

Induction training of Dev Team

Just log

PuGong

# Agenda

- What's Log
- What should be logged
- How to use the log
- Examples of Log System
- Q&A

# What's Log

- a record of a journey made by a ship or aircraft, detailing all events, or the book in which it is kept
- (Computers) Any of various chronological records made concerning the use of a computer system, the changes made to data, etc.
- The logs are often met
  - Transaction Log / Binlog
  - Operation Log
  - Application Log

# Are they log

- 编年史：（元年）夏，五月，郑伯克段于鄢。
- Black-box



# Key point of log

- Timestamp
- Sequence
- Meaningful
  - Format of records
  - Contents
- Immutable
- Structured vs Unstructured

# Why Log are important

- Compliance and regulations: Provide an audit trail of who, what, where, when and why
- Situational awareness
- Incident reponse
- Real time alerts

# Operation log

- Purpose
  - Keep the track of what user had done
  - For AUDIT
  - For Track of record change
- Key elements
  - When - Timestamp
  - Who - User
  - What - what was did
  - Where - IP/Host
  - Identifier - Table(moudle) Name, record\_id

# Sample of Open\*: support get-old-kv in watch #5850

 **Merged** xiang90 merged 1 commit into coreos:master from xiang90:get.



20 hours ago

**siddontang** opened issue [coreos/etcd#5879](#)



report snapshot finish cause process active fa



Conversation 14

 Commits 1



Files changed 12



21 hours ago

**xiang90** pushed to [master](#) at [coreos/etcd](#)



 929d6ab Merge pull request #5850

 c853704 \*: support get-old-kv in wa

[View comparison for these 2 commits »](#)



21 hours ago

**xiang90** merged pull request [coreos/etcd](#)



\*: support get-old-kv in watch

 1 commit with 383 additions and 231



21 hours ago

**yorkart** commented on issue [coreos/etcd](#)



I have the same problem , the cert nor

Commits on Jul 7, 2016



**Merge pull request #5886** from [heyitsanthony/health-check-str](#) ...

[heyitsanthony](#) committed on [GitHub](#) 2 hours ago

**Merge pull request #5885** from [xiang90/fix\\_snap\\_test](#) ...

[xiang90](#) committed on [GitHub](#) 2 hours ago



**rafthttp: make health check meaning clearer**

[heyitsanthony](#) committed 3 hours ago

**etcdserver: fix TestSnap**

[xiang90](#) committed 4 hours ago

Commits on Jul 6, 2016

**Merge pull request #5880** from [xiang90/put\\_prev](#) ...

[xiang90](#) committed on [GitHub](#) 17 hours ago



# Application log

- Purpose
  - Keep necessary application running information
  - For online problem analysis
  - For debug
- Key elements
  - When - Timestamp
  - What
    - Log Level
    - (Error) Message
    - Stacktrace
  - Where – Host/IP
  - Secure – remove sensitive information
  - Centralize

# Log Level

- Debug: Used only for development and testing. Temporary open on production to find more information. (Caution with the log size)
- Information: Used to keep the information that is useful for system running and management. The entry and exit points of key functions should be kept in this level.
- Warning: Used to keep the handled exceptions or other important log events.
- Error: Used to keep the unhandled exceptions
- Fatal: Reserved for special exceptions/conditions that need to be taken care of.

