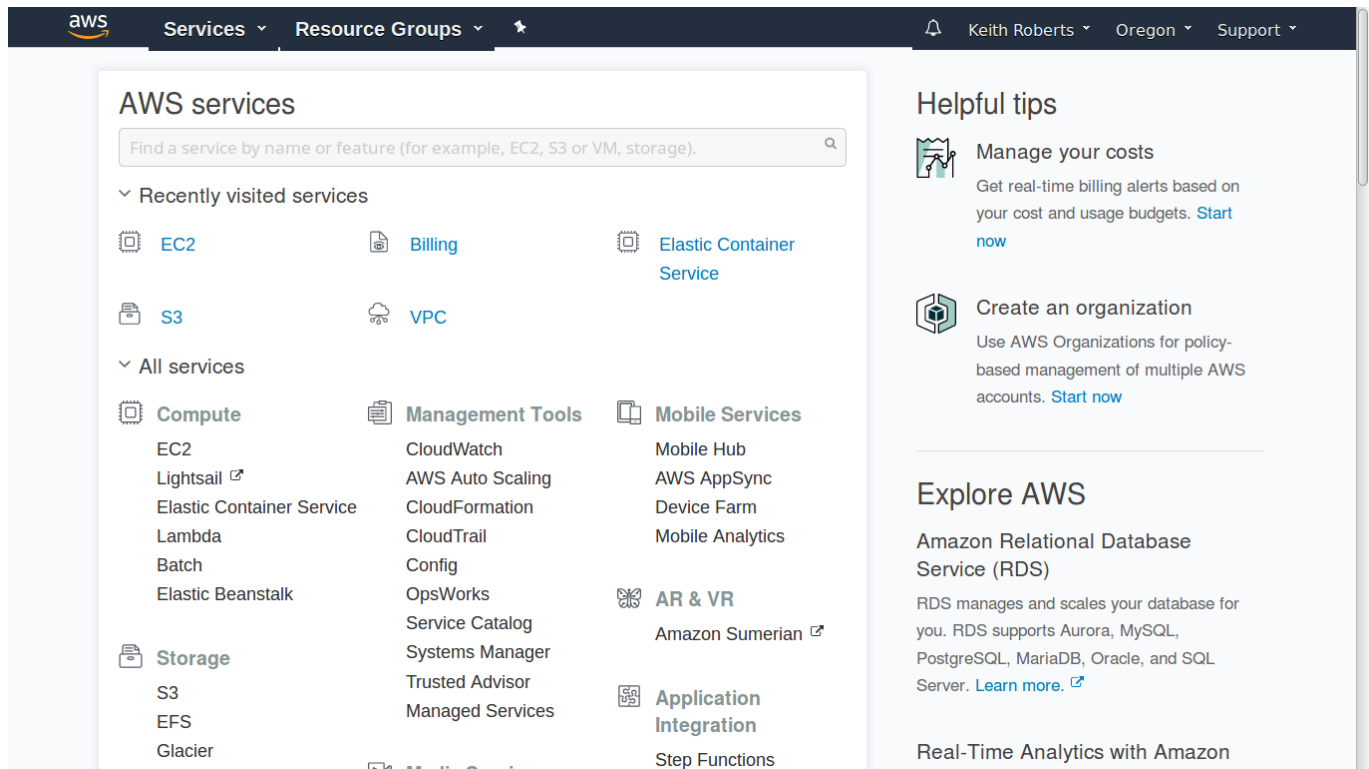


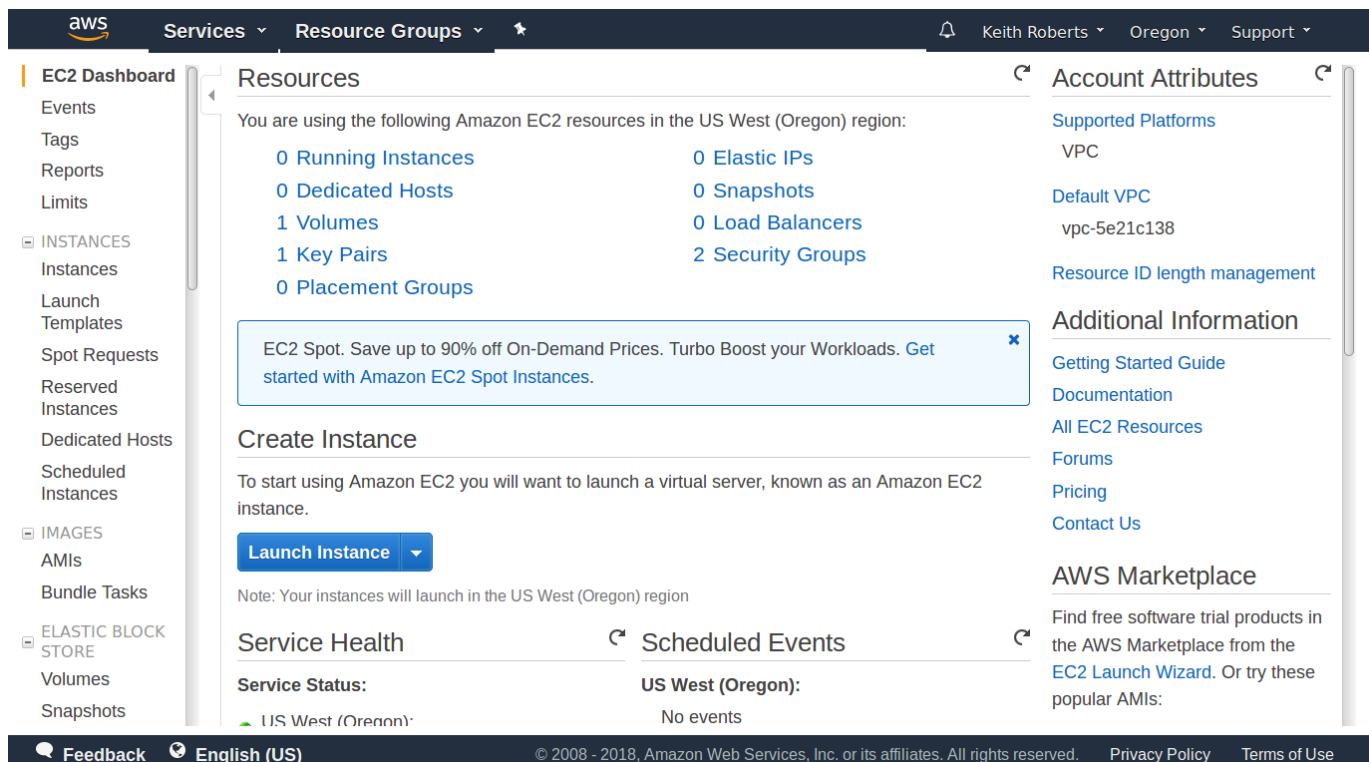
1. Instructions on how to create the server on AWS

