

This document moved to:

<https://s3-us-west-2.amazonaws.com/map-2.0-customer-documentation/html/latest/index.html>

The following page contains instructions that have been kept for reference only. Please use the [latest](#) version for the tagging instructions guide.

# Migration Acceleration Program

## Tagging Instruction Guide

*March 2021*



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## About this Document

This guide helps customers with their migration to AWS as part of the Migration Acceleration Program by detailing how to use tagging for their migrated workloads. Tagging enables customers to display Cost and Usage Report (CUR) based on the migrated resources, which can be utilized to report migrated workloads' spend and generate appropriate credits.

## Overview

The purpose of the Migration Acceleration Program (MAP) is to help AWS customers accelerate their migration to AWS. As a customer moves their existing workloads to AWS, the migrated workloads are identified through a mechanism called *tagging*, which enables them to display Cost and Usage Report (CUR) based on the migrated resources, which can be utilized to report migrated workloads' spend and generate appropriate credits.

## What is tagging?

Tagging is a way to assign a label to an AWS resource. Tags enable you to categorize your AWS resources in different ways. For example, you can categorize by purpose, owner, department, or environment. Each tag consists of a key and an optional value (for example, Department: Finance), both of which you define.

For the purposes of MAP, tagging of migrated workloads with the specific `map-migrated` tag (tag key is case sensitive) is necessary to enable the following:

- Tracking of the migration inventory scope, as it is migrated over time from the customer's existing environment to AWS
- Identification of the specific AWS resources being used in place of existing pre-migration resources
- Collecting the cost and usage data of all the migrated resources, which can be used by you to report TCO and other financial data

The tagging exercise is done when the workload is migrated to AWS. Typically, tags are applied by the workload owners who will be migrating their workloads. This process is repeated as workloads are moved across until the entire MAP migration scope has been migrated.

Even outside of MAP, tagging your AWS resources is a best practice. For more information, see the [Tagging Best Practices](#) whitepaper.

## Migration tracking through tagging

We rely on existing, publicly available services within AWS: Custom tags, AWS Cost and Usage Reports (AWS CUR), and AWS Migration Hub. MAP's migration tracking mechanism uses native AWS functionality which we will configure in four steps:

1. Set up the Cost and Usage Report
2. Activate cost allocation tags
3. Upload inventory to AWS Migration Hub and generate tag values
4. Tag the migrated resources in scope

The next section will walk you through step-by-step implementation of this mechanism.

## Requirements

You will need:

- Your Migration Program Engagement number (MPE number). You can find this number in your Migration Plan.
- Access to AWS management account(s) listed in your Migration Plan, and privileges allowing you to make changes to Cost and Usage Report, to activate Cost Allocation Tags and to create Amazon S3 buckets in the management account(s)
- Access to AWS Migration Hub service
- An initial list of the source environment resources in scope for migration

## Setup the Cost and Usage Report (CUR)

Note: You can setup the Cost and Usage Report using either automated or manual setup options.

Follow the below section for Automated option and for Manual setup and detailed information on resources created, see Appendix E.

### Automated option to setup CUR

You can utilize Automated option to quickly setup your Cost and Usage Report (CUR) in your management account(s) listed in your Migration Plan.

With Automated option, you use a CloudFormation template which creates the necessary resources and configuration in your account to correctly setup your Cost and Usage Report (CUR) for Migration Acceleration Program (MAP).

#### *Pre-requisites:*

- Access to the management account(s) listed in your Migration Plan
- Access to the minimum required permissions defined in below CURPolicy.json file:

<https://map-automation.s3-us-west-2.amazonaws.com/CURPolicy.json>

#### *Step by step instructions*

1. Make sure you log in to the management account(s) listed in your Migration Plan
2. Select your region
3. Navigate Services -> CloudFormation. Click on Create stack
4. Select 'Template is ready' and provide the following URL

<https://map-automation.s3-us-west-2.amazonaws.com/CUR-Automator.json>

### Create stack

**Prerequisite - Prepare template**

Prepare template  
Every stack is based on a template. A template is a JSON or YAML file that contains configuration information about the AWS resources you want to include in the stack.

Template is ready
  Use a sample template
  Create template in Designer

---

**Specify template**  
A template is a JSON or YAML file that describes your stack's resources and properties.

Template source  
Selecting a template generates an Amazon S3 URL where it will be stored.

Amazon S3 URL
  Upload a template file

Amazon S3 URL

Amazon S3 template URL  
 S3 URL: <https://map-automation.s3-us-west-2.amazonaws.com/CUR-Automator.json>

[View in Designer](#)

Cancel [Next](#)

5. Click Next
6. In “Configure Stack Options” step, Click Next

CloudFormation > Stacks > Create stack

Step 1  
Specify template

Step 2  
Specify stack details

Step 3  
**Configure stack options**

Step 4  
Review

### Configure stack options

**Tags**  
You can specify tags (key-value pairs) to apply to resources in your stack. You can add up to 50 unique tags for each stack. [Learn more](#)

[Remove](#)

---

**Permissions**  
Choose an IAM role to explicitly define how CloudFormation can create, modify, or delete resources in the stack. If you don't choose a role, CloudFormation uses permissions based on your user credentials. [Learn more](#)

IAM role - optional  
Choose the IAM role for CloudFormation to use for all operations performed on the stack.

[Remove](#)

---

**Advanced options**  
You can set additional options for your stack, like notification options and a stack policy. [Learn more](#)

**Stack policy**  
Defines the resources that you want to protect from unintentional updates during a stack update.

**Rollback configuration**  
Specify alarms for CloudFormation to monitor when creating and updating the stack. If the operation breaches an alarm threshold, CloudFormation rolls it back. [Learn more](#)

**Notification options**

**Stack creation options**

Cancel [Previous](#) [Next](#)

- 7. Give the stack a name and select a region for the S3 bucket that will store CUR.

**Specify stack details**

**Stack name**

Stack name

cur-stack

Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-).

**Parameters**

Parameters are defined in your template and allow you to input custom values when you create or update a stack.

**S3Region**

Select the region for S3 bucket to host CUR - Ensure the region you're in now matches what you select from the list.

us-east-1

Cancel Previous Next

- o Scroll down the page and check “I acknowledge that AWS CloudFormation might create IAM resources” box.

**Capabilities**

**The following resource(s) require capabilities: [AWS::IAM::Role]**

This template contains Identity and Access Management (IAM) resources that might provide entities access to make changes to your AWS account. Check that you want to create each of these resources and that they have the minimum required permissions. [Learn more](#)

I acknowledge that AWS CloudFormation might create IAM resources.

Cancel Previous Create change set Create stack

- The template will take about 1 minute to complete. You can see the created resources in “Resources” tab as shown below.

