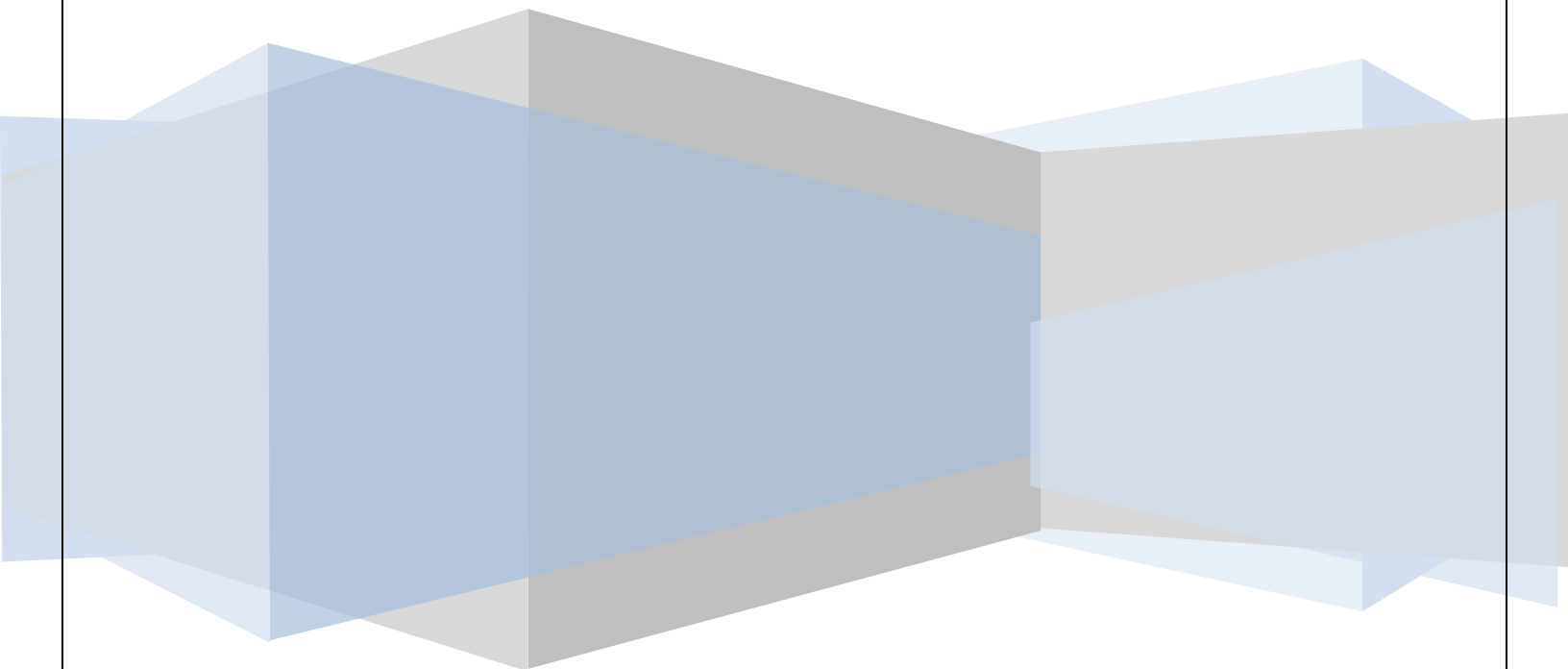




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AWS Cloud Training **AWS CLOUDFORMATION**

