F5 BIG-IP Virtual Edition (VE) on the AWS Cloud

Quick Start Reference Deployment

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F5 Networks, Inc.
AWS Quick Start Reference Team

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This Quick Start deployment guide was created by F5 Networks, Inc. in collaboration with Amazon Web Services (AWS).

Quick Starts are automated reference deployments that use AWS CloudFormation templates to deploy key technologies on AWS, following AWS best practices.

Quick Links

The links in this section are for your convenience. Before you launch the Quick Start, please review the architecture, security, and other considerations discussed in this guide.

- If you have an AWS account, and you’re already familiar with AWS services and BIG-IP Virtual Edition (VE), you can launch the Quick Start to build the architecture shown in Figure 1 in a new or existing virtual private cloud (VPC). The deployment takes approximately 30 minutes. If you’re new to AWS or to BIG-IP VE, please review the implementation details and follow the step-by-step instructions provided later in this guide.

- If you want to take a look under the covers, you can view the AWS CloudFormation templates that automate the deployment.
Overview

This Quick Start reference deployment guide provides step-by-step instructions for deploying an automatically scaled BIG-IP Virtual Edition (VE) solution on the AWS Cloud.

You can use this solution as a baseline, to build and test a proof of concept, or to create a production-ready solution. You can use the reference architecture to extend on-premises applications or to deploy new applications on AWS, by using the rich features of BIG-IP VE.

BIG-IP VE on AWS

BIG-IP VE is an application delivery and security services platform that is built to ensure speed, availability, and security for business-critical applications and networks. It enables intelligent L4-L7 load balancing and traffic management, robust network and web application firewalls, simplified application access, Domain Name System (DNS) services, and much more. For more information about BIG-IP VE, see the F5 website.

This Quick Start deploys an automatically scaled group of BIG-IP VE instances provisioned with Local Traffic Manager (LTM), which performs uniform resource identifier (URI) routing, Secure Sockets Layer (SSL) encryption, and automatic discovery of automatically scaled web applications.

You can customize this Quick Start by changing the configuration parameters. The Quick Start deploys a full working stack that you can inspect and use as a reference.

Costs and Licenses

You are responsible for the cost of the AWS services used while running this Quick Start reference deployment. There is no additional cost for using the Quick Start.

The AWS CloudFormation templates for this Quick Start include configuration parameters that you can customize. Some of these settings, such as instance type, will affect the cost of deployment. For cost estimates, see the pricing pages for each AWS service you will be using. Prices are subject to change.

Tip After you deploy the Quick Start, we recommend that you enable the AWS Cost and Usage Report to track costs associated with the Quick Start. This report delivers billing metrics to an Amazon Simple Storage Service (Amazon S3) bucket in your account. It provides cost estimates based on usage throughout each month, and finalizes the data at the end of the month. For more information about the report, see the AWS documentation.
This Quick Start uses an Amazon Machine Image (AMI) from AWS Marketplace for the BIG-IP VE software. You can choose an AMI based on three factors: license model, throughput, and bundling option.

- **License model:** Pay As You Go (PAYG) or Bring Your Own License (BYOL)*
- **Throughput:** 25 Mbps, 200 Mbps, 1 Gbps, or 5 Gbps
- **Bundle:** Good, Better, Best, or Per-App LTM

**Note** For a list of AMIs and links, see step 2 in the deployment instructions. If you're deploying the Quick Start for evaluation purposes, we recommend that you use the F5 BIG-IP Virtual Edition – Per-App LTM – (PAYG, 25 Mbps) AMI option.

* This Quick Start uses PAYG AMIs for a standalone, automatically scaled deployment. BYOL AMIs are for use with traditional static or F5 BIG-IQ managed deployments. For more information about other deployment options, see F5 Public Cloud Integrations on the F5 website. For more information about these licensing options, see K14810: Overview of BIG-IP VE license and throughput limits on the F5 website.

**Architecture**

Deploying this Quick Start for a new virtual private cloud (VPC) builds the following BIG-IP VE environment in the AWS Cloud. The illustrated architecture shows the optional demo applications.
The Quick Start sets up the following:

