

Cloud based Solution for Small and Medium Franchisees

Zainab Mirza, Zaeem Farooqui, Mohit Jain, Anas Karolia

Abstract— Cloud Computing is a leading sector of IT and is attracting the attention of various industries as well as for personal computing. A business that adapts cloud infrastructure has access to various functionalities and advantages that would otherwise either not be available to them or would have to expend a lot of resources and money to avail them. Normally the word Cloud Computing is usually associated with bigger organizations, however with the evolution and advancement in the field of cloud computing, it has become easier to develop and utilise cloud applications and has increased their overall accessibility.

Small to Medium businesses or organisations, particularly those with multiple branches are beginning to adopt cloud technologies or are basing their business models on top of cloud computing as they are realising the benefits that it can bring to their organisation. In this paper, the focus is on Small to Medium sized Franchises (SMFs) that use existing traditional applications for their management and the problems that these applications face. We have proposed a cloud based application for the management of SMFs and show how it will be executed and with the help of research and analysis describe how it will benefit the SMFs, the developers and the cloud providers.

Index Terms—Cloud Computing, Small to Medium Franchises, Traditional Systems, Amazon Web Services, Google charts.

I. INTRODUCTION

Cloud technology is one of the fastest growing sectors of IT and is attracting the attention of various businesses looking to upgrade the way their current method of operation. Many businesses have adopted that approach wherein they either provide their services to clients via cloud, such as IBM providing computational services to banks, or rather just move the management of their daily operations onto a private cloud such as McDonalds. However, the above mentioned companies are relatively big and can afford to spend a large amount of investment on data centers. Smaller businesses do not possess adequate resources to do the same and hence tend to opt for more traditional architectures such as client-server or distributed systems. Some problems that arise due to this are:-

The domestic SMFs has a feature of small scale, limited money, and anxiety to get revenue, adverse

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competitive circumstances. Facing fierce market competition and since traditional technologies are not able to meet the SMFs requirements there are few enterprises beginning to use Software as a Service (SaaS) based SMF technology.

- Usually the traditional systems are sufficient but they suffer limitations in terms of scalability and performance when compared to cloud architecture.

Recently, with the evolution and advancement in the field of CC, the technology has become more accessible to everyone. SMFs are beginning to adopt the usage of cloud technologies either for storage or by using applications hosted on a cloud architecture etc.

- A business franchise has a number of branches that all operate in remote locations. If they use traditional client-server architecture, it has a limited amount of resources.
- When the franchise expands and opens new branches the resources will at one point become insufficient and a new expensive server would have to be procured to ensure the business operations aren't disrupted.
- Instead, if we use cloud architecture then in such a case the cloud provider gives the additional resources as per requirement and is relatively cheaper.
- That way CC can be integrated into the running of a business such as a franchise or retail chain is through the means of an online application that is similar to a desktop application but is hosted on a cloud environment rather than a simple server like a website.
- What this means is that smaller businesses that normally couldn't afford enterprise-level hardware can now have access to such technology and tools that enable them to operate their business more effectively.

Compass Intelligence[1] forecasts a compound annual growth rate of 40% from 2011 to 2016. The largest opportunity lies within data services, cloud solutions, applications/software, and professional/managed services. Fig. 1 provides an overview of the Compass Intelligence forecast.

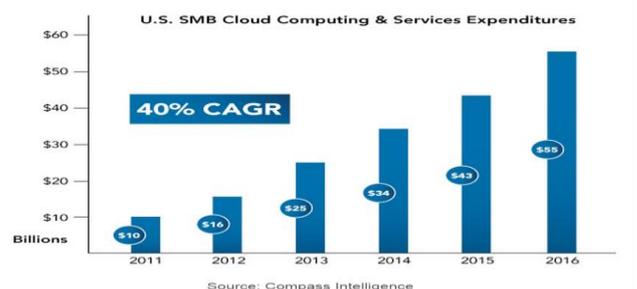


Fig. 1: Comparison of SMBs adopting Cloud.[2]

The application we have proposed, Franch Cloud, is a public cloud based solution for the management of business franchises that avails all the advantages of cloud computing and provides them at a relatively cheap cost. It uses a multi-tenant model and will provide services to multiple SMFs. Various tools for the inventory management, transaction processing, staff management, data visualization and analysis are provided to run the franchisees efficiently. Reporting and Notice circulation are also provided for effective management of the overall franchise.

II. EXISTING SYSTEMS

1. Traditional System and its limitations

OfficeBooks[3] is an existing web based business management application optimized for distributors and manufacturing. The features of OfficeBooks are Inventory Control, Sales and quotes, Purchase orders, Online Payment, Instant Communication, Order Tracing, etc. Limitations of this application are Scalability, Fault-Tolerance, Flexibility, Availability, etc. The limitations mentioned above are due to the developed model they are using. OfficeBooks is a web based application which runs on client-server model. In client server model as the data is not distributed it is not fault tolerant, if the servers stop working due to some failure then there will be availability issues for the application. Since a single server has limitations on the number of users that can work concurrently, hence it has poor scalability.

