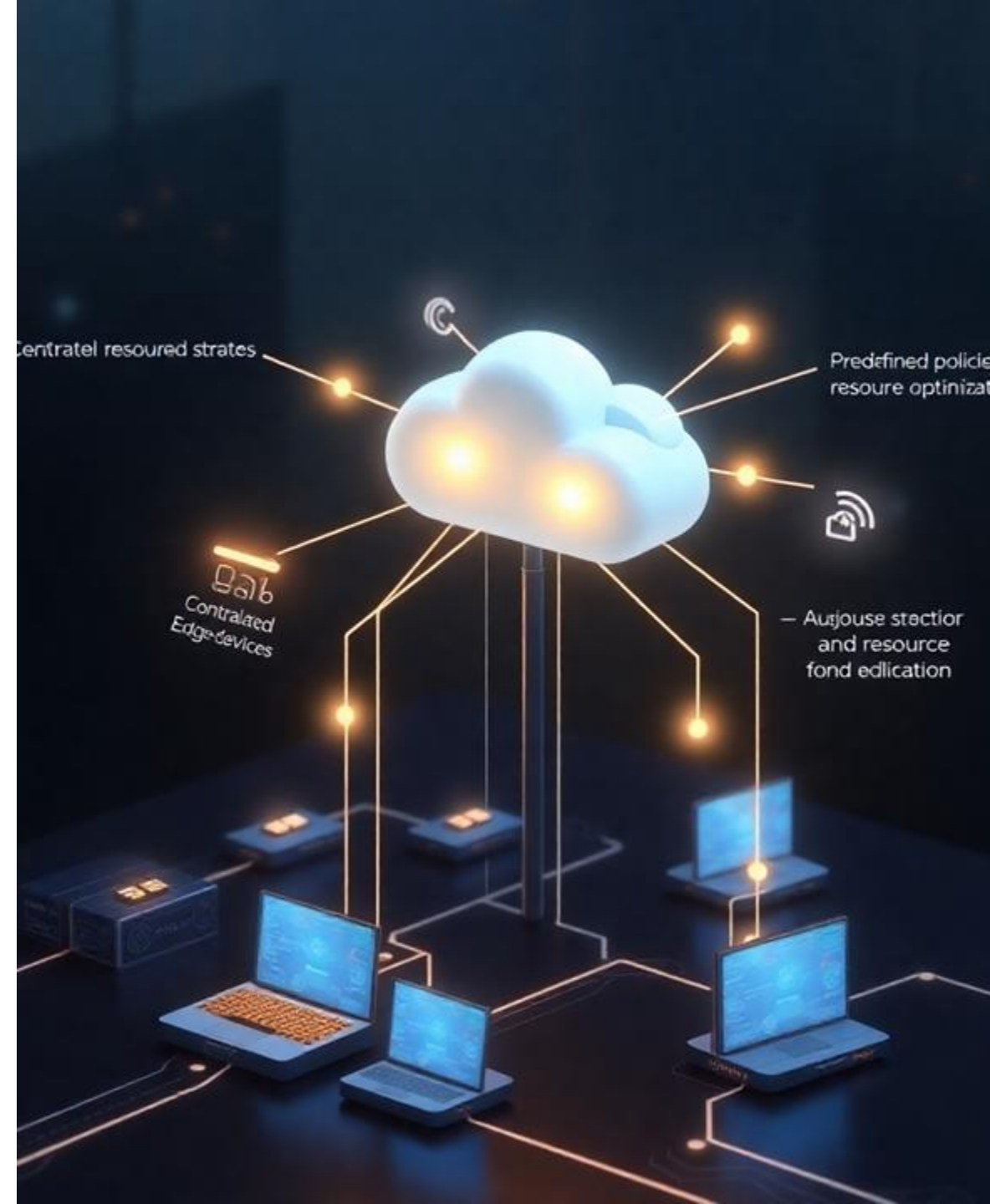


EDGE-CLOUD RESOURCE ALLOCATION STRATEGIES

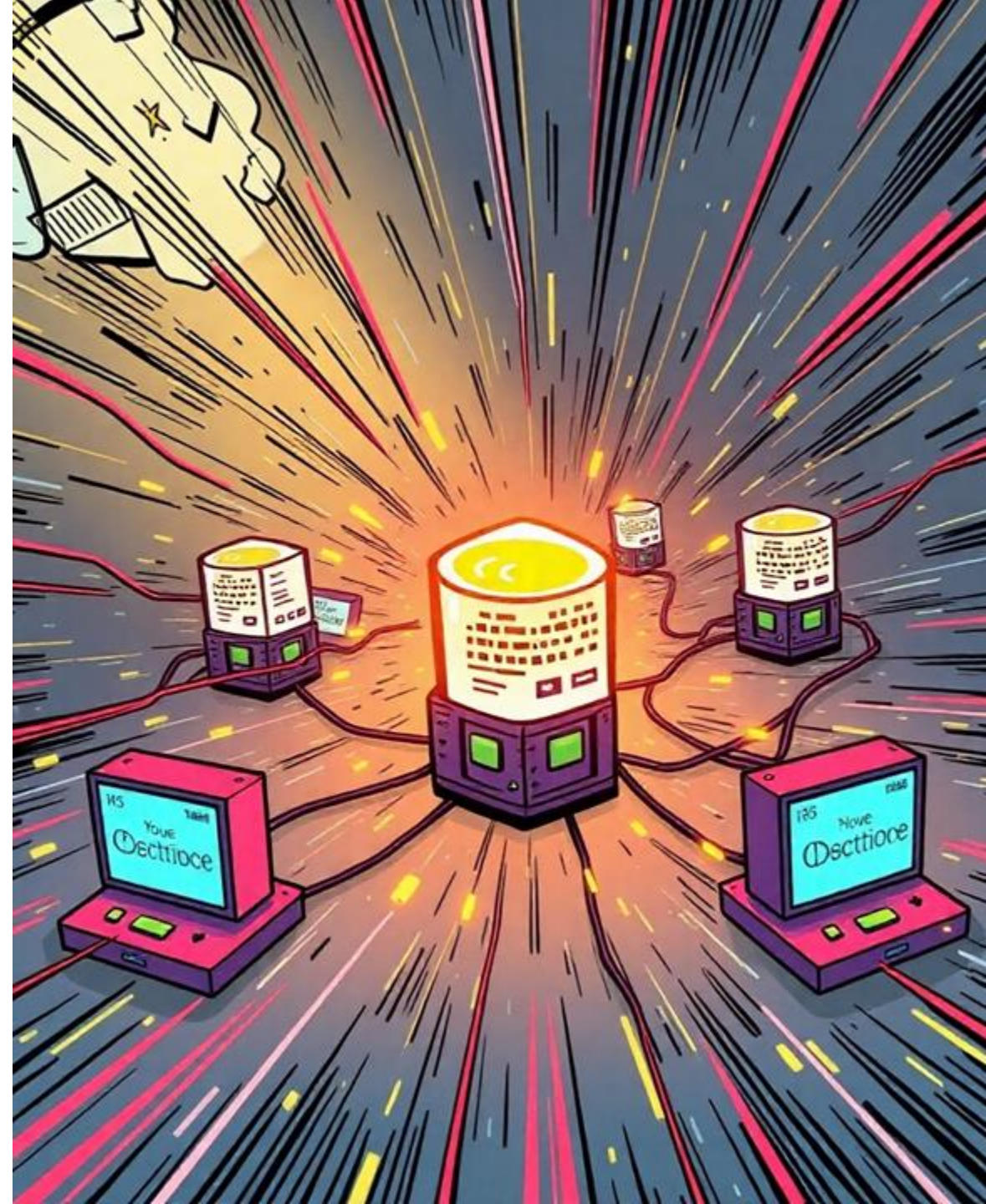
CENTRALISED RESOURCE ALLOCATION STRATEGY

- In a **centralised resource allocation** strategy, a central entity, like a cloud controller, manages resources across the edge-cloud infrastructure.
- The central controller receives requests from edge devices and allocates resources based on **predefined policies**.
- This approach offers a unified view of resource utilisation, enhancing **resource optimisation** and **load balancing**.
- However, it can lead to increased **latency** and potential issues if the central controller fails.



