# SOFT8025 Scalable Microservices Technical report/Project

**Completion Date: 6ᵗʰ December 2019**

**Value: 28 marks**

**Technical report/project area choices**
The topic of your technical report/project is to have a distributed systems focus. Ideally the structure of the report should follow that of a typical conference paper. See for example the paper attached paper "How Speedy is SPDY?". See other such papers here https://www.usenix.org/conference/nsdi14/technical-sessions
https://www.usenix.org/conference/nsdi15/technical-sessions

You may choose one of the following or create your own project based on the referenced papers below (or combine projects 1+2 etc):

1. **grpc design/performance**
Give a brief overview of grpc, HTTP/2 and SPDY
https://www.chromium.org/spdy/spdy-whitepaper. Develop a simple application to demonstrate grpc e.g. chat application
https://techblog.fexcofts.com/2018/07/20/grpc-nodejs-chat-example/ .
Show why grpc is suitable for messaging in the microservice architecture?

2. **Service discovery using zookeeper or etcd**
Give an overview of zookeeper or etcd. Show how etcd/zookeeper can be used for service discovery. https://lukebond.ghost.io/service-discovery-with-etcd-and-node-js/.
Explain how you would develop a simple application to demonstrate your service discovery.

3. **Zookeeper or etcd consenus**
Build a simple distributed application in zookeeper or etcd e.g.
https://zookeeper.apache.org/doc/current/recipes.html.
Show how the consenus algorithms of etcd or zookeeper are used internally to support a large distributed version of your application.

4. **Distributed log processing**
Explain how you would use of the elastic search stack for log processing and monitoring. https://www.elastic.co/solutions/logging
https://callistaenterprise.se/blogg/teknik/2017/09/13/building-microservices-part-8-logging-with-ELK/

Reference papers for all projects

1. Ongaro, Diego, and John K. Ousterhout. "In Search of an Understandable Consensus Algorithm." USENIX Annual Technical Conference. 2014.
2. Abadi, Daniel. "Consistency tradeoffs in modern distributed database system design: CAP is only part of the story." Computer 45.2 (2012): 37-42.
3. Hunt, Patrick, et al. "ZooKeeper: Wait-free Coordination for Internet-scale Systems." USENIX annual technical conference. Vol. 8. 2010.
4. Kreps, Jay, Neha Narkhede, and Jun Rao. "Kafka: A distributed messaging system for log processing." Proceedings of the NetDB. 2011.
5. Brewer, Eric. "CAP twelve years later: How the" rules" have changed." Computer 45.2 (2012): 23-29.
6. Junqueira, Flavio P., Benjamin C. Reed, and Marco Serafini. "Zab: High-performance broadcast for primary-backup systems." Dependable Systems & Networks (DSN), 2011 IEEE/IFIP 41st International Conference on. IEEE, 2011.
7. Dong, Bo, et al. "An optimized approach for storing and accessing small files on cloud storage." Journal of Network and Computer Applications 35.6 (2012): 1847-1862.