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# DIGITAL TALENT SCHOLARSHIP 2020





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# AWS Compute (cont.)

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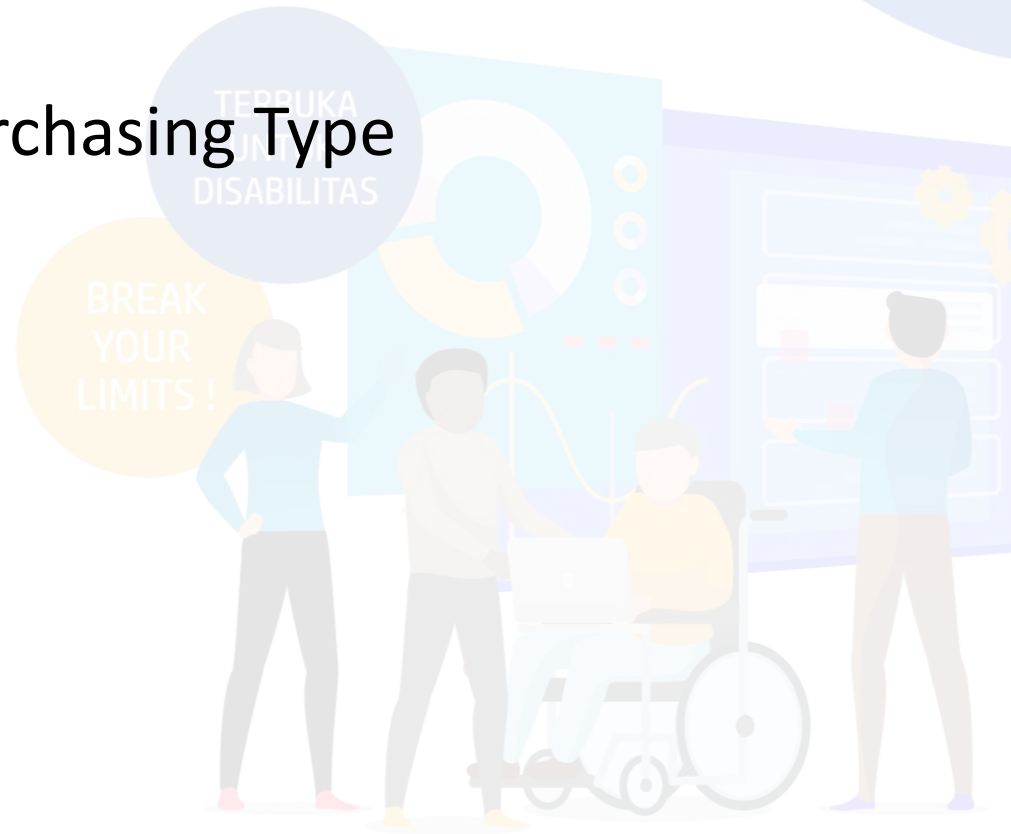




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# Agenda

- Optimizing Instance Purchasing Type
- Instance Meta Data
- Instance User Data
- Security Group





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# Amazon EC2 Purchasing Options

## On-Demand Instances

Pay by the **hour**.

## Reserved Instances

Purchase, at a significant **discount**, instances that are **always available**.

1-year to 3-year terms.

## Scheduled Instances

Purchase instances that are **always available** on the specified **recurring schedule**, for a one-year term.

## Spot Instances

Bid on **unused instances**, which can run as long as they are available and your bid is above the Spot price.

## Dedicated Instances

Pay, by the hour, for instances that run on **single-tenant hardware**.

## Dedicated Hosts

Pay for a physical host that is **fully dedicated** to running your instances.