# Sample of Application Log

```
23-Jun-2016 09:40:37.819 SEVERE [localhost-startStop-1] org.apache.catalina.core.StandardContext.startInternal One or more listeners failed to start. Full details will be found in the appropriate container log file
23-Jun-2016 09:40:37.819 SEVERE [localhost-startStop-1] org.apache.catalina.core.StandardContext.startInternal Context [
] startup failed due to previous errors
23-Jun-2016 09:40:37.871 INFO [localhost-startStop-1] org.apache.catalina.startup.HostConfig.deployDirectory Deployment of web application directory /usr/local/Cellar/tomcat/8.0.32/libexec/webapps/ROOT has finished in 3,044 ms
23-Jun-2016 09:40:37.876 INFO [main] org.apache.catalina.startup.Catalina.start Server startup in 23906 ms
23-Jun-2016 09:40:37.880 SEVERE [main] org.apache.catalina.core.StandardServer.await StandardServer.await: create[localhost:8005]:
java.net.BindException: Address already in use
    at java.net.PlainSocketImpl.socketBind(Native Method)
    at java.net.AbstractPlainSocketImpl.bind(AbstractPlainSocketImpl.java:387)
    at java.net.ServerSocket.bind(ServerSocket.java:375)
    at java.net.ServerSocket.<init>(ServerSocket.java:237)
    at org.apache.catalina.core.StandardServer.await(StandardServer.java:420)
    at org.apache.catalina.startup.Catalina.await(Catalina.java:717)
    at org.apache.catalina.startup.Catalina.start(Catalina.java:663)
    at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method)
    at sun.reflect.NativeMethodAccessorImpl.invoke(NativeMethodAccessorImpl.java:62)
    at sun.reflect.DelegatingMethodAccessorImpl.invoke(DelegatingMethodAccessorImpl.java:43)
    at java.lang.reflect.Method.invoke(Method.java:497)
    at org.apache.catalina.startup.Bootstrap.start(Bootstrap.java:351)
    at org.apache.catalina.startup.Bootstrap.main(Bootstrap.java:485)
```

# How to log - Metric log

- Purpose
  - Keep Application running stat, mainly numbers about business
  - Monitor
  - Alert
- Key element
  - When – Timestamp
  - Who – App Identifier
  - Where – Host/IP/Tags
  - What - Metrics

