Hands-on tutorials

Amazon EC2 Backup and Restore Using AWS Backup

Amazon EC2 Backup and Restore Using AWS Backup: Hands-on tutorials

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AWS experience	Intermediate
Time to complete	10 minutes
Cost to complete	Free Tier eligible (see Amazon EC2 pricing page for more details)
Services used	AWS Backup Amazon EC2
Last updated	January 23, 2023

Overview

AWS Backup enables you to centralize and automate data protection across AWS services. AWS Backup offers a cost-effective, fully managed, policy-based service that simplifies data protection at scale. AWS Backup helps you support your regulatory compliance obligations and meet your business continuity goals.

With just a few clicks in the AWS Backup console, you can create backup policies that automate backup schedules and retention management. With AWS Backup, you can create backup policies called backup plans. You can use these plans to define your backup requirements, such as how frequently to back up your data and how long to retain those backups. AWS Backup lets you apply backup plans to your AWS resources by simply tagging them. AWS Backup then automatically backs up your AWS resources according to the backup plan that you defined.

You can use AWS Backup to create on-demand backup jobs, or customize a backup plan to back up the supported resources. When using AWS Backup with Amazon Elastic Compute Cloud (Amazon EC2) instances, you can centralize your compliance and policy control for backups, increase security choices for your organization, and access instant enterprise-level features and functionality. When you back up an EC2 instance, AWS Backup will protect all Amazon EBS volumes attached to the instance, and will attach them to an AMI that stores all parameters from the original EC2 instance (excluding Elastic Inference accelerators and user data scripts).

What you will accomplish

In this tutorial, you will:

- Create an on-demand backup job of an Amazon EC2 instance
- Use a backup plan to back up Amazon EC2 resources—using a backup plan within AWS Backup lets you automate your backups on a schedule
- Add resources to an existing backup plan using tags

Prerequisites

You will need the following resources or permissions to proceed with this tutorial:

- An AWS account. For more information on using AWS Backup for the first time, view the AWS Backup documentation.
- One or more Amazon EC2 instances. You can refer to the Amazon EC2 pricing page for more details. For AWS Backup pricing, refer to the AWS Backup pricing page.
- IAM roles used by AWS Backup to create a backup of the Amazon EC2 instance.
  - If a subsequent role is not created, then the default IAM role can be used—AWSBackupDefaultRole.

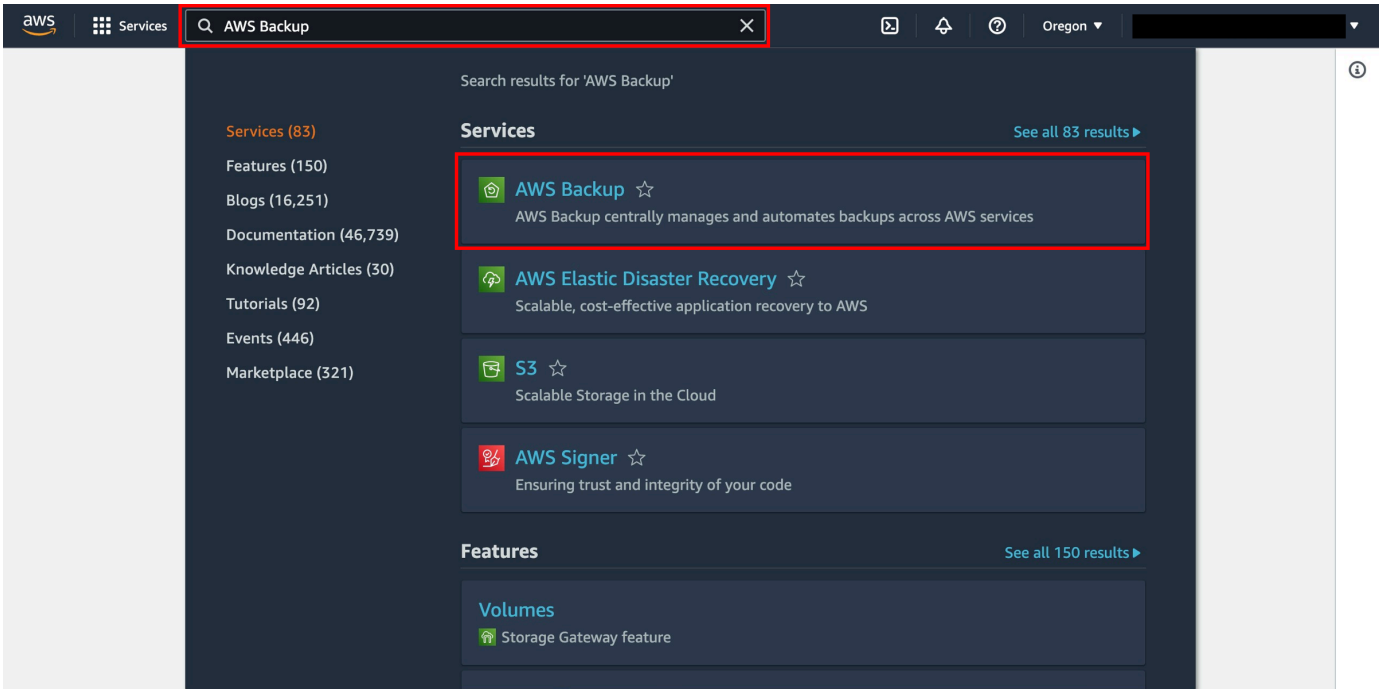
Implementation

In this tutorial, you will learn how to create an on-demand backup job of an Amazon EC2 instance. Then, you will use a backup plan to protect EC2 resources. Using a backup plan within AWS Backup lets you automate backups using tags.