Logical ID	Physical ID	Type	Status	Status reason
CostAndUsageIAMRole	cur-stack-CostAndUsageIAMRole-INIID25J2Q88	AWS::IAM::Role	CREATE_COMPLETE	-
CostAndUsageLambdaFunction	cur-stack-CostAndUsageLambdaFunction-1OK3AIL87GY99	AWS::Lambda::Function	CREATE_COMPLETE	-
CostAndUsageS3Bucket	cur-bucket-381024693377	AWS::S3::Bucket	CREATE_COMPLETE	-
CostAndUsageS3BucketPolicy	cur-stack-CostAndUsageS3BucketPolicy-1G3LYMF8MDAEQ	AWS::S3::BucketPolicy	CREATE_COMPLETE	-
InvokeCostAndUsageLambda	2020/11/26/[\$LATEST]e2bdf0f2d3624c1bb4741fd2fc7c0943	Custom::InvokeLambda	CREATE_COMPLETE	-

Note: The created S3 bucket can be tagged later on to use Server ID values generated by AWS Migration Hub, so that the S3 bucket is taken into account for MAP credits calculation.

## Activate Cost Allocation Tags

After setting up the Cost and Usage Report, you need to activate the Cost Allocation tags for the MAP tags.

For general MAP workloads, you must use the below tag keys:

- map-migrated
- map-migrated-app

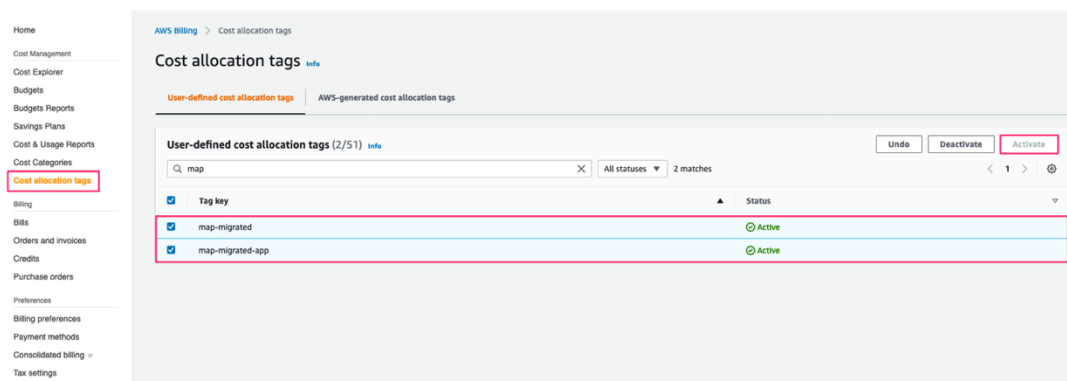
For SAP, Windows, and Database & Analytics workloads, please refer to the appendix.

PS: Tag keys are case sensitive; All cost allocation tags for the MAP program are in lower case.

The Cloudformation template used in the previous section creates the necessary tags. You need to activate the cost allocation tags that apply to your workload using the following steps:

To activate these tags:

1. In the AWS Management Console, under Services, go to **Billing**.
2. In navigation panel, go to [Cost allocation tags](#).
3. Click the checkboxes for the tags we created:  
**map-migrated**  
**map-migrated-app**
4. Click **Activate**
5. The status of the tags should now be **Active**.



Note: Once you create your cost allocation tags first time (e.g. map-migrated), it may take up to 24 hours to be visible in your account. If you can't see the tags in your account as shown above, revisit this step after 24 hours.

## Generate the Server IDs

Note: for manual option check the [Appendix F](#)

### Automated option for generating Server IDs

#### *Pre-requisites:*

- Access to the minimum permissions required:  
<https://map-automation.s3-us-west-2.amazonaws.com/Servers-ID-Policy.json>
- Set the AWS [Migration Hub home region](#).

#### *Step by step instructions:*

1. Set your region to the same region you set for the AWS Migration Hub home region.
2. Services -> CloudFormation. Click on Create stack
3. Select Template is ready and provide the following URL:  
<https://map-automation.s3-us-west-2.amazonaws.com/Servers-ID-Automator.json>
4. Click Next

### Create stack

**Prerequisite - Prepare template**

**Prepare template**  
Every stack is based on a template. A template is a JSON or YAML file that contains configuration information about the AWS resources you want to include in the stack.

Template is ready     Use a sample template     Create template in Designer

**Specify template**  
A template is a JSON or YAML file that describes your stack's resources and properties.

**Template source**  
Selecting a template generates an Amazon S3 URL where it will be stored.

Amazon S3 URL     Upload a template file

Amazon S3 URL

Amazon S3 template URL

S3 URL: `https://map-automation.s3-us-west-2.amazonaws.com/Originating-ID-Automator.json`

## 5. In “Configure Stack Options” step, Click Next

The screenshot shows the 'Configure stack options' step in the AWS CloudFormation console. The breadcrumb trail is 'CloudFormation > Stacks > Create stack'. The left sidebar shows four steps: Step 1: Specify template, Step 2: Specify stack details, Step 3: Configure stack options (current), and Step 4: Review. The main content area is titled 'Configure stack options' and contains three sections: 'Tags', 'Permissions', and 'Advanced options'. The 'Tags' section has a text input for 'Key', a text input for 'Value', and a 'Remove' button. Below it is an 'Add tag' button. The 'Permissions' section has a heading 'IAM role - optional' and a text input for 'IAM role name' with a dropdown arrow and a 'Remove' button. The 'Advanced options' section has four expandable sections: 'Stack policy', 'Rollback configuration', 'Notification options', and 'Stack creation options'. At the bottom right, there are three buttons: 'Cancel', 'Previous', and 'Next'.

## 6. In the next page

- a. Give the stack a name
- b. Enter your MPE number
- c. Select the region where you want to upload your inventory – this must match the AWS Migration Hub home region.

### Specify stack details

**Stack name**

Stack name

Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-).

**Parameters**

Parameters are defined in your template and allow you to input custom values when you create or update a stack.

**MPE**  
Contact your AWS account team, or check your MAP agreement.

**S3Region**  
Select a region for inventory upload to AWS Migration Hub.

Cancel Previous Next

7. You will need to acknowledge that AWS CloudFormation might create IAM resources, to do that scroll down to the bottom and select the checkbox that says **I acknowledge that AWS CloudFormation might create IAM resources**

### Capabilities

**The following resource(s) require capabilities: [AWS::IAM::Role]**

This template contains Identity and Access Management (IAM) resources that might provide entities access to make changes to your AWS account. Check that you want to create each of these resources and that they have the minimum required permissions. [Learn more](#)

 I acknowledge that AWS CloudFormation might create IAM resources.

Cancel Previous Create change set Create stack

The stack will take about 1 minute to complete. Once it's completed, click on the S3 bucket created.

**Resources (6)**

Search resources

Logical ID	Physical ID	Type	Status
CreateInputFolderLambdaFunction	<a href="#">originating-id-stack-CreateInputFolderLambdaFunction-1HHWO466IXRIU</a>	AWS::Lambda::Function	CREATE_COMPLETE
InvokeLambda	2020/11/26/[\$LATEST]66e30ff776eb4ed9a016500de9a453eb	Custom::InvokeLambda	CREATE_COMPLETE
MyIAMRole	<a href="#">originating-id-stack-MyIAMRole-8DIT85YVXE12</a>	AWS::IAM::Role	CREATE_COMPLETE
MyInvokeLambdaPermission	originating-id-stack-MyInvokeLambdaPermission-4FZ5V6C3I73C	AWS::Lambda::Permission	CREATE_COMPLETE
MyLambdaFunction	<a href="#">originating-id-stack-MyLambdaFunction-4MWAO40Y7KFB</a>	AWS::Lambda::Function	CREATE_COMPLETE
MyS3Bucket	<a href="#">migration-hub-inventory-bucket-381024693377</a>	AWS::S3::Bucket	CREATE_COMPLETE

**Objects (1)**

Objects are the fundamental entities stored in Amazon S3. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

Find objects by prefix

Name	Type	Last modified	Size	Storage class
<input type="checkbox"/> <a href="#">Upload-Your-Inventory-in-This-Folder/</a>	Folder	-	-	-

- Prepare your CSV file with on-premises inventory. If you don't have the CSV template, you can download it from [here](#). Remember, only 1 identifier is required. This could be Column A,C,D or E. You don't have to fill in the tag column.

