Privitar AWS Deployment Guide

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1. Introduction

The Privitar Data Privacy platform is a data privacy solution that enables organizations to use sensitive datasets more safely.

NOTE
For ease of reference, the Privitar Data Privacy platform is referred to as the **Privitar platform**, (or just **Privitar**) in the rest of this manual.

The Privitar platform can be deployed in a variety of different configurations. This document describes how to deploy the native Amazon Web Services (AWS) instance of the Privitar platform.

NOTE
For ease of reference, the native AWS instance of the Privitar platform is referred to as **Privitar AWS**.

Privitar AWS is supplied as an AWS Cloud Development Kit (CDK) application that can be deployed into an AWS cloud environment.

This document assumes that you are working in a Development Operations environment and have experience of deploying AWS resources into an AWS Cloud Environment.

1.1. Compatibility with the Privitar platform

Privitar AWS contains most of the features of the Privitar platform application running in other types of environments. This includes:

- Importing schemas from AWS Glue Data Catalog
- Creating and running masking or unmasking jobs using AWS Glue ETL
- Embedding and extracting watermarks
- Masking rules and manual generalization (without k-anonymity)
- Running jobs on Privitar On Demand or AWS EMR (separate deployment of these 2 components is required)

The following features of the Privitar platform are **not** present in the current version of Privitar AWS:

- Usage of Encrypt rule in AWS Glue Jobs

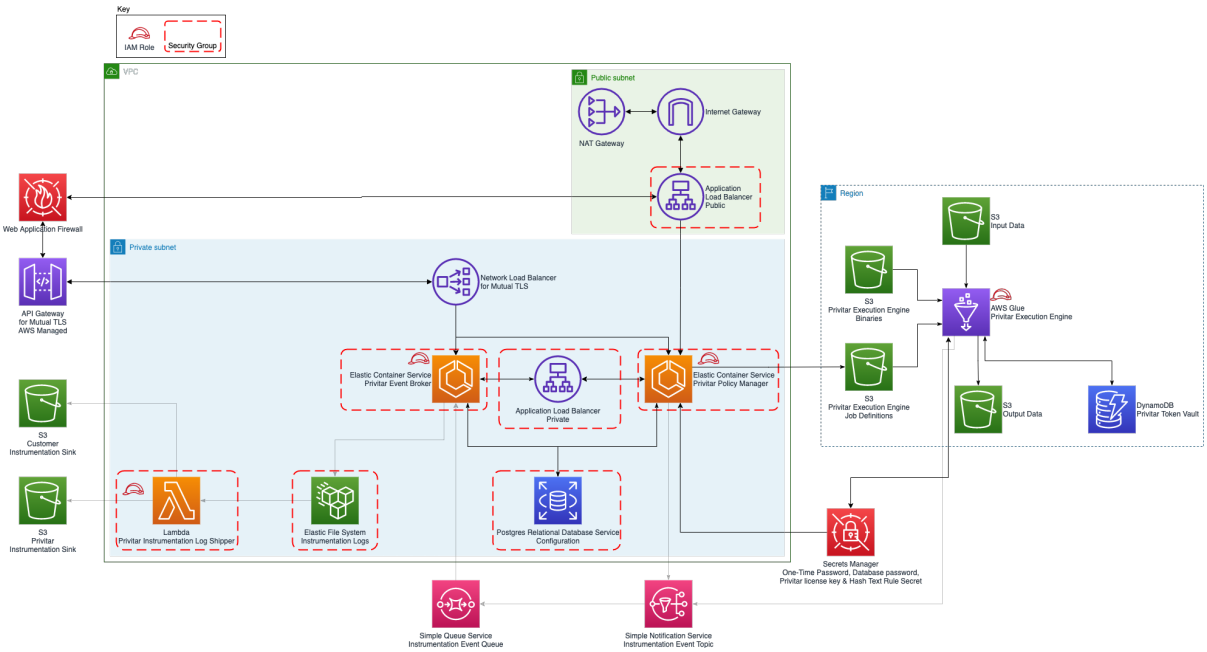
- Kerberos authentication for EMR
- Automatic generalization and k-anonymity in AWS Glue Jobs
- Supporting multiple tables masking/unmasking with a single AWS Glue Job

1.2. Architecture

This section describes the architecture of the Privitar AWS deployment together with information about the security implications of deploying AWS in your AWS Cloud environment.

1.2.1. Deployment architecture

The following diagram shows the overall architecture of the Privitar AWS Deployment and the associated AWS services that it uses:



The following table describes the AWS services that are used in the deployment:

Service	Description
Application Load Balancer and Network Load Balancer	Route traffic from the Internet to services, and between services.
Web Application Firewall	Blocks known malicious entities and provides rate limiting.
API Gateway	Terminate mutual TLS.
Elastic Container Service with Fargate	Host the applications that comprise Privitar AWS.
Relational Database Service	Store configuration and state for the applications that comprise Privitar AWS.
Secrets Manager	Store sensitive infrastructure information. For example, the configuration database (ConfigDB) password.
Simple Queue Service and Simple Notification Service	Route instrumentation telemetry data from Privitar Policy Manager and Glue execution environments to the Privitar Event Broker.

