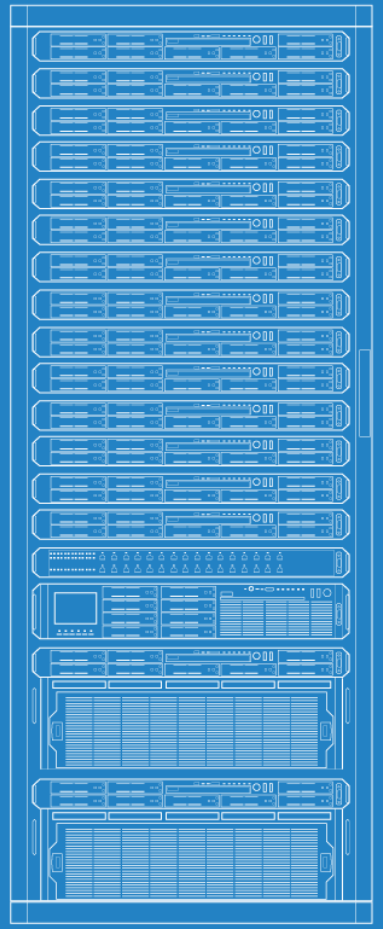
LOGGING DOCKER USING SYSLOG-NG

vDay 2017

Peter Czanik / Balabit



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ABOUT ME

- Peter Czanik from Hungary
- Evangelist at Balabit: syslog-ng upstream
- syslog-ng packaging, support, advocacy

Balabit is an IT security company with development HQ in Budapest, Hungary

Over 200 employees: the majority are engineers

OVERVIEW

- What is syslog-ng
- The four roles of syslog-ng
- Central syslog-ng in Docker
- Logging Docker infrastructure and containers
- Configuring syslog-ng

syslog-ng

Logging
Recording events, such as:

> Jan 14 11:38:48 linux-0jbu sshd[7716]: Accepted publickey for root from 127.0.0.1 port 48806 ssh2

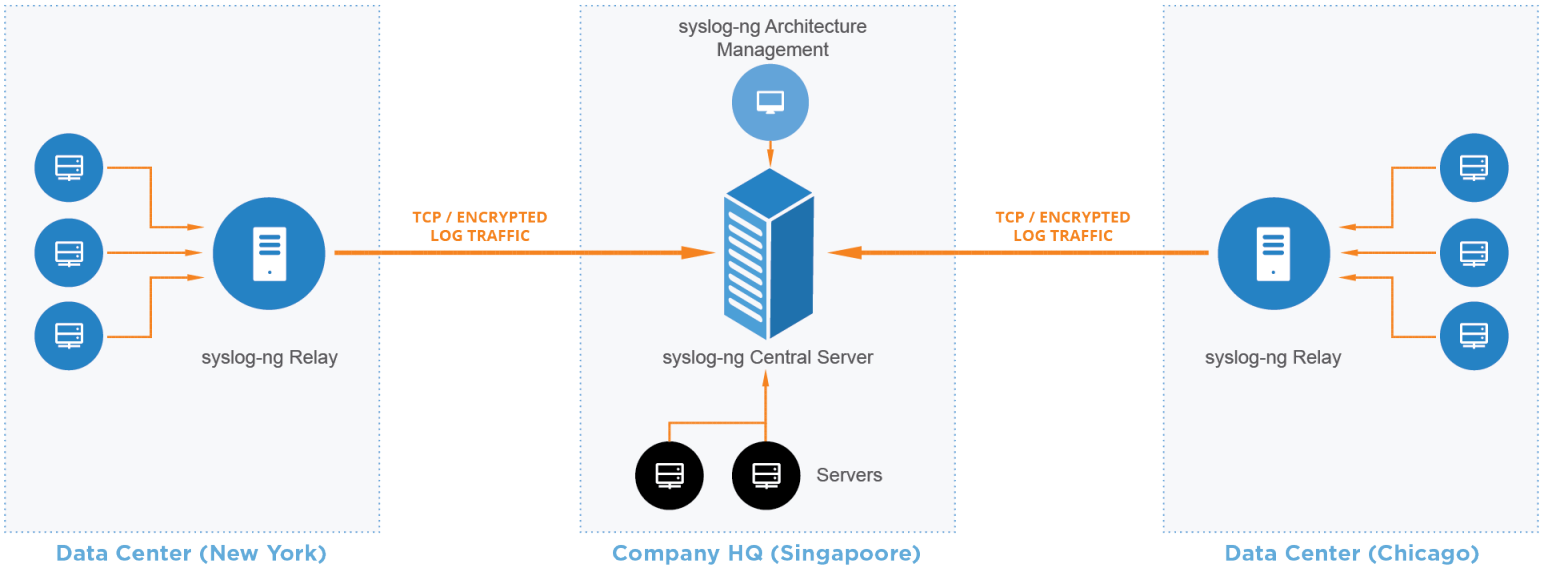
syslog-ng
Enhanced logging daemon with a focus on high-performance central log collection.

