4/30/25, 7:43 PM Availability

Grokking the Modern System Design Interview / ... / Availability

Availability

Learn about availability, how to measure it, and its importance.

What is availability?#

Availability is the percentage of time that some service or infrastructure is accessible to clients and is operated upon under normal conditions. For example, if a service has 100% availability, it means that the said service functions and responds as intended (operates normally) all the time.

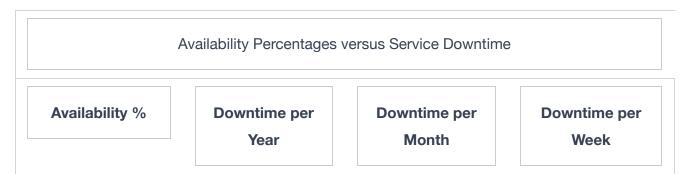
Measuring availability#

Mathematically, availability, A, is a ratio. The higher the A value, the better. We can also write this up as a formula:

A (in percent) =
$$\frac{(Total\ Time\ - Amount\ Of\ Time\ Service\ Was\ Down)}{Total\ Time}*100$$

We measure availability as a number of nines. The following table shows how much downtime is permitted when we're using a given number of nines.

The Nines of Availability



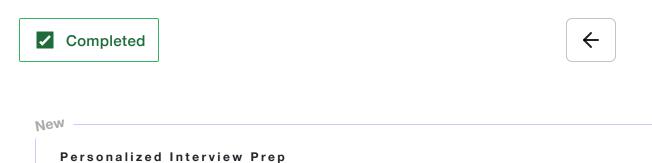
4/30/25, 7:43 PM Availability 90% (1 nine) 72 hours 16.8 hours 36.5 days 99% (2 nines) 3.65 days 7.20 hours 1.68 hours 99.5% (2 nines) 1.83 days 3.60 hours 50.4 minutes 99.9% (3 nines) 8.76 hours 43.8 minutes 10.1 minutes 99.999% (5 5.26 minutes 25.9 seconds 6.05 seconds nines) 99.9999% (6 31.5 seconds 2.59 seconds 0.605 seconds nines) 99.99999% (7 3.15 seconds 0.259 seconds 0.0605 seconds nines)

Availability and service providers<u>#</u>

Each service provider may start measuring availability at different points in time. Some cloud providers start measuring it when they first offer the service, while some measure it for specific clients when they start using the service. Some providers might not reduce their reported availability numbers if their service was not down for all the clients. The planned downtimes are excluded. Downtime due to cyberattacks might not be incorporated into the calculation of availability.

4/30/25, 7:43 PM Availability

Therefore, we should carefully understand how a specific provider calculates their availability numbers.



Want to try a more personalized approach to your prep?

Get a custom prep roadmap that adapts to your goals & progress

Full-loop practice for Coding Interviews, System Design, and more