

ERP TRENDS

Mobile Applications and Portal

Octavian Dospinescu, Doina Fotache, Bogdanel Adrian Munteanu
Business Information System Department, FEAA, Al. I Cuza University of Iasi, Romania

Luminița Hurbean
Business Information System Department, FSE, West University of Timisoara, Romania

Keywords: Enterprise Resource Planning (ERP), integration, mobility, portal, mobile ERP.

Abstract: Wireless applications provide new opportunities for organizations: in order to take advantage from the features of ubiquitous environment, ERP systems have to support the mobile behaviour of their users. The paper explores the mobile applications landscape and proposes an architecture model for the mobile services starting from the necessary unidentified functionalities for a portal of mobile services. Besides the general architecture of a portal of mobile applications for companies, a set of minimal functionalities for implementation is proposed in order to ensure the promotion and use of services.

1 QUO VADIS ERP?

The long-ago inflexibility of earlier ERP systems from SAP, Oracle and PeopleSoft pushed the customization drive. Customers are moving from a "best-of-breed" to a "best-for-business" approach, implying they prefer extensions to their existing ERP for applications like planning and optimization, business intelligence and knowledge management.

Verticalization is another noticeable trend. ERP vendors needed to tailor their software to the requirements of specific industry verticals. Verticalization means not just adding new functionality to a given industry solution, but adding vertical functionality to the horizontal functions within the ERP package: workflows, supply chains, data warehouses, and analytical tools should all be vertical-specific.

Outsourcing of ERP operations is the next emerging trend as a company can typically save operational costs close to 50%. With the improvement in connectivity, the option of "ERP as a service" using the SaaS (Software as a Service) model is now proving to be viable. The current generation ERPs, which are based on web architecture, and uses technologies like Service Oriented Architecture can easily facilitate this distributed mode.

"Mobility doesn't support service businesses, it changes them", "Put your business in motion", or

"Mobilize your ERP system today" are new mottos (www.abakus.fi, www.smithsconsulting.co.uk, <http://www.microsoft.com/technet/solutionaccelerators/mobile/plan/mobilerp.mspx#EOLAC>) in a dynamic and on the move world. It is estimated that 25% of the workforce is travelling one or more days a week (http://www.pocketpcmag.com/_top/, 2003). While away, many are supported by e-mail, calendar, and contact information, but very few are supported by information from their ERP/CRM system. Therefore mobile ERP/CRM is relevant to a large number of professionals and that could be the reason why many analysts predict very high growth in the mobile computing industry.

In addition, the emergence of sophisticated mobile devices, such as smartphones or pocket PCs, has added a new element into the enterprise, as they can enable mobile workers to remotely access e-mail and mission critical line-of-business applications.

For short, **mobile ERP** is about having access to software that allows a mobile device to be connected to the ERP system of an organization through a mobile net of communications and transmission of data GPRS/UMTS.

One of the most valuable benefits that motivate the users to decide on for this option is the possibility to access in real time to all the related data for a distinct operation or any other corporate applications of ERP (<http://www.exforsys.com/tutorials/erp/erp-and-the-future-mobile/1.html>, 2007).

Organizations will sense such positive effects as significantly lower transaction cost, improved cash flow, fewer disagreements with existing customers, and, last, but not least, more satisfied employees.

An interesting tendency is expected in the near future: the rise of mobile devices supporting Web services, service-oriented architectures, and SaaS.

In response to the **mobility** trend, our study came across many companies offer services and software that extend existing or deliver new end-to-end ERP solutions to mobile devices. We determined large ERP software vendors and niche solution providers experienced in "mobilizing" ERP solutions or providing middleware applications. Also, new partnerships emerged, involving ERP vendors, mobile application developers, consulting providers, telecom firms, and middleware developers.

We witnessed Microsoft launching their new products *Mobile Sales Assistant & Mobile Business Assistant*, that support *Dynamics* line products (NAV, AX, GP) strategy to offer roles- and task-based applications to empower employees.

The ERP world leader, SAP AG has extended their business applications such as *mySAP.com* e-business and services to mobile workers around the world. The *mySAP Workplace* provides mobile users with the ability to access *mySAP.com* functionality and other applications as well as maintain personal information.

2 A MOBILE SERVICES ARCHITECTURE PROPOSAL

There are some pro arguments to mobilize the enterprise; some directly affect the employees, while others affect their interaction with your customers and existing business applications, while still others affect the business's finances (Lee, 2004).

Some authors consider that the context of general business will change in three aspects: multinational localization, changing basis for competition, ICT Product/Process Innovation (Murray, 2000).

Within an architecture based on mobile services the following **functionalities** must be available:

- the client's possibility to look for the provider which can offer mobile services he needs, eventually in certain conditions of quality and price;
- the client has a "list of reserves" with the providers and services that can be appealed to if the initial service become unavailable temporarily;
- the possibility of the provider to accept/reject the requests of a client regarding a certain service;

- the client sending the firm request to the provider, by offering the necessary data and elements for carrying out the service;

- when a client chooses a mobile service provider, he should be sure that the eventual cultural differences between them will affect the contractual relation to the smallest extent possible.

