MINISTRY OF SECURITY

CLOUD

MADE EASY

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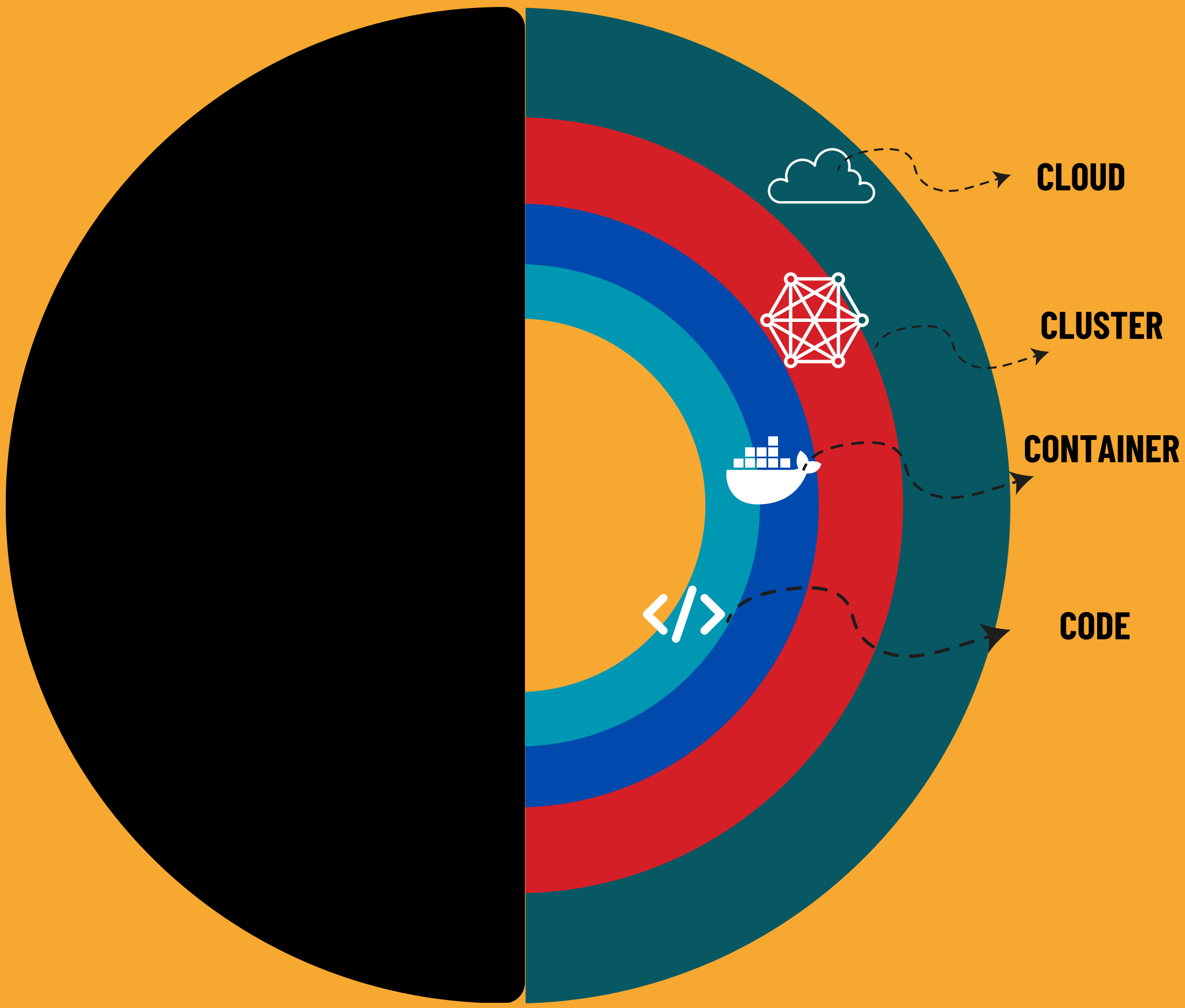
CLOUD ARCHITECTURE



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CONTAINER

Imagine you have software and want it to run reliably when moved from one computing environment to another.

For example, You’re going to test using Python 2.7, and then it’s going to run on Python 3 in production and something weird will happen.

A container is a light weight standalone executable package that contains everything needed to run an application including code, runtime, system tools and libraries, bundled into one package.

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POD

Let's say you have a simple web application consisting of two separate containers: a web server and a database.

The web server container needs to connect to the database container, but they are running in different environments with different network addresses. This makes it challenging for the web server to find and connect to the database.

A pod is a logical collection of one or more containers that share the same network namespace and storage volumes. and can communicate with each other using localhost.

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DOCKER

Docker is a containerization platform used for creating and running containers.

With Docker, developers can package and run applications in containers. Docker streamlines the delivery of applications by isolating them from the infrastructure.

