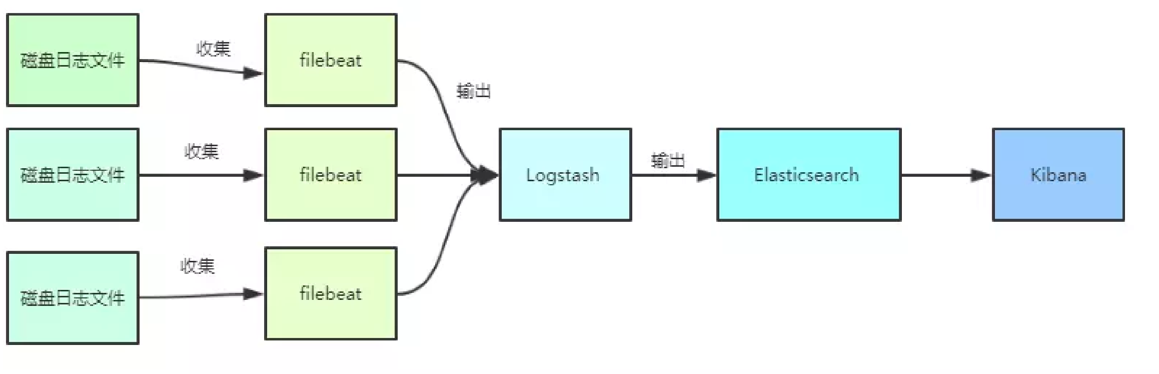
ELK是集中式、独立的、搜集管理各个服务和服务器上的日志信息，可以通过可视化的方式查看日志，帮助开发人员和运维人员快速处理和分析线上的问题。



1、Filebeat负责收集应用写到磁盘上的日志，并将日志发送给logstash

2、logstash处理来自filebeat的日志，并将处理后的日志保存elasticsearch索引库。

3、elasticsearch存储来自logstash的日志。

4、kibana从elasticsearch搜索日志，并展示到页面。

下面介绍一下整个日志管理系统的搭建过程。

环境准备：centos7，java8，node-v9.8.0（kibana依赖nodejs）

准备好Filebeat，logstash，elasticsearch，kibana，可以去官网下载，这里用的版本是6.2.4

1、安装elasticsearch。

出于安全考虑，elasticsearch默认不允许以root账号运行。

创建用户：

```
useradd suzhe
```

设置密码：

```
passwd suzhe
```

切换用户：

```
su - suzhe
```

上传安装包,并解压

```
[suzhe@VM_108_39_centos ~]$ tar -zxvf elasticsearch-6.2.4.tar.gz
```

目录重命名：

```
mv elasticsearch-6.2.4/ elasticsearch
```

进入查看目录

```
[suzhe@VM_108_39_centos elasticsearch]$ ll
total 240
drwxr-xr-x  2 suzhe suzhe   4096 Nov  8 09:59 bin
drwxr-xr-x  2 suzhe suzhe   4096 Dec 21 10:31 config
drwxrwxr-x  3 suzhe suzhe   4096 Nov  8 10:07 data
drwxr-xr-x  2 suzhe suzhe   4096 Apr 13  2018 lib
-rw-r--r--  1 suzhe suzhe  11358 Apr 13  2018 LICENSE.txt
drwxr-xr-x  2 suzhe suzhe   4096 Dec 20 05:38 logs
drwxr-xr-x 16 suzhe suzhe   4096 Apr 13  2018 modules
-rw-r--r--  1 suzhe suzhe 191887 Apr 13  2018 NOTICE.txt
drwxr-xr-x  3 suzhe suzhe   4096 Nov  8 10:40 plugins
-rw-r--r--  1 suzhe suzhe   9268 Apr 13  2018 README.textile
[suzhe@VM_108_39_centos elasticsearch]$
```

修改配置

cd config 进入配置目录。

```
[suzhe@VM_108_39_centos elasticsearch]$ cd config
[suzhe@VM_108_39_centos config]$ ll
total 16
-rw-rw---- 1 suzhe suzhe 2878 Nov 29 20:39 elasticsearch.yml
-rw-rw---- 1 suzhe suzhe 2771 Nov  8 10:03 jvm.options
-rw-rw---- 1 suzhe suzhe 5091 Apr 13  2018 log4j2.properties
[suzhe@VM_108_39_centos config]$
```

jvm.options（Elasticsearch基于Lucene的，而Lucene底层是java实现，因此可以调整jvm参数 ）

```
-Xms1g
-Xmx1g
```

修改elasticsearch.yml：vim elasticsearch.yml

- 修改数据和日志目录：

```
path.data: /home/suzhe/elasticsearch/data # 数据目录位置
path.logs: /home/suzhe/elasticsearch/logs # 日志目录位置
```

