

# Agility 2020 Hands-on Lab Guide

# PC101 - Deploying F5 Solutions to AWS w

F5 Networks, Inc.



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# PC 101 - Deploying F5 Solutions to AWS with CloudFormation Templates

This is a self-guided introductory lab that covers:

- · Deploying F5 solutions to AWS with Terraform and CloudFormation Templates
- · Service Discovery iApp Dynamically populate pool members with the AutoDiscovery iApp.
- · Cross Availability Zone HA with F5
- Application Services Extension Automate the creation of virtual servers and associated services using a declarative model.

# **1.1 Prerequisites**

In this lab we'll prepare our AWS environment with the prerequisites required to launch F5 CloudFormation templates.

- Create AWS account and login to the AWS console.
- · Accept the F5 license subscription from the AWS Marketplace.
- · Create and upload SSH keys to AWS.
- · Create the infrastructure prerequisites necessary to launch an F5 CloudFormation template.

# 1.1.1 Login to F5's lab platform (Unified Demo Framework) and launch a remote desktop session

Follow the link in your email invite and login to the lab environment.

Your Deployment => Systems => win2019 => DETAILS. Copy the Administrator password to your clipboard. The password starts immediately after Administrator:

<u>General</u> Subn	ets Access Metho	ds		
	Description		Cred	entials :: bdB2b71xkC
	Machine Specifications		Boot	Metrics
vCPUSs 2	Memory 4	Disk Size 30	Started in a minute	Booted in 2 minutes

Click [Done] in the lower right-hand corner.

Under win2019, from the ACCESS drop-down, select RDP and resolution. The lab looks best in FHD (1920 x 1080). This will download the rdp file to your computer. Launch the RDP file and login via RDP using the Administrator credentials. Copy and paste credentials from your clipboard.

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•		Management	Windows Server 2019 Base	
		DETAILS	ACCESS         DETAILS           RDP         1920x1080           1600x1200         1440x900           1366x768         1280x1024           1280x800         800x600           640x480         640x480	

When prompted with the blue "Networks" message click "Yes".



**Attention:** Before proceeding, wait 30 seconds for the Visual Studio Code and Postman applications to start automatically.

You can run the entire lab from within the Windows jump host.

Visual Studio Code => View => Terminal

#### You will see:

- · AWS Console URL
- AWS Console Username
- AWS Console Password

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Maximize the Terminal Window by clicking on the ^ in the upper-right-hand corner of the Terminal.

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# 1.1.2 Login to AWS Console

A URL shortcut has been auto-generated on the Windows desktop: "Amazon Web Services Sign-In".

First, launch Firefox from the taskbar, then click on the "Amazon Web Services Sign-In" URL shortcut on the Desktop.

If the Firefox resolution in your RDP session renders components off-screen, try to first launch Firefox from the taskbar *before* you click on the "Amazon Web Services Sign-In" URL shortcut on the Desktop.

Alternatively, you can CTRL+click the "AWS Console URL:" https shortcut in the Visual Studio Code terminal.



Login to the AWS web console with the credentials shown in your terminal.

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	https://346022609392.signin.aws.amazon.com/console	dvv5 °
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	f5admin@EC2AMAZ-OQBMC1S:~\$	
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In the upper-right-hand corner, choose US-West (Oregon) us-west-2 region.



"Services" => type "marketplace" in the search window. Select "AWS Marketplace Subscriptions" from the search results. Right-click on "Manage subscriptions" to open a new tab. => "Discover products" Type "f5 advanced 25mbps" in the search box. => "F5 Advanced WAF (PAYG, 25Mbps)" => "Continue to Subscribe" => "Accept Terms"

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	By subscribing to this software, you ago License Agreement (EULA) <sup>(2)</sup> , You also information about this transaction (incl seller, reseller or underlying provider, as <u>Notice</u> <sup>(2)</sup> , Your use of AWS services is so agreement with AWS governing your us	ee to the pricing terms and t agree and acknowledge that uding your payment terms) v applicable, in accordance w ubject to the <u>AWS Customer</u> e of such services.	the seller's <u>End User</u> AWS may share with the respective ith the <u>AWS Privacy</u> <u>Agreement</u> or othe	r	Accept Tethys	View Offer		
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Track "Effective date" and "Expiration date". When they are no longer "Pending" you can proceed.



# 1.1.3 Create an AWS VPC with Terraform

From the Visual Studio Code Terminal, clone the github repository for this lab and change to the working directory.

Attention: For a smooth ride, always invoke commands from inside the cloned git repository (f5agility2020-pc101). To check you're in the right place, you can run the command pwd and the output should read /home/f5admin/f5agility2020-pc101

```
git clone https://github.com/TonyMarfil/f5agility2020-pc101.git
cd f5agility2020-pc101/
```



Run the start.sh script to set environment variables and make the ./scripts directory executable

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Create an SSH key and upload to your AWS account. We'll later use this key to connect to our F5 instances.

create-ssh-keys.sh



From the AWS Console => Services => EC2 => Key pairs. Confirm your ssh key was created.

