

Zabbix integration with Big Data System in large-scale environment

Andy
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Company introduction

Established in 2010, Shanghai Grandage Data System Co., Ltd. is a professional IT service company. Focusing on development of IT software and provision of IT services for organization at different size around the world, We also offer a wide range of professional services including visualized software design and development, IT infrastructure monitoring system architecture design and implementation, ITOA consulting and technical solutions. Grandage is authorized by Zabbix as exclusive distributor in Greater China.

About me



IT Consultant, IT Architect, and Trainer in Shanghai Grandage Data System Corporation, Andy Zhou is the first Zabbix Certified Trainer in China and has nearly 10 years of IT administration and maintenance experience, 5 years of experience in Zabbix monitoring solution, and long-term experience in the field of ITOM and ITOA. Andy has worked on many IT administration and maintenance projects in China for insurance and financial industries.

01

Customer introduction

Customer profile

1. This customer is **the third largest** insurance company in China.
2. The total amount of device will reach **65000+** in the future.
3. There are **many objects** need to monitored: Operation systems, Databases, Middleware, Network device, Network Line, Storage device, PC Server hardware, Trap integrate, Syslog integrate, Virtualization, Application Log file, Private cloud platform and so on.
4. The customer are using many commercial monitoring tools: **IBM Netcool, BMC Patrol, Usight, Boya software, H3C U-Center**

Devices type

Operation system:



Database:



Middleware:



Application:



Network device:



Storage device:



PC Server hardware:



Virtualization:



Pain points


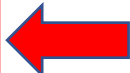
1. Many monitoring tools have inconsistent rules which result in unable to achieve unified management.
2. The systems are independent of each other and the interconnection is insufficient, may easily result in an information island.
3. The depth of monitoring is not enough.
4. Insufficient flexibility and weak in self control.
5. Too many commercial monitoring system which causes high license fees and maintenance costs.

Why Zabbix ?

1. Zabbix is the best open source monitoring system, no license fees
2. Zabbix installation and deployment is simple and fast
3. Zabbix is powerful and highly flexible
4. Easy to use and manage, user interface friendly
5. Zabbix backend is based on C language development, stable performance and low resource overhead

Load test

System information ⋮

Parameter	Value	Details
Zabbix server is running	Yes	 10051
Number of hosts (enabled/disabled/templates)	180	73 / 2 / 105
Number of items (enabled/disabled/not supported)	70410	68916 / 1088 / 406
Number of triggers (enabled/disabled [problem/ok])	3109	1915 / 1194 [4 / 1911]
Number of users (online)	5	1
Required server performance, new values per second	60233.37	

