

## *Provisioning k8s on the Cloud*

*GitHub Project Repo: pocK8sDemoCluster*

## *Terminology / Abbreviations*

### *Appendix*

**Terminology /  
Abbreviations**

### *Requirements*

### *DNS*

### *Certificate*

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# Terminology / Abbreviations

1. Domain Name System (DNS)
2. HyperText Transfer Protocol Secure (HTTP / HTTPS)
3. Transport Layer Security (TLS)
4. Secure Socket Layer (SSL) Certificates
5. Mutual Transport Layer Security (mTLS)
6. Monitoring (Health Checks, Probes etc)
7. Data Visualizer (Translating data to Virtual Content)
8. Kubernetes (k8s)
9. Kubernetes Service Mesh
10. Kubernetes Service Mesh with mTLS

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# DNS

## *Updating DNS Manually:*

- ▶ Adding records manually!
- ▶ Updating records manually!
- ▶ Deleting records manually!
- ▶ Zero to none human interaction! Automation!

## *Problems that will be introduced:*

- ▶ We are dependent on employee(s). Delay!
- ▶ What if a record in production is miss configured?
- ▶ Danger!!! Accidentally removed record(s)!
- ▶ Many different vendors! Accommodate all?

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## SSL Certificates

# SSL Certificates

### *Updating SSL Certificates Manually:*

- ▶ Creating Certificate manually!
- ▶ Updating a Certificate manually!
- ▶ Deleting a Certificate manually!
- ▶ Maximum expiration period up to two years!

### *Problems that will be introduced:*

- ▶ We are dependent on employee(s). Delay!
- ▶ Certificate is updated but not all dependencies?
- ▶ Accidentally removing a Certificate in production!
- ▶ We should be renew Certificates more often!

## SSL Certificates

# SSL Certificates

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## Centralized Login

# Centralized Login

### *Login from multiple Applications:*

- ▶ Multiple applications created by different teams!
- ▶ Multiple log levels per application!
- ▶ Logs from multiple k8s clusters?
- ▶ What is the cost of these tools on the cloud?

### *Problems that will be introduced:*

- ▶ We need to use centralized solutions!
- ▶ Logs Persisten Volumes (PV) will be overloaded!
- ▶ How many tools can provide this service?
- ▶ Storage and logs on the cloud are expensive!

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## *Monitoring and Visualizing*

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## Monitoring and Visualizing

# Monitoring and Visualizing

### Exporting metrics:

- ▶ More applications higher the complexity!
- ▶ Health Check of the applications and the nodes!
- ▶ Exporting network metrics is so so important!
- ▶ Visualize the Data in the simplest format!

### Problems if we do not process the Data:

- ▶ Metrics per application(s) with no configurations!
- ▶ Status (node(s) / application(s)) is a 24/7 necessity!
- ▶ Monitoring routing! Result to observe bottlenecks!
- ▶ Data or problems should be easy to visualize!

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# DNS Automation

- ▶ Can we accommodate all requirements?
- ▶ Can it be also compatible with many vendors?

▶ Amazon DNS

▶ Cloudflare

▶ Google Cloud DNS

▶ Microsoft Azure

▶ OpenDNS

▶ OVHCloud

▶ Route 53

▶ Simple DNS Plus

▶ Veeam

▶ Zimbra

▶ Zerigo

▶ Zonar



Image: Is it possible?

# DNS Automation

- ▶ Can we accommodate all requirements?
- ▶ Can it be also compatible with many vendors?
  - ▶ Amazon DNS
  - ▶ Azure DNS
  - ▶ Google DNS
  - ▶ CloudFlare
  - ▶ GoDaddy
  - ▶ etc...

- ▶ The answer is yes!



Image: Is it possible?

*DNS Automation*

# DNS Automation

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  - ▶ etc...
- ▶ The answer is yes!



Image: Route 53

# DNS Automation

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  - ▶ etc...
- ▶ The answer is yes!



Image: Azure DNS

*DNS Automation*

## *DNS Automation*

- ▶ Can we accommodate all requirements?
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  - ▶ Amazon DNS
  - ▶ Azure DNS
  - ▶ Google DNS
  - ▶ CloudFlare
  - ▶ GoDaddy
  - ▶ etc...



