

Logging and Metrics in Cloud Foundry

Using the Loggregator Logging System

Topics

- **Logging System Overview**
- Application Logs and Metrics
- Platform Logs and Metrics

Loggregator - The Voice of the System

- Provides **logging** and **metrics** for the Elastic Runtime
- A modern approach to logging that emphasizes:
 - Support for ephemeral, container-based applications
 - Productivity by streaming logs and metrics to operators and developers (no log shipping)
 - Accessibility and visibility into your applications and the platform
 - Seamless integration with modern log management services (e.g. Splunk, LogStash)

How can Loggregator help me?

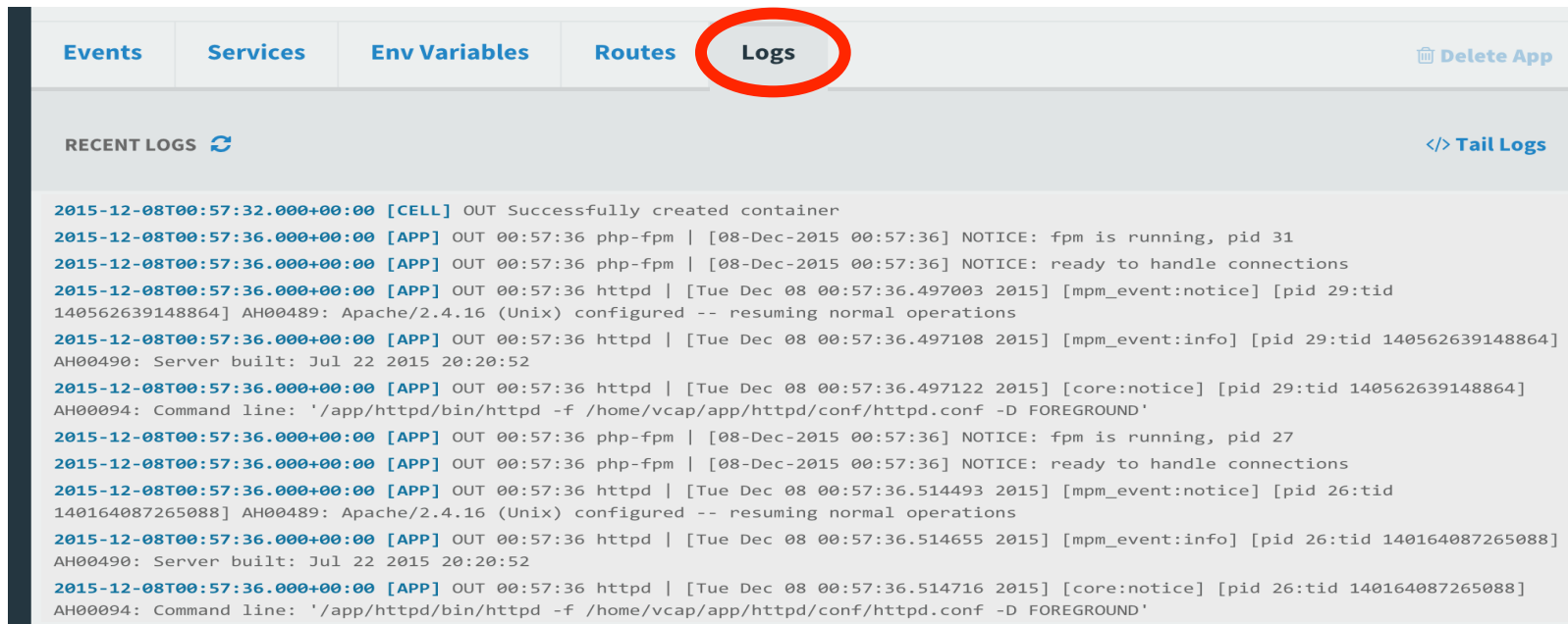
- Debugging applications
- Application insights
- Monitoring system and application health
- Exporting metrics into visualization tools

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- **Application Logs and Metrics**
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Viewing the Logs for your App using Apps Manager

In Apps Manager, select your app, then select Logs



The screenshot shows the Apps Manager interface with a navigation bar at the top. The 'Logs' tab is highlighted with a red circle. Below the navigation bar, there is a 'RECENT LOGS' section with a refresh icon and a 'Tail Logs' link. The main area displays a list of log entries for a specific app, showing timestamps, log levels, and messages.

