

(Q) Payroll processing in cloud computing.

Many state government departments are utilising standardised set of payroll packages which are deployed at user locations and it is amounting huge investment on procurement of hardware and software and maintenance for various locations of organisations.

Drawbacks.

Software maintenance problem

Individual hardware is required.

Data loss occurs.

Migrating the payroll package to cloud environment can be worked out without changing business logic.  
Give an overview architecture of multi-tenancy for the above scenario.

Migrating payroll processing to cloud computing environment can offer many benefits, including reducing the cost of hardware and software procurement and maintenance, improving data security and accessibility, and providing a scalable and flexible solution that can meet the changing needs of an organization.

One approach to implementing a cloud-based payroll processing system is to use a multi-tenant architecture. In a multi-tenant system, a single instance of a payroll software is shared by multiple organizations (tenants), which reduces the cost of hardware and software deployment and maintenance.

Here's an overview of a possible multi-tenant

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architecture for a cloud-based payroll processing system:-

1. Application Layer:- The application layer consists of payroll software, which runs on the cloud platform. The software is designed to be highly scalable and configurable, so that it can meet the needs of different organizations. It provides a user interface for employees to enter their time and attendance data, and for administrators to manage payroll processing, tax reporting, and other tasks.

2. Data Layer:- The data layer stores all the payroll data, including employee records, pay rates, tax tables, and payroll reports.

- (a) The data is stored in a secure and highly available database, which is partitioned by tenants.
- (b) Each tenant has its own schema within the database, which ensures that data is segregated and private.

3. Security Layer:- The security layer provides authentication and authorization services, as well as data encryption and access controls.

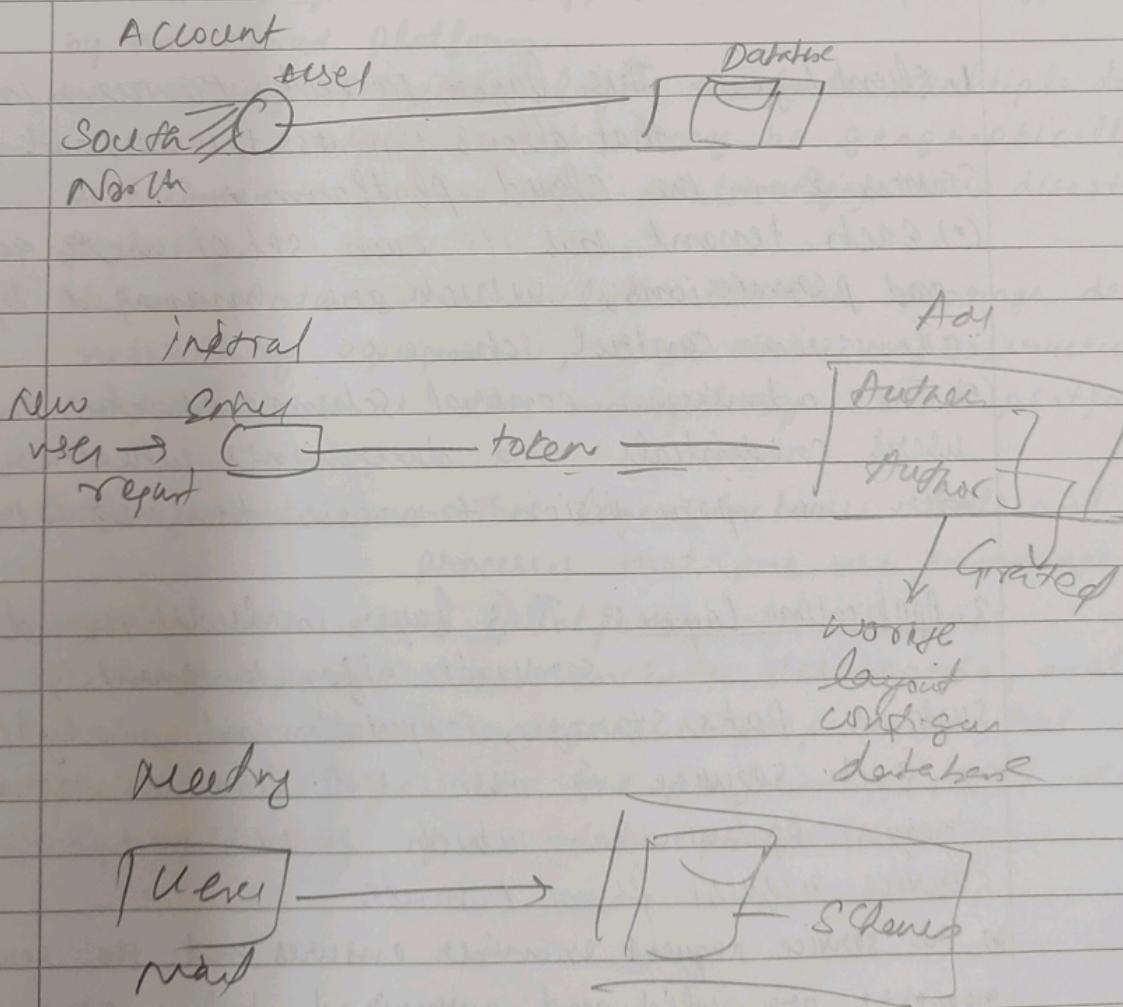
- (c) Each tenant has its own set of user accounts and permissions, which are managed by the payroll software.

