

การติดตั้งใช้งาน Google Cloud Server :GCP

- 1) สมัครการใช้งาน GCP หรือ Gmail Account

Google

Create your Google Account

First name Last name

Username @gmail.com
You can use letters, numbers & periods
[Use my current email address instead](#)

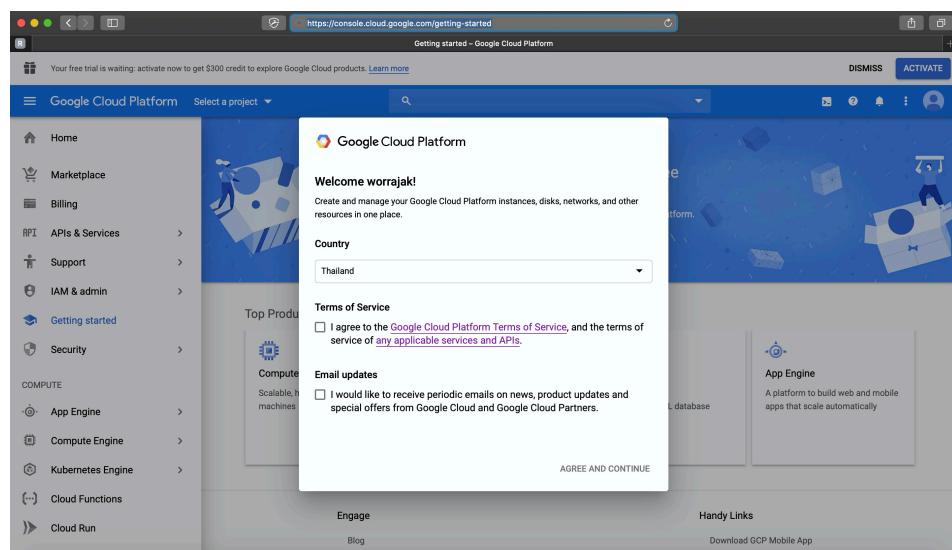
Password Confirm 

Use 8 or more characters with a mix of letters, numbers & symbols

One account. All of Google working for you.

[Sign in instead](#) [Next](#)

- 2) เข้าหน้าเว็บ <https://console.cloud.google.com/getting-started>



Your free trial is waiting: activate now to get \$300 credit to explore Google Cloud products. [Learn more](#)

DISMISS ACTIVATE

Google Cloud Platform Select a project

Home Marketplace Billing APIs & Services Support IAM & admin Getting started Security COMPUTE App Engine Compute Engine Kubernetes Engine Cloud Functions Cloud Run

Top Products Compute Scalable, highly available machines

Welcome worrjak!

Create and manage your Google Cloud Platform instances, disks, networks, and other resources in one place.

Country Thailand

Terms of Service I agree to the [Google Cloud Platform Terms of Service](#), and the terms of service of [any applicable services and APIs](#).

Email updates I would like to receive periodic emails on news, product updates and special offers from Google Cloud and Google Cloud Partners.

AGREE AND CONTINUE

Engage Blog Handy Links Download GCP Mobile App

 Google Cloud Platform

Welcome worrajak!

Create and manage your Google Cloud Platform instances, disks, networks, and other resources in one place.

Country

Thailand

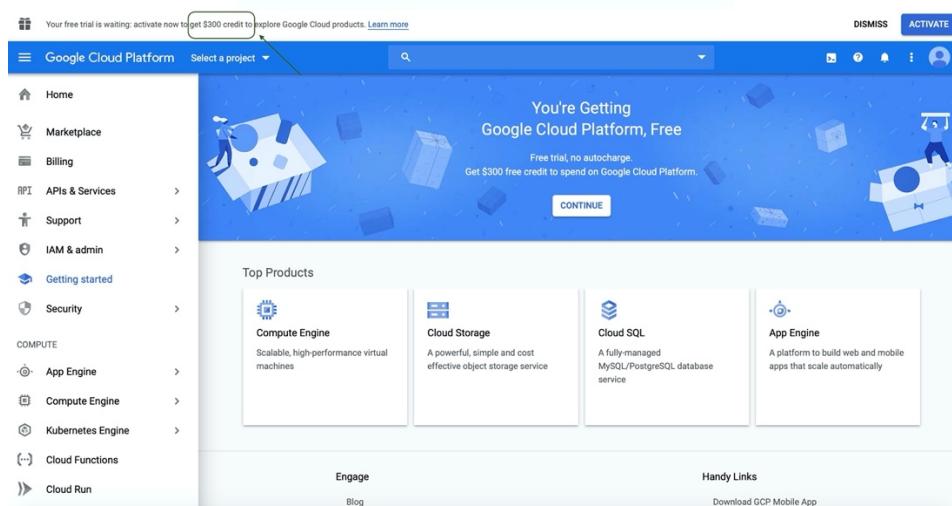
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DISMISS ACTIVATE

Google Cloud Platform Select a project

- Home
- Marketplace
- Billing
- APIs & Services
- Support
- IAM & admin
- Getting started
- Security
- COMPUTE
 - App Engine
 - Compute Engine
 - Kubernetes Engine
 - Cloud Functions
- Cloud Run

You're Getting Google Cloud Platform, Free

Free trial, no autocharge. Get \$300 free credit to spend on Google Cloud Platform.

CONTINUE

Top Products

| | | | |
|---|---|--|--|
|  Compute Engine Scalable, high-performance virtual machines |  Cloud Storage A powerful, simple and cost effective object storage service |  Cloud SQL A fully-managed MySQL/PostgreSQL database service |  App Engine A platform to build web and mobile apps that scale automatically |
|---|---|--|--|

Engage

Handy Links

Download GCP Mobile App

Try Google Cloud Platform for free

Step 1 of 2

Country

Thailand

Terms of Service

I have read and agree to the [Google Cloud Platform Free Trial Terms of Service](#).

Required to continue

[CONTINUE](#)

Access to all Cloud Platform Products

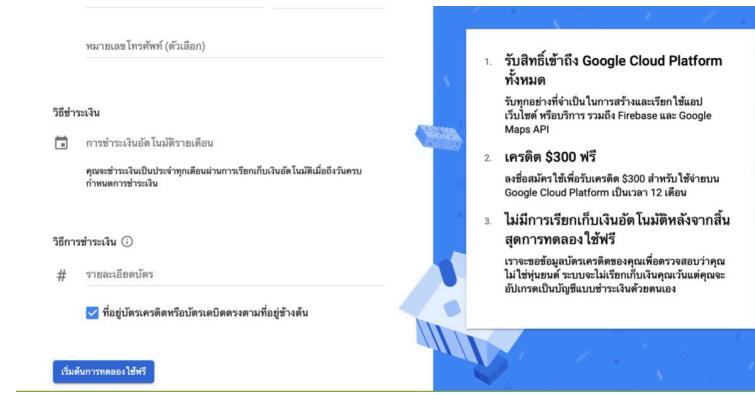
Get everything you need to build and run your apps, websites and services, including Firebase and the Google Maps API.

