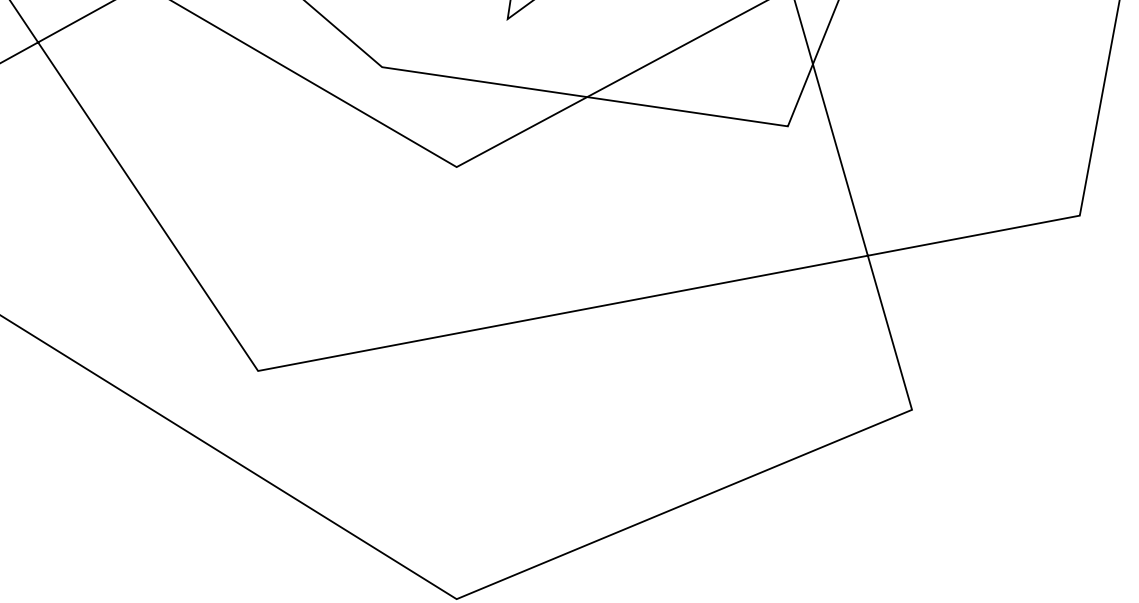

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LOAD BALANCING AND TASK SCHEDULING

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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

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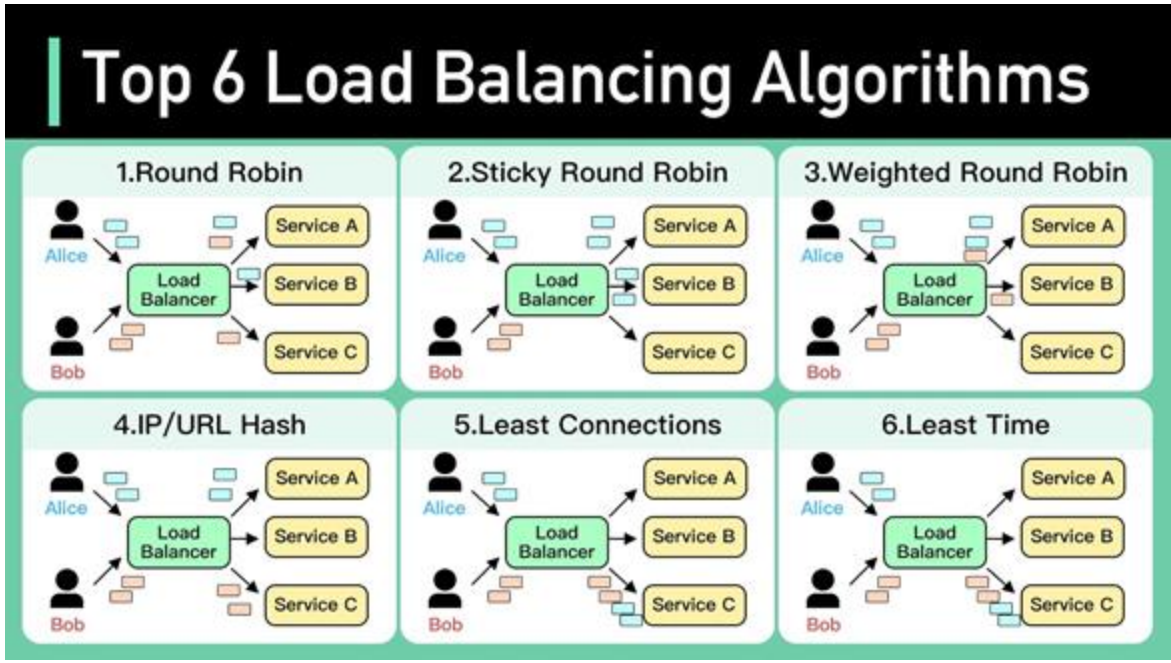
Load Balancing aims to distribute workloads evenly across servers to optimise resource utilisation and enhance performance.