- A highly available architecture that spans two Availability Zones.*
- A virtual private cloud (VPC) configured with public and private subnets according to AWS best practices, to provide you with your own virtual network on AWS.*
- An internet gateway to allow access to the internet. This gateway is used by the bastion hosts to send and receive traffic.*
- In the public subnets, managed network address translation (NAT) gateways to allow outbound internet access for resources in the private subnets.*
- In the public subnets, a Linux bastion host in an Auto Scaling group to allow inbound Secure Shell (SSH) access to Amazon Elastic Compute Cloud (Amazon EC2) instances in public and private subnets.*
- A Network Load Balancer that provides inbound access to the BIG-IP VE Auto Scaling group via HTTPS load balancing over port 443.
- In the private subnets, BIG-IP VE instances in an Auto Scaling group, in active/active status. The BIG-IP VE instances filter and load-balance the traffic to the automatically scaled web application instances and keep track of those instances by using the service discovery tool. The automatically scaled BIG-IP instances use various AWS services, including the following:
  - Amazon CloudWatch, to send custom metrics for Auto Scaling
  - An Amazon Simple Storage Service (Amazon S3) bucket, to store cluster data and backup files
  - Amazon Simple Queue Service (Amazon SQS), for cluster members to communicate with one another
  - Amazon Simple Notification Service (Amazon SNS), to send updates for scaling events
  - AWS Lambda, to facilitate tearing down the deployment
- (Optional) In the private subnets, two simple web applications, named WebApp1 and WebApp2, in separate Auto Scaling groups. These web applications simulate a Multi-AZ web application farm that receives traffic from BIG-IP VE. When you launch the Quick Start, if you set the **Deploy Demo Web App** parameter to **No**, these instances aren’t deployed.

* The template that deploys the Quick Start into an existing VPC skips the tasks marked by asterisks and prompts you for your existing VPC configuration.

**Note** By default, the Quick Start creates single instances for BIG-IP and the web applications in the Auto Scaling groups. When you launch the Quick Start, you can set the number of minimum and maximum instances in the BIG-IP Auto Scaling group by changing parameter values.
Prerequisites

Specialized Knowledge

Before you deploy this Quick Start, we recommend that you become familiar with the following AWS services. (If you are new to AWS, see Getting Started with AWS.)

- Amazon EC2
- Amazon Elastic Block Store (Amazon EBS)
- Amazon VPC
- AWS CloudFormation
- Auto Scaling

Technical Requirements

To deploy this solution, you must have:

- An SSH key in AWS.
- Permissions to create AWS Identity and Access Management (IAM) roles. These roles are required for BIG-IP VE to interact with the AWS environment.
- Permissions to create SNS topics, SQS queues, S3 buckets, and Lambda functions, which are used to support clustering among the automatically scaled instances.
- A subscription to the AWS Marketplace products used in this Quick Start, including BIG-IP VE and (optionally) the demo application. For subscription instructions, see step 2 of the deployment steps.

Deployment Options

This Quick Start provides two deployment options:

- **Deploy BIG-IP VE into a new VPC** (end-to-end deployment). This option builds a new AWS environment consisting of the VPC, subnets, NAT gateways, security groups, bastion hosts, and other infrastructure components, and then deploys BIG-IP VE into this new VPC.

- **Deploy BIG-IP VE into an existing VPC**. This option provisions BIG-IP VE in your existing AWS infrastructure.

The Quick Start provides separate templates for these options. It also lets you configure CIDR blocks, instance types, and BIG-IP VE settings, as discussed later in this guide.
Deployment Steps

Step 1. Prepare Your AWS Account

1. If you don’t already have an AWS account, create one at [https://aws.amazon.com](https://aws.amazon.com) by following the on-screen instructions.

2. Use the region selector in the navigation bar to choose the AWS Region where you want to deploy BIG-IP VE on AWS.

3. Create a key pair in your preferred region.

4. If necessary, request a service limit increase for the Amazon EC2 m5.large instance type (or the instance type you’re planning to use for the BIG-IP VE instances). You might need to do this if you already have an existing deployment that uses the same instance type, and you think you might exceed the default limit with this deployment.

Step 2. Subscribe to the AMIs Used by the Quick Start

This Quick Start uses AWS Marketplace software for BIG-IP VE and requires that you accept the terms of the F5 license agreement within the AWS account where you plan to deploy the Quick Start.


2. Open the page for the desired F5 BIG-IP Virtual Edition offering by choosing one of the links in the following table.

When you launch the Quick Start in step 3, you will use the BIG-IP Image parameter to select the bundle and throughput option that matches your AMI subscription. The following table lists the AMI options and corresponding parameter settings. If you select **Good5000Mbps**, you must choose an instance size of c4.8xlarge or larger.

<table>
<thead>
<tr>
<th>AWS Marketplace AMI</th>
<th>Big-IP Image parameter setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>F5 BIG-IP Virtual Edition – Per-App LTM – (PAYG, 200 Mbps)</td>
<td>PerAppVeLtm200Mbps</td>
</tr>
<tr>
<td>F5 BIG-IP Virtual Edition – Good (PAYG, 25 Mbps)</td>
<td>Good25Mbps</td>
</tr>
<tr>
<td>F5 BIG-IP Virtual Edition – Good (PAYG, 200 Mbps)</td>
<td>Good200Mbps</td>
</tr>
</tbody>
</table>