\$300 credit for free

Sign up and get \$300 to spend on Google Cloud Platform over the next 12 months.

No autocharge after free trial ends

We ask you for your credit card to make sure you are not a robot. You won't be charged unless you manually upgrade to a paid account.



หน้าจอแสดงหน้าหลักของ Google Cloud Platform:

Welcome, worrajak

Get started with Google Cloud Platform

Navigation menu:

- Home
- Marketplace
- Billing
- APIs & Services
- Support
- IAM & admin
- Getting started
- Security
- COMPUTE
- App Engine
- Compute Engine
- Kubernetes Engine
- Cloud Functions
- Cloud Run
- STORAGE

Content area:

Begin with the basics

Get up and running quickly by checking off common tasks

[GO TO CHECKLIST](#)

What's covered

- Reviewing billing, credits, and projects
- Finding products and APIs
- Adding resources to a project
- Understanding and calculating pricing

Top products

VIEW ALL

Compute products

Compute Engine

Other popular compute options

Kubernetes Engine

3) การสร้าง Virtual Machine บน GCP

หน้าจอแสดงหน้าหลักของ Google Cloud Platform:

#1

COMPUTE

App Engine

Compute Engine

Kubernetes Engine

Cloud Functions

Cloud Run

#2

VM instances

Instance groups

Instance templates

Sole-tenant nodes

Disks

Snapshots

Images

TPUs

Committed use discounts

Metadata

Health checks

Zones

Network endpoint groups

Operations

Security scans

Settings

Top products

Google Cloud Platform - My First Project

Compute Engine

- VM instances
- Instance groups
- Instance templates
- Sole-tenant nodes
- Disks
- Snapshots
- Images
- TPUs
- Committed use discounts
- Metadata
- Health checks
- Zones
- Network endpoint groups
- Operations
- Marketplace

VM instances

Create or Import or Take the quickstart

Marketplace

Choose a ready-to-go solution to get started faster.

Simple pre-configured Debian VM
Google Click to Deploy
Deploy your pre-configured virtual machine in just a few clicks

Ubuntu Trusty
Canonical
Ubuntu Trusty Linux (14.04 LTS)

CentOS 7
CentOS
CentOS 7

VIEW ALL (788)

Create an instance

To create a VM instance, select one of the options:

- New VM instance
- New VM instance from template
- Marketplace

Name instance-1

Region asia-east1 (Taiwan)

Zone asia-east1-a

Machine configuration

Machine family General-purpose

Series N1

Machine type g1-small (1 vCPU, 1.7 GB memory)

#1 You have \$9,069.75 free trial credits remaining

\$15.73 monthly estimate
That's about \$0.022 hourly
Pay for what you use: No upfront costs and per second billing

#2

#3

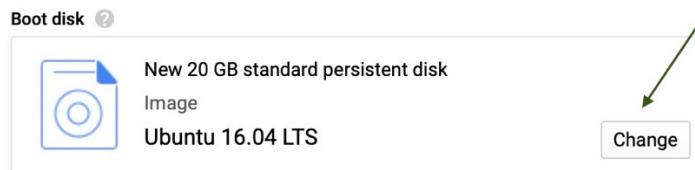
#4

#1-งบประมาณฟรีที่ GCP ให้ทดลองใช้งาน

#2-ตั้งชื่อ instance

#3-ที่อยู่ของ GCP farm

#4-ขนาดคอมพิวเตอร์ที่ต้องการใช้งาน



Boot disk

Select an image or snapshot to create a boot disk; or attach an existing disk

[OS images](#) Application images Custom images Snapshots Existing disks

- x86_64 built on 2019-11-21
 - CentOS 8
x86_64 built on 2019-11-21
 - CoreOS alpha 2345.0.0
amd64-user published on 2019-12-03
 - CoreOS beta 2331.1.0
amd64-user published on 2019-12-03
 - CoreOS stable 2303.3.0
amd64-user published on 2019-12-03
 - Ubuntu 16.04 LTS
amd64 xenial image built on 2019-12-17
 - Ubuntu 18.04 LTS
amd64 bionic image built on 2019-12-11
 - Ubuntu 19.04
amd64 disco image built on 2019-12-17
 - Ubuntu 19.10
amd64 eoan image built on 2019-12-17
 - Ubuntu 16.04 LTS Minimal
amd64 xenial minimal image built on 2019-12-17
 - Ubuntu 18.04 LTS Minimal
amd64 bionic minimal image built on 2019-12-17
 - Ubuntu 19.04 Minimal
amd64 disco minimal image built on 2019-12-17
 - Ubuntu 19.10 Minimal
amd64 eoan minimal image built on 2019-12-16
 - Container-Optimized OS 69-10895.385.0 stable
Kernel: ChromiumOS-4.14.145 Kubernetes: 1.11.8 Docker: 17.03.2 Family: cos-69-lts
 - Container-Optimized OS 73-11647.348.0 stable
Kernel: ChromiumOS-4.14.150 Kubernetes: 1.13.3 Docker: 18.09.7 Family: cos-73-lts
- Can't find what you're looking for? Explore hundreds of VM solutions in [Marketplace](#)

Boot disk type [?](#) Size (GB) [?](#)

Standard persistent disk

[Select](#) [Cancel](#)

Boot disk [?](#)



New 20 GB standard persistent disk
Image
Ubuntu 16.04 LTS

[Change](#)

Identity and API access [?](#)

Service account [?](#)

Compute Engine default service account [▼](#)

Access scopes [?](#)

- Allow default access
- Allow full access to all Cloud APIs
- Set access for each API

Firewall [?](#)

Add tags and firewall rules to allow specific network traffic from the Internet

- Allow HTTP traffic
- Allow HTTPS traffic

[▼ Management, security, disks, networking, sole tenancy](#)

Your free trial credit will be used for this VM instance. [GCP Free Tier](#) [?](#)

[Create](#) [Cancel](#)

