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Theoretic Performance Assessment

Perform all the following tasks in your study group. It is important to think about these cases, there are many good thoughts about it. Do not worry about mistakes or incomplete analysis – because you may lack knowledge: Make assumptions and discuss alternatives.

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Task 1: Estimating Efficiency for I/O (20 min)

As part of this task, you will apply the methodology for performance estimation on a use case. Understanding if observed performance is acceptable is important to identify optimization potential. In this task, imagine you have obtained a set of performance measurements on different systems, and you shall assess the performance.

Consider the following alternative system characteristics:

1. Network: 10 GBit Ethernet, or 100 GBit Infiniband.
2. 10 or 100 storage servers. A server may have either 1 or 4 network interfaces.
3. Storage nodes are equipped with either SSDs or HDDs, and either 1, 5, 8, or 16 storage media.
4. There are a various number of client nodes available, but a node has only one network interface.

We measured the following client configurations with given total amount of data and measured runtime of the overall applications:

- 1 Client node, 100 MByte of data in 0.1s.
- 10 Client nodes, 10 GByte of data in 1s.
- 100 Client nodes, 1 TByte of data in 100s.
- 1000 Client nodes, 100 TByte of data in 100s.

Steps

1. Analyze one system configuration and workload – hint: start with the simplest configuration
2. Calculate the expected performance for the system configuration and the efficiency
3. Analyze the other cases based on your initial approach

4. Discuss which combination of system configuration is probably impossible, efficient or rather inefficient.

Task 2: Estimate performance for your benchmark results (30 min)

In the exercise for the benchmarking, you ran a benchmark. Please assess the performance of your obtained results, potentially, rerun modify it and rerun parts of the benchmark.

1. Apply our methodology
2. When you think about the hardware of the system – can you say anything about its characteristics? How can you get the information?
3. Discuss the results in your study group

Task 2: Identifying workload and suitable system model for an arbitrary service (30 min)

This is a more difficult **optional** task that can be done instead of Task 2

As part of this task, you will apply the methodology for performance estimation on the service of your choice.

Steps

1. Discuss in the team which service you want to analyze – we recommend to choose one that you are familiar with. It can be anything from DNS requests, image/system provisioning, web, ticket system, ...
2. Identify a suitable workload.
3. Describe the system architecture. Therefore, think about a basic model how the workload may be implemented on the given hardware.
4. List the relevant system characteristics.
5. Discuss what efficiency you expect. If time permits, search a performance value online.