Service	Description
Elastic File System	Store event broker instrumentation logs, prior to shipping.
Lambda	Ship instrumentation logs and performs other small tasks. For example, key rolling.
Glue	Infer from Glue Schema. Execute Privitar jobs in Glue ETL.
DynamoDB	Store Privitar consistent tokenization mappings. This is referred to as the **Token Vault**.
S3	Store state, Glue ETL binaries and data
VPC networking	Core infrastructure for the network layer, including NAT gateway, internet gateway, VPC, subnets, security groups.
Key Management System (KMS)	Encryption keys for resources created as part of this deployment.

1.2.2. Deployment Security

There are certain security implications that you need to be aware of when deploying Privitar AWS.

Internet-facing components

The deployment contains internet facing components. This means that:

- A Route53 registered domain and public hosted zone is required. This means that the domain name and certificates are public.
- The AWS Application Load Balancer that the Route53 DNS A record points to is internet-facing.
- The optional mutual TLS enabled AWS API Gateway is internet-facing.

AWS Glue

Glue jobs created by Privitar AWS currently run inside the AWS managed networks, and not inside customer owned VPCs. It should be noted that AWS managed networks have outbound internet access.

2. Deployment Overview

This section presents an overview of the steps to follow to deploy Privitar AWS in an AWS Cloud environment. For each step described a link is provided to the appropriate section in the document that describes the procedure to follow to complete that step.

Step	Summary	Description
1	Read Pre-requisites	Ensure that you have the resources to deploy Privitar AWS. This includes: • Privitar AWS resources • AWS Cloud resources See, Pre-requisites for deploying Privitar AWS [6]
2	Bootstrap AWS CDK	Perform the initial setup and configuration of the AWS CDK resources that are required to deploy Privitar AWS in your AWS Cloud. See, Bootstrap AWS Cloud Development Kit [8]
3	Upload the Privitar AWS Binaries	Upload the Privitar AWS binaries to an AWS S3 location. See, Copying the Privitar AWS binaries [8]
4	Deploy Privitar AWS	Configure the Privitar AWS CloudFormation template to create a Stack containing the resources that are required by Privitar AWS. If the Stack is successfully created, CodePipeline will be automatically triggered to deploy Privitar AWS. See, Deploy Privitar AWS [9]

2.1. Pre-requisites for deploying Privitar AWS

This section details the pre-requisites to successfully deploy Privitar AWS in an AWS Cloud environment. There are two main areas:

- Privitar resources
- AWS Cloud resources

2.1.1. Privitar Resources

The following are needed for the deployment. Some of the items are provided as links to locations in the the private AWS Cloud environment that is hosted by Privitar. Other resources will be sent to you directly by Privitar:

- A launch-stack URL. This is a link to an AWS CloudFormation template that defines the resources used by Privitar AWS. Privitar will have granted you access to this location:

  ```
  https://eu-central-1.console.aws.amazon.com/cloudformation/home?
  region=eu-west-1#/stacks/create/review?templateURL=https://
  privitar-latest-release.s3-eu-west-1.amazonaws.com/cloudformation/
  cf_template.yaml
  ```

- The Privitar AWS infrastructure binaries (`infra.zip`) URL Privitar will have granted you access to this location:

  `s3://privitar-latest-release/infra.zip`
- A license key file. This key must be stored in AWS Secrets Manager. It is used to access Privitar AWS. Privitar will send you this information.
- An initial username and password to use to sign in to Privitar AWS once it has been deployed. Privitar will send you this information.

2.1.2. AWS Cloud Resources

The following items must be present in your AWS Cloud environment:

- Amazon S3 bucket location to store the Privitar binaries.

  The Privitar AWS deployment uses AWS CodePipeline. This pipeline consumes a zip file provided by Privitar which contains Privitar AWS artifacts and an AWS Cloud Development Kit application. Subsequent installations and updates of Privitar AWS involve uploading a zip file (provided by Privitar) to a configured location in S3 that is consumed by the pipeline.

  To create an Amazon S3 bucket to store the Privitar AWS artifacts and AWS Cloud Development Kit application, see Amazon S3 User Guide - Creating a Bucket.

  NOTE

  The bucket that is created *must* be versioned. If it is not versioned, CodePipeline will raise an error. To remedy this, enable versioning for the S3 bucket and run CodePipeline again. See, Amazon S3 User Guide - Using versioning in S3 buckets.
- Amazon S3 bucket location to store Privitar AWS Instrumentation Events.

  For more information about the Instrumentation system on the Privitar Platform, refer to the *Privitar User Guide*.
- AWS Secrets Manager to store the Privitar license key. The key should be stored in plaintext.

  To create a secret in AWS Secrets Manager to store the Privitar license key, see AWS Secrets Manager User Guide - Creating a Secret.
- An Amazon Route53 registered domain and an Amazon Route53 public hosted zone.

  These resources are used to automatically create DNS A records to route traffic from the Route53 domain to Privitar services. This hosted zone also enables HTTPS by facilitating the automatic issuing of publicly signed certificates in AWS Certificate Manager. As part of this process, ownership of the domain is automatically confirmed by writing CNAME records which AWS Certificate Manager verifies.

  To setup Amazon Route53, see Amazon Route53 Developer Guide.
- Two Amazon ECR repositories named `agrotera-dashboard` and `agrotera-event-broker` respectively.