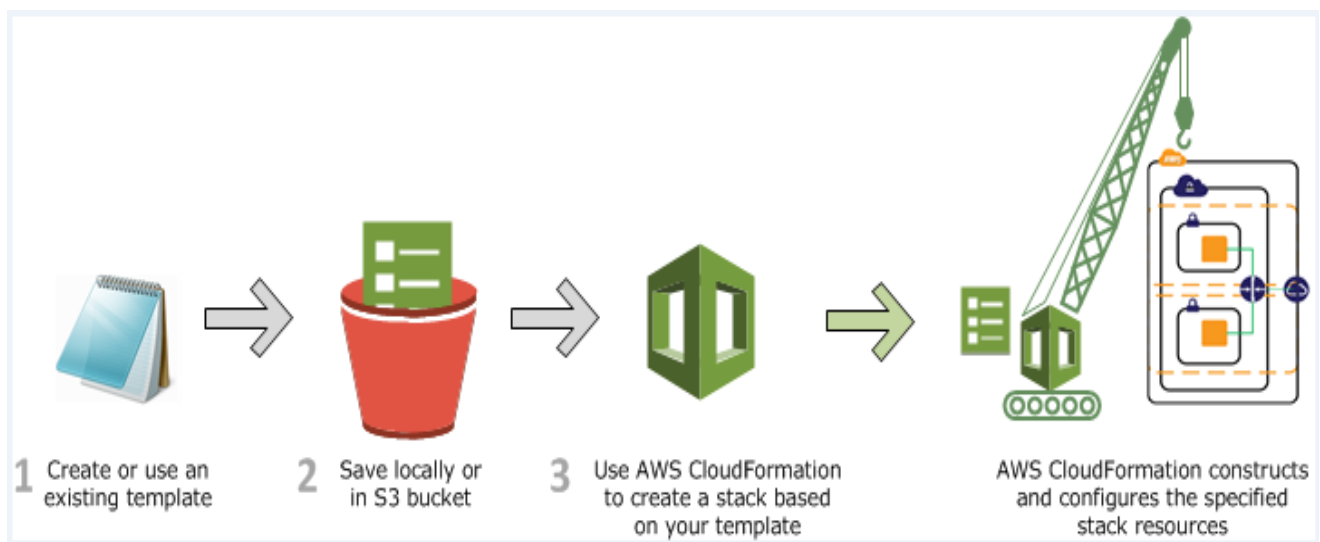


CLOUDFORMATION

AWS CloudFormation is a service that helps you model and set up your Amazon Web Services resources.

You create a template that describes all the AWS resources that you want (like Amazon EC2 instances or Amazon RDS DB instances), and AWS CloudFormation takes care of provisioning and configuring those resources for you.

You don't need to individually create and configure AWS resources and figure out what's dependent on what; AWS CloudFormation handles all of that.



Supported AWS Resources



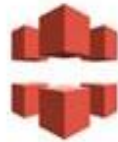
Auto scaling Group



AWS CloudFormation



Amazon EC2



CloudFront



CloudWatch



Amazon SQS



Elastic Load
Balancing



Amazon SNS



Amazon S3



Amazon RDS



DynamoDB



ElastiCache



Elastic Beanstalk



IAM



Amazon VPC



Amazon Route 53

AWS CLOUDFORMATION ANATOMY

```
{
  "AWSTemplateFormatVersion" : "version date",
  "Description" : "JSON string",
  "Parameters" : {
    set of parameters
  },
  "Mappings" : {
    set of mappings
  },
  "Conditions" : {
    set of conditions
  },
  "Resources" : {
    set of resources
  },
  "Outputs" : {
    set of outputs
  }
}
```

Format Version (optional)

Specifies the AWS CloudFormation template version that the template conforms to.

```
"AWSTemplateFormatVersion" : "2010-09-09"
```

Description (optional)

A text string that describes the template. This section must always follow the template format version section.

```
"Description" : "Test environment for Client B."
```

Parameters (optional)

Specifies values that you can pass in to your template at runtime (when you create or update a stack). You can refer to parameters in the Resources and Outputs sections of the template.

```
"Parameters" : {
  "DBPort" : {
    "Default" : "3306",
    "Description" : "TCP/IP port for the database",
    "Type" : "Number",
    "MinValue" : "1150",
    "MaxValue" : "65535"
  },
  "DBPwd" : {
    "NoEcho" : "true",
    "Description" : "The database admin account password",
    "Type" : "String",
    "MinLength" : "1",
    "MaxLength" : "41",
    "AllowedPattern" : "[a-zA-Z0-9]*"
  }
}
```

Mappings (optional)

