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DATABASE MANAGEMENT SYSTEMS

Database Management Systems - To-Rent Estate Agents

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Abstract

To-Rent is a real estate agency that helps potential customers to rent houses or apartments in different regional areas.

We are proposing a cloud-based solution using a DBMS server with SQL Server hosted in Amazon Web Services. This will guarantee scalability in different regional locations.

From our investigations of the current infrastructure, we believe that the DBMS server will allow To-Rent Estates to scale faster. A database management system is an assembly of data and a set of programs for accessing this data.

Introduction

As a major part of the United Kingdom economy, the real estate market includes buying, selling, renting or performing real estates activities on a contract basis (Statista, 2020). Due to the type of activity they perform and the high number of data they process on a daily basis, the real estate agents should be using a database system in order to access and process details in a timely manner.

From our investigations of the current infrastructure, we believe that the database management system (DBMS) server will allow To-Rent Estates to scale faster. A database management system is an assembly of data and a set of programs for accessing this data. This is a predefined data collection meaning and is therefore a database. Data collection, commonly referred to as a database, contains information relevant to a company. The main objective of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient (C.J. Date 2000).

We believe that the SQL Server will allow a very high degree of flexibility considering To-Rent Estates requirements. This is because SQL is a programming language designed to manage the data of the relational database management system. A database server is a program that provides database services to other computers or programs. So an SQL server is a database server that implements Structured Query Language (Thankur, n.d.)

The implementation is going to be hosted on the biggest cloud provider currently available, Amazon Web Services (Dignan, 2020). Amazon Web Services is a very large and complete cloud platform that offers many complete data center services globally. Many customers, including very large companies such as Siemens, Expedia or Airbnb, use Amazon Web Services to innovate faster and have fewer costs (Amazon, 2020).

Other cloud providers were considered (such as Microsoft Azure and Google Cloud) but we believe that Amazon has the most datacenter across the world.

Proposed Database scheme

As seen in Table 1.1 below, to each geographical region it was given a unique ID - no foreign keys could be seen in the regions table. As a result, a great deal of flexibility is offered as new regions can be created at any time.

regionId	regionName
1	Scotland
2	Wales
3	North West
4	Greater London

Table 1.1 List of geographical regions

Table 1.2 presents a list of cities located in each region. Here, it can be noticed that the region is referenced by the Id which was given at the previous step.

In order to have a correct table, a value should be added into each field (no null or empty fields).

cityId	cityName	regionId
1	Edinburgh	1
2	Cardiff	2
3	Liverpool	3
4	London	4

Table 1.2 List of cities by geographical regions

In table 1.3 below, various details about each branch could be found. It can be noticed that there is no city name. However, a cityId which links back to the previous table could be found.

This proves to be a scalable solution as numerous cities and regions could be created every time the business grows and need to add new branch locations to their portfolio.

branchNo	branchName	branchAddress	cityId	postcode	telNo
1	Princes Street	20 Princes Street	1	EH2 2AS	07845638973
2	Neville Street	24 Neville Street	2	CF10 1AB	076584930987
3	George Street	17 George Street	3	L3 5PS	075638297409
4	Bow Street	2 Bow Street	4	E3 2SD	07657294056

Table 1.3 List of branch details

Each branch will be referenced by customers, owners, and leases. This will allow an owner to have multiple clients and leases at the same time. Owner, client and lease tables are shown below.

Table 1.4 contains basic information about ‘Owner’ user type.

ownerID	ownerName	ownerAddress	ownerPostcode	telephoneNumber	owneremail
1	Christian	543 Lea Bridge Road	N22 5HT	0754638109	christ.cft89@hotmail.com
2	Mike	45 Gresham Street	J54 7BT	0758693285	mike.roun8@hotmail.com
3	Jennifer	36 Flin Street	R45 8GR	0746386954783	jennifer.fer90@gmail.com
4	Monika	2 Pancras Street	T54 9 BR	0765849566079	monika.onila@gmail.com

Table 1.4 List of owners

clientId	clientName	email	preAccType	maxRent	staffID	branchNo	telephoneNumber
1	Natalia	natalia.nt90@gmail.com	flat	1000	1	1	01234567890
2	Chris	chris.chr45@gmail.com	flat	980	2	2	01234567891
3	Marco	marco.rco4@gmail.com	house	1300	3	3	01234567897
4	Ella	ella.fav67@gmail.com	house	1450	4	4	04234567897

Table 1.5 List of prospective clients

In the client table (see Table 1.5) above, we have four clients and more information about the type of property, expected rent value as well as their contact details and in which branch they are registered.