我们把data和logs目录修改指向了elasticsearch的安装目录。但是这两个目录并不存在，因此我们需要创建出来。

进入elasticsearch的根目录，然后创建：

```
mkdir data
mkdir logs
```

- 修改绑定的ip：

```
network.host: 0.0.0.0 # 绑定到0.0.0.0，允许任何ip来访问
```

默认只允许本机访问，修改为0.0.0.0后则可以远程访问

运行：

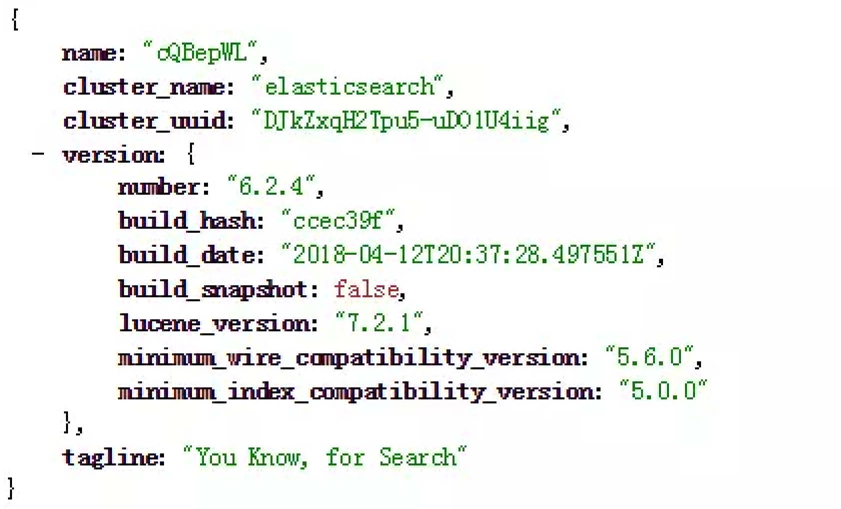
进入elasticsearch/bin目录可以看到elasticsearch 可执行文件

```
[suzhe@VM_108_39_centos elasticsearch]$ cd bin
[suzhe@VM_108_39_centos bin]$ ll
total 256
-rwxr-xr-x 1 suzhe suzhe   1557 Apr 13  2018 elasticsearch
-rw-r--r-- 1 suzhe suzhe   1431 Apr 13  2018 elasticsearch.bat
-rwxr-xr-x 1 suzhe suzhe   2238 Apr 13  2018 elasticsearch-env
-rw-r--r-- 1 suzhe suzhe   1713 Apr 13  2018 elasticsearch-env.bat
-rwxr-xr-x 1 suzhe suzhe    239 Apr 13  2018 elasticsearch-keystore
-rw-r--r-- 1 suzhe suzhe    329 Apr 13  2018 elasticsearch-keystore.bat
-rwxr-xr-x 1 suzhe suzhe    229 Apr 13  2018 elasticsearch-plugin
-rw-r--r-- 1 suzhe suzhe    319 Apr 13  2018 elasticsearch-plugin.bat
-rw-r--r-- 1 suzhe suzhe   8018 Apr 13  2018 elasticsearch-service.bat
-rw-r--r-- 1 suzhe suzhe 104448 Apr 13  2018 elasticsearch-service-mgr.exe
-rw-r--r-- 1 suzhe suzhe 103936 Apr 13  2018 elasticsearch-service-x64.exe
-rwxr-xr-x 1 suzhe suzhe    242 Apr 13  2018 elasticsearch-translog
-rw-r--r-- 1 suzhe suzhe    332 Apr 13  2018 elasticsearch-translog.bat
[suzhe@VM_108_39_centos bin]$
```

执行命令启动:

```
./elasticsearch -d
```

访问：http://node:9200/ 可以看到如下的json信息。



```
{
    name: "cQBepWL",
    cluster_name: "elasticsearch",
    cluster_uuid: "DJkZxqH2Tpu5-uDO1U4iig",
  - version: {
        number: "6.2.4",
        build_hash: "ccec39f",
        build_date: "2018-04-12T20:37:28.497551Z",
        build_snapshot: false,
        lucene_version: "7.2.1",
        minimum_wire_compatibility_version: "5.6.0",
        minimum_index_compatibility_version: "5.0.0"
    },
    tagline: "You Know, for Search"
}
```

2、安装kibana

1、解压

```
[root@VM_108_39_centos software]# tar -zxvf kibana-6.2.4-linux-x86_64
```

2、修改配置

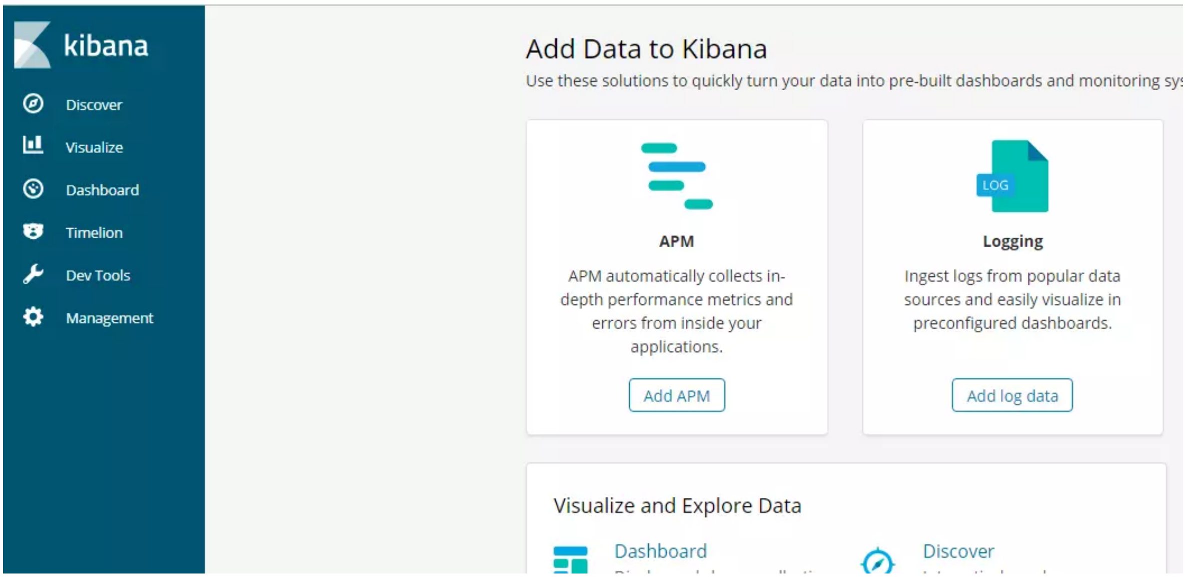
配置elasticsearch的地址

```
# Kibana is served by a back end server. This setting specifies the port to use.
server.port: 5601


# To allow connections from remote users, set this parameter to a non-loopback
address.
server.host: "0.0.0.0"

# The URL of the Elasticsearch instance to use for all your queries.
elasticsearch.url: "http://localhost:9200"
```

