SRE Operations Training
(3 Day)

Why OneCloud?

OneCloud Consulting is dedicated to providing exceptional technical education and professional services. Our team of experts combine skill, knowledge, and experience in providing quality education on Cloud Transformation, Infrastructure Automation, and Software Development. Our specializations include Cloud Services, Network and Services Automation, Data Center Solution Design and Deployment Services, and Technical Strategy.

Course Description

The SRE hands-on workshop equips students with the skills to manage both systems and applications in cloud environments. It offers comprehensive knowledge of the technologies involved in building IT and cloud infrastructure Upon completion, you will have a solid foundation to provide support for systems and applications in the cloud, using AWS as the primary platform. However, the acquired skills are transferable to other cloud platforms, such as Azure and GCP.

This course is a hands-on learning experience designed to familiarize the student with GitOps. GitOps is a unique approach to automating pipelines. It utilizes a version control system to create and maintain the infrastructure as well as the application source code. We will use a number of tools to create this workflow to build a complete workflow.

After this course you should be able to understand:
- Understand complete pipeline for capturing, storing, analyzing, alerting, and remediating
- Use Terraform to Deploy Cloud Environments (IAC)
- Build Ansible playbooks to manage configuration
- Enable Telegraf to collect metrics from many source
- Comprehend Prometheus stores the metrics
- Appreciate how Grafana can visualize the metric
- Create Alerts in Prometheus to trigger events
- Configure Fluent Bit captures logs and the parses and prepares the data
- Understand how Elasticsearch Stores the log data
- Setup Kibana to Visualize and Generate alerts and trigger events
- Use Argo Workflow to analyze and store what action to take in Github
- Watch GitHub actions triggers and runners

Prerequisites
- Familiarity with IT Operations
- Knowledge of basic IT troubleshooting
- Basic knowledge of Cloud Environment
- Some knowledge of git/GitHub

Who Should Attend?
- SRE
- Cloud/AWS Cloud Engineer
- Technical Support Eningeer
- IT & Cloud Support Analyst

Module 1: Infrastructure as Code: Terraform – AWS Hands on

- Terraform Basics
- Terraform Provider
- Terraform Modules
- Terraform Files
- Testing and Deploying
- Rollback
- Module Development
- Terraform CI/CD with github actions – CI/CD process

Module 2: Configuration as Code: Ansible

- Real World Use Cases
- Ansible CLI Tips & Tricks
- Troubleshooting
- Linters & Tools
- Inventory, Playbooks, Vault
- Loops & Task Controls
- Jinja2
- Roles
- Ansible & Terraform trigger via GitHub Actions

Module 3: Telegraf

- TelegrafBasics
- Configure Telegraf
- Telegraf plugins
- Telegraf use Cases

Module 4: Prometheus, Alert Manager, Grafana

- Collecting Metrics from OS and Various Apps
- Collecting Metrics from Kubernetes
- Collecting custom endpoints outside of Kubernetes (MongoDB, confluent kafka)
- Retrieving Metrics (How to use PromQL)
- Functions in Prometheus
- Teregraf metric Alerting (Using PromQL to setup alerts)
- Security in Prometheus
- Grafana Dashboard

Module 5: Fluent Bit

- Fluent Bit
- Key Concepts
- Fluent Bit Data Pipeline
- Stream Processor
- Buffering
- Input & Parser
- Filter
- Router & Output (kafka)
- How to add custom labels and tags for logs

Module 6: ELK with Kafka and Kibana alerts

- ELK Introduction
- Elasticsearch
- Elasticsearch Architecture with Kafka
- Logstash Overview
- Kibana
- Interacting with Kibana GUI
- Visualizations
- Kibana query Elastic Alerts

Module 7: Argo Workflow

- Getting Started
- Core Concepts
- Templates
- Inputs and Outputs
- Loading and saving data in a workflow.
- Reuse
- Workflow templates
- Cron workflows
- Exit handlers

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Terraform
- Terraform and AWS CLI Installation
- Terraform Basic Commands
- Fundamental Manifest Section
- Resource Meta-Argument - depends_on, count, For_Each
- Terraform Variables
- Terraform Modules
- Create VM in EC2 (small) commit to GitHub
- Create Kubernetes Deployment and Service commit to GitHub
- Create S3 storage commit to GitHub

Ansible
- CLI Tools & Ad-Hoc Commands
- Linters & Tools
- Inventory
- Playbooks
- Variables and Inclusions
- Loops
- Mount S3 storage on EC2 VM (github)
- Install MySQL on VM (github)
- (Later in class will use Ansible to deploy Telegraf and FluentBit)

Telegraf
- Telegraph Plugins
- MySQL
- Kubernetes
- Linux
- Libvirt
- Python
- Ceate a Telegraf Configuration for Prometheus
- Install Telegraf with Ansible on VM

Prometheus, Alert Manager, Grafana
- Data Sources
- Prometheus PromQL
- Metric & Data Types
- Feature Flags
- Subqueries, Operators
- Functions
- Grafana Dashboards
- Using, Importing, & Cloning
- Dashboard Creation with PromQL
- K8S Dashboard
- Virtual Machine Dashboard
- MySQL Dashboard
- Challenge Lab

Alert Manager
- Configuring Alert Rules
- Notifications
- Resource Approaching Capacity Limit - VM
- Nodes in a NotReady State – K8S
- Processing Jobs Not Running – MySQL
- Challenge Labs

Fluent Bit
- Fluent bit Service, Input, Filter, and Output Sections
- Install fluentbit w/Ansible
- verify logs to Elasticsearch
- Configuring Parser
- Using and Modifying Common Parsers
- Kubernetes, Linux, MySQL
- Labels and Tags
- Environment & Lifecycle Variables
- Selecting specific record keys
- Grouping Results and Window
- Querying Data
- Filtering logs per tags, Node, Pods.
- Query Challenge

GitHub Actions
- Basic Config and usage
- Create an Actions
- Runners
- Trigger Ansible
- Trigger Terraform

Argo Workflows
- Argo CLI
- Create a simple workflow
- Workflow Templates
- Container Example
- Resource Example
- Template for Ansible
- Template for Terraform
- Template for Windows - PowerShell
- Multi-Step workflow
- Workflow Exit Handler
- Workflows Cron Jobs
- Workflow Kubernetes Jobs
- Secrets and Config Maps
- Argo Workflows UI

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