Here are my answers to the hiring exercice:

1- Setting Up the environment:

- Create a Vagrantfile to start a VM machine with Ubuntu 16.0.4

```
Vagrant.configure("2") do |config|
  config.vm.box = "ubuntu/xenial64"
end
```

(Check the file in the attached documents: Scripts/Vagrantfile)

* Start the machine

```
vagrant up
```

* Access the machine

```
vagrant ssh
```

--> Logs:

```
PS C:\Users\A\Documents\Documents\partage> vagrant status
Current machine states:

default                  poweroff (virtualbox)

The VM is powered off. To restart the VM, simply run `vagrant up`
PS C:\Users\A\Documents\Documents\partage> vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Checking if box 'ubuntu/xenial64' is up to date...
==> default: There was a problem while downloading the metadata for your box
==> default: to check for updates. This is not an error, since it is usually due
==> default: to temporary network problems. This is just a warning. The problem
==> default: encountered was:
==> default:
==> default: Could not resolve host: vagrantcloud.com
==> default:
==> default: If you want to check for box updates, verify your network connection
==> default: is valid and try again.
==> default: Clearing any previously set forwarded ports...
==> default: Clearing any previously set network interfaces...
```

```
==> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
==> default: Forwarding ports...
    default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Running 'pre-boot' VM customizations...
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
    default: SSH auth method: private key
    default: Warning: Connection reset. Retrying...
    default: Warning: Connection aborted. Retrying...
    default: Warning: Connection reset. Retrying...
    default: Warning: Connection aborted. Retrying...
    default: Warning: Connection reset. Retrying...
    default: Warning: Connection aborted. Retrying...
    default: Warning: Connection reset. Retrying...
    default: Warning: Connection aborted. Retrying...
    default: Warning: Remote connection disconnect. Retrying...
    default: Warning: Connection aborted. Retrying...
    default: Warning: Connection reset. Retrying...
    default: Warning: Connection aborted. Retrying...
==> default: Machine booted and ready!
==> default: Checking for guest additions in VM...
    default: The guest additions on this VM do not match the installed version of
    default: VirtualBox! In most cases this is fine, but in rare cases it can
    default: prevent things such as shared folders from working properly. If you see
    default: shared folder errors, please make sure the guest additions within the
    default: virtual machine match the version of VirtualBox you have installed on
    default: your host and reload your VM.
    default:
    default: Guest Additions Version: 5.1.38
    default: VirtualBox Version: 5.2
==> default: Mounting shared folders...
    default: /vagrant => C:/Users/A/Documents/Documents/partage
==> default: Machine already provisioned. Run `vagrant provision` or use the `--provision`
==> default: flag to force provisioning. Provisioners marked to run always will still run.
PS C:\Users\A\Documents\Documents\partage> vagrant ssh
Welcome to Ubuntu 16.04.5 LTS (GNU/Linux 4.4.0-131-generic x86_64)


 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

 Get cloud support with Ubuntu Advantage Cloud Guest:
```

```
    http://www.ubuntu.com/business/services/cloud

2 packages can be updated.
0 updates are security updates.



Last login: Sun Aug  5 21:23:33 2018 from 10.0.2.2
```

- Installing agent

--> Logs

```
vagrant@ubuntu-xenial:/etc/datadog-agent/APM$
DD_API_KEY=e527bbb476b605db8ad1044e94ce2b3a bash -c "$(curl -L
https://raw.githubusercontent.com/DataDog/datadog-agent/master/cmd/agent/install_script
.sh)"
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 10323  100 10323    0     0  10364      0 --:--:-- --:--:-- --:--:-- 10364
tee: ddagent-install.log: Permission denied
```

- Installing apt-transport-https

--> Logs

```
Hit:1 http://archive.ubuntu.com/ubuntu xenial InRelease
Get:2 http://security.ubuntu.com/ubuntu xenial-security InRelease [107 kB]
Get:3 http://archive.ubuntu.com/ubuntu xenial-updates InRelease [109 kB]
Get:4 http://archive.ubuntu.com/ubuntu xenial-backports InRelease [107 kB]
Ign:5 https://apt.datadoghq.com stable InRelease
Hit:6 https://apt.datadoghq.com stable Release
Get:7 http://archive.ubuntu.com/ubuntu xenial-updates/main Sources [318 kB]
Get:8 http://security.ubuntu.com/ubuntu xenial-security/main Sources [131 kB]
Get:9 http://archive.ubuntu.com/ubuntu xenial-updates/universe Sources [217 kB]
Get:10 http://security.ubuntu.com/ubuntu xenial-security/universe Sources [69.5 kB]
Get:12 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [533 kB]
Get:13 http://archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [824 kB]
Get:14 http://security.ubuntu.com/ubuntu xenial-security/main Translation-en [228 kB]
Get:15 http://archive.ubuntu.com/ubuntu xenial-updates/main Translation-en [339 kB]
Get:16 http://archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [676
kB]
Get:17 http://archive.ubuntu.com/ubuntu xenial-updates/universe Translation-en [273 kB]
Get:18 http://archive.ubuntu.com/ubuntu xenial-backports/main Sources [4,488 B]
```

```
Get:19 http://archive.ubuntu.com/ubuntu xenial-backports/main amd64 Packages [6,756
B]
Get:20 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [363
kB]
Get:21 http://security.ubuntu.com/ubuntu xenial-security/universe Translation-en [136 kB]
Fetched 4,442 kB in 3s (1,307 kB/s)
Reading package lists...
Reading package lists...
Building dependency tree...
Reading state information...
apt-transport-https is already the newest version (1.2.27).
0 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
Reading package lists...
Building dependency tree...
Reading state information...
dirmngr is already the newest version (2.1.11-6ubuntu2.1).
0 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
```

- Installing APT package sources for Datadog

--> Logs:

```
Executing: /tmp/tmp.knDSx8oyI0/gpg.1.sh --recv-keys
--keyserver
hkp://keyserver.ubuntu.com:80
382E94DE
gpg: requesting key 382E94DE from hkp server keyserver.ubuntu.com
gpg: key 382E94DE: "Datadog, Inc <package@datadoghq.com>" not changed
gpg: Total number processed: 1
gpg:              unchanged: 1
```

- Installing the Datadog Agent package

```
Ign:1 https://apt.datadoghq.com stable InRelease
Hit:2 https://apt.datadoghq.com stable Release
Reading package lists...
Reading package lists...
Building dependency tree...
Reading state information...
datadog-agent is already the newest version (1:6.4.1-1).
0 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.


* Keeping old datadog.yaml configuration file
```

```
* Starting the Agent…
Your Agent is running and functioning properly. It will continue to run in the
background and submit metrics to Datadog.

If you ever want to stop the Agent, run:

    sudo systemctl stop datadog-agent

And to run it again run:

    sudo systemctl start datadog-agent
```

Hosts MAP Link:
https://app.datadoghq.com/infrastructure/map?fillby=avg%3Acpuutilization&sizeby=avg%3A
nometric&groupby=availability-zone&nameby=name&nometrichosts=false&tvMode=false&n
ogrouphosts=true&palette=green_to_orange&paletteflip=false&node_type=host

2- Collecting Metrics

Requirement:
* Add tags in the Agent config file and show us a screenshot of your host and its tags on
the Host Map page in Datadog.
* Install a database on your machine (MongoDB, MySQL, or PostgreSQL) and then install
the respective Datadog integration for that database.
* Create a custom Agent check that submits a metric named my_metric with a random
value between 0 and 1000.
* Change your check's collection interval so that it only submits the metric once every 45
seconds.
* **Bonus Question** Can you change the collection interval without modifying the Python
check file you created?

