Case study for cloud computing

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Content

- About us
- Study of the hospital
  - Transaction
  - Data used
  - Backup and security mechanism
- Issues
- Solution
- Security and financial implication

About us

Name	CB number	Task done
Sumaiya	CB014630	Study of the hospital, Security and financial implications
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Study of the hospital

Transactions	Manual/automated	Transaction handled by	Assumptions
Patient profile details	Mostly manual	Administration	Manual because patients are entering the details. But the backend involves automation
File uploads	Manual	Administration	User manually upload and the administrative staff ensure its correct quality for successful storage.
Queries	Mostly automated	IT department	The are initiated by client but the management, storage and execution are done automatically
Backups	Mostly automated	IT department	The transaction to remote location is done automatically
channeling	Moderate	Administration department	Channeling is done by customer the booking is automated
Reuploading customer details	Manual	Administration department	The customers are requested re-enter the email and other details

Data used

Data used	Data is managed by	Assumption
Customer personal data	IT	These data are sensitive so IT department manage them by storing in DB
Queries	Administration	These queries are managed and answered by administration
Booking details	Administration	The booked time is allocated to the correct customer, and it is managed by administrator
Advertisement	Finance	Stored, managed and published by finance department
Staff details	IT	Stored in DB which is managed by IT
Doctor details	IT	Stored in DB which is managed by IT
Medicine details	IT	Stored in DB which is managed by IT
Bank details	Finance	Store the details of current money transaction and deals with the finance related stuffs

Backup and data security mechanisms

- Storing in DB.
- Frequent backups.
- Secured with password.
- Password is only available for the IT manager.
- In case of any DOS attacks the system was taken offline and then let ISP to solve the issue by blocking the unauthorized Ips.
- The hospital has allocated a separate data center for its own use.
- Using FTP

security protocols, standards and regulations the hospital needs to follow

- Patient data must satisfy security rules and regulations.
- Authorized access: only the authorized people should access the data.
- Deletion of unwanted data: the hospital should legally delete the data that is no longer needed.
- Encryption: the transfer as well as storing of data should be encrypted so that the authentic data can be protected.
- Secure transmission: the data transfer should be done via a medium using security protocols.
- Data access history: storing the data of the people who access the data cab help the hospital to detect unauthorized access or any suspicious activity.
- Conducting secured data backup
- Integrity of the data: ensuring authentic data are being used in the system.

Issues faced by Medicare regarding their transactions

1) patient profile details

- data entry errors.
- deletion of certain patient records.
- patient records could be vulnerable to data security risks.
- access to patient profile records could be disrupted

2) Queries

- queries being timed out before completion.

3) file uploads

- slowing down of data transfers.
- inability upload some important files.
- increased chances of cybercriminals exploiting files.
- delayed access to patient records.

4) backups

- lengthy backup times.
- incomplete backups.

5) channeling

- several patient channelings haven’t been confirmed in the system.

The effect of these issues on Medicare, their patients and employees.

1) Issues regarding patient profile details
- misdiagnosis and delayed treatments.
- medication errors
- patient management errors
- missed revenue

2) delayed query responses
- decreased patient satisfaction

3) issues regarding backups
- operational disruption
- incurred costs

4) issues regarding patient channelings
- appointment overbookings
- patient disappointment

5) issues arising due to reuploading patient data
- wastage of time and resources.
- patient discontent

Comparing different cloud service providers

Factorstform	Amazon Web Services	Microsoft Azure	Google Cloud
Healthcare specific Services	**Amazon Health lake** ● Aggregating and analyzing healthcare data **AWS IOT** ● Enables remote patient monitoring	**Azure API** ● It enables to securely to and exchange electronic ● health records **Azure IOT** ● medical device integration	**Healthcare API** ● ingesting and storing health care data **Health care consent API** ● Provides tools for obtaining and managing patients consents
Security and compliance	1. **AWS IAM** ● who or what can access services and resources in AWS. 2. **AWS KMS** ● a managed service that makes it easy for you to create and control the cryptographic keys that are used to protect your data	**1.Azure AD** ● helps organizations secure and manage identities for hybrid and multi cloud environments **2.Azure key vault** ● can be used to Securely store and tightly control access to tokens, passwords, certificates, API keys, and other secrets	**1.Google cloud IAM** ● lets administrators authorize who can take action on specific resources **2.CSEK** ● Customer-Supplied Encryption Keys
Data analytics and Machine learning	1. **Amazon Redshift** 2. **Amazon Comprehend Medical**	1. **Azure Synapse Analytics** 2. **Azure Machine Learning**	1. **BigQuery** 2. **AI Platform**
Integration with other services	● Integration with AWS services ● eco system	● Integration with Microsoft 365 ● Power Platform	● Integration with Google Workspace ● google Maps

Conclusion

Cloud services

1. Clinical systems
2. Analytics using AI and ML
3. Patients and clinician services
4. Medical research
5. Finance and operation
6. Core health IT

Cloud service provider: AWS

Based on infrastructure,costing and customer reviews AWS emerges a choice for health care organisations seeking a cloud services provider.AWS have a significant market share and a mature ecosystem of services than others.It helps organizations to handle variable workload efficiently.ASW offers a variety of pricings models enabling organizations to cost optimization .AWS invest heavily in security and compliance

Cloud deployment model: Hybrid model

Hybrid cloud model in health care allows organizations to keep sensitive data on premises for compliance ,allowing organizations to keep data on premises .Additionally it ensures data residency and robust disaster recovery.

Security and financial factors	implication	suggestion
Access control	Allowing authentic people to access sensitive data	Applying multi factor authentication to access data in the private cloud
Cost Management	managing costs across multiple platforms and service providers	Allocating resources based on workload and cost effectiveness as well as using cost management tools provided by cloud providers
Data Protection	Prevention of public access to the important and sensitive data	Storing and process sensitive data in the private cloud.
Budget Planning and Allocation	Balancing capital as well as operational expenditures.	Allocating budget for security measures, compliance audits, and ongoing maintenance of hybrid infrastructure.
Security Monitoring and Incident Response	Detecting and responding to security incidents across hybrid environments	Implement continuous monitoring and threat detection tools

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THANK YOU