ISSN: 0974-2115
www.jchps.com Journal of Chemical and Pharmaceutical Sciences

Analysis of interoperability between mobile apps cross-platforms development using LCIM Model

C.Shanthi[1], M.S.Josephine[2], V.JeyabalaRaja[3]
[1]Vels University, Chennai, India
[2]Department of MCA, Dr.MGR Educational and Research Institute, Chennai, India.
[3]Department of CSE, VelammalEngg.College, Chennai, India.
***Corresponding author:E-Mail:Shan_c08@yahoo.co.in**

ABSTRACT

The Levels of Conceptual Interoperability Model (LCIM) was a layered approach of interoperation between system software and applied in various domains successfully and featured as a reference model and also good theory model to evaluate the levels of interoperability. Now can used LCIM Model to derive effects and requirements between mobile apps a cross-platform mobile development language. Interoperability makes systems and organizations work together (inter-operate) and writing cross-platform code that provides native functionality, performance, and look-and-feel across Android, iOS and Windows operating system. When we follow many levels for interoperability between mobile apps cross-platforms the best exchange of data can be done using LCIM model.

KEY WORDS: Mobile apps, interoperability, (LCIM) levels of conceptual interoperability model, Integratability, mobile cross-platform.

1. INTRODUCTION

Analyzes of interoperability between mobile application cross-platform and also includes analyses of different types of interoperability problems and issues and efforts to define models of interoperability that will aid in creating solutions to those problems and also the essential characteristics of interoperability, and also the key principles on which solutions will depend.

The interoperation between technology and mobile application are among different technical platforms. This cross-platform integration is achieved through information engineering, which translates process requirements into software programs. The data exchange in a prescribed manner and the processing of such data to extract clear information that can be used to coordinate operations Mobile applications cross-platform are becoming increasingly focused but the applications are less interoperable. On analyzing all the existing interoperability models, it was found that LCIM model used in systems engineering domain can be couturier to improve the interoperability of mobile apps cross-platform.

Evaluating the mobile apps based on interoperability would solve the problem of cross-platform interoperability. The goal is to increase interoperability between mobile apps cross-platform designed to interoperate, the challenge is not a simple one.

Interoperability testing used for checking given software program or technology is compatible with others and encourages cross-use functionality. Mobile device accessing integratability factors influence the level or growth paths and measurement indicators. The ways to integrate information through interfaces by database and by calling interoperability characteristic of mobile applications is presented according to the using of output of the application by another application.

When we start with interoperability process between mobile apps cross-platform we must come across many levels of interoperability to succeed the final level of data exchange.

- no interoperability, there no exist collaboration of data between any applications;
- Partial interoperability, only some data collaborate between applications;
- Total interoperability, all data exchanged can be used in other exchanged application, is a level of interoperability better but difficult to reach.

So this paper analysis how the difficulty can be clutched using levels of conceptual Interoperability in mobile apps cross-platform.

Importance of interoperability in mobile app:

- the reuse of existing data,
- technologies and systems,
- the need to reduce costs,
- the requirement for faster time to market.

The reasons for interoperability have remained the same, the approaches has endured some change in improving levels of interoperability between mobile apps, only one -- bridging -- has truly prevailed to overcome interoperability is LCIM Model.

Interoperability resists with the software implementation details of interoperations, including exchange of data elements based on a common data interpretation. The idea behind cross-platform mobile application development is to be able to write one code for a particular application, and be able to deploy this across multiple platforms. The basic goal is to make the application platform independent which can be done by implementing levels of interoperability.

Current models of interoperability and best model for approach: There are many ongoing attempts to develop useful models of software interoperability but I have proposed some concepts of an interoperability model that expand interoperation between mobile apps cross-platform.

There are many models for Interoperability-

- NATO C3 Technical Architecture (NC3TA) Reference Model for Interoperability (NMI) The North Atlantic Treaty Organization (NATO).
- Levels of Information Systems Interoperability (LISI) Model
- The “Organizational Interoperability Maturity” Model.

These are the best Interoperability Models in which only five levels of interoperability approach was succeeded but in

- The “Levels of Conceptual Interoperability” Model (LCIM)

We can come across seven levels of layered approach for getting best interoperation between data. The final level achieved in this model is conceptual interoperability of data between systems to system which is successful.

