



Monitoring Containers at New Relic

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dockercon 16

Docker - Data of Interest

- Docker Daemon Logs

- Jun 19 09:00:03 docker-20 docker: time="2016-06-19T09:00:03.938763022-07:00" level=error msg="HTTP Error" err="no such id: fbfe...cdca5607590e5" statusCode=404

- Docker Container (Application) Logs

- 2016-06-18 23:15:14,265{PST} [KafkaProducerPoolService STARTING] INFO c.n.d.n.p.KafkaProducerPoolService - added producer 1

- Docker Events

- 2016-06-19T16:40:43.108589658Z container die 2f457...040f (exitCode=2, image=progrium/stress, name=oom-2)

- Docker Statistics

CONTAINER	CPU %	MEM USAGE / LIMIT	MEM %	NET I/O	BLOCK I/O	PIDS
24b03e00057b	54.76%	1.021 GB / 1.93 GB	52.90%	648 B / 648 B	150.3 MB / 196.5 MB	0

Heka

Mozilla's Open Source
Message Processor



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<https://github.com/mozilla-services/heka>

Inputs - Docker Statistics & Events

```
[DockerEventInput]  
type = "DockerEventInput"
```

```
[DockerStatsInput]  
endpoint = "unix:///var/run/docker.sock"  
fields_from_env = ["SERVICE_ENV", "SERVICE_NAME"]  
decoder = "JsonDockerStatsDecoder"  
ticker_interval = 1
```


Inputs - Docker Daemon/Container Logs

```
[DockerLogInput]
```

```
fields_from_env = ["SERVICE_ENV", "SERVICE_NAME"]
```

```
since_path = "/var/log/heka-since"
```

```
[DockerDaemonLogInput]
```

```
address = "127.0.0.1:50001"
```

```
type = "UdpInput"
```

```
decoder = "LogfmtDecoder"
```

rsyslog - Docker Daemon Logs

```
template(name="ls_json"
  type="list"
  option.json="on") {
  constant(value="{")
  constant(value="\ttimestamp\":"\") property(name="timereported" dateFormat="rfc3339")
  constant(value="\tmessage\":"\") property(name="msg")
  constant(value="\thost\":"\") property(name="hostname")
  constant(value="\tseverity\":"\") property(name="syslogseverity-text")
  constant(value="\tfacility\":"\") property(name="syslogfacility-text")
  constant(value="\tprogram\":"\") property(name="programname")
  constant(value="\tpid\":"\") property(name="procid")
  constant(value="\t"}\n")
}

if $programname == 'docker' then @127.0.0.1:50001;ls_json
& stop
```

Decoders/Filters - Docker Daemon Logs

```
[LogfmtDecoder]  
filename = "/usr/share/heka/lua_plugins/logfmt_decoder.lua"  
script_type = "lua"  
type = "SandboxDecoder"
```

Decoders/Filters - Docker Statistics

```
[JsonDockerStatsDecoder]
```

```
filename = "/usr/share/heka/lua_plugins/docker_stats_filter.lua"
```

```
type = "SandboxDecoder"
```

```
[JsonDockerStatsDecoder.config]
```

```
payload_keep = false
```

```
type = "DockerStats"
```


Encoders/Outputs - Debugging

```
[counter_output]
type = "LogOutput"
message_matcher = "TRUE"
encoder = "RstEncoder"
```

```
[counter_file]
type = "FileOutput"
message_matcher = "TRUE"
path = "/var/log/heka-debug.log"
perm = "666"
flush_count = 100
flush_operator = "OR"
encoder = "RstEncoder"
```

```
[RstEncoder] # Restructured Text
Encoder
```

