

LOAD BALANCING AND TASK SCHEDULING

INTRODUCTION TO LOAD BALANCING AND TASK SCHEDULING

Load balancing and task scheduling are vital for optimising resource management in **edge-cloud systems**. This presentation will explore these concepts and their significance in enhancing operational efficiency within edge-cloud environments.

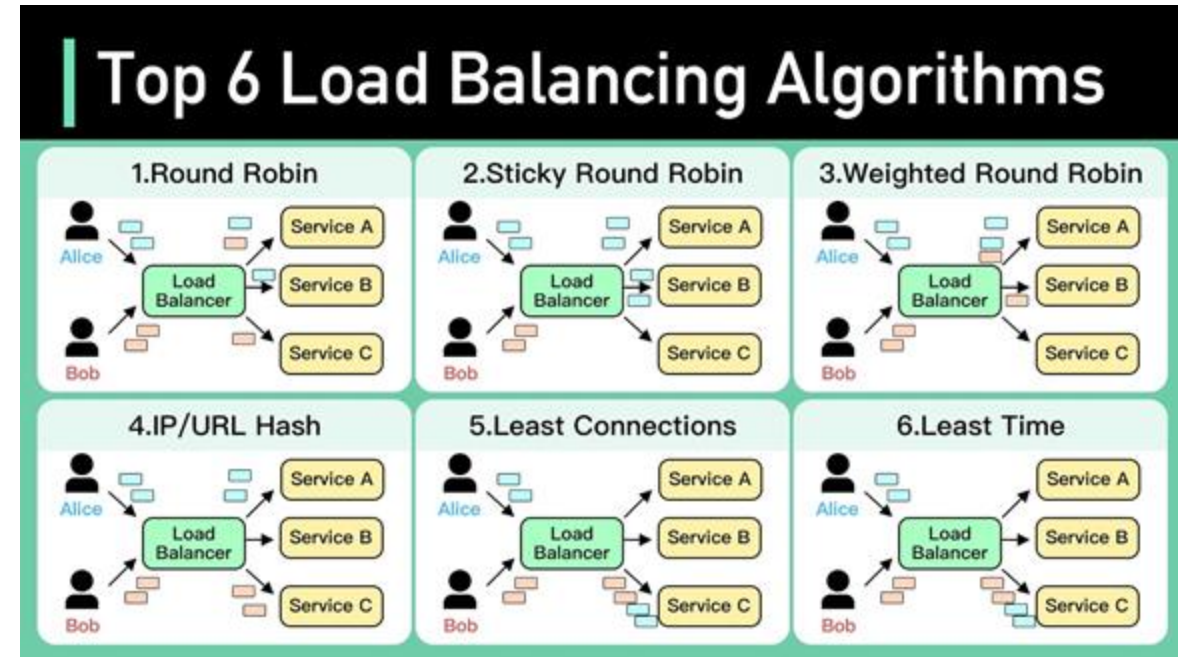


LOAD BALANCING TECHNIQUES FOR EDGE-CLOUD RESOURCE MANAGEMENT

Load Balancing aims to distribute workloads evenly across servers to optimise resource utilisation and enhance performance.

Key techniques include:

- **Round Robin**: Assigns tasks in a **cyclic manner** to ensure equal distribution among resources.
- Best suited for tasks with similar processing requirements and homogeneous resources.
- **Weighted Round Robin**: Assigns weights to resources based on their capacities.
- Proportional task allocation ensures resources with higher capacities handle more tasks.



LOAD BALANCING TECHNIQUES FOR EDGE-CLOUD RESOURCE MANAGEMENT



Least Connection

Assigns tasks to the resource with the fewest active connections. Efficiently utilises resources and prevents overload, especially for tasks with varying processing times.



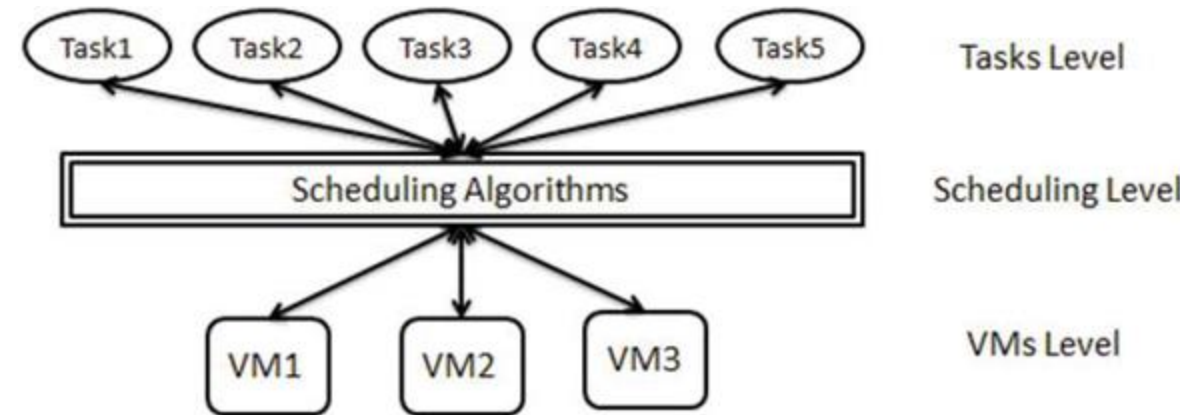
Least-Loaded

Focuses on the current workload of resources. Assigns tasks based on actual resource usage, effectively balancing load.

TASK SCHEDULING TECHNIQUES FOR EFFICIENT RESOURCE UTILISATION

Task scheduling determines the order and allocation of tasks on resources, ensuring efficient utilisation and performance. Key techniques include:

- **First-Come, First-Served (FCFS):** Schedules tasks based on their **arrival times**.
- Simple but may lead to suboptimal resource usage in time-sensitive scenarios.
- **Shortest Job Next (SJN):** Prioritises tasks with the **shortest execution time** first.
- Maximises resource utilisation but can lead to longer wait times for larger tasks.



TASK SCHEDULING TECHNIQUES FOR EFFICIENT RESOURCE UTILISATION



Priority-based Scheduling

Assigns priority values to tasks based on importance and deadlines. Ensures critical tasks are scheduled first, maximising resource utilisation while meeting deadlines.

Time-Slice Round Robin

Combines round-robin scheduling with time-slicing. Each task has a fixed time slice; if not completed, it is pre-empted, allowing other tasks to execute.

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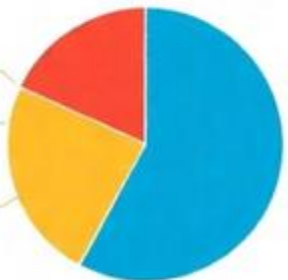


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IMPORTANCE OF LOAD BALANCING AND TASK SCHEDULING IN EDGE-CLOUD ENVIRONMENTS

Effective load balancing and task scheduling are crucial for optimising resource management in edge-cloud systems. By using appropriate algorithms, these techniques facilitate: Efficient **workload distribution** Maximised **resource utilisation** Meeting task priorities and deadlines

CONCLUSION

Load balancing and task scheduling techniques are essential for enhancing the efficiency of edge-cloud environments.

These methods ensure optimal resource management, enabling systems to handle workloads effectively while meeting critical deadlines.

Top 6 Load Balancing Algorithms