**Note**  You can choose any of these PAYG/hourly images, but **F5 BIG-IP Virtual Edition – Per-App LTM – (PAYG, 25 Mbps)** is the most economical for evaluation purposes.
### AWS Marketplace AMI

| F5 BIG-IP Virtual Edition – Good (PAYG, 1 Gbps) | Good1000Mbps |
| F5 BIG-IP Virtual Edition – Good (PAYG, 5 Gbps) | Good5000Mbps |
| F5 BIG-IP Virtual Edition – Better (PAYG, 200 Mbps) | Better200Mbps |
| F5 BIG-IP Virtual Edition – Better (PAYG, 1 Gbps) | Better1000Mbps |
| F5 BIG-IP Virtual Edition – Better (PAYG, 5 Gbps) | Better5000Mbps |
| F5 BIG-IP Virtual Edition – Best (PAYG, 25 Mbps) | Best25Mbps |
| F5 BIG-IP Virtual Edition – Best (PAYG, 200 Mbps) | Best200Mbps |
| F5 BIG-IP Virtual Edition – Best (PAYG, 1 Gbps) | Best1000Mbps |
| F5 BIG-IP Virtual Edition – Best (PAYG, 5 Gbps) | Best5000Mbps |

3. On the AMI page, choose **Continue to Subscribe**.

![Figure 2: AWS Marketplace page for one of the BIG-IP VE AMIs](https://aws.amazon.com/marketplace/details/1537780574157/en/0-245ref=_slr,res_product_title)
4. Accept the terms of the license agreement, and exit out of AWS Marketplace without further action. **Do not** provision the software from AWS Marketplace—the Quick Start will deploy the AMI for you.

![Figure 3: Accepting the terms of the BIG-IP VE license agreement](image)

5. (Optional) If you want to deploy the demo web applications (by setting the **Deploy Demo Web App** parameter to **Yes** during deployment), repeat the previous steps to subscribe to the demo application in AWS Marketplace: **Ubuntu 18.04 LTS – Bionic**.

**Step 3. Launch the Quick Start**

**Note**  You are responsible for the cost of the AWS services used while running this Quick Start reference deployment. There is no additional cost for using this Quick Start. For full details, see the pricing pages for each AWS service you will be using in this Quick Start. Prices are subject to change.

1. Choose one of the following options to launch the AWS CloudFormation template into your AWS account. For help choosing an option, see deployment options earlier in this guide.

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deploy BIG-IP VE into a new VPC on AWS</td>
<td>Deploy BIG-IP VE into an existing VPC on AWS</td>
</tr>
<tr>
<td><img src="image" alt="Launch" /></td>
<td><img src="image" alt="Launch" /></td>
</tr>
</tbody>
</table>

**Important**  If you’re deploying BIG-IP VE into an existing VPC, make sure that your VPC has two private subnets in different Availability Zones for the database instances. These subnets require NAT gateways or NAT instances in their route tables, to allow the instances to download packages and software without exposing them to the internet. You will also need the domain name option configured in the DHCP options as explained in the [Amazon VPC documentation](#). You will be prompted for your VPC settings when you launch the Quick Start.
Each deployment takes about 30 minutes to complete.

2. Check the region that’s displayed in the upper-right corner of the navigation bar, and change it if necessary. This is where the network infrastructure for BIG-IP VE will be built. The template is launched in the US East (Ohio) Region by default.

3. On the **Select Template** page, keep the default setting for the template URL, and then choose **Next**.

4. On the **Specify Details** page, change the stack name if needed. Review the parameters for the template. Provide values for the parameters that require input. For all other parameters, review the default settings and customize them as necessary. When you finish reviewing and customizing the parameters, choose **Next**.

In the following tables, parameters are listed by category and described separately for the two deployment options:

- Parameters for deploying BIG-IP VE into a new VPC
- Parameters for deploying BIG-IP VE into an existing VPC

**Option 1: Parameters for deploying BIG-IP VE into a new VPC**

**View template**

**Network Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Availability Zones</strong> (availabilityZones)</td>
<td><strong>Requires input</strong></td>
<td>The list of Availability Zones to use for the subnets in the VPC. The Quick Start uses two Availability Zones from your list and preserves the logical order you specify.</td>
</tr>
<tr>
<td><strong>VPC CIDR</strong> (vpcCIDR)</td>
<td>10.0.0.0/16</td>
<td>The CIDR block for the VPC.</td>
</tr>
<tr>
<td><strong>Public Subnet 1 CIDR</strong> (publicSubnet1CIDR)</td>
<td>10.0.10.0/24</td>
<td>The CIDR block for the public (DMZ) subnet located in Availability Zone 1.</td>
</tr>
<tr>
<td><strong>Public Subnet 2 CIDR</strong> (publicSubnet2CIDR)</td>
<td>10.0.20.0/24</td>
<td>The CIDR block for the public (DMZ) subnet located in Availability Zone 2.</td>
</tr>
<tr>
<td><strong>Private Subnet 1 CIDR</strong> (privateSubnet1CIDR)</td>
<td>10.0.11.0/24</td>
<td>The CIDR block for the private subnet located in Availability Zone 1.</td>
</tr>
<tr>
<td><strong>Private Subnet 2 CIDR</strong> (privateSubnet2CIDR)</td>
<td>10.0.21.0/24</td>
<td>The CIDR block for the private subnet located in Availability Zone 2.</td>
</tr>
</tbody>
</table>
Amazon EC2 Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Pair Name (keyPairName)</td>
<td>Requires input</td>
<td>A public/private key pair, which allows you to connect securely to your instance after it launches. When you created an AWS account, this is the key pair you created in your preferred region.</td>
</tr>
<tr>
<td>Allowed Bastion External Access CIDR (remoteAccessCIDR)</td>
<td>Requires input</td>
<td>The CIDR IP range that is permitted to access the bastion host. We recommend that you set this value to a trusted IP range. For example, you might want to grant only your corporate network access to the software.</td>
</tr>
</tbody>
</table>