Now i suggest LCIM (Levels of conceptual interoperability) Model. The best interoperability model for mobile apps cross-platform because of its layered approach which is much important in cross-platform development.

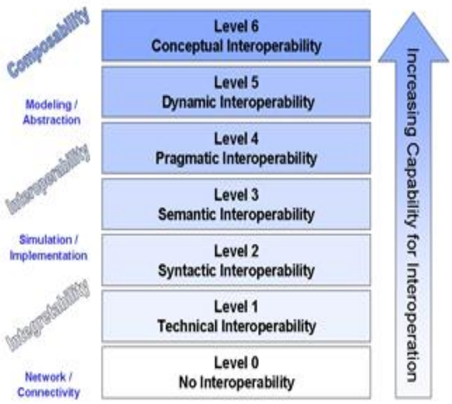

Figure.1.The levels of conceptual interoperability model

The different levels are characterized as follows:

- Level 0: Stand-alone systems have No Interoperability.
- Level 1: On the level of Technical Interoperability, a communication protocol exists for exchanging data between participating systems. On this level, a communication infrastructure is established allowing it to exchange bits and bytes, the underlying networks and protocols are unambiguously defined.
- Level 2: The Syntactic Interoperability level introduces a common structure to exchange information, i.e., a common data format is applied
- Level 3: If a common information exchange reference model is used, the level of Semantic Interoperability is reached.
- Level 4: Pragmatic Interoperability is reached when the interoperating systems are aware of the methods and procedures that each other are employing.
- Level 5: As a system operates on data over time, the state of that system will change, and this includes the assumptions and constraints that affect its data interchange. If systems have attained Dynamic Interoperability, then they are able to comprehend the state changes that occur in the assumptions and constraints that each other is making overtime, and are able to take advantage of those changes
- Level 6: Finally, if the conceptual model – i.e. the assumptions and constraints of the meaningful abstraction of reality – are aligned, the highest level of interoperability is reached: Conceptual Interoperability. In other words, on this weneed a “fully specified but implementation independent model” as requested in Davis and Anderson (1996), and not just a text describing the conceptual idea.

The level of conceptual interoperability model (LCIM) was introduced by Tolk and Muguira (2003) in order to establish the degree to which two or more systems interoperate. The latest version of the LCIM as presented by Turnitsa (2005) has seven levels: Above I have discussed about the seven levels of LCIM model which has been introduced by Tolk. How the data are exchanged with no interoperability to conceptual interoperability which is the final stage of interoperation between systems

Now I suggest LCIM model for its best interoperability between mobile apps cross-platform for getting conceptual interoperability between mobile apps.

Cross-Platorm frame work: By using cross platform framework, we can develop quality mobile apps for our clients which can serve their needs successfully and can run on a variety of platforms.

List of widely used cross-platform development frameworks/tools:

Phone Gap: Phone Gap is an open source framework that supports all the major platforms like iPhone, Blackberry, Android, Palm, and Symbian. This platform uses standard web development languages such as HTML and JavaScript. It provides the power to create native apps with web technology and allows the developer to work with device hardware features such as accelerometer, GPS/location, camera, and sound.

Appceleator: The Appcelerator platform consists of a comprehensive set of integrated products that enable enterprises to create, deliver and analyze their entire mobile application portfolio.

Sencha: Sencha is the first application framework in the world which is leveraging CSS3, HTML 5 and JavaScript to provide the best level of flexibility, capability and optimization.

RhoMobile: Rho Mobile offers Rhodes, which is an open-source framework based on Ruby. This permits the developer to create native apps spanning over a huge range of operating systems and smart phones. The operating systems include Android, Windows Mobile, Symbian, iPhone and RIM.

MoSync: MoSync is a free open source multi-platform mobile app dev SDK tool, based on standard web programming. This SDK offers the developer integrated compilers, libraries, runtimes, device profiles and other useful tools.

When we come across these frameworks there are pros and cons to each of these approaches and nothing is quite perfect. We need to consider them based on our requirements, framework support and capability.