  These repositories will contain a local copy of the ECR images of the Privitar Policy Manager and Event Broker services. The ECR images will be copied from the Privitar repository upon first run of the deployment pipeline.

To setup Amazon ECR, see Amazon ECR User Guide.

- A mutual TLS certificate authority file stored in S3. (Optional)

  Note that this is only necessary if mutual TLS is required. Mutual TLS enables the use of Privitar On Demand, the Privitar SDK and Privitar Policy Manager REST APIs. If this option is specified, an AWS API Gateway will be created which provides mutual TLS connectivity using the configured certificate authority.

  To setup Mutual TLS to enable the use of Privitar On Demand, the Privitar SDK and Privitar Policy Manager REST APIs, see Amazon API Gateway Developer Guide.

2.2. Bootstrap AWS Cloud Development Kit

Privitar AWS is an AWS Cloud Development Kit (CDK) application. In order to begin to deploy Privitar AWS into an AWS Cloud environment, you need to provision resources that the AWS CDK needs to perform the deployment. These resources will include, an Amazon S3 bucket for storing data for example. The process of provisioning these initial resources is called *bootstrapping*.

For more information on the procedure to follow to bootstrap the AWS CDK, see the Amazon Guide to Bootstrapping.

NOTE
If you are not familiar with how to bootstrap the AWS CDK, Prvitar can provide guidance and support. Contact `support@privitar.com`.

2.3. Copying the Privitar AWS binaries

The Privitar AWS binaries consist of all the required software to run Privitar in an AWS Cloud environment. The binaries are available from the following URL which points to a shared AWS Cloud location that is hosted by Privitar. The location is private, but Privitar will have given you access. (See Pre-requisites for deploying Privitar AWS [6].):

```
s3://privitar-latest-release/infra.zip
```

The easiest way to copy the zip file from the Privitar AWS Cloud Environment to your AWS Cloud environment is to use the AWS CloudShell service. This service has the AWS Command Line Interface (CLI) (v2) installed and configured so you can run `aws s3` commands to manage the contents of your s3 buckets:

1. Sign in to the AWS Management Console and open the Amazon S3 console at:

   `https://console.aws.amazon.com/s3/`
2. Choose the **CloudShell** AWS service. This is a browser-based *shell* that makes it easy to securely manage, explore, and interact with your AWS resources using a command-line.
3. From CloudShell, enter the following command to copy the zip file from Privitar to your location, where `<my-customer-bucket>` is an S3 location in your area where you wish to copy the file:

```
aws s3 cp s3://privitar-latest-release/infra.zip s3://my-customer-
bucket/infra.zip
```

For a comprehensive description of using CloudShell, refer to AWS CLoudShell User Guide.

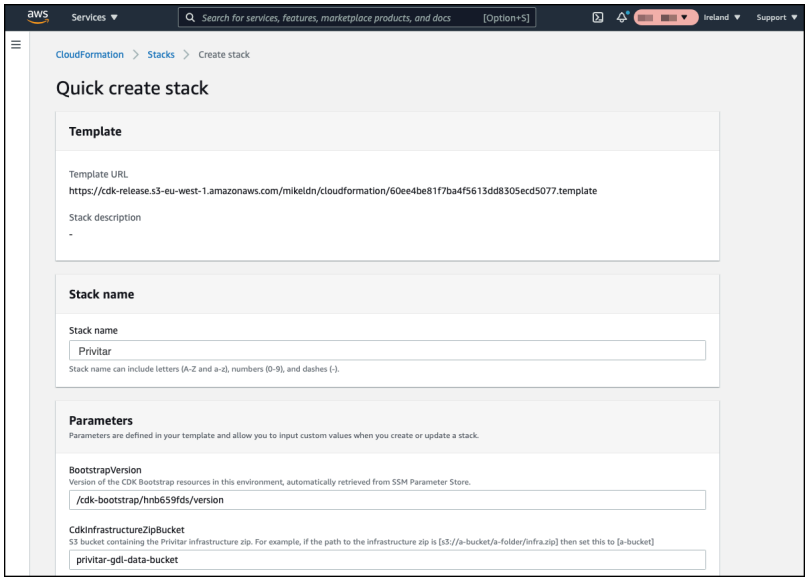
2.4. Deploy Privitar AWS

The Privitar AWS Stack contains all the resources that are required to deploy Privitar AWS in your AWS Cloud environment. Once the stack has been configured and successfully created, CodePipeline will then automatically deploy Privitar AWS.

To create the stack and configure the resources that are included in the stack, Privitar provides a **launch stack URL** that links to an AWS CloudFormation template that defines the resources used by Privitar AWS.

To create the stack, click on the Privitar launch stack URL. (This URL will have been sent to you from Privitar. See, Pre-requisites for deploying Privitar AWS [6]).

The AWS **Quick create stack** page is displayed:



This page lists the configuration parameters that are available for the Privitar AWS stack. Many of the parameters contain sensible default values, but others must be completed to set up the stack for your particular AWS Cloud environment.

To create and configure the Privitar AWS stack:

1. Enter a name for the stack in the **Stack name** field.

   The default name is **Privitar**. You can change this name to one that is more suitable for your AWS Cloud environment. A stack name can contain only alphanumeric characters (case-sensitive) and hyphens. It must start with an alphabetic character and can't be longer than 128 characters.
2. Enter new values to configure the Privitar AWS stack in the **Parameters** section.