Events	Services	Env Variables	Routes	Logs	Delete App
RECENT LOGS  Tail Logs					
<p>2015-12-08T00:57:32.000+00:00 [CELL] OUT Successfully created container</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 php-fpm [08-Dec-2015 00:57:36] NOTICE: fpm is running, pid 31</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 php-fpm [08-Dec-2015 00:57:36] NOTICE: ready to handle connections</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 httpd [Tue Dec 08 00:57:36.497003 2015] [mpm_event:notice] [pid 29:tid 140562639148864] AH00489: Apache/2.4.16 (Unix) configured -- resuming normal operations</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 httpd [Tue Dec 08 00:57:36.497108 2015] [mpm_event:info] [pid 29:tid 140562639148864] AH00490: Server built: Jul 22 2015 20:20:52</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 httpd [Tue Dec 08 00:57:36.497122 2015] [core:notice] [pid 29:tid 140562639148864] AH00094: Command line: '/app/httpd/bin/httpd -f /home/vcap/app/httpd/conf/httpd.conf -D FOREGROUND'</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 php-fpm [08-Dec-2015 00:57:36] NOTICE: fpm is running, pid 27</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 php-fpm [08-Dec-2015 00:57:36] NOTICE: ready to handle connections</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 httpd [Tue Dec 08 00:57:36.514493 2015] [mpm_event:notice] [pid 26:tid 140164087265088] AH00489: Apache/2.4.16 (Unix) configured -- resuming normal operations</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 httpd [Tue Dec 08 00:57:36.514655 2015] [mpm_event:info] [pid 26:tid 140164087265088] AH00490: Server built: Jul 22 2015 20:20:52</p> <p>2015-12-08T00:57:36.000+00:00 [APP] OUT 00:57:36 httpd [Tue Dec 08 00:57:36.514716 2015] [core:notice] [pid 26:tid 140164087265088] AH00094: Command line: '/app/httpd/bin/httpd -f /home/vcap/app/httpd/conf/httpd.conf -D FOREGROUND'</p>					