Step 1: Configure an on-demand AWS Backup job of an Amazon EC2 instance

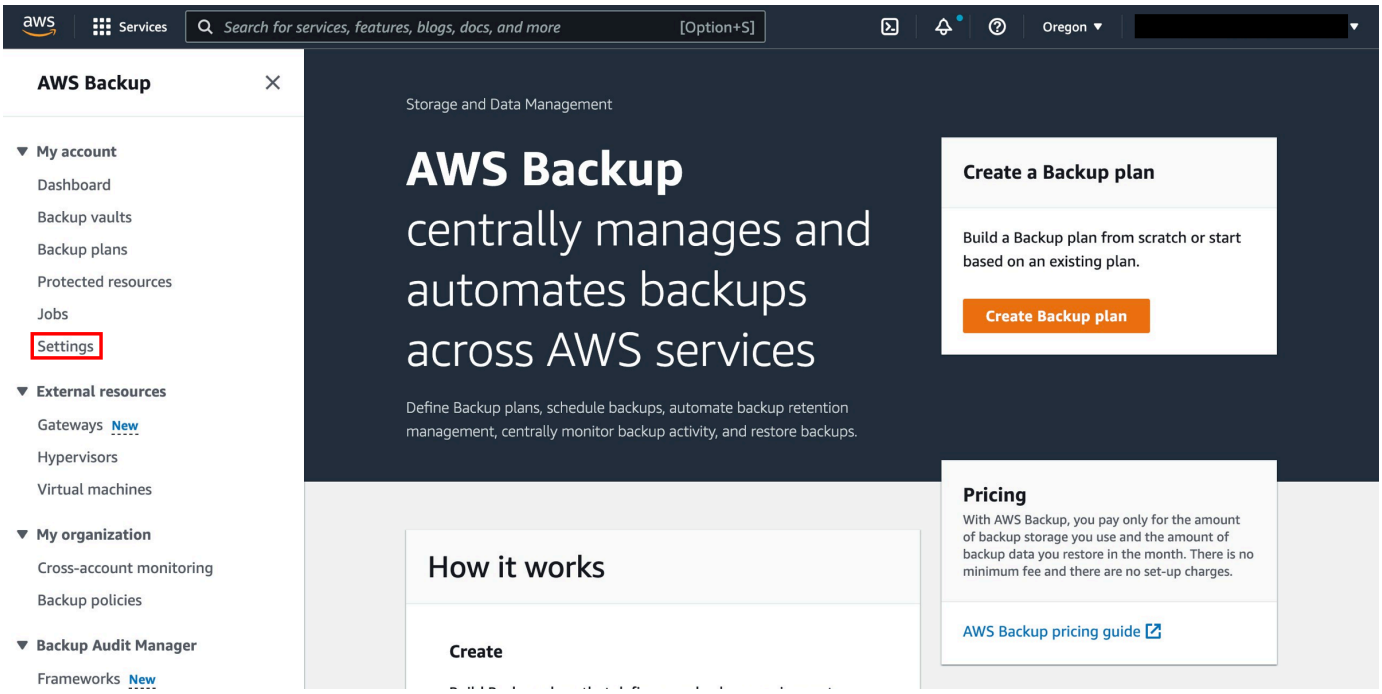
1. Open the AWS Backup console

   Log in to the AWS Management Console, and open the AWS Backup console.



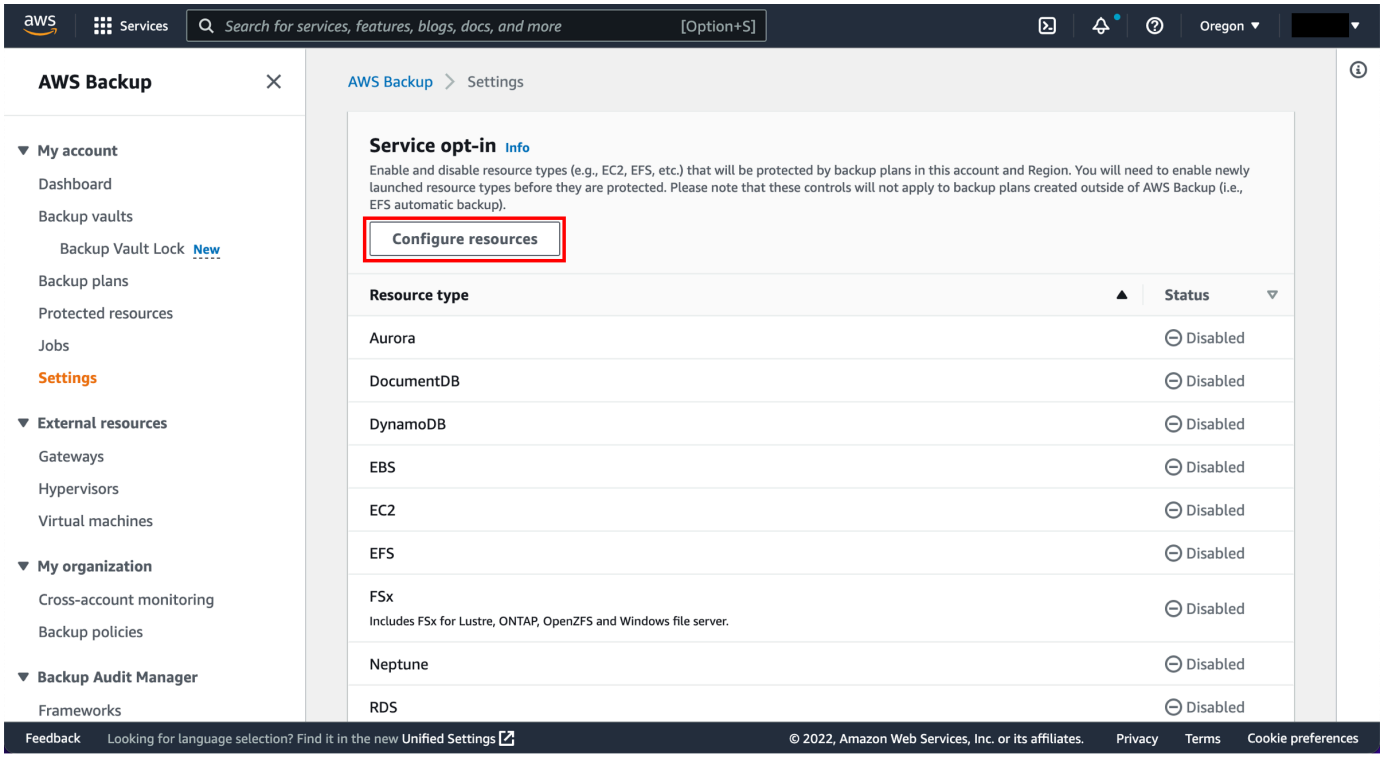
2. Configure the services used with AWS Backup