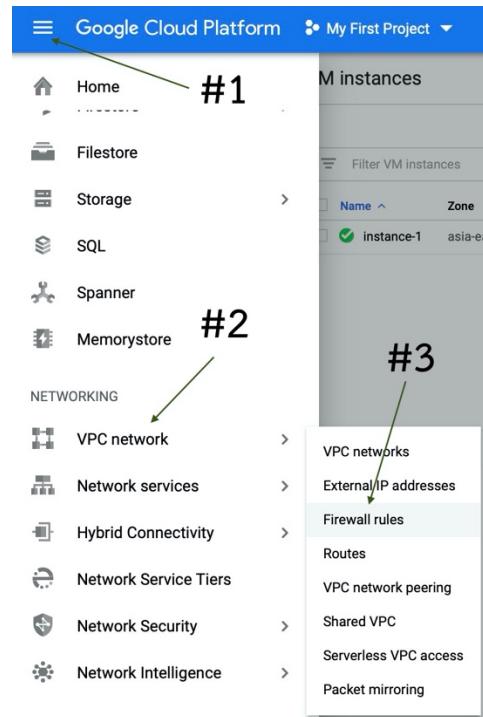
Google Cloud Platform [My First Project](#) [?](#) [Columns](#) [:](#)

Compute Engine VM instances [CREATE INSTANCE](#) [▼](#)

[VM instances](#) [Instance groups](#) [Instance templates](#) [Sole-tenant nodes](#)

| Name | Zone | Recommendation | In use by | Internal IP | External IP | Connect |
|------------|--------------|----------------|-----------|-------------------|--------------|---------|
| instance-1 | asia-east1-a | | | 10.140.0.2 (nic0) | 34.80.215.92 | SSH |

4) การปรับเปลี่ยน firewall เพื่อให้สามารถเข้าใช้งาน GCP จากภายนอก



The screenshot shows the 'Firewall rules' page under the 'VPC network' section. The left sidebar has 'Firewall rules' selected. The main content area displays a table of existing firewall rules:

| Name | Type | Targets | Filters | Protocols / ports | Action | Priority | Network |
|------------------------|---------|--------------|-------------------------|------------------------------------|--------|----------|---------|
| default-allow-http | Ingress | http-server | IP ranges: 0.0.0.0/0 | tcp:80 | Allow | 1000 | default |
| default-allow-https | Ingress | https-server | IP ranges: 0.0.0.0/0 | tcp:443 | Allow | 1000 | default |
| default-allow-icmp | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | icmp | Allow | 65534 | default |
| default-allow-internal | Ingress | Apply to all | IP ranges: 10.128.0.0/9 | tcp:0-65535 udp:0-65535 icmp | Allow | 65534 | default |
| default-allow-rdp | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | tcp:3389 | Allow | 65534 | default |
| default-allow-ssh | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | tcp:22 | Allow | 65534 | default |

Google Cloud Platform My First Project Create a firewall rule

VPC network

- VPC networks
- External IP addresses
- Firewall rules**
- Routes
- VPC network peering
- Shared VPC
- Serverless VPC access
- Packet mirroring

Create a firewall rule

Name: node-red

Description (Optional):

Logs: Turning on firewall logs can generate a large number of logs which can increase costs in Stackdriver. Learn more

On: Off

Network: default

Priority: 1000

Direction of traffic: Ingress

Action on match: Allow

Targets ?

All instances in the network

Specified target tags

Specified service account

Google Cloud Platform My First Project Create a firewall rule

| |
|-----------------------|
| VPC network |
| VPC networks |
| External IP addresses |
| Firewall rules |
| Routes |
| VPC network peering |
| Shared VPC |
| Serverless VPC access |
| Packet mirroring |

Create a firewall rule

Network: default

Priority: 1000

Direction of traffic: Ingress

Action on match: Allow

Targets: All instances in the network #1

Source filter: IP ranges #2

Source IP ranges: 0.0.0.0/0 #3

Second source filter: None

Protocols and ports: Allow all

Disable rule:

Create Cancel

Google Cloud Platform My First Project

| VPC network | Firewall rules | CREATE FIREWALL RULE | REFRESH | DELETE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------|---|--------------------------------------|-------------------------|------------------------------------|--------|----------|---------|---------|-------------------|--------|----------|---------|--------------------|---------|-------------|----------------------|--------|-------|------|---------|---------------------|---------|--------------|----------------------|---------|-------|------|---------|----------|---------|--------------|----------------------|-----|-------|------|---------|--------------------|---------|--------------|----------------------|------|-------|-------|---------|------------------------|---------|--------------|-------------------------|------------------------------------|-------|-------|---------|-------------------|---------|--------------|----------------------|----------|-------|-------|---------|-------------------|---------|--------------|----------------------|--------|-------|-------|---------|
| VPC networks | Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. Learn more | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| External IP addresses | Note: App Engine firewalls are managed here . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Firewall rules | <input type="text" value="Filter resources"/> Columns <table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Targets</th> <th>Filters</th> <th>Protocols / ports</th> <th>Action</th> <th>Priority</th> <th>Network</th> </tr> </thead> <tbody> <tr> <td>default-allow-http</td> <td>Ingress</td> <td>http-server</td> <td>IP ranges: 0.0.0.0/0</td> <td>tcp:80</td> <td>Allow</td> <td>1000</td> <td>default</td> </tr> <tr> <td>default-allow-https</td> <td>Ingress</td> <td>https-server</td> <td>IP ranges: 0.0.0.0/0</td> <td>tcp:443</td> <td>Allow</td> <td>1000</td> <td>default</td> </tr> <tr> <td>node-red</td> <td>Ingress</td> <td>Apply to all</td> <td>IP ranges: 0.0.0.0/0</td> <td>all</td> <td>Allow</td> <td>1000</td> <td>default</td> </tr> <tr> <td>default-allow-icmp</td> <td>Ingress</td> <td>Apply to all</td> <td>IP ranges: 0.0.0.0/0</td> <td>icmp</td> <td>Allow</td> <td>65534</td> <td>default</td> </tr> <tr> <td>default-allow-internal</td> <td>Ingress</td> <td>Apply to all</td> <td>IP ranges: 10.128.0.0/9</td> <td>tcp:0-65535 udp:0-65535 icmp</td> <td>Allow</td> <td>65534</td> <td>default</td> </tr> <tr> <td>default-allow-rdp</td> <td>Ingress</td> <td>Apply to all</td> <td>IP ranges: 0.0.0.0/0</td> <td>tcp:3389</td> <td>Allow</td> <td>65534</td> <td>default</td> </tr> <tr> <td>default-allow-ssh</td> <td>Ingress</td> <td>Apply to all</td> <td>IP ranges: 0.0.0.0/0</td> <td>tcp:22</td> <td>Allow</td> <td>65534</td> <td>default</td> </tr> </tbody> </table> | | | | Name | Type | Targets | Filters | Protocols / ports | Action | Priority | Network | default-allow-http | Ingress | http-server | IP ranges: 0.0.0.0/0 | tcp:80 | Allow | 1000 | default | default-allow-https | Ingress | https-server | IP ranges: 0.0.0.0/0 | tcp:443 | Allow | 1000 | default | node-red | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | all | Allow | 1000 | default | default-allow-icmp | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | icmp | Allow | 65534 | default | default-allow-internal | Ingress | Apply to all | IP ranges: 10.128.0.0/9 | tcp:0-65535 udp:0-65535 icmp | Allow | 65534 | default | default-allow-rdp | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | tcp:3389 | Allow | 65534 | default | default-allow-ssh | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | tcp:22 | Allow | 65534 | default |
| Name | Type | Targets | Filters | Protocols / ports | Action | Priority | Network | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| default-allow-http | Ingress | http-server | IP ranges: 0.0.0.0/0 | tcp:80 | Allow | 1000 | default | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| default-allow-https | Ingress | https-server | IP ranges: 0.0.0.0/0 | tcp:443 | Allow | 1000 | default | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| node-red | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | all | Allow | 1000 | default | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| default-allow-icmp | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | icmp | Allow | 65534 | default | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| default-allow-internal | Ingress | Apply to all | IP ranges: 10.128.0.0/9 | tcp:0-65535 udp:0-65535 icmp | Allow | 65534 | default | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| default-allow-rdp | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | tcp:3389 | Allow | 65534 | default | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| default-allow-ssh | Ingress | Apply to all | IP ranges: 0.0.0.0/0 | tcp:22 | Allow | 65534 | default | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Routes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VPC network peering | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Shared VPC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Serverless VPC access | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Packet mirroring | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