后台运行 Kibana：

```
[root@VM_108_39_centos software]# cd kibana-6.2.4-linux-x86_64/bin/
[root@VM_108_39_centos bin]# nohup ./kibana &
```

访问：http://node:5601


kibana
Discover
Visualize
Dashboard
Timelion
Dev Tools
Management
Add Data to Kibana
Use these solutions to quickly turn your data into pre-built dashboards and monitoring sys
APM
APM automatically collects in-depth performance metrics and errors from inside your applications.
Add APM
LOG
Logging
Ingest logs from popular data sources and easily visualize in preconfigured dashboards.
Add log data
Visualize and Explore Data
Dashboard
Discover

3、安装Logstash

解压logstash

```
[root@VM_108_39_centos software]# tar -zxvf logstash-6.2.4.tar.gz
```

创建配置文件

```
[root@VM_108_39_centos software]# vim logstash-6.2.4/config/filebeat-first.conf
```

内容如下

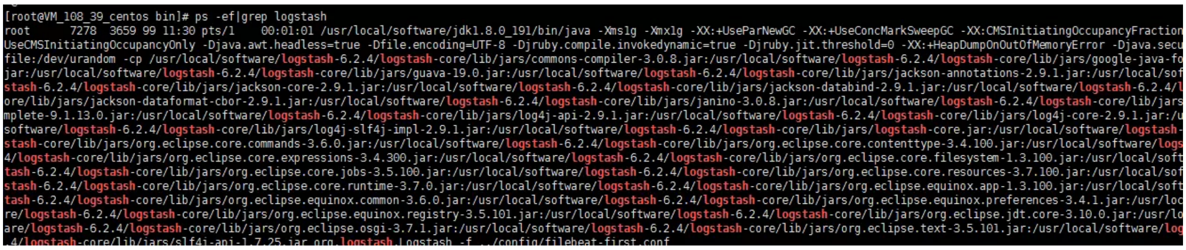
```
input {
    stdin {}
    beats {
        port => 5044
    }
}
output {
    elasticsearch {
        hosts => ["192.168.1.56:9200"]
    }
    stdout {
        codec => rubydebug
    }
}
```

port是接受filebeat的端口，192.168.1.56:9200为elsticsearch的的服务地址，这儿要替换成你的地址。

启动logstash

```
[root@VM_108_39_centos software]# cd logstash-6.2.4/bin/
[root@VM_108_39_centos bin]# nohup ./logstash -f ../config/filebeat-first.conf &
```

查看进程



```
[root@VM_108_39_centos bin]# ps -ef|grep logstash
root      7278  3659 99 11:30 pts/1    00:01:01 /usr/local/software/jdk1.8.0_191/bin/java -Xms1g -Xmx1g -XX:+UseParNewGC -XX:+UseConcMarkSweepGC -XX:CMSInitiatingOccupancyFraction
UseCMSInitiatingOccupancyOnly -Djava.awt.headless=true -Dfile.encoding=UTF-8 -Djruby.compile.invokedynamic=true -Djruby.jit.threshold=0 -XX:+HeapDumpOnOutOfMemoryError -Djava.secu
file:/dev/urandom -cp /usr/local/software/logstash-6.2.4/logstash-core/lib/jars/commons-compiler-3.0.8.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/google-java-fo
jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/guava-19.0.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/jackson-annotations-2.9.1.jar:/usr/local/sof
stash-6.2.4/logstash-core/lib/jars/jackson-core-2.9.1.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/jackson-databind-2.9.1.jar:/usr/local/software/logstash-6.2.4/l
ore/lib/jars/jackson-dataformat-cbor-2.9.1.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/janino-3.0.8.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars
mplete-9.1.13.0.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/log4j-api-2.9.1.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/log4j-core-2.9.1.jar:/u
software/logstash-6.2.4/logstash-core/lib/jars/log4j-slf4j-impl-2.9.1.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/logstash-core.jar:/usr/local/software/logstash-
stash-core/lib/jars/org.eclipse.core.commands-3.6.0.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.core.contenttype-3.4.100.jar:/usr/local/software/logs
4/logstash-core/lib/jars/org.eclipse.core.expressions-3.4.300.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.core.filesystem-1.3.100.jar:/usr/local/soft
tash-6.2.4/logstash-core/lib/jars/org.eclipse.core.jobs-3.5.100.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.core.resources-3.7.100.jar:/usr/local/sof
stash-6.2.4/logstash-core/lib/jars/org.eclipse.core.runtime-3.7.0.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.equinox.app-1.3.100.jar:/usr/local/soft
tash-6.2.4/logstash-core/lib/jars/org.eclipse.equinox.common-3.6.0.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.equinox.preferences-3.4.1.jar:/usr/loc
re/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.equinox.registry-3.5.101.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.jdt.core-3.10.0.jar:/usr/lo
are/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.osgi-3.7.1.jar:/usr/local/software/logstash-6.2.4/logstash-core/lib/jars/org.eclipse.text-3.5.101.jar:/usr/local/software/log
.4/logstash-core/lib/jars/slf4j-api-1.7.25.jar org.logstash.Logstash -f ../config/filebeat-first.conf
```