   In the navigation pane on the left side of the AWS Backup console, under **My account**, choose **Settings**.



3. Configure resources

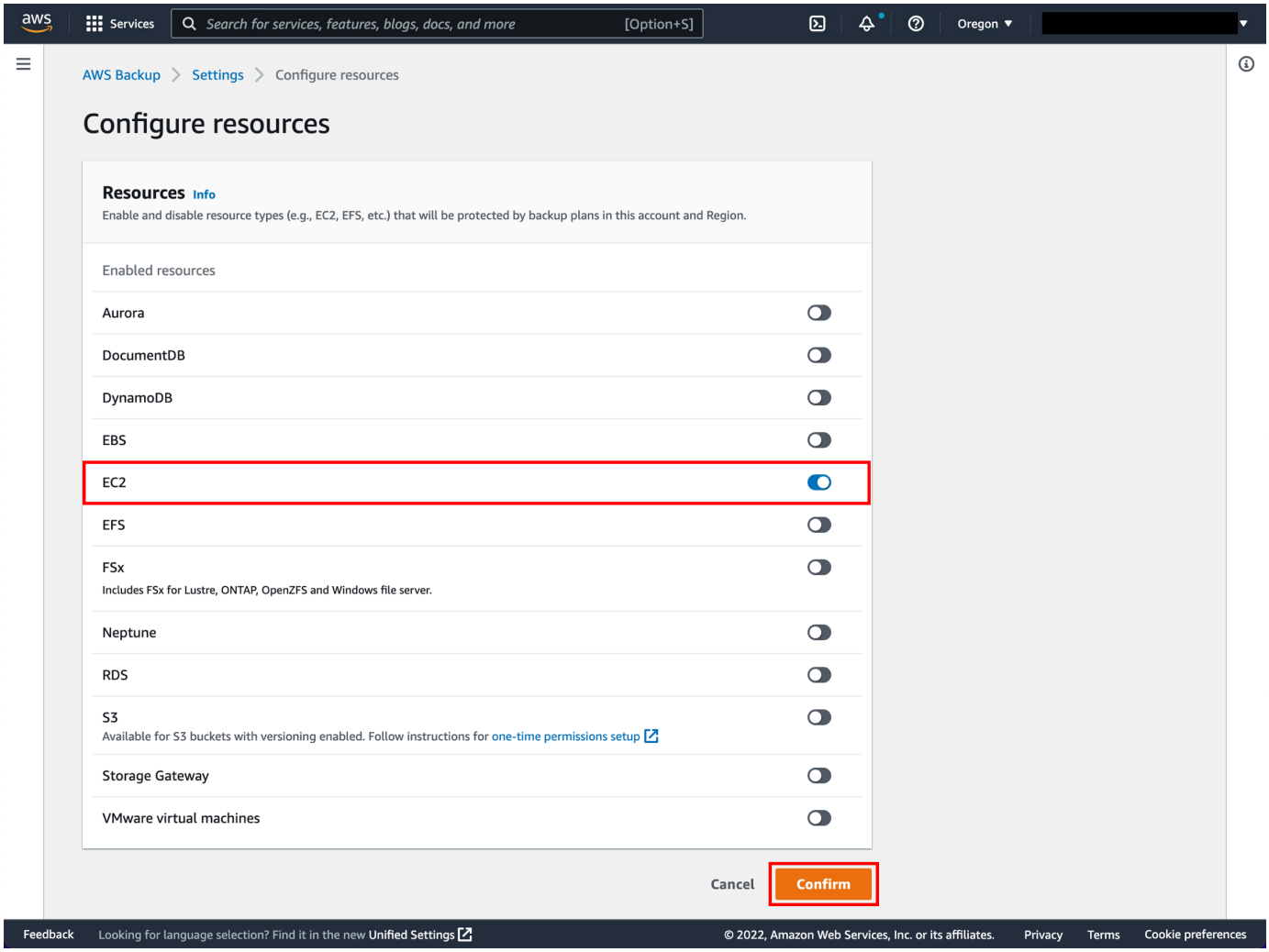
   On the **Service opt-in** page, choose **Configure resources**.



