Sandbox Setup Guide

Xiid Corporation

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Sandbox Setup

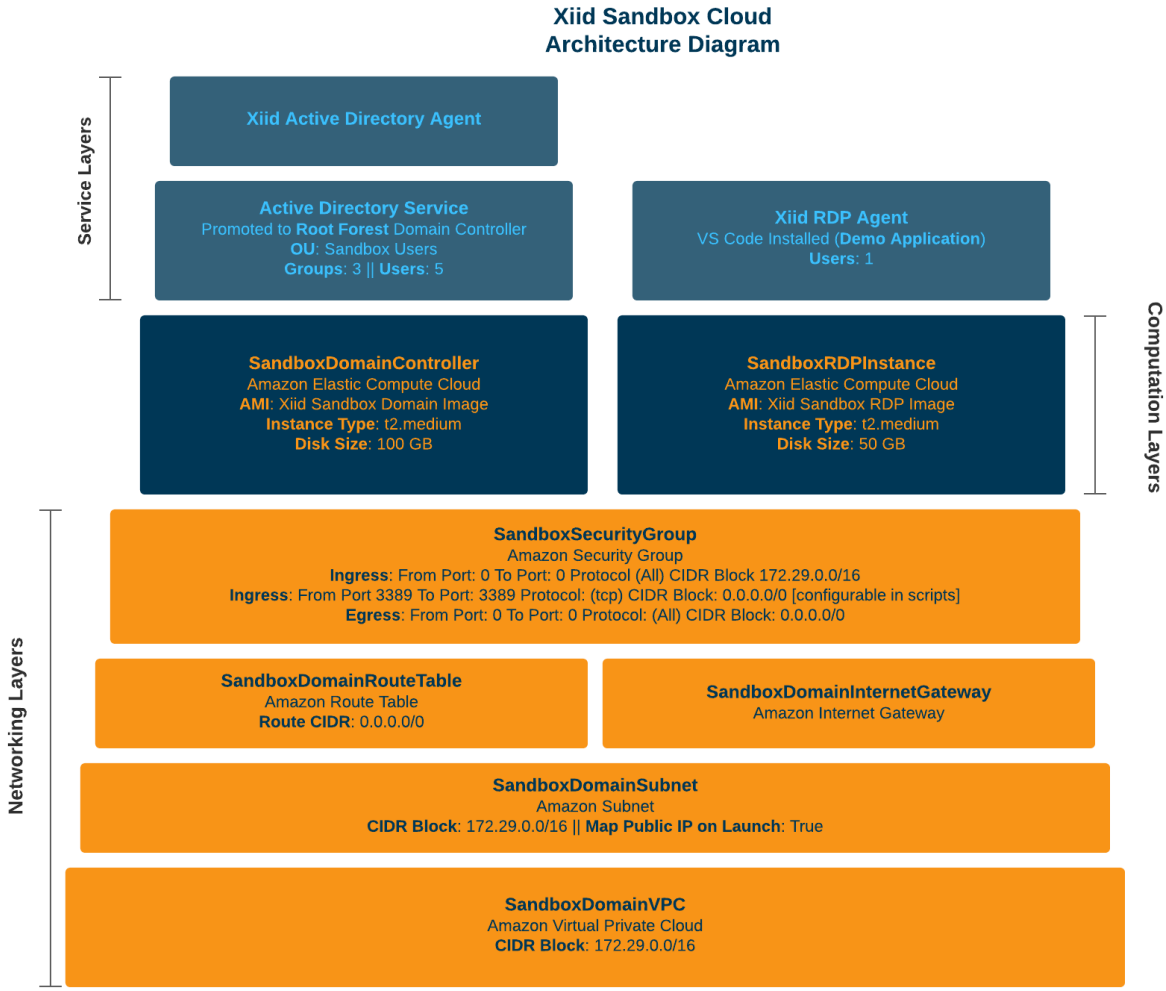
Introduction

Xiid's world-class security and access software integrates on top of a domain and a directory. Domains are considered critical infrastructure and system administrators are rightfully leery to tamper with their domain using software that they are unfamiliar with. Domain modifications – particularly for security – require concise and well-understood changes. For this reason, Xiid provides domain administrators with the ability to test Xiid's software in a safe, secure, separate cloud environment that will not affect production domains. The automated Xiid Domain Sandbox Tools provide customers with the ability to quickly and inexpensively deploy (and destroy) this "sandbox" domain.

