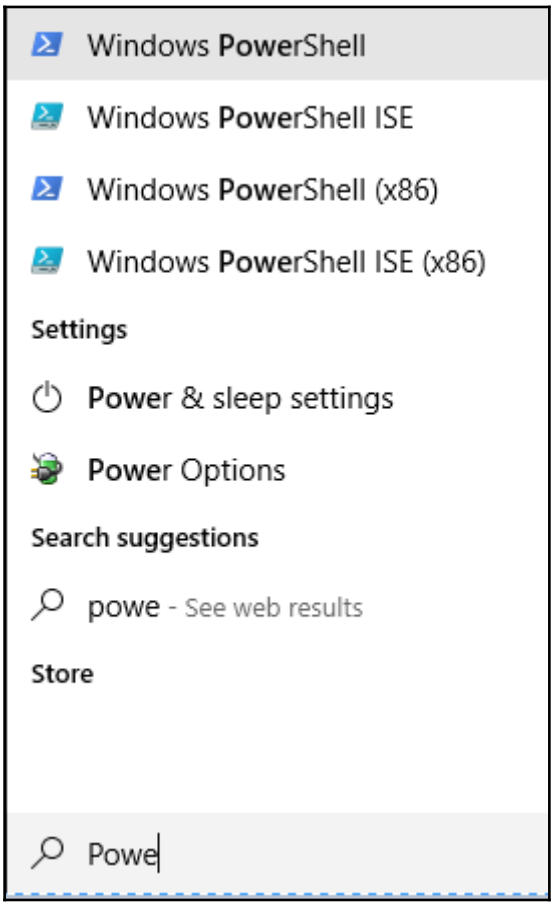
Chapter 1: PowerShell Essentials



```
PS C:\> get-host


Name             : ConsoleHost
Version          : 6.0.0
InstanceId       : 97e3ac95-bce3-40a3-8763-ebd1fb6f8334
UI               : System.Management.Automation.Internal.Host.InternalHostUserInterface
CurrentCulture   : en-AU
CurrentUICulture : en-US
PrivateData      : Microsoft.PowerShell.ConsoleHost+ConsoleColorProxy
DebuggerEnabled  : True
IsRunspacePushed : False
Runspace         : System.Management.Automation.Runspaces.LocalRunspace



PS C:\> $PSVersionTable

Name                           Value
----                           -----
PSVersion                      6.0.0-beta
PSEdition                      Core
BuildVersion                   3.0.0.0
CLRVersion
GitCommitId                    v6.0.0-beta.1
OS                             Microsoft Windows 10.0.14393
Platform                       Win32NT
PSCompatibleVersions           {1.0, 2.0, 3.0, 4.0...}
PSRemotingProtocolVersion      2.3
SerializationVersion           1.1.0.1
WSManStackVersion              3.0
```

```
PS C:\> Get-Help Get-Process

NAME
    Get-Process

SYNOPSIS
    Gets the processes that are running on the local computer or a remote computer.


SYNTAX
    Get-Process [[-Name] <String[]>] [-ComputerName <String[]>] [-FileVersionInfo] [-Module] [<CommonParameters>]

    Get-Process [-ComputerName <String[]>] [-FileVersionInfo] -Id <Int32[]> [-Module] [<CommonParameters>]

    Get-Process [-ComputerName <String[]>] [-FileVersionInfo] -InputObject <Process[]> [-Module] [<CommonParameters>]

    Get-Process -Id <Int32[]> -IncludeUserName [<CommonParameters>]

    Get-Process [[-Name] <String[]>] -IncludeUserName [<CommonParameters>]

    Get-Process -IncludeUserName -InputObject <Process[]> [<CommonParameters>]


DESCRIPTION
    The Get-Process cmdlet gets the processes on a local or remote computer.

    Without parameters, this cmdlet gets all of the processes on the local computer. You can also specify a particular process by process name or process ID (PID) or pass a
    process object through the pipeline to this cmdlet.

    By default, this cmdlet returns a process object that has detailed information about the process and supports methods that let you start and stop the process. You can also
    use the parameters of the Get-Process cmdlet to get file version information for the program that runs in the process and to get the modules that the process loaded.


RELATED LINKS
    Online Version: http://go.microsoft.com/fwlink/?linkid=821590
    Debug-Process
    Get-Process
    Start-Process
    Stop-Process
    Wait-Process

REMARKS
    To see the examples, type: "get-help Get-Process -examples".
    For more information, type: "get-help Get-Process -detailed".
    For technical information, type: "get-help Get-Process -full".
    For online help, type: "get-help Get-Process -online"
```

```
PS C:\> Get-Alias dir

CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Alias           dir -> Get-ChildItem


PS C:\> Get-Alias ls

CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Alias           ls -> Get-ChildItem


PS C:\> Get-Alias gci

CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Alias           gci -> Get-ChildItem
```

```
PS C:\> Get-Service

Status   Name               DisplayName
------   ----               -----------
Running  AdobeARMservice    Adobe Acrobat Update Service
Stopped  AJRouter           AllJoyn Router Service
Stopped  ALG                Application Layer Gateway Service
Running  ApHidMonitorSer... Alps HID Monitor Service
Stopped  AppIDSvc           Application Identity
Running  Appinfo            Application Information
```

```
PS C:\> Get-Service | Get-Member


   TypeName: System.ServiceProcess.ServiceController

Name                MemberType    Definition
----                ----------    ----------
Name                AliasProperty Name = ServiceName
RequiredServices    AliasProperty RequiredServices = ServicesDependedOn
Continue            Method        void Continue()
Dispose             Method        void Dispose(), void IDisposable.Dispose()
Equals              Method        bool Equals(System.Object obj)
GetHashCode         Method        int GetHashCode()
GetType             Method        type GetType()
Pause               Method        void Pause()
Refresh             Method        void Refresh()
Start               Method        void Start(), void Start(string[] args)
Stop                Method        void Stop()
WaitForStatus       Method        void WaitForStatus(System.ServiceProcess.ServiceControllerStatus desiredStatus), void Wait
CanPauseAndContinue Property      bool CanPauseAndContinue {get;}
CanShutdown         Property      bool CanShutdown {get;}
CanStop             Property      bool CanStop {get;}
DependentServices   Property      System.ServiceProcess.ServiceController[] DependentServices {get;}
DisplayName         Property      string DisplayName {get;}
MachineName         Property      string MachineName {get;}
ServiceHandle       Property      System.Runtime.InteropServices.SafeHandle ServiceHandle {get;}
ServiceName         Property      string ServiceName {get;}
ServicesDependedOn  Property      System.ServiceProcess.ServiceController[] ServicesDependedOn {get;}
ServiceType         Property      System.ServiceProcess.ServiceType ServiceType {get;}
StartType           Property      System.ServiceProcess.ServiceStartMode StartType {get;}
Status              Property      System.ServiceProcess.ServiceControllerStatus Status {get;}
ToString            ScriptMethod  System.Object ToString();
```

```
PS C:\> Get-Childitem C:\somedata\file*.txt -Recurse | Remove-Item -WhatIf
What if: Performing the operation "Remove File" on target "C:\somedata\file1.txt".
What if: Performing the operation "Remove File" on target "C:\somedata\file2.txt".
What if: Performing the operation "Remove File" on target "C:\somedata\file3.txt".
What if: Performing the operation "Remove File" on target "C:\somedata\file4.txt".
What if: Performing the operation "Remove File" on target "C:\somedata\file5.txt".
```

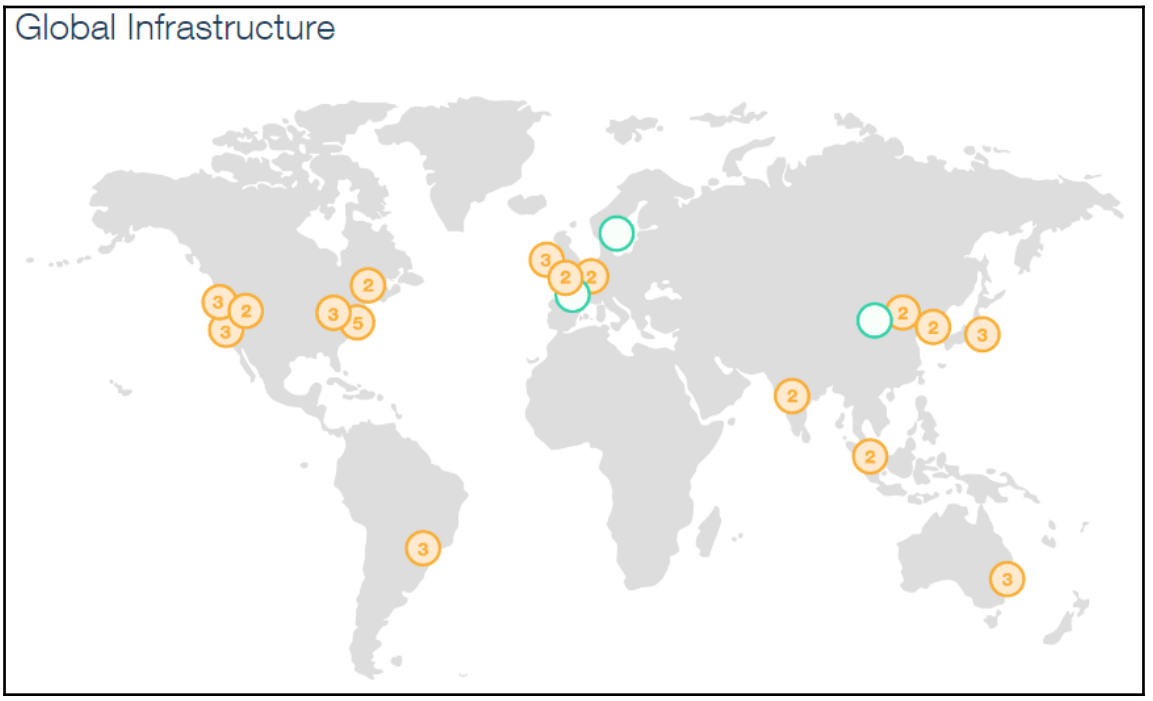
```
PS C:\> Get-Childitem C:\somedata\file*.txt -Recurse | Remove-Item -Confirm

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove File" on target "C:\somedata\file1.txt".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): N

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove File" on target "C:\somedata\file2.txt".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): N

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove File" on target "C:\somedata\file3.txt".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): N
```

```
PS D:\scripts> Get-Content .\PS_Comment.ps1
<#
.Synopsis
This is an example of building parameterized script
.Description
This script checks free space on the given drive
.Parameter ComputerName
This is name of the Computer for which script needs to be run
.Parameter Drive
This indicates drive letter for which free space need to be checked
.Parameter NotForUse
This is sample added parameter
.Example
Connecting to Local Computer
DiskInfo -Computername localhost
.Example
Connecting to Remote Computer
DiskInfo -ComputerName remote_machine
#>

param(
        [Parameter(Mandatory=$true)]
        [string[]] $Computername,
        $Drive,
        $NotForUse
)

# Main Code Below

Get-CimInstance -ComputerName $Computername -ClassName Win32_LogicalDisk -filter "DeviceID='$Drive'" |
Select-Object -Property @{n="ComputerName";e={$_.PSComputerName}},@{n="FreeGB";e={$_.FreeSpace / 1gb -as [int]}}
PS D:\scripts>
```

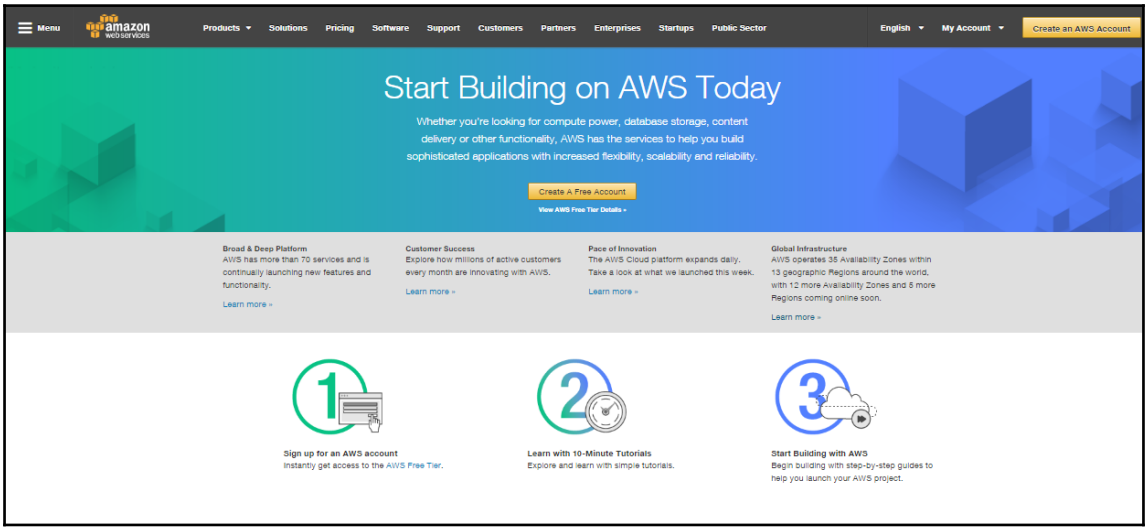
```
PS D:\scripts> get-help .\PS_Comment.ps1 -detailed

NAME
    D:\scripts\PS_Comment.ps1

SYNOPSIS
    This is an example of building parameterized script


SYNTAX
    D:\scripts\PS_Comment.ps1 [-Computername] <String[]> [[-Drive] <Object>] [[-NotForUse] <Object>] [<CommonParameters>]


DESCRIPTION
    This script checks free space on the given drive


PARAMETERS
    -Computername <String[]>
        This is name of the Computer for which script needs to be run

    -Drive <Object>
        This indicates drive letter for which free space need to be checked

    -NotForUse <Object>
        This is sample added parameter

    <CommonParameters>
        This cmdlet supports the common parameters: Verbose, Debug,
        ErrorAction, ErrorVariable, WarningAction, WarningVariable,
        OutBuffer, PipelineVariable, and OutVariable. For more information, see
        about_CommonParameters (https://go.microsoft.com/fwlink/?LinkID=113216).

    -------------------------- EXAMPLE 1 --------------------------

    PS C:\>Connecting to Local Computer

    DiskInfo -Computername localhost




    -------------------------- EXAMPLE 2 --------------------------

    PS C:\>Connecting to Remote Computer
```

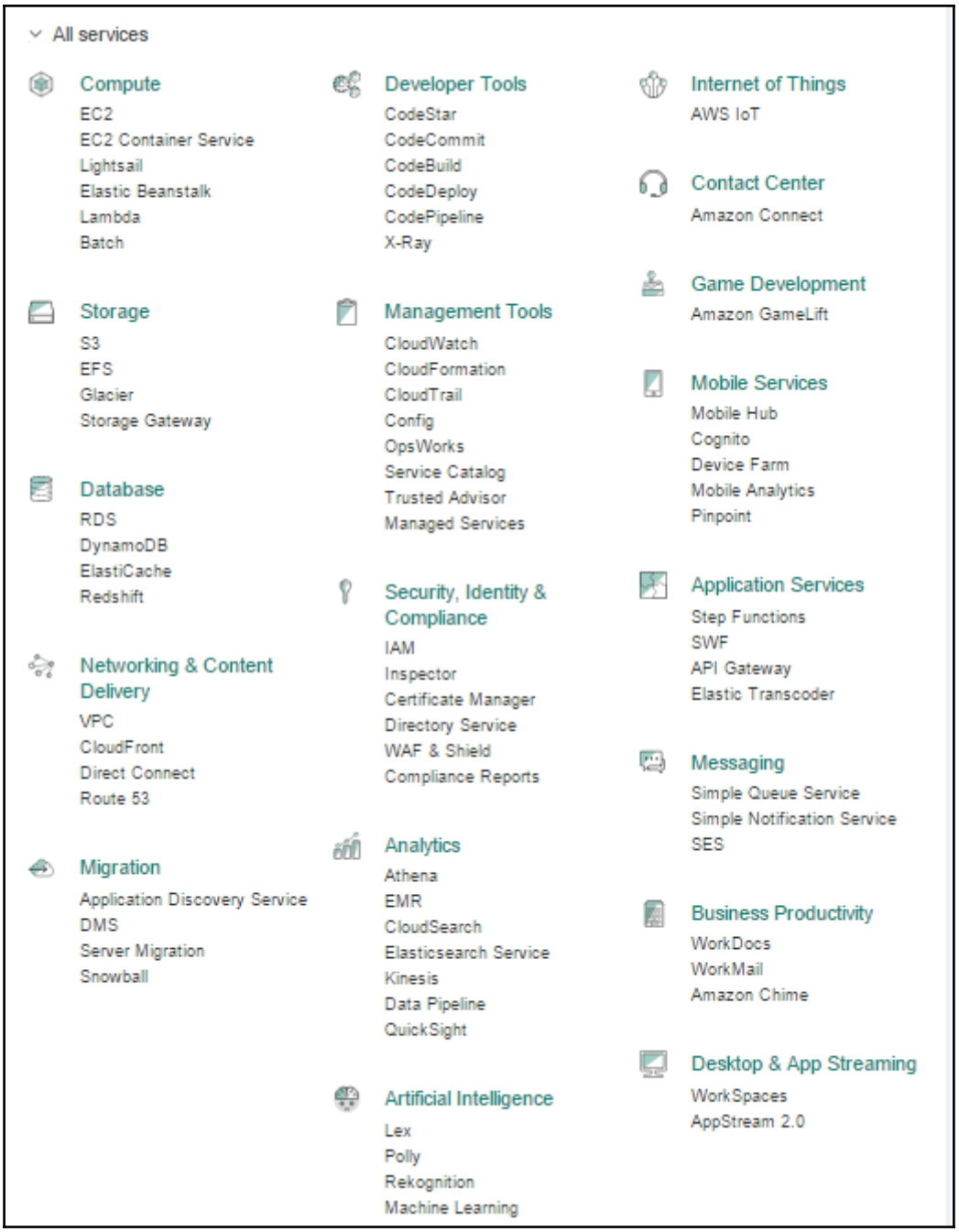
```
PS D:\scripts> Get-Content .\DiskInfo.ps1
param(
        [Parameter(Mandatory=$true)]
        [string[]] $Drive,
        $NotForUse
)

Get-CimInstance -ComputerName APPS1 -ClassName Win32_LogicalDisk -filter "DeviceID='$Drive'" |
Select-Object -Property @{n="ComputerName";e={$_.PSComputerName}},@{n="FreeGB";e={$_.FreeSpace / 1gb -as [int]}}
PS D:\scripts>
```

Chapter 2: The AWS Overview



Certifications / Attestations	Laws, Regulations, and Privacy	Alignments / Frameworks
C5 [Germany]	CISPE	CIS
Cyber Essentials Plus [UK]	EU Model Clauses	CJIS
DoD SRG	FERPA	CSA
FedRAMP	GLBA	ENS [Spain]
FIPS	HIPAA	EU-US Privacy Shield
IRAP [Australia]	HITECH	FISC
ISO 9001	IRS 1075	FISMA
ISO 27001	ITAR	G-Cloud [UK]
ISO 27017	My Number Act [Japan]	GxP (FDA CFR 21 Part 11)
ISO 27018	U.K. DPA - 1988	ICREA
MLPS Level 3 [China]	VPAT / Section 508	IT Grundschutz [Germany]
MTCS [Singapore]	EU Data Protection Directive	MITA 3.0
PCI DSS Level 1	Privacy Act [Australia]	MPAA
SEC Rule 17-a-4(f)	Privacy Act [New Zealand]	NIST
SOC 1	PDPA - 2010 [Malaysia]	PHR
SOC 2	PDPA - 2012 [Singapore]	Uptime Institute Tiers
SOC 3	PIPEDA [Canada]	UK Cloud Security Principles
	Spanish DPA Authorization	




All services
Compute
EC2
EC2 Container Service
Lightsail
Elastic Beanstalk
Lambda
Batch
Storage
S3
EFS
Glacier
Storage Gateway
Database
RDS
DynamoDB
ElastiCache
Redshift
Networking & Content Delivery
VPC
CloudFront
Direct Connect
Route 53
Migration
Application Discovery Service
DMS
Server Migration
Snowball
Developer Tools
CodeStar
CodeCommit
CodeBuild
CodeDeploy
CodePipeline
X-Ray
Management Tools
CloudWatch
CloudFormation
CloudTrail
Config
OpsWorks
Service Catalog
Trusted Advisor
Managed Services
Security, Identity & Compliance
IAM
Inspector
Certificate Manager
Directory Service
WAF & Shield
Compliance Reports
Analytics
Athena
EMR
CloudSearch
Elasticsearch Service
Kinesis
Data Pipeline
QuickSight
Artificial Intelligence
Lex
Polly
Rekognition
Machine Learning
Internet of Things
AWS IoT
Contact Center
Amazon Connect
Game Development
Amazon GameLift
Mobile Services
Mobile Hub
Cognito
Device Farm
Mobile Analytics
Pinpoint
Application Services
Step Functions
SWF
API Gateway
Elastic Transcoder
Messaging
Simple Queue Service
Simple Notification Service
SES
Business Productivity
WorkDocs
WorkMail
Amazon Chime
Desktop & App Streaming
WorkSpaces
AppStream 2.0

Features	Basic Current plan	Developer	Business	Enterprise
Customer service and communities	24x7 access to customer service, documentation, whitepapers, and support forums	24x7 access to customer service, documentation, whitepapers, and support forums	24x7 access to customer service, documentation, whitepapers, and support forums	24x7 access to customer service, documentation, whitepapers, and support forums
Best practices	Access to 4 core Trusted Advisor checks	Access to 4 core Trusted Advisor checks	Access to all Trusted Advisor checks	Access to all Trusted Advisor checks
Health status and Notifications	Access to Personal Health Dashboard	Access to Personal Health Dashboard	Access to Personal Health Dashboard & Health APIs	Access to Personal Health Dashboard & Health APIs
Technical support		Local business hours** access to Cloud Support Associates via email	24x7 access to Cloud Support Engineers via email, chat, and phone	24x7 access to Cloud Support Engineers via email, chat, and phone
Who can open cases		One primary contact/ Unlimited cases	Unlimited contacts/ Unlimited cases (IAM supported)	Unlimited contacts/ Unlimited cases (IAM supported)
Case severity/Response times*		General guidance: < 24 hours System impaired: < 12 hours	General guidance: < 24 hours System impaired: < 12 hours Production system impaired: < 4 hours Production system down: < 1 hour	General guidance: < 24 hours System impaired: < 12 hours Production system impaired: < 4 hours Production system down: < 1 hour Business-critical system down: < 15 minutes
Architecture support		General guidance	Contextual guidance based on your use-case	Consultative review and guidance based on your applications and solutions
Launch support			Infrastructure Event Management Contact us for pricing	Infrastructure Event Management (Included)
Programmatic case management			AWS Support API	AWS Support API
Third-party software support			Interoperability and configuration guidance and troubleshooting	Interoperability and configuration guidance and troubleshooting
Architecture review				Access to a Well-Architected Review delivered by AWS Solution Architects
Operations support				Operational reviews, recommendations, and reporting
Training				Access to online self-paced labs
Account assistance				Assigned Support Concierge
Proactive guidance				Designated Technical Account Manager
Pricing	Free	Starting at $29/month	Starting at $100/month	Starting at $15,000/month

Chapter 3: Installing PowerShell Core and AWS Tools

Platform	Downloads	How to Install
Windows 10 / Server 2016 (x64)	.msi	Instructions
Windows 8.1 / Server 2012 R2 (x64)	.msi	Instructions
Windows 7 / Server 2008 R2 (x64)	.msi	Instructions
Windows 7 (x86)	.msi	Instructions
Ubuntu 16.04	.deb	Instructions
Ubuntu 14.04	.deb	Instructions
Debian 8	.deb	Instructions
CentOS 7	.rpm	Instructions
Red Hat Enterprise Linux 7	.rpm	Instructions
OpenSUSE 42.1	.rpm	Instructions
Arch Linux		Instructions
Many Linux distributions	.AppImage	Instructions
macOS 10.12	.pkg	Instructions
Docker		Instructions

```
[root@ip-172-31-61-33 ~]# which powershell
/usr/bin/which: no powershell in (/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin:/root/bin)
[root@ip-172-31-61-33 ~]# cat /etc/redhat-release
Red Hat Enterprise Linux Server release 7.3 (Maipo)
[root@ip-172-31-61-33 ~]# curl https://packages.microsoft.com/config/rhel/7/prod.repo | sudo tee /etc/yum.repos.d/microsoft.repo
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   193  100   193    0     0    516      0 --:--:-- --:--:-- --:--:--   517
[packages-microsoft-com-prod]
name=packages-microsoft-com-prod
baseurl=https://packages.microsoft.com/rhel/7/prod/
enabled=1
gpgcheck=1
gpgkey=https://packages.microsoft.com/keys/microsoft.asc
[root@ip-172-31-61-33 ~]# sudo yum install -y powershell
```

```
[root@ip-172-31-61-33 ~]# which powershell
/bin/powershell
[root@ip-172-31-61-33 ~]# powershell
PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS /root> Get-Host


Name             : ConsoleHost
Version          : 6.0.0
InstanceId       : 4a369fd3-c67c-4e76-9f07-2df44ce749c1
UI               : System.Management.Automation.Internal.Host.InternalHostUserInterface
CurrentCulture   : en-US
CurrentUICulture : en-US
PrivateData      : Microsoft.PowerShell.ConsoleHost+ConsoleColorProxy
DebuggerEnabled  : True
IsRunspacePushed : False
Runspace         : System.Management.Automation.Runspaces.LocalRunspace
```

```
Administrator: PowerShell-6.0.0-beta.2
PS C:\> $PSHOME
C:\Program Files\PowerShell\6.0.0-beta.2
PS C:\> Install-Package -Name AWSPowerShell.NetCore -Source https://www.powershellgallery.com/api/v2/ -ProviderName NuGet -ExcludeVersion -Destination $PSHOM
E/Modules

The package(s) come(s) from a package source that is not marked as trusted.
Are you sure you want to install software from 'https://www.powershellgallery.com/api/v2/'?
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "N"): Y

Name                           Version          Source                         Summary
----                           -------          ------                         -------
AWSPowerShell.NetCore          3.3.98.0         https://www.powershellgallery... The AWS Tools for PowerShell Core lets developers and administrators man...
```

```
[root@ip-172-31-61-33 ~]# powershell
PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

PS /root> $PSHOME
/opt/microsoft/powershell/6.0.0-beta.2
PS /root> Install-Package -Name AWSPowerShell.NetCore -Source https://www.powershellgallery.com/api/v2/ -ProviderName NuGet -ExcludeVersion -Destination $PSH
OME/Modules

The package(s) come(s) from a package source that is not marked as trusted.
Are you sure you want to install software from 'https://www.powershellgallery.com/api/v2/'?
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "N"): Y

Name                           Version          Source                         Summary
----                           -------          ------                         -------
AWSPowerShell.NetCore          3.3.98.0         https://www.powershellgallery... The AWS Tools for PowerShell Core lets developers and administrators man...
```

```
PS /root> Get-Module -ListAvailable


    Directory: /opt/microsoft/powershell/6.0.0-beta.2/Modules


ModuleType Version    Name                                ExportedCommands
---------- -------    ----                                ----------------
Binary     3.3.98.0   AWSPowerShell.NetCore               {Add-AASScalableTarget, Add-ACMCertificateTag, Add-ADSConfigurationItemsToApplication, Add-ASAA...
Manifest   1.1.0.0    Microsoft.PowerShell.Archive        {Compress-Archive, Expand-Archive}
Manifest   3.0.0.0    Microsoft.PowerShell.Host           {Start-Transcript, Stop-Transcript}
Manifest   3.1.0.0    Microsoft.PowerShell.Management     {Add-Content, Clear-Content, Clear-ItemProperty, Join-Path...}
Manifest   3.0.0.0    Microsoft.PowerShell.Security       {Get-Credential, Get-ExecutionPolicy, Set-ExecutionPolicy, ConvertFrom-SecureString...}
Manifest   3.1.0.0    Microsoft.PowerShell.Utility        {Format-List, Format-Custom, Format-Table, Format-Wide...}
Script     1.1.4.0    PackageManagement                   {Find-Package, Get-Package, Get-PackageProvider, Get-PackageSource...}
Script     3.3.9      Pester                              {Describe, Context, It, Should...}
Script     1.1.3.1    PowerShellGet                       {Install-Module, Find-Module, Save-Module, Update-Module...}
Script     0.0        PSDesiredStateConfiguration         {ThrowError, Get-PSMetaConfigDocumentInstVersionInfo, New-DscChecksum, ValidateNodeResourceSour...
Script     1.2        PSReadLine                          {Get-PSReadlineKeyHandler, Set-PSReadlineKeyHandler, Remove-PSReadlineKeyHandler, Get-PSReadlin...
```

```
PS C:\> Get-Module -ListAvailable


    Directory: C:\program files\powershell\6.0.0-beta.2\Modules


ModuleType Version    Name                                ExportedCommands
---------- -------    ----                                ----------------
Binary     3.3.98.0   AWSPowerShell.NetCore               {Add-AASScalableTarget, Add-ACMCertificateTag, Add-ADSConfigurationItemsToApplication, Add-ASAA...
Manifest   1.0.0.0    CimCmdlets                          {Get-CimAssociatedInstance, Get-CimClass, Get-CimInstance, Get-CimSession...}
Manifest   1.1.0.0    Microsoft.PowerShell.Archive        {Compress-Archive, Expand-Archive}
Manifest   3.0.0.0    Microsoft.PowerShell.Diagnostics    {Get-WinEvent, New-WinEvent, Get-Counter, Import-Counter...}
Manifest   3.0.0.0    Microsoft.PowerShell.Host           {Start-Transcript, Stop-Transcript}
Manifest   1.0.0.0    Microsoft.PowerShell.LocalAccounts  {Add-LocalGroupMember, Disable-LocalUser, Enable-LocalUser, Get-LocalGroup...}
Manifest   3.1.0.0    Microsoft.PowerShell.Management     {Add-Content, Clear-Content, Clear-ItemProperty, Join-Path...}
Manifest   3.0.0.0    Microsoft.PowerShell.Security       {Get-Acl, Set-Acl, Get-PfxCertificate, Get-Credential...}
Manifest   3.1.0.0    Microsoft.PowerShell.Utility        {Format-List, Format-Custom, Format-Table, Format-Wide...}
Manifest   3.0.0.0    Microsoft.WSMan.Management          {Disable-WSManCredSSP, Enable-WSManCredSSP, Get-WSManCredSSP, Set-WSManQuickConfig...}
Script     4.2.3      NTFSSecurity                        {Add-NTFSAccess, Clear-NTFSAccess, Disable-NTFSAccessInheritance, Enable-NTFSAccessInheritance...}
Script     1.1.4.0    PackageManagement                   {Find-Package, Get-Package, Get-PackageProvider, Get-PackageSource...}
Script     3.3.9      Pester                              {Describe, Context, It, Should...}
Script     1.1.3.1    PowerShellGet                       {Install-Module, Find-Module, Save-Module, Update-Module...}
Script     0.0        PSDesiredStateConfiguration         {ThrowError, Get-PSMetaConfigDocumentInstVersionInfo, New-DscChecksum, ValidateNodeResourceSour...
Script     1.0.0.0    PSDiagnostics                       {Disable-PSTrace, Disable-PSWSManCombinedTrace, Disable-WSManTrace, Enable-PSTrace...}
Script     1.2        PSReadLine                          {Get-PSReadlineKeyHandler, Set-PSReadlineKeyHandler, Remove-PSReadlineKeyHandler, Get-PSReadlin...
Manifest   1.3.0.0    SecurityPolicyDsc
Manifest   1.2.0.0    xSystemSecurity
```

```
PS C:\> Get-ExecutionPolicy -List | Format-Table -AutoSize

        Scope ExecutionPolicy
        ----- ---------------
MachinePolicy       Undefined
   UserPolicy       Undefined
      Process       Undefined
  CurrentUser       Undefined
 LocalMachine      Restricted


PS C:\>
```

```
PS C:\> Set-ExecutionPolicy RemoteSigned
PS C:\> Get-ExecutionPolicy -List | Format-Table -AutoSize

        Scope ExecutionPolicy
        ----- ---------------
MachinePolicy       Undefined
   UserPolicy       Undefined
      Process       Undefined
  CurrentUser       Undefined
 LocalMachine    RemoteSigned


PS C:\>
```

```
PS C:\> Get-AWSPowerShellVersion

AWS Tools for PowerShell Core
Version 3.3.98.0
Copyright 2012-2017 Amazon.com, Inc. or its affiliates. All Rights Reserved.

Amazon Web Services SDK for .NET
Core Runtime Version 3.3.14.0
Copyright 2009-2015 Amazon.com, Inc. or its affiliates. All Rights Reserved.

Release notes: https://aws.amazon.com/releasenotes/PowerShell

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- Logging from log4net, Apache License
[http://logging.apache.org/log4net/license.html]

PS C:\>
```

```
PS C:\> Get-AWSPowerShellVersion -ListServices

AWS Tools for PowerShell Core
Version 3.3.98.0
Copyright 2012-2017 Amazon.com, Inc. or its affiliates. All Rights Reserved.

Amazon Web Services SDK for .NET
Core Runtime Version 3.3.14.0
Copyright 2009-2015 Amazon.com, Inc. or its affiliates. All Rights Reserved.

Release notes: https://aws.amazon.com/releasenotes/PowerShell

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[http://logging.apache.org/log4net/license.html]


Service                              Noun Prefix API Version
-------                              ----------- -----------
AWS AppStream                        APS         2016-12-01
AWS Batch                            BAT         2016-08-10
AWS Budgets                          BGT         2016-10-20
AWS Certificate Manager              ACM         2015-12-08
AWS Cloud Directory                  CDIR        2016-05-10
AWS Cloud HSM                        HSM         2014-05-30
AWS CloudFormation                   CFN         2010-05-15
```
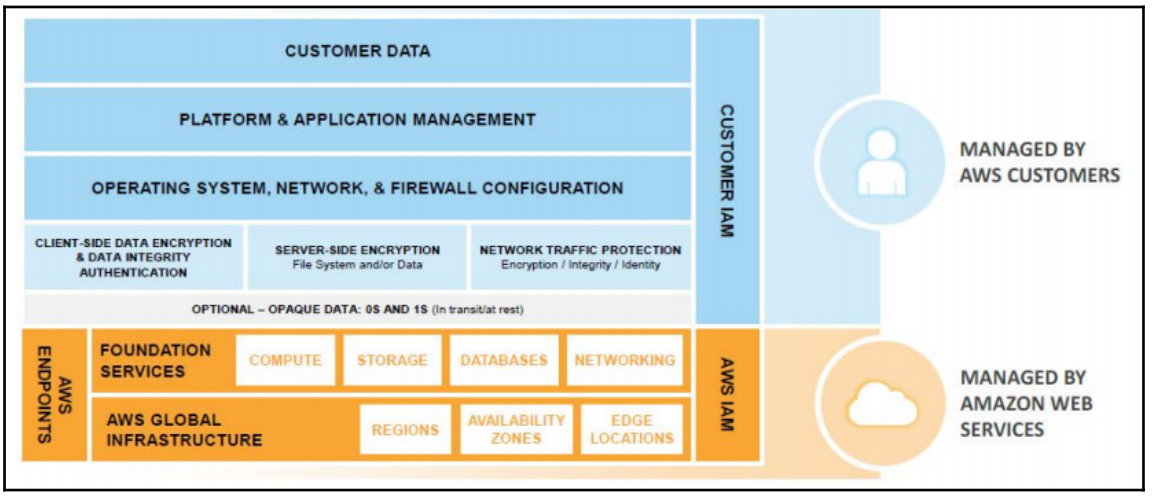

Chapter 4: AWS Identity and Access Management




```
PS C:\> Set-AWSCredentials -AccessKey AKIAIVQ7QQR7ISZUBY2A -SecretKey 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 -StoreAs PowerShellProfile
PS C:\> Get-AWSCredentials -ListProfileDetail

ProfileName       StoreTypeName         ProfileLocation
-----------       -------------         ---------------
PowerShellProfile NetSDKCredentialsFile


PS C:\>
```

```
PS C:\> Initialize-AWSDefaults -ProfileName PowerShellProfile -Region us-west-2
PS C:\> Get-AWSCredentials -ListProfileDetail

ProfileName       StoreTypeName         ProfileLocation
-----------       -------------         ---------------
PowerShellProfile NetSDKCredentialsFile
default           NetSDKCredentialsFile


PS C:\>
```

```
PS C:\> Get-AWSRegion

Region         Name                          IsShellDefault
------         ----                          --------------
ap-northeast-1 Asia Pacific (Tokyo)          False
ap-northeast-2 Asia Pacific (Seoul)          False
ap-south-1     Asia Pacific (Mumbai)         False
ap-southeast-1 Asia Pacific (Singapore)      False
ap-southeast-2 Asia Pacific (Sydney)         False
ca-central-1   Canada (Central)              False
eu-central-1   EU Central (Frankfurt)        False
eu-west-1      EU West (Ireland)             False
eu-west-2      EU West (London)              False
sa-east-1      South America (Sao Paulo)     False
us-east-1      US East (Virginia)            False
us-east-2      US East (Ohio)                False
us-west-1      US West (N. California)       False
us-west-2      US West (Oregon)              True


PS C:\>
```

```
PS C:\> New-IAMUser -UserName Ramesh


Arn               : arn:aws:iam::072316406132:user/Ramesh
CreateDate        : 6/5/2017 1:38:02 PM
PasswordLastUsed  : 1/1/0001 12:00:00 AM
Path              : /
UserId            : AIDAIIROGQFGVBDKMAUXY
UserName          : Ramesh
```

```
PS C:\> Get-IAMGroupList
PS C:\> New-IAMGroup -GroupName developer


Arn         : arn:aws:iam::072316406132:group/developer
CreateDate  : 6/5/2017 1:52:35 PM
GroupId     : AGPAJ7QFAJES6UK5NLGAK
GroupName   : developer
Path        : /



PS C:\> Get-IAMGroupList


Arn         : arn:aws:iam::072316406132:group/developer
CreateDate  : 6/5/2017 1:52:35 PM
GroupId     : AGPAJ7QFAJES6UK5NLGAK
GroupName   : developer
Path        : /
```

```
PS C:\> Get-IAMPolicies | where-object {$_.PolicyName -like "*S3*"} |format-table -Property PolicyName,Arn

PolicyName              Arn
----------              ---
AmazonDMSRedshiftS3Role arn:aws:iam::aws:policy/service-role/AmazonDMSRedshiftS3Role
AmazonS3FullAccess      arn:aws:iam::aws:policy/AmazonS3FullAccess
AmazonS3ReadOnlyAccess  arn:aws:iam::aws:policy/AmazonS3ReadOnlyAccess


PS C:\> Get-IAMPolicies | where-object {$_.PolicyName -like "*dynamo*"} |format-table -Property PolicyName,Arn

PolicyName                     Arn
----------                     ---
AmazonDynamoDBFullAccess       arn:aws:iam::aws:policy/AmazonDynamoDBFullAccess
AWSLambdaDynamoDBExecutionRole arn:aws:iam::aws:policy/service-role/AWSLambdaDynamoDBExecutionRole
AmazonDynamoDBReadOnlyAccess   arn:aws:iam::aws:policy/AmazonDynamoDBReadOnlyAccess
AmazonDynamoDBFullAccesswit... arn:aws:iam::aws:policy/AmazonDynamoDBFullAccesswithDataPipeline
AWSLambdaInvocation-DynamoDB   arn:aws:iam::aws:policy/AWSLambdaInvocation-DynamoDB
```

```
PS C:\> New-IAMLoginProfile -UserName Ramesh -Password Test123 -PasswordResetRequired $false
New-IAMLoginProfile : One or more errors occurred. (Password does not conform to the account password policy.)
At line:1 char:1
+ New-IAMLoginProfile -UserName Ramesh -Password Test123 -PasswordReset ...
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : InvalidOperation: (Amazon.PowerShe...inProfileCmdlet:NewIAMLoginProfileCmdlet) [New-IAMLoginProfile], InvalidOperationExcepti
   on
    + FullyQualifiedErrorId : System.AggregateException,Amazon.PowerShell.Cmdlets.IAM.NewIAMLoginProfileCmdlet

PS C:\> New-IAMLoginProfile -UserName Ramesh -Password Test1234 -PasswordResetRequired $false

CreateDate          PasswordResetRequired UserName
----------          --------------------- --------
6/5/2017 2:22:11 PM False                 Ramesh
```

```
PS C:\> Get-IAMAccountPasswordPolicy


AllowUsersToChangePassword : False
ExpirePasswords            : False
HardExpiry                 : False
MaxPasswordAge             : 0
MinimumPasswordLength      : 8
PasswordReusePrevention    : 0
RequireLowercaseCharacters : True
RequireNumbers             : True
RequireSymbols             : False
RequireUppercaseCharacters : True
```

```
PS C:\> Get-IAMAccessKey -UserName Ramesh
PS C:\> New-IAMAccessKey -UserName Ramesh


AccessKeyId     : AKIAIDT3Y5MSGWJL4PFA
CreateDate      : 6/5/2017 2:42:21 PM
SecretAccessKey : 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
Status          : Active
UserName        : Ramesh



PS C:\> Get-IAMAccessKey -UserName Ramesh

AccessKeyId          CreateDate          Status UserName
-----------          ----------          ------ --------
AKIAIDT3Y5MSGWJL4PFA 6/5/2017 2:42:21 PM Active Ramesh
```

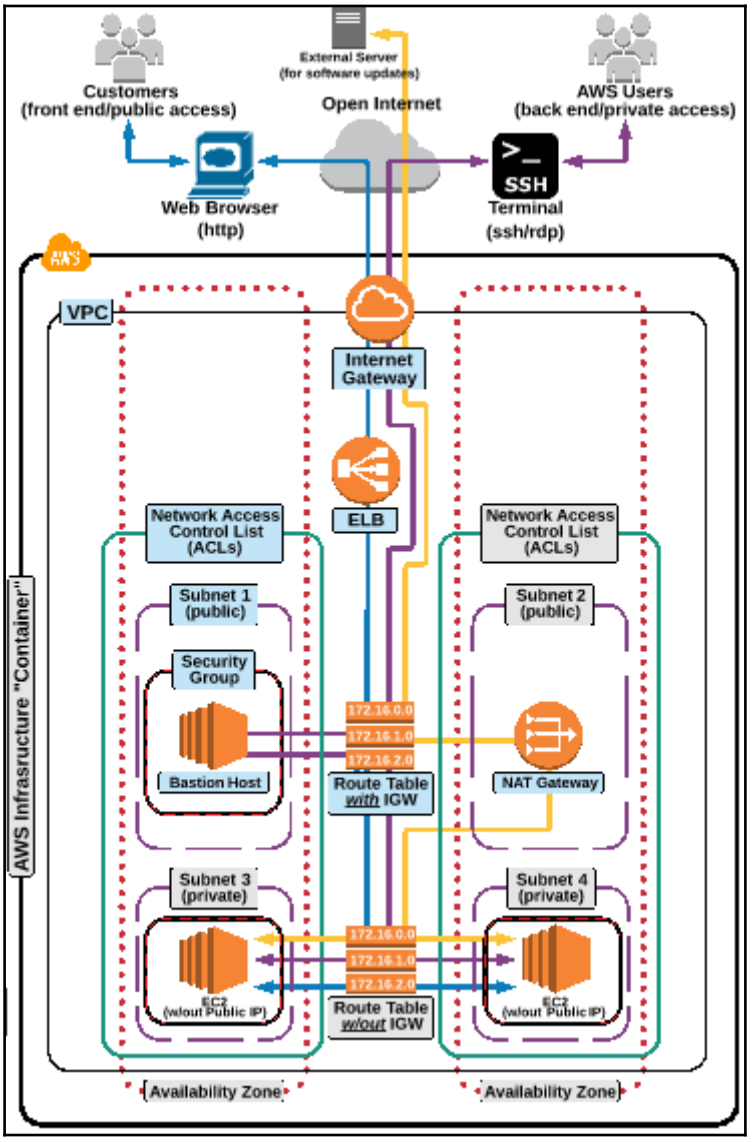
```
PS C:\> Get-IAMAccessKey -UserName Ramesh

AccessKeyId          CreateDate          Status UserName
-----------          ----------          ------ --------
AKIAIDT3Y5MSGWJL4PFA 6/5/2017 2:42:21 PM Active Ramesh


PS C:\>
PS C:\> Update-IAMAccessKey -UserName Ramesh -AccessKeyId AKIAIDT3Y5MSGWJL4PFA -Status Inactive
PS C:\> Get-IAMAccessKey -UserName Ramesh

AccessKeyId          CreateDate          Status   UserName
-----------          ----------          ------   --------
AKIAIDT3Y5MSGWJL4PFA 6/5/2017 2:42:21 PM Inactive Ramesh
```

