
F5 Networks Japan Technical Information Documentation

F5 Networks, Inc.

Dec 01, 2022

F5 2022 Read The Docs Guide

NGINX Kubernetes Observability Lab

F5??????????????????



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1.1 ?????

- ??????????Invite????????????????????????????????
- ?????????? git , jq , sudo, curl, make, kubectI(kubenetes??)
- NGINX Trial?????????????????????Home Directory???

1.2 ???? (UDF(Unified Demonstration Framework)) ??????????????

????????LAB????????????????????????????

????????????????????????????????????

Google Chrome?Support????????????????????????????????????????

???UDF Supported Browsers and Clients

1.2.1 Windows Jump Host??RDP??

Windows Jump Host??CLI????????????????????RDP Client????????????????????

1.3 HELM????

Helm ?? - Kubernetes?????????? - Helm??Kubernetes ????????????????????????????????????? - Ku-
bernetes????????????????????

???????NGINX Ingress Controller?NGINX Service Mesh????????????Helm????????????

1.4 ?????????????

????????????????????????????????????????????

- Namespace nginx-ingress ?NIC? nginx-mesh ?NSM????????? monitor
????????????????????
- NSM?Sidecar?????????Namespace??? prod ? staging ? legacy ???????
- NSM????????????????? nic2 ???NIC????????
- NSM?Sidecar????????????????????? nic1 ???NIC????????
- Grafana?Datasouce??? Prometheus ? Loki ? Jaeger ?????????????????????

[REDACTED]

2.1 1. ??????????HELM???????

????????????????

[REDACTED]

NSM?????Namespace??????

[REDACTED]

Listing 1: ????????

1
2
3

[REDACTED]

?????????HELM????????????????? HELM?install????

[REDACTED]

???HELM?????????????????

[REDACTED]

Listing 2: ????????

1

[REDACTED]

??????????????

2.2 2. NSM????????

??????????????

????????????Version????????????

Listing 3: ????????

1
2
3
4
5
6
7
8

Helm?NSM????????????????????????????????
Default??? GitHub nginx-service-mesh/helm-chart/values.yaml ??????????????

Listing 4: ????????

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12

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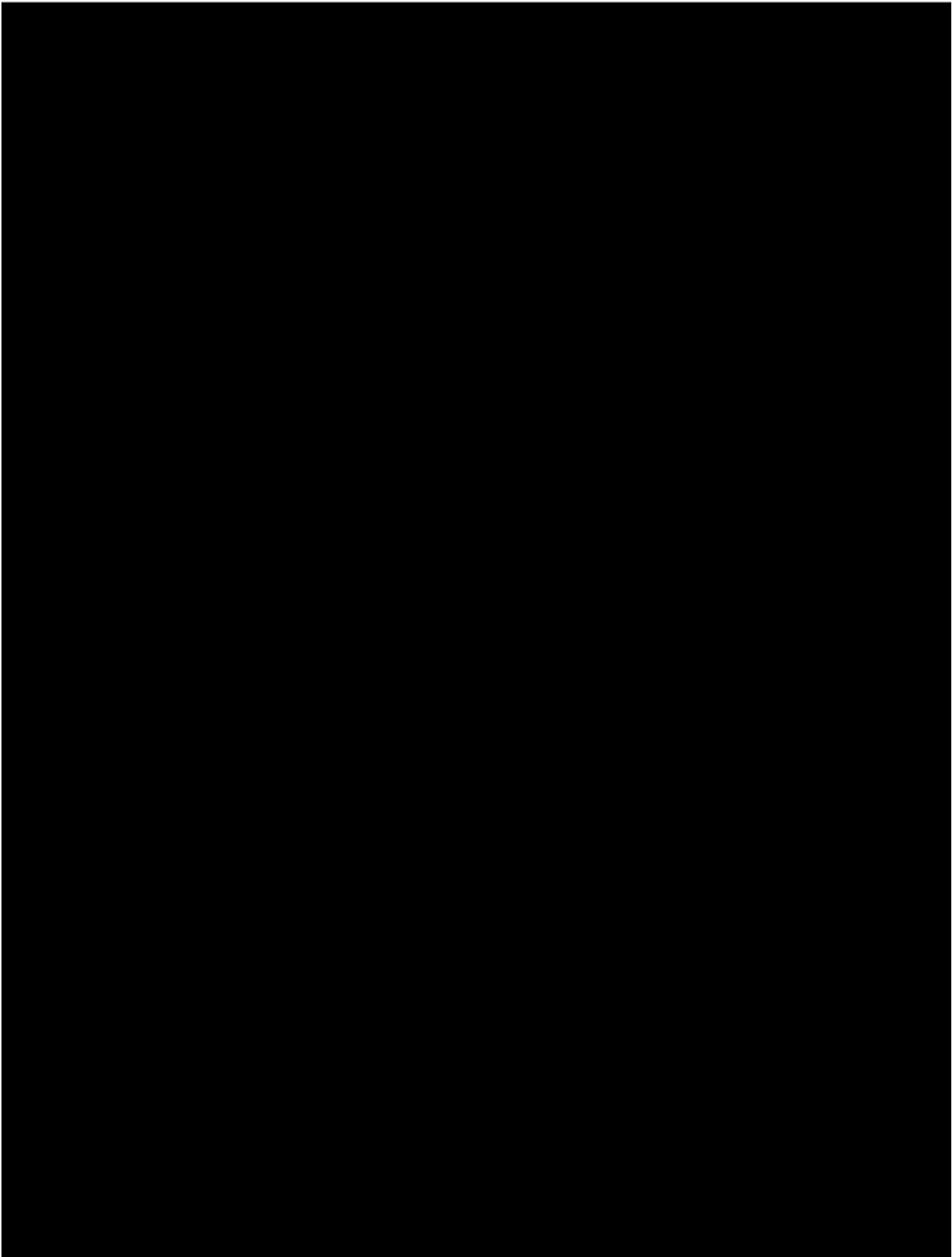
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- 20???Grafana?Deploy????49???Jaeger?Deploy??????
(????????????Jaeger??????? NSM v1.5???????)
- 33???Prometheus?53???57???Jaeger??????????
- ?????Trace????????????????SampleRate 1 ??????

NSM????????

- -f ?????????????????????Helm????????????????
- --namespace ??????Helm?????Namespace??????
- --create-namespace ??????Namespace????????Helm????????????

Listing 5: ????????

1
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Listing 6: ????????

1
2

Pod????????????????????

Listing 7: ????????

1
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3
4
5
6



2.3 3. NIC???????

???????????????



?????????????Version?????????????

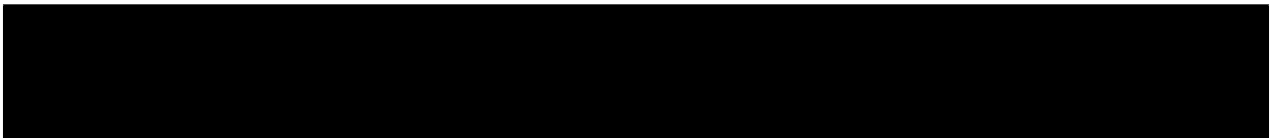


Listing 8: ????????

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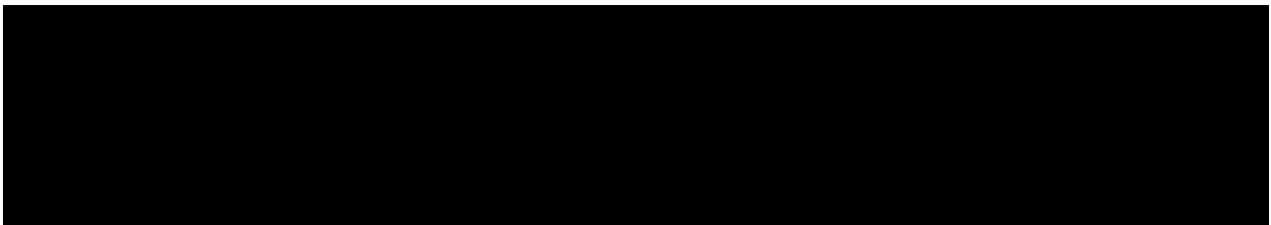


NAP DoS ? Arbitator ????????



Listing 9: ????????

1
2
3
4
5
6
7



???????????????



Listing 10: ????????

```
1 [REDACTED]
2 [REDACTED]
```

Pod????????????????????????????????

[REDACTED]

Listing 11: ????????

```
1 [REDACTED]
```

NIC????????????????????

???????????????????????????? ??: NIC???????????? ???????

(????????????5????????????????)

[REDACTED]

NIC????????????

NSM???????????????????????????? nic1 ??

???????????????????????????? nic2 ??????????

nic1 ??????????????????????

Default??? GitHub kubernetes-ingress/deployments/helm-chart/values.yaml ??????????????