Docker is an open-source containerization platform that helps build, deploy, and manage containers.
It provides a simple and efficient way to create, deploy, run, and manage containers

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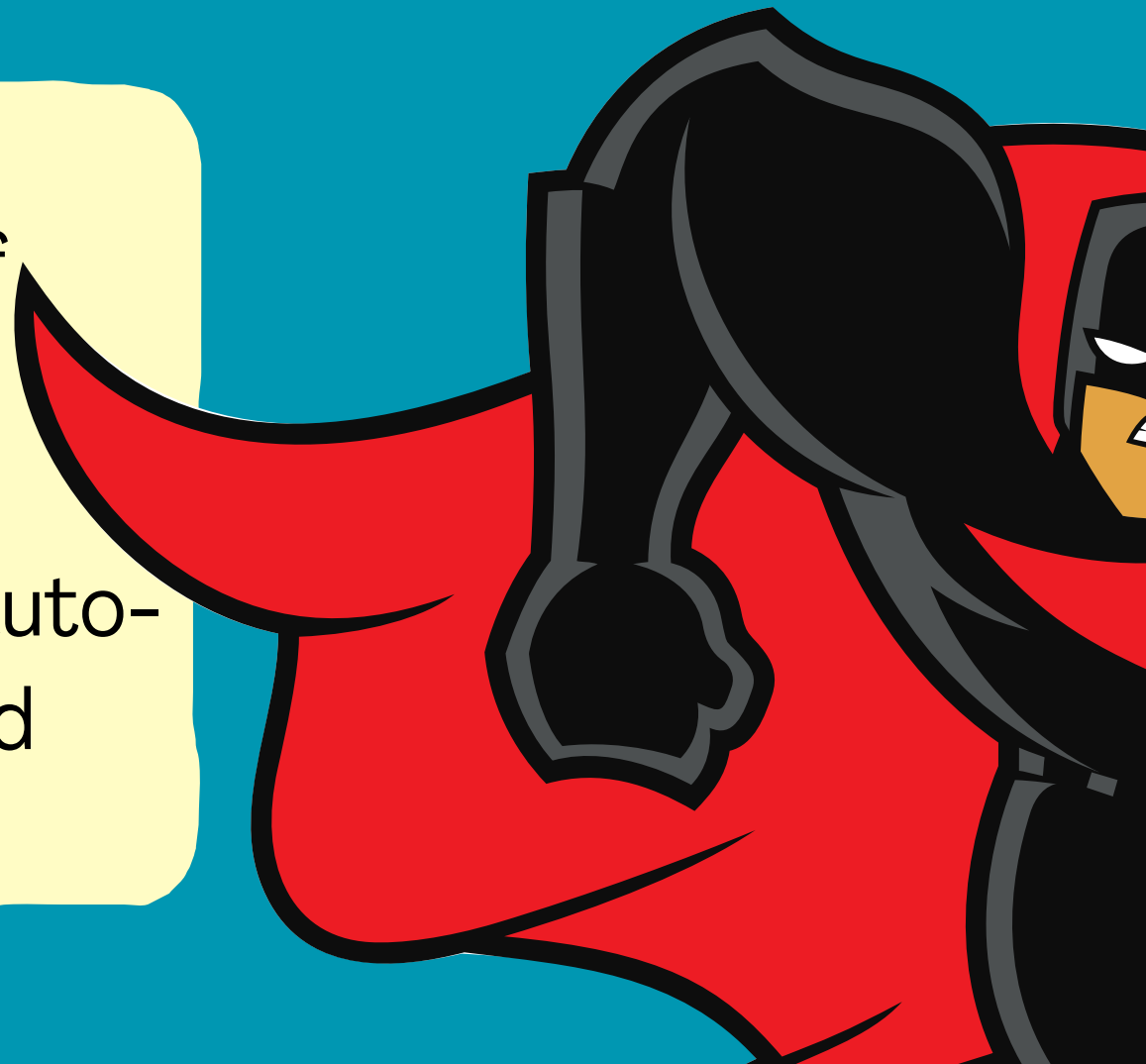
ORCHESTRATION (KUBERNETES)

Managing microservices, security, and network communication at scale and distributed systems in general is hard, if not impossible, to manage manually.

Kubernetes is an open-source container orchestration platform designed to automate deploying, scaling, and managing containerized applications.

Orchestration refers to managing the lifecycle of containerized applications. It enables deployment automatically (auto)scaling, auto-healing, load balancing and monitoring.