Note: Make sure the CSV file name doesn't include spaces or special characters

	A	B	C	D	E	F	G	H	I
1	ExternalId	SMBiosId	IPAddress	MACAddress	HostName	VMware.Mo	VMware.VC	CPU.Number	CPU.Number
2					crm1.example.com				
3					crm2.example.com				
4					crm3.example.com				
5					crm4.example.com				
6									

- Upload the file

The screenshot shows the AWS S3 console interface for a folder named "Upload-Your-Inventory-In-This-Folder/".

**Folder overview:**

- Region: US East (N. Virginia) us-east-1
- S3 URI: s3://migration-hub-inventory-bucket-000000000000/Upload-Your-Inventory-In-This-Folder/
- Amazon resource name (ARN): arn:aws:s3::migration-hub-inventory-bucket-000000000000/Upload-Your-Inventory-In-This-Folder/

Drag and drop files and folders you want to upload here, or choose Upload.

**Objects (1)**




Objects are the fundamental entities stored in Amazon S3. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

Find objects by prefix

Name	Type	Last modified	Size	Storage class
wave1-import_template.csv	csv	November 22, 2020, 18:27 (UTC-06:00)	833.0 B	Standard

- After the import completes in AWS Migration Hub, the script will create OutputFiles folder in the same S3 bucket.

**Objects (3)**  
Objects are the fundamental entities stored in Amazon S3. For others to access your objects, you'll need to explicitly grant them permissions.

<input type="checkbox"/>	Name	Type
<input type="checkbox"/>	 <a href="#">FormattedFiles/</a>	Folder
<input type="checkbox"/>	 <a href="#">OutputFiles/</a>	Folder
<input type="checkbox"/>	 <a href="#">Upload-Your-Inventory-In-This-Folder/</a>	Folder

- This folder includes multiple csv files with information about your inventory. Server.csv will contain a list of on-premises servers mapped to their generated Server IDs.

**Objects (7)**  
Objects are the fundamental entities stored in Amazon S3. For others to access your objects, you'll need to explicitly grant them permissions.

Refresh Delete Actions Create folder Upload

Find objects by prefix

Name	Type
OutputFiles381024693377_Application.csv	csv
OutputFiles381024693377_ApplicationResourceAssociation.csv	csv
OutputFiles381024693377_NetworkInterface.csv	csv
OutputFiles381024693377_Server.csv	csv
OutputFiles381024693377_SystemPerformance.csv	csv
OutputFiles381024693377_Tags.csv	csv
OutputFiles381024693377_VMwareInfo.csv	csv

- Inside the Server.csv file, you can see the unique-ids generated for each server. You can use these to perform the actual tagging on resources after you start the migration.

	A	B	C	D	E	F	G	H	I	J
1	id	accountNum	agentId	cpuType	hostName	hypervisor	osName	osVersion	smBiosId	type
2	d-server-02cf01663ltdiq	9.9664E+10			crm2.example.com					
3	d-server-01qci08sv47u24	9.9664E+10			crm7.example.com					
4	d-server-00axmahvgc4iea	9.9664E+10			crm3.example.com					
5	d-server-015i2b1qnox4q1	9.9664E+10			crm6.example.com					
6	d-server-02peiimgp0pbfl	9.9664E+10			crm4.example.com					
7	d-server-02pr2io6mt8j01	9.9664E+10			crm1.example.com					
8	d-server-02fjvikan8gvi4	9.9664E+10			crm5.example.com					
9	d-server-02e3teorgwbef1	9.9664E+10			crm8.example.com					
10										
11										

You can repeat this process for every new inventory file or every new migration wave.

## Tag the migrated resources

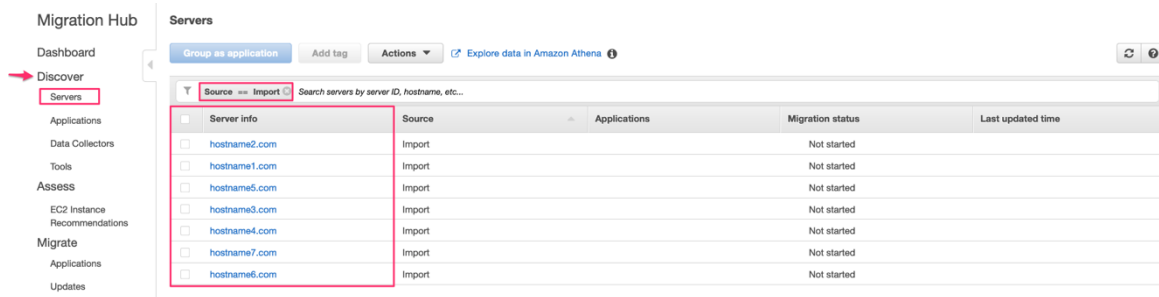
Tagging can be automated through scripts or if you are already using CloudEndure for re-hosting, it will automatically tag your resources. For more information, see [Automatic Tagging through CloudEndure](#).

In order to start tagging, you need the generated Server ID from AWS Migration Hub. This can be exported as bulk for all the imported servers. For more information, see [Appendix G: Export Server IDs from AWS Migration Hub](#).

In this section we will show you a simple example of manual tagging for one of the migrated resources. We will use the AWS Management Console for this purpose.

*To get the Server ID from the AWS Migration Hub console:*

1. In the AWS Management Console, under services, go to AWS [Migration Hub](#).
2. In the navigation pane, select **Servers** Under **Discover**.
3. Filter for the imported servers, using `source==Import`.



The screenshot shows the AWS Migration Hub console interface. On the left, the navigation pane is visible with 'Servers' selected under the 'Discover' section. The main content area displays a table of servers. A search filter 'Source == Import' is applied, resulting in a list of servers with the following columns: Server info, Source, Applications, Migration status, and Last updated time.

Server info	Source	Applications	Migration status	Last updated time
<input type="checkbox"/> hostname2.com	Import		Not started	
<input type="checkbox"/> hostname1.com	Import		Not started	
<input type="checkbox"/> hostname5.com	Import		Not started	
<input type="checkbox"/> hostname3.com	Import		Not started	
<input type="checkbox"/> hostname4.com	Import		Not started	
<input type="checkbox"/> hostname7.com	Import		Not started	
<input type="checkbox"/> hostname6.com	Import		Not started	

4. Select the server that you already migrated (for example, hostname1.com).
5. Copy the Server ID generated from AWS Migration Hub to use as the value for the tag key.