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EC2 Dashboard New						
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Tags	Q. Filter key pairs				< 1 >	0
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Instance Types						
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#### Initialize Terraform modules.

terraform init



Validate Terraform files and create a terraform dependency graph.



From the Windows desktop, click on the "terraform\_dependancy\_graph" URL shortcut. Review in your browser. Terraform creates a dependency of all of the objects in your environment. This is one of the major advantages to using a declarative tool for building infrastructure and services.



From the Visual Studio Code Terminal

```
terraform plan -var 'bigip_admin_password=f5letme1n'
terraform apply -var 'bigip_admin_password=f5letme1n' -auto-approve
```



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₿	<pre>aws_route_table.rt1: Refreshing state [id=rtb-049d aws_main_route_table_association.association-subnet:   aws_instance.example-a: Creating</pre>	20f4b17481123] Refreshing state [id=rtba	ssoc-0803a0bf5b70f8c45]				
ē	<pre>aws_instance.example-b: Creating aws_instance.example-a: Still creating [10s elapse aws_instance.example-b: Still creating [10s elapse aws_instance.example-a: Still creating [20s elapse</pre>	1] 1] 1]					
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	Apply complete! Resources: 3 added, 0 changed, 0 dest	royed.					
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Review the terraform output when complete. You can always get the terraform output details again by invoking from the terminal:



# **1.2 Deploying an F5 CloudFormation Template to AWS**

Deploy an F5 CloudFormation template to AWS using the supporting AWS infrastructure and services created in the previous lab.

### 1.2.1 F5 CloudFormation templates on Github

Open a new tab in the web browser. Click on the "PC101 AS3 Template" URL bookmar in the bookmark toolbar. An AS3 Declaration is a single JSON-formatted file that defines your virtual server(s) and all accompanying configuration objects. Some interesting configuration objects are highlighted int the screenshot below:

- We use AWS tags to lookup the application pool members dynamically. You do not hardcode the IP addresses of pool members.
- An HTTP/2 profile is enabled.
- The Virtual Server Address is a "catch-all" wildcard address: 0.0.0.0/0.

Open another new tab in the web browser. Click on the "f5-aws-cloudformation" URL bookmark in the bookmark toolbar. Supported F5 CloudFormation templates are hosted on the official F5 GitHub repo: https://github.com/F5Networks/.

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	Step 1 Specify template	Create stack					
	Step 2 Specify stack details	Prerequisite - Prepare template					
	Step 3	Prepare template Every stack is based on a template. A template is	a JSON or YAML file that contains configuration information	about the AWS resources you want to inc	lude in the stack.		
	Configure stack options	Template is ready	Use a sample template	O Create template in D	Designer		
		Specify template A template is a JSON or VAML file that describes ; Sectoring a template source Sectoring a template generates an Amazon S3 URL Mazon S3 URL https://f5-public-cloud.s3.amazonaws.co Amazon S3 template URL S3 URL: https://f5-public-cloud.s3.amazon	I where it will be stored.	template file igip_v5.7.1.template _2nic-bigip_v5.7.1.template	View in Designer		
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Scroll down and click on "Next"

Fill in the CloudFormation template parameters. Leave defaults where not explicitly called out below.

Parameter		Value				
NETWORKING CONFIGUR	ATION					
VPC		(10.0.0/16)(ter-				
		raform_student@f5lab.dev)				
Management Subnet AZ1		(10.0.101.0/24)(management)				
Management Subnet AZ2		(10.0.102.0/24)(management)				
Subnet1 in AZ1		(10.0.1.0/24)(public)				
Subnet1 in AZ2		(10.0.2.0/24)(public)				
INSTANCE CONFIGURATION	ON					
BIG-IP Image Name		AdvancedWaf25Mbps				
SSH Key		MyKeyPair-student@f5lab.dev				
Source Address(es) for Man	agement Access	0.0.0/0				
Source Address(es) for Web	Application Access (80/443)	0.0.0/0				
NTP Server		0.pool.ntp.org				
Timezone (Olson)		UTC				
BIG-IP Modules		Itm:nominal,avr:nominal				
VIRTUAL SERVICE CONFI	VIRTUAL SERVICE CONFIGURATION					
AS3 Declaration URL	https://f5-public-cloud.s3.amaz	conaws.com/pc101_as3_template				

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VS Services ~	Resource Groups 👻 🕏	
clober or macion / Stacks	/ Create statk	
Step 1 Specify template	Specify stack details	
Step 2 Specify stack details	Stack name	
	Stack name	
Step 3 Configure stack options	BIGIP-Across-Az-Cluster-2nic-PAYG	
estingene steam options	Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-).	
Step 4 Review	Parameters Parameters are defined in your template and allow you to input custom values when you create or update a stack.	
	NETWORKING CONFIGURATION VPC vpc-078b314202bbdfff7 (10.0.0.0/16) (terraform student/@f5lab.dev)	
	Management Subnet AZ1 Management Bubnet ID	Ca
	subnet-Oeb68f26d5bfeba2b (10.0.101.0/24) (management)	▼
	Management Subnet AZ2 Management Subnet ID	
	subnet-01dbdb4b6f59fa65d (10.0.102.0/24) (management)	▼
	Subnet1 in AZ1 Public or External subnet	
		▼
	Subnet1 in AZZ Public or External subnet	
		▼
	Provision Public IP addresses for the BIG-IP interfaces Whether or not to provision Public IP Addresses for the BIG-IP Network Interfaces. By Default no Public IP addresses are provision	ned.