[REDACTED]

Listing 12: ????????

```
1 [REDACTED]
2 [REDACTED]
3 [REDACTED]
4 [REDACTED]
5 [REDACTED]
```

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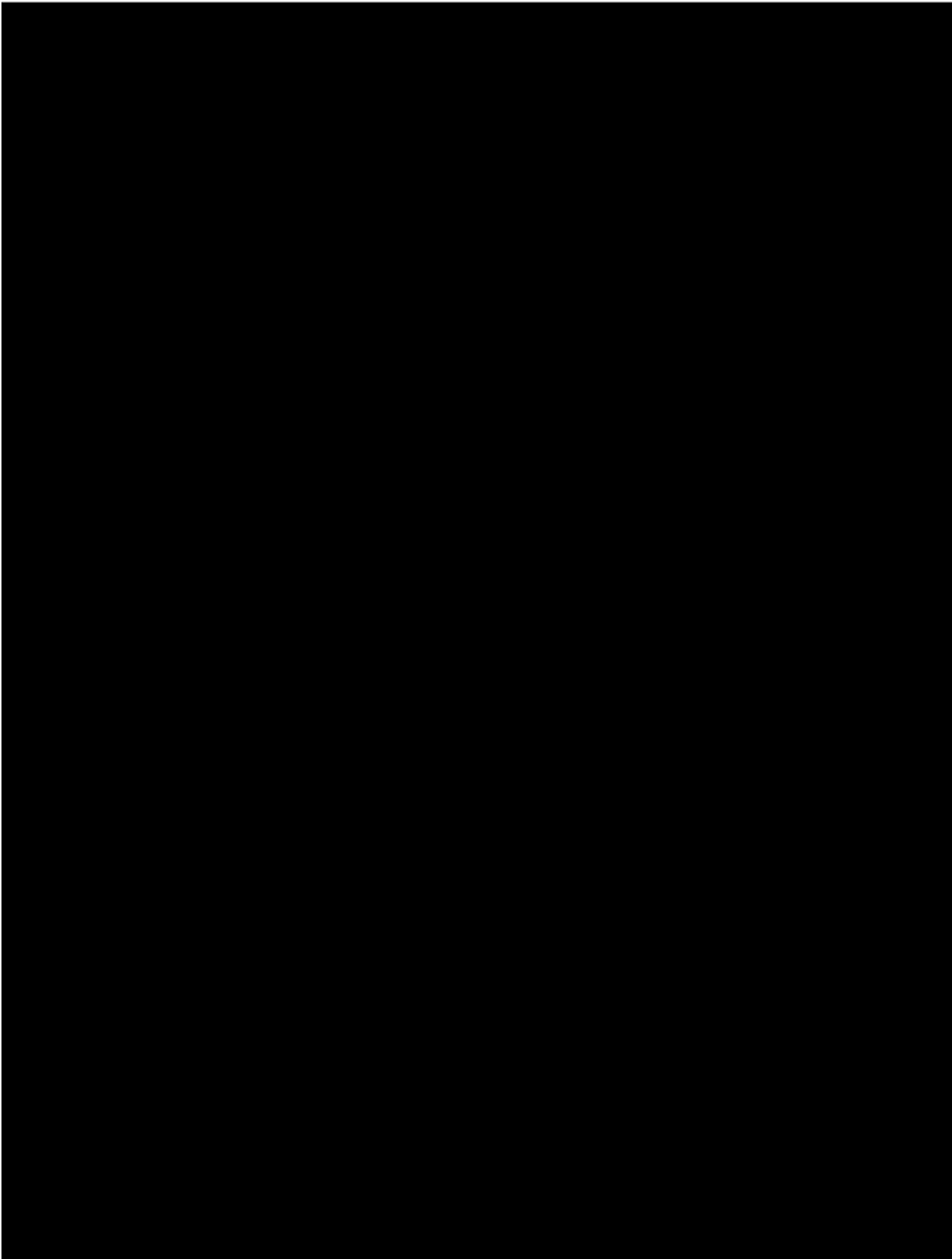
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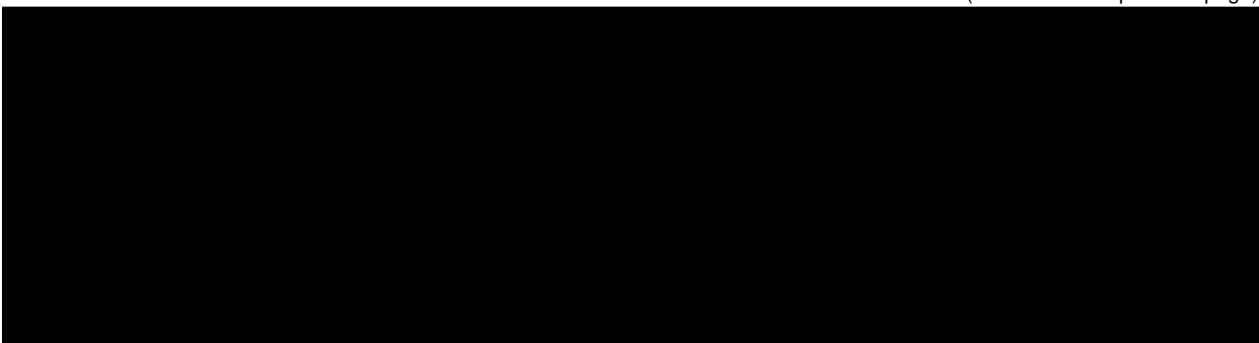
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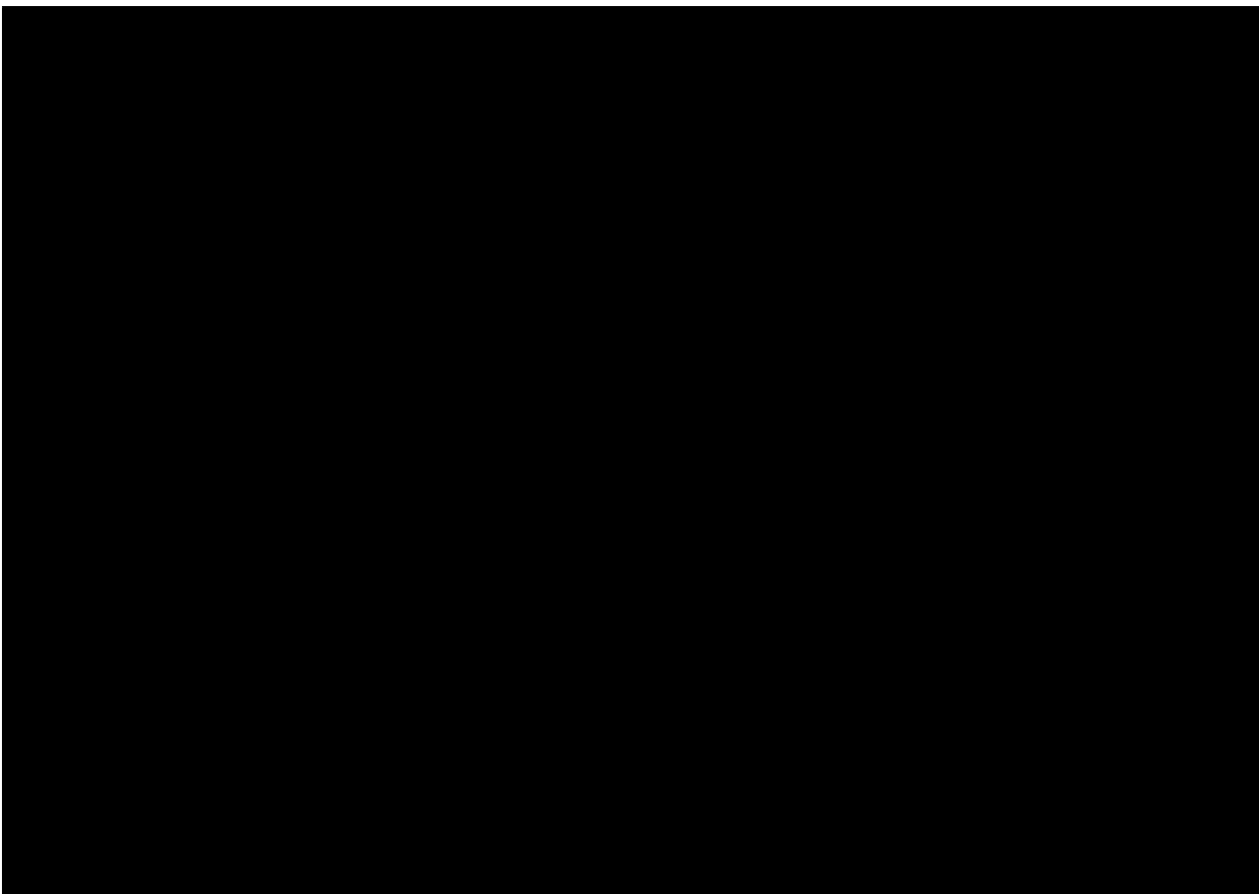
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- 1-3???NSM???????????????
- 6-9???NGINX Plus?????????????Image??????????
- 12-13???NAP WAF??16-17???NAP DoS???????????
- 19???Ingress Class??? nginx ??????????
- 56-67???Prometheus???????????????????????

??? nic2 ?????????????????????? nic1 ??????????????????



Listing 13: ??????????