WHY CENTRAL LOGGING?

EASE OF USE
one place to check instead of many

AVAILABILITY
even if the sender machine is down

SECURITY
logs are available even if sender machine is compromised



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MAIN SYSLOG-NG ROLES

collector

processor

filter

storage
(or forwarder)

ROLE: DATA COLLECTOR

Collect system and application logs together:
contextual data for either side

A wide variety of platform-specific sources:

- /dev/log & co
- Journal, Sun streams

Receive syslog messages over the network:

- Legacy or RFC5424, UDP/TCP/TLS

Logs or any kind of text data from applications:

- Through files, sockets, pipes, application output, etc.

ROLE: PROCESSING

Classify, normalize and structure logs with built-in parsers:

- CSV-parser, DB-parser (PatternDB), JSON parser, key=value parser, python parser and more to come

Rewrite messages:

- For example anonymization

Reformatting messages using templates:

- Destination might need a specific format (ISO date, JSON, etc.)

Enrich data:

- GeoIP
- Additional fields based on message content

ROLE: DATA FILTERING

Main uses:

- Discarding surplus logs (not storing debug level messages)
- Message routing (login events to SIEM)

Many possibilities:

- Based on message content, parameters or macros
- Using comparisons, wildcards, regular expressions and functions
- Combining all of these with Boolean operators

ROLE: DESTINATIONS

“TRADITIONAL”

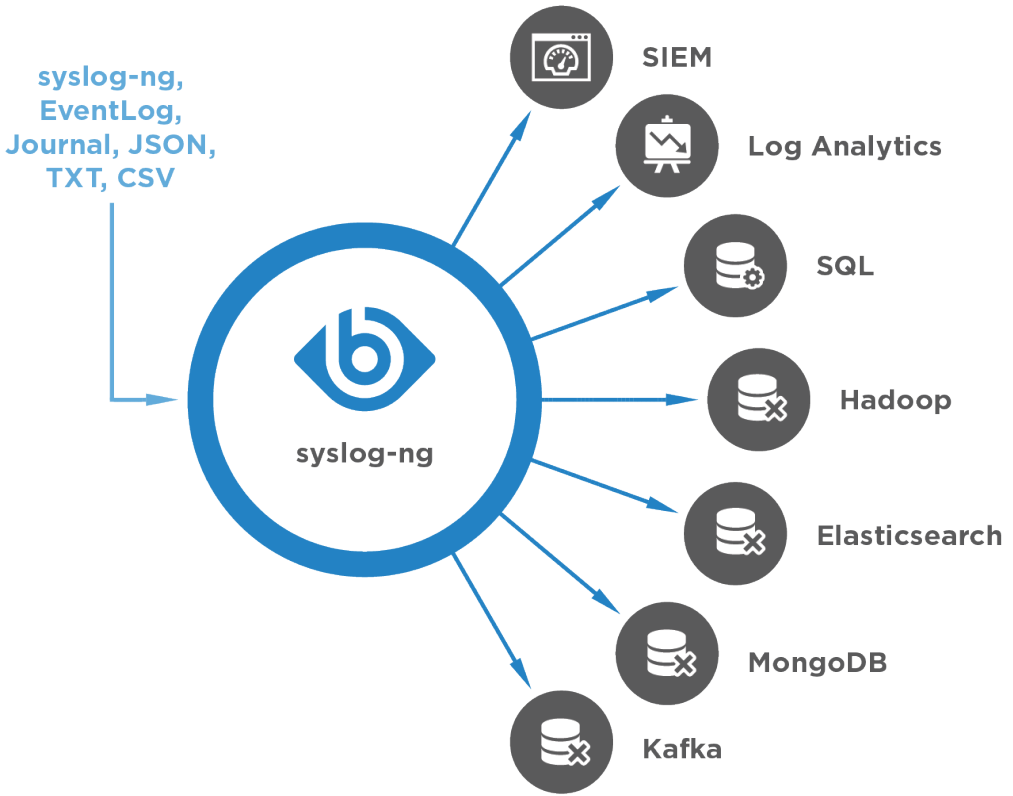
- File, network, TLS, SQL, etc.