● Adding tags in the agent file:

in /etc/datadog/datadog.yaml, add the follwing lines:

tags:
  - env:prod
  - host:ubuntu
  - name:precise64

(check the config file in the attached documents Scripts/datadogyaml)

Check screenshot of the added tags on Host monitor (Screenshots/adding_tags.png, Screenshots/hostmap_tags.png).

Host Map tags link:
https://app.datadoghq.com/infrastructure/map?host=543861600&fillby=avg%3Acpuutilization&sizeby=avg%3Anometric&groupby=availability-zone&nameby=name&nometrichosts=false&tvMode=false&nogrouphosts=true&palette=green_to_orange&paletteflip=false&node_type=host

- Installing a database:

Mysql is included in the datadog package as per the documentation
https://docs.datadoghq.com/integrations/mysql/

- Setting mysql:

--> Logs:

```
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ vi conf.yaml.example
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ ll
total 16
drwxr-xr-x  2 dd-agent dd-agent 4096 Aug  6 21:06 ./
drwxr-xr-x 97 dd-agent dd-agent 4096 Aug  5 21:31 ../
-rw-r--r--  1 dd-agent dd-agent 5000 Aug  1 20:29 conf.yaml.example
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ sudo cp conf.yaml.example conf.yaml
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ chmod 755 conf.yaml
chmod: changing permissions of 'conf.yaml': Operation not permitted
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ sudo chmod 755 conf.yaml
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ sudo vi conf.yaml
```

- Installing mysql server on the same machine

--> Logs:

vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ sudo apt-get update
Hit:1 http://security.ubuntu.com/ubuntu xenial-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu xenial InRelease
Hit:3 http://archive.ubuntu.com/ubuntu xenial-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu xenial-backports InRelease
Ign:5 https://apt.datadoghq.com stable InRelease
Hit:6 https://apt.datadoghq.com stable Release
Reading package lists... Done
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ sudo apt-get install
mysql-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libaio1 libcgi-fast-perl libcgi-pm-perl libencode-locale-perl libevent-core-2.0-5 libfcgi-perl
libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl libhttp-date-perl
libhttp-message-perl libio-html-perl
  liblwp-mediatypes-perl libtimedate-perl liburi-perl mysql-client-5.7 mysql-client-core-5.7
mysql-common mysql-server-5.7 mysql-server-core-5.7
Suggested packages:
  libdata-dump-perl libipc-sharedcache-perl libwww-perl mailx tinyca
The following NEW packages will be installed:
  libaio1 libcgi-fast-perl libcgi-pm-perl libencode-locale-perl libevent-core-2.0-5 libfcgi-perl
libhtml-parser-perl libhtml-tagset-perl libhtml-template-perl libhttp-date-perl
libhttp-message-perl libio-html-perl
  liblwp-mediatypes-perl libtimedate-perl liburi-perl mysql-client-5.7 mysql-client-core-5.7
mysql-common mysql-server mysql-server-5.7 mysql-server-core-5.7
0 upgraded, 21 newly installed, 0 to remove and 2 not upgraded.
Need to get 19.4 MB of archives.
After this operation, 162 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y

- Setting the datadog-Mysql integration

--> Logs:

vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ sudo mysql -u root
--password=Kenza1608
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 5.7.23-0ubuntu0.16.04.1 (Ubuntu)

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

```
mysql> CREATE USER 'datadog'@'localhost' IDENTIFIED BY 'Hello00';
ERROR 1819 (HY000): Your password does not satisfy the current policy requirements
mysql> CREATE USER 'datadog'@'localhost' IDENTIFIED BY 'Hello1234';
Query OK, 0 rows affected (0.00 sec)

vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ mysql -u datadog
--password="Hello1234" -e "show status" | \
> grep Uptime && echo -e "\033[0;32mMySQL user - OK\033[0m" || \
> echo -e "\033[0;31mCannot connect to MySQL\033[0m";
mysql: [Warning] Using a password on the command line interface can be insecure.
Uptime  714
Uptime_since_flush_status      714
MySQL user - OK
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ mysql -u datadog
--password="Hello1234" -e "show slave status" && \
> echo -e "\033[0;32mMySQL grant - OK\033[0m" || \
> echo -e "\033[0;31mMissing REPLICATION CLIENT grant\033[0m"
mysql: [Warning] Using a password on the command line interface can be insecure.
ERROR 1227 (42000) at line 1: Access denied; you need (at least one of) the SUPER,
REPLICATION CLIENT privilege(s) for this operation
Missing REPLICATION CLIENT grant
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ sudo mysql -u datadog
--password="Hello1234" -e "show slave status" && echo -e "\033[0;32mMySQL grant -
OK\033[0m" || echo -e "\033[0;31mMissing REPLICATION CLIENT grant\033[0m"
mysql: [Warning] Using a password on the command line interface can be insecure.
ERROR 1227 (42000) at line 1: Access denied; you need (at least one of) the SUPER,
REPLICATION CLIENT privilege(s) for this operation
Missing REPLICATION CLIENT grant
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ sudo mysql -u root
--password=Kenza1608
mysql: [Warning] Using a password on the command line interface can be insecure.
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 13
Server version: 5.7.23-0ubuntu0.16.04.1 (Ubuntu)
```

```
Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> GRANT REPLICATION CLIENT ON *.* TO 'datadog'@'localhost' WITH
MAX_USER_CONNECTIONS 5;
Query OK, 0 rows affected, 1 warning (0.00 sec)

mysql> GRANT PROCESS ON *.* TO 'datadog'@'localhost';
Query OK, 0 rows affected (0.00 sec)

mysql> show databases like 'performance_schema';
+------------------------------+
| Database (performance_schema) |
+------------------------------+
| performance_schema           |
+------------------------------+
1 row in set (0.00 sec)

mysql> GRANT SELECT ON performance_schema.* TO 'datadog'@'localhost';
Query OK, 0 rows affected (0.00 sec)

mysql>
```

