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1. What is cloud migration? Explain the model to follow for migration the data on cloud.

Ans A cloud migration is when a company moves some or all of its data center capabilities into the cloud, usually to run on the cloud-based infrastructure provided by a cloud service provider such as AWS, Google cloud, or Azure.
As more and more companies have already transitioned to the cloud, cloud migrations are increasingly taking place within the cloud, as companies migrate between different cloud providers (known as cloud to cloud migration). But for those making the initial foray to the cloud, there are a few critical considerations to be aware of, which we'll take a look at below.
This is part of our series of comprehensive guides about infrastructure as a service (IaaS).

☆ What are the main benefits of migrating to the cloud?
Here are some of the benefits that compel organizations to migrate resources to the public cloud.

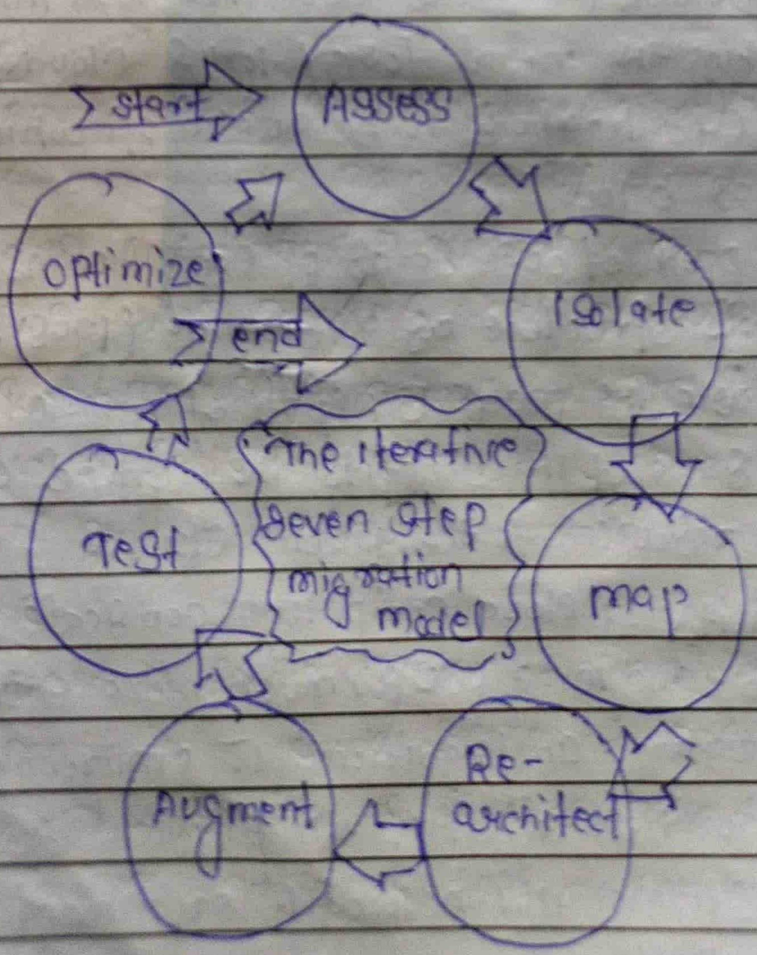
• Scalability :→ Cloud computing can scale to support larger workloads and more users, much more easily than on-premise infrastructure. In traditional IT environments, companies had to purchase and set up physical servers, software licenses, storage and network equipment to scale up business services.

• Cost :→ Cloud providers take over maintenance and upgrades, companies migrating to the cloud can spend significantly less on IT companies. They can devote more resources to innovation - developing new products or improving existing products.

• Performance :→ migrating to the cloud can improve performance and end-user experience. Application and websites hosted in the cloud can easily scale to serve more users or high throughput, and can run in geographical locations near to end users, to reduce network latency.

• Digital experience :→ users can access cloud services and data from anywhere, whether they are employees or customers. This contributes to digital transformation, enables an improved experience for customers, and provides employees with modern, flexible tools.

* The Seven-Step model of migrations into a Cloud



1. ASSESSMENT :→
migration starts with an assessment of the issues relating to migration, at the application, code, design and architecture levels. moreover, assessments are also required for tools being used, functionality, test cases, and configuration of the application. The proof of concepts for migration and the corresponding pricing details will help to assess these issues properly.