BIG-IP and Auto Scaling Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIG-IP Image (bigipImage)</td>
<td>PerAppVeLtm25 Mbps</td>
<td>The AWS Marketplace AMI to use for the BIG-IP deployment. This must match the AMI you subscribed to in step 2.</td>
</tr>
<tr>
<td>BIG-IP EC2 Instance Size (bigipInstanceType)</td>
<td>m5.large</td>
<td>The EC2 instance type to use for the BIG-IP instances. If you selected Good5000Mbps for the BIG-IP image, you must choose an instance size of c4.8xlarge or larger.</td>
</tr>
<tr>
<td>Management Port (bigipManagementGuiPort)</td>
<td>8443</td>
<td>The port for the BIG-IP management configuration utility. This must be a valid, unused port.</td>
</tr>
<tr>
<td>Minimum No. of Instances (bigipScalingMinSize)</td>
<td>1</td>
<td>The minimum number of BIG-IP instances you want to make available in the Auto Scaling group. You can choose 1-8 instances.</td>
</tr>
<tr>
<td>Maximum No. of Instances (bigipScalingMaxSize)</td>
<td>1</td>
<td>The maximum number of BIG-IP instances that will be created in the Auto Scaling group. You can choose 1-8 instances.</td>
</tr>
</tbody>
</table>

Application Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Name (application)</td>
<td>f5demoapp</td>
<td>The name of the application to deploy behind the proxy.</td>
</tr>
<tr>
<td>Application Pool Tag Key (applicationPoolTagKey)</td>
<td>f5demoapp</td>
<td>The pool tag key and tag values BIG-IP will use to detect the automatically scaled instances.</td>
</tr>
<tr>
<td>Application1 Pool Tag Value (application1PoolTagValue)</td>
<td>f5-demo-app-0.0.1</td>
<td>BIG-IP uses both the tag key and the tag values to discover new instances of the applications deployed behind the proxy, regardless of whether they are custom applications or the demo applications provided with this Quick Start. The default values represent the demo applications.</td>
</tr>
<tr>
<td>Application2 Pool Tag Value (application2PoolTagValue)</td>
<td>f5-demo-app-0.0.2</td>
<td></td>
</tr>
</tbody>
</table>
### Application Restricted Source Address

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application Restricted Source Address</strong> (applicationRestrictedSrcAddr)</td>
<td><strong>Requires input</strong></td>
<td>The CIDR IP range that is permitted to access the virtual service and web applications.</td>
</tr>
</tbody>
</table>

### Analytics:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Notification Email</strong> (notificationEmail)</td>
<td><strong>Requires input</strong></td>
<td>A valid email address. Auto Scaling event notifications will be sent to this address.</td>
</tr>
<tr>
<td><strong>Send Anonymous Statistics to F5</strong> (allowUsageAnalytics)</td>
<td>No</td>
<td>Set this parameter to <strong>Yes</strong> to send anonymous statistics to F5 to help determine how to improve solutions. If you keep the default setting, statistics are not sent.</td>
</tr>
</tbody>
</table>

### Web App Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Deployment Name</strong> (deploymentName)</td>
<td>f5awsqs</td>
<td>The name to use as a prefix for object names in the web applications. This is a 1-25 character string. If you’re deploying the Quick Start multiple times in the same environment, make sure to use a unique name.</td>
</tr>
<tr>
<td><strong>Deploy Demo Web App</strong> (deployDemoWebApp)</td>
<td>No</td>
<td>Set this parameter to <strong>Yes</strong> if you want to deploy the two demo web applications (WebApp1 and WebApp2). If you choose <strong>Yes</strong>, make sure that you have subscribed to the AMI for the web applications (<strong>Ubuntu 18.04 – Bionic</strong>) in AWS Marketplace.</td>
</tr>
</tbody>
</table>