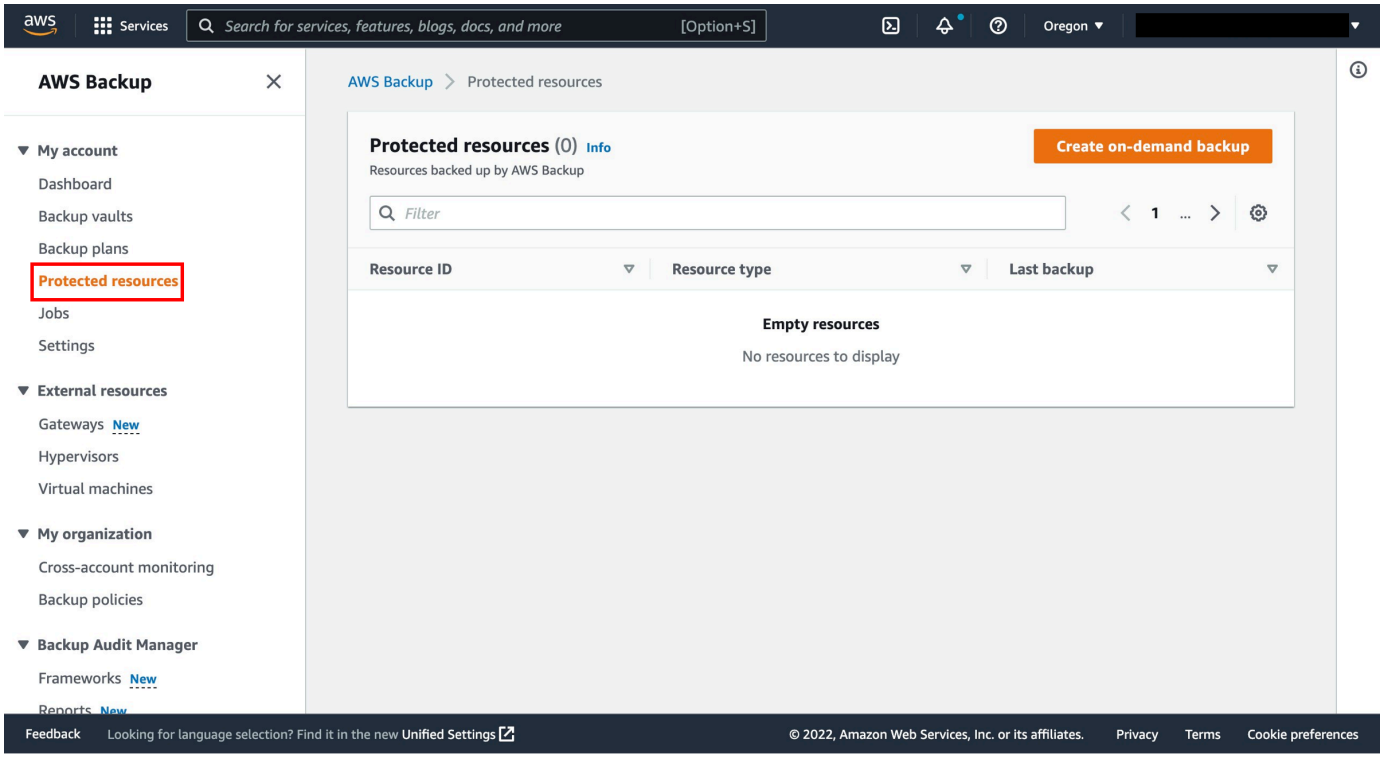
4. Select EC2 for backup

On the **Configure resources** page, use the toggle switches to enable or disable the services used with AWS Backup. In this case, select **EC2**. Choose **Confirm** when your services are configured.

- AWS resources that you're backing up should be in the Region you are using for this tutorial, and resources must all be in the same AWS Region (however, see step 2.10 for information on Cross-Region Copy). This tutorial uses the US West (Oregon) Region (us-west-1).