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Scroll to the bottom of the CloudFormation template and click [Next].

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Step 3 Configure stack options	owner	student@f5lab.dev	Remove		î
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	Permissions Choose an ILM role to explicitly define how CloudFormation can create, modify, or based on your user circlentials. Learn more 🗗	delete resources in the stack. If you don't choose a role, Cloud	formation uses permissions		
	IAM role - optional Choose the IAM role for CloudFormation to use for all operations performed on the	e stack.			
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	Contain set additional options for your static, like inditication options and     Stack policy     Defines the resources that you want to protect from unintentional updates dur	a stack policy. Learn nore [2]			
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	<ul> <li>Notification options</li> </ul>				
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Click on "Estimate cost".

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Specify stack details	Template				
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Step 4	Stack description				
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	costcenter	f5costcenter			
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You can estimate the cost of running this CloudFormation stack with the AWS Simple Monthly Calculator. Review and close this screen.

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Scroll to the bottom of the CloudFormation template. Acknowledge that AWS CloudFormation might create IAM resources and [Create stack].

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Watch as your resources are built in AWS by refreshing the CloudFormation Events screen.

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# **1.3 Explore the AWS Virtual Private Cloud**

The F5 environment will be ready to protect our web applications shortly. In the meantime, let's explore the AWS Virtual Private Cloud we've created to familiarize ourselves with some basic AWS networking concepts.

# **1.3.1 Explore AWS Environment**

Services => VPC => Your VPCs. A VPC (Virtual Private Cloud) was created by Terraform. All of our supporting infrastructure will run inside this VPC.

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Security Groups	VPC: vpc-078b314202bbdfff7							
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Services => VPC => Internet Gateways. An Internet Gateway was created to allow instances in our VPC to connect to the Internet.

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Security Groups	Internet gateway: Igw-0ca48816500473b76	888
Matural Balancia	Description Tags	
Network (VPN)	ID igw-0ca48816500473b76 Attached VPC ID vpc-078b314202bbdff7 [terraform student@f5lab.dev	
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Services => VPC => Subnets. Terraform created management and traffic subnets (both public and private)

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Cloud	private s	subnet-01d1969c004f12dbc	available	vpc-078b314202bbdfff7	10.0.100.0/24	251	-	us-west-2a	usw2-az2	us-west-2	rtb-049d2	0f4b1748112
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Subnets	public s	subnet-073a1c49f0efc007f	available	vpc-078b314202bbdfff7	10.0.1.0/24	247	-	us-west-2a	usw2-az2	us-west-2	rtb-049d2	014b1748112
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across two Availability Zones: us-wesst-2a and us-west-2b.

Services => VPC => Elastic IPs. Elastic IPs are public IP addresses assigned to the management and traffic interfaces of the F5 Virtual Editions deployed.

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Subnets	44.231.46	113 elpalloc-0e8fea11	-	10.0.1.33	vpc	eipassoc-020021	us-west-2	eni-02182b1051ea226ee	346022609392
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Customer Gateways	Address Pool Private IP address	amazon 10.0.101.159				Instance	-		
Virtual Private Gateways	Association ID	eipassoc-0d106675ab3e9fd8a				Network Border Group	us-west-2		
Site-to-Site VPN	Public DNS	-				Network interface ID	eni-01125ff0a0f20a1ef		
Connections	Network interface owner	346022609392							
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Services => VPC => Security Groups. Security Groups are stateful port filters applied to either instances or network interfaces.

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Name	Group ID	Group Name	VPC ID	Туре	Description ~	Owner	*		
	sg-007394214374 sg-00ab404bc3a9	default	vpc-078b314202b	EC2-VPC EC2-VPC	default VPC secur	346022609392 346022609392			
	sg-00b3a27bda5e	f5_management	vpc-078b314202b	EC2-VPC	Managed by Terra	346022609392			
	sg-0122d4059e0d	terraform-example	vpc-078b314202b	EC2-VPC	Managed by Terra	346022609392			
Bigip Management Security Grup:B.     Bigip External Security Group:B.	sg-056de270316e	BIGIP-Across-Az BIGIP-Across-Az	vpc-078b314202b	EC2-VPC EC2-VPC	Public or external i	346022609392			
0	sg-07f29efb6f0ed	terraform-example	vpc-078b314202b	EC2-VPC	Managed by Terra	346022609392			
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Services => CloudFormation. The CloudFormation Stack "BIGIP-Across-Az-Cluster-2nic-PAYG" will quickly show status of "CREATE\_COMPLETE"

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Services => EC2 => Instances. Two example NGINX web servers were deployed: web-az1 and web-az2. The "findme : web" tag will be used later in the lab so that our F5 Virtual Edition can auto-discover its pool members.