- Updating mysql config file:

init_config:
This is how is written the conf.yaml file in /etc/datadog/check.d/mysql.d

```
instances:
   # NOTE: Even if the server name is "localhost", the agent will connect to MySQL using
TCP/IP, unless you also
   # provide a value for the sock key (below).
 - server: 127.0.0.1
   user: datadog
   pass: Hello1234
   port: 3306          # Optional
   # sock: /path/to/sock    # Connect via Unix Socket
   # defaults_file: my.cnf  # Alternate configuration mechanism
   # connect_timeout: None  # Optional integer seconds
   # tags:              # Optional
```

```
    #   - optional_tag1
    #   - optional_tag2
     options:            # Optional
       replication: 0
    #   replication_channel: channel_1  # If using multiple sources, the channel name to
monitor
    #   replication_non_blocking_status: false  # grab slave count in non-blocking manner
(req. performance_schema)
       galera_cluster: 1
       extra_status_metrics: true
       extra_innodb_metrics: true
       extra_performance_metrics: true
       schema_size_metrics: false
       disable_innodb_metrics: false
```

The file can be found within the attached documents (Scripts/conf.yaml).

- Update my.cnf

--> Logs:

```
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$ cat /etc/mysql/my.cnf
#
# The MySQL database server configuration file.
#
# You can copy this to one of:
# - "/etc/mysql/my.cnf" to set global options,
# - "~/.my.cnf" to set user-specific options.
#
# One can use all long options that the program supports.
# Run program with --help to get a list of available options and with
# --print-defaults to see which it would actually understand and use.
#
# For explanations see
# http://dev.mysql.com/doc/mysql/en/server-system-variables.html


#
# * IMPORTANT: Additional settings that can override those from this file!
#   The files must end with '.cnf', otherwise they'll be ignored.
#

!includedir /etc/mysql/conf.d/
!includedir /etc/mysql/mysql.conf.d/

[mysqld_safe]
```

```
log_error=/var/log/mysql/mysql_error.log
[mysqld]
general_log = on
general_log_file = /var/log/mysql/mysql.log
log_error=/var/log/mysql/mysql_error.log
slow_query_log = on
slow_query_log_file = /var/log/mysql/mysql-slow.log
long_query_time = 2
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d/mysql.d$
```

The file can be found within the attached documents. (Scripts/my.cnf)

-    enabling mysql logs in datadog conf file:

--> Logs:

```
# - type : (mandatory) type of log input source (tcp / udp / file)
  #   port / path : (mandatory) Set port if type is tcp or udp. Set path if type is file
  #   service : (mandatory) name of the service owning the log
  #   source : (mandatory) attribute that defines which integration is sending the logs
  #   sourcecategory : (optional) Multiple value attribute. Can be used to refine the source
attribtue
  #   tags: (optional) add tags to each logs collected


  - type: file
    path: /var/log/mysql/mysql_error.log
    source: mysql
    sourcecategory: database
    service: myapplication

  - type: file
    path: /var/log/mysql/mysql-slow.log
    source: mysql
    sourcecategory: database
    service: myapplication

  - type: file
    path: /var/log/mysql/mysql.log
    source: mysql
    sourcecategory: database
    service: myapplication
```

Agent restart was done after each change

- Creating custom metric

In order to create a new metric, two files needs to be created:
- /etc/datadog-agent/conf.d/my_metric.yaml (Scripts/my_metric.yaml)

```
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d$ cat my_metric.yaml
init_config:

instances:
 - min_collection_interval: 45
vagrant@ubuntu-xenial:/etc/datadog-agent/conf.d$
```

- Run check every 45s

min_collection_interval: 45 was added to enable the check every 45s

- /etc/datadog-agent/check.d/my_metric.py (Scripts/my_metric.py)

```
vagrant@ubuntu-xenial:/etc/datadog-agent/checks.d$ cat my_metric.py
from checks import AgentCheck
import random

class my_check(AgentCheck):
    def check(self, instance):
        self.gauge('my_metric',random.randint(0,1000))
vagrant@ubuntu-xenial:/etc/datadog-agent/checks.d$
```

and then then restart agent.
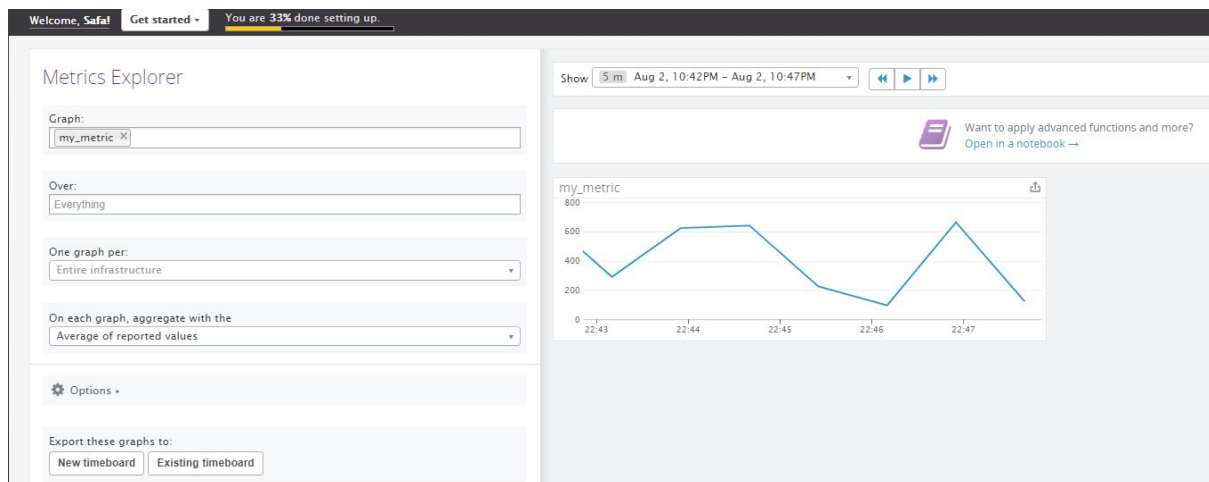
BONUS QUESTION:
The change of the check interval is done on the config file, thus, no need to modify the python script.