Starting from these functionalities, we propose architecture based on the general concept of **services portal**. In fact, this portal accomplishes the role of broker, both for the client and for the provider.

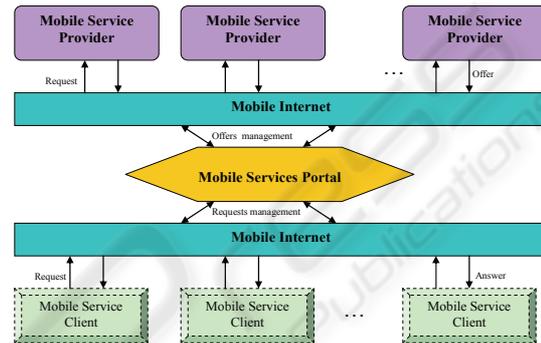


Figure 1: The architecture based on portal for enterprise mobile services.

We consider that the architecture proposed can be divided in two distinct components, according to the entity that the mobile services portal interacts with: the interface with the clients and the interface with the providers. Based on the identified functionalities, the portal must support several types of orders presented in Table 1.

Table 1: "Requests management" orders.

Order type	Explanation
<i>Find a service</i>	The portal will search in the list of mobile services available the one that corresponds with the criteria specified by the client: quality, price, execution time etc. It is also returned a "list of reserves" with the services that can be appealed in the case that the first becomes unavailable for several reasons.
<i>Request connection</i>	The portal will connect the client with the provider chosen after "find a service". The portal can offer the client identification data or can demand the service in his own name, continuing to provide the client transparently.
<i>Execute service</i>	The portal will request the execution of the service by the provider, under the conditions established after the "request connection" order.
<i>Execute next service</i>	This order should be executed under the conditions in which the initial service or provider temporarily becomes unavailable.

According to the degree of development of the portal, this should execute the “find a service” orders trying to attenuate as much as possible the eventual cultural differences between the client and the provider. In a list of available services that are identical, the portal would firstly suggest the client the one that most resembles the client’s culture. We consider that for increasing the portal flexibility, the implementation of an order of the type “negotiated” which allows a client to negotiate different terms of the contractual relation (price, execution time, execution parameters etc.) with different providers would be indicated.

3 A MODEL OF IMPLEMENTATION FOR EXPANDING NAVISION’S CAPABILITIES

We propose a special architecture in order to expand the capabilities of Microsoft NAVISION, which is one of the most important ERP products (<http://www.erpsoftware360.com/erp-software.htm>, accessed on November 2007; Navision ERP Solution has more than 83,000 customers). Usually, this ERP system operates on desktops and servers, but we intend to improve its capabilities in order to be a mobile alternative for managers.

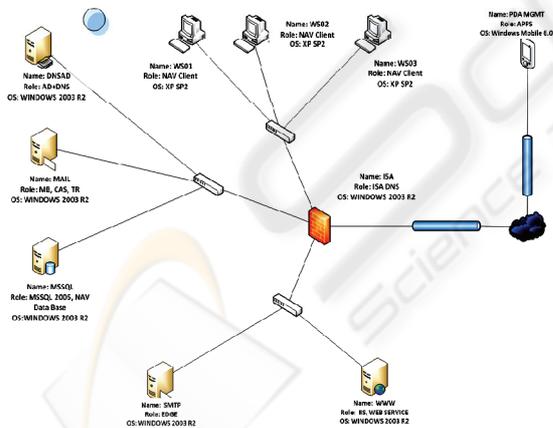


Figure 2: The main architecture for transforming a “desktop” ERP into a mobile ERP.

The servers that are designed in Figure 2 have different roles, from authentication to data transmission from database to the final mobile users. The vision to expand the capabilities of NAVISION ERP system also includes the web services, implemented on .NET platform.

These services offer to the mobile users (PDA, SmartPhone) the functionalities that are required in order to obtain reports about the state of the company. For example, the web service function getCustomers() provides the dataset containing the list of the customers. This function can be customized by the user with parameters (e.g. best customer, most important/less important customer).

```
Imports System.Web
Imports System.Web.Services
Imports System.Web.Services.Protocols
Imports System.Data.SqlClient
Imports System.Data.OleDb
<WebService(Namespace:="http://tempuri.org")> _
<WebServiceBinding(ConformsTo:=WsiProfiles.BasicPr
ofile1_1)> _
<Global.Microsoft.VisualBasic.CompilerServices.Design
erGenerated()> _
Public Class Service
    Inherits System.Web.Services.WebService
    '—the definition of getCustomers() function
    <WebMethod()> _
    Public Function getCustomers() As Data.DataSet
        Dim setDate As New Data.DataSet()
        Dim conexiune As New SqlConnection()
        Dim comanda As New SqlCommand()
        Dim adaptor As New SqlDataAdapter()
        conexiune.ConnectionString = "Data
Source=DOCTAV;Initial Catalog=Navision Demo
Database (4-0);Integrated Security=True"
        comanda.CommandText = "SELECT [Name] AS
NUME from [dbo].[CRONUS Romania SRL$Customer]
AS CLIENTI ORDER BY [Name] DESC"
        comanda.Connection = conexiune
        adaptor.SelectCommand = comanda
        adaptor.Fill(setDate, "CLIENTI")
        Return setDate
    End Function
End Class
```

The web service can be invoked through a web browser or another kind of client.