Login to your AWS account and go to the AWS home page by clicking on the AWS icon at the top left hand side of the page.



Under Recently visited services or Compute click on the 'EC2' option.

This will take you to the EC2 Dashboard:



This is where you can create new Amazon Virtual Machine Instances from AMI templates.

If we click on the blue 'Launch Instance' button this takes us to the following screen:

Step 1: Choose an Amazon Machine Image (AMI) Cancel and Exit

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Quick Start 1 to 36 of 36 AMIs

My AMIs	AWS Marketplace	Community AMIs
<input type="checkbox"/> Free tier only ⓘ		
<div> Amazon Linux AMI 2017.09.1 (HVM), SSD Volume Type - ami-f2d3638a Select </div> <p>The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages.</p> <p>Root device type: ebs Virtualization type: hvm ENA Enabled: Yes</p> <p>64-bit</p>		
<div> Amazon Linux 2 LTS Candidate AMI 2017.12.0 (HVM), SSD Volume Type - ami-7f43f307 Select </div> <p>Amazon Linux 2 is the next generation of Amazon Linux. It includes the latest LTS kernel (4.9) tuned for enhanced performance on Amazon EC2, systemd support, newer versions of glibc, gcc and binutils, and an additional set of core packages for performance and security improvements.</p> <p>Root device type: ebs Virtualization type: hvm ENA Enabled: Yes</p> <p>64-bit</p>		
<div> SUSE Linux Enterprise Server 12 SP3 (HVM), SSD Volume Type - ami-6bc56f13 Select </div> <p>SUSE Linux Enterprise Server 12 Service Pack 3 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.</p> <p>Root device type: ebs Virtualization type: hvm ENA Enabled: Yes</p> <p>64-bit</p>		
<div> Red Hat Enterprise Linux 7.4 (HVM), SSD Volume Type - ami-223f945a Select </div> <p>Red Hat Enterprise Linux version 7.4 (HVM), EBS General Purpose (SSD) Volume Type.</p> <p>Root device type: ebs Virtualization type: hvm ENA Enabled: Yes</p> <p>64-bit</p>		

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We now need to choose an Amazon Machine Image to create our Virtual Machine instance from.

Basically an AMI is a template used to create a usable VM on the AWS cloud platform.

If we tick the 'Free tier only' box this will filter out all the other non-free tier AMI's.

Step 1: Choose an Amazon Machine Image (AMI) Cancel and Exit

Community AMIs

☒ Free tier only ⓘ

Amazon Linux 2 LTS Candidate AMI 2017.12.0 (HVM), SSD Volume Type - ami-7f43f307 Select	<p>Amazon Linux 2 is the next generation of Amazon Linux. It includes the latest LTS kernel (4.9) tuned for enhanced performance on Amazon EC2, systemd support, newer versions of glibc, gcc and binutils, and an additional set of core packages for performance and security improvements.</p> <p>Root device type: ebs Virtualization type: hvm ENA Enabled: Yes</p> <p>64-bit</p>
SUSE Linux Enterprise Server 12 SP3 (HVM), SSD Volume Type - ami-6bc56f13 Select	<p>SUSE Linux Enterprise Server 12 Service Pack 3 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.</p> <p>Root device type: ebs Virtualization type: hvm ENA Enabled: Yes</p> <p>64-bit</p>
Red Hat Enterprise Linux 7.4 (HVM), SSD Volume Type - ami-223f945a Select	<p>Red Hat Enterprise Linux version 7.4 (HVM), EBS General Purpose (SSD) Volume Type</p> <p>Root device type: ebs Virtualization type: hvm ENA Enabled: Yes</p> <p>64-bit</p>
Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-1ee65166 Select	<p>Ubuntu Server 16.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).</p> <p>Root device type: ebs Virtualization type: hvm ENA Enabled: Yes</p> <p>64-bit</p>