The following table describes the parameters that must be completed to create a Privitar AWS stack. (For more information about the optional parameters available in this section, see Stack Parameters [22].)

Parameter	Description

CdkInfrastructureZipBucket	The Amazon S3 bucket name of the S3 bucket containing the Privitar AWS infrastructure zip file. The AWS CodePipeline deployed by the CloudFormation template will look for the Privitar infrastructure zip file in this bucket.
	
	For example, if the full path to the infrastructure zip file is:
	
	`s3://a-bucket/a-folder/infra.zip`
	
	then set this parameter to:
	
	`a-bucket`

CdkInfrastructureZipKey	The Amazon S3 key for the S3 object that is the Privitar AWS infrastructure zip file.
	
	For example, if the full path to the infrastructure zip file is:
	
	`s3://a-bucket/a-folder/infra.zip`
	
	then set this parameter to:
	
	`a-folder/infra.zip`

CreateTenantInstrumentationBucket	Whether or not to create a separate S3 bucket for storing the Privitar AWS instrumentation events. This can be set to `True` or `False`. The default setting is: `False`. If set to `True`, you must provide an S3 bucket location to store the events. The location is provided by Privitar and can be set using the PrivitarInstrumentationBucket parameter. The name of the bucket created is of the format: privitar-${deploymentId}-instrumentation-bucket where ${deploymentId} is substituted with the setting of the DeploymentID parameter of this template.

Parameter	Description
DeploymentID	A unique identifier for the Privitar AWS deployment. Resources created by Privitar AWS CloudFormation will include the value of this parameter in their identifier and name. This helps AWS users to understand the resource, and enables running multiple Privitar deployments in the same AWS account. The deployment ID can contain only alphanumeric characters (lower-case alphabetic characters only) and hyphens. It must start with an alphabetic character and can't be longer than 128 characters. For example: `data1234`
HostedZoneID	The AWS Route 53 public hosted zone ID to use to generate a domain name and certificate that can be used by Privitar AWS. AWS Route 53 is used to automatically create DNS A records to route traffic from the Route53 domain to Privitar services. This hosted zone also enables HTTPS by facilitating the automatic issuing of publicly signed certificates in AWS Certificate Manager. As part of this process, ownership of the domain is automatically confirmed by writing CNAME records which AWS Certificate Manager verifies. For example: `Z053459332BOI952MZ6ZK`
HostedZoneName	The AWS Route 53 hosted zone domain name of the public hosted zone specified in the `HostedZoneID` parameter. For example: `privitar-aws.com`
LicenceKeySecret (Provided by Privitar)	The ARN of a plaintext AWS Secrets Manager secret that contains the Privitar license key file contents. This license key may need to be periodically updated. For example: `arn:aws:secretsmanager:eu-west-1:423009687000:secret:license-key`

Parameter	Description
PrivitarInstrumentationBucket (Provided by Privitar)	The name of the S3 bucket location to store Privitar AWS instrumentation events. The events are non-sensitive data events that describe how Privitar AWS is being used. Typically, the S3 bucket location will reside in Privitar's AWS account.

3. Click the check box in the **Capabilities** section to agree to the changes that will be made to your AWS account by creating the Privitar AWS stack.
4. Select **Create stack** to create the Privitar AWS stack.

   If the stack is created successfully, it will appear in the AWS CloudFormation stack list:

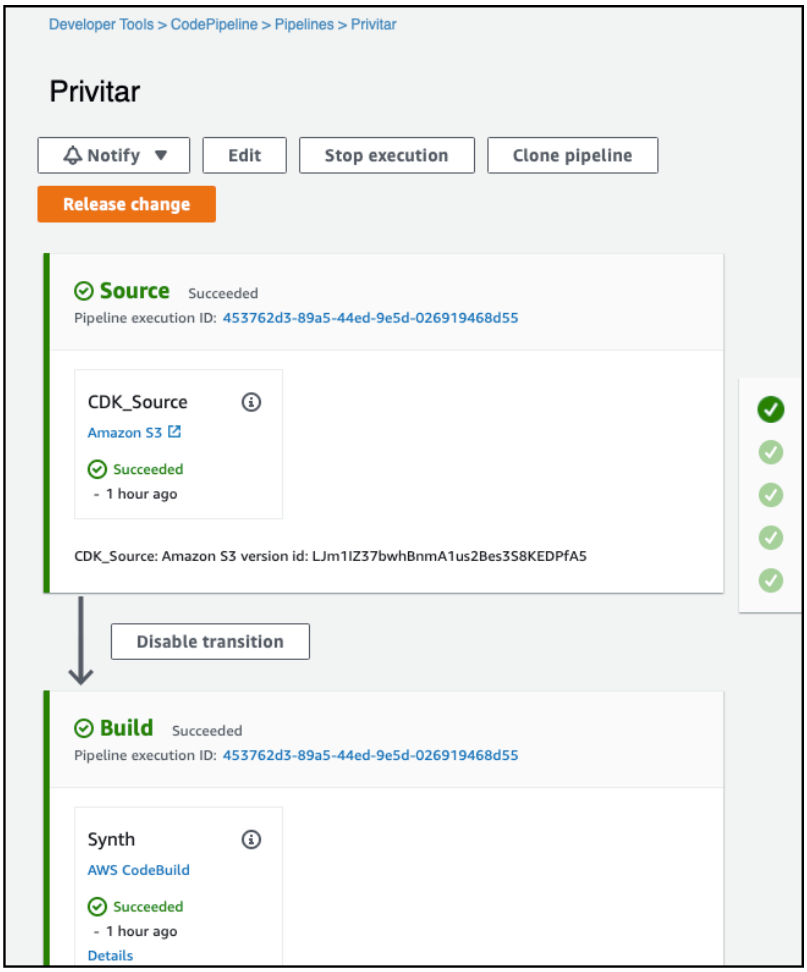
   `CloudFormation > Stacks > <stack-name>`