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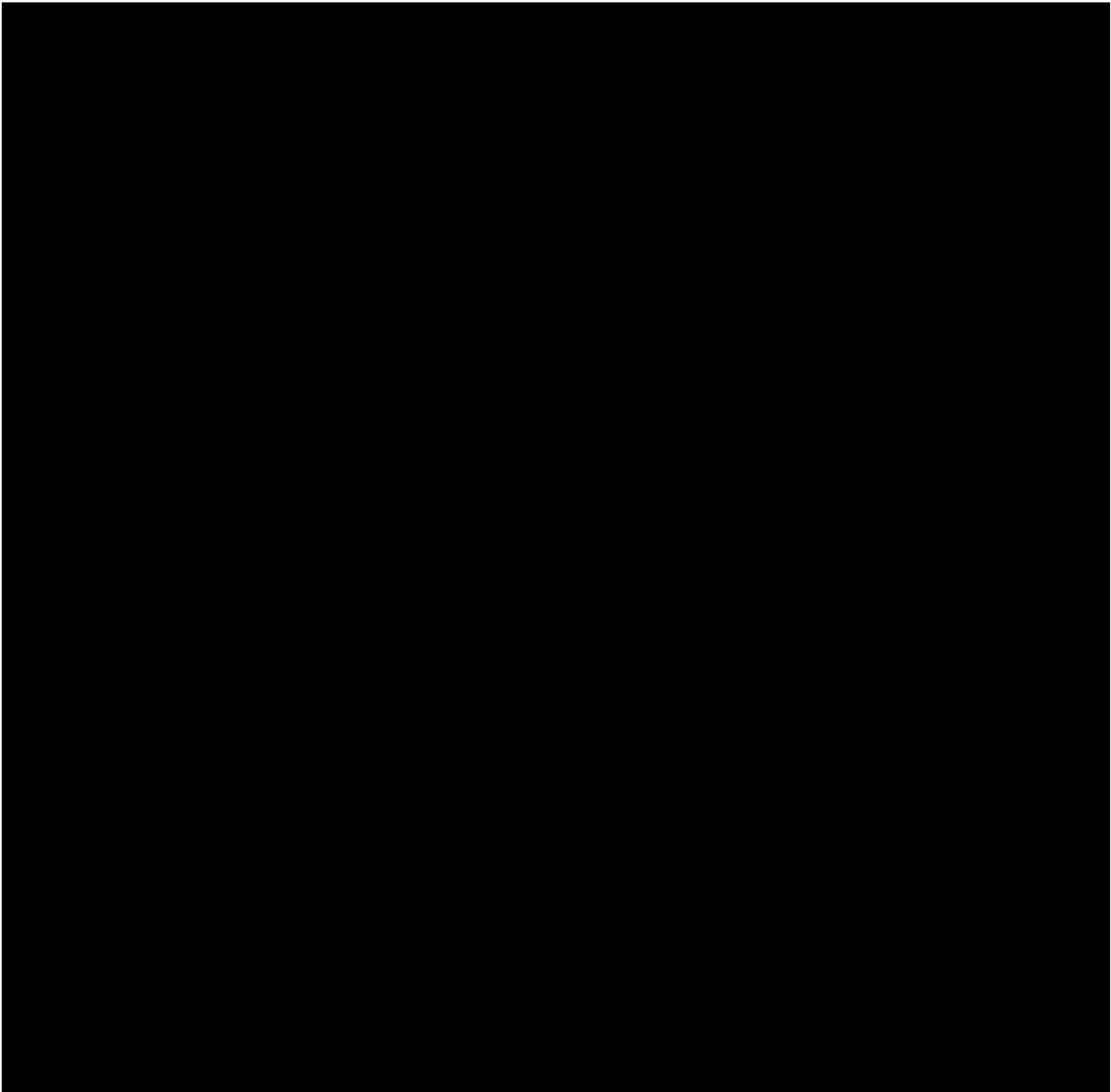
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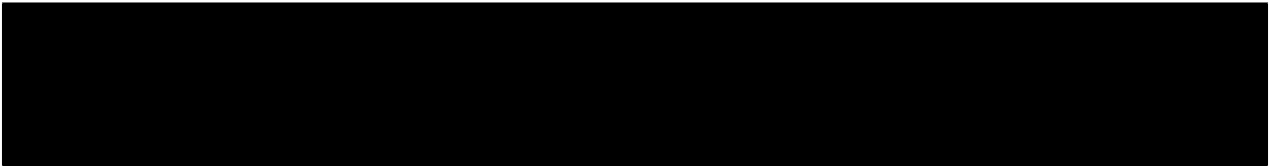
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- NSM????????????1-3????????(false)?????
- 19???Ingress Class??? *nginx2* ????????? (nic1?nginx)

NIC????????????



????????????

[REDACTED]

Listing 14: ????????

1
2
3
4

[REDACTED]

Pod????????????????????

[REDACTED]

Listing 15: ????????

1
2
3
4

[REDACTED]

NIC????????????????????

NodePort????????????

[REDACTED]

Listing 16: ????????

1
2

[REDACTED]

????????????????????????????????????????????????????????????NGINX????????????

[REDACTED]

????????????????????NodePort????????????????????????????????????NGINX????????

Listing 17: nginx.conf

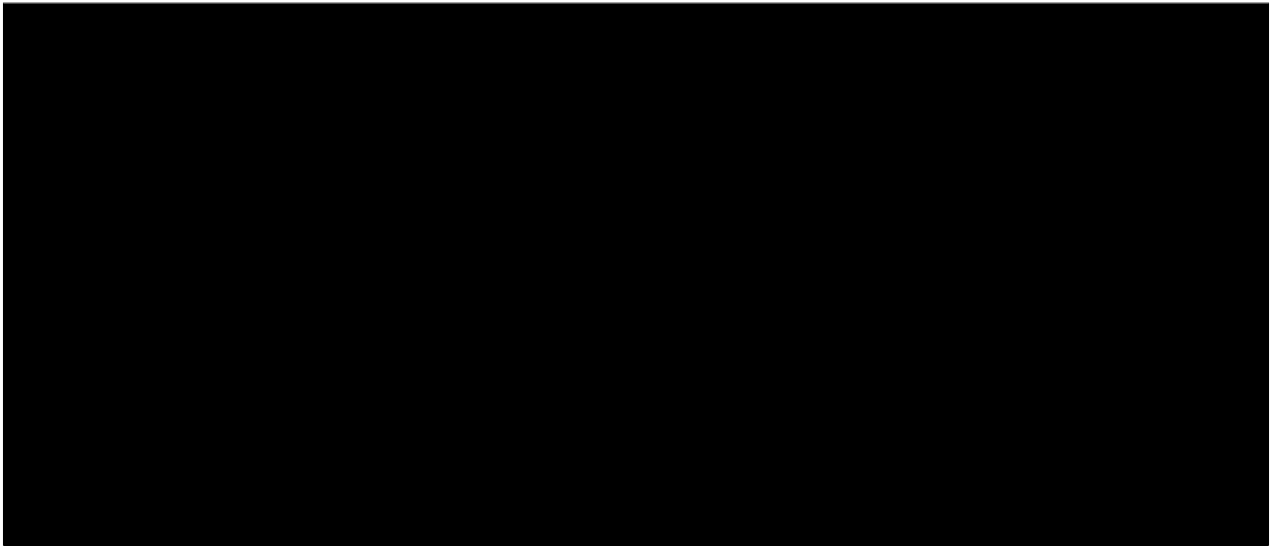
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[REDACTED]

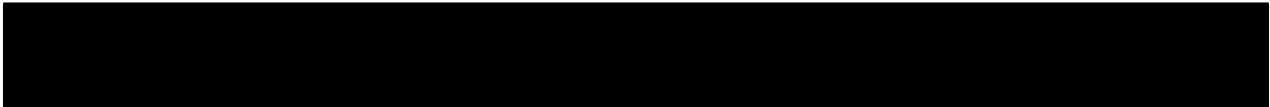
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3.1 1. Prometheus?????

Helm?????????Default????NIC?NSM????????????????????Prometheus?????????????

Prometheus?????????????????????????????

- Prometheus Overview

Prometheus?????????????

Listing 1: ??????????

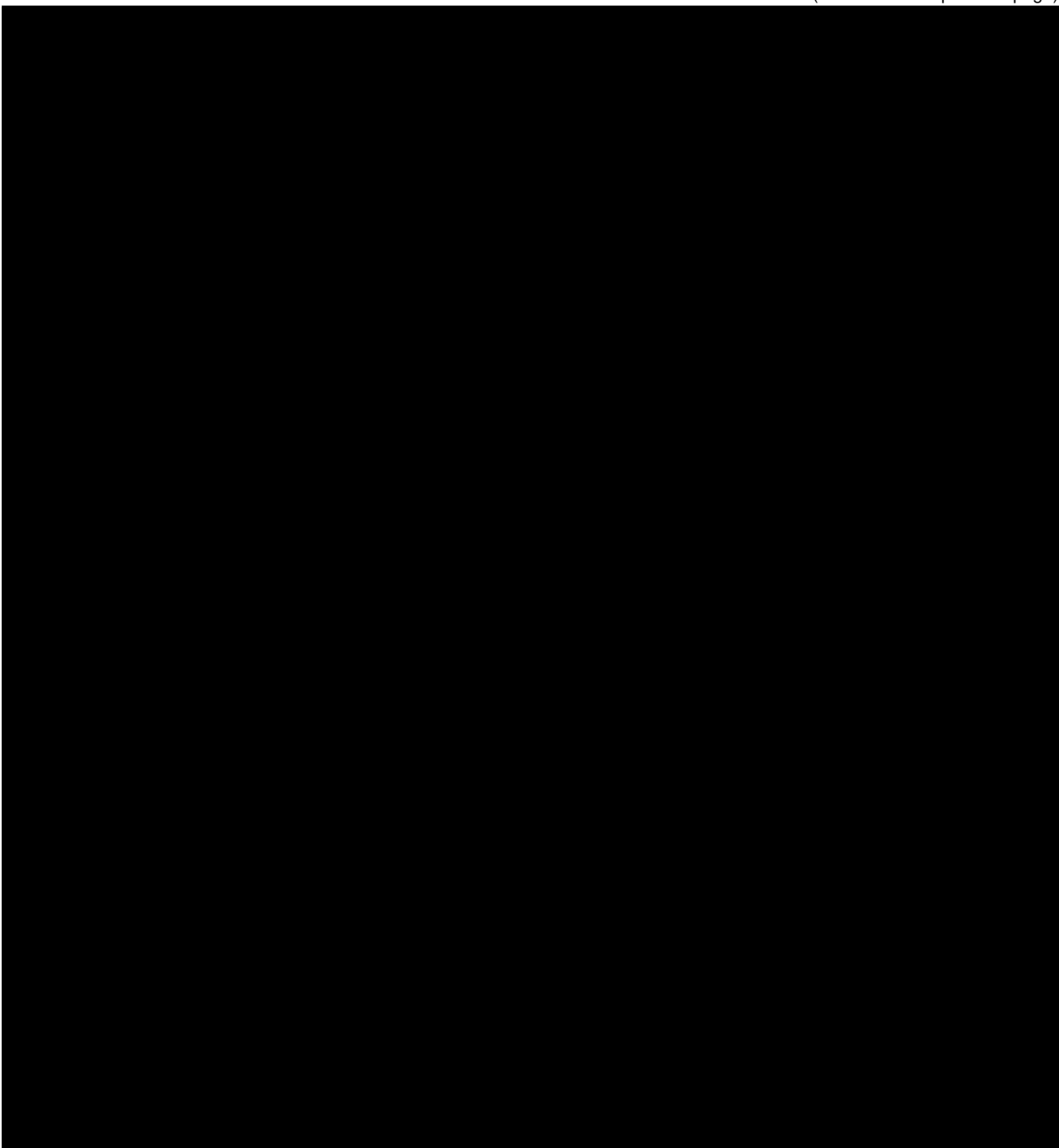
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- 1???NGINX Service Mesh?????????
- 20???NGINX Ingress Controller?????