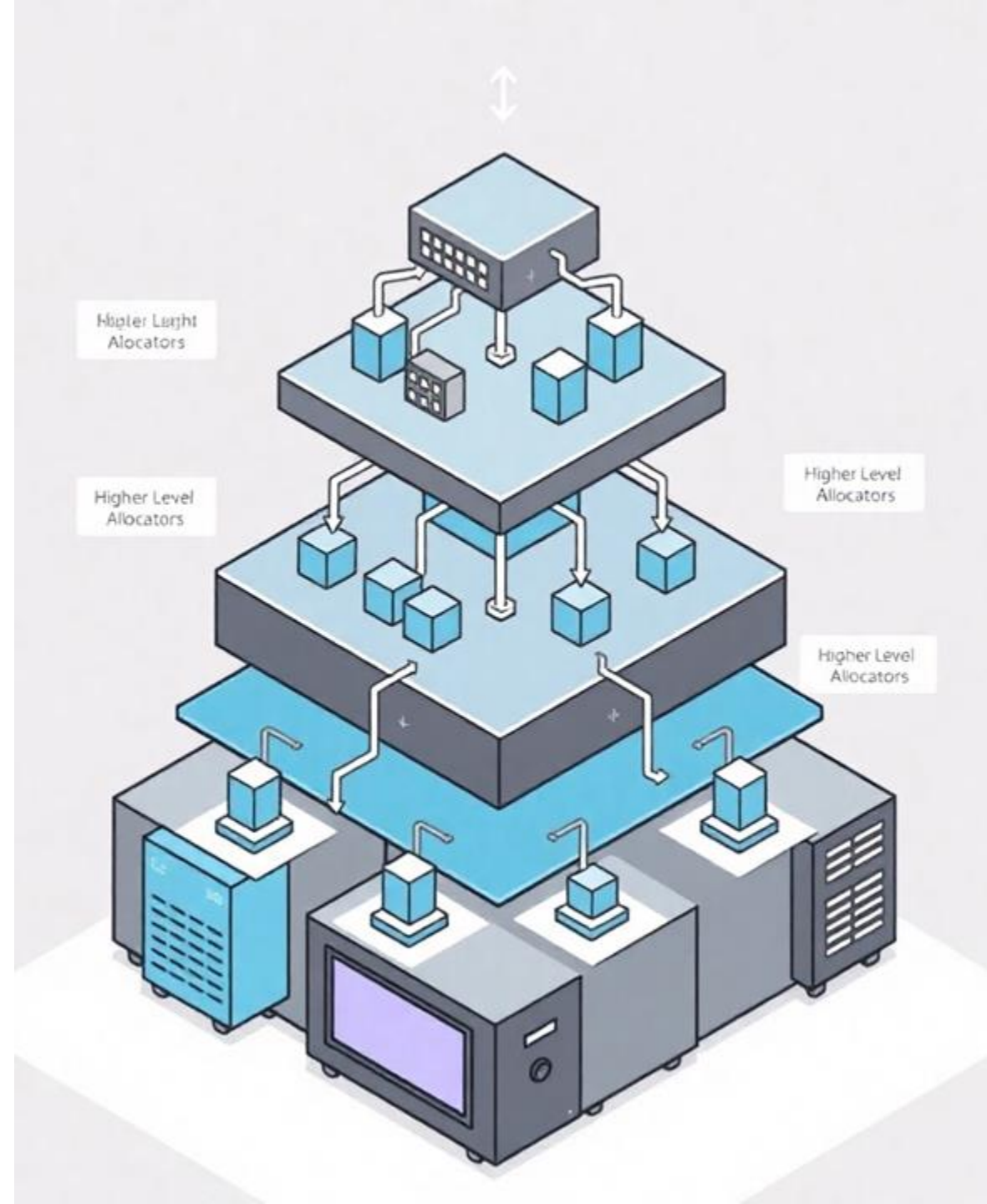
DISTRIBUTED RESOURCE ALLOCATION STRATEGY

- The **distributed resource allocation** strategy allows each edge device to manage its own resources.
- Edge devices make autonomous allocation decisions based on local information and rules.
- This decentralised approach enables **faster decision-making** and reduces reliance on a central authority.
- Despite its advantages, it may lack a global perspective, potentially resulting in **suboptimal resource allocation**.