5) การติดตั้ง Node-RED

Google Cloud Platform

- #2 VM instances
- Instance groups
- Instance templates
- Sole-tenant nodes
- Disks
- Snapshots
- Images
- TPUs
- Committed use discounts
- Metadata
- Health checks
- Zones
- Network endpoint groups
- Operations
- Security scans
- Settings

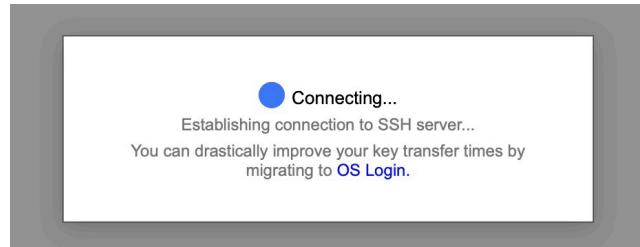
#1 Compute Engine

- App Engine
- Compute Engine
- Kubernetes Engine
- Cloud Functions
- Cloud Run

Top products

Google Cloud Platform My First Project

| Compute Engine | VM instances | CREATE INSTANCE | REFRESH | STOP | START | DELETE | SHOW INFO | | | | | | | | | | | | | | |
|--------------------|--|---------------------------------|-------------------------|----------------------|-----------------------|------------------------|---------------------------|------|------|----------------|-----------|-------------|-------------|---------|------------|--------------|--|--|-------------------|--------------|---------------------|
| VM instances | <input type="text" value="Filter VM instances"/> Columns <table border="1"> <thead> <tr> <th>Name</th> <th>Zone</th> <th>Recommendation</th> <th>In use by</th> <th>Internal IP</th> <th>External IP</th> <th>Connect</th> </tr> </thead> <tbody> <tr> <td>instance-1</td> <td>asia-east1-a</td> <td></td> <td></td> <td>10.140.0.2 (nic0)</td> <td>34.80.215.92</td> <td>SSH</td> </tr> </tbody> </table> | | | | | | | Name | Zone | Recommendation | In use by | Internal IP | External IP | Connect | instance-1 | asia-east1-a | | | 10.140.0.2 (nic0) | 34.80.215.92 | SSH |
| Name | Zone | Recommendation | In use by | Internal IP | External IP | Connect | | | | | | | | | | | | | | | |
| instance-1 | asia-east1-a | | | 10.140.0.2 (nic0) | 34.80.215.92 | SSH | | | | | | | | | | | | | | | |
| Instance groups | | | | | | | | | | | | | | | | | | | | | |
| Instance templates | | | | | | | | | | | | | | | | | | | | | |
| Sole-tenant nodes | | | | | | | | | | | | | | | | | | | | | |
| Disks | | | | | | | | | | | | | | | | | | | | | |



```

Connected, host fingerprint: ssh-rsa 0 D3:F0:EB:97:40:39:F2:CB:46:FC:E6:38:9B
:D3:C9:03:1E:A8:29:5E:55:BA:12:47:E2:49:D4:09:9F:59:8B
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.15.0-1050-gcp x86_64)

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

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

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

prach_m76@instance-1:~$ 

```

ทำการคัดลอกคำสั่ง และวางในหน้าต่าง ssh console และกด Enter

```
bash <(curl -sL https://raw.githubusercontent.com/node-red/raspbian-deb-package/master/resources/update-nodejs-and-nodered)
```

```

Connected, host fingerprint: ssh-rsa 0 D3:F0:EB:97:40:39:F2:CB:46:FC:E6:38:9B
:D3:C9:03:1E:A8:29:5E:55:BA:12:47:E2:49:D4:09:9F:59:8B
Welcome to Ubuntu 16.04.6 LTS (GNU/Linux 4.15.0-1050-gcp x86_64)

 * Documentation: https://help.ubuntu.com
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prach_m76@instance-1:~$ bash <(curl -sL https://raw.githubusercontent.com/node-red/raspbian-deb-package/master/resources/update-nodejs-and-nodered) 

```

จะมีการถามการติดตั้งโปรแกรมให้ทำการกด y

```

prach_m76@instance-1:~$ bash <(curl -sL https://raw.githubusercontent.com/node-red/raspbian-deb-package/master/resources/update-nodejs-and-nodered)
*****
The command that got you this script has been updated.
In the future please use the following version:
  bash <(curl -sL https://raw.githubusercontent.com/node-red/linux-installers/master/deb/update-nodejs-and-nodered
)
See https://github.com/node-red/linux-installers for details.
Thank you.
*****


Are you really sure you want to do this ? [y/N] ? y
Would you like to install the Pi-specific nodes ? [y/N] ? 