Results - Debugging

```
:Timestamp: 2016-06-02 00:35:18.950140231 +0000 UTC
>Type: DockerEvent
:Hostname: demo.example.com
:Pid: 0
:Uuid: 92d64bfc-f040-4913-9b0b-171d19dd5bc7
:Logger: ffdde973eb1264b389eb4cee33d624c6b03341790cf951a3d724a4e032b0269
:Payload: id:ffd...b0269 status:destroy from:eeacms/phoronix-test-suite time:1464827718
:EnvVersion:
:Severity: 7
:Fields:
| name:"ID" type:string value:"ffdde973eb1264b389eb4c...90cf951a3d724a4e032b0269"
| name:"Status" type:string value:"destroy"
| name:"From" type:string value:"eeacms/phoronix-test-suite"
| name:"Time" type:integer value:1464827718 representation:"ts"
```

Encoders/Outputs - Insights

```
[InsightsDockerStatsOutput]
filename = "/usr/share/heka/lua_plugins/insights_output.lua"
message_matcher = "Type == 'DockerStats'"
module_directory = "/usr/share/heka/lua_modules"
script_type = "lua"
ticker_interval = 10
type = "SandboxOutput"
```

```
[InsightsDockerStatsOutput.config]
default_event_source = "DockerStats"
default_event_type = "DockerStats"
default_event_version = 2
event_post_count_max = 30
event_url = "https://insights-collector.newrelic.com/v1/accounts/#####/events"
insert_key = "REDACTED"
```

Insights

New Relic's Analytics Engine

Monitor Success Rate (Login Feature)
Since 1 week ago

Errors over Time
Since 1 week ago

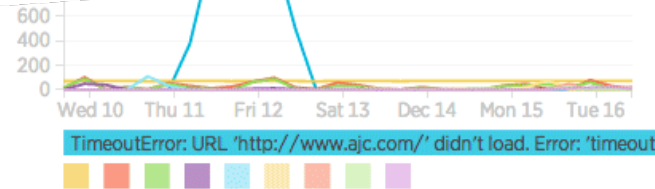
Most Common

Error Messages

98.99

Success Rate

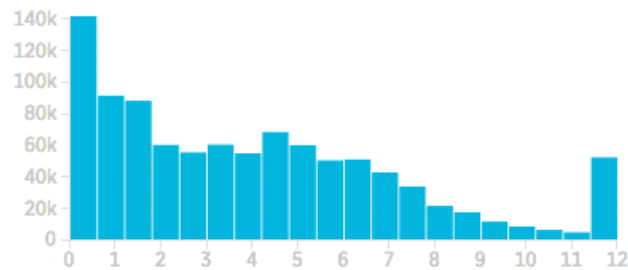
99.0%
100



Error Message	Results
TimeoutError: URL 'http://www.ajc.com/' didn't lo...	5.31 K
AssertionError: assertTextPresent failed	2 K
TimeoutError: URL 'http://www.people.com/peopl...	785
TimeoutError: URL 'http://fortune.com/' didn't loa...	662
TimeoutError: URL 'http://www.nme.com' didn't lo...	154
TimeoutError: Click failed: timeout	141

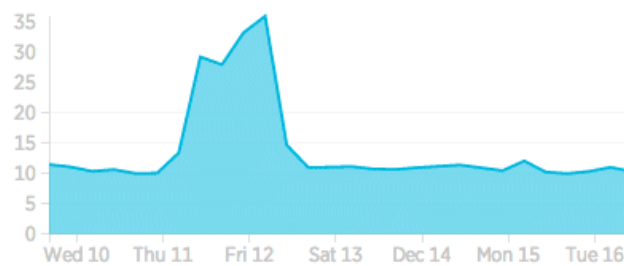
Load Duration Histogram

Since 1 week ago



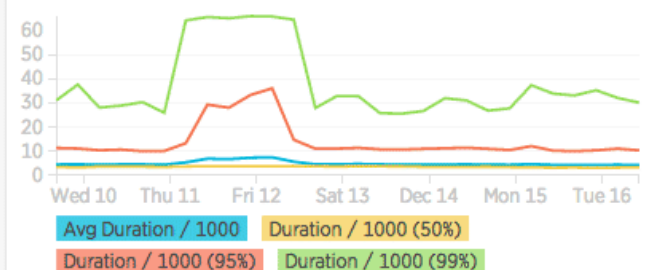
Login (Seconds)

