ELK 收集日志

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归档：上课文档

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老男孩教育-Linux学院

快捷键：

Ctrl + 1 标题 1
Ctrl + 2 标题 2
Ctrl + 3 标题 3
Ctrl + 4 实例
Ctrl + 5 程序代码
Ctrl + 6 正文

格式说明：

蓝色字体：注释
黄色背景：重要
绿色背景：注意

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第1章 ELK 介绍

没有日志收集平台的时候如何分析日志？什么是 ELK/EFLK? ELK 的数据流转流程?
官方演示地址：

```
https://demo.elastic.co/
```

第2章 日志收集分类

```
代理层：nginx,haproxy
web 层：nginx,tomcat
数据库层：mysql,redis,mongo,elasticsearch
操作系统层：secure,message
```

第3章 安装部署 ELK

3.1 官方地址

```
https://www.elastic.co/guide/index.html
```

3.2 安装配置 java

```
[root@elk-175 ~]# yum install java-1.8.0-openjdk.x86_64 -y
[root@elk-175 ~]# java -version
openjdk version "1.8.0_212"
OpenJDK Runtime Environment (build 1.8.0_212-b04)
OpenJDK 64-Bit Server VM (build 25.212-b04, mixed mode)
```

3.3 更新时间

```
yum install ntpdate -y
ntpdate time1.aliyun.com
```

3.4 安装配置 elasticsearch

```
[root@elk-175 ~]# mkdir /data/soft/ -p
[root@elk-175 ~]# cd /data/soft/
[root@elk-175 soft]# rz
[root@elk-175 soft]# ll
```

```
总用量 506120
-rw-r--r-- 1 root root 114059630 2 月   25 11:09 elasticsearch-6.6.0.rpm
-rw-r--r-- 1 root root   36581177 4 月   27 12:29 elasticsearch-head.tar.gz
-rw-r--r-- 1 root root   11790119 2 月   25 11:08 filebeat-6.6.0-x86_64.rpm
-rw-r--r-- 1 root root 185123116 2 月   25 11:11 kibana-6.6.0-x86_64.rpm
-rw-r--r-- 1 root root 170703770 2 月   25 11:38 logstash-6.6.0.rpm
[root@elk-175 soft]# rpm -ivh elasticsearch-6.6.0.rpm
警告：elasticsearch-6.6.0.rpm: 头 V4 RSA/SHA512 Signature, 密钥 ID d88e42b4: NOKEY
准备中...                          ################################# [100%]
Creating elasticsearch group... OK
Creating elasticsearch user... OK
正在升级/安装...
   1:elasticsearch-0:6.6.0-1          ################################# [100%]
### NOT starting on installation, please execute the following statements to configure elasticsearch
service to start automatically using systemd
 sudo systemctl daemon-reload
 sudo systemctl enable elasticsearch.service
### You can start elasticsearch service by executing
 sudo systemctl start elasticsearch.serviceCreated elasticsearch keystore in /etc/elasticsearch
```

3.4.1 相关配置目录及配置文件

```
[root@elk-175 ~]# rpm -qc elasticsearch
/etc/elasticsearch/elasticsearch.yml
/etc/elasticsearch/jvm.options
/etc/elasticsearch/log4j2.properties
/etc/elasticsearch/role_mapping.yml
/etc/elasticsearch/roles.yml
/etc/elasticsearch/users
/etc/elasticsearch/users_roles
/etc/init.d/elasticsearch
/etc/sysconfig/elasticsearch
/usr/lib/sysctl.d/elasticsearch.conf
/usr/lib/systemd/system/elasticsearch.service
```

3.4.2 ES 配置文件解读

```
[root@elk-175 soft]# vim /etc/elasticsearch/elasticsearch.yml
[root@elk-175 soft]# grep ^[a-z] /etc/elasticsearch/elasticsearch.yml
node.name: node-1
```

```
path.data: /var/lib/elasticsearch
path.logs: /var/log/elasticsearch
bootstrap.memory_lock: true
network.host: 192.168.47.175,127.0.0.1
http.port: 9200
[root@elk-175 soft]# systemctl daemon-reload
[root@elk-175 soft]# systemctl enable elasticsearch.service
Created symlink from /etc/systemd/system/multi-user.target.wants/elasticsearch.service to
/usr/lib/systemd/system/elasticsearch.service.
[root@elk-175 soft]# systemctl start elasticsearch.service
```

3.4.3 启动失败报错

此时启动会发现失败，原因是内存锁定失败

```
[2019-05-12T14:39:58,764][ERROR][o.e.b.Bootstrap          ] [node-1] node validation exception
[1] bootstrap checks failed
[1]: memory locking requested for elasticsearch process but memory is not locked
```

3.4.4 锁定内存失败解决方案

官方解决方案

```
https://www.elastic.co/guide/en/elasticsearch/reference/6.4/setup-configuration-memory.html
https://www.elastic.co/guide/en/elasticsearch/reference/6.4/setting-system-settings.html#sysconfig
### 修改启动配置文件
vim /usr/lib/systemd/system/elasticsearch.service
### 增加如下参数
[Service]
LimitMEMLOCK=infinity
### 重新启动
systemctl daemon-reload
systemctl restart elasticsearch
```

3.4.5 检查启动是否成功

```
[root@elk-175 ~]# netstat -lntup|grep 9200
tcp6       0      0 192.168.47.175:9200     :::*                    LISTEN      15824/java
tcp6       0      0 127.0.0.1:9200          :::*                    LISTEN      15824/java
[root@elk-175 ~]# curl localhost:9200
{
  "name" : "node-1",
  "cluster_name" : "elasticsearch",
```

```
  "cluster_uuid" : "As5ZlEQ2Syq0ktLL0hg5XA",
  "version" : {
    "number" : "6.6.0",
    "build_flavor" : "default",
    "build_type" : "rpm",
    "build_hash" : "a9861f4",
    "build_date" : "2019-01-24T11:27:09.439740Z",
    "build_snapshot" : false,
    "lucene_version" : "7.6.0",
    "minimum_wire_compatibility_version" : "5.6.0",
    "minimum_index_compatibility_version" : "5.0.0"
  },
  "tagline" : "You Know, for Search"
}
```