# Sample of Metric Log



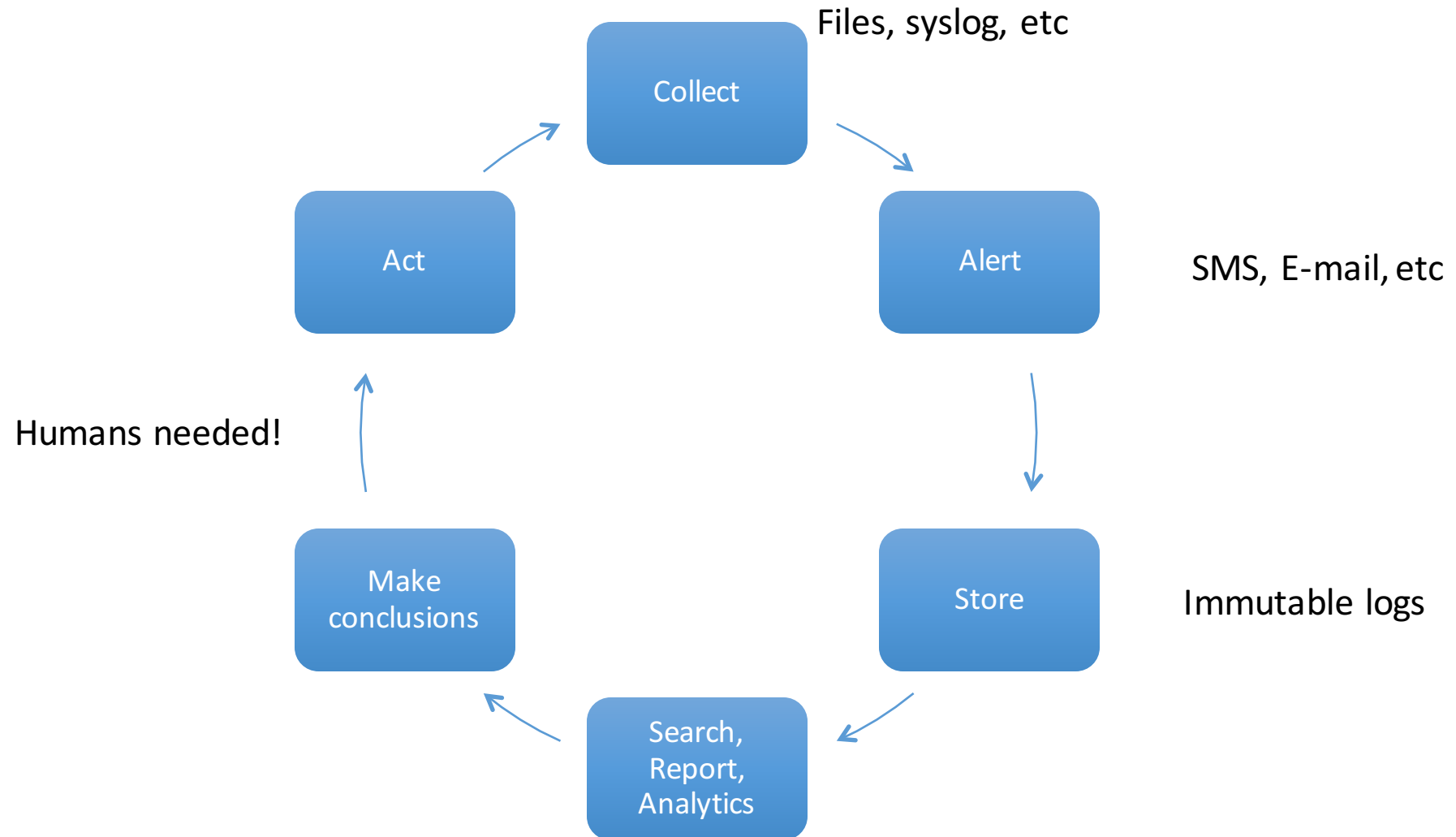
# How to log - Trace Log

- Purpose
  - An unique Id to link the logs in different application
    - Generated at the very beginning at the request
    - Save in every logs as a field or a tag
  - Online problem analysis
  - User behavior tracking
- Key Elements
  - What – unique tracke Id in other log
  - Others – almost the same as

# How to use the logs

- Metrics for monitor and alert
- Where alerts rings, go to application log for detail information
- Use trace to find association logs in other app is necessary
- Prediction

