Dependable Distributed Systems

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Contents

1 Modelling Distributed Systems

A distributed system is a set of entities, computes or machines communicating, coordinating and sharing resources to reach a common goal, appearing as a single computing system.

2 Time in Distributed Systems

3 Logical Clock

4 Distributed Mutual Exclusion

5 Failure Detection Abstraction

A **failure detector abstraction** is a software module used to detect faulty processes, it encapsulate timing assumptions of a either partially synchronous or fully synchronous system. It has two properties:

- **Accuracy**: that represents the ability to avoid mistakes
- **Completeness**: that represents the ability to detect all failures

5.1 Perfect Failure Detectors

Here is a figure that illustrates the specifications of perfect failure detectors:

Module 2.6: Interface and properties of the perfect failure detector

Module:

Name: PerfectFailureDetector, **instance** $\mathcal{P}$.

Events:

Indication: $\langle\ \mathcal{P}, Crash \mid p\ \rangle$: Detects that process p has crashed.

Properties:

PFD1: *Strong completeness:* Eventually, every process that crashes is permanently detected by every correct process.

PFD2: *Strong accuracy:* If a process p is detected by any process, then p has crashed.

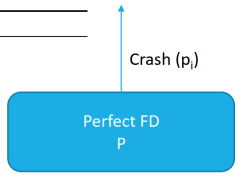

Figure 1: Specifications of perfect failure detectors

5.2 Eventually Perfect Failure Detectors

5.3 Leader Election

5.4 Eventual Leader Election

6 Broadcast Communications

7 Consensus

8 Ordered Communications

9 Registers

10 Software Replication

11 Overview on Capacity Planning

12 Modeling the Workload of a System

13 Building a Performance Model 1

14 Building a Performance Model 2

15 Dependability Evaluation

16 Intro to Experimental Design

17 CAP Theorem

18 Consistency Criteria for Distributed Shared Memories

19 Publish-Subscribe Communication Paradigm

20 Overlay Networks

21 DLT and Blockchain

22 Exercises

Notice: The exercises are from 2022-2023 academic year.

23 Exams