3.5 服务模式安装配置 es-head 插件

3.5.1 插件官方地址

```
https://github.com/mobz/elasticsearch-head
```

3.5.2 使用 docker 部署 elasticsearch-head

```
docker pull alivv/elasticsearch-head
docker run --name es-head -p 9100:9100 -dit alivv/elasticsearch-head
```

3.5.3 使用 nodejs 编译安装

官网地址

```
https://nodejs.org/en/download/package-manager/
https://nodejs.org/dist/latest-v10.x/
http://npm.taobao.org
```

下载安装

```
yum install nodejs npm openssl screen -y
node -v
npm   -v
npm install -g cnpm --registry=https://registry.npm.taobao.org
cd /opt/
git clone git://github.com/mobz/elasticsearch-head.git
cd elasticsearch-head/
cnpm install
```

```
screen -S es-head
cnpm run start
Ctrl+A+D
```

3.5.4 修改 ES 配置文件支持跨域

官方说明：

```
https://www.elastic.co/guide/en/elasticsearch/reference/6.6/modules-http.html
```

配置参数：

```
http.cors.enabled: true
http.cors.allow-origin: "*"
```

3.5.5 网页访问

```
IP 地址:9100
```

3.6 谷歌浏览器插件形式安装 es-head

使用服务模式安装 es-head 插件过程比较繁琐，网络不好的时候还会经常卡住

幸运的是 es-head 插件官方还提供了另外一种更简便的方式，就是 google chrome 的插件

优势如下；

1.免安装，直接下载插件安装在浏览器即可

2.只要浏览器和服务器可以通信就能使用

3.7 安装配置 kibana

3.7.1 安装配置 kibana

```
[root@elk-175 soft]# rpm -ivh kibana-6.6.0-x86_64.rpm
[root@elk-175 soft]# grep "^[a-z]" /etc/kibana/kibana.yml
server.port: 5601
server.host: "192.168.47.175"
elasticsearch.hosts: ["http://localhost:9200"]
kibana.index: ".kibana
[root@elk-175 soft]# systemctl start kibana
[root@elk-175 soft]# systemctl status kibana
[root@elk-175 soft]# netstat -lntup|grep 5601
tcp        0      0 192.168.47.175:5601     0.0.0.0:*               LISTEN      16442/node
```

3.8 安装 filebeat 和 logstash

```
rpm -ivh filebeat-6.6.0-x86_64.rpm
```

```
rpm -ivh logstash-6.6.0.rpm
```

3.9 docker 安装 elk

```
version: '3'
services:
  elasticsearch:
    image: elasticsearch:v1
    container_name: elasticsearch
    environment:
      - cluster.name=docker-cluster
      - bootstrap.memory_lock=true
      - "ES_JAVA_OPTS=-Xms8g -Xmx8g"
      - "discovery.zen.ping.unicast.hosts=elasticsearch"
    ulimits:
      memlock:
        soft: -1
        hard: -1
    volumes:
      - /data/docker_es_data:/usr/share/elasticsearch/data
    ports:
      - 19200:9200
    networks:
      - esnet
  elasticsearch-head:
    image: elasticsearch-head:v1
    container_name: elasticsearch-head
    ports:
      - 19100:9100
    networks:
      - esnet
  kibana:
    image: kibana:v1
    container_name: kibana
    environment:
     - ELASTICSEARCH_URL="http://elasticsearch:9200"
     - kibana.index=".kibana"
    ports:
      - 15601:5601
    networks:
```

```
      - esnet
  logstash:
    image: logstash:v1
    container_name: logstash
    environment:
     - ELASTICSEARCH_URL="http://elasticsearch:9200"
    ports:
      - 16379:6379
    networks:
      - esnet
networks:
  esnet:
```

第4章 使用 filebeat 配置日志收集

4.1 收集 nginx 日志

4.1.1 安装 nginx 和 ab 工具

```
[root@elk-175 ~]# yum install nginx httpd-tool -y
```

4.1.2 启动测试

```
[root@elk-175 ~]# systemctl start nginx
[root@elk-175 ~]# netstat -lntup|grep nginx
tcp        0      0 0.0.0.0:80              0.0.0.0:*               LISTEN      1888/nginx: master
tcp6       0      0 :::80                   :::*                    LISTEN      1888/nginx: master
[root@elk-175 ~]# ab -c 10 -n 100 192.168.47.175/
[root@elk-175 ~]# ab -c 10 -n 100 192.168.47.175/test.html
```

4.1.3 查看日志

```
[root@elk-175 ~]# tail -f /var/log/nginx/access.log
192.168.47.175 - - [13/May/2019:00:24:02 +0800] "GET /test.html HTTP/1.0" 404 3650 "-"
"ApacheBench/2.3" "-"
192.168.47.175 - - [13/May/2019:00:24:02 +0800] "GET /test.html HTTP/1.0" 404 3650 "-"
"ApacheBench/2.3" "-"
.....
```

4.1.4 配置 filebeat 收集普通日志

相关网址

```
https://www.elastic.co/guide/en/beats/filebeat/7.x/filebeat-input-log.html
https://www.elastic.co/guide/en/beats/filebeat/7.x/configuration-template.html
https://www.elastic.co/guide/en/beats/filebeat/7.x/configuration-template.html
```

正确配置

```
filebeat.inputs:
- type: log
  enabled: true
  paths:
    - /var/log/nginx/access.log
setup.kibana:
  host: "192.168.47.175:5601"
output.elasticsearch:
  hosts: ["localhost:9200"]
  index: "nginx-%{[beat.version]}-%{+yyyy.MM.dd}"
setup.template.name: "nginx"
setup.template.pattern: "nginx-*"
setup.template.enabled: false
setup.template.overwrite: true
```