Image: Google DNS

- ▶ The answer is yes!

# DNS Automation

- ▶ Can we accommodate all requirements?
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  - ▶ Amazon DNS
  - ▶ Azure DNS
  - ▶ Google DNS
  - ▶ CloudFlare
  - ▶ GoDaddy
  - ▶ etc...



Image: CloudFlare

- ▶ The answer is yes!

# DNS Automation

- ▶ Can we accommodate all requirements?
- ▶ Can it be also compatible with many vendors?
  - ▶ Amazon DNS
  - ▶ Azure DNS
  - ▶ Google DNS
  - ▶ CloudFlare
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  - ▶ etc...
- ▶ The answer is yes!



Image: GoDaddy

*DNS Automation*

## *DNS Automation*

- ▶ Can we accommodate all requirements?
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  - ▶ Amazon DNS
  - ▶ Azure DNS
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  - ▶ GoDaddy
  - ▶ etc...

etc.

*Image:* Many More...

- ▶ The answer is yes!

# DNS Automation

- ▶ Can we accommodate all requirements?
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  - ▶ Amazon DNS
  - ▶ Azure DNS
  - ▶ Google DNS
  - ▶ CloudFlare
  - ▶ GoDaddy
  - ▶ etc...
- ▶ The answer is yes!



Image: ExternalDNS

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## Certificate Automation

# Certificate Automation



- ▶ Can we accommodate all requirements?
- ▶ Can it be also automated and self renewed?

→ 90 days expiration  
→ Renewal  
→ Self Renewal

- ▶ The answer is yes!
- ▶ Official Authority

Image: Is it possible?

## Certificate Automation

# Certificate Automation



- ▶ Can we accommodate all requirements?
- ▶ Can it be also automated and self renewed?
  - ▶ 90 days expiration
  - ▶ Auto Renew
  - ▶ Official Authority
- ▶ The answer is yes!
- ▶ Official Authority

Image: Is it possible?

## Certificate Automation

# Certificate Automation



Image: 90 days

- ▶ Can we accommodate all requirements?
- ▶ Can it be also automated and self renewed?
  - ▶ 90 days expiration
  - ▶ Auto Renew
  - ▶ Official Authority
- ▶ The answer is yes!
- ▶ Official Authority

## Certificate Automation

# Certificate Automation



Image: Auto Renew

- ▶ Can we accommodate all requirements?
- ▶ Can it be also automated and self renewed?
  - ▶ 90 days expiration
  - ▶ Auto Renew
  - ▶ Official Authority
- ▶ The answer is yes!
- ▶ Official Authority

## Certificate Automation

# Certificate Automation



**Image:** Official Authority

- ▶ Can we accommodate all requirements?
- ▶ Can it be also automated and self renewed?
  - ▶ 90 days expiration
  - ▶ Auto Renew
  - ▶ **Official Authority**
- ▶ The answer is yes!
- ▶ Official Authority

## Certificate Automation

# Certificate Automation



Image: Cert Manager

- ▶ Can we accommodate all requirements?
- ▶ Can it be also automated and self renewed?
  - ▶ 90 days expiration
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  - ▶ Official Authority
- ▶ The answer is yes!
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## Certificate Automation

# Certificate Automation



Image: Let's Encrypt

- ▶ Can we accommodate all requirements?
- ▶ Can it be also automated and self renewed?
  - ▶ 90 days expiration
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  - ▶ Official Authority
- ▶ The answer is yes!
- ▶ **Official Authority**

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## *Centralized Login*

## *Centralized Login*

- ▶ Logs, super important!
  - ▶ Exporter compatibility!
  - ▶ Multiple k8s clusters!
  - ▶ Group data in one place!
  - ▶ Visualize and filter logs!
  - ▶ All in one tool!  
Possible?



## Image: Dump of Logs

## Centralized Login

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Possible?

what are other words for easy-to-use?



helpful, handy, useful, convenient, practical, functional, serviceable, well-designed, user-friendly

Image: Zero Complexity

## Centralized Login

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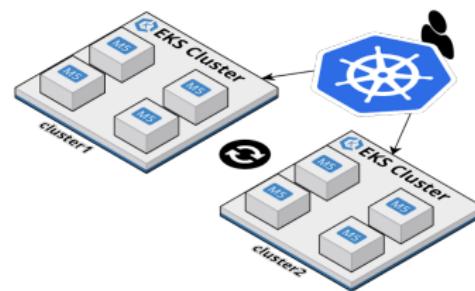


Image: One to Many

## Centralized Login

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Image: Gather all in One

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Possible?

