

Cloud Based Apartment Management System

By:- Anurag Roy, Ajinkya Kulkarni, Anindya Gangakhedkar, Mayuresh Amdekar

MIT College of Engineering, Pune

Abstract:

This paper presents the possible approaches to manage an Apartment by a system deployed on cloud. Apartment Management system is a emerging trend in online computing applications. Increase in population coupled with high metropolitan migration has lead to a tremendous expansion in the number of housing complexes. The age old methods of managing these apartments are not able to meet the tremendous demand and sizes of the societies. It is necessary to facilitate the management of these societies on an online cloud based user friendly platform. Software coupled with reliable hardware allows developers to create multitenant applications with relative ease. These applications are able to support millions of users without any maintenance from the developer.

1. Literature Survey:

1.1 Introduction to Apartment Management System

Apartment management system is a computer based system which is used to monitor the various activities of a regular residential metropolitan society. The concept of apartment management system has arisen from the fact that various large societies need monitoring and maintenance for their various day to day activities.

In a normal residential society the day to day chores include maintenance of the society, plumbing, parking allocations, waste management, security facilities ,tracking dues, inventory management etc. these activities individually are very tedious and long processes. They require the

co-ordination between the respective management societies coupled with the vendors which provide these services so that the appropriate convenience can be provided. Apartment management is the operation, control, and oversight of real estate as used in its most broad terms[1].

1.2 Types of Apartment Management systems

- AMS on local server:
 - In this type, the system is implemented and deployed on a local server existing in the apartment complex itself.
 - These systems can be handled by only the apartment manager, they are normally difficult to use and even more difficult to implement

because of various needs of different societies[2].

- AMS on a website:
 - In this type the AMS is based on a website server. This type is based on a website and needs a internet connection[2].
 - The system has various usernames and specifies the hierarchies for the system. Each hierarchy has access to only a limited set of tasks.
 - The main problem with this system is that even though it is on a website, the application needs to edited as per the needs of the society. This proves to be a expensive and tedious task.

- AMS on Cloud:
 - This is the latest way to implement AMS. It provides all the features of the above type with the additional feature of a multitenant cloud platform.
 - Multi-tenancy allows a developer to develop a single app and cater it to various needs of different societies.
 - Another major plus point about cloud is that it is very economically efficient and there is no down time on the system. The individual user

is thus able to use only the features he needs at a economic and maintenance free system.

The data of the system is automatically backed up by the cloud platform provider, hence the data is always secure.

2. Aspects of AMS

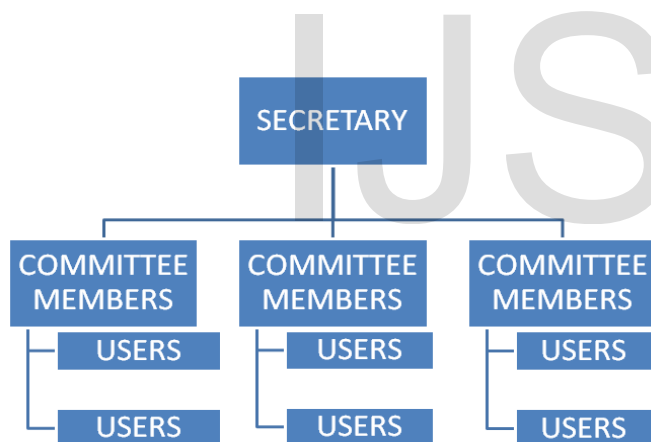
Over the years AMS has evolved as a science and now involves a vast range of features. The living environment laboratory in Japan has conducted a survey and had identified certain set of basic parameters required for AMS.

The various sub systems in apartment management system are:

- **Member List:**
 - Apartment management system allows every member of the in the apartment to create a unique identify on the AMS.
 - Each user has a username which specifies his/her hierarchy based on his role in the management of the apartment complex.
 - Each member will have a unique profile which will allow him to raise complaints, and track his problems and raise them to the appropriate persons in-charge.

- **Role based Access**

- In every apartment society there is a committee administering the needs of the society.
- Everyone in the committee has individual roles and handle different responsibilities in the apartment
- AMS provides all the features with the help of username. Each user can be thus can be given access to only things he is concerned with in the appointment.



- **Maintenance and accounting Dues:**

- Scheduling jobs, assigning personnel, reserving materials, recording costs, and tracking relevant information such as the cause of the problem (if any), downtime involved (if any), and recommendations for future action. Typically, the CMMS schedules preventive maintenance automatically based

on maintenance plans and/or meter readings. Different software packages use different techniques for reporting when a job should be performed[3].

- **Issues and complaints tracker:**

- AMS gives a provision for tracking the issues and complaints of the residents and tries to automate the process of solving these issues.
- Complaints can be lodged into the system by the users with the help of their respective accounts. The system then tries to come up with an optimised solution in order to solve the particular issue.
- The priorities are assigned to the issues and complaints lodged by the users. According to the priority of the issue and the position of the user, the system gives a solution to the problem.

