RV Educational Institutions

RV Institute of Technology and Management®

Bangalore – 560076

Event Name	**Cloud Computing and Devops : From VIrtual Machine and Kubernates**
Date	3rd and 5th of April 2025
Venue	MCA Seminar hall, RVITM
Audience	VI semester students of CSE branches of RVITM
Resource Person	M. VIjayasanthi
Faculty Coordinators	Mrs Rachana M S (Assistant Professor, Dept. of CSE, RVITM) Mrs. Prabhavathi K (Assistant Professor, Dept. of CSE, RVITM)

Department of Computer Science and Engineering

Objective of the Program:

The objective of this report is to present a detailed account of the two-day workshop titled **"Cloud Computing and DevOps: From Virtual Machine to Kubernetes."** The workshop was aimed at equipping students with foundational and advanced knowledge in cloud computing, starting from basic virtual machines to containerization and orchestration using industry-standard tools like Docker and Kubernetes. It intended to bridge the gap between academic learning and practical implementation by providing hands-on exposure to real-time cloud deployment scenarios.

The report outlines the transition from traditional virtualized environments to lightweight, scalable container-based architectures. It focuses on building an understanding of how Docker simplifies application deployment, and how orchestration tools like Docker Swarm and Kubernetes enable automated scaling and management of containerized workloads. The workshop also emphasized DevOps practices such as continuous deployment, system monitoring, and cost optimization using AWS services like EC2, S3, CloudFront, CloudWatch, and ElasticCache. Through this report, the goal is to capture the essence of the workshop and provide a structured summary of all the concepts, tools, and strategies explored, ultimately preparing students to approach cloud-native and DevOps roles with confidence.

Topics Covered

Day 1: Introduction to Cloud, Docker, and EC2

- Introduction to cloud computing
- Life advice session by the resource person
- Basics of Docker and containerization
- Hands-on with common Docker commands
- Practice using Docker Playground for testing containers
- AWS account creation and setup
- Launching EC2 instance on AWS
- Installing Docker on the EC2 instance
- Running containers on cloud infrastructure
- Introduction to Docker Swarm and its core concepts

Day 2: Kubernetes, Caching, and Cloud Services

- Understanding Kubernetes: clusters, pods, and orchestration
- Kubernetes setup using DigitalOcean
- Hands-on session with Kubernetes commands
- Introduction to caching: what it is and how it helps
- Cache hit vs. cache miss explained
- Choosing the right load strategy for performance
- Real-world use cases of caching in applications
- Setting up AWS ElasticCache for Redis
- Creating and configuring S3 buckets
- Integrating S3 with CloudFront for content delivery
- Monitoring with AWS CloudWatch
- Creating billing alarms and setting cost alerts
- Importance of monitoring cloud infrastructure

Event Details:

The Cloud Computing and DevOps Workshop was conducted successfully over two days, on 18th and 19th March 2025, at the MCA Seminar Hall, RVITM. The session was organized for the benefit of third-year Computer Science and Engineering (CSE) students of the 2022 batch, aiming to bridge the gap between academic knowledge and industry-relevant cloud skills

Attendance was made mandatory, and students were instructed to carry fully charged laptops to ensure seamless participation during the interactive hands-on labs. Strict attendance monitoring was in place throughout both days to maintain a high level of involvement and discipline during the sessions**.**

Day 1 Highlights – Cloud, Docker & Orchestration

Introduction to cloud computing, IT infrastructure, and DevOps career paths

Life and career advice on becoming a Cloud/DevOps engineer

Docker installation and basic commands (`run`, `ps`, `stop`, `rm`)

Writing Dockerfiles and building custom images

Pushing images to Docker Hub

Pulling Nginx from Docker Hub and running containers

Multi-node orchestration using Docker Playground and Docker Swarm

Introduction to Kubernetes: architecture, pods, and clusters

Setting up Kubernetes using Minikube and DigitalOcean

Day 2 Highlights – AWS, Caching & Monitoring

Cache concepts: hits, misses, TTL, write-through vs write-behind strategies

AWS account creation and IAM configuration

EC2 instance setup and Docker installation on cloud servers

Redis cluster setup via AWS ElasticCache

S3 bucket creation, file uploads, and CloudFront integration

Monitoring with AWS CloudWatch and setting performance alarms

Cost control through billing alert configuration and usage tracking

Bootcamp Outcomes:

Participants developed a strong foundation in **cloud computing concepts**, including virtualization, containerization, and cloud-native application deployment.

They gained **hands-on experience with Docker**, from writing Dockerfiles and managing containers to pushing custom images on Docker Hub.

Students successfully worked with **Docker Swarm and Kubernetes**, understanding how to orchestrate containers across nodes, scale services, and manage deployments using YAML and kubectl.

Through guided sessions, they learned to **launch and configure AWS EC2 instances**, set up security groups, and deploy containerized applications in the cloud.

The workshop introduced key **AWS services** like **S3**, **ElasticCache**, and **CloudFront**, allowing participants to explore storage, caching, and content delivery in real-world scenarios.

Attendees were taught how to use **AWS CloudWatch** to monitor infrastructure and set up **billing alerts** for cost optimization—an essential DevOps skill.

By the end of the bootcamp, students were capable of designing, deploying, and monitoring a **complete cloud infrastructure stack**, using industry-relevant tools like Docker, Kubernetes, and AWS services.

Acknowledgments:

The successful execution of the **Cloud Computing and DevOps: From Virtual Machines to Kubernetes** workshop on **3rd & 4th April 2025** would not have been possible without the collective support and guidance of the following individuals:

Resource Person:

Ms. M. Vijayasanthi
Seasoned AWS and DevOps Engineer with over 5 years of hands-on experience in the IT industry. Her in-depth knowledge and real-world insights brought tremendous value to the participants.

Faculty Coordinators:

Mrs. Rachana M S, Assistant Professor, Department of CSE, RVITM

Mrs. Prabhavathi K, Assistant Professor, Department of CSE, RVITM

Coordinator Signature	Coordinator Signature	HOD's Signature
Mrs. Rachana M S	Mrs. Prabhavathi K	
Assistant Professor	Assistant Professor	
Dept. of CSE	Dept. of CSE	
RVITM	RVITM	