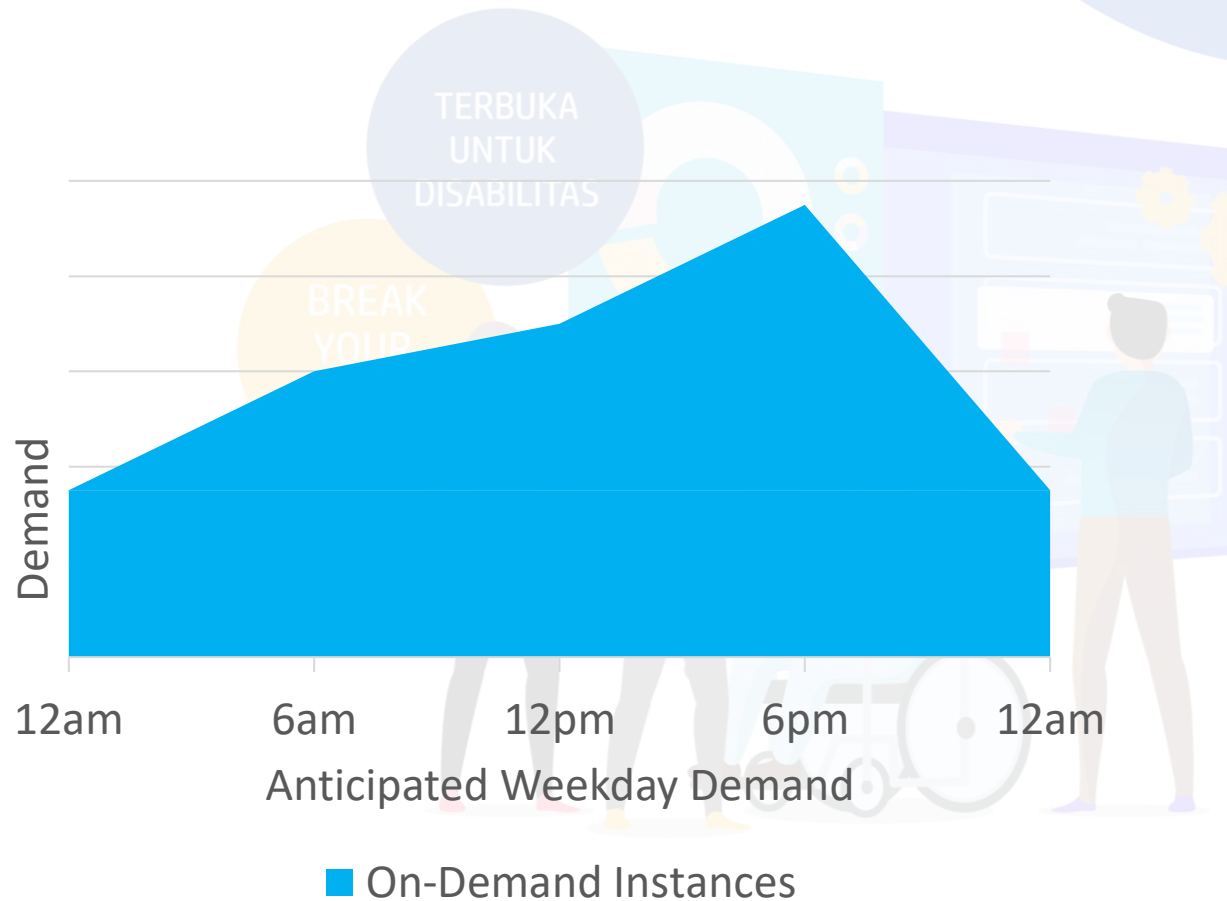


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# How Can You Reduce Cost in This Scenario?

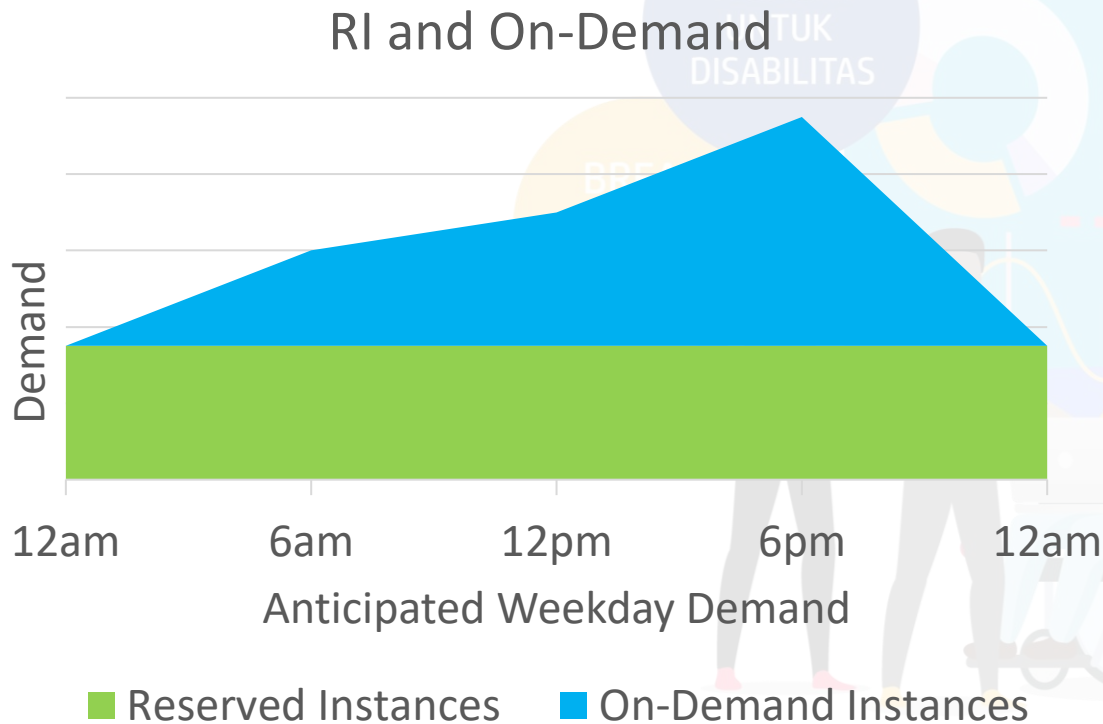
The client has traffic volumes as seen in this graph:

- Spike in traffic during work hours
- Base level of consistent traffic at all times
- Using On-Demand Instances



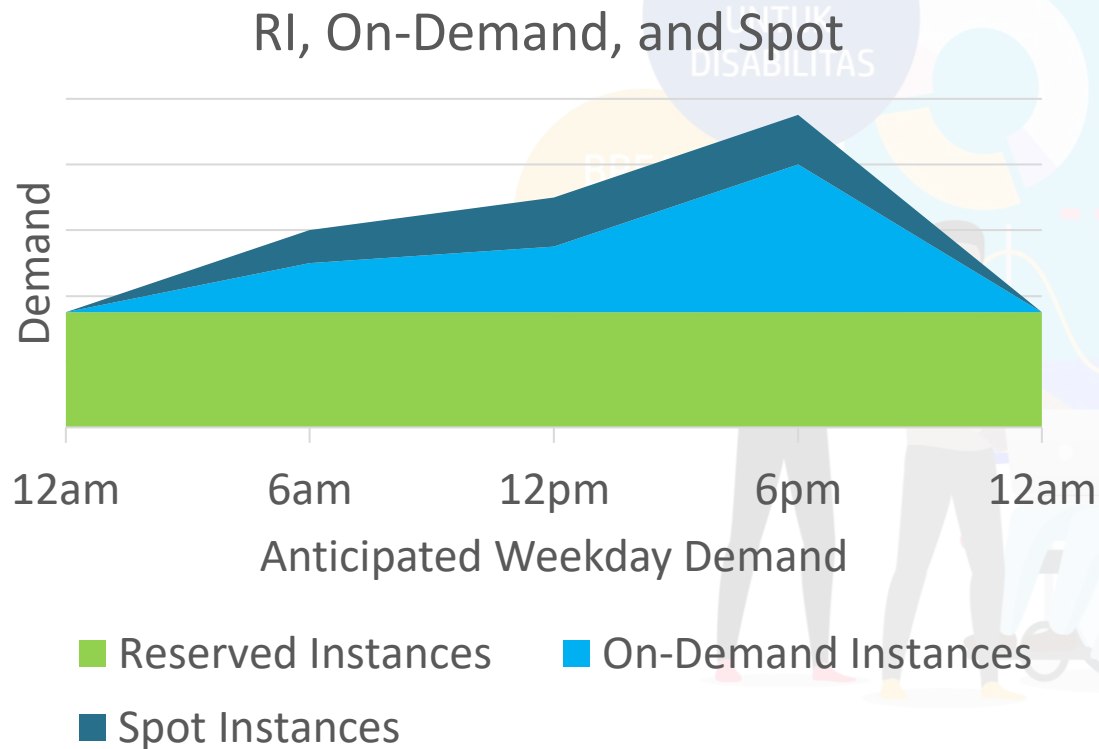


# Leveraging Different Pricing Models in Amazon EC2





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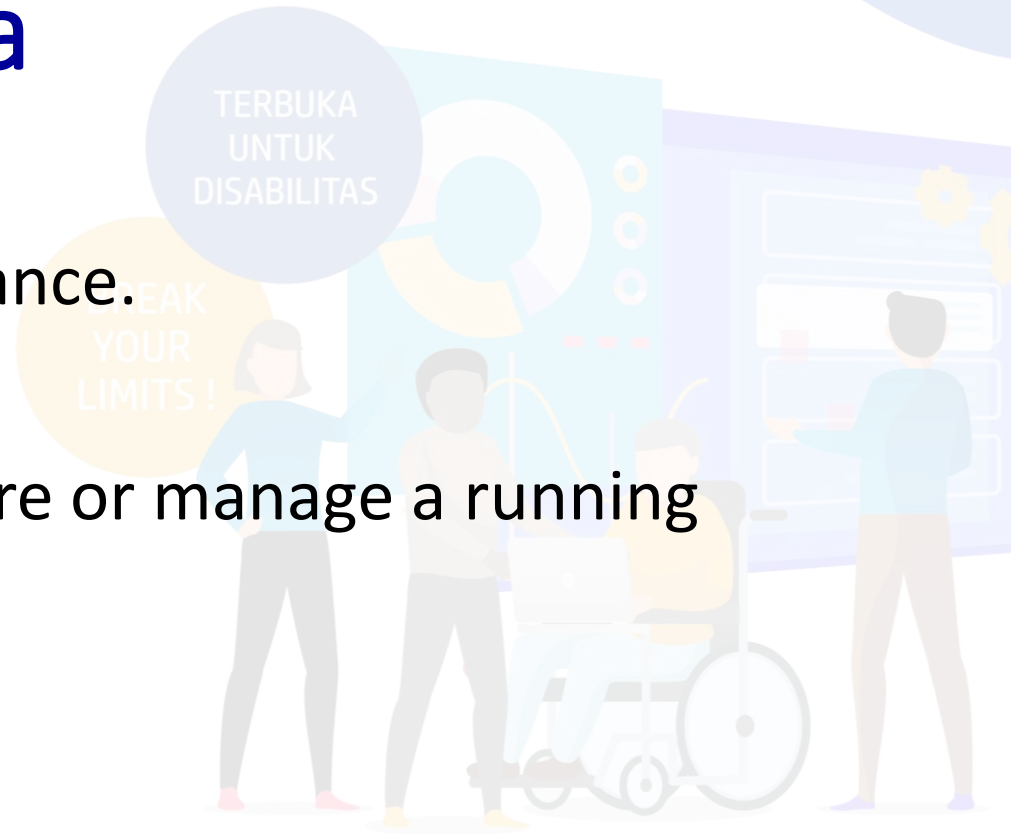




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# Instance Metadata

- Is data about your instance.
- Can be used to configure or manage a running instance.







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# Retrieving Instance Metadata

- To view all categories of instance metadata from within a running instance, use the following URI:

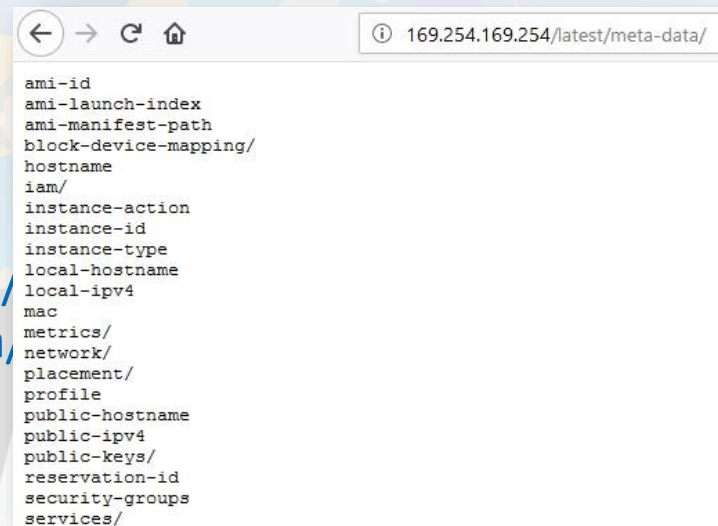
<http://169.254.169.254/latest/meta-data/>

- On a Linux instance, you can use:

```
$ curl http://169.254.169.254/latest/meta-data/
```

```
$ GET http://169.254.169.254/latest/meta-data/
```