The lease table (Table 1.6) holds information about the client, owner, property - all referenced by their unique ID - as well as the deposit status and start/end date of the lease.

	leaseNumber	clientId	ownerID	propertyID	methodofpay	depositPaidStatus	startDate	endDate
1	1	1	1	1	card	yes	3/4/20	3/4/21
2	2	2	2	2	paypal	no	6/6/19	3/4/22
3	3	3	3	3	card	no	1/1/21	1/1/22
4	4	4	4	4	card	yes	5/6/20	8/6/22

Table 1.6 List of lease details

Notice that the start date and end date are of SQL type Date, this allows for various data manipulation operations. For example, we could calculate the expiry date of each lease or we could find which leases have the deposit paid, as shown below:

`select * from lease where depositPaidStatus = 'Yes'`

	leaseNumber	clientId	ownerID	propertyID	methodofpay	depositPaidStatus	startDate	endDate
	1	1	1	1	card	yes	3/4/20	3/4/21
	4	4	4	4	card	yes	5/6/20	8/6/22

Table 1.7 Lease information with calculations performed

As displayed above the tables offer great flexibility and more columns can easily be added to the scheme as the company grows and requirements change.

Advantages of the proposed solution

Using an SQL Server, will provide various advantages (quick start 2020) to the estate agents as:

- Simplified installation - a guided installation is provided and prerequisite updates are automatically downloaded from the installer. The difficulty of installing the software is minimal due to the automatic installation of updates. The database and analytical services can be installed separately afterwards and the maintenance costs are reduced, thanks to the automatic installation.
- Better security features - an SQL server uses policy-based administration to detect non-compliant security policies. With this function only authorized personnel can have access to the database. Security audits and events can be automatically written to the log files.
- Enhanced performance - The MS SQL server has a function of transport compression and encryption of integrating data. Users should not modify data encryption programs. The MS SQL server has access control combined with efficient authorization management tools. In addition, it offers optimized performance when it comes to data collection.
- Lower cost of ownership - SQL Server includes valid data management and data extraction tools along with disk partitioning. The ideal maintenance of a server can be guaranteed by following effective data management practices. These practices also help ensure the availability and retrieval of data.

As mentioned above, there are many advantages provided by an SQL server however, its disadvantages should also be discussed. Although an SQL server provides a low cost of ownership, due to its vigorous technology, it results in a high acquisition cost for their users (Techwalla, n.d.). In this situation, probably smaller companies will have to use alternative options but considering To-Rent's targets and their successful growth, this should not be an impediment in hosting the SQL server solution.

Benefits of Amazon Web Services

The implementation is going to be hosted on the biggest cloud provider currently available, Amazon Web Services.

The various benefits of Amazon Web Services (Impiger Technologies, 2019) include the following:

1. **Comprehensiveness:** switching from on-site inventory to the cloud could be done very easily with Amazon Web Services (AWS) due to the contribution they have made to training and education. The cloud control panel provides a wealth of information on their website, including documentation and videos with instructions for starting AWS and their different structure.
2. **Cost-Effective:** AWS offers very low prices compared to other local service costs. It could be used by start-ups as well as very large corporations.
3. **Adaptable:** whether it is used when moving for the first time to the cloud or moving to another service platform, AWS has all the resources needed to improve an IT environment. Their model helps to scale or reduce resources, which means that a company does not have to face any worry when the volume is an issue or when needs continue to vary. Furthermore, there is no need to make assumptions or invest in any scientific investigation to recognize the requirement of a framework. Automatic scaling can be used to formulate an appropriate automatic monitoring framework based on the actual requirement and on the traffic/resources used. Amazon Machine Images allow clones in many areas for different situations in minutes; eliminating the need to review installation steps each time.
4. **Security:** protecting the business from potential information leakage and hacking risks is extremely important to AWS. They have some well-perceived claims of compliance and comply with safety laws around the world. AWS has produced a safe, world-class, both physical and practical environment. The following are some of the security efforts features mentioned on the Amazon Web Services website:
 - Different geographic neighborhoods and availability areas allow you to stay flexible even with most modes of damage; including system failures or natural disasters.
 - Take advantage of Identity and Access Management (IAM) and CloudTrail to track all the activities of various customers.