Migration Hub hostname1.com

Sources: Import | Applications: None | Tags: aws-migration-project-id

Basic information

VM name	-	VMware guest tools status	-
VMware moref ID	-	CPU type	-
Type	-	OS name	-
VM folder path	-	OS version	-
Manufacturer	-	Hypervisor	-
VMware host system ID	-	# of Cores	-
Data center ID	-	# of CPUs	-
VMware vCenter ID	-	# of Disks	-
MAC address	-	# of Network cards	-
Hostname	hostname1.com	Free disk size (MB)	-
IP address	-	Total disk size (MB)	-
Server ID	d-server-02yfs6henmczj	Total RAM (MB)	-

- Go to the migrated resources (for example, Amazon RDS) and choose **Add tags**.
- In the **Add tags** box, use **map-migrated** as the **Tag Key** (case sensitive) and use the **Server ID** you copied from the previous step as the **Value** then click **Add**.

**Add tags** [Close]

Add tags to your RDS resources to organize and track your Amazon RDS costs. [Learn more](#)

Tag key	Value
map-migrated	d-server-02yfs6henmczj

[Add another Tag] [Cancel] **Add**

- Repeat the previous step for any other associated resources (e.g. Snapshots)

Note: Tagging is not required to be a one-to-one relationship. It can be one-to-many in the re-architecting scenarios.

# Automatic Tagging through CloudEndure

## Generate the Server IDs with CloudEndure

To get the tag values that will be used for migration tracking, use AWS Migration Hub to generate a unique Server ID for the source environment. If you are using CloudEndure Migration, this can be done automatically by connecting CloudEndure to Migration Hub. The default [CloudEndure IAM Policy](#) will work to connect to Migration Hub.

Once you install the CloudEndure agent on the source systems to migrate, they will appear as discovered resources in Migration Hub with a unique Server ID.

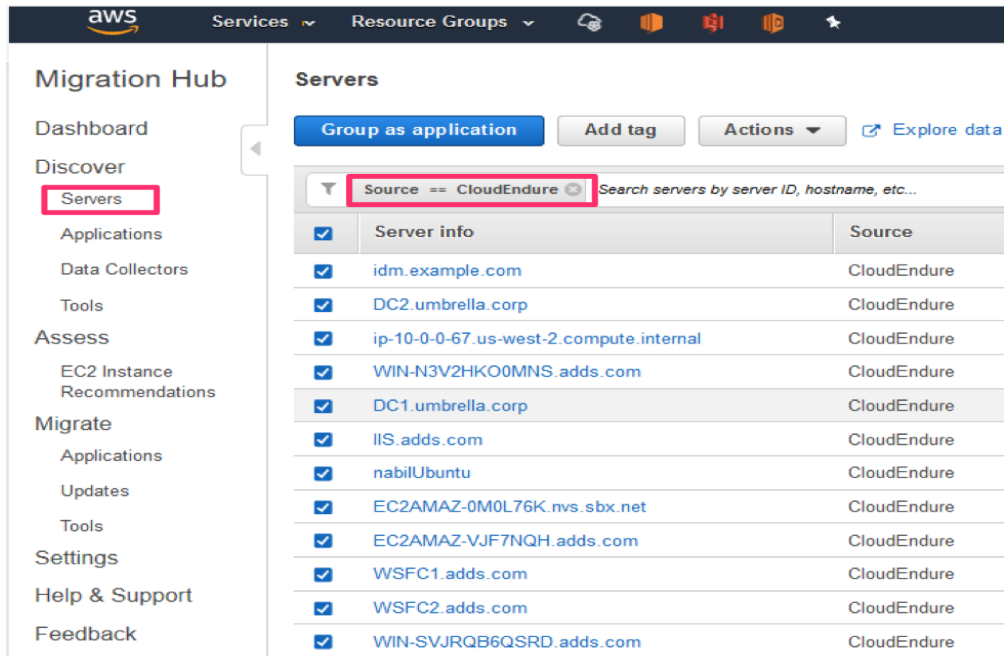
## Update imported servers with the MPE number

To update the source environment with the MPE, you need to select every entry in the scope of your Migration Plan and add the MPE number as a tag in AWS Migration Hub. To do this, you need to filter on the discovered resources with CloudEndure as source of discovery as following:

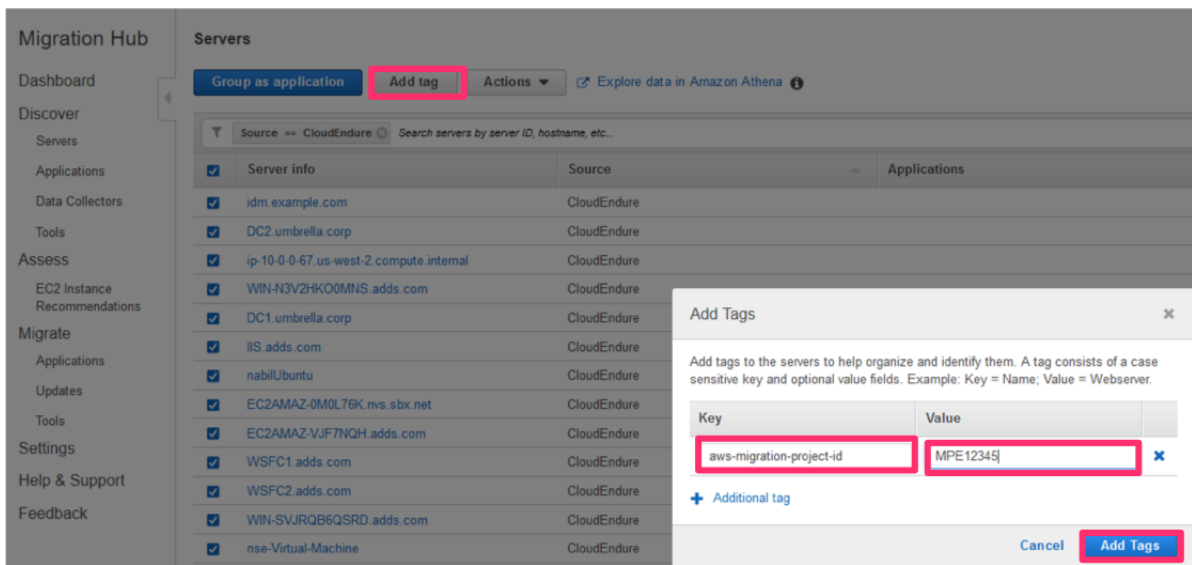
Note: If this is your first-time using Migration Hub, you will need to choose the home region for the Migration Hub. For more information, see [The AWS Migration Hub Home Region](#).

Note: Migration Hub must be initialized in each account where CloudEndure is to be used before the first server migration with CloudEndure Migration.

1. In the AWS Management Console, under services, go to [Migration Hub](#).
2. Select **Servers** under **Discover**.
3. Filter for the servers imported by CloudEndure, using **source==CloudEndure**.
4. Select all servers included in the Migration Plan, as shown in the following image.



5. Click **Add tag** and add *aws-migration-project-id* in the **Key** field and your MPE number in the **Value** field.



## Activate cost allocation tags

If you are using CloudEndure automatic tagging, you need to activate cost allocation tags that are used by CloudEndure integration with AWS Migration Hub.

Note: `aws:migrationhub:source-id` will only show up after you migrated at least one server using CloudEndure.