Systems have existed or been implemented and need to be integrated to reach a certain interoperation goal. The description and evaluation for interoperation of data LCIM can be seen as the two sides of a coin - one is what exist or have done, the other is what needs to be done.

2. CONCLUSION

The current smart phone market has made it necessary to develop applications for several platforms. The Cross-platform development approaches are one way of increasing asset reuse of data between platforms and increasing inter-operation of data. Overall, the LCIM model was found solid and suitable for the type of application presented in the study. I performance issues that varied between mobile platforms were also encountered. Comparison of the models of interoperability approach with other cross-platform approaches would be interesting topic, perhaps by implementing the same demonstrator using LCIM model. The systems must constantly change to provide additional benefits the systems must evolve to remain useful.

This evolution affects both individual and cross platform frameworks. Individual systems must be modified to address unique and changing demands of their specific context and users.

The result of this study confirms that two of the main challenges that developer of mobile apps cross platform faces in general interoperation of data between mobile apps in particular. Finally, some directions to overcome these challenges are proposed. In terms of testing and verification of how to react in real world mobile apps interoperability using LCIM model development of these applications is more difficult than traditional application development.

REFERENCES

Department of Defense. Department of Defense Dictionary of Military and Associated Terms. Washington, DC: Operational Plans and Joint Force Development Directorate, 2001.

Goldwater-Nichols Department of Defense Reorganization Act of (Public Law 99-433), 1986.

International Journal of Emerging Technology and Advanced Engineering (ISSN 2250-2459, ISO 9001:2008 Certified Journal, 3(5), 2013.

ISSC NATO Open Systems Working Group, NATO C3 Technical Architecture Volume I – C4ISR/Sim TRM Applicability to NATO Interoperability – Management, Version 4.0, 2000.

Levine L, Meyers C, Morris E, Place P & Plakosh D, Proceedings of the System of Systems Interoperability Workshop (CMU/SEI-2003-TN-016). Pittsburgh, PA, Software Engineering Institute, Carnegie Mellon University, 2003.

Meyers B, Craig & Oberndorf, Patricia A Framework for the Specification of Acquisition Models (CMU/SEI-2001-TR-004, ADA401717). Pittsburgh, PA: Software Engineering Institute, Carnegie Mellon University, 2001.

Meyers B, Craig & Oberndorf, Patricia, Managing Software Acquisition Open Systems and COTS Products Boston, MA: Addison Wesley, 2001.

National Communications System, Telecommunications, Glossary of Telecommunication Terms (Federal Standard 1037C). Arlington, VA: National Communications System, 1996

Netravali A.N and Haskell B.G, Digital Pictures, 2nd, Plenum Press, New York, 1995, 613-651.

Robinson S, Conceptual modelling for simulation part I, Definition and requirements, Journal of the Operational Research Society, 59, 2008, 278-290.

Standards Coordinating Committee, IEEE Standard Glossary of Software Engineering Terminology (IEEE Std 610.12-1990). New York, NY, The Institute of Electrical and Electronics Engineers, 1990.

Sun H, Kwok W and Zdepski J, Architectures for MPEG compressed bitstream scaling, IEEE Trans, Circuits Syst, Video Technol, 6(2),1996, 191-199.

Tolk A, Interoperability and Composability, Chapter 12 in J.A. Sokolowski and C.M. Banks (Eds), Modeling and Simulation Fundamentals - Theoretical Underpinnings and Practical Domains, John Wiley, 2010, 403-433.

Tolk A, Muguira JA, The levels of conceptual interoperability model, Fall Simulation Interoperability Workshop. Orlando, Florida: Simulation Interoperability Standards Organization, 2003.

Tolk A, Turnitsa C, Diallo S, Implied ontological representation within the levels of conceptual interoperability model, Intelligent Decision Technologies, 2, 2008, 3-19.

Tolk, Andreas & Muguira, James A, The Levels of Conceptual Interoperability Model, Proceedings of the 2003 Fall Simulation Interoperability Workshop. Orlando, Florida, Sept. 14-19, 2003. Orlando, FL: Simulation Interoperability Standards Organization, 2003.

Warner, Neil, Interoperability - An Australian View, Proceedings of the 7th International Command and Control Research and Technology Symposium, Quebec City, Canada, 16-20, 2002.