What is the Sandbox Domain?

The Sandbox Domain is a basic domain setup that can be easily deployed within a cloud provider (e.g., AWS, Azure) for testing purposes. The Sandbox Domain includes the cloud networking layers necessary for creating and managing a domain controller. A basic Virtual Private Cloud (VPC) is created, and subnetworking layer configurations and security are defined within the VPC. There are security groups wrapping the domain controller and RDP instance(s) with additional inbound/outbound network security to lock down access to the servers as much as possible.

The architectural diagram below shows the infrastructure components deployed within your cloud computing account when you run the Xiid Domain Sandbox Tools' scripts:



What the Sandbox Setup Guide Includes

This guide will walk you through setting up a "Sandbox" Domain for you to use in testing Xiid's software.

For those wanting to use AWS for the sandbox, this guide also includes very minor AWS and Terraform instructions. If you are not familiar with AWS, it is recommended that you familiarize yourself with the AWS Console and CLI. That being said, there are no complex actions required within AWS, as all infrastructure and networking is configured and built automatically by the Xiid-provided scripts.

What the Sandbox Setup Guide Does Not Include

This guide will not provide background on managing domains, domain controllers, Active Directory, or other typical system administrator tasks. Typical use of Xiid's software does not require in-depth knowledge of domain management. It is, however, advised that you understand how to manage (create/remove/update) users in Active Directory for additional testing.

This guide will not provide background on Terraform, any cloud providers (besides AWS), or any other infrastructure setup. The terraform scripts and infrastructure setup used in this guide are purely for Sandbox/testing purposes. **We advise against using these scripts to build a production domain.**

What You Will Need

The following are required for using the Xiid Domain Sandbox Tools for an AWS deployment:

1. An AWS Account
2. An Xiid Domain Sandbox Tools package (contact sales@xiid.com to request it)

If you wish to use a different cloud provider (Azure, GCP, XetaOne, etc.), Xiid will help you provision the sandbox for that environment.

Environment Setup

To start using the Xiid Sandbox Domain, you will first need to set up your computer and AWS account with the appropriate tools and configurations necessary for the Sandbox deployment. Follow the steps below to set up the AWS CLI and an IAM User.

AWS CLI Setup

Note: this step is not required if using macOS, as the macOS version of Xiid's scripts install required dependencies automatically.

The Amazon Web Services Command-Line Interface is a tool which allows users to interact with AWS resources using command prompt. The AWS CLI operates as the "engine" behind Terraform, driving the deployment commands to your AWS account.

Download the AWS CLI here, open the installer, and move through the prompts.

After the installation is complete, you can open a command prompt or Terminal window and type aws to verify that the CLI was properly installed. You should receive a list of AWS commands available.

AWS IAM User Setup

First, sign in to the AWS Console at aws.amazon.com in a browser.

After signing in, navigate to IAM (Identity and Access Management) by clicking the black search bar in the top left, typing *IAM*, and selecting *IAM* from the list.

Click on **Users** on the left side navigation panel.

On the Users screen, click the blue **Add users** button in the top right.

Provide a username for your new user, leave the *Provide user access to the AWS Management Console* box **unchecked**, and click the orange **Next** button.

On the Set Permissions screen, click the **Attach policies directly** box near the top.

Select the **AdministratorAccess** policy and click the orange **Next** button.

Enter any tags you wish to associate with your user (this is optional), and then click **Next**.

Review your new user information, and if it all looks correct, click the orange **Create User** button.

