ATMIYA UNIVERSITY

DESIGNING DATA CENTRE FOR PROVIDING SERVICES TO SMALL INDUSTRIAL AREA

A
Thesis
Submitted to the
Atmiya University,
For the Degree
of

Doctor of Philosophy

in

Computer Science

by

Rayjada Hardiksinh Hardevsinh

Enrolment No. 190881002

Under the Guidance of

Dr. Parag Shukla

Department of Computer Science

ATMIYA UNIVERSITY,

Yogidham Gurukul, Kalawad Road,

Rajkot–360005, Gujarat (India)

September, 2022

Summary

Introduction

The Cloud Data Center it's not a Data Center or Server room, Cloud is a Third-party services provider that provides servers for rent via the Internet it's called a cloud. The data centre it's a typical server room, anyone can deploy as per requirement. There are numerous factors to consider when deciding on the knowledge of a data centre. Data centre design is the process of improvement of modeling and planning a data centre's Information Technology properties architectural arrangement and perfect arrangement. It allows the logical idea of a data centre preceding to increase or employment in an organization or IT background.

I was identified at an early stage in the Small and Medium industry to use on-premises server rooms or also use a Cloud Data centre. In both scenarios Small and medium enterprise businesses can't afford it. In this research, I have comparative services displayed in some data centre. Server room and Data centre working functionality same as like required power, cooling, cabling, and technical maintenance and management. Additionally, mission-critical applications require 24x7x365 support. I compare cloud data center and local server room costs estimated in this research the Small and MSME are using the data center facelift at a cost-effective rate.

Chapter 1 - Introduction to Data Centre

The term data center is a physical space, a facility that contains computer systems and related components. They can include power supply, backup services that provide redundancy, or communication equipment. The objective of the study and requirement of re-thinking of data centre services. Statement of the problems GIDC Lodhika Industrial Association-GLIA METODA Industrial area Rajkot has more than a thousand Industrial units. Using services to Data Center facility. Today the technology trends require ICT day by day. Our limitation for this research is the Practical Deployment of data center. In this research, the advantage is medium small users are using this facility and also new jobs and businesses are developing. The Data centre may be a difficult area for the investor, here so many researchers have rethought a data center design to cost-effective and zero latency services.

Chapter 2 - Literature Review

Introduces a literature review and studied current research on data center-related work. Numerous research work has done and is still rethinking data center design and

architecture. Various researcher has done work around the green energy data center, challenges. If we talk about rethinking data center design then it is required for data center services, hardware and maintenance cost, and energy cost. The data center also consumes more energy than air conditioning. The major research work is on green energy and energy-sufficient data center design and some research work is on network architects in the data center. Every data center service is required today all the digitization is online.

Chapter 3 - Understanding of Different Types of Data Centre

Provides brief information about the current working data center in India. Here we understand the current work data center characteristics. And also an online study of the Indian data center functionality. Different types of data centers are there and their working functionality same but services are different. The generally maximum accepted standard for data centre design and infrastructure there are two types of organizations providing the certification standard, one is ANSI (American National Standards Institute)/TIA-942 and the second is Uptime Institute. IaaS, PaaS, and SaaS are the three most popular types of cloud service offerings. (They are sometimes referred to as cloud service models or cloud computing service models.)

Chapter 4 – Survey and Problem Identified for GIDC (Lodhika) Industrial Association

Extend my performance studies from an online survey and currently need or requirement of data centre services, and also visit one-to-one industries Units and data centre working functionality. GIDC (Lodhika) Industrial Association Represents Lodhika GIDC Estate, spread over 424 Hector close to state Highway Number 23 & at the distance of 12 Km. from Rajkot city, the 4th biggest city in the state of Gujarat. Visit Guj Info Petro Ltd is a Government of Gujarat Undertaking pioneer in satisfying the state's energy needs and has risen to the technical development software and colocation data centre. On dated 23rd April 2022 Online Visit to the data centre of Sheelafoam ltd is Noida based Polyurethane foam-based company last 1971. It is a sub-branch company STAQO world Pvt. Ltd. its IT solution provider company its software as well as cloud data centre solution providers worldwide. Sheela foam Data centre Noida visited online virtually. The Centre of Excellence is the Central facility for the metoda Industrial association to provide all activities, meetings, and rules and regulations are

discussed and applied to this centre. This centre is also provided to display facility for industries production items and provide training to an employee for skilled. If the data centre is deployed to her so all industries are trusted for security and agree. Visit metoda industries who is currently using an on-premises data centre, and online survey for understanding the user's actual need. I propose the name on town. The town is bigger the village and smaller than a city but its facility are all required for local users.

Chapter 5 – Design Proposed Town Data Centre for Small Industrial Area

IT Data Centres are a huge investment and most midsize companies need to set up their own data centers to run their business operations. Building new data centres is a time-consuming effort needing millions of dollars and months of planning. Companies cannot afford to make a wrong decision when designing and setting up a new data centre as these need to build for a life of around 20 years.

Designs a proposed town data centre to provide services to small industries. I also show that in reality data centre design is performance and cost-effectively. This chapter five are included the proposed design data centre. Site selection criteria, city climate change, local government support, infrastructure design, and planning. Rack sizing and calculation space, active passive ICT types of equipment requirement, power supply calculation for a total load of data center and design. Server configuration with model and his power retirement with size. Green energy power supply, air conditioning calculation, and proposed design. Virtualization network design and planning. Data centre is virtually and physical security. Software and certificate requirement. Tier one architect and total cost and revenues of the town data centre.

Chapter 6 – Recommendation Machine Learning Model for Data Centre Design

Machine learning and recommendation algorithm are used to propose town data centre statistical data analysis and propose prediction. Choosing the right machine learning algorithm depends on data and the requirement of prediction of output. Here I use a recommendation algorithm. And supervised and unsupervised machine learning model use separately and in hybrid modes.

We are predicting the data in different five machine learning models for the correct prediction of the data. This model is also mostly preferable for any new item-based prediction. K-means clustering, cosine similarity, vector space model, matrix

factorization, collaborative, content-Based recommender systems. The prediction is up to 80 to 90 percent for recommending to users our town data centre facility.

Chapter 7 - Conclusion and Future Scope for Extension of Research Work

Conclusion and future expansion of the research work. The town data centre it's getting basic services and functionality to the current data centre to create a proposed design data centre for real-time requirements for small and medium industries or other users. The proposed town data center is a combination of getting references or upgrading design for past and present data center designs.

Conclusion

Today and future technology are more advanced and also Ai enables 5G internet speed if rethink design data centre as per upcoming technology then the cost and services are reliable to current technology. All users in small and medium industries are using cost-effective data centre services. The Indian government also initiated 2019 after covid situation to make data Center Park

Cloud Services are reliable when we use Online Applications for Publically uses, so when users are increased the server auto-scale up or down. The industry has limited users and when the users are fixed no need to require an auto-scale up or down the load is the same in 365 days. Cloud Service providers use SaaS online bases but Town Data Center also deployed the same concept and users manage on-demand services locally based.

Server room references are used for on-premises but it is modified to the nearest industries. Typical or enterprise data centre are given to Fibre or wireless connection. Cloud data center refers to online services subscribed by users. A hybrid is also a combination server room and cloud data center. So its common solution is a town data centre design. Edge data centre and micro are also similar to hybrid combination data centre but both functionalities are different when I combine the same functionality in the town data centre.