Abstraction:

* Abstraction is the art of obfuscating details that we don’t need. It allows us to concentrate on the big picture.

Remote Procedure Calls (RPC):

* Remote procedure calls (RPCs) provide an abstraction of a local procedure call to the developers by hiding the complexities of packing and sending function arguments to the remote server, receiving the return values, and managing any network retries.
* RPC mechanisms are employed when a computer program causes a procedure or subroutine to execute in a separate address space.
* **The RPC method is similar to calling a local procedure, except that the called procedure is usually executed in a different process and on a different computer.**

Consistency:

* Consistency may mean many things. One is that each replica node has the same view of data at a given point in time. The other is that each read request gets the value of the recent write.
* There is a difference between consistency in ACID properties and consistency in the CAP theorem.
* Database rules are at the heart of ACID consistency. If a schema specifies that a value must be unique, a consistent system will ensure that the value is unique throughout all actions. If a foreign key indicates that deleting one row will also delete associated rows, a consistent system ensures that the state can’t contain related rows once the base row has been destroyed.
* CAP consistency guarantees that, in a distributed system, every replica of the same logical value always has the same precise value.

Spectrum of Consistency Models:

1. Eventual Consistency
2. Casual Consistency
3. Sequential Consistency
4. Strict Consistency

* Applications with strong consistency requirements use techniques like quorum-based replication to increase the system’s availability.
* Application programmers have to compromise performance and availability if they use services with strong consistency models

The Spectrum of Failure Models:

1. Fail-Stop
2. Crash
3. Omission failures
4. Temporal failures
5. Byzantine failures

Non-Functional System Characteristics:

1. Availability
2. Reliability (The measurement of availability is driven by time loss, whereas the frequency and impact of failures drive the measure of reliability.)
3. Scalability (Horizontal and Vertical Scaling)
4. Maintainability
5. Fault Tolerance (Replication, Checkpointing)

Types of data center servers:

1. Web servers
2. Application servers
3. Storage servers (Blob storage, temporary processing queue storage, BigTable (Thumbnails), Relational database management system (RDBMS))