

Outsourcing Opportunities for Internet Banking Solutions

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Abstract—The main goal of the article is to present new model of application architecture of banking IT solution providing the Internet Banking services that is particularly outsourced. At first, we propose business rationale and a SWOT analysis to explain the reasons for the model in the article. The most important factor for our model is nowadays' big boom around smart phones and tablet devices. As next, we focus on IT architecture viewpoint where we design application, integration and security model. Finally, we propose a generic governance model that serves as a basis for the specialized governance model. The specialized instance of governance model is designed to ensure that the development and the maintenance of different parts of the IT solution are well governed in time.

Keywords—governance model, front-end application, Internet Banking, smart phones

I. INTRODUCTION

NOWADAYS, there is a big boom with modern technologies especially in the area of smart phones and similar devices using various operation systems from various developers. These devices are often used for access to the Internet and of course that the users are demanding the access to the Internet Banking as well. The issue is that there are many operation systems and many devices and it is not easy and cheap to develop and maintain so many special variants/versions of the front-end application for the Internet Banking for all the technology alternatives. In fact, there are not many reasons, why not to swap these activities to other parties. It means the bank would only define some principles and procedures that must be respected in the process of development and maintenance of the front-end applications (areas: functionality, integration, security, data model, connectivity). From another point of view there are too many applications closely connected with the Internet Banking that it makes sense to closely integrate some functionality from the Internet Banking and generally from the banking services to these applications. For example there can be closer links between the banks and the companies selling the tickets via internet or the applications to the smartphones. In those cases it also seems that it makes sense to interconnect the service provider and the banking system to provide the service in much better way.

II. CURRENT RESEARCH AND MARKET DEVELOPMENT

The idea of Internet Banking is described in many articles.

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In our research we focus on comparison of our idea with other relevant sources. Kelly in his book [1, page 4] thinks that Internet Banking it provided as Software-as-a-service itself, because we do not need to install anything. But as we know, for many Internet Banking services we need to install some supplement applications. Kelly also did not develop his idea further and assume only monolithic architecture.

Also Mamhoom et al. in his book [2, page 8] understand Internet Banking as software a service, but also in one monolithic block.

There are also some article concerning the outsourcing of Internet Banking services, such as Weier [3], but these outsourcing ideas are about fully outsourcing of developing and maintenance of application, which is still paid by the bank. We did not find the idea of developing the application by third party on their own risk.

III. BUSINESS PERSPECTIVE - WHY THE BANKS SHOULD DO THIS

From the business point of the view, the applications in the smartphones and similar kind of the devices are needed, because everyone has a similar application. But development of these applications is very expensive because of the necessity to develop, test and maintain several different front end application versions and it is often very hard to earn significant revenues from these services.

Therefore we see two main possibilities for the future development from the business point of view:

- 1) Develop a unique application, which will be able to generate the revenue to the bank. This way can help to reduce the costs of the development of Internet Banking services and attract the new customers to the bank. Obviously, to find a new kind of this service is not easy and will be very hard to find application of the Internet Banking that will be so successful.
- 2) Develop only basic set of functionality and cooperate with 3rd parties on the development of the front end application. Because for the banks is enormously costly to develop whole scale of Internet Banking solutions, they can be responsible only for the development of the back-end systems. The development of front-end systems will be fully under control of third parties, when bank will set the basic rules and the fully development of the functionality will be under control of 3rd party. In this case the investment the banks' investments are relatively low and they can generate interesting revenues and increase the number of the clients.

Threats - loss of the users data, misuse of data, the companies will be not interested in cooperation with banks, other banks can provide better services.

We assume that today's implementations of Internet Banking IT solutions are typically based on the three tier application model. It means that the application can be viewed

The diagram compares two architectural models for a banking system. Both models show a User at the top interacting with a stack of layers. In the Standard Model, the layers are: UI Services, Presentation Layer (Front-end application), Core IB Services, Application Layer (back-end core application logic), Data Services, and Data Layer (back-end data logic and storages). The Application Layer is highlighted in red. In Our Model, the layers are: UI Services, Presentation Layer (Front-end application), Core IB Services, Application Layer (back-end core application logic), Data Services, and Data Layer (back-end data logic and storages). The Application Layer is highlighted in red. In Our Model, the Presentation Layer is managed by the Third party, while the Application, Data Services, and Data Layer are managed by the Bank.

Actually nowadays, there is a broad adoption of service oriented architecture standards in the area of information technology. Service oriented architecture is thoroughly discussed for example by Marks [6] and the related standards for example by Chappel [7]. These technologies and approaches are suitable for the model, because we need to set up an universal accessible interface that can be called from different devices and platforms. Web services (WS) are the ideal solution to handle that request [10].