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The "Big-IP1" and "Big-IP2" F5 instances are still "Initializing" and will come online shortly.

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Services => CloudFormation => Stacks => "BIGIP-Across-Az-Cluster-2nic-PAYG" => Events. When you deploy via CloudFormation template, all of the steps to build the F5 in AWS environment are recorded as CloudFormation Events.

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The CloudFormation template created a pair of F5 Virtual Edition instances and many other supporting resources. All of the resources created by CloudFormation are recorded here.

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The CloudFormation stack will compute output attributes and report them here. What's the public management IP addresses URL for Big-IP1? What is the Virtual Server Elastic IP address? These sorts of questions can be answered by querying the CloudFormation stack outputs. We make use of this useful convenience in a future lab section.

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		Bigip1ManagementEipAddress 44.232.76.46 IP address of the management port on BIG-IP	-
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Feedback		Bigip1Url https://44.232.76.46 BIG-IP Management GUI	
		Bigip1VipEipAddress http://54.70.100.164:80 EIP address for VIP	
		Bigip1VipPrivatelp 10.0.1.248 VIP on External Interface Secondary IP 1	
		Bigip1subnet1Az1Interface eni-02182b1051ea226ee External interface Id on BIG-IP	
		Bigip1subnet1Az1SelfEipAddress 44.231.46.113 IP Address of the External interface attached to BIG-IP	
		Bigip2ExternalInterfacePrivatelp 10.0.2.40 Internally routable IP of the public interface on BIG-IP	
		Bigip2InstanceId i-051c921412a5534e0 Instance Id of BIG-IP in Amazon	
		Bigip2ManagementEipAddress 44.231.146.69 IP address of the management port on BIG-IP	
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CloudFormation parameters will report on the values fed into the CloudFormation template. Look here to confirm a value or when you suspect an error/typo and want to confirm.

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The CloudFormation template can be customized when you need to deviate from the default behavior.

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# 1.4 F5 Admin SSH and Configuration Utility (WebUI) Access

Configure admin SSH and Configuration Utility (WebUI) access to the F5 Virtual Editions. Retrieve information about our deployment using CloudFormation outputs.

### 1.4.1 Check status of F5 instances before proceeding.

From the AWS Web Console => Services => EC2 => INSTANCES => Instances. Select the Big-IP1... Select the "Status Check" tab below.



From the AWS Web Console => Services => EC2 => INSTANCES => Instances. Select the Big-IP2... Select the "Status Check" tab below.

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**Attention:** Ensure both the System Status Checks and the Instance Status Checks have passed (green font) before proceeding.

### 1.4.2 Create terraform data resource to read CloudFormation outputs.

From the Visual Studio Code Terminal, enable the f5-cft-outputs.tf terraform file.



#### terraform init

terraform init

#### terraform validate

terraform validate



#### terraform plan

terraform plan -var 'bigip_admin_password=f5letmeln'	
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#### terraform apply

terraform apply -var 'bigip\_admin\_password=f5letme1n' -auto-approve

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#### terraform apply completed.