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As Cydar are using Ubuntu Let's base our test VM instance on:

Ubuntu Server 16.04 LTS, SSD Volume Type

If we click on the blue 'Select' button this takes us to the following screen:

Step 2: Choose an Instance Type
Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: **All instance types** **Current generation** [Show/Hide Columns](#)

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro <small>Free tier eligible</small>	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	m5.large	2	8	EBS only	Yes	Up to 10 Gbps	Yes

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Instance Details](#)

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As Amazon knows we are on the Free Tier the t2.micro instance type has already been selected for us:

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

If we click the blue 'Review and Launch' button we are taken to the following screen:

Step 7: Review Instance Launch
Please review your instance launch details. You can go back to edit changes for each section. Click **Launch** to assign a key pair to your instance and complete the launch process.

AMI Details [Edit AMI](#)

Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-1ee65166
Free tier eligible
Ubuntu Server 16.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).
Root Device Type: ebs Virtualization type: hvm

Instance Type [Edit instance type](#)

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

Security Groups [Edit security groups](#)

Security group name: launch-wizard-1
Description: launch-wizard-1 created 2018-01-22T14:36:00.890+00:00

Type	Protocol	Port Range	Source	Description
This security group has no rules				

Instance Details [Edit instance details](#)

[Cancel](#) [Previous](#) [Launch](#)

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If we now click the blue 'Launch' button we are presented with the following pop-up window:

Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Choose an existing key pair

Select a key pair
MyKeyPair

☒ I acknowledge that I have access to the selected private key file (MyKeyPair.pem), and that without this file, I won't be able to log into my instance.

Cancel
Launch Instances

Having selected my pre-configured key pair stored on AWS I can now start the AWS instance by clicking on 'Launch Instances'.

The VM instance is now being created and started on the AWS cloud platform.

aws
Services
Resource Groups

Keith Roberts
Oregon
Support

Launch Status

✓
Your instances are now launching

The following instance launches have been initiated: i-08671acb1e2a82ac0 [View launch log](#)

ℹ
Get notified of estimated charges

Create billing alerts to get an email notification when estimated charges on your AWS bill exceed an amount you define (for example, if you exceed the free usage tier).

How to connect to your instances

Your instances are launching, and it may take a few minutes until they are in the **running** state, when they will be ready for you to use. Usage hours on your new instances will start immediately and continue to accrue until you stop or terminate your instances.

Click **View Instances** to monitor your instances' status. Once your instances are in the **running** state, you can **connect** to them from the Instances screen. [Find out](#) how to connect to your instances.

Here are some helpful resources to get you started

- How to connect to your Linux instance
- Learn about AWS Free Usage Tier
- Amazon EC2: User Guide
- Amazon EC2: Discussion Forum

While your instances are launching you can also

- Create status check alarms to be notified when these instances fail status checks. (Additional charges may apply)
- Create and attach additional EBS volumes (Additional charges may apply)
- Manage security groups

View Instances

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If we now click on the 'View Instances' button this will take us to the EC2 Dashboard and show details of the instance we have just launched:

The screenshot shows the AWS Management Console for an EC2 instance. The instance is named 'i-08671acb1e2a82ac0' and is running in the 'us-west-2' region. The instance type is 't2.micro'. The public IPv4 address is 54.212.247.223. The console shows various details including instance state, instance type, availability zone, security groups, and network interfaces.

Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public
	i-08671acb1e2a82ac0	t2.micro	us-west-2b	running	2/2 checks passed	None	ec2-54

Instance: i-08671acb1e2a82ac0 Public DNS: ec2-54-212-247-223.us-west-2.compute.amazonaws.com

Description	Status Checks	Monitoring	Tags
Instance ID	i-08671acb1e2a82ac0		
Instance state	running		
Instance type	t2.micro		
Elastic IPs			
Availability zone	us-west-2b		
Security groups	launch-wizard-1. view inbound rules		
Scheduled events	No scheduled events		
AMI ID	ubuntu/images/hvm-ssd/ubuntu-xenial-16.04-amd64-server-20180109 (ami-1ee65166)		
Platform	-		
IAM role	-		
Key pair name	MyKeyPair		
EBS-optimized	False		
Public DNS (IPv4)	ec2-54-212-247-223.us-west-2.compute.amazonaws.com		
IPv4 Public IP	54.212.247.223		
IPv6 IPs	-		
Private DNS	ip-172-31-21-171.us-west-2.compute.internal		
Private IPs	172.31.21.171		
Secondary private IPs			
VPC ID	vpc-5e21c138		
Subnet ID	subnet-b0c49d7		
Network interfaces	eth0		
Source/dest. check	True		
T2 Unlimited	Disabled		
Owner	331852305225		
Launch time	January 22, 2018 at 2:46:13 PM UTC (less than		

We can see that this running instance has a public IPv4 address of 54.212.247.223