“BIG DATA”

- Hadoop
- MongoDB
- Elasticsearch
- Kafka

“OTHERS”

- HTTP(S)
- Java / Python



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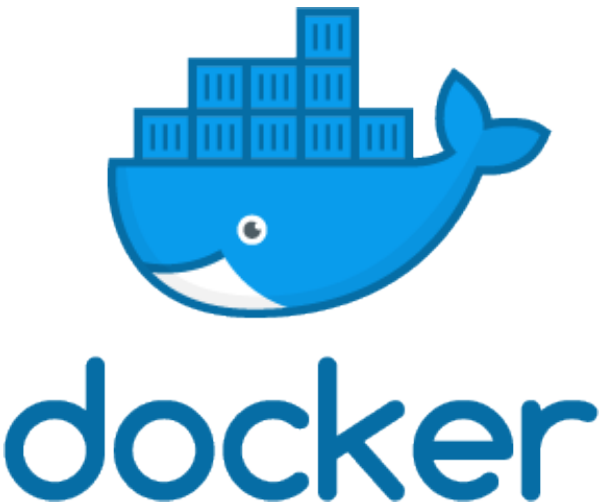
Docker

Containers

- Many implementations before Docker (FreeBSD jail, Solaris Zones and others)
- Docker brought ease of use

syslog-ng in Docker

- Central server
- Docker infrastructure logs
- Container logs
- Can combine roles



syslog-ng images

Images

- balabit/syslog-ng
  - based on Ubuntu + latest release, all features
- Certified RHEL container with most features
- Many more images on Docker hub
  - Alpine-based images are very small