Now, you will be taken back to the **Users** screen. Click the new user you just created, and select the **Security credentials** tab below the Summary box.

Scroll down to the **Access keys** section and click **Create Access Key**.

Select the **Command Line Interface (CLI)** option, select the checkbox next to **I understand the above recommendation and want to proceed to create an access key**, and click the orange **Next** button.

Enter any tags you wish to associate with your access key (this is optional), and then click **Create Access Key**.

The next screen will display your **Access Key** and **Secret Key** for the user.

Click the **Download .csv file** button above the table of new users to download the access key and secret key to your computer.

Do not lose track nor give away (privately or publicly) the access key, secret key, or csv file.

Later, after Xiid's scripts have finished deploying your infrastructure, you may (but are not required to) delete this IAM user and follow the above steps to re-create the user before tearing down the infrastructure. If you do this, you will need to open a command prompt or Terminal window, run *aws configure*, and enter the new Access Key and Secret Key **before** running any infrastructure teardown commands or scripts.

Infrastructure Setup and Deployment

The following steps will help you get your workspace and infrastructure setup and deployed correctly.

Start by downloading the Xiid Domain Sandbox Tools zip file and unzipping it in a safe location.

Infastructure Deployment

To deploy the infrastructure in your AWS Account, follow these steps according to which operating system you use **on the computer you're going to deploy the sandbox from**.

Windows Point-and-Click:

You can navigate to the unzipped folder for your Xiid Domain Sandbox Tools and double click the *deploy_sandbox.bat* file to deploy your sandbox environment to AWS.

Please note that if you choose this option, you are accepting the default values for *ip_address* and *deploy_region*, which are 0.0.0.0/0 and us-west-1 respectively.

Windows Command-Line:

Open a command prompt and navigate to the unzipped folder.

From the unzipped folder location, run the *deploy_sandbox.bat* Batch Script by typing *deploy_sandbox.bat*

You can specify zero, one, or two flags to the *deploy_sandbox.bat* script: - **ip_address**: The IPv4 IP Address to restrict RDP access to only your computer. - To specify the ip_address, you would run: deploy_sandbox.bat {your ip address} - **deploy_region**: The region to deploy your infrastructure in. The Region **must** be the **second** argument to the batch script. So if you do not want to specify an explicit IP address but would like to change the deployment region, you would run: deploy_sandbox.bat 0.0.0.0/0 {region_to_deploy} - **rdp_count**: The number of RDP Instances to deploy in your infrastructure. Rdp_count **must** be the **third** argument to the batch script. - As an example, a full command with arguments would look like this: - deploy_sandbox.bat 0.0.0.0/0 us-west-2 3

macOS:

Using Terminal, *cd* to the folder containing the unzipped Xiid Domain Sandbox Tools and run *./deploy_sandbox_macos.sh*. By default, this uses the values 0.0.0.0/0 for *ip_address* and us-west-1 for *deploy_region*.

You can specify zero, one, or two arguments to the *deploy_sandbox_macos.sh* script: - **ip_address**: The IPv4 IP Address to restrict RDP access to only your computer. - To specify the ip_address, you would run: ./deploy_sandbox_macos.sh {your ip address} - **deploy_region**: The region to deploy your infrastructure in. The Region **must** be the **second** argument to the batch script. So if you do not want to specify an explicit IP address but would like to change the deployment region, you would run: ./deploy_sandbox_macos.sh 0.0.0.0/0 {region_to_deploy} - **rdp_count**: The number of RDP Instances to deploy in your infrastructure. rdp_count **must** be the **third** argument to the batch script. - As an example, a full command with arguments would look like this: - ./deploy_sandbox_macos.sh 0.0.0.0/0 us-west-2 3

The script will automatically check if its dependencies, Homebrew, Terraform, and the AWS CLI, are installed on your Mac. If they are not, the script will offer to install them for you.