2. Logging in to the server using SSH

Now the server is up and running we can SSH into it from a terminal with the following command:

```
spock@aspire-laptop ~ $ ssh -i ~/.ssh/MyKeyPair.pem ubuntu@54.212.247.223
```

```
(ubuntu) 54.212.247.223 — Konsole
File Edit View Bookmarks Settings Help

spock@aspire-laptop ~ $
spock@aspire-laptop ~ $ ssh -i ~/.ssh/MyKeyPair.pem ubuntu@54.212.247.223
The authenticity of host '54.212.247.223 (54.212.247.223)' can't be established.
ECDSA key fingerprint is SHA256:1a55se8pAZ9UeafyaS6mfWcvKECTj2ULQod2FdFd4w.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '54.212.247.223' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 16.04.3 LTS (GNU/Linux 4.4.0-1047-aws 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

28 packages can be updated.
23 updates are security updates.

Last login: Mon Jan 22 15:46:19 2018 from 92.20.252.242
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-21-171:~$
```

It looks like there are some security updates to apply so let's do that first, before installing Nginx web server.

If we type 'sudo su' at the command line then type 'cd', we can then switch to the root user to update system packages.

Running the command 'apt update' will get a listing of all the available security updates available, and save it to a local cache.

```
ubuntu@ip-172-31-21-171:~$  
ubuntu@ip-172-31-21-171:~$ sudo su  
root@ip-172-31-21-171:/home/ubuntu# cd  
root@ip-172-31-21-171:~#  
root@ip-172-31-21-171:~# apt update  
Hit:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial InRelease  
Get:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]  
Get:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-backports InRelease [102 kB]  
Get:4 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main Sources [290 kB]  
Get:5 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/universe Sources [188 kB]  
Get:6 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages [705 kB]  
Get:7 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main Translation-en [294 kB]  
Get:8 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/restricted amd64 Packages [7,588 B]  
Get:9 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/universe amd64 Packages [577 kB]  
Get:10 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/universe Translation-en [233 kB]  
Get:11 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/multiverse amd64 Packages [16.2 kB]  
Get:12 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]  
Get:13 http://security.ubuntu.com/ubuntu xenial-security/main Sources [106 kB]  
Get:14 http://security.ubuntu.com/ubuntu xenial-security/universe Sources [49.3 kB]  
Get:15 http://security.ubuntu.com/ubuntu xenial-security/main amd64 Packages [430 kB]  
Get:16 http://security.ubuntu.com/ubuntu xenial-security/main Translation-en [188 kB]  
Get:17 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 Packages [198 kB]  
Get:18 http://security.ubuntu.com/ubuntu xenial-security/universe Translation-en [101 kB]  
Fetched 3,689 kB in 2s (1,523 kB/s)  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
25 packages can be upgraded. Run 'apt list --upgradable' to see them.  
root@ip-172-31-21-171:~#
```

Having updated the local cache we can now run the 'apt upgrade' command as root to apply the latest security updates.

```
root@ip-172-31-21-171:~# apt upgrade  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
Calculating upgrade... Done  
The following NEW packages will be installed:  
linux-aws-headers-4.4.0-1049 linux-headers-4.4.0-1049-aws linux-image-4.4.0-1049-aws
```

```
The following packages will be upgraded:  
bind9-host cloud-initramfs-copymods cloud-initramfs-dyn-netconf distro-info-data  
dnsutils iproute2 libbind9-140  
libc-bin libc6 libdns-export162 libdns162 libisc-export160 libisc160 libisccc140  
libisccfg140 liblwres141 linux-aws  
linux-headers-aws linux-image-aws locales multiarch-support openssh-client openssh-  
server openssh-sftp-server  
overlayroot  
25 upgraded, 3 newly installed, 0 to remove and 0 not upgraded.  
Need to get 30.0 MB/39.6 MB of archives.  
After this operation, 133 MB of additional disk space will be used.  
Do you want to continue? [Y/n] y
```

```
Get:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64  
distro-info-data all 0.28ubuntu0.7 [4,334 B  
]  
Get:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64  
iproute2 amd64 4.3.0-1ubuntu3.16.04.3 [522  
kB]  
Get:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64  
linux-image-4.4.0-1049-aws amd64 4.4.0-1049  
.58 [18.9 MB]  
Get:4 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64  
linux-aws amd64 4.4.0.1049.51 [1,810 B]  
Get:5 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64  
linux-image-aws amd64 4.4.0.1049.51 [2,404  
B]
```