02

System architecture design

Customer environmental statistics

65000+ device in the future

01

02

Historical data kept 2 days, trend data kept 7 days

Average of 300 items for a host

03

04

NVPS: 325,000

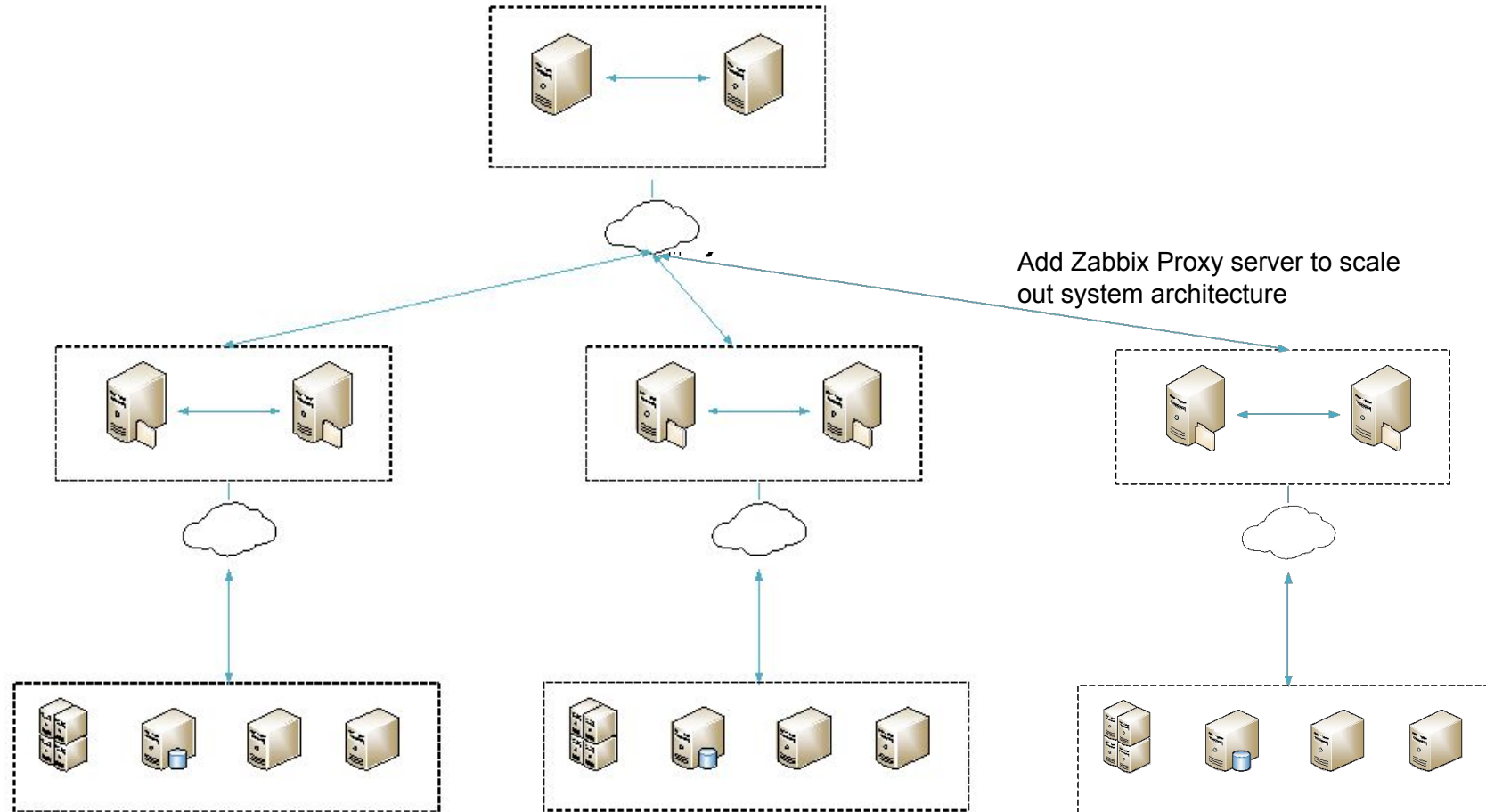
Average 60s frequency, 19,500,000 items

05

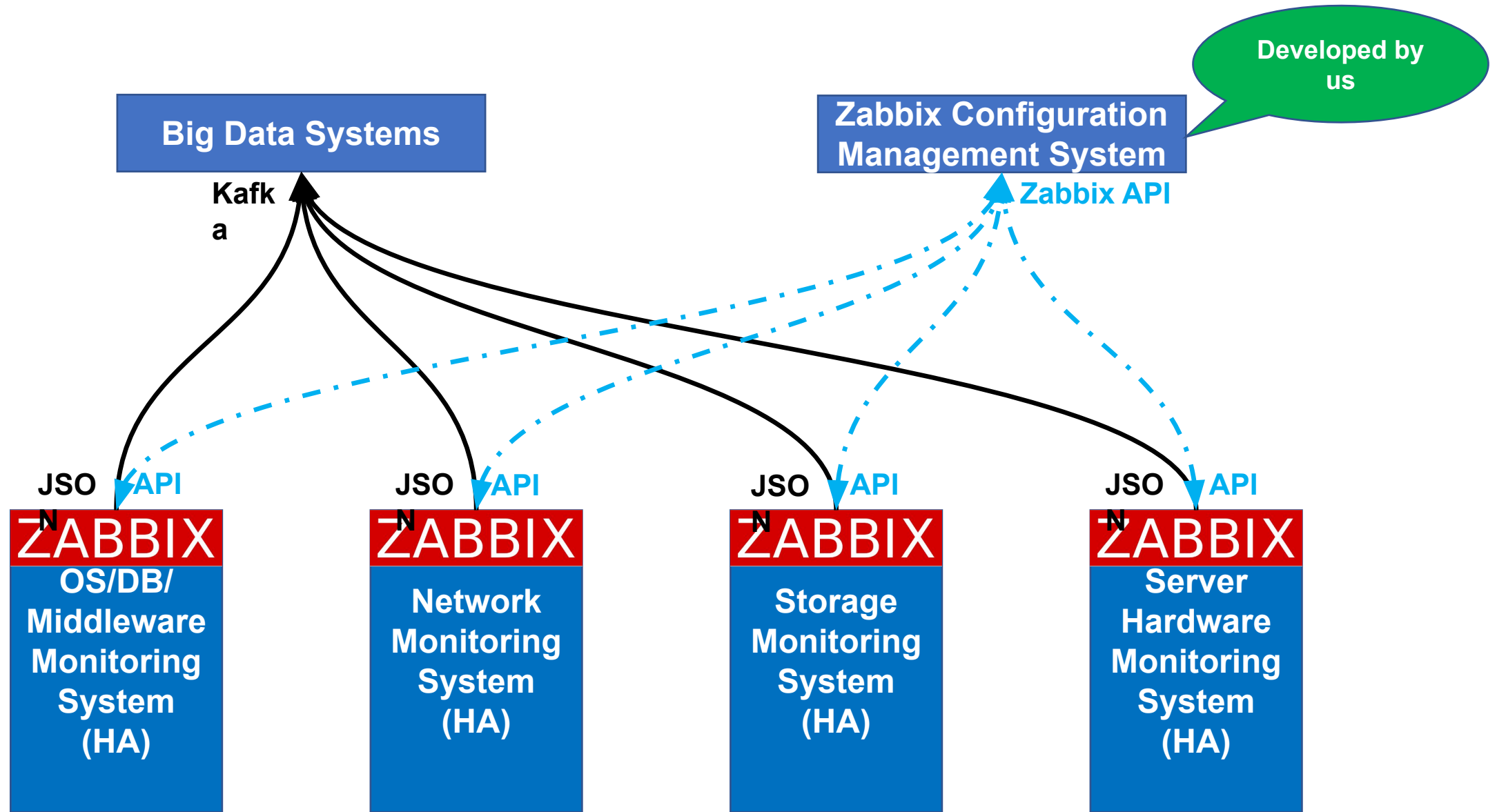
06

Data size: 4,486.04 GB

Zabbix HA architecture

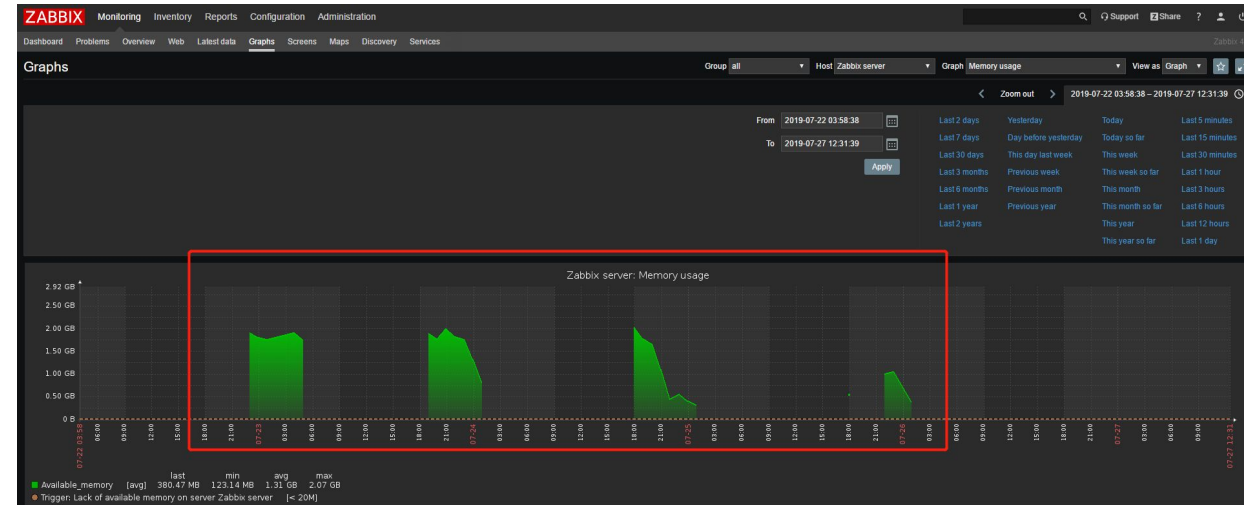


Distributed Central Management Architecture



Issues

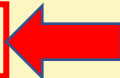
1. Frequent gaps in graphs
2. Many queues appear



***** Script profiler *****

Total time: 19.32682

Total SQL time: 19.186768



SQL count: 5636 (selects: 4065 | executes: 1531)

Peak memory usage: 362.5M

Memory limit: 10240M

1. Database query time is too long
2. Zabbix frontend page response time is too long

How to optimize performance ?

0

1
Nginx replaces
Apache

02

Zabbix configuration
parameter optimization

03

MySQL database
parameter
optimization

04

MySQL database
partition table
configuration, one
data table per day

05

Operating system
kernel parameter
optimization

06

Use SSD high
performance storage

07

Monitoring item data
collection interval
optimization

08

Server hardware
configuration upgrade

After optimization

***** Script profiler *****

Total time: **1.23175** ←

Total SQL time: 0.211628

SQL count: 5636 (selects: 4089 | executes: 1627)

Peak memory usage: 402.9M

Memory limit: 10240M

ZABBIX Monitoring Inventory Reports Configuration Administration

General Proxies Authentication User groups Users Media types Scripts Queue Zabbix Server4.0.4

Queue of items to be updated Overview by proxy ▾

Proxy	5 seconds	10 seconds	30 seconds	1 minute	5 minutes	More than 10 minutes
TestProxy1	0	0	0	0	0	0
TestProxy2	0	0	0	0	0	0
TestProxy3	0	0	0	0	0	0
TestProxy4	0	0	0	0	0	0
TestProxy5	0	0	0	0	0	0
TestProxy6	0	0	0	0	0	0
TestProxy7	0	0	0	0	0	0
TestProxy8	0	0	0	0	0	0
TestProxy9	0	0	0	0	0	0
Server	0	0	0	0	0	0

Total: 10

After optimization, the Zabbix front-end access became faster and no queues.

