1. Exercise 1:

1.1 Performance

- CDN (content delivery network): In systems where data being supplied is static, we can use CDN to provide data to customers at different geographical locations.
- Caching: In cases where we have many read operations in our software systems, we can use caching to cache data that is read often times
- Algorithm optimization: Using algorithms with optimal speed in the application can also improve the application performance speed.
- Serverless architectures: Using serverless architectures like Amazon Lambda that are already optimized can also improve the performance of our applications.
- Autoscaling: Auto scaling the application in times of high performance can greatly increase the performance of an application.

1.2 Scalability

- CDN (content delivery network): Use of CDN also increases scalability in cases where the system is to be used in different geographical areas.
- Autoscaling: Scaling up and down the application as per timely need also improves scalability. Auto scaling can be achieved using many technologies on the market such as Kubernetes.

1.3 Availability

- Load balancing: creating multiple instances of the same application can improve availability in times when one instance is down another instance can handle the requests.
- Deploying the applications in containers and using container orchestration can greatly improve the availability of the application.
- Autoscaling can also improve availability since when one instance is down and we have many request, other instances are brought up to manage the scaling.

1.4 Maintainability

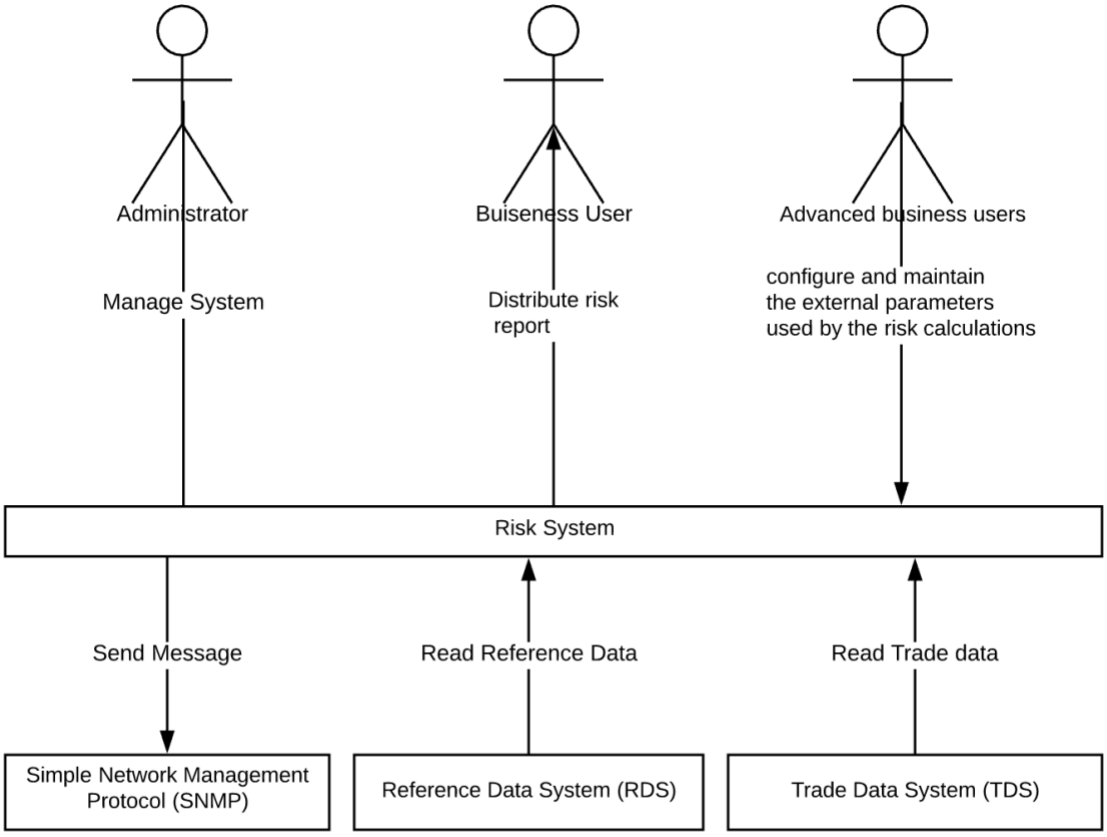
- Keeping the application simple will make the application maintainable.
- Making the application modular also will make the application maintainable.