KA-ROBERTS_Cydar-OSE-technical-test.fodt

```
Get:6 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64
linux-aws-headers-4.4.0-1049 all 4.4.0-1049
.58 [9,937 kB]
Get:7 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64
linux-headers-4.4.0-1049-aws amd64 4.4.0-10
49.58 [676 kB]
Get:8 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64
linux-headers-aws amd64 4.4.0.1049.51 [2,40
8 B]
Get:9 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64
cloud-initramfs-copymods all 0.27ubuntu1.5
[4,384 B]
Get:10 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64
cloud-initramfs-dyn-netconf all 0.27ubuntu
1.5 [6,946 B]
Get:11 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64
overlayroot all 0.27ubuntu1.5 [15.8 kB]
Fetched 30.0 MB in 0s (65.9 MB/s)
Preconfiguring packages ...
(Reading database ... 51121 files and directories currently installed.)
Preparing to unpack .../libc6_2.23-0ubuntu10_amd64.deb ...
Unpacking libc6:amd64 (2.23-0ubuntu10) over (2.23-0ubuntu9) ...
Setting up libc6:amd64 (2.23-0ubuntu10) ...
Processing triggers for libc-bin (2.23-0ubuntu9) ...
(Reading database ... 51121 files and directories currently installed.)
Preparing to unpack .../locales_2.23-0ubuntu10_all.deb ...
Unpacking locales (2.23-0ubuntu10) over (2.23-0ubuntu9) ...
Preparing to unpack .../libc-bin_2.23-0ubuntu10_amd64.deb ...
Unpacking libc-bin (2.23-0ubuntu10) over (2.23-0ubuntu9) ...
Processing triggers for man-db (2.7.5-1) ...
Setting up libc-bin (2.23-0ubuntu10) ...
(Reading database ... 51121 files and directories currently installed.)
Preparing to unpack .../multiarch-support_2.23-0ubuntu10_amd64.deb ...
Unpacking multiarch-support (2.23-0ubuntu10) over (2.23-0ubuntu9) ...
Setting up multiarch-support (2.23-0ubuntu10) ...
(Reading database ... 51121 files and directories currently installed.)
Preparing to unpack .../distro-info-data_0.28ubuntu0.7_all.deb ...
Unpacking distro-info-data (0.28ubuntu0.7) over (0.28ubuntu0.6) ...
Preparing to unpack .../iproute2_4.3.0-1ubuntu3.16.04.3_amd64.deb ...
Unpacking iproute2 (4.3.0-1ubuntu3.16.04.3) over (4.3.0-1ubuntu3.16.04.2) ...
Preparing to unpack .../libisc-export160_1%3a9.10.3.dfsg.P4-
8ubuntu1.10_amd64.deb ...
Unpacking libisc-export160 (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-
8ubuntu1.9) ...
Preparing to unpack .../libdns-export162_1%3a9.10.3.dfsg.P4-
8ubuntu1.10_amd64.deb ...
Unpacking libdns-export162 (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-
8ubuntu1.9) ...
Preparing to unpack .../bind9-host_1%3a9.10.3.dfsg.P4-8ubuntu1.10_amd64.deb ...
Unpacking bind9-host (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-
8ubuntu1.9) ...
Preparing to unpack .../dnsutils_1%3a9.10.3.dfsg.P4-8ubuntu1.10_amd64.deb ...
Unpacking dnsutils (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-8ubuntu1.9)
...
Preparing to unpack .../libisc160_1%3a9.10.3.dfsg.P4-8ubuntu1.10_amd64.deb ...
Unpacking libisc160:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-
8ubuntu1.9) ...
Preparing to unpack .../libdns162_1%3a9.10.3.dfsg.P4-8ubuntu1.10_amd64.deb ...
Unpacking libdns162:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-
8ubuntu1.9) ...
Preparing to unpack .../libisccc140_1%3a9.10.3.dfsg.P4-8ubuntu1.10_amd64.deb ...
Unpacking libisccc140:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-
8ubuntu1.9) ...
Preparing to unpack .../libisccfg140_1%3a9.10.3.dfsg.P4-8ubuntu1.10_amd64.deb ...
Unpacking libisccfg140:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-
```

```

8ubuntu1.9) ...
Preparing to unpack .../liblwres141_1%3a9.10.3.dfsg.P4-8ubuntu1.10_amd64.deb ...
Unpacking liblwres141:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-8ubuntu1.9) ...
Preparing to unpack .../libbind9-140_1%3a9.10.3.dfsg.P4-8ubuntu1.10_amd64.deb ...
Unpacking libbind9-140:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) over (1:9.10.3.dfsg.P4-8ubuntu1.9) ...
Preparing to unpack .../openssh-sftp-server_1%3a7.2p2-4ubuntu2.4_amd64.deb ...
Unpacking openssh-sftp-server (1:7.2p2-4ubuntu2.4) over (1:7.2p2-4ubuntu2.2) ...
Preparing to unpack .../openssh-server_1%3a7.2p2-4ubuntu2.4_amd64.deb ...
Unpacking openssh-server (1:7.2p2-4ubuntu2.4) over (1:7.2p2-4ubuntu2.2) ...
Preparing to unpack .../openssh-client_1%3a7.2p2-4ubuntu2.4_amd64.deb ...
Unpacking openssh-client (1:7.2p2-4ubuntu2.4) over (1:7.2p2-4ubuntu2.2) ...
Selecting previously unselected package linux-image-4.4.0-1049-aws.
Preparing to unpack .../linux-image-4.4.0-1049-aws_4.4.0-1049.58_amd64.deb ...
Done.
Unpacking linux-image-4.4.0-1049-aws (4.4.0-1049.58) ...
Preparing to unpack .../linux-aws_4.4.0.1049.51_amd64.deb ...
Unpacking linux-aws (4.4.0.1049.51) over (4.4.0.1047.49) ...
Preparing to unpack .../linux-image-aws_4.4.0.1049.51_amd64.deb ...
Unpacking linux-image-aws (4.4.0.1049.51) over (4.4.0.1047.49) ...
Selecting previously unselected package linux-aws-headers-4.4.0-1049.
Preparing to unpack .../linux-aws-headers-4.4.0-1049_4.4.0-1049.58_all.deb ...
Unpacking linux-aws-headers-4.4.0-1049 (4.4.0-1049.58) ...
Selecting previously unselected package linux-headers-4.4.0-1049-aws.
Preparing to unpack .../linux-headers-4.4.0-1049-aws_4.4.0-1049.58_amd64.deb ...
Unpacking linux-headers-4.4.0-1049-aws (4.4.0-1049.58) ...
Preparing to unpack .../linux-headers-aws_4.4.0.1049.51_amd64.deb ...
Unpacking linux-headers-aws (4.4.0.1049.51) over (4.4.0.1047.49) ...
Preparing to unpack .../cloud-initramfs-copymods_0.27ubuntu1.5_all.deb ...
Unpacking cloud-initramfs-copymods (0.27ubuntu1.5) over (0.27ubuntu1.4) ...
Preparing to unpack .../cloud-initramfs-dyn-netconf_0.27ubuntu1.5_all.deb ...
Unpacking cloud-initramfs-dyn-netconf (0.27ubuntu1.5) over (0.27ubuntu1.4) ...
Preparing to unpack .../overlayroot_0.27ubuntu1.5_all.deb ...
Unpacking overlayroot (0.27ubuntu1.5) over (0.27ubuntu1.4) ...
Processing triggers for man-db (2.7.5-1) ...
Processing triggers for libc-bin (2.23-0ubuntu10) ...
Processing triggers for ufw (0.35-0ubuntu2) ...
Processing triggers for systemd (229-4ubuntu21) ...
Processing triggers for ureadahead (0.100.0-19) ...
Setting up locales (2.23-0ubuntu10) ...
Generating locales (this might take a while)...
en_US.UTF-8... done
Generation complete.
Setting up distro-info-data (0.28ubuntu0.7) ...
Setting up iproute2 (4.3.0-1ubuntu3.16.04.3) ...
Setting up libisc-export160 (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up libdns-export162 (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up libisc160:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up libdns162:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up libisccc140:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up libisccfg140:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up libbind9-140:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up liblwres141:amd64 (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up bind9-host (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up dnsutils (1:9.10.3.dfsg.P4-8ubuntu1.10) ...
Setting up openssh-client (1:7.2p2-4ubuntu2.4) ...
Setting up openssh-sftp-server (1:7.2p2-4ubuntu2.4) ...
Setting up openssh-server (1:7.2p2-4ubuntu2.4) ...
Setting up linux-image-4.4.0-1049-aws (4.4.0-1049.58) ...
Running depmod.
update-initramfs: deferring update (hook will be called later)
Examining /etc/kernel/postinst.d.
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 4.4.0-1049-aws
/boot/vmlinuz-4.4.0-1049-aws