A mapping of keys and associated values that you can use to specify conditional parameter values, similar to a lookup table. You can match a key to a corresponding value by using the Fn::FindInMap intrinsic function in the Resources and Outputs section.

```
"Mappings" : {
  "RegionMap" : {
    "us-east-1" : "ami-7a11e213",
    "us-west-1" : "ami-cfc7978a",
    "eu-west-1" : "ami-31c2f645",
    "ap-southeast-1" : "ami-60f28c32",
    "ap-northeast-1" : "ami-a003a8a1"
  }
}
```

Conditions (optional)

Defines conditions that control whether certain resources are created or whether certain resource properties are assigned a value during stack creation or update. For example, you could conditionally create a resource that depends on whether the stack is for a production or test environment.

```
{
  "AWSTemplateFormatVersion" : "2010-09-09",
  "Parameters" : {
    "EnvType" : {
      "Description" : "Environment type.",
      "Default" : "test",
      "Type" : "String",
      "AllowedValues" : ["prod", "test"],
      "ConstraintDescription" : "must specify prod or test."
    }
  },
  "Conditions" : {
    "CreateProdResources" : {"Fn::Equals" : [{"Ref" : "EnvType"}, "prod"]}
  },
  "Resources" : {
    "EC2Instance" : {
      "Type" : "AWS::EC2::Instance",
      "Properties" : {
        "ImageId" : "ami-2f726546"
      }
    },
    "NewVolume" : {
      "Type" : "AWS::EC2::Volume",
      "Condition" : "CreateProdResources",
      "Properties" : {
        "Size" : "100",
        "AvailabilityZone" : { "Fn::GetAtt" : [ "EC2Instance",
"AvailabilityZone" ]}
      }
    },
    "MountPoint" : {
      "Type" : "AWS::EC2::VolumeAttachment",
      "Condition" : "CreateProdResources",
      "Properties" : {
        "InstanceId" : { "Ref" : "EC2Instance" },
        "VolumeId" : { "Ref" : "NewVolume" },
        "Device" : "/dev/sdh"
      }
    }
  }
}
```

Resources (required)

Specifies the stack resources and their properties, such as an Amazon Elastic Compute Cloud instance or an Amazon Simple Storage Service bucket.

```
"Resources" : {  
  "MyEC2Instance" : {  
    "Type" : "AWS::EC2::Instance",  
    "Properties" : {  
      "ImageId" : "ami-2f726546"  
    }  
  }  
}
```

Outputs (optional)

Describes the values that are returned whenever you view your stack's properties.

```
"Outputs" : {  
  "InstanceID" : {  
    "Description": "The Instance ID",  
    "Value" : { "Ref" : "EC2Instance" }  
  }  
}
```

CLOUDFORMATION SAMPLE TEMPLATE

you can download sample template for WordPress Multi AZ installation with ELB and Autoscaling configured.





http://s3.amazonaws.com/cloudformation-templates-us-east-1/WordPress_Multi_AZ.template

Once you logged in to AWS Management Console, create a key pair from EC2 page if you have not created already.



Form Console home page choose CloudFormation under Management Tools.

Amazon Web Services



Compute

-  **EC2**
Virtual Servers in the Cloud
-  **EC2 Container Service**
Run and Manage Docker Containers
-  **Elastic Beanstalk**
Run and Manage Web Apps
-  **Lambda**
Run Code in Response to Events




Storage & Content Delivery

-  **S3**
Scalable Storage in the Cloud
-  **CloudFront**
Global Content Delivery Network


Developer Tools

-  **CodeCommit**
Store Code in Private Git Repositories
-  **CodeDeploy**
Automate Code Deployments
-  **CodePipeline**
Release Software using Continuous Delivery


Management Tools

-  **CloudWatch**
Monitor Resources and Applications
-  **CloudFormation**
Create and Manage Resources with Templates
-  **CloudTrail**
Track User Activity and API Usage




