



mobile computing anytime & anywhere

White Paper

„The wireless telegraph is not difficult to understand.
The ordinary telegraph is like a very long cat.
You pull the tail in New York, and the cat meows in Los Angeles.
The wireless is the same, only without the cat.“

Albert Einstein

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1. Problem definition

The current trend indicates a rising request of mobility in professional and private sectors especially in supporting technology requirements. Mobile equipment – like computers, cellular phones, PDAs and last but not least car radios – offers a permanent increasing computing power at a decreasing size. Applications running on these devices are called “mobile applications”. A basic requirement in this field is connecting these mobile applications to the existing infrastructure of a company.

The development of mobile distributed applications which cover several systems is a superior exercise. Basically it is necessary to coordinate the interaction of several computer systems. Furthermore there is the need of meeting the functional requirements of the applications. The development of interacting applications between stationary systems already is a challenge. In order to guarantee a secure and stable usage of mobile distributed applications it is essential to overcome additional difficulties.

Problems you have to consider when you want to develop mobile applications can be summarised as follows:

- unreliable network connections with strong fluctuating quality and speed
- complex communication with other systems
- transfer of known methods for the integration into existing systems
- transfer of company data via insecure wireless networks
- devices with limited resources like storage, computing power and energy

The framework jtom[®] (Java to mobile) considers these difficulties. Therefore it is highly qualified for developing mobile distributed applications.

2. Mobile Business and Java

Inside the mobile sector you can find a plurality of different operating systems that have no consistent standard till this day. So the adoption of the programming language Java makes extra sense for developing mobile distributed applications.

Java 2 Micro Edition (J2ME) is a Java environment developed by Sun Microsystems designed to meet the requirements of devices with limited system resources.

The framework jtom[®] is based on this J2ME technology and connects mobile applications to server technologies.

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3. jtom[®]

jtom[®] is a Java framework which supports the development process for mobile distributed applications. Especially the connection to existing server systems forms the main focus of this framework.

On the one hand jtom[®] enables you to access existing company's workflows from mobile devices in order to modify data directly. On the other hand the framework delivers synchronisation mechanisms which allow working on the device without a permanent online connection.

Functions for communication with server systems are missing inside the J2ME. jtom[®] adds these identified and reproduced functions.

With jtom[®] technical requirements for the transfer between mobile device and server system are covered. The integration of customer data into mobile applications and the resulting problems are solved. Technical logic can be developed without any knowledge of the underlying layers.

The object oriented development of mCommerce applications is supported consequently and continuously, guaranteed by the use of "pure Java" technology. Especially jtom[®] supports platforms like J2ME and PersonalJava for development on PDAs and cellular phones.

4. jtom[®] concrete

Development framework

jtom[®] is a development framework that makes the development process of mobile distributed applications much more efficient. It enables the communication between small mobile devices (PDAs, smartphones, mobile phones, ...) and server systems. Limited system resources of mobile devices are considered.

Platform independence with "pure Java"

jtom[®] is developed in „pure Java“ and as a result the framework is platform independent. The technologies of the J2ME CDC and CLDC configurations are considered. jtom[®] is based on the latest technologies and offers a high protection of investment.

Message-oriented Middleware

With jtom[®] a message-oriented middleware (MOM) is developed for an interactive communication with application servers and legacy systems. jtom[®] delivers interfaces to connect to relevant application servers like BEA, IBM, WebSphere, JBoss.

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JNDI

jtom[®] provides the developer with a JNDI (Java Naming and Directory Interface) in order to access backend systems remotely.

JMS

Based on JNDI jtom[®] enables you to use JMS (Java Messaging Service). With this technology messages can be exchanged “over the air” between server and client.

SYNC

The synchronisation mechanism, based on JNDI, provides an opportunity for synchronization of data between server and client.

5. jtom[®] Technology

The architecture of jtom[®] consists of a client component, a server component and a management system.

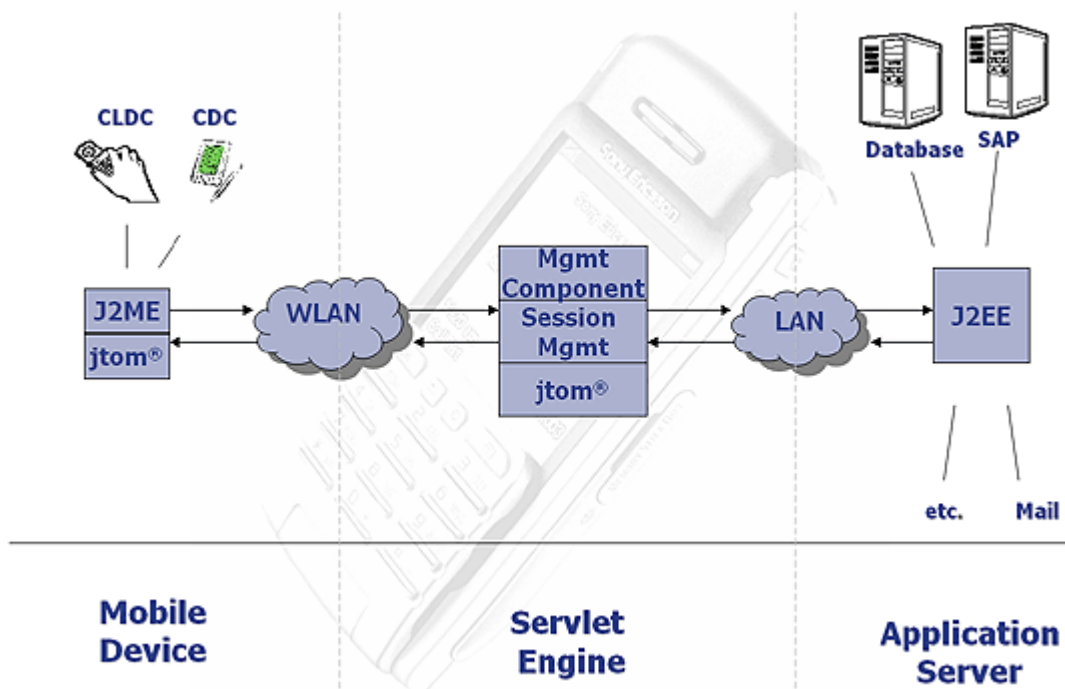


figure 1: jtom[®] architecture

The client program developed with jtom[®] contains the technical logic and further the jtom[®] “client component” for the communication with an application server. This program runs on J2ME compatible mobile devices.

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Based on jtom[®] the mobile device initialises a secure connection via the internet (WLAN, GPRS, UMTS) to a servlet engine (e.g. tomcat) and communicates with the jtom[®] “server component”. jtom[®] “server component” features a secure session management and allows to continue the course of business after a connection failure.

The “server component” can be extended by using any kind of technical logic in order to forward the request to an application server. As a result server functionality is available on the mobile device to be integrated into the course of business.

During the development of jtom[®] the following principles were considered:

- simple interfaces
- transparent and secure transfer of data objects between server and client
- connection-independent backup of the communication state
- abstraction of the complexity of the distributed communication
- modular architecture for future enhancements
- scalability of client numbers

Further information can be obtained via internet under www.jtom.de.