Linux:

Using your preferred terminal, *cd* to the folder containing the unzipped Xiid Domain Sandbox Tools and run *./deploy_sandbox_linux.sh*. By default, this uses the values 0.0.0.0/0 for *ip_address* and us-west-1 for *deploy_region*.

You can specify zero, one, or two arguments to the *deploy_sandbox_linux.sh* script: - **ip_address**: The IPv4 IP Address to restrict RDP access to only your computer. - To specify the ip_address, you would run: ./deploy_sandbox_linux.sh {your ip address} - **deploy_region**: The region to deploy your infrastructure in. The Region **must** be the **second** argument to the batch script. So if you do not want to specify an explicit IP address but would like to change the deployment region, you would run: ./deploy_sandbox_linux.sh 0.0.0.0/0 {region_to_deploy} - **rdp_count**: The number of RDP Instances to deploy in your infrastructure. rdp_count **must** be the **third** argument to the batch script. - As an example, a full command with arguments would look like this: - ./deploy_sandbox_linux.sh 0.0.0.0/0 us-west-2 3

The script requires the dependencies Terraform and the AWS CLI.

While Running the Sandbox Tools:

While running the sandbox deployment script for your operating system, you will be prompted for your Access Key and Secret Key. Enter those values from the instructions you followed in the **AWS IAM User Setup** section. You can hit enter to skip the region and output format.

Next you should see the terraform init command running automatically for you. You should see the message: **Terraform has been successfully initialized!**

Last, you will see *terraform apply* run automatically. The command will generate an execution graph. Confirm that there are **8 Plans** to add, and then type *"yes"* to execute the plan.

Note: There are 7 core infrastructure components, plus X number of rdp instances, as specified by the **rdp_count** variable with a default of one. So if you chose 3 rdp instances, you would see **10 Plans** to add.

Wait for the Terraform commands to finish setting up your infrastructure, and then you should see a final message saying: **Apply complete! Resources: 8 added, 0 changed, 0 destroyed.**

(If you are using Windows and ran the *deploy_sandbox.bat* file from command prompt, please note that after "press any key to continue…" the command prompt will be closed.)

After the Windows script finishes executing, you should observe a new batch script generated for you automatically called destroy_sandbox.bat. You can use that batch script to tear down your infrastructure when you are done (see Infrastructure Tear Down).

On macOS and Linux, instructions for infrastructure teardown are outputted to a file in your current directory named *cleanup_instructions.txt*.

CRITICAL NOTE: Do **NOT** delete, modify, or move the **terraform.tfstate** or **terraform.tfstate.backup** files. These files are used by Terraform to keep track of the infrastructure you just deployed. If you modify, delete or move these files, Terraform will no longer have the associations to your deployed infrastructure and cannot tear it down.

Infrastructure Validation

Once you have deployed your infrastructure, you can verify that the infrastructure is fully stood up and ready to go.

Start first by signing into the AWS Console and navigating to EC2.

Be sure to select the region in the top right corner that you chose when running the deploy_sandbox.bat script (the default region is us-west-1).

Click the **Instances** menu item on the left side of the EC2 console.

You should see two EC2 instances available in the EC2 console: one named **SandboxDomainController** and one named **SandboxRDP**.

Verify that there is a green checkmark listed under the **Status Check** column before attempting to access your instances.

Infrastructure Tear Down

NOTE: If you lost the **terraform.tfstate** or **terraform.tfstate.backup** files, you will not be able to tear down your infrastructure. Those files are used by terraform to reference the infrastructure previously created in the Infrastructure Deployment step.

Windows:

When you are done using your infrastructure and would like to tear it all down, double click the *destroy_sandbox.bat* file that was generated when running the *deploy_sandbox.bat* script. Terraform will print a destruction plan for your resources. Confirm that there are **8 Plans** to destroy, and then type *"yes"* to execute the tear down.