# 1.4.3 SSH to Big-IP1 and Big-IP2

Run the create-ssh-to-bigip-alias.sh shell script to create convenient command aliases for bigip1 and bigip2.

```
source create-ssh-to-bigip-alias.sh
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Confirm the bigip1 and bigip2 aliases were created.

type	bigip1
type	bigip2
🗙 File	Edit Selection View Go Debug Terminal Help — 🛱 📶 sestem 107/459-6504-433-6152-69043ac61a15.access.udf.5.com 📷 🗕 🖉 🗙 — 🔗 🗡 — 🗇 🗙
þ	
ا م	f5admin@EC2AMAZ-0QBMC15:-/f5agility2020-pc101\$ type bigip1 bigip1 is aliased to `ssh -i ./MyKeyPair-student@f5lab.dev.pem admin@\${Bigip1ManagementEipAddress}' f5admin@EC2AMAZ-0QBMC15:-/f5agility2020-pc101\$ type bigip2 bigip2 is aliased to `ssh -i ./MyKeyPair-student@F5lab.dev.pem admin@\${Bigip2ManagementEinAddress}'
<u>ک</u>	f5admin@EC2AMAZ-0QBMC1S:~/f5agility2020-pc1015
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<u>L</u> ⊚	
¥	
503 503	
≫ wsl: u	buntu-18.04 🎾 master* ↔ 🛞 5 🋆 0 🛞
م 🖪	Fit 🔗 🖪 🎂 🜌 🐵 📓 🔏 🧐 🥥 刘

SSH to Big-IP1 to confirm state and change the admin password.

**Attention:** Ensure the system status prompt is either Active or Standby before proceeding. All other status prompts indicate the system is not ready. Use the screenshots as a guide.

bigip1

Acknowledge the ssh remote host when prompted "Are you sure you want to continue connecting (yes/no)?"





SSH to Big-IP2 to confirm state and change the admin password.

**Attention:** Ensure the system status prompt is either Active or Standby before proceeding. All other status prompts indicate the system is not ready. Use the screenshots as a guide.

#### bigip2

Acknowledge the ssh remote host when prompted "Are you sure you want to continue connecting (yes/no)?"

yes modify auth user admin password f5letmeln modify /sys global-settings gui-setup disabled save /sys config quit



# 1.4.4 Configuration Utility (WebUI) HTTPS access to Big-IP1 and Big-IP2

We need the management address to connect to the Configuration utility (WebUI). Invoke *terraform output* and look for:

Bigip1Url

#### Bigip2Url

terraform output



From the Visual Studio Code Terminal, Ctrl + click to follow link for "BigIP1Url" =



We are using self-signed certificates in the lab. Bypass the TLS warnings. "Accept the Risk and Continue".

>	File Edit Selection View Go ··· f5admin [WSL: Ubuntu-here] Hall at a 1ct7/459-b5b4-43d3-b152-	b9043ac61a15.access.udf.f5.com 🗀 🖅 🕹 🕹 Private Browsing X 🔺 Warning: Potential Se: X + - 🗆 X						
		(<) → C ŵ 0 ‰ https://44.232.76.46 ···· ♡ ☆ IN ED @ 👪 Ξ						
لی ا		😼 Getting Started 🖓 F5 Networks - GitHub 🤉 Releases - f5devcentral 🎧 f5-cloud-iapps/f5-serv 🔀 bigip1.f5lab.dev (Did 💮 bigip2.f5lab.dev (Did 🔅						
	f5admin@EC2AMAZ-OQBMC1S:~/f5agility2020-pc101\$ terraform output							
0	AWS_CONSOLE_LINK = https://346022609392.signin.aws.amazon.com/console							
	AWS_PASSWORD = qVpcQCRXE5KaqpBjpiQeNEMo							
~	AWS_USER = udf							
<u>ل</u> م	BIGIP-Across-Az-Cluster-2nic-PAYG_outputs = {							
	BigipiExternalInterracePrivatelp = 10.0.1.55 "Bigip1InstanceId" = "i-0e3f0f09b2df5b557"							
) <del>C</del> r	"Bigip1ManagementEipAddress" = "44.232.76.46"							
1Xt	"Bigip1ManagementInterface" = "eni-01125ff0a0f20a1ef"							
	"Bigip1ManagementInterfacePrivateIp" = "10.0.101.169"							
HC I	"Bigip1Url" = "https://44.232.76.46"							
	"Bigip1VipEipAddress" = "http://54.70.100.164:80"							
	"BigipivipPrivatelp" = "10.0.1.248" "Bigipicubpet1071Interface" = "eni-82182b1851es226ee"							
Lo	"Bigin1subnet1Az1SelfFinAddress" = "44 231 46 113"							
	"Bigip2ExternalInterfacePrivateIp" = "10.0.2.40"	Warning: Potential Security Rick Aboad						
	"Bigip2InstanceId" = "i-051c921412a5534e0"	Warning. Fotential Security Risk Arleau						
	"Bigip2ManagementEipAddress" = "44.231.146.69"	Firefox detected a potential security threat and did not continue to 44 232 76 46. If you visit this site, attackers						
	"Bigip2ManagementInterface" = "eni-0311fdf632d5d4a23"	could try to steal information like your passwords, emails, or credit card details.						
	"Bigip2ManagementInterfacePrivateIp" = "10.0.102.232"							
	"Bigip20P1" = "NTTPS://44.231.146.69" "Bigip2cubnet10z2Tntenface" = "eni-6f927b4721d142bbf"	Learn more						
	"Bigin2subnet1Az2SelfFinAddress" = "34 215 219 51"							