4.1.5 kibana 配置

management-->index patterns-->nginx-->@timestamp

4.1.6 修改 nginx 日志为 json 格式

```
    log_format main '{ "time_local": "$time_local", '
                                '"remote_addr": "$remote_addr", '
                                '"referer": "$http_referer", '
                                '"request": "$request", '
                                '"status": $status, '
                                '"bytes": $body_bytes_sent, '
                                '"agent": "$http_user_agent", '
                                '"x_forwarded": "$http_x_forwarded_for", '
                                '"up_addr": "$upstream_addr",'
                                '"up_host": "$upstream_http_host",'
                                '"upstream_time": "$upstream_response_time",'
                                '"request_time": "$request_time"'
```

```
    ' }';
```

4.1.7 查看日志是否为 json 格式

```
[root@elk-175 ~]# tail -f /var/log/nginx/access.log
{ "time_local": "13/May/2019:00:30:51 +0800", "remote_addr": "192.168.47.175", "referer": "-", "request": "GET /test.html HTTP/1.0", "status": 404, "bytes": 3650, "agent": "ApacheBench/2.3", "x_forwarded": "-", "up_addr": "-","up_host": "-","upstream_time": "-","request_time": "0.000" }
{ "time_local": "13/May/2019:00:30:51 +0800", "remote_addr": "192.168.47.175", "referer": "-", "request": "GET /test.html HTTP/1.0", "status": 404, "bytes": 3650, "agent": "ApacheBench/2.3", "x_forwarded": "-", "up_addr": "-","up_host": "-","upstream_time": "-","request_time": "0.000" }
```

4.1.8 收集多个日志并分类创建索引

filebeat 配置

```
[root@elk-175 filebeat]# cat filebeat.yml
filebeat.inputs:
- type: log
  enabled: true
  paths:
    - /var/log/nginx/access.log
  json.keys_under_root: true
  json.overwrite_keys: true
  tags: ["access"]
- type: log
  enabled: true
  paths:
    - /var/log/nginx/error.log
  tags: ["error"]
setup.template.settings:
  index.number_of_shards: 3
setup.kibana:
  host: "192.168.47.175:5601"
output.elasticsearch:
  hosts: ["localhost:9200"]
  indices:
    - index: "nginx_access-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
        tags: "access"
    - index: "nginx_error-%{[beat.version]}-%{+yyyy.MM.dd}"
```

```
        when.contains:
          tags: "error"
setup.template.name: "nginx"
setup.template.pattern: "nginx_*"
setup.template.enabled: false
setup.template.overwrite: true
```

4.2 收集 tomcat 日志

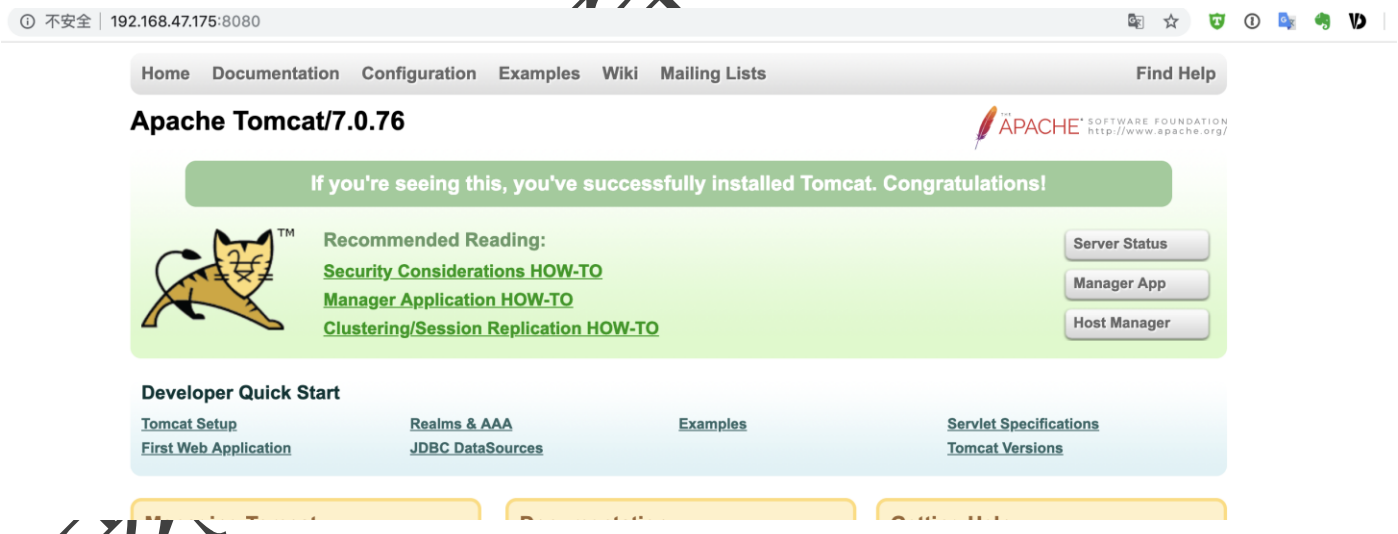
4.2.1 安装 tomcat

```
yum install tomcat tomcat-webapps tomcat-admin-webapps tomcat-docs-webapp tomcat-javadoc -y
```

4.2.2 启动检查

```
[root@elk-175 ~]# systemctl start tomcat
[root@elk-175 ~]# systemctl status tomcat
[root@elk-175 ~]# lsof -i:8080
COMMAND   PID   USER   FD   TYPE DEVICE SIZE/OFF NODE NAME
java    18915 tomcat   49u  IPv6  61950      0t0  TCP *:webcache (LISTEN)
```

4.2.3 访问测试



4.2.4 修改日志为 json 格式

```
[root@elk-175 ~]# vim /etc/tomcat/server.xml
[root@elk-175 ~]# cat -n /etc/tomcat/server.xml
----------------
   137             <Valve className="org.apache.catalina.valves.AccessLogValve" directory="logs"
   138                    prefix="localhost_access_log." suffix=".txt"
   139
```

```
pattern="{&quot;clientip&quot;:&quot;%h&quot;,&quot;ClientUser&quot;:&quot;%l&quot;,&quot;authenticated&quot;:&quot;%u&quot;,&quot;AccessTime&quot;:&quot;%t&quot;,&quot;method&quot;:&quot;%r&quot;,&quot;status&quot;:&quot;%s&quot;,&quot;SendBytes&quot;:&quot;%b&quot;,&quot;Query?string&quot;:&quot;%q&quot;,&quot;partner&quot;:&quot;%{Referer}i&quot;,&quot;AgentVersion&quot;:&quot;%{User-Agent}i&quot;}"/>
----------------
```