Viewing Recent Logs For an App using the cf CLI

Use `cf logs <app_name> --recent`

```
my-php-app88 — bash — 66x10
greylag:my-php-app88 sbyrnes$ cf help logs
NAME:
  logs - Tail or show recent logs for an app

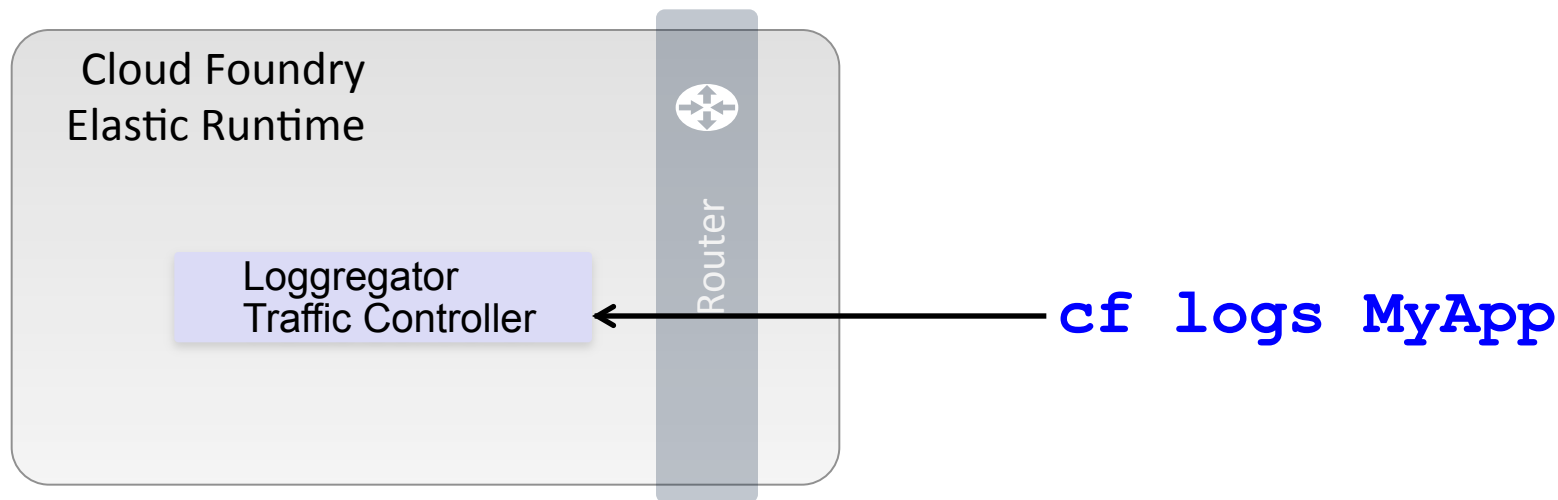
USAGE:
  cf logs APP_NAME

OPTIONS:
  --recent      Dump recent logs instead of tailing
greylag:my-php-app88 sbyrnes$
```

```
greylag:repos sbyrnes$ cf logs my-php-app88 --recent
Connected, dumping recent logs for app my-php-app88 in org sbyrnes-org / space development as sbyrnes@pivotal.io...

2015-12-22T13:14:36.13-0800 [CELL/0] OUT Creating container
2015-12-22T13:14:36.83-0800 [CELL/0] OUT Successfully created container
2015-12-22T13:14:40.13-0800 [APP/0] OUT 21:14:40 php-fpm | [22-Dec-2015 21:14:40] NOTICE: fpm is running, pid 27
2015-12-22T13:14:40.13-0800 [APP/0] OUT 21:14:40 php-fpm | [22-Dec-2015 21:14:40] NOTICE: ready to handle connections
2015-12-22T13:14:40.16-0800 [APP/0] OUT 21:14:40 httpd | [Tue Dec 22 21:14:40.153683 2015] [mpm_event:notice] [pid 25:
tid 140364163196736] AH00489: Apache/2.4.12 (Unix) configured -- resuming normal operations
2015-12-22T13:14:40.16-0800 [APP/0] OUT 21:14:40 httpd | [Tue Dec 22 21:14:40.153867 2015] [mpm_event:info] [pid 25:ti
d 140364163196736] AH00490: Server built: Mar 2 2015 15:50:48
2015-12-22T13:14:40.16-0800 [APP/0] OUT 21:14:40 httpd | [Tue Dec 22 21:14:40.153925 2015] [core:notice] [pid 25:tid 1
40364163196736] AH00094: Command line: '/home/vcap/app/httpd/bin/httpd -f /home/vcap/app/httpd/conf/httpd.conf -D FOREGROUND'
2015-12-22T13:14:40.28-0800 [HEALTH/0] OUT healthcheck passed
2015-12-22T13:14:40.28-0800 [HEALTH/0] OUT Exit status 0
2015-12-22T13:14:44.76-0800 [RTR/1] OUT my-php-app87.cfapps.io - [22/12/2015:21:14:44 +0000] "GET / HTTP/1.1" 200 0 185
"- "Mozilla/5.0 (Macintosh; Intel Mac OS X 10_11_2) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/47.0.2526.80 Safari/537.36
" 10.10.2.247:23755 x_forwarded_for:"209.234.137.222" x_forwarded_proto:"http" vcap_request_id:f210e3a5-24c1-41ca-7edd-56d406
da2cf7 response_time:0.00228655 app_id:a4263c77-3ada-4030-9ae9-fa2d0e6c5579
2015-12-22T13:14:44.77-0800 [APP/0] OUT 21:14:44 httpd | 209.234.137.222 - - [22/Dec/2015:21:14:44 +0000] "GET / HTTP/
1.1" 200 185 vcap_request_id=f210e3a5-24c1-41ca-7edd-56d406da2cf7 peer_addr=10.10.16.16
2015-12-22T13:14:48.88-0800 [APP/0] OUT 21:14:48 httpd | [Tue Dec 22 21:14:48.853886 2015] [core:info] [pid 36:tid 140
364103026432] [client 209.234.137.222:37018] AH00128: File does not exist: /home/vcap/app/htdocs/favicon.ico, referer: http:/
/my-php-app87.cfapps.io/
2015-12-22T13:14:48.88-0800 [APP/0] OUT 21:14:48 httpd | 209.234.137.222 - - [22/Dec/2015:21:14:48 +0000] "GET /favico
n.ico HTTP/1.1" 404 209 vcap_request_id=0968141d-f21a-44ab-53e7-ce571fbb9020 peer_addr=10.10.80.16
2015-12-22T13:15:10.30-0800 [HEALTH/0] OUT healthcheck passed
2015-12-22T13:15:10.30-0800 [HEALTH/0] OUT Exit status 0
```

