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**“AZƏRBAYCAN HAVA YOLLARI” CJSC**

**NATIONAL AVIATION ACADEMY**

**Topic**: What is Kubernetes

**Subject**: Operating Systems

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Kubernetes, also known as K8s, is an open-source system for automating deployment, scaling, and management of containerized applications.

## **What does Kubernetes do?**

Kubernetes is a platform for running your applications and services. It manages the full lifecycle of container-based applications, by automating tasks, controlling resources, and abstracting infrastructure. Enterprises adopt Kubernetes to cut down operational costs, reduce time-to-market, and transform their business. Developers like container-based development, as it helps break up monolithic applications into more maintainable microservices. Kubernetes allows their work to move seamlessly from development to production, and results in faster-time-to-market for a businesses’ applications.

Kubernetes works by:

* Orchestrating containerised applications across multiple hosts
* Ensures that containerised apps behave in the same way in all environments, from testing to production
* Controlling and automating application deployments and updates
* Making more efficient use of hardware to minimise resources needed to run containerised applications
* Mounting and adding storage to run stateful apps
* Scaling and load balancing containerised applications and their resources on the fly and reacting to changes in the workload
* Exposing containers to the internet, to other containers and to other clusters
* Health-checking and self-healing applications with auto-placement, autorestart, auto-replication and autoscaling
* Declaratively managing services, which guarantees that applications are always running as intended
* Being open source and maintained by a large, active community

**How does Kubernetes work?**

Kubernetes works by joining a group of physical or virtual host machines, referred to as “nodes”, into a cluster. This creates a “supercomputer” to run containerized applications with a greater processing speed, more storage capacity, and increased network capabilities than any single machine would have on its own. The nodes include all necessary services to run “pods”, which in turn run single or multiple containers. A pod corresponds to a single instance of an application in Kubernetes.

One (or more for larger clusters, or High Availability) node of the cluster is designated as the “control plane”. The control plane node then assumes responsibility for the cluster as the orchestration layer – scheduling and allocating tasks to the “worker” nodes in a way which optimises the resources of the cluster. All administrative and operational tasks on the cluster are done through the control plane, whether these are changes to the configuration, executing or terminating workloads, or controlling ingress and egress on the network.

The control plane is also responsible for monitoring all aspects of the cluster, enabling it to perform additional useful functions such as automatically reallocating workloads in case of failure, scaling up tasks which need more resources and otherwise ensuring that the assigned workloads are always operating correctly.

