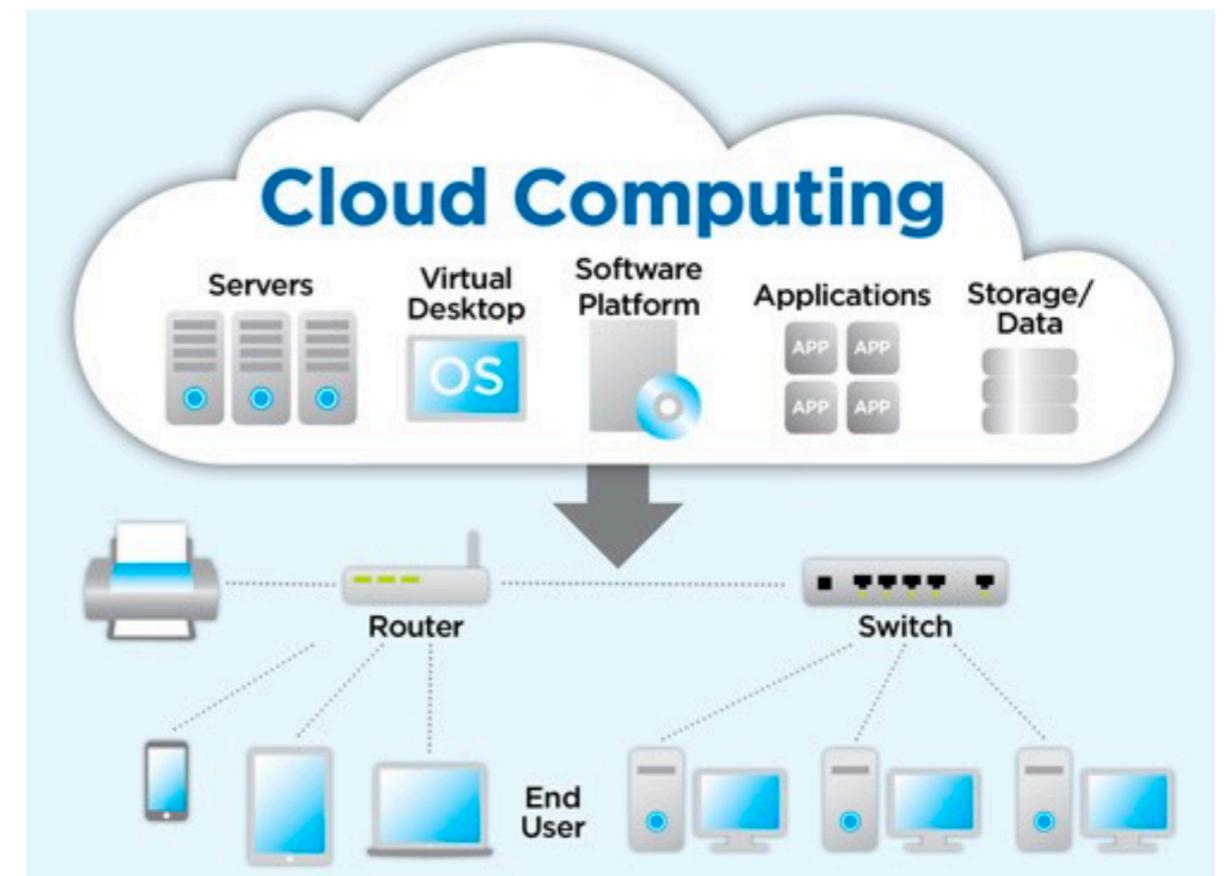


BY SASHWAT

TECHNIQUES TO SECURE DATA ON CLOUD: DOCKER SWARM OR KUBERNETES?

WHAT IS CLOUD COMPUTING?