Central server

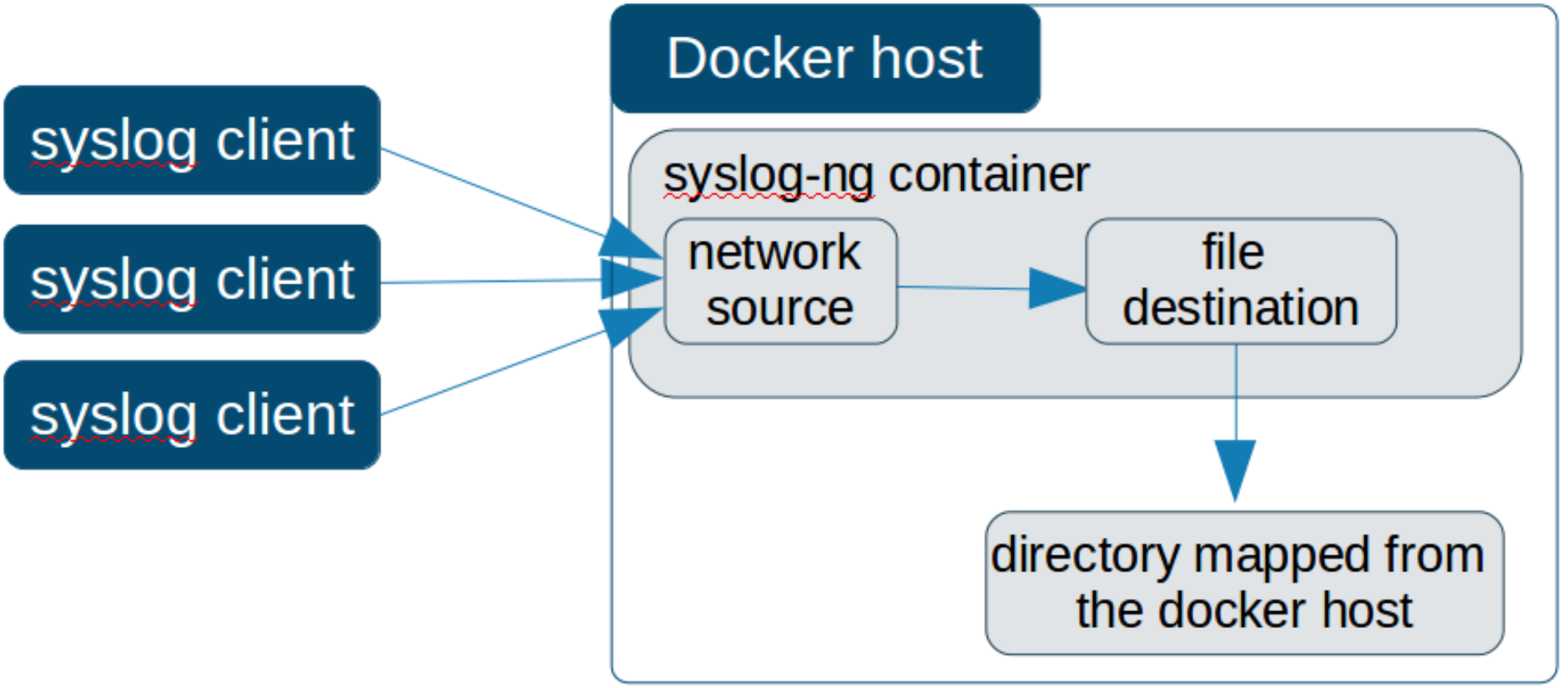
Simple

- Almost like on the host
- Network sources
- Use any filter/parser/destination supported by the image

Starting the syslog-ng container for a test

- docker run -it -v /data/syslog-ng/conf/syslog-ng.conf:/etc/syslog-ng/syslog-ng.conf -v /data/syslog-ng/logs:/var/log -p 514:514 -p 601:601 --name syslog-ng balabit/syslog-ng:latest -edv

Central server



Central server

A simple configuration

```
@version: 3.12
source s_net {
   udp( ip("0.0.0.0") );
   syslog( ip("0.0.0.0") );
 };
 destination d_file {
   file("/var/log/syslog");
 };
 log {source(s_net); destination(d_file); };
```