????? --set-file extraScrapeConfigs ??????????????
kubernetes_sd_configs ? Pod ?????Prometheus?Pod?Metrics?Scarpe????????????????????????????????????

- Prometheus CONFIGURATION kubernetes_sd_configs

????????PersistentVolume????????????????

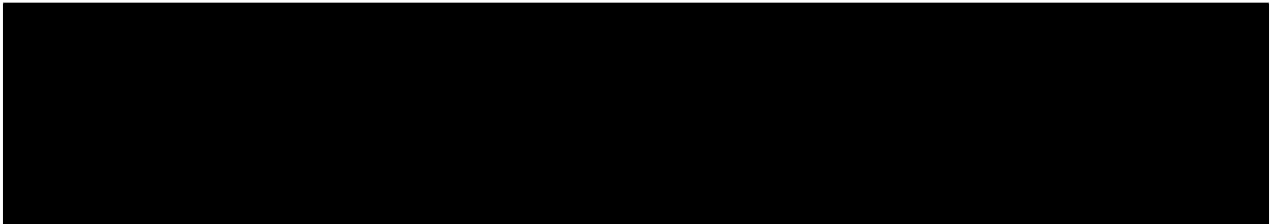


Listing 2: ????????

1
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4
5
6



Prometheus???????



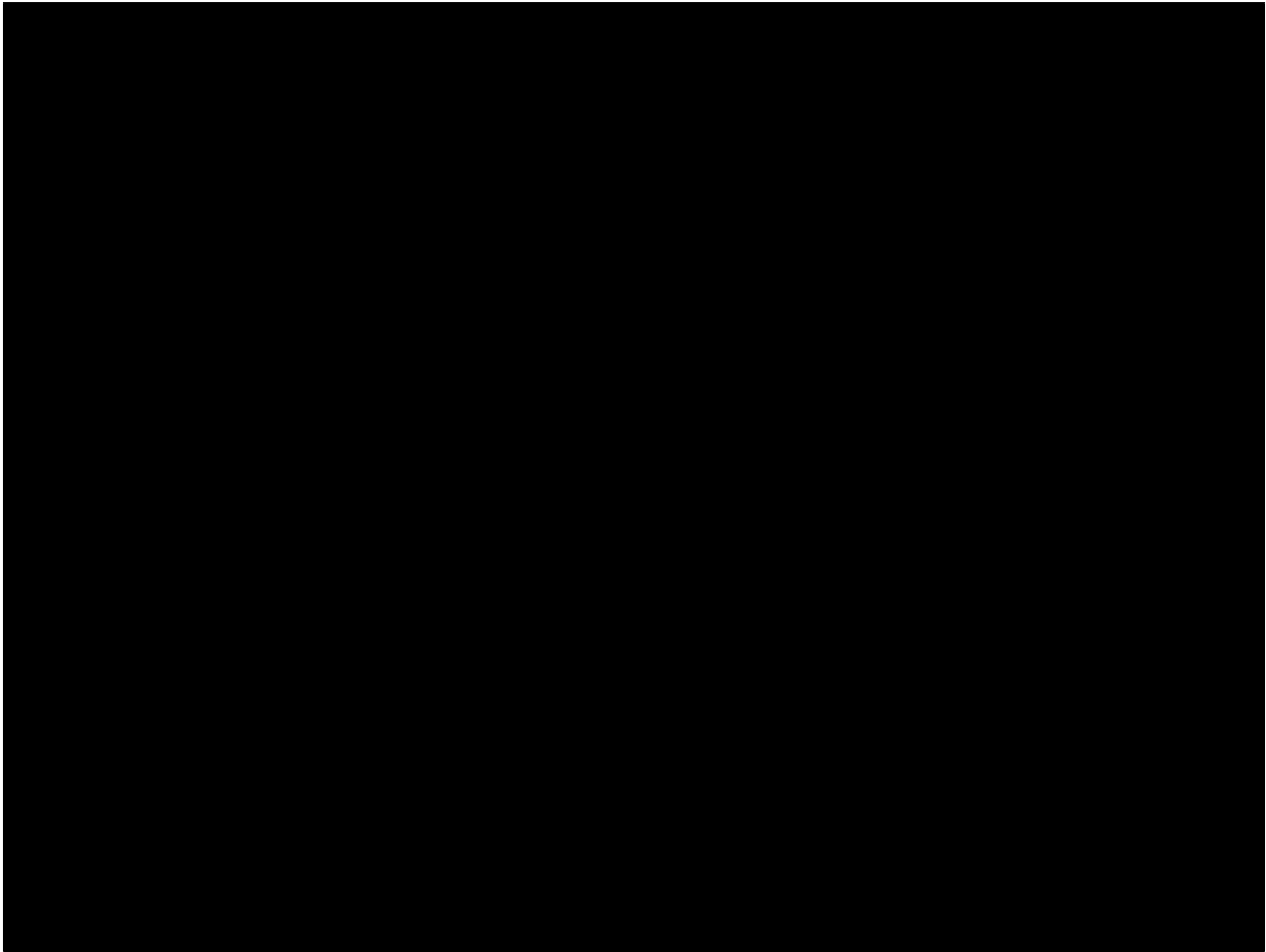
Listing 3: ????????

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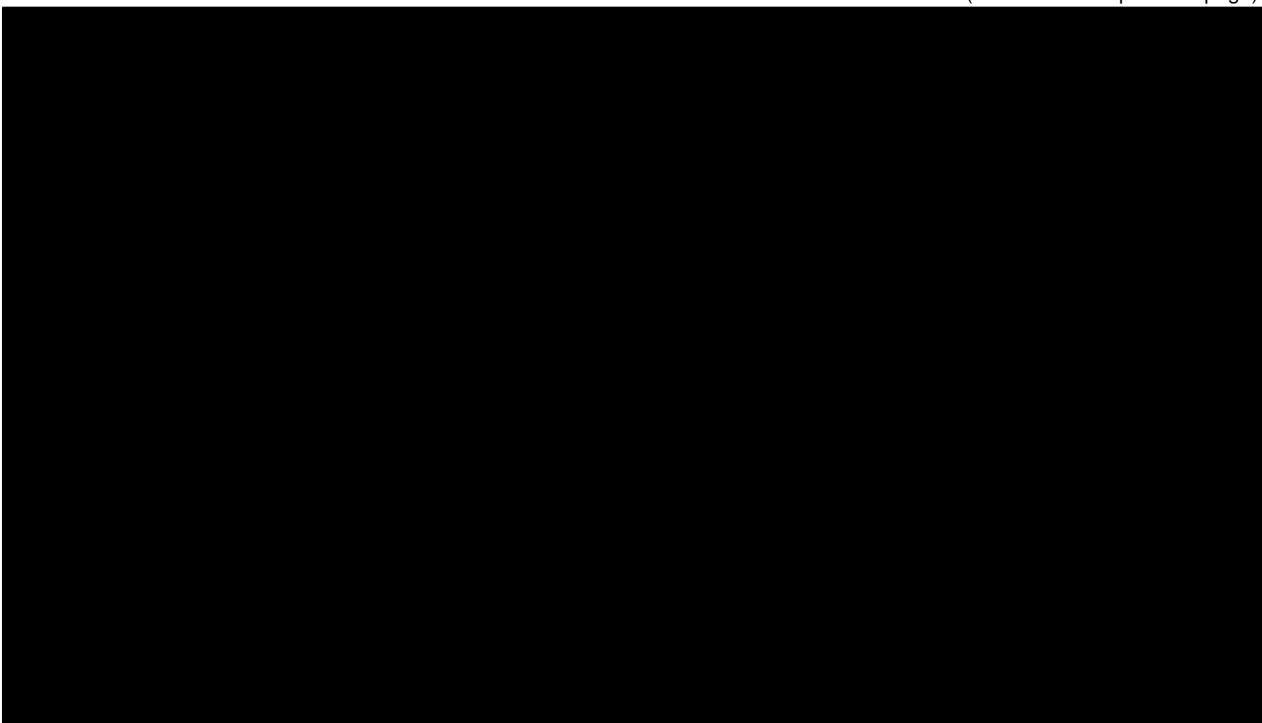
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Listing 4: ????????

1

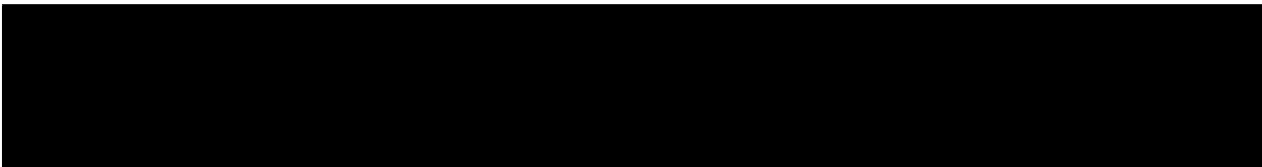


Pod????????????????????



Listing 5: ????????

1
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4
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3.2 2. Grafana Loki?????

Helm?????????Default?????Loki?????????Kubernetes
????????????????????????????????????

Node?????????Pod?????????????

?????????????Loki???Promtail?Grafana?????????