4. Infrastructure Layer:- The infrastructure layer provides the underlying cloud infrastructure.

including servers, storage, and network resources.

(c) The cloud platform provides automatic scaling and load balancing, which ensures that the system can handle large volumes of data and traffic.

5. Integration Layer :- The integration layer provides interfaces to external systems, such as HRIS, accounting software, and tax reporting systems. The payroll software can exchange data with these systems using standard APIs and file formats.



(Q) Assume that constitute a data set to offer different services to multiple tenancy and associate the service request examiners and admission control schemes in cloud computing environment with this prospective give the suitable overall architecture for the different data centers.

To provide different services to multiple tenants in a cloud computing environment, a suitable overall architecture for different data centers can be a multi-tier architecture that includes the following components:-

1. Client Layer :- This layer includes the user interface that allows tenants to access and request services from the cloud platform.

- (o) Each tenant has its own set of user accounts and permissions, which are managed by the admission control scheme.
- (o) The admission control scheme checks the user's credentials and determines whether the user has permission to access the requested service.

2. Application Layer :- This layer includes the different services offered to tenants,

such as Data storage, computation and analytics.

- (o) Each service is associated with the service request examiner, which receives and processes service requests from tenants.
- (o) The service request examiner ensures that the service requests are valid and authorized before passing them to the appropriate service for processing.

3. Middleware Layer:- This layer provides the necessary communication and integration services between the application layer and the infrastructure layer.

(i) The middleware layer includes load balancers, message brokers, and other middleware components that ensure the scalability, reliability, and performance of the cloud platform.

4. Infrastructure Layer:- This layer includes the physical and virtual resources that are required to support the services offered by the cloud platform.

(i) The infrastructure layer includes multiple data centers, each of which may be geographically distributed to ensure high availability and disaster recovery.

(ii) Each data center includes servers, storage devices, networking equipment, and other infrastructure components that are managed by cloud platform.

5. Management Layer:- This layer includes tools and processes that are used to manage and monitor the cloud platform.

(i) The management layer includes dashboards, analytics tools, and other management components that provide visibility into the performance, utilization, and availability of the cloud platform.

(Q) Explain intercloud storage model with suitable example and list down a few cloud storage providers and explain any two.

Intercloud Storage model refers to the concept of storing data across multiple clouds or cloud providers, instead of relying on a single cloud provider. The idea is to improve reliability, scalability, and availability of data storage, by distributing the data across multiple cloud providers, while also minimizing the risk of vendor lock-in.

For example, consider a large enterprise that stores sensitive data such as financial records, customer information, and product designs in the cloud. To ensure high availability and disaster recovery, the enterprise can store the data across multiple cloud providers, such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP), using a combination of public, private, and hybrid cloud architectures. By distributing the data across multiple clouds, the enterprise can minimize the risk of data loss or downtime due to a single cloud provider outage.

Here are a few examples of cloud storage providers and brief explanations of two to them:

1. Amazon Web Services (AWS) :- AWS is a popular cloud storage provider that offers a wide range of storage services, including Amazon S3 (Simple Storage

Service), Amazon EBS (Elastic Block Store), and Amazon Glacier. AWS is known for its scalability, reliability, and security, and is widely used by businesses of all sizes.

2. Microsoft Azure:- It is a cloud storage provider that offers a variety of storage options, including Azure Blob Storage, Azure Files, and Azure Disk Storage.

Azure is known for its integration with Microsoft Office 365 and other Microsoft products, as well as its support for hybrid cloud architectures.

3. Google Cloud Platform (GCP):- GCP is a cloud storage provider that offers a variety of storage services, including Google Cloud Storage, Google Cloud Filestore, and Google Cloud Block Storage.

GCP is known for its performance, scalability, and AI/ML capabilities, and is widely used by businesses that require high-speed data processing.

4. Dropbox:- Dropbox is a cloud storage provider that offers personal and business storage plans, with features such as file sharing, collaborations, and synchronization across devices.

Dropbox is known for its user-friendly interface and ease of use, and is widely used by individuals and small businesses.

5. Box:- Box is a cloud storage provider that offers secure file storage and sharing for businesses, with

features such as access control, workflow automation, and integration with other business applications.

Box is known for its security and compliance features, and is widely used by businesses that require strict data governance and regulatory compliance.

- (Q) A government owned transportation enterprises having different zones and prepared themselves to go for integration of various departments like workshop, online tickets, job scheduling, accounting, root allocation, maintenance and purchasing now they plan to migrate to your own cloud provider help them out in provisioning an application server model and data centers model deployed in the multi-tenancy.