4.2.5 重启确认日志是否为 json 格式

```
[root@elk-175 ~]# systemctl restart tomcat
[root@elk-175 ~]# tail -f /var/log/tomcat/localhost_access_log.2019-05-13.txt
{"clientip":"192.168.47.1","ClientUser":"-","authenticated":"-","AccessTime":"[13/May/2019:13:18:03 +0800]","method":"GET /docs/images/tomcat.gif HTTP/1.1","status":"200","SendBytes":"2066","Query?string":"","partner":"http://192.168.47.175:8080/docs/realm-howto.html","AgentVersion":"Mozilla/5.0 (Macintosh; Intel Mac OS X 10_14_4) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/72.0.3626.109 Safari/537.36"}
```

在线解析测试正确

4.2.6 filebeat 配置

```
[root@elk-175 ~]# cat /etc/filebeat/filebeat.yml
filebeat.inputs:
- type: log
  enabled: true
  paths:
    - /var/log/tomcat/localhost_access_log*
  json.keys_under_root: true
```

```
  json.overwrite_keys: true
setup.kibana:
  host: "192.168.47.175:5601"
output.elasticsearch:
  hosts: ["localhost:9200"]
  index: "tomcat-%{[beat.version]}-%{+yyyy.MM.dd}"
setup.template.name: "tomcat"
setup.template.pattern: "tomcatn-*"
setup.template.enabled: false
setup.template.overwrite: true
```

4.2.7 配置 tomcat 收集多个域名的日志

配置多个 host 标签

4.3 收集 java 日志

4.3.1 官方地址

```
https://www.elastic.co/guide/en/beats/filebeat/6.6/multiline-examples.html
```

因为 java 日志的输出信息非常多，需要将多行拼成一个事件，所以需要多行匹配模式

因为 elasticsearch 本身就是 java 开发的，所以我们可以直接收集 ES 的日志

4.3.2 filebeat 配置

```
[root@elk-175 ~]# cat /etc/filebeat/filebeat.yml
filebeat.inputs:
- type: log
  enabled: true
  paths:
    - /var/log/elasticsearch/elasticsearch.log
  multiline.pattern: '^\['
  multiline.negate: true
  multiline.match: after
setup.kibana:
  host: "192.168.47.175:5601"
output.elasticsearch:
  hosts: ["localhost:9200"]
  index: "es-%{[beat.version]}-%{+yyyy.MM.dd}"
setup.template.name: "es"
setup.template.pattern: "es-*"
```

```
setup.template.enabled: false
setup.template.overwrite: true
```

4.4 收集 docker 日志

4.4.1 安装 docker

```
rm -fr /etc/yum.repos.d/local.repo
curl -o /etc/yum.repos.d/CentOS-Base.repo http://mirrors.aliyun.com/repo/Centos-7.repo
wget -O /etc/yum.repos.d/docker-ce.repo https://mirrors.ustc.edu.cn/docker-ce/linux/centos/docker-ce.repo
sed -i 's#download.docker.com#mirrors.tuna.tsinghua.edu.cn/docker-ce#g' /etc/yum.repos.d/docker-ce.repo
yum install docker-ce -y
systemctl start docker
cat >  /etc/docker/daemon.json <<EOF
{
  "registry-mirrors": ["https://registry.docker-cn.com"]
}
EOF
systemctl restart docker
```

4.4.2 运行 nginx 镜像

```
docker pull nginx
docker run --name nginx -p 80:80 -d nginx
docker ps
docker logs -f nginx
```

4.4.3 配置 filebeat 收集单个 docker 日志

官方介绍：

```
https://www.elastic.co/guide/en/beats/filebeat/6.7/filebeat-input-docker.html
```

首先查看 docker 容器的 ID

```
docker inspect nginx-test|grep -w "Id"
```

配置文件

```
filebeat.inputs:
- type: docker
  containers.ids:
    - '2338d5038f7a2eac96d84d6cf424fb1829bd754ec5e0df944bdd29ba6d61a54e'
```

```
  tags: ["docker-nginx"]
output.elasticsearch:
  hosts: ["localhost:9200"]
  index: "docker-nginx-%{[beat.version]}-%{+yyyy.MM.dd}"
setup.template.name: "docker"
setup.template.pattern: "docker-*"
setup.template.enabled: false
setup.template.overwrite: true
```

4.4.4 使用通配符收集所有容器的日志

新版本的 filebeat 增加了收集多个容器的日志的选项

```
https://www.elastic.co/guide/en/beats/filebeat/7.2/filebeat-input-container.html
```

4.4.5 配置 filebeat 通过标签收集多个容器日志

假如我们有多个 docker 镜像或者重新提交了新镜像，那么直接指定 ID 的就不是太方便了。

我们从当前的容器提交一个新的镜像并且运行起来

```
docker commit nginx nginx:v2
docker images
docker run --name nginx -p 8080:80 -d nginx:v2
docker ps -q
```

此时我们的容器目录下就有了两个不同的容器目录

```
[root@elk-176 containers]# ls /var/lib/docker/containers/
2338d5038f7a2eac96d84d6cf424fb1829bd754ec5e0df944bdd29ba6d61a54e
3bb5250e7e50a4ed8d1fae7a43d3bf4294864ac4e0af125ae5231cd9bd76b914
```