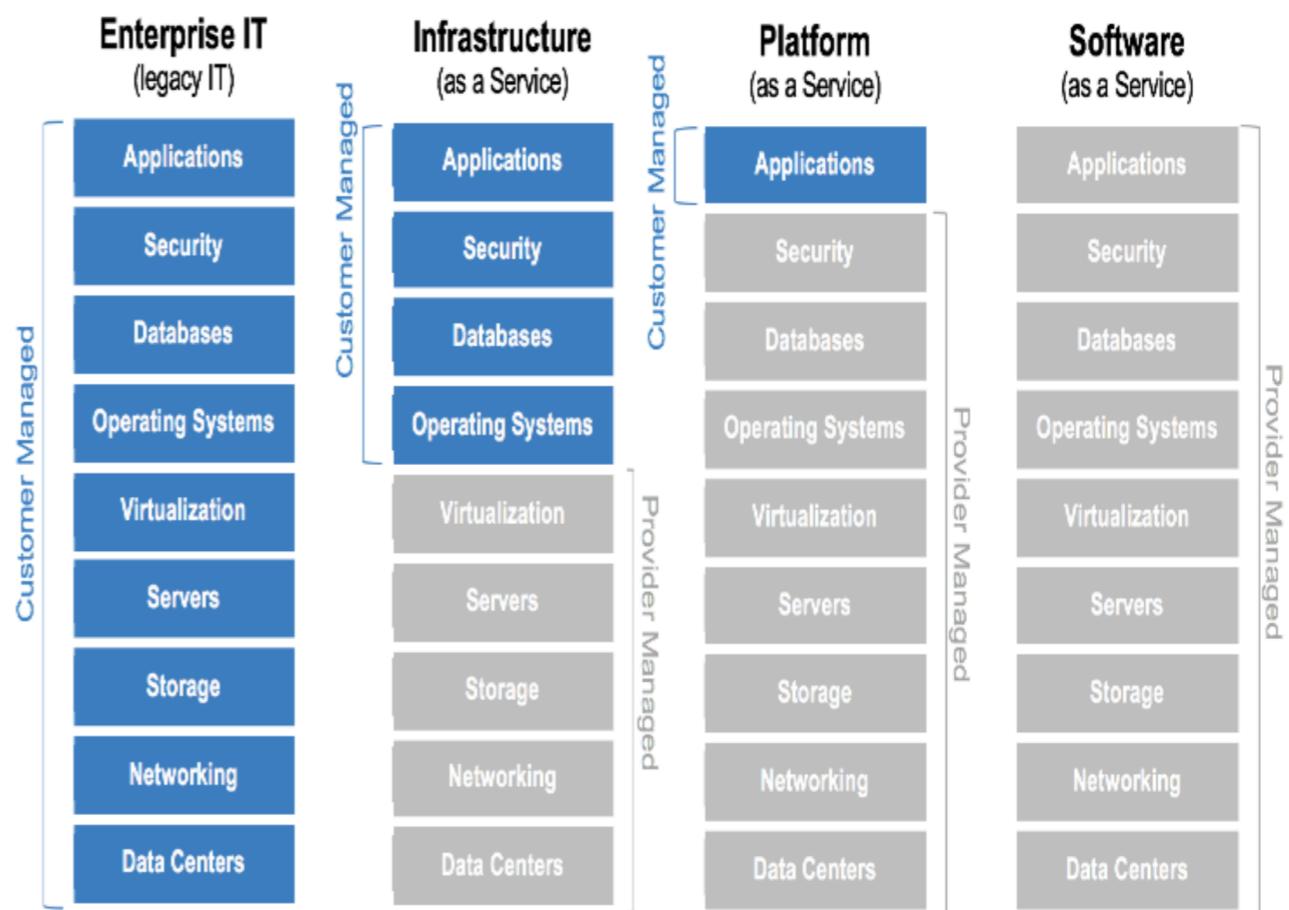
- ▶ A Cloud Computing model is a model which enables convenient, on demand network access to a shared pool of configurable computing resources and services.
- ▶ The resources includes:-
 - ▶ Network
 - ▶ Storage
 - ▶ CPU cores
 - ▶ RAM



