

Healthcare Products Management and System Analysis in Cloud Computing Environment (Salesforce)

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Abstract

Cloud Computing, Big Data, IoT etc these have become an essential part of technology, as the area of research and usefulness of these is wider and helpful to society. Especially in healthcare, these found out great for analyzing, managing and monitoring devices. So, every second we are getting Gigabytes of data as well as for managing the commercial devices and production to sales workflow, we need some uniform platform. For this work, Salesforce (Cloud) platform is used in which we can easily manage the related things which will be explained in rest of document. The key target of this project is to develop an application which will be uniform independent of platform i.e. it can be handled by mobile, tablet, desktop like devices. The other work will be improving the current system by automating the different business processes. In the second part system, will check the performance of the current system. The key concept of the paper is to utilize the time of the user for doing more things by increasing the response time of the system. The future work will be finding out more ways to utilize this platform and working on the more efficient platform.

Keywords: Cloud Computing, Salesforce, Automation, Product Management

1. INTRODUCTION

There are many CRM tools available in the market like Siebel. But Salesforce is a CRM which is one of the commonly used software in recent years. It is used to keep track of the existing and new clients which will enable the strength of the company

growth. In the use of Salesforce CRM system, you will get introduced to 5 main data objects named Contact, Accounts, Opportunities, Leads. Also, you will educate for the sales process and lead generation.

In the salesforce terminology Account, can be the customer of the system which is involved in the deal. Any organization specifically hospitals (in healthcare) are the Accounts in SFDC. The people associated with these organization can be termed as Contacts. For any deal, we need a chance of selling the product, so the most interested customer is the opportunity in the system. Salesforce is much concern about the accounts i.e. customer so all these things are interlinked in the system also.

1.1. CRM (Customer Relationship Management):

CRM is a short name for customer relationship management. CRM is a tool which will collaborate the practices, technologies, and strategies which will help your business for the expansion.

Today's cloud world, CRM indicates the bunch of tools, specifically offline or online web application that pushes the organization to focus extra attention on the customer and associates i.e. buyers, suppliers, service users or anyone in the organization.

For maintaining and expanding the customer relationships, one may concentrate on CRM system. So, these tools become an essential part of business, but the reality is that CRM is a relatively new development.

Diagram of CRM (Customer Relationship Management) [10]:

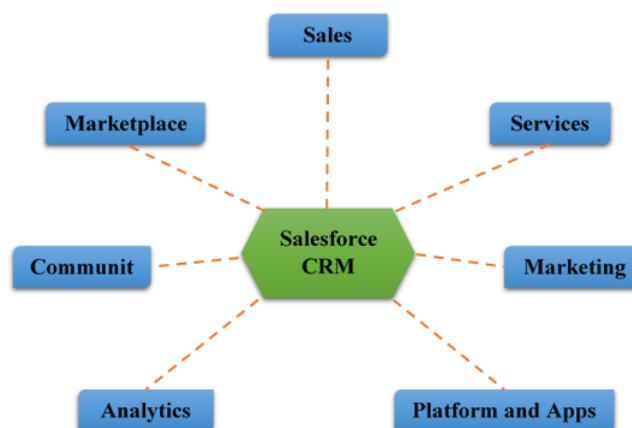


Fig. 1 Salesforce CRM System

1.2. Salesforce and App Architecture:

Salesforce is having one of the complicated architecture, as it is having Multi-Tenant Infrastructure which means multiple users can use the same resources without affecting each other's functionality, independent of each other. It is having a platform provider Force.com, which is the base for the salesforce. For dealing with sales of products and creating the ways(Leads) from multiple things is the Data.com. Salesforce uses Work.com for the social networking engagement as well as the organization of the performance of the system.

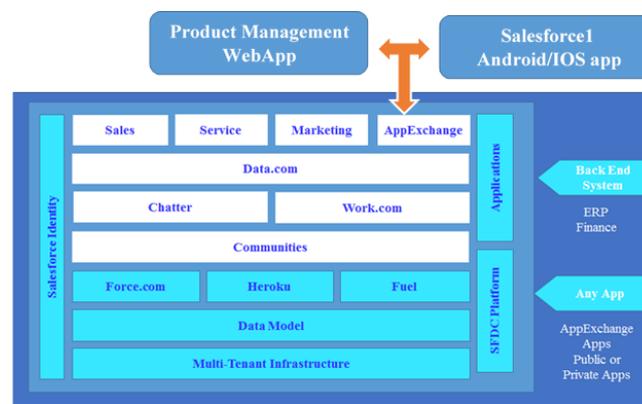


Fig. 2 Salesforce and App Architecture

1.3. Salesforce Terminologies [11]:

1.3.1. Accounts: Most important term in accordance with salesforce. Any association, person, hospitals in healthcare can be an account. Also, it comprises the competitors and partners.

