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Homework #4

1. A distributed system is a system that has two sides to it. The first element is the individual nodes. Several processes and functions are performed in a decentralized fashion, happening over several different machines. However, the second part combines all the individual processes and presents one coherent interface to the user.
2. An overlay network is similar in the concept of having individual nodes running different functions. There are two different kinds of overlay networks, the structured and unstructured. A structured overlay network means that each node will have a well-defined set of neighbors that are communicated with in practice. An unstructured overlay network will use references to other nodes that are randomly selected by the system. The key with overlay networks is that they are always connected.
3. The main issue with replication in scalability is that when several copies are being made, it is difficult to keep each one consistent with the others. To keep the copies consistent, there needs to be a method of global synchronization.
4. In general, when a system fails, it is convenient to know where the issue is in order to resolve the problem faster. If a user goes to login on a given website and the process fails, the user will have no idea what part of the system caused the problem without some form of communication that compromises the transparency. For example, the browser might indicate that the user is not connected to a secure network, the website might send a message that their server is down, etc. The feedback on why something didn’t work is much more important and practical to the user than the transparency of the distributed system.