Grokking the System Design Interview

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Heartbeat (New)

Let's learn about the heartbeat and its usage.

We'll cover the following ∧

- Background

- Solution

Background#

In a distributed environment, work/data is distributed among servers. To efficiently route requests in such a setup, servers need to know what other servers are part of the system. Furthermore, servers should know if other servers are alive and working. In a decentralized system, whenever a request arrives at a server, the server should have enough information to decide which server is responsible for entertaining that request. This makes the timely

detection of server failure an important task, which also enables the system to take corrective actions and move the data/work to another healthy server and stop the environment from further deterioration.

Solution#

Each server periodically sends a heartbeat message to a central monitoring server or other servers in the system to show that it is still alive and functioning.

Heartbeating is one of the mechanisms for detecting failures in a distributed system. If there is a central server, all servers periodically send a heartbeat message to it. If there is no central server, all servers randomly choose a set of servers and send them a heartbeat message every few seconds. This way, if no heartbeat message is received from a server for a while, the system can suspect that the server might have crashed. If there is no heartbeat within a configured timeout period, the system can conclude that the server is not alive anymore and stop sending requests to it and start working on its replacement.

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