03

Use the valuable data

Data in different stage of IT management

The development stage of IT

operation and maintenance management:

01

ITOM
Use tools to monitor
and manage IT
objects

02

ITOA
Data Processing,
Association and
Analysis in Different
Dimensions

03

AIOps
Big data analysis,
machine learning,
algorithms

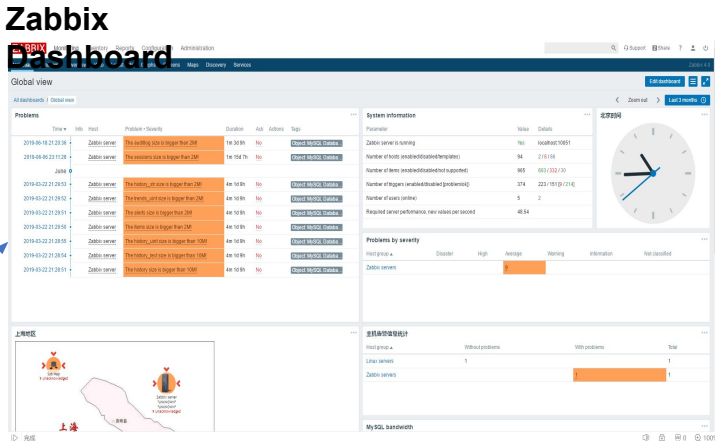
No matter which stage, the data is
the basis for analysis and process!

Data collection



ZABBIX

Use Zabbix to collect data from different devices and objects.



Export JSON data

```
{
  "data": [
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "1m 30s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "1m 30s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "4m 10s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "4m 10s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "4m 10s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "4m 10s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "4m 10s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "4m 10s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "4m 10s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    },
    {
      "host": "Linux server",
      "application": "Zabbix server",
      "problem": "Problems: disk usage from 20%",
      "severity": "Warning",
      "duration": "4m 10s",
      "acknowledged": "No",
      "actions": "Open, Close, Update",
      "tags": ""
    }
  ]
}
```

Data analysis

DB2DIAG 日志

db2diag.log 日志监控

小部件拖到任何你喜欢的位置在 解锁 / 编辑 模式。

过去1小时日志数

in 8 minutes

104



Hostname 统计

in 8 minutes

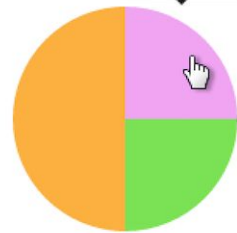


Value	%	Count
Top values		
tivomni01	100.00%	104



Log Level 统计

in 8 minutes



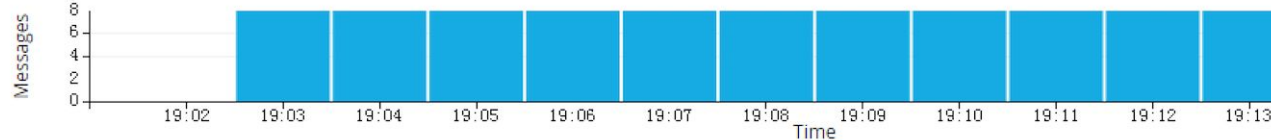
Value	%	Count
Top values		
Event	50.00%	52
Warning	25.00%	26
Error (OS)	25.00%	26



Function 统计

Value
Top values
DB2 UDB, base sy...
es, sqlReleaseSt...
e, probe:12463
DB2 UDB, base sy...
es, sqlGetStStLo...
obe:12741
DB2 UDB, SQO M...
Management, sql...
reateSingleSegm...
e:100
DB2 UDB, base sy...

过去15分钟日志数



没有更新
搜索的历史

搜索结果

Found 112 messages in 10 ms, searched in 1条索引中搜索。 Results retrieved at 2016-12-26 19:08:21.

计数添加到仪表盘 保存搜索条件

More actions

Fields Decorators

Default All None Filter fields

- DATE
- DATE_EU
- DB2_FUNCTION
- DB2_HOSTNAME
- DB2_INSTANCE
- DB2_LEVEL
- DB2_NODE
- DB2_PID
- DB2_PROC
- DB2_TID

柱状图

Year, Quarter, Month, Week, Day, Hour, Minute

添加到仪表盘

消息

上一页 1 下一页

Timestamp	source
2016-12-26 19:16:27.92	158.222.59.52-collector
6	
2016-12-26-19.16.27.882409+480 I775995304E379 LEVEL: Warning	
EID : 11873 TID : 13994889913120 PROC : db2star2	
INSTANCE: db2inst1 NODE : 000	
HOSTNAME: tivomni01	
2016-12-26 19:16:27.92	158.222.59.52-collector

柱状图

Year, Quarter, Month, Week, Day, Hour, Minute

添加到仪表盘

消息

上一页 1 2 3 4 5 6 7 下一页

时间戳	nf_bytes	nf_dst	nf_pkts	nf_proto_name	nf_src
2016-11-02 18:05:12.000	291	10.100.132.109:10050	5	TCP	10.100.132.107:34055
2016-11-02 18:05:12.000	9670	10.100.121.107:63408	7	TCP	10.100.132.109:12900
2016-11-02 18:05:12.000	841	10.100.121.107:63409	1	TCP	10.100.132.109:12900
2016-11-02 18:05:12.000	317	255.255.255.255:67	1	UDP	0.0.0.0:68
2016-11-02 18:05:12.000	4882	10.100.132.109:12900	12	TCP	10.100.121.107:63407
2016-11-02 18:05:12.000	7812	10.100.121.107:63407	9	TCP	10.100.132.109:12900
2016-11-02 18:05:12.000	13644	10.100.132.109:12900	63	TCP	10.100.121.107:63382

04

Zabbix integrate with Big Data System

Elastic component

Filebeat
Real-time insight into log data.

[Download](#)

Packetbeat
Analyze network packet data.

[Download](#)

Winlogbeat
Analyze Windows event logs.

[Download](#)

Metricbeat
Ship and analyze metrics.

[Download](#)

Heartbeat
Ping your Infrastructure.

