Harbin Institute of Technology

Service Computing Spring 2022

Case study assignment

Submission deadline: 8th May 2022

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Task. Read the description below and propose a SOA based solution for Bama Tea:

1. Justify why SOA-based solution is appropriate in this case.
2. Suggest the best delivery strategy, justify your choice.
3. Follow the service-oriented analysis and service-oriented design stages of the SOA delivery lifecycle to design an example services of your choice for Bama Tea.
4. Suggest suitable development technologies.

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* 1. Company introduction

Chinese tea company, Bama Tea Co., Ltd., is a prominent corporation in the Chinese tea sector. Bama Tea, which started as a single shop about three centuries ago, has developed into an integrated tea cultivation chain. The company mainly deals with different stages of developing tea products:

- planting

- developing

- producing - one of its factories, Longmen Processing Factory, being the most modern refinement processing factory of oolong and Tieguanyin in Asia.

- selling - with the largest number of chain stores in mainland China, Bama Tea, as of December 31, 2019, has more than 1,800 chain stores nationwide (including signing and renovation stores).

Bama Tea also exports its products. It also established a tourism branch that partners with tea plantations. Bama Tea has also conducted cooperation with overseas tea industries. Through project cooperation, and with years of experience in tea research, Bama Tea provides support to the development of new flavors or products for several overseas companies, such as Mauritius's largest tea company, Mauri Tea Investment Co., Ltd., the Italian Master Horeca SRL, Japan's Ito Park, and tea companies in Malaysia and Singapore. Bama Tea owns and carries out its operations in three entities: Anxi Bama Tea Limited Company, Shenzhen Bama Tea Chain Limited Company, and Xiamen Bama Tea Limited Company. Currently, the company manages a tea base of over 50,000 and has an annual processing capability of 6,000 tons.

* 1. Existing systems description

In this case, we will study Bama’s accounting solution. It exists as a two-tier client-server application, where the bulk of application logic resides within an executable deployed on client workstations. This two-tier client-server system governing all accounting and inventory control transactions. The administrative clerks manually feed this system with standard transaction document data (primarily incoming and outgoing purchase orders and invoices). Receipt and submission of these documents typically initiates corresponding inventory receiving and order shipping processes. The completion of each task involves a series of steps that constitute a business process. This process was originally modelled using standard workflow logic and then implemented as part of a packaged solution. It is compiled into a single executable that provides a fixed manner in which the process is automated. Its GUI front-end consists of a single executable designed for deployment on old Windows workstations. It provides user-interfaces for looking up, editing, and adding various accounting records.

Bama’s two primary business processes are: Order Fulfillment (accepting and processing purchase orders from a client) and Invoice Submission (sending an invoice to a client).

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| Invoice Submission Process | Order Fulfilment Process |
| 1. Accounting clerk creates and issues an electronic invoice using the legacy accounting system. 2. The save event triggers a custom script that exports an electronic copy of the invoice to a network folder. 3. A custom developed component, which polls this folder at ten-minute intervals, picks up the document and transforms it into an XML document. 4. The invoice XML document is then validated. If it is deemed valid, it is forwarded to the Invoice Submission Service. If validation fails, the document is rejected, and the process ends. 5. Depending on when the last metadata check was performed, the service may issue a Get Metadata request to the Bama’s customers B2B solution. 6. If the Get Metadata request is issued and if it determines that no changes were made to the relevant Bama’s customers service descriptions, the Invoice Submission Service transmits the invoice document to the Bama’s customers B2B solution using the ExactlyOnce delivery assurance. If the Get Metadata request identifies a change to the Bama’s customers service descriptions, the invoice is not submitted, and the process ends. | 1. The Bama Order Fulfilment Service receives a SOAP message from Bama’s customer, containing a payload consisting of a Bama’s customer purchase order document. 2. The service validates the incoming document. If valid, the document is passed to a custom component. If the Bama’s customer PO fails validation, a rejection notification message is sent to Bama’s customer, and the process ends. 3. The component has the XML document transformed into a purchase order that conforms to the accounting system's native document format. 4. The PO then is submitted to the accounting system using its import extension. 5. The PO ends up in the work queue of an accounting clerk who then processes the document. |

* 1. Problems

Recently, Bama noticed that the profit margins have been noticeably declining over the past year. Clients have been switching to a competitor providing the same products in a more efficient manner and at a lower cost. Further investigation led to the discovery that this competitor has implemented an extension to their existing accounting system, allowing them to perform various transactions online via B2B solutions provided by some of the larger clients. Bama realised they are a company with outdated technology automating inefficient business processes and need to better respond to new business trends and automation requirements. To remain competitive and minimize losses, Bama must upgrade its automation environment as soon as possible. Bama decides to re-evaluate its environment in consideration of establishing an SOA. Further, Bama realizes that it must also seek new clients and this new requirement ends up also affecting the design of its SOA.

Problems with their accounting application have also surfaced. Operating system upgrades have introduced erratic behavior on some screens, resulting in unexplainable error messages. It is uncertain if these are caused by other programs that have been installed on the workstations. The workstations themselves have been rarely upgraded and have not kept pace with the hardware demands of recent software upgrades. After the accounting system launches, there is little more the user can do with the computer. As a result, employee productivity has been affected somewhat. Following a new records management policy and some billing procedure changes, a modification to the overall billing process was imposed on the accounting personnel. Because the accounting system was not designed to accommodate this change, employees are required to supplement the automated billing process by manually filling out supplementary forms. Fundamentally, this accounting system has been getting the job done. However, the actual accounting tasks performed by the users have become increasingly convoluted and inefficient. This is due to the questionable stability of the workstation environments and also because the system itself is not easily adaptable to changes in the processes it automates.