1.5 Reliability

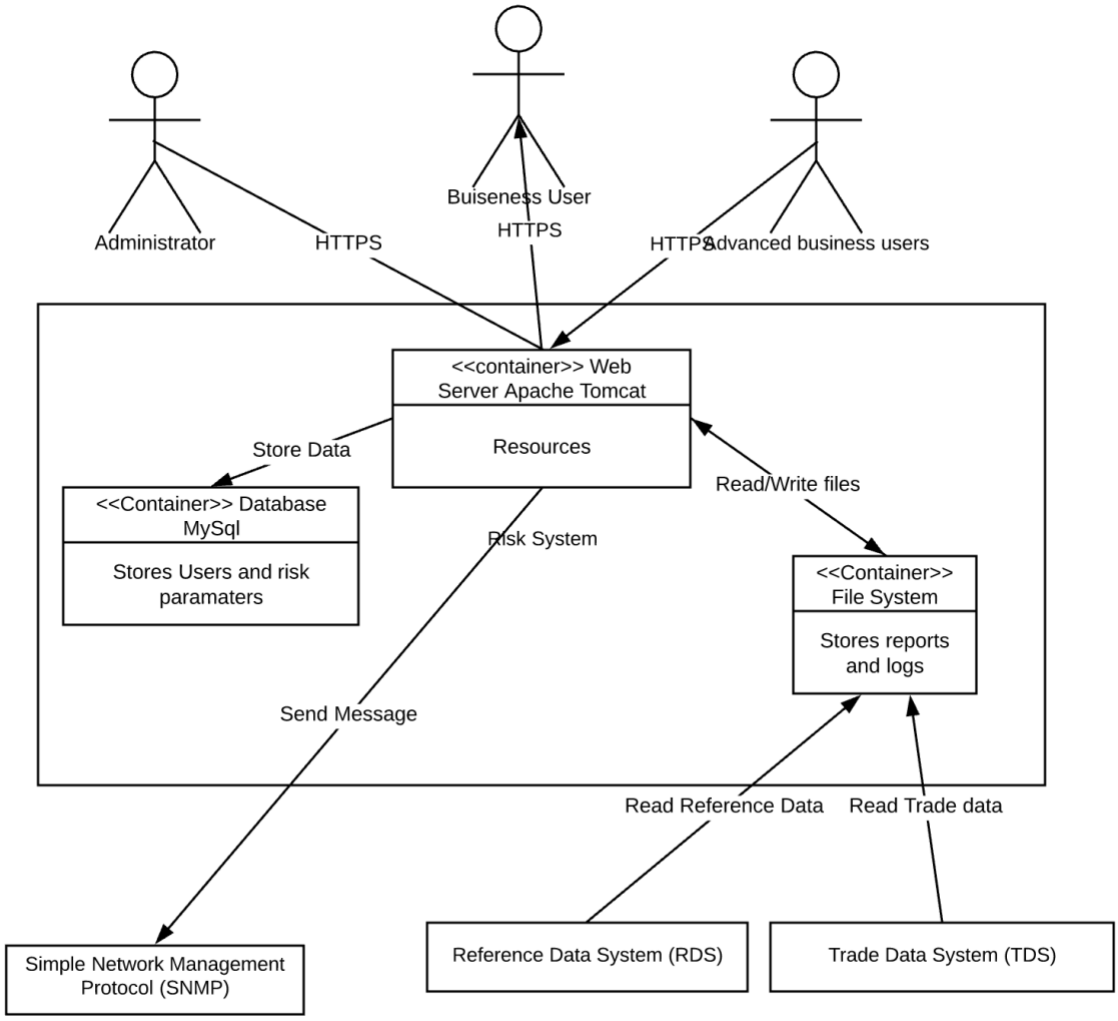
- Autoscaling can make the application reliable since we can be sure that we will at all times have enough instances to handle our requests.
- Making the application fault tolerant such as using containers and container orchestration to manage the application can make the application reliable.
- Ensuring that the application can recover in the smallest period of time in cases where you have calamities such as having backup datacenters can improve reliability.