Since 1 week ago



Duration Percentiles (sec)

Since 1 week ago



Monitor Fail Rate (Checkout Feature)

Since 1 week ago

Fail Rate

Check Request / Response Size

Since 1 week ago

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<https://newrelic.com/insights>

Latest events

	Logger	Payload	Status	Time	Type
72bb02b62dfd1d5d87fc7ca...	d3343ea2d372bb02b62dfd1d5d87fc7ca...	id:d3343ea2d372bb02b62dfd1d5d87fc7...	exec_start: bash -c cat /etc/shadow	3 minutes ago	DockerEvent
72bb02b62dfd1d5d87fc7ca...	d3343ea2d372bb02b62dfd1d5d87fc7ca...	id:d3343ea2d372bb02b62dfd1d5d87fc7...	exec_create: bash -c cat /etc/shadow	3 minutes ago	DockerEvent
ed92e1a91a526ffad9214834...	aeedb13ef3ed92e1a91a526ffad9214834...	id:aeedb13ef3ed92e1a91a526ffad92148...	network:disconnect	4 minutes ago	DockerEvent
f1576fb545469467044c7067...	0c2931098ef1576fb545469467044c7067...	id:0c2931098ef1576fb545469467044c70...	die	4 minutes ago	DockerEvent
ed92e1a91a526ffad9214834...	aeedb13ef3ed92e1a91a526ffad9214834...	id:aeedb13ef3ed92e1a91a526ffad92148...	network:disconnect	5 minutes ago	DockerEvent
f07610e1092a17912143c6c...	d6cade1f0aff07610e1092a17912143c6c...	id:d6cade1f0aff07610e1092a17912143c...	die	5 minutes ago	DockerEvent
20b3fc9538c9c2d5a9405ef...	f41ad696feb20b3fc9538c9c2d5a9405ef...	id:f41ad696feb20b3fc9538c9c2d5a9405...	start	5 minutes ago	DockerEvent
ed92e1a91a526ffad9214834...	aeedb13ef3ed92e1a91a526ffad9214834...	id:aeedb13ef3ed92e1a91a526ffad92148...	network:connect	5 minutes ago	DockerEvent
20b3fc9538c9c2d5a9405ef...	f41ad696feb20b3fc9538c9c2d5a9405ef...	id:f41ad696feb20b3fc9538c9c2d5a9405...	create	5 minutes ago	DockerEvent
72bb02b62dfd1d5d87fc7ca...	d3343ea2d372bb02b62dfd1d5d87fc7ca...	id:d3343ea2d372bb02b62dfd1d5d87fc7...	start	5 minutes ago	DockerEvent
ed92e1a91a526ffad9214834...	aeedb13ef3ed92e1a91a526ffad9214834...	id:aeedb13ef3ed92e1a91a526ffad92148...	network:connect	5 minutes ago	DockerEvent
72bb02b62dfd1d5d87fc7ca...	d3343ea2d372bb02b62dfd1d5d87fc7ca...	id:d3343ea2d372bb02b62dfd1d5d87fc7...	create	5 minutes ago	DockerEvent
f07610e1092a17912143c6c...	d6cade1f0aff07610e1092a17912143c6c...	id:d6cade1f0aff07610e1092a17912143c...	start	5 minutes ago	DockerEvent
ed92e1a91a526ffad9214834...	aeedb13ef3ed92e1a91a526ffad9214834...	id:aeedb13ef3ed92e1a91a526ffad92148...	network:connect	5 minutes ago	DockerEvent
f07610e1092a17912143c6c...	d6cade1f0aff07610e1092a17912143c6c...	id:d6cade1f0aff07610e1092a17912143c...	create	5 minutes ago	DockerEvent
ed92e1a91a526ffad9214834...	aeedb13ef3ed92e1a91a526ffad9214834...	id:aeedb13ef3ed92e1a91a526ffad92148...	network:disconnect	10 minutes ago	DockerEvent
ea783105aa723e9043f929c4...	c1ea0a3129ea783105aa723e9043f929c4...	id:c1ea0a3129ea783105aa723e9043f929...	die	10 minutes ago	DockerEvent
ed92e1a91a526ffad9214834...	aeedb13ef3ed92e1a91a526ffad9214834...	id:aeedb13ef3ed92e1a91a526ffad92148...	network:disconnect	11 minutes ago	DockerEvent