   where `<stack-name>` is the name of the stack that you defined in the **Stack name** field. By default, the name will be **Privitar**.

   CloudFormation will report **CREATE COMPLETE** in the **Status** column to indicate that the stack has been successfully created.

   The successful completion of the stack by CloudFormation will automatically trigger CodePipeline to deploy Privitar AWS.
5. Navigate to **Developer Tools > CodePipeline > Pipelines > <stack-name>**

   From this location you can observe each stage of the deployment taking place. For example:



6. In the CodePipeline interface, look for the **Review** stage to manually approve the changes before they are deployed. When the change set is ready to be reviewed, click the **Review** button in the **ManualApproval** action, then click **Accept** to accept the changes and continue the deployment.
7. If the deployment is successful, a new deployment will be created in **CloudFormation > Stacks**. The new stack will have **-deployed** appended to the stack name. So, in the above example, the Privitar AWS deployment created would be:

   Privitar-deployed
8. To confirm that Privitar AWS has been deployed, enter the URL of the deployment.

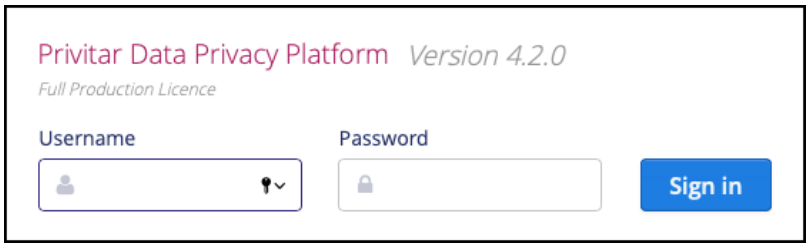
   The URL is derived from the `DeploymentID` parameter together with the `HostedZoneName` that were defined when the Privitar AWS stack was created. For example, if these two parameters were defined as:

   - DeploymentID - `data1234`
   - HostedZoneName - `privitar-aws.com`

   The URL for Privitar AWS would be:

   `https://data1234.privitar-aws.com`

   Enter the URL in a browser, the Privitar AWS login screen is displayed:



9. A one-time-use password has been randomly generated and stored as a secret in AWS Secrets Manager, under the name of `privitar/DeploymentID/one-time-password`, where `DeploymentID` is the value of the parameter defined in the Privitar AWS Stack. To retrieve the one-time password in the AWS Secret Manager service, go to the AWS Console and navigate to **AWS Secrets Manager > Secrets**, click on the secret with the name defined above and click **Retrieve Secret Value** to show the password value.
10. Go back to the URL for Privitar AWS, use the username `admin` and the one-time password retrieved in the step above to log-in. The Privitar AWS dashboard is displayed.

    Refer to Using Privitar AWS [21] for more information on how to setup and begin using Privitar AWS.

3. Optional - Configure Single Sign On with SAML

The Privitar Platforms supports two different User Management mode:

1. Internal (default). The Privitar Platform manages the users credentials and their groups membership in its local database.
2. Single Sign On. The Privitar Platform uses a 3rd party Identity Provider via the SAML2.0 protocol.

When using Single Sign On there are two parties, the Privitar Platform as Service Provider (SP), and a 3rd party identity service as the Identity Provider (IDP).

Follow the following steps to configure SSO:

1. Obtain the metadata file from the IDP service and upload it to an S3 bucket which can be read by the Privitar service. For example, a possible location could be the bucket where infra.zip is to be uploaded (as specified by the CF parameter `CdkInfrastructureZipBucket`).
2. Provide the following settings via CloudFormation parameters:

Parameter	Value
UserManagementProvider	Set this parameter to `SSO_SAML` to enable Single Sign On.
SsoSamlIdpMetadataS3Uri	This parameter should be set to the S3 location where the metadata file was uploaded in step 1.
SsoSamlSuperuserGroup	This parameter should contain the name of the group which maps on to superuser privilege.
SsoSamlUserAttribute	The name of the saml attribute representing a unique username that can be used by publisher to manage the user. The identity provider will give a saml assertion containing this attribute
SsoSamlUserDisplayNameAttribute	The name of the SAML attribute representing a display name for the user which is used as the user's name in the policy manager UI.
SsoSamlUserGroupsAttribute	A list of permissions groups to which the user belongs. These can be mapped on the Teams and Roles in the Privitar UI. Note: Privitar is case insensitive with regards to group names.

3. Apply the changes to the Stack (see the Modify Stack Parameter [18] section of this guide) and wait for the changes to be applied.
4. Once the Privitar Policy Manager has started, download the Service Provider metadata file from the following address: `https://<DeploymentID>.<HostedZoneName>/saml/metadata`. Use this file to configure your IDP service.