To help the government-owned transportation enterprise migrate to a cloud-based model, we can propose a solution based on an application server model and a data center model deployed in a multi-tenancy environment. Here is an overview of the proposed solution:-

1. Application Server Model:- We can deploy the various applications required by the transportation enterprise on an application server model. This model will enable the enterprises to access the applications from anywhere, and on any device, provided there is an internet connection.

- (o) The application server model will be hosted on a cloud infrastructure, which will provide

the enterprise with scalability, availability, and cost-efficiency.

- (e) The cloud infrastructure will be provided by our own cloud provider, which will ensure that the enterprise's data is secure and protected.

2. Data Centers Model:- To ensure the security and reliability of the transportation enterprise's data, we can deploy the data centers model in a multi-tenancy environment. This model will enable the transportation enterprise to store its data on a distributed network of servers, which will be located in different regions, ensuring data redundancy and availability.

- (e) The data centers model will be hosted on a cloud infrastructure, which will provide the enterprise with scalability, availability, and cost-efficiency.
- (e) The cloud infrastructure will be provided by our own cloud provider, which will ensure that the enterprise's data is secure and protected.

3. Multi-tenancy Environment:- We can deploy the application server model and Data centers model in a multi-tenancy environment, which will enable the transportation enterprise to share computing resources with other tenants, while maintaining data privacy and security.

- (e) The multi-tenancy environment will be hosted on a cloud infrastructure, which will provide the enterprise with scalability, availability, and cost-efficiency.
- (e) The cloud infrastructure will be provided by our own cloud provider, which will ensure that the enterprise

data is secure and protected.

By deploying an application server model and a data centers model in a multi-tenancy environment, the transportation enterprise will be able to achieve the following benefits:-

1. Scalability :- The enterprise will be able to scale up or down its computing resources as per its business requirements, without having to worry about hardware procurement, maintenance, and upgrades.
2. Availability :- The enterprise will be able to access its applications and data from anywhere, and on any device, provided there is an internet connection.
  - (•) The cloud infrastructure will ensure that the enterprise's applications and data are always available, even during peak loads or system failures.
3. Cost-efficiency :- The enterprise will be able to reduce its hardware and software procurement, maintenance, and upgrades costs, as these will be taken care of by our own cloud provider.
  - (•) Additionally, the enterprise will only pay for the computing resources it uses, without having to worry about idle resources.

(Q) Explain in detail with real time example about Inter cloud resource management , answer in points --

- (a) Intercloud resource management involves managing and allocating resources across multiple cloud providers, to optimize resource utilization, reduce costs, and improve performance.
- (b) A real-time example of intercloud resource management is the use of a multi-cloud management platform, such as Kubernetes or VMware vSphere, to manage workloads across multiple cloud providers.
- (c) Imagine a company that runs its web application on AWS and uses Google Cloud Platform for its big data analytics. By using a multi-cloud management platform, the company can allocate resources across both cloud providers to ensure optimal performance and cost efficiency.
- (d) The multi-cloud management platform acts as an intermediary between the company and the cloud providers, providing a single interface for managing resources across multiple clouds.
- (e) The platform can automatically monitor the performance and availability of each cloud provider, and adjust resource allocations accordingly to ensure maximum performance and cost efficiency.
- (f) For example, during peak hours, the web application running on AWS experiences a surge in traffic

that cause server to slow down. The multi-cloud management platform can detect this and allocate additional resources from Google Cloud Platform to ensure that the web application maintains its performance levels.

(Q) Explain the six layer of the Cloud services and describe the methods or resource provisioning and what are the classes available in that.

1 Haas: Hardware as a Service. It is a cloud computing model in which hardware resources are provided to users on a subscription basis. Instead of owning and managing their own hardware, users can lease hardware resources from a third-party provider, who manages and maintains the hardware infrastructure.

2 Naas: Network as a Service. It is a cloud computing model in which networking services are provided to users on a subscription basis. Instead of owning and managing their own networking infrastructure, users can lease network services from a third-party provider, who manages and maintains the networking infrastructure.

3 Laas:- Location as a Service is a cloud computing model that provides location-based services to applications and users. Laas uses Global Positioning System (GPS) or other location-based technologies to provide location information, which can be used by applications to offer services such as navigation, location-based advertising, and tracking.

4 CaaS:- Communication as a service is a cloud computing model that provides communication and collaboration services to users and businesses. CaaS is also sometimes referred to as "unified communication as a service" (UCAaaS).

5 PaaS:- Platform as a service. It is a cloud computing model in which a third-party provider offers a computing platform that enables users to develop, run, and manage applications without the complexity of building and maintaining the underlying infrastructure.

6 IaaS:- Infrastructure as a service. It is a cloud computing model in which a third-party provider offers virtualized computing resources over the internet such as servers, storage, and networking, to users on a pay-per-use basis.