Internet of Things

-  **AWS IoT**
Connect Devices to the Cloud

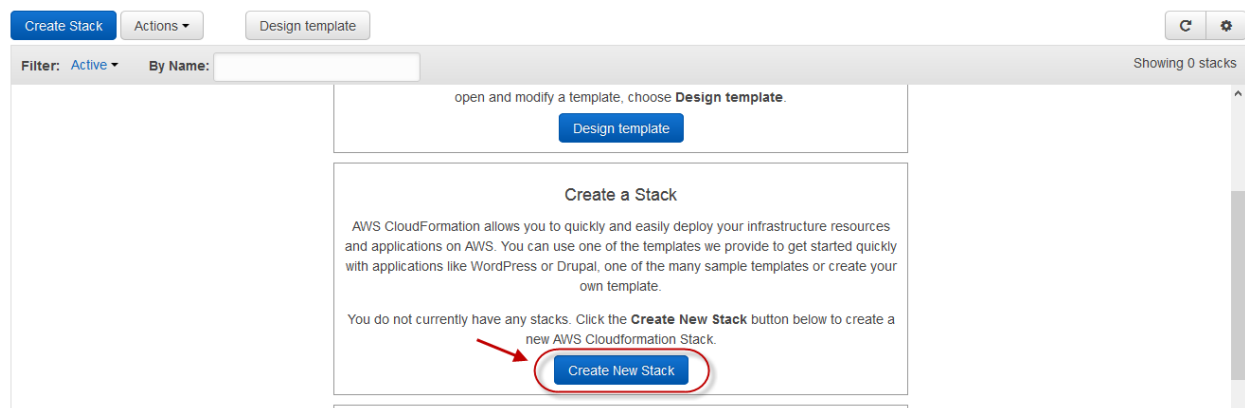
Game Development

-  **GameLift**
Deploy and Scale Session-based Multiplayer Games

Mobile Services

-  **Mobile Hub**
Build, Test, and Monitor Mobile Apps
-  **Cognito**
User Identity and App Data Synchronization
-  **Device Farm**
Test Android, iOS, and Web Apps on Real Devices in the Cloud

Then choose Create New Stack.



On the next page under Choose a template from the drop down list of select a sample template choose WordPress blog.

Select Template

Select the template that describes the stack that you want to create. A stack is a group of related resources that you manage as a single unit.

Design a template Use AWS CloudFormation Designer to create or modify an existing template. [Learn more.](#)

Design template

Choose a template A template is a JSON-formatted text file that describes your stack's resources and their properties. [Learn more.](#)

☒ Select a sample template

WordPress blog

View/Edit template in Designer

Single Instance Samples

- LAMP Stack
- Ruby on Rails Stack
- WordPress blog

Multi-AZ Samples

- LAMP Stack
- Ruby on Rails Stack
- WordPress blog

Windows Samples

- Windows features and roles
- Windows Active Directory

Tools

Then choose next to go to next page.

Select Template

Select the template that describes the stack that you want to create. A stack is a group of related resources that you manage as a single unit.

Design a template Use AWS CloudFormation Designer to create or modify an existing template. [Learn more.](#)

Design template

Choose a template A template is a JSON-formatted text file that describes your stack's resources and their properties. [Learn more.](#)

☒ Select a sample template

WordPress blog View/Edit template in Designer

☐ Upload a template to Amazon S3

Browse... No file selected.

☐ Specify an Amazon S3 template URL

https://s3-ap-southeast-1.amazonaws.com/cloudformation-templa

Cancel

Next

On Specify details, specify a stack name under stack name text field.

Specify Details

Specify a stack name and parameter values. You can use or change the default parameter values, which are defined in the AWS CloudFormation template.

Stack name

Then under Parameters section specify all required options then choose Next.

DBAllocatedStorage	<input type="text" value="5"/>	The size of the database (Gb)
DBClass	<input type="text" value="db.t2.small"/>	Database instance class
DBName	<input type="text" value="wordpress"/>	The WordPress database name
DBPassword	<input type="password" value="....."/>	The WordPress database admin account password
DBUser	<input type="password" value="...."/>	The WordPress database admin account username
InstanceType	<input type="text" value="t2.small"/>	WebServer EC2 instance type
KeyName	<input type="text" value="linux"/>	Name of an existing EC2 KeyPair to enable SSH access to the instances
MultiAZDatabase	<input type="text" value="false"/>	Create a Multi-AZ MySQL Amazon RDS database instance
SSHLocation	<input type="text" value="0.0.0.0/0"/>	The IP address range that can be used to SSH to the EC2 instances
WebServerCapacity	<input type="text" value="2"/>	The initial number of WebServer instances

Cancel Previous **Next**

On the next page, specify Tags if you want, specify notifications which is under Advanced, then choose Next to continue.