Insights - API Query

```
# curl -H "Accept: application/json" -H "X-Query-Key: REDACTED" "https://insights-api.newrelic.com/v1/accounts/#####/query?nrql=SELECT%20%2a%20FROM%20DockerEvent%20WHERE%20Status%20%3D%20%27destroy%27%20OR%20Status%20%3D%20%27oom%27%20SINCE%201%20HOUR%20AGO" | jq
{
  "results": [
    {
      "events": [
        {
          "Status": "destroy",
          "severity": 7,
          "hostname": "demo.example.com",
          "payload": "id:347d59b07f105f3...97d93145a27 status:destroy from:f85b5b675a9e time:1465003319",
          "eventVersion": 1,
          "logger": "347d59b07f105f3f9a8057069d4f5e2b444ddeb2829a13fb5a5697d93145a27",
          "eventSource": "DockerEvent",
          "Time": 1465003319,
          "ID": "347d59b07f105f3f9a8057069d4f5e2b444ddeb2829a13fb5a5697d93145a27",
          "From": "f85b5b675a9e",
          "type": "DockerEvent",
          "timestamp": 1465003319436
        }, ...
      ]
    }
  ]
}
```



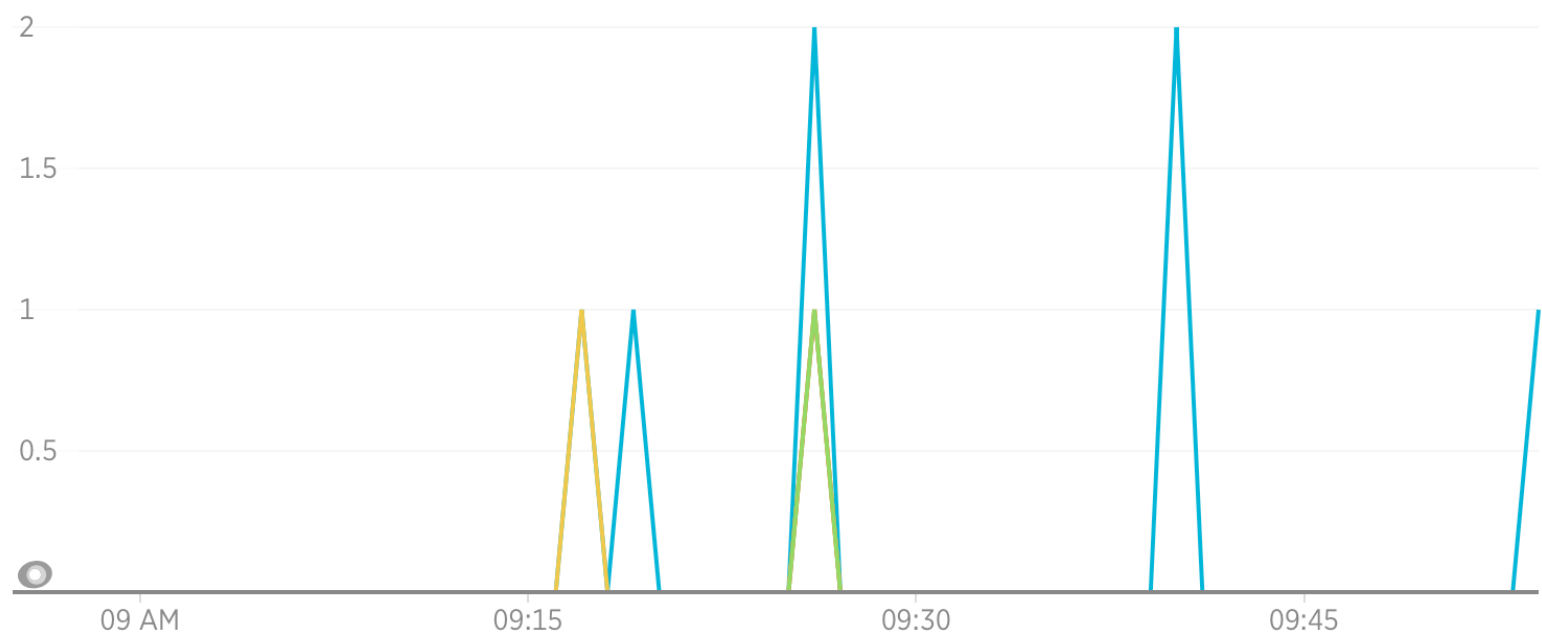
```
NRQL> SELECT count(*) FROM DockerEvent WHERE Status = 'destroy' OR Status = 'oom' SINCE 1 HOUR AGO  
TIMESERIES FACET `From`
```