	"availabilityZone1" = "us-west-2a"	Go Back (Recommended) Advanced						
	"availabilityZone2" = "us-west-2b"							
	"bigipExternalSecurityGroup" = "sg-056de270316ea8bc1"							
	"bigipManagementSecurityGroup" = "sg-04ce53b880cd526c2"							
	}	Websites prove their identity via certificates. Firefox does not trust this site because it uses a						
	eid_dns_name = tf-eid-studentf51abdev-1462435546.us-west-2.eid.amazonaws.co	Certificate that is not valid for 44.232.76.46.						
	web1 address = 10.0.1.80	Error code: MOZILLA_PKIX_ERROR_SELF_SIGNED_CERT						
	web2 address = 10.0.2.80							
	f5admin@EC2AMAZ-OQBMC1S:~/f5agility2020-pc101\$	View Certificate						
and the								
503		Go Back (Recommended) Accept the Rink and Continue						
× ws	L: Ubuntu-18.04 🖇 master* 🕂 🛞 5 🛆 0 🙂 🗘 1							
	電 ク 時 🤗 🗃 🍏 🖉 🚯 🏈 🔌 💷							
		1/23/2020						

Login to the Big-IP1 Configuration Utility (WebUI):

#### Username: admin

Password: f5letme1n



Look in the upper-left-hand corner. Note whether this is the active or standby unit.



From the Visual Studio Code Terminal, Ctrl + click to follow link for "BigIP2Url" =



We are using self-signed certificates in the lab. Bypass the TLS warnings. "Accept the Risk and Continue".

×1 -	ile Edit Selection View Go ··· f5admin [WSL: Ubuntu- <mark>No.04] Holder St. 1ct7t459-b5b4-43d3-b15</mark> 2-b	9943ac61a15.access.udf.f5.com 📷 💶 🗗 🗙 👘 Private Browsin 🗙 🚯 BIG-IP 8 - ip-1 🗙 🔒 Warning: Poter 🗙 +
		(←) → C <sup>*</sup> ŵ 10 € https://44.231.146.69 ···· ⊙ ☆ 11\ 11 @ 11 ≡
لی ا		🔞 Getting Started 🔉 F5 Networks - GitHub 🤇 Releases - f5devcentral 🖓 f5-cloud-iapps/f5-serv 🔀 bigip1.f5lab.dev (Did 🕀 bigip2.f5lab.dev (Did 🔅
	f5admin@EC2AMAZ-OQBMC1S:~/f5agility2020-pc101\$ terraform output	·
0	AWS_CONSOLE_LINK = https://346022609392.signin.aws.amazon.com/console	
	AWS_PASSWORD = qVpcQCRXE5KaqpBjpiQeNEMo	
0	AWS_USER = udf	
<u>ل</u> م	BIGIP-Across-AZ-Cluster-2010-PAYG_OUTPUTS = {	
	"BigipilInstanceId" = "i-0e3f0f09b2df5b557"	
<del>ус</del> к	"Bigip1ManagementEipAddress" = "44.232.76.46"	
xx	"Bigip1ManagementInterface" = "eni-01125ff0a0f20a1ef"	
_	"Bigip1ManagementInterfacePrivateIp" = "10.0.101.169"	
- AH	"Bigip1Url" = "https://44.232.76.46"	
	BigipiVipEipAddress = http://54./0.100.104:80	
	"Bigipitup: Fitutcip = 10:011.240 "Bigipitup: Fitutcip = "eni-02182b1051ea226ee"	
L⊙	"Bigip1subnet1Az1SelfEipAddress" = "44.231.46.113"	
	"Bigip2ExternalInterfacePrivateIp" = "10.0.2.40"	Warning: Potential Security Risk Ahead
	"Bigip2InstanceId" = "i-051c921412a5534e0"	
	"Bigip2ManagementElpAddress" = "44.231.146.69" "Bigip2ManagementIntenface" = "ani-0211fdfc22d5d4a02"	Firefox detected a potential security threat and did not continue to 44.231.146.69. If you visit this site, attackers
	"Bigip2ManagementInterfacePrivateIn" = "10.0.102.232"	could try to steal information like your passwords, emails, or credit card details.
	"Bigip2Url" = "https://44.231.146.69"	
	"Bigip2subnet1Az2Interface" = "eni-0f937b4721d143bbf"	Lean nove
	"Bigip2subnet1Az2SelfEipAddress" = "34.215.219.51"	Go Back (Recommended) Advanced
	"availabilityZone1" = "us-west-2a"	
	"avallablilty/one/" = "US-West-2D" "biginEvtennalSecurity/Engurn" = "cg-2E6de270216ea9be1"	
	"bigipLater Maisecul (Lydroup = "sg-05002/0510ea80c1" "bigipManagementSecurityGroup" = "sg-04ce53b880cd526c2"	
	}	Websites prove their identity via certificates. Firefox does not trust this site because it uses a
	<pre>elb_dns_name = tf-elb-studentf5labdev-1462435346.us-west-2.elb.amazonaws.co</pre>	certificate that is not valid for 44.231.146.69.
	m	Error code: MOZILLA PKIX ERROR SELF SIGNED CERT
	Web1_address = $10.0.1.80$	
	f5admin@EC2AMAZ-00BMC1S:~/f5agilitv2020-pc101\$	View Certificate
503		Go Back (Recommended) Accept the Risk and Continue
× ws	Ubuntu-1804 Prostort & Q 5 A 0	
		- 1033 AM (-
ч.	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	토브 여종 1/23/2020 나니

Login to the Big-IP2 Configuration Utility (WebUI):

#### Username: admin

Password: f5letme1n



Look in the upper-left-hand corner. Note whether this is the active or standby unit.



**Attention:** Make sure Big-IP1 is active and Big-IP2 is standby before proceeding. To force Big-IP2 to standby: "Device Management" => "Devices" => bigip2.f5lab.dev => [Force to Standby].

# 1.5 Creating High Availability Virtual Servers in AWS

The F5 Virtual Edition can discover instances in AWS dynamically using tags.