Options

Tags

You can specify tags (key-value pairs) for resources in your stack. You can add up to 10 unique key-value pairs for each stack. [Learn more.](#)

	Key (127 characters maximum)	Value (255 characters maximum)	
1	<input type="text"/>	<input type="text"/>	<input data-bbox="1377 401 1409 428" type="button" value="+"/>

► Advanced

You can set additional options for your stack, like notification options and a stack policy. [Learn more.](#)

Then click on Create below of the to create the Stack.

Options

Tags

No tags provided

Advanced

Notification
Timeout none
Rollback on failure Yes

Then on the cloudformation page, you can see status of the stack as CREATE_IN_PROGRESS, you can also see the events under the Events tab.

Create Stack Actions Design template

Filter: Active By Name: Showing 1 stack

Stack Name	Created Time	Status	Description
<input checked="" type="checkbox"/> MultiWP	2016-05-11 21:45:25 UTC+0550	CREATE_IN_PROGRESS	AWS CloudFormation Sample Template WordPress_Multi_AZ: WordPress is web software you can use

Overview Outputs Resources Events Template Parameters Tags Stack Policy Change Sets

2016-05-11

Status	Type	Logical ID	Status reason
21:46:05 UTC+0550 CREATE_IN_PROGRESS	AWS::RDS::DBInstance	DBInstance	Resource creation Initiated
21:46:02 UTC+0550 CREATE_IN_PROGRESS	AWS::RDS::DBInstance	DBInstance	Resource creation Initiated
21:45:58 UTC+0550 CREATE_COMPLETE	AWS::RDS::DBSecurityGroup	DBSecurityGroup	Resource creation Initiated
21:45:57 UTC+0550 CREATE_IN_PROGRESS	AWS::RDS::DBSecurityGroup	DBSecurityGroup	Resource creation Initiated
21:45:56 UTC+0550 CREATE_IN_PROGRESS	AWS::RDS::DBSecurityGroup	DBSecurityGroup	Resource creation Initiated
21:45:52 UTC+0550 CREATE_COMPLETE	AWS::EC2::SecurityGroup	WebServerSecurityGroup	Resource creation Initiated
21:45:51 UTC+0550 CREATE_IN_PROGRESS	AWS::EC2::SecurityGroup	WebServerSecurityGroup	Resource creation Initiated

Once created, stack status will change to CREATE_COMPLETE.

Create Stack Actions Design template

Filter: Active By Name:

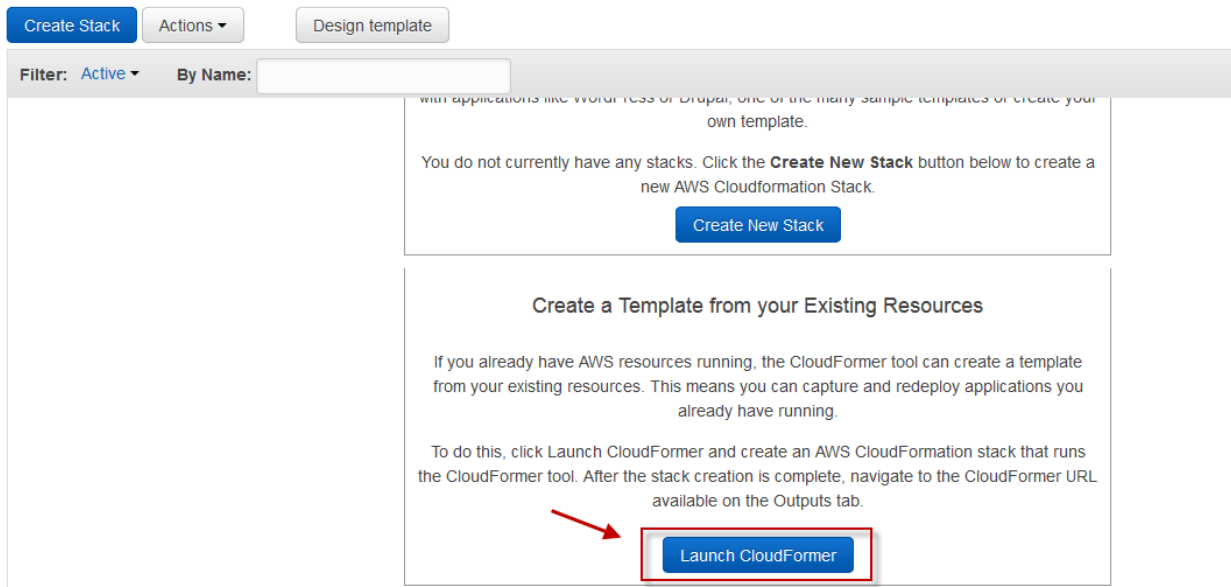
Stack Name	Created Time	Status	Description
<input checked="" type="checkbox"/> MultiWP	2016-05-11 21:45:25 UTC+0550	CREATE_COMPLETE	AWS CloudFormation Sample Template WordPress_Multi_AZ: V

