Day 4 – Why is Kubernetes Used?

1. Why is Kubernetes Used?

Ans) Kubernetes is used to automate the deployment, scaling, and management of containerized applications. It provides a robust and production-ready system for running applications in containers across clusters of machines.

🚀 Why Kubernetes is Used

a. Container Orchestration:

-> Kubernetes manages hundreds or thousands of containers automatically.

-> It ensures that your containers run where and when you want them.

b. Scalability

-> It automatically scales applications up or down based on load (e.g., CPU usage, memory).

-> This helps maintain performance while optimizing costs.

c. High Availability & Fault Tolerance

-> If a container or node fails, Kubernetes can restart or replace it.

-> It can distribute workloads across nodes for better reliability.

d. Automated Rollouts & Rollbacks

-> You can deploy updates gradually and safely.

-> If something goes wrong, Kubernetes can rollback automatically.

e. Service Discovery & Load Balancing

-> Kubernetes exposes containers via DNS names or IPs.

-> It can distribute network traffic across multiple instances of a service.

f. Efficient Resource Utilization

-> Kubernetes optimizes resource usage by scheduling containers based on available resources.

g. Environment Consistency

-> Works the same in development, testing, and production, reducing “it works on my machine” problems.

🧱 Example Use Case

A company runs a web app made up of a frontend (React), a backend (Node.js), and a database (PostgreSQL)

With Kubernetes, they can:

-> Deploy each component in its own container

-> Scale the frontend during peak traffic

-> Restart backend containers on failure

-> Manage secrets and configurations securely

-> Update services without downtime