查看端口是否被监听：

```
[root@VM_108_39_centos bin]# netstat -lntp|grep 5044
tcp        0      0 0.0.0.0:5044            0.0.0.0:*               LISTEN
7278/java
[root@VM_108_39_centos bin]#
```

4、安装Filebeat

解压

```
[root@VM_108_39_centos software]# tar -zxvf filebeat-6.2.4-linux-x86_64.tar.gz
```

编辑配置文件

```
[root@VM_108_39_centos software]# vim filebeat-6.2.4-linux-x86_64/filebeat.yml


#=========================== Filebeat prospectors =============================

filebeat.prospectors:

- type: log
  enabled: true
  paths:
   - /data/logs/admin.log
   - /data/logs/mobile.log
  fields:
   log_source: node1
   logtype: applog
  document_type: applog
  multiline.pattern: '^\['
  multiline.negate: true
  multiline.match: after
  exclude_lines: ['DEBUG']



#----------------------------- Logstash output --------------------------------
output.logstash:
  # The Logstash hosts
  hosts: ["192.168.1.56:5044"]
```

filebeat.yml 配置的主要有两个部分，一个是日志收集，一个是日志输出的配置。

配置解释:

type: log 读取日志文件的每一行（默认） enabled: true 该配置是否生效,如果改为false,将不收集该配置的日志 paths: 要抓取日志的全路径 fields: 自定义属性,可以定义多个,继续往下排就行 multiline.pattern: 正则表达式 multiline.negate: true 或 false；默认是false，匹配pattern的行合并到上一行；true，不匹配pattern的行合并到上一行 multiline.match: after 或 before，合并到上一行的末尾或开头

exclude_lines: ['DEBUG'] 该属性配置不收集DEBUG级别的日志,如果配置多行 这个配置也要放在多行的后面

192.168.1.56:5044 为输出到Logstash的地址和端口。

启动filebeat

```
[root@VM_108_39_centos filebeat-6.2.4-linux-x86_64]# nohup ./filebeat -e -c
filebeat.yml &
```

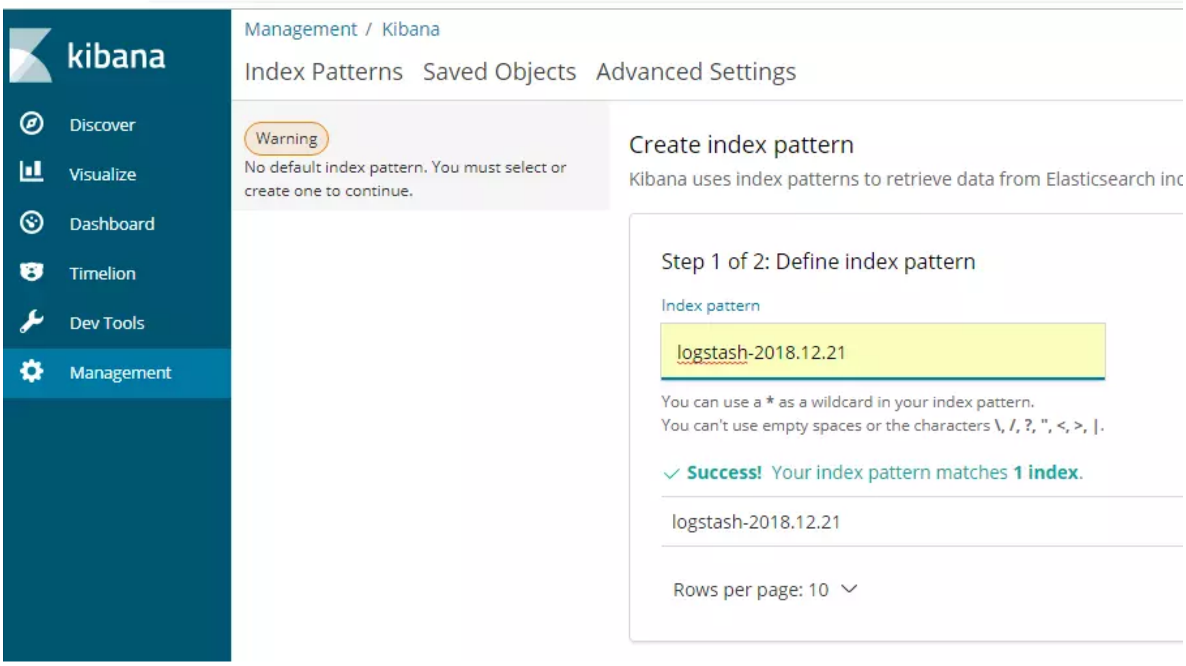
5、验证

1、输入日志文件

进入/data/logs目录输入日志。

```
[root@VM_108_39_centos logs]# echo "删除用户" >> admin.log
[root@VM_108_39_centos logs]#  echo "提现成功 " >> mobile.log
[root@VM_108_39_centos logs]# echo "注册成功 " >> mobile.log
[root@VM_108_39_centos logs]#  echo "I love you,admin" >> admin.log
```

2、创建index



Warning
No default index pattern. You must select or create one to continue.