```

หลังจากนั้นจะเข้าสู่กระบวนการติดตั้งโปรแกรมจนกระบวนการติดตั้งเสร็จล้วน

```

Running Node-RED update for user prach_m76 at /home/prach_m76 on ubuntu\n
This can take 20-30 minutes on the slower Pi versions - please wait.\n
Stop Node-RED          ✓\nRemove old version of Node-RED    ✓\nRemove old version of Node.js     ✓\nInstall Node.js LTS\nClean npm cache\nInstall Node-RED core\nMove global nodes to local\nInstall extra Pi nodes\nNpm rebuild existing nodes\nAdd shortcut commands\nUpdate systemd script\n\nAny errors will be logged to /var/log/nodered-install.log

```

```

This can take 20-30 minutes on the slower Pi versions - please wait.\n
Stop Node-RED          ✓\nRemove old version of Node-RED    ✓\nRemove old version of Node.js     ✓\nInstall Node.js LTS          ✓   Node v10.18.0   Npm 6.13.4\nClean npm cache          ✓\nInstall Node-RED core\n\nnpm update check failed\nTry running with sudo or get access\n  to the local update config store via\n  sudo chown -R $USER:$(id -gn $USER) /home/prach_m76/.config\n\nInstall Node-RED core          ✓  1.0.3\nAny errors will be logged to /var/log/nodered-install.log\n\nnpm update check failed\nTry running with sudo or get access\n  to the local update config store via\n  sudo chown -R $USER:$(id -gn $USER) /home/prach_m76/.config\n\nMove global nodes to local      -\nInstall extra Pi nodes         -\nNpm rebuild existing nodes    -\nAdd shortcut commands          ✓\nUpdate systemd script          ✓\n\nAll done.\nYou can now start Node-RED with the command node-red-start\nor using the icon under Menu / Programming / Node-RED\nThen point your browser to localhost:1880 or http://[your_pi_ip-address]:1880\nStarted Wed Dec 18 03:52:13 UTC 2019 - Finished Wed Dec 18 03:53:06 UTC 2019\nrm: cannot remove '/usr/bin/update-nodejs-and-nodered': No such file or directory\nprach_m76@instance-1:~$ 

```

ให้โปรแกรม node-RED ทำงานตอนมีการ boot โดยอัตโนมัติ ทำการพิมพ์คำสั่ง

sudo systemctl enable nodered.service

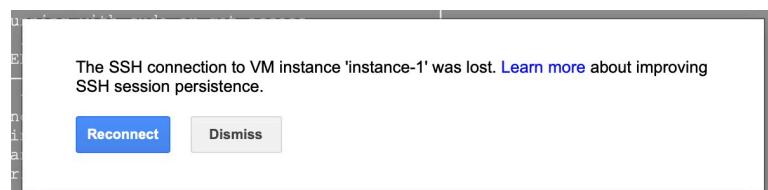
```

prach_m76@instance-1:~$ sudo systemctl enable nodered.service
Created symlink from /etc/systemd/system/multi-user.target.wants/nodered.service to /lib/systemd/system/nodered.service.
prach_m76@instance-1:~$ 

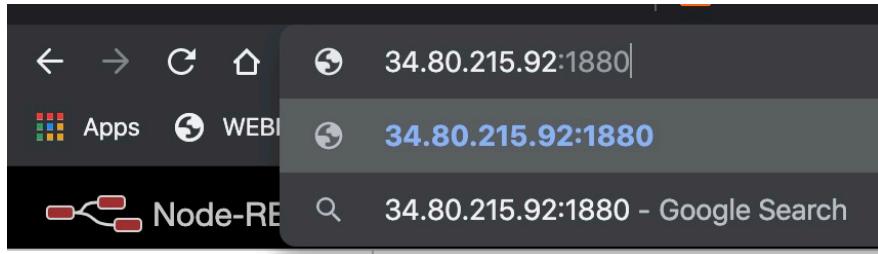
```

และทำการพิมพ์คำสั่ง เพื่อให้โปรแกรม Node-RED เริ่มทำงาน

sudo reboot



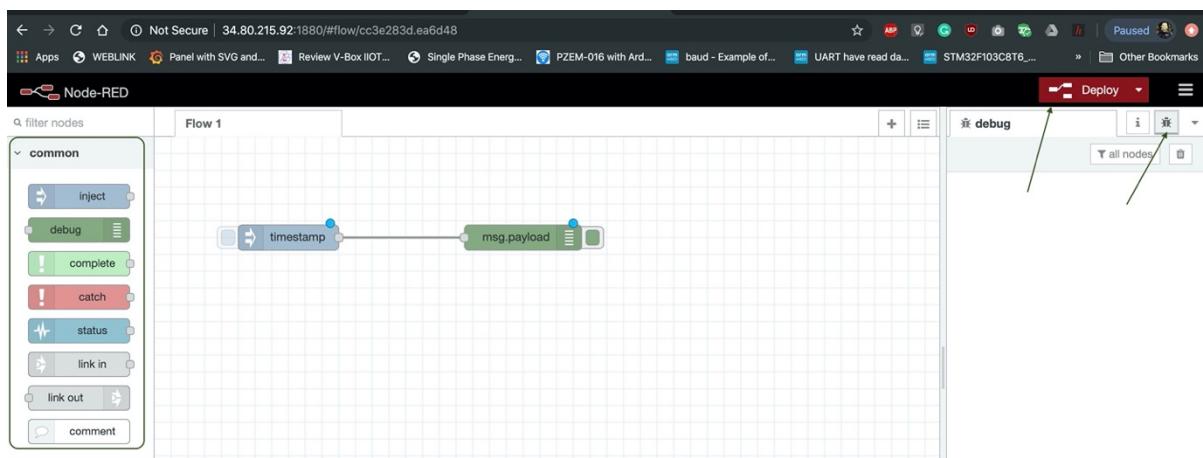
- 6) ทำการเข้าใช้งาน node-RED โดยพิมพ์ใน browser โดยใช้หมายเลข IP address ของ GCP ที่เราได้ติดตั้ง VM ทั้งนี้ให้เพิ่ม 1880 ซึ่งเป็น port ใช้งาน Node-RED ด้วย



