

Replication - A Systems Approach for Mobile Middleware

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There is a clear need for data sharing and collaboration support in a large number of computer applications in different domains. In this lecture, we are mainly motivated by applications that support data sharing by people using mobile devices (e.g. laptops). For example, a group of people outside their offices such as in the hotel lobby, while at the airport, in a train, in a building construction site, in the assembly line of a factory, etc.

A very interesting and relevant solution to support the above mentioned usage scenarios is replication; this is a well-known technique for improving data availability and application performance as it allows to collocate data and code. Thus, data availability is ensured because, even in presence of network failures, data remains locally available; in addition, application performance is potentially better (when compared to a remote invocation approach) as all accesses to data are local.

There are several relevant difficulties that must be solved at the (mobile) middleware level to take full advantage of replication. In this lecture we address the following: i) replica management, ii) memory management, and iii) adaptability. We present an archetypical architecture for mobile middleware that is used along this lecture, the mechanisms supporting how and which data is replicated (both for the object and file models), the solution for the garbage collection of replicas, and the policies allowing applications to control objects replication.