To develop the mobile application, we also used the .NET platform and we first test on PDA emulators the connection with the web services. The main advantages of using the combination between web services and mobile PDA applications are:

- the final clients (PDA users) do not need extra power for querying or processing data, because the web services on the server side do that;
- if one client loses the wireless connection with the server, the others are able to use the services with their own connections;
- if it is necessary to adapt the data provided by Navision database, all we have to do is to modify only the web service, not the entire application.

The client application installed on PDA devices uses the previous web services and produces results to the managers.

Public Class frmClientiLista

Private Sub btnListaCustomers_Click(.....) Handles btnListaClienti.Click

Dim serviciu As New WebReference.Service()

Dim dsClienti As Data.DataSet

dsCustomers = serviciu.getCustomers()

'—and from here the application uses the data set

End Sub

End Class



Figure 3: The final result.

From now, it is very simple for managers to have access to their company's data wherever they are. It is also important to mention that data are available as they are inserted, deleted or updated by the "normal" users (the users that populate the database through the NAVISION desktop applications).

4 CONCLUSIONS

Mobile device improvements, combined with increasing local and wide area wireless bandwidth, have opened a new door to additional productivity enhancements, cost reductions, and user's satisfaction increases. Microsoft, one of the most important players on the mobile ERP market, powered mobile devices, such as Pocket PCs and Handheld PCs, offering them at a quarter of the cost of custom ruggedized mobile devices from just a few years ago. Utilizing the same development tools and technologies as the PC, these mobile devices make it easier and quicker to get ERP solutions into the hands of the mobile workforce.

The research in the present article does not propose to present the effective implementation of the portal functionality, but we consider that it could be achieved on a web-services type structure on a Java or .NET platform.

The way companies acquire ERP services in the future will change radically. Application mobility surpasses the technology borders, becoming a paradigm that provides the enterprise with a clear strategic business advantage: the ability to do business in real time, in an event driven environment, and with reduced latency.

REFERENCES

- ERP and the future mobile, <http://www.exforsys.com/tutorials/erp/erp-and-the-future-mobile/1.html>
- ERP Market Trends, <http://www.oracleappshub.com/misc/erp-market-trends/>, January 9th 2007
- Key trends in ERP/Enterprise Applications, http://www.berkerynoyes.com/publication/publication/key_trends_in_ERP.aspx
- Microsoft and SAP: Revolutionizing How Information Workers Access Enterprise Business Applications, <http://www.sap.com/solutions/duet/index.epx>
- Mobile ERP/CRM: Integrating With the Enterprise Back End, *Smartphone&PocketPC Magazine*, January 2003, http://www.pocketpcmag.com/_top/
- Britton C., Bye P., *IT Architectures and Middleware: Strategies for Building Large, Integrated Systems*, Addison-Wesley Professional, 2004
- Cairncross, F., *The Company of The Future: How the Communication Revolution Is Changing Management*, Harvard Business School Publishing, 2002
- Fotache D., Hurbean L., *Soluții informatice integrate pentru gestiunea afacerilor – ERP*, Editura Economică, București, Romania, 2004
- Gold-Bernstein B., Ruh W.A., *Enterprise Integration Applied*, Addison-Wesley, 2004
- Irani, Z., Love, P., *Information systems evaluation: past, present and future*, *European Journal of Information Systems*, Vol. 10, No 4, 2001, pp. 204-215
- Lee, V., et al, *Mobile Applications. Architecture, Design, and Development*, Prentice Hall, 2004
- Linthicum D., *Next generation application integration*, Addison Wesley, 2003
- Mahato S., Jain A., Balasubramanian V., *Enterprise Systems Consolidation*, *Information Systems Management*, vol. 23, is. 4, September 2006, pp. 7-19
- Mathias C., *Mobile Predictions for 2007*, in *ComputerWeekly*, Jan. 2007, available online at <http://www.computerweekly.com/Articles/2007/01/03/220873/mobile-predictions-for-2007.htm>
- Murray, F., Willmott, H., *Putting Information Technology in its Place, in Information, Technology and Organizations. Strategy, Networks, and Integration*, Oxford University Press, Great Britain, 2000
- Paavilainen, J., *Mobile Business Strategies. Understanding the technologies and opportunities*, Addison-Wesley, Great Britain, 2002
- Yeaple D., *The Changing Device Management Landscape*, *Smartphone&PocketPC Magazine*, Aug/Sep 2007, available online at http://www.pocketpcmag.com/_top/