

Provisioning k8s on the Cloud

Terminology / Abbreviations

Appendix

**Terminology /
Abbreviations**

Requirements

DNS

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Summary



Terminology / Abbreviations

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

DNS

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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?

DNS

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SSL Certificates

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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

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Centralized Login

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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!

Centralized Login

Centralized Login

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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!

Monitoring and Visualizing

Monitoring and Visualizing

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Monitoring and Visualizing

Monitoring and Visualizing

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Monitoring and Visualizing

Monitoring and Visualizing

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DNS Automation

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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



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

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



Image: Route 53

DNS Automation

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



Image: Google DNS

- ▶ The answer is yes!

DNS Automation

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



Image: CloudFlare

DNS Automation

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



Image: GoDaddy

DNS Automation

DNS Automation

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 - ▶ Amazon DNS
 - ▶ Azure DNS
 - ▶ Google 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
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 - ▶ 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
 - Official Authority
- ▶ 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
 - ▶ Auto Renew
 - ▶ Official Authority
- ▶ The answer is yes!
- ▶ Official Authority

Certificate Automation

Certificate Automation



Image: Let's Encrypt

- ▶ 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**

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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?

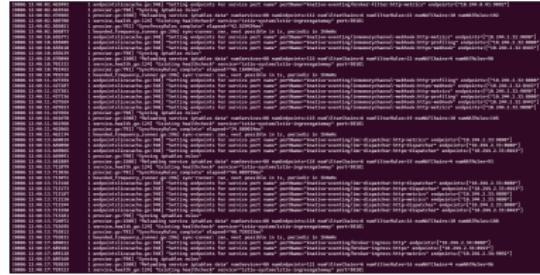


Image: Dump of Logs

Centralized Login

Centralized Login

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what are other words for easy-to-use?



Image: Zero Complexity

Centralized Login

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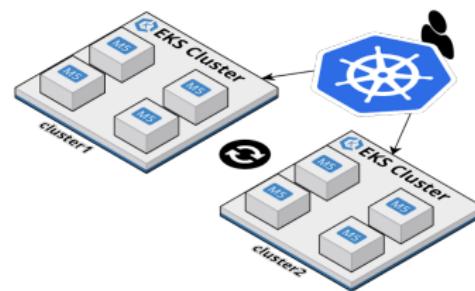


Image: One to Many

Centralized Login

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Image: Gather all in One

Centralized Login

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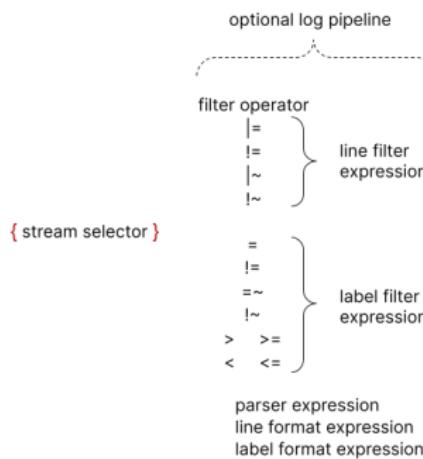


Image: Filter Data

Centralized Login

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- ▶ Exporter compatibility!
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- ▶ Group data in one place!
- ▶ Visualize and filter logs!
- ▶ All in one tool!
Possible?

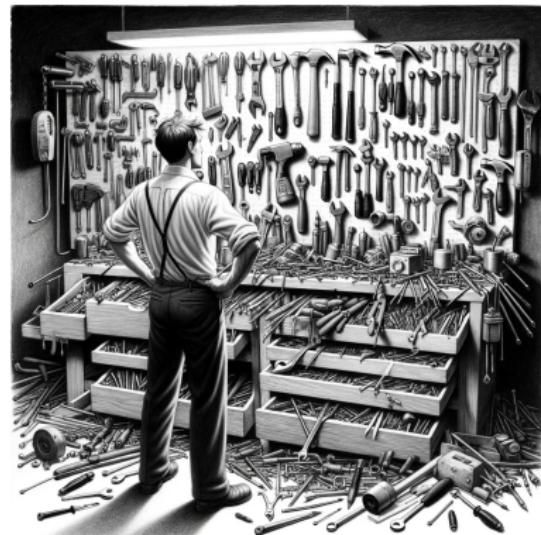


Image: Way too Many

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Monitoring and Visualizing

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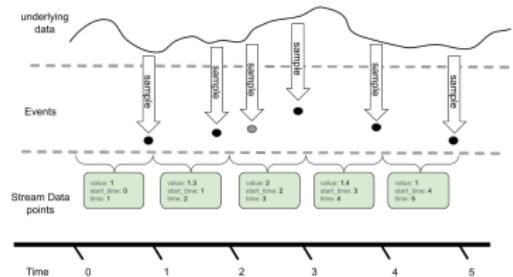
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Monitoring and Visualizing

Monitoring and Visualizing



► Metrics from everything?

