

Distributed Computing

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Introduction

Many of the most important and visible uses of computer technology rely on distributed computing. Understanding distributed computing requires an understanding of the problems and the challenges stemming from the coordinated operation of different hardware and software. The course focuses on a set of common techniques required to address the key challenges of distributed computing.

Aims

Many of the most important and visible uses of computer technology rely on distributed computing. This course unit aims to build on the course unit in the first year (COMP10052) which introduced students to the principles of distributed computing, and it focuses on techniques and methods in sufficient breadth and depth to provide a foundation for the exploration of specific topics in more advanced course units. The course unit assumes that students have already a solid understanding of the main principles of computing within a single machine, have a rudimentary understanding of the issues related to machine communication and networking, and have been introduced to the area of distributed computing.

- Revision of the characteristics of distributed systems. Challenges. Architectural models.
- Remote Invocation and Distributed Objects
- Java RMI, CORBA, Web Services.
- Message-Oriented middleware
- Synchronous vs asynchronous messaging. Point-to-point messaging. Publish-subscribe.
- Concurrency, co-ordination and distributed transactions
- Ordering of events. Two-phase commit protocol. Consensus.
- Caching and Replication
- Security
- Service-Oriented Architectures, REST and Web Services

Additional reading

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