Loki????????????????????????????????

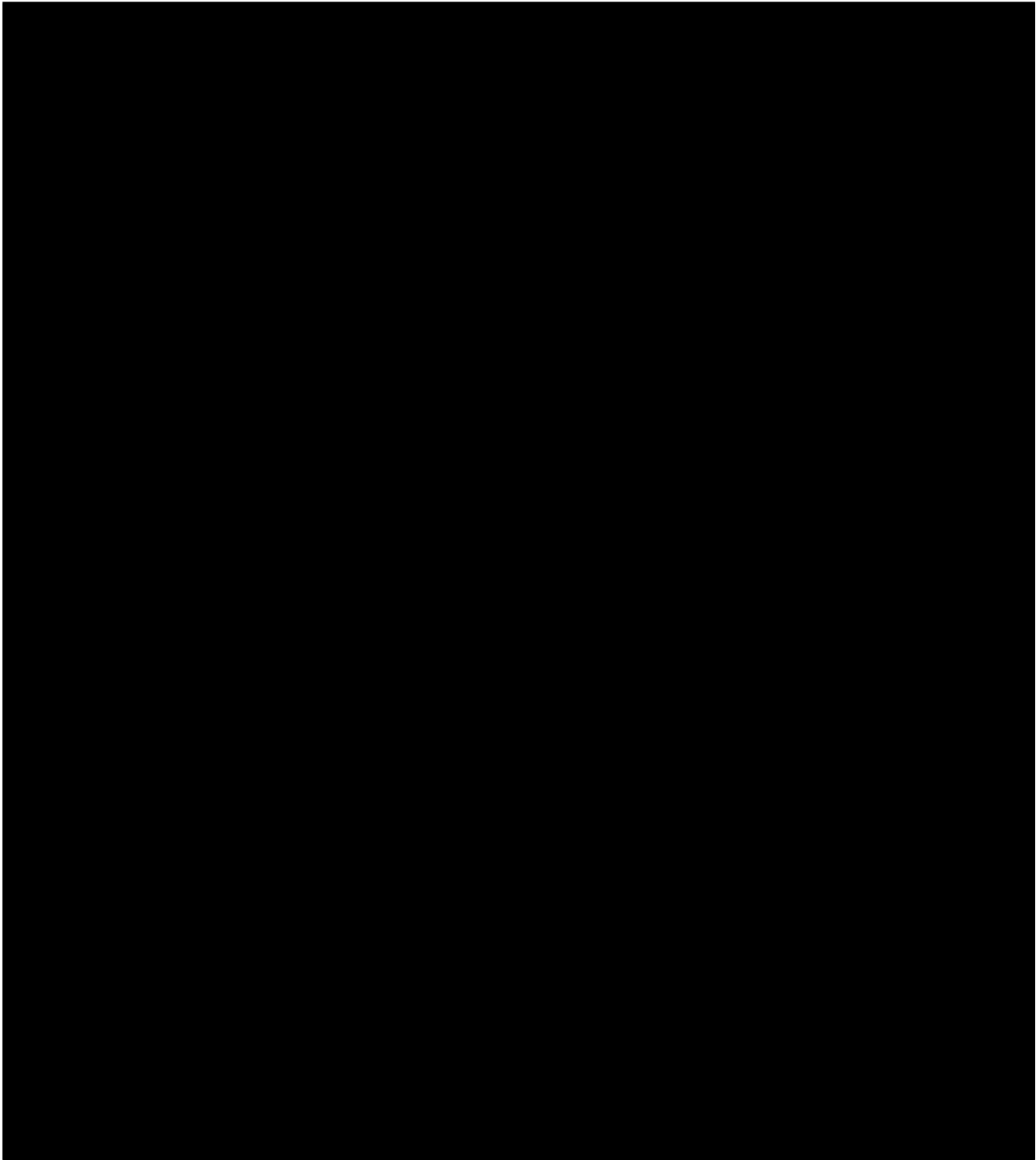
- Promtail Scraping
- Loki LogQL

Helm?????Loki??????????



Listing 6: ????????

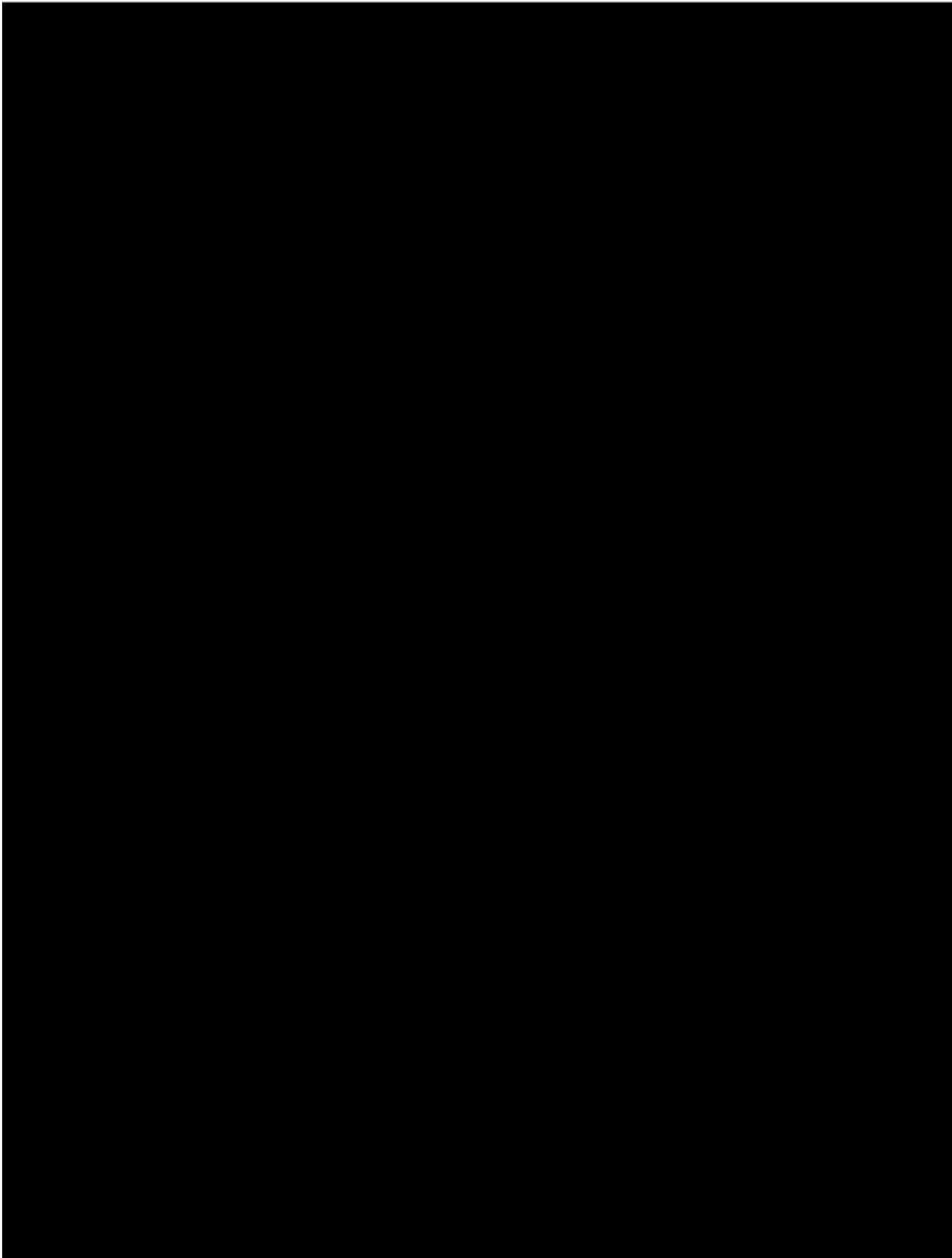
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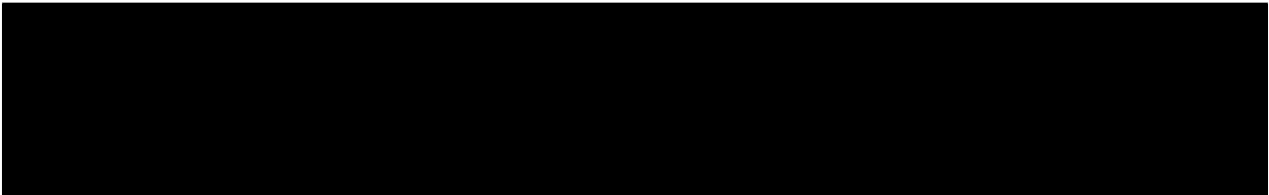
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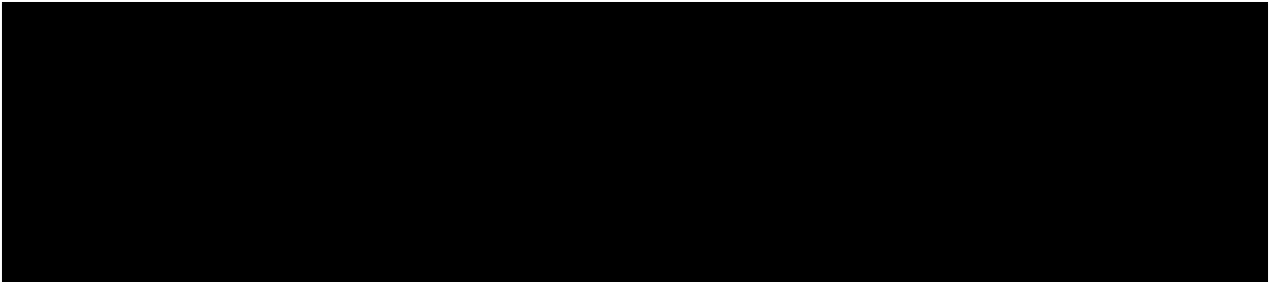
- 50-51??? kubernetes_sd_configs ? pod ?????Node????Pod????????????????50????Helm????
- 2??? cri ?????3-8??? json ?????log ?????
- 10-26???8???? log ????? match ?????NGINX? accesslog ?????
- 28-48???10-26???? match ?????NAP WAF? securitylog ?????

