 Performance Measurement

Various tools are used to inspect the performance. Here is a brief overview of tools to analyze front-end and/or back-end performance for different browsers:

- Performance Measurement Tool

  The tool described in SAP Note 1041556 allows you to measure the front-end UI rendering of a process. When comparing this measurement with the STAD records of the CRM server you will get a better idea of where the issue exists.

  For more information, see SAP Note 1041556 - *SAP HTTP PlugIn for IE*.

- Front-end and back-end: Performance Tracker

  From SAP CRM 7.0 on the performance in the Web Client UI can be tracked by pressing `CTRL+SHIFT+F7`. A window appears in the upper right corner of the work area frame which shows back-end and front-end rendering times for every back-end event that happens after the window appears. The window shows the accurate back-end (i.e. ABAP) processing time. The front-end time is not to be taken as the 100% value but is the lower limit and gives a good indication about the real time the browser takes for rendering.

  You can close the window with the same key combination.

4 Additional Useful Information

4.1 Help

- SAP Note 1251767 - *Automatic Delta Handling: Checking*

4.2 General

- SAP Note 1162605 - *Network performance for CRM 2007 Webclient*
- SAP Note 1048388 - *General Performance improvements of BSP transactions*

4.3 Front-end

- SAP Note 1255130 - *WEBCUIF: Frotend performance w.r.t PAI and table lines*
- SAP Note 1252586 - *WEBCUIF: Light-DDLB for improved performance*
- SAP Note 1256218 - *WEBCUIF: Cellerator tag: Resizing performance enhancement*
- SAP Note 1280372 - *Web Client UI: Performance when using F4 with help objects*
- SAP Note 1283980 - *THTMLB cellerator sizing performance fix*
- SAP Note 1300154 - *JavaScript circular reference fix in thtmlbUtil eventing*
- SAP Note 1301750 - *Severe JavaScript memory leak fix*
- SAP Note 1302789 - *JavaScript memory leak fix for IC in CRM 2007*
- SAP Note 1318610 - *Frontend Selection for Web Client UI tables*
- SAP Note 1326441 - *Debugging authority check performance improvement*

4.4 Back-end

- SAP Note 1244479 - *CRM WebClient: Runtime related issues*