4. Manage the deployment

To facilitate the installation and update process using Cloud Development Kit, Privitar uses the AWS CodePipeline continuous delivery service. CodePipeline makes deployment and future updates easier, by automating many of the deployment steps. For example, a Privitar AWS update involves simply uploading the zip file to a defined S3 location, which will then trigger CodePipeline to redeploy the application.

It is also possible to use CodePipeline to roll-back a deployment if an error occurs during the deployment. This section describes how to manage the deployment.

4.1. CodePipeline deployment stages

The following table describes the sequential deployment steps that are executed by CodePipeline. If any of the steps fail to complete, then the update halts and rolls back any infrastructure changes. Although, any database changes made by applications as part of the update are not rolled back automatically.

Stage	Description
1. Source	Trigger the Pipeline when a new Privitar infrastructure zip file is uploaded to the appropriate S3 bucket location.
2. Build	Synthesize the Cloud Development Kit (CDK) application to CloudFormation. This will generate several CloudFormation templates, one for each stack that makes up the deployment, including several nested stacks.
3. UpdatePipeline	If the CodePipeline itself has changed between releases, then the template and its resources (the pipeline) will be updated. The primary purpose of this is to add or change CloudFormation parameters or to update the CDK version being used.
4. Assets	Upload the CloudFormation templates generated during the Build stage, and upload any binaries. For example, the Privitar Glue integration.
5. Pre-deployment, CreateDBSnapshot	If the deployment is an update for Privitar AWS, then take a snapshot of the Privitar Policy Manager configuration database. A snapshot will be required if the deployment fails and a roll back is required.
6. Deployment-stack	Execute the CloudFormation change set. This stage rolls out the update to the `-deployment` CloudFormation stack and its resources. Examples of changes: modify existing IAM policies, roll out updated ECR images of Privitar applications to ECS.

4.2. Rolling back a deployment

A manual rollback is required if the deployment has failed to complete during any of the stages outlined in the previous section.

To perform a manual roll-back

1. If CodePipeline reports that the Privitar AWS CloudFormation stack is in one of the following states:

   - ROLLBACK_FAILED
   - UPDATE_ROLLBACK_FAILED

   To recover from either of these states, upload the Privitar AWS zip file for the version that you want to roll-back to and use CodePipeline to roll back to the different version. If this also fails, contact Privitar as manual changes may be needed.

   If the CodePipeline reports that the stack is in one of these following states:

   - ROLLBACK_COMPLETE
   - UPDATE_COMPLETE

   This means that the infrastructure and ECS image versions will already have been automatically rolled back, so there is no further action required.
2. To roll back the configuration database to the snapshot created during the *Pre-deployment, CreateDBSnapshot* stage of the CodePipeline run that is being rolled back, see Restoring from a DB snapshot.

   Note that when working through this information:

   - The RDS will be called:

     `${DeploymentID}-db`
   - The snapshot will be called:

     `${DeploymentID}-db-pre-update-${date-time}`

     For example:

     `privitar-db-pre-update-2021-02-11-11-34`
3. Restart the Privitar Policy Manager and Event Broker ECS containers so that they are automatically restarted and recover.

   This can be done from ECS, by selecting **Stop All** from the ECS **Task** tab.

5. Modify Stack parameters

It is possible to make changes to configuration of the existing Privitar AWS deployment by modifying the Privitar AWS stack parameters and updating the stack.

Some of the changes that can be made, include:

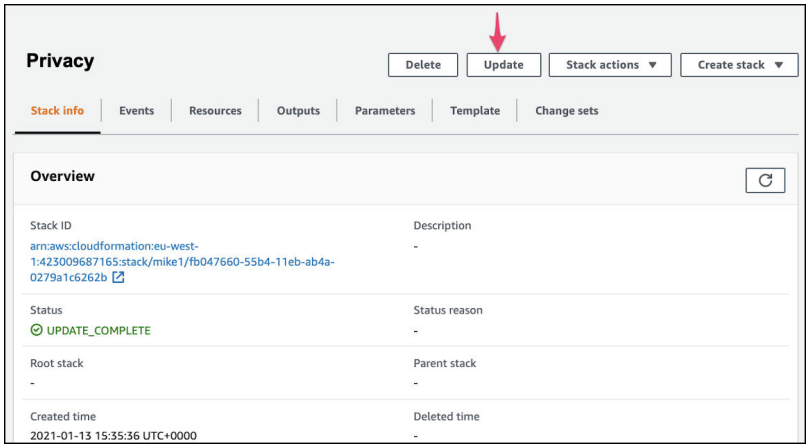
- Adding functionality that you did not include in a previous deployment. For example, mutual TLS.
- Taking advantage of a new configuration parameter that has been added to the Privitar AWS stack.