Create index pattern

Kibana uses index patterns to retrieve data from Elasticsearch inc

Step 1 of 2: Define index pattern

Index pattern: logstash-2018.12.21

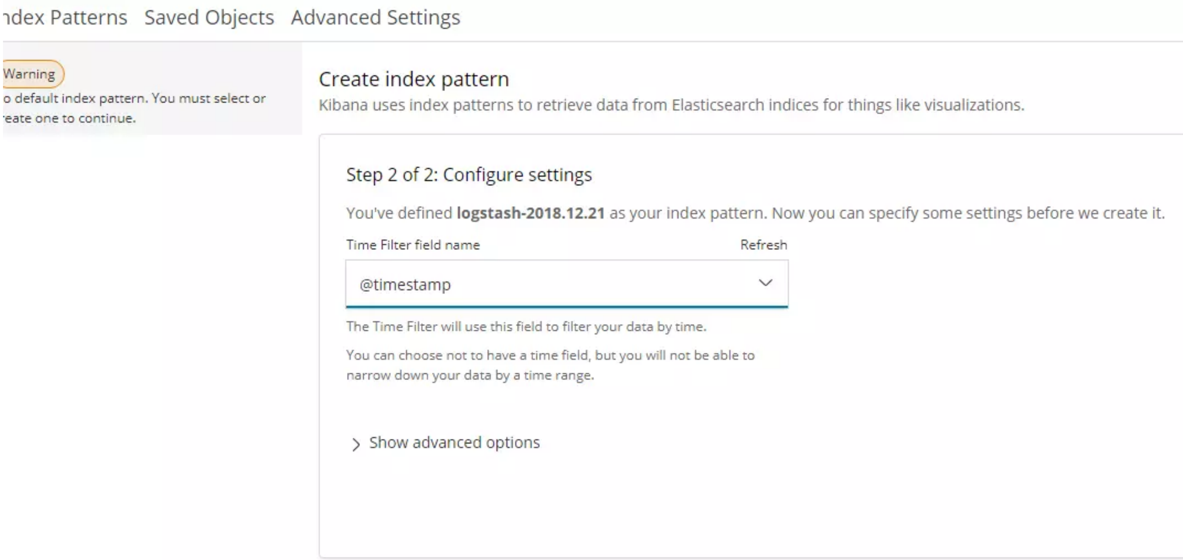
You can use a * as a wildcard in your index pattern.
You can't use empty spaces or the characters \, /, ?, ", <, >, |.

✓ **Success!** Your index pattern matches **1 index**.

logstash-2018.12.21

Rows per page: 10

点击next step



Warning
o default index pattern. You must select or
eate one to continue.

Create index pattern

Kibana uses index patterns to retrieve data from Elasticsearch indices for things like visualizations.

Step 2 of 2: Configure settings

You've defined **logstash-2018.12.21** as your index pattern. Now you can specify some settings before we create it.

Time Filter field name: @timestamp
Refresh

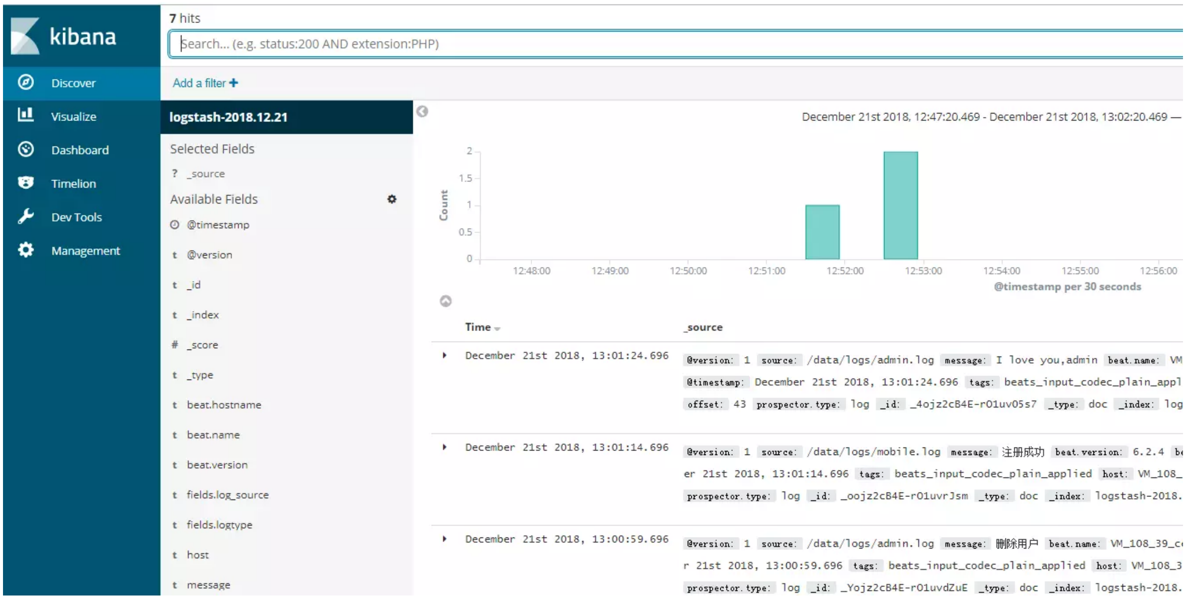
The Time Filter will use this field to filter your data by time.