Terraform is region-agnostic and region-ignorant, meaning that even after you deploy and retain the terraform.tfstate file, Terraform still doesn't know what region the resources were deployed in. The *destroy_sandbox.bat* script will create the **terraform destroy** command and include the region you deployed to, ensuring that you can easily tear down the infrastructure after.

macOS and Linux:

On macOS and Linux, instructions for infrastructure teardown are outputted to a file in your current directory named *cleanup_instructions.txt*.

Running the command mentioned in the text file should successfully de-provision resources used for the Xiid Sandbox.

Sandbox Information

Understanding the Infrastructure

The following provides information regarding the Sandbox Domain Controller and Sandbox RDP Instance as well as usage instructions for accessing and utilizing the machines.

Domain Controller

Information

The Sandbox Domain Controller comes pre-installed with a number of users and groups in Active Directory, both for ease of access to the domain controller as well as to help expedite the process of using and understanding Xiid's software. We encourage you to create any users and groups that you wish, as Xiid has only provided basic defaults.

Xiid highly recommends that you change the passwords associated with all users on the domain controller for maximum security.

What Is the Domain Controller?

The Domain Controller is an out-of-the-box Windows 2019 Server.

The Domain Controller has had the Active Directory Services installed and has been promoted to a Domain Controller as a new domain forest.

The domain name is *sandbox.local*.

The Domain Controller is **not** a DNS Server. If you would like to promote your Domain Controller to a DNS server, you can do so after deploying the sandbox domain, however be aware that you will need to reconfigure your DHCP Options Set in AWS and you will need a domain name from a trusted Certificate Authority.

Users:

There are a number of users created by default in the sandbox domain.

- **sandboxadmin**: The administrator account for the Sandbox domain. See Domain Controller Usage for more information.
- **xiid-svc**: Standard service account for use by the Authenticator component in your Xiid Agent. The default **password** is: Cyb3r$3cur!ty
- **sandbit**: Short for SandboxIT, this is an example IT User on your domain, who may have access to an RDP instance not available to the broader company
- **sandboxengineer**: Example engineer User on your domain, who may have access to a shared VS Code repository on an RDP instance.
- **sandboxuser**: Example of a general user on your domain, only in the **SandboxAll** Security group.

Please **note** that the sandbit, sandboxengineer, and sandboxuser accounts are all disabled by default and the passwords are not provided. To use these users, open Active Directory Users and Computers and re-enable each account and set a password.

Groups:

A few basic Security Groups are created for you and the users are organized into these basic groups to facilitate access management examples.

- **SandboxAll**: Security Group for all users in the sandbox OU. **Members**: sandbit, sandboxengineer, sandboxuser.
- **SandboxEngineering**: Example Security Group for an Engineering Organization. Recommended to use with the VS Code application utilizing the **RDP App** Application in the Xiid Agent Management Portal. **Members**: sandboxengineer
- **SandboxIT**: Example Security Group for an IT Organization. This is a useful group for demonstrating restricted RDP access to IT. **Members**: sandbit

Usage

Now that your infrastructure is deployed and verified, you're ready to start using your sandbox domain.

Windows

Navigate to the AWS EC2 Console, find your domain controller, and copy the Public IPv4 Address.

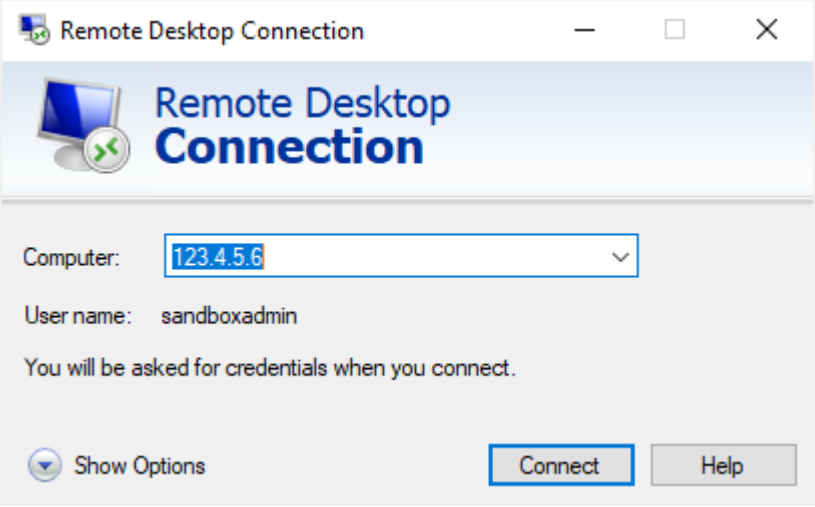
Paste the IP Address into an RDP connection (.rdp) or into the RDP application of your choosing.

