**SBIT Documentation**

Update, polish, and reorganize later

Before using SBIT, you must create an account with Amazon Web Services. You can do thing by going to <https://aws.amazon.com/> and clicking on ‘Sign-Up.’ Once you have an account there are a few tasks that you must complete before running the SBIT script. These are listed below.

**Before…**

**Create an IAM User:**

Before execution of SBIT, users should create a separate IAM user with administrative access:

1. Log in to your AWS console.
2. Scroll down to the section titled **Security, Identity & Compliance** and click on the **IAM** link.
3. In the Navigation Pane on the left, click **Groups**.
4. Click the **Create New Group** Button.
5. Give the group a meaningful name (for example, ‘Administrators’). Click Next.
6. In the search/filter box, type ‘AdministratorAccess’ and tick the box next to **AdministratorAccess**. Click Next.
7. Click **Create Group**.
8. In the Navigation Pane, click **Users**.
9. Click **Add User**.
10. Give the user a name.
11. Under **Select AWS Access Type**, tick both boxes.
12. Give the user a custom password.
13. Untick **Require password reset**. Click Next.
14. Click **Add user to group**.
15. Tick the box next to the group you created in Steps 3-7. Click Next.
16. Verify the information and click **Create User**.
17. Make a note of the user’s Access Key and Secret Key. These are needed in order to use SBIT. Keep these stored in a safe place; if the secret key is lost or otherwise compromised, your account may be vulnerable. At the very least, you will have to generate a new user.
18. Click Close.

**Create a Key Pair:**

1. Log into your AWS Console.
2. Find the **Compute** section and click the **EC2** link.
3. In the Navigation Pane, under **Network and Security**, click **Key Pairs**.
4. Click **Create Key Pair**.
5. Give the key pair a name. The name has little impact but should be meaningful.
6. Be sure to download the key file as you CANNOT download it later. This will be the last time you can download the key file. The key file must be stored in a secure location. If the key file is lost, you must regenerate a new key and must use the AWS Console to reconfigure all instances to use the new key.
7. The name of this key pair will need to be entered when running SBIT.

Note: SBIT will use this one key pair to secure access to all instances. Again, all instances will use the same key file to secure access.

**Configuring AWS CLI:**

After a separate IAM account has been created and enabled for programmatic access, the Access and Secret Access Keys must be configured in the AWS CLI.

1. Install Python 3.6.4 onto the computer from which SBIT will be run.
2. Follow Amazon’s online documentation to install the AWS CLI.
3. Install Boto3 (the Python SDK for AWS).
4. Once these three things are installed, open a **Command Prompt**. This can be done by pressing the Windows key and typing **cmd**.
5. When the Command Prompt opens, type **aws configure** and press enter.
6. Enter the Access Key, Secret Key, AWS Region, and Output Format when prompted.
7. When finished, you can close the Command Prompt.

\*Note: The AWS Region determines where the instances created by SBIT will be placed. This should generally be the nearest AWS region to your on-site location. The output type determines how information is returned to the user and is more or less unimportant to the execution of SBIT.

**During…**

**Required Information (from user):**

Before execution of SBIT, users must have the following information available. The SBIT script will ask for all of the following information. (Actual prompt text is included in italics.)

**Domain name:**

*Enter your Domain Name (Ex. "example.com"):*

* If you want the domain name to be accessible by the public, for a web server for example, you should purchase a domain name from any reputable domain name registrars. I can personally use GoDaddy.
* If you do not want the domain to be accessible by the public and the domain will be entirely private, you can choose any domain name that you would like, within the standard domain naming rules.

\*Note: At the current stage of development on SBIT, this domain can be anything. Currently, there are no components that need public DNS records, therefore you don’t need to worry about someone else having your domain name.

**NetBIOS Name of the Domain:**

*Enter the NetBIOS name of the domain (Ex. "EXAMPLE"):*

* This is a shortened version of the domain name and is required for certain steps in SBIT. This name is typically the domain name in all capital letters without the root domain attached.
* Ex. The ‘example.com’ domain name would usually have ‘EXAMPLE’ as the NetBIOS name.