2. ISOLATE :→ The second step is the isolation of all the environmental and systemic dependencies of the enterprise application within the captive data center. These include library, application, and architectural dependencies. This step results in a better understanding of the complexity of the migration.

3. MAP :→ A mapping construct is generated to separate the components that should reside in the captive data center from the ones that will go into the cloud.

4. RE-ARCHITECT :→ It is likely that a substantial part of the application has to be re-architected and implemented in the cloud. This can affect the functionalities of the application and some of these might be lost. It is possible to approximate lost functionality using cloud runtime support API.

~~6. TEST~~

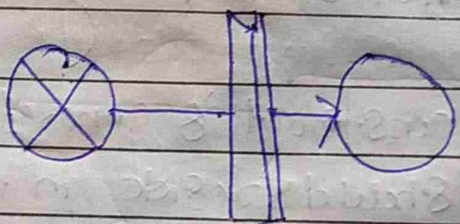
5. AUGMENT :→ The features of cloud computing service are used to augment the application.

6. TEST :→ once the augmentation is done, the application needs to be validated and tested. This is to be done using a test suite for the applications on the cloud. New test cases due to augmentation and proof-of-concepts are also tested at this stage.

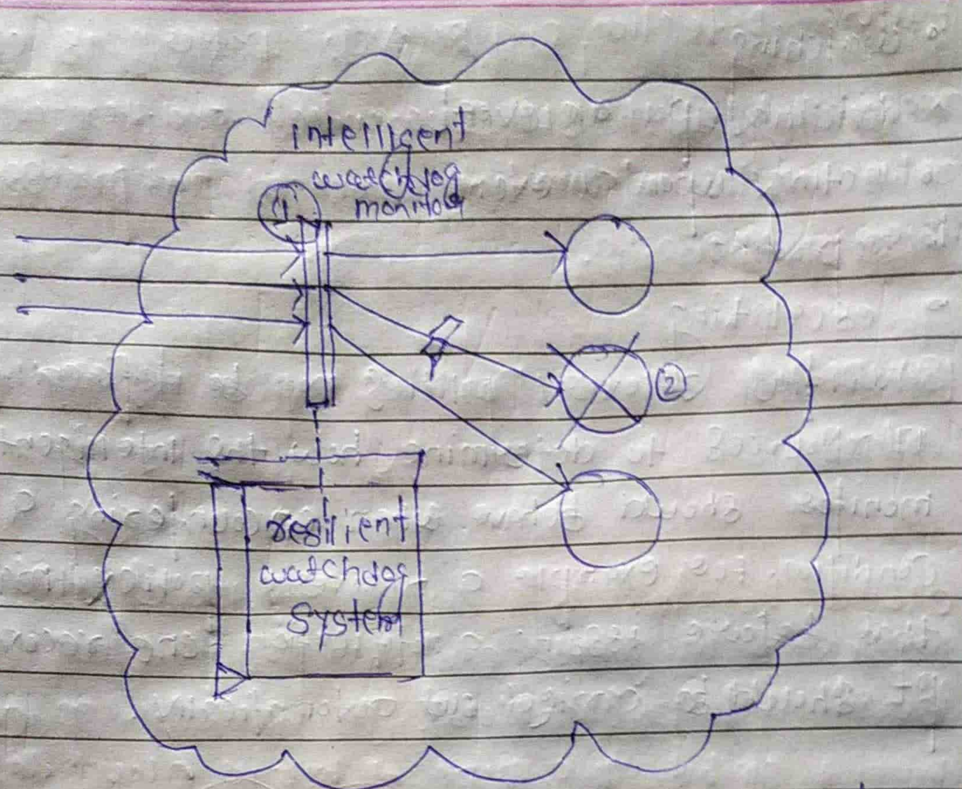
7. OPTIMISE :- The results from the last step can be mixed and so require iteration and optimization. It may take several optimizing iterations for the migration to be successful. It is best to iterate through this seven step model as this will ensure the migration to be robust and comprehensive.