There is also a *domain_controller.rdp* file available to use. Right click the file in Windows File Explorer and click *"Edit"*.

In the RDP Connection screen, enter the Public IPv4 Address copied above into the *"Computer"* section and click *"Save"* (under Show Options).

macOS and Linux

The *domain_controller.rdp* file has automatically been updated to use your new domain controller's IP address, and you may use the file without further modification.



Double Click the *domain_controller.rdp* file and paste the password below to connect.

Domain Controller Admin Credentials:

- **Username**: sandboxadmin
- **Password**: 4CcXL!#X%JeU9@

We recommend that you change the sandboxadmin user's password after logging in for maximum security.

After you log in to the instance, you can check the Active Directory Users and Computers to view the default users and groups.

The Xiid Active Directory Agent installer is already available on the desktop, just double click to start the installation process, and refer to our Quickstart Guide for assistance with configuring Xiid.

Sandbox RDP Instance

Information

The RDP Instance is a Windows 2019 Server and comes with a default Administrator user (called **rdpuser**), VS Code pre-installed, and the Xiid RDP Installer available on the desktop.

Usage

Windows

To access your Sandbox RDP instance, start by navigating to the EC2 Console in AWS, select the **Instances** tab on the left, find the SandboxRDP Instance, and copy the Public IPv4 Address.

In your *sandbox* folder, right click *rdp_instance.rdp* file and click *"Edit"*.

Enter the IPv4 Address that you just copied in the *"Computer"* section and click *"Save"* (under Show Options).

macOS and Linux

The *rdp_instance.rdp* file has automatically been updated to use your RDP instance's IP address, and you may use the file without further modification.

Double click the *rdp_instance.rdp* file and enter the password below to connect.

RDP Instance Admin Credentials: - **Username**: rdpuser - **Password**: Cyb3r$3cur!ty

Advanced Features

Below are some advanced configuration and usage information. If you are familiar with AWS and Terraform, you can review the below information for making custom changes to the scripts to cater more to your individual needs.

Script Configuration

You can customize the following aspects of the *main.tf* Terraform script to cater your infrastructure to your preferences. Below are some common modifications to the script:

- **Instance Type:**
  - You can configure the instance types for your Domain Controller and RDP instance, if you would like faster hardware to run your sandbox domain.
  - Modify the instance type on Line 97 (for the Domain Controller) and Line 111 (for the RDP instance) to any of the Amazon Standard Instance Types.
  - **Note:** Changing the instance type may incur additional charges from AWS. Please consult the AWS Pricing Guide for more information.
- **Disk Space:**
  - You can configure the amount of disk space provisioned for your instances.
  - To change the disk space on the Domain Controller, modify the value on line 101. To modify the RDP instance disk space, modify the value on line 115.

  - **Note:** Changing the amount of partitioned disk space may incur additional AWS charges.

Using the Terraform Script Directly

If you do not wish to use the batch files and scripted Terraform integration, you can use the Terraform script directly to deploy your sandbox environment.

Follow these steps to deploy the sandbox environment using *just* the Terraform script.

Start by creating a new folder. For this guide, we will call that folder *sandbox*. Copy the **main.tf** script file to your *sandbox* directory.

Next, open a command prompt and navigate to the sandbox directory. Type *aws configure* and hit enter. The AWS CLI will prompt you for your access key and secret key and region. Enter the access key and secret key for your programmatic administrator access to AWS. The region will be defined by Terraform (you can skip it by just hitting enter, or you can type any region).