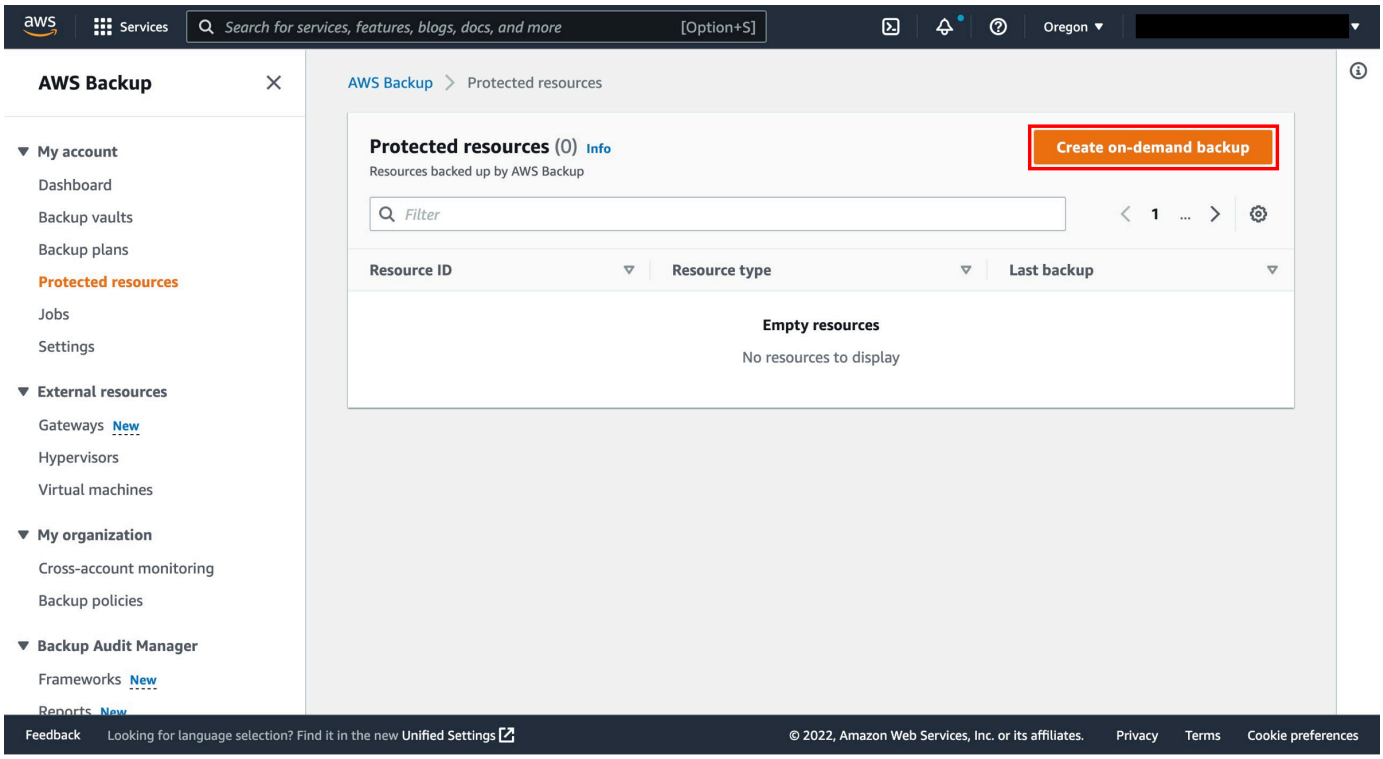


5. Create an on-demand backup job of an Amazon EC2 instance



6. Choose Create an on-demand backup

   From the dashboard, choose the **Create on-demand backup** button.



7. Configure on-demand backup settings

On the **Create on-demand backup** page, choose the following options:

Select the resource type that you want to back up; for example, choose **EC2** for Amazon EC2.

Choose the **Instance ID** of the EC2 resource that you want to protect.

Ensure that **Create backup now** is selected. This initiates your backup job immediately and enables you to see your saved resource sooner on the **Protected resources** page.

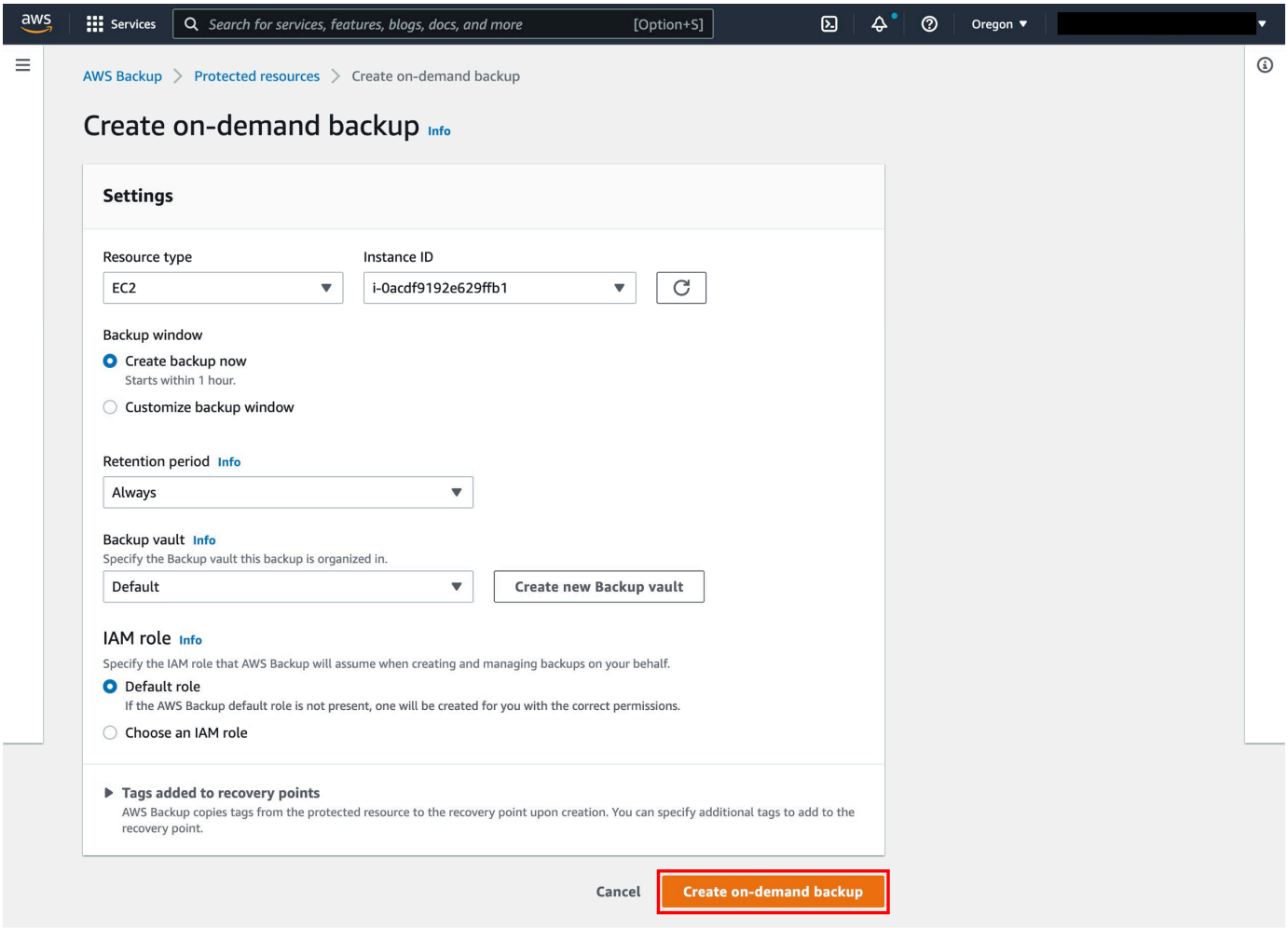
Select the desired **retention period**. AWS Backup automatically deletes your backups at the end of this period to save storage costs for you.

