Preface

The number of distributed systems has been increasing dramatically in the past few years. Many people are using distributed technologies every day, and their lives depend on various distributed systems. However, end users might not be aware of these distributed systems, because these computers and devices are connected and working together in a seamless and transparent way.

New distributed systems and related applications are being enabled by recent advancements in different areas of development and research. The first is the proliferation of mobile devices such as smart phones and tablets. In the latest Cisco Visual Networking Index: Global Mobile Data traffic Forecast Update report (Cisco, 2012), "last year's mobile data traffic was three times the size of the entire global internet in 2000." It also predicts that number of mobile devices in year 2015 will be increased to 7.1 billion which approximately equals to the world's population in that year. Instead of being a client in traditional distributed systems, mobile device can be a server as well because its processing capacity improves significantly in the past few years. Coupled with plummeting prices and higher speed of wireless communication (e.g. wifi, 3G, and 4G), these mobile devices can be connected with traditional computer systems efficiently in a distributed environment. Advances in sensors also have dramatic effects. Sensors are smaller and less expensive nowadays. They can be embedded to distributed systems easily. These changes provide a lot of opportunities for designers to design new applications with new types of distributed systems.

Another important improvement is the advancements in cloud computing. Due to large investment of big computer companies (e.g. IBM, Microsoft, Google, Apple, etc.), cloud computing became more mature, and a lot of problems have been solved. Many companies are now considering cloud adoption. Distributed Systems Designers will discover that they can get the distributed computing power at a lower price and in more flexible ways.

On the other hand, the above new developments also provide new challenges to designers, implementers, and researchers. In order to compute efficiently and smoothly in distributed systems, one must understand the fundamental principles, costs and benefits, related algorithms, possible limitations, and available tools. This book collects the latest development and research results in distributed computing. There are three sections and 16 chapters. Each chapter covers one topic, and they are independent. The book will be useful for graduate students and senior level undergraduate in related fields. It will be a good reference for systems designers, practitioners, and researchers in distributed computing.

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REFERENCES

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