Docker infrastructure & container logs

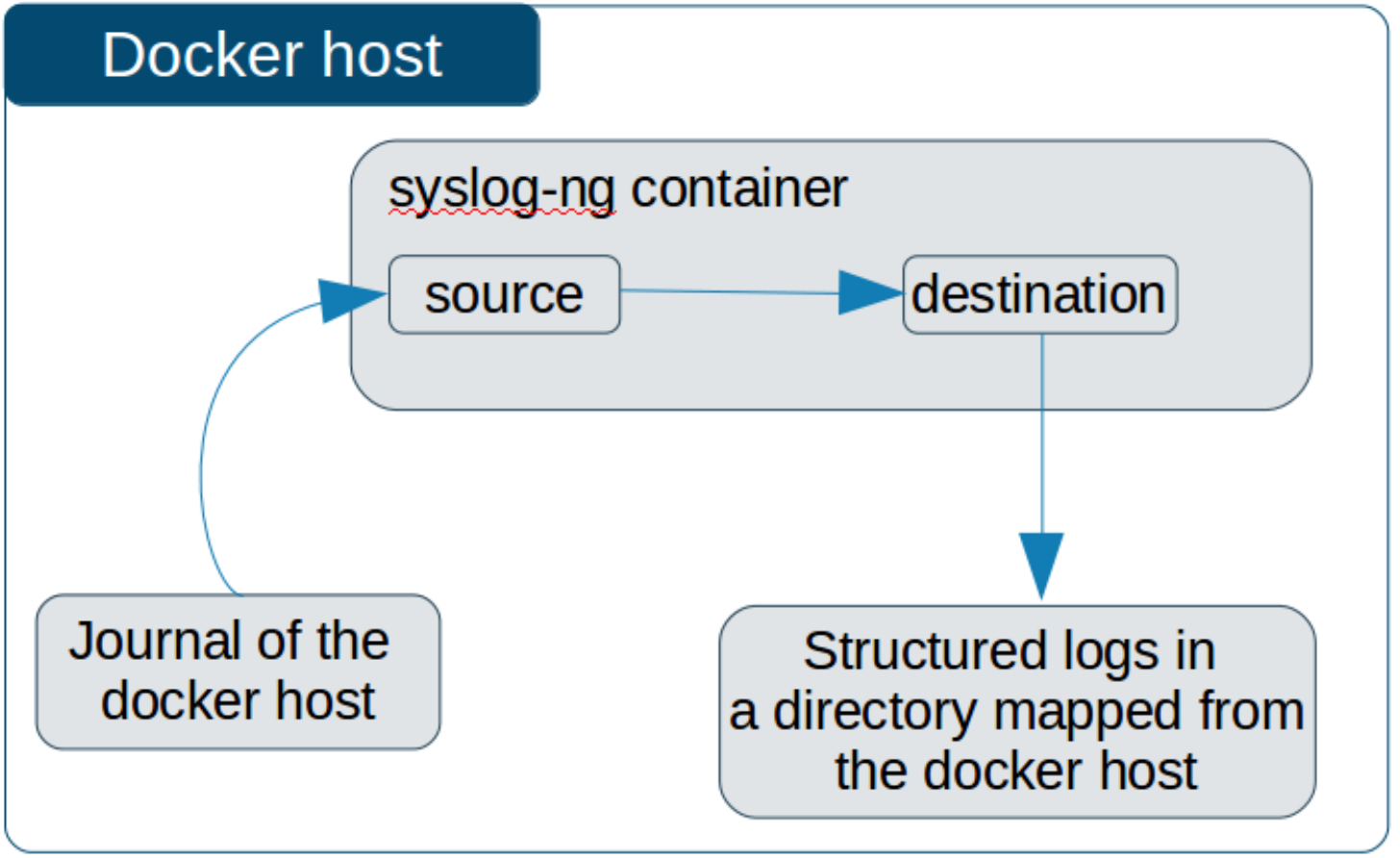
Using the Docker journal logging driver

- “docker logs” + full featured remote log collection with syslog-ng
- Host / Docker infrastructure logs
- Container logs (only the stdout of containers)
- Name-value pairs with container identifiers

Starting syslog-ng

- docker run -ti -v **/etc/machine-id:/etc/machine-id** -v /data/syslog-ng/conf/journal.conf:/etc/syslog-ng/syslog-ng.conf -v /data/syslog-ng/logs/:/var/log -v **/var/log/journal:/var/log/journal** --name journal balabit/syslog-ng:latest

Docker infrastructure & container logs



Docker infrastructure & container logs

```
@version: 3.12
source s_journal {
  systemd-journal(prefix("journal."));
};
source s_internal { internal(); };
destination d_int { file("/var/log/int"); };
destination d_file {
  file("/var/log/journal.json" template("$(format_json --scope rfc5424 --key journal.*)\n\n"));
};
log {source(s_journal); destination(d_file); };
log {source(s_internal); destination(d_int); };
```