### AWS Quick Start Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quick Start S3 Bucket Name</strong> (QSS3BucketName)</td>
<td>quickstart-reference</td>
<td>The S3 bucket you have created for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. The bucket name can include numbers, lowercase letters, uppercase letters, and hyphens, but should not start or end with a hyphen.</td>
</tr>
<tr>
<td><strong>Quick Start S3 Key Prefix</strong> (QSS3KeyPrefix)</td>
<td>quickstart-f5-big-ip-virtual-edition/</td>
<td>The <strong>S3 key name prefix</strong> used to simulate a folder for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. This prefix can include numbers, lowercase letters, uppercase letters, hyphens, and forward slashes.</td>
</tr>
</tbody>
</table>
• **Option 2: Parameters for deploying BIG-IP VE into an existing VPC**

**View template**

**Network Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPC ID (vpc)</td>
<td>Requires input</td>
<td>The ID of your existing VPC (e.g., vpc-0343606e).</td>
</tr>
<tr>
<td><strong>Availability Zones</strong> (availabilityZones)</td>
<td>Requires input</td>
<td>The list of Availability Zones to use for the subnets in the VPC. The Quick Start uses two Availability Zones from your list and preserves the logical order you specify.</td>
</tr>
<tr>
<td><strong>Private Subnet 1 ID</strong> (privateSubnet1ID)</td>
<td>Requires input</td>
<td>The ID of the private subnet in Availability Zone 1 in your existing VPC (e.g., subnet-a0246dcd).</td>
</tr>
<tr>
<td><strong>Private Subnet 2 ID</strong> (privateSubnet2ID)</td>
<td>Requires input</td>
<td>The ID of the private subnet in Availability Zone 2 in your existing VPC (e.g., subnet-b58c3d67).</td>
</tr>
<tr>
<td><strong>Public Subnet 1 ID</strong> (publicSubnet1ID)</td>
<td>Requires input</td>
<td>The ID of the public subnet in Availability Zone 1 in your existing VPC (e.g., subnet-a0246dcd).</td>
</tr>
<tr>
<td><strong>Public Subnet 2 ID</strong> (publicSubnet2ID)</td>
<td>Requires input</td>
<td>The ID of the public subnet in Availability Zone 2 in your existing VPC (e.g., subnet-b58c3d67).</td>
</tr>
</tbody>
</table>

**Amazon EC2 Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Pair Name</strong> (keyPairName)</td>
<td>Requires input</td>
<td>A public/private key pair, which allows you to connect securely to your instance after it launches. When you created an AWS account, this is the key pair you created in your preferred region.</td>
</tr>
<tr>
<td><strong>Allowed Internal Access CIDR</strong> (restrictedSrcAddress)</td>
<td>Requires input</td>
<td>The CIDR IP range that is permitted to access BIG-IP’s management port. We recommend that you set this value to a trusted IP range. For example, you might want to grant only your corporate network access to the software.</td>
</tr>
</tbody>
</table>

**BIG-IP and Auto Scaling Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIG-IP Image</strong> (bigipImage)</td>
<td>PerAppVeLtm25Mbps</td>
<td>The AWS Marketplace AMI to use for the BIG-IP deployment. This must match the AMI you subscribed to in step 2.</td>
</tr>
<tr>
<td><strong>BIG-IP EC2 Instance Type</strong> (bigipInstanceType)</td>
<td>m5.large</td>
<td>The EC2 instance type to use for the BIG-IP instances. If you selected <strong>Good5000Mbps</strong> for the BIG-IP image, you <strong>must</strong> choose an instance size of c4.8xlarge or larger.</td>
</tr>
<tr>
<td><strong>Management Port</strong> (bigipManagementGuiPort)</td>
<td>8443</td>
<td>The port for the BIG-IP management configuration utility. This must be a valid, unused port.</td>
</tr>
<tr>
<td>Parameter label (name)</td>
<td>Default</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Minimum No. of BIG-IP Instances</td>
<td>1</td>
<td>The minimum number of BIG-IP instances you want to make available in the Auto Scaling group. You can choose 1-8 instances.</td>
</tr>
<tr>
<td>(bigipScalingMinSize)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum No. of BIG-IP Instances</td>
<td>1</td>
<td>The maximum number of BIG-IP instances that will be created in the Auto Scaling group. You can choose 1-8 instances.</td>
</tr>
<tr>
<td>(bigipScalingMaxSize)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Application Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Name</td>
<td>f5demoapp</td>
<td>The name of the application to deploy behind the proxy.</td>
</tr>
<tr>
<td>(application)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application Pool Tag Key</td>
<td>f5demoapp</td>
<td>The pool tag key and tag values BIG-IP will use to detect the automatically scaled instances.</td>
</tr>
<tr>
<td>(applicationPoolTagKey)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application1 Pool Tag Value</td>
<td>f5-demo-app-o.0.1</td>
<td>BIG-IP uses both the tag key and the tag values to discover new instances of the applications deployed behind the proxy, regardless of whether they are custom applications or the demo applications provided with this Quick Start. The default values represent the demo applications.</td>
</tr>
<tr>
<td>(application1PoolTagValue)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application2 Pool Tag Value</td>
<td>f5-demo-app-o.0.2</td>
<td></td>
</tr>
<tr>
<td>(application2PoolTagValue)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application Restricted Source Address</td>
<td>Requires input</td>
<td>The CIDR IP range that is permitted to access the virtual service and web applications.</td>
</tr>
<tr>
<td>(applicationRestrictedSrcAddr)</td>
<td></td>
<td></td>
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</table>