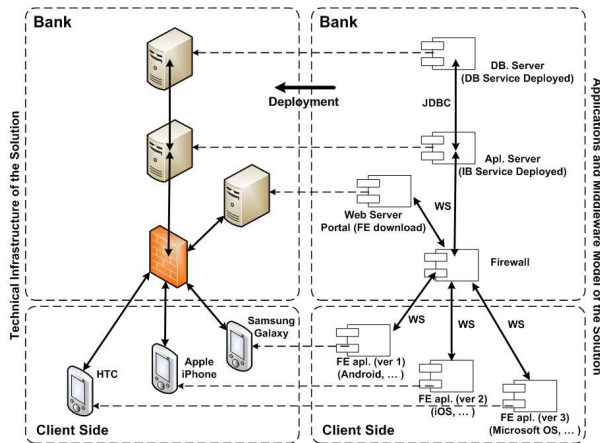


Fig. 2 Integration and Deployment Model [authors]

3. Security Viewpoint

Identification of the main potential security issues:

- 1) Modification of the front end (FE) application on the client's side that results in undesirable or harmful behavior of the application.
- 2) The lost of client's data as the identification data that can lead to unauthorized access to bank's services

Let us now analyze the security from another point of view. Our focus is to identify the situations where the security issues mentioned can emerge.

FE application downloads from bank's web portal:

In general, there are no big security issues, if a bank provides portal where client can securely directly download the application from.

FE installation on the smart phone:

The installation software is actually what is provided on the portal, so the installation process should be without issues, if there is no harmful software on the device modifying or influencing the installation process and as a result causing the damaged installation. There should be provided the hash of FE application to enable verification that the application has not been changed.

FE application calling the interface (IB services):

The calling can be safe if suitable mechanisms and technologies are used, but the risk is the application has been modified on the client side before the calling. Not necessarily during the installation process but even after. The modification can lead to these unpleasant behaviors:

- 1) Application could be able to call the service without client permission and do undesirable operations or transactions.
- 2) When client connects / calls the services then the application can do undesirable operations or transactions.

It is impossible let the bank bear all the risk because bank cannot guarantee the safe environment deployed on the client's device.

Therefore there should be a model of risk sharing between the bank and the client. It means the client must maintain his / her device to reduce the risks of application modification.

The bank can perform a monitoring to notify client about

suspect behavior with his / her account. The client can be notified about any operations by SMS or email that enables client's monitoring.

V. GOVERNANCE SYSTEM

To ensure a smooth development of the Internet Banking solution (front-end and back-end parts) and meet the defined SLAs contracts related to the provided application services, it is necessary to define and implement a governance system for our model, see Fig. 3. As for any governance system, let us set the main components of such the system. The components are typically considered: processes, roles, principles and procedures, tools. The definition respects chosen aspects of approaches described in [5], [6] and [11].

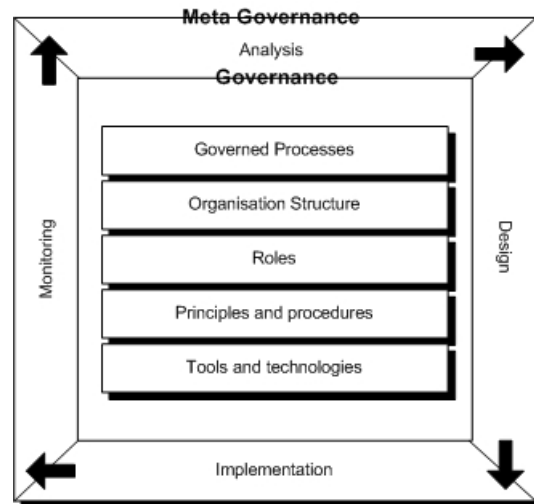


Fig. 3 Reference Governance Model [authors]

Meta Governance = The Governance system must be developed in time, it is not a static system, rather it is a dynamic one. The meta governance system ensures the improvement of the governance in the organization in time.

The Governance = is a system of processes, roles, principles and policies and tools that are implemented to ensure that the organization (governed area) is governed in a way that the set goals and strategy are met, see Fig. 4.

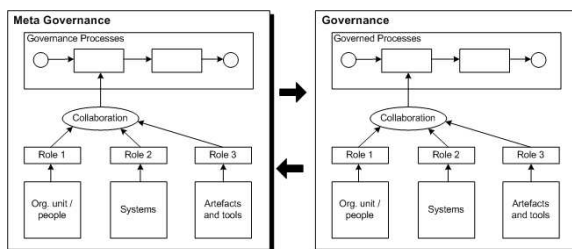


Fig. 4 Meta Governance and Governance Layers [authors]

A. Governance processes

Analysis - analyzing of the current governance model and its implementation from the issues and problems point of view.

Design - redesigning of the current governance model to better address the governance needs.

Implementation (includes training) - implementation of the new version of the model.

Monitoring - monitoring of the implemented governance model, looking for issues and problems.

B. Governed processes (standard)

The application system must be governed as any other application, but the governance model must address even the front-end part of the system even though the development and maintenance is not in the bank's responsibility, because the bank's services are provided via the user interface not only via application interface. As a result, it is not possible to reduce the governance model only on the back-end part of the solution. That is why we need to cover even the third party side in the governance model.