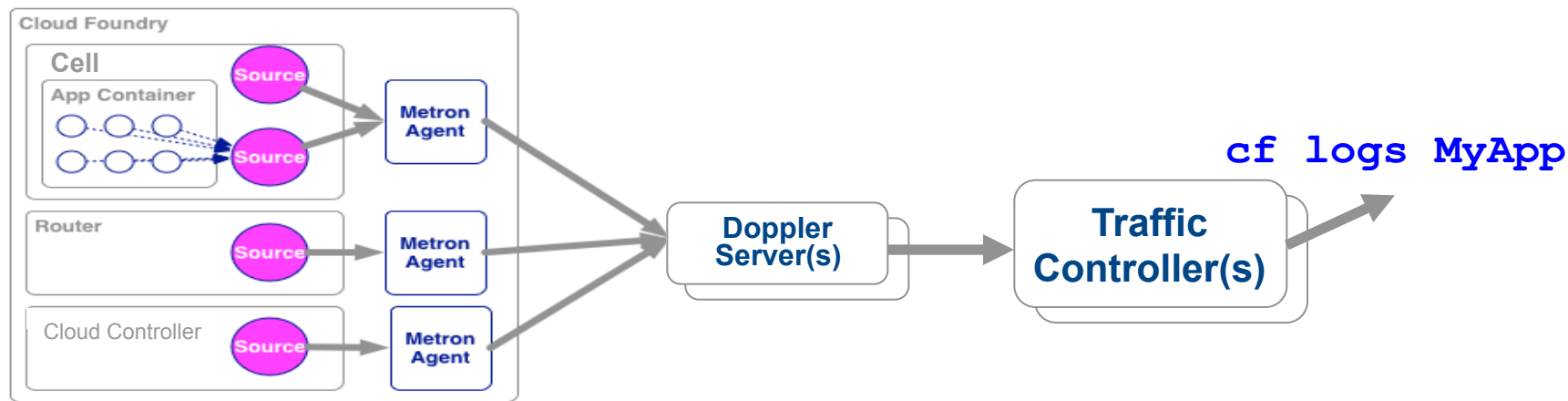
cf logs- Behind the Scenes



- A component of the Loggregator system called the **Traffic Controller** receives and responds to requests for logs and metrics
- Note: Loggregator typically sends logging traffic out over port 4443- your company's inbound firewall must open this port in order to read logs using **cf logs**
 - This port is configured in Ops Manager > Pivotal Elastic Runtime > Settings > IPs and Ports > Loggregator port

cf logs MyApp- Deeper Behind the Scenes

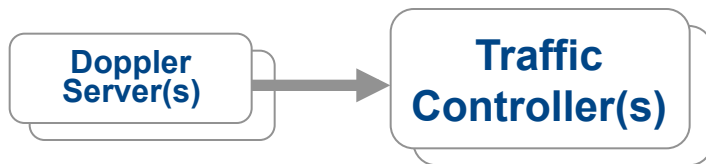
- **Sources** of logging and metrics data send data to **Metron Agents**, which reside on Cloud Foundry components
- The Metron Agents send the data to **Doppler Servers**
- When the request for logs is made, the Traffic Controller gets the data from the Doppler Servers



