Architect Project Profile – Level 1 – Example – XYZ Hospital, USA

NOTE: This content is taken from an authentic approved project profile from a Global Markets candidate in the USA. Client names and some other details have been changed or removed. This document is for illustration purposes only. If the candidate is from a non-English speaking background, the grammar may reflect this. All Architects should endeavour to carefully check grammar and spelling. SME Reviewer observations have been included to highlight strengths. Candidates should write in their own style and review their application with their mentor prior to submission. Refer to the Architect Resource Centre wiki for project profile criteria and

L1 (Experienced) – The Candidate is able to perform with assistance/supervision, with a wide range of appropriate skills, as a contributing architect. **Applied**, performs with supervision or mentoring.

Business Opportunity or Problem

Your description for this section should address the following:

1. Describe the nature of the engagement in terms of the business problem the client had, including the scope and complexity of the problem
2. Describe the scope and complexity of the problem in terms of phases of development or in terms of size (number of processes, client environment, number of modules, etc.).
3. Describe the client sponsors for the project including their titles.
4. Describe your relationship and communications with client sponsors and management.

Describe the client's business opportunity or their problem in the context of your geography.

Business problem

XYZ hospital wanted to create a high-tech "Intelligent-Rooms" program that featured a system for automatically organizing and prioritizing the work of nurses and other healthcare providers. The goal was to focus more towards patient-care responsibly, while reducing the overhead paper work load for every action performed by care providers. Another requirement was to be in HIPAA regulatory compliance by only providing real time relevant data to individuals who should have access to it.

Complexity

In order to resolve this business problem, the solution had to be developed using a simple touch screen interface on a monitor in the patient's room; this allowed a nurse or an aide to document the completion of tasks in just a few seconds, rather than writing down the information and waiting to enter it into a computer later. Intelligent-Room was designed to provide real-time links to key clinical systems, including pharmacy and lab services. Patient email, testing schedules, education content, and other features were also offered through this Intelligent-Room technology.

Sponsorship

The project was sponsored by the Director of XYZ hospital in partnership with IBM Software group. I was brought in as SME on Health-care Life science architecture for developing a solution, which later helped integrating medical devices with IBM SOA product. Due to being an expert in Health Level Seven International (HL7) framework that provided exchange, integration, sharing, and retrieval of electronic health information, I became an integral part of the project and the go-to-person between the Hospital IT department and the healthcare team. I was on the project for almost seven months as an integration architecture resource. The

SME Comment: The solution had clearly-defined work efforts which took place in parallel, each with their own solution development and design activities and their own deliverables. Some evidences required:
- Architecture Overview Diagram (AOD)
- Context Diagram or use cases

Note: Candidates are encourage to add a small number of diagrams that will help explain their solution

overall budget or the project was for $800k for creating a system, which can expand to one floor of the hospital, containing 24 rooms. This was a great opportunity for both IBM and XYZ, if the project were to become successful. IBM could have had an exclusive sales channel for the Intelligent-Room solution and would have helped to implement the technology for customers across the USA. The potential revenue sales growth for IBM

> SME Comment: The candidate has clearly explained the business needs, stakeholders' requirements and solution vision. His industry knowledge provides a bridge between the client and IBM as a trusted advisor. These evidences confirm that the Business Opportunity criteria was fully addressed.

software was estimated to be $xx million dollars.

Solution

Briefly describe the solution you implemented, deliverables prepared, technology used, etc. Your description should address the following:

1. Describe the solution you developed and the expected benefit for the client. Include how the benefits were shown to the client including the expected benefits from a successful implementation.
2. Describe how the solution addressed key functional and non-functional requirements.
3. Describe any standards or industry direction you took in the development of the solution.
4. Describe your role in the engagement and your specific tasks, responsibilities, and accomplishments, including your role in planning the effort, tracking progress and reporting to the IBM and Client project management. You should be able to show how you performed as a lead technical resource in the architectural design, development, implementation *and/or* management of the project.
5. Summarize the key technical decisions you made, the reasons for the decisions, and the alternatives that were considered. Ensure you describe how your mitigated risk to maximize client value.
6. Describe the major problems or obstacles you encountered, and the actions you took to overcome them.

Describe the solution you implemented, deliverables prepared, technology used, etc.

