COMP18121 - Fundamentals of Distributed Systems

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Introduction

Distributed systems take many forms, and many of the best known and most widely used computer systems are as prevalent as they are because of their distributed nature. This course unit introduces some of the essential concepts underlying distributed systems.

Students are guided into an exploration of exemplar distributed applications (such as the web, email, file sharing and multi-user gaming) and, through these exemplars, are introduced to the basic concepts that underpin modern distributed computing.

Recurring themes will include how distributed systems offer transparencies of various kinds and how they must contend with a range of complex issues to achieve that.

We also look at how massive distribution enables high-performance computing, how service abstractions in the web enable business-to-business integration and how the web of hyperlinked documents is changing into a richer web of data.

Aims

This course unit aims to provide students with a basic understanding of distributed computing, drawing on their general experience as users of distributed applications to inform the discovery, description and classification of fundamental concepts in distributed systems.

This course unit builds on the knowledge gained by students in COMP10120: The First Year Team Project course unit and aims to equip them better to benefit from more technically-demanding course units in second and third years (in particular, the course units on Computer Networks, Distributed Computing and Mobile Systems).

After a brief introduction that contrasts the distributed view of computing with the centralized one presented in other course units, the course unit progresses by studying a few exemplar distributed applications, one by one. Each exemplar application is chosen with a view to illustrating issues and challenges arising in distributed systems.

After each dissection of an exemplar application, time is taken to make explicit, in a more systematic way, some of the basic principles involved, how tools and techniques have been developed that enforce those principles, and how these tools and techniques both give rise and presuppose the distributed computing infrastructures that pervade modern computing.

Additional reading

Distributed systems: principles and paradigms (2nd edition)

Author:	Tanenbaum, Andrew S. and Maarten van Steen
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Edition:	2nd
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