Choose an existing backup vault. Choosing **Create new Backup vault** opens a new page to create a vault and then returns you to the **Create on-demand backup** page when you are finished.

Under **IAM role**, choose **Default** role.

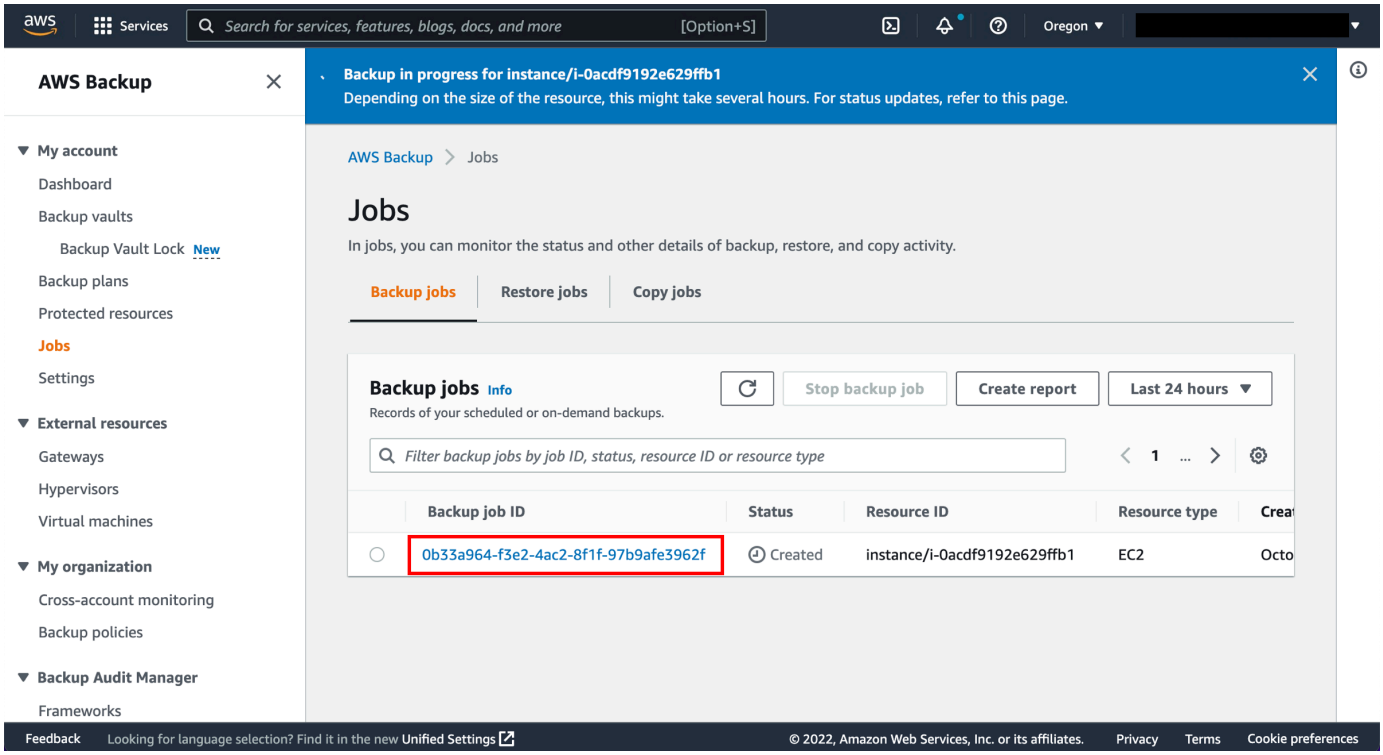
> **Note**
>
> If the AWS Backup Default role is not present in your account, then an AWS Backup Default role is created with the correct permissions.

Choose the **Create on-demand backup** button. This takes you to the **Jobs** page, where you will see a list of jobs



8. View the backup job details

   Choose the **Backup job ID** for the resource that you chose to back up to see the details of that job.