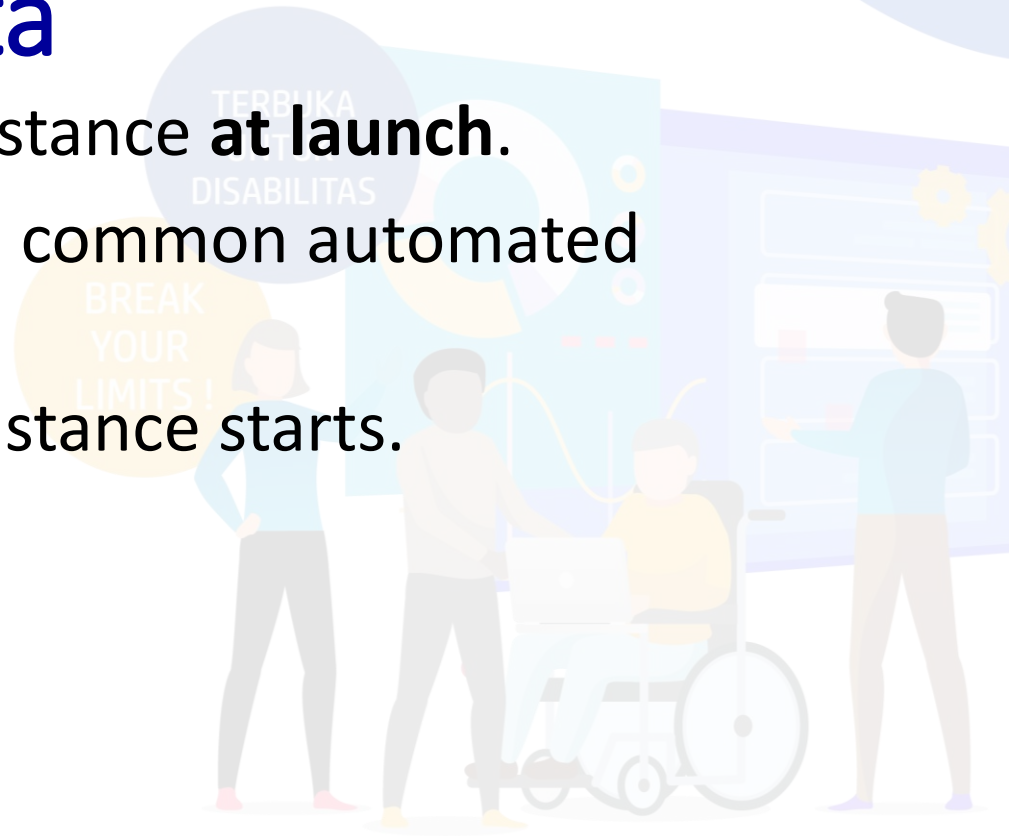
- All metadata is returned as text (content type text/plain).





# Instance User Data

- Can be passed to the instance **at launch**.
- Can be used to perform common automated configuration tasks.
- Runs scripts after the instance starts.