Check the attached screenshot for the my_metric graph.
(Screenshots/my_metric_interval_45.png, Screenshots/last_5_min.png)
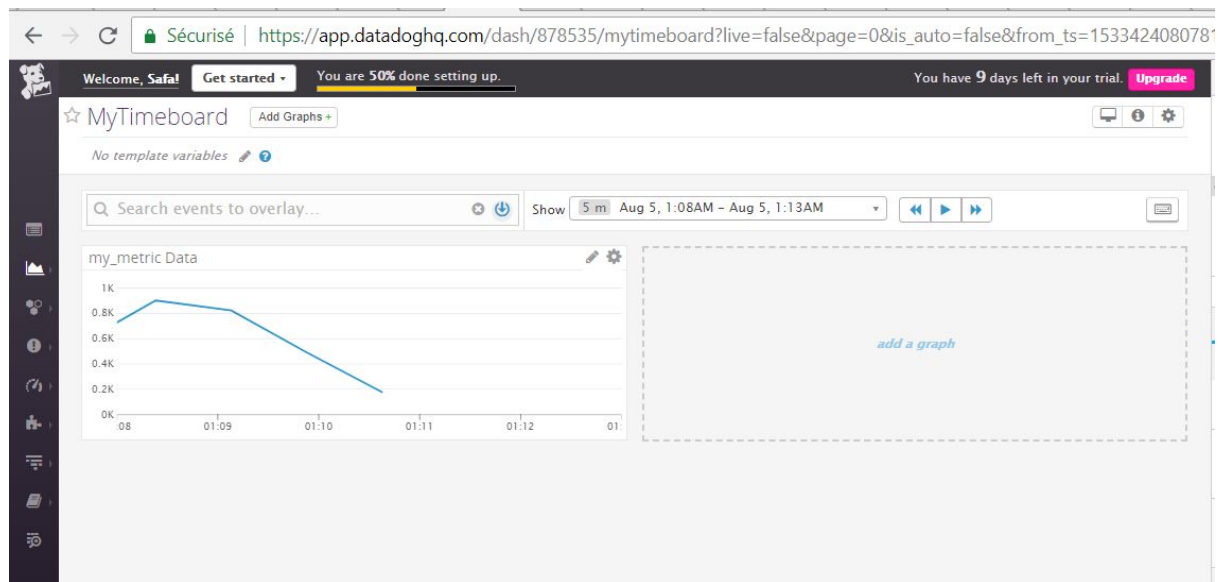
3- Visualizing data

Requirement:

Utilize the Datadog API to create a Timeboard that contains:

* Your custom metric scoped over your host.
* Any metric from the Integration on your Database with the anomaly function applied.
* Your custom metric with the rollup function applied to sum up all the points for the past hour into one bucket

Please be sure, when submitting your hiring challenge, to include the script that you've used to create this Timeboard.

Once this is created, access the Dashboard from your Dashboard List in the UI:

* Set the Timeboard's timeframe to the past 5 minutes
* Take a snapshot of this graph and use the @ notation to send it to yourself.
* **Bonus Question**: What is the Anomaly graph displaying?

● Script used to create the timeboard:

First step is setting the api_key and app_key

vagrant@ubuntu-xenial:/etc/datadog-agent$ export
app_key=bdfabec3f3baa57a44f6514d1d302fa3bed5e69a
vagrant@ubuntu-xenial:/etc/datadog-agent$ export
api_key=e527bbb476b605db8ad1044e94ce2b3a

```
vagrant@ubuntu-xenial:/etc/datadog-agent$ echo $app_key
bdfabec3f3baa57a44f6514d1d302fa3bed5e69a
vagrant@ubuntu-xenial:/etc/datadog-agent$ echo $api_key
e527bbb476b605db8ad1044e94ce2b3a
vagrant@ubuntu-xenial:/etc/datadog-agent$
```

The insertion of the anomalies graph did not work:

```
vagrant@ubuntu-xenial:/etc/datadog-agent$ curl  -X POST -H "Content-type:
application/json" -d '{
  "title" : "MyMetric Dashboard",
  "description" : "A dashboard created with API.",
  "viz": "timeseries",
  "status": "done",
  "graphs": [{
      "title": "MyMetric Timeboard",
      "definition": {
      "events": [],
      "requests": [
      {
          "q": "avg:my_metric{*}",
          "type": "line",
          "style": {
              "palette": "dog_classic",
              "type": "solid",
              "width": "normal"
              },
          "conditional_formats": [],
          "aggregator": "avg"
      },
      {
      "q": "anomalies(avg:mysql.performance.cpu_time{*}, 'basic', 2)",
      "type": "line",
      "style": {
          "palette": "dog_classic",
          "type": "solid",
          "width": "normal"
          }
      },
      {
      "q": "avg:my_metric{*}.rollup(sum, 3600)",
      "type": "line",
      "style": {
          "palette": "dog_classic",
          "type": "solid",
```

```
                "width": "normal"
            }
        }
        ]
    }
}],
    "autoscale": true
}'
"https://api.datadoghq.com/api/v1/dash?api_key=${api_key}&application_key=${app_key}"
{"errors": ["Error parsing query: unable to parse
anomalies(avg:mysql.performance.cpu_time{*}, basic, 2): Rule 'scope_expr' didn't match
at ', 2)' (line 1, column 51)."]}vagrant@ubuntu-xenial:/etc/datadog-agent$
```

The other graphs were created:

```
vagrant@ubuntu-xenial:/etc/datadog-agent$ curl  -X POST -H "Content-type:
application/json" -d '{
  "title" : "MyMetric Dashboard",
  "description" : "A dashboard created with API.",
  "viz": "timeseries",
  "status": "done",
  "graphs": [{
        "title": "MyMetric Timeboard",
        "definition": {
        "events": [],
        "requests": [
        {
            "q": "avg:my_metric{*}",
            "type": "line",
            "style": {
                "palette": "dog_classic",
                "type": "solid",
                "width": "normal"
                },
            "conditional_formats": [],
            "aggregator": "avg"
        },
        {
        "q": "avg:my_metric{*}.rollup(sum, 3600)",
        "type": "line",
        "style": {
                "palette": "dog_classic",
                "type": "solid",
                "width": "normal"
```

```
            }
        }
        ]
    }
}],
  "autoscale": true
}'
"https://api.datadoghq.com/api/v1/dash?api_key=${api_key}&application_key=${app_key}"
{"dash":{"read_only":false,"graphs":[{"definition":{"requests":[{"q":"avg:my_metric{*}","aggre
gator":"avg","style":{"width":"normal","palette":"dog_classic","type":"solid"},"type":"line","co
nditional_formats":[]},{"q":"avg:my_metric{*}.rollup(sum,
3600)","style":{"width":"normal","palette":"dog_classic","type":"solid"},"type":"line"}],"events
":[]},"title":"MyMetric Timeboard"}],"description":"A dashboard created with
API.","title":"MyMetric
Dashboard","created":"2018-08-22T20:52:15.892313+00:00","id":895669,"created_by":{"di
sabled":false,"handle":"safa.el.kafsi@gmail.com","name":"Safa
Gafsi","is_admin":true,"role":null,"access_role":"adm","verified":true,"email":"safa.el.kafsi@
gmail.com","icon":"https://secure.gravatar.com/avatar/45be402fe79dc57b1ddaa5fc8651dc
b0?s=48&d=retro"},"modified":"2018-08-22T20:52:15.906881+00:00"},"url":"/dash/895669/
mymetric-dashboard","resource":"/api/v1/dash/895669"}vagrant@ubuntu-xenial:/etc/datad
og-agent$
```