Run



Embed

Since 1 hour ago



progrium/stress spkane/train-os:latest spkane/phoronix:latest spkane/train-os

Title

Notes

Add to this dash

Add to an Insights o

86 Events Inspected in 3.0 ms

```
NRQL> SELECT uniques(`From`),uniques(ID) FROM DockerEvent WHERE (Status = 'destroy' OR Status = 'oom')
      SINCE 1 HOUR AGO
```

Run

{ }

Embed

Since 1 hour ago

```
{
  "results": [
    {
      "members": [
        "spkane/train-os:latest",
        "spkane/train-os",
        "progrium/stress",
        "spkane/phoronix:latest"
      ]
    },
    {
      "members": [
        "c762314badcd304b58f276967ae296424058cfb1a390af65ca5a3517b25bfd7d",
        "2f45713be58d027352ce17c87f2d011fdbcce7ae7df3c401ac132c094eb4040f",
        "84d6e19b77ffd001717dabe7777a0f2eb50670d4da50dd6722a330b0ba0c3c18",
        "041bd28d6f95604598443a7c06004f61892c3e8635f7110eac43dc5cfef0316f",
        "7a02a1ec5a2f3219a305f31b2d4e335406ffa28933d3097aaae3ed71a25d5841",
        "2e92bd2a1ca938566ec2df3fc3da372cd3bd1ac225e9107a2ae81d238af6c107",