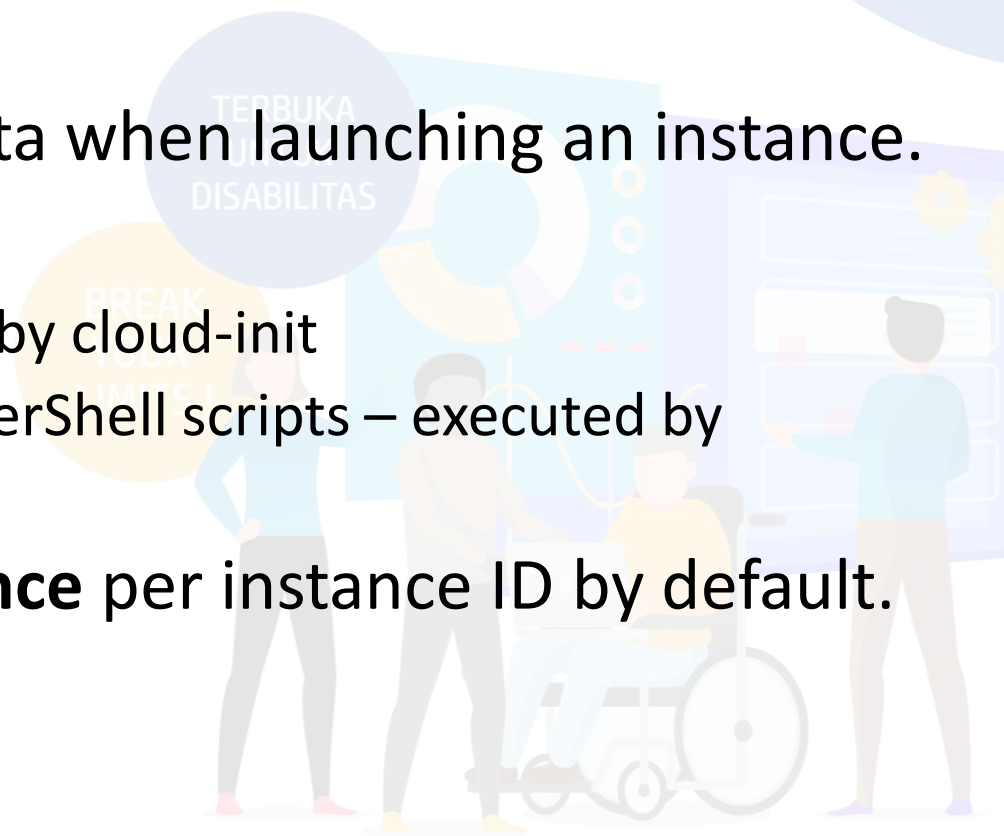




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# Adding User Data

- You can specify user data when launching an instance.
- User data can be:
  - **Linux** script – executed by cloud-init
  - **Windows** batch or PowerShell scripts – executed by EC2Launch service
- User data scripts **run once** per instance ID by default.





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# User Data Example Linux

```
#!/bin/sh
```

User data shell scripts must start with the `#!` characters and the path to the interpreter you want to read the script.

```
yum -y install httpd  
chkconfig httpd on  
/etc/init.d/httpd start
```

Install Apache web server  
Enable the web server  
Start the web server

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# User Data Example Windows

```
<powershell>
```

```
Import-Module ServerManager
```

```
Install-WindowsFeature web-server, web-  
webserver
```

```
Install-WindowsFeature web-mgmt-tools
```

```
</powershell>
```

Import the Server Manager module  
for Windows PowerShell.

Install IIS  
Install Web Management Tools