**Analytics:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notification Email</td>
<td>Requires input</td>
<td>A valid email address. Auto Scaling event notifications will be sent to this address.</td>
</tr>
<tr>
<td>(notificationEmail)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Send Anonymous Statistics to F5</td>
<td>No</td>
<td>Set this parameter to Yes to send anonymous statistics to F5 to help determine how to improve solutions. If you keep the default setting, statistics are not sent.</td>
</tr>
<tr>
<td>(allowUsageAnalytics)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Web App Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deployment Name</td>
<td>f5awsqs</td>
<td>The name to use as a prefix for object names in the web applications. This is a 1-25 character string. If you're deploying the Quick Start multiple times in the same environment, make sure to use a unique name.</td>
</tr>
<tr>
<td>(deploymentName)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Parameter label (name) | Default | Description
---|---|---
**Deploy Demo Web App** (deployDemoWebApp) | No | Set this parameter to **Yes** if you want to deploy the two demo web applications (WebApp1 and WebApp2). If you choose **Yes**, make sure that you have subscribed to the AMI for the web applications (Ubuntu 18.04 – Bionic) in AWS Marketplace.

### AWS Quick Start Configuration:

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Start S3 Bucket Name (QSS3BucketName)</td>
<td>quickstart-reference</td>
<td>The S3 bucket you have created for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. The bucket name can include numbers, lowercase letters, uppercase letters, and hyphens, but should not start or end with a hyphen.</td>
</tr>
<tr>
<td>Quick Start S3 Key Prefix (QSS3KeyPrefix)</td>
<td>quickstart-f5-big-ip-virtual-edition/</td>
<td>The S3 key name prefix used to simulate a folder for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. This prefix can include numbers, lowercase letters, uppercase letters, hyphens, and forward slashes.</td>
</tr>
</tbody>
</table>

5. On the **Options** page, you can **specify tags** (key-value pairs) for resources in your stack and **set advanced options**. When you’re done, choose **Next**.

6. On the **Review** page, review and confirm the template settings. Under **Capabilities**, select the check box to acknowledge that the template will create IAM resources.

7. Choose **Create** to deploy the stack.

8. Monitor the status of the stack. When the status is **CREATE_COMPLETE**, the BIG-IP VE cluster is ready.

### Step 4. Test the Deployment Using the Demo Applications

When the Quick Start has been deployed successfully, traffic goes through an AWS Network Load Balancer to BIG-IP VE instances in an Auto Scaling group. If you deploy the optional web applications by choosing **Yes** for the **Deploy Demo Web App** parameter, the traffic then goes to web servers, which are also in other Auto Scaling groups.

We refer to the web servers in this deployment as WebApp1 and WebApp2. They are differentiated by the background color and version of the demo application, as shown in Figures 4 and 5.

WebApp1 runs version f5-demo-app:0.0.1 and has a blue background.
Figure 4: WebApp1 (f5-demo-app:0.0.1)

WebApp2 runs version f5-demo-app:0.0.2 and has a green background.

Figure 5: WebApp2 (f5-demo-app:0.0.2)

To test the deployment, you'll connect to WebApp1 and confirm that it changes to WebApp2 after your modifications.
**Connect to WebApp1**

When the master CloudFormation stack status is **CREATE_COMPLETE** for all the nested stacks, you can test the application:

1. In the **Outputs** tab of the master stack, find the **appUrl** key, as shown in Figure 6.

   ![Figure 6: DNS name to access the web application](image)

2. Click the URL next to the key, or copy and paste it into a web browser.

3. The application uses a self-signed certificate by default. Follow your web browser’s instructions to click through the SSL warnings.

   For example, the Chrome browser displays a certificate error page, as shown in Figure 7. Choose **Advanced** to expand the page, as shown in Figure 8. To access the web application, follow the link at the bottom of the page, as highlighted in Figure 8.
You will be directed to WebApp1, which has a blue screen, as shown earlier in Figure 4.

**Connect to BIG-IP VE**

Because you cannot access the BIG-IP VE instance from outside the VPC, you will need to use a Linux bastion host to connect to BIG-IP VE.

1. Find the public IP of the bastion host:
   a. In the [AWS CloudFormation console](https://console.aws.amazon.com/cloudformation/home), choose the master stack, choose the **Outputs** tab, and find the value of **bastionAutoscaleGroup**.
b. In the Amazon EC2 console, choose Auto Scaling Groups, and type BastionStack in the filter box. Choose the Auto Scaling group that’s displayed.

c. On the Auto Scaling group’s Instances tab, choose an instance ID. Note the IPv4 public IP in the Description tab of that instance. You will need that IP to construct the SSH command.