Traditionally, all the patient's information at the XYZ hospital was stored in the system using HL7 feed, which contained patient records with each action performed by hospital workers after the initial patient admission. To integrate Intelligent-Room sensors and peripheral devices, I used the System-Oriented Architecture (SOA). Some key non-functional requirements that had to be document and understood were the availability, security, and the HIPAA compliance; these requirements changed as the solution was implemented in different sections of the hospital. For the first phase, we wanted to integrate the system to display all the action performed by a nurse in patient room on a large TV screen. These actions were then tracked by RFID band and sensors in the room; the actions performed were only assessed by authorized personnel involved in the patient care. To implement this solution, I used four IBM products, IBM MQ, IBM WebSphere Message Broker (WMB), IBM HealthCare Pack for Broker and IBM DB2. Since the HL7 feed could only be stored in XML format, and because WMB is a well-known product for its reliability & performance, I felt that it was the right product to generate or manipulate the feed in memory for this project. In conjunction to WMB, we used Healthcare Pack provided by WMB software group. I created a workflow that took aggregated or parsed incoming messages in HL7 format and forwarded the right data to different applications. To make sure no message or data was to get lost before & after WMB workflow, I decided to place it on MQ. I also made sure that the fail message is stored on file for HIPAA compliance. The Db2 was used to store audit logs from each sensor and RFID band. To validate design and compatibility, I created this solution for only two rooms and four nurses. In the next phase, the task was to integrate data produced by peripheral devices (blood pressure machine, pulse ox meter, thermometer. etc.) to the TV screen. Our next goal was to add more functionality to the existing work flow which can handle actions performed by aid or doctor. This process demanded for all the new information to be transformed in HL7 feed and the mapping of each action to HL7 framework demanded for us to work with a nurse and XYZ IT health department. Integrating with new devices and adding hospital team that can perform these actions also had to be documented. To expand these capabilities, I had to assign some tasks to the IT consultant who worked at XYZ. Enabling this solution for 24 rooms was very challenging and I had to work with 8 team members consisting the register nurse, healthcare hardware & IBM software engineers. I assigned the tasks to engineers for placing the RIFD sensors and peripheral devices at the right location in the patient room. The performance of ingesting HL7 data had to be done instantaneously to view the result on patient screen and to achieve this I designed the deployment into 4 different WMB servers so that each server was only responsible for six rooms with twelve patient maximums. To reduce the

hardware cost and for quick deployment, I relied on VMware technology. Furthermore, each WMB server was using same MQ Cluster of active and passive mode. This was done to save all the data on MQ in case of catastrophic failure of the system. During the whole process, we faced a few major problems which the IBM team had no control over. For instance, if healthcare workers were to perform an unintentional error, there was no way for us to capture/catch it due to the entire process relying on automation, sensor, and touch screen. Not only that, we noted that sometimes the sensor itself failed to identify the right RFID band, due to hardware sensor provided by XYZ healthcare specific vendor- resulting in the Intelligent Room screen showing an out of sequence message of steps performed by any healthcare personnel.

Result

Assess the overall success or failure of the project from the standpoint of:

1. Client Satisfaction
2. Quality of deliverables
3. Performance of the IBM team
4. Progression of the opportunity
5. KPIs delivered on
6. Sales results and/or software burn down
7. Next steps

Briefly describe the overall success of the project

The successful implementation and delivering of the Intelligent-Room project from two rooms to twenty-four rooms, within seven months span made our client very satisfied. This project did have some challenges, especially from understanding of mapping HL7 data to the action performed by individuals. The WMB healthcare pack came in very handy in transforming the messages into right HL7 standards. Our customer was satisfied with the work performed by IBM Software group. The integration point between components was well documented and passed the HIPAA compliance review board. After seeing the success of the project, XYZ did sign the legal agreement to purchase the software for future implementations at the XYZ Hospital. I used the SOA architecture with my healthcare background to enable the team to integrate different type of data with HL7 feed. I used the product knowledge and technology in conjunction with customer requirements for developing and implementing the solution, which was easy to maintain and connect to other types of data without adding new software layers. The architecture was simple yet elegant and required minimum time to deploy.

