**Load Testing Concepts**

**1. Difference between Load, Stress, Spike, and Soak testing**

* **Load Testing**: Checks system performance under expected user load (normal traffic). Ensures response time, stability, and throughput are acceptable.
* **Stress Testing**: Pushes the system beyond its capacity until it breaks. Goal: find the breaking point and how system recovers.
* **Spike Testing**: Sudden increase or decrease in load (traffic spikes). Goal: check system’s ability to handle sudden changes.
* **Soak Testing (Endurance Testing)**: Runs system under normal load for an extended period. Goal: detect memory leaks, resource depletion, and performance degradation over time.

**2. Throughput and Latency in Load Testing**

* **Throughput**: Number of transactions/requests the system processes per unit time (requests per second) & Measures capacity.
* **Latency**: Time taken for a single request to travel through the system (request to response). Measures responsiveness.

**3. Metrics Monitored during a Load Test**

* **Performance Metrics**:
  + Response time (average, min, max, percentile)
  + Throughput (transactions/sec, hits/sec, bandwidth)
  + Error rate (failed requests %)
* **System Metrics**:
  + CPU utilization
  + Memory usage (RAM, garbage collection)
  + Disk I/O and Network I/O
* **Stability Metrics**:
  + Resource leaks over time
  + Application/server crashes or restarts