

1 Introduction to Enabling Technologies for Wireless E-Business

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1.1 Introduction

Wireless e-business allows people to communicate and transact in business via wireless technology, without physical connectivity, such as wires or cabling. Wireless e-business uses many devices, including mobile phones, pagers, palm-powered personal computers (PCs), pocket PCs, laptop computers, and other mobile devices or devices connected to the wireless networks.

Advancements in wireless technologies hold the promise to reshape the way businesses conducted. With wireless technologies, people can break free from spatial and temporal constraints, as they are able to use these technologies to work anywhere and anytime. With wireless e-business, companies can locate inventory items, anytime, anywhere; emergency units are able to respond in real time; and universities are able to manage communications across campuses. The rapid growth in mobile telephony in recent years has provided a strong model for the adoption of undeterred wireless e-business. A number of consulting firms have made various estimations on the growth of the number of mobile phone users worldwide. These estimations are certainly confirmed by the huge increase in the number of mobile phone users in China – the country currently has over 300 million mobile phone users, more than the entire population of the USA. The rapid transition from fixed to mobile telephony will almost certainly be followed by a similar transition from conducting e-business through desktop computers via physical connectivity to wireless e-business through a variety of mobile devices via wireless communication networks in the near future.

To make wireless e-business work effectively, a variety of enabling technologies are needed. First, one must be connected wirelessly. This means that wireless communications networks must be in place. From the first commercial Global System for Mobile Communication (GSM) network launched in 1992 to 3G services launched in Hong Kong, UK, and Italy in recent years, wireless communication networks have penetrated almost every part of the world. The 2G/2.5G and 3G wireless communication systems are the cornerstones of wireless communications. In addition, there are other wireless networks, such as Wi-Fi, Wi-Max, Bluetooth, and infrared. Wireless security is crucial for wireless e-business. Accessing the Internet, digitally signing e-commerce transactions, authentication, and

encryption of transaction information, all these wireless e-business activities need security. However, given that wireless e-businesses broadly use mobile devices such as mobile phones, and that these devices have strict processing requirements and storage limitations of wireless environments, ubiquitous wireless security technologies must be ready to satisfy these requirements and overcome these limitations. To enable mobile Internet applications, application environment and various application protocols are needed. In 1997, Ericsson, Motorola, and Nokia formed a forum for creating such protocols. As a result, the wireless application protocol (WAP), a suite of emerging standards, has been defined. The WAP is designed to assist the convergence of two fast-growing network technologies, namely, wireless communications and the Internet. The convergence is based on the rapidly increasing numbers of mobile phone users and the dramatic effect of e-business over the Internet. The combination of these two technologies will have a big impact on current e-business practice, and it will create huge market potential.

To be able to connect mobile people to the information and applications they need — anytime and anywhere, to allow people to have computation capabilities and network resources at hand, and to move the workplace to any place, supporting the broadest spectrum of mobile networks and a wide array of devices on the client side, necessary wireless middleware software and mobile data management are essential. When a mobile user moves with a handheld mobile device and connects to a wireless network, how one can ensure that the connection will not be lost while the user moves out of the range of the wireless network that can reach? Roaming from one wireless network into another is therefore a desired feature for wireless e-business applications.

Mobile content delivery technology deals with delivering the digital contents to mobile devices with limited computing and storage resources. For example, if a digital photo is too large to fit into the memory of a mobile phone, then for the mobile user to see the photo, one must convert the original digital photo into one of a smaller size that can fit into the mobile phone. This converting process is called transcoding.

When a mobile user is located in a place where the businesses are close to him, these businesses may wish to inform the user on either services or products available at a special price, which the user might be interested in. The technology enabling such a capability is called location-aware technology, while related services are called location-aware services.

To transact wireless e-business, mobile payment is essential. Without mobile payment, wireless e-business is not going to be successful as people need to collect the payment when they conduct e-business anytime and anywhere. Mobile payment needs wireless security to ensure secure authentication and data confidentiality. In addition, restriction of mobile devices and wireless communications must be considered while making the payment.

Wireless e-business also needs mobile agent technology. A mobile agent system is a platform that can create, interpret, execute, transfer, and manage agents. The ability to travel, which distinguishes mobile agents from other types of agents, allows them to move to a new host and then to take advantage of being in the same environment to interact with each other locally.