1.3.2. Contacts: Account is just the name; many people are associated with it. The contacts are the live thing with which you can track all the information about accounts. Contacts having all the information i.e. contact number, emails, titles and characters in a deal.

1.3.3. Leads: It is the customer or the organization who is concerned about buying your products. These could be the person from the meetings, visiting's etc.

1.3.4. Opportunities: This is the most probable lead which will probably to convert into deal. Simply it is the favorable chance to sell your products. For tracking the details of the account opportunity is used.

1.3.5. Quote: Where the configuration and the information of the product is stored.

1.3.6. Invoice: It is having Deal and product pricing details.

Basic sales flow contains following steps to sell the product.

Lead Generation: How one can get the contacts where we can sell products? How to on-board these people on our platform? Measure the weights of the leads.

Enhance Lead Data and flow: Define process to convert lead into opportunity? Are there multiple leads related to the same account? How to identify the top players?

Closing Deals: How do you provide the options for selling your products and services?

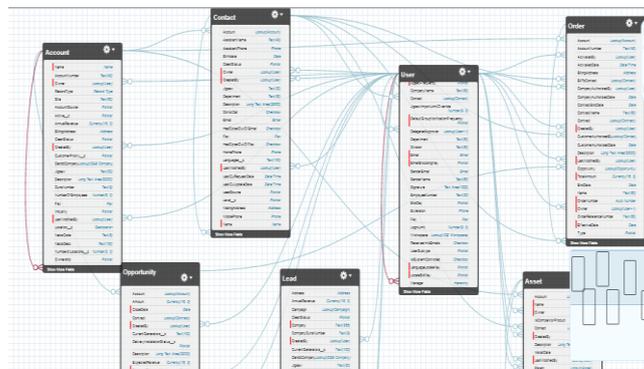


Fig. 3 Object Schema from the System

1.4. Salesforce MVC [12]

Bellow diagram gives the clear idea about the Salesforce Model-View-Controller pattern. Also, shows the specific elements of it.

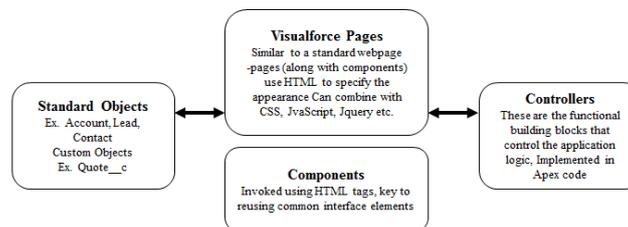


Fig. 4 Salesforce MVC Model

1.4.1. MODEL

In salesforce, the model can be redefined as the objects. Generally, In SFDC there are two types of Objects. 1. Standard Objects 2. Custom Objects. Some of the standard objects are Accounts, Contacts, Opportunities etc. As the purpose of the problem, we

can define our own objects with its definition. It is like data model in MVC systems.

1.4.2. VIEW

For any of the system model, we need the interface i.e. the user interface of the system.

PAGES – In SFDC we always use the term as Pages, which are nothing but the visual force pages. These can be considered as the building block of the user interfaces. In VF pages HTML is used for layout the appearance of the application. Every page created in the cloud has Unique URL just like a normal web page. For obtaining modularity VF components are used which can be directly invoked by simple tags inside your page.

COMPONENTS – There are two kinds of components 1. Standard 2. Custom. You can imagine VF components as the Widgets, that you can easily incorporate into your page. The remarkable significance of these components is the Reusability. Once the component is defined, you can use it in multiple pages. These can also be styled with the CSS and JS.

1.4.3. CONTROLLER

The part where you write your application logic is in Controller. APEX language is used to write the controllers for enforcing business logic and the controlling your pages. As we all know separation of the Business logic and the UI is the main motive of the MVC model. The view layer shouldn't be mixed with the business controller layer. In salesforce, pages interact with the controller through components to send and receive the data as per the user requirements. For viewing, editing, saving the pages, SFDC is having pre-built controllers. You can extend these controllers for additional features over their basic functionalities.