```


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```
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 4.4.0-1049-aws
/boot/vmlinuz-4.4.0-1049-aws
update-initramfs: Generating /boot/initrd.img-4.4.0-1049-aws
W: mdadm: /etc/mdadm/mdadm.conf defines no arrays.
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 4.4.0-1049-aws
/boot/vmlinuz-4.4.0-1049-aws
run-parts: executing /etc/kernel/postinst.d/update-notifier 4.4.0-1049-aws
/boot/vmlinuz-4.4.0-1049-aws
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 4.4.0-1049-aws
/boot/vmlinuz-4.4.0-1049-aws
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-4.4.0-1049-aws
Found initrd image: /boot/initrd.img-4.4.0-1049-aws
Found linux image: /boot/vmlinuz-4.4.0-1047-aws
Found initrd image: /boot/initrd.img-4.4.0-1047-aws
done
Setting up linux-image-aws (4.4.0.1049.51) ...
Setting up linux-aws-headers-4.4.0-1049 (4.4.0-1049.58) ...
Setting up linux-headers-4.4.0-1049-aws (4.4.0-1049.58) ...
Setting up linux-headers-aws (4.4.0.1049.51) ...
Setting up linux-aws (4.4.0.1049.51) ...
Setting up cloud-initramfs-copymods (0.27ubuntu1.5) ...
Setting up cloud-initramfs-dyn-netconf (0.27ubuntu1.5) ...
Setting up overlayroot (0.27ubuntu1.5) ...
Installing new version of config file /etc/overlayroot.conf ...
Processing triggers for libc-bin (2.23-0ubuntu10) ...
Processing triggers for initramfs-tools (0.122ubuntu8.10) ...
update-initramfs: Generating /boot/initrd.img-4.4.0-1049-aws
W: mdadm: /etc/mdadm/mdadm.conf defines no arrays.
root@ip-172-31-21-171:~#
```

We can double check all the security updates have been applied by typing the 'apt update' command again.

```
root@ip-172-31-21-171:~# apt update
Hit:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial InRelease
Hit:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates InRelease
Hit:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Fetched 102 kB in 0s (128 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
```

Having applied the security updates we now need to restart the Ubuntu VM instance from the EC2 console.

When the instance has restarted we can then SSH into it and get the following logon message:

```
spock@aspire-laptop ~ $ ssh -i ~/.ssh/MyKeyPair.pem ubuntu@54.212.247.223
Welcome to Ubuntu 16.04.3 LTS (GNU/Linux 4.4.0-1049-aws 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
```

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

```
Last login: Tue Jan 23 07:51:10 2018 from 92.20.252.242
```

3. Installing Nginx web server

We can show the details of a package with the 'apt show package-name' command.