# Retrieving User Data

- To retrieve user data, use the following URI:

`http://169.254.169.254/latest/user-data`

- On a Linux instance, you can use:

`$ curl http://169.254.169.254/latest/user-data/`

`$ GET http://169.254.169.254/latest/user-data/`

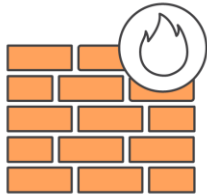
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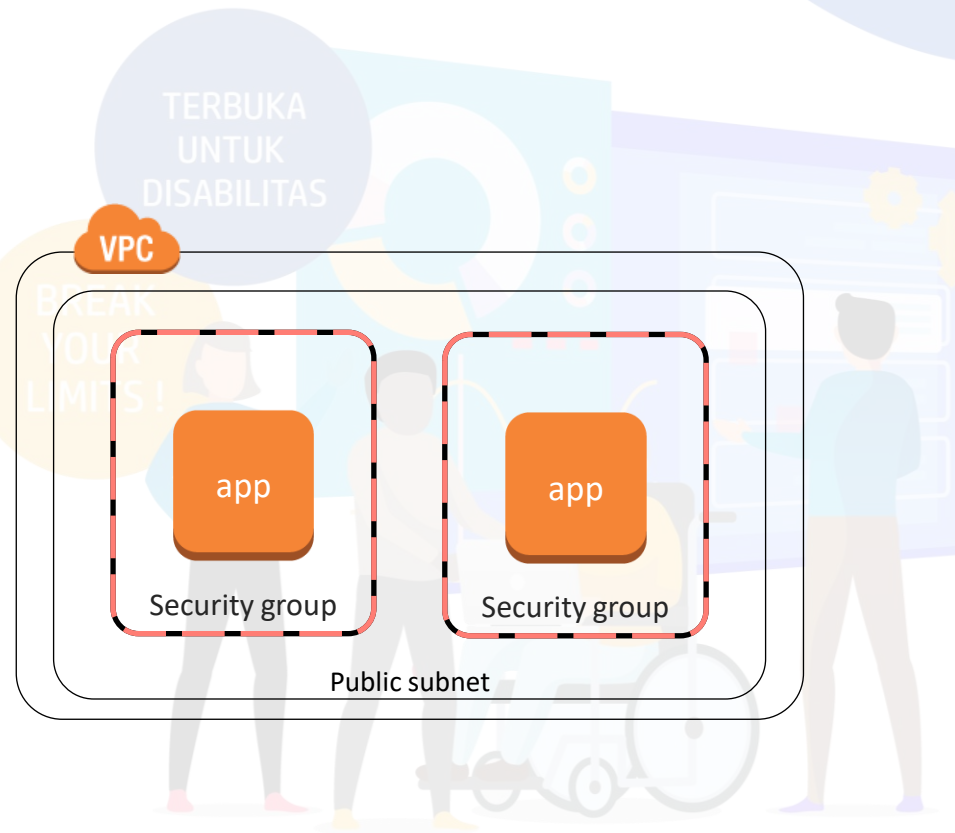
```
ec2-user@ip-172-31-31-72:~$  
Using username "ec2-user".  
Authenticating with public key "imported-openssh-key"  
  
_ _ | _ _ )  
_ | ( _ | /  Amazon Linux AMI  
_ | \ _ | _ |  
  
https://aws.amazon.com/amazon-linux-ami/2015-08-release-notes/  
[ec2-user@ip-172-31-31-72 ~]$ curl http://169.254.169.254/latest/user-data  
#!/bin/bash  
yum update -y  
yum install -y httpd24 php56 mysql55-server php56-mysqld  
service httpd start  
chkconfig httpd on  
groupadd www  
usermod -a -G www ec2-user  
chown -R root:www /var/www  
chmod 2775 /var/www  
find /var/www -type d -exec chmod 2775 {} +  
find /var/www -type f -exec chmod 0664 {} +  
echo "<?php phpinfo(); ?>" > /var/www/html/phpinfo.php[ec2-user@ip-172-31-72  
~]$
```