2. LITERATURE SURVEY

“ASAAS: Application Software as a Service for High-Performance Cloud Computing”[1], this research work by Xingshe Zhou gives the different solutions which are usually provided for business. One of them is the Salesforce.com which is used for the accelerating the productivity. With these solutions, Several concentrates on the applications with the highly efficient scientific computing. This team has come up with the solution for the traditional application software. But not for the service oriented software's. Going forward, for the large scale and dynamic users, there are the roadblock of the licenses. In the proposed solution of the ASAAS, writer provided the web-based portal. In this portal, users can be dynamically added which can use the applications over the portal. They integrated the applications with the web services to get the

enhanced user experience. This portal is coming with a pay-per-use scheme, which doesn't have the licensing issue. Easy registration, good job response time, high delivery and the cost are the features of the system. This implementation gave the new way of delivering the software application with better outcomes [2].

“Role of Platform Providers in Service Networks: The Case of Salesforce.com AppExchange” [3], this is the research published by Jorn Altmann and his colleagues. They gave explanation about many innovation studies performed for the finding relation and interaction between the platform provider and users with respect to network science. For cloud like Salesforce, the data are the integral part of the system. These researchers closely worked with the data from the AppExchange and the other resource of the data i.e. Salesforce.com, Also for the enhancing the result they included the network how the services are structured. The literature survey of their paper tells about the Open Innovation which is mostly run in a research oriented companies and the Software Service Provider and Software-as-A-Service, Platform-as-A-Service. Their outcomes have both scholarly and in addition down to earth suggestions. Discoveries are the drivers of the service network studies which are applied to the platform providers. So, the participation of the other parties will increase. The current world of technology, software role of platform giver and the developers (third-party) are detached. Generalizing the roles of the platform provider like Salesforce is a little bit hard for analyzing. The overall benefit of the paper is we got to know the importance of the platform vendors and developers.

Mikio Aoyama presented the “An Extended Orthogonal Variability Model for Metadata-Driven Multitenant Cloud Services”[4] to explain the features of the cloud. The architecture of the multitenant cloud service is one of the important parts. This is used for enabling the multiuser concept using single or limited resources, which give rise to multi-tenancy. The tenants are the different users of the cloud services. In this paper, they have correctly mentioned that for the application development on such cloud we need to generate the applications using the metadata of the web APIs at runtime instead of the direct application development. Many models for the multi-tenancy are used, the researcher tried to give the one of the extended version of it. The method called OVM-Orthogonal-Variability-Model which considers the two-level details of the tenancy. The benefit of the OVM is validated through the application which is developed on force.com. The writer tried to explain the future of this idea is the verification of all types of dependencies with the consistency. Summary of the paper suggests the importance of the multitenancy and the rapid application development in the cloud environment.

Leymann Frank demonstrated in their research “A Self-Service Portal for Service-Based Applications”[5] benefit of the cloud service. They said like in today's enterprises, they are continually seeking to reduce the cost of the IT-Operations. The former approach is to outsource these IT-operations. With the advent of Cloud compu-

ting, the outsourcing of infrastructure, runtime platforms, and even whole applications has greatly facilitated. With the help of these clouds Amazon's EC2 or Salesforce's force.com, customers can select from a set of pre-defined machine images or application, which they can run on a cloud on demand. These clouds allow you to model, offer, configure and automate the flow only in a generic manner. In this paper, researcher given the way of customizing this application and the usefulness of the customization.

Amy Farrow with the help of Steve Greene, who are from salesforce.com published their research "Fast & Predictable - A Lightweight Release Framework Promotes Agility through Rhythm and Flow"[6], Amy Farrow and Steve Greene for enhancing the giant change methodologies. This idea contains the adaptiveness and challenges about the methodologies which are used for the developments. In addition, for a development organization, they are having more than 4 releases per year, so it is important to manage all things related to development and the management. For the part of the solution of this problem, a writer suggested a way which focuses on the development instead of controlling the system. In the business world, it is important to deliver on the time. So, this idea will give the ease to optimize the delivery of the high-quality products. This framework will open doors for the correction, open, easy, lightweight management of the teams. Once your business is stable, then one of the important thing is expansion. As the things go big, the complexity and team size will grow. The researcher suggests that in this disaster also this framework will work. The golden egg of this work is, how to expand your business so that management will become very easy for the all levels of the different hierarchies. And to build easy-controlled and unbending structure. Due to this attitude, it will the flexibility of the overall organization [7].