2 Exercise 2

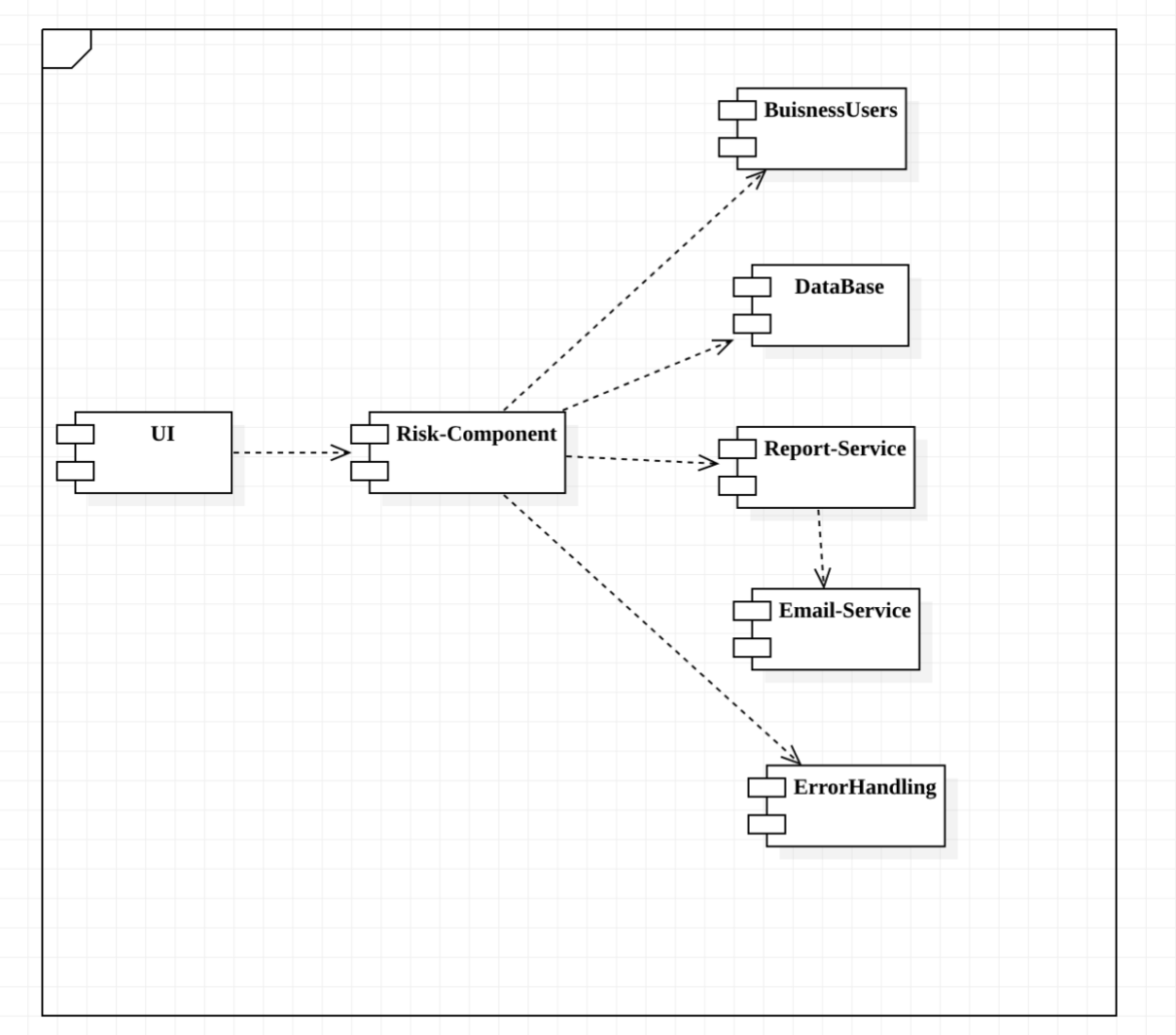
2.1 Context Diagram



2.2 container diagram



2.3 component diagram



2.4 Sequence Diagram