You can choose not to have a time field, but you will not be able to narrow down your data by a time range.

> Show advanced options

点击 create index pattern 创建索引

点击 discover可查看日志



7 hits

logstash-2018.12.21

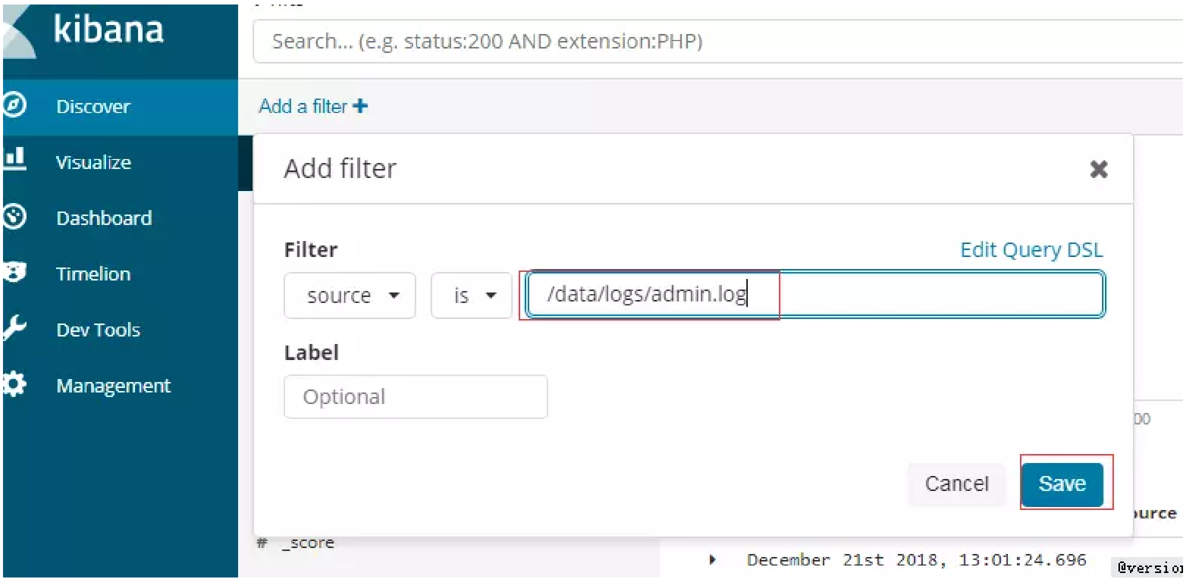
Selected Fields
? _source

Available Fields
⊙ @timestamp
t @version
t _id
t _index
_score
t _type
t beat.hostname
t beat.name
t beat.version
t fields.log_source
t fields.logtype
t host
t message

December 21st 2018, 12:47:20.469 - December 21st 2018, 13:02:20.469 —

```
Time                              _source
December 21st 2018, 13:01:24.696  @version: 1 source: /data/logs/admin.log message: I love you,admin beat.name: VM
                                  @timestamp: December 21st 2018, 13:01:24.696 tags: beats_input_codec_plain_appl
                                  offset: 43 prospector.type: log _id: _4ojz2cB4E-rO1uv05s7 _type: doc _index: log
December 21st 2018, 13:01:14.696  @version: 1 source: /data/logs/mobile.log message: 注册成功 beat.version: 6.2.4 be
                                  er 21st 2018, 13:01:14.696 tags: beats_input_codec_plain_applied host: VM_108_
                                  prospector.type: log _id: _oojz2cB4E-rO1uvrJsm _type: doc _index: logstash-2018.
December 21st 2018, 13:00:59.696  @version: 1 source: /data/logs/admin.log message: 删除用户 beat.name: VM_108_39_c
                                  r 21st 2018, 13:00:59.696 tags: beats_input_codec_plain_applied host: VM_108_3
                                  prospector.type: log _id: _Yojz2cB4E-rO1uvdZuE _type: doc _index: logstash-2018.
```