### To activate cost allocation tags:

1. In the AWS Management Console, go to the **Billing** service in the management account and select **Cost Allocation Tags**.
2. Select **aws:migrationhub:source-id** from the list of tags and click **Activate**.

The screenshot shows the AWS Management Console interface for 'Cost Allocation Tags'. On the left is a navigation menu with 'Cost allocation tags' selected. The main content area shows 'User-Defined Cost Allocation Tags' with a status of 'Finished loading tags'. Below this are instructions and a 'Refresh' button. A table of tags is displayed with a search filter 'aws:migrationhub:source-id'. The table has columns for 'Tag key\*' and 'Status'. One tag is listed: 'aws:migrationhub:source-id' with a status of 'Inactive'. The 'Activate' button and the tag's checkbox are highlighted with red boxes.

Tag key*	Status
<input checked="" type="checkbox"/> aws:migrationhub:source-id	Inactive

This will enable you to organize and track your AWS costs for the migrated resources.

## Tagging Examples

AWS custom tag keys are case sensitive. For MAP program, all the tag keys used are lower case and should be adhered to exactly as in the below examples.

### Example 1: Re-hosting using CloudEndure

Customer is moving from on-premises to AWS using a lift-and-shift (re-hosting) migration pattern, and decided to use CloudEndure for the migration.

Tag Key (automated)	Value (automated)
<b>aws:migrationhub:source-id</b>	Server ID from Migration Hub

### Example 2: DC Migration (mix of migration patterns)

Customer is moving different workloads from on-premises to AWS using various migration patterns (re-hosting, re-architecting, etc.) as part of general MAP.

Tag Key	Value
<b>map-migrated</b>	Server ID from Migration Hub
<b>map-migrated-app (optional)</b>	App ID from Migration Hub

### Example 3: Move to Managed Database

Customer is moving MS SQL databases from Amazon EC2 instances on AWS to Amazon RDS for SQL server as part of MAP for Database.

Tag Key	Value
<b>map-migrated</b>	ARN value of the source EC2 instance
<b>aws-migration-project-id</b>	MPE number

### Example 4: Database Modernization

Customer is moving from on-premises MS SQL server to Amazon Aurora, this example is for workloads that qualify for the DBA modernization benefits, including both if you are modernizing directly from on-premises or modernizing after migrating to EC2 as a first stage of the migration.

Tag Key	Value
<b>map-dba</b>	Server ID from Migration Hub

Tag Key	Value
<b>aws-migration-project-id</b>	MPE number

## Conclusion

In this document we covered how to set up the Cost and Usage Report, activate cost allocation tags, use AWS Migration Hub to generate the Server IDs, and tag the migrated resources in order to track the migrated workloads' spend and generate appropriate credits for the Migration Acceleration Program. We believe these details will help your migration efforts.

## Additional Resources

Below are some useful resources for troubleshooting any issue that you might experience during the tagging procedure for MAP:

- [Setting up an Amazon S3 bucket for Cost and Usage Report](#)
- [Creating Cost and Usage Reports](#)
- [Managing your Cost and Usage Reports](#)
- [Cost Allocation Tags](#)
- [Viewing your Cost and Usage Reports details](#)
- [Querying Cost and Usage Report using Amazon Athena](#)
- [AWS Migration Acceleration Program \(MAP\)](#)
- [Services included in the MAP](#)
- [AWS Migration Hub](#)
- [AWS Migration Hub Import Template](#)
- [Troubleshooting Failed Import records to AWS Migration Hub](#)
- [Detailed Instructions on Amazon EKS and AWS Fargate tagging](#)

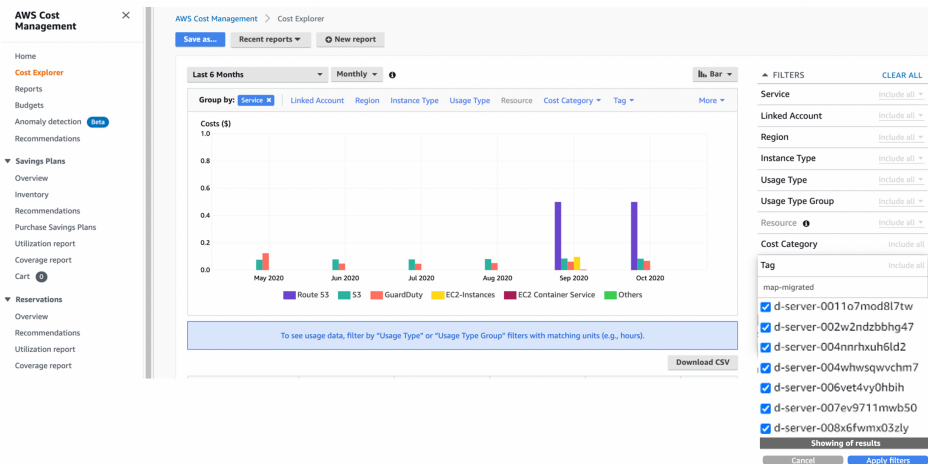
## Document Revisions

Date	Description
<b>September 2020</b>	First publication
<b>October 2020</b>	Adding more clarification for the Tagging examples
<b>February 2021</b>	Adding automation section for CUR and ServerID export Adding Cost Explorer Validation Adding more examples to the database and analytics tags Changing the sections order for better flow
<b>March 2021</b>	Added language to call out that tags are case sensitive Added links to Amazon EKS tagging instructions

# Appendix A: Cost Explorer Validation

After you have tagged the target AWS resources, if you want to see how much the target AWS resources are used for each management account in your Migration Plan, you can use Cost Explorer to see the approximate amount of the target AWS resources. For more information, see the [AWS Billing and Cost Management - Analyzing your costs with Cost Explorer User Guide](#).

1. Log in to your AWS management account.
2. On the navigation bar, choose your Account, and then choose My Billing Dashboard.
3. In the navigation menu, choose Cost Explorer, and then Click Launch Cost Explorer.
4. In the navigation menu, choose Cost Explorer again.
5. FILTERS menu, select Tag, enter the map tag name “map-migrated”.
6. Click apply filters



7. In “Advanced Options” under “show costs as” select **Amortized costs**
8. you will be able to see the approximate amount of the target AWS resources.

Service	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Service Total
Total cost (\$)					
Route 53 (\$)					
S3 (\$)					
GuardDuty (\$)					
EC2-Instances (\$)					
EC2 Container Ser... (\$)					
CloudWatch Events (\$)					



## Appendix B: Windows Workload Tags

If your MAP Migration Tracking and Incentive Guide or Migration Plan includes eligibility for Windows MAP Credits or the Windows MAP Formula, an alternative tag(s) needs to be activated in cost allocation tags and to be used for the migrated resources. Several scenarios based on the source and destination are listed in the following table.

PS: AWS custom tags are case sensitive. For MAP program, all the tag keys used are lower case and should be adhered to as shown below.

Source	Destination	Tag Key	Tag Value
<b>on-premises (windows)</b>	EC2 (Windows)	<b>map-migrated</b>	<b>Server ID</b> generated from migration hub
<b>on-premises (windows)</b>	Open Source: EC2/ Serverless/ Containers	<b>map-win-modernized</b>	<b>Server ID</b> generated from migration hub
<b>AWS (EC2 Windows) *</b>	Open Source: EC2/ Serverless/ Containers	<b>map-win-modernized</b>	ARN value of the source EC2 instance
		<b>aws-migration-project-id</b>	MPE number

\* Apply these tags only if this is a second step of Windows modernization. That is, if you migrate workload from on-premises to Amazon EC2 Windows as part of MAP and then modernize.