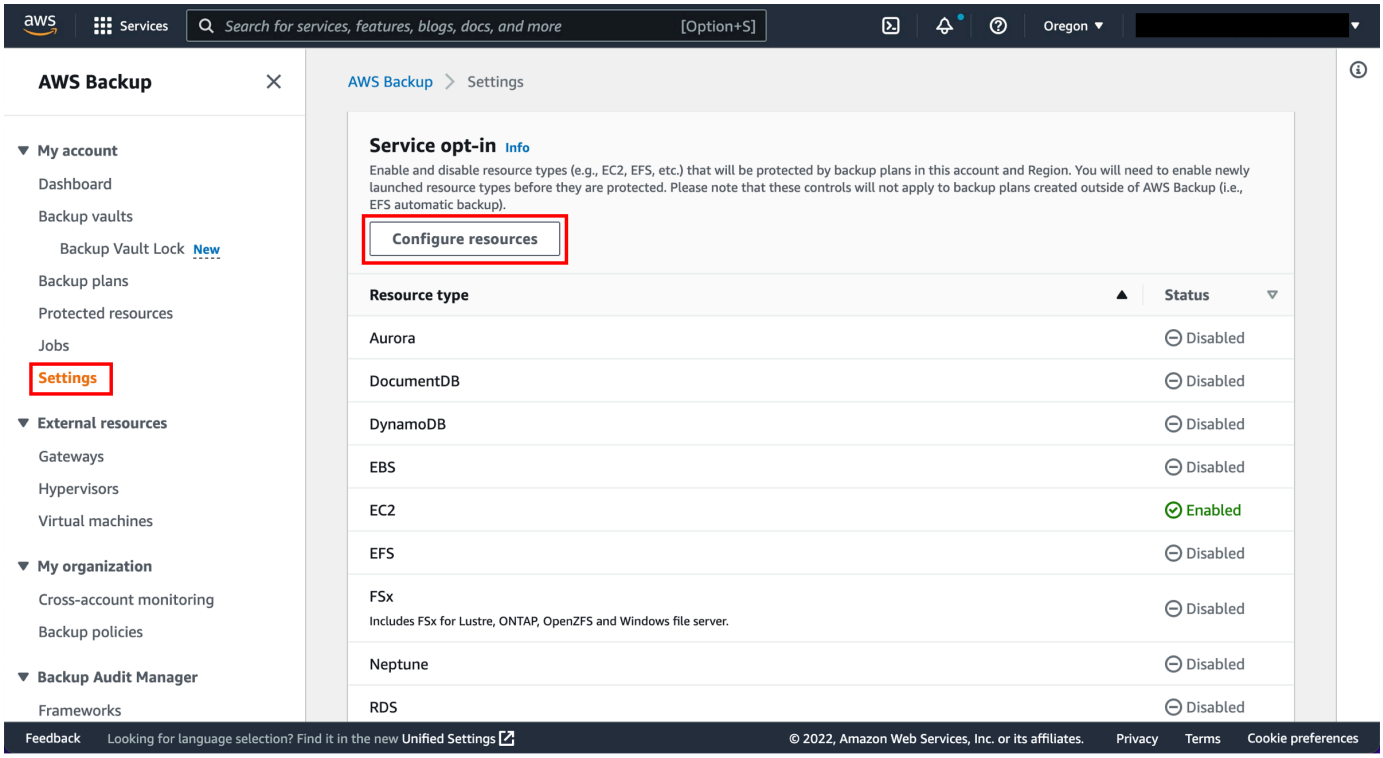


Step 2: Configure an automatic AWS Backup job of an Amazon EC2 instance

1. Configure the services used with AWS Backup

   In the left navigation pane in the AWS Backup console, under **My account**, choose **Settings**.

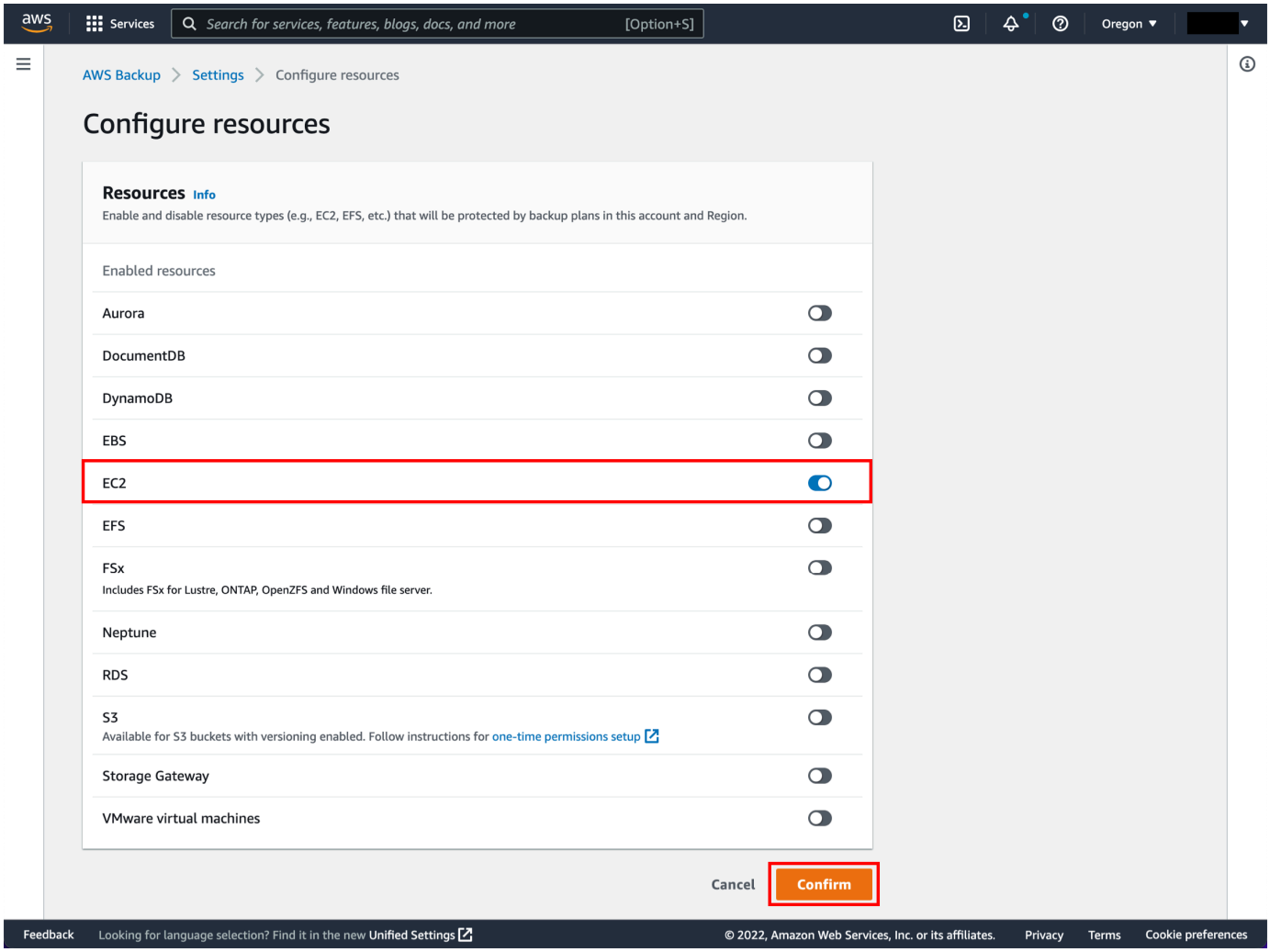
   On the **Service opt-in** page, choose **Configure resources**.