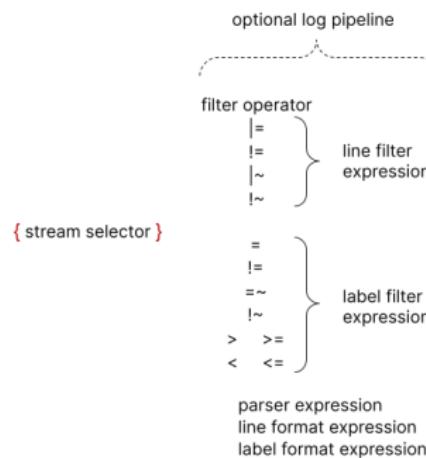


Image: Filter Data

## Centralized Login

# Centralized Login

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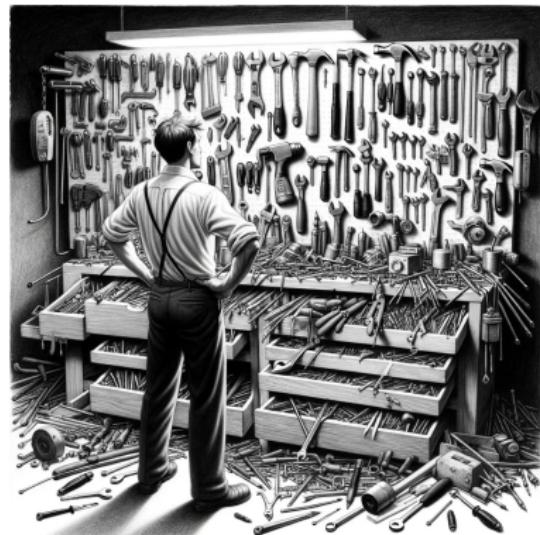


Image: Way too Many

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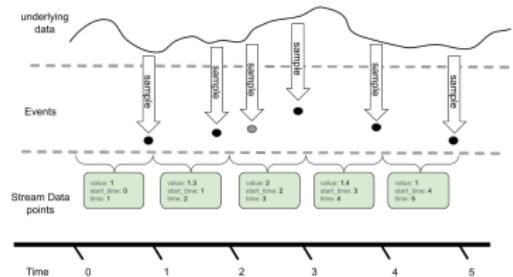
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## Monitoring and Visualizing

# Monitoring and Visualizing



► Metrics from everything?

- Server(s)
- Pods
- Network

► Mix all requirements?

► What's the difference?

► What's the difference?

► What's the difference?

► There can be only one! (Ref. Highlander)

## Image: Metrics

## Monitoring and Visualizing

# Monitoring and Visualizing



Image: One to Many

- ▶ Metrics from everything?
  - ▶ Server(s)
  - ▶ Pods
  - ▶ Network
- ▶ Mix all requirements?

Metrics from everything?

Mix all requirements?

- ▶ There can be only one! (Ref. Highlander)

## Monitoring and Visualizing

# Monitoring and Visualizing

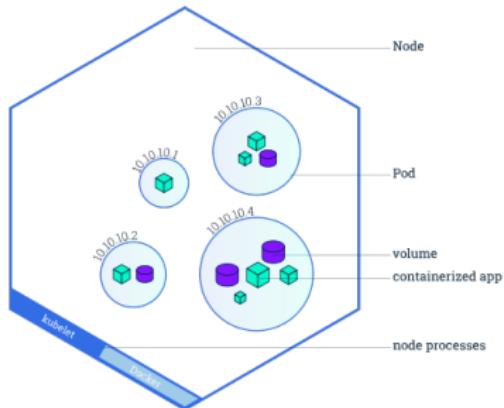


Image: Pod Structure

- ▶ Metrics from everything?
  - ▶ Server(s)
  - ▶ Pods
  - ▶ Network
- ▶ Mix all requirements?

