Advanced Systems Lab (Fall'15) – First Milestone

Name: *Sandro Huber*
Legi number: *10-924-777*

Grading

Section	Points
1.1	
1.2	
1.3	
2.1	
2.2	
2.3	
3.1	
3.2	
3.3	
3.4	
3.5	
3.6	
Total	

1   System Description

1.1   Database

Length: 1-2 pages

Start by explaining the schema of the database and the indexes used to speed up data access. Describe the interface to the database (queries and stored procedures).

Make sure to explain the design in terms of what you wanted to achieve, what decisions you took and what is the expected behavior.

Include baseline performance characteristics of the database (max throughput, response time, and scalability).

1.1.1   Schema and Indexes

1.1.2   Stored Procedures

1.1.3   Design decisions

1.1.4   Performance characteristics

1.2   Middleware

Length: 1-2 pages

Explain the design from a high-level point of view, highlighting what you wanted to achieve, design decisions, expected behavior.

Then go into more detail on how the middleware connects to the database and clients, and how queuing is implemented.

Show what are the performance characteristics of the middleware (i.e. throughput, latency, scalability).

1.2.1   Design overview

1.2.2   Interfacing with clients

1.2.3   Queuing and Connection pool to database

1.2.4   Performance characteristics

1.3   Clients

Length: 2-3 pages

Explain the interface of the clients to your messaging system and their high level design, including the ways you have instrumented the code for debugging and benchmarking purposes.

Provide a detailed description of the workloads used later in the report (operation mix, starting and ending state of the database, assumptions on workload behavior). Explain how the load was generated (include baselines on load generation speed) and how the clients were deployed.

Which are the sanity checks in place for ensuring correct load generation and validity of responses?

2 Experimental Setup

Length: 1-2 pages

Explain the overall design of the complete system and list the configurations (number of middlewares, number of clients, types of machines, communication patterns) corresponding to the main workloads.

Describe the mechanisms for deploying the system for experiments and the way performance numbers are gathered and processed. Make the description so that someone unfamiliar with your system can replicate the steps, and reference the different script files you submit as code in the SVN repository.

2.1 System Configurations

2.2 Configuration and Deployment mechanisms

2.3 Logging and Benchmarking mechanisms

3 Evaluation

Length: up to 10 pages

In this section we expect to see the different experiments you ran to exercise the system, and with each experiment we expect a clear description of the system configuration used, the hypothesis on behavior and the explanation of the behavior observed (in terms of the different design decisions taken beforehand) – *missing either of these for an experiment might make you lose all points for that given experiment!* Keep in mind that for a good explanation of the results of an experiment you might have to use one or more methods of data analysis presented in the lecture and in the book.

See below for a short description on what each part should contain.

3.1 System Stability

To prove that your system functions correctly and that it is stable include the trace of a 30 minute run, plotting both response time and throughput. Use at least 30 clients (sending and receiving data), 2 middlewares and a non-empty database.

3.2 System Throughput

Measure the maximum throughput of the system (describe the exact configuration and workload, and the reasoning behind choosing these particular ones) and show the average response time for this experiment.

3.3 System Scalability

Explain the different configurations used to explore the scalability of your system, and the outcomes of these experiments in terms of throughput and response times. The main goal of this subsection is to define the ranges in which your system operates best.

3.4 Response Time Variations

Report and analyze how the response times change in the system with different message sizes, different number of clients and different number of middleware nodes.

3.5 2^k Experiment

Conduct a 2^k analysis of your system (aim at exploring non-obvious interactions of parameters). Use the methods learned in this lecture to conduct the detailed analysis.

3.6 Conclusion

To conclude the report summarize the behavior of the system in terms of the design and the representative workloads. Finally, outline in a few points what would you do differently if you could design the system anew.