To modify the stack parameters:

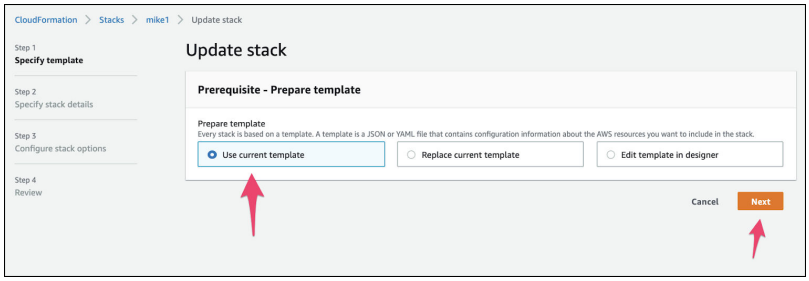
1. Locate the Privitar AWS stack that you created in AWS CloudFormation. This is the original stack that you created, not the `-deployed` version. For example:

   `CloudFormation > Stacks > <stack-name>`

2. Click on **Update**:



   The **Update Stack** window is displayed:



3. Select **Use Current Template** and click **Next**.

   The **Specify stack details** window is displayed.

4. Modify the stack parameters as required.

   Refer to the descriptive text provided above each parameter for more information about the use of each parameter. For a summary of all the parameters, see Stack Parameters [22].

5. Click **Next**.

   The **Configure stack options** window is displayed. Modify any options in this window.

6. Click **Next**.

   The **Review** window is displayed summarizing all the values that have been specified. It is possible to make other changes to the stack configuration from here.

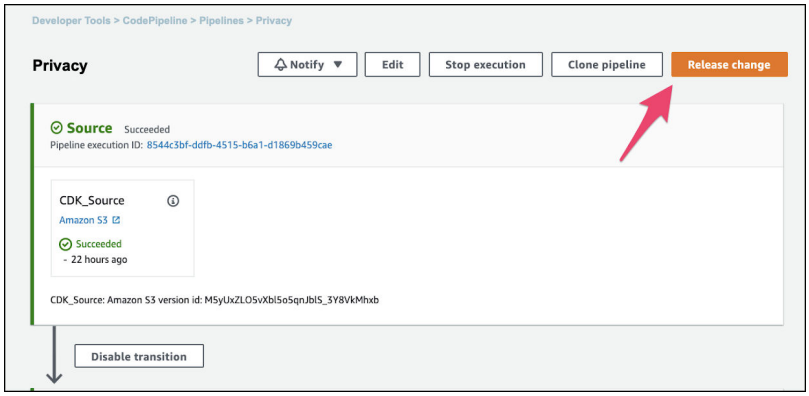
7. Click **Update stack** to confirm the changes and update the stack.

   The stack is updated and the main stack window is displayed.

   CloudFormation will report **CREATE COMPLETE** in the **Status** column to indicate that the stack has been successfully created.

8. To redeploy Privitar AWS with the new stack, for the new changes to take effect, you need to force an update on CodePipeline for the stack.

   Navigate to **Developer Tools > CodePipeline > Pipelines > <stack-name>** and click on **Release change** to force the update:



   CodePipeline will report **Succeeded** in the **Status** column.

   This means that all the stages in CodePipeline have been successful and the update to Privitar AWS has been successfully deployed. (If the deployment has failed for any reason, see AWS CodePipeline User Guide - Troubleshooting.)

6. Updating Privitar AWS

The Privitar AWS binaries consist of all the required software to run Privitar in an AWS Cloud environment. Any update for Privitar AWS will be supplied to you as a zip file from Privitar.

To update Privitar AWS:

1. Copy the new zip file from the Privitar AWS S3 bucket to the appropriate S3 bucket in your AWS Cloud environment.

   The S3 bucket location for your AWS Cloud environment is defined by the following parameters that were defined when the Privitar AWS stack was created:

   - `CdkInfrastructureZipBucket`
   - `CdkInfrastructureZipKey`

   (For more information about copying files to an S3 bucket, see Copying the Privitar AWS binaries [8].)
2. Copying a new zip file to the S3 bucket, will automatically trigger AWS CodePipeline to begin to re-deploy the new version of Privitar AWS.
3. If the re-deployment is successful:

   - CloudFormation will report **UPDATE_COMPLETE** in the **Status** column.

     This means that the CloudFormation template has been successfully updated. (If the template has failed to update for any reason, see AWS CloudFormation User Guide - Troubleshooting.)
   - CodePipeline will report **Succeeded** in the **Status** column.

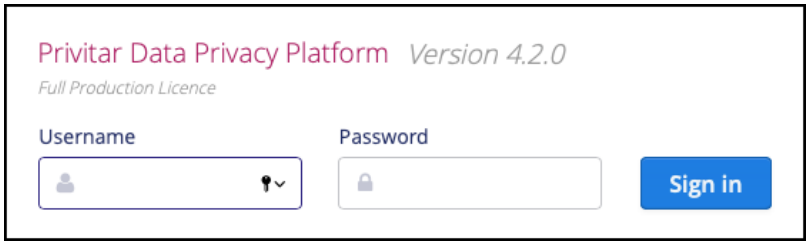
     This means that all the stages in CodePipeline have been successful and the update to Privitar AWS has been successfully deployed. (If the deployment has failed for any reason, see AWS CodePipeline User Guide - Troubleshooting.)
4. To confirm that Privitar AWS has been re-deployed, enter the URL of the deployment.

   For example:

   `https://data1234.privitar-aws.com`

   Enter the URL in a browser, the Privitar AWS login screen is displayed.