# Security Groups



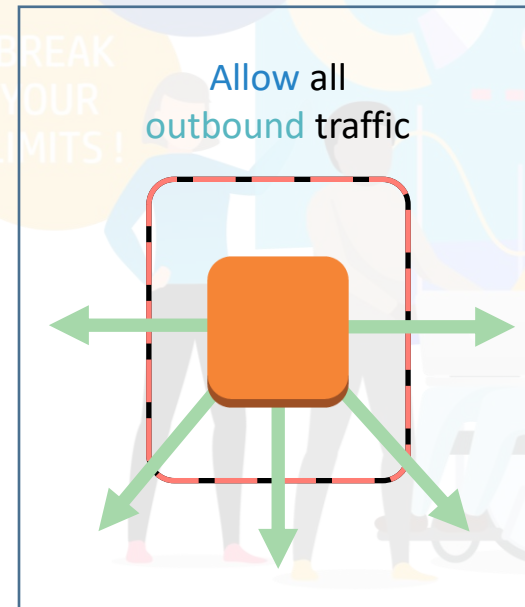
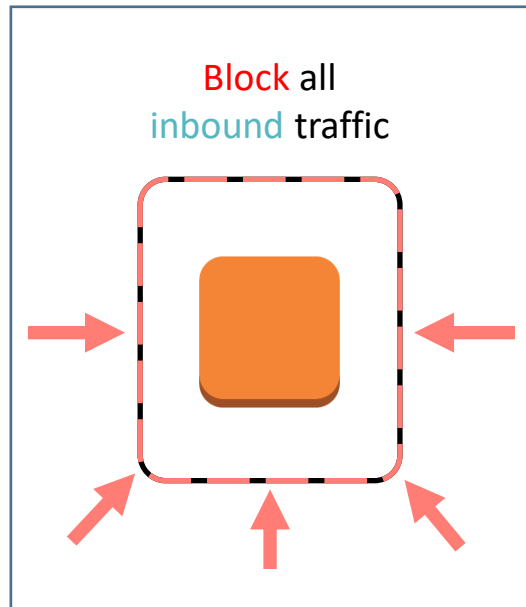
- **Virtual firewalls** that control inbound and outbound traffic into AWS resources
- Traffic can be **restricted** by any IP protocol, port, or IP address
- Rules are **stateful**





# Security Groups: By Default

New security groups:

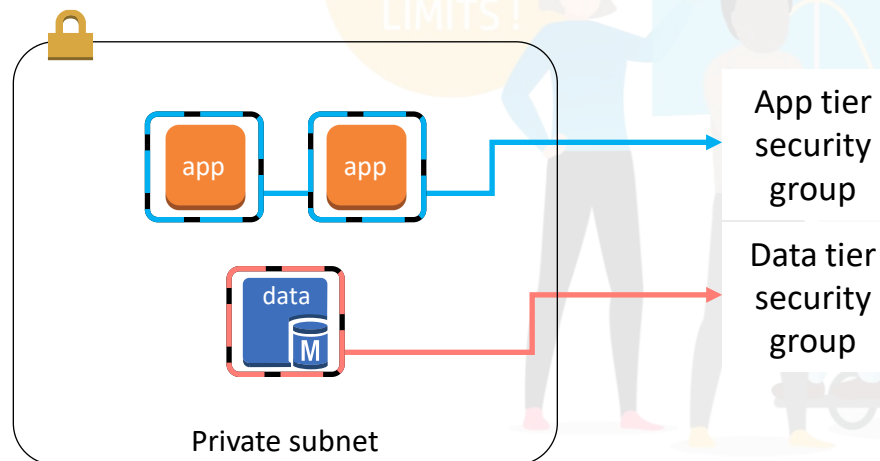






# Security Groups: Controlling Traffic

Most cloud organizations create security groups with  
inbound rules for each functional tier.