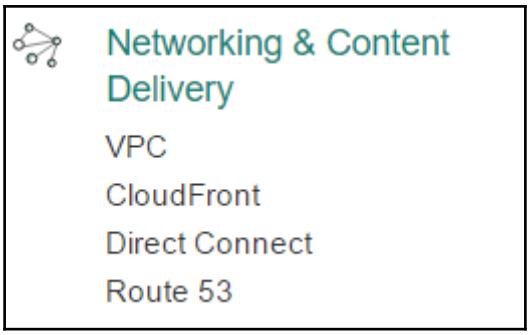
```
PS C:\> Get-Content -raw D:\EC2_Trust_Policy_4_Apps.json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "Service": "ec2.amazonaws.com"
      },
      "Action": "sts:AssumeRole"
    }
  ]
}
PS C:\> New-IAMRole -AssumeRolePolicyDocument (Get-Content -raw D:\EC2_Trust_Policy_4_Apps.json) -RoleName WorldPressAppRole


Arn                       : arn:aws:iam::072316406132:role/WorldPressAppRole
AssumeRolePolicyDocument  : %7B%0A%20%20%22Version%22%3A%20%222012-10-17%22%2C%0A%20%20%22Statement%22%3A%20%5B%0A%20%20%20%20%7B%0A%20%20%20%20%20%20%22Effe
                            ct%22%3A%20%22Allow%22%2C%0A%20%20%20%20%20%20%22Principal%22%3A%20%7B%0A%20%20%20%20%20%20%20%20%22Service%22%3A%20%22ec2.amazon
                            aws.com%22%0A%20%20%20%20%20%20%7D%2C%0A%20%20%20%20%20%20%22Action%22%3A%20%22sts%3AAssumeRole%22%0A%20%20%20%20%7D%0A%20%20%5D%
                            0A%7D
CreateDate                : 6/5/2017 5:49:56 PM
Description               :
Path                      : /
RoleId                    : AROAJOFJELFO6XSCZ4HB4
RoleName                  : WorldPressAppRole
```

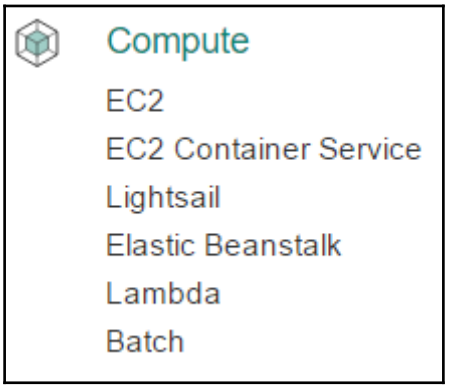
```
PS C:\> Get-Content -Raw D:\MyCustomPolicy.json
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Action": [
        "s3:GetBucketLocation",
        "s3:GetBucketNotification",
        "s3:GetBucketTagging",
        "s3:List*",
        "ses:Get*",
        "ses:List*",
        "sns:GetTopicAttributes",
        "sns:List*",
        "sqs:GetQueueAttributes",
        "sqs:ListQueues",
        "tag:Get*"
      ],
      "Effect": "Allow",
      "Resource": "*"
    }
  ]
}
PS C:\> New-IAMPolicy -PolicyName MyAppCustomPolicy -PolicyDocument (Get-Content -Raw D:\MyCustomPolicy.json)


Arn              : arn:aws:iam::072316406132:policy/MyAppCustomPolicy
AttachmentCount  : 0
CreateDate       : 6/5/2017 7:11:43 PM
DefaultVersionId : v1
Description      :
IsAttachable     : True
Path             : /
PolicyId         : ANPAIONWILCYMEJP6H5Q4
PolicyName       : MyAppCustomPolicy
UpdateDate       : 6/5/2017 7:11:43 PM
```

```
PS C:\> Get-AWSCredential -ListProfileDetail

ProfileName       StoreTypeName         ProfileLocation
-----------       -------------         ---------------
PowerShellProfile NetSDKCredentialsFile
default           NetSDKCredentialsFile
TestProfile       NetSDKCredentialsFile


PS C:\> Remove-AWSCredentialProfile -ProfileName TestProfile

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-AWSCredentialProfile" on target "TestProfile".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
PS C:\> Get-AWSCredential -ListProfileDetail

ProfileName       StoreTypeName         ProfileLocation
-----------       -------------         ---------------
PowerShellProfile NetSDKCredentialsFile
default           NetSDKCredentialsFile
```

Chapter 5: AWS Virtual Private Cloud








```
PS C:\> Get-EC2Vpc | Format-Table -AutoSize

CidrBlock      DhcpOptionsId InstanceTenancy Ipv6CidrBlockAssociationSet IsDefault State     Tags   VpcId        VpcState  Tag
---------      ------------- --------------- ------------------------- --------- -----     ----   -----        --------  ---
10.11.0.0/16   dopt-d928d0bc default         {}                          False available {Name} vpc-849c2ae3 available {Name}
172.31.0.0/16  dopt-d928d0bc default         {}                           True available {Name} vpc-0ac0136e available {Name}


PS C:\>
```

```
PS C:\> $resultVPC=Get-EC2Vpc -VPCId vpc-849c2ae3
PS C:\> $resultVPC.tags

Key  Value
---  -----
Name ramesh_vpc


PS C:\>
```

```
PS C:\> New-EC2Vpc -CidrBlock 10.0.0.0/16 -InstanceTenancy default


CidrBlock                   : 10.0.0.0/16
DhcpOptionsId               : dopt-d928d0bc
InstanceTenancy             : default
Ipv6CidrBlockAssociationSet : {}
IsDefault                   : False
State                       : pending
Tags                        : {}
VpcId                       : vpc-a6bb60df



PS C:\> Get-EC2VPC |Format-Table -AutoSize

CidrBlock      DhcpOptionsId InstanceTenancy Ipv6CidrBlockAssociationSet IsDefault State     Tags   VpcId        VpcState  Tag
---------      ------------- --------------- -------------------------- --------- -----     ----   -----        --------  ---
10.11.0.0/16   dopt-d928d0bc default         {}                           False available {Name} vpc-849c2ae3 available {Name}
172.31.0.0/16  dopt-d928d0bc default         {}                            True available {Name} vpc-0ac0136e available {Name}
10.0.0.0/16    dopt-d928d0bc default         {}                           False available {}     vpc-a6bb60df available {}


PS C:\>
```

```
PS C:\> Get-EC2VpcAttribute -VpcId vpc-a6bb60df -Attribute enableDnsSupport

EnableDnsHostnames EnableDnsSupport VpcId
------------------ ---------------- -----
False              True             vpc-a6bb60df


PS C:\> Get-EC2VpcAttribute -VpcId vpc-a6bb60df -Attribute enableDnsHostnames

EnableDnsHostnames EnableDnsSupport VpcId
------------------ ---------------- -----
False              False            vpc-a6bb60df


PS C:\> Edit-EC2VpcAttribute -VpcId vpc-a6bb60df -EnableDnsHostnames $true
PS C:\> Edit-EC2VpcAttribute -VpcId vpc-a6bb60df -EnableDnsSupport $true
PS C:\>
```

```
PS C:\> Get-EC2InternetGateway

Attachments    InternetGatewayId Tags
-----------    ----------------- ----
{vpc-0ac0136e} igw-b5c0fed0      {Name}
{vpc-849c2ae3} igw-f6abfb92      {}


PS C:\> Get-EC2VPC |Format-Table -AutoSize

CidrBlock      DhcpOptionsId InstanceTenancy Ipv6CidrBlockAssociationSet IsDefault State     Tags   VpcId        VpcState  Tag
---------      ------------- --------------- ------------------------- --------- -----     ----   -----        --------  ---
10.11.0.0/16   dopt-d928d0bc default         {}                            False available {Name} vpc-849c2ae3 available {Name}
172.31.0.0/16  dopt-d928d0bc default         {}                             True available {Name} vpc-0ac0136e available {Name}
10.0.0.0/16    dopt-d928d0bc default         {}                            False available {}     vpc-a6bb60df available {}


PS C:\> New-EC2InternetGateway

Attachments InternetGatewayId Tags
----------- ----------------- ----
{}          igw-4b55c22d      {}
```

```
PS C:\> Get-EC2InternetGateway

Attachments    InternetGatewayId Tags
-----------    ----------------- ----
{vpc-0ac0136e} igw-b5c0fed0      {Name}
{vpc-849c2ae3} igw-f6abfb92      {}
{}             igw-4b55c22d      {}


PS C:\> Add-EC2InternetGateway -InternetGatewayId igw-4b55c22d -VpcId vpc-a6bb60df
PS C:\> Get-EC2InternetGateway

Attachments    InternetGatewayId Tags
-----------    ----------------- ----
{vpc-0ac0136e} igw-b5c0fed0      {Name}
{vpc-849c2ae3} igw-f6abfb92      {}
{vpc-a6bb60df} igw-4b55c22d      {}
```

```
PS C:\> New-EC2RouteTable -VpcId vpc-a6bb60df


Associations    : {}
PropagatingVgws : {}
Routes          : {}
RouteTableId    : rtb-50472228
Tags            : {}
VpcId           : vpc-a6bb60df



PS C:\> New-EC2RouteTable -VpcId vpc-a6bb60df


Associations    : {}
PropagatingVgws : {}
Routes          : {}
RouteTableId    : rtb-c24421ba
Tags            : {}
VpcId           : vpc-a6bb60df
```

```
PS C:\> New-EC2Route -RouteTableId rtb-50472228 -DestinationCidrBlock 0.0.0.0/0 -GatewayId igw-4b55c22d
True
```

```
PS C:\> New-EC2Subnet -VpcId vpc-a6bb60df -CidrBlock 10.0.1.0/24 -AvailabilityZone us-east-1a


AssignIpv6AddressOnCreation : False
AvailabilityZone            : us-east-1a
AvailableIpAddressCount     : 251
CidrBlock                   : 10.0.1.0/24
DefaultForAz                : False
Ipv6CidrBlockAssociationSet : {}
MapPublicIpOnLaunch         : False
State                       : pending
SubnetId                    : subnet-b262c19e
Tags                        : {}
VpcId                       : vpc-a6bb60df
```

```
PS C:\> Get-EC2Subnet |Select-Object VpcID,SubnetID,State,CidrBlock,AvailabilityZone |Where-Object VpcID -eq 'vpc-a6bb60df' |Format-Table -AutoSize

VpcId        SubnetId        State     CidrBlock   AvailabilityZone
-----        --------        -----     ---------   ----------------
vpc-a6bb60df subnet-c843dd80 available 10.0.2.0/24 us-east-1b
vpc-a6bb60df subnet-b29d3e9e available 10.0.3.0/24 us-east-1a
vpc-a6bb60df subnet-b262c19e available 10.0.1.0/24 us-east-1a
vpc-a6bb60df subnet-f042dcb8 available 10.0.4.0/24 us-east-1b
```

```
PS C:\> Register-EC2RouteTable -RouteTableId rtb-50472228 -SubnetId subnet-c843dd80
rtbassoc-feb0f685
PS C:\> Register-EC2RouteTable -RouteTableId rtb-50472228 -SubnetId subnet-b29d3e9e
rtbassoc-1dbef866
PS C:\> Register-EC2RouteTable -RouteTableId rtb-c24421ba -SubnetId subnet-b262c19e
rtbassoc-11b8fe6a
PS C:\> Register-EC2RouteTable -RouteTableId rtb-c24421ba -SubnetId subnet-f042dcb8
rtbassoc-7cbef807
PS C:\>
```

```
PS C:\> New-EC2Address -Domain Vpc

AllocationId      Domain PublicIp
------------      ------ --------
eipalloc-929853a2 vpc    34.201.232.104


PS C:\> New-EC2NatGateway -SubnetId subnet-c843dd80  -AllocationId eipalloc-929853a2

ClientToken NatGateway
----------- ----------
            Amazon.EC2.Model.NatGateway
```

```
PS C:\> Get-EC2Natgateway |Select-Object NatGatewayId,State,VpcId |Where-Object State -eq 'available'

NatGatewayId          State     VpcId
------------          -----     -----
nat-0c08f0ce9062ab192 available vpc-a6bb60df
```

```
PS C:\> New-EC2Route -RouteTableId rtb-c24421ba -DestinationCidrBlock 0.0.0.0/0 -GatewayId nat-0c08f0ce9062ab192
True
```

View: All rules

Rule #	Type	Protocol	Port Range	Source	Allow / Deny
100	ALL Traffic	ALL	ALL	0.0.0.0/0	ALLOW
*	ALL Traffic	ALL	ALL	0.0.0.0/0	DENY

View: All rules

Rule #	Type	Protocol	Port Range	Destination	Allow / Deny
100	ALL Traffic	ALL	ALL	0.0.0.0/0	ALLOW
*	ALL Traffic	ALL	ALL	0.0.0.0/0	DENY

View: All rules

Rule #	Type	Protocol	Port Range	Source	Allow / Deny
60	SSH (22)	TCP (6)	22	0.0.0.0/0	ALLOW
70	HTTPS (443)	TCP (6)	443	0.0.0.0/0	ALLOW
80	HTTPS (443)	TCP (6)	443	0.0.0.0/0	DENY
100	ALL Traffic	ALL	ALL	0.0.0.0/0	ALLOW
*	ALL Traffic	ALL	ALL	0.0.0.0/0	DENY

```
PS C:\> New-EC2NetworkAcl -VpcId vpc-a6bb60df


Associations : {}
Entries      : {Amazon.EC2.Model.NetworkAclEntry, Amazon.EC2.Model.NetworkAclEntry}
IsDefault    : False
NetworkAclId : acl-882c6df1
Tags         : {}
VpcId        : vpc-a6bb60df
```

```
PS C:\> (Get-EC2NetworkAcl -NetworkAclId acl-27c7825e).Associations

NetworkAclAssociationId NetworkAclId SubnetId
----------------------- ------------ --------
aclassoc-5d2ceb2e       acl-27c7825e subnet-b29d3e9e
aclassoc-6f2fe81c       acl-27c7825e subnet-f042dcb8
aclassoc-9d2becee       acl-27c7825e subnet-c843dd80
aclassoc-ff23e48c       acl-27c7825e subnet-b262c19e
```

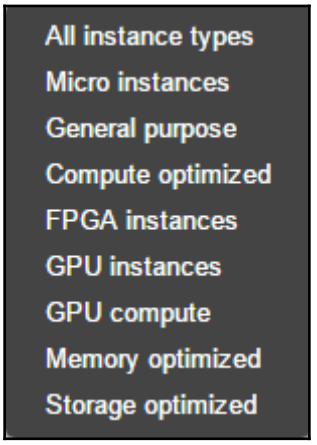
```
PS C:\> Set-EC2NetworkAclAssociation -AssociationId aclassoc-6f2fe81c -NetworkAclId acl-882c6df1
aclassoc-5a71b329
PS C:\> (Get-EC2NetworkAcl -NetworkAclId acl-27c7825e).Associations

NetworkAclAssociationId NetworkAclId SubnetId
----------------------- ------------ --------
aclassoc-5d2ceb2e       acl-27c7825e subnet-b29d3e9e
aclassoc-9d2becee       acl-27c7825e subnet-c843dd80
aclassoc-ff23e48c       acl-27c7825e subnet-b262c19e


PS C:\> (Get-EC2NetworkAcl -NetworkAclId acl-882c6df1).Associations

NetworkAclAssociationId NetworkAclId SubnetId
----------------------- ------------ --------
aclassoc-5a71b329       acl-882c6df1 subnet-f042dcb8
```

```
PS C:\> (Get-EC2NetworkAcl -NetworkAclId acl-882c6df1).Entries |format-table -AutoSize

CidrBlock Egress IcmpTypeCode Ipv6CidrBlock PortRange Protocol RuleAction RuleNumber
--------- ------ ------------ ------------- --------- -------- ---------- ----------
0.0.0.0/0   True                                     -1       allow             100
0.0.0.0/0   True                                     -1       deny            32767
0.0.0.0/0  False                                     -1       allow             100
0.0.0.0/0  False                                     -1       deny            32767
```

Type	Protocol	Port Range	Source
ALL Traffic	ALL	ALL	sg-5be1fd25

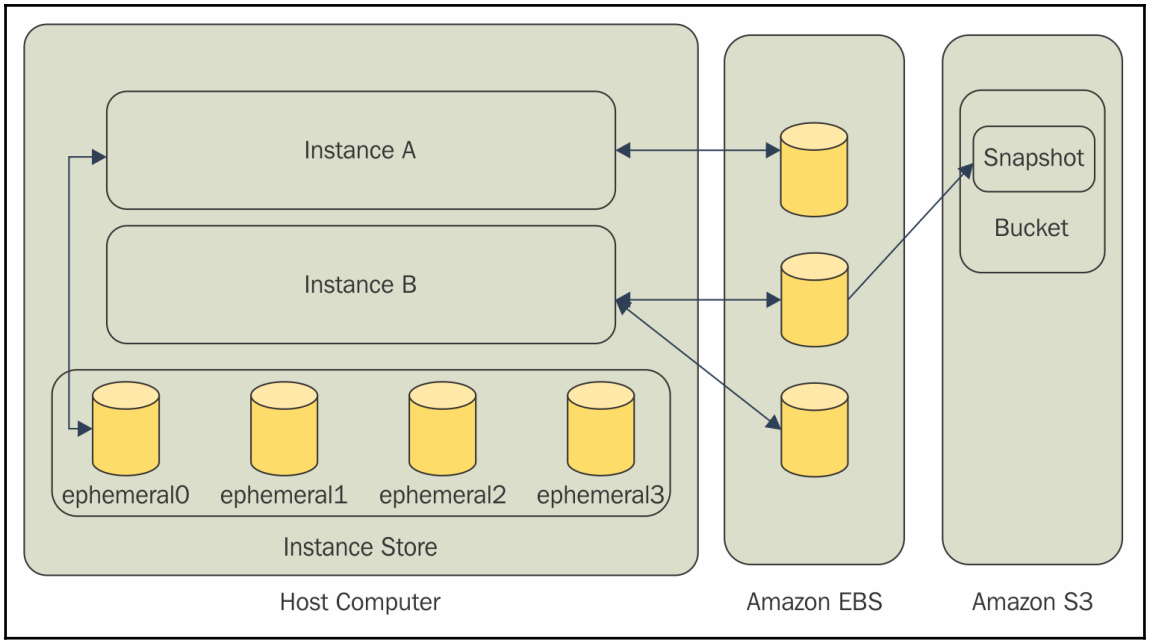
```
PS C:\> (Get-EC2SecurityGroup -GroupId sg-6fd1361e).IpPermissionsEgress |Format-Table -AutoSize

FromPort IpProtocol IpRanges    Ipv6Ranges PrefixListIds ToPort UserIdGroupPairs UserIdGroupPair IpRange
-------- ---------- --------    ---------- ------------ ------ ---------------- --------------- -------
       0 -1         {0.0.0.0/0} {}         {}                0 {}               {}              {0.0.0.0/0}


PS C:\> (Get-EC2SecurityGroup -GroupId sg-6fd1361e).IpPermissions |Format-Table -AutoSize
PS C:\> $ip1 = @{ IpProtocol="tcp"; FromPort="22"; ToPort="22"; IpRanges="0.0.0.0/0" }
PS C:\> $ip2 = @{ IpProtocol="tcp"; FromPort="3389"; ToPort="3389"; IpRanges="0.0.0.0/0" }
PS C:\> Grant-EC2SecurityGroupIngress -GroupId sg-6fd1361e -IpPermission @( $ip1, $ip2 )
PS C:\> (Get-EC2SecurityGroup -GroupId sg-6fd1361e).IpPermissions |Format-Table -AutoSize

FromPort IpProtocol IpRanges    Ipv6Ranges PrefixListIds ToPort UserIdGroupPairs UserIdGroupPair IpRange
-------- ---------- --------    ---------- ------------ ------ ---------------- --------------- -------
      22 tcp        {0.0.0.0/0} {}         {}               22 {}               {}              {0.0.0.0/0}
    3389 tcp        {0.0.0.0/0} {}         {}             3389 {}               {}              {0.0.0.0/0}
```

Chapter 6: AWS Elastic Compute Cloud



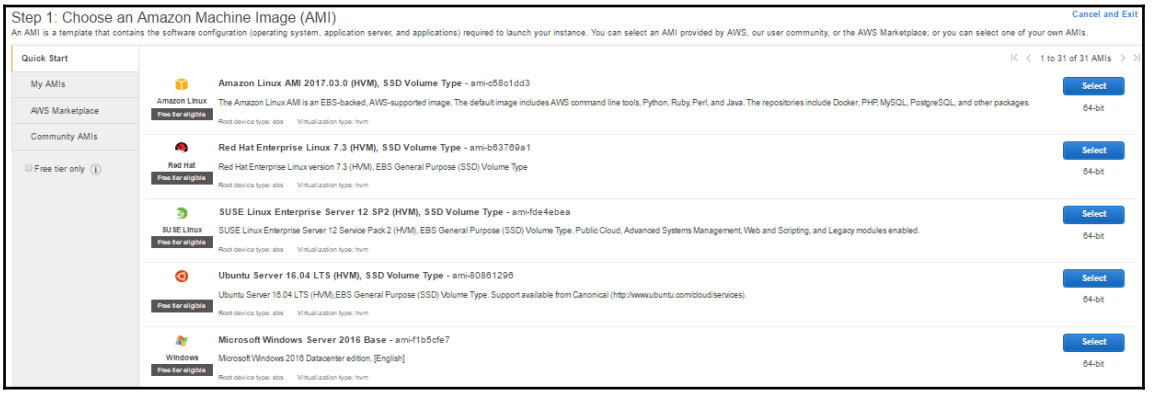
Model	vCPU	Mem (GiB)	Storage	Dedicated EBS Bandwidth (Mbps)
c4.large	2	3.75	EBS-Only	500
c4.xlarge	4	7.5	EBS-Only	750
c4.2xlarge	8	15	EBS-Only	1,000
c4.4xlarge	16	30	EBS-Only	2,000
c4.8xlarge	36	60	EBS-Only	4,000


Instance generation
c4.large
Instance family
Instance size


Instance A
Instance B
ephemeral0
ephemeral1
ephemeral2
ephemeral3
Instance Store
Host Computer
Amazon EBS
Snapshot
Bucket
Amazon S3

```
PS C:\> (New-EC2KeyPair -KeyName "MyWebPressApp").KeyMaterial | Out-File C:\AWSKey\MyWebPressApp.pem
PS C:\> Get-Content -Raw C:\AWSKey\MyWebPressApp.pem
-----BEGIN RSA PRIVATE KEY-----
MIIEpAIBAAKCAQEAuW+Vr7gwIq1h/VdbLyQOhg+DOH2Pc0ngbhSrXWVAo+2oVH/wii4we+LoDSL8
J9nr3C95zRlebBDW64WkMSDWNCrjvdctgYpVUdxRgpFItZO9C1ysHwuHEI7Oo9IwVGFGJIdmOeso
5wL7NWPj3f+bO42DszpuA9IlF8ykmbVrRvwDgxIB7AD4kkRyzfq47YBpimPcPRmhN3znBYwjZcD/
rz4A02+w6BYpsGBnPw04gTVmF314aBBLuN+35B/5o+kBLw2/vLlMWEJjVaO026RtLodJrXroFpO2
grINgjuUw5VfNyoolqMuUYqI4+g8nz3NZXfXWls1eUYnEGXb96vXyQIDAQABAoIBAQC5Et5Bl8Ir
CgLvt70hKop4UIk121NNzGD7XRO/TiwasDq9w0dOklT/gHL7kXw7Ret6QcP96KDtmEz4mdRK2CwR
uvC760PWszr+Tbboapo353DZIzACeB3gb7dbl4921/MKyDxF+CdFkRspqT2mttK2uEHGor1kgNtW
in+JjaC5IWAbeCdi5M/Vwyzr8gM8RYu+bitOvuSYDKciGs3Wq/RMO3mNovU0fg3riHZaM96vlPDh
j0/MQHVjaeU9I9omMHItCrZlJ71QcZ2UMgz3ZKdQdwZN1fsxUb60UzDnKl8/yH1fquQJpiCGsfr
oJKmCiX3BFtjcrByhqadwVz90k0RAoGBAOKgD0T6FsHjgiFK+FDCEfRHOU+gPnwbJpgDlQaw52V7
R9eIByGCrD4E8GVbuXPMRlRuTfkhsmOLOxtMEb4oSpUH2qjn8kaOGRRQqxnMJTvbFuQ/Gnq/AfiJ
s9Kwod/C5RjqLg/eT1YFzzXSrkqA+U8FznhpUph5mpETy7FtbjF9AoGBANF4xMVZCSxQClGL5+LU
/8xZZKm0X5x8ndNN1tC9sDGw7WIngTzL/Iv/Y0WvS7vVFGO2Y9rkQPovtFm/2+M3yi1+oJK1XU3f
vRVOh3fFi+Lqa/V194uMcMTdUThofiM5tfEoHi2R2Zj9oEmhIthh4z4fn0eHnTzVv7DRgc61f9E9
AoGAdFYsYIFtq0zKYaLlxDdMFjV14z1ktjsN3d2A5DVuJDdcEvWei4JUP2YzriSfGCXWOMODPZAh
zl4MEqBDP3XZi5XDlw+y3KtXjok2vICC4K5Amx0Vz8s8DMVLza2k+4RGLTsSOE0sNwG2dG/Zzx9U
XE+jxUZ0Axfx0+Xwm/2MItUCgYEAsOVNPt+m6H4biKwewqdf8gGYCdyiVbPDULvOam+WiRBCF/8G
nAIkH1IoUqPr0A7s7hwMDcFuwhlhM93bYvItUeg60EpLJkWJF6I+sr3oGVQgoaTizT1nykigm4Na
6oKFDMf1XERsP1AIecWTeKqJzl/EEhMLjWFxRXBYL+mErH0CgYBi2XuWjDwcdg3aznG9jkMfvEnV
wQFR+r+GZF0MYp75TK+E56MhSYc4e8j6CMJji3wfJxqQNeNfL/fsiE/RTeO2H9opIygdTGafA56u
MxVK/fr9PxIASCxWBbWH+lUl1bBp3UWuyqFjgPcn1ZUNB4eD/00LCk8PUzZJKGLWqgPuOA==
-----END RSA PRIVATE KEY-----
```

```
PS C:\> Get-EC2KeyPair

KeyFingerprint                                                  KeyName
--------------                                                  -------
f3:fe:95:08:4d:b0:50:0f:ef:0d:ef:cf:a5:8a:b3:48:b3:50:c4:a8 AWSBastion
71:4a:a0:b9:a2:74:dd:b5:de:b4:88:8b:9d:33:ae:5e:1e:73:81:b5 Mysql
bc:44:f7:48:6a:47:ca:e6:af:cf:97:a3:48:a8:d3:98:90:b2:07:06 MyWebPressApp
56:dc:ae:80:2d:c0:31:8f:a8:f9:2c:40:5d:38:95:9e:79:94:2e:2d PowerShell
d5:4a:b6:7c:a1:a0:8d:3c:8f:f9:c5:36:7f:f4:94:b5:7d:61:82:46 winkey
```



```
PS C:\> New-EC2Instance -ImageId ami-c58c1dd3 -AssociatePublicIp $true -MinCount 1 -MaxCount 1 -SubnetId subnet-c843dd80 -InstanceType t2.micro -KeyName MyWe
bPressApp -SecurityGroupId sg-9ec521ef


GroupNames    : {}
Groups        : {}
Instances     : {MyWebPressApp}
OwnerId       : 072316406132
RequesterId   :
ReservationId : r-084e0e042ac3f4b4a
```

```
PS C:\> Get-EC2Instance |Format-Table -AutoSize

GroupNames Groups Instances       OwnerId      RequesterId ReservationId       RunningInstance
---------- ------ ---------       -------      ----------- -------------       ---------------
{}         {}     {PowerShell}    072316406132             r-03b32f874f10767da {PowerShell}
{}         {}     {MyWebPressApp} 072316406132             r-084e0e042ac3f4b4a {MyWebPressApp}
```

```
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).Instances


AmiLaunchIndex        : 0
Architecture          : x86_64
BlockDeviceMappings   : {/dev/xvda}
ClientToken           :
EbsOptimized          : False
EnaSupport            : True
Hypervisor            : xen
IamInstanceProfile    :
ImageId               : ami-c58c1dd3
InstanceId            : i-0cab647fc9e824f2c
InstanceLifecycle     :
InstanceType          : t2.micro
KernelId              :
KeyName               : MyWebPressApp
LaunchTime            : 6/15/2017 2:37:38 PM
Monitoring            : Amazon.EC2.Model.Monitoring
NetworkInterfaces     : {ip-10-0-2-122.ec2.internal}
Placement             : Amazon.EC2.Model.Placement
Platform              :
PrivateDnsName        : ip-10-0-2-122.ec2.internal
PrivateIpAddress      : 10.0.2.122
ProductCodes          : {}
PublicDnsName         : ec2-54-209-21-209.compute-1.amazonaws.com
PublicIpAddress       : 54.209.21.209
RamdiskId             :
RootDeviceName        : /dev/xvda
RootDeviceType        : ebs
SecurityGroups        : {bastion_ps}
SourceDestCheck       : True
SpotInstanceRequestId :
SriovNetSupport       :
State                 : Amazon.EC2.Model.InstanceState
StateReason           :
StateTransitionReason :
SubnetId              : subnet-c843dd80
Tags                  : {}
VirtualizationType    : hvm
VpcId                 : vpc-a6bb60df
```

```
PS C:\> Set-Alias ssh 'c:\Program Files\Openssh\ssh.exe'
PS C:\> get-alias ssh

CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Alias           ssh -> ssh.exe


PS C:\> ssh -i 'C:\Users\ramesh\AWSKey\MyWebPressApp.pem' ec2-user@54.209.21.209
Last login: Thu Jun 15 23:24:37 2017 from ppp118-210-156-36.bras1.adl6.internode.on.net

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2017.03-release-notes/
8 package(s) needed for security, out of 12 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-10-0-2-122 ~]$ sudo su - root
Last login: Thu Jun 15 23:24:56 UTC 2017 on pts/0
[root@ip-10-0-2-122 ~]#
```

```
$ ls -ltr
total 4
-r-------- 1 ramesh ramesh 1676 Jun 15 19:21 MyWebPressApp.pem

ramesh@apps1 ~/AWSKey
$ ssh -i "MyWebPressApp.pem" ec2-user@54.209.21.209
The authenticity of host '54.209.21.209 (54.209.21.209)' can't be established.
ECDSA key fingerprint is SHA256:w1VQo5RLAwajWD5Fxaq4HYc3L1RuKev1T/j8ZO27ZUk.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '54.209.21.209' (ECDSA) to the list of known hosts.

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2017.03-release-notes/
8 package(s) needed for security, out of 12 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-10-0-2-122 ~]$ sudo su - root
[root@ip-10-0-2-122 ~]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        488M   56K  488M   1% /dev
tmpfs           497M     0  497M   0% /dev/shm
/dev/xvda1      7.8G  975M  6.8G  13% /
```

```
PS C:\> $ip = "54.157.244.96"
PS C:\> Set-Item WSMan:\localhost\Client\TrustedHosts $ip

WinRM Security Configuration.
This command modifies the TrustedHosts list for the WinRM client. The computers in the TrustedHosts list might not be authenticated. The client might send
credential information to these computers. Are you sure that you want to modify this list?
[Y] Yes  [N] No  [S] Suspend  [?] Help (default is "Y"): Y
PS C:\> Get-EC2PasswordData -InstanceId i-00dd7a63ca4db18f1 -PemFile C:\Users\ramesh\AWSKey\MyWebPressApp.pem
Vz7ReA$$%s
PS C:\> Enter-PSSession -ComputerName $ip -Credential ~\Administrator

Windows PowerShell credential request
Enter your credentials.
Password for user ~\Administrator: **********
```

```
[root@ip-10-0-2-122 ~]# curl http://169.254.169.254/latest/meta-data/
ami-id
ami-launch-index
ami-manifest-path
block-device-mapping/
hostname
instance-action
instance-id
instance-type
local-hostname
local-ipv4
mac
metrics/
network/
placement/
profile
public-hostname
public-ipv4
public-keys/
reservation-id
security-groups
services/[root@ip-10-0-2-122 ~]#
```

```
[root@ip-10-0-2-122 ~]# curl http://169.254.169.254/latest/meta-data/instance-id;echo
i-0cab647fc9e824f2c
[root@ip-10-0-2-122 ~]# curl http://169.254.169.254/latest/meta-data/public-ipv4;echo
54.209.21.209
[root@ip-10-0-2-122 ~]# curl http://169.254.169.254/latest/meta-data/hostname;echo
ip-10-0-2-122.ec2.internal
[root@ip-10-0-2-122 ~]# curl http://169.254.169.254/latest/meta-data/ami-id;echo
ami-c58c1dd3
[root@ip-10-0-2-122 ~]# curl http://169.254.169.254/latest/meta-data/local-ipv4;echo
10.0.2.122
```

```
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.instanceid
i-0cab647fc9e824f2c
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.state

Code Name
---- ----
16   running


PS C:\> Stop-EC2Instance -InstanceId i-0cab647fc9e824f2c

CurrentState                    InstanceId          PreviousState
------------                    ----------          -------------
Amazon.EC2.Model.InstanceState i-0cab647fc9e824f2c Amazon.EC2.Model.InstanceState


PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.instanceid
i-0cab647fc9e824f2c
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.state

Code Name
---- ----
80   stopped
```

```
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.instanceid
i-0cab647fc9e824f2c
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.state

Code Name
---- ----
80   stopped


PS C:\> Start-EC2Instance -InstanceId i-0cab647fc9e824f2c

CurrentState                    InstanceId          PreviousState
------------                    ----------          -------------
Amazon.EC2.Model.InstanceState i-0cab647fc9e824f2c Amazon.EC2.Model.InstanceState


PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.instanceid
i-0cab647fc9e824f2c
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.state

Code Name
---- ----
16   running
```

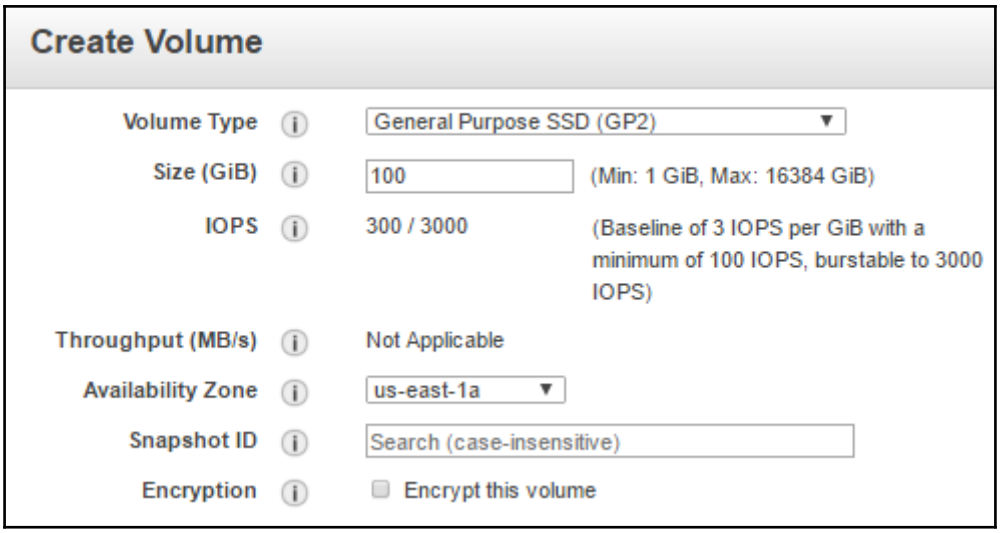
```
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.instanceid
i-0cab647fc9e824f2c
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.PublicIpAddress
52.54.150.159
PS C:\> New-EC2Address -Domain Vpc

AllocationId      Domain PublicIp
------------      ------ --------
eipalloc-2f34941f vpc    52.22.141.99


PS C:\> Register-EC2Address -InstanceId i-0cab647fc9e824f2c -PublicIp 52.22.141.99
eipassoc-2851b91a
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.instanceid
i-0cab647fc9e824f2c
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.PublicIpAddress
52.22.141.99
```

```
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.instanceid
i-0cab647fc9e824f2c
PS C:\> Remove-EC2Instance -InstanceId i-0cab647fc9e824f2c

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-EC2Instance (TerminateInstances)" on target "i-0cab647fc9e824f2c".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y

CurrentState                  InstanceId          PreviousState
------------                  ----------          -------------
Amazon.EC2.Model.InstanceState i-0cab647fc9e824f2c Amazon.EC2.Model.InstanceState


PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.State

Code Name
---- ----
32   shutting-down


PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id"; Values="r-084e0e042ac3f4b4a" }).instances.State

Code Name
---- ----
48   terminated
```

```
PS C:\> New-EC2PlacementGroup -GroupName my-app-group -Strategy cluster
PS C:\> New-EC2Instance -ImageId ami-c58c1dd3 -AssociatePublicIp $true -MinCount 3 -MaxCount 6 -SubnetId subnet-c843dd80 -InstanceType c4.large -KeyName MyWe
bPressApp -SecurityGroupId sg-9ec521ef -PlacementGroup my-app-group


GroupNames    : {}
Groups        : {}
Instances     : {MyWebPressApp, MyWebPressApp, MyWebPressApp, MyWebPressApp...}
OwnerId       : 072316406132
RequesterId   :
ReservationId : r-00e3f34d511c7be3d
```

```
PS C:\> New-IAMInstanceProfile -InstanceProfileName S3AccessProfile


Arn                 : arn:aws:iam::072316406132:instance-profile/S3AccessProfile
CreateDate          : 6/16/2017 4:40:49 PM
InstanceProfileId   : AIPAIGXFFJU3ODWHG2PRQ
InstanceProfileName : S3AccessProfile
Path                : /
Roles               : {}
```

```
PS C:\> Add-IAMRoleToInstanceProfile -InstanceProfileName S3AccessProfile -RoleName WorldPressAppRole
PS C:\> New-EC2Instance -ImageId ami-c58c1dd3 -AssociatePublicIp $true -MinCount 1 -MaxCount 1 -SubnetId subnet-c843dd80 -InstanceType t2.micro -KeyName MyWe
bPressApp -SecurityGroupId sg-9ec521ef -InstanceProfile_Name S3AccessProfile


GroupNames    : {}
Groups        : {}
Instances     : {MyWebPressApp}
OwnerId       : 072316406132
RequesterId   :
ReservationId : r-00f0f90d2e69829d0
```




```
PS C:\> Get-EC2Volume |Select-Object Attachment,AvailabilityZone,Size,VolumeId,VolumeType,State|Format-Table -Autosize

Attachment            AvailabilityZone Size VolumeId              VolumeType State
----------            ---------------- ---- --------              ---------- -----
{i-00dd7a63ca4db18f1} us-east-1b         30 vol-0b1c26c7172143b78 gp2        in-use
{i-04d05832e0428bb80} us-east-1b          8 vol-00e9f3ac498a6e397 gp2        in-use
{i-0129c1ef8529004f7} us-east-1a         10 vol-0df9fd81cc14503a4 gp2        in-use


PS C:\> New-EC2Volume -size 50 -AvailabilityZone us-east-1b -VolumeType gp2


Attachments      : {}
AvailabilityZone : us-east-1b
CreateTime       : 6/16/2017 8:22:08 PM
Encrypted        : False
Iops             : 150
KmsKeyId         :
Size             : 50
SnapshotId       :
State            : creating
Tags             : {}
VolumeId         : vol-0b4ffe0db5189fad7
VolumeType       : gp2



PS C:\> Get-EC2Volume |Select-Object Attachment,AvailabilityZone,Size,VolumeId,VolumeType,State|Format-Table -Autosize

Attachment            AvailabilityZone Size VolumeId              VolumeType State
----------            ---------------- ---- --------              ---------- -----
{i-00dd7a63ca4db18f1} us-east-1b         30 vol-0b1c26c7172143b78 gp2        in-use
{i-04d05832e0428bb80} us-east-1b          8 vol-00e9f3ac498a6e397 gp2        in-use
{}                    us-east-1b         50 vol-0b4ffe0db5189fad7 gp2        available
{i-0129c1ef8529004f7} us-east-1a         10 vol-0df9fd81cc14503a4 gp2        in-use
```

```
PS C:\> ssh -i 'C:\Users\ramesh\AWSKey\MyWebPressApp.pem' ec2-user@54.175.247.46
Last login: Fri Jun 16 11:00:43 2017 from ppp118-210-156-36.bras1.adl6.internode.on.net

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2017.03-release-notes/
8 package(s) needed for security, out of 12 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-10-0-2-27 ~]$ ls -ltr /dev/xv*
brw-rw---- 1 root disk 202, 0 Jun 16 10:56 /dev/xvda
brw-rw---- 1 root disk 202, 1 Jun 16 10:56 /dev/xvda1
[ec2-user@ip-10-0-2-27 ~]$ exit
logout
Connection to 54.175.247.46 closed.
PS C:\> Add-EC2Volume -InstanceId i-0e90b6d5d439175a3 -VolumeId vol-0b4ffe0db5189fad7 -Device /dev/sdc


AttachTime          : 6/16/2017 9:02:57 PM
DeleteOnTermination : False
Device              : /dev/sdc
InstanceId          : i-0e90b6d5d439175a3
State               : attaching
VolumeId            : vol-0b4ffe0db5189fad7



PS C:\> ssh -i 'C:\Users\ramesh\AWSKey\MyWebPressApp.pem' ec2-user@54.175.247.46
Last login: Fri Jun 16 11:02:31 2017 from ppp118-210-156-36.bras1.adl6.internode.on.net

       __|  __|_  )
       _|  (     /   Amazon Linux AMI
      ___|\___|___|

https://aws.amazon.com/amazon-linux-ami/2017.03-release-notes/
8 package(s) needed for security, out of 12 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-10-0-2-27 ~]$ ls -ltr /dev/xv*
brw-rw---- 1 root disk 202,  0 Jun 16 10:56 /dev/xvda
brw-rw---- 1 root disk 202,  1 Jun 16 10:56 /dev/xvda1
brw-rw---- 1 root disk 202, 32 Jun 16 11:03 /dev/xvdc
[ec2-user@ip-10-0-2-27 ~]$
```

Chapter 7: AWS Simple Storage Service


```
PS D:\Data> Get-AWSCredential -ListProfileDetail

ProfileName       StoreTypeName         ProfileLocation
-----------       -------------         ---------------
PowerShellProfile NetSDKCredentialsFile
default           NetSDKCredentialsFile
NeilProfile       NetSDKCredentialsFile
SharaProfile      NetSDKCredentialsFile
```

```
PS D:\Data> Get-Content -Raw D:\Data\IAMPolicies\S3UserHomeDirectoryAccess.txt
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "s3:ListAllMyBuckets",
        "s3:GetBucketLocation"
      ],
      "Resource": "arn:aws:s3:::*"
    },
    {
      "Effect": "Allow",
      "Action": "s3:ListBucket",
      "Resource": "arn:aws:s3:::myfirstpowershellbucket",
      "Condition": {"StringLike": {"s3:prefix": [
        "",
        "home/",
        "home/${aws:username}/*"
      ]}}
    },
    {
      "Effect": "Allow",
      "Action": "s3:*",
      "Resource": [
        "arn:aws:s3:::myfirstpowershellbucket/home/${aws:username}",
        "arn:aws:s3:::myfirstpowershellbucket/home/${aws:username}/*"
      ]
    }
  ]
}
```

```
PS D:\Data> Set-AWSCredentials -ProfileName NeilProfile
PS D:\Data> Get-IAMUser


Arn              : arn:aws:iam::072316406132:user/neil
CreateDate       : 6/19/2017 1:36:31 PM
PasswordLastUsed : 1/1/0001 12:00:00 AM
Path             : /
UserId           : AIDAIEQORPJZR4GX43Y4C
UserName         : neil
```

```
PS D:\Data> Write-S3Object -BucketName myfirstpowershellbucket -Key "home/neil/Myfile.txt" -Content "This is neil file"
PS D:\Data> Write-S3Object -BucketName myfirstpowershellbucket -Key "home/shara/Myfile.txt" -Content "This is neil trying to write in Shara home directory"
Write-S3Object : One or more errors occurred. (Access Denied)
At line:1 char:1
+ Write-S3Object -BucketName myfirstpowershellbucket -Key "home/shara/M ...
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : InvalidOperation: (Amazon.PowerShe...eS3ObjectCmdlet:WriteS3ObjectCmdlet) [Write-S3Object], InvalidOperationException
    + FullyQualifiedErrorId : System.AggregateException,Amazon.PowerShell.Cmdlets.S3.WriteS3ObjectCmdlet
```