2. Explain the role of intelligent watchdog monitor in Dynamic failure detection and recovery architecture

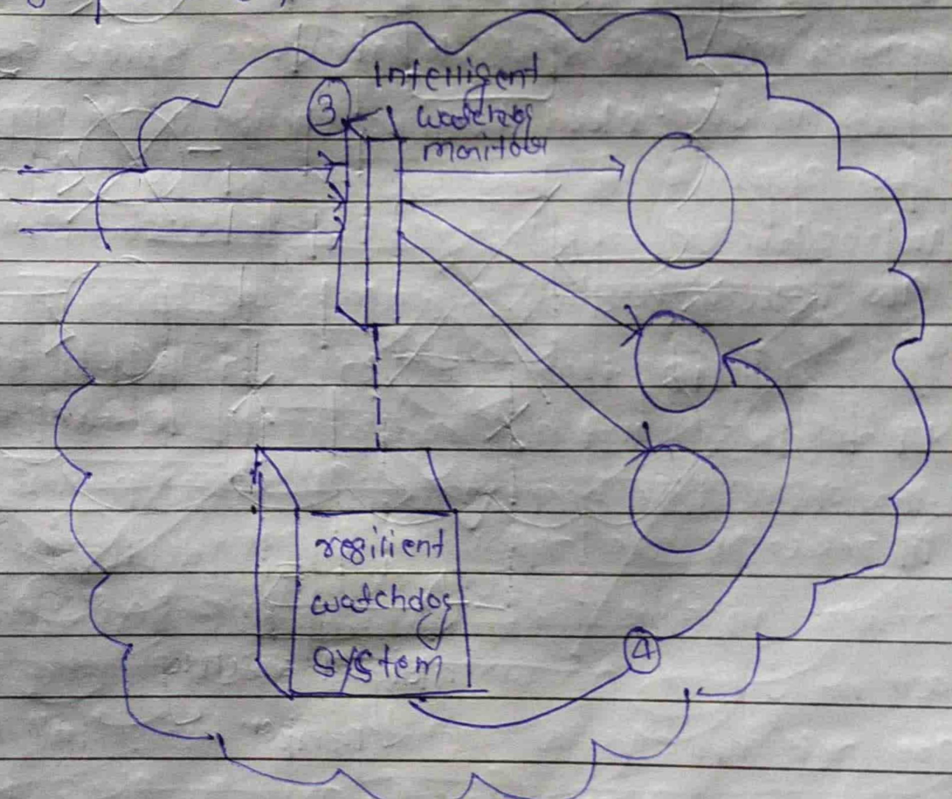
Ans Dynamics Failure Detection and Recovery



problem
cloud environments can be comprised of vast quantities of IT resources being accessed by numerous cloud consumers. Any of those IT resources can experience predictable failure conditions that requires intervention to resolve. manually administering and solving standard IT resources failures in cloud environments is generally inefficient and impractical
Solutions
A resilient watchdog system is established to monitor and respond to a wide range of pre-defined failure scenarios. This system is further able to notify and certain failure conditions that it cannot automatically solve itself.