You can go and see the resources which were created by CloudFormation by going in to each services dashboard.

CREATE CLOUDFORMATON TEMPLATE FROM EXISTING ENVIRONMENT

Log in to AWS management console, then go to CloudFormation from the Console Home Page.

Then choose Launch CloudFormer.



Then choose Next on Select Template page.

Select Template

Select the template that describes the stack that you want to create. A stack is a group of related resources that you manage as a single unit.

Design a template Use AWS CloudFormation Designer to create or modify an existing template. [Learn more.](#)

Design template

Choose a template A template is a JSON-formatted text file that describes your stack's resources and their properties. [Learn more.](#)

☐ Select a sample template

LAMP Stack

☐ Upload a template to Amazon S3

Browse... No file selected.

☒ Specify an Amazon S3 template URL

[View/Edit template in Designer](#)

Cancel Next

On Specify details page, specify username and password, then choose next to continue.

Specify Details

Specify a stack name and parameter values. You can use or change the default parameter values, which are defined in the AWS CloudFormation template. [Learn more.](#)

Stack name

Parameters

Password Password to log in to CloudFormer

Username Username to log in to CloudFormer

[Cancel](#)

[Previous](#)

[Next](#)

On the Options page, choose Next.

Options

Tags

You can specify tags (key-value pairs) for resources in your stack. You can add up to 10 unique key-value pairs for each stack. [Learn more.](#)

	Key (127 characters maximum)	Value (255 characters maximum)	
1	<input type="text"/>	<input type="text"/>	+

Advanced

You can set additional options for your stack, like notification options and a stack policy. [Learn more.](#)

[Cancel](#)

[Previous](#)

[Next](#)

On the review page, go to below section of the page, check the acknowledgement box, then choose Create button.

Capabilities

i The following resource(s) require capabilities: [AWS::IAM::InstanceProfile, AWS::IAM::Policy, AWS::IAM::Role]

This template might include Identity and Access Management (IAM) resources, which can include groups, IAM users, and IAM roles with certain permissions. Ensure that the template you are using is from a trusted source. [Learn more.](#)