????Syslog Server????



Listing 7: ?????

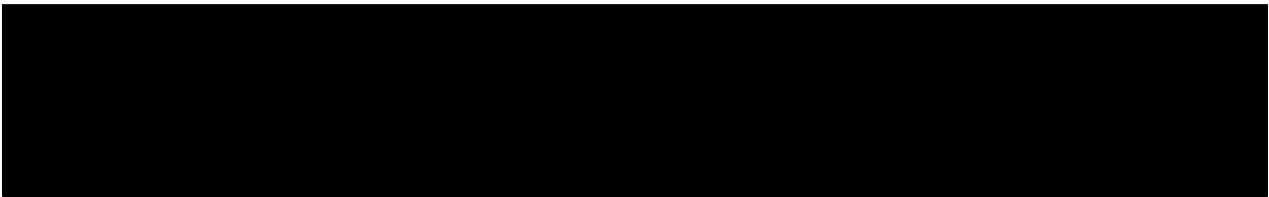
1
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5
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9



???Loki????

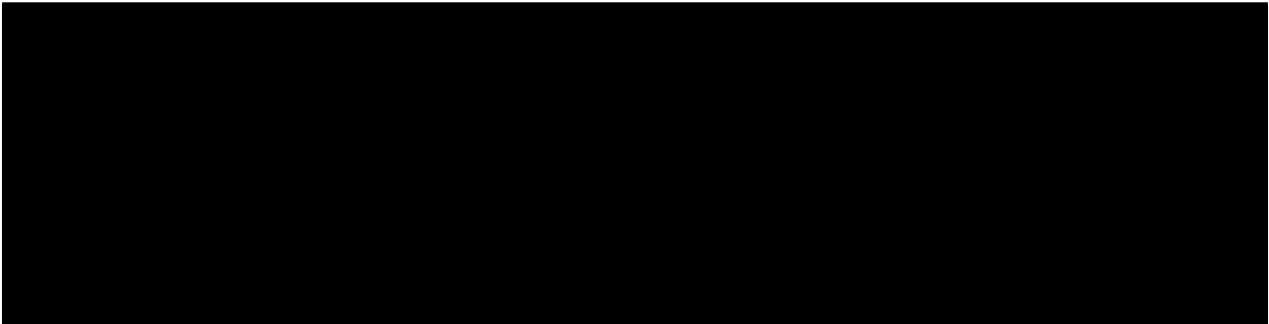
- GitHub helm-charts/charts/loki-stack/
- GitHub helm-charts/charts/loki-stack/values.yaml

Loki????



Listing 8: ?????

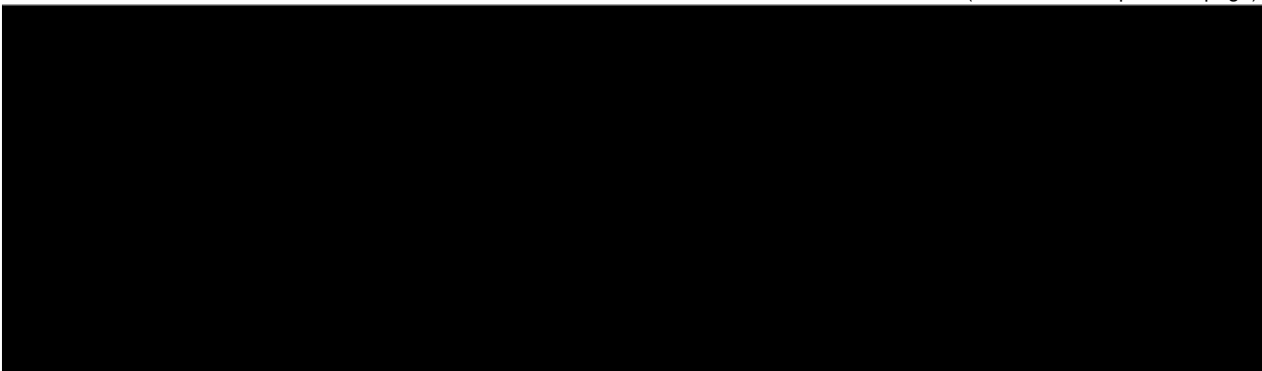
1
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16



????????????????



Listing 9: ????????

1

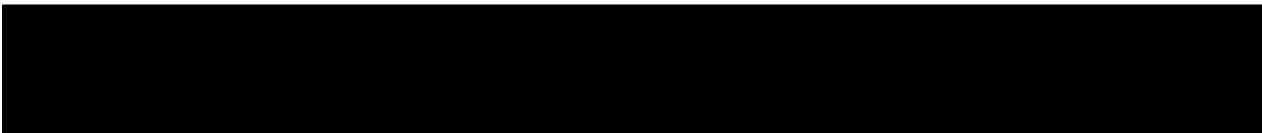


Pod????????????????



Listing 10: ????????

1
2
3
4



3.3 3. Jaeger?????

????????all-in-one ?Jaeger?????????
Helm????????Jaeger??????????

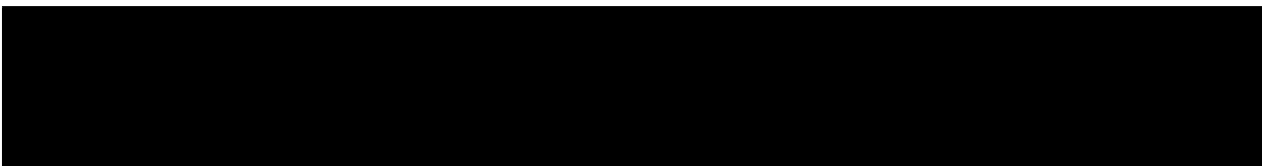
Jaeger????????????????

- JAEGER Getting Started



Listing 11: ????????

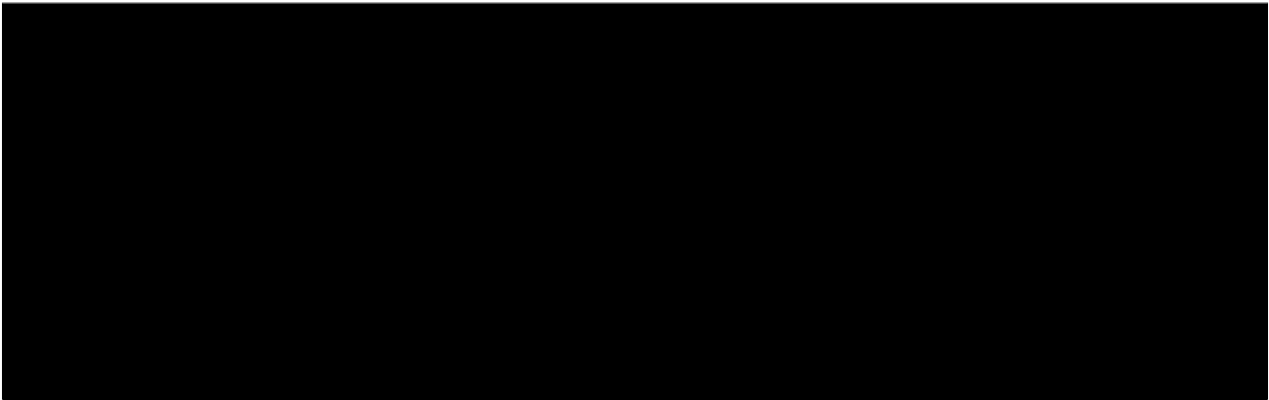
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- 6-7??? allInOne ?????????????????????????????????????????

Jaeger????????????????????????????????????

- GitHub helm-charts/charts/jaeger/
- GitHub helm-charts/charts/jaeger/values.yaml

Jaeger????????



Listing 12: ????????

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Listing 13: ????????

1

Pod????????????????????

Listing 14: ????????

1

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3.4 Tips1. Helm????????????????????

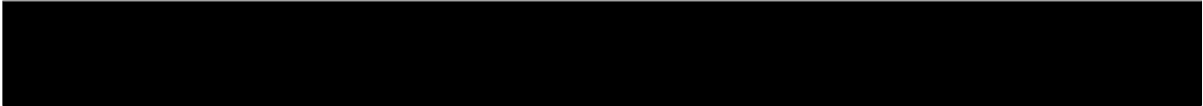
Tips2????????????????Helm????????????????
????????????????????????????????????

Prometheus????????????????

- 1. ?????????????????Helm Chart??Chart?????GitHub????????
 - Prometheus helm-charts
 - GitHub helm-charts/prometheus
 - GitHub helm-charts/prometheus values.yaml
- 2. ?????????????????
- 3. ?????????????????helm get ?????????????????

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- 4. 1. ? 3. ??????????????????????
- 5. 4. ???????????????????3. ??????????
 - -f ?????????????????????????????????????
 - --set ??????????????????????????
 - --set-file ?????????????????????????????????
- 6. ???????????????????