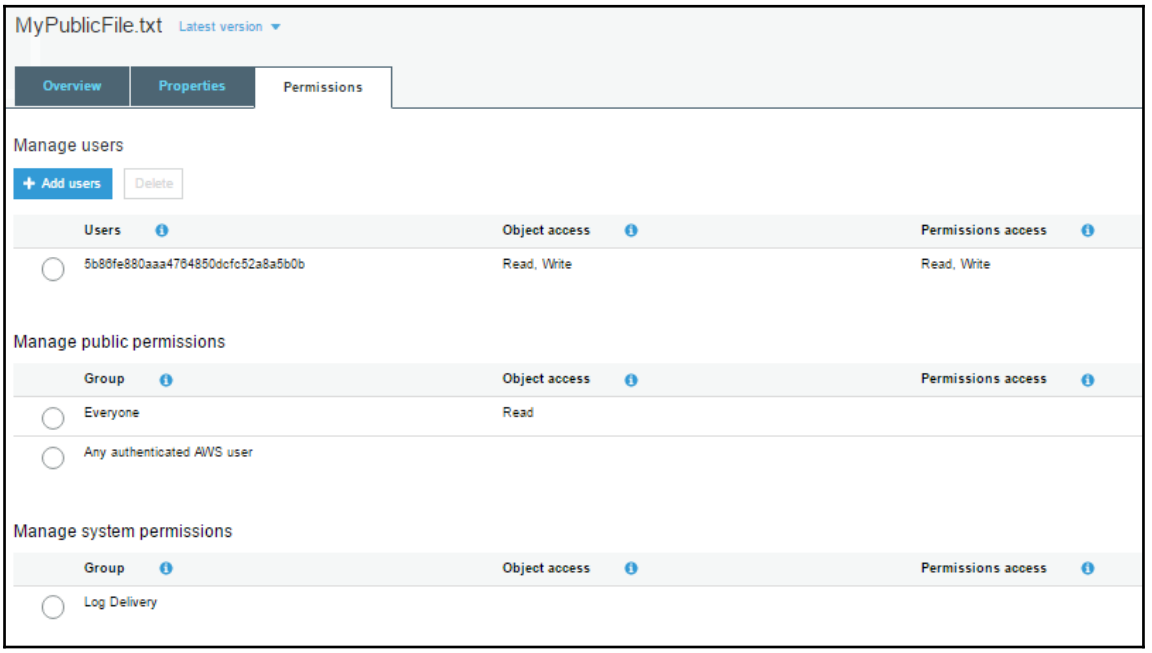
```
PS D:\Data> Set-AWSCredentials -ProfileName SharaProfile
PS D:\Data> Get-IAMUser


Arn              : arn:aws:iam::072316406132:user/shara
CreateDate       : 6/19/2017 1:36:31 PM
PasswordLastUsed : 1/1/0001 12:00:00 AM
Path             : /
UserId           : AIDAJJL2QR42IBOQRNLIG
UserName         : shara



PS D:\Data> Write-S3Object -BucketName myfirstpowershellbucket -Key "home/shara/Myfile.txt" -Content "This is neil file"
PS D:\Data> Write-S3Object -BucketName myfirstpowershellbucket -Key "home/neil/Myfile.txt" -Content "This is shara trying to write in Neil home directory"
Write-S3Object : One or more errors occurred. (Access Denied)
At line:1 char:1
+ Write-S3Object -BucketName myfirstpowershellbucket -Key "home/neil/My ...
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : InvalidOperation: (Amazon.PowerShe...eS3ObjectCmdlet:WriteS3ObjectCmdlet) [Write-S3Object], InvalidOperationException
    + FullyQualifiedErrorId : System.AggregateException,Amazon.PowerShell.Cmdlets.S3.WriteS3ObjectCmdlet
```

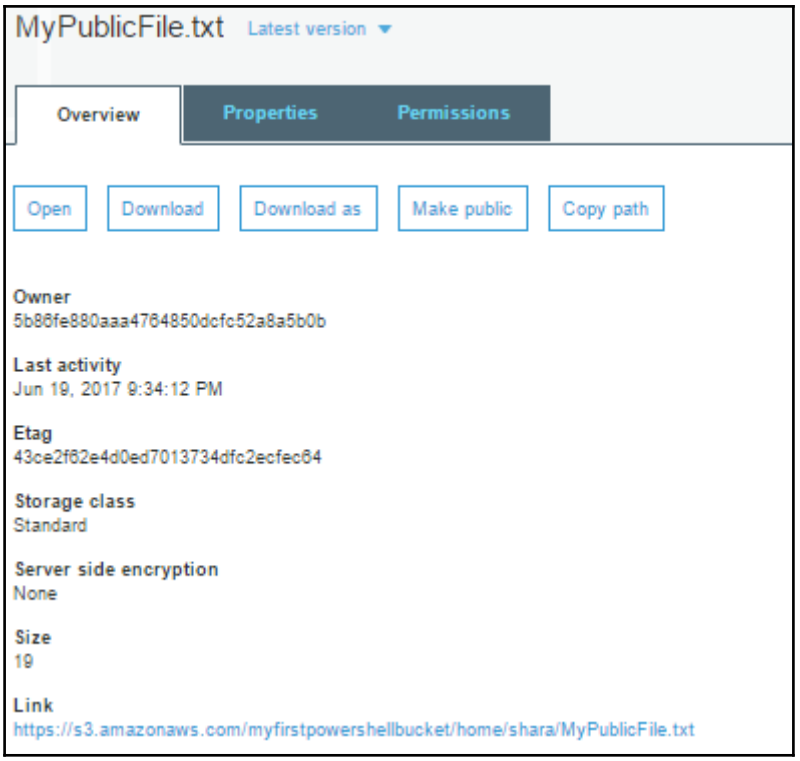
```
PS D:\Data> Get-Content -Raw D:\data\Policies\S3BucketPolicyExample.json
{
  "Id": "Policy1497862132609",
  "Version": "2012-10-17",
  "Statement": [
    {
      "Sid": "Stmt1497862055498",
      "Action": [
        "s3:GetObject",
        "s3:PutObject"
      ],
      "Effect": "Allow",
      "Resource": "arn:aws:s3:::myfirstpowershellbucket/*",
      "Principal": {
        "AWS": [
          "arn:aws:iam::072316406132:user/shara"
        ]
      }
    },
    {
      "Sid": "Stmt1497862126133",
      "Action": [
        "s3:DeleteObject",
        "s3:DeleteObjectVersion"
      ],
      "Effect": "Deny",
      "Resource": "arn:aws:s3:::myfirstpowershellbucket/*",
      "Principal": {
        "AWS": [
          "arn:aws:iam::072316406132:user/shara"
        ]
      }
    }
  ]
}
```

```
PS C:\> Get-S3BucketPolicy -BucketName myfirstpowershellbucket
PS C:\> Write-S3BucketPolicy -BucketName myfirstpowershellbucket -Policy (Get-Content -Raw D:\data\Policies\S3BucketPolicyExample.json)
PS C:\> Get-S3BucketPolicy -BucketName myfirstpowershellbucket
{"Version":"2012-10-17","Id":"Policy1497862132609","Statement":[{"Sid":"Stmt1497862055498","Effect":"Allow","Principal":{"AWS":"arn:aws:iam::072316406132:use
r/shara"},"Action":["s3:GetObject","s3:PutObject"],"Resource":"arn:aws:s3:::myfirstpowershellbucket/*"},{"Sid":"Stmt1497862126133","Effect":"Deny","Principal
":{"AWS":"arn:aws:iam::072316406132:user/shara"},"Action":["s3:DeleteObject","s3:DeleteObjectVersion"],"Resource":"arn:aws:s3:::myfirstpowershellbucket/*"}]}
```

```
PS C:\> Set-AWSCredentials -ProfileName SharaProfile
PS C:\> Get-IAMUser


Arn              : arn:aws:iam::072316406132:user/shara
CreateDate       : 6/19/2017 1:36:31 PM
PasswordLastUsed : 1/1/0001 12:00:00 AM
Path             : /
UserId           : AIDAJJL2QR42IBOQRNLIG
UserName         : shara



PS C:\> Write-S3Object -BucketName myfirstpowershellbucket -Key "home/shara/Myfile.txt" -Content "This is Shara file"
PS C:\> Remove-S3Object -BucketName myfirstpowershellbucket -Key home/shara/Myfile.txt

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-S3Object (DeleteObjects)" on target "".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
Remove-S3Object : One or more errors occurred. (Access Denied)
At line:1 char:1
+ Remove-S3Object -BucketName myfirstpowershellbucket -Key home/shara/M ...
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : InvalidOperation: (Amazon.PowerShe...eS3ObjectCmdlet:RemoveS3ObjectCmdlet) [Remove-S3Object], InvalidOperationException
    + FullyQualifiedErrorId : System.AggregateException,Amazon.PowerShell.Cmdlets.S3.RemoveS3ObjectCmdlet
```

```
PS C:\> Write-S3Object -BucketName myfirstpowershellbucket -Key "home/shara/MyPublicFile.txt" -Content "This is public file"
PS C:\> Get-S3ACL -BucketName myfirstpowershellbucket -Key home/shara/MyPublicFile.txt

Owner                  Grants
-----                  ------
Amazon.S3.Model.Owner {Amazon.S3.Model.S3Grant}


PS C:\> Set-S3ACL -BucketName myfirstpowershellbucket -Key home/shara/MyPublicFile.txt -PublicReadOnly
PS C:\> Get-S3ACL -BucketName myfirstpowershellbucket -Key home/shara/MyPublicFile.txt

Owner                  Grants
-----                  ------
Amazon.S3.Model.Owner {Amazon.S3.Model.S3Grant, Amazon.S3.Model.S3Grant}
```

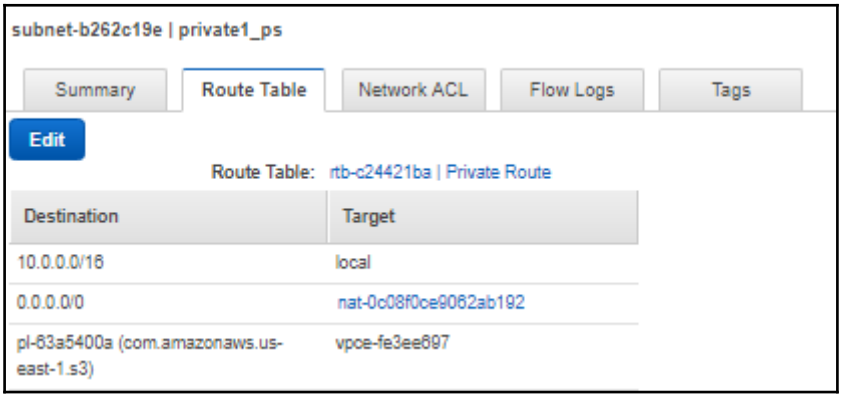




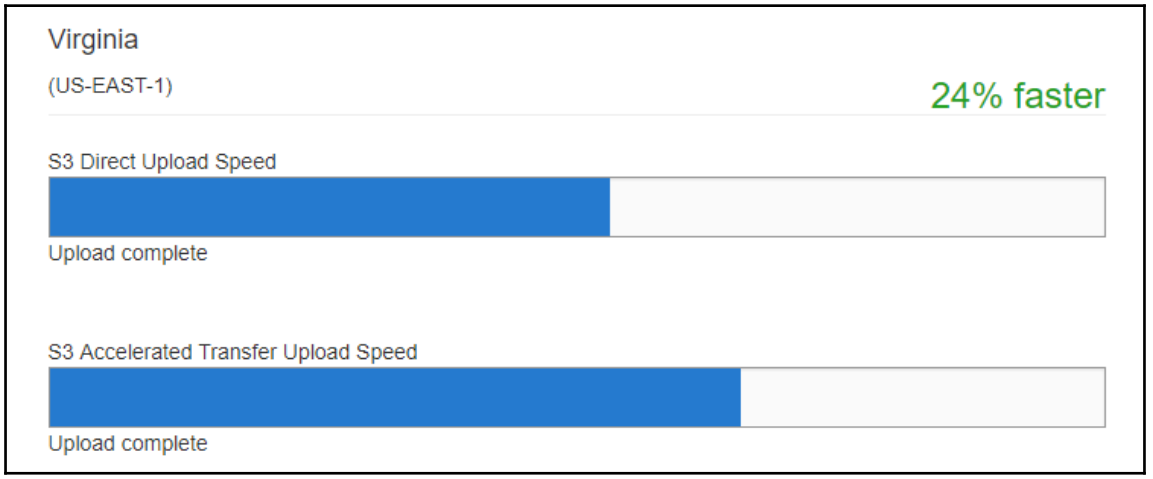

```
PS C:\> Get-Content -Raw D:\Data\Policies\S3EndPointPolicy.json
{
    "Statement": [
        {
            "Action": "*",
            "Effect": "Allow",
            "Resource": "*",
            "Principal": "*"
        }
    ]
}
```

```
[root@ip-10-0-1-74 ~]# traceroute us-east-1.s3.amazonaws.com
traceroute to us-east-1.s3.amazonaws.com (52.216.18.232), 30 hops max, 60 byte packets
 1  ip-10-0-2-7.ec2.internal (10.0.2.7)  0.424 ms  0.419 ms  0.415 ms
 2  216.182.224.110 (216.182.224.110)  18.914 ms 216.182.224.104 (216.182.224.104)  19.253 ms 216.182.224.102 (216.182.224.102)  18.496 ms
 3  100.66.8.214 (100.66.8.214)  23.020 ms 100.66.12.36 (100.66.12.36)  12.707 ms 100.66.8.98 (100.66.8.98)  22.139 ms
 4  100.66.14.32 (100.66.14.32)  13.410 ms 100.66.14.128 (100.66.14.128)  18.530 ms 100.66.14.136 (100.66.14.136)  20.875 ms
 5  100.66.22.163 (100.66.22.163)  17.379 ms 100.66.22.119 (100.66.22.119)  23.510 ms 100.66.23.111 (100.66.23.111)  17.597 ms
 6  100.66.21.205 (100.66.21.205)  15.828 ms 100.66.21.193 (100.66.21.193)  14.528 ms 100.66.21.231 (100.66.21.231)  166.901 ms
 7  100.65.47.49 (100.65.47.49)  16.320 ms  15.889 ms  15.185 ms
 8  52.216.18.232 (52.216.18.232)  1.166 ms  1.140 ms  1.042 ms
```

```
PS C:\> New-EC2VpcEndpoint -VpcId vpc-a6bb60df -RouteTableId rtb-c24421ba -ServiceName com.amazonaws.us-east-1.s3 -PolicyDocument (Get-Content -Raw D:\Data\P
olicies\S3EndPointPolicy.json)

ClientToken VpcEndpoint
----------- -----------
            Amazon.EC2.Model.VpcEndpoint


PS C:\> Get-EC2VPCEndPoint


CreationTimestamp : 7/1/2017 9:39:39 AM
PolicyDocument    : {"Version":"2008-10-17","Statement":[{"Effect":"Allow","Principal":"*","Action":"*","Resource":"*"}
                    ]}
RouteTableIds     : {rtb-c24421ba}
ServiceName       : com.amazonaws.us-east-1.s3
State             : Available
VpcEndpointId     : vpce-fe3ee697
VpcId             : vpc-a6bb60df
```



```
[root@ip-10-0-1-74 ~]# traceroute us-east-1.s3.amazonaws.com
traceroute to us-east-1.s3.amazonaws.com (52.216.232.19), 30 hops max, 60 byte packets
 1  * * *
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  * * *
 8  * * *
 9  * * *
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  * * *
21  * * *
22  * * *
23  * * *
24  * * *
25  * * *
26  * * *
27  * * *
28  * * *
29  * * *
30  * * *
```



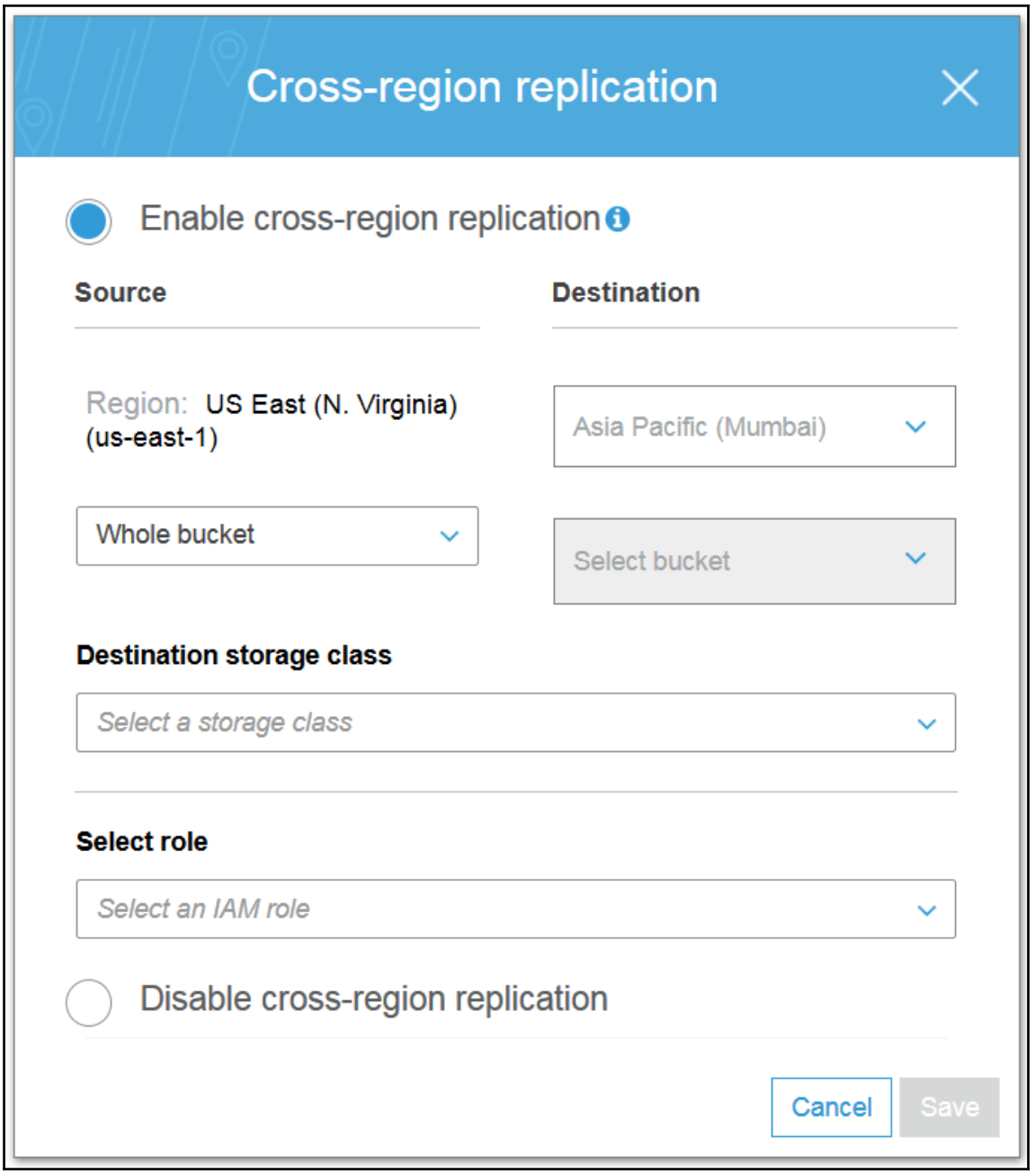
```
PS C:\> Write-S3BucketAccelerateConfiguration -BucketName myfirstpowershellbucket -AccelerateConfiguration_Status enabled
PS C:\> Get-S3BucketAccelerateConfiguration -BucketName myfirstpowershellbucket

Value
-----
Enabled
```

```
PS C:\> Write-S3BucketAccelerateConfiguration -BucketName myfirstpowershellbucket -AccelerateConfiguration_Status suspended
PS C:\> Get-S3BucketAccelerateConfiguration -BucketName myfirstpowershellbucket

Value
-----
Suspended
```

```
PS C:\> Write-S3BucketVersioning -BucketName myfirstpowershellbucket -VersioningConfig_Status Enabled
PS C:\> Get-S3BucketVersioning -BucketName myfirstpowershellbucket

Status  EnableMfaDelete
------  ---------------
Enabled False
```

```
PS C:\> Write-S3BucketVersioning -BucketName myfirstpowershellbucket -VersioningConfig_Status Suspended
PS C:\> Get-S3BucketVersioning -BucketName myfirstpowershellbucket

Status    EnableMfaDelete
------    ---------------
Suspended False
```


Lifecycle rule
Name and scope
Transitions
Expiration
4
Review
Name and scope
Edit
Name MyBackupLifeCyclePolicy
Scope Whole bucket
Transitions
Edit
For current version of objects
Transition to Standard-IA after 30 days
Transition to Amazon Glacier after 60 days
Expiration
Edit
Expire after 365 days


Cross-region replication
Enable cross-region replication
Source
Destination
Region: US East (N. Virginia) (us-east-1)
Asia Pacific (Mumbai)
Whole bucket
Select bucket
Destination storage class
Select a storage class
Select role
Select an IAM role
Disable cross-region replication
Cancel
Save

```
PS C:\> Remove-S3Bucket -BucketName myfirstpowershellbucket -DeleteBucketContent

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-S3Bucket (DeleteBucket)" on target "myfirstpowershellbucket".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
```

```
PS C:\> New-S3Bucket -BucketName myfirstpowershellbucket

CreationDate         BucketName
------------         ----------
6/18/2017 7:10:21 AM myfirstpowershellbucket
```

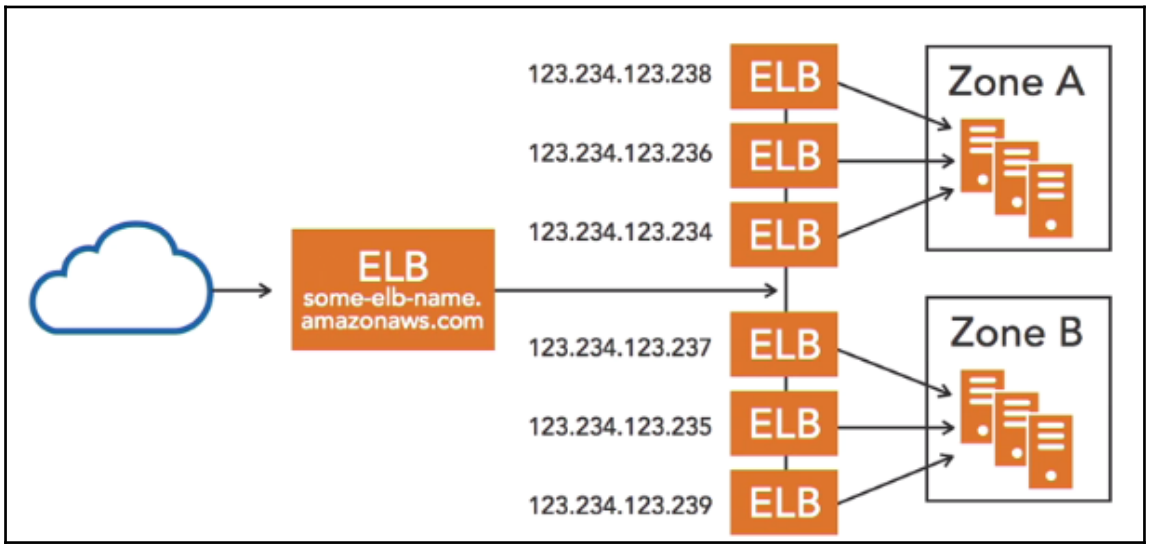
```
PS C:\> New-S3Bucket -BucketName mysecondpowershellbucket -region us-west-2

CreationDate         BucketName
------------         ----------
6/18/2017 7:14:01 AM mysecondpowershellbucket


PS C:\> Get-S3BucketLocation -BucketName mysecondpowershellbucket

Value
-----
us-west-2
```

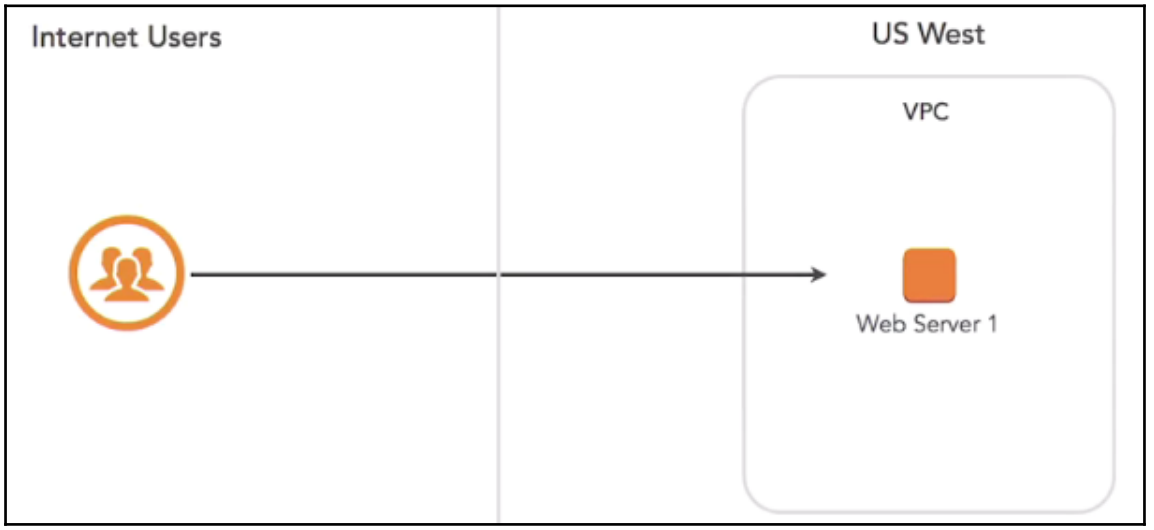
```
PS C:\> Get-S3BucketLocation -BucketName myfirstpowershellbucket

Value
-----



PS C:\> Get-S3BucketLocation -BucketName 5b86fe880aaa4764850dcfc52a8a5b0b-logs

Value
-----
us-west-2
```

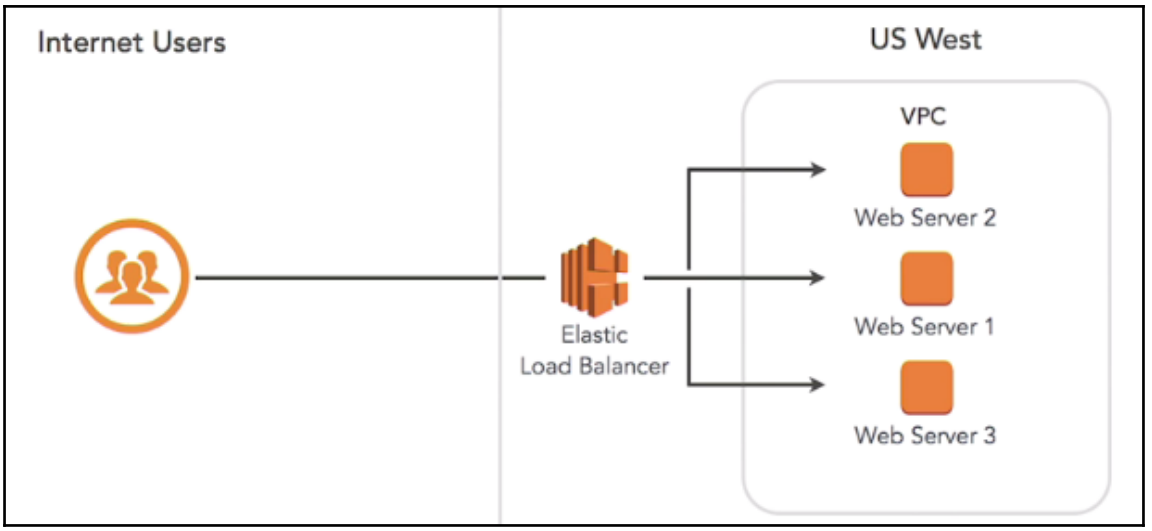
```
PS C:\> Get-S3Object -BucketName myfirstpowershellbucket
PS C:\> Write-S3Object -BucketName myfirstpowershellbucket -Folder 'D:\sampleimages\' -KeyPrefix Images
PS C:\> Get-S3Object -BucketName myfirstpowershellbucket


ETag          : "d48dd1daf5b6a89018777b4bda33c4d6"
BucketName    : myfirstpowershellbucket
Key           : Images/IMG_0309.JPG
LastModified : 6/18/2017 6:29:16 PM
Owner         : Amazon.S3.Model.Owner
Size          : 1363330
StorageClass : STANDARD
```

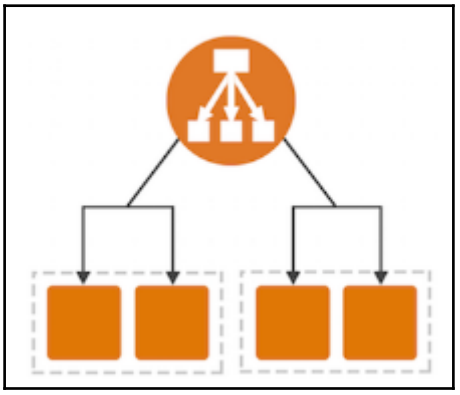
```
PS D:\Data\S3Download> dir
PS D:\Data\S3Download> Read-S3Object -BucketName myfirstpowershellbucket -Key Tax -File local-Tax.txt

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----        6/19/2017   9:53 AM           1704 local-Tax.txt


PS D:\Data\S3Download> Read-S3Object -BucketName myfirstpowershellbucket -KeyPrefix Books -Folder local-books

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----        6/19/2017   9:54 AM                local-books


PS D:\Data\S3Download> Get-S3Bucket | ? { $_.BucketName -like '*powershell*' } | Get-S3Object | ? { $_.Key -like '*.JPG' } | Read-S3Object -Folder Images

Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----        6/19/2017   9:56 AM        1363330 IMG_0309.JPG
-a----        6/19/2017   9:57 AM        1504457 IMG_0310.JPG
-a----        6/19/2017   9:57 AM        1369265 IMG_0311.JPG
-a----        6/19/2017   9:57 AM        1406505 IMG_0312.JPG
-a----        6/19/2017   9:57 AM        1484573 IMG_0313.JPG
-a----        6/19/2017   9:57 AM        1544019 IMG_0314.JPG
-a----        6/19/2017   9:57 AM        1368887 IMG_0315.JPG
```

Chapter 8: Elastic Load Balancer

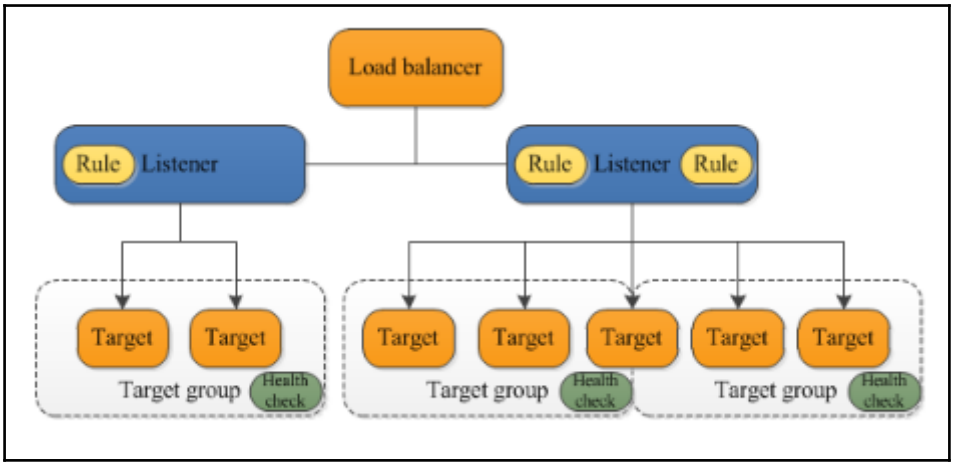





Internet Users
US West
VPC
Web Server 2
Web Server 1
Web Server 3
Elastic
Load Balancer

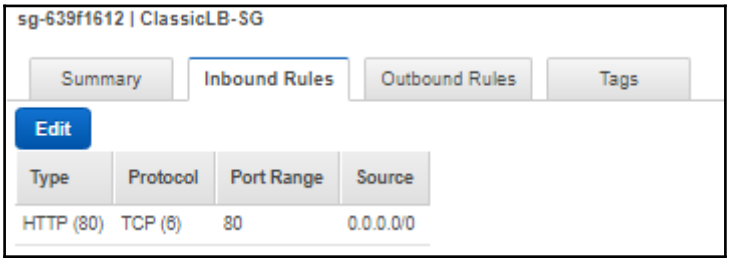


Feature	Classic Load Balancer	Application Load Balancer
Protocols	HTTP, HTTPS, TCP, SSL	HTTP, HTTPS
Platforms	EC2-Classic, EC2-VPC	EC2-VPC
Sticky sessions (cookies)	✓	load balancer generated
Idle connection timeout	✓	✓
Connection draining	✓	✓
Cross-zone load balancing †	✓	Always enabled
Health checks † †	✓	Improved
CloudWatch metrics	✓	Improved
Access logs	✓	Improved
Host-based routing		✓
Path-based routing		✓
Route to multiple ports on a single instance		✓
HTTP/2 support		✓
Websockets support		✓
Load balancer deletion protection		✓

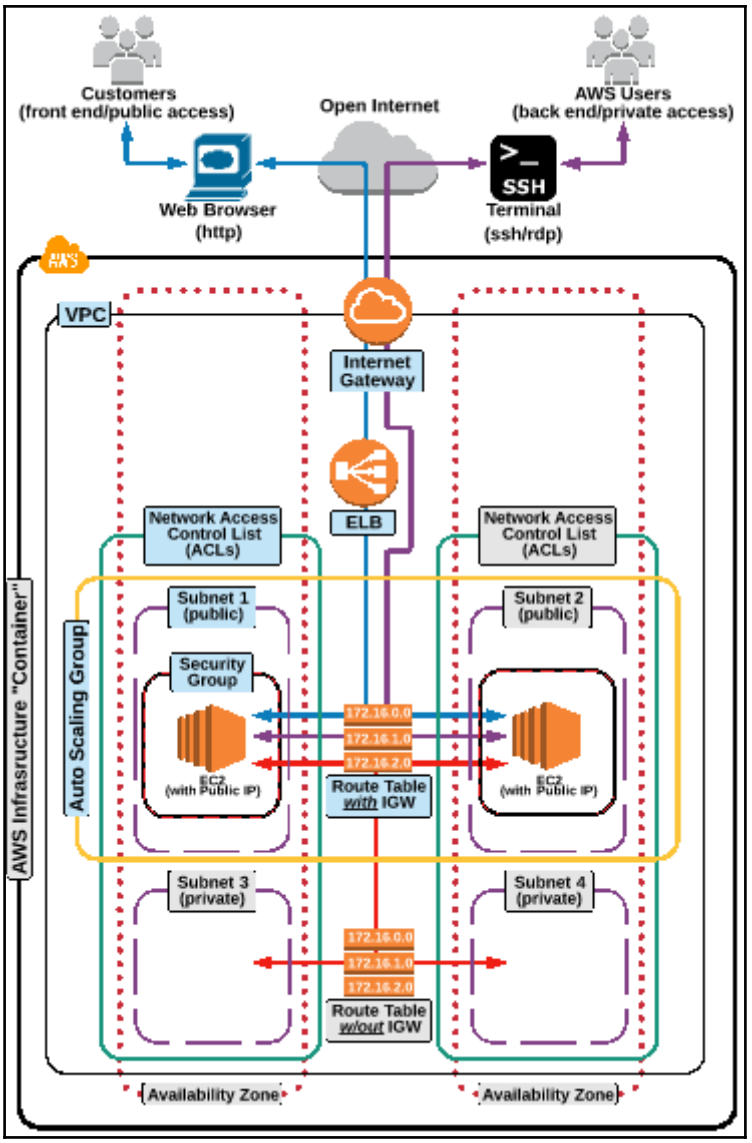


```
PS C:\> Get-ELBAccountLimit

Max Name
--- ----
20  classic-load-balancers
100 classic-listeners
```

Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4	IPv6 CIDR	Availability Zone
public1_ps	subnet-c843dd80	available	vpc-a6bb60df | PowerShellTest	10.0.2.0/24	250		us-east-1b
public2_ps	subnet-b29d3e9e	available	vpc-a6bb60df | PowerShellTest	10.0.3.0/24	251		us-east-1a
private1_ps	subnet-b262c19e	available	vpc-a6bb60df | PowerShellTest	10.0.1.0/24	251		us-east-1a
private2_ps	subnet-f042dcb8	available	vpc-a6bb60df | PowerShellTest	10.0.4.0/24	251		us-east-1b




```
PS C:\> $httpListener = New-Object Amazon.ElasticLoadBalancing.Model.Listener
PS C:\> $httpListener.Protocol = "http"
PS C:\> $httpListener.LoadBalancerPort = 80
PS C:\> $httpListener.InstanceProtocol = "http"
PS C:\> $httpListener.InstancePort = 80
PS C:\> New-ELBLoadBalancer -LoadBalancerName myfirstclassiclb -SecurityGroup sg-639f1612 -Subnet subnet-b29d3e9e,subnet-c843dd80 -Listener $httpListener
myfirstclassiclb-1809645133.us-east-1.elb.amazonaws.com
```


Customers
(front end/public access)
Open Internet
AWS Users
(back end/private access)
Web Browser
(http)
SSH
Terminal
(ssh/rdp)
AWS
VPC
Internet Gateway
ELB
Network Access Control List (ACLs)
Network Access Control List (ACLs)
Auto Scaling Group
Subnet 1 (public)
Subnet 2 (public)
Security Group
172.16.0.0
172.16.1.0
172.16.2.0
EC2 (with Public IP)
EC2 (with Public IP)
Route Table with IGW
Subnet 3 (private)
Subnet 4 (private)
172.16.0.0
172.16.1.0
172.16.2.0
Route Table w/out IGW
AWS Infrasructure "Container"
Availability Zone
Availability Zone

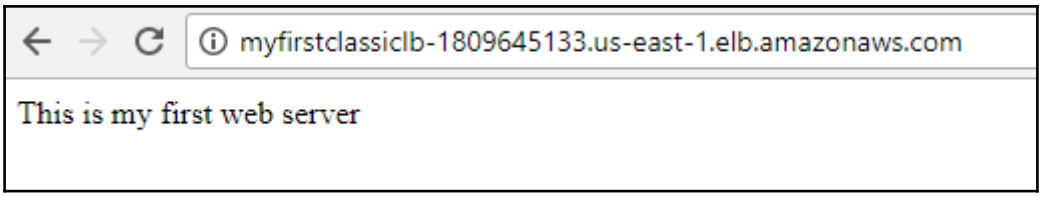
```
PS C:\> Get-Content -Raw "D:\data\UserData\MyWebServerUserData1.txt"
#!/bin/bash
sudo yum update -y
sudo yum install -y httpd
sudo service httpd start
sudo chkconfig httpd on
sudo groupadd www
sudo usermod -a -G www ec2-user
sudo chown -R root:www /var/www
sudo chmod 2775 /var/www
sudo find /var/www -type d -exec chmod 2775 {} +
sudo find /var/www -type f -exec chmod 0664 {} +
sudo echo "This is my first web server" > /var/www/html/index.html
PS C:\>
PS C:\> New-EC2Instance -ImageId ami-a4c7edb2 -MinCount 1 -MaxCount 1 -SubnetId subnet-b262c19e -InstanceType t2.micro -KeyName MyWebPressApp -EncodeUserData
 -UserDataFile "D:\data\UserData\MyWebServerUserData1.txt" -SecurityGroupId sg-9ec521ef


GroupNames    : {}
Groups        : {}
Instances     : {MyWebPressApp}
OwnerId       : 072316406132
RequesterId   :
ReservationId : r-0549a8195bbc08561
```

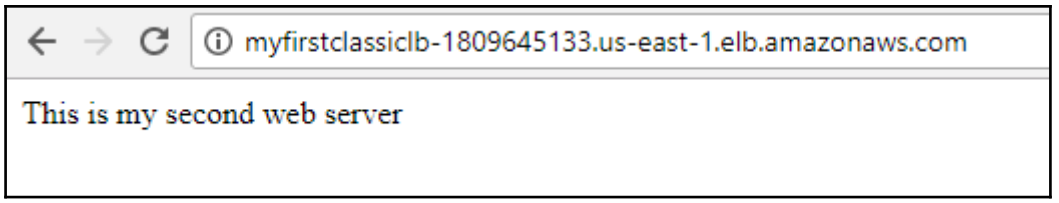
```
PS C:\> Get-Content -Raw "D:\data\UserData\MyWebServerUserData2.txt"
#!/bin/bash
sudo yum update -y
sudo yum install -y httpd
sudo service httpd start
sudo chkconfig httpd on
sudo groupadd www
sudo usermod -a -G www ec2-user
sudo chown -R root:www /var/www
sudo chmod 2775 /var/www
sudo find /var/www -type d -exec chmod 2775 {} +
sudo find /var/www -type f -exec chmod 0664 {} +
sudo echo "This is my second web server" > /var/www/html/index.html
PS C:\>
PS C:\> New-EC2Instance -ImageId ami-a4c7edb2 -MinCount 1 -MaxCount 1 -SubnetId subnet-f042dcb8 -InstanceType t2.micro -KeyName MyWebPressApp -EncodeUserData
 -UserDataFile "D:\data\UserData\MyWebServerUserData2.txt" -SecurityGroupId sg-9ec521ef


GroupNames    : {}
Groups        : {}
Instances     : {MyWebPressApp}
OwnerId       : 072316406132
RequesterId   :
ReservationId : r-0186ecc2ed6173293
```

```
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id";Values="r-0549a8195bbc08561" }).Instances.InstanceId
i-06ce23d76d459ee3f
PS C:\> (Get-EC2Instance -Filter @{ Name="reservation-id";Values="r-0186ecc2ed6173293" }).Instances.InstanceId
i-03f0f169a698a3a2d
```

```
PS C:\> Register-ELBInstanceWithLoadBalancer -LoadBalancerName myfirstclassiclb -Instance i-03f0f169a698a3a2d,i-06ce23d76d459ee3f

InstanceId
----------
i-03f0f169a698a3a2d
i-06ce23d76d459ee3f
```

```
PS C:\> Get-ELBInstanceHealth -LoadBalancerName myfirstclassiclb

Description InstanceId          ReasonCode State
----------- ----------          ---------- -----
N/A         i-03f0f169a698a3a2d N/A        InService
N/A         i-06ce23d76d459ee3f N/A        InService
```






```
PS C:\> Get-ELBLoadBalancer -LoadBalancerName myfirstclassiclb


AvailabilityZones         : {us-east-1a, us-east-1b}
BackendServerDescriptions : {}
CanonicalHostedZoneName   : myfirstclassiclb-1809645133.us-east-1.elb.amazonaws.com
CanonicalHostedZoneNameID : Z35SXDOTRQ7X7K
CreatedTime               : 7/4/2017 11:44:21 AM
DNSName                   : myfirstclassiclb-1809645133.us-east-1.elb.amazonaws.com
HealthCheck               : Amazon.ElasticLoadBalancing.Model.HealthCheck
Instances                 : {i-03f0f169a698a3a2d, i-06ce23d76d459ee3f}
ListenerDescriptions      : {Amazon.ElasticLoadBalancing.Model.ListenerDescription}
LoadBalancerName          : myfirstclassiclb
Policies                  : Amazon.ElasticLoadBalancing.Model.Policies
Scheme                    : internet-facing
SecurityGroups            : {sg-639f1612}
SourceSecurityGroup       : Amazon.ElasticLoadBalancing.Model.SourceSecurityGroup
Subnets                   : {subnet-b29d3e9e, subnet-c843dd80}
VPCId                     : vpc-a6bb60df
```

```
PS C:\> (Get-ELBLoadBalancer -LoadBalancerName myfirstclassiclb).HealthCheck


HealthyThreshold   : 2
Interval           : 5
Target             : TCP:80
Timeout            : 2
UnhealthyThreshold : 2
```

```
PS C:\> Set-ELBHealthCheck -LoadBalancerName myfirstclassiclb -HealthCheck_HealthyThreshold 3 -HealthCheck_Interval 6 -HealthCheck_Target TCP:80 -HealthCheck
_Timeout 3 -HealthCheck_UnhealthyThreshold 5


HealthyThreshold   : 3
Interval           : 6
Target             : TCP:80
Timeout            : 3
UnhealthyThreshold : 5



PS C:\> (Get-ELBLoadBalancer -LoadBalancerName myfirstclassiclb).HealthCheck


HealthyThreshold   : 3
Interval           : 6
Target             : TCP:80
Timeout            : 3
UnhealthyThreshold : 5
```

```
PS C:\> (Get-ELBLoadBalancer -LoadBalancerName myfirstclassiclb).ListenerDescriptions.Listener


InstancePort     : 80
InstanceProtocol : HTTP
LoadBalancerPort : 80
Protocol         : HTTP
SSLCertificateId :
```

```
PS C:\> Get-ELB2AccountLimit

Max  Name
---  ----
20   application-load-balancers
200  target-groups
1000 targets-per-application-load-balancer
10   listeners-per-application-load-balancer
100  rules-per-application-load-balancer
```

```
PS C:\> New-ELB2TargetGroup -HealthCheckIntervalSecond 5 -HealthCheckPath "/" -HealthCheckPort 80 -HealthCheckProtocol http -HealthCheckTimeoutSecond 2 -Heal
thyThresholdCount 2 -Matcher_HttpCode 200 -Name myfirsttargetgroup -Port 80 -Protocol http -UnhealthyThresholdCount 2 -VpcId vpc-a6bb60df


HealthCheckIntervalSeconds : 5
HealthCheckPath            : /
HealthCheckPort            : 80
HealthCheckProtocol        : HTTP
HealthCheckTimeoutSeconds  : 2
HealthyThresholdCount      : 2
LoadBalancerArns           : {}
Matcher                    : Amazon.ElasticLoadBalancingV2.Model.Matcher
Port                       : 80
Protocol                   : HTTP
TargetGroupArn             : arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52
TargetGroupName            : myfirsttargetgroup
UnhealthyThresholdCount    : 2
VpcId                      : vpc-a6bb60df
```

```
PS C:\> New-ELB2LoadBalancer -IpAddressType ipv4 -Name myfirstALB -Scheme internet-facing -SecurityGroup sg-639f1612 -Subnet subnet-b29d3e9e,subnet-c843dd80


AvailabilityZones     : {us-east-1a, us-east-1b}
CanonicalHostedZoneId : Z35SXDOTRQ7X7K
CreatedTime           : 7/4/2017 6:51:07 PM
DNSName               : myfirstALB-2030720075.us-east-1.elb.amazonaws.com
IpAddressType         : ipv4
LoadBalancerArn       : arn:aws:elasticloadbalancing:us-east-1:072316406132:loadbalancer/app/myfirstALB/08170653024b5608
LoadBalancerName      : myfirstALB
Scheme                : internet-facing
SecurityGroups        : {sg-639f1612}
State                 : Amazon.ElasticLoadBalancingV2.Model.LoadBalancerState
Type                  : application
VpcId                 : vpc-a6bb60df
```

```
PS C:\> (Get-ELB2LoadBalancer -Name myfirstALB).state

Code   Reason
----   ------
active
```

