Chapter 2.1
Developing Smart Client Mobile Applications

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ABSTRACT

This chapter examines the convergence of mobile technologies based on smart client architecture. To improve the usability and accessibility of mobile applications and services, the smart client architecture extends the capabilities of the mobile computing platform with support for mutimodal interfaces, smart client database and synchronization, presence awareness, location awareness and identity management. Its broad impact on business communication and productivity is highlighted as a tangible benefit.

INTRODUCTION

In the highly competitive mobile market, a key differentiator is provided by improving the user experience of the mobile application. To improve the user experience, common usability and accessibility problems in mobile applications can be mitigated by multimodal interfaces and smart client architecture. For instance, the provision of multimodal interfaces for browser-based applications can help to overcome the limitations of small viewing areas and input options, whereas smart clients based on rich application interfaces can be utilized to push processing load onto the mobile device. Furthermore, smart clients that enable presence, context sensitivity, location awareness, and real-time collaboration promise a new paradigm for mobile communications, delivering far richer, dynamic user experiences.

SMART CLIENT

As mobile enabling technologies advance in capability, affordability, and availability, users expect improved design of mobile devices that will leverage the advances and convergence in technology and the Internet to deliver richer applications and value-added mobile services (a.k.a., m-services). A key enabling technology for delivering on the promise of mobile applications with high levels of functionality, performance, flexibility, and integration is the *smart client.* This is a type of

application model that bridges the gap between the thick and thin client models, providing the responsiveness and adaptability of a thick client model with the manageability of a thin client.

Dave Hill, from the Microsoft .NET Enterprise Architecture team, defines five characteristics of a smart client application (2004):

1. **Utilizes Local Resources:** Smart clients exploit local resources such as hardware for storage, processing, or data capture to deliver a richer user experience.
2. **Connected:** Smart clients are ready to connect and exchange data with various systems across the enterprise.
3. **Off-Line Capable:** Off-line capability using local caching and processing enable operation during periods of disconnection or intermittent network connectivity. Smart clients can send data in the background, resulting in greater responsiveness in the user interface.
4. **Intelligent Install and Update:** The smart client interface allows the remote update of the smartphone software to repair bugs, change characteristics, or incorporate new features.
5. **Client Device Flexibility:** Smart client applications support multiple versions that target specific device type and functionality.

The smart client architecture supports multimodality, data integration, Bluetooth interoperability, presence awareness, location awareness, and identity management. Each of these features extends serviceable functionality to the mobile application, from voice-activated commands to authentication and non-repudiation services. Moreover, the integration of serviceable functionality promises to deliver rich user experiences. For example, the voice-activated smart wireless device will automatically connect, authenticate, and show the identity and location of the receiver.

The convergence of presence, location, and identity management is an emergent technology integrating the services that support a secure mobile network and an online community environment with applications that facilitate information retrieval, communications, dating, gambling, financial management, trading, paying bills, games, and entertainment. As the mobile market is highly competitive and dynamic, and driven by the mass market demand for high-performance m-applications, the impact of technology convergence highlights the need for common industry standards.

INDUSTRY STANDARDS FOR SMART CLIENT MOBILE APPLICATIONS

As the specifications for smart client mobile application interfaces are complex, it is necessary for wireless developers to adhere to industry standards. The Mobile Industry Processor Interface (MIPI) Alliance is a non-profit organization that spearheaded the initiative of industry specifications for smartphones and application-rich mobile devices.

Wireless and embedded software developers have a choice between Microsoft .NET and Sun Java development frameworks and runtime environments for designing and delivering next-generation mobile applications.

The Microsoft .NET Compact Framework is a subset of the developer software for PCs and servers that allows powerful .NET applications to run on handheld computers, and specifically supports: Pocket PC, embedded solutions running on Windows CE .NET for smart mobile devices, and Microsoft Smartphone 2002. The .NET Compact Framework can be extended to support additional mobile device interfaces. The inclusion of SQL Server CE 2.0 provides developers with a powerful, local relational database for creating dynamic, client-side mobile applications with