如果直接配置 filebeat 存到 es 里本台机器所有的容器日志都会混在一起没有办法区分

多容器日志收集处理：

其实收集的日志本质来说还是文件，而这个日志是以容器-json.log 命名存放在默认目录下的 json 格式的文件：

```
[root@elk-176 ~]# head -1
/var/lib/docker/containers/2338d5038f7a2eac96d84d6cf424fb1829bd754ec5e0df944bdd29ba6d61a54e
/2338d5038f7a2eac96d84d6cf424fb1829bd754ec5e0df944bdd29ba6d61a54e-json.log
{"log":"192.168.47.1 - - [23/May/2019:19:12:04 +0000] \"GET / HTTP/1.1\" 200 612 \"-\" \"Mozilla/5.0
(Macintosh; Intel Mac OS X 10_14_5) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/74.0.3729.157
Safari/537.36\" \"-\"\n","stream":"stdout","time":"2019-05-23T19:12:04.939212514Z"}
```

但是每个容器的 ID 都不一样，为了区分不同服务运行的不同容器，可以使用 docker-compose 通过给容器添加 labels 标签来作为区分

然后 filbeat 把容器日志当作普通的 json 格式来解析并传输到 es

操作步骤：

1.安装 docker-compose

```
yum install -y python2-pip
```

2.这里使用 pip 安装，默认源为国外，可以使用国内加速，相关网站

```
https://mirrors.tuna.tsinghua.edu.cn/help/pypi/
```

pip 加速操作命令

```
pip install -i https://pypi.tuna.tsinghua.edu.cn/simple pip -U
pip config set global.index-url https://pypi.tuna.tsinghua.edu.cn/simple
```

3.继续安装 docker-compose

```
pip install docker-compose
```

4.检查

```
docker-compose version
```

5.编写 docker-compose.yml

```
[root@elk-176 ~]# cat docker-compose.yml
version: '3'
services:
  nginx:
    image: nginx:v2
    # 设置 labels
    labels:
      service: nginx
    # logging 设置增加 labels.service
    logging:
      options:
        labels: "service"
    ports:
      - "8080:80"
  db:
    image: nginx:latest
    # 设置 labels
    labels:
      service: db
    # logging 设置增加 labels.service
    logging:
      options:
```

```
        labels: "service"
    ports:
      - "80:80"
```

6.清理镜像

```
docker ps -a|awk 'NR>1{print "docker rm",$1}'|bash
```

7.运行 docker-compose.yml

```
docker-compose up -d
```

8.检查日志是否增加了 lable 标签

```
[root@elk-176 ~]# tail -1
/var/lib/docker/containers/b2c1f4f7f5a2967fe7d12c1db124ae41f009ec663c71608575a4773beb6ca5f8/b
2c1f4f7f5a2967fe7d12c1db124ae41f009ec663c71608575a4773beb6ca5f8-json.log
{"log":"192.168.47.1 - - [23/May/2019:13:22:32 +0000] \"GET / HTTP/1.1\" 304 0 \"-\" \"Mozilla/5.0
(Macintosh; Intel Mac OS X 10_14_5) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/74.0.3729.157
Safari/537.36\" \"-\"\n","stream":"stdout","attrs":{"service":"nginx"},"time":"2019-05-
23T13:22:32.478708392Z"}
```

9.配置 filebeat

```
[root@elk-176 ~]# cat /etc/filebeat/filebeat.yml
filebeat.inputs:
- type: log
  enabled: true
  paths:
    - /var/lib/docker/containers/*/*-json.log
  json.keys_under_root: true
  json.overwrite_keys: true
output.elasticsearch:
  hosts: ["192.168.47.175:9200"]
  indices:
    - index: "docker-nginx-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
        attrs.service: "nginx"
    - index: "docker-db-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
        attrs.service: "db"
setup.template.name: "docker"
setup.template.pattern: "docker-*"
setup.template.enabled: false
setup.template.overwrite: true
```

4.4.6 配置 filebeat 通过服务类型和日志类型多条件创建不同索引

目前为止，已经可以按服务来收集日志了，但是错误日志和正确日志混在了一起，不好区分，所以可以进一步进行条件判断，根据服务和日志类型创建不同的索引

filebeat 配置文件

```
[root@elk-176 ~]# cat /etc/filebeat/filebeat.yml
filebeat.inputs:
- type: log
  enabled: true
  paths:
    - /var/lib/docker/containers/*/*-json.log
  json.keys_under_root: true
  json.overwrite_keys: true
output.elasticsearch:
  hosts: ["192.168.47.175:9200"]
  indices:
    - index: "docker-nginx-access-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
          attrs.service: "nginx"
          stream: "stdout"
    - index: "docker-nginx-error-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
          attrs.service: "nginx"
          stream: "stderr"
    - index: "docker-db-access-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
          attrs.service: "db"
          stream: "stdout"
    - index: "docker-db-error-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
          attrs.service: "db"
          stream: "stderr"
setup.template.name: "docker"
setup.template.pattern: "docker-*"
setup.template.enabled: false
setup.template.overwrite: true
```

4.4.7 验证提交新镜像运行后日志收集情况

1.提交新镜像

```
[root@elk-176 ~]# docker ps -a
CONTAINER ID        IMAGE               COMMAND                  CREATED
STATUS                      PORTS               NAMES
f92f4d747584        nginx:latest        "nginx -g 'daemon of..."   45 minutes ago      Exited (0) 51
seconds ago                             root_db_1
b2c1f4f7f5a2        nginx:v2            "nginx -g 'daemon of..."   45 minutes ago      Exited (0) 51
seconds ago                             root_nginx_1
[root@elk-176 ~]# docker commit root_nginx_1 nginx:v3
sha256:4457e2b7afc719ef185c75c02031b11c1407efe2e2e57b85f0c9347d04a9ff00
[root@elk-176 ~]# docker commit root_db_1 nginx:v4
sha256:a7e8d8b3290c817194956aa06fc486ef928853121d9c6224fd64fe759c967dda
[root@elk-176 ~]# docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
nginx               v4                  a7e8d8b3290c        35 seconds ago      109MB
nginx               v3                  4457e2b7afc7        45 seconds ago      109MB
nginx               v2                  c181c6355cd9        2 hours ago         109MB
nginx               latest              53f3fd8007f7        2 weeks ago         109MB
```