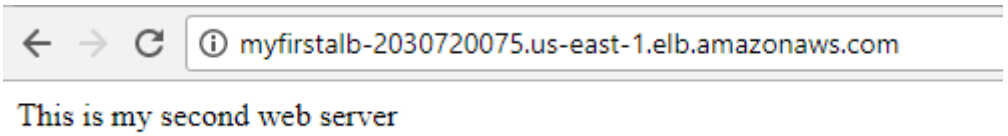
```
PS C:\> $target1 = New-Object Amazon.ElasticLoadBalancingV2.Model.TargetDescription
PS C:\> $target1.id="i-03f0f169a698a3a2d"
PS C:\> $target2 = New-Object Amazon.ElasticLoadBalancingV2.Model.TargetDescription
PS C:\> $target2.id="i-06ce23d76d459ee3f"
PS C:\> Register-ELB2Target -TargetGroupArn arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52 -Target $targ
et1
PS C:\> Register-ELB2Target -TargetGroupArn arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52 -Target $targ
et2
```

```
PS C:\> (Get-ELB2TargetHealth -TargetGroupArn arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52).Target

Id                  Port
--                  ----
i-06ce23d76d459ee3f 80
i-03f0f169a698a3a2d 80


PS C:\> (Get-ELB2TargetHealth -TargetGroupArn arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52).TargetHeal
th

Description                                                          Reason          State
-----------                                                          ------          -----
Target group is not configured to receive traffic from the load balancer Target.NotInUse unused
Target group is not configured to receive traffic from the load balancer Target.NotInUse unused
```

```
PS C:\> $Action1 = New-Object Amazon.ElasticLoadBalancingV2.Model.Action
PS C:\> $Action1.TargetGroupArn ="arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52"
PS C:\> $Action1.Type ="forward"
PS C:\> New-ELB2Listener -LoadBalancerArn arn:aws:elasticloadbalancing:us-east-1:072316406132:loadbalancer/app/myfirstALB/08170653024b5608 -Port 80 -Protocol
 http -DefaultAction $Action1


Certificates    : {}
DefaultActions  : {Amazon.ElasticLoadBalancingV2.Model.Action}
ListenerArn     : arn:aws:elasticloadbalancing:us-east-1:072316406132:listener/app/myfirstALB/08170653024b5608/019276023fede5d7
LoadBalancerArn : arn:aws:elasticloadbalancing:us-east-1:072316406132:loadbalancer/app/myfirstALB/08170653024b5608
Port            : 80
Protocol        : HTTP
SslPolicy       :
```

```
PS C:\> (Get-ELB2TargetHealth -TargetGroupArn arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52).TargetHeal
th

Description Reason State
----------- ------ -----
                   healthy
                   healthy
```

```
PS C:\> Get-ELB2LoadBalancer -Name myfirstALB


AvailabilityZones     : {us-east-1a, us-east-1b}
CanonicalHostedZoneId : Z35SXDOTRQ7X7K
CreatedTime           : 7/4/2017 6:51:07 PM
DNSName               : myfirstALB-2030720075.us-east-1.elb.amazonaws.com
IpAddressType         : ipv4
LoadBalancerArn       : arn:aws:elasticloadbalancing:us-east-1:072316406132:loadbalancer/app/myfirstALB/08170653024b5608
LoadBalancerName      : myfirstALB
Scheme                : internet-facing
SecurityGroups        : {sg-639f1612}
State                 : Amazon.ElasticLoadBalancingV2.Model.LoadBalancerState
Type                  : application
VpcId                 : vpc-a6bb60df
```



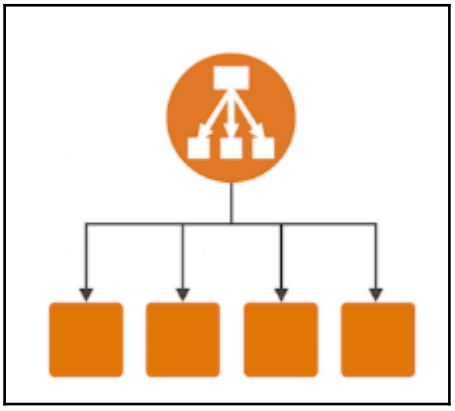

```
PS C:\> $Action1 = New-Object Amazon.ElasticLoadBalancingV2.Model.TargetGroupAttribute
PS C:\> $Action1.key="stickiness.enabled"
PS C:\> $Action1.value="true"
PS C:\> Edit-ELB2TargetGroupAttribute -TargetGroupArn arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52 -At
tribute $Action1

Key                                Value
---                                -----
stickiness.enabled                 true
deregistration_delay.timeout_seconds  300
stickiness.type                    lb_cookie
stickiness.lb_cookie.duration_seconds 86400
```

```
PS C:\> Remove-ELBLoadBalancer -LoadBalancerName myfirstclassiclb

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-ELBLoadBalancer (DeleteLoadBalancer)" on target "myfirstclassiclb".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
```

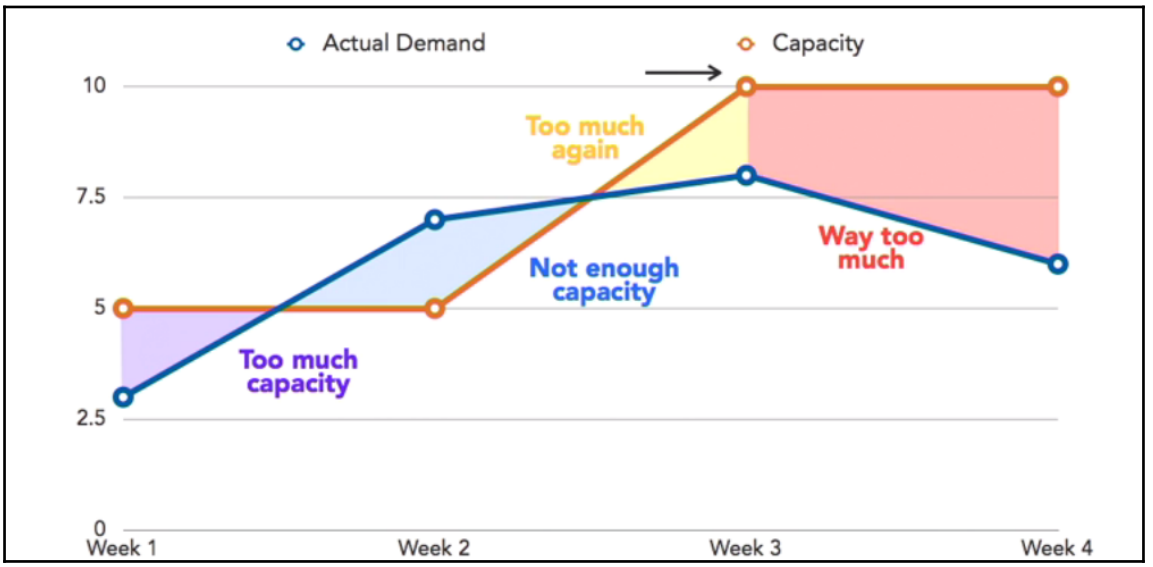
```
PS C:\> Remove-ELB2LoadBalancer -LoadBalancerArn arn:aws:elasticloadbalancing:us-east-1:072316406132:loadbalancer/app/myfirstALB/08170653024b5608

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-ELB2LoadBalancer (DeleteLoadBalancer)" on target
"arn:aws:elasticloadbalancing:us-east-1:072316406132:loadbalancer/app/myfirstALB/08170653024b5608".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
```

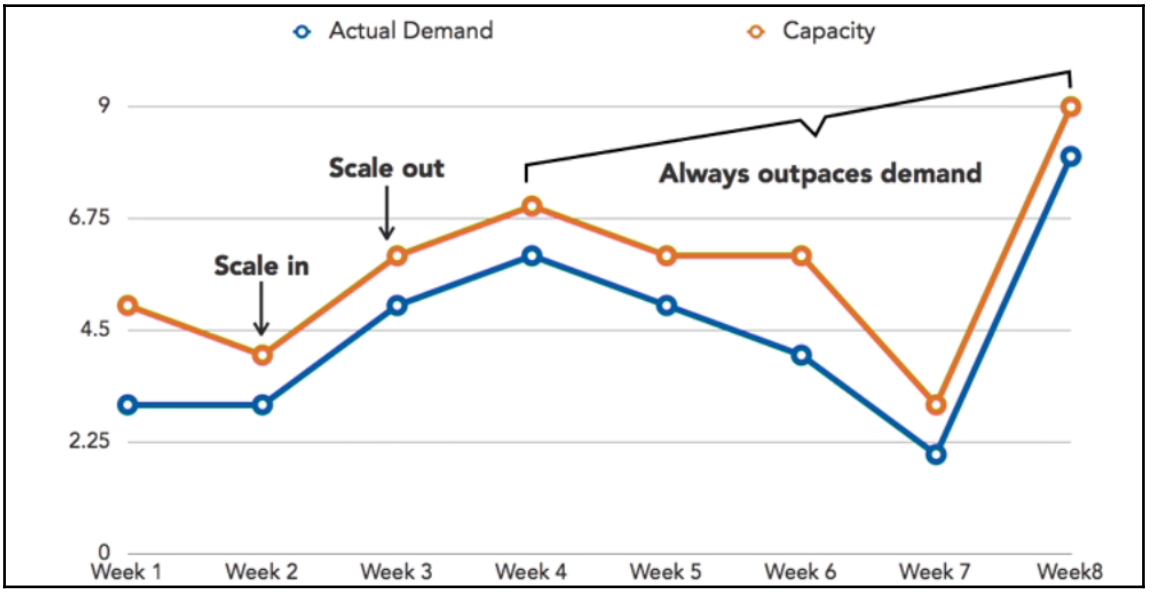
```
PS C:\> Remove-ELB2TargetGroup -TargetGroupArn arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-ELB2TargetGroup (DeleteTargetGroup)" on target
"arn:aws:elasticloadbalancing:us-east-1:072316406132:targetgroup/myfirsttargetgroup/325817ee7a290b52".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
```

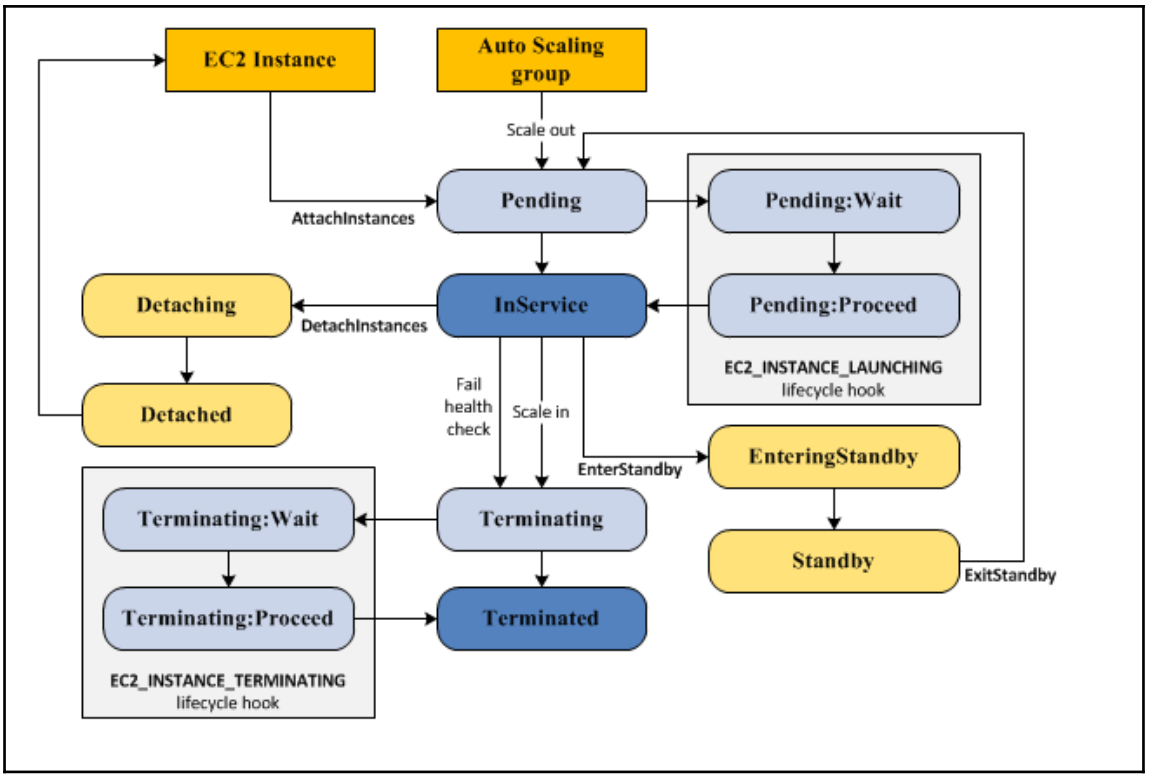
```
PS C:\> Remove-EC2Instance -InstanceId i-03f0f169a698a3a2d

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-EC2Instance (TerminateInstances)" on target "i-03f0f169a698a3a2d".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y

CurrentState                    InstanceId          PreviousState
------------                    ----------          -------------
Amazon.EC2.Model.InstanceState i-03f0f169a698a3a2d Amazon.EC2.Model.InstanceState


PS C:\> Remove-EC2Instance -InstanceId i-06ce23d76d459ee3f

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-EC2Instance (TerminateInstances)" on target "i-06ce23d76d459ee3f".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y

CurrentState                    InstanceId          PreviousState
------------                    ----------          -------------
Amazon.EC2.Model.InstanceState i-06ce23d76d459ee3f Amazon.EC2.Model.InstanceState
```

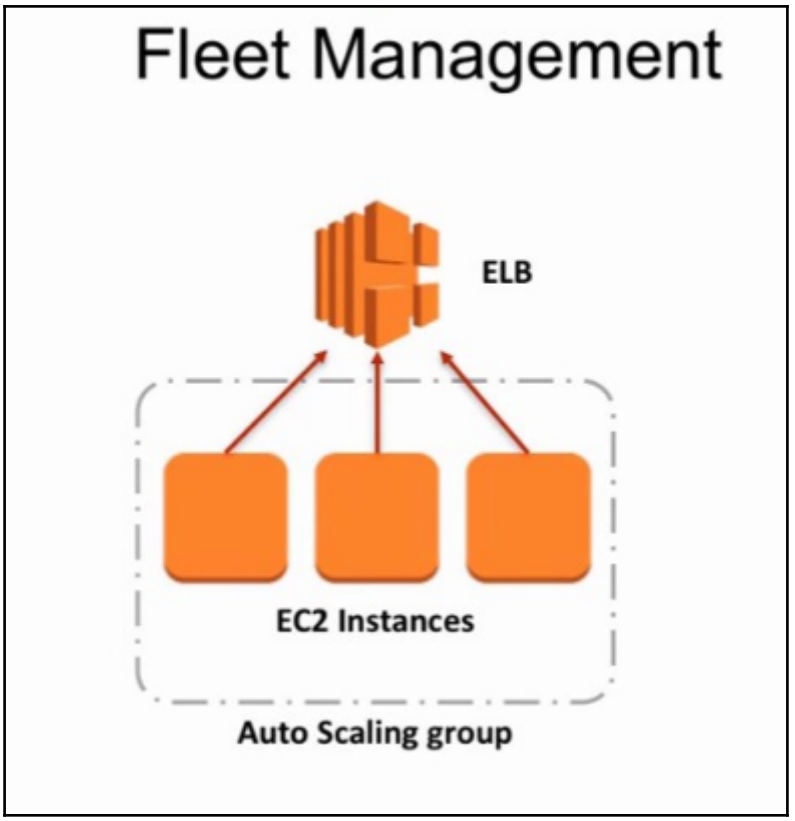


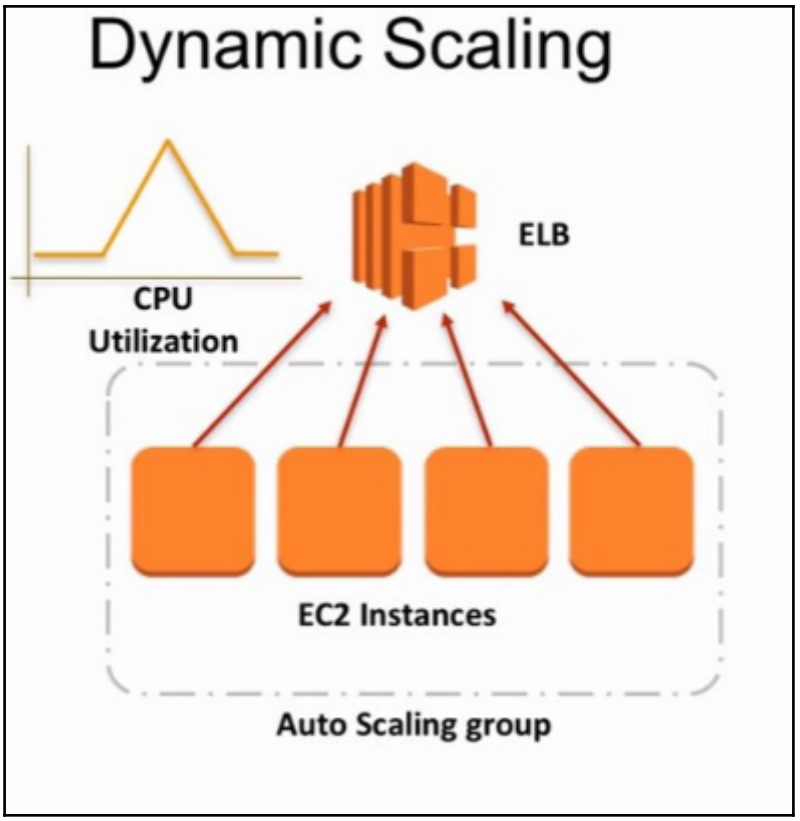
Chapter 9: Auto Scaling






EC2 Instance
Auto Scaling group
Scale out
AttachInstances
Pending
Pending:Wait
Pending:Proceed
EC2_INSTANCE_LAUNCHING
lifecycle hook
Detaching
DetachInstances
InService
Detached
Fail health check
Scale in
EnterStandby
EnteringStandby
Standby
ExitStandby
Terminating:Wait
Terminating
Terminating:Proceed
Terminated
EC2_INSTANCE_TERMINATING
lifecycle hook


Fleet Management
ELB
EC2 Instances
Auto Scaling group




```
PS C:\> Get-ASAccountLimit

MaxNumberOfAutoScalingGroups MaxNumberOfLaunchConfigurations NumberOfAutoScalingGroups NumberOfLaunchConfigurations
---------------------------- ------------------------------- ------------------------- ----------------------------
20                           100                             0                         0
```

```
PS C:\> Get-Content -Raw D:\data\UserData\WebAppLCUserData.txt
#!/bin/bash
yum update -y
yum install -y httpd curl
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 "I am coming from " > /var/www/html/index.html
export myhost=`curl http://instance-data/latest/meta-data/instance-id`
echo $myhost >> /var/www/html/index.html
```

```
PS C:\> Get-EC2KeyPair -KeyName MyWebPressApp

KeyFingerprint                                                  KeyName
--------------                                                  -------
bc:44:f7:48:6a:47:ca:e6:af:cf:97:a3:48:a8:d3:98:90:b2:07:06 MyWebPressApp
```

```
PS C:\> New-IAMInstanceProfile -InstanceProfileName WebAppRoleProfile


Arn                 : arn:aws:iam::072316406132:instance-profile/WebAppRoleProfile
CreateDate          : 7/10/2017 2:24:39 PM
InstanceProfileId   : AIPAIZQMVKVXB23AWQXYU
InstanceProfileName : WebAppRoleProfile
Path                : /
Roles               : {}



PS C:\> Add-IAMRoleToInstanceProfile -InstanceProfileName WebAppRoleProfile -RoleName WorldPressAppRole
```

```
PS C:\> $userdata = (Get-Content -Raw D:\data\UserData\WebAppLCUserData.txt)
PS C:\> $EncodeUserData = [System.Text.Encoding]::UTF8.GetBytes($userdata)
PS C:\> $EncuserData = [System.Convert]::ToBase64String($EncodeUserData)
PS C:\> New-ASLaunchConfiguration -LaunchConfigurationName WebAppLC -InstanceType "t2.micro" -ImageId "ami-a4c7edb2" -SecurityGroup "sg-7b1f700a" -IamInstanc
eProfile "WebAppRoleProfile" -KeyName "MyWebPressApp" -AssociatePublicIpAddress $false -Userdata $EncuserData
```

```
PS C:\> Get-ASLaunchConfiguration


AssociatePublicIpAddress     : False
BlockDeviceMappings          : {}
ClassicLinkVPCId             :
ClassicLinkVPCSecurityGroups : {}
CreatedTime                  : 7/10/2017 5:15:39 PM
EbsOptimized                 : False
IamInstanceProfile           : WebAppRoleProfile
ImageId                      : ami-a4c7edb2
InstanceMonitoring           : Amazon.AutoScaling.Model.InstanceMonitoring
InstanceType                 : t2.micro
KernelId                     :
KeyName                      : MyWebPressApp
LaunchConfigurationARN       : arn:aws:autoscaling:us-east-1:072316406132:launchConfiguration:2f700b60-94b0-4c16-8731-63902cecbdc8:launchConfigurationName/WebAppLC
LaunchConfigurationName      : WebAppLC
PlacementTenancy             :
RamdiskId                    :
SecurityGroups               : {sg-7b1f700a}
SpotPrice                    :
UserData                     : IyEvYmluL2Jhc2gNCnl1bSB1cGRhdGUgLXkNCnl1bSBpbnN0YWxsIC15IGh0dHBkIGN1cmwNCnNlcnZpY2UgaHR0cGQgc3RhcnQNCmNoa2NvbmZpZyBodHRwZCBvbg0KZ3JvdXBhZGQgd3d3DQp1c2VybW9kIC1hIC1HIHd3dyBlYzItdXNlcg0KY2hvd24gLVIgcm9vdDp3d3cgL3Zhci93d3cNCmNobW9kIDI3NzUgL3Zhci93d3cNCmZpbmQgL3Zhci93d3cgLXR5cGUgZCAtZXhlYyBjaG1vZCAyNzc1IHt9IKwNCmZpbmQgL3Zhci93d3cgLXR5cGUgZiAtZXhlYyBjaG1vZCAwNjY0IHt9IKwNCmVjaG8gIkkgYW0gY29taW5nIGZyb20gIiA+IC92YXIvd3d3L2h0bWwvaW5kZXguaHRtbA0KZXhwb3J0IG15aG9zdD1gY3VybCBodHRwOi8vaW5zdGFuY2UtZGF0YS9sYXRlc3QvbWV0YS1kYXRhL2luc3RhbmNlLWlkYA0KZWNobyAkbXlob3N0ID4+IC92YXIvd3d3L2h0bWwvaW5kZXguaHRtbA0K
```

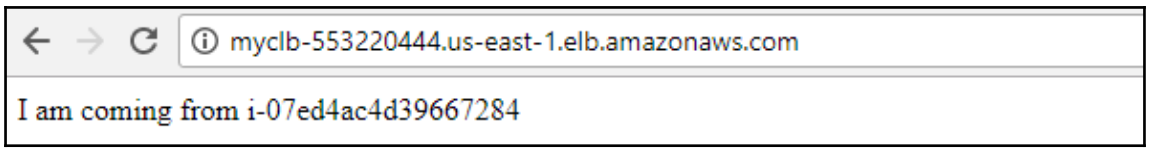
User data

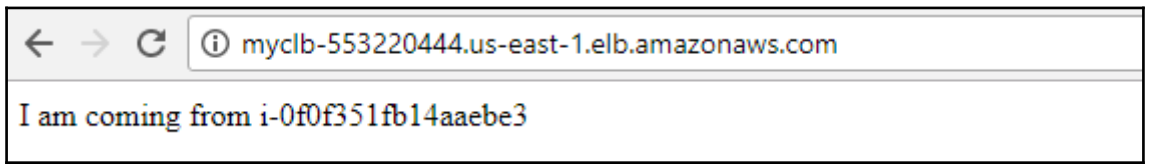
```
#!/bin/bash
yum update -y
yum install -y httpd curl
service httpd start
chkconfig httpd on
groupadd www
usermod -a -G www ec2-user
chown -R root:www /var/www
chmod 2775 /var/www
find /var/www -type d -exec chmod 2775 {} +
find /var/www -type f -exec chmod 0664 {} +
echo "I am coming from " > /var/www/html/index.html
export myhost=`curl http://instance-data/latest/meta-data/instance-id`
echo $myhost >> /var/www/html/index.html
```

```
PS C:\> $httpListener = New-Object Amazon.ElasticLoadBalancing.Model.Listener
PS C:\> $httpListener.Protocol = "http"
PS C:\> $httpListener.LoadBalancerPort = 80
PS C:\> $httpListener.InstanceProtocol = "http"
PS C:\> $httpListener.InstancePort = 80
PS C:\> New-ELBLoadBalancer -LoadBalancerName MyCLB -SecurityGroup sg-639f1612 -Subnet subnet-b29d3e9e,subnet-c843dd80 -Listener $httpListener
MyCLB-553220444.us-east-1.elb.amazonaws.com
PS C:\> Edit-ELBLoadBalancerAttribute -LoadBalancerName MyCLB -CrossZoneLoadBalancing_Enabled $true

LoadBalancerAttributes                                LoadBalancerName
----------------------                                ----------------
Amazon.ElasticLoadBalancing.Model.LoadBalancerAttributes MyCLB
```

```
PS C:\> New-ASAutoScalingGroup -AutoScalingGroupName WebAppASG -LaunchConfigurationName WebAppLC -MinSize 2 -MaxSize 2 -AvailabilityZone @("us-east-1a", "us-east-1b") -VPCZoneIdentifier "subnet-b262c19e,subnet-f042dcb8" -HealthCheckType ELB -HealthCheckGracePeriod 10 -LoadBalancerName MyCLB
```

```
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG


AutoScalingGroupARN             : arn:aws:autoscaling:us-east-1:072316406132:autoScalingGroup:8936441b-7586-42d5-9726-04de681ba047:autoScalingGroupName/Web
                                  AppASG
AutoScalingGroupName            : WebAppASG
AvailabilityZones               : {us-east-1a, us-east-1b}
CreatedTime                     : 7/10/2017 5:41:58 PM
DefaultCooldown                 : 300
DesiredCapacity                 : 2
EnabledMetrics                  : {}
HealthCheckGracePeriod          : 10
HealthCheckType                 : ELB
Instances                       : {WebAppLC, WebAppLC}
LaunchConfigurationName         : WebAppLC
LoadBalancerNames               : {MyCLB}
MaxSize                         : 2
MinSize                         : 2
NewInstancesProtectedFromScaleIn : False
PlacementGroup                  :
Status                          :
SuspendedProcesses              : {}
Tags                            : {}
TargetGroupARNs                 : {}
TerminationPolicies             : {Default}
VPCZoneIdentifier               : subnet-b262c19e,subnet-f042dcb8
```





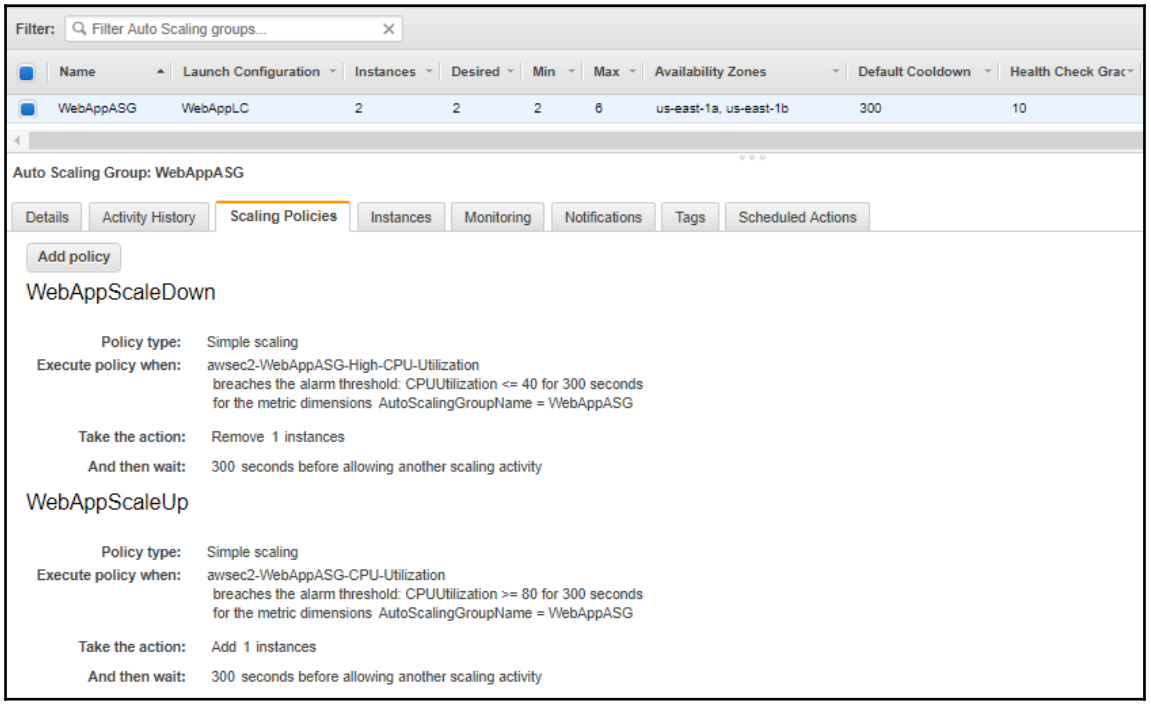

```
PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance


AutoScalingGroupName    : WebAppASG
AvailabilityZone        : us-east-1a
HealthStatus            : HEALTHY
InstanceId              : i-07ed4ac4d39667284
LaunchConfigurationName : WebAppLC
LifecycleState          : InService
ProtectedFromScaleIn    : False

AutoScalingGroupName    : WebAppASG
AvailabilityZone        : us-east-1b
HealthStatus            : HEALTHY
InstanceId              : i-0f0f351fb14aaebe3
LaunchConfigurationName : WebAppLC
LifecycleState          : InService
ProtectedFromScaleIn    : False
```

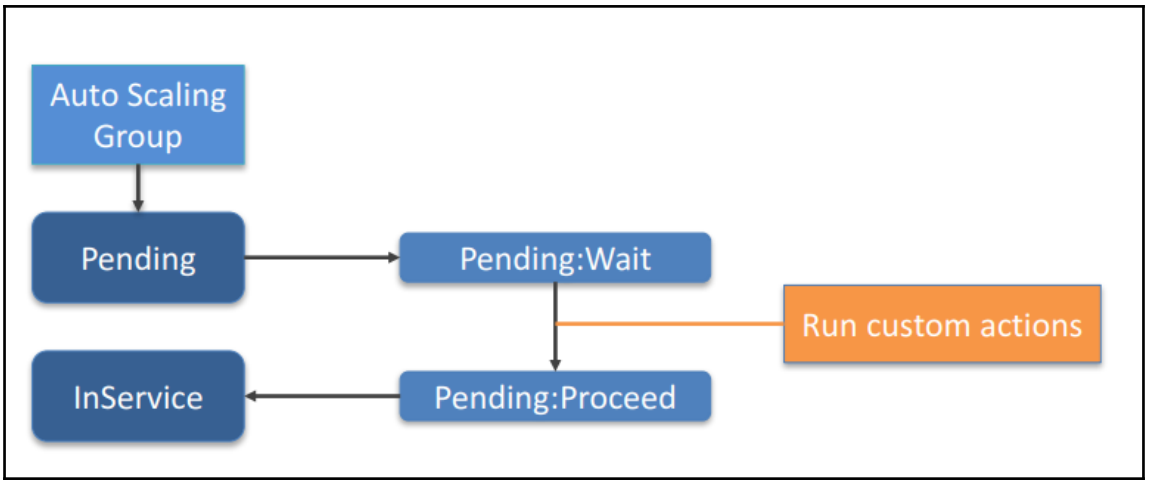
```
PS C:\> Update-ASAutoScalingGroup -AutoScalingGroupName WebAppASG  -DesiredCapacity 3 -MinSize 2 -MaxSize 6
PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus

InstanceId          HealthStatus
----------          ------------
i-07ed4ac4d39667284 HEALTHY
i-0bc6d110b967ba74f HEALTHY
i-0f0f351fb14aaebe3 HEALTHY
```

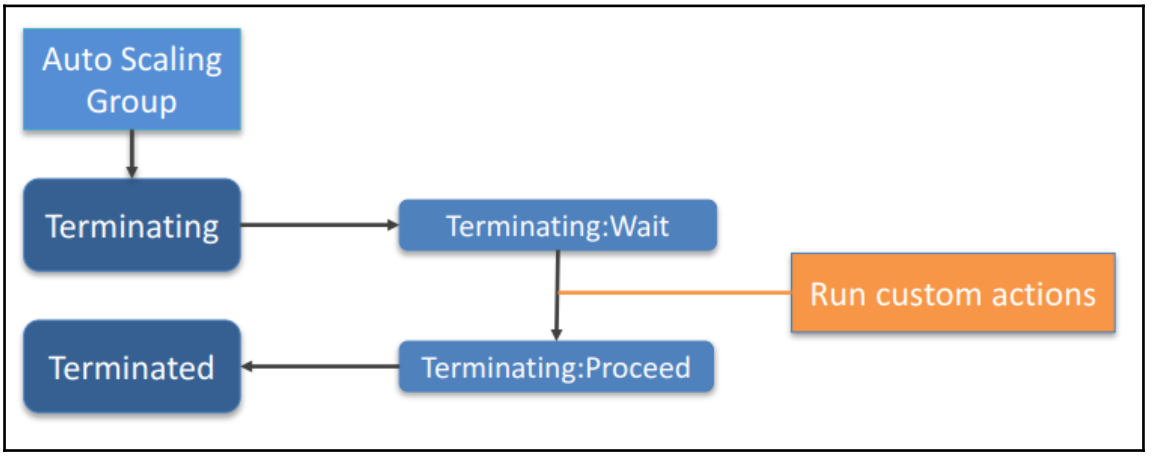
```
PS C:\> Set-ASDesiredCapacity -AutoScalingGroupName WebAppASG -DesiredCapacity 4
PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus

InstanceId          HealthStatus
----------          ------------
i-07ed4ac4d39667284 HEALTHY
i-0bc6d110b967ba74f HEALTHY
i-0c57398c25453eda8 HEALTHY
i-0f0f351fb14aaebe3 HEALTHY
```

```
PS C:\> Set-ASDesiredCapacity -AutoScalingGroupName WebAppASG -DesiredCapacity 2
PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus

InstanceId          HealthStatus
----------          ------------
i-07ed4ac4d39667284 HEALTHY
i-0c57398c25453eda8 HEALTHY
i-0f0f351fb14aaebe3 HEALTHY


PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus

InstanceId          HealthStatus
----------          ------------
i-07ed4ac4d39667284 HEALTHY
i-0f0f351fb14aaebe3 HEALTHY
```

```
PS C:\> Write-ASScalingPolicy -AutoScalingGroupName WebAppASG -AdjustmentType "ChangeInCapacity" -PolicyName "WebAppScaleUp" -ScalingAdjustment +1
arn:aws:autoscaling:us-east-1:072316406132:scalingPolicy:81642e7c-9a08-49a1-95ac-132a0cd2af57:autoScalingGroupName/WebAppASG:policyName/WebAppScaleUp
PS C:\> Write-ASScalingPolicy -AutoScalingGroupName WebAppASG -AdjustmentType "ChangeInCapacity" -PolicyName "WebAppScaleDown" -ScalingAdjustment -1
arn:aws:autoscaling:us-east-1:072316406132:scalingPolicy:91b5ec1a-fea4-48ca-8aaa-6e71fb939aeb:autoScalingGroupName/WebAppASG:policyName/WebAppScaleDown
```








```
PS C:\> Get-ELBInstanceHealth -LoadBalancerName MyCLB

Description InstanceId          ReasonCode State
----------- ----------          ---------- -----
N/A         i-053f08daac48361c7 N/A        InService
N/A         i-0af44cc4eddd53738 N/A        InService


PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus,Lifecy
cleState

InstanceId          HealthStatus LifecycleState
----------          ------------ --------------
i-053f08daac48361c7 HEALTHY      InService
i-0af44cc4eddd53738 HEALTHY      InService
```

```
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table DesiredCapacity,MinSize,MaxSize

DesiredCapacity MinSize MaxSize
--------------- ------- -------
              2       2       6
```

```
PS C:\> Get-ASLifecycleHook -AutoScalingGroupName WebAppASG
PS C:\> Write-ASLifecycleHook -AutoScalingGroupName WebAppASG -LifecycleHookName "MyLCHookAtLaunch" -LifecycleTransition "autoscaling:EC2_INSTANCE_LAUNCHING"

PS C:\> Get-ASLifecycleHook -AutoScalingGroupName WebAppASG


AutoScalingGroupName  : WebAppASG
DefaultResult         : ABANDON
GlobalTimeout         : 172800
HeartbeatTimeout      : 3600
LifecycleHookName     : MyLCHookAtLaunch
LifecycleTransition   : autoscaling:EC2_INSTANCE_LAUNCHING
NotificationMetadata  :
NotificationTargetARN :
RoleARN               :
```

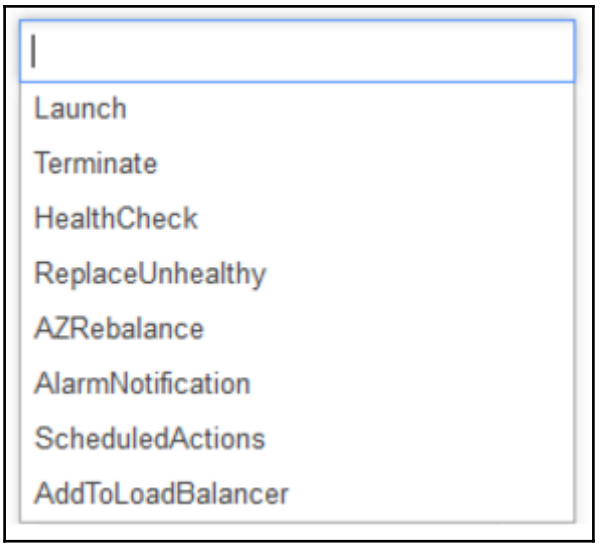
```
PS C:\> Set-ASDesiredCapacity -AutoScalingGroupName WebAppASG -DesiredCapacity 3
PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus,Lifecy
cleState

InstanceId          HealthStatus LifecycleState
----------          ------------ -------------
i-053f08daac48361c7 HEALTHY      InService
i-05ba9441e9d65e0ff HEALTHY      Pending:Wait
i-0af44cc4eddd53738 HEALTHY      InService


PS C:\> Get-ELBInstanceHealth -LoadBalancerName MyCLB

Description InstanceId          ReasonCode State
----------- ----------          ---------- -----
N/A         i-053f08daac48361c7 N/A        InService
N/A         i-0af44cc4eddd53738 N/A        InService
```

```
PS C:\> Complete-ASLifecycleAction -LifecycleHookName "MyLCHookAtLaunch" -AutoScalingGroupName WebAppASG -LifecycleActionResult CONTINUE -InstanceId i-05ba94
41e9d65e0ff
PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus,Lifecy
cleState

InstanceId          HealthStatus LifecycleState
----------          ------------ -------------
i-053f08daac48361c7 HEALTHY      InService
i-05ba9441e9d65e0ff HEALTHY      InService
i-0af44cc4eddd53738 HEALTHY      InService


PS C:\> Get-ELBInstanceHealth -LoadBalancerName MyCLB

Description InstanceId          ReasonCode State
----------- ----------          ---------- -----
N/A         i-053f08daac48361c7 N/A        InService
N/A         i-05ba9441e9d65e0ff N/A        InService
N/A         i-0af44cc4eddd53738 N/A        InService
```

```
PS C:\> Get-ASLifecycleHook -AutoScalingGroupName WebAppASG


AutoScalingGroupName  : WebAppASG
DefaultResult         : ABANDON
GlobalTimeout         : 172800
HeartbeatTimeout      : 3600
LifecycleHookName     : MyLCHookAtLaunch
LifecycleTransition   : autoscaling:EC2_INSTANCE_LAUNCHING
NotificationMetadata  :
NotificationTargetARN :
RoleARN               :



PS C:\> Write-ASLifecycleHook -AutoScalingGroupName WebAppASG -LifecycleHookName "MyLCHookAtLaunch" -HeartbeatTimeout 7200
PS C:\> Get-ASLifecycleHook -AutoScalingGroupName WebAppASG


AutoScalingGroupName  : WebAppASG
DefaultResult         : ABANDON
GlobalTimeout         : 172800
HeartbeatTimeout      : 7200
LifecycleHookName     : MyLCHookAtLaunch
LifecycleTransition   : autoscaling:EC2_INSTANCE_LAUNCHING
NotificationMetadata  :
NotificationTargetARN :
RoleARN               :
```

```
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table AutoScalingGroupName,DefaultCooldown

AutoScalingGroupName DefaultCooldown
-------------------- ---------------
WebAppASG                        300


PS C:\> Update-ASAutoScalingGroup -AutoScalingGroupName WebAppASG -DefaultCooldown 7200
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table AutoScalingGroupName,DefaultCooldown

AutoScalingGroupName DefaultCooldown
-------------------- ---------------
WebAppASG                       7200
```

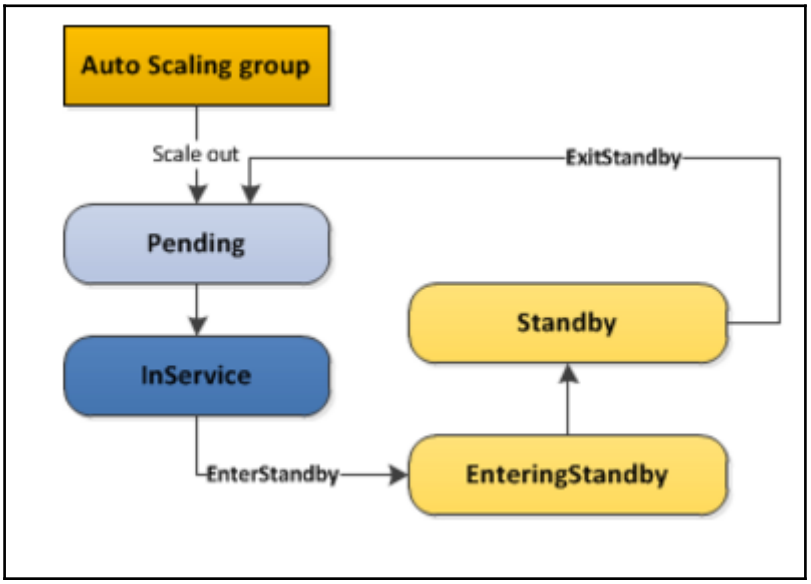
```
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table NewInstancesProtectedFromScaleIn

NewInstancesProtectedFromScaleIn
--------------------------------
                           False


PS C:\> Update-ASAutoScalingGroup -AutoScalingGroupName WebAppASG -NewInstancesProtectedFromScaleIn $true
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table NewInstancesProtectedFromScaleIn

NewInstancesProtectedFromScaleIn
--------------------------------
                            True
```




```
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table SuspendedProcesses

SuspendedProcesses
------------------
{}


PS C:\> Suspend-ASProcess -AutoScalingGroupName WebAppASG -ScalingProcess "Terminate"
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table SuspendedProcesses

SuspendedProcesses
------------------
{Terminate}
```

```
PS C:\> Suspend-ASProcess -AutoScalingGroupName WebAppASG
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table SuspendedProcesses

SuspendedProcesses
------------------
{HealthCheck, ReplaceUnhealthy, AZRebalance, AlarmNotification...}
```

```
PS C:\> Resume-ASProcess -AutoScalingGroupName WebAppASG -ScalingProcess "Terminate"
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table SuspendedProcesses

SuspendedProcesses
------------------
{AZRebalance, AddToLoadBalancer, AlarmNotification, HealthCheck...}


PS C:\> Resume-ASProcess -AutoScalingGroupName WebAppASG
PS C:\> Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG |Format-Table SuspendedProcesses

SuspendedProcesses
------------------
{}
```