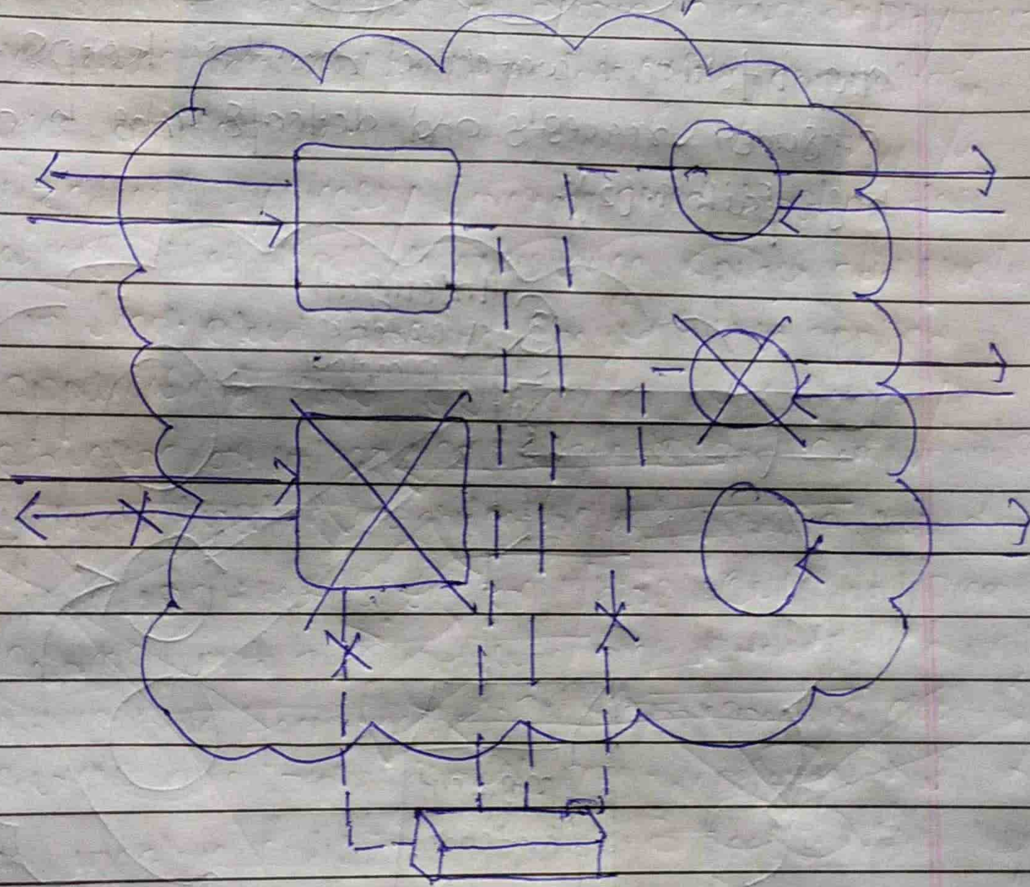
The intelligent watchdog monitor keeps track of cloud consumer requests and detects that a cloud service has failed. (2).



The resilient watchdog system, together with the intelligent watchdog monitor, performs the following five core functions:

- watching
- deciding upon an event
- acting upon an event
- reporting
- escalating

Sequential recovery policies can be defined for each IT resources to determine how the intelligent watchdog monitor should behave when encountering a failure condition. For example a recovery policy may state that before issuing a notification, one recovery attempt should be carried out automatically.



Intelligent watchdog monitor

In the event of any failures, the active monitor refers to its predefined policies to recover the service step by step, escalating the processes as the

problem proves to be deeper than expected.
When the intelligent watchdog monitor escalates an issue, there are common types of actions it may take, such as:

- running a batch file
- sending a console message
- sending a text message
- sending an email message
- sending an snmp trap
- logging a ticket in a ticketing and event monitoring system.

There are varieties of programs and products that can act as an intelligent watchdog monitor. most can be integrated with standard ticketing and event management systems.

Mechanisms

- Audit monitor - This mechanism may be required to ensure that the manner in which this pattern is carried out at runtime is in compliance with any related legal or policy requirements.
- Cloud usage monitor - various specialized cloud usage monitors may be involved with monitoring and collecting IT resource usage data as part of failure conditions and recovery notification and escalating activity.
- Failover system - Failover is fundamental to the application of this pattern, as the failover system mechanism is generally utilized during the initial attempts to recover failed IT resources.
- SLA management system and SLA monitor - The functionality introduced by the application of the Dynamic

Failure Detection and Recovery pattern is closely associated with SLA guarantees and therefore commonly relies on the information managed and processed by these mechanisms.

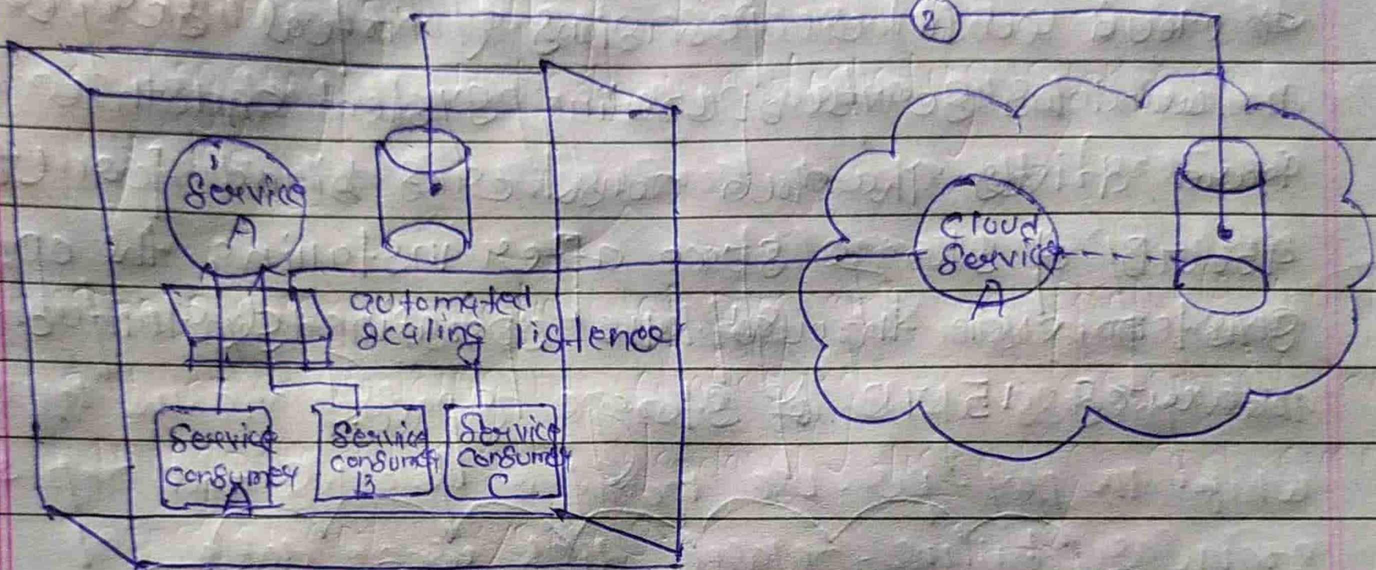
3. (a) Define cloud Bursting. Explain its architecture in details

Ans Cloud bursting is a deployment model that runs applications in a data center or private cloud, and then burst into public clouds, as needed, when computing demand spike. This type of hybrid cloud deployment enables organizations to pay for extra computing resources on-demand.

Organizations typically leverage cloud bursting for applications that tends to experience spikes and fluctuations in load. Cloud bursting should not be applied for applications that rely on complex delivery infrastructure or integrated systems and components.

The cloud bursting architecture establishes a form of dynamic scaling that scales or "bursts out" on-premise IT resources into a cloud whenever predefined capacity thresholds have been reached. The corresponding cloud based IT resources are redundantly pre-deployed but remain inactive until cloud bursting occurs. After they are no longer required, the cloud-based IT resources are released and the architecture "burst in" back to the on-premise environment. Cloud bursting is a flexible scaling architecture that provides cloud consumers with the options of using cloud-based IT resources only to meet higher usage demands.

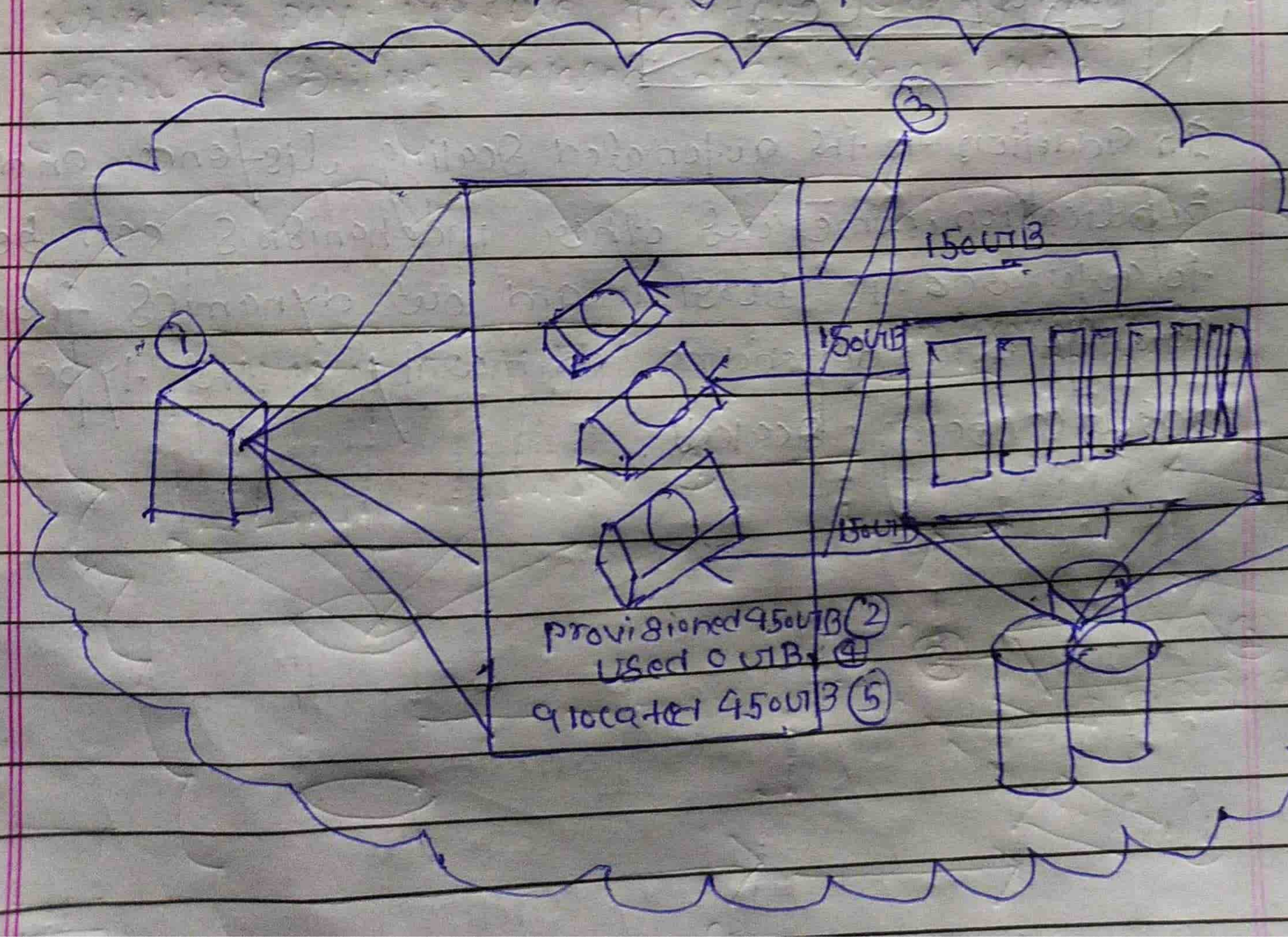
The foundation of this architectural model is based on the automated scaling listener and resource replication mechanisms. The automated scaling listener determines when to redirect requests to cloud-based IT resources, and resources replication is used to maintain synchronicity between on-premise and cloud-based IT resources in relation to state information.



In addition to the automated scaling listener and resource replication, numerous other mechanisms can be used to automated the burst in and out dynamics for this architecture, depending primarily on the type of IT resource being scaled.