INTRODUCTION

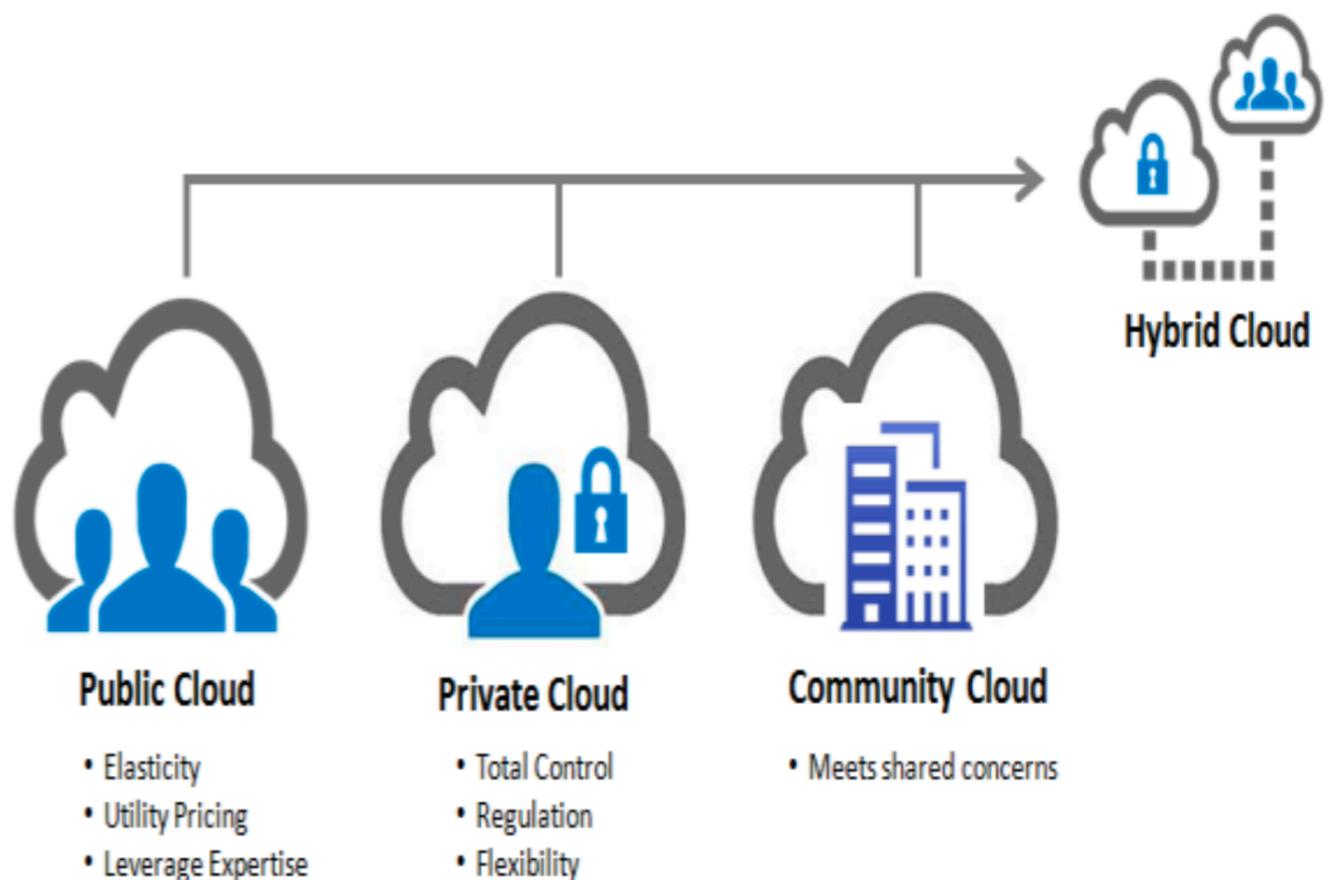
CLOUD COMPUTING SERVICE MODEL

- ▶ Infrastructure as a Service (IaaS)
- ▶ Platform as a Service (PaaS)
- ▶ Software as a Service (SaaS)



CLOUD COMPUTING DEPLOYMENT MODEL

- ▶ Public cloud
- ▶ Private cloud
- ▶ Community cloud
- ▶ Hybrid cloud



SECURITY

- ▶ Three principles of cloud security:-
 - ▶ Availability
 - ▶ Confidentiality
 - ▶ Integrity
- ▶ Best security method - Cryptography, RSA algorithm and Container clustering
- ▶ Kubernetes and Docker swarm are technologies that use container clustering

WHAT IS CONTAINER?

- ▶ A container image is a lightweight, stand-alone, executable package of a piece of software that includes everything needed to run it: code, runtime, system tools, system libraries, settings.
- ▶ It is platform independent.

WHAT IS DOCKER?

- ▶ Docker is a set of platform-as-a-service products that use OS-level virtualisation to deliver software in packages called containers.
- ▶ Core DevOps tool.
- ▶ Docker is the next step from virtualisation. Before virtualisation, all the features were deployed in one server.

ADVANTAGES OF DOCKER?

- ▶ Continuous deployment and testing.
- ▶ Multi-Cloud platform (Available in AWS, DigitalOcean etc).
- ▶ Environment standardisation and version control.
- ▶ Isolation (Kernel Level).
- ▶ Security.

RELATIONSHIP BETWEEN CLOUD COMPUTING AND DOCKER?

- ▶ Docker with PaaS.
 - ▶ Fundamental unit / Feature by cloud providers.
 - ▶ Eg: AWS, DigitalOcean etc.
- ▶ Docker with IaaS.
 - ▶ Docker deployed on Virtual Machine.
 - ▶ Eg: Docker on a VM.