**Key Pair name:**

*Enter the name of the Key Pair (used when accessing instances):*

* You will need the key pair in order to access instances. You must have this in order to manage your servers.
* The key pair must be created before the script is executed. See Create a Key pair

**Number of Domain Controllers:** (Currently, the script only supports 2 DCs. The number entered here isn’t used.)

*How many Domain Controllers? [Leave blank to use default of 2]:*

* Default: 2
* Can be anywhere between 2 and 8,
  + Two provides redundancy and availability, enough for most very small businesses
  + Four provides even more redundancy
  + More than 4 is likely overkill for most target businesses, save those with extremely high employee counts
* This number will be split across two availability zones

**Number of File Servers:** (Currently, the script only supports 2 FSs. The number entered here isn’t used.)

*How many File Servers? [Leave blank to use default of 2]:*

* Default: 2
* Can be anywhere between 2 and 4
* These will be split across two availability zones

**File Server Storage:** (Currently, this number isn’t validated.)

*How much storage would you like (in GiBs) on file servers?:*

* The size of the second volume (“extra drives”) which will be added to file servers, specifically for shares
* Can be between 10 (GiB) and 1500 (GiB), no default
* Currently, doesn’t actually make a second drive.

**Exchange Server Storage:**

*How much storage would you like (in GiBs) on the Exchange server?:*

* This parameter determines the size of the root volume (the size of the C drive). This is needed as the default size of 30GB is not enough to install Exchange.

Note: 33 is the minimum number that should be entered here. Much more should be entered if the environment is to be used in actual production. 33GB is only enough for basic testing and should not be used in a production deployment.

**Instance Types:**

*Enter the instance type to use for Domain Controllers [Default: t2.micro]:*

*Enter the instance type to use for File Servers [Default: t2.micro]:*

*Enter the instance type to use for Exchange servers [Default: r4.large]:*

* DCs, File, and Exchange servers can be set independently
* Instance type determines resources available to server (memory, cpu, etc.) as well as cost.
* Type r4.large is the lowest recommended size for Exchange servers. I have tested with smaller (cheaper) instances, but the Exchange installation or configuration fails, or problems arise without enough resources.
* Type t2.micro lies within the free tier. For the first year of AWS use, users are granted up to 750 hours of free t2.micro use per month. Charges for other services or licenses may still apply.

**Domain Administrator Username and Password:** (Currently, passwords are NOT secured.)

*Enter a username for the domain administrator account (separate account from the default "Administrator" account):*

*Enter a password for the domain administrator account:*

* Domain Admin user will be added to domain and given domain admin permissions
* Safer/more secure than using default Admin account

Note: Without this secondary domain admin user, I would need to halt script execution after the Active Directory was configured and ask the user for the default Windows password of the DC1 domain controller instance. This is because the DC1 default password is the password of the default Domain Administrator account. This secondary user allows me to gather information once, and only once, from the user.

**Domain Restore Mode Password:** (Currently, passwords are NOT secured.)

*Enter a password for Active Directory Restore Mode:*

* Required for Active Directory
* Allows users to put domain in “Restore Mode” in case of server impairment or possible attack.

**Static, Publicly-Routable IP Address:**

*Enter the public IP of the firewall:*

* This can typically be obtained from an ISP. This component is required to create the site-to-site VPN, which gives the on-premise network access to the SBIT environment.
* This IP CANNOT be a private IP (see RFC 1918).
* This IP can reside behind a device performing NAT translation. (Likely needs special configuration)

**After…**

**Configure Palo Alto FW:**

Before anything may be done with the firewall, you must have access to the device to manage it. Follow these steps to get access to the web console and import a pre-built configuration. The pre-built configuration sets up a site-to-site VPN between your firewall and AWS, giving you access to your servers.

Note: These instructions have been tested with the Palo Alto VM-Series Firewall. The steps should be identical for physical devices; however, they have not been tested on such devices.