Scaling Logging and Metrics Data Handling

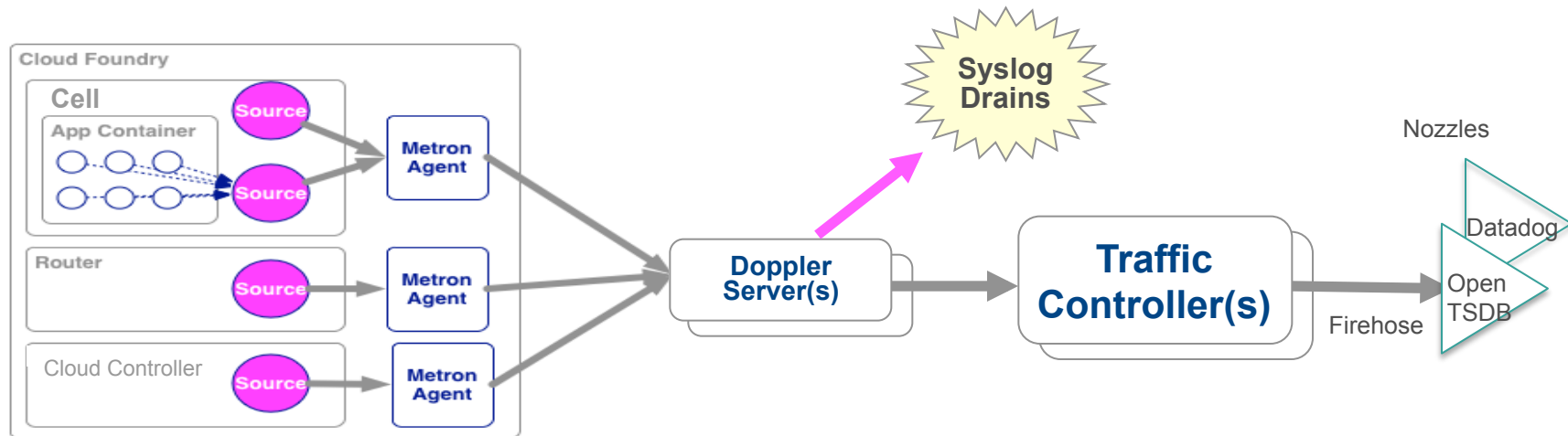
- Doppler Servers and Traffic Controllers are components of the Loggregator system installed with Pivotal Elastic Runtime
- The components may become lossy if the logging and metric data is too high (e.g. large number of Cells or apps)
 - The system favors stability over logging everything
- Scale these components using the Resource Config tab of Pivotal Elastic Runtime
- You can also increase the Syslog Drain Buffer size on the System Logging tab (default is 100 messages)

✓ Resource Config	Doppler Server	1	
	Loggregator Trafficcontroller	1	



Syslog Drains

- Syslog drains allow data related to **an application** to be sent to third-party log managers
- The data from the Doppler Servers is sent to the Syslog drain
 - The Traffic Controller is not used



Syslog Drains- Third-Party Log Managers

- Recommended approach for application logging
 - Can store far more logging information than Cloud Foundry
 - Allow for persistence, storage, searching, analyzing, metrics
- Variety of third-party log managers supported:



papertrail



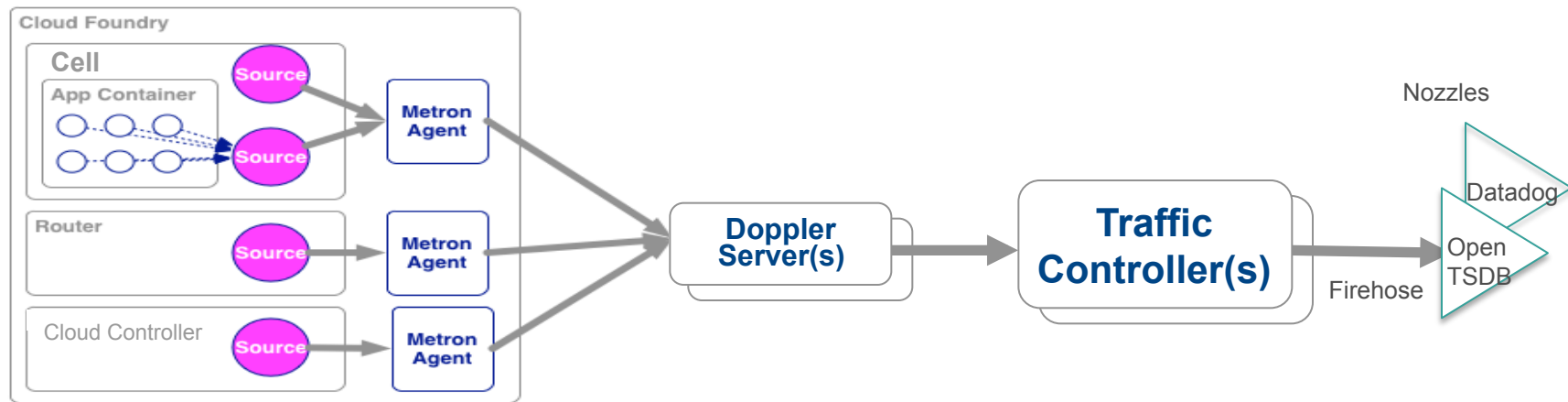
logstash



splunk>storm™

Firehose and Nozzles

- Traffic Controllers have a Firehose endpoint
- The Firehose streams all the event data coming from an Elastic Runtime deployment
 - Includes application logs, HTTP events and container metrics
 - Includes metrics from all Elastic Runtime components
 - Does not include Elastic Runtime component logs
- Operators can deploy **nozzles** to the Firehose endpoint, which listen for a subset of data from the Firehose




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- **Platform Logs and Metrics**

Download Platform Logs









Request the logs for a specific job

 PCF Ops Manager admin ▾

[Installation Dashboard](#)
Pivotal Elastic Runtime

SettingsStatusCredentials**Logs**

Jobs on Availability Zone "us-east-1a"

JOB	INDEX	IPS	CID	LOAD AVG15	CPU	MEMORY	SWAP	SYSTEM DISK	EPHEM. DISK	PERS. DISK	LOGS
NATS	0	10.0.16.11	i-f32d334d	0.05	0.0%	7%	0%	44%	3%	N/A	
Consul	0	10.0.16.12	i-f02d334e	0.05	0.1%	8%	0%	44%	5%	0%	
etcd	0	10.0.16.13	i-f12d334f	0.05	0.2%	12%	0%	44%	6%	30%	
Diego BBS	0	10.0.16.14	i-4f2d33f1	0.05	0.3%	13%	0%	44%	24%	30%	
NFS Server	0	10.0.16.15	i-bd2a3403	0.05	0.0%	9%	0%	44%	2%	6%	
Router	0	10.0.16.16	i-4d2d33f3	0.05	0.1%	8%	0%	44%	6%	N/A	
MySQL Proxy	0	10.0.16.17	i-452836fb	0.05	0.0%	9%	0%	44%	11%	N/A	
MySQL Server	0	10.0.16.18	i-c7293779	0.05	0.5%	17%	0%	44%	9%	10%	

Platform syslog

- Elastic Runtime can send system logs to an external syslog server
- Configure this in the System Logging tab

The screenshot shows the 'PCF Ops Manager' interface for 'Pivotal Elastic Runtime'. The 'Settings' tab is selected, and the 'System Logging' sub-tab is active. A sidebar on the left lists various configuration sections: Assign Networks, Assign Availability Zones, System Database Config, File Storage Config, IPs and Ports, Security Config, MySQL Proxy Config, Cloud Controller, and System Logging (which is highlighted). The main content area is titled 'Configure system logging. Leave the External Syslog fields blank unless you wish to use an external syslogd server.' It contains four input fields: 'External Syslog Aggregator Hostname' (with a text input box and a note that the aggregator must be reachable and use RELP), 'External Syslog Aggregator Port' (with a text input box), 'External Syslog Network Protocol' (with a dropdown menu), and 'Syslog Drain Buffer Size (# of messages)' (with a text input box containing the value '100'). A blue 'Save' button is located at the bottom right of the configuration area.

Lab

Configuring Third-Party Log Management Tools with Cloud Foundry