```
root@ip-172-31-21-171:~# apt show nginx
Package: nginx
Version: 1.10.3-0ubuntu0.16.04.2
Priority: optional
Section: web
Origin: Ubuntu
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Original-Maintainer: Kartik Mistry <kartik@debian.org>
Bugs: https://bugs.launchpad.net/ubuntu/+filebug
Installed-Size: 37.9 kB
Depends: nginx-core (>= 1.10.3-0ubuntu0.16.04.2) | nginx-full (>= 1.10.3-0ubuntu0.16.04.2) | nginx-light (>= 1.10.3-0ubuntu0.16.04.2) | nginx-extras (>= 1.10.3-0ubuntu0.16.04.2), nginx-core (< 1.10.3-0ubuntu0.16.04.2.1~) | nginx-full (< 1.10.3-0ubuntu0.16.04.2.1~) | nginx-light (< 1.10.3-0ubuntu0.16.04.2.1~) | nginx-extras (< 1.10.3-0ubuntu0.16.04.2.1~)
Homepage: http://nginx.net
Supported: 5y
Download-Size: 3,490 B
APT-Sources: http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial-updates/main amd64 Packages
Description: small, powerful, scalable web/proxy server
Nginx ("engine X") is a high-performance web and reverse proxy server created by Igor Sysoev. It can be used both as a standalone web server and as a proxy to reduce the load on back-end HTTP or mail servers.
.
This is a dependency package to install either nginx-core (by default), nginx-full, nginx-light, or nginx-extras.
```

We can now install Nginx with the following command:

```
root@ip-172-31-21-171:~# apt install nginx
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
fontconfig-config fonts-dejavu-core libfontconfig1 libgd3 libjpeg-turbo8 libjpeg8 libtiff5 libvpx3 libxpm4 libxslt1.1 nginx-common nginx-core
Suggested packages:
libgd-tools fcgiwrap nginx-doc ssl-cert
The following NEW packages will be installed:
fontconfig-config fonts-dejavu-core libfontconfig1 libgd3 libjpeg-turbo8 libjpeg8 libtiff5 libvpx3 libxpm4 libxslt1.1 nginx nginx-common nginx-core
0 upgraded, 14 newly installed, 0 to remove and 0 not upgraded.
Need to get 3,000 kB of archives.
After this operation, 9,783 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libjpeg-turbo8 amd64 1.4.2-0ubuntu3 [111 kB]
Get:2 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 libjpeg8 amd64 2.1-3.1 [26.6 kB]
Get:3 http://us-west-2.ec2.archive.ubuntu.com/ubuntu xenial/main amd64 fonts-dejavu-core all 2.35-1 [1,039 kB]
...
```

Let's now check and see if Nginx is installed and running OK.

```
root@ip-172-31-21-171:~# which nginx
/usr/sbin/nginx
```

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```
root@ip-172-31-21-171:~# systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
Active: active (running) since Mon 2018-01-22 23:11:16 UTC; 5min ago
Main PID: 22822 (nginx)
CGroup: /system.slice/nginx.service
└─22822 nginx: master process /usr/sbin/nginx -g daemon on; master_process on
   └─22823 nginx: worker process
```

```
Jan 22 23:11:16 ip-172-31-21-171 systemd[1]: Starting A high performance web server and a reverse proxy server...
Jan 22 23:11:16 ip-172-31-21-171 systemd[1]: Started A high performance web server and a reverse proxy server.
root@ip-172-31-21-171:~#
```

Lets do a quick test to see that Nginx is accessible from the Ubuntu VM instance:

```
root@ip-172-31-21-171:~# wget localhost
--2018-01-22 23:30:52-- http://localhost/
Resolving localhost (localhost)... 127.0.0.1
Connecting to localhost (localhost)|127.0.0.1|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 612 [text/html]
Saving to: 'index.html'
```

```
index.html 100%[=====] 612 --.-KB/s in 0s
```

```
2018-01-22 23:30:52 (134 MB/s) - 'index.html' saved [612/612]
```

```
root@ip-172-31-21-171:~# ls
index.html
```

```
root@ip-172-31-21-171:~# cat index.html
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
body {
width: 35em;
margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif;
}
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
root@ip-172-31-21-171:~#
```

Nginx is now running and serving the default index.html file from the Document Root of /var/www/html

4. Script to automate Installing Nginx web server

This is a simple bash shell script called create-nginx-server.sh

```
#!/bin/bash

# This script will install the Nginx server

#-----#

# install Nginx
apt -y install nginx nginx-common nginx-core

# check it's up and running OK
systemctl --no-pager status nginx

echo

#-----#

exit
```

There is another shell script called remove-nginx-server.sh

```
#!/bin/bash

# This script will remove the Nginx server
# leave and it's configuration files on the Ubuntu instance

#-----#

# get the status of the Nginx server
systemctl --no-pager status nginx

# shut down the Nginx server
systemctl stop nginx

# get the status of the Nginx server
systemctl --no-pager status nginx

# remove Nginx
apt -y remove nginx nginx-common nginx-core

echo

#-----#

exit
```

5. Configuring Nginx web server

I have already created a version.txt file in Nginx's Document Root directory with the text contents of 'version-1.2.3':

```
root@ip-172-31-21-171:/var/www/html# ls
index.nginx-debian.html index.nginx-debian.html.orig version.txt

root@ip-172-31-21-171:/var/www/html# cat version.txt
version-1.2.3
```

6. Making Nginx web server accessible on the internet

We can now open port 80 to make Nginx accessible externally.