VM instances [CREATE INSTANCE](#) [SHOW INFO PAI](#)

| Name | Zone | Recommendation | In use by | Internal IP | External IP | Connect |
|--|--------------|----------------|-----------|-------------------|--------------|---------------------------------------|
| <input checked="" type="checkbox"/> instance-1 | asia-east1-a | | | 10.140.0.2 (nic0) | 34.80.215.92 | SSH ⋮ |

หน้าต่างโปรแกรม node-RED



- 7) การติดตั้งโปรแกรม MQTT Server

```
sudo apt-get update
sudo apt-get install mosquitto
```

```
prach_m76@instance-1:~$ sudo apt-get update
Hit:1 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial InRelease
Hit:2 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial-updates InRelease
Hit:3 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial-backports InRelease
Hit:4 https://deb.nodesource.com/node_10.x xenial InRelease
Hit:5 http://security.ubuntu.com/ubuntu xenial-security InRelease
Hit:6 http://archive.canonical.com/ubuntu xenial InRelease
Reading package lists... Done
```

```

prach_m76@instance-1:~$ sudo apt-get install mosquitto
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libev4 libuv1 libwebsockets7
The following NEW packages will be installed:
  libev4 libuv1 libwebsockets7 mosquitto
0 upgraded, 4 newly installed, 0 to remove and 4 not upgraded.
Need to get 256 kB of archives.
After this operation, 716 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial/universe amd64 libuv1 amd64 1.8.0-1 [57.4 kB]
Get:2 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial/universe amd64 libev4 amd64 1:4.22-1 [26.3 kB]
Get:3 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial/universe amd64 libwebsockets7 amd64 1.7.1-1 [61.0 kB]
Get:4 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 mosquitto amd64 1.4.8-1ubuntu0.16.04.7 [111 kB]
Fetched 256 kB in 1s (132 kB/s)
Selecting previously unselected package libuv1:amd64.
(Reading database ... 75238 files and directories currently installed.)
Preparing to unpack .../libuv1_1.8.0-1_amd64.deb ...
Unpacking libuv1:amd64 (1.8.0-1) ...
Selecting previously unselected package libev4.
Preparing to unpack .../libev4_1%3a4.22-1_amd64.deb ...
Unpacking libev4 (1:4.22-1) ...
Selecting previously unselected package libwebsockets7:amd64.
Preparing to unpack .../libwebsockets7_1.7.1-1_amd64.deb ...
Unpacking libwebsockets7:amd64 (1.7.1-1) ...
Selecting previously unselected package mosquitto.
Preparing to unpack .../mosquitto_1.4.8-1ubuntu0.16.04.7_amd64.deb ...
Unpacking mosquitto (1.4.8-1ubuntu0.16.04.7) ...
Processing triggers for libc-bin (2.23-0ubuntu11) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for ureadahead (0.100.0-19.1) ...
Processing triggers for systemd (229-4ubuntu21.23) ...
Setting up libuv1:amd64 (1.8.0-1) ...
Setting up libev4 (1:4.22-1) ...
Setting up libwebsockets7:amd64 (1.7.1-1) ...
Setting up mosquitto (1.4.8-1ubuntu0.16.04.7) ...
Processing triggers for libc-bin (2.23-0ubuntu11) ...
Processing triggers for ureadahead (0.100.0-19.1) ...
Processing triggers for systemd (229-4ubuntu21.23) ...
prach_m76@instance-1:~$ 

```

Install client

```
sudo apt-get install mosquitto-clients
```

```

prach_m76@instance-1:~$ sudo apt-get install mosquitto-clients
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libc-ares2 libmosquittol
The following NEW packages will be installed:
  libc-ares2 libmosquittol mosquitto-clients
0 upgraded, 3 newly installed, 0 to remove and 4 not upgraded.
Need to get 97.0 kB of archives.
After this operation, 334 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libc-ares2 amd64 1.10.0-3ubuntu0.2 [34.1 kB]
Get:2 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 libmosquittol amd64 1.4.8-1ubuntu0.16.04.7 [31.9 kB]
Get:3 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 mosquitto-clients amd64 1.4.8-1ubuntu0.16.04.7 [31.0 kB]
Fetched 97.0 kB in 1s (77.9 kB/s)
Selecting previously unselected package libc-ares2:amd64.
(Reading database ... 75283 files and directories currently installed.)
Preparing to unpack .../libc-ares2_1.10.0-3ubuntu0.2_amd64.deb ...
Unpacking libc-ares2:amd64 (1.10.0-3ubuntu0.2) ...
Selecting previously unselected package libmosquittol:amd64.
Preparing to unpack .../libmosquittol_1.4.8-1ubuntu0.16.04.7_amd64.deb ...
Unpacking libmosquittol:amd64 (1.4.8-1ubuntu0.16.04.7) ...
Selecting previously unselected package mosquitto-clients.
Preparing to unpack .../mosquitto-clients_1.4.8-1ubuntu0.16.04.7_amd64.deb ...
Unpacking mosquitto-clients (1.4.8-1ubuntu0.16.04.7) ...
Processing triggers for libc-bin (2.23-0ubuntu11) ...
Processing triggers for man-db (2.7.5-1) ...
Setting up libc-ares2:amd64 (1.10.0-3ubuntu0.2) ...
Setting up libmosquittol:amd64 (1.4.8-1ubuntu0.16.04.7) ...
Setting up mosquitto-clients (1.4.8-1ubuntu0.16.04.7) ...
Processing triggers for libc-bin (2.23-0ubuntu11) ...
prach_m76@instance-1:~$ 

```

Setup password ให้กับ MQTT Server

```
sudo mosquitto_passwd -c /etc/mosquitto/passwd username  
Password: password
```

username ที่จะติดต่อกับ MQTT Server
password และ Reenter password เมื่อพิมพ์จะมองไม่เห็นตัวอักษรแสดงออกมา ต้องรำมัดระวังการพิมพ์ให้เหลืออนกัน

```
prach_m76@instance-1:~$ sudo mosquitto_passwd -c /etc/mosquitto/passwd prach  
Password:  
Reenter password:  
prach_m76@instance-1:~$ 
```