2.修改并运行 docker-compose

```
[root@elk-176 ~]# cat docker-compose.yml
version: '3'
services:
  nginx:
    image: nginx:v3
    # 设置 labels
    labels:
      service: nginx
    # logging 设置增加 labels.service
    logging:
      options:
        labels: "service"
    ports:
      - "8080:80"
  db:
    image: nginx:v4
    # 设置 labels
    labels:
      service: db
    # logging 设置增加 labels.service
    logging:
```

```
        options:
          labels: "service"
      ports:
        - "80:80"
[root@elk-176 ~]# docker-compose up -d
Starting root_nginx_1 ...
Starting root_nginx_1 ... done
Starting root_db_1    ... done
[root@elk-176 ~]# docker ps
CONTAINER ID        IMAGE               COMMAND                  CREATED
STATUS              PORTS               NAMES
04308aa3928b        nginx:v4            "nginx -g 'daemon of..."   30 seconds ago      Up 1 second
0.0.0.0:80->80/tcp  root_db_1
49d2e2210e6f        nginx:v3            "nginx -g 'daemon of..."   30 seconds ago      Up 1 second
0.0.0.0:8080->80/tcp  root_nginx_1
```

3.访问并查看是否有新数据生成

```
curl logcalhost/zhangya.html
curl logcalhost:8080/zhangya.html
```

4.经过查看发现已经成功收集到了日志，这样我们就做到了不用修改 filebeat 配置文件也可以持续的收集新镜像的日志并按分类创建不同的索引

4.4.8 修改 docker 容器内日志类型为 json

刚才收集的 docker 内的日志类型为普通格式，如果我们修改为 json 格式会如何呢？

第5章 使用 filedeat modules 配置

5.1 官方网址

```
https://www.elastic.co/guide/en/beats/filebeat/6.6/configuration-filebeat-modules.html
```

5.2 使用模版配置 nginx 正常日志

社区论坛：

```
https://discuss.elastic.co/t/filebeat-module-custom-index/181350
```

5.2.1 filebeat 配置文件

```
[root@elk-175 ~]# cat /etc/filebeat/filebeat.yml
filebeat.config.modules:
```

```
  path: ${path.config}/modules.d/*.yml
  reload.enabled: true
setup.kibana:
  host: "192.168.47.175:5601"
output.elasticsearch:
  hosts: ["localhost:9200"]
  indices:
    - index: "nginx_access-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
        fileset.name: "access"
    - index: "nginx_error-%{[beat.version]}-%{+yyyy.MM.dd}"
      when.contains:
        fileset.name: "error"
setup.template.name: "nginx"
setup.template.pattern: "nginx_*"
setup.template.enabled: false
setup.template.overwrite: true
```

5.2.2 filebeat modules 配置

使用 nginx 模版配置需要安装 2 个插件，默认从官网下载速度太慢，可以提前下载然后离线安装

```
https://www.elastic.co/guide/en/elasticsearch/plugins/6.6/ingest-geoip.html
https://www.elastic.co/guide/en/elasticsearch/plugins/6.6/plugin-management-custom-url.html
```

在线安装：

```
[root@elk-175 ~]# /usr/share/elasticsearch/bin/elasticsearch-plugin install ingest-user-agent
[root@elk-175 ~]# /usr/share/elasticsearch/bin/elasticsearch-plugin install ingest-geoip
```

离线下载安装：

```
[root@elk-175 ~]# wget https://artifacts.elastic.co/downloads/elasticsearch-plugins/ingest-user-agent/ingest-user-agent-6.6.0.zip
[root@elk-175 ~]# wget https://artifacts.elastic.co/downloads/elasticsearch-plugins/ingest-geoip/ingest-geoip-6.6.0.zip
[root@elk-175 ~]# /usr/share/elasticsearch/bin/elasticsearch-plugin install file:///root/ingest-geoip-6.6.0.zip
[root@elk-175 ~]# /usr/share/elasticsearch/bin/elasticsearch-plugin install file:///root/ingest-user-agent-6.6.0.zip
```

激活 nginx 模块：

```
[root@elk-175 ~]# filebeat modules enable nginx
[root@elk-175 ~]# egrep -v "#|^$" /etc/filebeat/modules.d/nginx.yml
```

```
- module: nginx
  access:
    enabled: true
    var.paths: ["/var/log/nginx/access.log"]
  error:
    enabled: true
    var.paths: ["/var/log/nginx/error.log"
```

注意：6.7 之后这两个插件默认集成到了 elasticsearch，不需要单独安装了

5.3 使用模块收集系统日志 message 和 secure 日志

如果不需要转换，也可以直接按普通日志模式收集 message 和 secure 日志

5.4 导入 kibana 视图

默认如果使用 filbeat 模版导入视图会把所有的服务都导入进去,而我们实际上并不需要这么多视图，而且默认的视图模版只能匹配 filebeat-*开头的索引，所以这里我们有 2 个需要需要解决：

1.通过一定处理只导入我们需要的模版

2.导入的视图模版索引名称可以自定义

解决方法：

1.备份一份 filebeat 的 kibana 视图，删除不需要的视图模版文件

2.修改视图文件里默认的索引名称为我们需要的索引名称

```
cp -a /usr/share/filebeat/kibana /root
find . -type f ! -name "*nginx*"|xargs rm -rf
替换索引目录下和视图的索引名称
sed -i 's#filebeat\-\*#nginx\_\*#g' Filebeat-nginx-logs.json
sed -i 's#filebeat\-\*#nginx\_\*#g' Filebeat-nginx-overview.json
sed -i 's#filebeat\-\*#nginx\_\*#g' filebeat.json
filebeat setup --dashboards -E setup.dashboards.directory=/root/kibana/
```

5.5 使用模块收集 mysql 日志和慢日志

5.5.1 查询 mysql 慢日志

```
show variables like '%long_query_time%';
show variables like '%slow_query%';
```

5.5.2 开启 mysql 慢日志

```
开启全局慢日志
set global slow_query_log=ON;
```

```
设置慢查询日志存放位置
set global slow_query_log_file=’/var/lib/mysql/slow.log’;
设置超过 5 秒就记录
set global long_query_time=5
以上是临时生效 避免重启后失效 将以上内容追加到配置文件配置文
vim /etc/my.conf
slow_query_log=ON
slow_query_log_file=/var/lib/mysql/slow.log
long_query_time=5
```