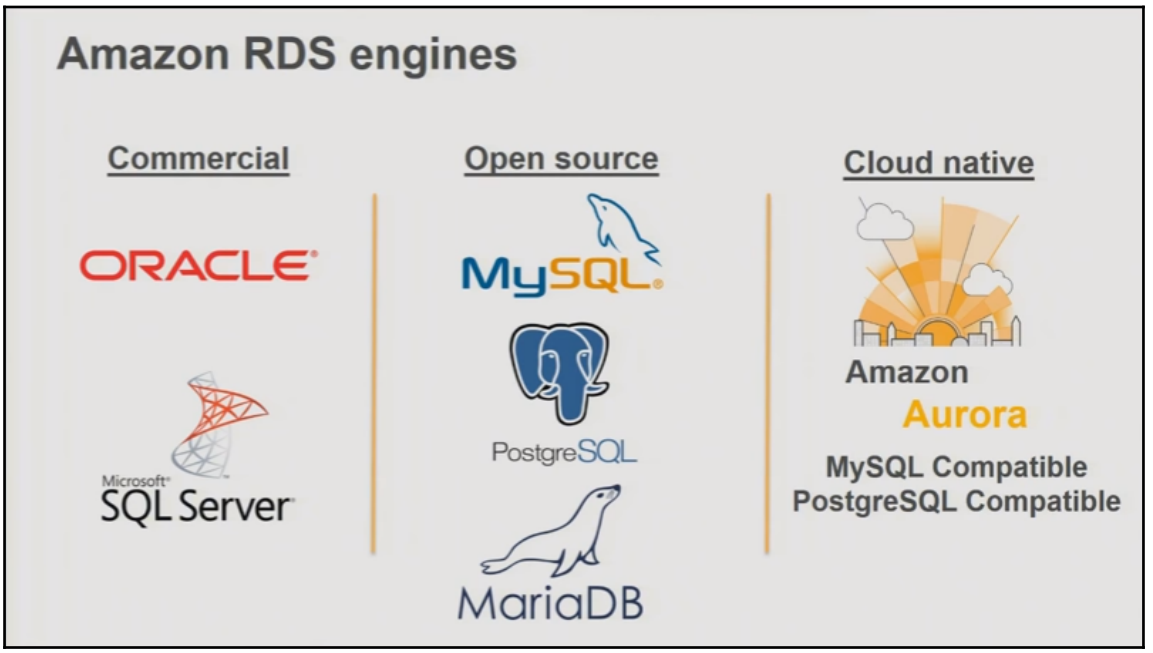


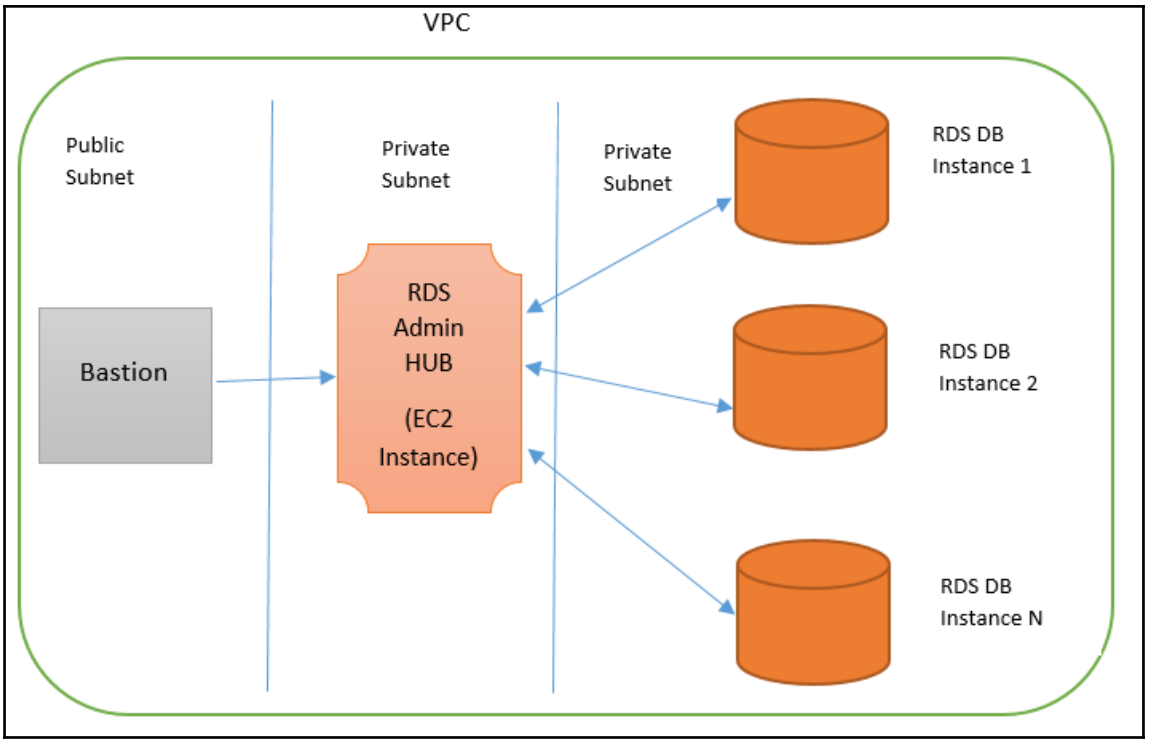
```
PS C:\> Enter-ASStandby -InstanceId i-05ba9441e9d65e0ff -AutoScalingGroupName WebAppASG -ShouldDecrementDesiredCapacity $false


ActivityId           : c67a8079-23a0-4e7a-88dc-675216394f52
AutoScalingGroupName : WebAppASG
Cause                : At 2017-07-11T04:33:56Z instance i-05ba9441e9d65e0ff was moved to standby in response to a user request.
Description          : Moving EC2 instance to Standby: i-05ba9441e9d65e0ff
Details              : {"Subnet ID":"subnet-b262c19e","Availability Zone":"us-east-1a"}
EndTime              : 1/1/0001 12:00:00 AM
Progress             : 50
StartTime            : 7/11/2017 2:33:56 PM
StatusCode           : InProgress
StatusMessage        :



PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus,Lifecy
cleState

InstanceId          HealthStatus LifecycleState
----------          ------------ --------------
i-053f08daac48361c7 HEALTHY      InService
i-05ba9441e9d65e0ff HEALTHY      Standby
i-0c32a482ebe32b44b HEALTHY      Pending:Wait


PS C:\> Get-ELBInstanceHealth -LoadBalancerName MyCLB

Description InstanceId          ReasonCode State
----------- ----------          ---------- -----
N/A         i-053f08daac48361c7 N/A        InService
```

```
PS C:\> Exit-ASStandby -InstanceId i-05ba9441e9d65e0ff -AutoScalingGroupName WebAppASG


ActivityId           : beb450ff-2b7e-4ab4-be41-b9f8546bb910
AutoScalingGroupName : WebAppASG
Cause                : At 2017-07-11T04:56:09Z instance i-05ba9441e9d65e0ff was moved out of standby in response to a user request, increasing the capacity
                       from 2 to 3.
Description          : Moving EC2 instance out of Standby: i-05ba9441e9d65e0ff
Details              : {"Subnet ID":"subnet-b262c19e","Availability Zone":"us-east-1a"}
EndTime              : 1/1/0001 12:00:00 AM
Progress             : 30
StartTime            : 7/11/2017 2:56:09 PM
StatusCode           : PreInService
StatusMessage        :



PS C:\> (Get-ASAutoScalingGroup -AutoScalingGroupName WebAppASG).Instances | Get-ASAutoScalingInstance| format-table -property InstanceId,HealthStatus,Lifecy
cleState

InstanceId          HealthStatus LifecycleState
----------          ------------ --------------
i-053f08daac48361c7 HEALTHY      InService
i-05ba9441e9d65e0ff HEALTHY      InService
i-0c32a482ebe32b44b HEALTHY      InService


PS C:\> Get-ELBInstanceHealth -LoadBalancerName MyCLB

Description InstanceId          ReasonCode State
----------- ----------          ---------- -----
N/A         i-053f08daac48361c7 N/A        InService
N/A         i-05ba9441e9d65e0ff N/A        InService
N/A         i-0c32a482ebe32b44b N/A        InService
```

```
PS C:\> Remove-ASAutoScalingGroup -AutoScalingGroupName WebAppASG

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-ASAutoScalingGroup (DeleteAutoScalingGroup)" on target "WebAppASG".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
Remove-ASAutoScalingGroup : One or more errors occurred. (You cannot delete an AutoScalingGroup while there are instances or pending Spot instance
request(s) still in the group.)
At line:1 char:1
+ Remove-ASAutoScalingGroup -AutoScalingGroupName WebAppASG
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : InvalidOperation: (Amazon.PowerShe...lingGroupCmdlet:RemoveASAutoScalingGroupCmdlet) [Remove-ASAutoScalingGroup], InvalidOper
   ationException
    + FullyQualifiedErrorId : System.AggregateException,Amazon.PowerShell.Cmdlets.AS.RemoveASAutoScalingGroupCmdlet

PS C:\> Remove-ASAutoScalingGroup -AutoScalingGroupName WebAppASG -ForceDelete $true -Force
PS C:\>
```

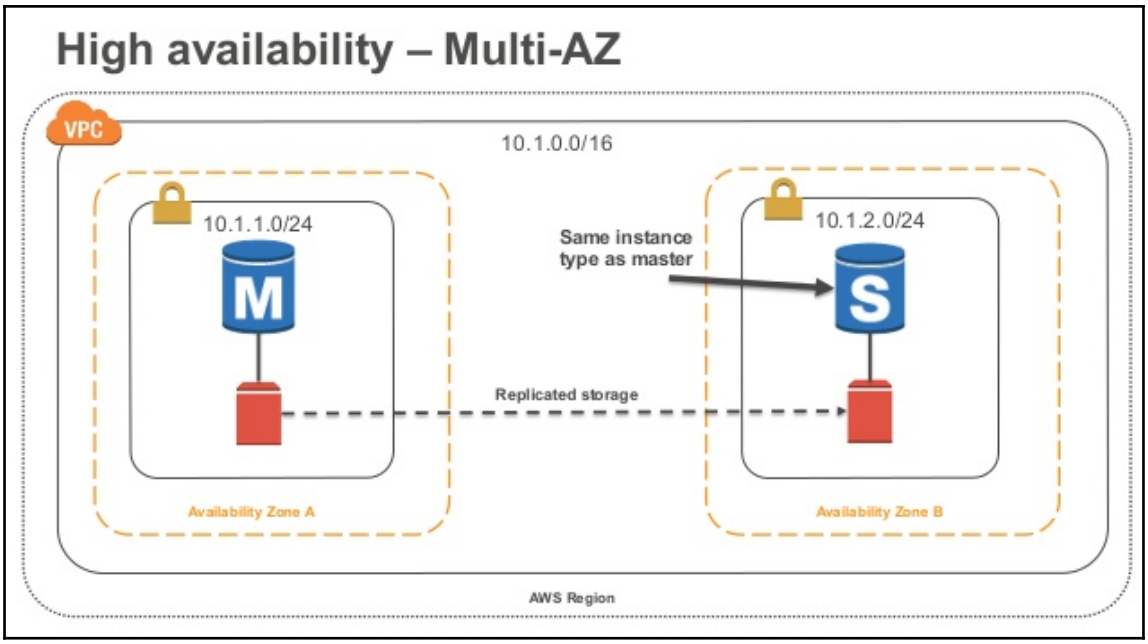
Chapter 10: Laying Foundation for RDS Databases

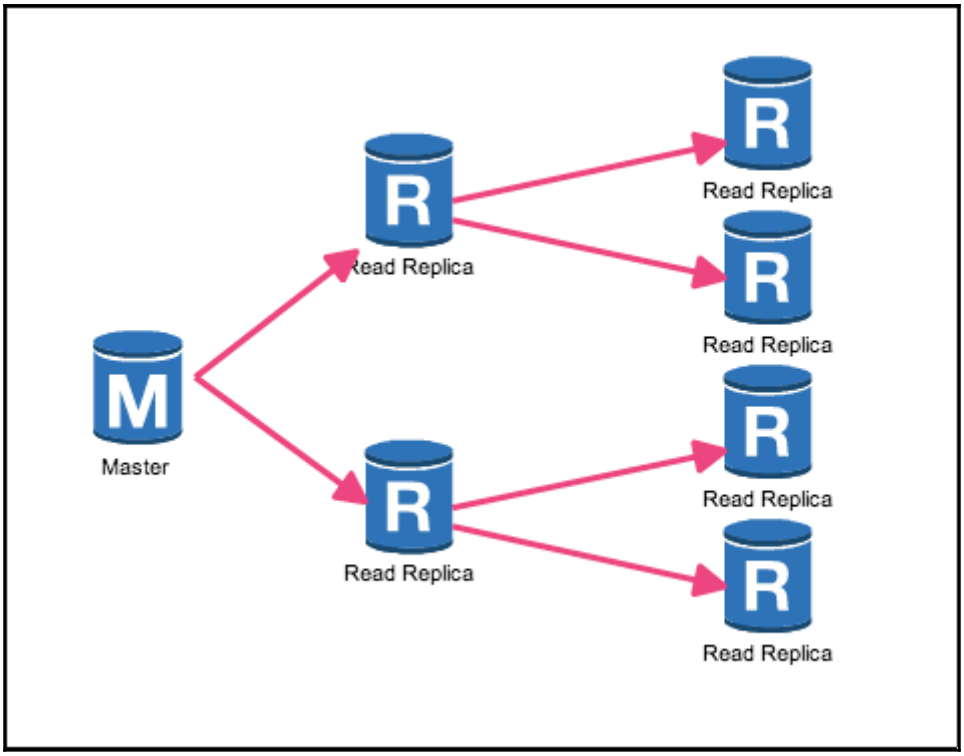



VPC
Public
Subnet
Private
Subnet
Private
Subnet
RDS DB
Instance 1
RDS
Admin
HUB
(EC2
Instance)
Bastion
RDS DB
Instance 2
RDS DB
Instance N

Instance Type	vCPU	Memory (GiB)	PIOPS-Optimized	Network Performance
Standard				
db.m4.large	2	8	Yes	Moderate
db.m4.xlarge	4	16	Yes	High
db.m4.2xlarge	8	32	Yes	High
db.m4.4xlarge	16	64	Yes	High
db.m4.10xlarge	40	160	Yes	10 Gigabit
db.m3.medium	1	3.75	-	Moderate
db.m3.large	2	7.5	-	Moderate
db.m3.xlarge	4	15	Yes	High
db.m3.2xlarge	8	30	Yes	High
Memory Optimized				
db.r3.large	2	15	-	Moderate
db.r3.xlarge	4	30.5	Yes	Moderate
db.r3.2xlarge	8	61	Yes	High
db.r3.4xlarge	16	122	Yes	High
db.r3.8xlarge	32	244	-	10 Gigabit
Micro instances				
db.t2.micro	1	1	-	Low
db.t2.small	1	2	-	Low

High availability – Multi-AZ




R
Read Replica
R
Read Replica
R
Read Replica
M
Master
R
Read Replica
R
Read Replica
R
Read Replica

Compliance

Aurora
SOC 1, 2, 3
ISO 20001/9001
ISO 27107/27018
PCI
HIPAA BAA

MariaDB
SOC 1, 2, 3
ISO 20001/9001
ISO 27107/27018
PCI

MySQL
SOC 1, 2, 3
ISO 20001/9001
ISO 27107/27018
PCI
FedRamp
HIPAA BAA
UK Gov. Programs
Singapore MTCS

Oracle
SOC 1, 2, 3
ISO 20001/9001
ISO 27107/27018
PCI
FedRamp
HIPAA BAA
UK Gov. Programs
Singapore MTCS

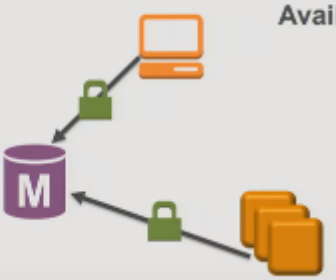
PostgreSQL
SOC 1, 2, 3
ISO 20001/9001
ISO 27107/27018
PCI
UK Gov. Programs
Singapore MTCS
HIPAA BAA

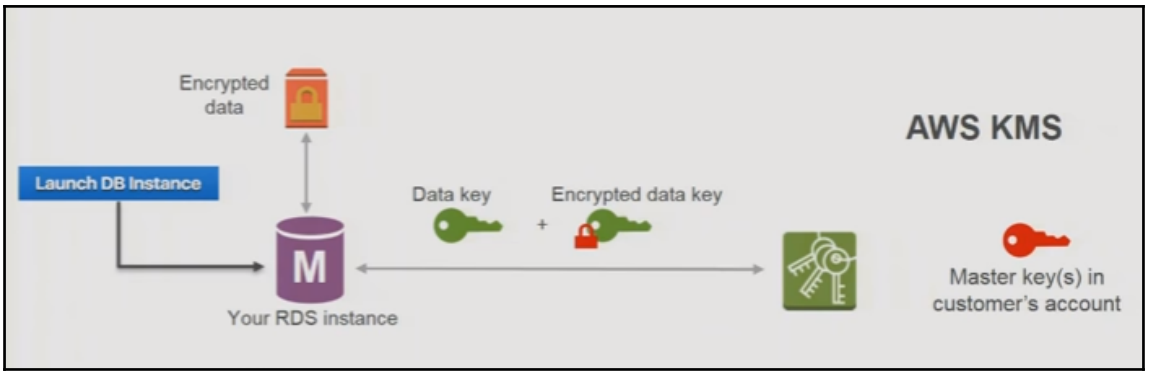
SQL Server
SOC 1, 2, 3
ISO 20001/9001
ISO 27107/27018
PCI
UK Gov. Programs
Singapore MTCS

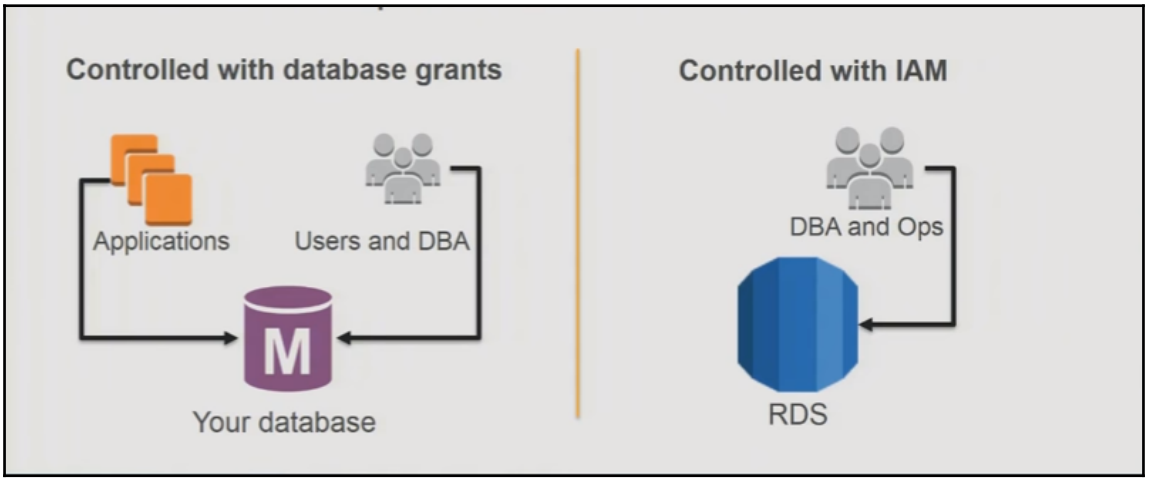
SSL

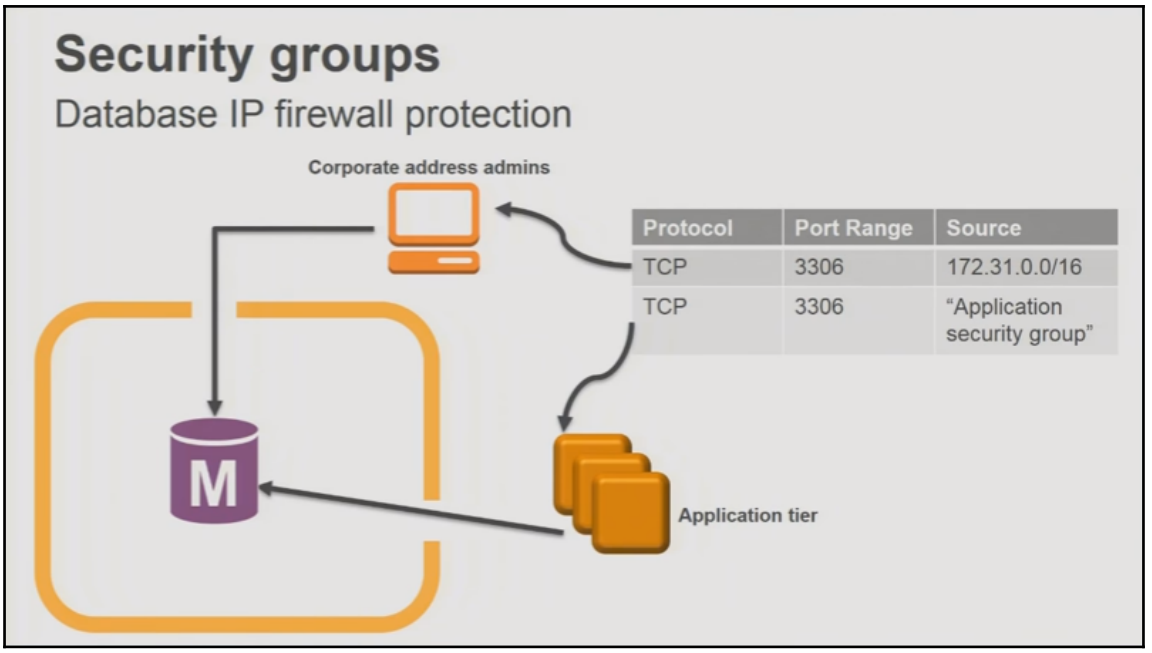
Database traffic encryption

Available for all six engines




Encrypted data
AWS KMS
Launch DB Instance
Data key
+
Encrypted data key
M
Your RDS instance
Master key(s) in customer's account


Controlled with database grants
Controlled with IAM
Applications
Users and DBA
M
Your database
DBA and Ops
RDS

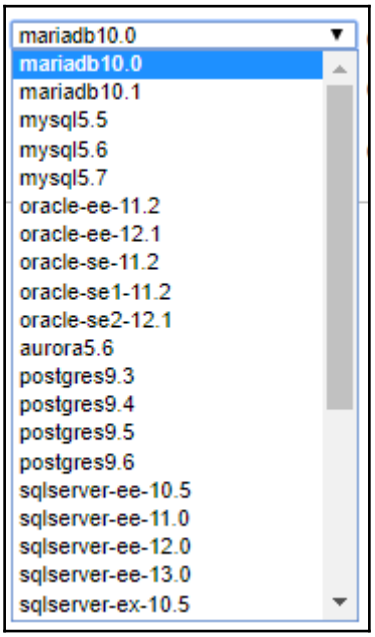



```
PS C:\> New-EC2SecurityGroup -GroupName MyRDSSG -Description "Security Group for RDS" -VpcId vpc-a6bb60df
sg-c97606b8
PS C:\> $ug = New-Object Amazon.EC2.Model.UserIdGroupPair
PS C:\> $ug.GroupId = "sg-6fd1361e"
PS C:\> $ug.UserId = "072316406132"
PS C:\> Grant-EC2SecurityGroupIngress -GroupId sg-c97606b8 -IpPermission @( @{ IpProtocol="tcp"; FromPort="3306"; ToPort="3306"; UserIdGroupPairs=$ug } )
PS C:\> Grant-EC2SecurityGroupIngress -GroupId sg-c97606b8 -IpPermission @( @{ IpProtocol="tcp"; FromPort="1521"; ToPort="1521"; UserIdGroupPairs=$ug } )
PS C:\>
```

```
PS C:\> (Get-EC2SecurityGroup -GroupID sg-c97606b8).IPPermissions|Format-Table -AutoSize

FromPort IpProtocol IpRanges Ipv6Ranges PrefixListIds ToPort UserIdGroupPairs UserIdGroupPair IpRange
-------- ---------- -------- ---------- ------------- ------ ---------------- --------------- -------
    1521 tcp        {}       {}         {}              1521 {}               {}              {}
    3306 tcp        {}       {}         {}              3306 {}               {}              {}
```

Name	Subnet ID	State	VPC	IPv4 CIDR	Available IPv4 .	IPv6 CIDR	Availability Zone
public1_ps	subnet-c843dd80	available	vpc-a6bb60df | PowerShellTest	10.0.2.0/24	249		us-east-1b
public2_ps	subnet-b29d3e9e	available	vpc-a6bb60df | PowerShellTest	10.0.3.0/24	249		us-east-1a
private1_ps	subnet-b262c19e	available	vpc-a6bb60df | PowerShellTest	10.0.1.0/24	251		us-east-1a
private2_ps	subnet-f042dcb8	available	vpc-a6bb60df | PowerShellTest	10.0.4.0/24	250		us-east-1b

```
PS C:\> New-RDSDBSubnetGroup -DBSubnetGroupName MySQLDBSub -DBSubnetGroupDescription "MySQL DB Deployment Subnets" -SubnetId subnet-b262c19e,subnet-f042dcb8


DBSubnetGroupArn         : arn:aws:rds:us-east-1:072316406132:subgrp:mysqldbsub
DBSubnetGroupDescription : MySQL DB Deployment Subnets
DBSubnetGroupName        : mysqldbsub
SubnetGroupStatus        : Complete
Subnets                  : {Amazon.RDS.Model.Subnet, Amazon.RDS.Model.Subnet}
VpcId                    : vpc-a6bb60df
```




```
PS C:\> New-RDSDBParameterGroup -DBParameterGroupName "MyWebAppPrd" -Description "My Web App Production Database" -DBParameterGroupFamily "mysql5.7"

DBParameterGroupArn                                DBParameterGroupFamily DBParameterGroupName Description
-------------------                                ---------------------- ------------------- -----------
arn:aws:rds:us-east-1:072316406132:pg:mywebappprd mysql5.7               mywebappprd         My Web App Production Database
```

```
PS C:\> Get-RDSDBParameter -DBParameterGroupName "MyWebAppPrd" | Where-Object {$_.ParameterName -eq "read_buffer_size"}


AllowedValues        : 8200-2147479552
ApplyMethod          : immediate
ApplyType            : dynamic
DataType             : integer
Description          : Each thread that does a sequential scan allocates this buffer. Increased value may help perf if performing many sequential scans.
IsModifiable         : True
MinimumEngineVersion :
ParameterName        : read_buffer_size
ParameterValue       : 262144
Source               : user
```

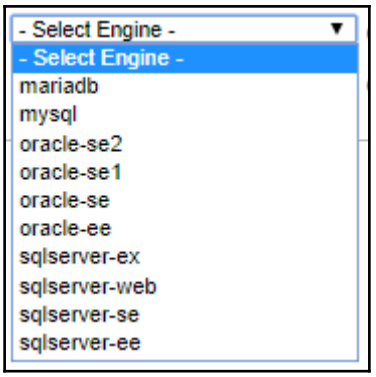
```
PS C:\> $Parameter1 = New-Object Amazon.RDS.Model.Parameter
PS C:\> $Parameter1.ParameterName="read_buffer_size"
PS C:\> $Parameter1.ParameterValue=524288
PS C:\> $Parameter1.ApplyMethod="Immediate"
PS C:\> Edit-RDSDBParameterGroup -DBParameterGroupName "MyWebAppPrd" -Parameter $Parameter1
mywebappprd
PS C:\> Get-RDSDBParameter -DBParameterGroupName "MyWebAppPrd" | Where-Object {$_.ParameterName -eq "read_buffer_size"}


AllowedValues        : 8200-2147479552
ApplyMethod          : immediate
ApplyType            : dynamic
DataType             : integer
Description          : Each thread that does a sequential scan allocates this buffer. Increased value may help perf if performing many sequential scans.
IsModifiable         : True
MinimumEngineVersion :
ParameterName        : read_buffer_size
ParameterValue       : 524288
Source               : user
```

Option	Option ID	Engine Versions
MariaDB Audit Plugin Support	MARIADB_AUDIT_PLUGIN	MySQL 5.6.29 and later MySQL 5.7.11 and later
MySQL MEMCACHED Support	MEMCACHED	MySQL 5.6 and later

Option	Option ID
Oracle Application Express	APEX APEX-DEV
Oracle Enterprise Manager	OEM OEM_AGENT
Oracle Label Security	OLS
Oracle Native Network Encryption	NATIVE_NETWORK_ENCRYPTION
Oracle SSL	SSL
Oracle Statspack	STATSPACK
Oracle Time Zone	Timezone
Oracle Transparent Data Encryption	TDE
Oracle UTL_MAIL	UTL_MAIL
Oracle XML DB	XMLDB

Option	Option ID	Engine Editions
Native Backup and Restore	SQLSERVER_BACKUP_RESTORE	SQL Server Enterprise Edition SQL Server Standard Edition SQL Server Web Edition SQL Server Express Edition
Transparent Data Encryption	TRANSPARENT_DATA_ENCRYPTION	SQL Server Enterprise Edition

Option ID	Engine Versions
MARIADB_AUDIT_PLUGIN	MariaDB 10.0.24 and later




```
PS C:\> New-RDSOptionGroup -OptionGroupName "MyWebAppPrd" -EngineName mysql -MajorEngineVersion 5.7 -OptionGroupDescription "Option Group for Mysql 5.7"


AllowsVpcAndNonVpcInstanceMemberships : True
EngineName                            : mysql
MajorEngineVersion                    : 5.7
OptionGroupArn                        : arn:aws:rds:us-east-1:072316406132:og:mywebappprd
OptionGroupDescription                : Option Group for Mysql 5.7
OptionGroupName                       : mywebappprd
Options                               : {}
VpcId                                 :
```

```
PS C:\> $Option1 = New-Object Amazon.RDS.Model.OptionConfiguration
PS C:\> $Option1.OptionName = "MARIADB_AUDIT_PLUGIN"
PS C:\> Edit-RDSOptionGroup -OptionGroupName "MyWebAppPrd" -ApplyImmediately $true -OptionsToInclude $Option1


AllowsVpcAndNonVpcInstanceMemberships : False
EngineName                            : mysql
MajorEngineVersion                    : 5.7
OptionGroupArn                        : arn:aws:rds:us-east-1:072316406132:og:mywebappprd
OptionGroupDescription                : Option Group for Mysql 5.7
OptionGroupName                       : mywebappprd
Options                               : {MARIADB_AUDIT_PLUGIN}
VpcId                                 :
```

```
PS C:\> Edit-RDSOptionGroup -OptionGroupName "MyWebAppPrd" -ApplyImmediately $true -OptionsToRemove "MARIADB_AUDIT_PLUGIN"


AllowsVpcAndNonVpcInstanceMemberships : True
EngineName                            : mysql
MajorEngineVersion                    : 5.7
OptionGroupArn                        : arn:aws:rds:us-east-1:072316406132:og:mywebappprd
OptionGroupDescription                : Option Group for Mysql 5.7
OptionGroupName                       : mywebappprd
Options                               : {}
VpcId                                 :
```

Chapter 11: DB Instance Administration and Management

Region	Time Block
US West (Oregon) Region	06:00–14:00 UTC
US West (N. California) Region	06:00–14:00 UTC
US East (Ohio) Region	03:00–11:00 UTC
US East (N. Virginia) Region	03:00–11:00 UTC
Asia Pacific (Mumbai) Region	17:30–01:30 UTC
Asia Pacific (Seoul) Region	13:00–21:00 UTC
Asia Pacific (Singapore) Region	14:00–22:00 UTC
Asia Pacific (Sydney) Region	12:00–20:00 UTC
Asia Pacific (Tokyo) Region	13:00–21:00 UTC
Canada (Central) Region	06:29–14:29 UTC
EU (Frankfurt) Region	23:00–07:00 UTC
EU (Ireland) Region	22:00–06:00 UTC
EU (London) Region	06:00–14:00 UTC
South America (São Paulo) Region	00:00–08:00 UTC
AWS GovCloud (US)	06:00–14:00 UTC

```
PS C:\> New-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" -DBName "mywebappprd" -StorageType gp2 -AllocatedStorage 10 -AutoMinorVersionUpgrade $true -DB
InstanceClass db.t2.large -DBParameterGroupName "mywebappprd" -OptionGroupName "mywebappprd" -VpcSecurityGroupId sg-c97606b8 -DBSubnetGroupName "mysqldbsub"
-Engine mysql -EngineVersion 5.7 -LicenseModel "general-public-license" -MasterUsername "rdsdba" -MasterUserPassword "rdsdba123" -PreferredMaintenanceWindow
"SUN:23:00-SUN:23:59" -PreferredBackupWindow "01:00-02:00" -PubliclyAccessible $false


AllocatedStorage                    : 10
AutoMinorVersionUpgrade             : True
AvailabilityZone                    :
BackupRetentionPeriod               : 1
CACertificateIdentifier             : rds-ca-2015
CharacterSetName                    :
CopyTagsToSnapshot                  : False
DBClusterIdentifier                 :
DBInstanceArn                       : arn:aws:rds:us-east-1:072316406132:db:mywebappprd
DBInstanceClass                     : db.t2.large
DBInstanceIdentifier                : mywebappprd
DbInstancePort                      : 0
DBInstanceStatus                    : creating
DbiResourceId                       : db-GN33C2COXNNY2A2WQGIHB6H2HY
DBName                              : mywebappprd
DBParameterGroups                   : {mywebappprd}
DBSecurityGroups                    : {}
DBSubnetGroup                       : Amazon.RDS.Model.DBSubnetGroup
DomainMemberships                   : {}
Endpoint                            :
Engine                              : mysql
EngineVersion                       : 5.7.17
EnhancedMonitoringResourceArn       :
IAMDatabaseAuthenticationEnabled    : False
InstanceCreateTime                  : 1/1/0001 12:00:00 AM
Iops                                : 0
KmsKeyId                            :
LatestRestorableTime                : 1/1/0001 12:00:00 AM
LicenseModel                        : general-public-license
MasterUsername                      : rdsdba
MonitoringInterval                  : 0
MonitoringRoleArn                   :
MultiAZ                             : False
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table DBInstanceStatus

DBInstanceStatus
----------------
available
```

```
PS C:\> New-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" -DBName "mywebappprd" -MultiAZ $true -StorageType gp2 -AllocatedStorage 10 -AutoMinorVersionUp
grade $true -DBInstanceClass db.t2.large -DBParameterGroupName "mywebappprd" -OptionGroupName "mywebappprd" -VpcSecurityGroupId sg-c97606b8 -DBSubnetGroupNam
e "mysqldbsub" -Engine mysql -EngineVersion 5.7 -LicenseModel "general-public-license" -MasterUsername "rdsdba" -MasterUserPassword "rdsdba123" -PreferredMai
ntenanceWindow "SUN:23:00-SUN:23:59" -PreferredBackupWindow "01:00-02:00" -PubliclyAccessible $false


AllocatedStorage                    : 10
AutoMinorVersionUpgrade             : True
AvailabilityZone                    :
BackupRetentionPeriod               : 1
CACertificateIdentifier             : rds-ca-2015
CharacterSetName                    :
CopyTagsToSnapshot                  : False
DBClusterIdentifier                 :
DBInstanceArn                       : arn:aws:rds:us-east-1:072316406132:db:mywebappprd
DBInstanceClass                     : db.t2.large
DBInstanceIdentifier                : mywebappprd
DbInstancePort                      : 0
DBInstanceStatus                    : creating
DbiResourceId                       : db-NHMO4D3KTUZCRS7MHJHGJ4FHCI
DBName                              : mywebappprd
DBParameterGroups                   : {mywebappprd}
DBSecurityGroups                    : {}
DBSubnetGroup                       : Amazon.RDS.Model.DBSubnetGroup
DomainMemberships                   : {}
Endpoint                            :
Engine                              : mysql
EngineVersion                       : 5.7.17
EnhancedMonitoringResourceArn       :
IAMDatabaseAuthenticationEnabled    : False
InstanceCreateTime                  : 1/1/0001 12:00:00 AM
Iops                                : 0
KmsKeyId                            :
LatestRestorableTime                : 1/1/0001 12:00:00 AM
LicenseModel                        : general-public-license
MasterUsername                      : rdsdba
MonitoringInterval                  : 0
MonitoringRoleArn                   :
MultiAZ                             : True
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table MultiAZ, DBInstanceStatus

MultiAZ DBInstanceStatus
------- ----------------
   True creating


PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table MultiAZ, DBInstanceStatus

MultiAZ DBInstanceStatus
------- ----------------
  False modifying


PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table MultiAZ, DBInstanceStatus

MultiAZ DBInstanceStatus
------- ----------------
   True backing-up


PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table MultiAZ, DBInstanceStatus

MultiAZ DBInstanceStatus
------- ----------------
   True modifying


PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table MultiAZ, DBInstanceStatus

MultiAZ DBInstanceStatus
------- ----------------
   True available
```

```
PS C:\> $policydoc=(Get-Content -Raw D:\data\Policies\KMSPolicy.txt)
PS C:\> New-KMSKey -Description "MySQLDBWebAppKey" -Origin AWS_KMS -Policy $policydoc


Arn             : arn:aws:kms:us-east-1:072316406132:key/8c21ccee-415c-499e-989c-dc9184e07ac1
AWSAccountId    : 072316406132
CreationDate    : 7/14/2017 8:47:54 AM
DeletionDate    : 1/1/0001 12:00:00 AM
Description     : MySQLDBWebAppKey
Enabled         : True
ExpirationModel :
KeyId           : 8c21ccee-415c-499e-989c-dc9184e07ac1
KeyState        : Enabled
KeyUsage        : ENCRYPT_DECRYPT
Origin          : AWS_KMS
ValidTo         : 1/1/0001 12:00:00 AM
```

```
PS C:\> New-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" -DBName "mywebappprd" -MultiAZ $true -StorageType gp2 -AllocatedStorage 10 -AutoMinorVersionUp
grade $true -DBInstanceClass db.t2.large -DBParameterGroupName "mywebappprd" -OptionGroupName "mywebappprd" -VpcSecurityGroupId sg-c97606b8 -DBSubnetGroupNam
e "mysqldbsub" -Engine mysql -EngineVersion 5.7 -LicenseModel "general-public-license" -MasterUsername "rdsdba" -MasterUserPassword "rdsdba123" -PreferredMai
ntenanceWindow "SUN:23:00-SUN:23:59" -PreferredBackupWindow "01:00-02:00" -PubliclyAccessible $false -StorageEncrypted  $true -KmsKeyId "arn:aws:kms:us-east-
1:072316406132:key/8c21ccee-415c-499e-989c-dc9184e07ac1"


AllocatedStorage                    : 10
AutoMinorVersionUpgrade             : True
AvailabilityZone                    :
BackupRetentionPeriod               : 1
CACertificateIdentifier             : rds-ca-2015
CharacterSetName                    :
CopyTagsToSnapshot                  : False
DBClusterIdentifier                 :
DBInstanceArn                       : arn:aws:rds:us-east-1:072316406132:db:mywebappprd
DBInstanceClass                     : db.t2.large
DBInstanceIdentifier                : mywebappprd
DbInstancePort                      : 0
DBInstanceStatus                    : creating
DbiResourceId                       : db-CXTPDFW6R4KKWI6KQOZE7E4TN4
DBName                              : mywebappprd
DBParameterGroups                   : {mywebappprd}
DBSecurityGroups                    : {}
DBSubnetGroup                       : Amazon.RDS.Model.DBSubnetGroup
DomainMemberships                   : {}
Endpoint                            :
Engine                              : mysql
EngineVersion                       : 5.7.17
EnhancedMonitoringResourceArn       :
IAMDatabaseAuthenticationEnabled    : False
InstanceCreateTime                  : 1/1/0001 12:00:00 AM
Iops                                : 0
KmsKeyId                            : arn:aws:kms:us-east-1:072316406132:key/8c21ccee-415c-499e-989c-dc9184e07ac1
LatestRestorableTime                : 1/1/0001 12:00:00 AM
LicenseModel                        : general-public-license
MasterUsername                      : rdsdba
MonitoringInterval                  : 0
MonitoringRoleArn                   :
MultiAZ                             : True
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table MultiAZ, DBInstanceStatus,StorageEncrypted

MultiAZ DBInstanceStatus StorageEncrypted
------- ---------------- ----------------
   True available                   True
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd"|Format-Table AvailabilityZone,SecondaryAvailabilityZone

AvailabilityZone SecondaryAvailabilityZone
---------------- -------------------------
us-east-1b       us-east-1a
```

```
PS C:\> (Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" ).endpoint

Address                                                HostedZoneId   Port
-------                                                ------------   ----
mywebappprd.cwrq5w1v98ur.us-east-1.rds.amazonaws.com Z2R2ITUGPM61AM 3306
```

```
[root@ip-10-0-2-158 ~]# mysql -u rdsdba -prdsdba123 -h mywebappprd.cwrq5w1v98ur.us-east-1.rds.amazonaws.com
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 37
Server version: 5.7.17-log MySQL Community Server (GPL)

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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> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| innodb             |
| mysql              |
| mywebappprd        |
| performance_schema |
| sys                |
+--------------------+
6 rows in set (0.00 sec)

mysql>
```

```
mysql> use mywebappprd;
Database changed
mysql> CREATE TABLE pet_master (name VARCHAR(20), owner VARCHAR(20),
    -> species VARCHAR(20), sex CHAR(1), birth DATE, death DATE);
Query OK, 0 rows affected (0.04 sec)

mysql> show tables;
+------------------------+
| Tables_in_mywebappprd |
+------------------------+
| pet_master             |
+------------------------+
1 row in set (0.00 sec)

mysql>
```

```
[root@ip-10-0-2-158 ~]# wget https://s3.amazonaws.com/rds-downloads/rds-combined-ca-bundle.pem
--2017-07-14 12:01:28--  https://s3.amazonaws.com/rds-downloads/rds-combined-ca-bundle.pem
Resolving s3.amazonaws.com (s3.amazonaws.com)... 54.231.49.148
Connecting to s3.amazonaws.com (s3.amazonaws.com)|54.231.49.148|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 21672 (21K) [binary/octet-stream]
Saving to: ‘rds-combined-ca-bundle.pem’

rds-combined-ca-bundle.pem             100%[===========================================================================>]  21.16K  --.-KB/s    in 0s

2017-07-14 12:01:29 (108 MB/s) - ‘rds-combined-ca-bundle.pem’ saved [21672/21672]

[root@ip-10-0-2-158 ~]# ls -ltr
total 24
-rw-r--r-- 1 root root 21672 Oct 18  2016 rds-combined-ca-bundle.pem
[root@ip-10-0-2-158 ~]# pwd
/root
[root@ip-10-0-2-158 ~]# mysql -u rdsdba -prdsdba123 -h mywebappprd.cwrq5w1v98ur.us-east-1.rds.amazonaws.com \
> --ssl-ca=rds-combined-ca-bundle.pem --ssl-verify-server-cert
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 86
Server version: 5.7.17-log MySQL Community Server (GPL)

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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> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| innodb             |
| mysql              |
| mywebappprd        |
| performance_schema |
```

```
[root@ip-10-0-2-158 ~]# mysql -u rdsdba -prdsdba123 -h mywebappprd.cwrq5w1v98ur.us-east-1.rds.amazonaws.com \
> --ssl-ca=rds-combined-ca-bundle.pem --ssl-verify-server-cert
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 92
Server version: 5.7.17-log MySQL Community Server (GPL)

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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> \s
--------------
mysql  Ver 14.14 Distrib 5.5.56, for Linux (x86_64) using readline 5.1

Connection id:          92
Current database:
Current user:           rdsdba@10.0.2.158
SSL:                    Cipher in use is AES256-SHA
Current pager:          stdout
Using outfile:          ''
Using delimiter:        ;
Server version:         5.7.17-log MySQL Community Server (GPL)
Protocol version:       10
Connection:             mywebappprd.cwrq5w1v98ur.us-east-1.rds.amazonaws.com via TCP/IP
Server characterset:    latin1
Db     characterset:    latin1
Client characterset:    utf8
Conn.  characterset:    utf8
TCP port:               3306
Uptime:                 3 hours 11 min 28 sec

Threads: 2  Questions: 6586  Slow queries: 0  Opens: 174  Flush tables: 1  Open tables: 146  Queries per second avg: 0.573
--------------

mysql>
```

```
[root@ip-10-0-2-158 ~]# mysql -u rdsdba -prdsdba123 -h mywebappprd.cwrq5w1v98ur.us-east-1.rds.amazonaws.com
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 94
Server version: 5.7.17-log MySQL Community Server (GPL)

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owners.

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

mysql> \s
--------------
mysql  Ver 14.14 Distrib 5.5.56, for Linux (x86_64) using readline 5.1

Connection id:          94
Current database:
Current user:           rdsdba@10.0.2.158
SSL:                    Not in use
Current pager:          stdout
Using outfile:          ''
Using delimiter:        ;
Server version:         5.7.17-log MySQL Community Server (GPL)
Protocol version:       10
Connection:             mywebappprd.cwrq5w1v98ur.us-east-1.rds.amazonaws.com via TCP/IP
Server characterset:    latin1
Db     characterset:    latin1
Client characterset:    utf8
Conn.  characterset:    utf8
TCP port:               3306
Uptime:                 3 hours 16 min 24 sec

Threads: 2  Questions: 6745  Slow queries: 0  Opens: 174  Flush tables: 1  Open tables: 146  Queries per second avg: 0.572
--------------
```

```
PS C:\> Stop-RDSDBInstance -DBInstanceIdentifier "WebSingleAZDB" -DBSnapshotIdentifier "Before-stop-Snapshot-20170717"


AllocatedStorage                    : 10
AutoMinorVersionUpgrade             : True
AvailabilityZone                    : us-east-1a
BackupRetentionPeriod               : 1
CACertificateIdentifier             : rds-ca-2015
CharacterSetName                    :
CopyTagsToSnapshot                  : False
DBClusterIdentifier                 :
DBInstanceArn                       : arn:aws:rds:us-east-1:072316406132:db:websingleazdb
DBInstanceClass                     : db.t2.large
DBInstanceIdentifier                : websingleazdb
DbInstancePort                      : 0
DBInstanceStatus                    : stopping
DbiResourceId                       : db-3NWSE3Y7T6VBEFSX6Y7U46LXUQ
DBName                              : WebSingleAZDB
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "WebSingleAZDB" |Format-Table DBInstanceStatus

DBInstanceStatus
----------------
stopping


PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "WebSingleAZDB" |Format-Table DBInstanceStatus

DBInstanceStatus
----------------
stopped
```

```
PS C:\> Start-RDSDBInstance -DBInstanceIdentifier "WebSingleAZDB"


AllocatedStorage                    : 10
AutoMinorVersionUpgrade             : True
AvailabilityZone                    : us-east-1a
BackupRetentionPeriod               : 1
CACertificateIdentifier             : rds-ca-2015
CharacterSetName                    :
CopyTagsToSnapshot                  : False
DBClusterIdentifier                 :
DBInstanceArn                       : arn:aws:rds:us-east-1:072316406132:db:websingleazdb
DBInstanceClass                     : db.t2.large
DBInstanceIdentifier                : websingleazdb
DbInstancePort                      : 0
DBInstanceStatus                    : starting
DbiResourceId                       : db-3NWSE3Y7T6VBEFSX6Y7U46LXUQ
DBName                              : WebSingleAZDB
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "WebSingleAZDB" |Format-Table DBInstanceStatus

DBInstanceStatus
----------------
available
```

```
PS C:\> Restart-RDSDBInstance -DBInstanceIdentifier "mywebappprd" -ForceFailover $true


AllocatedStorage                    : 10
AutoMinorVersionUpgrade             : True
AvailabilityZone                    : us-east-1b
BackupRetentionPeriod               : 1
CACertificateIdentifier             : rds-ca-2015
CharacterSetName                    :
CopyTagsToSnapshot                  : False
DBClusterIdentifier                 :
DBInstanceArn                       : arn:aws:rds:us-east-1:072316406132:db:mywebappprd
DBInstanceClass                     : db.t2.large
DBInstanceIdentifier                : mywebappprd
DbInstancePort                      : 0
DBInstanceStatus                    : rebooting
DbiResourceId                       : db-CXTPDFW6R4KKWI6KQOZE7E4TN4
DBName                              : mywebappprd
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table DBInstanceStatus, AvailabilityZone, SecondaryAvailabilityZone

DBInstanceStatus AvailabilityZone SecondaryAvailabilityZone
---------------- ---------------- ------------------------
available        us-east-1a       us-east-1b
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table DBInstanceIdentifier, StorageType,AllocatedStorage

DBInstanceIdentifier StorageType AllocatedStorage
-------------------- ----------- ----------------
mywebappprd          gp2                      10


PS C:\> Edit-RDSDBInstance -DBInstanceIdentifier "mywebappprd" -AllocatedStorage 20 -ApplyImmediately $true


AllocatedStorage                     : 10
AutoMinorVersionUpgrade              : True
AvailabilityZone                     : us-east-1a
BackupRetentionPeriod                : 1
CACertificateIdentifier              : rds-ca-2015
CharacterSetName                     :
CopyTagsToSnapshot                   : False
DBClusterIdentifier                  :
DBInstanceArn                        : arn:aws:rds:us-east-1:072316406132:db:mywebappprd
DBInstanceClass                      : db.t2.large
DBInstanceIdentifier                 : mywebappprd
DbInstancePort                       : 0
DBInstanceStatus                     : available
DbiResourceId                        : db-CXTPDFW6R4KKWI6KQOZE7E4TN4
DBName                               : mywebappprd
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table DBInstanceIdentifier, DBInstanceStatus, StorageType, AllocatedStorage

DBInstanceIdentifier DBInstanceStatus StorageType AllocatedStorage
-------------------- ---------------- ----------- ----------------
mywebappprd          available        gp2                      20
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table DBInstanceIdentifier, BackupRetentionPeriod, PreferredBackupWindow

DBInstanceIdentifier BackupRetentionPeriod PreferredBackupWindow
-------------------- --------------------- ---------------------
mywebappprd                             1 01:00-02:00
```

```
PS C:\> Edit-RDSDBInstance -DBInstanceIdentifier "mywebappprd" -BackupRetentionPeriod 7 -ApplyImmediately $true


AllocatedStorage                     : 20
AutoMinorVersionUpgrade              : True
AvailabilityZone                     : us-east-1a
BackupRetentionPeriod                : 7
CACertificateIdentifier              : rds-ca-2015
CharacterSetName                     :
CopyTagsToSnapshot                   : False
DBClusterIdentifier                  :
DBInstanceArn                        : arn:aws:rds:us-east-1:072316406132:db:mywebappprd
DBInstanceClass                      : db.t2.large
DBInstanceIdentifier                 : mywebappprd
DbInstancePort                       : 0
DBInstanceStatus                     : available
DbiResourceId                        : db-CXTPDFW6R4KKWI6KQOZE7E4TN4
DBName                               : mywebappprd
```

```
PS C:\> Get-RDSDBSnapshot -DBInstanceIdentifier "mywebappprd" |Format-Table DBSnapshotIdentifier,Encrypted,AvailabilityZone,PercentProgress

DBSnapshotIdentifier             Encrypted AvailabilityZone PercentProgress
--------------------             --------- ---------------- ---------------
rds:mywebappprd-2017-07-14-09-13      True us-east-1b                  100
rds:mywebappprd-2017-07-15-01-10      True us-east-1a                  100
```

```
PS C:\> Restore-RDSDBInstanceFromDBSnapshot -DBInstanceIdentifier "copymywebappprd" -DBSnapshotIdentifier "rds:mywebappprd-2017-07-15-01-10" -DBInstanceClass
 "db.m3.medium" -DBSubnetGroupName "mysqldbsub" -Engine mysql -StorageType gp2


AllocatedStorage                    : 10
AutoMinorVersionUpgrade             : True
AvailabilityZone                    :
BackupRetentionPeriod               : 1
CACertificateIdentifier             : rds-ca-2015
CharacterSetName                    :
CopyTagsToSnapshot                  : False
DBClusterIdentifier                 :
DBInstanceArn                       : arn:aws:rds:us-east-1:072316406132:db:copymywebappprd
DBInstanceClass                     : db.m3.medium
DBInstanceIdentifier                : copymywebappprd
DbInstancePort                      : 0
DBInstanceStatus                    : creating
DbiResourceId                       : db-ENARSHZR74E4DSCBUSJQYRE7NQ
DBName                              : mywebappprd
```

```
PS C:\> New-RDSDBSnapshot -DBSnapshotIdentifier "before-change-mywebappprd" -DBInstanceIdentifier "mywebappprd"


AllocatedStorage                  : 20
AvailabilityZone                  : us-east-1a
DBInstanceIdentifier              : mywebappprd
DBSnapshotArn                     : arn:aws:rds:us-east-1:072316406132:snapshot:before-change-mywebappprd
DBSnapshotIdentifier              : before-change-mywebappprd
Encrypted                         : True
Engine                            : mysql
EngineVersion                     : 5.7.17
IAMDatabaseAuthenticationEnabled  : False
InstanceCreateTime                : 7/14/2017 7:03:49 PM
Iops                              : 0
KmsKeyId                          : arn:aws:kms:us-east-1:072316406132:key/8c21ccee-415c-499e-989c-dc9184e07ac1
LicenseModel                      : general-public-license
MasterUsername                    : rdsdba
OptionGroupName                   : mywebappprd
PercentProgress                   : 0
Port                              : 3306
SnapshotCreateTime                : 1/1/0001 12:00:00 AM
SnapshotType                      : manual
SourceDBSnapshotIdentifier        :
SourceRegion                      :
Status                            : creating
StorageType                       : gp2
TdeCredentialArn                  :
Timezone                          :
VpcId                             : vpc-a6bb60df
```

```
PS C:\> Get-RDSDBSnapshot -DBInstanceIdentifier "mywebappprd" |Format-Table DBSnapshotIdentifier,Encrypted,AvailabilityZone,PercentProgress

DBSnapshotIdentifier            Encrypted AvailabilityZone PercentProgress
--------------------            --------- ---------------- ---------------
before-change-mywebappprd            True us-east-1a                   91
rds:mywebappprd-2017-07-14-09-13     True us-east-1b                  100
rds:mywebappprd-2017-07-15-01-10     True us-east-1a                  100
```

```
PS C:\> Remove-RDSDBInstance -DBInstanceIdentifier "copymywebappprd" -FinalDBSnapshotIdentifier "Myfinalsnapshot4webappprd"

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-RDSDBInstance (DeleteDBInstance)" on target "copymywebappprd".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y


AllocatedStorage                    : 10
AutoMinorVersionUpgrade             : True
AvailabilityZone                    : us-east-1a
BackupRetentionPeriod               : 1
CACertificateIdentifier             : rds-ca-2015
CharacterSetName                    :
CopyTagsToSnapshot                  : False
DBClusterIdentifier                 :
DBInstanceArn                       : arn:aws:rds:us-east-1:072316406132:db:copymywebappprd
DBInstanceClass                     : db.m3.medium
DBInstanceIdentifier                : copymywebappprd
DbInstancePort                      : 0
DBInstanceStatus                    : deleting
DbiResourceId                       : db-ENARSHZR74E4DSCBUSJQYRE7NQ
DBName                              : mywebappprd
```

```
PS C:\> Get-RDSAccountAttribute

AccountQuotaName                 Max    Used
----------------                 ---    ----
DBInstances                      40     3
ReservedDBInstances              40     0
AllocatedStorage                 100000 40
DBSecurityGroups                 25     0
AuthorizationsPerDBSecurityGroup 20     0
DBParameterGroups                50     1
ManualSnapshots                  100    3
EventSubscriptions               20     0
DBSubnetGroups                   50     1
OptionGroups                     20     2
SubnetsPerDBSubnetGroup          20     2
ReadReplicasPerMaster            5      0
DBClusters                       40     0
DBClusterParameterGroups         50     0
DBClusterRoles                   5      0
```