- ▶ There can be only one! (Ref. Highlander)

## Monitoring and Visualizing

# Monitoring and Visualizing



Image: Network Traffic

- ▶ Metrics from everything?
  - ▶ Server(s)
  - ▶ Pods
  - ▶ Network

- ▶ Mix all requirements?

- ▶ Monitoring

- ▶ There can be only one! (Ref. Highlander)

## Monitoring and Visualizing

# Monitoring and Visualizing

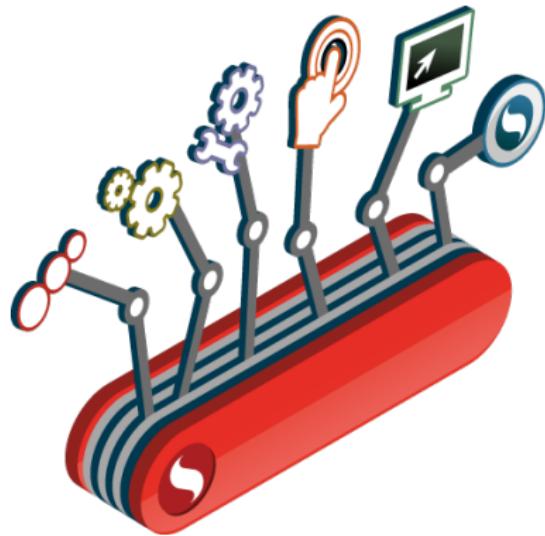


Image: Multi Tool

- ▶ Metrics from **everything?**
  - ▶ Server(s)
  - ▶ Pods
  - ▶ Network
- ▶ Mix all requirements?
  - ▶ Monitoring
  - ▶ Filter Logs
  - ▶ Visualizing
- ▶ There can be only one! (Ref. Highlander)

## Monitoring and Visualizing

# Monitoring and Visualizing

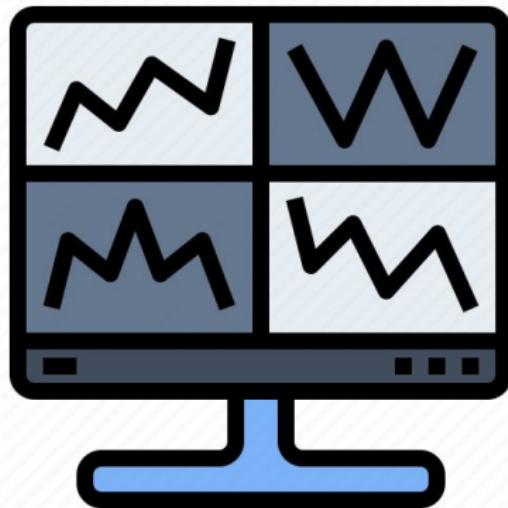


Image: Monitoring Metrics

- ▶ Metrics from **everything?**
  - ▶ Server(s)
  - ▶ Pods
  - ▶ Network
- ▶ Mix all **requirements?**
  - ▶ **Monitoring**
  - ▶ Filter Logs
  - ▶ Visualizing
- ▶ There can be only one! (Ref. Highlander)

## Monitoring and Visualizing

# Monitoring and Visualizing



Image: Filtering Logs

- ▶ Metrics from **everything?**
  - ▶ Server(s)
  - ▶ Pods
  - ▶ Network
- ▶ Mix all **requirements?**
  - ▶ Monitoring
  - ▶ **Filter Logs**
  - ▶ Visualizing
- ▶ There can be only one! (Ref. Highlander)

## Monitoring and Visualizing

# Monitoring and Visualizing



Image: Visualizing Data

- ▶ Metrics from **everything?**
  - ▶ Server(s)
  - ▶ Pods
  - ▶ Network
- ▶ Mix all **requirements?**
  - ▶ Monitoring
  - ▶ Filter Logs
  - ▶ **Visualizing**
- ▶ There can be only one! (Ref. Highlander)

## Monitoring and Visualizing

# Monitoring and Visualizing



# Grafana

Image: Grafana

- ▶ Metrics from **everything?**
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  - ▶ Pods
  - ▶ Network
- ▶ Mix all **requirements?**
  - ▶ Monitoring
  - ▶ Filter Logs
  - ▶ Visualizing
- ▶ There can be only one! (Ref. Highlander)