Logs from other containers

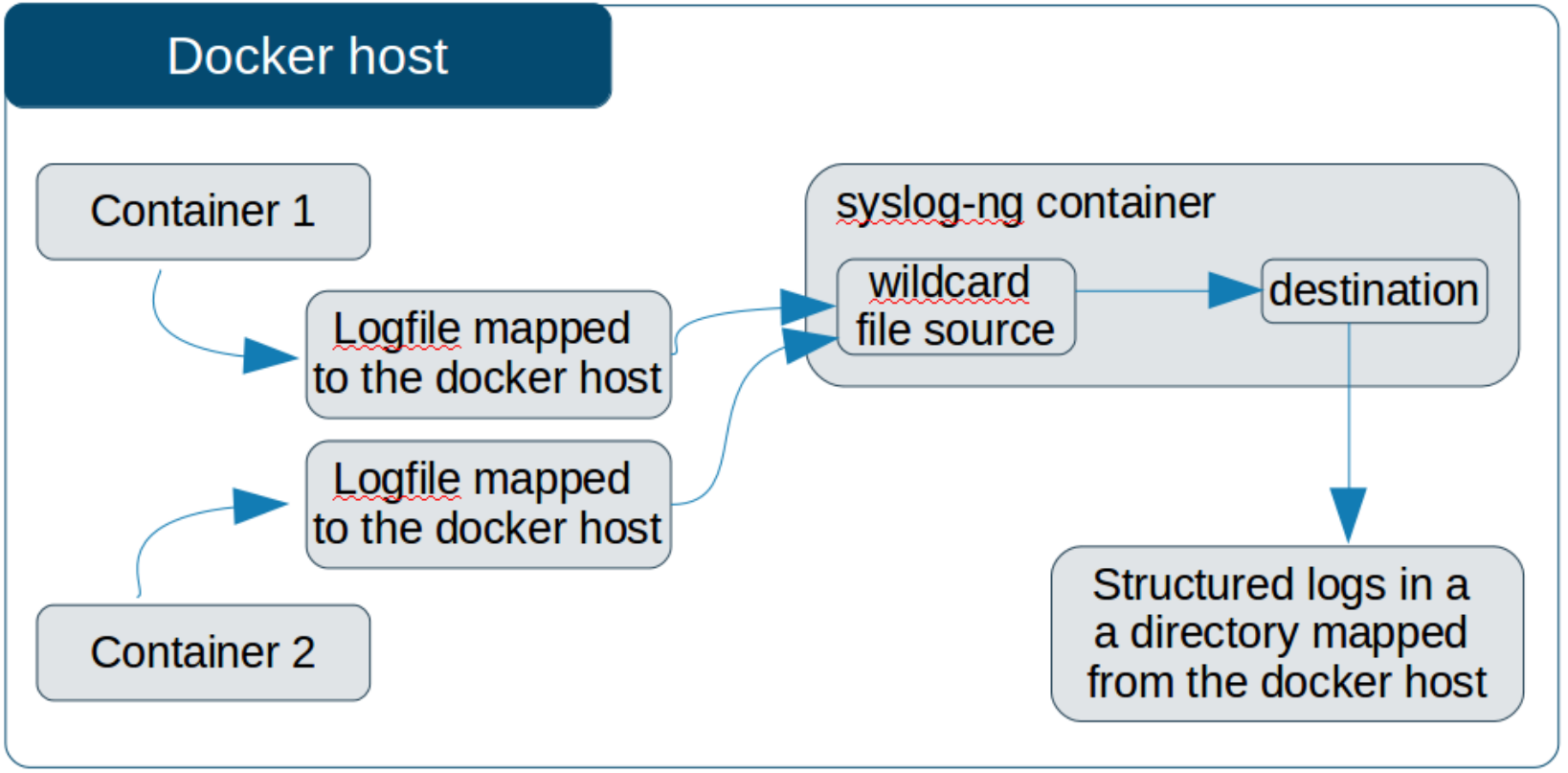
Volumes

- Not all software can log to stdout
- Share log directories using volumes
- Wildcard-file source