- **Stores and inventory management:**

- Every residential society has an inventory of basic items required for the various activities. These items include the basic tools like ladders, gardening equipments etc.
- AMS gives a provision for tracking and management of this inventory in order to

prevent the mismanagement involving the same.

- It includes the updates regarding the count of various items on check-ins and check-outs.

- **Legal advice**

- In a working residential complex, there can be legal issues that require an expert legal advice so that they are resolved peacefully.

- AMS keeps a list of legal advisors which specialize in particular types of issues. The list consists of contact info and past record of the legal advisor.

- The users of the AMS can use this list in order to communicate with required advisors according to their needs.

- **E-Accounting:**

- E-accounting or online accounting, is the application of online and Internet technologies to the business accounting function. Similar to e-mail being an electronic version of traditional mail, e-accounting is "electronic enablement" of lawful accounting and traceable accounting processes which were traditionally manual and paper-based.

- E-accounting involves performing regular accounting functions, accounting research and

the accounting training and education through various computer based /internet based accounting tools such as digital tool kits, various internet resources, international web-based materials, institute and company databases which are internet based, web links, internet based accounting software and electronic financial spreadsheet tools to provide efficient decision making.

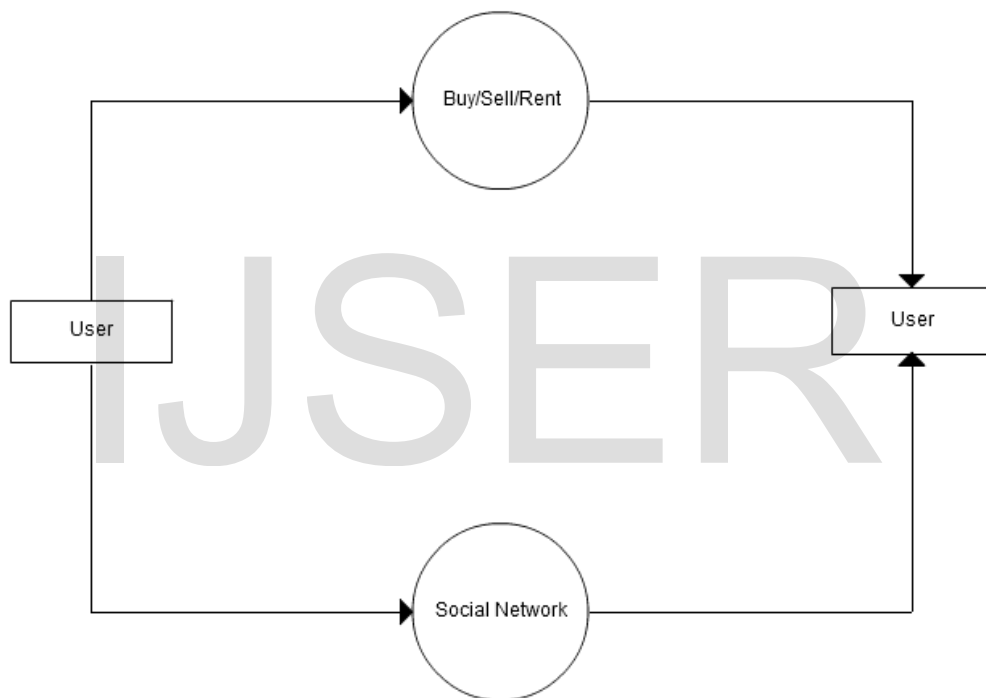
- Online accounting through a web application is typically based on a simple monthly charge and zero-administration approach to help businesses concentrate on core activities and avoid the hidden costs associated with traditional accounting software such as installation, upgrades, exchanging data files, backup and disaster recovery.

- E-accounting does not have a standard definition but merely refers to the changes in accounting due to computing and networking technologies. Most e-accounting services are offered as SaaS: 'software as a service', i.e. as a cloud service.