1. Connect the firewall device to the network. You should follow the manufacturer’s instruction on how best to do this.
2. Connect to the device, either through the console port on the device, or via SSH session. If using the VM-Series firewall, you can simply use your hypervisor’s built-in virtual desktop connection (Note: The name of this feature may differ based on the hypervisor.)
   1. The default Palo Alto admin credentials are as follows:
      1. Username: **admin**
      2. Password: **admin**
3. Run the following commands in the firewall’s command line:

**configure**

**set deviceconfig system type static**

**set deviceconfig system ip-address 10.0.52.2 netmask 255.255.255.0 default-gateway 10.0.52.1**

These commands configure the device with an IP address so that it can be managed through the web console.

1. Go to **https://10.0.52.2/** and log in with the Username and Password from above.
2. Click **OK** to ignore the warning. The warning says that you should change the default administrator password. We will do this in an upcoming step.
3. If a series of welcome popups appear, click **Close**.
4. Click **Device** on the top navigation bar.
5. In the action pane, click the **Operations** subtab.
6. Click **Import named configuration snapshot**.
7. Click browse and navigate to the SBIT folder and select the **SBIT-PA-config.xml** file. Click **Open**, then **OK**.
8. When the import is complete, click **Load named configuration snapshot**.
9. Click the dropdown arrow and select the **SBIT-PA-config.xml** file that you just imported.
10. Leave the *Decryption Key* field empty and click **OK**.
11. Click **Administrators** in the left navigation pane. Click **admin** in the action pane. Enter **#Disaster8dR** as the *Old Password*. Enter a new password for the **admin** user. This password should be at least 8 characters in length and should contain at least one uppercase letter, lowercase letter, number, and symbol.
12. You may want to create another administrative user. To do this, click **Add** in the bottom left corner of the action pane.
13. Click **Commit** in the upper right corner of the console and click **OK** to apply the changes.

Note: Once the changes have been committed, you should disable DHCP on any wireless routers (or similar devices running the DHCP service). Part of the above configuration creates a DHCP server that integrates with SBIT. Any other DHCP servers must be disabled or network connectivity issues may arise.

**Customize Configuration:**

Before the firewall can properly communicate with the AWS environment created by SBIT, you must change a few fields with your custom information.

1. Log into your AWS management console and navigate to the **Console Home**.
2. Scroll down to the section titled **Networking & Content Delivery**.
3. Click **VPC**.
4. In the navigation pane on the left, find the **VPN Connections** section and select **VPN Connections**.
5. Check the box to select **SBIT VPN Connection**.
6. Click **Download Configuration**.
7. Select **Palo Alto Networks** for the *Vendor*.
8. Select **PA Series** for the *Platform*.
9. Select **PANOS 7.0+** for the *Software*.
10. Click **Download** and save the configuration information in the SBIT folder.

You will need some of the information contained in this configuration file for the VPN connection. (I recommend using Notepad++, or some other text editor that displays line numbers, as I will be referencing the line numbers of specific information in the following steps.)

To change your public IP:

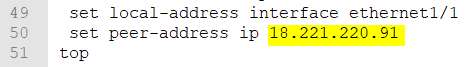
1. Go to **https://10.0.52.2**/ and log in with the **admin** username and password.
2. Click **Objects** in the top navigation bar.
3. Click **Addresses** in the left navigation pane.
4. Click **External Interface Address** and change **69.27.22.232/24** to your public IP and subnet. You should have acquired this information from your ISP (or from whomever you were assigned your public IP).

To change the Peer Addresses and Pre-Shared Keys:

1. Go to **https://10.0.52.2**/ and log in with the **admin** username and password.
2. Click **Network** in the top navigation bar.
3. Expand the **Network Profiles** section in the left navigation pane.
4. Click **IKE Gateways**.
5. Click **SBIT-Ike-GW-0**.
6. Replace the **Pre-shared Key** and **Confirm Pre-shared Key** with the string of random characters found at the end of *Line 47* of the VPN Configuration file you downloaded earlier.



