

**SOFE4790/CSCI4640 Distributed Systems**

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# **Assignment 1**

1. Read the use case study in section 1.6 in the text book on the Web and for each of the DS challenges listed below give a brief description of how that challenge is reflected in the Web case study. The challenges are:

### **Heterogeneity**

### **Openness**

The World Wide Web allows for implementation and extensibility by providing communication, documentation and content standards. It also allows for a variety of resources that can be published.

### **Security**

To provide security to content that a user does not want to share with anyone with a network connectivity to a web server, a user can configure a server to issue a challenge such a password to be able to view the content.

### **Scalability**

Scalability challenges in the web are found in the domain of number of requests per seconds to a server. As the number of users of a site increase the server will slow, in turn slowing the response to the user. Caching resources and proxy servers, as well as diving server loads across computer clusters are used to increase responsiveness.

### **Failure Handling**

The webs failure handling comes in terms of error response codes including the famous 404 Not Found response.

### **Concurrency**

A client may only specify one request per HTTP request. If a web page contains several resources these resources will all need to be requested individually when the web page is loaded. To provide better performance a browser will perform concurrent requests to the server to reduce the overall delay.

### **Transparency**

The Case Study addresses the transparency challenge in the form of urls. Urls are used to mask the ip addresses of servers and in turn it does not appear to users that they are accessing different servers across the world.

### **Quality of Service**

2. Modify the UDP and TCP programs included for the assignment so that you can compare the performance of TCP and UDP with regards to latency, packet loss, and throughput. For the tests you can try have the Client send 100000 messages to server with the size of 25, 30, 35 kilobytes respectively and plot the delay, loss of data, and throughput for both the UDP and TCP connections.

3. Describe the serialized form that a serialization algorithm would produce when serializing an instance of the following class:

```
class Couple implements Serializable {
    private Person one;
    private Person two;
    public Couple(Person a, Person b) {
        one = a;
        two = b;
    }
}
```

Couple	8-byte version number		h0
2	Person one	Person two	
Person	8-byte version number		h0
3	int year	java.lang.String name:	java.lang.String place: