PROJECT AND TEAM INFORMATION

Project Title

(Try to choose a catchy title. Max 20 words).

Stimulation of Inter-VM Data Exchange in Cloud Computing using CloudSim

Student / Team Information

Team Name: *Team #*	*Cloud-Stack Innovators*
Team member 1 (Team Lead) *(Last Name, name: student ID: email, picture):*	*Akriti Rawat – 23018263* *akritirawat12345@gmail.com*
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PROPOSAL DESCRIPTION (10 pts)

Motivation (1 pt)

(Describe the problem you want to solve and why it is important. Max 300 words).

In cloud computing, virtual machines (VMs) play a crucial role in running applications and processing data. However, efficient data sharing between VMs is a challenge due to network latency, security concerns, and resource allocation inefficiencies. This project aims to simulate and optimize data exchange between VMs using CloudSim to analyze performance, security, and resource utilization.

State of the Art / Current solution (1 pt)

(Describe how the problem is solved today (if it is). Max 200 words).

Currently, cloud providers use different approaches for inter-VM communication, such as shared storage, network-based data transfer, and middleware solutions. However, these approaches may suffer from high latency, security vulnerabilities, and inefficient bandwidth usage. This project aims to explore and improve these methods in a simulated environment.

Project Goals and Milestones (2 pts)

(Describe the project general goals. Include initial milestones as well any other milestones. Max 300 words).

1. Implement a cloud environment using CloudSim.
2. Create two virtual machines that can share and receive data.
3. Simulate various data exchange methods and analyze performance.
4. Identify bottlenecks and propose optimizations.
5. Document findings and results.

Project Approach (3 pts)

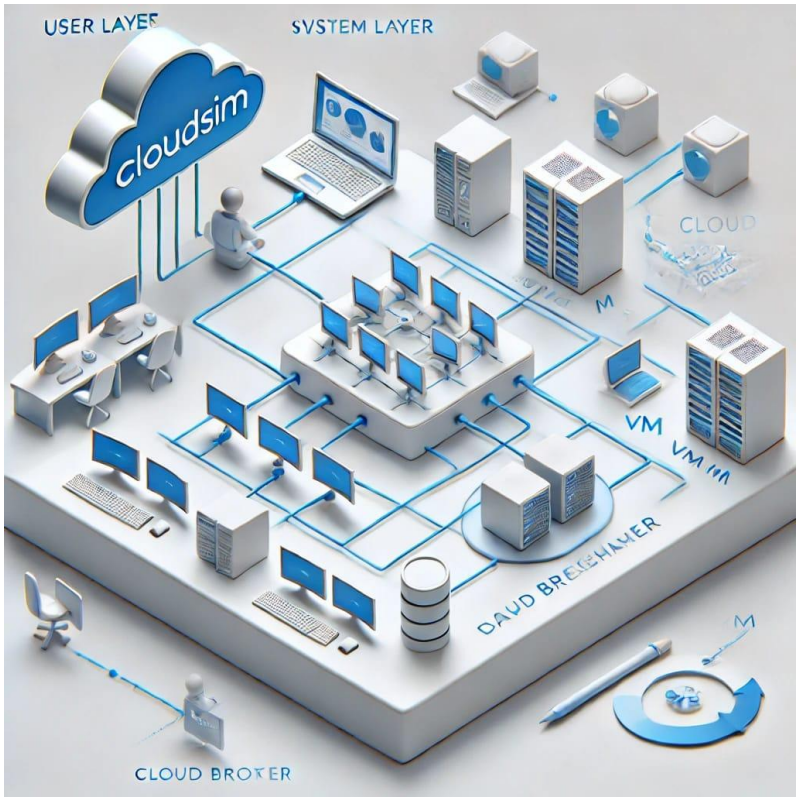
(Describe how you plan to articulate and design a solution. Including platforms and technologies that you will use. Max 300 words).

This project will use CloudSim to simulate a cloud environment with two virtual machines. A cloud broker will allocate tasks (cloudlets) to VMs, and different data-sharing mechanisms such as direct communication, shared storage, and network-based exchange will be tested. Performance metrics like latency, bandwidth usage, and resource consumption will be analyzed.

System Architecture (High Level Diagram)(2 pts)

(Provide an overview of the system, identifying its main components and interfaces in the form of a diagram using a tool of your choice).

Components of the System:



- *CloudSim Framework - The simulation environment where all components interact.*
- *Datacenter - Represents a cloud datacenter hosting virtual machines (VMs).*
- *Cloud Broker - Manages VM allocation and data transfer.*
- *Virtual Machines (VM1 & VM2) - Simulated instances that exchange data.*
- *Cloudlets - Simulated tasks processed by VMs.*
- *Data Exchange Mechanisms - Methods like direct communication, shared storage, and network-based transfer.*

Diagram Description:

- *User Layer: Represents the simulation user interacting with CloudSim.*
- *CloudSim Layer: Manages the virtual cloud environment, handling VM creation and task allocation.*
- *Datacenter Layer: Hosts VMs and enables data exchange.*
- *Network & Storage Layer: Handles data transmission between VMs using different techniques.*

Project Outcome / Deliverables (1 pts)

(Describe what are the outcomes / deliverables of the project. Max 200 words).

1. A CloudSim-based simulation of inter-VM data exchange.
2. Performance analysis and comparison of different data-sharing techniques.
3. A report detailing findings and optimizations.

Assumptions

(*Describe the assumptions (if any) you are making to solve the problem. Max 100 words)*

1. CloudSim accurately represents real-world cloud environments.

2. Simulated network latency and resource usage are close to actual cloud implementations.

References

(Provide a list of resources or references you utilised for the completion of this deliverable. You may provide links).

1. CloudSim: A Framework for Modeling and Simulation of Cloud Computing Infrastructures.
2. Research papers on inter-VM communication and performance optimization.