Ensuring Reliability in Critical Systems

Course: CPIT-455

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1 .Define the Profile:

Users: Vehicle drivers in Saudi Arabia who are involved in traffic accidents.

Usage Pattern: Intermittent and Critical. The user does not interact with the application continuously, but only requests it during emergencies (when an accident occurs).

2 .Choose the Metric and Justification

The most appropriate engineering metric for the Najm app is POFOD (Probability of Failure on Demand).

Justification: According to the slides, POFOD is used for critical systems with intermittent use. Najm is not a system with continuous high-volume transactions to be measured by ROCOF, nor is its primary focus just minimizing general downtime (AVAIL). The most critical goal is that the system does not fail at the exact moment the user demands it. A Failure on demand here means the user remains stranded on the road, causing traffic disruption. Therefore, ensuring the system responds to every single emergency request is the true measure of its Reliability.

3 .Propose 1 Strategy:

The proposed strategy is an architectural decision based on the Redundancy pattern.

Description: Based on the architectural patterns in the provided content, redundancy means having multiple identical components running in parallel. For the Najm app, this translates to providing redundant servers. The purpose is to protect against hardware failure. During bad weather conditions (like heavy rain), accidents increase and the load on the app spikes. Having redundant servers ensures that if a Fault occurs in a primary active server, the redundant server takes over immediately, preventing the Error from turning into a complete Failure visible to the user.