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.



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LOAD BALANCING TECHNIQUES FOR EDGE-CLOUD RESOURCE MANAGEMENT

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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.

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TASK SCHEDULING TECHNIQUES FOR EFFICIENT RESOURCE UTILISATION

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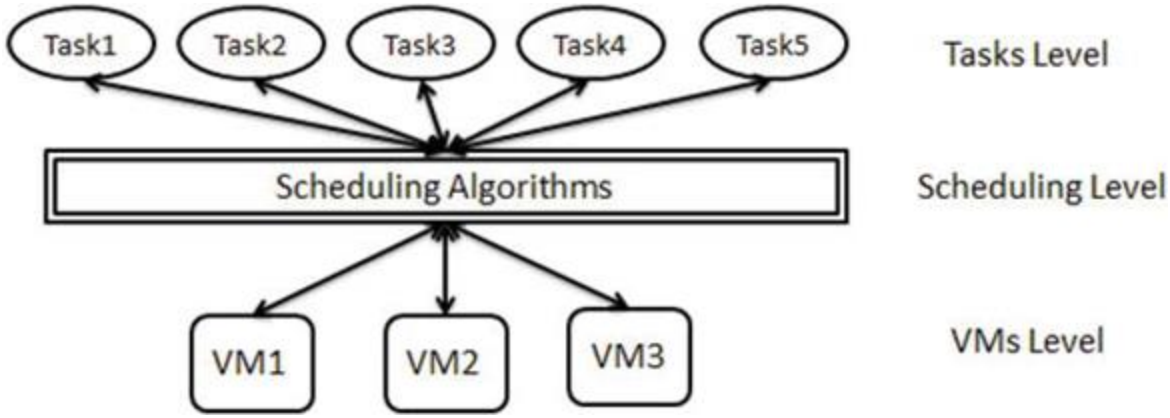
Task scheduling determines the order and allocation of tasks on resources, ensuring efficient utilisation and performance. Key techniques include:

- **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.



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TASK SCHEDULING TECHNIQUES FOR EFFICIENT RESOURCE UTILISATION

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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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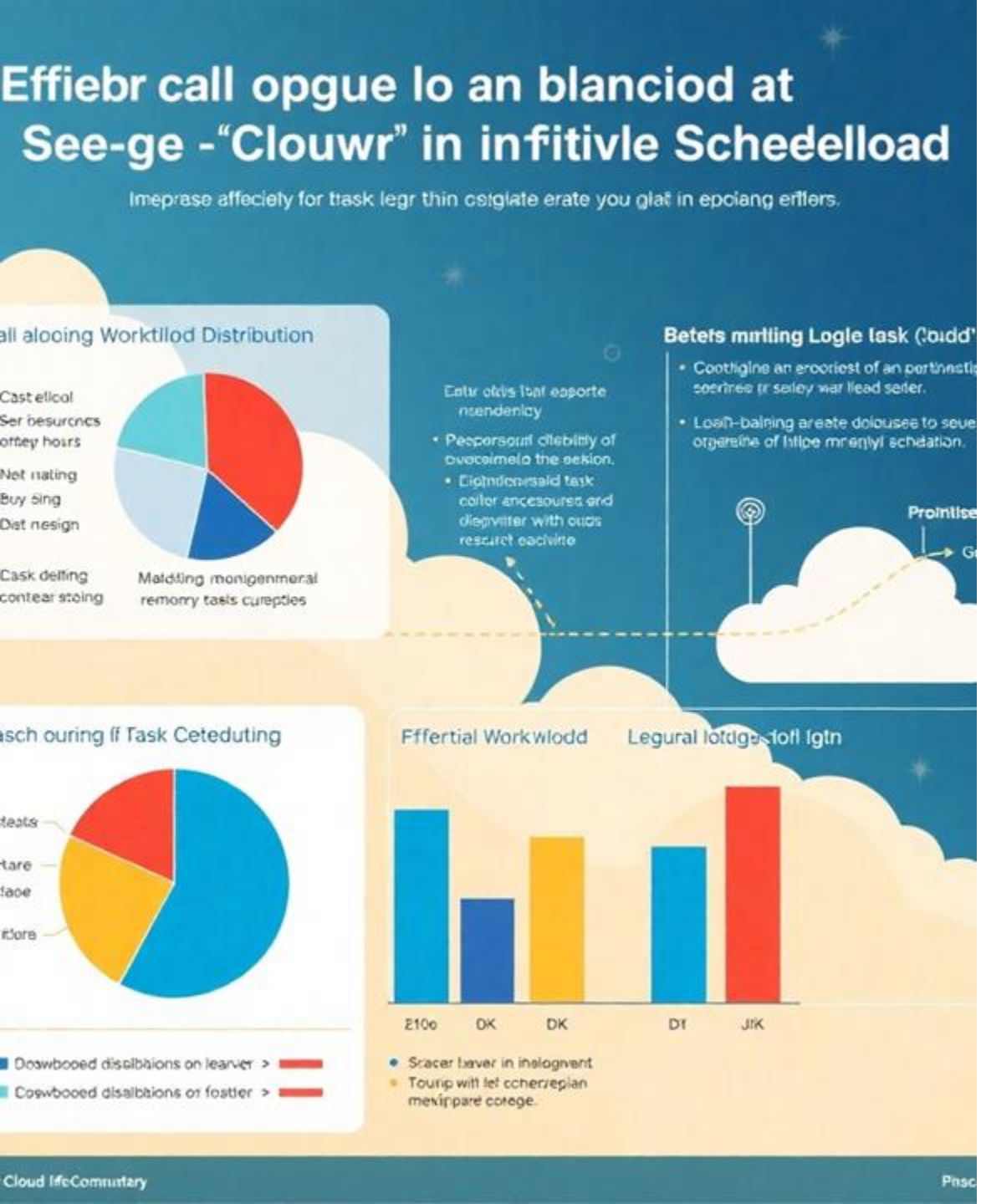