- The server centers have staff 24 hours a day, 7 days a week, with a trained security team and access is carefully approved with the premise of minimum privileges.
- Possibility to design integrated firewall rules from absolutely open to totally private or, in some cases, somewhere in the middle to control access to what is needed.

5. **Improved productivity:** the availability of Amazon Web Services to support cloud computing shows the obligations and dangers related to the content of the internal IT framework. It also reduces the requirements for IT support staff and saves the organization's time and expenses in the long run

6. **Innovation:** many experts say that their competitive prices as well as their commitment to innovation, resulted in having major corporate brands as customers. Amazon Web Services may have competitors like Microsoft and Google in terms of pricing, but when it comes to dedication and innovation, there is no other cloud service provider that can compete effectively with Amazon's web services.

7. **Global Leader:** AWS has an extensive network in many countries around the world and supports more than one million customers. Amazon Web Services is providing services to the private sector as well as the public one. As organizations continue to move to the cloud, alternatives to cloud-based services continue to multiply. However, only a number of options meet a wide range of business needs, such as Amazon Web Services.

Therefore, running applications on Amazon Web Service can allow a faster movement, work safer, save a lot of money, and expand a business.

At the some time Amazon Web Services has some limitations (data-flair.training 2020) which are:

1. **Limitations OF Amazon EC2:** AWS sets default limits on resources which vary from region to region.
2. **Technical Support Fee:** AWS charges you for immediate support.
3. **General cloud Computing Issues:** AWS does have general cloud computing issues when you move to a cloud such as a downtime, limited control, and backup protection.

Conclusion

From all the points of view elaborated above we understand that the database To-Rent Estate Agent is necessary for the increase of customers in all regions of the uk.

References

amazon. (2020). *Cloud computing with AWS*. Available:

https://aws.amazon.com/what-is-aws/?nc2=h_q_l_le_int

amazon. (2020). *aws*. Available:

<https://aws.amazon.com/solutions/case-studies/?customer-references-cards.sort-by=item.additionalField>

computer notes. (). *What is a Database Server*. Available:

<https://ecomputernotes.com/fundamental/what-is-a-database/what-is-a-database-server>

C.J. Date (2000). *Introduction to Database Systems*. 7th ed. United States: addison-Wesley Longman Publishing Co., Inc.. 938.

data-flair.training. (2020). *AWS Advantages & Disadvantages | Advantages of Cloud Computing*.

Available: <https://data-flair.training/blogs/aws-advantages/>

impiger technologies. (2019). *Top 7 Benefits of Amazon Web Services (AWS)*. Available:

<https://www.impigertech.com/resources/blogs/benefits-of-aws>

quick start. (2020). *Microsoft SQL Server Database Advantages And Best Practices*. Available:

<https://www.quickstart.com/blog/microsoft-sql-server-database-advantages-and-best-practices/>

statista. (2020). *Real estate market in the UK - Statistics & Facts*. Available:

<https://www.statista.com/topics/6049/real-estate-market-in-the-uk/>

techwalla. (2020). *The Disadvantages of a Microsoft SQL Server*. Available:

<https://www.techwalla.com/articles/the-disadvantages-of-a-microsoft-sql-serve>

zdnet. (2020). *Top cloud providers in 2020: AWS, Microsoft Azure, and Google Cloud, hybrid, SaaS players*. Available:

<https://www.zdnet.com/article/the-top-cloud-providers-of-2020-aws-microsoft-azure-google-cloud-hybrid-saas/>