Chapter 12: Working with RDS Read Replicas

Source DB Instance Storage Type	Source DB Instance Storage Allocation	Read Replica Storage Type Options
PIOPS	100 GB - 3 TB	PIOPS | GP2 | Standard
GP2	100 GB - 3 TB	PIOPS | GP2 | Standard
GP2	Less than 100 GB	GP2 | Standard
Standard	100 GB - 3 TB	PIOPS | GP2 | Standard
Standard	Less than 100 GB	GP2 | Standard

```
PS C:\> New-RDSDBInstanceReadReplica -DBInstanceIdentifier "mywebappprdrr01" -SourceDBInstanceIdentifier "mywebappprd" -AutoMinorVersionUpgrade $true -DBInst
anceClass "db.t2.large" -StorageType gp2


AllocatedStorage                : 20
AutoMinorVersionUpgrade         : True
AvailabilityZone                :
BackupRetentionPeriod           : 0
CACertificateIdentifier         : rds-ca-2015
CharacterSetName                :
CopyTagsToSnapshot              : False
DBClusterIdentifier             :
DBInstanceArn                   : arn:aws:rds:us-east-1:072316406132:db:mywebappprdrr01
DBInstanceClass                 : db.t2.large
DBInstanceIdentifier            : mywebappprdrr01
DbInstancePort                  : 0
DBInstanceStatus                : creating
DbiResourceId                   : db-GGLMIAJWQBHNGNHNWNPA254J4U
DBName                          : mywebappprd
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd"|format-table ReadReplicaDBInstanceIdentifiers

ReadReplicaDBInstanceIdentifiers
--------------------------------
{mywebappprdrr01, mywebappprdrr02}
```

```
PS C:\> Get-RDSDBInstance |Format-Table DBInstanceIdentifier, DBInstanceStatus

DBInstanceIdentifier DBInstanceStatus
-------------------- ----------------
mywebappprd          available
mywebappprdrr01      available
mywebappprdrr02      creating
websingleazdb        available
```

```
PS C:\> Restart-RDSDBInstance -DBInstanceIdentifier "mywebappprdrr02"


AllocatedStorage                      : 20
AutoMinorVersionUpgrade               : True
AvailabilityZone                      : us-east-1a
BackupRetentionPeriod                 : 0
CACertificateIdentifier               : rds-ca-2015
CharacterSetName                      :
CopyTagsToSnapshot                    : False
DBClusterIdentifier                   :
DBInstanceArn                         : arn:aws:rds:us-east-1:072316406132:db:mywebappprdrr02
DBInstanceClass                       : db.t2.large
DBInstanceIdentifier                  : mywebappprdrr02
DbInstancePort                        : 0
DBInstanceStatus                      : rebooting
DbiResourceId                         : db-2GR5TUTHFA6JI4BWPT5H74BYN4
DBName                                : mywebappprd
```

```
PS C:\> (Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprdrr01").endpoint

Address                                                HostedZoneId   Port
-------                                                ------------   ----
mywebappprdrr01.cwrq5w1v98ur.us-east-1.rds.amazonaws.com Z2R2ITUGPM61AM 3306
```

```
[root@ip-10-0-2-158 ~]# mysql -u rdsdba -prdsdba123 -h  mywebappprdrr01.cwrq5w1v98ur.us-east-1.rds.amazonaws.com \
> --ssl-ca=rds-combined-ca-bundle.pem --ssl-verify-server-cert
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 27
Server version: 5.7.17 MySQL Community Server (GPL)

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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> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| innodb             |
| mysql              |
| mywebappprd        |
| performance_schema |
| sys                |
+--------------------+
6 rows in set (0.01 sec)
```
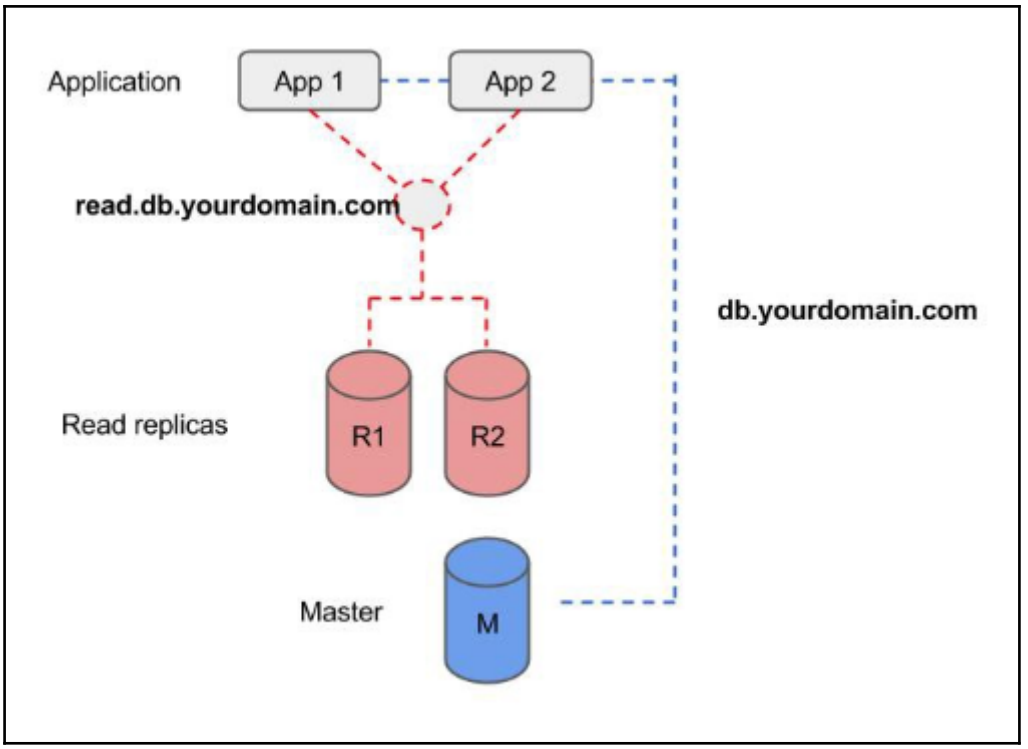

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprdrr01" |Format-Table BackupRetentionPeriod,PreferredBackupWindow

BackupRetentionPeriod PreferredBackupWindow
--------------------- ---------------------
                    0 01:00-02:00
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprdrr01" |Format-Table BackupRetentionPeriod,PreferredBackupWindow

BackupRetentionPeriod PreferredBackupWindow
--------------------- ---------------------
                    7 01:00-02:00
```

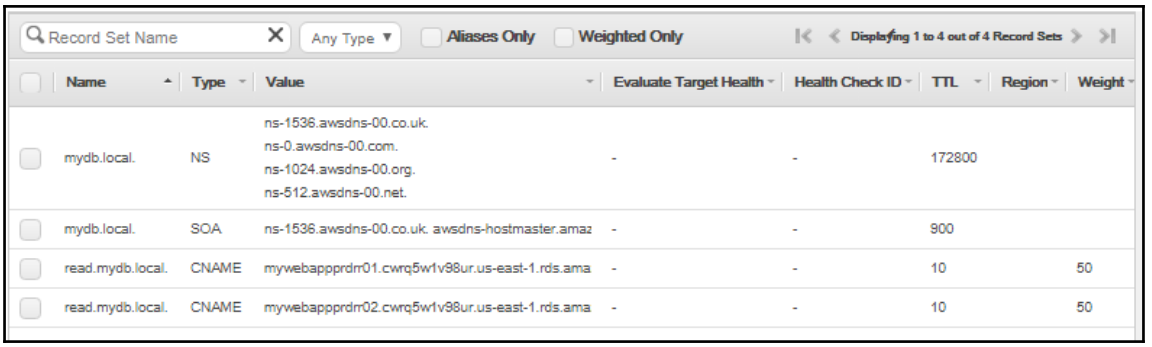
```
PS C:\> Convert-RDSReadReplicaToStandalone -DBInstanceIdentifier "mywebappprdrr01"


AllocatedStorage                     : 20
AutoMinorVersionUpgrade              : True
AvailabilityZone                     : us-east-1b
BackupRetentionPeriod                : 7
CACertificateIdentifier              : rds-ca-2015
CharacterSetName                     :
CopyTagsToSnapshot                   : False
DBClusterIdentifier                  :
DBInstanceArn                        : arn:aws:rds:us-east-1:072316406132:db:mywebappprdrr01
DBInstanceClass                      : db.t2.large
DBInstanceIdentifier                 : mywebappprdrr01
DbInstancePort                       : 0
DBInstanceStatus                     : modifying
DbiResourceId                        : db-GGLMIAJWQBHNGNHNWNPA254J4U
DBName                               : mywebappprd
```

```
PS C:\> Remove-RDSDBInstance -DBInstanceIdentifier "mywebappprdrr02" -SkipFinalSnapshot $true

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-RDSDBInstance (DeleteDBInstance)" on target "mywebappprdrr02".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y


AllocatedStorage                     : 20
AutoMinorVersionUpgrade              : True
AvailabilityZone                     : us-east-1a
BackupRetentionPeriod                : 0
CACertificateIdentifier              : rds-ca-2015
CharacterSetName                     :
CopyTagsToSnapshot                   : False
DBClusterIdentifier                  :
DBInstanceArn                        : arn:aws:rds:us-east-1:072316406132:db:mywebappprdrr02
DBInstanceClass                      : db.t2.large
DBInstanceIdentifier                 : mywebappprdrr02
DbInstancePort                       : 0
DBInstanceStatus                     : deleting
DbiResourceId                        : db-2GR5TUTHFA6JI4BWPT5H74BYN4
DBName                               : mywebappprd
```




```
PS C:\> New-R53HostedZone -CallerReference mydb.local -Name mydb.local -HostedZoneConfig_PrivateZone $true -VPC_VPCId vpc-a6bb60df -VPC_VPCRegion  us-east-1


HostedZone     : Amazon.Route53.Model.HostedZone
ChangeInfo     : Amazon.Route53.Model.ChangeInfo
DelegationSet  :
VPC            : Amazon.Route53.Model.VPC
Location       : https://route53.amazonaws.com/2013-04-01/hostedzone/Z28YQ9RW3T149F
```

```
PS C:\> Get-RDSDBInstance -DBInstanceIdentifier  "mywebappprd" |Format-Table ReadReplicaDBInstanceIdentifiers

ReadReplicaDBInstanceIdentifiers
--------------------------------
{mywebappprdrdrr01, mywebappprdrdrr02}


PS C:\> (Get-RDSDBInstance -DBInstanceIdentifier "mywebappprdrdrr01").endpoint

Address                                                HostedZoneId   Port
-------                                                ------------   ----
mywebappprdrdrr01.cwrq5w1v98ur.us-east-1.rds.amazonaws.com Z2R2ITUGPM61AM 3306


PS C:\> (Get-RDSDBInstance -DBInstanceIdentifier "mywebappprdrdrr02").endpoint

Address                                                HostedZoneId   Port
-------                                                ------------   ----
mywebappprdrdrr02.cwrq5w1v98ur.us-east-1.rds.amazonaws.com Z2R2ITUGPM61AM 3306
```




```
[root@ip-10-0-2-158 ~]# dig read.mydb.local ANY

; <<>> DiG 9.8.2rc1-RedHat-9.8.2-0.62.rc1.55.amzn1 <<>> read.mydb.local ANY
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 26887
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;read.mydb.local.               IN      ANY

;; ANSWER SECTION:
read.mydb.local.        2       IN      CNAME   mywebappprdrr02.cwrq5w1v98ur.us-east-1.rds.amazonaws.com.

;; Query time: 0 msec
;; SERVER: 10.0.0.2#53(10.0.0.2)
;; WHEN: Sat Jul 15 08:26:50 2017
;; MSG SIZE  rcvd: 103

[root@ip-10-0-2-158 ~]# dig read.mydb.local ANY

; <<>> DiG 9.8.2rc1-RedHat-9.8.2-0.62.rc1.55.amzn1 <<>> read.mydb.local ANY
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 61448
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;read.mydb.local.               IN      ANY

;; ANSWER SECTION:
read.mydb.local.        10      IN      CNAME   mywebappprdrr01.cwrq5w1v98ur.us-east-1.rds.amazonaws.com.

;; Query time: 3 msec
;; SERVER: 10.0.0.2#53(10.0.0.2)
;; WHEN: Sat Jul 15 08:26:52 2017
;; MSG SIZE  rcvd: 103
```

```
[root@ip-10-0-2-158 ~]# mysql -u rdsdba -prdsdba123 -h read.mydb.local
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 34
Server version: 5.7.17 MySQL Community Server (GPL)

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owners.

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

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| innodb             |
| mysql              |
| mywebappprd        |
| performance_schema |
| sys                |
+--------------------+
6 rows in set (0.00 sec)
```
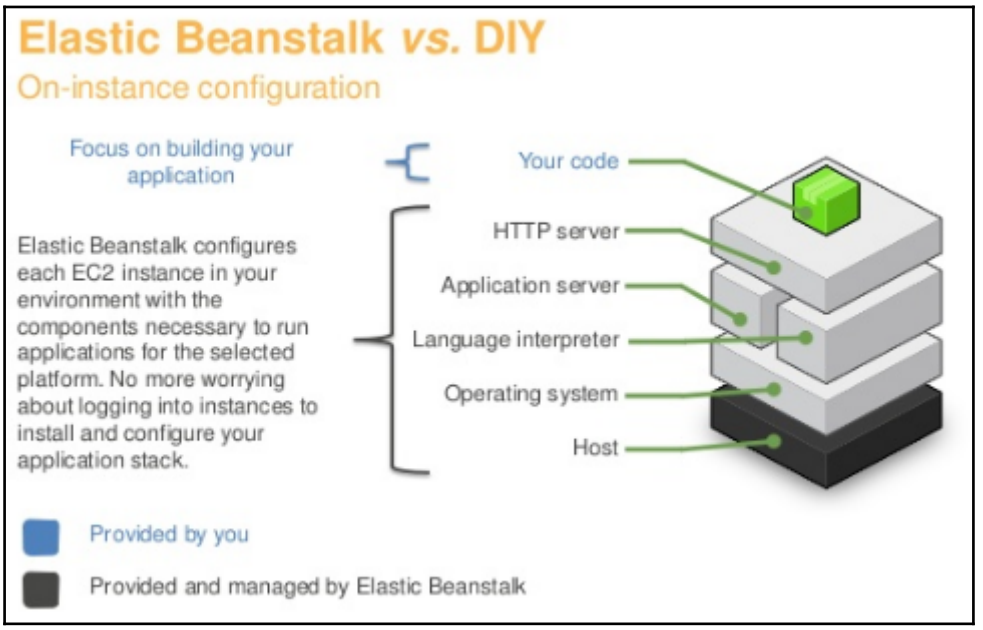
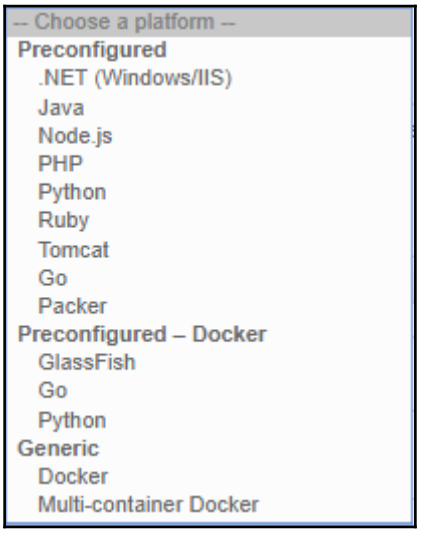
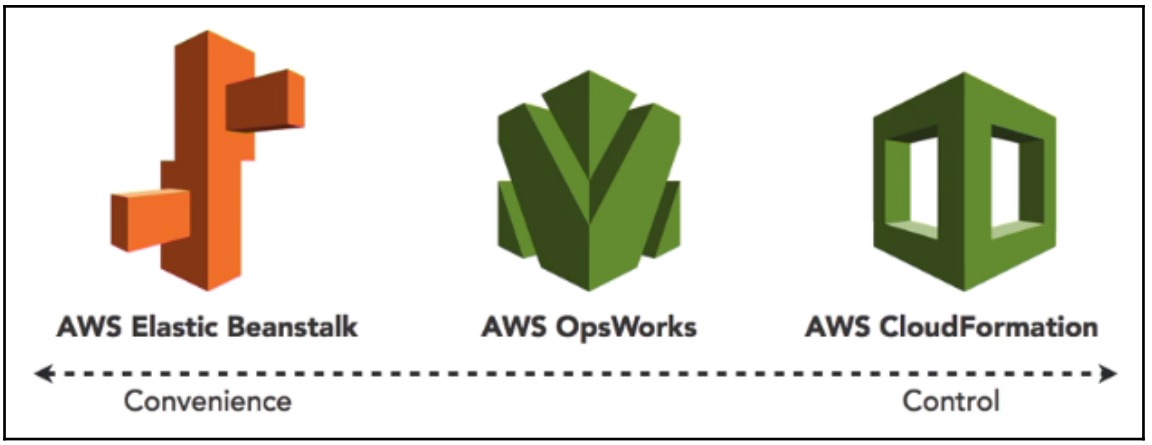
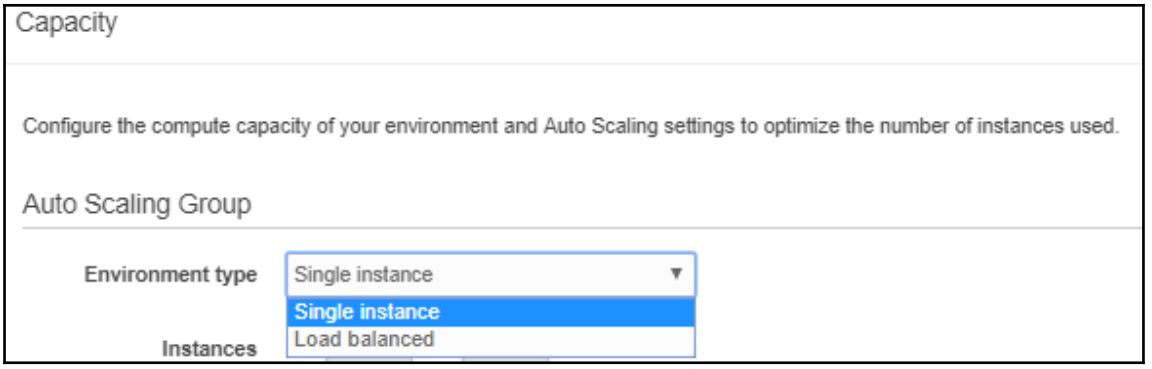

Chapter 13: AWS Elastic Beanstalk






AWS Elastic Beanstalk
AWS OpsWorks
AWS CloudFormation
Convenience
Control


Capacity
Configure the compute capacity of your environment and Auto Scaling settings to optimize the number of instances used.
Auto Scaling Group
Environment type
Single instance
Single instance
Load balanced
Instances


Scaling
Environment type: Single instance
Custom Availability Zones: blank

Method	Impact of Failed Deployment	Deploy Time	Zero Downtime	No DNS Change	Rollback Process	Code Deployed To
All at once	Downtime	🕒	X	✓	Re-deploy	Existing instances
Rolling	Single batch out of service. Any successful batches prior to failure running new application version.	🕒🕒†	✓	✓	Re-deploy	Existing instances
Rolling with additional batch	Minimal if first batch fails, otherwise similar to **Rolling**.	🕒🕒🕒†	✓	✓	Re-deploy	New & existing instances
Immutable	Minimal	🕒🕒🕒🕒	✓	✓	Re-deploy	New instances
Blue/green	Minimal	🕒🕒🕒🕒	✓	X	Swap URL	New instances

```
PS C:\> New-EBApplication -ApplicationName "WebWorldPressApp" -Description "WebWorldPressApp"


ApplicationName         : WebWorldPressApp
ConfigurationTemplates  : {}
DateCreated             : 7/17/2017 2:05:29 PM
DateUpdated             : 7/17/2017 2:05:29 PM
Description             : WebWorldPressApp
ResourceLifecycleConfig : Amazon.ElasticBeanstalk.Model.ApplicationResourceLifecycleConfig
Versions                : {}
```

```
PS C:\> (Get-EBAvailableSolutionStackList).SolutionStackDetails

PermittedFileTypes SolutionStackName
------------------ -----------------
{zip}              64bit Windows Server Core 2016 v1.2.0 running IIS 10.0
{zip}              64bit Windows Server 2016 v1.2.0 running IIS 10.0
{zip}              64bit Windows Server Core 2012 R2 v1.2.0 running IIS 8.5
{zip}              64bit Windows Server 2012 R2 v1.2.0 running IIS 8.5
{zip}              64bit Windows Server 2012 v1.2.0 running IIS 8
{zip}              64bit Windows Server 2008 R2 v1.2.0 running IIS 7.5
{jar, zip}         64bit Amazon Linux 2017.03 v2.5.1 running Java 8
{jar, zip}         64bit Amazon Linux 2017.03 v2.5.1 running Java 7
{zip}              64bit Amazon Linux 2017.03 v4.2.0 running Node.js
```

```
{zip}              64bit Amazon Linux 2017.03 v2.4.1 running PHP 5.4
{zip}              64bit Amazon Linux 2017.03 v2.4.1 running PHP 5.5
{zip}              64bit Amazon Linux 2017.03 v2.4.1 running PHP 5.6
{zip}              64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
{zip}              64bit Amazon Linux 2016.03 v2.1.6 running PHP 5.4
{zip}              64bit Amazon Linux 2016.03 v2.1.6 running PHP 5.5
{zip}              64bit Amazon Linux 2016.03 v2.1.6 running PHP 5.6
{zip}              64bit Amazon Linux 2016.03 v2.1.6 running PHP 7.0
{zip}              64bit Amazon Linux 2015.03 v1.4.6 running PHP 5.6
{zip}              64bit Amazon Linux 2015.03 v1.4.6 running PHP 5.5
{zip}              64bit Amazon Linux 2015.03 v1.4.6 running PHP 5.4
{zip}              64bit Amazon Linux 2014.03 v1.1.0 running PHP 5.5
{zip}              64bit Amazon Linux 2014.03 v1.1.0 running PHP 5.4
{zip}              32bit Amazon Linux 2014.03 v1.1.0 running PHP 5.5
{zip}              32bit Amazon Linux 2014.03 v1.1.0 running PHP 5.4
{zip}              64bit Amazon Linux running PHP 5.3
{zip}              32bit Amazon Linux running PHP 5.3
```

```
PS C:\> New-EBConfigurationTemplate -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate" -SolutionStackName "64bit Amazon Linux 2017.
03 v2.4.1 running PHP 7.0"


ApplicationName   : WebWorldPressApp
DateCreated       : 7/17/2017 2:43:18 PM
DateUpdated       : 7/17/2017 2:43:18 PM
DeploymentStatus  :
Description       :
EnvironmentName   :
OptionSettings    : {}
PlatformArn       : arn:aws:elasticbeanstalk:us-east-1::platform/PHP 7.0 running on 64bit Amazon Linux/2.4.1
SolutionStackName : 64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
TemplateName      : WebWorldPressAppTemplate
```

```
PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings

Namespace                                 OptionName                          ResourceName                          Value
---------                                 ----------                          ------------                          -----
aws:autoscaling:asg                       Availability Zones                  AWSEBAutoScalingGroup                 Any
aws:autoscaling:asg                       Cooldown                            AWSEBAutoScalingGroup                 360
aws:autoscaling:asg                       Custom Availability Zones           AWSEBAutoScalingGroup
aws:autoscaling:asg                       MaxSize                             AWSEBAutoScalingGroup                 4
aws:autoscaling:asg                       MinSize                             AWSEBAutoScalingGroup                 1
aws:autoscaling:launchconfiguration       BlockDeviceMappings                 AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration       EC2KeyName                          AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration       IamInstanceProfile                  AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration       ImageId                             AWSEBAutoScalingLaunchConfiguration   ami-0f774019
aws:autoscaling:launchconfiguration       InstanceType                                                              t1.micro
aws:autoscaling:launchconfiguration       MonitoringInterval                  AWSEBAutoScalingLaunchConfiguration   5 minute
aws:autoscaling:launchconfiguration       RootVolumeIOPS                      AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration       RootVolumeSize                      AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration       RootVolumeType                      AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration       SSHSourceRestriction                                                      tcp,22,22,0.0.0.0/0
aws:autoscaling:launchconfiguration       SecurityGroups                      AWSEBAutoScalingLaunchConfiguration
```

```
PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings |
>> Where-Object {$_.namespace -eq "aws:autoscaling:asg"}

Namespace           OptionName                  ResourceName          Value
---------           ----------                  ------------          -----
aws:autoscaling:asg Availability Zones          AWSEBAutoScalingGroup Any
aws:autoscaling:asg Cooldown                    AWSEBAutoScalingGroup 360
aws:autoscaling:asg Custom Availability Zones   AWSEBAutoScalingGroup
aws:autoscaling:asg MaxSize                     AWSEBAutoScalingGroup 4
aws:autoscaling:asg MinSize                     AWSEBAutoScalingGroup 1
```

```
PS C:\> $Option1=New-Object Amazon.ElasticBeanstalk.Model.ConfigurationOptionSetting
PS C:\> $Option1.Namespace="aws:autoscaling:asg"
PS C:\> $Option1.OptionName="Cooldown"
PS C:\> $Option1.Value=720
PS C:\> $Option2=New-Object Amazon.ElasticBeanstalk.Model.ConfigurationOptionSetting
PS C:\> $Option2.Namespace="aws:autoscaling:asg"
PS C:\> $Option2.OptionName="MinSize"
PS C:\> $Option2.Value=2
PS C:\> Update-EBConfigurationTemplate -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate" -OptionSetting $Option1,$Option2


ApplicationName   : WebWorldPressApp
DateCreated       : 7/17/2017 2:43:18 PM
DateUpdated       : 7/17/2017 3:04:12 PM
DeploymentStatus  :
Description       :
EnvironmentName   :
OptionSettings    : {}
PlatformArn       : arn:aws:elasticbeanstalk:us-east-1::platform/PHP 7.0 running on 64bit Amazon Linux/2.4.1
SolutionStackName : 64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
TemplateName      : WebWorldPressAppTemplate



PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings |
>> Where-Object {$_.namespace -eq "aws:autoscaling:asg"}

Namespace           OptionName                  ResourceName          Value
---------           ----------                  ------------          -----
aws:autoscaling:asg Availability Zones          AWSEBAutoScalingGroup Any
aws:autoscaling:asg Cooldown                    AWSEBAutoScalingGroup 720
aws:autoscaling:asg Custom Availability Zones   AWSEBAutoScalingGroup
aws:autoscaling:asg MaxSize                     AWSEBAutoScalingGroup 4
aws:autoscaling:asg MinSize                     AWSEBAutoScalingGroup 2
```

```
PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings |
>> Where-Object {$_.namespace -eq "aws:autoscaling:launchconfiguration"}

Namespace                           OptionName           ResourceName                       Value
---------                           ----------           ------------                       -----
aws:autoscaling:launchconfiguration BlockDeviceMappings  AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration EC2KeyName           AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration IamInstanceProfile   AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration ImageId              AWSEBAutoScalingLaunchConfiguration ami-0f774019
aws:autoscaling:launchconfiguration InstanceType                                             t1.micro
aws:autoscaling:launchconfiguration MonitoringInterval   AWSEBAutoScalingLaunchConfiguration 5 minute
aws:autoscaling:launchconfiguration RootVolumeIOPS       AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration RootVolumeSize       AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration RootVolumeType       AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration SSHSourceRestriction                                     tcp,22,22,0.0.0.0/0
aws:autoscaling:launchconfiguration SecurityGroups       AWSEBAutoScalingLaunchConfiguration
```

```
PS C:\> $Option3=New-Object Amazon.ElasticBeanstalk.Model.ConfigurationOptionSetting
PS C:\> $Option3.Namespace="aws:autoscaling:launchconfiguration"
PS C:\> $Option3.OptionName="EC2KeyName"
PS C:\> $Option3.Value="MyWebPressApp"
PS C:\> $Option4=New-Object Amazon.ElasticBeanstalk.Model.ConfigurationOptionSetting
PS C:\> $Option4.Namespace="aws:autoscaling:launchconfiguration"
PS C:\> $Option4.OptionName="InstanceType"
PS C:\> $Option4.Value="t2.large"
PS C:\> Update-EBConfigurationTemplate -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate" -OptionSetting $Option3,$Option4


ApplicationName   : WebWorldPressApp
DateCreated       : 7/17/2017 2:43:18 PM
DateUpdated       : 7/17/2017 3:21:29 PM
DeploymentStatus  :
Description       :
EnvironmentName   :
OptionSettings    : {}
PlatformArn       : arn:aws:elasticbeanstalk:us-east-1::platform/PHP 7.0 running on 64bit Amazon Linux/2.4.1
SolutionStackName : 64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
TemplateName      : WebWorldPressAppTemplate



PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings |
>> Where-Object {$_.namespace -eq "aws:autoscaling:launchconfiguration"}

Namespace                           OptionName           ResourceName                       Value
---------                           ----------           ------------                       -----
aws:autoscaling:launchconfiguration BlockDeviceMappings  AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration EC2KeyName           AWSEBAutoScalingLaunchConfiguration MyWebPressApp
aws:autoscaling:launchconfiguration IamInstanceProfile   AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration ImageId              AWSEBAutoScalingLaunchConfiguration ami-4c74435a
aws:autoscaling:launchconfiguration InstanceType                                             t2.large
aws:autoscaling:launchconfiguration MonitoringInterval   AWSEBAutoScalingLaunchConfiguration 5 minute
aws:autoscaling:launchconfiguration RootVolumeIOPS       AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration RootVolumeSize       AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration RootVolumeType       AWSEBAutoScalingLaunchConfiguration
aws:autoscaling:launchconfiguration SSHSourceRestriction                                     tcp,22,22,0.0.0.0/0
aws:autoscaling:launchconfiguration SecurityGroups       AWSEBAutoScalingLaunchConfiguration
```

```
PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings |
>> Where-Object {$_.namespace -eq "aws:ec2:vpc"}

Namespace   OptionName               ResourceName                       Value
---------   ----------               ------------                       -----
aws:ec2:vpc AssociatePublicIpAddress AWSEBAutoScalingLaunchConfiguration
aws:ec2:vpc ELBScheme                                                   public
aws:ec2:vpc ELBSubnets
aws:ec2:vpc Subnets                  AWSEBAutoScalingGroup
aws:ec2:vpc VPCId                    AWSEBLoadBalancerSecurityGroup
```

```
PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings |
>> Where-Object {$_.namespace -eq "aws:elb:loadbalancer"}

Namespace             OptionName                  ResourceName      Value
---------             ----------                  ------------      -----
aws:elb:loadbalancer CrossZone                   AWSEBLoadBalancer false
aws:elb:loadbalancer LoadBalancerHTTPPort        AWSEBLoadBalancer 80
aws:elb:loadbalancer LoadBalancerHTTPSPort       AWSEBLoadBalancer OFF
aws:elb:loadbalancer LoadBalancerPortProtocol    AWSEBLoadBalancer HTTP
aws:elb:loadbalancer LoadBalancerSSLPortProtocol AWSEBLoadBalancer HTTPS
aws:elb:loadbalancer SSLCertificateId            AWSEBLoadBalancer
aws:elb:loadbalancer SecurityGroups              AWSEBLoadBalancer {"Ref":"AWSEBLoadBalancerSecurityGroup"}
```

```
PS C:\> $Option5=New-Object Amazon.ElasticBeanstalk.Model.ConfigurationOptionSetting
PS C:\> $Option5.Namespace="aws:ec2:vpc"
PS C:\> $Option5.OptionName="Subnets"
PS C:\> $Option5.Value="subnet-f042dcb8,subnet-b262c19e,subnet-717bf32b"
PS C:\> $Option6=New-Object Amazon.ElasticBeanstalk.Model.ConfigurationOptionSetting
PS C:\> $Option6.Namespace="aws:ec2:vpc"
PS C:\> $Option6.OptionName="ELBSubnets"
PS C:\> $Option6.Value="subnet-c843dd80,subnet-b29d3e9e,subnet-2c77fe76"
PS C:\> Update-EBConfigurationTemplate -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate" -OptionSetting $Option5,$Option6


ApplicationName   : WebWorldPressApp
DateCreated       : 7/17/2017 2:43:18 PM
DateUpdated       : 7/17/2017 3:45:16 PM
DeploymentStatus  :
Description       :
EnvironmentName   :
OptionSettings    : {}
PlatformArn       : arn:aws:elasticbeanstalk:us-east-1::platform/PHP 7.0 running on 64bit Amazon Linux/2.4.1
SolutionStackName : 64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
TemplateName      : WebWorldPressAppTemplate



PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings |
>> Where-Object {$_.namespace -eq "aws:ec2:vpc"}

Namespace   OptionName              ResourceName                      Value
---------   ----------              ------------                      -----
aws:ec2:vpc AssociatePublicIpAddress AWSEBAutoScalingLaunchConfiguration false
aws:ec2:vpc ELBScheme                                                 public
aws:ec2:vpc ELBSubnets                                                subnet-c843dd80,subnet-b29d3e9e,subnet-2c77fe76
aws:ec2:vpc Subnets                  AWSEBAutoScalingGroup            subnet-b262c19e,subnet-717bf32b,subnet-f042dcb8
aws:ec2:vpc VPCId                    AWSEBLoadBalancerSecurityGroup   vpc-a6bb60df
```

```
PS C:\> $Option7=New-Object Amazon.ElasticBeanstalk.Model.ConfigurationOptionSetting
PS C:\> $Option7.Namespace="aws:elb:loadbalancer"
PS C:\> $Option7.OptionName="CrossZone"
PS C:\> $Option7.Value=$true
PS C:\> Update-EBConfigurationTemplate -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate" -OptionSetting $Option7


ApplicationName   : WebWorldPressApp
DateCreated       : 7/17/2017 2:43:18 PM
DateUpdated       : 7/17/2017 3:59:13 PM
DeploymentStatus  :
Description       :
EnvironmentName   :
OptionSettings    : {}
PlatformArn       : arn:aws:elasticbeanstalk:us-east-1::platform/PHP 7.0 running on 64bit Amazon Linux/2.4.1
SolutionStackName : 64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
TemplateName      : WebWorldPressAppTemplate



PS C:\> (Get-EBConfigurationSetting -ApplicationName "WebWorldPressApp" -TemplateName "WebWorldPressAppTemplate").OptionSettings |
>> Where-Object {$_.namespace -eq "aws:elb:loadbalancer"}

