DevOps School – Diploma

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Variant 7

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Task description

Variant 7

Task:

- Using API https://www.metaweather.com/api/ get data about weather in Moscow for current month and store it into DB:

    - id

    - weather state name

    - wind direction compass

    - created

    - applicable date

    - min temp

    - max temp

    - the temp

Output the data by date (the date is set) in the form of a table and sort them by created in ascending order.

Application:

http://dev-epm-diploma-v7.westeurope.cloudapp.azure.com/

http://prod-epm-diploma-v7.westeurope.cloudapp.azure.com/

Grafana:

http://grafana-epm-diploma-v7.westeurope.cloudapp.azure.com/

GuthHb – application source code:

https://github.com/rinxster/epam-diploma-v7

GuthHb – Terraform IaC:

https://github.com/rinxster/epam-diploma-v7-IaC

Architecture Decisions

Domain	Related Course Module	Solution\tool used
SCM	Git	GitHub
Tests(optional)	CI/CD	N/A - Skipped as optional
Quality gate	CI/CD	SonarCloud + Azure Devops
IaC	Cloud, Terraform, Ansible	Terraform
Orchestration	Kubernetes	Azure Kubernetes Service (AKS)
Logging	Monitoring and Logging	Azure Monitor, LogAnalyticsWorkplace
Monitoring	Monitoring and Logging	Azure Monitor, Grafana
Runtime/Deployment	CI/CD	Azure Devops
Scalability/redundancy	Kubernetes	Azure Kubernetes Service (AKS)
Cloud and Cost efficiency**	Cloud	Azure costs management+Azure Budget

SCM - GitHub

- GitFlow used as branching strategy
- Main and develop are permanent branches.
- Feature/fix branches are temprorary and deleted after merge.
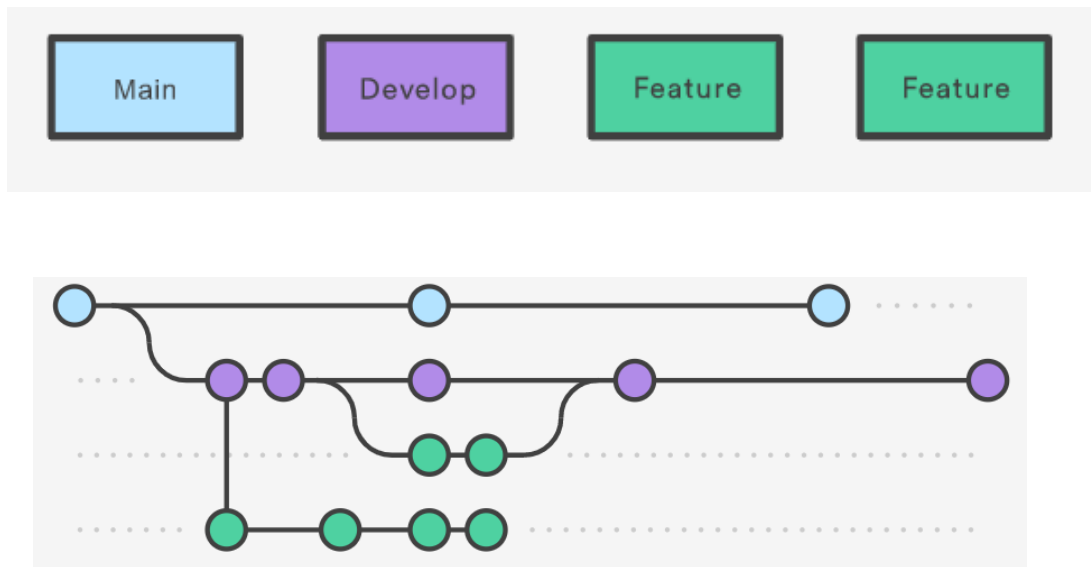
IaC – Terraform