Among "standard" governed processes, it is possible to include processes of COBIT process model (part of COBIT framework) related to the change (analysis, development, testing, deployment) and run (problem and incidents management, SLA management,...) of the application, see Fig. 5 other frameworks can be used [9].

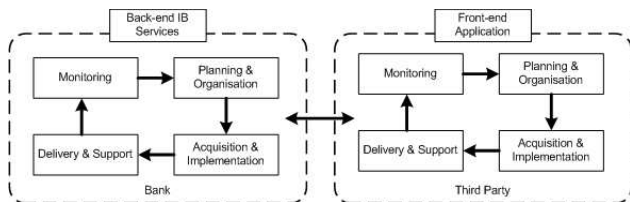


Fig. 5 Collaboration between the bank and the supplier (from COBIT [4, page 26] processes perspective) [authors]

C. Governed processes (specific)

As specific processes of the governance model, let us consider at least these:

- 1) *The vendors selection process* (specialization of the RFI and RFP processes of the organization) – if a bank is planning to implement the new model of Internet Banking IT solution and outsource the development and maintenance activities, it should implement process how to select the right vendors on the basis of defined rules. A bank must assign responsible person to the roles related to the process and support them with suitable rules and tools.
- 2) *The application compliance process* – every application that is not directly under control of a bank should be controlled and checked if it is compliant with the bank's principles and procedures, especially with the security rules. The output of the process is a statement if the front-end application is approved or denied.
- 3) *The application distribution process* – there must be the processes implemented enabling that users can safely download and install the Internet Banking front-end application on their smart devices. The front-end application must be able to download from a trusted place like secured portal guaranteed by the bank. Nobody can trust any other instances of the applications because of their possible modification implying security issues for the client.

As a recommendation, the bank should provide a portal with secure access where all the different instances of front end application are available. This guarantees that the application download by a user is valid application and not modified (for example application with malign source code implemented).

- 4) *Architecture exceptions and dispensations process* (8, architecture governance – dispensation process) - if there is a request to avoid some principles or procedures defined and approved by a bank, then there must be set up the process for governing such exceptions because any exception mainly if it is related to the security is crucial. Such a process is typically a part of the architecture exceptions governance mechanism in the organization.
- 5) *The mandatory application principles and policies distribution process* - the process ensure that all the partners developing the front-end layer are informed about all the mandatory application principles and policies in time.

Roles, Organization model, Artifacts and Tools as the next components of Governance model must be defined. These are out of the scope of article. We only set their definitions.

- 1) *Roles* - the responsibility framework for different process tasks must be set.
- 2) *Organization model* - Assigning of concrete people, organization roles or units to defined logical roles (the previous component called "Roles").
- 3) *Artifacts* - principles and policies encapsulated in different forms (patterns, models, guidelines and others). For example security standards for the integration of FE application to IB back-end services or special FE application requirements from the bank's side.
- 4) *Tools* - mainly the application support tools, i.e. the portal for FE applications download, or the development frameworks and others.

VI. CONCLUSION

The development of Internet Banking IT solution will definitely undergo big changes in the near future. The banks can decide whether they will carry all costs or whether they will share a small part of the profit with third parties in exchange for changing some data and giving the possibility of development our Internet Banking applications.

There will be needed changes in the laws and in the business view, but we think that development and operation of the front end Internet Banking application can be beneficial for both sides.

REFERENCES

- [1] Kelly, James Floyd, *Don't spend a dime: the path to low-cost computing*. Apress, 2009, ISBN: 1430218630
- [2] Mahmood, Zaigham, Hill Richard, *Cloud Computing for Enterprise Architectures*. Springer, 2011, ISBN: 1447122356
- [3] Weier, Mary Hayes, *Innovation Amid Gloom*. Wall Street & Technology; Sep/Oct2009, Vol. 27 Issue 6, p26-27, 2p, ISSN: 1060989X

- [4] IT Governance Institute, *COBIT Framework 4.1*. IT Governance Institute ; 2007, p26, ISBN 1-933284-72-2
- [5] Weill Peter, Ross Jeanne W., *IT Governance – How Top Performers Manage IT Decision Rights for Superior Results*. Harvard Business School Press ;2004, ISBN 1-59139-253-5
- [6] Marks, Eric A., *Service-Oriented Architecture Governance for the Services Driven Enterprises*. John Wiley & Sons; 2008, ISBN 978-0-470-17125-7
- [7] Chappell, David A., Jewell Tyler , *Java Web Services*. O'Reilly; 2002, ISBN: 0-596-00269-6
- [8] The Open Group, *TOGAF Version 9.1. The Open Group* ; 2011, web : <http://pubs.opengroup.org/architecture/togaf9-doc/arch/>
- [9] Office of Government Commerce , *ITIL Lifecycle Publication Suite*. The Stationery Office Books ; 2007, ISBN : 978-0113310500
- [10] IBM, web: <http://www-03.ibm.com/systems/z/os/zvse/solutions/webservices.html>
- [11] Oracle, web: <http://www.oracle.com/us/technologies/soa/oracle-soa-governance-best-practice-066427.pdf>