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## Features Development

# Features Development



Image: FAAS

## ► Why to use Function As A Service?

- ▶ Open FAAS
- ▶ NOT OPEN
- ▶ KNATIVE
- ▶ ISTIO Service Mesh
- ▶ KNATIVE Service Mesh

## Features Development

# Features Development

- ▶ Why to use Function As A Service?
  - ▶ Open FAAS
  - ▶ NOT OPEN
  - ▶ KNATIVE
- ▶ ISTIO Service Mesh
- ▶ KNATIVE Service Mesh



Image: OPEN FAAS

## Features Development

# Features Development

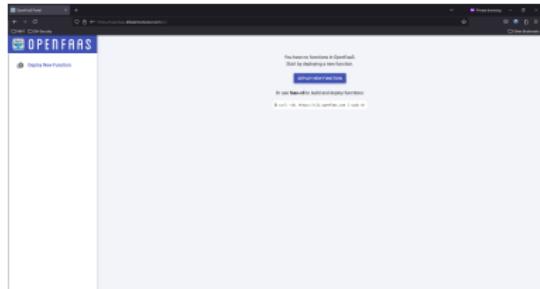


Image: OPEN FAAS

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  - ▶ Open FAAS
  - ▶ NOT OPEN
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- ▶ ISTIO Service Mesh
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## Features Development

# Features Development



- ▶ Why to use Function As A Service?
  - ▶ Open FAAS
  - ▶ NOT OPEN
  - ▶ **KNATIVE**
- ▶ ISTIO Service Mesh
- ▶ KNATIVE Service Mesh

Image: KNATIVE

## Features Development

# Features Development



- ▶ Why to use Function As A Service?
  - ▶ Open FAAS
  - ▶ NOT OPEN
  - ▶ KNATIVE
- ▶ ISTIO Service Mesh
- ▶ KNATIVE Service Mesh

Image: ISTIO

## Features Development

# Features Development



Image: istioKnative

- ▶ Why to use Function As A Service?
  - ▶ Open FAAS
  - ▶ NOT OPEN
  - ▶ KNATIVE
- ▶ ISTIO Service Mesh
- ▶ **KNATIVE Service Mesh**

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# *Versions and Features Development*

*Table 1:* Features / Versions table

Features	Version 1	Version 2
Grafana	✓	✓
Prometheus	✓	✓
Loki	✓	✓
Promtail	✓	✓
ArgoCD	✓	✓
Cert Manager	✓	✓
Let's Encrypt	✓	✓
External DNS	✓	✓
Knative (FAAS)	✓	✓
Ingress NGINX	✓	✗
Gateway ISTIO	✗	✓
Service Mesh	✗	✓
Service Mesh (FAAS)	✗	✓

Demonstrate Automations

Appendix

Requirements

DNS

Certificate

Logs

Monitoring

Versions

Demo

Demonstrate  
Automations

Summary

*Appendix*  
oo  
oo  
oo  
oo

*Requirements*  
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oo  
oo  
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*DNS*  
oo

*Certificate*  
oo

*Logs*  
oo

*Monitoring*  
oo

*Versions*  
oo  
oo

*Demo*  
oo  
●

*Summary*  
oo  
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*Demonstrate Automations*

# *Coming up: Demo*

*Appendix*  
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*Requirements*  
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oo  
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*DNS*  
oo

*Certificate*  
oo

*Logs*  
oo

*Monitoring*  
oo

*Versions*  
oo  
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*Demo*  
oo

*Summary*  
oo  
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*Key points repetition*

*Logs*

*Appendix*

*Monitoring*

*Requirements*

*Versions*

*DNS*

*Demo*

*Certificate*

*Summary*

*Key points repetition*

Key points repetition

## Summary

- ▶ In section “Requirements” page “2” What is the bare minimum!
- ▶ In section “DNS” page “3” Automated DNS, why it is so important!
- ▶ In section “Certificate” page “4” Certificates, auto renew!
- ▶ In section “Logs” page “5” Why need to collect and filter logs!
- ▶ In section “Monitoring” page “6” Monitoring Visualization!
- ▶ In section “Versions” page “7” Features and Versions!

## Key points repetition

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## *Questions*

# *Coming up: Q & A*