Namespace             OptionName                  ResourceName      Value
---------             ----------                  ------------      -----
aws:elb:loadbalancer CrossZone                   AWSEBLoadBalancer true
aws:elb:loadbalancer LoadBalancerHTTPPort        AWSEBLoadBalancer 80
aws:elb:loadbalancer LoadBalancerHTTPSPort       AWSEBLoadBalancer OFF
aws:elb:loadbalancer LoadBalancerPortProtocol    AWSEBLoadBalancer HTTP
aws:elb:loadbalancer LoadBalancerSSLPortProtocol AWSEBLoadBalancer HTTPS
aws:elb:loadbalancer SSLCertificateId            AWSEBLoadBalancer
aws:elb:loadbalancer SecurityGroups              AWSEBLoadBalancer {"Ref":"AWSEBLoadBalancerSecurityGroup"}
```

```
PS C:\> Get-EBDNSAvailability -CNAMEPrefix "WebWorldPressApp"

Available FullyQualifiedCNAME
--------- -------------------
True      WebWorldPressApp.us-east-1.elasticbeanstalk.com
```

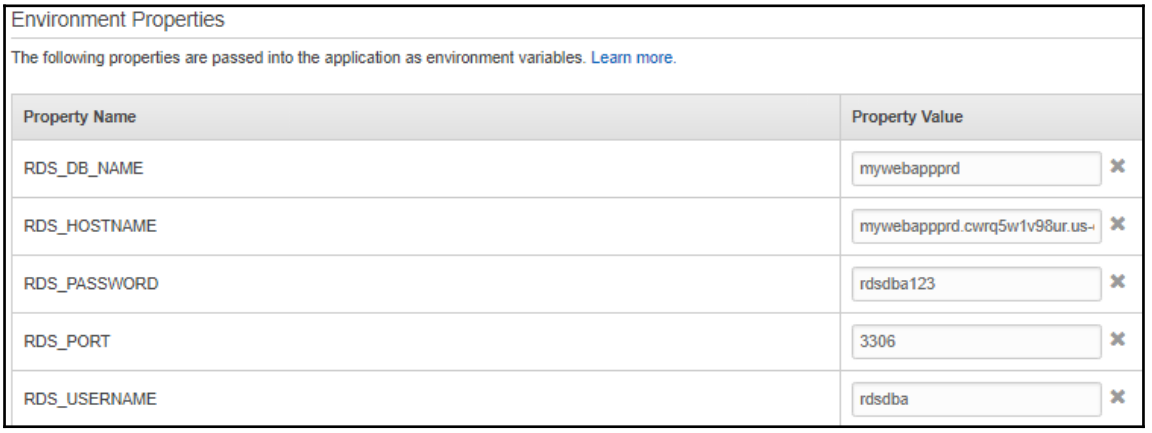
```
PS C:\> New-EBEnvironment -ApplicationName "WebWorldPressApp" -EnvironmentName "prd-WebWorldPressApp" -CNAMEPrefix "WebWorldPressApp" -Description "My Production WebApp site" -TemplateName "WebWorldPressAppTemplate"


AbortableOperationInProgress : False
ApplicationName              : WebWorldPressApp
CNAME                        : WebWorldPressApp.us-east-1.elasticbeanstalk.com
DateCreated                  : 7/17/2017 4:16:15 PM
DateUpdated                  : 7/17/2017 4:16:15 PM
Description                  : My Production WebApp site
EndpointURL                  :
EnvironmentId                : e-vncgsvupfb
EnvironmentLinks             : {}
EnvironmentName              : prd-WebWorldPressApp
Health                       : Grey
HealthStatus                 :
PlatformArn                  : arn:aws:elasticbeanstalk:us-east-1::platform/PHP 7.0 running on 64bit Amazon Linux/2.4.1
Resources                    :
SolutionStackName            : 64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
Status                       : Launching
TemplateName                 :
Tier                         : Amazon.ElasticBeanstalk.Model.EnvironmentTier
VersionLabel                 :
```

```
PS C:\> Get-EBEvent -ApplicationName "WebWorldPressApp" -EnvironmentName "prd-WebWorldPressApp"|Format-Table

ApplicationName  EnvironmentName      EventDate            Message
---------------  ----------------     ---------            -------
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:18:14 PM Successfully launched environment: prd-WebWorldPressApp
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:18:13 PM Application available at WebWorldPressApp.us-east-1.elasticbeanstalk.com.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:18:10 PM Adding instance 'i-0b51a6e0daa354f3a' to your environment.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:18:10 PM Added EC2 instance 'i-0b51a6e0daa354f3a' to Auto Scaling Group 'awseb-e-vncgsvupfb-stack-AWSEB...
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:18:10 PM Adding instance 'i-09f237e61a99097bf' to your environment.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:18:10 PM Added EC2 instance 'i-09f237e61a99097bf' to Auto Scaling Group 'awseb-e-vncgsvupfb-stack-AWSEB...
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:17:54 PM Created CloudWatch alarm named: awseb-e-vncgsvupfb-stack-AWSEBCloudwatchAlarmLow-1JVY1OM7HIS1O
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:17:54 PM Created CloudWatch alarm named: awseb-e-vncgsvupfb-stack-AWSEBCloudwatchAlarmHigh-1WRRP7DZVQ2DL
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:17:54 PM Created Auto Scaling group policy named: arn:aws:autoscaling:us-east-1:072316406132:scalingPol...
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:17:54 PM Created Auto Scaling group policy named: arn:aws:autoscaling:us-east-1:072316406132:scalingPol...
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:17:54 PM Waiting for EC2 instances to launch. This may take a few minutes.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:17:54 PM Created Auto Scaling group named: awseb-e-vncgsvupfb-stack-AWSEBAutoScalingGroup-1HW16UCON1GOJ
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:16:52 PM Created Auto Scaling launch configuration named: awseb-e-vncgsvupfb-stack-AWSEBAutoScalingLaun...
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:16:37 PM Created load balancer named: awseb-e-v-AWSEBLoa-DWSDXYL260H9
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:16:36 PM Created security group named: sg-830148f2
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:16:36 PM Created security group named: sg-580a4329
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:16:15 PM Using elasticbeanstalk-us-east-1-072316406132 as Amazon S3 storage bucket for environment data.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 4:16:14 PM createEnvironment is starting.
```

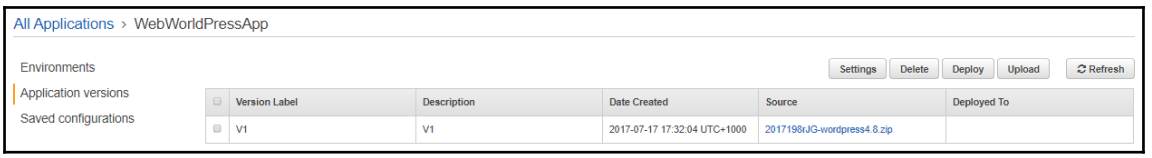
```
PS C:\> Get-EBEnvironment -ApplicationName "WebWorldPressApp" -EnvironmentName "prd-WebWorldPressApp"|Select-Object CNAME

CNAME
-----
WebWorldPressApp.us-east-1.elasticbeanstalk.com
```


```
PS D:\wordpress> dir


    Directory: D:\wordpress


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----         6/8/2017   2:29 PM                wp-admin
d-----         6/8/2017   2:29 PM                wp-content
d-----         6/8/2017   2:29 PM                wp-includes
------        9/25/2013  12:18 AM            418 index.php
------         1/2/2017   6:58 PM          19935 license.txt
------       12/12/2016   9:01 AM           7413 readme.html
------        9/27/2016   9:36 PM           5447 wp-activate.php
------       12/19/2015  12:20 PM            364 wp-blog-header.php
------        8/29/2016  12:00 PM           1627 wp-comments-post.php
------       12/16/2015  10:58 AM           2853 wp-config-sample.php
------        5/24/2015   5:26 PM           3286 wp-cron.php
------       11/21/2016   3:46 AM           2422 wp-links-opml.php
------       10/25/2016   4:15 AM           3301 wp-load.php
------        5/12/2017   5:12 PM          34327 wp-login.php
------         1/11/2017   6:13 AM           8048 wp-mail.php
------          4/6/2017   6:01 PM          16200 wp-settings.php
------         1/24/2017  12:08 PM          29924 wp-signup.php
------       10/14/2016   8:39 PM           4513 wp-trackback.php
------        8/31/2016   4:31 PM           3065 xmlrpc.php
```

```
// ** MySQL settings - You can get this info from your web host ** //
/** The name of the database for WordPress */
define('DB_NAME', $_SERVER['RDS_DB_NAME']);

/** MySQL database username */
define('DB_USER', $_SERVER['RDS_USERNAME']);

/** MySQL database password */
define('DB_PASSWORD', $_SERVER['RDS_PASSWORD']);

/** MySQL hostname */
define('DB_HOST', $_SERVER['RDS_HOSTNAME']);
```

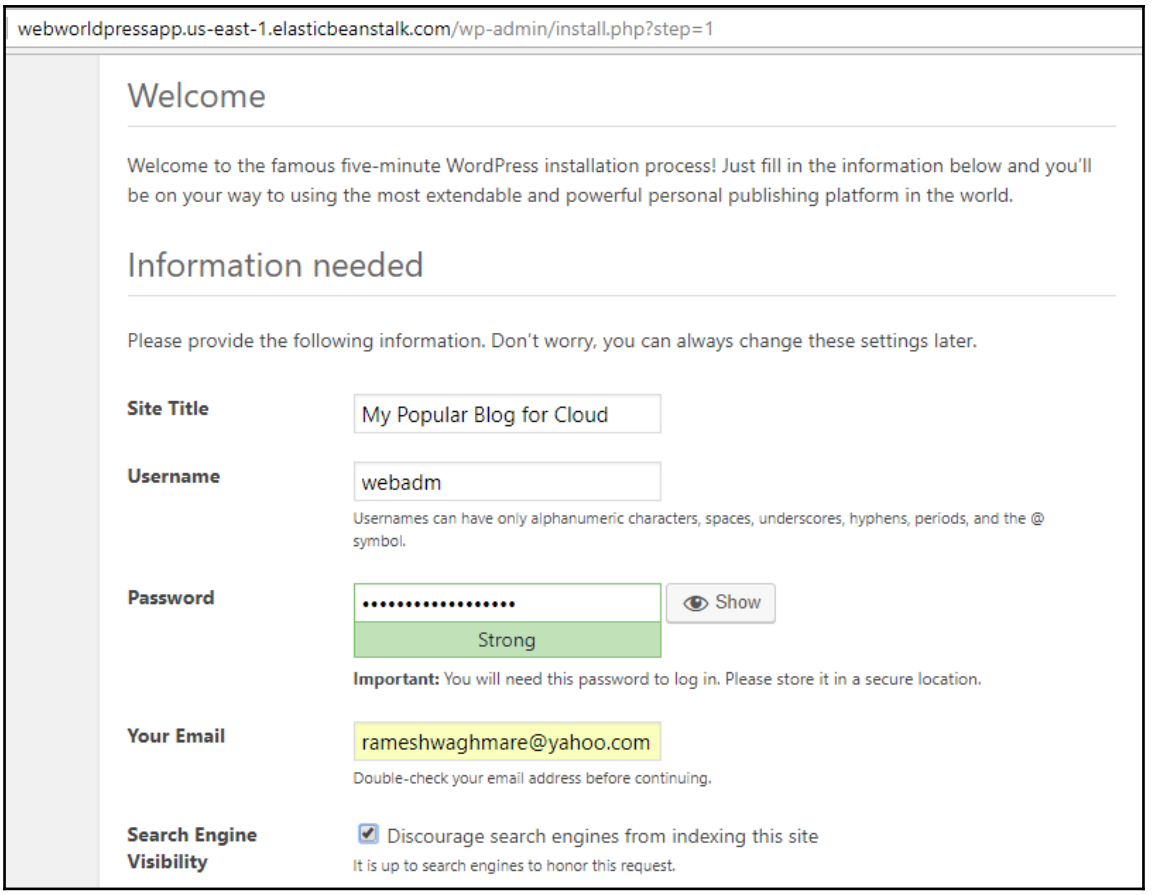


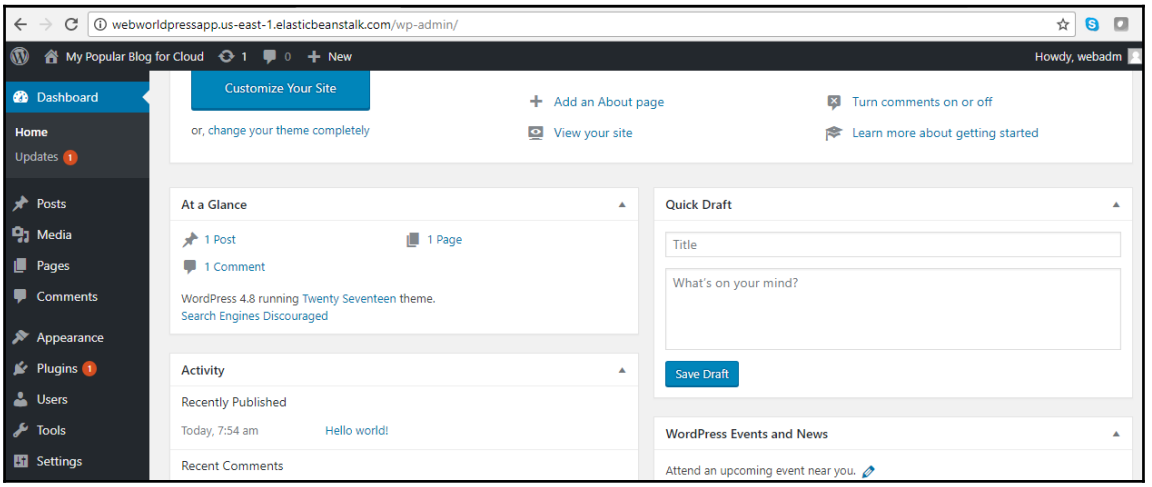

```
PS D:\wordpress> Get-EBEvent -ApplicationName "WebWorldPressApp" -EnvironmentName "prd-WebWorldPressApp"|Format-Table

ApplicationName  EnvironmentName      EventDate            Message
---------------  ---------------      ---------            -------
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 5:17:31 PM Environment update completed successfully.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 5:17:31 PM Successfully deployed new configuration to environment.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 5:16:16 PM Updating environment prd-WebWorldPressApp's configuration settings.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 5:16:11 PM Environment update is starting.
```

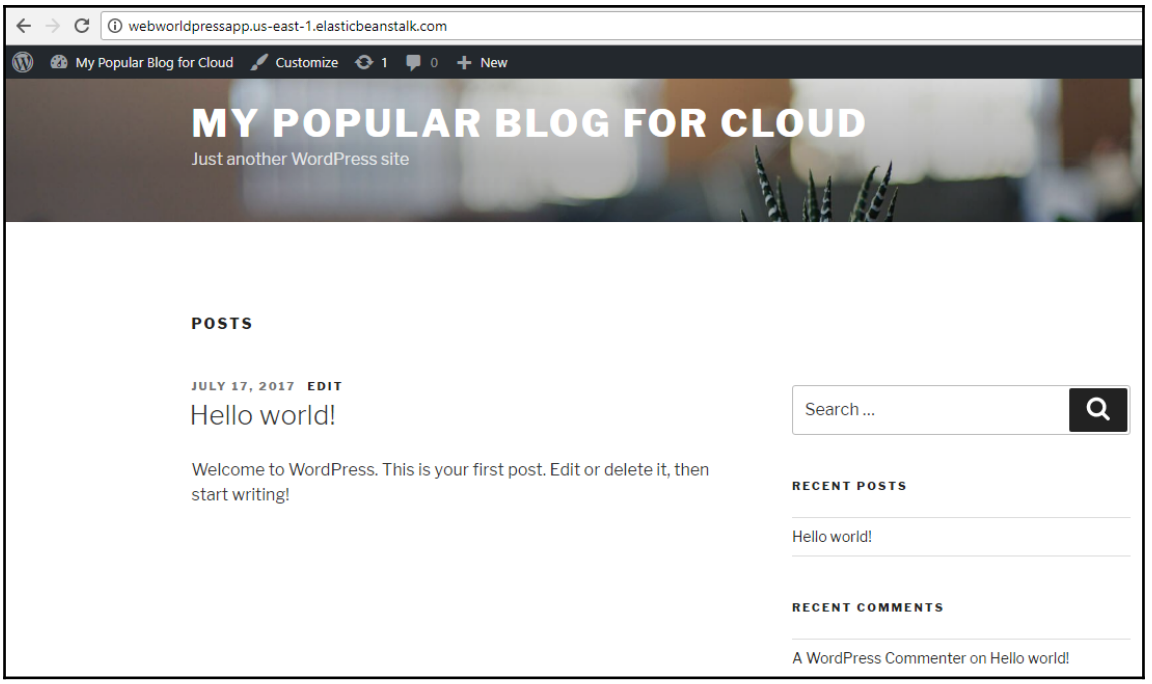


```
PS D:\wordpress> Update-EBEnvironment -ApplicationName "WebWorldPressApp" -EnvironmentName "prd-WebWorldPressApp" -VersionLabel "V1"


AbortableOperationInProgress : True
ApplicationName              : WebWorldPressApp
CNAME                        : WebWorldPressApp.us-east-1.elasticbeanstalk.com
DateCreated                  : 7/17/2017 4:16:15 PM
DateUpdated                  : 7/17/2017 5:36:31 PM
Description                  : My Production WebApp site
EndpointURL                  : awseb-e-v-AWSEBLoa-DWSDXYL260H9-1146012130.us-east-1.elb.amazonaws.com
EnvironmentId                : e-vncgsvupfb
EnvironmentLinks             : {}
EnvironmentName              : prd-WebWorldPressApp
Health                       : Grey
HealthStatus                 :
PlatformArn                  : arn:aws:elasticbeanstalk:us-east-1::platform/PHP 7.0 running on 64bit Amazon Linux/2.4.1
Resources                    :
SolutionStackName            : 64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
Status                       : Updating
TemplateName                 :
Tier                         : Amazon.ElasticBeanstalk.Model.EnvironmentTier
VersionLabel                 : V1
```

```
PS D:\wordpress> Get-EBEvent -ApplicationName "WebWorldPressApp" -EnvironmentName "prd-WebWorldPressApp"|Format-Table

ApplicationName  EnvironmentName      EventDate            Message
---------------  ---------------      ---------            -------
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 5:37:56 PM Environment update completed successfully.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 5:37:56 PM New application version was deployed to running EC2 instances.
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 5:37:12 PM Deploying new version to instance(s).
WebWorldPressApp prd-WebWorldPressApp 7/17/2017 5:36:30 PM Environment update is starting.
```


webworldpressapp.us-east-1.elasticbeanstalk.com/wp-admin/install.php?step=1
Welcome
Welcome to the famous five-minute WordPress installation process! Just fill in the information below and you'll be on your way to using the most extendable and powerful personal publishing platform in the world.
Information needed
Please provide the following information. Don't worry, you can always change these settings later.
Site Title
My Popular Blog for Cloud
Username
webadm
Usernames can have only alphanumeric characters, spaces, underscores, hyphens, periods, and the @ symbol.
Password
Show
Strong
Important: You will need this password to log in. Please store it in a secure location.
Your Email
rameshwaghmare@yahoo.com
Double-check your email address before continuing.
Search Engine Visibility
Discourage search engines from indexing this site
It is up to search engines to honor this request.


webworldpressapp.us-east-1.elasticbeanstalk.com/wp-admin/
My Popular Blog for Cloud
New
Howdy, webadm
Dashboard
Home
Updates
Posts
Media
Pages
Comments
Appearance
Plugins
Users
Tools
Settings
Customize Your Site
or, change your theme completely
Add an About page
View your site
Turn comments on or off
Learn more about getting started
At a Glance
1 Post
1 Page
1 Comment
WordPress 4.8 running Twenty Seventeen theme.
Search Engines Discouraged
Quick Draft
Title
What's on your mind?
Save Draft
Activity
Recently Published
Today, 7:54 am
Hello world!
Recent Comments
WordPress Events and News
Attend an upcoming event near you.




```
PS D:\scripts> cat .\clone_env.ps1
#############################################################################
# Declaration of the parameters
#############################################################################
[CmdletBinding()]
Param(
   [Parameter(Mandatory=$True)]
   [string]$vApplicationName,
   [Parameter(Mandatory=$True)]
   [string]$vSourceEnvironmentName,
   [Parameter(Mandatory=$True)]
   [string]$vNewEnvironmentName,
   [Parameter(Mandatory=$True)]
   [string]$vNewEnvironmentCname
 )
#############################################################################
# Create Unique Template Name
#############################################################################
$templateName = [Guid]::NewGuid().ToString();
$environment = Get-EBEnvironment -ApplicationName $vApplicationName -EnvironmentName $vSourceEnvironmentName;
#############################################################################
# Get current environment ID and Application Name
#############################################################################
$environmentId = $environment.EnvironmentId;
$ApplicationName = $environment.ApplicationName;
#############################################################################
#Create new template using existing environment set up
#############################################################################
$template = New-EBConfigurationTemplate -ApplicationName $ApplicationName -TemplateName $templateName -EnvironmentId $environmentId;
while (-not (Get-EBApplication -ApplicationNames $ApplicationName)[0].ConfigurationTemplates.Contains($templateName)) {
   echo ([string]::Format("can't find template '{0}'", $templateName));
   Start-Sleep -s 5;
}
(Get-EBApplication -ApplicationNames $ApplicationName)[0].ConfigurationTemplates.Contains($templateName);
Get-EBEnvironment -ApplicationName $ApplicationName -EnvironmentNames $SourceEnvironmentName
#############################################################################
# Create new environment  and remove template
#############################################################################
New-EBEnvironment -ApplicationName $ApplicationName -EnvironmentName $vNewEnvironmentName -CNAMEPrefix $vNewEnvironmentCname -TemplateName $template.Template
Name;
Remove-EBConfigurationTemplate -ApplicationName $ApplicationName -TemplateName $templateName -Force;
```

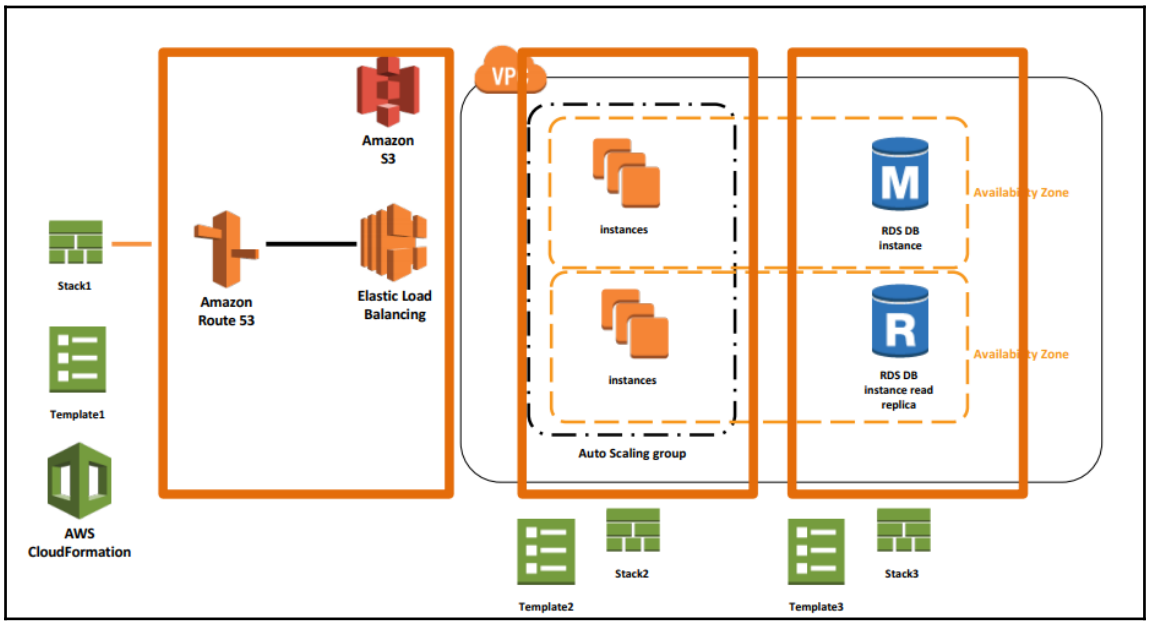
```
PS D:\scripts> .\clone_env.ps1

cmdlet clone_env.ps1 at command pipeline position 1
Supply values for the following parameters:
ApplicationName: WebWorldPressApp
SourceEnvironmentName: prd-WebWorldPressApp
NewEnvironmentName: dev-WebWorldPressApp
NewEnvironmentCname: dev-WebWorldPressApp
True
```

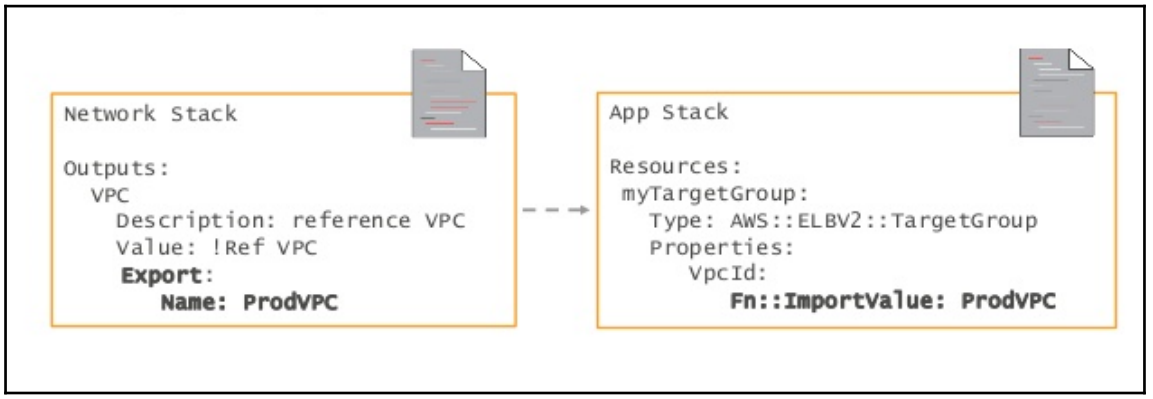
```
PS D:\scripts> Get-EBEnvironment -ApplicationName "WebWorldPressApp" -EnvironmentName "prd-WebWorldPressApp"|Select-Object CNAME

CNAME
-----
WebWorldPressApp.us-east-1.elasticbeanstalk.com


PS D:\scripts> Get-EBEnvironment -ApplicationName "WebWorldPressApp" -EnvironmentName "dev-WebWorldPressApp"|Select-Object CNAME

CNAME
-----
dev-WebWorldPressApp.us-east-1.elasticbeanstalk.com


PS D:\scripts> Set-EBEnvironmentCNAME -SourceEnvironmentId "e-vncgsvupfb" -SourceEnvironmentName "prd-WebWorldPressApp" -DestinationEnvironmentId "e-s3b62fek
i2" -DestinationEnvironmentName "dev-WebWorldPressApp"
PS D:\scripts> Get-EBEnvironment -ApplicationName "WebWorldPressApp" -EnvironmentName "prd-WebWorldPressApp"|Select-Object CNAME

CNAME
-----
dev-WebWorldPressApp.us-east-1.elasticbeanstalk.com


PS D:\scripts> Get-EBEnvironment -ApplicationName "WebWorldPressApp" -EnvironmentName "dev-WebWorldPressApp"|Select-Object CNAME

CNAME
-----
WebWorldPressApp.us-east-1.elasticbeanstalk.com
```

```
PS D:\scripts> Stop-EBEnvironment -EnvironmentId "e-s3b62feki2" -EnvironmentName "dev-WebWorldPressApp" -TerminateResource $true


AbortableOperationInProgress : False
ApplicationName              : WebWorldPressApp
CNAME                        : WebWorldPressApp.us-east-1.elasticbeanstalk.com
DateCreated                  : 7/17/2017 6:26:04 PM
DateUpdated                  : 7/17/2017 7:19:50 PM
Description                  :
EndpointURL                  : awseb-e-s-AWSEBLoa-J6X202CXXBF6-1611547768.us-east-1.elb.amazonaws.com
EnvironmentId                : e-s3b62feki2
EnvironmentLinks             : {}
EnvironmentName              : dev-WebWorldPressApp
Health                       : Grey
HealthStatus                 :
PlatformArn                  : arn:aws:elasticbeanstalk:us-east-1::platform/PHP 7.0 running on 64bit Amazon Linux/2.4.1
Resources                    :
SolutionStackName            : 64bit Amazon Linux 2017.03 v2.4.1 running PHP 7.0
Status                       : Terminating
TemplateName                 :
Tier                         : Amazon.ElasticBeanstalk.Model.EnvironmentTier
VersionLabel                 :
```

```
PS C:\> Remove-EBApplication -ApplicationName "WebWorldPressApp"

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-EBApplication (DeleteApplication)" on target "WebWorldPressApp".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
```

Chapter 14: AWS CloudFormation





```
---
AWSTemplateFormatVersion: '2010-09-09'
Description: Creating Base Network for Application
Parameters:
  VPCCIDRRange:
    Description: My CIDR Block for VPC
    Type: String
  PublicSubnetCIDR1:
    Description: First Public Subnet
    Type: String
  PublicSubnetCIDR2:
    Description: Second Public Subnet
    Type: String
  PrivateSubnetCIDR1:
    Description: First Private Subnet
    Type: String
  PrivateSubnetCIDR2:
    Description: Second Private Subnet
    Type: String
```

```
Resources:
  myCFVPC:
    Type: AWS::EC2::VPC
    Properties:
      CidrBlock:
        Ref: VPCCIDRRange
      EnableDnsSupport: 'true'
      EnableDnsHostnames: 'true'
      InstanceTenancy: default
      Tags:
      - Key: Name
        Value: "CFVpc"
  myCFIgw:
    Type: "AWS::EC2::InternetGateway"
    Properties:
      Tags:
      - Key: Name
        Value: "CFIgw"
  AttachGateway:
    Type: AWS::EC2::VPCGatewayAttachment
    Properties:
      VpcId:
        Ref: myCFVPC
      InternetGatewayId:
        Ref: myCFIgw
```

```
  CFPublicRoute:
    Type: AWS::EC2::RouteTable
    Properties:
      VpcId:
        Ref: myCFVPC
      Tags:
      - Key: Name
        Value: CFPublicRT
  CFPrivateRoute:
    Type: AWS::EC2::RouteTable
    Properties:
      VpcId:
        Ref: myCFVPC
      Tags:
      - Key: Name
        Value: CFPrivateRT
```

```
CFPublic1:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId:
      Ref: myCFVPC
    CidrBlock:
      Ref: PublicSubnetCIDR1
    AvailabilityZone: "us-east-1a"
    Tags:
    - Key: Name
      Value: CFPublicSubnet1
CFPublic2:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId:
      Ref: myCFVPC
    CidrBlock:
      Ref: PublicSubnetCIDR2
    AvailabilityZone: "us-east-1b"
    Tags:
    - Key: Name
      Value: CFPublicSubnet2
```

```
CFPrivate1:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId:
      Ref: myCFVPC
    CidrBlock:
      Ref: PrivateSubnetCIDR1
    AvailabilityZone: "us-east-1a"
    Tags:
    - Key: Name
      Value: CFPrivateSubnet1
CFPrivate2:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId:
      Ref: myCFVPC
    CidrBlock:
      Ref: PrivateSubnetCIDR2
    AvailabilityZone: "us-east-1b"
    Tags:
    - Key: Name
      Value: CFPrivateSubnet1
```

```
  myCFPublicRoute:
    Type: AWS::EC2::Route
    DependsOn: myCFIgw
    Properties:
      RouteTableId:
        Ref: CFPublicRoute
      DestinationCidrBlock: 0.0.0.0/0
      GatewayId:
        Ref: myCFIgw
```

```
myCFSubnetRouteTableAssociation1:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    SubnetId:
      Ref: CFPublic1
    RouteTableId:
      Ref: CFPublicRoute
myCFSubnetRouteTableAssociation2:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    SubnetId:
      Ref: CFPublic2
    RouteTableId:
      Ref: CFPublicRoute
```

```
myCFEIP:
  Type: AWS::EC2::EIP
  Properties:
    Domain: vpc
myCFNat:
  Type: AWS::EC2::NatGateway
  Properties:
    AllocationId:
      Fn::GetAtt:
      - myCFEIP
      - AllocationId
    SubnetId:
      Ref: CFPublic1
myCFNatPrivateRoute:
  Type: AWS::EC2::Route
  Properties:
    RouteTableId:
      Ref: CFPrivateRoute
    DestinationCidrBlock: 0.0.0.0/0
    NatGatewayId:
      Ref: myCFNat
myCFSubnetRouteTableAssociation3:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    SubnetId:
      Ref: CFPrivate1
    RouteTableId:
      Ref: CFPrivateRoute
myCFSubnetRouteTableAssociation4:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    SubnetId:
      Ref: CFPrivate2
    RouteTableId:
      Ref: CFPrivateRoute
```

```
myCFSecurityGroup:
  Type: AWS::EC2::SecurityGroup
  Properties:
    GroupDescription: Allow http and ssh to client host
    VpcId:
      Ref: myCFVPC
    SecurityGroupIngress:
    - IpProtocol: tcp
      FromPort: '22'
      ToPort: '22'
      CidrIp: 0.0.0.0/0
    Tags:
    - Key: Name
      Value: myCFSG
SGBaseIngress:
  Type: AWS::EC2::SecurityGroupIngress
  Properties:
    GroupId:
      Ref: myCFSecurityGroup
    IpProtocol: tcp
    FromPort: '80'
    ToPort: '80'
    CidrIp: 0.0.0.0/0
```

```
Outputs:
  myCFVPCId:
    Description: VPC Id
    Value:
      Ref: myCFVPC
    Export:
      Name: 'exmyCFVPC'
  CFPublic1Id:
    Description: Public Subnet 1 Id
    Value:
      Ref: CFPublic1
    Export:
      Name: 'exCFPublic1SubnetId'
  CFPublic2Id:
    Description: Public Subnet 2 Id
    Value:
      Ref: CFPublic2
    Export:
      Name: 'exCFPublic2SubnetId'
  CFPrivate1Id:
    Description: Private Subnet 1 Id
    Value:
      Ref: CFPrivate1
    Export:
      Name: 'exCFPrivate1SubnetId'
  CFPrivate2Id:
    Description: Private Subnet 2 Id
    Value:
      Ref: CFPrivate2
    Export:
      Name: 'exCFPrivate2SubnetId'
  myCFSecurityGroupId:
    Description: Security Group for VPC
    Value:
      Ref: myCFSecurityGroup
    Export:
      Name: 'exCFSecurityGroupId'
```

```
PS C:\> $vpcstack=(Get-Content -Raw D:\scripts\basenetwork.txt)
PS C:\> Test-CFNTemplate -TemplateBody $vpcstack


Capabilities        : {}
CapabilitiesReason  :
DeclaredTransforms  : {}
Description         : Creating Base Network for Application
Parameters          : {VPCCIDRRange, PublicSubnetCIDR1, PrivateSubnetCIDR1, PrivateSubnetCIDR2...}
```

```
PS C:\> $vpcstack=(Get-Content -Raw D:\scripts\basenetwork.txt)
PS C:\> $p1 = New-Object -Type Amazon.CloudFormation.Model.Parameter
PS C:\> $p1.ParameterKey = "VPCCIDRRange"
PS C:\> $p1.ParameterValue = "10.12.0.0/16"
PS C:\> $p2 = New-Object -Type Amazon.CloudFormation.Model.Parameter
PS C:\> $p2.ParameterKey = "PublicSubnetCIDR1"
PS C:\> $p2.ParameterValue = "10.12.1.0/24"
PS C:\> $p3 = New-Object -Type Amazon.CloudFormation.Model.Parameter
PS C:\> $p3.ParameterKey = "PublicSubnetCIDR2"
PS C:\> $p3.ParameterValue = "10.12.2.0/24"
PS C:\> $p4 = New-Object -Type Amazon.CloudFormation.Model.Parameter
PS C:\> $p4.ParameterKey = "PrivateSubnetCIDR1"
PS C:\> $p4.ParameterValue = "10.12.3.0/24"
PS C:\> $p5 = New-Object -Type Amazon.CloudFormation.Model.Parameter
PS C:\> $p5.ParameterKey = "PrivateSubnetCIDR2"
PS C:\> $p5.ParameterValue = "10.12.4.0/24"
PS C:\> New-CFNStack -StackName "myVpcStack" -TemplateBody $vpcstack -Parameter @($p1,$p2,$p3,$p4,$p5) -OnFailure "ROLLBACK"
arn:aws:cloudformation:us-east-1:072316406132:stack/myVpcStack/b24bc180-6c42-11e7-bd57-500c2855d8d1
```

```
PS C:\> Get-CFNStackEvent -StackName myVpcStack|Format-Table EventId,ResourceType,ResourceStatus

EventId                                                              ResourceType                         ResourceStatus
-------                                                              ------------                         --------------
1df4ca80-6c43-11e7-8351-503acac5c0fd                                 AWS::CloudFormation::Stack           CREATE_COMPLETE
myCFNatPrivateRoute-CREATE_COMPLETE-2017-07-19T05:28:34.237Z         AWS::EC2::Route                      CREATE_COMPLETE
myCFNatPrivateRoute-CREATE_IN_PROGRESS-2017-07-19T05:28:17.416Z      AWS::EC2::Route                      CREATE_IN_PROGRESS
myCFNatPrivateRoute-CREATE_IN_PROGRESS-2017-07-19T05:28:16.311Z      AWS::EC2::Route                      CREATE_IN_PROGRESS
myCFNat-CREATE_COMPLETE-2017-07-19T05:28:13.161Z                     AWS::EC2::NatGateway                 CREATE_COMPLETE
myCFSubnetRouteTableAssociation2-CREATE_COMPLETE-2017-07-19T05:26:41.855Z    AWS::EC2::SubnetRouteTableAssociation CREATE_COMPLETE
myCFSubnetRouteTableAssociation1-CREATE_COMPLETE-2017-07-19T05:26:41.556Z    AWS::EC2::SubnetRouteTableAssociation CREATE_COMPLETE
myCFSubnetRouteTableAssociation4-CREATE_COMPLETE-2017-07-19T05:26:40.142Z    AWS::EC2::SubnetRouteTableAssociation CREATE_COMPLETE
myCFSubnetRouteTableAssociation3-CREATE_COMPLETE-2017-07-19T05:26:40.064Z    AWS::EC2::SubnetRouteTableAssociation CREATE_COMPLETE
myCFSubnetRouteTableAssociation2-CREATE_IN_PROGRESS-2017-07-19T05:26:26.134Z AWS::EC2::SubnetRouteTableAssociation CREATE_IN_PROGRESS
myCFSubnetRouteTableAssociation1-CREATE_IN_PROGRESS-2017-07-19T05:26:25.758Z AWS::EC2::SubnetRouteTableAssociation CREATE_IN_PROGRESS
myCFPublicRoute-CREATE_COMPLETE-2017-07-19T05:26:25.509Z             AWS::EC2::Route                      CREATE_COMPLETE
myCFSubnetRouteTableAssociation2-CREATE_IN_PROGRESS-2017-07-19T05:26:25.156Z AWS::EC2::SubnetRouteTableAssociation CREATE_IN_PROGRESS
myCFNat-CREATE_IN_PROGRESS-2017-07-19T05:26:24.745Z                  AWS::EC2::NatGateway                 CREATE_IN_PROGRESS
myCFSubnetRouteTableAssociation1-CREATE_IN_PROGRESS-2017-07-19T05:26:24.717Z AWS::EC2::SubnetRouteTableAssociation CREATE_IN_PROGRESS
myCFSubnetRouteTableAssociation4-CREATE_IN_PROGRESS-2017-07-19T05:26:24.577Z AWS::EC2::SubnetRouteTableAssociation CREATE_IN_PROGRESS
myCFSubnetRouteTableAssociation3-CREATE_IN_PROGRESS-2017-07-19T05:26:24.413Z AWS::EC2::SubnetRouteTableAssociation CREATE_IN_PROGRESS
myCFNat-CREATE_IN_PROGRESS-2017-07-19T05:26:24.086Z                  AWS::EC2::NatGateway                 CREATE_IN_PROGRESS
myCFSubnetRouteTableAssociation3-CREATE_IN_PROGRESS-2017-07-19T05:26:23.464Z AWS::EC2::SubnetRouteTableAssociation CREATE_IN_PROGRESS
myCFSubnetRouteTableAssociation4-CREATE_IN_PROGRESS-2017-07-19T05:26:23.442Z AWS::EC2::SubnetRouteTableAssociation CREATE_IN_PROGRESS
```

```
PS C:\> (Get-CFNStack -StackName myVpcStack).Outputs

Description            OutputKey           OutputValue
-----------            ---------           -----------
VPC Id                 myCFVPCId           vpc-b3d3b6ca
Private Subnet 1 Id    CFPrivate1Id        subnet-ee9f02c2
Private Subnet 2 Id    CFPrivate2Id        subnet-bd2470f5
Public Subnet 2 Id     CFPublic2Id         subnet-ac396de4
Public Subnet 1 Id     CFPublic1Id         subnet-c89e03e4
Security Group for VPC myCFSecurityGroupId sg-15d58564
```

```
PS C:\> Get-CFNExport

ExportingStackId                                                                                                Name                 Value
----------------                                                                                                ----                 -----
arn:aws:cloudformation:us-east-1:072316406132:stack/myVpcStack/b24bc180-6c42-11e7-bd57-500c2855d8d1 exCFPrivate1SubnetId subnet-ee9f02c2
arn:aws:cloudformation:us-east-1:072316406132:stack/myVpcStack/b24bc180-6c42-11e7-bd57-500c2855d8d1 exCFPrivate2SubnetId subnet-bd2470f5
arn:aws:cloudformation:us-east-1:072316406132:stack/myVpcStack/b24bc180-6c42-11e7-bd57-500c2855d8d1 exCFPublic1SubnetId  subnet-c89e03e4
arn:aws:cloudformation:us-east-1:072316406132:stack/myVpcStack/b24bc180-6c42-11e7-bd57-500c2855d8d1 exCFPublic2SubnetId  subnet-ac396de4
arn:aws:cloudformation:us-east-1:072316406132:stack/myVpcStack/b24bc180-6c42-11e7-bd57-500c2855d8d1 exCFSecurityGroupId  sg-15d58564
arn:aws:cloudformation:us-east-1:072316406132:stack/myVpcStack/b24bc180-6c42-11e7-bd57-500c2855d8d1 exmyCFVPC            vpc-b3d3b6ca
```

```
---
AWSTemplateFormatVersion: "2010-09-09"
Description: Creating EC2 Instance using CloudFormation
Parameters:
  myAMIId:
    Description: My AMI Id
    Type: String
  InstanceType:
    Type: String
    Default: t2.large
    AllowedValues:
      - t2.nano
      - t2.micro
      - t2.small
      - t2.large
Resources:
  MyEc2Instance:
    Type: AWS::EC2::Instance
    Properties:
      ImageId:
        Ref: myAMIId
      InstanceType:
        Ref: InstanceType
      KeyName: MyWebPressApp
      NetworkInterfaces:
        - AssociatePublicIpAddress: "true"
          DeviceIndex: "0"
          GroupSet:
            - !ImportValue 'exCFSecurityGroupId'
          SubnetId: !ImportValue 'exCFPublic1SubnetId'
      UserData:
        Fn::Base64: |
          #! /bin/bash -xe
          yum install nginx -y
          sudo service nginx start
Outputs:
  MyEC2InstancePublicIP:
    Description: My EC2 Instance Public IP
    Value: !GetAtt MyEc2Instance.PublicIp
  MyEC2InstanceID:
    Description: My EC2 Instance ID
    Value: !Ref MyEc2Instance
```

```
PS C:\> $ec2stack=(Get-Content -Raw D:\scripts\EC2AppServer.txt)
PS C:\> Test-CFNTemplate -TemplateBody $ec2stack


Capabilities       : {}
CapabilitiesReason :
DeclaredTransforms : {}
Description        : Creating EC2 Instance using CloudFormation
Parameters         : {myAMIId, InstanceType}
```

```
PS C:\> $p1 = New-Object -Type Amazon.CloudFormation.Model.Parameter
PS C:\> $p1.ParameterKey = "myAMIId"
PS C:\> $p1.ParameterValue = "ami-a4c7edb2"
PS C:\> $p2 = New-Object -Type Amazon.CloudFormation.Model.Parameter
PS C:\> $p2.ParameterKey = "InstanceType"
PS C:\> $p2.ParameterValue = "t2.large"
PS C:\> New-CFNStack -StackName EC2AppServer -TemplateBody $ec2stack -Parameter @($p1,$p2) -OnFailure "ROLLBACK"
arn:aws:cloudformation:us-east-1:072316406132:stack/EC2AppServer/30507b50-6c4a-11e7-954a-500c28604c82
```

```
PS C:\> Get-CFNStackEvent -StackName EC2AppServer|Format-Table EventId,ResourceType,ResourceStatus