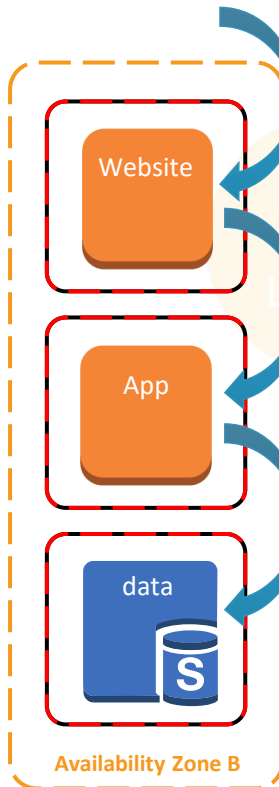


# Security Groups: Chaining Diagram

Web tier  
Security group

Application  
Security group

Database  
Security group



**Inbound rule**  
Allow HTTPS port 443  
Source: 0.0.0.0/0 (any)

**Inbound rule**  
Allow HTTP port 80  
Source: Web tier

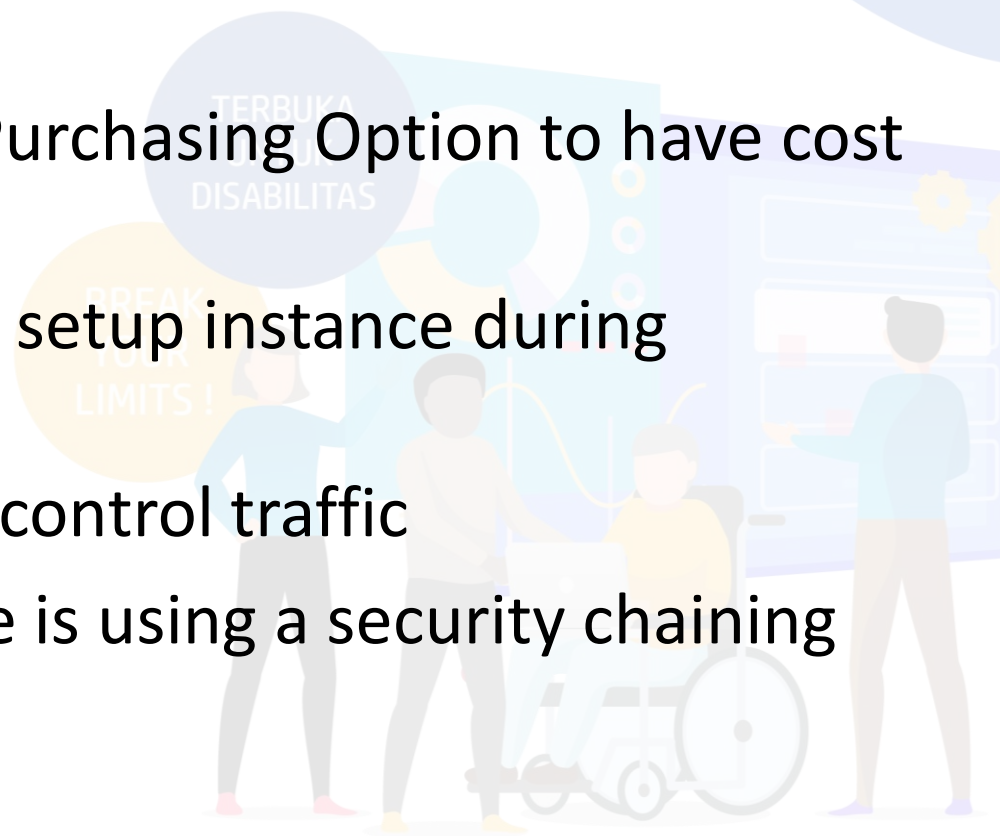
**Inbound rule**  
Allow TCP port 3306  
Source: App tier



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# Key Point

- We can combine AWS Purchasing Option to have cost optimization
- User data can be use to setup instance during installation
- Security Group used to control traffic
- One of the best practice is using a security chaining








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