   If the deployment has been successful, the displayed **Version** of the platform will display the updated version number of the software:



7. Using Privitar AWS

This section describes some initial setup tasks for using Privitar AWS, following a new installation.

This section assumes that you have just deployed a new version of Privitar, as described in Deploy Privitar AWS [9].

In summary, the main setup tasks that you need to perform before you can use Privitar AWS to de-identify your data are listed below. For each task, there is a reference to to the specific section of the Privitar AWS User Guide that provides more information:

- Setup Users and Teams. See, *Managing Roles* in the *Privitar User Guide*.
- Setup your AWS Glue Environment. See, *AWS Glue Environment Configuration* in the *Privitar User Guide*.

To begin using Privitar AWS, you need to:

1. Define a Schema for the new input data. See, *Creating a Schema from an AWS Glue Data Catalog* in the *Privitar User Guide*.
2. Create a Policy representing the de-identification operations required. See, *Creating a Policy* in the *Privitar User Guide*.
3. Define the Protected Data Domain to be used as the destination for all data related to the use case in question. See, *Creating a PDD* in the *Privitar User Guide*.
4. Based on the Policy, create and execute a Job. This is done by selecting a Policy and a destination Protected Data Domain. See, *Creating a Batch Job* and *Running a Batch Job* in the *Privitar User Guide*.

8. Stack Parameters

The following table describes the stack parameters that are used to configure the Privitar AWS stack. The highlighted parameters are mandatory.

Parameter	Description
BootstrapVersion	The version of the CDK Bootstrap resources in this environment, automatically retrieved from SSM Parameter Store.
CdkInfrastructureZipBucket	The Amazon S3 bucket name of the S3 bucket containing the Privitar AWS infrastructure zip file. The AWS CodePipeline deployed by the CloudFormation template will look for the Privitar infrastructure zip file in this bucket.
CdkInfrastructureZipKey	The Amazon S3 key for the S3 object that is the Privitar AWS infrastructure zip file.
CreateTenantInstrumentationBucket	Whether or not to create a separate S3 bucket for storing the Privitar AWS instrumentation events.
DeploymentID	A unique identifier for the Privitar AWS deployment.
DeploymentGlobalID	Across all of AWS, uniquely identify global entities; for example S3 buckets must have a unique name across all accounts. Global resources created by Privitar CloudFormation will include the value of this parameter in their name.
GlueDataBucketKeys	The IDs of AWS KMS customer managed keys (CMK) that Privitar AWS Glue ETL jobs are allowed to use.
GlueDataDestinationBuckets	Specifies what S3 buckets Privitar AWS Glue ETL jobs are allowed to write data to, as a comma delimited list.
GlueDataSourceBuckets	Specifies what S3 buckets Privitar AWS Glue ETL jobs are allowed to read data from, as a comma delimited list.
HadoopUserName	The username to use to read or write HDFS files, if running jobs against an AWS EMR cluster.
HostedZoneID	The AWS Route 53 public hosted zone ID to use to generate a domain name and certificate that can be used by Privitar AWS.
HostedZoneName	The AWS Route 53 hosted zone domain name of the public hosted zone specified in the `HostedZoneID` parameter.
LicenceKeySecret (Provided by Privitar)	The ARN of a plaintext AWS Secrets Manager secret that contains the Privitar license key file contents.
MutualTlsCertificateAuthorityPath	Full path to Mutual Transport Layer Security (MTLS) certificate authority.

Parameter	Description
PrivitarInstrumentationBucket (Provided by Privitar)	The name of the S3 bucket location to store Privitar AWS instrumentation events.
RdsSnapshotID	If creating a new deployment from an existing Privitar Policy Manager configuration database, specify an AWS RDS snapshot to restore from.
RdsSnapshotSecret	If RdsSnapshotID is specified then this option is required. This is the ARN of a plaintext AWS Secrets Manager secret, that contains the AWS RDS snapshot database password.
SsoSamlIdpMetadataS3Uri	The S3 location of the SAML Identity Provider metadata file. Required when using SSO_SAML as User Management Provider.
SsoSamlSuperuserGroup	This parameter should contain the name of the group which maps on to superuser privilege. Required when using SSO_SAML as User Management Provider.
SsoSamlUserAttribute	The name of the SAML attribute representing a unique username that can be used by Privitar to manage the user. The identity provider will give a SAML assertion containing this attribute. Required when using SSO_SAML as User Management Provider.
SsoSamlUserDisplayNameAttribute	The name of the saml attribute representing a display name for the user which is used as the user's name in the policy manager UI. Required when using SSO_SAML as User Management Provider.
SsoSamlUserGroupsAttribute	A list of permissions groups to which the user belongs. These can be mapped on the teams and roles in the Privitar UI. Note: Privitar is case insensitive with regards to group names. Required when using SSO_SAML as User Management Provider.
Tags	This parameter controls what AWS tags will be applied to resources created by Privitar CloudFormation.
TrustedAdminRoles	A comma delimited list of trusted AWS IAM roles. Privitar infrastructure includes strict security controls that may prevent AWS users from reading or writing to certain resources.
UserManagementProvider	This parameter defines the Identity Provider used by the Privitar Platform. Possible values are `INTERNAL` (default) or `SSO_SAML`.
VpcPeerings	This parameter allows the Privitar control plane VPC to be automatically peered with other VPCs.