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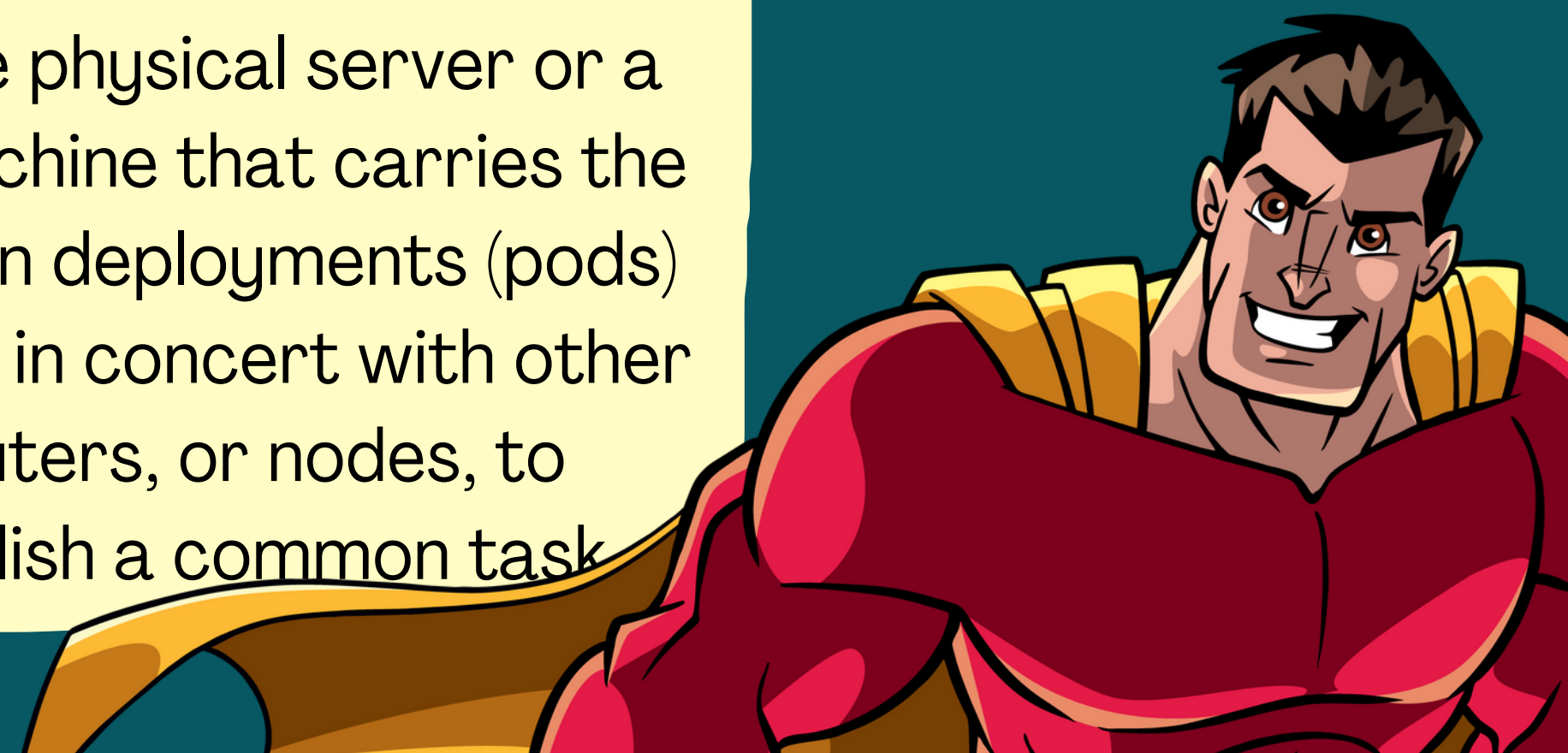
NODE

While an application could run on one single machine, there are some risks involved with that. Namely that the failure of the underlying system will disrupt the application.

To address this, developers started creating distributed applications where each process runs on its own node.

Nodes are the individual hardware physical server or a virtual machine that carries the application deployments (pods) and works in concert with other computers, or nodes, to accomplish a common task



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CLUSTER

Software that runs on a single computer presents a single point of failure if that computer crashes, or someone accidentally unplugs the power cable, then some business-critical system may be taken offline.

That’s why modern software is generally built as distributed applications, grouped together as clusters.

Distributed applications run across multiple machines, eliminating a single point of failure. The collection of all these containerized services, connected over a network, represent a cluster.

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VIRTUAL MACHINE

When physical hardware is bound to a single operating system, how well the machine's resources can be used is somewhat limited.

Also, when an operating system is bound to a single physical machine, its availability is directly tied to that hardware. If the physical machine is offline due to maintenance or hardware failures, so is the operating system.

A virtual machine (VM) rely on virtualization to carve a single physical computer into multiple virtual computers allowing multiple instances of single hardware to be used.

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HYPERVISOR

Imagine how tiring it would be to manually manage resource allocation or if there is no isolation between different operating systems and applications. If one OS crashes or is compromised, it can affect the entire system.

Hypervisors make it possible to use more of a system's available resources and provide greater IT mobility since the guest VMs are independent of the host hardware.

A hypervisor is software that creates and runs virtual machines (VMs). A hypervisor allows one host computer to support multiple guest VMs by virtually sharing its resources, such as memory and processing

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MULTITENANCY

A tenant is a user, application, or a group of users/applications that utilize the software to operate on their own data set.

Without multitenancy, each tenant would need a dedicated software installation. This increases resource utilization and maintenance efforts, ultimately software costs.

Multitenancy refers to a single software installation that serves multiple tenants and a segregated environment (work data, settings, list of credentials etc.), simultaneously serving multiple tenants.

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