根据source过滤，只查看admin的日志



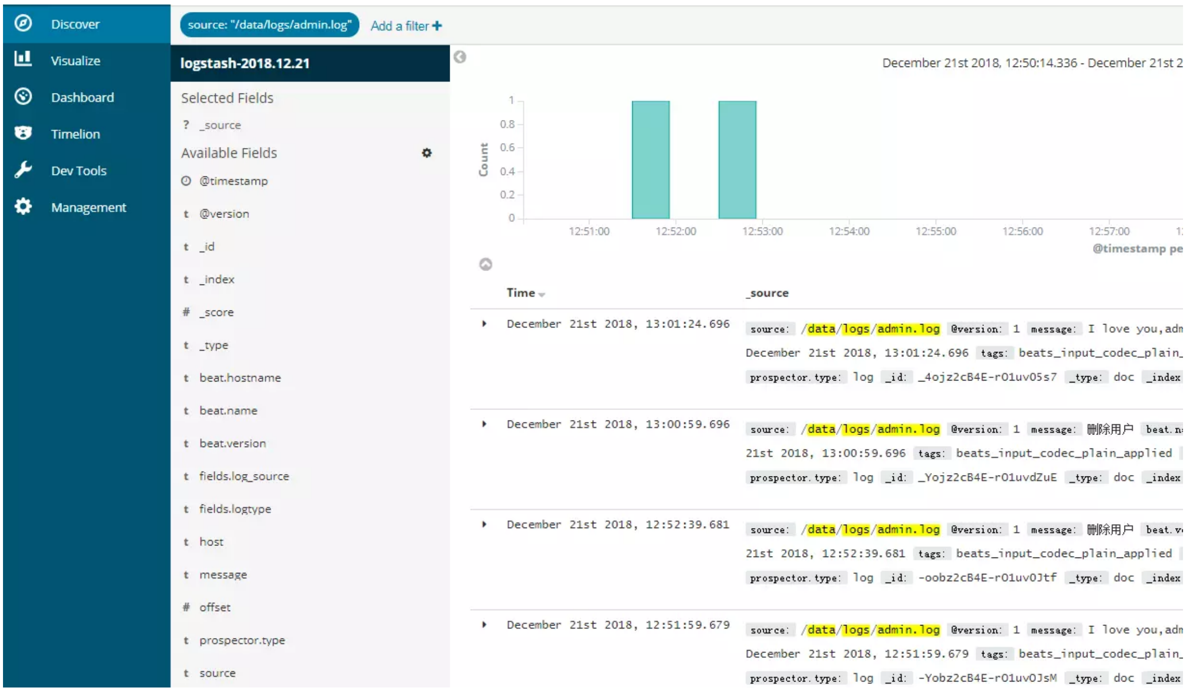
Search... (e.g. status:200 AND extension:PHP)

Filter: source ▾ is ▾ /data/logs/admin.log

Label: Optional

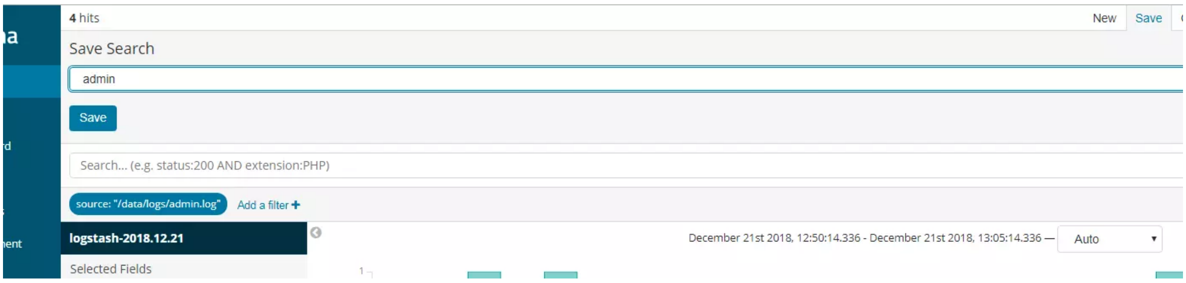
```
# _score
▸ December 21st 2018, 13:01:24.696   @versio
```

点击保存，可以看到只有admin的日志。



```
Time ▾                               _source
▸ December 21st 2018, 13:01:24.696   source: /data/logs/admin.log @version: 1 message: I love you,adm
                                     December 21st 2018, 13:01:24.696 tags: beats_input_codec_plain_
                                     prospector.type: log _id: _4ojz2cB4E-r01uv05s7 _type: doc _index

▸ December 21st 2018, 13:00:59.696   source: /data/logs/admin.log @version: 1 message: 删除用户 beat.n
                                     21st 2018, 13:00:59.696 tags: beats_input_codec_plain_applied
                                     prospector.type: log _id: _Yojz2cB4E-r01uvdZuE _type: doc _index

▸ December 21st 2018, 12:52:39.681   source: /data/logs/admin.log @version: 1 message: 删除用户 beat.v
                                     21st 2018, 12:52:39.681 tags: beats_input_codec_plain_applied
                                     prospector.type: log _id: -oobz2cB4E-r01uv0Jtf _type: doc _index

▸ December 21st 2018, 12:51:59.679   source: /data/logs/admin.log @version: 1 message: I love you,adm
                                     December 21st 2018, 12:51:59.679 tags: beats_input_codec_plain_
                                     prospector.type: log _id: -Yobz2cB4E-r01uv0JsM _type: doc _index
```

保存该过滤条件



4 hits

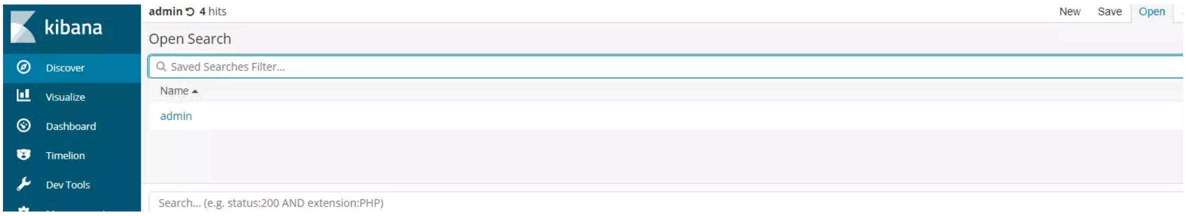
Save Search: admin

Search... (e.g. status:200 AND extension:PHP)

source: "/data/logs/admin.log"