Some of the main KPI deliverables for the project were:
(1.) Developed the integrated HL7 solutions, which were robust and easier to maintain by transforming data in HL7 format with simple WMB API, allowing fast message parsing using in memory WMB product.
(2.) Created working flows, that could be changed or updated depending on a HIPAA compliance rules.
(3.) Enabled full interface monitoring, reporting, and real-time exception handling.
(4.) The goal was to avoid the risk of data being lost, as it must be saved in log files to meet the HIPAA compliance; for this reason, MQ was used for transferring every message in a persistent mode.
(5.) Solution was capable of integrating future healthcare provider devices or use-cases using the SOA enterprise bus.
I deployed SOA designs that included clustering techniques to achieve resilient in the solution. Customer was content to see the solution being put together within allotted timeframe. Due to this success, the customer bought the IBM software for any future implementation of Intelligent-Room. At the end of the project, XYZ board was still weighing in the cost of converting standard patient room to Intelligent-Room. The solution did add an extra expense to the hospital overall budget, hence decision was still in the pending state of either to retain admins to perform the patient work or training nurses to use Intelligent-Room concept.

SME Comment: The candidate has demonstrated an understanding of the impact of architectural decisions on the realization and operation of the solution.

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Architectural Thinking

Describe how you used Architectural Thinking by apply sound, creative, and innovative architectural thinking to enhance and expand implementation of architectural principles, practices, and concepts to meet the business intent or the delivery of solutions. Apply strategic architectural thinking to mission, strategy, and vision in ways that deliver positive impact and results to the business. Provide break-through architectural thinking to the innovative application of information technology to deliver greater business value.

L1: Experienced

TOGAF architecture framework was utilized to help coordinate proposal deliverables. In the preliminary phase of the architectural design, input was gathered from all members of the healthcare team & XYZ IT department. This input was then used to create a document consisting of architecture capability, organizational model for enterprise and tailored SOA framework to handle the business, data, and application requirements. The first draft of the design helped IBM team to make capability assessment with IT review board. The detail communication between the devices, patient, hospital staff, and IT system helped us in performing a gap analysis. By utilizing the documented information, I was able to define Technical Refence Model, which provided generic SOA services & capability by the solution. The application platform interface of the model, provided us with detailed interaction information on security, transaction process, user interface, data interface and software engineering This helped to explain the interoperability requirements and achieve business transformation by meeting the HIPAA compliance level.

Architectural Methods

Describe how you used Architectural Methods by following processes, techniques, and guidelines to produce deliverables that communicate their designs, which instruct the various downstream resources in the assembly and operation of that given a work effort, adapt, apply, and enforce the use of a method that meets the method recognition criteria documented on the Open CA website to successfully create architectural work products that meet the requirements of the work effort. Candidates are not required to have used more than one recognized method. IBM Certified Architects must demonstrate the ability to adapt and follow a recognized method to help ensure repeatability of delivery and success. The use of methods usually requires selection of work products and processes (adaptation). Methods are seldom adopted without change.

L1: Experienced

I used TOGAF process to deliver all phases of this project and by following its methodology, availability, scalability, cost, and the solution performances were achieved during this project. In the application's architecture phase, I described the technology components required for implementation of the solution. The IBM middleware software MQ, WMB and DB2 components were used as an Enterprise Bus Service (EBS). The EBS components were deployed on X86 Redhat OS, and the solution was configured to keep the technology platform simple for the XYZ IT organization. Using the defined software and hardware infrastructure required supporting the portfolio of SOA services, the use-cases scenarios were established, and implemented using the WMB work flows. I defined component model in which software components along with their responsibility, interface, relationship, and required functionality. This helped us in understanding the HL7 feed transaction process flows coming from Cerner and then being able to update the database for each Intelligent-Room patient entry. The Intelligent-Room application was only able to process the XML, but the WMB workflow was used to map the XML to HL7 feed based upon the criteria properties. Implementing the solution for only two rooms helped the customer to test the integrated solution and provided real time feedback on any possible issues. This also gave healthcare team a chance to understand how the technology could affect work pattern and basic patient interaction. By implementing the first phase, we could map out a system boundary diagram for solutions. In order to expand the same solution on the entire floor, I created a top-down view of the

solution deployment guide; this presented each user's role interacting with infrastructure interface, network services, operation system services, application services, and business application. This helped to assign the tasks to XYZ IT department, healthcare workers, and the IBM team. The entire deployment helped to bring out some non-functional requirements like response time, backup, role responsibility of the system. Many different individuals from difference section of the XYZ facility had to create a new role/responsibility chart if any problem were to arise in the Intelligent-Room.