EventId                                                ResourceType                ResourceStatus
-------                                                ------------                --------------
3b145f20-6c4a-11e7-be2a-500c28b4e461                   AWS::CloudFormation::Stack CREATE_COMPLETE
MyEc2Instance-CREATE_COMPLETE-2017-07-19T06:19:30.509Z AWS::EC2::Instance          CREATE_COMPLETE
MyEc2Instance-CREATE_IN_PROGRESS-2017-07-19T06:19:21.058Z AWS::EC2::Instance       CREATE_IN_PROGRESS
MyEc2Instance-CREATE_IN_PROGRESS-2017-07-19T06:19:19.529Z AWS::EC2::Instance       CREATE_IN_PROGRESS
3051b3d0-6c4a-11e7-954a-500c28604c82                   AWS::CloudFormation::Stack CREATE_IN_PROGRESS
```

```
PS C:\> (Get-CFNStack -StackName EC2AppServer).Outputs

Description                OutputKey              OutputValue
-----------                ---------              -----------
My EC2 Instance Public IP MyEC2InstancePublicIP 107.22.53.9
My EC2 Instance ID         MyEC2InstanceID        i-0b01a6ffdd9172756
```

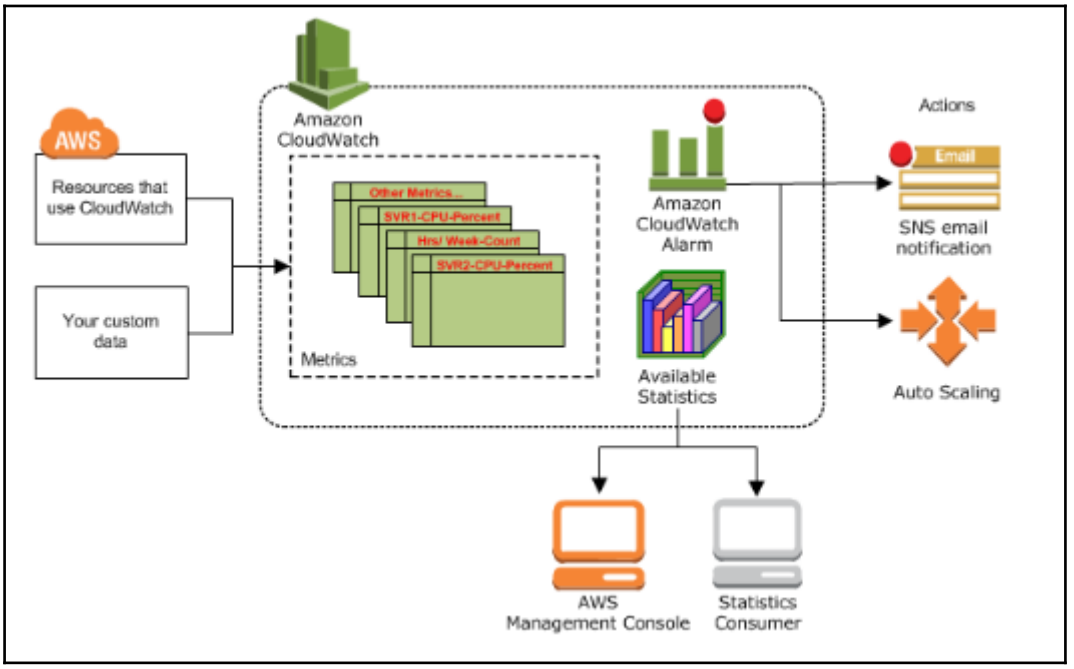

```
PS C:\> Invoke-Webrequest 107.22.53.9


StatusCode        : 200
StatusDescription : OK
Content           : <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN" "http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">
```

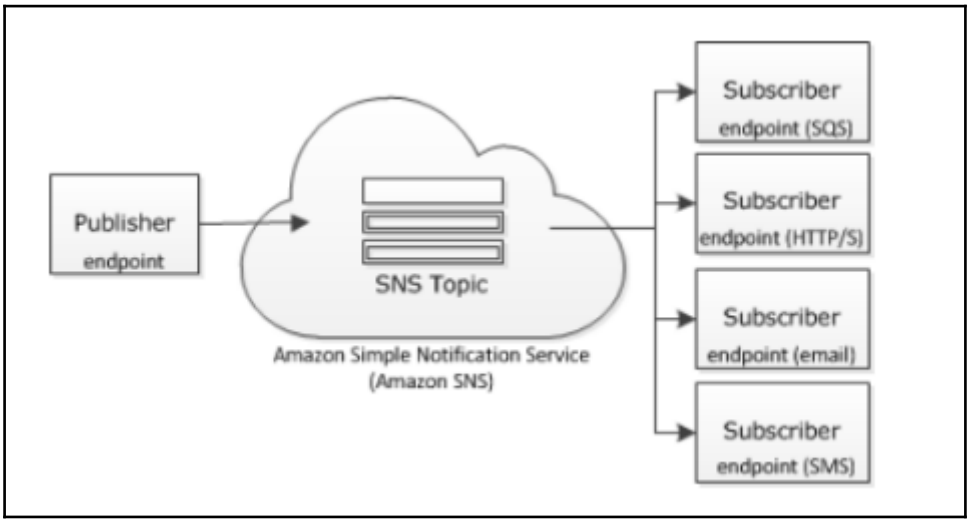
```
---
AWSTemplateFormatVersion: "2010-09-09"
Description: Demo of nested stack template
Resources:
  ChildStack01:
    Type: AWS::CloudFormation::Stack
    Properties: "https://s3.amazonaws.com/cloudformation-templates-us-east-1/myVPC.template"
    TimeoutInMinutes: 60
  ChildStack02:
    Type: AWS::CloudFormation::Stack
    Properties: "https://s3.amazonaws.com/cloudformation-templates-us-east-1/mySubnets.template"
    TimeoutInMinutes: 60
    Parameters:
      VpcID: Fn::GetAtt : [ "ChildStack01", "Outputs.VpcID" ]

Outputs:
  StackRef:
    value:
      Ref: ChildStack02
  OutputFromNestedStack:
    value:
      Fn::GetAtt: [ "ChildStack02", "Outputs.SubnetID" ]
```

```
{
 "Statement"    :[
  {
        "Effect":"Allow",
        "Action":"Update:*",
        "Principal":"*",
        "Resource":"*"
  },
  {
        "Effect":"Deny",
        "Action":"Update:*",
        "Principal":"*",
        "Resource":"LogicalResourceId/EC2Instance"
  }
 ]
}
```

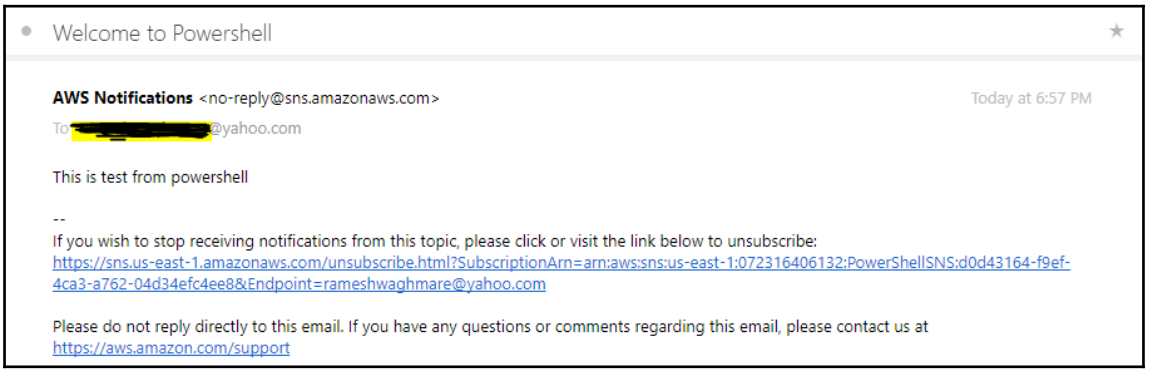
```
PS C:\> Remove-CFNStack -StackName EC2AppServer

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-CFNStack (DeleteStack)" on target "EC2AppServer".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
PS C:\>
PS C:\> Get-CFNStackEvent -StackName EC2AppServer|Format-Table EventId,ResourceType,ResourceStatus

EventId                                              ResourceType                ResourceStatus
-------                                              ------------                --------------
MyEc2Instance-DELETE_IN_PROGRESS-2017-07-19T11:16:09.666Z AWS::EC2::Instance         DELETE_IN_PROGRESS
a91a2030-6c73-11e7-ba18-500c217b26c6                 AWS::CloudFormation::Stack DELETE_IN_PROGRESS
3b145f20-6c4a-11e7-be2a-500c28b4e461                 AWS::CloudFormation::Stack CREATE_COMPLETE
MyEc2Instance-CREATE_COMPLETE-2017-07-19T06:19:30.509Z    AWS::EC2::Instance         CREATE_COMPLETE
MyEc2Instance-CREATE_IN_PROGRESS-2017-07-19T06:19:21.058Z AWS::EC2::Instance         CREATE_IN_PROGRESS
MyEc2Instance-CREATE_IN_PROGRESS-2017-07-19T06:19:19.529Z AWS::EC2::Instance         CREATE_IN_PROGRESS
3051b3d0-6c4a-11e7-954a-500c28604c82                 AWS::CloudFormation::Stack CREATE_IN_PROGRESS
```

Chapter 15: AWS CloudWatch





```
PS C:\> New-SNSTopic -Name PowerShellSNS
arn:aws:sns:us-east-1:072316406132:PowerShellSNS
PS C:\>
PS C:\> New-SNSTopic -Name PowerShellSNS
arn:aws:sns:us-east-1:072316406132:PowerShellSNS
PS C:\>
```



```
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.DimensionFilter
PS C:\> $p1.Name = "InstanceId"
PS C:\> $p1.Value = "i-09ca5e201782643e7"
PS C:\> Get-CWMetricList -Namespace "AWS/EC2" -Dimension $p1

Dimensions   MetricName                Namespace
----------   ----------                ---------
{InstanceId} StatusCheckFailed_System  AWS/EC2
{InstanceId} DiskWriteBytes            AWS/EC2
{InstanceId} DiskWriteOps              AWS/EC2
{InstanceId} NetworkPacketsIn          AWS/EC2
{InstanceId} NetworkIn                 AWS/EC2
{InstanceId} DiskReadOps               AWS/EC2
{InstanceId} StatusCheckFailed         AWS/EC2
{InstanceId} DiskReadBytes             AWS/EC2
{InstanceId} NetworkOut                AWS/EC2
{InstanceId} NetworkPacketsOut         AWS/EC2
{InstanceId} CPUCreditUsage            AWS/EC2
{InstanceId} CPUCreditBalance          AWS/EC2
{InstanceId} CPUUtilization            AWS/EC2
{InstanceId} StatusCheckFailed_Instance AWS/EC2
```

```
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.DimensionFilter
PS C:\> $p1.Name = "InstanceId"
PS C:\> $p1.Value = "i-09ca5e201782643e7"
PS C:\> $p2 = New-Object Amazon.CloudWatch.Model.DimensionFilter
PS C:\> $p2.Name = "MetricName"
PS C:\> $p2.Value = "CPUUtilization"
PS C:\> Get-CWMetricList -Namespace "AWS/EC2" -Dimension $p1,$p2

Dimensions   MetricName     Namespace
----------   ----------     ---------
{InstanceId} CPUUtilization AWS/EC2
```

```
PS C:\> $powershellsns="arn:aws:sns:us-east-1:072316406132:PowerShellSNS"
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p1.Name = "InstanceId"
PS C:\> $p1.Value = "i-09ca5e201782643e7"
PS C:\> $p2 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p2.Name = "MetricName"
PS C:\> $p2.Value = "CPUUtilization"
PS C:\> Write-CWMetricAlarm -Namespace "AWS/EC2" -MetricName "CPUUtilization" -AlarmName "WebAppServerCPU" `
>> -AlarmDescription "Alarm for WebApp CPU" -AlarmAction $powershellsns -Dimension $p1 -EvaluationPeriod 1 `
>> -Statistic "Average" -Threshold 50 -Period 300 -ComparisonOperator "GreaterThanOrEqualToThreshold"
PS C:\>
```

```
PS C:\> Get-CWAlarm |Format-Table AlarmName,MetricName,StateValue, ActionsEnabled

AlarmName       MetricName     StateValue        ActionsEnabled
---------       ----------     ----------        --------------
WebAppServerCPU CPUUtilization INSUFFICIENT_DATA           True
```

```
PS C:\> $powershellsns="arn:aws:sns:us-east-1:072316406132:PowerShellSNS"
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p1.Name = "InstanceId"
PS C:\> $p1.Value = "i-09ca5e201782643e7"
PS C:\> $p2 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p2.Name = "MetricName"
PS C:\> $p2.Value = "StatusCheckFailed_Instance"
PS C:\> Write-CWMetricAlarm -Namespace "AWS/EC2" -MetricName "StatusCheckFailed_Instance" `
>> -AlarmName "WebAppServerInstanceSysChk" -AlarmDescription "Alarm for Instance Status Check" `
>> -AlarmAction $powershellsns -Dimension $p1 -EvaluationPeriod 1 -Statistic "Average" `
>> -Threshold 1 -Period 300 -ComparisonOperator "GreaterThanOrEqualToThreshold"
PS C:\>
PS C:\> $powershellsns="arn:aws:sns:us-east-1:072316406132:PowerShellSNS"
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p1.Name = "InstanceId"
PS C:\> $p1.Value = "i-09ca5e201782643e7"
PS C:\> $p2 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p2.Name = "MetricName"
PS C:\> $p2.Value = "StatusCheckFailed_System"
PS C:\> Write-CWMetricAlarm -Namespace "AWS/EC2" -MetricName "StatusCheckFailed_System" `
>> -AlarmName "WebAppServerSystemSysChk" -AlarmDescription "Alarm for System Status Check" `
>> -AlarmAction $powershellsns -Dimension $p1 -EvaluationPeriod 1 -Statistic "Average" `
>> -Threshold 1 -Period 300 -ComparisonOperator "GreaterThanOrEqualToThreshold"
PS C:\>
```

```
PS C:\> Disable-CWAlarmAction -AlarmName "WebAppServerCPU"
PS C:\>
PS C:\> Get-CWAlarm |Format-Table AlarmName,MetricName,StateValue, ActionsEnabled

AlarmName                  MetricName                 StateValue        ActionsEnabled
---------                  ----------                 ----------        --------------
WebAppServerCPU            CPUUtilization             INSUFFICIENT_DATA          False
WebAppServerInstanceSysChk StatusCheckFailed_Instance INSUFFICIENT_DATA           True
WebAppServerSystemSysChk   StatusCheckFailed_System   INSUFFICIENT_DATA           True


PS C:\> Enable-CWAlarmAction -AlarmName "WebAppServerCPU"
PS C:\>
PS C:\> Get-CWAlarm |Format-Table AlarmName,MetricName,StateValue, ActionsEnabled

AlarmName                  MetricName                 StateValue        ActionsEnabled
---------                  ----------                 ----------        --------------
WebAppServerCPU            CPUUtilization             INSUFFICIENT_DATA           True
WebAppServerInstanceSysChk StatusCheckFailed_Instance INSUFFICIENT_DATA           True
WebAppServerSystemSysChk   StatusCheckFailed_System   INSUFFICIENT_DATA           True
```

```
[root@ip-10-0-2-158 aws-scripts-mon]# ./mon-put-instance-data.pl --mem-util --mem-used --mem-avail --swap-util \
> --swap-used --disk-path=/ --disk-space-util --disk-space-used --disk-space-avail

Successfully reported metrics to CloudWatch. Reference Id: a816f47e-6d4f-11e7-b707-119735027c55
```

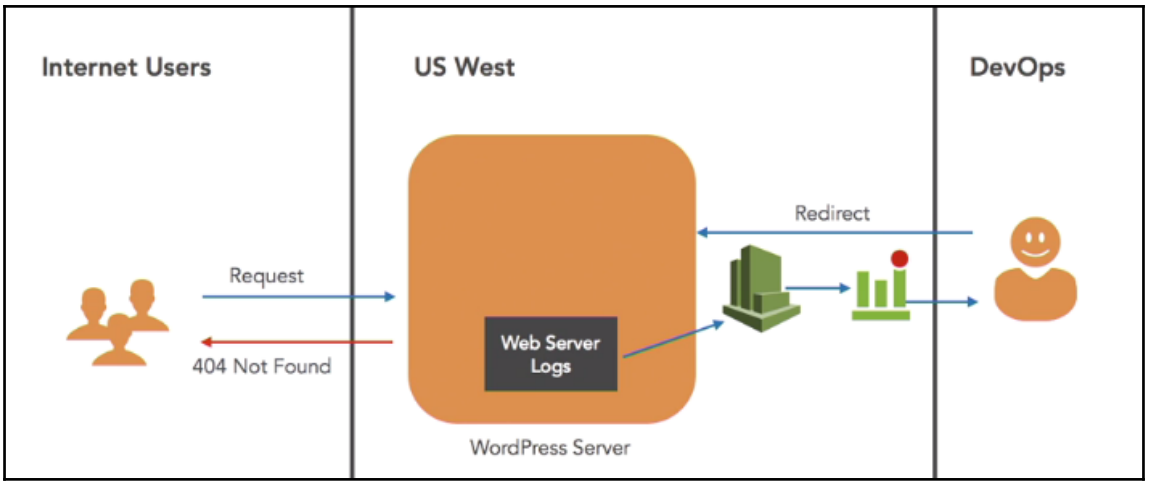
```
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.DimensionFilter
PS C:\> $p1.Name = "InstanceId"
PS C:\> $p1.Value = "i-09ca5e201782643e7"
PS C:\> Get-CWMetricList -Dimension $p1

Dimensions                                MetricName                Namespace
----------                                ----------                ---------
{InstanceId}                              NetworkPacketsIn          AWS/EC2
{InstanceId}                              NetworkIn                 AWS/EC2
{InstanceId}                              DiskWriteBytes            AWS/EC2
{InstanceId}                              NetworkPacketsOut         AWS/EC2
{InstanceId}                              NetworkOut                AWS/EC2
{InstanceId}                              DiskReadBytes             AWS/EC2
{InstanceId}                              StatusCheckFailed         AWS/EC2
{InstanceId}                              DiskReadOps               AWS/EC2
{InstanceId}                              CPUCreditBalance          AWS/EC2
{InstanceId}                              CPUUtilization            AWS/EC2
{InstanceId}                              StatusCheckFailed_Instance AWS/EC2
{InstanceId}                              DiskWriteOps              AWS/EC2
{InstanceId}                              StatusCheckFailed_System  AWS/EC2
{InstanceId}                              CPUCreditUsage            AWS/EC2
{InstanceId}                              SwapUtilization           System/Linux
{InstanceId}                              SwapUsed                  System/Linux
{InstanceId}                              MemoryUsed                System/Linux
{InstanceId}                              MemoryUtilization         System/Linux
{InstanceId}                              MemoryAvailable           System/Linux
{MountPath, InstanceId, Filesystem}       DiskSpaceUtilization      System/Linux
{MountPath, InstanceId, Filesystem}       DiskSpaceAvailable        System/Linux
{MountPath, InstanceId, Filesystem}       DiskSpaceUsed             System/Linux
```

```
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.DimensionFilter
PS C:\> $p1.Name = "InstanceId"
PS C:\> $p1.Value = "i-09ca5e201782643e7"
PS C:\> Get-CWMetricList -Namespace "System/Linux" -Dimension $p1

Dimensions                                  MetricName           Namespace
----------                                  ----------           ---------
{InstanceId}                                MemoryUsed           System/Linux
{InstanceId}                                MemoryUtilization    System/Linux
{InstanceId}                                MemoryAvailable      System/Linux
{InstanceId}                                SwapUtilization      System/Linux
{InstanceId}                                SwapUsed             System/Linux
{MountPath, InstanceId, Filesystem} DiskSpaceUtilization System/Linux
{MountPath, InstanceId, Filesystem} DiskSpaceAvailable   System/Linux
{MountPath, InstanceId, Filesystem} DiskSpaceUsed        System/Linux
```

```
PS C:\> $powershellsns="arn:aws:sns:us-east-1:072316406132:PowerShellSNS"
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p1.Name = "InstanceId"
PS C:\> $p1.Value = "i-09ca5e201782643e7"
PS C:\> Write-CWMetricAlarm -Namespace "System/Linux" -MetricName "SwapUtilization" `
>> -AlarmName "WebAppServerSwapUtil" -AlarmDescription "Alarm for Swap Check Check" `
>> -AlarmAction $powershellsns -Dimension $p1 -EvaluationPeriod 1 -Statistic "Average" `
>> -Threshold 60 -Period 300 -ComparisonOperator "GreaterThanOrEqualToThreshold"
PS C:\> Get-CWAlarm |Format-Table AlarmName,MetricName,StateValue, ActionsEnabled

AlarmName                  MetricName                StateValue         ActionsEnabled
---------                  ----------                ----------         --------------
WebAppServerCPU            CPUUtilization            OK                           True
WebAppServerInstanceSysChk StatusCheckFailed_Instance OK                          True
WebAppServerSwapUtil       SwapUtilization           INSUFFICIENT_DATA            True
WebAppServerSystemSysChk   StatusCheckFailed_System  OK                           True
```

```
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.DimensionFilter
PS C:\> $p1.Name = "DBInstanceIdentifier"
PS C:\> $p1.Value = "mywebappprd"
PS C:\> Get-CWMetricList -Namespace "AWS/RDS" -Dimension $p1

Dimensions              MetricName                Namespace
----------              ----------                ---------
{DBInstanceIdentifier} DatabaseConnections       AWS/RDS
{DBInstanceIdentifier} CPUCreditUsage            AWS/RDS
{DBInstanceIdentifier} WriteLatency              AWS/RDS
{DBInstanceIdentifier} CPUCreditBalance          AWS/RDS
{DBInstanceIdentifier} ReadIOPS                  AWS/RDS
{DBInstanceIdentifier} NetworkTransmitThroughput AWS/RDS
{DBInstanceIdentifier} WriteThroughput           AWS/RDS
{DBInstanceIdentifier} SwapUsage                 AWS/RDS
{DBInstanceIdentifier} CPUUtilization            AWS/RDS
{DBInstanceIdentifier} FreeStorageSpace          AWS/RDS
{DBInstanceIdentifier} WriteIOPS                 AWS/RDS
{DBInstanceIdentifier} FreeableMemory            AWS/RDS
{DBInstanceIdentifier} ReadThroughput            AWS/RDS
{DBInstanceIdentifier} NetworkReceiveThroughput  AWS/RDS
{DBInstanceIdentifier} ReadLatency               AWS/RDS
{DBInstanceIdentifier} BurstBalance              AWS/RDS
{DBInstanceIdentifier} DiskQueueDepth            AWS/RDS
{DBInstanceIdentifier} BinLogDiskUsage           AWS/RDS
```

```
PS C:\> $powershellsns="arn:aws:sns:us-east-1:072316406132:PowerShellSNS"
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p1.Name = "DBInstanceIdentifier"
PS C:\> $p1.Value = "mywebappprd"
PS C:\> Write-CWMetricAlarm -Namespace "AWS/RDS" -MetricName "CPUUtilization" `
>> -AlarmName "RDSmywebappprdCPUUtil" -AlarmDescription "Alarm for RDS CPU Check" `
>> -AlarmAction $powershellsns -Dimension $p1 -EvaluationPeriod 1 -Statistic "Average" `
>> -Threshold 80 -Period 300 -ComparisonOperator "GreaterThanOrEqualToThreshold"
PS C:\>
PS C:\> $powershellsns="arn:aws:sns:us-east-1:072316406132:PowerShellSNS"
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p1.Name = "DBInstanceIdentifier"
PS C:\> $p1.Value = "mywebappprd"
PS C:\> Write-CWMetricAlarm -Namespace "AWS/RDS" -MetricName "FreeStorageSpace" `
>> -AlarmName "RDSmywebappprdCPUUtil" -AlarmDescription "Alarm for free storage for RDS" `
>> -AlarmAction $powershellsns -Dimension $p1 -EvaluationPeriod 1 -Statistic "Average" `
>> -Threshold 80 -Period 300 -ComparisonOperator "LessThanOrEqualToThreshold"
PS C:\>
```




```
[/var/log/messages]
datetime_format = %b %d %H:%M:%S
file = /var/log/messages
buffer_duration = 5000
log_stream_name = {instance_id}
initial_position = start_of_file
log_group_name = /var/log/messages
```

```
[/var/log/messages]
datetime_format = %b %d %H:%M:%S
file = /var/log/messages
buffer_duration = 5000
log_stream_name = {instance_id}
initial_position = start_of_file
log_group_name = /var/log/messages

[/var/log/httpd/access_log]
datetime_format = %b %d %H:%M:%S
file = /var/log/httpd/access_log
buffer_duration = 5000
log_stream_name = {instance_id}
initial_position = start_of_file
log_group_name = MyWebServerApp
```

```
PS C:\> Get-CWLLogGroup


Arn                : arn:aws:logs:us-east-1:072316406132:log-group:/var/log/messages:*
CreationTime       : 5/27/2016 9:13:56 AM
LogGroupName       : /var/log/messages
MetricFilterCount  : 0
RetentionInDays    :
StoredBytes        : 7916696

Arn                : arn:aws:logs:us-east-1:072316406132:log-group:MyWebServerApp:*
CreationTime       : 7/21/2017 8:36:35 AM
LogGroupName       : MyWebServerApp
MetricFilterCount  : 0
RetentionInDays    :
StoredBytes        : 0
```

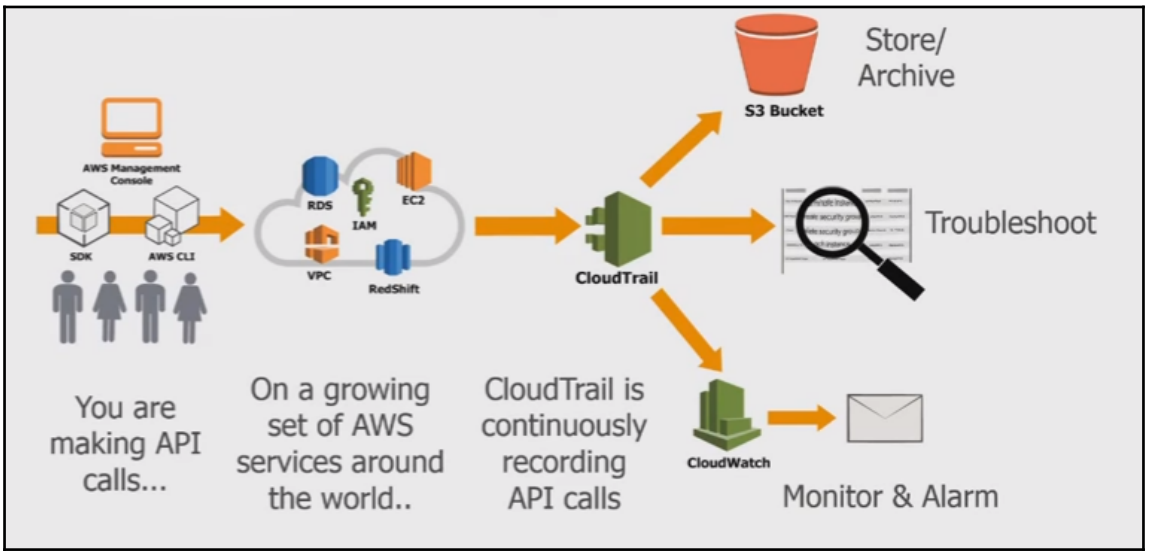
```
PS C:\> Get-CWLLogStream -LogGroupName MyWebServerApp


Arn                 : arn:aws:logs:us-east-1:072316406132:log-group:MyWebServerApp:log-stream:i-09ca5e201782643e7
CreationTime        : 7/21/2017 8:36:36 AM
FirstEventTimestamp : 7/21/2017 8:36:34 AM
LastEventTimestamp  : 7/21/2017 9:19:49 AM
LastIngestionTime   : 7/21/2017 9:19:55 AM
LogStreamName       : i-09ca5e201782643e7
StoredBytes         : 0
UploadSequenceToken : 495678492140046093751721395357620706595013647712932835 70
```

```
PS C:\> (Get-CWLLogEvent  -LogGroupName MyWebServerApp -LogStreamName i-09ca5e201782643e7).Events

IngestionTime        Message
-------------        -------
7/21/2017 8:36:36 AM 202.161.5.17 - - [21/Jul/2017:08:34:57 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 8:36:36 AM 202.161.5.17 - - [21/Jul/2017:08:34:59 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 8:36:36 AM 202.161.5.17 - - [21/Jul/2017:08:35:01 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 8:48:23 AM 202.161.5.17 - - [21/Jul/2017:08:48:17 +0000] "GET /sample.php HTTP/1.1" 404 287 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) Appl...
7/21/2017 9:11:33 AM 202.161.5.17 - - [21/Jul/2017:09:11:27 +0000] "GET /sample.php HTTP/1.1" 404 287 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) Appl...
7/21/2017 9:11:33 AM 202.161.5.17 - - [21/Jul/2017:09:11:29 +0000] "GET /sample.php HTTP/1.1" 404 287 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) Appl...
7/21/2017 9:11:41 AM 202.161.5.17 - - [21/Jul/2017:09:11:36 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:11:41 AM 202.161.5.17 - - [21/Jul/2017:09:11:38 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:11:46 AM 202.161.5.17 - - [21/Jul/2017:09:11:40 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:11:46 AM 202.161.5.17 - - [21/Jul/2017:09:11:42 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:16:19 AM 202.161.5.17 - - [21/Jul/2017:09:16:13 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:16:19 AM 202.161.5.17 - - [21/Jul/2017:09:16:15 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:16:19 AM 202.161.5.17 - - [21/Jul/2017:09:16:17 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:16:39 AM 202.161.5.17 - - [21/Jul/2017:09:16:33 +0000] "GET /sample.php HTTP/1.1" 404 287 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) Appl...
7/21/2017 9:16:39 AM 202.161.5.17 - - [21/Jul/2017:09:16:35 +0000] "GET /sample.php HTTP/1.1" 404 287 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) Appl...
7/21/2017 9:19:45 AM 202.161.5.17 - - [21/Jul/2017:09:19:39 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:45 AM 202.161.5.17 - - [21/Jul/2017:09:19:41 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:45 AM 202.161.5.17 - - [21/Jul/2017:09:19:43 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:50 AM 202.161.5.17 - - [21/Jul/2017:09:19:43 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:50 AM 202.161.5.17 - - [21/Jul/2017:09:19:44 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:50 AM 202.161.5.17 - - [21/Jul/2017:09:19:45 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:50 AM 202.161.5.17 - - [21/Jul/2017:09:19:45 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:50 AM 202.161.5.17 - - [21/Jul/2017:09:19:46 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:50 AM 202.161.5.17 - - [21/Jul/2017:09:19:47 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:50 AM 202.161.5.17 - - [21/Jul/2017:09:19:47 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:50 AM 202.161.5.17 - - [21/Jul/2017:09:19:48 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
7/21/2017 9:19:55 AM 202.161.5.17 - - [21/Jul/2017:09:19:48 +0000] "GET / HTTP/1.1" 403 3839 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/5...
```

```
PS C:\> $p1 = New-Object Amazon.CloudWatchLogs.Model.MetricTransformation
PS C:\> $p1.MetricName="web404"
PS C:\> $p1.MetricNamespace="webserver"
PS C:\> $p1.MetricValue=1
PS C:\> Write-CWLMetricFilter -LogGroupName MyWebServerApp -FilterName "404_MyWebServerApp" -FilterPattern 404 -MetricTransformation $p1
```

```
PS C:\> $powershellsns="arn:aws:sns:us-east-1:072316406132:PowerShellSNS"
PS C:\> $p1 = New-Object Amazon.CloudWatch.Model.Dimension
PS C:\> $p1.Name = "WebError404"
PS C:\> $p1.Value = "web404"
PS C:\> Write-CWMetricAlarm -Namespace "webserver" -MetricName "web404" `
>> -AlarmName "WebSever404" -AlarmDescription "Alarm for 404 error for web server" `
>> -AlarmAction $powershellsns -Dimension $p1 -EvaluationPeriod 1 -Statistic "Average" `
>> -Threshold 1 -Period 300 -ComparisonOperator "GreaterThanOrEqualToThreshold"
```

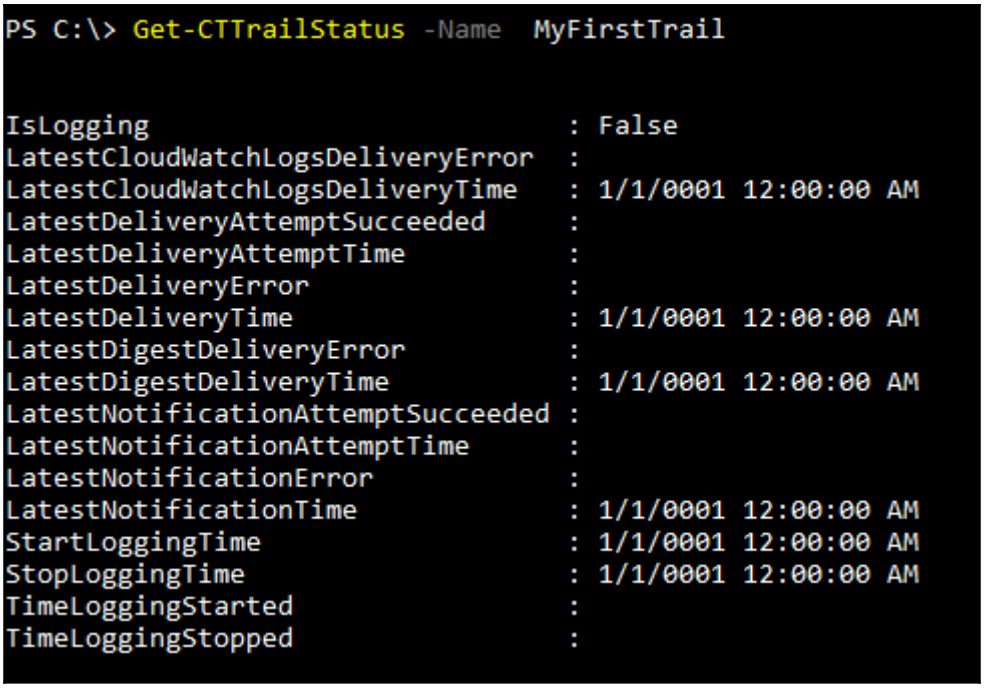
Chapter 16: AWS Resource Auditing

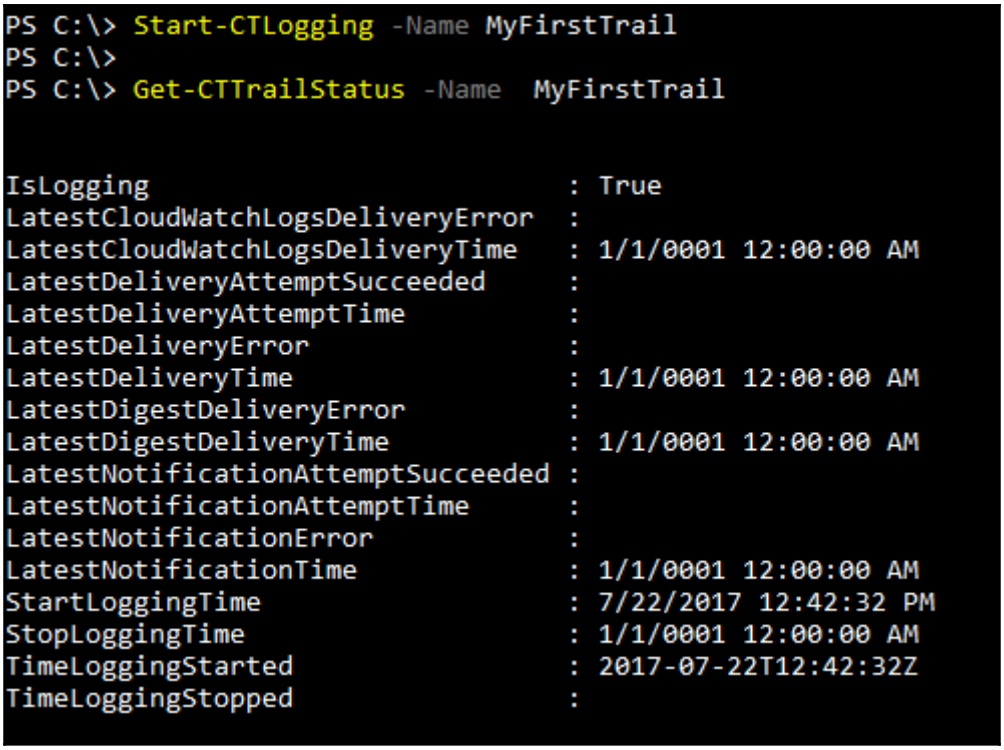


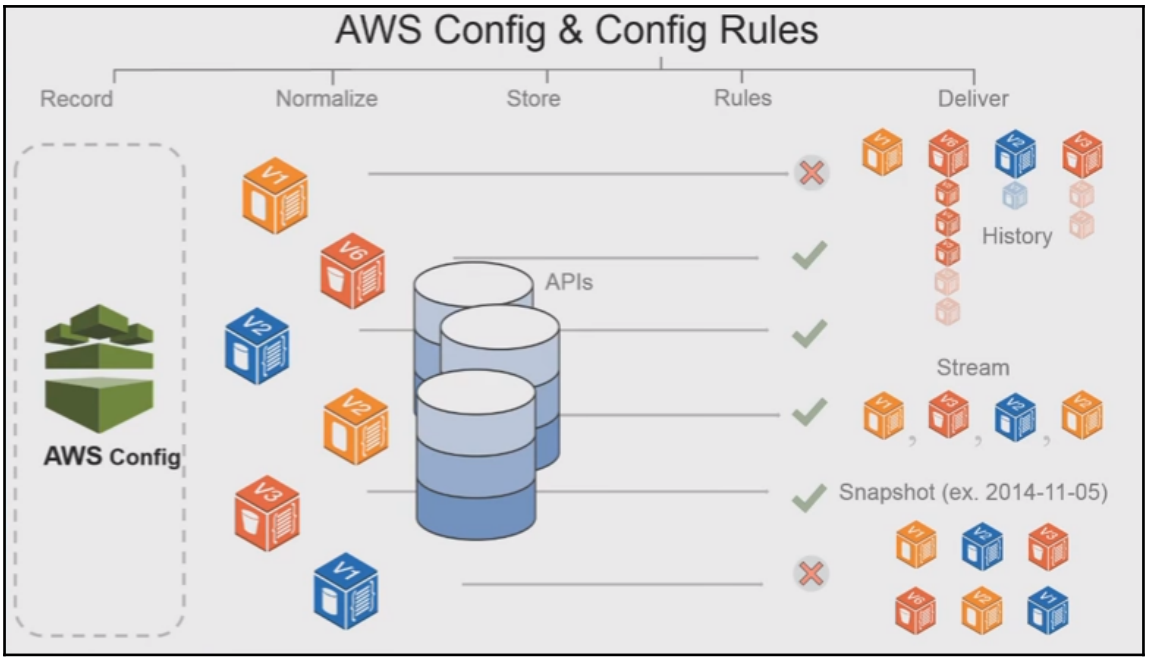
AWS access key	AKIAIVQ7QQR7ISZUBY2A	**Event source**	monitoring.amazonaws.com
AWS region	us-east-1	**Event time**	2017-07-21, 07:18:35 PM
Error code		**Request ID**	927314fa-6df5-11e7-898f-3527badd2291
Event ID	4cad45f1-b0a0-4302-9b22-991f0e9698e1	**Source IP address**	202.161.5.17
Event name	PutMetricAlarm	**User name**	awsadmin

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "AWSCloudTrailAclCheck20150319",
            "Effect": "Allow",
            "Principal": {
                "Service": "cloudtrail.amazonaws.com"
            },
            "Action": "s3:GetBucketAcl",
            "Resource": "arn:aws:s3:::myenterpriseawslog"
        },
        {
            "Sid": "AWSCloudTrailWrite20150319",
            "Effect": "Allow",
            "Principal": {
                "Service": "cloudtrail.amazonaws.com"
            },
            "Action": "s3:PutObject",
            "Resource": "arn:aws:s3:::myenterpriseawslog/powershell/AWSLogs/<account_number>/*",
            "Condition": {
                "StringEquals": {
                    "s3:x-amz-acl": "bucket-owner-full-control"
                }
            }
        }
    ]
}
```

```
PS C:\> New-CTTrail -Name MyFirstTrail -S3BucketName myenterpriseawslog -S3KeyPrefix powershell `
>> -EnableLogFileValidation $true -IncludeGlobalServiceEvent $true -IsMultiRegionTrail $true


CloudWatchLogsLogGroupArn  :
CloudWatchLogsRoleArn      :
IncludeGlobalServiceEvents : True
IsMultiRegionTrail         : True
KmsKeyId                   :
LogFileValidationEnabled   : True
Name                       : MyFirstTrail
S3BucketName               : myenterpriseawslog
S3KeyPrefix                : powershell
SnsTopicARN                :
SnsTopicName               :
TrailARN                   : arn:aws:cloudtrail:us-east-1:072316406132:trail/MyFirstTrail
```


PS C:\> Get-CTTrailStatus -Name MyFirstTrail
IsLogging : False
LatestCloudWatchLogsDeliveryError :
LatestCloudWatchLogsDeliveryTime : 1/1/0001 12:00:00 AM
LatestDeliveryAttemptSucceeded :
LatestDeliveryAttemptTime :
LatestDeliveryError :
LatestDeliveryTime : 1/1/0001 12:00:00 AM
LatestDigestDeliveryError :
LatestDigestDeliveryTime : 1/1/0001 12:00:00 AM
LatestNotificationAttemptSucceeded :
LatestNotificationAttemptTime :
LatestNotificationError :
LatestNotificationTime : 1/1/0001 12:00:00 AM
StartLoggingTime : 1/1/0001 12:00:00 AM
StopLoggingTime : 1/1/0001 12:00:00 AM
TimeLoggingStarted :
TimeLoggingStopped :


PS C:\> Start-CTLogging -Name MyFirstTrail
PS C:\>
PS C:\> Get-CTTrailStatus -Name MyFirstTrail
IsLogging : True
LatestCloudWatchLogsDeliveryError :
LatestCloudWatchLogsDeliveryTime : 1/1/0001 12:00:00 AM
LatestDeliveryAttemptSucceeded :
LatestDeliveryAttemptTime :
LatestDeliveryError :
LatestDeliveryTime : 1/1/0001 12:00:00 AM
LatestDigestDeliveryError :
LatestDigestDeliveryTime : 1/1/0001 12:00:00 AM
LatestNotificationAttemptSucceeded :
LatestNotificationAttemptTime :
LatestNotificationError :
LatestNotificationTime : 1/1/0001 12:00:00 AM
StartLoggingTime : 7/22/2017 12:42:32 PM
StopLoggingTime : 1/1/0001 12:00:00 AM
TimeLoggingStarted : 2017-07-22T12:42:32Z
TimeLoggingStopped :




```
PS C:\> Write-CFGConfigurationRecorder -ConfigurationRecorderName "MyFirstConfigRecorder" `
>> -RecordingGroup_AllSupported $true `
>> -RecordingGroup_IncludeGlobalResourceType $true `
>> -ConfigurationRecorder_RoleARN "arn:aws:iam::072316406132:role/AWSConfig"
PS C:\>
```

```
PS C:\> Write-CFGDeliveryChannel -DeliveryChannelName "MyConfigDelivery" `
>> -ConfigSnapshotDeliveryProperties_DeliveryFrequency One_Hour `
>> -DeliveryChannel_S3BucketName "myaccountconfiglog" `
>> -DeliveryChannel_S3KeyPrefix powershelltest `
>> -DeliveryChannel_SnsTopicARN "arn:aws:sns:us-east-1:072316406132:PowerShellSNS"
PS C:\>
```

```
PS C:\> Get-CFGConfigurationRecorderStatus -ConfigurationRecorderName "MyFirstConfigRecorder"


LastErrorCode         :
LastErrorMessage      :
LastStartTime         : 1/1/0001 12:00:00 AM
LastStatus            :
LastStatusChangeTime  : 1/1/0001 12:00:00 AM
LastStopTime          : 1/1/0001 12:00:00 AM
Name                  : MyFirstConfigRecorder
Recording             : False
```

```
PS C:\> Start-CFGConfigurationRecorder -ConfigurationRecorderName "MyFirstConfigRecorder"
PS C:\> Get-CFGConfigurationRecorderStatus -ConfigurationRecorderName "MyFirstConfigRecorder"


LastErrorCode         :
LastErrorMessage      :
LastStartTime         : 7/23/2017 10:22:59 AM
LastStatus            : Pending
LastStatusChangeTime  : 7/23/2017 10:22:59 AM
LastStopTime          : 1/1/0001 12:00:00 AM
Name                  : MyFirstConfigRecorder
Recording             : True
```

```
PS C:\> Stop-CFGConfigurationRecorder -ConfigurationRecorderName "MyFirstConfigRecorder"
PS C:\> Remove-CFGDeliveryChannel -DeliveryChannelName "MyConfigDelivery"

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-CFGDeliveryChannel (DeleteDeliveryChannel)" on target "MyConfigDelivery".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
PS C:\> Remove-CFGConfigurationRecorder -ConfigurationRecorderName "MyFirstConfigRecorder"

Confirm
Are you sure you want to perform this action?
Performing the operation "Remove-CFGConfigurationRecorder (DeleteConfigurationRecorder)" on target "MyFirstConfigRecorder".
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): Y
PS C:\>
```