# How to use logs

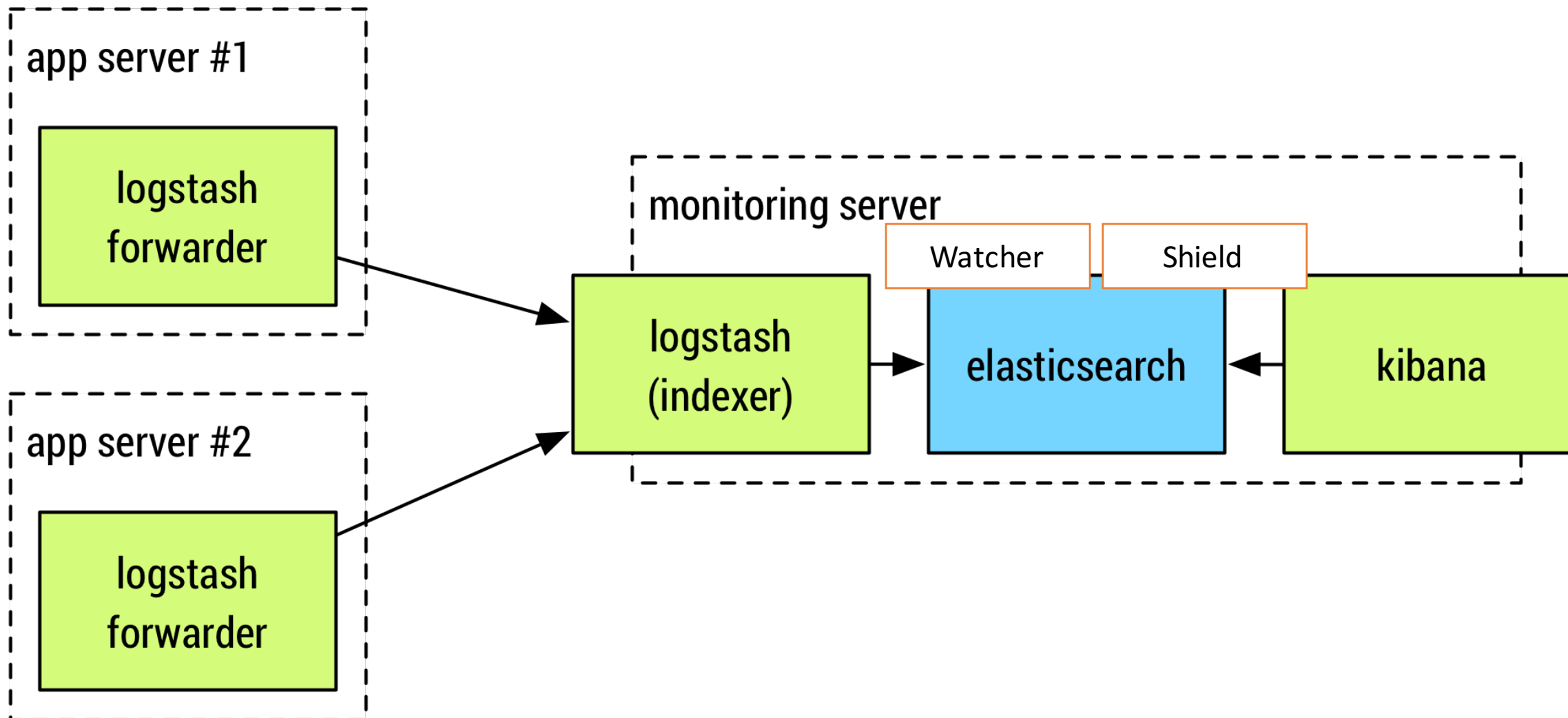




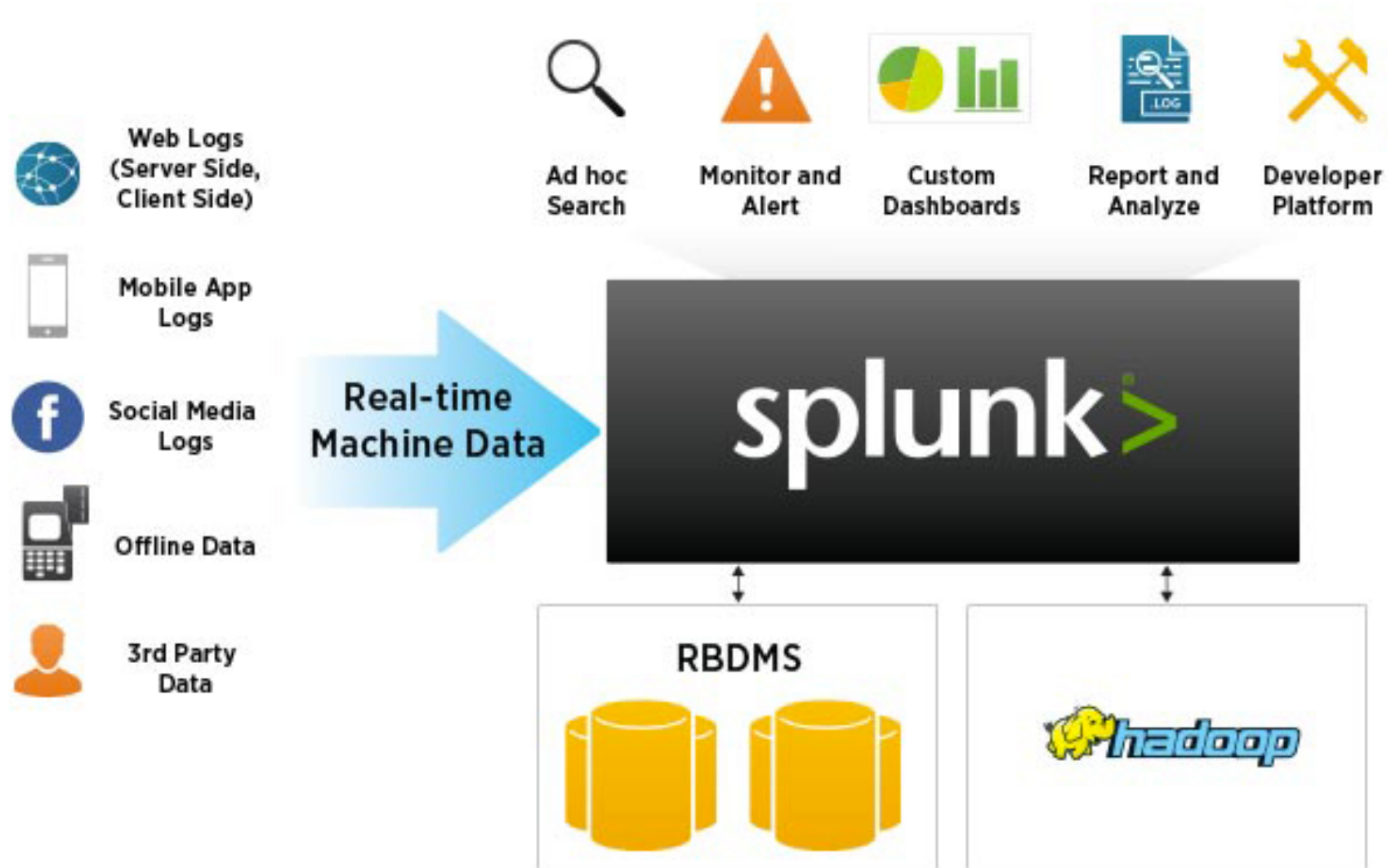
# Log System

- ELK – Metrics, application log etc
- Statsd+Grafana / statsd + graphite – Metrics
- Splunk – commercial
- Customized