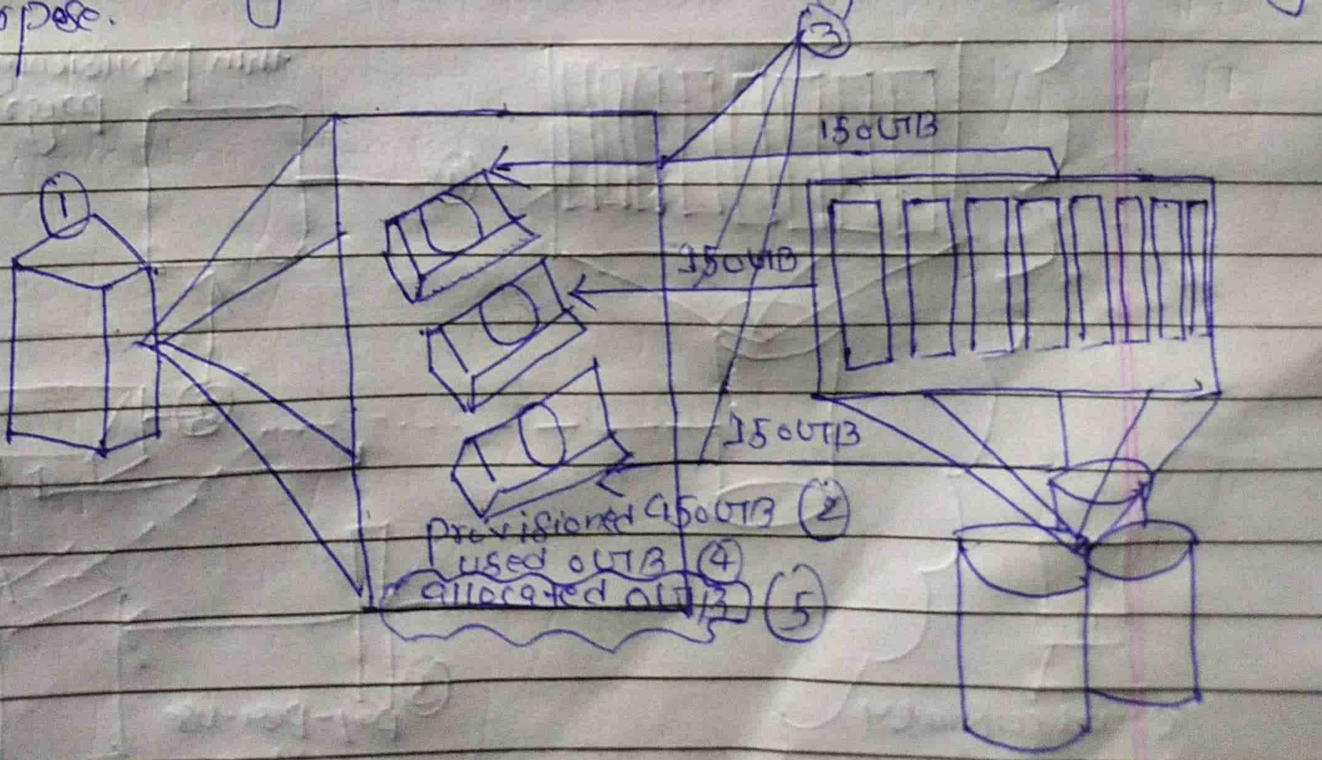
(b) Describe the Elastic disk provisioning Architecture with proper diagram.

Ans Cloud consumers are commonly charged for cloud-based storage space based on fixed-disk storage allocation, meaning the charges are predetermind by disk capacity and not aligned with actual data storage consumption demonstrates this by illustrating a scenario in which a cloud consumer provisions a virtual server with the windows server operating system and three 150GB hard drives. The cloud consumer is billed for using 450GB of storage space after installing the operating system, even through the operating system only requires 15GB of storage space.