IaC design deployed using Terraform in Azure

GuthHb – Terraform IaC:
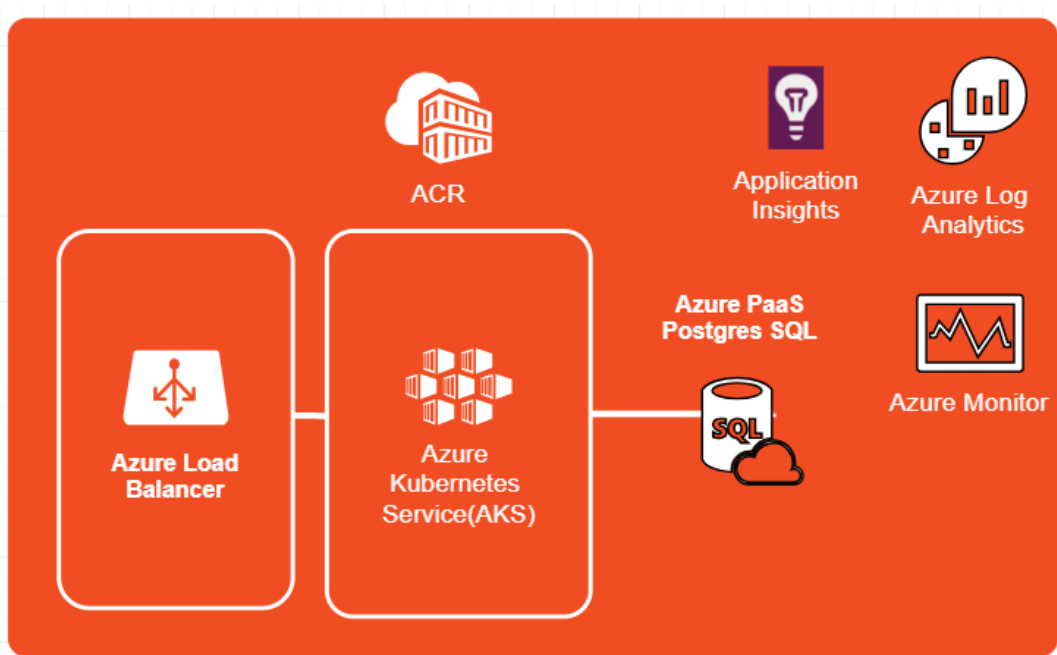
https://github.com/rinxster/epam-diploma-v7-IaC

- NB: Following resources are pre-deployed in advance manually:
    - Storage Account(to store tfsate and run Azure Cloudshell)
    - Resource Group
    - Azure Key Vault(to prepare and store passwords for deployment)

Orchestration - AKS

Azure Kubernetes Service (AKS)

Prod\Dev namespace overview

{{azure-dns-label-name}}.westeurope.cloudapp.azure.com

Azure
Load Balancer
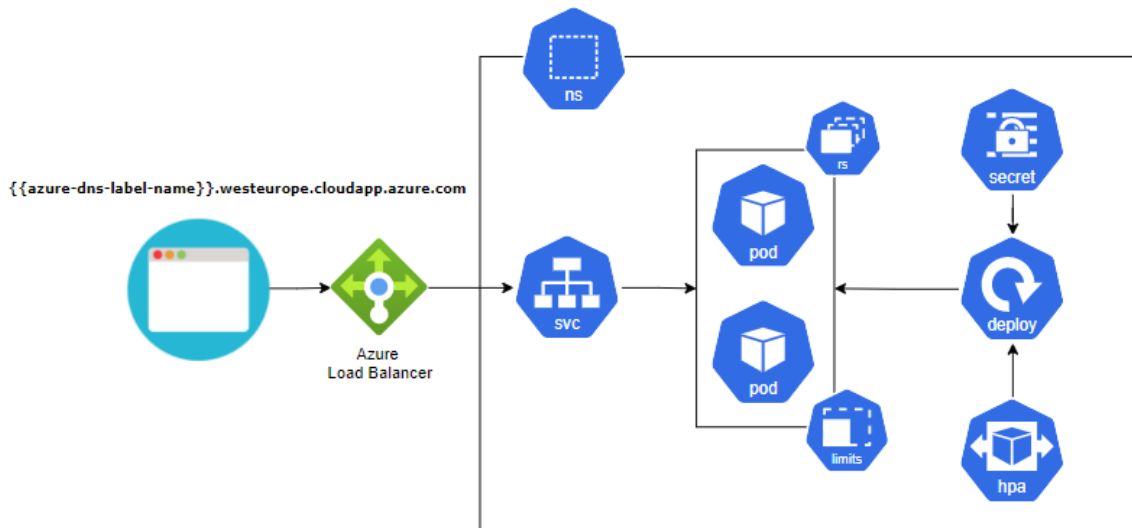
- 2 namespaces: Prod and Dev
- Secrets file generated with data from Azure KeyVault
- Horizontal pod autoscaler configured.
- 1 separate namespace for Grafana: "Monitoring"
- Grafana (deployed separately using helm chart).