2. Find the private IP of BIG-IP:

a. In the AWS CloudFormation console, choose the master stack, choose the Outputs tab, and find the value of bigipAutoscaleGroup.

b. In the Amazon EC2 console, choose Auto Scaling Groups, and type BIGIPStack in the filter box. Choose the Auto Scaling group that’s displayed.

c. On the Auto Scaling Group’s Instances tab, choose the instance ID that has Scale-In protection enabled. Note the IPv4 private IP in the Description tab of that instance. You will need it to construct the SSH command.

![Auto Scaling Group Details](image)

Figure 9: BIG-IP Selection for the Login

3. Connect to BIG-IP.

You can connect to BIG-IP VE either through the command line interface (CLI) or through the graphical user interface (GUI).

**CLI:**

From your desktop client or shell, create an SSH tunnel, replacing the variables in brackets as appropriate:
This will use the bastion host as a proxy and take you directly to the BIG-IP shell.

For example:

```
ssh -i [keyname-passed-to-template.pem] -o ProxyCommand='ssh -i [keyname-passed-to-template.pem] -W %h:%p ubuntu@[BASTION-HOST-PUBLIC-IP]' admin@[BIG-IP-HOST-PRIVATE-IP]
```

GUI:

Type in the following command, replacing the variables in brackets as appropriate:

```
ssh -i [keyname-passed-to-template.pem] ubuntu@[BASTION-HOST-PUBLIC-IP] -L 8443:[BIG-IP-HOST-PRIVATE-IP]:8443
```

For example:

```
ssh -i mykey.pem ubuntu@18.215.65.86 -L 8443:10.0.21.7:8443
```

4. Open a browser on your desktop:

   https://localhost:8443

5. You will see a certificate error message similar to the one you encountered earlier for the web application. Follow the steps shown in Figures 7 and 8.

6. Log in to the BIG-IP management GUI:

   username: quickstart
   password: [instance-id of BIG-IP VE]
7. Change the password for the user **quickstart** by choosing **System, Users** in the menu. When you update the password, the system will log you out. Log back in with the new password.

**Modify the Deployment**

BIG-IP’s virtual service is configured through its declarative API, which is called the Application Services 3 Extension (AS3). The example virtual service consists of an HTTPS wildcard virtual listener on port 443. The service uses an SSL profile, a URI routing policy, and the service discovery feature, which searches for tags on instances or network interface cards (NICs or AWS elastic network interfaces) to populate its pool members. If you would like to modify this configuration (for example, if you didn’t deploy the example demo applications and would like to point the service at your own application), see **Test 2**. For more information on configuration options, see the [Application Services 3 Extension documentation](https://f5.com) on the F5 website.

**Test 1: Evaluate the URI routing policy**

1. In WebApp1 (with the blue background), choose the **API** tab.

   Notice that the window turns green. This is because requests are being directed to the second pool, which contains WebApp2. In this case, the second pool contains a different version of the same application or service, but a route would typically point to a pool with a different service.

   You can see this redirection by inspecting pool statistics in BIG-IP VE.

   **CLI:**

   ```bash
   admin@(ip-10-0-21-7)(cfg-sync In Sync)(Active)(/Common)(tmos)# cd /tenant/https_virtual
   admin@(ip-10-0-21-7)(cfg-sync In Sync)(Active)(/tenant/https_virtual)(tmos)# show ltm pool
   ```

   **GUI:**

   In BIG-IP, choose **Local Traffic, Pools**. The window won’t display any pools until you choose **Partition, tenant** from the upper-right corner of the window.

2. When the two pools appear, choose **Statistics**.
3. You can also inspect the forwarding policy and statistics on each rule by choosing **Local Traffic, Policies, forward_policy**.

4. Choose any other tab to return to WebApp1.
Test 2: Evaluate the blue-green scenario by upgrading from f5-demo-app:0.0.1 to f5-demo-app:0.0.2

In this test, you will evaluate the blue-green upgrade. In our case, the default pool points to WebApp1 (version f5-demo-app:0.0.1). After the upgrade, the default becomes WebApp2 f5-demo-app:0.0.2. To perform this upgrade, follow these steps:

1. Open a bash shell with connectivity to BIG-IP’s management UI. This could be a local client (assuming you have access via the tunnel discussed previously), the bastion host, or BIG-IP. (To use BIG-IP’s bash shell, type `bash`.)