Risk Management

Describe how you used risk management techniques to identify the elements of a project that put the integrity of the architecture at risk and managed those elements to the successful completion of the project. Given a project plan, identify those elements of the plan that put the integrity of any aspects of the plan/timeline at risk. Manage those elements through to completion as agreed by the client/project manager. IBM Certified professionals must be able to work closely with clients/project managers and address issues in project plans that put their work at risk. They must be able communicate the likelihood and impact of architectural risks and come to a mutual agreement with clients/project managers.
L1: Experienced

Since this type of solution had never been applied, there were substantial unknowns and greater risk possibilities associated with successful implementation. Being able to integrate numerous peripheral devices with HL7 data in an Intelligent-Room was one of the biggest risks we faced during execution of this project. Another risk we were to successfully incorporate daily assignments/tasks of healthcare providers in an Intelligent-Room, and the lack of documentation and support provided by the devices attached to a patient made this task even tougher. We had to rely entirely on XYZ IT department to guide us and capture data from these devices as it gathered through the network. Using the Intelligent-Room program triggered a sense of behavior change between patient & providers; this positive outcome was not expected or planned initially during this project. To mitigate the risk, I asked the project manager to deliver and implement the solution for two rooms. During the first implantation phase, we tried to eliminate any extra devices, which did require HL7 message feed to get integrated with Intelligent-Room. After delivering the first phase of the project, we noticed that XYZ nurse and IT department lacked the basic understanding about the product and were often unable to fix the mighty issues. This further lead us into numerous misunderstandings as to who is responsible for fixing these sorts of problems when working with Intelligent-Room. To mitigate the risk, I had to train a team of four XYZ employees who could support the entire floor of Intelligent-Room system. To ensure the success of this training, we made sure each team member had a basic knowledge regarding HIPAA policies, IT system & HL7 flow structure. Later, a well-documented guide and flow diagram on how to triage a problem when it occurred in patent room was created and presented. After going through the exercise on configuring and managing the two rooms, the whole process became slightly easier to scale the implementation to twelve rooms and then to total of twenty-four rooms. During scaling, I had to rely or previously coached staff to train more XYZ nurse and IT department members for future purposes.

Lesson Learned

Your description should address the following questions:
What might you have done differently on this project?
What lessons did you learn from this experience?
How did this change your behavior or decisions on subsequent engagements? Consider the entire solution lifecycle from strategy, design, implementation and management through to completion.

Describe lessons learned throughout the entire solution lifecycle from strategy, design, implementation and management through to completion.

The major lesson learned was the need to apply both rigor and flexibility with high-degree of communication to capture the changing goals, requirements, decisions, and strategies.
Significant proposal efforts were driven to both:
(1.) win, by putting together forward IBM's best value proposition (with our partners), and

(2.) to commit by accurately estimating the ability to deliver on-time and within cost limits.
While SOA architect had the potential to both add customer value and reduce IT cost, the effort to develop a solution at XYZ IT department was quite challenging. Reasoning behind this was lack of usability knowledge among XYZ IT department, who never used IBM products, which was pretty complex if both "win" and "commit" goals were considered. I learned ways to simplify and manage the complexities we faced, while still achieving the above goals. This was done so by learning how to take a multiple-release, end-to-end SOA architecture approach for the XYZ Intelligent-Room transformation solutions, while allowing the architecture to be an effective "glue" between the various solution's efforts for both winning and committing to execution. The architecture resulting from this approach was then used to trace fulfillment of customer requests, accept changes rapidly during solution development. This allowed the development/maintenance of a traceable BOE, BOM, schedule, and transition strategy content. In the end, we were able to maximize our value to win the contract as well as confidently commit to successful delivery.

Summary SME Comments:

Overall, this is a very good project profile. The candidate has demonstrated:
- Use of Different Types of Technologies and products
- Full lifecycle experience
- Apply industry Standards and Industry knowledge
- Documented solution architecture and solution design
- Leadership and solution guidance
- Understanding of Business Aspects
- Managed Risks, Issues and the Solution technical integrity
- Use of Modeling Techniques
- Work with functional and non-functional requirements

Note; The candidate was asked to attach the following documents as supporting evidence: -
- System Context
- Architecture Overview Diagram (AOD)
- Architecture decisions