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Challenges of Deploying a Pervasive & Persistent Mobile Solution

As the “mobile information revolution” shifts into high gear, users around the globe have come to expect fast, seamless and pervasive access to a world of information at their fingertips, wherever and whenever they need it. The convergence of voice and data over wireless access infrastructures, diversity of access technologies and the expanded capabilities of cellular handsets, PDAs and laptops have steadily raised the bar with regard to speed and usability. However, *the success of a truly pervasive and persistent mobile solution will depend on the implementation firm’s understanding of the challenges faced during design and deployment of a mobile application.*

The overall goal of seamlessly managing and delivering dynamically changing rich information content across heterogeneous wireless and wired environments requires addressing a number of difficult technical and operational challenges. The following sections provide an overview of some of the most critical issues, such as overall data proliferation and diversity, living within tight device-level design constraints and the challenges of providing secure access and transparent interoperability across many different communications standards and protocols.

Secure and Seamless Access to Information

The shift in mobile services from voice-centric toward data-centric applications is driving the need for robust software architectures that can support secure and seamless access to information and services, independent of the underlying communication infrastructures. Enterprise applications, such as virtual private networks (VPNs), sales force automation (SFA), or inventory route management, require business-critical data to be shared and synchronized between conventional server-based environments and a variety of mobile devices in a secure and seamless fashion. Similarly, consumer applications, such as location-based services (LBS) and WLAN hot spots for localized public access (airports, hotels, cybercafes, etc.), depend upon the ability to efficiently deliver incremental amounts of data over dynamically changing connections to a myriad of different devices.

Despite the fact that wireless connection speeds continue to increase, the accelerating growth of data-centric applications means that bandwidth management will always be an important issue. As a result, databases and applications need to provide the performance, intelligence and connectivity options that are required to support quick and efficient movement of only the right amounts of data – when and where it is needed to support the end user application. In essence, data needs to be able to “flow like water” across wired and wireless infrastructures, moving freely and efficiently between large information repositories and small handheld devices, often with limited local storage capacity.



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Communications Standards and Interoperability Requirements

Pervasive mobile information delivery and persistent access management also introduce a number of new challenges that are not factors with conventional desktop systems. To support transparent user-friendly service discovery, the software environment must be able to provide seamless hand-over between different types of infrastructures. This gives the user an appearance of continuous access even though the underlying software may be dynamically managing a number of different intermittent connectivity sessions.

Mobile software solutions must deal with an array of disparate and rapidly evolving communications standards in order to provide secure and hassle-free “always on” connectivity that will drive the growth of new services and applications. To assure seamless access over the best possible path, mobile software must support high-speed WLAN standards (e.g. W-LAN, HiperLAN II) as well as other established or emerging wireless standards (GSM/HSCSD, GPRS, WCDMA-UTMS, Bluetooth, etc.). In addition, usage-tracking, billing and policy-driven path selection functions should be available as an integrated part of the wireless software, to give individuals and enterprises complete control over automated access processes.

Hassle-free Transparency for End Users

Users are no longer thinking about what kind of pipe they are connecting over. Instead they just want to receive the best available connection at all times, while keeping their primary focus on the information they need to access. Whether it involves sending and receiving SMS messages, checking email, connecting to a corporate network through various VPN solutions, browsing the Web or finding a nearby restaurant that suits their taste, end users expect to be provided with information that is relevant, timely and easily available. The ultimate challenge of today’s and tomorrow’s mobile information management software is to support all of these end user activities seamlessly and transparently, even as users move between various local wireless access environments, or inside 2G or 3G networks.

Data Proliferation and Diversity of Data Types

One of the greatest challenges revolves around the sheer amounts of information that must be handled as well as the expanding diversity of data types. The convergence of voice, data, and multimedia over common delivery networks along with other specialized data types, such as geographic information, make it particularly difficult to design databases and associated software structures that can accommodate the whole spectrum. Flexibility in data storage models, query speeds, update efficiency and compactness of the database footprint all become critical factors for success when it comes to handling big data on small devices.

In addition, the need to assure interoperability with large traditional legacy databases makes it important for small footprint compact databases to support cross-platform standards such as



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XML. Due to the overhead associated with any unnecessary data conversions, it is also very important that small footprint embeddable databases be able to handle XML as a native data format rather than only as a translation mode for access to data stored in other formats.

Device-level Design Constraints

Local databases and access management software always must take into consideration the tight resource constraints that are inherent to every mobile or handheld device design. Even though Moore's Law continues to push CPU performance and memory densities to greater heights, the proliferation of new data-intensive networked applications threatens to overwhelm even the most advanced handheld devices. As always, power usage represents another critical factor in mobile device design. With longer battery life a core demand from all end users and every function in the device already competing for a slice of the available power, database efficiency is vital for success. This means both minimizing the size of embedded databases and optimizing data models to reduce the demand for CPU cycles needed for queries, updates and other database operations.

Software solutions also must smoothly adapt to accommodate the special requirements of mobile device designs. With so many constraints already coming into play, device designers cannot afford to be "dictated to" by their software selections. For example, cross-platform database support for a wide range of operating systems is critical, including Microsoft, PocketPC, Palm OS, Linux and RTOS environments. In addition, designers need the ability to tailor underlying software to support hardware-specific requirements across multiple target platforms, such as laptops, PDAs, or cell phones, which can require different screen layouts, I/O mechanisms, etc.

Professional Services & Engineering Support

Lyon Technical Services gives office managers and IT directors a comprehensive foundation for creating pervasive and persistent mobile information applications. In addition to help office managers and IT Directors manage the challenges of pervasive mobility, Lyon has an experienced cadre of engineering and support resources to help our partners get optimal results from their mobile initiatives.

Professional services from Lyon Technical Services are available to assist with a whole spectrum of activities, ranging from optimizing the integration of databases, business applications to assisting with the definition and deployment of new wireless access services. Because Lyon's experts have in-depth experience working with leading players throughout the value chain, we also are able to bring to the table broad insights with regard to both enabling technologies and emerging market opportunities.