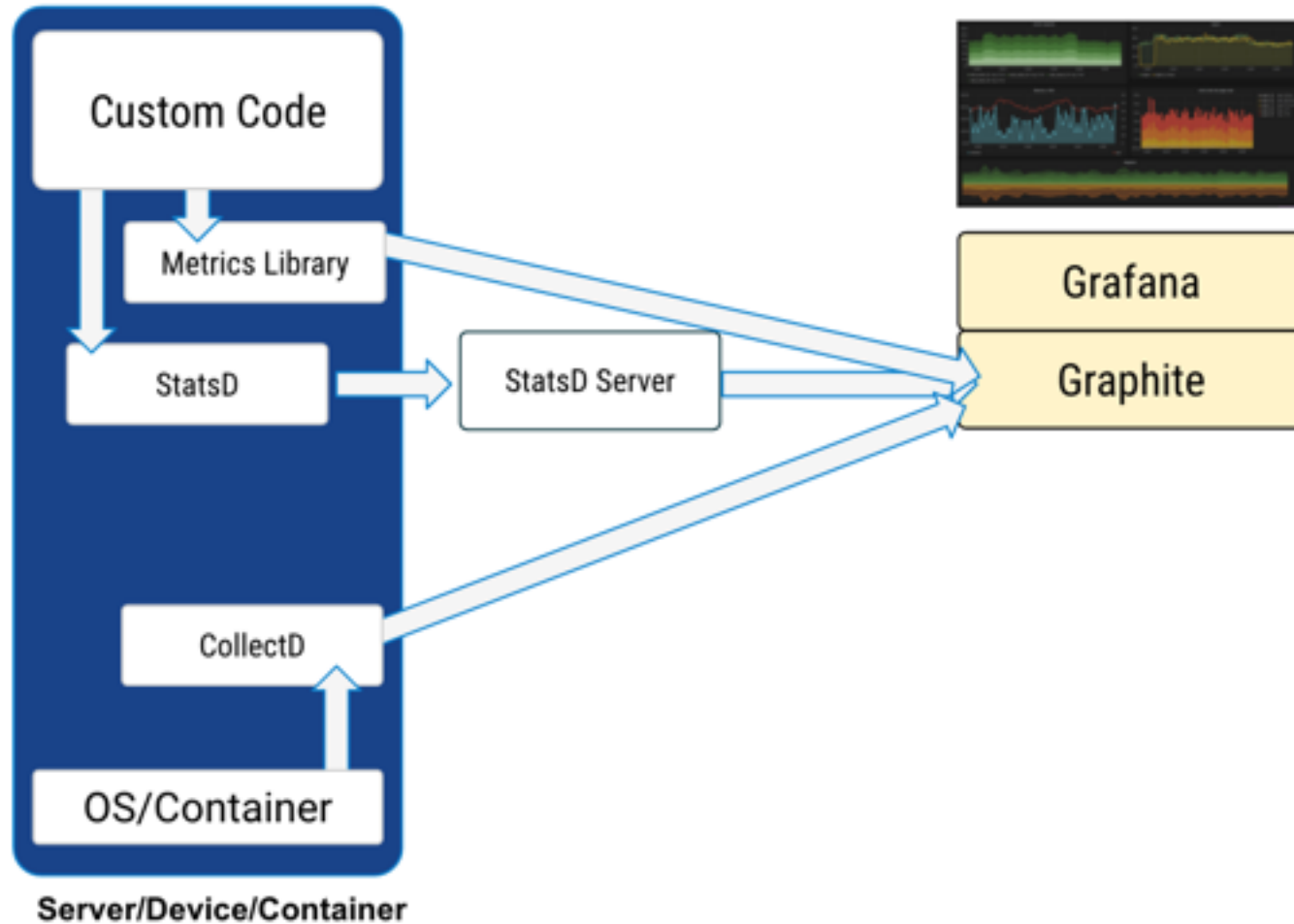
# ELK



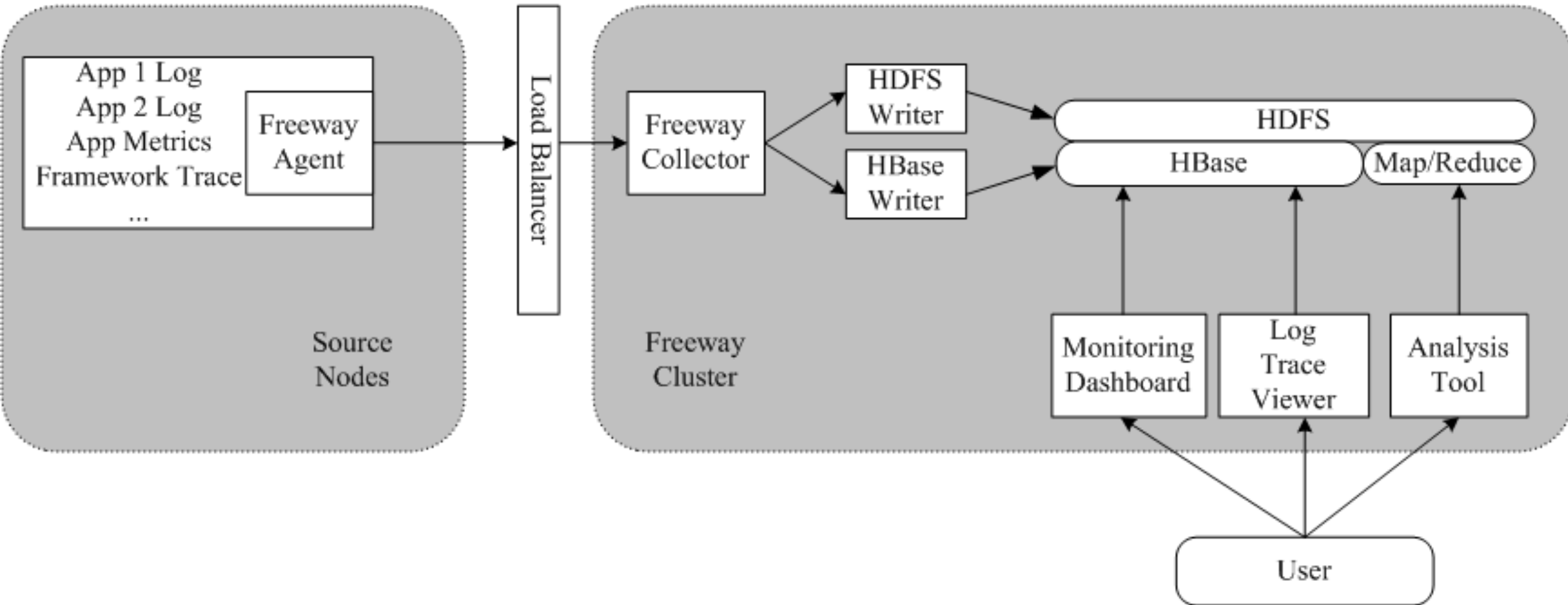
# Splunk



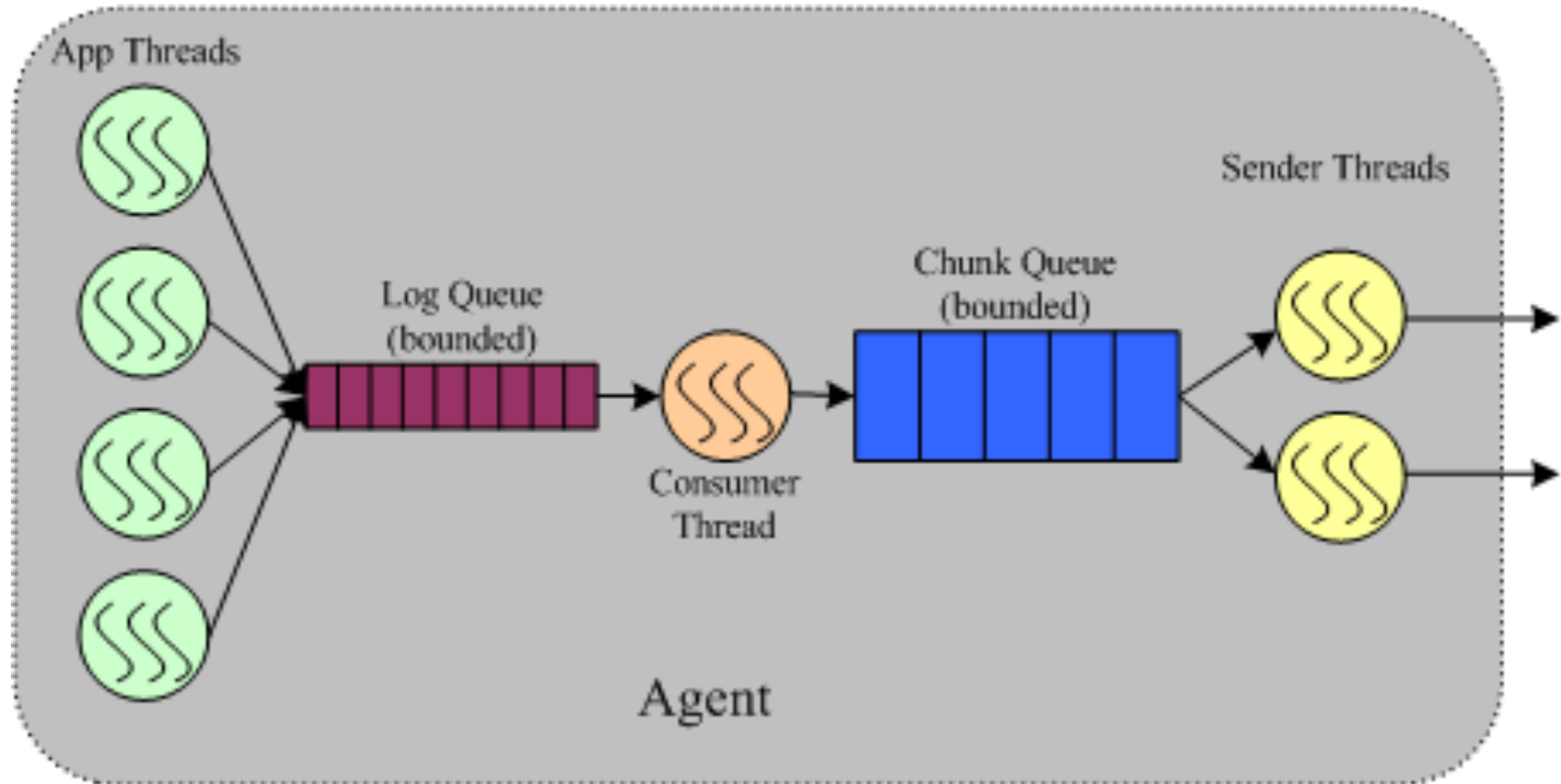
# StatSD + Grafana



# A Custimized Log system architecture



# Log agent



# Sum Up

- Careful choose log level
- Centralize the logs
- Secure the logs
  
- Do Log
- Do Use the log:
  - Monitor & Alert
  - Analysis the logs

# Reference

- [The Log: What every software engineer should know about real-time data's unifying abstraction](#)
- [日志：每个软件工程师都应该知道的有关实时数据的统一概念](#)
- [Log Everything All The Time](#)
- <http://play.grafana.org/>
- [Elastic Search, Logstash & Kibana](#)
- Splunk: <http://www.splunk.com/>
- Zabbix: <https://www.zabbix.com/>
- Cacti: <http://cacti.net/>
- nagios: <https://www.nagios.org/>