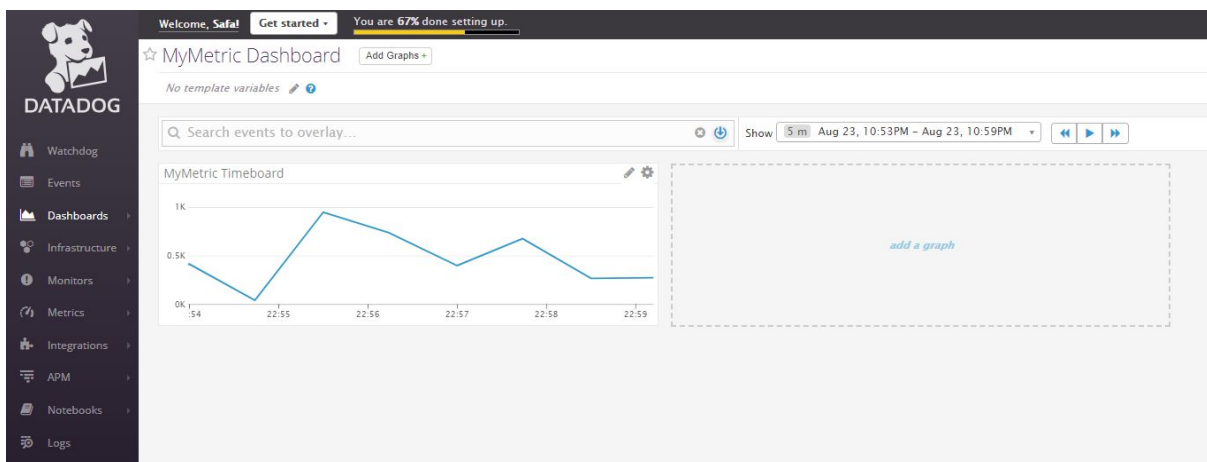The timeboard was created on front-end:
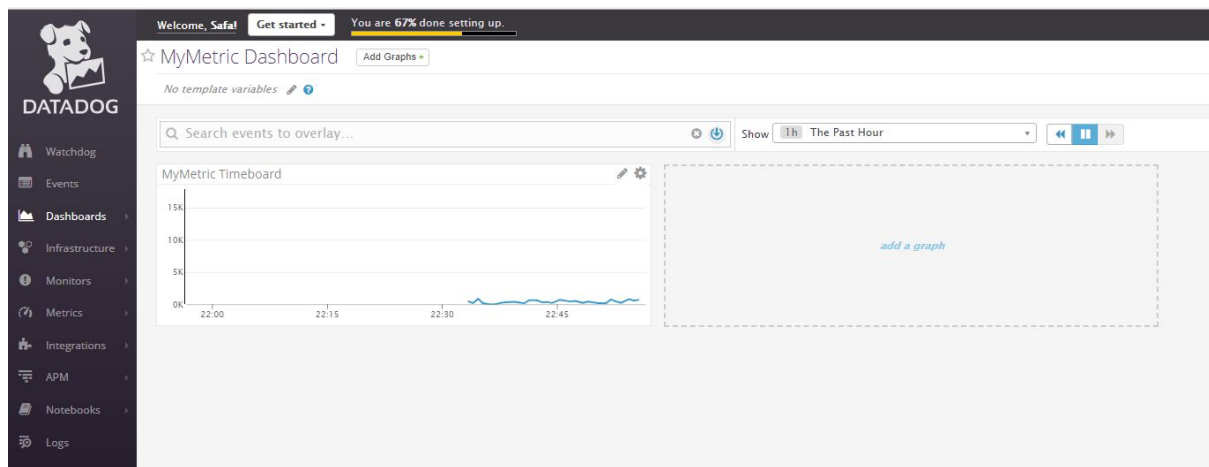
This is the timeboard grouping the three graphs:
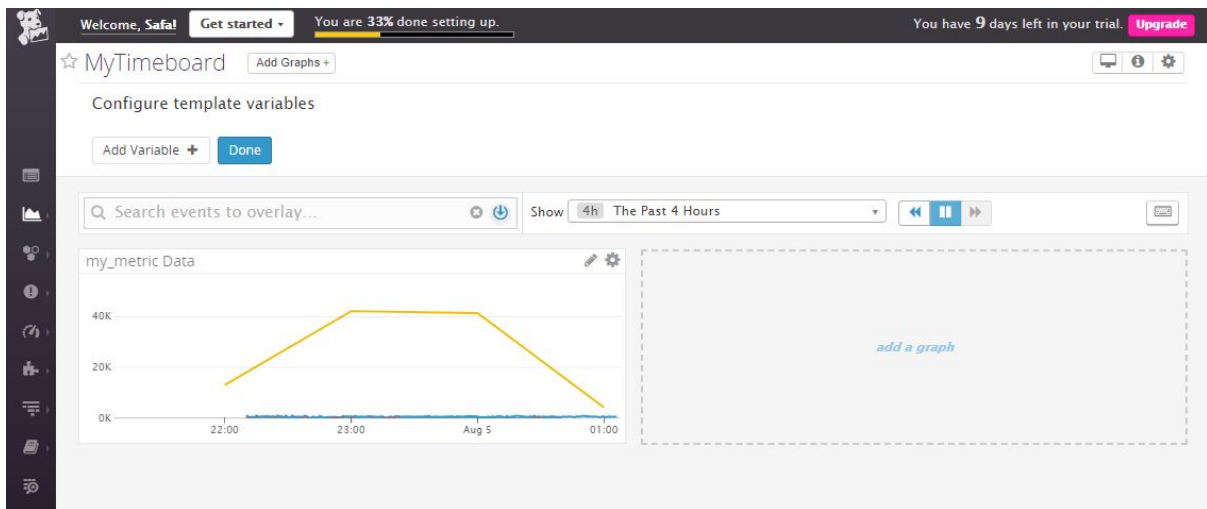
- Setting the Timeboard's timeframe to the past 5 minutes

- Taking a snapshot of the graph and sending it to myself

Timeboard link:
https://app.datadoghq.com/dash/878535/mytimeboard?live=true&page=0&is_auto=false&from_ts=1533662828984&to_ts=1533677228984&tile_size=m

BONUS QUESTION:
--> The anomaly graph is displaying the expected behavior of the metric based on its past collected values.