# 1.5.1 Check example application is running

From the Visual Studio Code Terminal, invoke terraform output.

terraform output | grep Bigip1VipEipAddress

... Ctrl + click on the *Bigip1VipEipAddress*=. This is the same Elastic IP we just reviewed in the AWS Console.



We are using self-signed certificates in the lab. Bypass the TLS warnings. "Accept the Risk and Continue". You will see the example app.



# 1.5.2 Survive a fail-over event across Availability Zones

From the AWS Console, Services => EC2 => NETWORK & SECURITY => Elastic IPs. Note the Elastic IP address (public IPv4 address) mapping for the Secondary IP address of our **Active** Big-IP1 (10.0.1.x).

🔋 Elastic IP address   EC2 Manage 🗙 🚺	🎁 Instances   EC2 Managen	nent C × 🔓 BIG-IP® - ip-10-0-101-169.	us × 🚯 BIG-IP® - ip-10-0-102-232.	as-v 🗙 🔓 FS vLab	× +	🕂 📶 1cf7f459-b5b4-43d3	-b152-b9043ac61a15.access.udf.f5.com	_ 8 ×
÷) → 健 @	🛛 🔒 https://us-w	est-2.console.aws.amazon.com/ec2/v2/	"home?region=us-west-2#Addresses:				… ⊠ ☆	I\ 🗉 🛎 👪
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aws Services ~	Resource Group	is v 1≹				¢	udf @ 3460-2260-9392 👻 Oregon	• Support •
New EC2 Experience Tell us what you think	EC2 > Elastic	IP addresses > 54.70.100.164						
EC2 Dashboard New								
Events	Elastic IP a	addresses (5)				C	Actions 🔻 Allocate Elastic I	P address
Tags 4	An Elastic IP a	ddress is a static, public IPv4 address	that you allocate to your AWS accou	int and is reachable from the interr	net. Learn more 🔀			
Reports	Q						< -	⇒ ⊚
Umits								
INSTANCES	Nam	e Public IPv4 address	Allocation ID	Associated instance ID	Private IP address	Association ID	Network interface owner account ID	Network B
nstances		34.215.219.51	eipalloc-03a364f49e317be0c	i-051c921412a5534e0 🖸	10.0.2.40	eipassoc-0e1068d7c9345ed4b	346022609392	us-west-2
Launch Templates New		44.231.146.69	eipalloc-05f0ad803a83c3c83	i-051c921412a5534e0 🖸	10.0.102.232	eipassoc-045c185215dabba4b	346022609392	us-west-2
Spot Requests		44.231.46.113	eipalloc-0e8fea11367d098a2	i-0e3f0f09b2df5b557 🖸	10.0.1.33	eipassoc-020021d042250cfa1	346022609392	us-west-2
Savings Plans		44.232.76.46	eipalloc-01b5dfd68fb309e99	i-0e3f0f09b2df5b557	10.0.101.169	eipassoc-0d106675ab3e9fd8a	346022609392	us-west-2
Reserved Instances								
edicated Hosts		54.70.100.164	eipalloc-Obe5180D3c4091701	1-0e310109b2d15b557	10.0.1.248	eipassoc-08de2d863df8ca0db	346022609392	us-west-2
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Big-IP1 => Device Management => Devices => Self => [Force to Standby]. Click [OK] to confirm.

🎁 Elastic IP address   EC2 Manage 🗙 🔋	Instances   EC2 Management C 2	× (S BIG-IP® - ip-10-0-101-169.us-v × S BIG-IP® - ip-10-0-102-232.us-v	× 🕼 F5 vLab	× + 🗸	P all	1ct/1459-b5b4-43d3-b152-b9043ac61a15.a	cess.udf.f5.com	* * 7
(←) → C* @	🗊 🔒 =0 https://44.232.7	6.46/xui/?nocache=1579793577243				🖂 🏠	lii\ 🗊	: :: ≡
6 Getting Started O F5 Networks - GitH	ub 🖸 Releases - f5devcentral (	🗘 f5-cloud-iapps/f5-serv 🖨 bigip1.f5lab.dev (Did 🖨 bigip2.f5lab.dev (D	id O f5-aws-cloudformatio					
Hostname ip-10-0-101-169 us-west-2.comp IP Address 10.0.101.169	ute.internal Date Jan 23, 2026 Time 3:44 PM (UTC)	User admin Role: Administrator					Partition: Common 🕓	Log out
ONLINE (ACTIVE) In Sync Provisioning Warning								
Main Help About								
Statistics	🐡 👻 Properties Co	nfligSync Fallover Network Mirroring						
iApps	General Properties							
E Local Traffic	Name	Ip-10-0-101-169.us-west-2.compute.internal Change Device Name						
Acceleration	Description			1000				
Device Management	Location		Force this Device to standby?					
Operior	Contact							
Devices	Comment		N Cancel					
Device Groups	Hostname	ip-10-0-101-169.us-west-2.compute.internal	13					
Device Trust	Management IP Address	10.0.101.169						
Traffic Groups 💮	Alternate Management IP Address							
-	Serial Number	f06a28ec-8432-61fc-607d2d8a63ac						
Shared Objects	MAC Address	05:95:20:a4:74:52						
Retwork	Time Zone	UTC						
	Time Delta (sec)	0						
[ <u>₽</u> ♥] System	Platform ID	Z100						
	Platform Name	BIG-IP Virtual Edition						
	Software Version	BIG-IP v15.0.1 (Build 0.0.11)						
	Status	T/1 active						