In paper "Event Management Application using Salesforce.com" [8], the Salesforce based application is made by Romit and his team based on Salesforce. Various developers have proposed the different design for the Event Management, but as per this paper, Salesforce provides a good framework for SaaS and PaaS. They have included the notification and scheduling based on first come first serve. Also, they have added that Event management is a business which requires hard work as well as dynamic nature. They provided an app, which recognized by concepts, plans, methods of organization and effective execution.

In patent numbered 5963953 of United States Patents [9], it is given that the crucial part of the product management system is the product configuration. Per their invention, a method which will enable the sales guys to configure the system which is having the complex configurations. According to this patent, the same method can be used to solve the problem from the many unsatisfied requirements[14-18].

3. METHODOLOGY

In the methodology, system will be useful to the customer/sales representative to help in his work. Focus of the system will be decreasing the time business process and enhancing performance analysis.

Methodology Contains 3 major implementations:

1. Data Loading and setup
2. Automate the flow of sales
3. Performance analysis

3.1. Data Loading and Setup

3.1.1. With the help of salesforce.com create developers account and the organization on the cloud

3.1.2. Loading the hospitals data and product data with the help of Soql Queries and data loader tools

3.2. Automate the Flow of Sales

3.2.1. General Flow of the Product Management [13]:



Fig. 5 Basic Sales Flow

Account Creation: For each hospital record one account and respective contact is created

Lead: Possible account which is interested in buying the product

Opportunity Creation: most favorable lead which is reached for the selling of product

Product config and Quote: The requested product search and the configuration (including pricing)

Approval and Invoice Generation: Invoice generation for the customer

Order placed: order is confirmed and delivery information

3.2.2. Automate the flow

Idea for automating the flow:

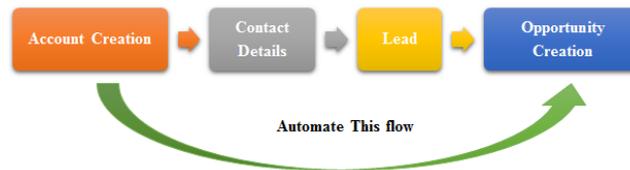


Fig. 6 Flow Automation

Input: Salesforce product management system

Output: Automation as per business logic

Algorithm:

1. Start
2. Check the account and the flag of automation
3. If(flag==automation)
4. {
5. Ask for the primary contact of the account
6. Auto-generate the quote with the record
7. }
8. After approval trigger for the invoice generation
9. End

Explanation:

In the given algorithm as shown, Triggers are created with the help of different object dependency from the salesforce. Also, creating the Visualforce Page and Driving controller for displaying the records and required information.

3.3. Performance Analysis

In any automated system, the main concern is the reliability. For that, we need to track the performance of the system. This is system is the browser based system which can

be accessed from anywhere so one of the measuring task about the performance is to measure the loading and processing time of the visual force pages.

Scripts are made with the help of Selenium Tool which with automatically enters in the system and measures the loading time of the pages. Generally, selenium is used for the testing purpose but we can use it for the measuring the time of the page load.

Input: Web objects from your system

Output: time for processing and loading the pages

Algorithm:

1. Start
2. Reach out to the webElements
3. Call the method `getXpathLocator(obj,HTMLcode)` from selenium ide for locating the elements from the pages
4. Client events.action(sLocator) for the inputs from client side
5. Measure (Action Time - Click Time) for each page.
6. End

This will produce the time chart for loading and processing the request.

4. CONCLUSION

The important motto of this project is to enhance the business process of the enterprise product system. With the help of this methodology we can decrease the time for product ordering system. The paper emphasizes on the automating the system as well as goes beyond it and contribute the increase the efficiency of the business process. The work done in this paper is having potential benefits such as productivity improvements, enhanced customer relationship management and growth of business.

Future work will be automating more and more components with the complex so that system will have less clicks and sales-representative will efficiently use his time for cracking more deals. Moreover, finding different techniques for the automating the flow will be interesting task.

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