```

Title

Notes

Add to this dash

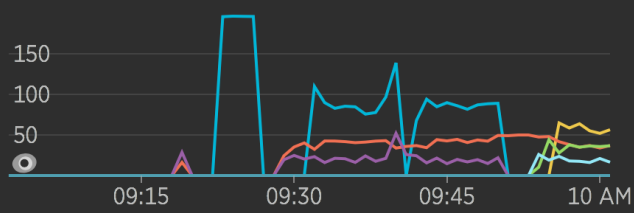
Add to an Insights d

91 Events Inspected in 7.0 ms

Created by _____

Container CPU Total

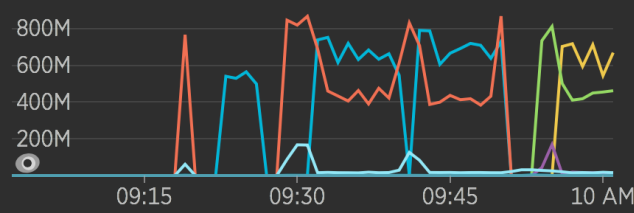
Since 1 hour ago



- stress-2
- stress-3
- chess-2
- chess-3
- io-2
- io-3
- log_errors

Memory Usage

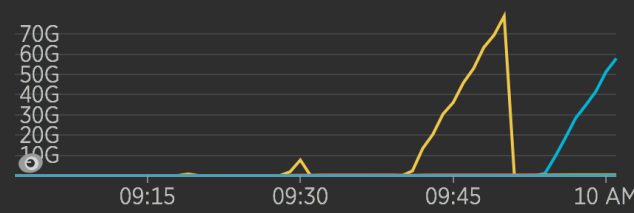
Since 1 hour ago



- stress-2
- stress-3
- io-2
- io-3
- chess-3
- chess-2
- log_errors

Container Block IO Total

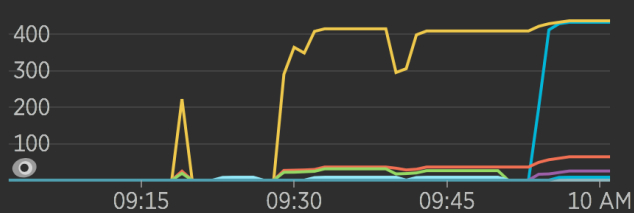
Since 1 hour ago



- io-3
- io-2
- chess-2
- chess-3
- stress-3
- log_errors
- stress-2

Container RX Packets

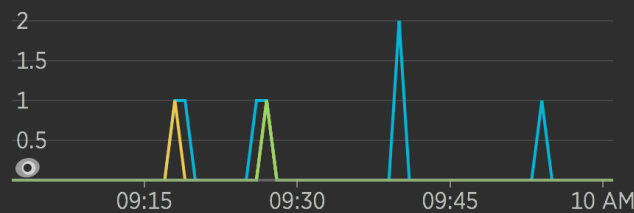
Since 1 hour ago



- chess-3
- chess-2
- log_errors
- io-2
- io-3
- stress-2
- stress-3

Container Destroy/OOM Events

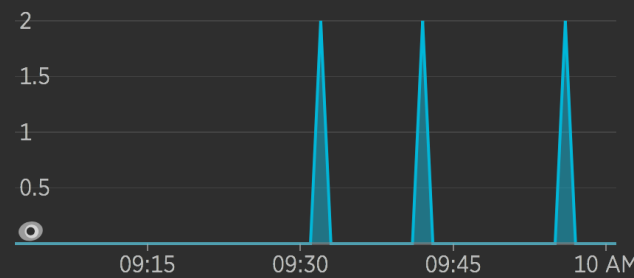
Since 1 hour ago



- progrium/stress
- spkane/train-os:latest
- spkane/phoronix:latest
- spkane/train-os

Container Exec Events

Since 1 hour ago



Container Error Logs

Since 1 hour ago



Daemon Unmount Device Logs

Since 1 hour ago



NRQL QUERY Docker Block Writes High

Last modified 9:38 am Copy Delete On

Enter a NRQL query

```
NRQL> SELECT average(blkio_bytes_write) FROM DockerStats
```

[View timeseries in Insights](#)

> What's possible with NRQL alerting?

Define thresholds

Evaluate query data from 3 mins ago ?