Ensure that Terraform is properly installed by typing *terraform -h* or *terraform -version*. You should see a list of Terraform commands (if you typed *terraform -h*) or the version of Terraform you are using (if you typed *terraform -version*).

Then type *terraform init* and hit enter. You should receive a message saying: **Terraform has been successfully initialized!**

Then type *terraform apply*. This will build and display an execution graph of the infrastructure to set up.

You can specify three variables to override in the Terraform script:

- **ip_address**: Specify your IPv4 IP Address to restrict RDP access to only your computer. Default value is: 0.0.0.0/0 (any IP address can RDP to the machine with the admin username/password)
  - To override the ip_address variable, add: *-var ip_address={your_ip_address}*
- **deploy_region**: Specify an region to deploy your infrastructure into. Default value is: us-west-1
  - To override the deploy_region variable, add: *-var deploy_region={region_to_deploy}*
- **rdp_count**: Specify the number RDP Instances to launch alongside your Domain Controller.
  - To override the rdp_count variable, add: *-var rdp_count={number_of_instances}*
- The full command would look like this: *terraform apply -var ip_address=0.0.0.0/0 -var deploy_region=us-west-2 -var rdp_count=3*

After running the terraform apply command with relevant flags, verify that there are **8 Plans** to add, and then type *"yes"* to confirm. You can also check the execution graph in the console to verify the infrastructure that will be created.

Last, refer to the Infrastructure Validation section to verify that the sandbox was properly deployed.

When you are ready to tear down your infrastructure, type terraform destroy. If you deployed your sandbox domain in a region other than the default region (us-west-1), you will need to provide the region to the destroy command as such:

terraform destroy var deploy_region={your_region}

i.e. *terraform destroy var deploy_region=us-west-2*

Sandbox Resources

The following are descriptions of the resources created for the Sandbox Domain:

- Terraform:
  - Required Version: >= 0.14.9
- Provider:
  - Source: hashicorp/aws

  - Version: ~> 3.27
- VPC:
  - CIDR Block: 172.29.0.0./16
  - Name: SandboxDomainVPC
- Subnet:
  - CIDR Block: 172.29.0.0/16
  - Map Public IP on Launch: true
  - Name: SandboxDomainSubnet
- Internet Gateway:
  - Name: SandboxDomainInternetGateway
- Route Table:
  - Route:
    - CIDR Block: 0.0.0.0/0
  - Name: SandboxDomainRouteTable
- Security Group:
  - Group Name: sandbox_domain_security_group
  - Ingress:
    - From Port: 0
    - To Port: 0
    - Protocol: -1 (All)
    - CIDR Block: 172.29.0.0/16
  - Ingress:
    - From Port: 3389
    - To Port: 3389
    - Protocol: tcp
    - CIDR Block: [0.0.0.0/0 by default, override by ip_address var]
  - Egress:
    - From Port: 0
    - To Port: 0
    - Protocol: -1 (All)
    - CIDR Block: 0.0.0.0/0
  - Name: SandboxSecurityGroup
- Domain Controller:
  - AMI: OneOf(DC Images)
  - Instance Type: t2.medium
  - Disk Size: 100 GB
  - Name: SandboxDomainController
- RDP Instance:
  - AMI: OneOf(RDP Images)
  - Instance Type: t2.medium
  - Disk Size: 50 GB
  - Name: SandboxRDPInstance

Infrastructure Costs

Please be aware of the costs associated with standing up infrastructure in AWS. You can refer to the AWS Pricing Guide for more information regarding costs. Please consider that the region you deploy your infrastructure in will also affect the cost. Also, the length of time with which you leave your infrastructure running will change the costs. If you are concerned about the costs of running your infrastructure in AWS, you can use free-tier infrastructure, which the automated sandbox deployment scripts attempt to choose by default. You can also stop your instances when you are not using them to save money.