Pipes

- Using volumes
- No need for log rotation

Logs from other containers



CONFIGURATION

- “Don't Panic”
- Simple and logical, even if it looks difficult at first
- Pipeline model:
  - Many different building blocks (sources, destinations, filters, parsers, etc.)
  - Connected into a pipeline using “log” statements

syslog-ng.conf: global options

```
@version:3.12
@include "scl.conf"

# this is a comment :)

options {
    flush_lines (0);
# [...]
    keep_hostname (yes);
};
```

syslog-ng.conf: sources

```
source s_sys {
    system();
    internal();
};

source  s_net {
    udp(ip(0.0.0.0) port(514));
};
```

syslog-ng.conf: destinations

```
destination d_mesg { file("/var/log/messages"); };
destination d_es {
  elasticsearch(
    index("syslog-ng_${YEAR}.${MONTH}.${DAY}")
    type("test")
    cluster("syslog-ng")
    template("$(format-json --scope rfc3164 --scope nv-pairs --exclude R_DATE --key ISODATE)\n");
  );
};
```

syslog-ng.conf: filters, parsers

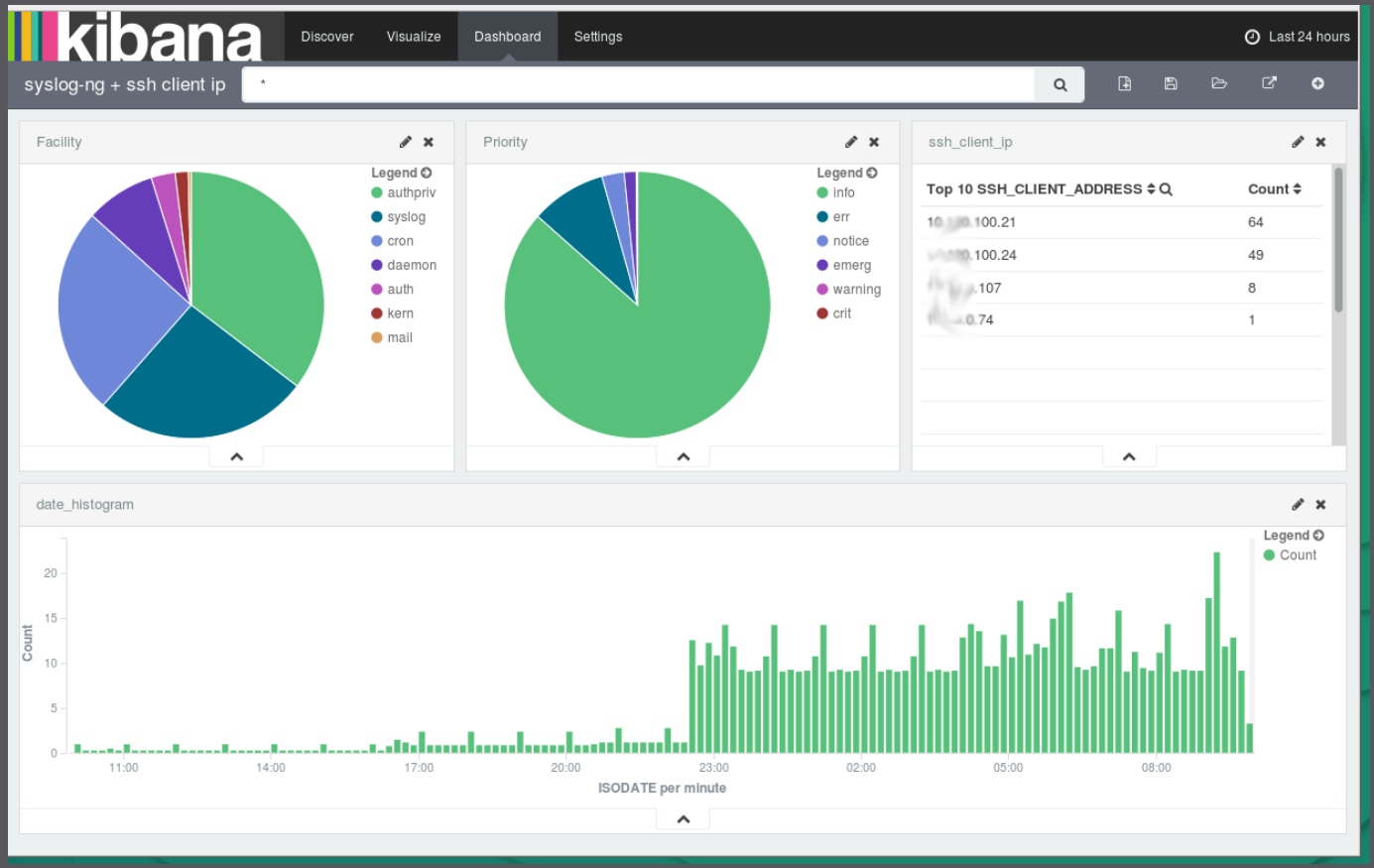
```
filter f_nodebug    { level(info..emerg); };
filter f_messages    { level(info..emerg) and
                       not (facility(mail)
                       or facility(authpriv)
                       or facility(cron)); };

parser pattern_db {
  db-parser(file("/opt/syslog-ng/etc/patterndb.xml") );
};
```