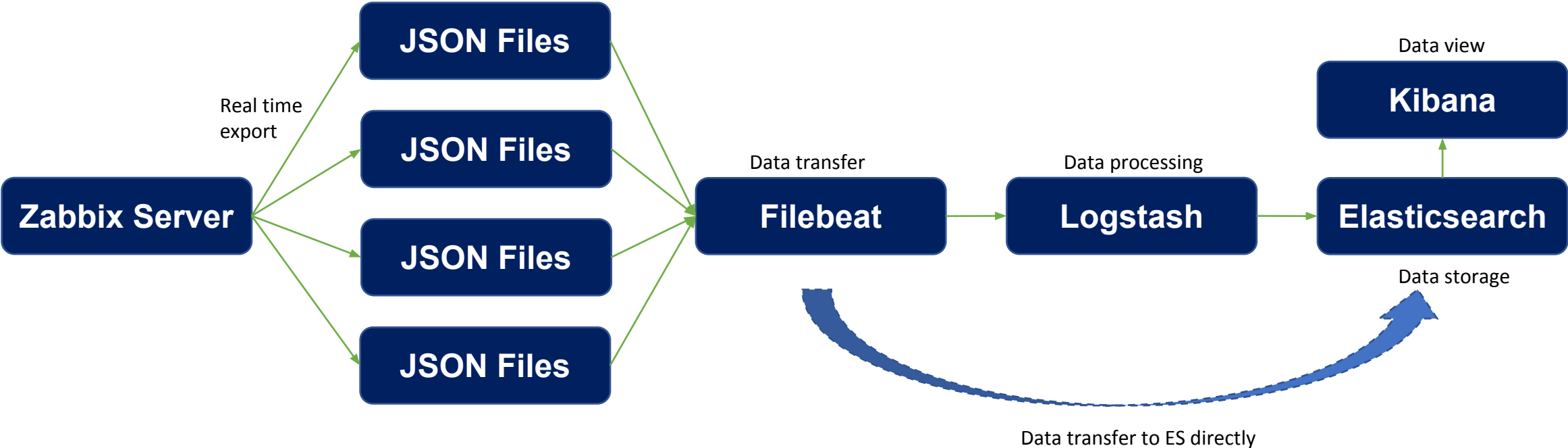
[Download](#)

Auditbeat
Send audit data to Elasticsearch.

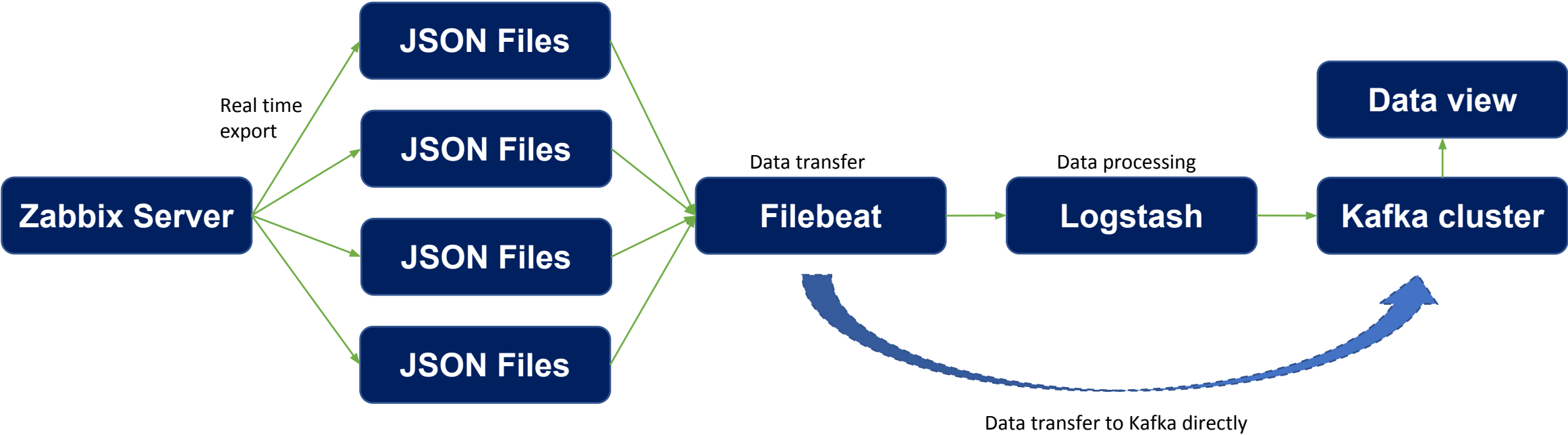
[Download](#)

Beats is the platform for single-purpose data shippers. They send data from hundreds or thousands of machines and systems to Logstash or Elasticsearch , Here we use the Filebeat.

How it works



How it works



Data export configuration

Data directory and data file size in the Zabbix configuration file:

```
# 1 - enable
#
# Mandatory: no
# Default:
# HistoryStorageDateIndex=0

### Option: ExportDir
# Directory for real time export of events, history and trends in newline delimited JSON format.
# If set, enables real time export.
#
# Mandatory: no
# Default:
ExportDir=/opt/ZabbixExport

### Option: ExportFileSize
# Maximum size per export file in bytes.
# Only used for rotation if ExportDir is set.
#
# Mandatory: no
# Range: 1M-1G
# Default:
ExportFileSize=100M

##### ADVANCED PARAMETERS #####

### Option: StartPollers
# Number of pre-forked instances of pollers.
#
# Mandatory: no
# Range: 0-1000
# Default:
StartPollers=20

### Option: StartIPMIPollers
# Number of pre-forked instances of IPMI pollers.
# The IPMI manager process is automatically started when at least one IPMI poller is started.
#
# Mandatory: no
# Range: 0-1000
# Default:
StartIPMIPollers=0

### Option: StartPreprocessors
# Number of pre-forked instances of preprocessing workers.
# The preprocessing manager process is automatically started when preprocessor worker is started.
```

Exported Json data file:

```
[root@TestServer ZabbixExport]# ll
total 37656
-rw-rw-r-- 1 zabbix zabbix 318175 Jul 23 01:26 history-history-syncer-1.ndjson
-rw-rw-r-- 1 zabbix zabbix 10139431 Jul 23 01:26 history-history-syncer-2.ndjson
-rw-rw-r-- 1 zabbix zabbix 8183167 Jul 23 01:26 history-history-syncer-3.ndjson
-rw-rw-r-- 1 zabbix zabbix 6723198 Jul 23 01:26 history-history-syncer-4.ndjson
-rw-rw-r-- 1 zabbix zabbix 0 Jul 10 18:12 history-main-process-0.ndjson
-rw-rw-r-- 1 zabbix zabbix 2873 Jul 22 23:39 problems-history-syncer-1.ndjson
-rw-rw-r-- 1 zabbix zabbix 2924 Jul 22 23:29 problems-history-syncer-2.ndjson
-rw-rw-r-- 1 zabbix zabbix 2360 Jul 22 06:43 problems-history-syncer-3.ndjson
-rw-rw-r-- 1 zabbix zabbix 3780 Jul 22 23:29 problems-history-syncer-4.ndjson
-rw-rw-r-- 1 zabbix zabbix 0 Jul 10 18:12 problems-main-process-0.ndjson
-rw-rw-r-- 1 zabbix zabbix 0 Jul 10 18:12 problems-task-manager-1.ndjson
-rw-rw-r-- 1 zabbix zabbix 956864 Jul 23 01:03 trends-history-syncer-1.ndjson
-rw-rw-r-- 1 zabbix zabbix 901060 Jul 23 01:04 trends-history-syncer-2.ndjson
-rw-rw-r-- 1 zabbix zabbix 799531 Jul 23 01:09 trends-history-syncer-3.ndjson
-rw-rw-r-- 1 zabbix zabbix 697143 Jul 23 01:08 trends-history-syncer-4.ndjson
-rw-rw-r-- 1 zabbix zabbix 115946 Jul 18 06:25 trends-main-process-0.ndjson
[root@TestServer ZabbixExport]#
```

Data is exported from the Zabbix
Server to the **JSON file** in real time.