WHY USE DOCKER SWARM OR KUBERNETES OVER DOCKER?

- ▶ Coordination
- ▶ Scheduling
- ▶ Orchestration
- ▶ Best use for large scale environment.

DOCKER SWARM VS KUBERNETES

- ▶ Networking:-
 - ▶ Docker swarm: Node model. Creates a overlay network for the containers and a host only bridge for communication.
 - ▶ Kubernetes: Flat network. Allows interaction with each other.

CONTINUE..

- ▶ High Availability:-
 - ▶ Docker swarm: Load balancing detects unhealthy pods and removes it.
 - ▶ Kubernetes: Controls entire cluster and handles worker node's resources.

CONTINUE..

- ▶ Container setup:-
 - ▶ Docker swarm: Native tools support for docker
 - ▶ Kubernetes: YAML, APIs and client definitions. Cannot use Docker compose.

CONTAINER CLUSTERING AND GLUSTERFS

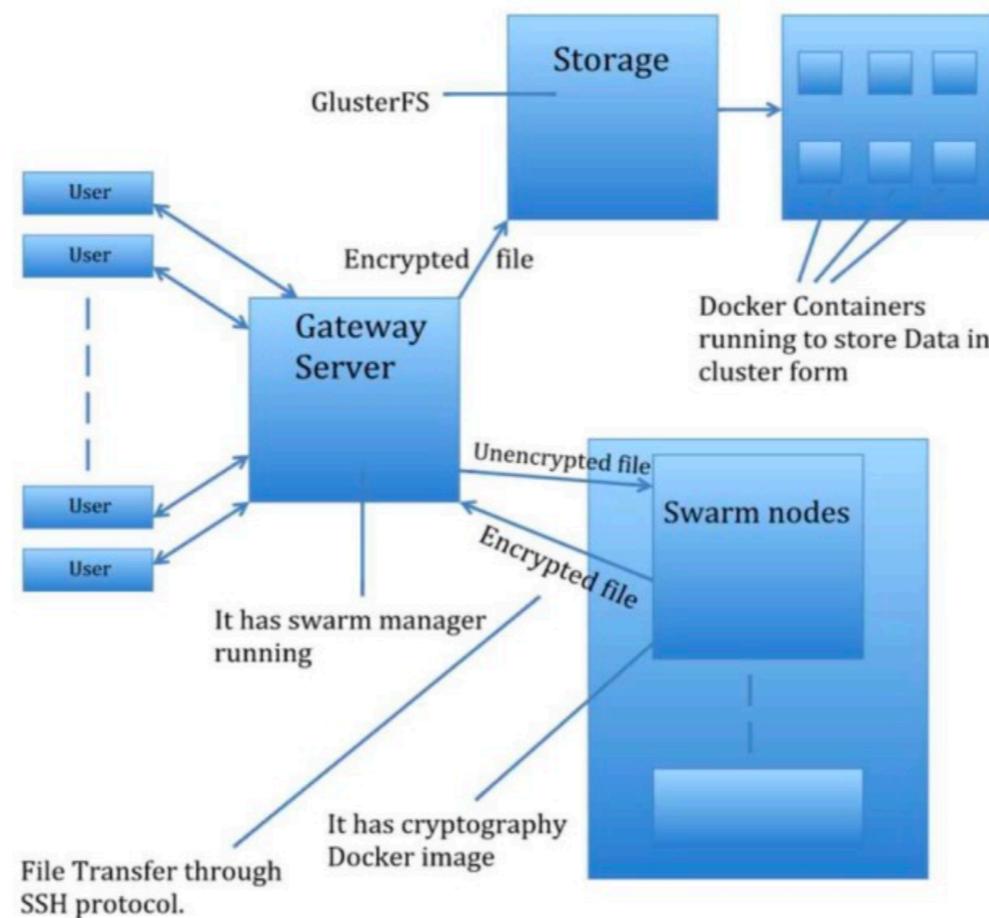
- ▶ Network file system developed by RedHat.
- ▶ Used for storing data in clusters.
- ▶ Process: Stripping or replicating or both.

