Chapter IX

Wireless Middleware

Ken MacGregor, University of Cape Town, South Africa
Nico de Wet, University of Cape Town, South Africa
Bonnie Lam, University of Cape Town, South Africa
Nadim Yazdani, University of Cape Town, South Africa

ABSTRACT

Introduced in this chapter is wireless middleware as a means of writing distributed applications for mobile environments. The concepts of middleware and the additional challenges that arise from wireless communications are introduced, in particular, low bandwidth and unreliability. Then described are the commercial wireless products currently available, with particular emphasis on the manner in which they solve challenges. The authors hope that greater appreciation of the capabilities of wireless middleware will enable future developers of applications for mobile environments to produce more efficient systems and researchers to produce better wireless middleware products.
INTRODUCTION

What is Middleware?

Middleware is not a new concept in distributed computing. It was first developed during the 1990s and has evolved significantly since, with the increase in distributed systems. Due to its changing nature, it is difficult to provide one generally accepted definition and scope for *middleware*. A workshop was held at the International Center for Advanced Internet Research in December 1998 to decide on a general definition of middleware and to identify essential services to be researched and developed. Conclusions from the workshop (Aiken et al., 2000) were that it was agreed that the definition of middleware was dependent on the subjective perspective of those trying to define it. It was accepted that:

*Application environment users and programmers see everything below the API as middleware. Networking gurus see anything above IP as middleware. Those working on applications, tools, and mechanisms between these two extremes see it as somewhere between TCP and the API...*

Perhaps more generic definitions of middleware are (Emmerich, 2000) as follows:

*“Middleware is a layer between network operating systems and application components.” Middleware “facilitates communication and coordination of distributed components.”*

This can be visualized in Figure 1.

Middleware has become widely adopted in the industry to simplify the problem of constructing distributed systems. One of the classic application areas for middleware is enterprise application integration, perhaps resulting from corporate mergers. Very often, the period of integration allowed is so short that building a new system is neither feasible nor cost effective. Second, when components are to be integrated, they may have incompatible hardware and operating system (OS) platforms. To build applications using network OS primitives is too time consuming and expensive. Middleware resolves the heterogeneity between systems and provides higher-level primitives so that application engineers can focus on application requirements.
A Novel Approach to Avoid Mobile Phone Accidents While Driving and Cost-Effective Fatalities
www.igi-global.com/article/novel-approach-avoid-mobile-phone/58653?camid=4v1a

Cross-Layer Multimedia QoS Provisioning over Ad Hoc Networks
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