Runtime/Deployment - CI\CD

Azure DevOps

- Separate CI\CD pipelines for DEV and PROD.

- Dev\Prod CI triggered by commit in Dev\Main branches

- Dev\Prod CD triggered once appropriate Dev\Prod CI pipeline completed successfully.

- Azure KeyVault used to store passwords and keys securely for the files that are prepared and published during CI

- CD has Quality Gate enabled (SonarCloud)

- Annotations added to Grafana dashboard upon Prod\Dev CD completion.

- Telegram notifications sent upon CI\CD completion(whether failed or succeeded)

CI Pipeline

CD Pipeline

Telegram notifications example

Quality Gate

CI Pipeline

Results published

CD Pipeline

Logging – Azure Monitor and Log Analytics Workplace

Monitoring with Grafana and Azure Monitor
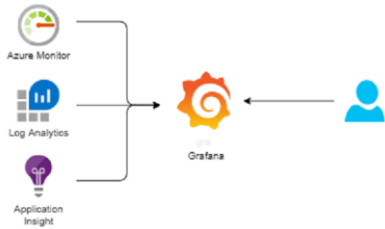
Application Monitoring:

"appinsights" python module used to report data to Azure Application Insighs(integrated into app.py and index.html template)
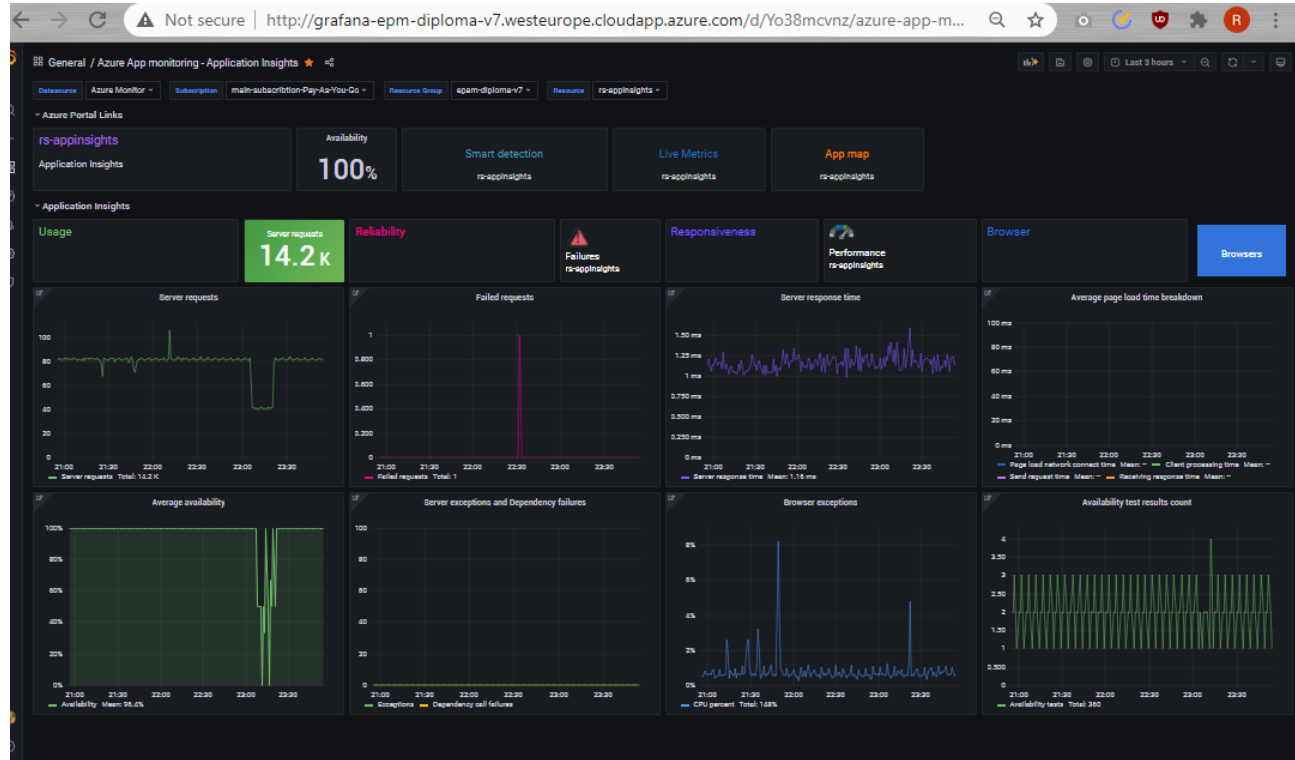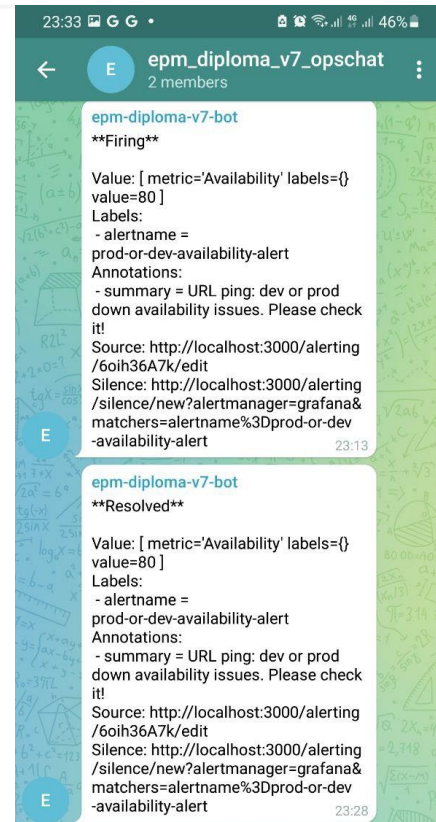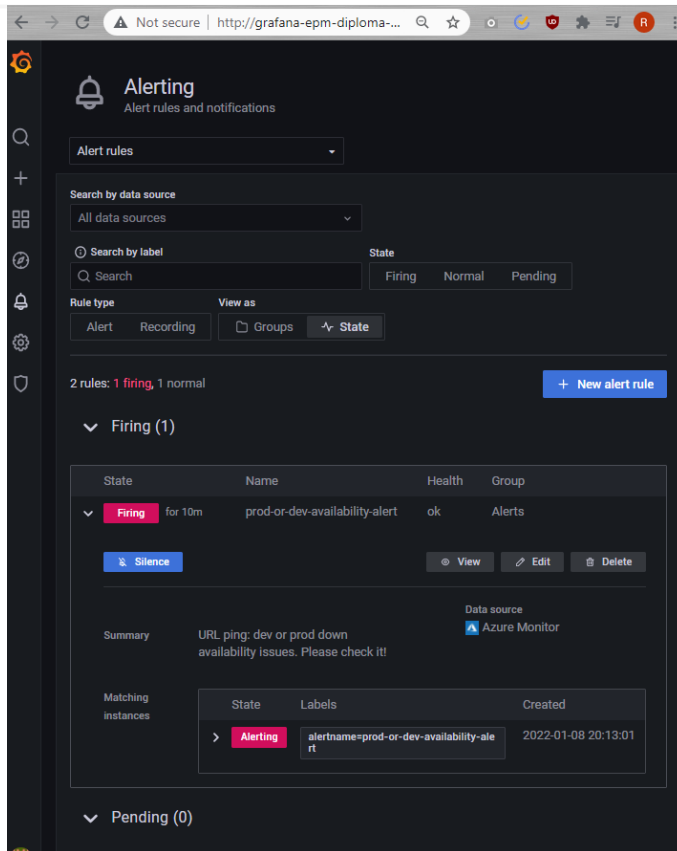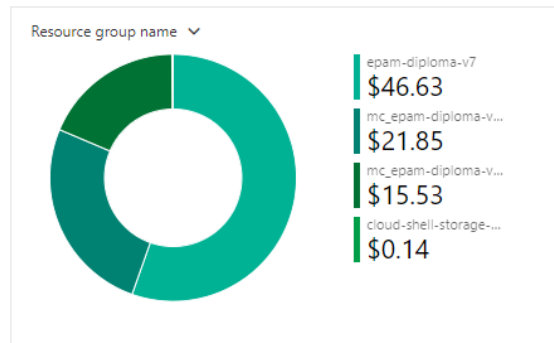
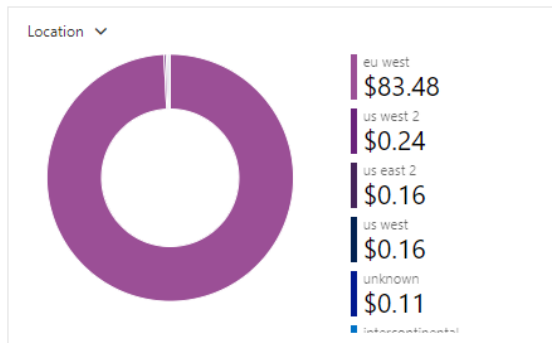# Azure DevOps Webhooks and Grafana CD Release annotations

