

* Distributed System (DS) - Assignment Number - 6

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* What is a failure model? Explain the different types of failure.

→ 1. Failure models defines the way in which failure may occur in order to provide an understanding of its effects.

2. A taxonomy of failure which distinguish between the failures of process and communication channels is provided:-

I> Omission Failure: Process or channel failed to do something.

II> Arbitrary Failure: Any type of error can occurs in processes or channels.

III> Timing Failure: Applicable only to synchronous DS where time limits may not be met.

3. Omission Failure: A process or communication channels fails to perform action that it is supposed to do.

a) Process omission failures

b) Communication omission failure.

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4. Arbitrary Failures:

- Arbitrary failure in processes cannot be detected by seeing whether the process responds to invocation because it might arbitrarily omit to reply.

- Communication channel also suffer from arbitrary failure.

- a) Arbitrary process failure
- b) Arbitrary channel failure.

5. Timing Failure:

Timing failure are applicable in synchronous DS where time limits are set on process execution time, message delivery time and clock drift rate.

- a) Clock Failure
- b) Performance Failure
- c) Performance Channel Failure.

★ Explain reliable client server communication.

→ 1. A communication channel may lose and for corrupt messages.

2. Techniques for reliable communication:

- a) Use redundant bits to detect bit errors in packet.
- b) Use sequence numbers to detect packet loss.
- c) Recover from corrupted/lost packet using.

3. Five types of failures can occur in RPC:

- a) Client cannot locate server.

- b) Server crashes after receiving a request.
- c) Client request is lost
- d) Server response is lost
- e) Client crashes after sending a request.

4. Communication using TCP

- A reliable point-to-point communication can be established by using TCP protocols
- TCP masks omission failures
- TCP does not mask crash failures.

5. Communication using RPC (Remote procedure calls)

- The goal of RPC is to hide communication by making remote procedure calls that look just like local ones.
- The RPC mechanism works well as long as both the client and server function properly.