4- Monitoring Data

Requirement:

Since you've already caught your test metric going above 800 once, you don't want to have to continually watch this dashboard to be alerted when it goes above 800 again. So let's make life easier by creating a monitor.

Create a new Metric Monitor that watches the average of your custom metric (my_metric) and will alert if it's above the following values over the past 5 minutes:

* Warning threshold of 500
* Alerting threshold of 800
* And also ensure that it will notify you if there is No Data for this query over the past 10m.

Please configure the monitor's message so that it will:

* Send you an email whenever the monitor triggers.
* Create different messages based on whether the monitor is in an Alert, Warning, or No Data state.
* Include the metric value that caused the monitor to trigger and host ip when the Monitor triggers an Alert state.
* When this monitor sends you an email notification, take a screenshot of the email that it sends you.

* **Bonus Question**: Since this monitor is going to alert pretty often, you don't want to be alerted when you are out of the office. Set up two scheduled downtimes for this monitor:

  * One that silences it from 7pm to 9am daily on M-F,
  * And one that silences it all day on Sat-Sun.
  * Make sure that your email is notified when you schedule the downtime and take a screenshot of that notification.

● Creating metric monitor

● Alerting message template:

Hello team,

{{#is_alert}}

Please be advised that the average of my_metric value is {{value}}, and is then beyond 800 on {{host.name}} ({{{host.ip}}}). This needs to be investigated as soon as possible.

{{/is_alert}}

{{#is_warning}}

Please be warned that the average of my_metric value is {{value}}, and is then beyond 500 on {{host.name}} ({{host.ip}}) . Please note that this needs to be investigated.

{{/is_warning}}
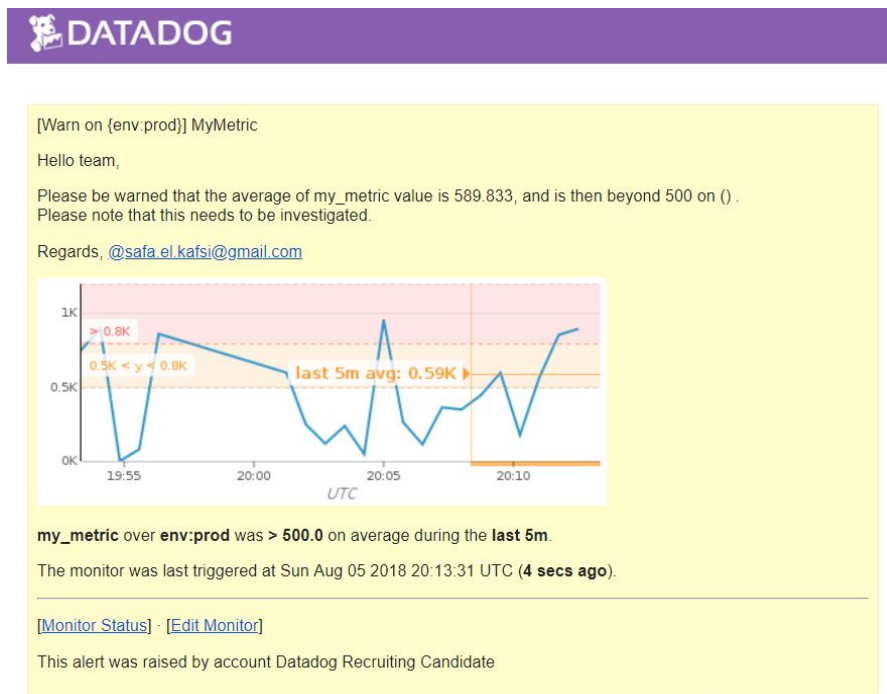
{{#is_no_data}}

Please be warned that no data was collected on {{host.name}} ({{host.ip}}), for my_metric the last 10min. Please note that this needs to be investigated.

{{/is_no_data}}

Regards, @safa.el.kafsi@gmail.com

- Mails received (Screenshots/notification_warn)

- Adding maintenance periods:

Maintenance period link: https://app.datadoghq.com/monitors#downtime?id=358240967

Schedule Downtime 🔧

① Choose what to silence

Monitor: MyMetric   × ▾

* ×

❓

② Schedule

[One-Time] [**Recurring**]

Start Date:	2018/08/06 Time Zone: Europe/Paris ▾
Repeat Every:	1 weeks ▾
Repeat On:	☑ Sun ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☑ Sat
Beginning:	00:01
Duration:	1 days ▾
Repeat Until:	No end date ▾
Summary:	From **12:01am** to **12:01am tomorrow** **Weekly** on **Sunday and Saturday**

ⓘ Preview planned recurrences

③ Add a message

👁 Preview   ✏ **Edit**   Markdown supported

Hello,

The MyMetruc monitor will be silenced over the weekend.
It will turned on again on Monday starting 9AM.

Regards, @safa.el.kafsi@gmail.com

④ Notify your team

Safa Gafsi ×

[Cancel] [**Save**]

Schedule Downtime 🔧

1 **Choose what to silence**

Monitor: MyMetric   × ▾

* × |

❓

2 **Schedule**

| One-Time | **Recurring** |

Start Date: 2018/08/06   Time Zone: Europe/Paris ▾

Repeat Every: 1   weeks ▾

Repeat On: ☐ Sun ☑ Mon ☑ Tue ☑ Wed ☑ Thu ☑ Fri ☐ Sat

Beginning: 19:01

Duration: 11   hours ▾

Repeat Until: No end date ▾

Summary: From **7:01pm** to **6:01am tomorrow**
                 Weekly on **Monday, Tuesday, Wednesday, Thursday, and Friday**

ℹ️ Preview planned recurrences

3 **Add a message**

| 👁 Preview | ✏ Edit | Markdown supported |

Hello Team,

The alerts for MyMetric have been silenced for tonight. The metric will be monitored again tomorrow starting 9AM.

Regads, **@safa.el.kafsi@gmail.com**

4 **Notify your team**

Safa Gafsi ×

                                                    Cancel   **Save**

A Datadog event mentioned you:

Scheduled downtime on MyMetric started
Scheduled downtime on MyMetric has started.
Alerting on MyMetric will be silenced until **7:00AM UTC** on **August 8**.
Hello Team,
The alerts for MyMetric have been silenced for tonight.
The metric will be monitored again tomorrow starting 9AM.
Regads, @safa.el.kafsi@gmail.com
07 Aug, 17:00:37 UTC

[Reply on Datadog]

To manage your Datadog subscriptions, click here.