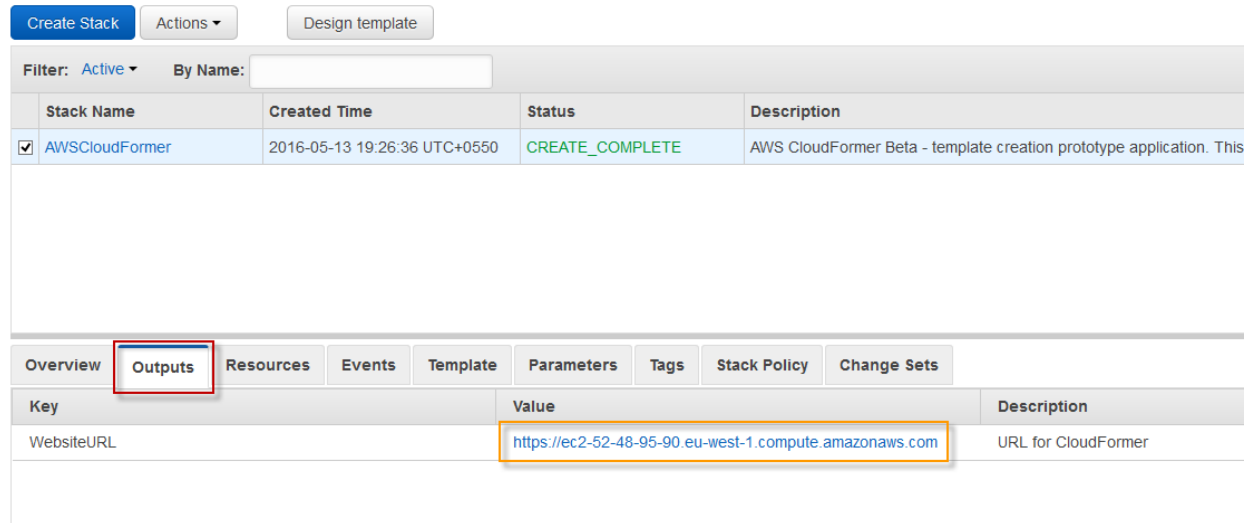
☒ I acknowledge that this template might cause AWS CloudFormation to create IAM resources.

[Cancel](#)

[Previous](#)

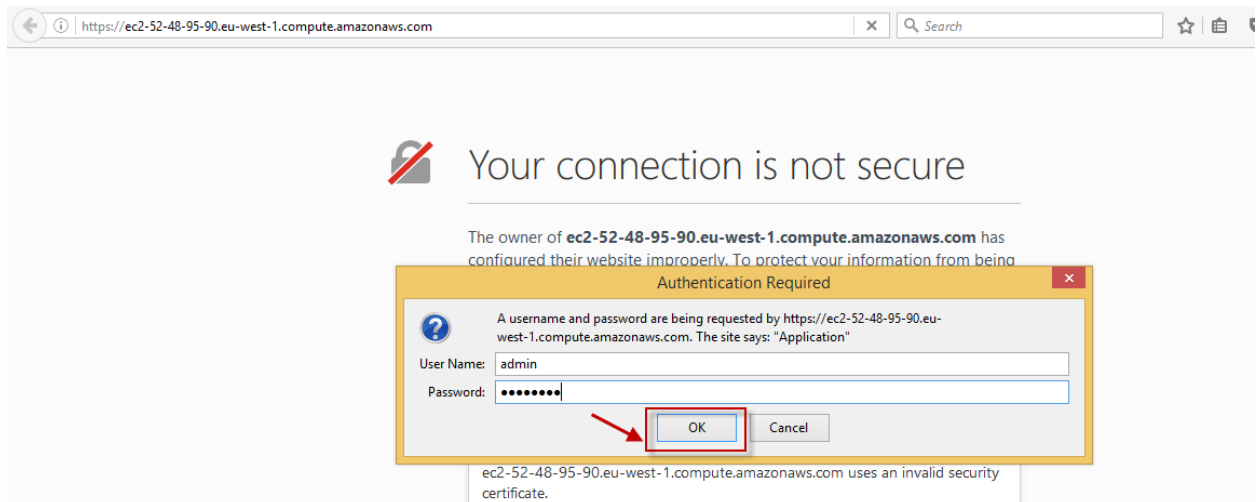
[Create](#)

Cloudformation will create a stack, once the stack creation has been completed. Go to Outputs section.
Copy the URL and open in your browser.



The screenshot shows the AWS CloudFormation console. At the top, there are buttons for 'Create Stack', 'Actions', and 'Design template'. Below these is a filter section with 'Filter: Active' and a 'By Name' search box. A table lists the stack 'AWSCloudFormer' with a status of 'CREATE_COMPLETE'. Below the table, there are tabs for 'Overview', 'Outputs', 'Resources', 'Events', 'Template', 'Parameters', 'Tags', 'Stack Policy', and 'Change Sets'. The 'Outputs' tab is selected, showing a table with one output: 'WebsiteURL' with the value 'https://ec2-52-48-95-90.eu-west-1.compute.amazonaws.com' and the description 'URL for CloudFormer'. The URL is highlighted with an orange box.

Once you have opened the URL, specify the username and password which you have specified while creating the stack, then click on Ok.