December 21st 2018, 12:50:14.336 - December 21st 2018, 13:05:14.336 —

下次再查看日志可以直接点击open--》点击admin进行查看



admin ⟲ 4 hits

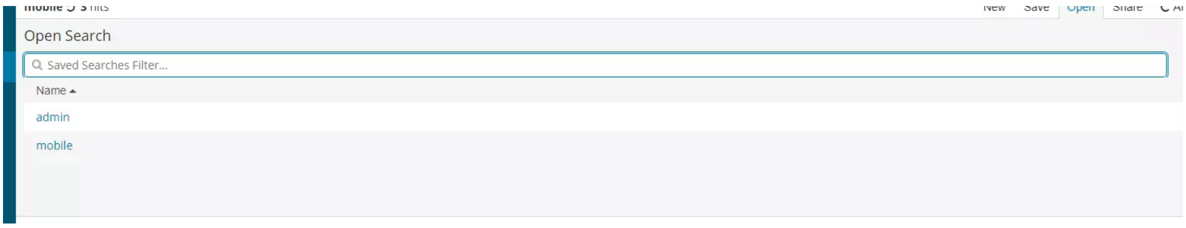
Open Search

Saved Searches Filter...

admin

Search... (e.g. status:200 AND extension:PHP)

同理mobile也可以配置好过滤，下次查看日志的时候直接根据情况选择admin或者mobile。



Open Search

Saved Searches Filter...

Name ▲

admin

mobile

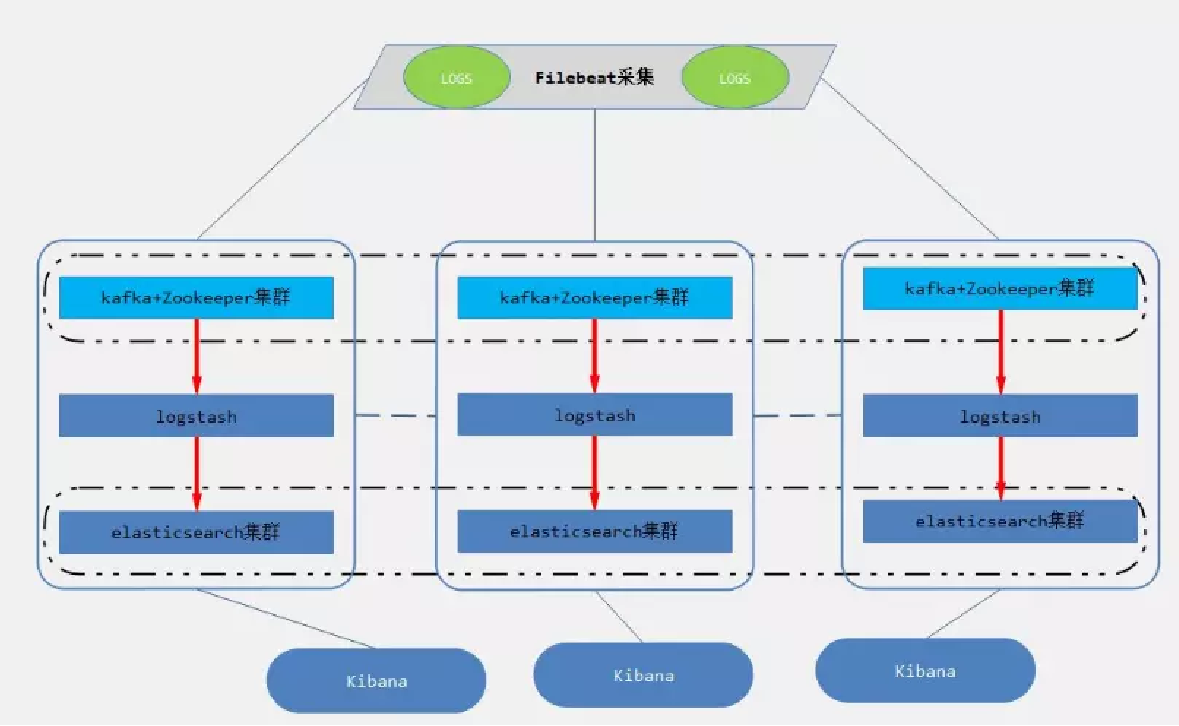
ok，到这里，整个日志管理系统就搭建好了。

6、思考

以上对于一般的中小型公司，上面的系统基本上可以满足需求，只是需要做到高可用（logstash集群，elasticsearch集群，kibana高可用），这部分比较简单。但是对于高并发场景，可能会产生大量的日志，大量的数据涌入Logstash集群以及elasticsearch集群，可能系统会遇到流量上的瓶颈。

如何解决这个问题?

加入数据缓冲层，日志采集客户端采集来的数据,转存到kafka+zookeeper集群中,做一个消息队列,让数据有一定的缓冲。如图所示:



LOGS
Filebeat采集
LOGS
kafka+Zookeeper集群
kafka+Zookeeper集群
kafka+Zookeeper集群
logstash
logstash
logstash
elasticsearch集群
elasticsearch集群
elasticsearch集群
Kibana
Kibana
Kibana