8) การติดตั้ง influxDB

For Ubuntu users

```
curl -sL https://repos.influxdata.com/influxdb.key | sudo apt-key add -  
source /etc/lsb-release  
echo "deb https://repos.influxdata.com/${DISTRIB_ID,,} ${DISTRIB_CODENAME} stable" | sudo tee /etc/apt/sources.list.d/influxdb.list
```

```
prach_m76@instance-1:~$ curl -sL https://repos.influxdata.com/influxdb.key | sudo apt-key add -  
OK  
prach_m76@instance-1:~$ source /etc/lsb-release  
prach_m76@instance-1:~$ echo "deb https://repos.influxdata.com/${DISTRIB_ID,,} ${DISTRIB_CODENAME} stable" | sudo tee /etc/apt/sources.list.d/influxdb.list  
deb https://repos.influxdata.com/ubuntu xenial stable  
prach_m76@instance-1:~$ 
```

การติดตั้ง

```
sudo apt-get update && sudo apt-get install influxdb
```

```
prach_m76@instance-1:~$ sudo apt-get update && sudo apt-get install influxdb  
Hit:1 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial InRelease  
Hit:2 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial-updates InRelease  
Hit:3 http://asia-east1.gce.archive.ubuntu.com/ubuntu xenial-backports InRelease  
Hit:4 https://deb.nodesource.com/node_10.x xenial InRelease  
Hit:5 http://archive.canonical.com/ubuntu xenial InRelease  
Hit:6 http://security.ubuntu.com/ubuntu xenial-security InRelease  
Get:7 https://repos.influxdata.com/ubuntu xenial InRelease [4,731 B]  
Get:8 https://repos.influxdata.com/ubuntu xenial/stable amd64 Packages [924 B]  
Fetched 5,655 B in 1s (4,947 B/s)  
Reading package lists... Done  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following NEW packages will be installed:  
  influxdb  
0 upgraded, 1 newly installed, 0 to remove and 4 not upgraded.  
Need to get 63.5 MB of archives.  
After this operation, 178 MB of additional disk space will be used.  
Get:1 https://repos.influxdata.com/ubuntu xenial/stable amd64 influxdb amd64 1.7.9-1 [63.5 MB]  
Fetched 63.5 MB in 7s (8,422 kB/s)  
Selecting previously unselected package influxdb.  
(Reading database ... 75300 files and directories currently installed.)  
Preparing to unpack .../influxdb_1.7.9-1_amd64.deb ...  
Unpacking influxdb (1.7.9-1) ...  
Processing triggers for man-db (2.7.5-1) ...  
Setting up influxdb (1.7.9-1) ...  
Created symlink from /etc/systemd/system/influxd.service to /lib/systemd/system/influxdb.service.  
Created symlink from /etc/systemd/system/multi-user.target.wants/influxdb.service to /lib/systemd/system/influxdb.service.
```

ให้ influxdb ทำงานตอนเริ่ม star หรือ boot เครื่อง

```
sudo systemctl start influxdb
```

```
prach_m76@instance-1:~$ sudo systemctl start influxdb
prach_m76@instance-1:~$ 
```

Point the process to the correct configuration file by using the `-config` option:

```
influxd -config /etc/influxdb/influxdb.conf
```

```
prach_m76@instance-1:~$ sudo systemctl start influxdb
prach_m76@instance-1:~$ influxd -config /etc/influxdb/influxdb.conf

8888888     .d888 888          8888888b. 8888888b.
888     d88P" 888          888 "Y88b 888 "88b
888     888 888          888 888 888 .88P
888 888888b. 8888888 888 888 888 888 888 8888888K.
888 888 "88b 888 888 888 888 Y8bd8P' 888 888 888 "Y88b
888 888 888 888 888 888 X88K 888 888 888 888 888
888 888 888 888 888 Y88b 888 .d8""8b. 888 .d88P 888 d88P
8888888 888 888 888 888 "Y88888 888 888 88888888P" 8888888P"

2019-12-18T04:20:10.695913Z      info    InfluxDB starting      {"log_id": "0JmoasH1000", "version": "1.7.9", "branch": "1.7", "commit": "23bc63d43a8dc05f53afa46e3526ebb5578f3d88"}
2019-12-18T04:20:10.696098Z      info    Go runtime      {"log_id": "0JmoasH1000", "version": "go1.12.6", "maxprocs": 1}
run: open server: listen: listen tcp 127.0.0.1:8088: bind: address already in use
prach_m76@instance-1:~$ 
```

Set the environment variable

```
echo $INFLUXDB_CONFIG_PATH /etc/influxdb/influxdb.conf
```

```
prach_m76@instance-1:~$ echo $INFLUXDB_CONFIG_PATH /etc/influxdb/influxdb.conf
/etc/influxdb/influxdb.conf
prach_m76@instance-1:~$ 
```

Start influxDB

```
influxd
```

การสร้าง Databases

```
prach_m76@instance-1:~$ influx
Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> 
```

```
CREATE DATABASE myIoT
```

```
prach_m76@instance-1:~$ influx
Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> CREATE DATABASE myIoT
> [
```

Show Databases

```
SHOW DATABASES
```

```
prach_m76@instance-1:~$ influx
Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> CREATE DATABASE myIoT
> SHOW DATABASES
name: databases
name
-----
internal
myIoT
> [
```

Use databases

```
USE myIoT
```

```
prach_m76@instance-1:~$ influx
Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> CREATE DATABASE myIoT
> SHOW DATABASES
name: databases
name
-----
internal
myIoT
> USE myIoT
Using database myIoT
> [
```

เพิ่ม password ให้กับ influxdb

```
influx
Connected to http://localhost:8086 version 1.4.x
InfluxDB shell 1.4.x
> auth
username: todd
password:
>
```

สร้าง username กับ password ที่ต้องใช้งานกับ http

```
CREATE USER prach WITH PASSWORD 'prach123' WITH ALL PRIVILEGES
```

```

prach_m76@instance-1:~$ influx
Connected to http://localhost:8086 version 1.7.9
InfluxDB shell version: 1.7.9
> CREATE USER prach WITH PASSWORD 'prach'! WITH ALL PRIVILEGES
> 