2. Existing Cloud Application and its limitations

The Waterfall FMS[4] is a SaaS application that enables franchises of all sizes to consolidate digital assets, communication, and business intelligence analytics within a single franchise management system. Developed primarily with Ruby on Rails, Waterfall Software’s franchise software offers a comprehensive, turn-key franchise technology solution. It enables the creation and distribution of franchise websites and intranets as well as full dashboard-based business intelligence analytics. Features include Content Management System, CRM, Intranet, Integration, etc. It reduces operating expenses and also provides greater insights into franchise operations and also increases management efficiency.

The Waterfall Software aims at increasing the efficiency of already running organisational franchises. While it can be used by small-scale business franchises, they are not their dedicated audience. It is more of a general management platform which provides only generic functionalities. The system we have proposed has more dedicated domain-specific services. It also does not provided tools for performing the daily transactional operations.

Table 1: Comparison of Traditional and Cloud Infrastructure

Feature	Traditional IT infrastructure	Cloud computing
Resilience and Elasticity	Limited capacity and are susceptible to downtime.	Data is distributed across multiple servers, thus providing high resilience and elastic storage.
Flexibility	Less flexibility.	Virtual space on an on-demand, as-needed basis, thus providing higher flexibility.
Performance	Spikes in traffic to those websites can mean decreased performance.	The load is balanced across a cluster of multiple servers, thus spikes in traffic can be managed.
Availability	Availability or uptime is lesser.	Due to virtualization and distribution of resources, availability is high.
Scalability	Additional server space to add to your storage space and processing power. If traffic falls again, you will be paying for resources that you aren’t using.	Customers don’t need to pay for up front for extra storage or processing capacity that they don’t use.
Security	Organization itself has to deal with security issues.	Provided by mainly Cloud provider or third party Security and Service provider.
Running Costs	Less cost effective.	More cost effective.

III. PROPOSED SYSTEM

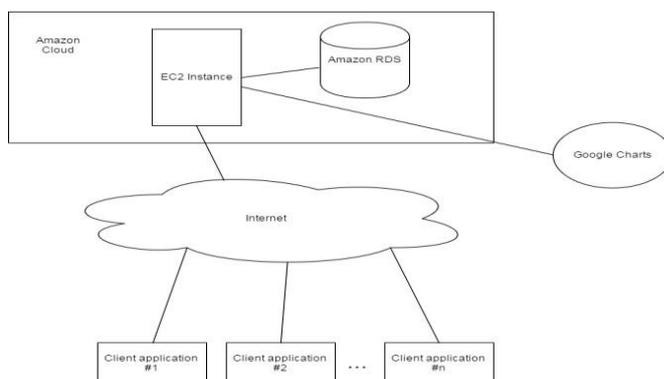


Fig.2: Application Architecture

Franch cloud application provides small and growing franchises a centralized system to manage their franchisees. Clients are provided with tools for transaction processing, inventory, staff management. Tools for data visualization and analysis are also provided and they allow us to compare the performance of the franchisees and thus help in making better business decisions.

The application is hosted on an EC2 Instance on the Amazon Cloud, as shown in Fig.2. The client will access the application through a browser such as Google Chrome or Mozilla Firefox. The data from the application is stored in Amazon RDS on Amazon Cloud. The EC2 Instance communicates with the RDS as well as with the Google Charts tool provided by Google for visualization purposes.

1. Authentication and Authorization

The System allows user to log in with the franchise account, which is available to all of the staff. After that the user has to log in with their specific franchisee account which is available to the staff of that specific franchisee or the franchisor logs in with their franchisor account. The user is then redirected according to the designation of the account. Authorization is based on designation of the user using Role Based Access Control.

2. Transaction

After user is authenticated, the system displays a form for transaction. It is a form with pre-specified products or services with pre-defined prices. Once the final receipt is generated, it is then put into a standard format and then forwarded to the printer for printing.

3. Inventory and Staff management

The system maintains records for inventory and staff. This data can be retrieved when requested for and be display. The designated users are allowed to add, delete and modify the records. The system allows the stored data to be used for generation of graphs charts and other form of visualization.

4. Data Visualization

Options for various visualization techniques such as graphs and charts are available and then records are given as input for parameters. For analysis purpose, data mining is used over the desired records to give the results.

5. Reports and Circulars

The reports are generated automatically at regular intervals such as daily or weekly and then sent to the franchisor. The franchisor has a tab with reports from all the franchisees.

IV. TECHNOLOGIES USED

1. Amazon EC2

Amazon EC2[5] presents a true virtual computing environment, allowing you to use web service interfaces to launch instances with a variety of operating systems, load them with your custom application environment, manage your network's access permissions, and run your image using as many or few systems as you desire. We are using one year free subscription of Amazon EC2 instance which is provided by AWS for first time registration. We are also using Elastic IP address for static IP address. Fig.3 shows the dashboard of our Amazon web services (AWS) account which shows the running instances along with volumes, Elastic groups and many other features.