JSON data exported from Zabbix

```
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["sysmaps", "ZCP_Training"],
  "itemid": 29869,
  "name": "Total_size sysmaps",
  "clock": 1563749099,
  "ns": 100742185,
  "value": 81920
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "httpstep"],
  "itemid": 29659,
  "name": "Index length httpstep",
  "clock": 1563749099,
  "ns": 104308828,
  "value": 16384
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "maintenances_groups"],
  "itemid": 29679,
  "name": "Index length maintenances_groups",
  "clock": 1563749099,
  "ns": 104892779,
  "value": 32768
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "usrgrp"],
  "itemid": 29889,
  "name": "Total_size usrgrp",
  "clock": 1563749099,
  "ns": 105054080,
  "value": 32768
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "task"],
  "itemid": 29729,
  "name": "Index length task",
  "clock": 1563749099,
  "ns": 106371713,
  "value": 32768
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "media_type"],
  "itemid": 29829,
  "name": "Total_size media_type",
  "clock": 1563749099,
  "ns": 106511664,
  "value": 32768
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "acknowledges"],
  "itemid": 29459,
  "name": "Data length acknowledges",
  "clock": 1563749099,
  "ns": 106619821,
  "value": 16384
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "hosts"],
  "itemid": 29799,
  "name": "Total_size hosts",
  "clock": 1563749099,
  "ns": 106709657,
  "value": 163840
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["corr_condition_tagpair", "ZCP_Training"],
  "itemid": 29619,
  "name": "Index length corr_condition_tagpair",
  "clock": 1563749099,
  "ns": 108917042,
  "value": 0
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["slides", "ZCP_Training"],
  "itemid": 29569,
  "name": "Data length slides",
  "clock": 1563749099,
  "ns": 109030095,
  "value": 16384
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["conditions", "ZCP_Training"],
  "itemid": 29469,
  "name": "Data length conditions",
  "clock": 1563749099,
  "ns": 111213744,
  "value": 16384
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "dashboard_user"],
  "itemid": 29479,
  "name": "Data length dashboard_user",
  "clock": 1563749099,
  "ns": 111475275,
  "value": 16384
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["slides", "ZCP_Training"],
  "itemid": 29859,
  "name": "Total_size slides",
  "clock": 1563749099,
  "ns": 111593636,
  "value": 49152
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["httptestitem", "ZCP_Training"],
  "itemid": 29519,
  "name": "Data length httptestitem",
  "clock": 1563749099,
  "ns": 111595837,
  "value": 16384
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["service_alarms", "ZCP_Training"],
  "itemid": 29709,
  "name": "Index length service_alarms",
  "clock": 1563749099,
  "ns": 113587087,
  "value": 32768
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "sysmaps"],
  "itemid": 29579,
  "name": "Data length sysmaps",
  "clock": 1563749099,
  "ns": 113627246,
  "value": 16384
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCS_Training"],
  "itemid": 29359,
  "name": "SSH-TEST",
  "clock": 1563749099,
  "ns": 220202922,
  "value": "zabbix_server (Zabbix) 4.0.4"
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Classes"],
  "itemid": 29893,
  "name": "cl Loaded Class Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 2258
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Classes"],
  "itemid": 29894,
  "name": "cl Total Loaded Class Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 2258
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory pool"],
  "itemid": 29923,
  "name": "mp Code Cache committed",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 4587520
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Threads"],
  "itemid": 29946,
  "name": "th Thread Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 38
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Threads"],
  "itemid": 29944,
  "name": "th Daemon Thread Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 37
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Garbage collector"],
  "itemid": 29905,
  "name": "gc PS MarkSweep accumulated time spent in collection",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 0.000000
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Operating system"],
  "itemid": 29940,
  "name": "os Process CPU Load",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 0.073839
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory"],
  "itemid": 29916,
  "name": "mem Object Pending Finalization Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 0
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Garbage collector"],
  "itemid": 29904,
  "name": "gc PS MarkSweep number of collections per second",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 0.000000
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Operating system"],
  "itemid": 29939,
  "name": "os Open File Descriptor Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 58
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Garbage collector"],
  "itemid": 29907,
  "name": "gc PS Scavenge accumulated time spent in collection",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 0.165000
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory"],
  "itemid": 29912,
  "name": "mem Heap Memory used",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 12919880
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Compilation"],
  "itemid": 29897,
  "name": "comp Accumulated time spent in compilation",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 2.992000
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Classes"],
  "itemid": 29895,
  "name": "cl Unloaded Class Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 0
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Runtime"],
  "itemid": 29941,
  "name": "jvm Uptime",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 157
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory"],
  "itemid": 29915,
  "name": "mem Non-Heap Memory used",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 20737984
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory pool"],
  "itemid": 29928,
  "name": "mp PS Old Gen used",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 4066336
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory pool"],
  "itemid": 29926,
  "name": "mp PS Old Gen committed",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 33554432
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory pool"],
  "itemid": 29925,
  "name": "mp Code Cache used",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 4480000
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Threads"],
  "itemid": 29945,
  "name": "th Peak Thread Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 40
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory"],
  "itemid": 29910,
  "name": "mem Heap Memory committed",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 60817408
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Threads"],
  "itemid": 29947,
  "name": "th Total Started Thread Count",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 44
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Memory"],
  "itemid": 29913,
  "name": "mem Non-Heap Memory committed",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 21561344
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["ZCP_Training"],
  "itemid": 30195,
  "name": "Tomcat Version",
  "clock": 1563749112,
  "ns": 390847930,
  "value": "Apache Tomcat/7.0.76"
},
{
  "host": "Tomcat",
  "groups": ["Linux servers"],
  "applications": ["Garbage collector"],
  "itemid": 29906,
  "name": "gc PS Scavenge number of collections per second",
  "clock": 1563749112,
  "ns": 368141528,
  "value": 0.000000
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["application_prototype", "ZCP_Training"],
  "itemid": 29608,
  "name": "Index length application_prototype",
  "clock": 1563749118,
  "ns": 142989982,
  "value": 32768
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "graphs_items"],
  "itemid": 29788,
  "name": "Total_size graphs_items",
  "clock": 1563749118,
  "ns": 143123963,
  "value": 245760
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["sysmap_element_trigger", "ZCP_Training"],
  "itemid": 29718,
  "name": "Index length sysmap_element_trigger",
  "clock": 1563749118,
  "ns": 143209486,
  "value": 32768
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["users_groups", "ZCP_Training"],
  "itemid": 29888,
  "name": "Total_size users_groups",
  "clock": 1563749118,
  "ns": 143387606,
  "value": 49152
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["ZCP_Training", "profiles"],
  "itemid": 29698,
  "name": "Index length profiles",
  "clock": 1563749118,
  "ns": 146515406,
  "value": 65536
},
{
  "host": "Zabbix server",
  "groups": ["Zabbix servers"],
  "applications": ["opconditions", "ZCP_Training"],
  "itemid": 29688,
  "name": "Index length opconditions",
  "clock": 1563749118,
  "ns": 147790202,
  "value": 16384
}
```


How to transfer JSON data?