```

9) Install Grafana

sudo apt-get install grafana

```

prach_m76@instance-1:~$ sudo apt-get install grafana
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  binutils build-essential cpp cpp-5 dpkg-dev fakeroot fontconfig-config fonts-dejavu-core fonts-font-awesome g++
  g++-5 gcc gcc-5 golang-1.6-go golang-1.6-race-detector-runtime golang-1.6-src golang-go
  golang-race-detector-runtime golang-src grafana-data javascript-common libalgorithm-diff-perl
  libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan2 libatomic1 libc-dev-bin libc6-dev libcc1-0
  libcilkrt5 libdpkg-perl libfakeroot libfile-fcntllock-perl libfontconfig1 libgcc-5-dev libgomp1 libis115
  libitm1 libjs-angularjs libjs-jquery libjs-jquery-metadata libjs-jquery-tablesorter libjs-twitter-bootstrap
  liblsan0 libmpc3 libmpx0 libquadmath0 libstdc++-5-dev libtsan0 libubsan0 linux-libc-dev make manpages-dev
  pkg-config
Suggested packages:
  binutils-doc cpp-doc gcc-5-locales debian-keyring g++-multilib g++-5-multilib gcc-5-doc libstdc++6-5-dbg
  gcc-multilib autoconf automake libtool flex bison qdb gcc-doc gcc-5-multilib libgcc1-dbg libgomp1-dbg
  libitm1-dbg libatomic1-dbg libasan2-dbg liblsan0-dbg libtsan0-dbg libubsan0-dbg libcilkrt5-dbg libmpx0-dbg
  libquadmath0-dbg bzr mercurial subversion apache2 | lighttpd | httpd glibc-doc libjs-bootstrap libstdc++-5-doc
  make-doc
The following NEW packages will be installed:
  binutils build-essential cpp cpp-5 dpkg-dev fakeroot fontconfig-config fonts-dejavu-core fonts-font-awesome g++
  g++-5 gcc gcc-5 golang-1.6-go golang-1.6-race-detector-runtime golang-1.6-src golang-go
  golang-race-detector-runtime golang-src grafana-data javascript-common libalgorithm-diff-perl
  libalgorithm-diff-xs-perl libalgorithm-merge-perl libasan2 libatomic1 libc-dev-bin libc6-dev libcc1-0
  libcilkrt5 libdpkg-perl libfakeroot libfile-fcntllock-perl libfontconfig1 libgcc-5-dev libgomp1 libis115
  libitm1 libjs-angularjs libjs-jquery libjs-jquery-metadata libjs-jquery-tablesorter libjs-twitter-bootstrap
  liblsan0 libmpc3 libmpx0 libquadmath0 libstdc++-5-dev libtsan0 libubsan0 linux-libc-dev make manpages-dev
  pkg-config
0 upgraded, 55 newly installed, 0 to remove and 4 not upgraded.
Need to get 72.9 MB of archives.
After this operation, 375 MB of additional disk space will be used.
Do you want to continue? [Y/n] 

```

sudo systemctl start grafana-server

sudo systemctl status grafana-server

```

prach_m76@instance-1:~$ sudo systemctl status grafana-server
● grafana.service - Starts and stops a single grafana instance on this system
  Loaded: loaded (/lib/systemd/system/grafana.service; enabled; vendor preset: enabled)
  Active: active (running) since Wed 2019-12-18 04:31:41 UTC; 1min 51s ago
    Docs: http://docs.grafana.org
 Main PID: 10672 (grafana)
   CGroup: /system.slice/grafana.service
           └─10672 /usr/sbin/grafana --config=/etc/grafana/grafana.ini cfg:default.paths.logs=/var/log/grafana cfg:

Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Migrator: exec migration id: create dashboard_sn
Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Migrator: exec migration id: create index UQE_da
Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Migrator: exec migration id: create index UQE_da
Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Migrator: exec migration id: create index IDX_da
Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Migrator: exec migration id: alter dashboard_sna
Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Migrator: exec migration id: create quota_table
Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Migrator: exec migration id: create index UQE_qu
Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Created default admin user: admin
Dec 18 04:31:42 instance-1 grafana[10672]: 2019/12/18 04:31:42 [I] Listen: http://0.0.0.0:3000
Dec 18 04:32:16 instance-1 systemd[1]: Started Starts and stops a single grafana instance on this system.
lines 1-18/18 (END) [1]

```

เรียกใช้งาน Grafana ด้วย IP address ตามด้วย Port 3000 เช่น

<http://34.80.215.92:3000>

The screenshot shows the Grafana Home page. On the left, there's a sidebar with 'Dashboards' and 'Data Sources' sections. Under 'Data Sources', it lists 'admin', 'Main Org.', 'Grafana admin', and 'Sign out'. The main area features the Grafana logo and a 'Starred dashboards' section.

The screenshot shows the 'Organization users' page. It has tabs for 'Organization' and 'Users'. The 'Users' tab is selected, showing a table with one user entry: 'admin' (Login: admin, Email: admin@localhost, Role: Admin). There are buttons for 'Add or Invite' and a delete icon.

| Login | Email | Role |
|-------|-----------------|-------|
| admin | admin@localhost | Admin |

The screenshot shows the Grafana interface for managing data sources. On the left sidebar, there are links for Dashboards, Data Sources, and user authentication (admin, Main Org., Grafana admin, Sign out). The main content area is titled 'Edit data source' for a source named 'myIoT'. It's configured as an 'InfluxDB 0.9.x' type. The 'Http settings' section has 'Url' set to 'http://localhost:8086', 'Access' set to 'proxy', and 'Http Auth' set to 'Basic Auth' with 'With Credentials' checked. The 'User' field is 'prach' and the 'Password' field is masked. The 'InfluxDB Details' section shows 'Database' as 'myIoT' and 'User' as 'prach', also with a masked password. A green 'Success' box at the bottom indicates 'Data source is working'.

Installing Grafana from APT Repository

To install Grafana from APT repository, you need to first install Grafana APT repo GPG signing key.

```
sudo apt install curl  
curl https://packages.grafana.com/gpg.key | sudo apt-key add -
```

Next, install the Grafana APT repository by running the command below:

```
sudo apt install software-properties-common  
sudo add-apt-repository "deb https://packages.grafana.com/oss/deb stable main"
```

After that, re-synchronize your system packages to the latest versions and install Grafana.

```
sudo apt update  
sudo apt install grafana
```

Verify the installed version of Grafana.

Running Grafana

Once the installation is done, reload systemd unit configuration files and start and enable Grafana to run on system boot.

```
sudo systemctl daemon-reload  
sudo systemctl enable grafana-server  
sudo systemctl start grafana-server
```

Uninstall just grafana:

```
sudo apt-get remove grafana  
Uninstall grafana and its dependencies:
```

```
sudo apt-get remove --auto-remove grafana
```

Install plugin

```
sudo grafana-cli plugins install bessler-pictureit-panel
```

I put my image in /usr/share/grafana/public/img

then in Grafana panel I put /public/img/abc.jpg