## Appendix C: SAP Workload Tags

If you have received a MAP for SAP Migration Tracking and Incentive Guide, or if your MAP Migration Tracking and Incentive Guide or Migration Plan includes eligibility for the MAP for SAP Formula, an alternative tag, `map-sap`, will be required to be activated and used for MAP program.

PS: AWS custom tags are case sensitive. For MAP program, all the tag keys used are lower case and should be adhered to as shown below.

Source	Destination	Tag Key	Tag Value
<code>on-premises</code>	AWS	<code>map-sap</code>	Server ID generated from AWS Migration Hub

AWS resources for SAP must be consuming a three-year Reserved Instance (RI) or Saving Plan (SP) to be considered for spend calculations.

## Appendix D: Database and analytics Tags

Many DB&A migrations will still use the ‘map-migrated’ tag key. This appendix explains when you should use this tag key, and when you should use ‘map-dba’.

If your MAP Migration Tracking and Incentive Guide or Migration Plan includes eligibility for DB&A MAP Credits or the DB&A MAP Formulas, an alternative tag(s) needs to be activated in cost allocation tags and to be used for the migrated resources. Several scenarios based on the source and destination are listed in the following table.

PS: AWS custom tags are case sensitive. For MAP program, all the tag keys used are lower case and should be adhered to as shown below.

### The Change

The ‘map-dba’ tag is only required when you’re migrating away from any third-party database engine, data warehouse, or analytics offering where you have paid a fee for use rights, enhancements, maintenance, or support for that third party offering to a qualified ‘Modern Databases or Analytics Service’ listed [here](#).

If your migration is multi-step e.g.

1. on-premises database to EC2 (same engine)
2. EC2 to RDS (same engine)
3. RDS commercial engine to RDS open-source engine

You would use ‘map-migrated’ for steps 1 and 2, and ‘map-dba’ for step 3.

Whether it’s a one-step, two-step, or three-step migration, it’s ONLY the step that meets the criteria above that requires ‘map-dba’. Migrations that don’t result in ‘the change’ as outlined above just use ‘map-migrated’.

Several common source/destination examples are listed in the following table. We have not published an exhaustive list because the market for relational databases, data warehouses, and analytics products is large and changes regularly.

## Examples using ‘map-migrated’:

Source	Destination	Tag Key	Tag Value
On-premises Oracle	EC2 Oracle	map-migrated	Server ID
On-premises MS SQL Server	RDS MS SQL Server	map-migrated	Server ID
On-premises PostgreSQL	Aurora PostgreSQL	map-migrated	Server ID
EC2 Oracle	RDS Oracle	map-migrated	ARN of the source EC2 instance
		aws-migration-project-id	MPE number
On-premises Elasticsearch (open source)	Amazon Elasticsearch	map-migrated	Server ID

## Examples using ‘map-dba’:

PS: AWS custom tags are case sensitive. For MAP program, all the tag keys used are lower case and should be adhered to as shown below.

Source	Destination	Tag Key	Tag Value
On-premises Oracle	RDS PostgreSQL or Aurora PostgreSQL or Amazon DynamoDB	map-dba	Server ID
EC2 MS SQL	Aurora MySQL	map-dba  aws-migration- project-id	ARN of source EC2 instance MPE Number
RDS MS SQL	Aurora DynamoDB	map-dba  aws-migration- project-id	ARN of source RDS instance MPE Number
On-premises Cloudera*	Amazon EMR	map-dba	Server ID
On-premises Elasticsearch* (commercially supported)	Amazon Elasticsearch	map-dba	Server ID

\* Remember, if the source is on-premises open source, use the map-migrated tag. Only use ‘map-dba’ when you’re migrating away from any third-party database engine, data warehouse, or analytics offering where you have paid a fee for use rights, enhancements, maintenance, or support for that third party offering.

## Appendix E: Manual option for the CUR setup

Note: This is a one-time process done per management account and needs to be done at least 48 hrs. before the planned migration.

In case of SAP workload, this must be done 48 hours before the purchase of the RI or Savings Plan, not the actual migration.

The Cost and Usage Report (CUR) is enabled once per management account by the team with the right privileges to the management account. An associated Cost and Usage Report then needs to be created to allow tracking of MAP tagged resources.

To create the Cost and Usage Report (CUR):

1. Log in to your AWS management account.
2. Under services, go to **Billing**
3. In the navigation menu, select [Cost & Usage Reports](#).
4. Click **Create Report**.
5. In the **Report name** field, enter the report name with the prefix: **map-migrated**.
6. Select **Include resource IDs**.
7. Click **Next**.

AWS Cost and Usage Reports > Create report

Step 1  
**Report content**

Step 2  
Delivery options

Step 3  
Review

### Report content

Report name - required ↙ Prefix Must be 'map-migrated'

map-migrated-report ✔ Valid report name

**Report includes**

- Account identifiers
- Invoice and Bill Information
- Usage Amount and Unit
- Rates and Cost
- Product Attributes (e.g., instance type, operating system, and region)
- Pricing Attributes (e.g., offer types, and lease lengths)
- Reservation identifiers and related details (for reserved instances only)

**Additional report details**  
When resources are created, AWS assigns each resource a unique resource ID. Including individual resource IDs in your report can significantly increase the file size.