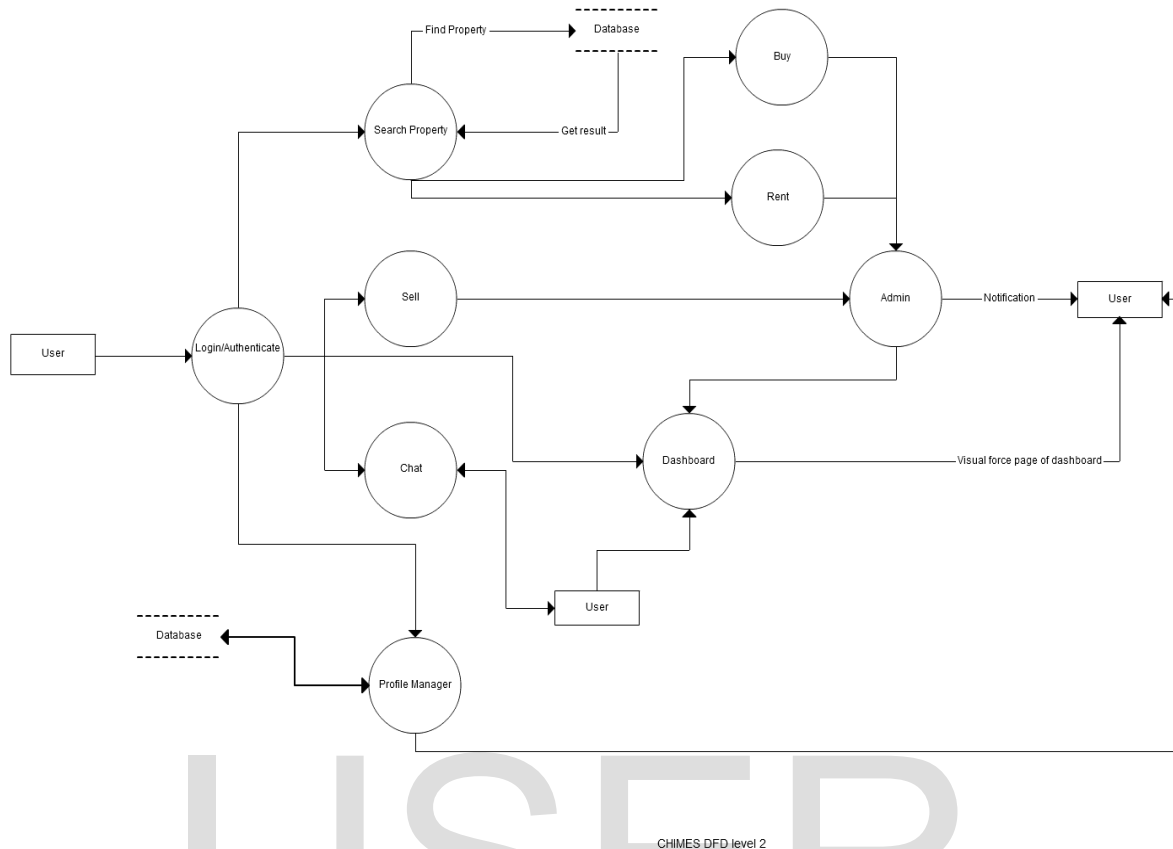
3. Data Flow Diagrams



CHIMES DFD Level 0



CHIMES DFD Level 1



4. Automation

The major advantage of AMS over the old methods of managing the society on paper by humans is that a high level of automation can be introduced which not only reduces risks of errors but also helps solve all the problems in an unbiased manner based on an algorithm.

Automation can be useful for the following aspects of the AMS:

- **Parking Management:** With the increasing number of vehicles that every resident has now a days it is very difficult for the society to allocate

or accommodate parking space for all the residents. Using AMS a systematic approach can be followed which would allocate parking to the users on the basis of an algorithm designed on following rules:

- A Resident can have only a single parking slot given by the builder.
- If in case the resident does not make use of the parking space allocated to him/her then he can rent/sell the space to some other user which would be updated on the system automatically.

- Depending on the available slots and total slots allotted the system would run the algorithm recursively to be able to cater to the parking allotment request of a user.
- Maintenance Requesting/Solving
 - Maintenance can be classified as personal apartment maintenance or general society maintenance.
 - The user can request for a maintenance to the system which then using an algorithm would automatically find out the correct vendor to contact to for the particular problem making use of the previous records or update the database if it's a new complain.
- Auditing of inventory and finance
 - Inventory and finance management can be done easily by just creating workflows which keep a track of every inflow and outflow of

material belonging to the society and finance.

Conclusion and Future Scope

In this paper we highlighted the need for Apartment Management system and the advantage of having it on cloud. Due to population growth and metropolitan migration the age old paper based techniques need to be replaced by modern computerized applications. AMS provides a Buy/Sell/Rent portal for users to browse through various apartment complexes[4]. AMS as an application has greatly modified the normal client server architecture with cloud based architecture which is scalable to any number of users and greatly reduces hardware requirements. For the future work we would make the system integrated with finance handling softwares like TALLY, etc.

ACKNOWLEDGMENT

The authors wish to thank Prof Bharati Ainapure, Mr. Ananta Shamal and Mr. Bysani Sheshaphani for their support and guidance.

References

- [1] System architecture and interface for an apartment management system- Higuma, T., Living Environ. Syst. Lab., Mitsubishi Electr. Corp., Kanagawa Inoue, M. ; Nanjo, K. ; Suzuki, S. ; Kobayashi, T. IEEE

Transactions on Consumer Electronics Volume
40 Issue 3 page 111-117

[2] Property management system wiki-
http://en.wikipedia.org/wiki/Property_management_system

[3] Facility management system wiki-
http://en.wikipedia.org/wiki/Facility_management

[4] Cloud Computing: Issues and Challenges-
Digital Ecosyst. & Bus. Intell. Inst., Curtin
Univ. of Technol., Perth, WA, Australia

IJSER