A Datadog event mentioned you:

Scheduled downtime on MyMetric started
Scheduled downtime on MyMetric has started.
Alerting on MyMetric will be silenced until **10:01PM UTC** on **August 6**.
Hello,
The MyMetruc monitor will be silenced over the weekend.
It will turned on again on Monday starting 9AM.
Regards, @safa.el.kafsi@gmail.com
05 Aug, 22:01:15 UTC

[Reply on Datadog]

To manage your Datadog subscriptions, click here.

5- Collecting APM Data

Requirement:

Given the following Flask app (or any Python/Ruby/Go app of your choice) instrument this using Datadog's APM solution:

```python
from flask import Flask
import logging
import sys

# Have flask use stdout as the logger
main_logger = logging.getLogger()
main_logger.setLevel(logging.DEBUG)
c = logging.StreamHandler(sys.stdout)
```

```
formatter = logging.Formatter('%(asctime)s - %(name)s - %(levelname)s - %(message)s')
c.setFormatter(formatter)
main_logger.addHandler(c)

app = Flask(__name__)

@app.route('/')
def api_entry():
    return 'Entrypoint to the Application'

@app.route('/api/apm')
def apm_endpoint():
    return 'Getting APM Started'

@app.route('/api/trace')
def trace_endpoint():
    return 'Posting Traces'

if __name__ == '__main__':
    app.run(host='0.0.0.0', port='5050')
```

* **Note**: Using both ddtrace-run and manually inserting the Middleware has been known to cause issues. Please only use one or the other.

* **Bonus Question**: What is the difference between a Service and a Resource?

Provide a link and a screenshot of a Dashboard with both APM and Infrastructure Metrics.

Please include your fully instrumented app in your submission, as well.

- ● Installing flask and ddtrace:

APM Services link:
https://app.datadoghq.com/apm/service/flask/flask.request?start=1533591120928&end=1533677520928&env=prod&paused=false

--> Logs:

```
root@ubuntu-xenial:~# pip install flask
Collecting flask
  Downloading
https://files.pythonhosted.org/packages/7f/e7/08578774ed4536d3242b14dacb4696386634607af824ea997202cd0edb4b/Flask-1.0.2-py2.py3-none-any.whl (91kB)
    100% |||||||||||||||||||||||||||||||||| 92kB 2.1MB/s
Collecting Jinja2>=2.10 (from flask)
```

```
   Downloading
https://files.pythonhosted.org/packages/7f/ff/ae64bacdfc95f27a016a7bed8e8686763ba4d2
77a78ca76f32659220a731/Jinja2-2.10-py2.py3-none-any.whl (126kB)
    100% |¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦| 133kB 2.2MB/s
Collecting itsdangerous>=0.24 (from flask)
  Downloading
https://files.pythonhosted.org/packages/dc/b4/a60bcdba945c00f6d608d8975131ab3f25b2
2f2bcfe1dab221165194b2d4/itsdangerous-0.24.tar.gz (46kB)
    100% |¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦| 51kB 2.3MB/s
Collecting Werkzeug>=0.14 (from flask)
  Downloading
https://files.pythonhosted.org/packages/20/c4/12e3e56473e52375aa29c4764e70d1b8f3ef
a6682bef8d0aae04fe335243/Werkzeug-0.14.1-py2.py3-none-any.whl (322kB)
    100% |¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦| 327kB 891kB/s
Collecting click>=5.1 (from flask)
  Downloading
https://files.pythonhosted.org/packages/34/c1/8806f99713ddb993c5366c362b2f908f18269
f8d792aff1abfd700775a77/click-6.7-py2.py3-none-any.whl (71kB)
    100% |¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦¦| 71kB 2.0MB/s
Collecting MarkupSafe>=0.23 (from Jinja2>=2.10->flask)
  Downloading
https://files.pythonhosted.org/packages/4d/de/32d741db316d8fdb7680822dd37001ef7a44
8255de9699ab4bfcbdf4172b/MarkupSafe-1.0.tar.gz
Building wheels for collected packages: itsdangerous, MarkupSafe
  Running setup.py bdist_wheel for itsdangerous ... done
  Stored in directory:
/root/.cache/pip/wheels/2c/4a/61/5599631c1554768c6290b08c02c72d7317910374ca602ff
1e5
  Running setup.py bdist_wheel for MarkupSafe ... done
  Stored in directory:
/root/.cache/pip/wheels/33/56/20/ebe49a5c612fffe1c5a632146b16596f9e64676768661e4
e46
Successfully built itsdangerous MarkupSafe
Installing collected packages: MarkupSafe, Jinja2, itsdangerous, Werkzeug, click, flask
Successfully installed Jinja2-2.10 MarkupSafe-1.0 Werkzeug-0.14.1 click-6.7 flask-1.0.2
itsdangerous-0.24
You are using pip version 8.1.1, however version 18.0 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
root@ubuntu-xenial:~# cd /etc/datadog-agent/APM/
root@ubuntu-xenial:/etc/datadog-agent/APM# ddtrace-run python my_app.py
ddtrace-run: command not found
root@ubuntu-xenial:/etc/datadog-agent/APM# pip install ddtrace
Collecting ddtrace
```

```
    Downloading
https://files.pythonhosted.org/packages/9d/48/c59c5fb0df206bcb744ae9ed72d0fc5a523d5
2df18f879a92a24c236cfbb/ddtrace-0.12.1.tar.gz (93kB)
    100% |!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!| 102kB 1.6MB/s
Collecting wrapt (from ddtrace)
    Downloading
https://files.pythonhosted.org/packages/a0/47/66897906448185fcb77fc3c2b1bc20ed0ecc
a81a0f2f88eda3fc5a34fc3d/wrapt-1.10.11.tar.gz
Collecting msgpack-python (from ddtrace)
    Downloading
https://files.pythonhosted.org/packages/8a/20/6eca772d1a5830336f84aca1d8198e5a3f47
15cd1c7fc36d3cc7f7185091/msgpack-python-0.5.6.tar.gz (138kB)
    100% |!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!| 143kB 2.0MB/s
Building wheels for collected packages: ddtrace, wrapt, msgpack-python
  Running setup.py bdist_wheel for ddtrace ... done
  Stored in directory:
/root/.cache/pip/wheels/4b/38/40/1a7038e5586b14716aa16ad635c5eb7e49ca695f0ef2ac
ea6e
  Running setup.py bdist_wheel for wrapt ... done
  Stored in directory:
/root/.cache/pip/wheels/48/5d/04/22361a593e70d23b1f7746d932802efe1f0e523376a74f3
21e
  Running setup.py bdist_wheel for msgpack-python ... done
  Stored in directory:
/root/.cache/pip/wheels/d5/de/86/7fa56fda12511be47ea0808f3502bc879df4e63ab168ec0
406
Successfully built ddtrace wrapt msgpack-python
Installing collected packages: wrapt, msgpack-python, ddtrace
Successfully installed ddtrace-0.12.1 msgpack-python-0.5.6 wrapt-1.10.11
You are using pip version 8.1.1, however version 18.0 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.
```