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IMPORTANCE OF LOAD BALANCING AND TASK SCHEDULING IN EDGE-CLOUD ENVIRONMENTS

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

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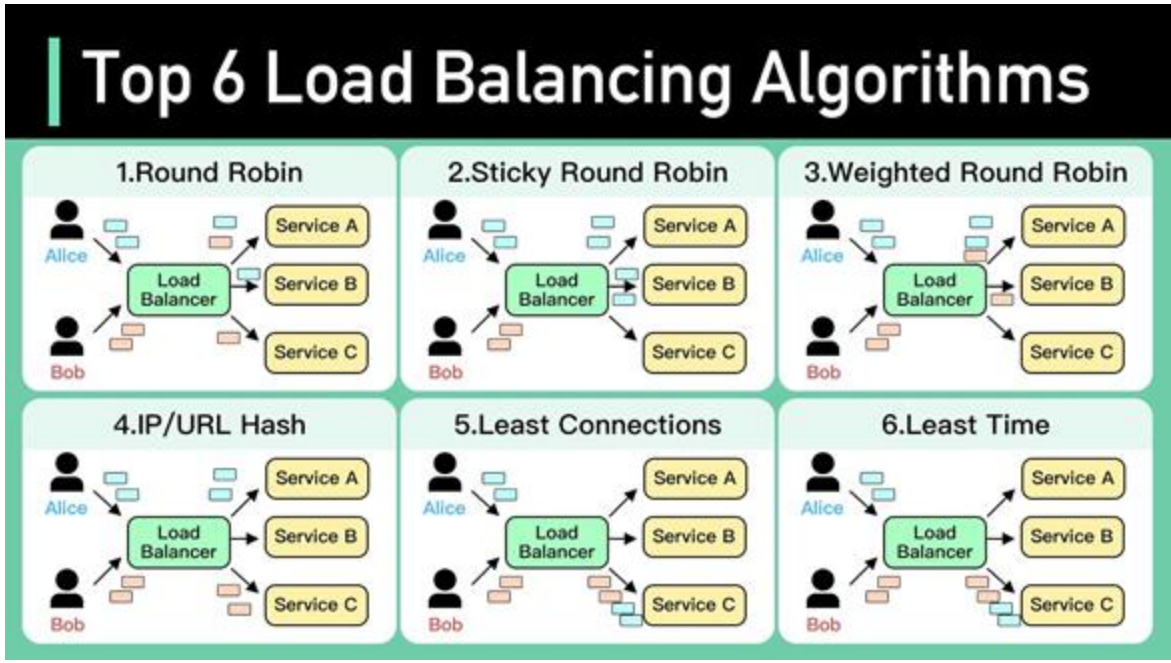
CONCLUSION

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.



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