	Active Modules	Markelpiace, AVF, 25 Mbps, Hourly (DFREMEO-MHOCFIQ)     Rate Bhaping     Gale Strapping     Microsoft (Compression, VE     Microsoft, ADD AVIS PC (027)XEEG-RCJOFYP)						
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Big-IP2 is now active.

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Addess Translation     I       Image: Acceleration     Image: Acceleration       Image: Device Management     Image: Acceleration       Image: Shared Objects     Image: Acceleration       Image: Metwork     Image: Acceleration	
Acceleration       Device Management       Shared Objects       Acceleration	
Emice Management  Shared Objects  Hetwork	
Shared Objects       Shared Objects	
Retwork	
F* System	

From the AWS Console, Services => EC2 => NETWORK & SECURITY => Elastic IPs. Note the Elastic IP address (public IPv4 address) mapping for the Secondary IP has changed to the new **Active** Big-IP2 (10.0.2.x). Hit the refresh icon in the upper-right-hand side a few times until you notice the change.

C	D A https://us-west-2.com	sole.aws.amazon.com/ec2/v2/	home?region=us-west-2#Add					
orted <b>O</b> F5 Networks - GitHu	ub 🞧 Releases - f5devcentral 🎧		nomenegion-us-west-2#Audresses:				… ⊠ ☆	III\ 🗉 🔅
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	Resource Groups 🐱	*					û udf @ 3460-2260-9392 ▼ Ore	gon 👻 Supp
C2 Experience								
shboard New	EC2 > Elastic IP addres	ses > 54.70.100.164						
_	Elastic IP address	es (5)					C Actions  Allocate Elast	c IP address
	An Elastic IP address is	a static, public IPv4 address	that you allocate to your AWS account	t and is reachable from the int	ernet. Learn more 🗹			
	Q						<	1 > @
ICES	Name	Public IPv4 address	Allocation ID	Associated instance ID	Private IP address	Association ID	Network interface owner accour	t ID Netw
Types		34.215.219.51	eipalloc-03a364f49e317be0c	i-051c921412a5534e0 🗹	10.0.2.40	eipassoc-0e1068d7c9345e	d4b 346022609392	us-we
Templates New		44.231.146.69	eipalloc-05f0ad803a83c3c83	i-051c921412a5534e0 🖸	10.0.102.232	eipassoc-045c185215dabb	a4b 346022609392	us-we
quests		44.231.46.113	eipalloc-0e8fea11367d098a2	i-0e3f0f09b2df5b557 🔀	10.0.1.33	eipassoc-020021d042250c	fa1 346022609392	us-we
Plans		44.232.76.46	eipalloc-01b5dfd68fb309e99	i-0e3f0f09b2df5b557 🔀	10.0.101.169	eipassoc-0d106675ab3e9f	d8a 346022609392	us-we
d Instances		54,70,100,164	einalloc-Obe518bb3c40917bf	i-051c921412a5534e0	10.0.2.121	eipassoc-0901470a7484de	0a3 346022609392	LIS-WE
d Hosts	<				3			
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asks	Cumment Terre							
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ts	Summary							
Manager	Public IPu4 address		Allocation ID		Association ID		Scope	
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Groups	Associated instance ID		Private IP address		Network interface ID		Network interface owner account ID	
PS New	i-051c921412a5534e0	2	10.0.2.121		eni-0f937b4721d143bbf 🖸		346022609392 🗇	
back 🙆 English (US	5)					© 2008 - 2020. Amazon Web S	ervices. Inc. or its attiliates. All rights reserved.	ivacy Policy Te

Back to the example app screen. We are using self-signed certificates in the lab. Bypass the TLS warnings. "Accept the Risk and Continue". You will see the example app now behind the new active Big-IP2.



**Attention:** The example application reports which Availability Zone is serving up the content (pool member), *not* which Availability Zone is hosting the active Big-IP.

# **1.6 Delete Environment in Fell Swoops**

The promise of declarative automation tools is that we can both quickly stand up *and* tear down environments.

# 1.6.1 Cleanup

Delete the S3 bucket.

AWS => Services => S3 => delete bucket.



Delete the CloudFormation Stack.

🔋 CloudFormation - Stack BIGIP- 🗙 🧃	Instances   EC2 Management C 🗙 🚯 BIG-IP® - ip=10-0-101 (1000) 🖶 🖬 🖬 Sectore 2	ct7f459-b5b4-43d3-b152-b9043ac61a15.access.udf.f5.com	- B × +	- ø ×
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### 1.6.2 Terraform destroy

From the Visual Studio Code Terminal, invoke terraform destroy.

```
terraform destroy --force -var 'bigip_admin_password=f5letme1n'
```



Confirm it's all gone. Review AWS => Services => ec2 => Instances.

Fin









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