1. Replace the **Peer IP Address** with the IP address found on *Line 50* in the VPN Configuration file.



1. Click **OK**.
2. Click **SBIT-Ike-GW-1**.
3. Replace the **Pre-shared Key** and **Confirm Pre-shared Key** with the string of random characters found at the end of *Line 188* of the VPN Configuration file you downloaded earlier. (See example figure for step 6.)
4. Replace the **Peer IP Address** with the IP address found on *Line 191* in the VPN Configuration file. (See example figure for step 7.)
5. Click **OK**.
6. Click **Commit** in the top right corner of the console and click **OK** to apply the changes.

**Create GP VPN:**

Follow the next steps if you would like (or need) a Remote Access VPN into your network. (Palo Alto’s implementation of this type of VPN is called GlobalProtect)

Device > Certificate Management > Certificates

Generate CA Cert

Click Generate

Name doesn’t matter (I called it SBIT-GP-VPN-CA)

Common Name: <domain name>

Check **Certificate Authority** box

Click Generate

Generate VPN Cert

Click Generate

Name doesn’t matter (I called it SBIT-GP-VPN-Cert

Common Name: <public IP>

Signed by: CA Cert (from above)

Uncheck **Certificate Authority**

Click Generate

Device > Certificate Management > SSL/TLS Service Profile

Click Add

Name doesn’t matter (I called it SBIT-GP-VPN-Cert-Profile)

Certificate: <VPN Cert (from above)>

Click OK

Device > Authentication Profile

Click Add

Name doesn’t matter (I called it Local DB Auth Profile)

Authentication Tab

For Type, select Local Database

Advanced Tab, in the Allow List box

Click Add

Select **all**

Click OK

Network > GlobalProtect > Portals

Click Add

General Tab

Name doesn’t matter (I called it SBIT-GP-VPN-Portal)

In the Network Settings box, Select **ethernet1/2** for the Interface and **External Interface Address** for the IPv4 Address.

Change Appearance

Authentication Tab

In the Server Authentication box, select the SSL/TLS Profile (from above)

In the Client Authentication box, click Add.

Name doesn’t matter (SBIT-GP-VPN-client-auth)

In the Authentication Profile column, select the Authentication Profile (from above)

Agent Tab

In the top Agent box, click Add.

On the Authentication Tab, Name doesn’t matter. (SBIT-GP-agent-config)

On the External Tab, in the External Gateways box, top box, click Add.

Name doesn’t matter (SBIT-GP-VPN-external-gateway)

Click the IP button (not FQDN)

In the IPv4 box, enter your Public IP.

In the Source Region box, click Add, then select **All**.

Click OK

Click OK

In the Trusted Root CA box, click Add.

Select the CA Cert (from above)

Check the Install box

Click OK

Network > GlobalProtect > Gateways

Click Add

General Tab

Name doesn’t matter (SBIT-GP-VPN-Gateway)

In the Network Settings box, select **ethernet1/2** for the Interface and **External Interface Address** for the IPv4 Address

Authentication Tab

In the Server Authentication box, select the SSL/TLS Profile (from above)

In the Client Authentication box, click Add. Follow Portal>Authentication Tab>Client Authentication steps.

Agent Tab

On the Tunnel Settings tab, check the box for Tunnel Mode. Select **tunnel.3** for Tunnel Interface.

On the Client Settings tab, click Add.

Authentication Override, Name doesn’t matter (SBIT-GP-Gateway-client-config)

IP Pools, IP Pool box, click Add. Type **192.168.0.50-192.168.0.250** in the field.

On the Split Tunnel tab, click Add in the Includes box. Type **0.0.0.0/0** in the field.

Click OK.

On the Network Services tab, type **172.16.0.10** for Primary DNS and **172.16.1.10** for Secondary DNS.

Click OK

Click **Commit** in the top right corner of the screen. Wait for changes to be applied.

On a device connected to a separate network, open a browser and navigate to the **https://<your public IP>/** (Ex. **https://69.27.22.232/** ).

Note: If a warning appears due to an “Incorrectly configured web page” or similar error, continue to the page or create an exception. This is due to the “self-signed” certificate we created.

Before users can make use of the VPN, they must be added to the firewall’s local database. Navigate to Device>Local User Database>Users. Users can be added by clicking Add, entering the users name and password, and clicking **Commit** at the top right of the page.

Mention **GP-Demo**