ENCRYPTION OVER CLOUD MODEL AND ITS PROCESS USING CONTAINER

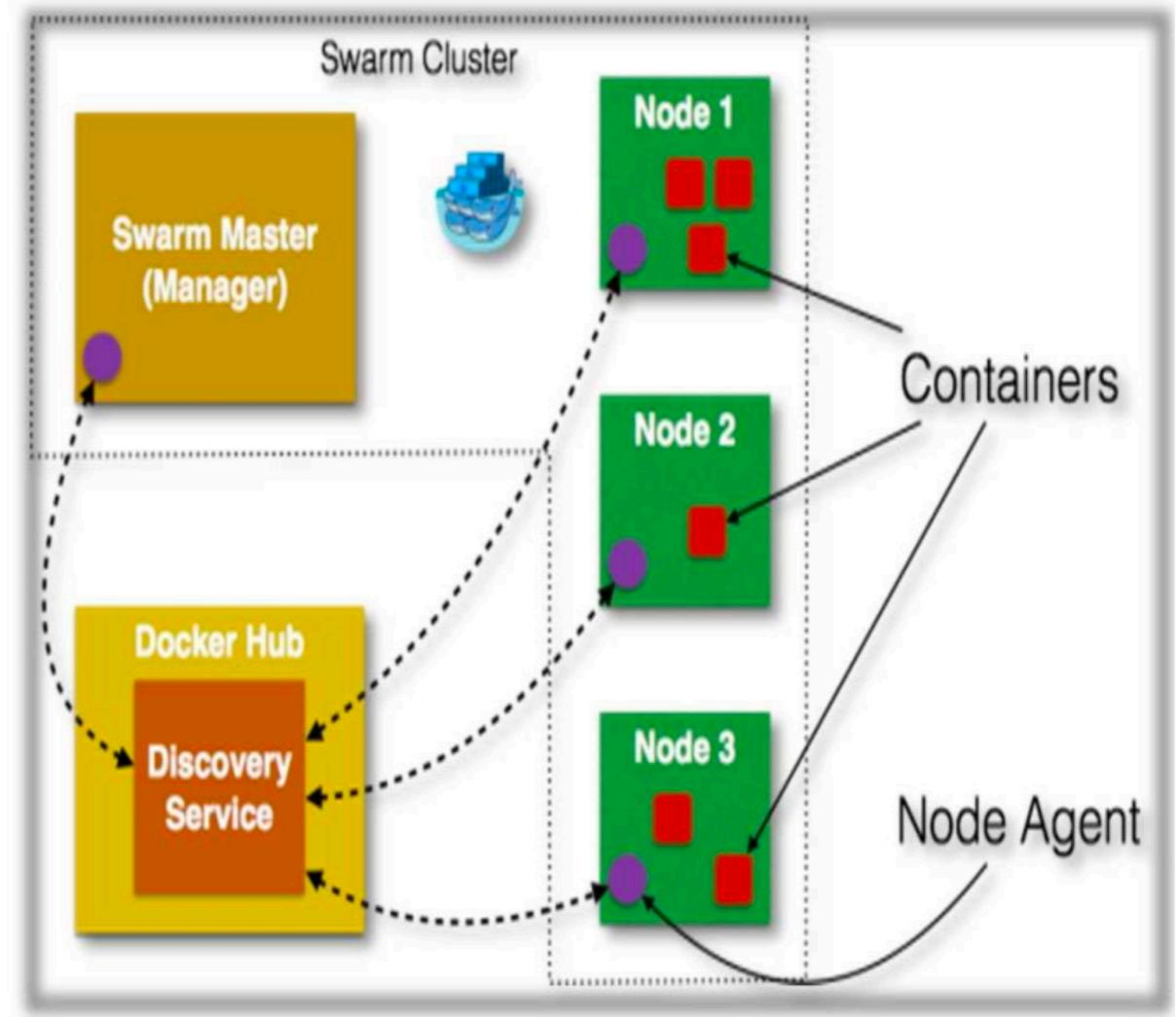
- ▶ Swarm manager
 - ▶ Send plain text (Unencrypted) to a container running Docker Cryptography Container.
- ▶ Gateway Server
 - ▶ Uses SSH for communication.
- ▶ Gateway Manager
 - ▶ Data stored to make highly available.

CONTINUE..

- ▶ GlusterFS:-
 - ▶ Stores data to multiple docker containers.



DOCKER



SWARM MODEL

USING KUBERNETES INSTEAD OF DOCKER SWARM

- ▶ More efficiency.
- ▶ Better power, performance and flexibility in container management.
- ▶ Better optimisation for the existing model.

CONCLUSION

- ▶ Cloud computing is very popular and are more prone to cyber threats.
- ▶ So securing the cloud is a necessity.
- ▶ The technology of containers is used to secure data that is being uploaded to the cloud.
- ▶ For each user a container can be used to manage encryption / decryption of user data.
- ▶ Kubernetes is better for this model due to its shear strength.

THANK YOU