The screenshot shows a web browser with the address bar displaying 'https://ec2-52-48-95-90.eu-west-1.compute.amazonaws.com'. Below the browser, there is a security warning: 'Your connection is not secure'. The warning states: 'The owner of ec2-52-48-95-90.eu-west-1.compute.amazonaws.com has configured their website improperly. To protect your information from being intercepted, an invalid security certificate was issued by an organization that is not trusted by your computer.' Below the warning is an 'Authentication Required' dialog box. The dialog box contains the text: 'A username and password are being requested by https://ec2-52-48-95-90.eu-west-1.compute.amazonaws.com. The site says: "Application"'. It has fields for 'User Name' (containing 'admin') and 'Password' (containing masked characters). There are 'OK' and 'Cancel' buttons. A red arrow points to the 'OK' button. Below the dialog box, there is a message: 'ec2-52-48-95-90.eu-west-1.compute.amazonaws.com uses an invalid security certificate.'

Once opened, choose your region where you have your resources from the Select the AWS region drop down list, then choose Create Template.

AWS CloudFormer 0.41 (Beta)

Welcome to the [AWS CloudFormation](#) template creation utility. This utility helps you to create a CloudFormation template for your AWS resources currently running in your account using a few simple steps. While the created template is complete, you can launch an AWS CloudFormation stack, it is a starting point for further customization. You should consider at least:

- Add Parameters to enable stacks to be customized at launch time.
- Add Mappings to allow the template to be customized to the specific environment.
- Replace static values with "Ref" and "Fn::GetAtt" functions to flow property data between resources where property is dependent on the value of a property from a different resource.
- Remove any static IP addresses, availability zones and other environmental properties to create more general templates.
- Use CloudFormation metadata and on-host helper scripts to deploy files, packages and run commands on your instances.
- Customize any RDS Database, ElastiCache cluster or Redshift cluster passwords.
- Customize or add more stack outputs to list important information needed by the stack user.

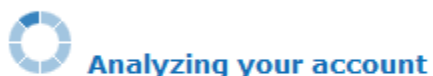
Select the AWS Region Asia Pacific (Singapore) ▼

When you press "Create Template" we will analyze all of the AWS resources in your account. This may take a little time.

Create Template

For more information on how to build a template see the [AWS CloudFormation User Guide](#). You can also check out the [AWS CloudFormation CLI](#).

Wait for some time as it will analyse your account.



Then on the next page, add some Template description, select check box for all resources then choose continue tab above the page.

AWS CloudFormer

Region ap-southeast-1



Template Information

Select the AWS region to introspect. The description is optional but will be displayed in the AWS Management console when the template is used to create a stack. You can optionally enter a filter for the resources. If you specify a filter, all resources with a name or a tag value that contains the filter text will be selected automatically. Note that the filter is a case-insensitive match.

Template Description

Testing CloudFormer Tool

Resource Name Filter

Select resources matching filter

☒ Select all resources in your account

Choose resources by Service.

Once done you will have an option to save the template which is created by CloudFormer to S3 bucket or copy and save it in your desktop.

AWS CloudFormation Template

Region ap-southeast-1

You can save the AWS CloudFormation template in an existing S3 bucket in your account by selecting a bucket and clicking on the Save button below. Alternatively, you can cut and paste the template content below and store it locally or in your source control repository. NOTE: If you save the template to an S3 bucket in a different AWS region from the one used to create the template, launching it in the new AWS region will likely fail since the template may have hardcoded values based on the original AWS region.

Template Name cloudformer.template S3 Bucket cf-templates-jzkt7dp55r6p-ap-southeast-1 (ap-southeast-1) ▼

```
{
  "AWSTemplateFormatVersion": "2010-09-09",
  "Resources": {
    "vpcsa20b29c7": {
      "Type": "AWS::EC2::VPC",
      "Properties": {
        "CidrBlock": "172.17.0.0/16",
        "InstanceTenancy": "default",
        "EnableDnsSupport": "true",
        "EnableDnsHostnames": "false",
        "Tags": [
          {
            "Key": "Name",
            "Value": "vpcsa20b29c7"
          }
        ]
      }
    }
  }
}
```