If the query returns a value above

7700 for at least 1 min

6600 for at least 2 mins Remove

Runbook URL

<https://www.kernel.org/doc/Documentation/> Remove

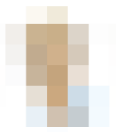
Cancel

Save condition

Closed 9m 0 / 1 0 / 0 1
 STATUS DURATION CRITICAL WARNING INVOLVED

docker
 ALERT POLICY

acknowledged on 10:14 am
 29m after incident opened



Violations

Event log

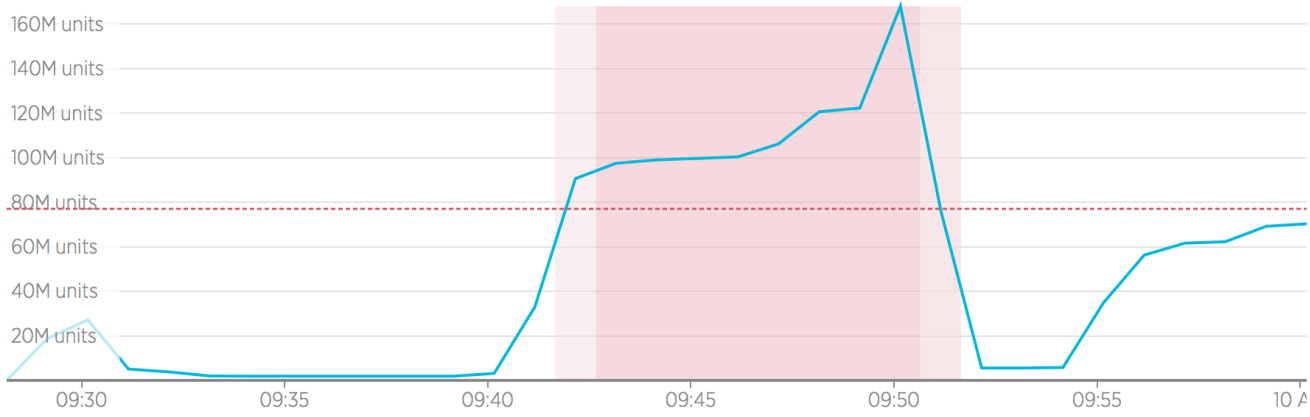
Violation	Opened	Closed
CRITICAL DockerStats query result is > 77000000 for 1 minutes Docker Block Writes High	9:42 am	9:50 am

DockerStats query result is > 77000000 for 1 minutes in **Docker Block Writes High**

9:42 am 9:50 am 8m **CRITICAL**
 OPENED CLOSED DURATION SEVERITY

`SELECT average(blkio_bytes_write) FROM DockerStats SINCE 3 minutes ago UNTIL 2 minutes ago`
 NRQL query

[Go to 'DockerStats query' overview](#)



[Open runbook](#) [Edit alert condition](#)

new messages



New Relic BOT 9:44 AM

docker (DockerStats query violated Docker Block Writes High)

Incident #3 open

Policy: [docker](#)

Violation: 'DockerStats query result is > 77000000 for 1 minutes' was violated by [DockerStats query](#)



New Relic BOT 9:53 AM

docker (DockerStats query violated Docker Block Writes High)

Incident #3 closed

Overview

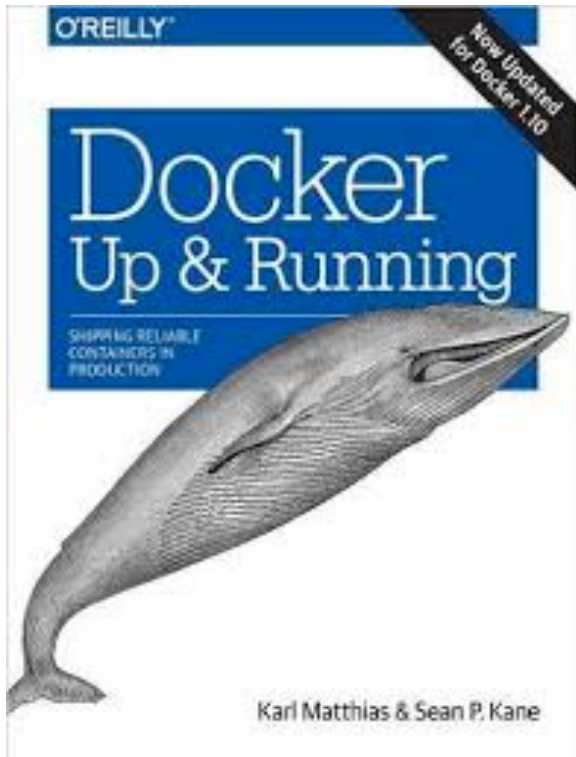
- Docker Endpoints
- Heka
 - <https://github.com/mozilla-services/heka>
- TOML - Tom's Obvious, Minimal Language
 - <https://github.com/toml-lang/toml>
- New Relic Insights
 - <https://newrelic.com/insights>
- New Relic Alerting
 - <https://blog.newrelic.com/2015/05/06/new-relic-alerts/>

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<https://newrelic.com/>

More about Docker



Book: <http://shop.oreilly.com/product/0636920036142.do>

Docker: Up and Running - Online Course
June 28 & 29, 2016

Class: <http://www.oreilly.com/online-training/docker-up-and-running.html>

Thank you!

Any Questions?