2. Amazon RDS

Amazon also provides Amazon Relational Database Service (Amazon RDS), which has 8 GB of storage in free-tier subscription time. Amazon Relational Database Service (Amazon RDS)[6] is a web service that makes it easier to set up, operate, and scale a relational database in the cloud. It provides cost-efficient, resizable capacity for an industry-standard relational database and manages common database administration tasks. We can also increase the space of Amazon RDS as per the requirements.

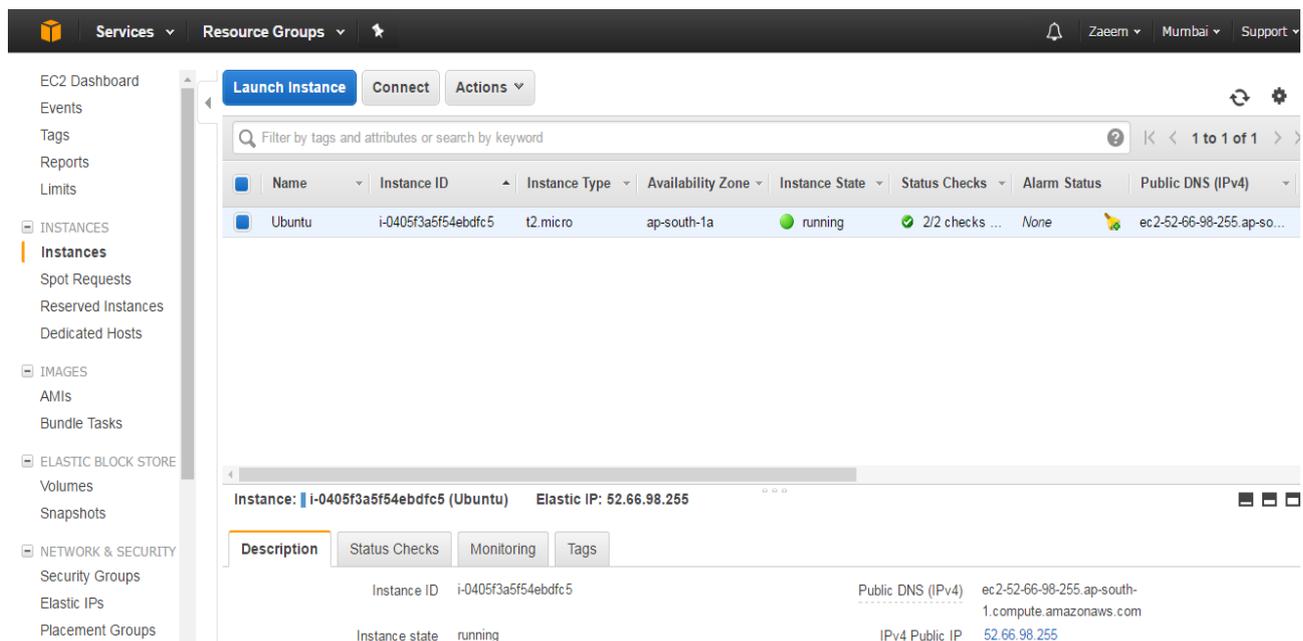


Fig.3: AWS Dashboard

VI. ADVANTAGES OF CLOUD BASED SMF SOLUTION

1. As Franch Cloud is hosted on cloud architecture, the cloud provider provides automated scalability as per the requirement.
2. Low initial investment as commodity hardware is required to run.
3. Cheap cost for franchisees as it is pay per use model.
4. EC2 instances are used as servers, thus the application has high availability (Amazon Web Services EC2 instance SLA claims 99.95% availability) [9].
5. Application provides Data Visualization such as Pie Chart, Histogram, Scatter plot, etc. which will help users to analyze data easily.
6. No external hardware acquisition required for expanding as application.
7. Fault-Tolerance of the application is very high.
8. Application developer's profits are increased by using pay-per use model.

VII. FUTURE SCOPE

- An additional add-on for transaction processing that can be downloaded locally and used in absence of an internet connection.
- A single webpage online for advertisement of the franchise.
- More domain specific functions such as make combo meals for fast food chains etc.

VI. CONCLUSION

Franch Cloud is a cloud application makes an effort to increase the productivity of SMFs by providing centralized storage, Data visualization, Transaction processing, Analysis of sales, Staff management, and Inventory management. Centralized storage will help the franchisee to store data in an efficient and organized manner, so they don't have to use file system which are not very efficient. Staff and Inventory management helps franchisee to manage their Stocks and Staff which helps to keep up-to-date information in products and staff. Implementation of above modules increases the efficiency of the franchisee and franchise as well.

Franch Cloud also visualizes sales data, Product data, Inventory data; staff data which increases customer readability and also makes the application user friendly.

Another highlight of the application is that it extracts knowledge from to find useful insights which will helps franchisee to make better business decision.

In addition, Franch Cloud offline version could also be developed which work similar to online version in case of internet unavailability. As soon as internet is available the offline application will get sync to online application which will maintain consistency.

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