syslog-ng.conf: logpath

```
log { source(s_sys); filter(f_messages); destination(d_mesg); };
log {
  source(s_net);
  source(s_sys);
  filter(f_nodebug);
  parser(pattern_db);
  destination(d_es);
  flags(flow-control);
};
```

Patterndb & ElasticSearch & Kibana



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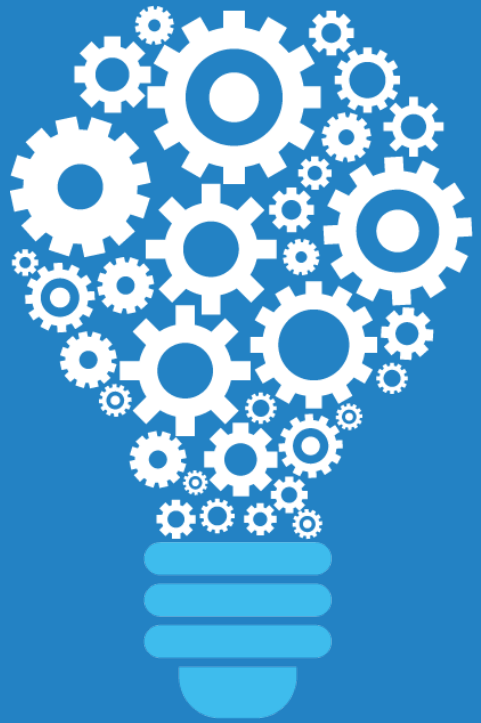
WHAT IS NEW IN SYSLOG-NG



- Disk-based buffering
- Grouping-by(): correlation independent of patterndb
- Parsers written in Python
- Elasticsearch REST API support
- HTTP(s) destination
- Wildcard file source
- Performance improvements
- Many more :-)

SYSLOG-NG BENEFITS

High-performance reliable log collection

Simplified architecture

Single application for both syslog and application data

Easier-to-use data

Parsed and presented in a ready-to-use format

Lower load on destinations

Efficient message filtering and routing

JOINING THE COMMUNITY

- syslog-ng: http://syslog-ng.org/
- Source on GitHub: https://github.com/balabit/syslog-ng
- Mailing list: https://lists.balabit.hu/pipermail/syslog-ng/
- Gitter: https://gitter.im/balabit/syslog-ng

QUESTIONS?

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