Add the data file needs to be transferred in the Filebeat configuration file and enable it.

```
##### Filebeat Configuration Example #####

# This file is an example configuration file highlighting only the most common
# options. The filebeat.reference.yml file from the same directory contains all the
# supported options with more comments. You can use it as a reference.
#
# You can find the full configuration reference here:
# https://www.elastic.co/guide/en/beats/filebeat/index.html

# For more available modules and options, please see the filebeat.reference.yml sample
# configuration file.

#----- Filebeat inputs -----

filebeat.inputs:

# Each - is an input. Most options can be set at the input level, so
# you can use different inputs for various configurations.
# Below are the input specific configurations.

- type: log

  # Change to true to enable this input configuration.
  enabled: true
  encoding: UTF8

  # Paths that should be crawled and fetched. Glob based paths.
  paths:
    - /opt/ZabbixExport/history-history-syncer-*.ndjson
    #- C:\programdata\elasticsearch\logs\

  # Exclude lines. A list of regular expressions to match. It d
  # matching any regular expression from the list.
  #exclude_lines: ['^DBG']

  # Include lines. A list of regular expressions to match. It e
  # matching any regular expression from the list.
  #include_lines: ['^ERR', '^WARN']

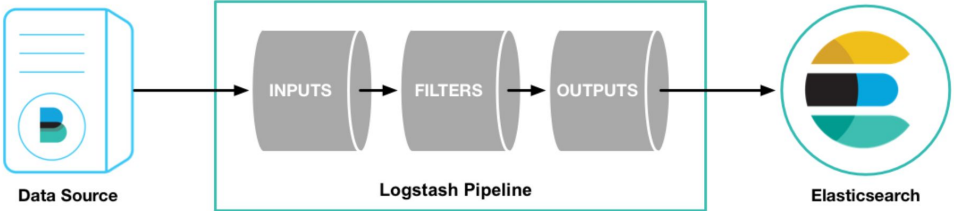
  # Exclude files. A list of regular expressions to match. File
  # are matching any regular expression from the list. By defau
  #exclude_files: ['.gz$']

2019-07-23T05:08:05.997+0800 INFO instance/beat.go:278 Setup Beat: filebeat; Version: 6.5.4
2019-07-23T05:08:09.001+0800 INFO add_cloud_metadata/add_cloud_metadata.go:319 add_cloud_metadata: hosting provider type not detected.
2019-07-23T05:08:09.001+0800 INFO elasticsearch/client.go:163 Elasticsearch url: http://192.168.25.140:9200
2019-07-23T05:08:09.001+0800 INFO [publisher] pipeline/module.go:110 Beat name: TestServer
2019-07-23T05:08:09.004+0800 INFO [monitoring] log/log.go:117 Starting metrics logging every 30s
2019-07-23T05:08:09.004+0800 INFO instance/beat.go:400 filebeat start running.
2019-07-23T05:08:09.004+0800 INFO registrar/registrar.go:134 Loading registrar data from /var/lib/filebeat/registry
2019-07-23T05:08:09.005+0800 INFO registrar/registrar.go:141 States Loaded from registrar: 4
2019-07-23T05:08:09.005+0800 INFO crawler/crawler.go:72 Loading Inputs: 1
2019-07-23T05:08:09.007+0800 INFO log/input.go:138 Configured paths: [/opt/ZabbixExport/history-history-syncer-*.ndjson]
2019-07-23T05:08:09.007+0800 INFO input/input.go:114 Starting input of type: log; ID: 10697899969480767183
2019-07-23T05:08:09.008+0800 INFO crawler/crawler.go:106 Loading and starting Inputs completed. Enabled inputs: 1
2019-07-23T05:08:09.008+0800 INFO cfgfile/reload.go:150 Config reloader started
2019-07-23T05:08:09.008+0800 INFO log/harvester.go:254 Harvester started for file: /opt/ZabbixExport/history-history-syncer-1.ndjson
2019-07-23T05:08:09.009+0800 INFO INFO
2019-07-23T05:08:09.011+0800 INFO log/harvester.go:254 Loading of config files completed.
2019-07-23T05:08:09.011+0800 INFO log/harvester.go:254 Harvester started for file: /opt/ZabbixExport/history-history-syncer-2.ndjson
2019-07-23T05:08:09.012+0800 INFO log/harvester.go:254 Harvester started for file: /opt/ZabbixExport/history-history-syncer-3.ndjson
```

Logstash configuration

Logstash has two required elements: **input**

and **output**, and one optional element is **filter**



```
input {
  beats {
    port => 5044
    type => "logs"
    add_field => {"DataSource" => "Zabbix"}
    add_field => {"DataFormateVerion" => 1}
    add_hostname => false
  }
}
```

```
filter{
  json {
    source => "message"
    target => "json"
  }
  mutate {
    copy => {"json[host]" => "org_host"}
    copy => {"json[groups]" => "groups"}
    copy => {"json[applications]" => "applications"}
    copy => {"json[itemid]" => "itemid"}
    copy => {"json[name]" => "name"}
    copy => {"json[clock]" => "clock"}
    copy => {"json[ns]" => "ns"}
    copy => {"json[value]" => "value"}
    remove_field => ["json", "message"]
  }
}
```

```
output {
  if [dest_field4] == "Filesystems" or [dest_field4] == "CPU" or [dest_field4] == "Memory" {
    kafka {
      topic_id => "test"
      bootstrap_servers => "192.168.178.226:9092"
      codec => plain {
        format => "%{message}"
      }
    }
  }
}
```