5.5.3 手动制造 mysql 慢查询

```
MariaDB [(none)]> select  user,host from mysql.user ;
+------+-----------+
| user | host      |
+------+-----------+
| root | 127.0.0.1 |
| root | ::1       |
|      | db01      |
| root | db01      |
|      | localhost |
| root | localhost |
+------+-----------+
6 rows in set (0.00 sec)

MariaDB [(none)]> select sleep(1) user,host from mysql.user ;
+------+-----------+
| user | host      |
+------+-----------+
|    0 | 127.0.0.1 |
|    0 | ::1       |
|    0 | db01      |
|    0 | db01      |
|    0 | localhost |
|    0 | localhost |
+------+-----------+
```

```
6 rows in set (6.01 sec)
```

5.6 使用模块收集 mongo 日志和 redis 日志

第6章 使用缓存收集日志

当日志的数量非常多的时候，可能需要引入缓存层作为临时存储数据的地方，防止因为 ES 处理不过来导致日志丢失的情况。

filebeat 支持将日志发送到 redis 或者 kafka 作为消息队列缓存。

但是使用了缓存层，就不能使用模版来配置日志收集了。

所以最好日志是 json 格式

6.1 使用单台 redis 作为缓存

这里需要说明，如果使用 redis 作为缓存

可以将不同的日志类型单独写成一个键，这样好处是清晰，但是缺点是 logstash 写起来起来复杂

也可以将所有的日志全部写入到一个键中，然后靠后端的 logstash 去过滤处理。

6.1.1 安装启动测试 redis

```
[root@elk-175 ~]# yum install redis -y
[root@elk-175 ~]# systemctl status redis
[root@elk-175 ~]# redis-cli
127.0.0.1:6379> set k1 v1
OK
127.0.0.1:6379> GEt k1
"v1"
127.0.0.1:6379>
```

6.1.2 配置 nginx 的 json 日志

将 nginx 的日志调整为 json 格式

```
    log_format   json   '{ "time_local": "$time_local", '
                            '"remote_addr": "$remote_addr", '
                            '"referer": "$http_referer", '
                            '"request": "$request", '
                            '"status": $status, '
                            '"bytes": $body_bytes_sent, '
                            '"agent": "$http_user_agent", '
                            '"x_forwarded": "$http_x_forwarded_for", '
```

```
                '"up_addr": "$upstream_addr",'
                '"up_host": "$upstream_http_host",'
                '"upstream_time": "$upstream_response_time",'
                '"request_time": "$request_time"' ' }';
```

6.1.3 配置 filebeat 写入到不同的 key 中

```
[root@elk-175 ~]# cat /etc/filebeat/filebeat.yml
filebeat.inputs:
- type: log
  enabled: true
  paths:
    - /var/log/nginx/access.log
  json.keys_under_root: true
  json.overwrite_keys: true
  tags: ["access"]
- type: log
  enabled: true
  paths:
    - /var/log/nginx/error.log
  tags: ["error"]
setup.template.settings:
  index.number_of_shards: 3
setup.kibana:
  host: "192.168.47.175:5601"
output.redis:
  hosts: ["localhost"]
  keys:
    - key: "nginx_access"
      when.contains:
        tags: "access"
    - key: "nginx_error"
      when.contains:
        tags: "error"
```

6.1.4 配置 logstash 读取不同的 key

```
[root@elk-175 ~]# cat /etc/logstash/conf.d/redis.conf
input {
  redis {
```

```
    host => "127.0.0.1"
    port => "6379"
    db => "0"
    key => "nginx_access"
    data_type => "list"
  }
  redis {
    host => "127.0.0.1"
    port => "6379"
    db => "0"
    key => "nginx_error"
    data_type => "list"
  }
}

filter {
  mutate {
    convert => ["upstream_time", "float"]
    convert => ["request_time", "float"]
  }
}

output {
    stdout {}
    if "access" in [tags] {
      elasticsearch {
        hosts => "http://localhost:9200"
        manage_template => false
        index => "nginx_access-%{+yyyy.MM.dd}"
      }
    }
    if "error" in [tags] {
      elasticsearch {
        hosts => "http://localhost:9200"
        manage_template => false
        index => "nginx_error-%{+yyyy.MM.dd}"
      }
    }
}
```

6.1.5 filebeat 收集日志写入到一个 key 中

```
[root@elk-175 ~]# cat /etc/filebeat/filebeat.yml
filebeat.inputs:
- type: log
  enabled: true
  paths:
    - /var/log/nginx/access.log
  json.keys_under_root: true
  json.overwrite_keys: true
  tags: ["access"]
- type: log
  enabled: true
  paths:
    - /var/log/nginx/error.log
  tags: ["error"]
setup.template.settings:
  index.number_of_shards: 3
setup.kibana:
  host: "192.168.47.175:5601"
output.redis:
  hosts: ["localhost"]
  key: "filebeat"
```

6.1.6 logstash 根据 tag 区分一个 key 里的不同日志

```
[root@elk-175 ~]# cat /etc/logstash/conf.d/redis.conf
input {
  redis {
    host => "127.0.0.1"
    port => "6379"
    db => "0"
    key => "filebeat"
    data_type => "list"
  }
}
filter {
  mutate {
    convert => ["upstream_time", "float"]
    convert => ["request_time", "float"]
```

```
  }
}
output {
    if "access" in [tags] {
      elasticsearch {
        hosts => "http://localhost:9200"
        manage_template => false
        index => "nginx_access-%{+yyyy.MM.dd}"
      }
    }
    if "error" in [tags] {
      elasticsearch {
        hosts => "http://localhost:9200"
        manage_template => false
        index => "nginx_error-%{+yyyy.MM.dd}"
      }
    }
}
```