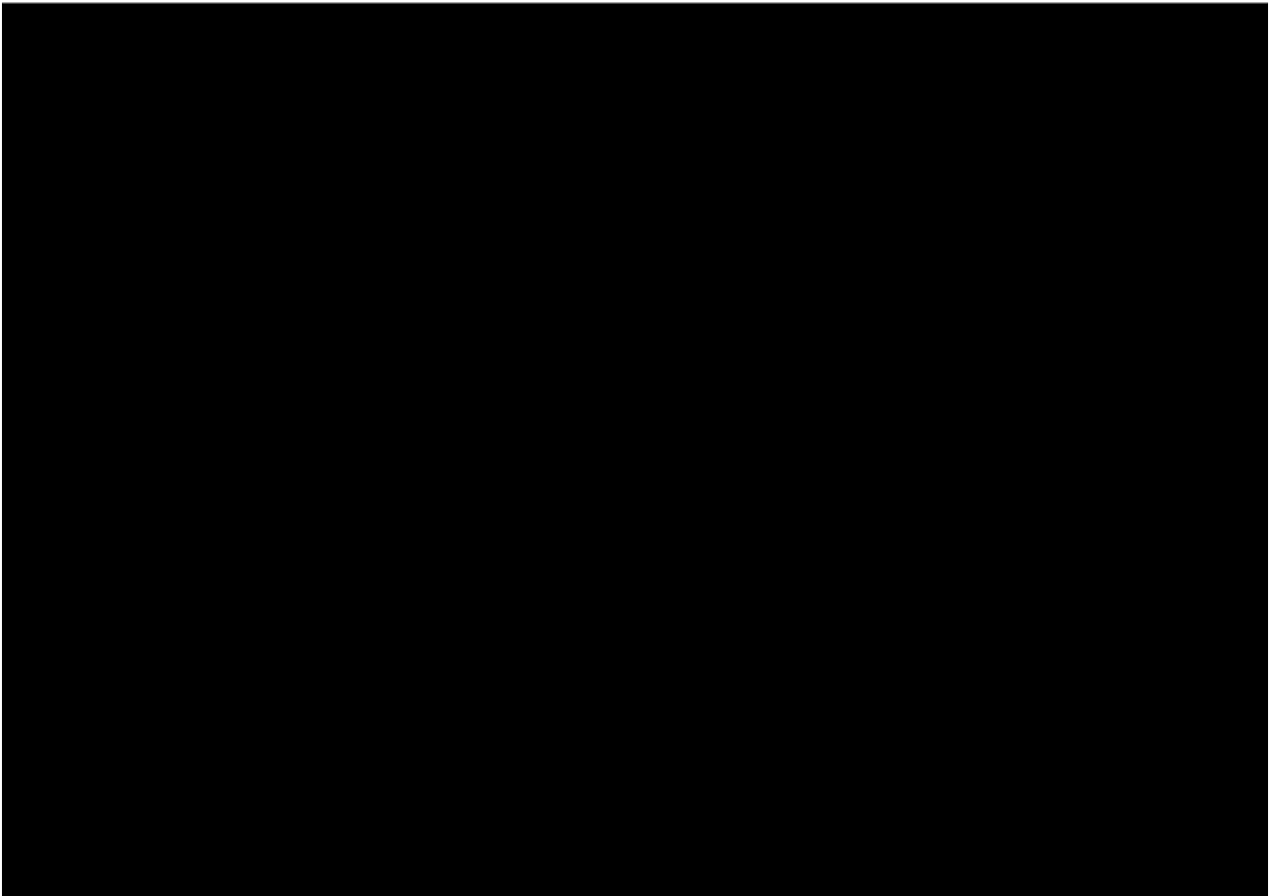
3.5 Tips2. Helm??????????????

Helm????????Prometheus????????????????????????????????
????????????????????



Listing 15: ????????

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the 1990s, the number of people in the United States who are 65 years of age or older has increased by 50 percent, and the number of people 75 years of age or older has increased by 100 percent. The number of people 85 years of age or older has increased by 200 percent. The number of people 90 years of age or older has increased by 400 percent. The number of people 95 years of age or older has increased by 800 percent. The number of people 100 years of age or older has increased by 1,600 percent. The number of people 105 years of age or older has increased by 3,200 percent. The number of people 110 years of age or older has increased by 6,400 percent. The number of people 115 years of age or older has increased by 12,800 percent. The number of people 120 years of age or older has increased by 25,600 percent. The number of people 125 years of age or older has increased by 51,200 percent. The number of people 130 years of age or older has increased by 102,400 percent. The number of people 135 years of age or older has increased by 204,800 percent. The number of people 140 years of age or older has increased by 409,600 percent. The number of people 145 years of age or older has increased by 819,200 percent. The number of people 150 years of age or older has increased by 1,638,400 percent. The number of people 155 years of age or older has increased by 3,276,800 percent. The number of people 160 years of age or older has increased by 6,553,600 percent. The number of people 165 years of age or older has increased by 13,107,200 percent. The number of people 170 years of age or older has increased by 26,214,400 percent. The number of people 175 years of age or older has increased by 52,428,800 percent. The number of people 180 years of age or older has increased by 104,857,600 percent. The number of people 185 years of age or older has increased by 209,715,200 percent. The number of people 190 years of age or older has increased by 419,430,400 percent. The number of people 195 years of age or older has increased by 838,860,800 percent. The number of people 200 years of age or older has increased by 1,677,721,600 percent. The number of people 205 years of age or older has increased by 3,355,443,200 percent. The number of people 210 years of age or older has increased by 6,710,886,400 percent. The number of people 215 years of age or older has increased by 13,421,772,800 percent. The number of people 220 years of age or older has increased by 26,843,545,600 percent. The number of people 225 years of age or older has increased by 53,687,091,200 percent. The number of people 230 years of age or older has increased by 107,374,182,400 percent. The number of people 235 years of age or older has increased by 214,748,364,800 percent. The number of people 240 years of age or older has increased by 429,496,729,600 percent. The number of people 245 years of age or older has increased by 858,993,459,200 percent. The number of people 250 years of age or older has increased by 1,717,986,918,400 percent. The number of people 255 years of age or older has increased by 3,435,973,836,800 percent. The number of people 260 years of age or older has increased by 6,871,947,673,600 percent. The number of people 265 years of age or older has increased by 13,743,895,347,200 percent. The number of people 270 years of age or older has increased by 27,487,790,694,400 percent. The number of people 275 years of age or older has increased by 54,975,581,388,800 percent. The number of people 280 years of age or older has increased by 109,951,162,777,600 percent. The number of people 285 years of age or older has increased by 219,902,325,555,200 percent. The number of people 290 years of age or older has increased by 439,804,651,110,400 percent. The number of people 295 years of age or older has increased by 879,609,302,220,800 percent. The number of people 300 years of age or older has increased by 1,759,218,604,441,600 percent. The number of people 305 years of age or older has increased by 3,518,437,208,883,200 percent. The number of people 310 years of age or older has increased by 7,036,874,417,766,400 percent. The number of people 315 years of age or older has increased by 14,073,748,835,532,800 percent. The number of people 320 years of age or older has increased by 28,147,497,671,065,600 percent. The number of people 325 years of age or older has increased by 56,294,995,342,131,200 percent. The number of people 330 years of age or older has increased by 112,589,990,684,262,400 percent. The number of people 335 years of age or older has increased by 225,179,981,368,524,800 percent. The number of people 340 years of age or older has increased by 450,359,962,737,049,600 percent. The number of people 345 years of age or older has increased by 900,719,925,474,099,200 percent. The number of people 350 years of age or older has increased by 1,801,439,850,948,198,400 percent. The number of people 355 years of age or older has increased by 3,602,879,701,896,396,800 percent. The number of people 360 years of age or older has increased by 7,205,759,403,792,793,600 percent. The number of people 365 years of age or older has increased by 14,411,518,807,585,587,200 percent. The number of people 370 years of age or older has increased by 28,823,037,615,171,174,400 percent. The number of people 375 years of age or older has increased by 57,646,075,230,342,348,800 percent. The number of people 380 years of age or older has increased by 115,292,150,460,684,697,600 percent. The number of people 385 years of age or older has increased by 230,584,300,921,369,395,200 percent. The number of people 390 years of age or older has increased by 461,168,601,842,738,790,400 percent. The number of people 395 years of age or older has increased by 922,337,203,685,477,580,800 percent. The number of people 400 years of age or older has increased by 1,844,674,407,370,955,161,600 percent. The number of people 405 years of age or older has increased by 3,689,348,814,741,910,323,200 percent. The number of people 410 years of age or older has increased by 7,378,697,629,483,820,646,400 percent. The number of people 415 years of age or older has increased by 14,757,395,258,967,641,292,800 percent. The number of people 420 years of age or older has increased by 29,514,790,517,935,282,585,600 percent. The number of people 425 years of age or older has increased by 59,029,581,035,870,565,171,200 percent. The number of people 430 years of age or older has increased by 118,059,162,071,741,130,342,400 percent. The number of people 435 years of age or older has increased by 236,118,324,143,482,260,684,800 percent. The number of people 440 years of age or older has increased by 472,236,648,286,964,521,369,600 percent. The number of people 445 years of age or older has increased by 944,473,296,573,929,042,739,200 percent. The number of people 450 years of age or older has increased by 1,888,946,593,147,858,085,478,400 percent. The number of people 455 years of age or older has increased by 3,777,893,186,295,716,170,956,800 percent. The number of people 460 years of age or older has increased by 7,555,786,372,591,432,341,913,600 percent. The number of people 465 years of age or older has increased by 15,111,572,745,182,864,683,827,200 percent. The number of people 470 years of age or older has increased by 30,223,145,490,365,729,367,654,400 percent. The number of people 475 years of age or older has increased by 60,446,290,980,731,458,735,308,800 percent. The number of people 480 years of age or older has increased by 120,892,581,961,462,917,470,617,600 percent. The number of people 485 years of age or older has increased by 241,785,163,922,925,834,941,235,200 percent. The number of people 490 years of age or older has increased by 483,570,327,845,851,669,882,470,400 percent. The number of people 495 years of age or older has increased by 967,140,655,691,703,339,764,940,800 percent. The number of people 500 years of age or older has increased by 1,934,281,311,383,406,679,529,881,600 percent. The number of people 505 years of age or older has increased by 3,868,562,622,766,813,359,059,763,200 percent. The number of people 510 years of age or older has increased by 7,737,125,245,533,626,718,119,526,400 percent. The number of people 515 years of age or older has increased by 15,474,250,491,067,253,436,239,052,800 percent. The number of people 520 years of age or older has increased by 30,948,500,982,134,506,872,478,105,600 percent. The number of people 525 years of age or older has increased by 61,897,001,964,269,013,744,956,211,200 percent. The number of people 530 years of age or older has increased by 123,794,003,928,538,027,489,912,422,400 percent. The number of people 535 years of age or older has increased by 247,588,007,857,076,054,979,824,844,800 percent. The number of people 540 years of age or older has increased by 495,176,015,714,152,109,959,649,689,600 percent. The number of people 545 years of age or older has increased by 990,352,031,428,304,219,919,299,379,200 percent. The number of people 550 years of age or older has increased by 1,980,704,062,856,608,439,838,598,758,400 percent. The number of people 555 years of age or older has increased by 3,961,408,125,713,216,879,677,197,516,800 percent. The number of people 560 years of age or older has increased by 7,922,816,251,426,433,759,354,395,033,600 percent. The number of people 565 years of age or older has increased by 15,845,632,502,852,867,518,708,790,067,200 percent. The number of people 570

- `helm get all ??????????????????????????`
- `helm ???????????? USER-SUPPLIED VALUES ????????`
- `COMPUTED VALUES ??????????????????????????????????????????Template?????????????????????????`

4.1 1. NGINX Ingress Controller???