- Server(s)
- Pods
- Network

► Mix all requirements?

► Single source of truth

► Centralized storage

► Standardized interface

► 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

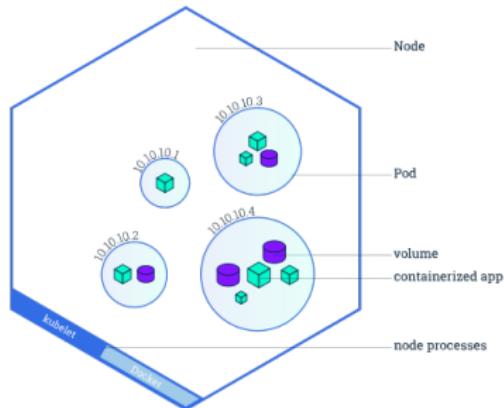


Image: Pod Structure

- ▶ 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

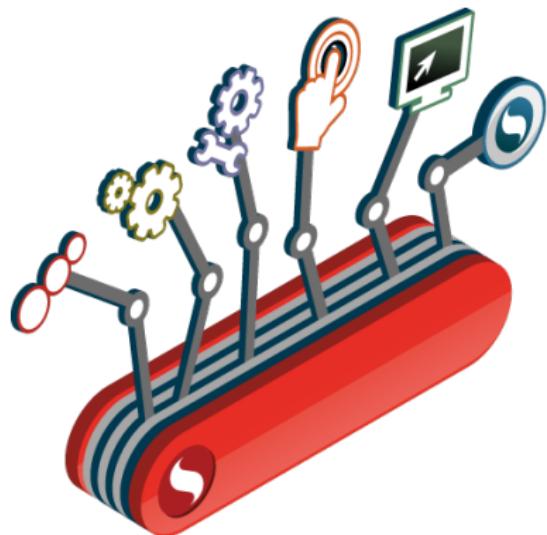


Image: Multi Tool

- ▶ 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

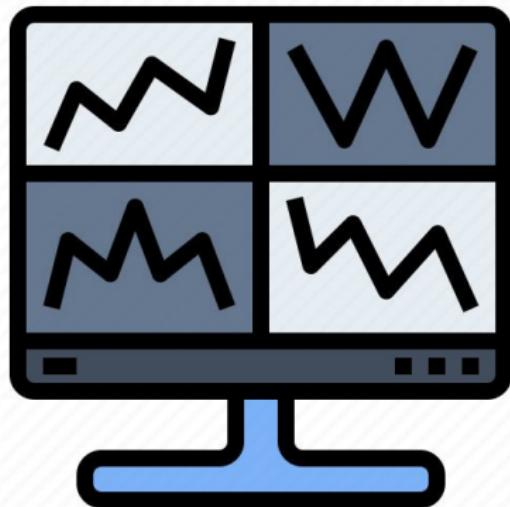


Image: Monitoring Metrics

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

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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



OPEN FAAS

Image: OPEN FAAS

Features Development

Features Development

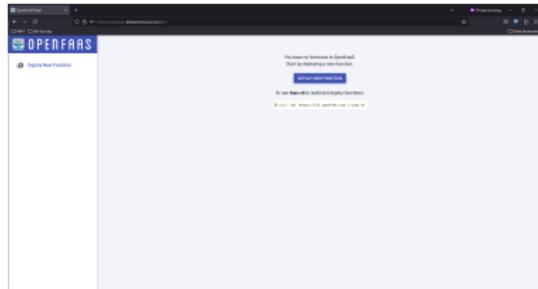


Image: OPEN FAAS

- ▶ 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: 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	✓	X
Gateway ISTIO	X	✓
Service Mesh	X	✓
Service Mesh (FAAS)	X	✓

Demonstrate Automations

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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

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!
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- ▶ In section “Versions” page “7” Features and Versions!

Key points repetition

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Questions

Coming up: Q & A