BENCHMARKING

The database's and frontend's version from beginning of Decembers 2015 were benchmarked during the development. This document describes the overall procedure and considerations, used parameters and conclusions drawn.

PROCESS AND PARAMETERS

TPC-W PROCESS: Like in TPC-W Benchmarking, several terminals call the web pages containing database information, measure the time until receiving an answer and wait a specified time before performing the next call.

PARAMETERS: The relevant parameters are the number of terminals n, waiting time t, and the workload mix specifying how often a webpage is called relative to the others. The workload used can be seen in the following table.

Frequency	Webpage
25 %	Distribution of Seats: *http://localhost/SeatsBundestag?electionId=2*
10 %	Members of Parliament: *http://localhost/MemberBundestag?Electionid=2*
25 %	Detailed analysis of a random (ID=123) district *http://localhost/Wahlkreis/Overview?electionid=2*
10 %	Erststimme Winners *http://localhost/Winner?electionid=2*
10 %	Überhangmandate *http://localhost/Ueberhangmandate?electionid=2*
20 %	Closest wins/ losses for every party (Erststimme) *http://localhost/ClosestWinner/Result?electionid=2*

15 seconds were considered as the average time a user spends on a single page with election analysis data. Therefore, the time between calling pages was set to 15 seconds for realistic simulation and 5 seconds for simulating peak times. The number of request sending terminals was varied between 50 and 100. Tests with all possible parameter pairs of n and t ([15;50], [15;100], [5;50], [5;100])were performed.

To simulate annoyed users aborting their request after 30 seconds waiting for a response, we set the http timeout of our webpages to 30 seconds. Therefore, requests that could not be served within this particular timespan occurred as errors in the statistical analysis of the benchmarking.

RESULT FILES

The result files generated by the VisualStudio Workloadtest are attached to this documentation and can be found in Benchmarking\Testresults_files. As those files cannot be opened without VisualStudio, it might be useful to also have a look at Benchmarking\Testresults_screenshots.

Chosen parameters, benchmarking process and results were also explained in a presentation in December 2015. Slides prepared for this presentation can also be found in the Benchmarking folder.

OBSERVATIONS AND CONCLUSION

Queries, that are related to the overall seat distribution, i.e. Distribution of Seats, Members of Parliament, Überhangmandate are very slow and are likely to cause timeout exceptions. This is not surprising because of known performance issues in an SQL view querying the seats gained by Zweitstimme per party in each state. More alarmingly is the insight, that these slow queries also impair the performance of the other three tested webpages. Therefore, timeout exceptions appeared in two of the other pages, too. To validate the thesis that this happens due to the slower views discussed above, all load tests were performed without calling seat-distribution dependent views. Here, no timeout errors were observable. This clearly indicates, that our performance issues only came from problems with the seat distribution and –particularly- the computation of seats gained by Zweitstimme.

In consequence of these observations, we identified the clear need to optimize the computation of the seat distribution in order to make it run faster and to avoid negative influences to other queries.