The screenshot shows the AWS Management Console interface for creating a security group. The 'Inbound' tab is active, displaying a table of inbound rules. The table has the following data:

Type	Protocol	Port Range	Source	Description
HTTP	TCP	80	0.0.0.0/0	
HTTP	TCP	80	::/0	
SSH	TCP	22	0.0.0.0/0	

```
spock@aspire-laptop ~ $ wget 54.212.247.223/version.txt
--2018-01-23 08:55:17-- http://54.212.247.223/version.txt
Connecting to 54.212.247.223:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 14 [text/plain]
Saving to: 'version.txt'
```

```
version.txt                               100%
[=====>]                               14  --.-KB/s    in 0s
```

```
2018-01-23 08:55:17 (1.75 MB/s) - 'version.txt' saved [14/14]
```

```
spock@aspire-laptop ~ $ cat version.txt
version-1.2.3
```

That's the Nginx server all set up to serve the above version.txt file.

7. Running the checker script

The checker script is called check-server.sh and takes 2 optional command line parameters.

with zero parameters

```
./check-server
```

This defaults to a wait time of 5 seconds and the filename of version.txt

with one parameter

```
./check-server 1
```

This sets the wait time to 1 second and keeps the default filename at version.txt

with two parameters

```
./check-server 1 another-file.txt
```

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This sets the wait time to 1 second and changes the requested filename to another-file.txt

NB: to set the requested filename as the second parameter you MUST also set the wait time as the first parameter.

Running the script without any parameters

```
spock@aspire-laptop ~/cydar-check-script $ ./check-server.sh
```

```
WAIT_TIME: 5
```

```
WAIT_TIME defaults to 5 seconds
```

```
FILENAME: version.txt
```

```
FILENAME defaults to version.txt
```

```
version.txt
```

```
removed './version.txt'
```

```
--2018-01-24 10:59:38-- http://54.212.247.223/version.txt
```

```
Connecting to 54.212.247.223:80... connected.
```

```
HTTP request sent, awaiting response... 200 OK
```

```
Length: 14 [text/plain]
```

```
Saving to: 'version.txt'
```

```
version.txt
```

```
100%
```

```
[=====>] 14 --.-KB/s in 0s
```

```
2018-01-24 10:59:38 (1.46 MB/s) - 'version.txt' saved [14/14]
```

```
version.txt
```

```
DOWNLOADED_VERSION_NUMBER: version-1.2.3
```

```
EXPECTED_VERSION_NUMBER: version-1.2.3
```

```
The version numbers are identical.
```

```
The server is running OK.
```

```
Press [CTRL+C] to exit program...
```

Running the script with one parameter

The first parameter is an integer value to set the number of seconds the script has to wait before requesting the version.txt file from the server again.

We can set that wait time with:

```
spock@aspire-laptop ~/cydar-check-script $ ./check-server.sh 2
```

```
WAIT_TIME: 2
```

```
WAIT_TIME set to 2 second(s)
```

```
FILENAME: version.txt
```

```
FILENAME defaults to version.txt
```

```
version.txt
```

```
removed './version.txt'
```

```
--2018-01-24 11:04:11-- http://54.212.247.223/version.txt
```

```
Connecting to 54.212.247.223:80... connected.
```

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HTTP request sent, awaiting response... 200 OK
Length: 14 [text/plain]
Saving to: 'version.txt'

```
version.txt                               100%  
[=====>]                               14  --.-KB/s    in 0s
```

2018-01-24 11:04:11 (792 KB/s) - 'version.txt' saved [14/14]

version.txt

DOWNLOADED_VERSION_NUMBER: version-1.2.3

EXPECTED_VERSION_NUMBER: version-1.2.3

The version numbers are identical.
The server is running OK.

Press [CTRL+C] to exit program...

Running the script with two parameters

```
spock@aspire-laptop ~/cydar-check-script $ ./check-server.sh 2 another-file.txt
```

WAIT_TIME: 2

WAIT_TIME set to 2 second(s)

FILENAME: another-file.txt

FILENAME set to another-file.txt

version.txt

removed './version.txt'

--2018-01-24 11:24:17-- http://54.212.247.223/another-file.txt

Connecting to 54.212.247.223:80... connected.

HTTP request sent, awaiting response... 404 Not Found

2018-01-24 11:24:17 ERROR 404: Not Found.

ls: cannot access 'version.txt': No such file or directory

cat: ./version.txt: No such file or directory

DOWNLOADED_VERSION_NUMBER:

EXPECTED_VERSION_NUMBER: version-1.2.3

There may be problems with the server.

Press [CTRL+C] to exit program...