????????????????????NGINX Ingress Controller???????
Loki????????????????Loki????????????????????????????????

????????????????

Listing 1: ????????

1
2
3
4



?????????(Chrome)????????????URL????????????????????

- Prometheus: <http://prometheus.example.com:8080/>

- Jaeger: <http://jaeger.example.com:8080/>

- Grafana: <http://grafana.example.com:8080/>

Listing 2: ????????

1

```
???? admin ?????????????????????????????????????????
```

```
???????? Configuration (???????) > DataSource ??? Add data source ????????????
```

```
DataSource?Prometheus???????
```

```
URL ? http://prometheus-server ????? Save & test ????????????
```

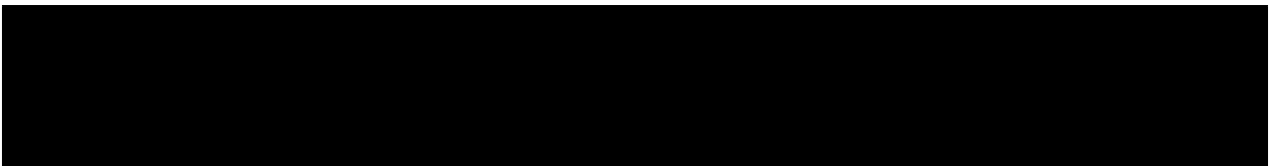
DataSource?Jaeger???????

URL ? <http://jaeger-query:16686> ? Filter by Trace ID ? Filter by Span ID ? Enable
Node Graph ? Save & test

Loki????????????????????????????????????????????

4.3 3. ???????????????????

????????????????????NGINX Ingress Controller???????

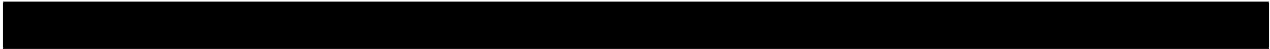


??????????????



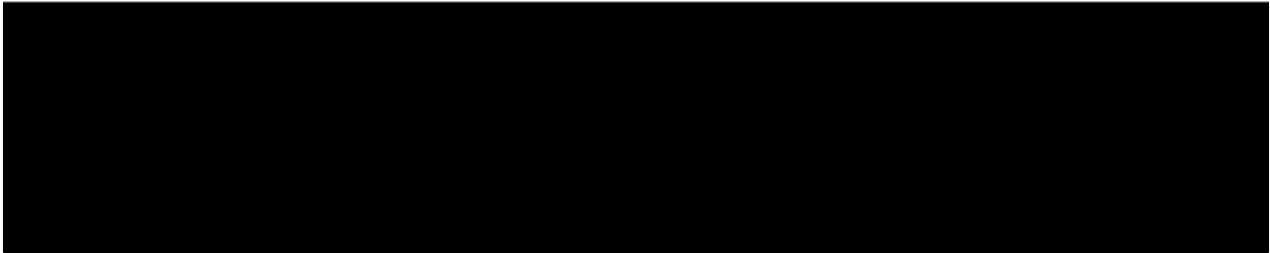
Listing 3: ????????

1
2
3
4
5



Listing 4: ????????

1
2
3
4
5
6
7
8



NSM Lab????? bookinfo ?????????????????? ??? NSM ?????????????????? ??????????



Listing 5: ????????

1
2
3
4
5
6
7



5.1 1. Dashboard????

Grafana ?????? ? ????????????? Import ??????Dashboard?Import??????????

????????????????Dashboard?Import??????

5.1.1 1. NIC Dashboard

Import?????????URL????????? Import via panel json ?????? Load ????????????

- GitHub NIC-Dashboard.json

Json????????????????????????????? Prometheus ???Grafana?Datasource?? Prometheus ??????

Import ????????????

5.1.2 2. NSM Dashboard

Import?????????URL????????? Import via panel json ?????? Load ????????????

- GitHub NSM-Dashboard.json

Json????????????????????????????? Prometheus ???Grafana?Datasource?? Prometheus ??????

Import ????????????

- GitHub Loki-Dashboard.json

```
Json????????????????????????????? Loki ???Grafana?Datasource?? Loki ????? Import ????????????
```

5.2 2. ???????????

????????????????????

Listing 1: ????????

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

5.3 3. ????????

[illegible]

5.3.1 1. NIC Dashboard

???? NIC ?????NIC???????????????? NIC ?????????

Success Rates Over Time ??????????????????

- View : ?????????????????

- Explore : ????????????

- Inspect > Data : ??????????????

5.3.2 2. NSM Dashboard

5.3.3 3. Loki Dashboard

5.3.4 4. Jaeger ???

5.4 Tips1. ???????????

Grafana ? Explore ???????????????????????????????

5.4.1 Prometheus ????????

Metric Browser ???????Prometheus?????Metrics???????

Prometheus?PromQL????????Metrics???????????????????? PromQL????????????????????

- Prometheus Querying Functions
- Prometheus Querying Examples

5.4.2 Loki ????????

Loki?LogQL????????Metrics???????????????????? LogQL????????????????????

- Grafana Log queries

Log browser ???LogQL????????????? Ctrl + Enter ??? ????? Run query ??????????????????

???1: logtype securitylog ??????Bot??? curl ????????????

Listing 2: Log Query???



{namespace="nginx-ingress"}	????????????????
json	json ??????????????
logtype="securitylog"	logtype ? securitylog ?????????
bot_signature_name="curl"	bot_signature_name ? curl ?????????

???2: logtype accessylog ??????grafana.example.com ???????

Listing 3: Log Query???



{namespace="nginx-ingress"}	???????????????
json	json ??????????????
logtype="accesslog"	logtype ? accesslog ????????
server_name="grafana.example.com"	server_name ? grafana.example.com ????????

???3: logtype accessylog ?????5?????????server_name ????????

Listing 4: Log Query???



sum by (server_name)(????????????????????????????
count_over_time(????????????????
{namespace="nginx-ingress"}	????????????????
json	json ??????????????
logtype="accesslog"	logtype ? accesslog ????????
[5m]))	count_over_time ?????? (5m=5?)

5.4.3 Loki Promtail ??

Loki?????Promtail???????????????

?????????????????????Loki?????????????????????

Helm Chart? values.yaml config ?????????? Template ? secret.yaml ??????? Promtail ????????????????

?????????????????????????????????????

- Grafana Configuring Promtail

?????????????????????????????????????????????

```

????????? scrape_configs ?Log????????????????????????????????????? scrape_configs ??????

```

```

????? loki-scrape-addvalue.yaml ? loki-scrape.yaml ??????????????????????????????

```

```

Syslog????????????? job_name: syslog ?Syslog?????Log????????????????????? ?Pod?????????
job_name: kubernetes-pods ??????????

```

```

scrape_configs ??????????????????????

```

- Scraping (Service Discovery)?
 - ??????????????
 - Scrape????? Kubernetes ? Windows Event ? Journal (Linux) ? syslog ???????
 - Scrape????????????????????????????????????????????????????????????? Relabel ??????
 - ?????????????????? Grafana Configuring Promtail ? Grafana Promtail Scraping ??????????
- Relabel :
 - ?????????????????????????????????????? ??????????
 - Scrape????????????????????????????????????????????????????????????? ??????????2? (__) ??????????????????????
 - ?????????????????????? Grafana Configuring Promtail ? Grafana Promtail Scraping ??????????
- Pipeline :

- ??????????????????????????????????????????Pipeline????Stage????????????????????????????????
- Pipeline ???? Grafana Promtail ??????????
- Stage ?????????????? Grafana Promtail Stages ??????????

```
Pipeline ?????????????????????? Stage? Parsing ? Transoform ? Action ? Filtering
?4?????????????????????????????
```

- Parsing stages: ??????????????????????
 - docker: ??????Docker Format????????
 - cri: ??????CRI Format????????
 - json: ??????Json Format????????
- Transform stages: ???????????????????
 - template: Go?Template????????????????
- Action stages: ???????????????????
 - timestamp: ?????????????????????
- Filtering stages: ?????????????????????????????????
 - match: ?????????????????????stage??????

????????????????Loki????????
 ?????????????????

?Stage????????????????

????????????????Loki????????????

- NIC?Access Log(logtype accesslog)?NAP WAF?Log(logtype accesslog)?json????????
- NAP WAF?Log?JSON????????????????????????????????Access Log??

LogQL????????????????????????????????

5.5 Tips2. ?????????????

- ?????????????
 - helm ?????????????

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- kubectl ?????????????

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- ?????????????
 - ?????????????

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– WAF????????????????