   ```bash
   admin@(ip-10-0-21-7)(cfg-syn) In Sync(Active)(/tenant/https_virtual)(tmos)# bash
   ```

2. Obtain the virtual server definition from the BIG-IP host’s REST API and output it to a file:

   ```bash
   #!/bin/bash
   bigip_username=quickstart
   bigip_password=i-0fa6d0e62c763ea6d
   bigip_host=10.0.21.7 # (or localhost if using tunnel)
   bigip_port=8443

   # GET
   curl -sk -u ${bigip_username}:${bigip_password} -H "Content-type: application/json" -X GET https://${bigip_host}:${bigip_port}/mgmt/shared/appsvcs/declare | python -m json.tool > virtual_service_definition.json
   ```

   If you’re on BIG-IP, you can also use the example definition file for the Quick Start, which is located at /config/cloud/aws/virtual_service_definition.json.

3. Edit the `virtual_service_definition.json` file and increment the values in the `tagValue` fields:

   ```json
   "tagKey": "f5demoapp",
   "tagValue": "f5-demo-app-0.0.1",
   ```

   For example, there are two pools in this definition. Change "f5-demo-app-0.0.1" to "f5-demo-app-0.0.2" and "f5-demo-app-0.0.2" to "f5-demo-app-0.0.3".
**Note**  If you deployed the Quick Start without the demo applications, you can change the tags to search for something in your environment instead:

```
"tagKey": "aws:autoscaling:groupName",
"tagValue": "yourapp-v001",
```

For more information on configuration options, see the Application Services 3 Extension documentation on the F5 website.

4. Update the virtual service definition in the BIG-IP host’s REST API:

```
# POST
curl -sk -u ${bigip_username}:${bigip_password} -H "Content-type: application/json" -X POST -d @virtual_service_definition.json https://${bigip_host}:${bigip_port}/mgmt/shared/appsvcs/declare | python -m json.tool
```

5. Review the output to confirm that the values have changed.

Now if you open the URL associated with the appURL key, you’ll notice that the default home page is going to the second pool, as indicated by the green screen.

**Best Practices for Using BIG-IP VE on AWS**

BIG-IP VE is similar to BIG-IP; for information about best practices, see the BIG-IP documentation on the F5 website.

For information about configuration details that apply to BIG-IP VE, see BIG-IP VE in AWS User’s Guide on the F5 website.

**Troubleshooting**

**Q.** I encountered a CREATE_FAILED error when I launched the Quick Start.

**A.** If AWS CloudFormation fails to create the stack, we recommend that you relaunch the template with Rollback on failure set to No. (This setting is under Advanced in the AWS CloudFormation console, Options page.) With this setting, the stack’s state will be retained and the instance will be left running, so you can troubleshoot the issue. (Look at the log files in %ProgramFiles%\Amazon\EC2ConfigService and C:\cfn\log.)
Important When you set Rollback on failure to No, you will continue to incur AWS charges for this stack. Please make sure to delete the stack when you finish troubleshooting.

For additional information, see Troubleshooting AWS CloudFormation on the AWS website.

Q. I encountered a size limitation error when I deployed the AWS CloudFormation templates.

A. We recommend that you launch the Quick Start templates from the location we’ve provided or from another S3 bucket. If you deploy the templates from a local copy on your computer or from a non-S3 location, you might encounter template size limitations when you create the stack. For more information about AWS CloudFormation limits, see the AWS documentation.

Git Repository

The Quick Start uses AWS CloudFormation templates to build the AWS infrastructure and to deploy BIG-IP VE. You can visit our GitHub repository to download the templates and scripts, to post your comments, and to share your customizations with others.

In addition to this Quick Start, F5 provides several other AWS CloudFormation templates for creating BIG-IP VE solutions on AWS. These templates are maintained and supported for customers who have an active support contract and can also be used as a reference architecture for custom deployments. For more information about these templates, see F5 Public Cloud Integrations on the F5 website.

Additional Resources

AWS services

- Amazon EBS
- Amazon EC2
  https://aws.amazon.com/documentation/ec2/
- Amazon VPC
  https://aws.amazon.com/documentation/vpc/
• AWS CloudFormation
  https://aws.amazon.com/documentation/cloudformation/

• Elastic Load Balancing
  https://aws.amazon.com/documentation/elastic-load-balancing/

• Auto Scaling
  https://aws.amazon.com/documentation/autoscaling/

BIG-IP VE documentation

• BIG-IP VE in AWS documentation
  https://clouddocs.f5.com/cloud/public/v1/aws_index.html
  K14810: Overview of BIG-IP VE license and throughput limits

• F5 Network’s official repository for AWS CloudFormation templates
  https://github.com/f5networks/f5-aws-cloudformation

• Application Services Extension

Quick Start reference deployments

• AWS Quick Start home page
  https://aws.amazon.com/quickstart/

Document Revisions

<table>
<thead>
<tr>
<th>Date</th>
<th>Change</th>
<th>In sections</th>
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<tbody>
<tr>
<td>December 2018</td>
<td>Added instructions for subscribing to the AWS Marketplace AMI for the demo applications</td>
<td>Step 2</td>
</tr>
<tr>
<td>November 2018</td>
<td>Initial publication</td>
<td>—</td>
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