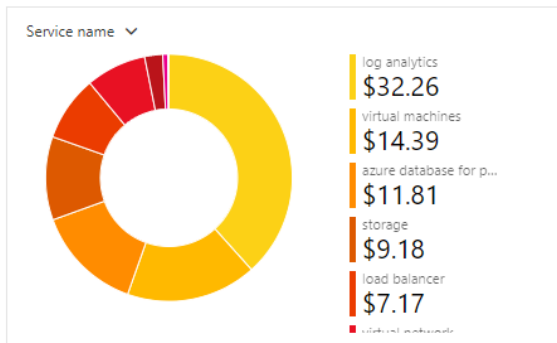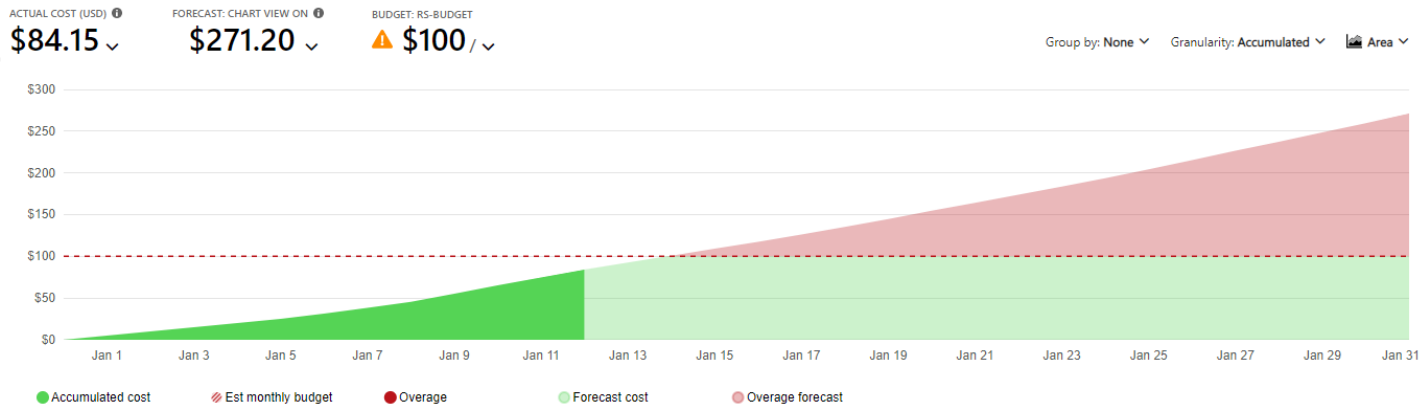# Alerting with Grafana and Telegram

http://dev-epm-diploma-v7.westeurope.cloudapp.azure.com/

http://prod-epm-diploma-v7.westeurope.cloudapp.azure.com/

Costs

NB: Application Monitoring: Personal (non Epam) Azure account and subscription used for this diploma to save time for resource limitations and access troubleshooting and fixing.

Demo

○ Application demo

○ Terraform plan&apply

○ K8s HPA Demo – cpu load and autoscaling

○ Pipelines demo

○ Telegram notifications/Grafana annotations

Q&A