Logstash to process data

We can use Logstash to **filter**, **convert**, **split**, **splice** and **format** the data transferred by filebeat.

```
[root@TestServer conf.d]# cat 01-logstash-initial.conf
input {
  beats {
    port => 5044
    type => "logs"
    add_field => {"DataSource" => "Zabbix"}
    add_field => {"DataFormatVerion" => 1}
    add_hostname => false
  }
}

filter{
  json {
    source => "message"
    target => "json"
  }
  mutate {
    copy => {"json[host]" => "org_host"}
    copy => {"json[groups]" => "groups"}
    copy => {"json[applications]" => "applications"}
    copy => {"json[itemid]" => "itemid"}
    copy => {"json[name]" => "name"}
    copy => {"json[clock]" => "clock"}
    copy => {"json[ns]" => "ns"}
    copy => {"json[value]" => "value"}
    remove_field => ["json", "message"]
  }
  date{
    match => ["clock", "%Y-%m-%d %H:%M:%S", "%UNIX"]
    target=> "date_clock"
  }
  grok{
    match => {
      "date_clock" => "%{YEAR:clock_year}-%{MONTHNUM:clock_month}-%{MONTHDAY:clock_day}[T ]%{HOUR:clock_hour}:%{MINUTE:clock_minute}:%{SECOND:clock_second}[%{ISO8601_TIMEZONE}]"
    }
    add_field => {"clock_date1" => "%{clock_year}-%{clock_month}-%{clock_day} %{clock_hour}:%{clock_minute}:%{clock_second}"}
  }
  mutate{
    convert => ["DataFormatVerion", "integer"]
    split => ["applications", ", "]
    # add_field => {"applications2" => "applications[0]"}
    copy => { "applications[0]" => "applications2" }
    split => {"clock_date1", "."}
    copy => { "clock_date1[0]" => "clock_date2" }
  }
}

#####
if [applications2] == "Filesystems" {
  mutate{
    split => ["name", ", "]
    copy => { "name[0]" => "FilesystemsName" }
    copy => { "name[1]" => "ParameterName" }
    copy => { "DataSource" => "dest_field1" }
    copy => { "org_host" => "dest_field5" }
    copy => { "DataFormatVerion" => "dest_field3" }
    copy => { "applications2" => "dest_field4" }
    copy => { "ParameterName" => "dest_field7" }
    copy => { "FilesystemsName" => "dest_field8" }
    copy => { "clock_date2" => "dest_field9" }
    copy => { "value" => "dest_field10" }
    join => { "applications" => ", " }
    add_field => {
      "message" => "%{dest_field1},%{dest_field5},%{
    }
  }
}

else {
  mutate{
    copy => { "DataSource" => "dest_field1" }
    copy => { "org_host" => "dest_field5" }
    copy => { "DataFormatVerion" => "dest_field3" }
    copy => { "applications2" => "dest_field4" }
    copy => { "name" => "dest_field8" }
    copy => { "clock_date2" => "dest_field9" }
    copy => { "value" => "dest_field10" }
    join => { "applications" => ", " }
    add_field => {
      "message" => "%{dest_field1},%{dest_field5},%{
    }
  }
}

#####
output {
  if [dest_field4] == "Filesystems" or [dest_field4] == "CPU" {
    kafka {
      topic_id => "zabbix"
      bootstrap_servers => "192.168.25.139:9092"
      compression_type => "LZ4"
      codec => plain {
        format => "%(message)"
      }
    }
  }
}
#}
}
```

```
[root@TestServer conf.d]# /usr/share/logstash/bin/logstash -f /etc/logstash/conf.d/01-logstash-initial.conf
Sending Logstash logs to /var/log/logstash which is now configured via log4j2.properties
[2019-06-08T05:25:24,470][WARN ][logstash.config.source.multilocal] Ignoring the 'pipelines.yml' file because modules or command line options are specified
[2019-06-08T05:25:24,526][INFO ][logstash.runner] Starting Logstash {"logstash.version"=>"6.5.4"}
[2019-06-08T05:25:32,956][WARN ][logstash.inputs.beats] You are using a deprecated config setting "add_hostname" set in beats. Deprecated settings will continue to work, but are scheduled for removal from logstash in the future. Host field will not be automatically populated by future version of the Beats input If you have any questions about this, please visit the #logstash channel on freenode irc. {:name=>"add_hostname", :plugin=><LogStash::Inputs::Beats add_field=>{"DataSource"=>"Zabbix", "DataFormatVerion"=>1}, id=>"51c977357ba4ad86e44beea35383d72479f7bbc2e80e003025c9dda43f7b7c94", type=>"logs", port=>5044, add_hostname=>false, enable_metric=>true, debug=>false, codec=><LogStash::Codecs::Plain id=>"plain_bb7c99f5-c333-45a1-9d45-7d9779981e04", enable_metric=>true, charset=>"UTF-8">, host=>"0.0.0.0", ssl=>false, ssl_verify_mode=>"none", ssl_peer_metadata=>false, include_codec_tag=>true, ssl_handshake_timeout=>10000, tls_min_version=>1, tls_max_version=>1.2, cipher_suites=>["TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384", "TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384", "TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256", "TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256", "TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384", "TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384", "TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256", "TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256"], client_inactivity_timeout=>60, executor_threads=>4}
[2019-06-08T05:25:40,478][INFO ][logstash.pipeline] Starting pipeline {:pipeline_id=>"main", "pipeline.workers"=>4, "pipeline.batch.size"=>125, "pipeline.batch.delay"=>50}
[2019-06-08T05:25:41,334][INFO ][logstash.inputs.beats] Beats inputs: Starting input listener {:address=>"0.0.0.0:5044"}
[2019-06-08T05:25:41,410][INFO ][logstash.pipeline] Pipeline started successfully {:pipeline_id=>"main", :thread=>"#<Thread:0x6b2747fa run>"}
[2019-06-08T05:25:41,532][INFO ][logstash.agent] Pipelines running {:count=>1, :running_pipelines=>[:main], :non_running_pipelines=>[]}
[2019-06-08T05:25:41,696][INFO ][org.logstash.beats.Server] Starting server on port: 5044
[2019-06-08T05:25:42,400][INFO ][logstash.agent] Successfully started Logstash API endpoint {:port=>9600}
```

Zabbix integrate with ELK

The screenshot shows the Kibana interface with the following components:

- Header:** Kibana logo, search bar containing 'zabbix', and navigation links: New, Save, Open, Share, Reporting, Auto-refresh, Options.
- Left Sidebar:** Navigation menu with icons for Discover, Visualize, Dashboard, Timelion, APM, Dev Tools, Monitoring, and Management. A 'Collapse' button is at the bottom.
- Filter Bar:** Shows '5,060 hits' and 'logstash-*' as the selected filter.
- Fields Panel:** Lists 'Selected fields' (e.g., @timestamp, @version, _id, _index, #_score, _type, beat.hostname, beat.name, beat.version, host.architecture, host.containerized, host.id, host.name, host.os.codename, host.os.family, host.os.platform, host.os.version, input.type, message, _offset) and 'Available fields'.
- Main Content Area:** Displays a list of log entries under the '_source' field. Each entry is a JSON object containing details like host information, application name, and log message.

```
message: {"host": "Zabbix server", "groups": ["Zabbix servers"], "applications": ["Zabbix server"], "itemid": 23275, "name": "Zabbix history index cache, % used", "clock": 1544621695, "ns": 375492575, "value": 0.220510} beat.version: 6.5.2 beat.hostname: TestServer beat.name: TestServer source: /opt/ZabbixExport/history-history-syncer-2.ndjson input.type: log offset: 312,122 prospector.type: log type: logs @timestamp: December 12th 2018, 21:40:31.997 tags: beats_input_codec_plain_applied @version: 1 host.containerized: true host.os.version: 7 (Core) host.os.platform: centos host.os.codename: Core host.os.family: redhat host.name: TestServer host.id: af04474238d54af6b5ee1a5b44351705 host.architecture: x86_64 _id: sGilmcBIFfAs42U_hyP _type: doc _index: logstash-2018.12.12 _score: 0.002
```

```
message: {"host": "Zabbix server", "groups": ["Zabbix servers"], "applications": ["Zabbix server"], "itemid": 28249, "name": "Zabbix preprocessing queue", "clock": 1544620849, "ns": 476314722, "value": 0} beat.version: 6.5.2 beat.hostname: TestServer beat.name: TestServer source: /opt/ZabbixExport/history-history-syncer-3.ndjson offset: 141,122 input.type: log prospector.type: log type: logs @timestamp: December 12th 2018, 21:40:32.000 tags: beats_input_codec_plain_applied @version: 1 host.containerized: true host.os.version: 7 (Core) host.os.platform: centos host.os.family: redhat host.os.codename: Core host.name: TestServer host.id: af04474238d54af6b5ee1a5b44351705 host.architecture: x86_64 _id: 42ilomcBIFfAs42U_hyP _type: doc _index: logstash-2018.12.12 _score: 0.002
```

```
message: {"host": "Zabbix server", "groups": ["Zabbix servers"], "applications": ["Zabbix server"], "itemid": 23273, "name": "Zabbix configuration cache, % used", "clock": 1544620913, "ns": 531999782, "value": 3.435230} beat.version: 6.5.2 beat.hostname: TestServer beat.name: TestServer source: /opt/ZabbixExport/history-history-syncer-3.ndjson offset: 148,588 input.type: log prospector.type: log type: logs @timestamp: December 12th 2018, 21:40:32.003 tags: beats_input_codec_plain_applied @version: 1 host.containerized: true host.os.version: 7 (Core) host.os.platform: centos host.os.family: redhat host.os.codename: Core host.name: TestServer host.id: af04474238d54af6b5ee1a5b44351705 host.architecture: x86_64 _id: C2ilomcBIFfAs42U_h2Q _type: doc _index: logstash-2018.12.12 _score: 0.002
```

```
message: {"host": "Zabbix server", "groups": ["Zabbix servers"], "applications": ["Zabbix server"], "itemid": 23274, "name": "Zabbix history write cache, % used", "clock": 1544620914, "ns": 533129662, "value": 0.000000} beat.version: 6.5.2 beat.hostname: TestServer beat.name: TestServer source: /opt/ZabbixExport/history-history-syncer-3.ndjson offset: 148,784 input.type: log prospector.type: log type: logs @timestamp: December 12th 2018, 21:40:32.003 tags: beats_input_codec_plain_applied @version: 1 host.os.version: 7 (Core) host.os.platform: centos host.os.family: redhat host.os.codename: Core host.containerized: true host.name: TestServer host.id: af04474238d54af6b5ee1a5b44351705 host.architecture: x86_64 _id: DGilomcBIFfAs42U_h2Q _type: doc _index: logstash-2018.12.12 _score: 0.002
```

```
message: {"host": "Zabbix server", "groups": ["Zabbix servers"], "applications": ["Zabbix server"], "itemid": 23628, "name": "Zabbix value cache misses", "clock": 1544621748, "ns": 439911663, "value": 0.000000} beat.version: 6.5.2 beat.hostname: TestServer beat.name: TestServer source: /opt/ZabbixExport/history-history-syncer-2.ndjson input.type: log offset: 315,309 prospector.type: log type: logs @timestamp: December 12th 2018, 21:40:32.007 tags: beats_input_codec_plain_applied @version: 1 host.os.version: 7 (Core) host.os.platform: centos host.os.family: redhat host.os.codename: Core host.containerized: true host.name: TestServer host.id: af04474238d54af6b5ee1a5b44351705 host.architecture: x86_64 _id: L2imomcBIFfAs42UAB2q _type: doc _index: logstash-2018.12.12 _score: 0.002
```

```
message: {"host": "Zabbix server", "groups": ["Zabbix servers"], "applications": ["Zabbix server"], "itemid": 23625, "name": "Zabbix value cache hits", "clock": 1544621805, "ns": 507503922, "value": 4.860935} beat.version: 6.5.2 beat.hostname: TestServer beat.name: TestServer source: /opt/ZabbixExport/history-history-syncer-2.ndjson input.type: log offset: 318,465 prospector.type: log type: logs @timestamp: December 12th 2018, 21:40:32.010 tags: beats_input_codec_plain_applied @version: 1 host.containerized: true host.os.version: 7 (Core) host.os.family: redhat host.os.
```


Zabbix integrate with ELK

The screenshot shows the Kibana search interface. The search bar contains the query `>_ Search... (e.g. status:200 AND extension:PHP)`. The search results show 370 hits. The selected field is `str*`. The available fields list includes `t _id`, `t _index`, `# _score`, `t _type`, `# clock`, `# itemid`, `# ns`, `# ttl`, and `t value`. The search results are displayed in a table view, showing the following fields: `itemid`, `value`, `clock`, `ns`, `ttl`, `_id`, `_type`, `_index`, and `_score`. The first result is highlighted with a red box, showing the following values: `itemid: 29,359`, `value: zabbix_server (Zabbix) 4.0.4`, `clock: 1,554,558,519`, `ns: 660,454,183`, `ttl: 172,800`, `_id: Nk_o8mkBRRoCwSwwjH2R`, `_type: values`, `_index: str`, and `_score: 1`.

370 hits

New Save Open Share Inspect Auto-refresh

>_ Search... (e.g. status:200 AND extension:PHP) Options Refresh

Add a filter +

str*

Selected fields

? _source

Available fields

t _id

t _index

_score

t _type

clock

itemid

ns

ttl

t value

Table JSON View single document

t _id	Nk_o8mkBRRoCwSwwjH2R
t _index	str
# _score	1
t _type	values
# clock	1,554,558,519
# itemid	29,359
# ns	660,454,183
# ttl	172,800
t value	zabbix_server (Zabbix) 4.0.4

itemid: 29,359 value: zabbix_server (Zabbix) 4.0.4 clock: 1,554,558,519 ns: 660,454,183 ttl: 172,800 _id: Nk_o8mkBRRoCwSwwjH2R _type: values _index: str _score: 1

itemid: 29,359 value: zabbix_server (Zabbix) 4.0.4 clock: 1,554,558,769 ns: 183,832,952 ttl: 172,800 _id: dk_s8mkBRRoCwSwwj48 _type: values _index: str _score: 1

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Zabbix integrate with Kafka

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Zabbix data displayed in Big Data System

Alarm details

Ticket information

Relates Information

Operation logs

Job logs

Remarks

Performance details

Log details

Alarm details

Event ID:	19052136 10.168.131.69:1122	Platform area:	东莞松山湖
Status:	CLOSED	Monitoring type:	Zabbix_For_Test
Alarm time:	2019-07-15 03:20:18	Update time:	2019-07-15 03:22:56
IP address:	10.168.131.28	Node location:	东莞测试
Severity:	MINOR	Original severity:	MINOR
Obeject type:	FILESYSTEM	Monitoring object:	Used diskspace on /var (percentage)
Emergency:	中	Influences:	高
Monitoring item:	vfs.fs.size[/var,pused]	Value:	95.3
High availability type:	*	Classification:	*
Details :	东莞测试告警平台：测试Zabbix监控，告警IP：10.168.131.28，告警内容：文件系统：/var 使用率超过95，请派单至：东莞测试系统组，应用系统：OA系统		
First operation:	2019-07-15 03:52:18 Ticket	First operator:	王阳明
Source IP:	10.168.131.69:1122	Relevance:	否
Notification object:	*	Event platform:	大数据平台

Thank
you!