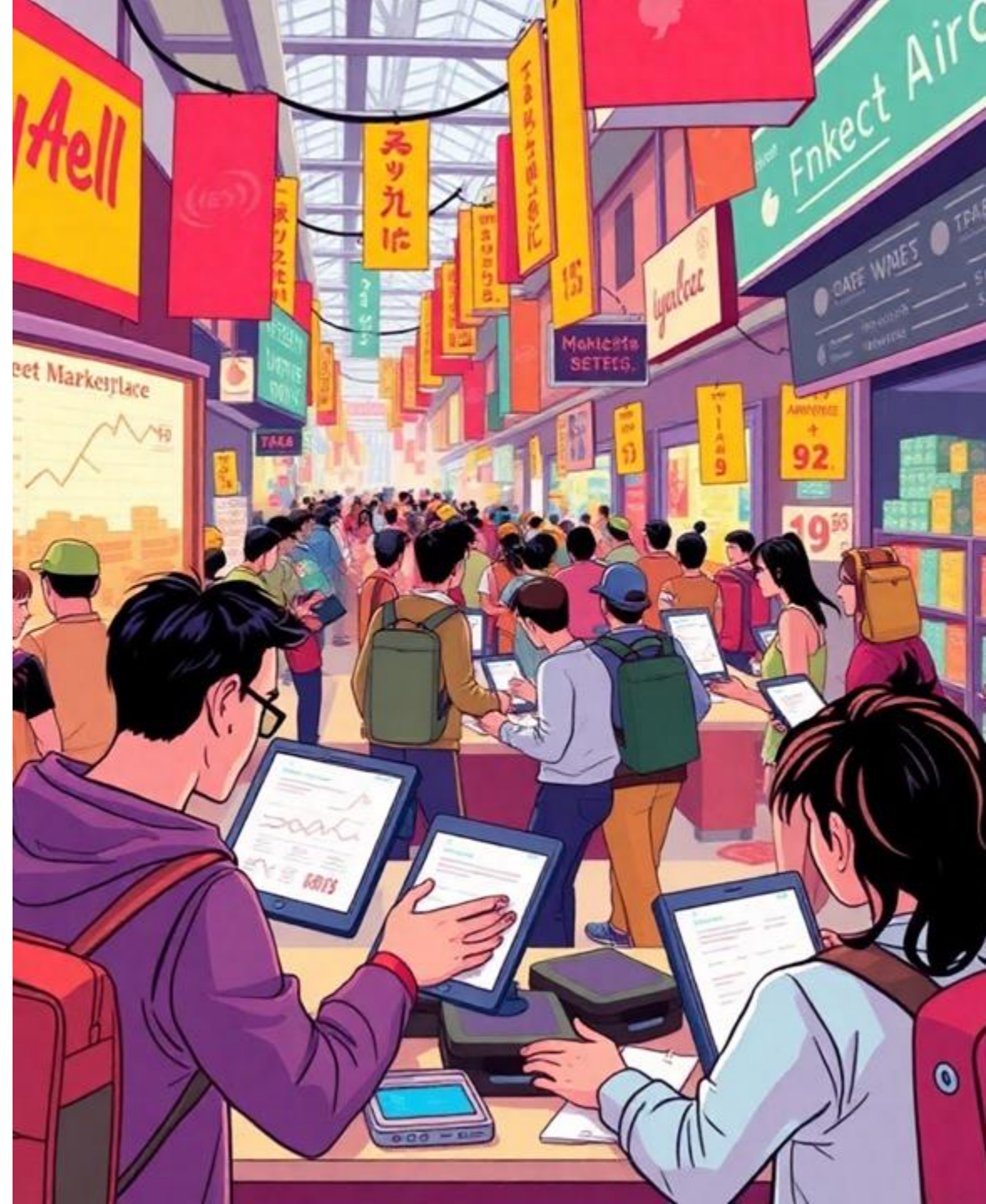
HIERARCHICAL RESOURCE ALLOCATION STRATEGY

- **Hierarchical resource allocation** divides the infrastructure into multiple layers, each with its own resource allocation responsibilities.
- Local allocators make decisions based on local data, while higher-level allocators coordinate across the hierarchy.
- This strategy enhances **scalability** and **flexibility**, allowing fine-tuning of resource allocation.
- However, it adds complexity in managing coordination across various levels.



MARKET-BASED RESOURCE ALLOCATION STRATEGY

- The **market-based resource allocation** strategy employs market mechanisms for decentralised resource distribution.
- Edge devices act as buyers and sellers, with prices determined by **supply and demand** dynamics.
- This approach encourages competition and allows for **dynamic adjustments** to resource allocation.
- A robust market design is necessary to prevent manipulation and ensure **fair allocation**.



PREDICTIVE RESOURCE ALLOCATION STRATEGY

- **Predictive resource allocation** uses historical data and analytics to forecast resource demands.
- Machine learning algorithms model usage patterns to facilitate proactive resource allocation.
- This strategy enhances resource optimisation based on future needs, improving **system performance** and efficiency.
- However, the effectiveness relies on accurate prediction models, and unexpected demand changes can lead to **suboptimal allocation**.

CONCLUSION:

CHOOSING THE RIGHT RESOURCE ALLOCATION STRATEGY FOR EDGE-CLOUD SYSTEMS

The selection of an appropriate strategy hinges on factors such as system requirements, application characteristics, and infrastructure constraints.

Edge computing systems can achieve optimal resource utilisation, thereby enhancing overall performance and user experience.