- Running my_app.py

--> Logs:

```
root@ubuntu-xenial:/etc/datadog-agent/APM# ddtrace-run python my_app.py
DEBUG:ddtrace.contrib.flask.middleware:flask: initializing trace middleware
2018-08-06 22:26:03,036 - ddtrace.contrib.flask.middleware - DEBUG - flask: initializing
trace middleware
DEBUG:ddtrace.writer:resetting queues. pids(old:None new:6181)
2018-08-06 22:26:03,039 - ddtrace.writer - DEBUG - resetting queues. pids(old:None
new:6181)
DEBUG:ddtrace.writer:starting flush thread
```

```
2018-08-06 22:26:03,041 - ddtrace.writer - DEBUG - starting flush thread
DEBUG:ddtrace.contrib.flask.middleware:please install blinker to use flask signals.
http://flask.pocoo.org/docs/0.11/signals/
2018-08-06 22:26:03,042 - ddtrace.contrib.flask.middleware - DEBUG - please install
blinker to use flask signals. http://flask.pocoo.org/docs/0.11/signals/
 * Serving Flask app "my_app" (lazy loading)
 * Environment: production
   WARNING: Do not use the development server in a production environment.
   Use a production WSGI server instead.
 * Debug mode: off
INFO:werkzeug: * Running on http://0.0.0.0:5050/ (Press CTRL+C to quit)
2018-08-06 22:26:03,057 - werkzeug - INFO -  * Running on http://0.0.0.0:5050/ (Press
CTRL+C to quit)
DEBUG:ddtrace.api:reported 1 services
2018-08-06 22:26:04,054 - ddtrace.api - DEBUG - reported 1 services
```

Please check the attached screenshots (Screenshots/apm_enabled.png,
Screenshots/APMvsCPULoad.png)
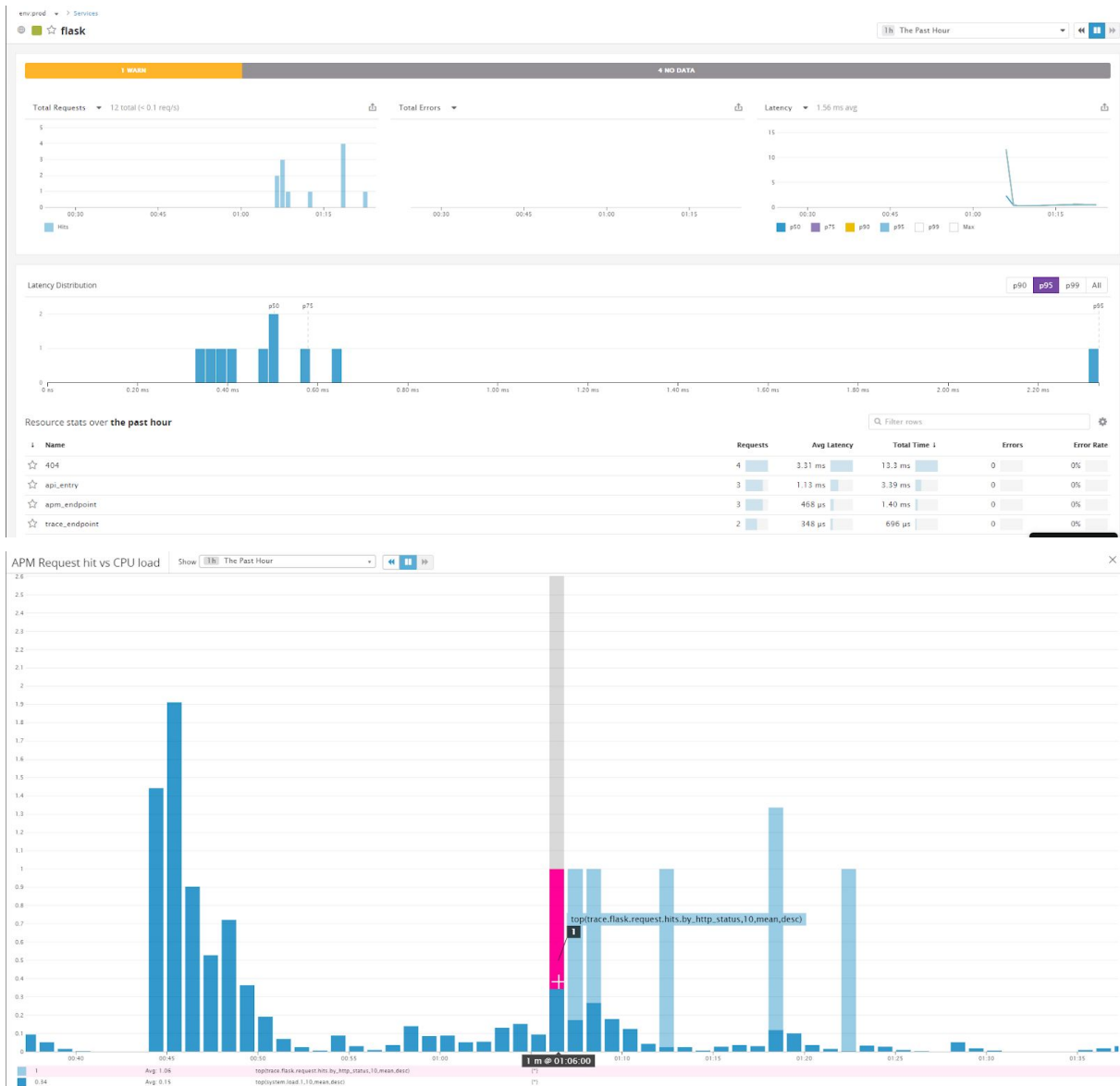
Timeboard System vs APM metrics:
https://app.datadoghq.com/dash/880157/apm-vs-system-timeboard?live=true&page=0&is_auto=false&from_ts=1533673962051&to_ts=1533677562051&tile_size=m

BONUS QUESTION
Service: a process/set of processes that can provide a feature, these are being defined by the user.
Resource: A query to a service to return certain data, we can have multiple resources attached to a service, for multiple type of data requested.

6- Final Question:

It can be used to help blinded people cross streets by monitoring red/green lights in their way.