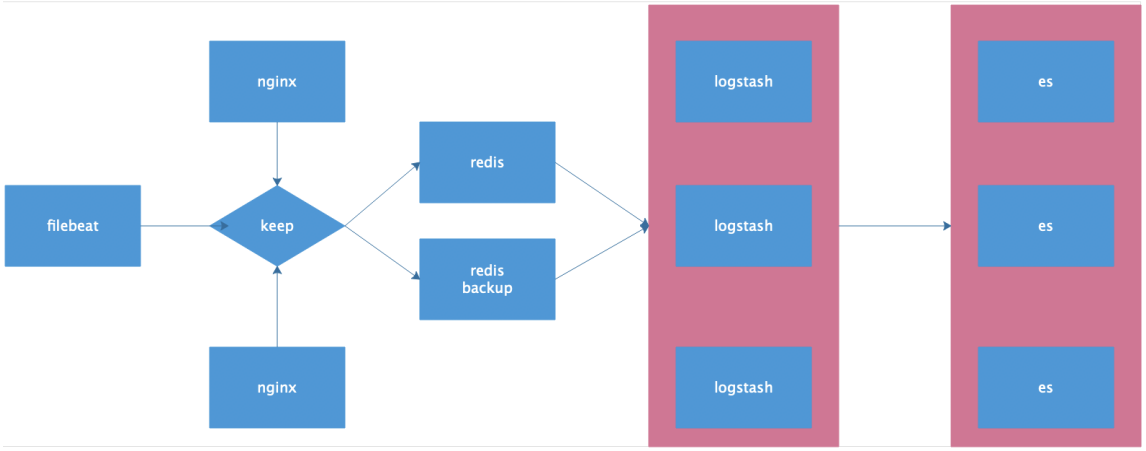
6.2 使用 nginx+keepalived 代理多台 redis

6.2.1 解决方案介绍

上面我们实验了单台 redis 作为收集日志的缓存层，但是单台 redis 存在一个问题，就是单点故障
虽然可以做持久化处理，但是加以服务器坏掉或者修复时间未知的情况下还是有可能会丢数据。
redis 集群方案有哨兵和集群，但可惜的是 filebeat 和 logstash 都不支持这两种方案。
不过利用我们目前所学的知识完全可以解决这个问题，虽然不是彻底解决，但是已经很好了
方案如下：

1. 使用 nginx+keepalived 反向代理负载均衡到后面的多台 redis
2. 考虑到 redis 故障切换中数据一致性的问题，所以最好我们只使用 2 台 redis,并且只工作一台，另外一台作为 backup，只有第一台坏掉后，第二台才会工作。
3. filebeat 的 oputut 的 redis 地址为 keepalived 的虚拟 IP
4. logstash 可以启动多个节点来加速读取 redis 的数据
5. 后端可以采用多台 es 集群来做支撑

拓扑图如下：



6.2.2 nginx 配置文件

注意：添加 stream 模块，要在 nginx.conf 里最后添加，而不是在 conf.d 里面添加子配置

```
[root@lb02 ~]# cat /etc/nginx/nginx.conf
.....................
stream {
  upstream redis {
       server 10.0.0.51:6381 max_fails=2 fail_timeout=10s;
       server 10.0.0.51:6382 max_fails=2 fail_timeout=10s backup;
  }

  server {
          listen 6379;
          proxy_connect_timeout 1s;
          proxy_timeout 3s;
          proxy_pass redis;
  }
}
```

6.2.3 redis 配置

```
[root@db01 /opt/redis_6381/conf]# cat /opt/redis_6381/conf/redis_6381.conf
bind 10.0.0.51
port 6381
daemonize yes
pidfile /opt/redis_6381/pid/redis_6381.pid
logfile /opt/redis_6381/logs/redis_6381.log
```

```
databases 16
save 900 1
save 300 10
save 60 10000
stop-writes-on-bgsave-error yes
rdbcompression yes
rdbchecksum yes
dbfilename redis_6381.rdb
dir /data/redis_6381
```

6.2.4 模拟故障测试

6.2.5 logstash 配置

6.2.6 使用 supervisor 批量管理多个 logstash 进程

6.3 使用 kafka 作为缓存

6.3.1 介绍

6.3.2 zookeeper 安装配置

6.3.3 kafka 安装配置

6.3.4 kafka 集群收发消息测试

6.3.5 filebeat 配置

```
[root@kafka-175 conf.d]# cat /etc/filebeat/filebeat.yml
filebeat.inputs:
```

```
- type: log
  enabled: true
  paths:
    - /var/log/nginx/access.log
  json.keys_under_root: true
  json.overwrite_keys: true
  tags: ["access"]
- type: log
  enabled: true
  paths:
    - /var/log/nginx/error.log
  tags: ["error"]
setup.template.settings:
  index.number_of_shards: 3
setup.kibana:
  host: "192.168.47.175:5601"
output.kafka:
  hosts: ["192.168.47.175:9092","192.168.47.176:9092","192.168.47.177:9092"]
  topic: elklog
```

6.3.6 logstash 配置

```
[root@kafka-175 conf.d]# cat /etc/logstash/conf.d/kafka.conf
input{
  kafka{
    bootstrap_servers=>"192.168.47.175:9092"
    topics=>["elklog"]
    group_id=>"logstash"
    codec => "json"
  }
}
filter {
  mutate {
    convert => ["upstream_time", "float"]
    convert => ["request_time", "float"]
  }
}
output {
    if "access" in [tags] {
      elasticsearch {
```

```
        hosts => "http://localhost:9200"
        manage_template => false
        index => "nginx_access-%{+yyyy.MM.dd}"
      }
    }
    if "error" in [tags] {
      elasticsearch {
        hosts => "http://localhost:9200"
        manage_template => false
        index => "nginx_error-%{+yyyy.MM.dd}"
      }
    }
}
```

第7章 配置 logstash 同步 mysql 数据

使用 jdbc 插件可以同步 mysql 的数据到 logstash 里

第8章 kibana 画图展示

8.1 kibana 页面介绍

8.2 kibana 创建图标

8.3 kibana 创建面板视图

第9章 grafana 画图展示

除了 kibana 外，grafana 也支持从 es 调取数据并展示

```
https://grafana.com/docs/features/datasources/elasticsearch/#using-elasticsearch-in-grafana
```

第10章 面试问题

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