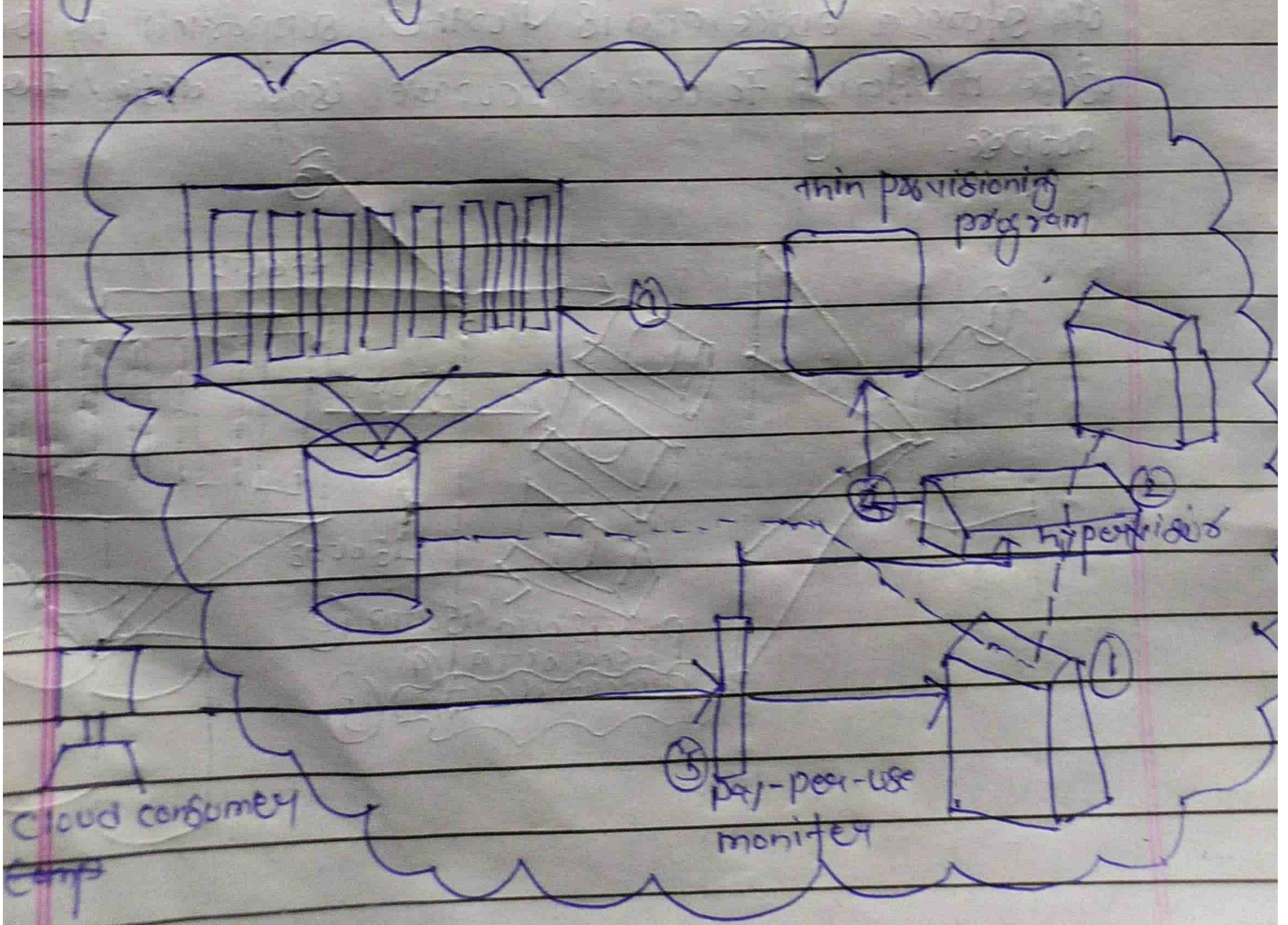
The cloud consumer requests a virtual server with three hard disks, each with a capacity of 150 GB (1). The virtual server is provisioned according to the elastic disk provisioning architecture, with a total of 450 GB of disk space (2). The 450 is allocated to the virtual server by the cloud provider (3). The cloud consumer has not installed any software yet, meaning the actual used space is currently 0 GB (4). Because the 450 GB are already allocated and reserved for the cloud consumer it will be charged 450 GB of disk usage as of the point of allocation (5).

The elastic disk provisioning architecture establishes a dynamic storage provisioning system that ensures that the cloud consumer is granularly billed for the exact amount of storage that it actually uses. This system uses thin-provisioning technology for the dynamic allocation of storage space, and is further supported by runtime usage monitoring to collect accurate usage data for billing purpose.



The cloud consumer requests a virtual server with three hard disk, each with capacity of 150 GB (1). The virtual server is provisioned by this architecture with a total of 450 GB of disk space (2). The 450 GB are set as the maximum disk usage that is allowed for this virtual server, although no physical disk space has been reserved or allocated yet (3). The cloud consumer has not installed any software, meaning the actual used space is currently at 0 GB (4). Because the allocated disk space is equal to the actual used space (which is currently at zero) the cloud consumer is not charged for any disk space usage (5).

Thin-provisioning software is installed on virtual servers that process dynamic storage allocation via the hypervisor, while the pay-per-use monitor tracks and reports granular billing-related disk usage data.



A request is received from a cloud consumer, and the provisioning of a new virtual server instance begins (1) As part of the provisioning process, the hard disks are chosen as dynamic or thin-provisioned disks (2). The hypervisor calls a dynamic disk allocation component to create thin disks for the virtual server (3) virtual server disks are created via the thin-provisioning program and saved in a folder of near-zero size. The size of this folder and its files grow as operating applications are installed and additional files are copied onto the virtual server (4) The pay-per-use monitor tracks the actual dynamically allocated storage for billing purpose (5).

The Following mechanisms can be included in the architecture in addition to the cloud storage device, virtual server, hypervisor, and pay-per-use monitor.

- Cloud usage monitor:- Specialized cloud usage monitors can be used to track and log storage usage ~~and~~ fluctuations.
- Resource Replication - Resource replication is part of an elastic disk provisioning system when conversion of dynamic thin-disk storage into static think-disk storage is required.