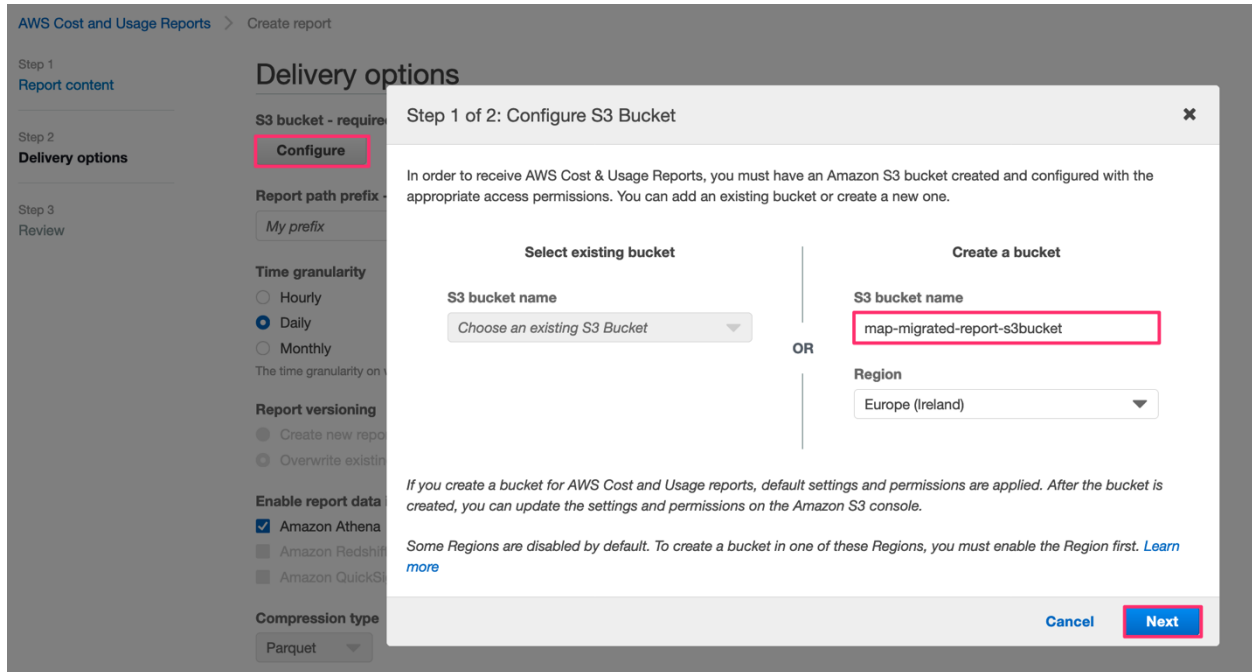
Include resource IDs

**Data refresh settings**  
These charges are often related to refunds, credits, and AWS Support fees.

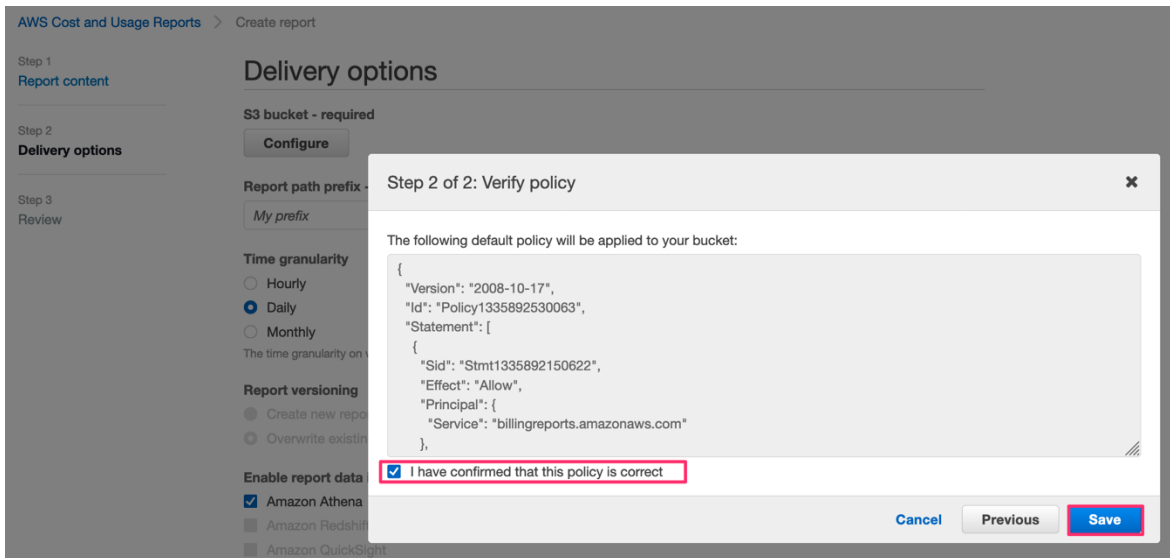
Automatically refresh your Cost & Usage Report when charges are detected for previous months with closed bills.

[Cancel](#) [Next](#)

8. Under **S3 Bucket**, click **Configure**.
  - a. Enter a unique bucket name (for example, **map-migrated-report-s3bucket**)
  - b. Select a region that Migration Hub is configured to use and click **Next**.



9. Review the policy, confirm that it is correct then click **Save**.



10. Set the **Report path prefix** with your preferred prefix (for example, **map-credits-report**).

11. Set Time granularity as **Daily**.
12. Set Report versioning as **Overwrite existing report**.
13. Enable report data integration for **Amazon Athena**.
14. Set Compression type as **Parquet**.
15. Click **Next** and then **Review and Complete**.

AWS Cost and Usage Reports > Create report

Step 1  
Report content

Step 2  
**Delivery options**

Step 3  
Review

### Delivery options

**S3 bucket - required**  
map-migrated-report-s3bucket Configure Verify Valid Bucket

**Report path prefix - required**  
map-credits-report ?

**Time granularity**  
 Hourly  
 **Daily**  
 Monthly  
The time granularity on which report data are measured and displayed.

**Report versioning**  
 Create new report version  
 **Overwrite existing report**

**Enable report data integration for**  
 **Amazon Athena**  
 Amazon Redshift  
 Amazon QuickSight

**Compression type**  
Parquet

**File format**  
Parquet

Cancel Previous **Next**

Your Cost and Usage Report now displays in the console.

AWS Cost and Usage Reports

Create report Edit Delete

<input type="checkbox"/>	Report name	S3 bucket	Time granularity	Data last refreshed
<input type="checkbox"/>	map-migrated-report	map-migrated-report-s3bucket	Daily	N/A

Note: In the next 24 hours, your first report will be delivered to the Amazon S3 bucket you configured during the report creation.

## Appendix F: Manual option for generating the ServerIDs

To generate the tag values that will be used for migration tracking, use the AWS Migration Hub to generate a unique Server ID for the source environment. To do that, provide AWS Migration Hub with the source environment inventory (the migration scope as per the Migration Plan). A comma-separated values (.csv) import template file is available for this purpose and can be found [here](#).

The CSV file captures many attributes about servers in scope for migration. Only two attributes are required for this purpose to generate a unique Server ID for each server:

- A unique identifier, which can be any of the fields below (at least one is required):
  - ExternalID
  - IPAddress
  - MACAddress
  - Hostname
- A Migration Project ID, which must be under the following field:
  - Tags

### To fill out the CSV file:

1. In the **Hostname** column, add the hostname.  
This must be unique. If the hostname is not unique, use the IPAddress, MACAddress, or ExternalID.
2. In the **Tags** column, add the following tag/value pair:  
aws-migration-project-id: <your migration project plan number>

Tip: You can get the Migration Project Engagement number from your MAP Migration Plan. MPE Number format will be MPEnnnnn.

For example:

```
HostName,Tags  
hostname1,aws-migration-project-id:MPE12345  
hostname2,aws-migration-project-id:MPE12345
```

In the above example, we used the minimal requirements for the import template. However, you can add more details by using the remaining attributes.

Note: If you used ExternalID only as the unique identifier, use the same value in the hostname as well. This will help you in the export stage later for correlation with the generated Server ID.

The most granular view of on-premises servers to AWS workloads will be achieved by creating unique tags per server. For re-architecting scenarios, where source servers must be represented by a group (such as multiple servers that constitute an overall application), there is an additional **Applications** field in the import template. You can use this field to represent the overall group that the server belongs to.

```
HostName,Applications,Tags  
hostname1,SampleApp1,aws-migration-project-id:MPE12345  
hostname2,SampleApp1,aws-migration-project-id:MPE12345
```

After you have filled out the CSV file, go to the AWS Management Console and choose [Migration Hub](#) service. If this is your first time using Migration Hub, you will need to choose the home region for the Migration Hub. For more information, see [The AWS Migration Hub Home Region](#).

#### To import the CSV file:

1. In the AWS Management Console, under services, go to [Migration Hub](#).
2. In the navigation pane, select **Tools** Under **Discover** and then click **Import**.
3. In the **Import name**, add a name for the import task.
4. Click **Go to S3**, to upload the CSV file that you created earlier to any existing S3 bucket (or a new bucket if needed)

- In **Amazon S3 Object URL**, add the S3 object URL for the CSV file that you uploaded in the previous step.

### Import

Start by downloading the [import template](#). Populate the template with your data and upload it to an Amazon S3 bucket.

**Important:** To ensure successful import, your data must match our import template format. [Learn more](#)

[Download import template](#)

Import name \*

map-initial-import-list

Amazon S3 Object URL \*

https://map-tagging.s3.eu-central-1.amazonaws.com/sample-map\_template.csv

[Go to S3](#)

[How to find the Object URL on S3](#)

\*Required

Cancel

Import

- Click **Import**. Once the import task completed, you will see the import details.

The screenshot shows the AWS Migration Hub console. On the left is a navigation sidebar with options like Dashboard, Discover, Servers, Applications, Data Collectors, Tools, and Assess. The main content area shows 'Tools > Imports' and 'Imports' as the current view. A green notification box at the top states 'Import task successfully started'. Below this are buttons for 'Import', 'Delete imported data', and 'Download failed records'. A table below lists the import tasks:

Name	Import ID	Import time	Import status	Imported rec...	Failed records
map-initial-import-list	import-task-ed5cf...	a few seconds ago	Imported	7	0

If the import failed, you can download the failed records to troubleshoot and fix it. For more details check [Troubleshooting Failed Import records to AWS Migration Hub](#)

You can perform additional imports of new source systems multiple times during the migration project. Check [Appendix G](#) for manual export for the ServerIDs.

## Appendix G: Export server IDs from AWS Migration Hub

Server IDs can be bulk exported from the AWS Command Line Interface (AWS CLI). If not already installed, the AWS CLI must first be installed in your environment. For more information, see the [AWS Command Line Interface User Guide](#).

1. Open the Command prompt (Windows) or Terminal (MAC/Linux).
2. Type `aws configure` and press Enter.
3. Enter your AWS Access Key Id and AWS Secret Access Key.
4. Enter your Default Region Name.
5. Enter text for Default Output Format.
6. Enter the following command to generate an export ID:

```
aws discovery start-export-task
```

7. Using the export ID generated in the previous step, type the following command to generate an Amazon S3 URL as a value for the parameter `configurationsDownloadUrl`:

```
aws discovery describe-export-tasks --export-ids <export ID>
```

8. Copy the URL generated in the previous step and paste it in a browser to download the zip file with collected data of the imported servers.

## Appendix H: Frequently Asked Questions

### 1. Which AWS account should I use to log into Migration Hub and generate the Server IDs?

Customers can use any AWS account linked to the management account(s) identified in their migration plan to do this.

### 2. Should migrations occur under the same management account?

All workloads must be migrated to a management account listed in your Migration Plan that has Cost and Usage Report (CUR) enabled, or to an account linked to one of those management accounts.

### 3. Do we have to use AWS Migration Hub in that management account, or can we use a shared services child account under that management account for the actual AWS Migration Hub activity?

You must use an account linked to the management account listed in your Migration Plan that has CUR is enabled. If you don't have a linked account, then migration, CUR enablement, and Migration Hub all must happen in the same account.

### 4. The documentation states that we need to specify an MPE number. Where do I find that number?

We need the MPE number identified on your Migration Plan to be part of the CSV import file for the migration hub. This is to facilitate multiple Migration Plans per customer and per account. You can find this number at the top of your Migration Plan when it is sent to you for acceptance by your account team.

### 5. Once my input data is uploaded to Migration Hub, how do I get the Server ID information?

There are two ways to get the information:

- Use the [automated option for generating the server IDs](#).
- Use AWS-CLI commands to get a download of all the information in a zip file. For more information, see [Appendix G: Export server IDs from AWS Migration Hub](#).

### 6. How do I tag my migrated resources in AWS with the *map-migrated* tag?

There are several ways to tag resources in AWS. It can be as simple as going to each resource in the AWS Management Console and create the tags or you can write custom scripts to bulk tag your resources during or after the creation.

**7. What if I upload the CSV file to AWS Migration Hub multiple times with updated information? Will it generate duplicate Server IDs for migrating servers?**

AWS Migration Hub generates the unique Server ID based on the following fields in the CSV file:

- External ID,
- IP Address,
- MAC Address
- Host Name

As long as these entries don't change for a source asset, duplicate Server IDs will not be issued.

In case for any reason, you need to change the preceding fields after the first import, you will get a new Server ID. In that case, you will need to update the *map-migrated* tag value that applied during the first import.

**8. What is the process for baselining AWS services that cannot be tagged but are also included in MAP (VMware Cloud on AWS, Amazon Connect, AWS Managed Services)?**

The baselining for Amazon Connect, VMware Cloud on AWS, and AWS Managed Services (AMS) is an automated process.

If you are planning to use an existing Amazon S3 bucket, you will need to provide the baseline to consider the incremental spend calculation.

**9. Can I tag existing AWS resources?**

The Program Terms clearly state that only workloads that will be migrated after the start of the MAP Credit Period (i.e., after the date you accept the Program Terms for your Migration Plan) are eligible for the incentive (other than existing Amazon Storage Resources identified in your Migration Plan and certain DB&A workloads that may be available in your MAP Migration Tracking and Incentive Guide or as specified in your Migration Plan). You will have up to 120 days to tag the resources post migration.

**10. Which services are in scope for MAP?**

You can find all eligible services for MAP in [Included Services and DB Freedom Sources](#).

**11. Does CloudEndure Migration automatically apply the MAP tags?**

If you are using CloudEndure (or a tool that uses AWS Migration Hub API and migrates to EC2 instances or AMIs) for migration, the AWS resources will be automatically tagged with **aws:migrationhub:source-id tag**. (AWS Migration Hub Home Region must be set prior to using auto-tagging). So, if you are using CE, no CSV upload or manual tagging required.

**12. What is the cost of running CUR Automator or Servers IDs Automator in the customer's account?**

Both CUR Automator and Servers IDs Automator use S3 to store CUR and the uploaded inventory respectively. These files are typically small (a few KBs) and it will take time before they start incurring charges. Check [Amazon S3 pricing](#) for details. Similarly, both CUR Automator and Servers IDs Automator use Lambda function for a time (a few seconds) that's short enough to not incur charges on customer's accounts. Check [AWS Lambda Pricing](#) for details. Given that CUR Automator has to run only once, and Servers IDs Automator runs with every new inventory upload, it's safe to say they both don't incur charges.

**13. Does Server ID Automator support across accounts? Meaning, can I launch the CFN in one account and upload inventory in another account?**

Not currently. You need to launch the CFN template in the same account where you upload inventory.

**14. My customer is concerned about security and they ask for more details about the permissions CUR Automator and Servers IDs Automator use in the customer's account. Where do I find more details about that?**

- Minimum permissions used by CUR Automator [here](#)
- Minimum permission used by Server ID Automator [here](#)

**15. Are tags case sensitive?**

Yes. AWS custom tags are case sensitive. For MAP program, all the tag keys used are lower case and should be adhered to.