2. Select EC2 for backup

On the **Configure resources** page, use the toggle switches to enable or disable the services used with AWS Backup. Choose **Confirm** when your services are configured.

- AWS resources that you're backing up should be in the Region you are using for this tutorial, and resources must all be in the same AWS Region (however, see step 2.10 for information on Cross-Region Copy). This tutorial uses the US West (Oregon) Region (us-west-1).



3. Configure a backup plan for an Amazon EC2 instance

   In the AWS Backup console, select **Backup plans** in the left navigation pane under **My account**, and then **Create backup plan**.

4. Create a new backup plan

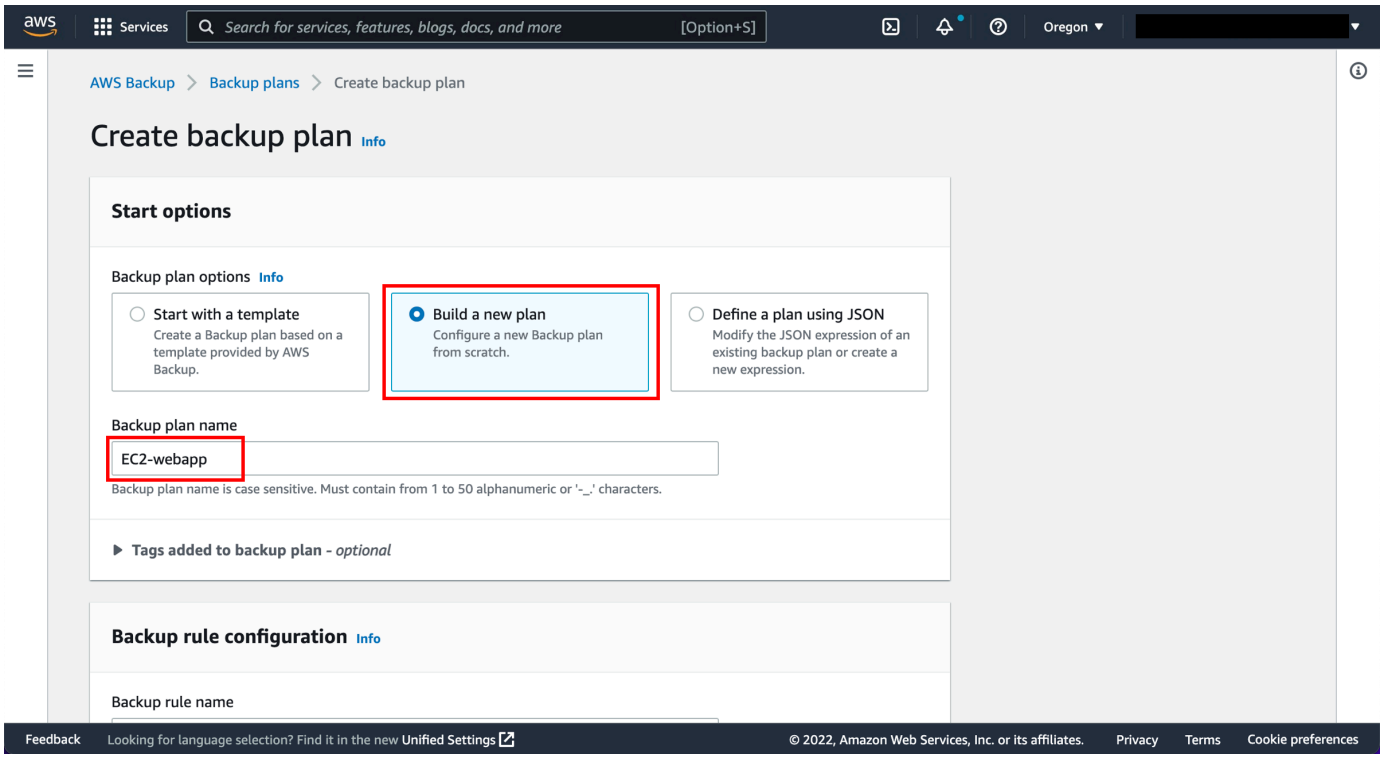
   AWS Backup provides three ways to get started using backup plans, but for this tutorial, select **Build a new plan:**

   - **Start with a template** — You can create a new backup plan based on a template provided by AWS Backup. Be aware that backup plans created by AWS Backup are based on backup best practices and common backup policy configurations. When you select an existing backup plan to start from, the configurations from that backup plan are automatically

populated for your new backup plan. You can then change any of these configurations according to your backup requirements.

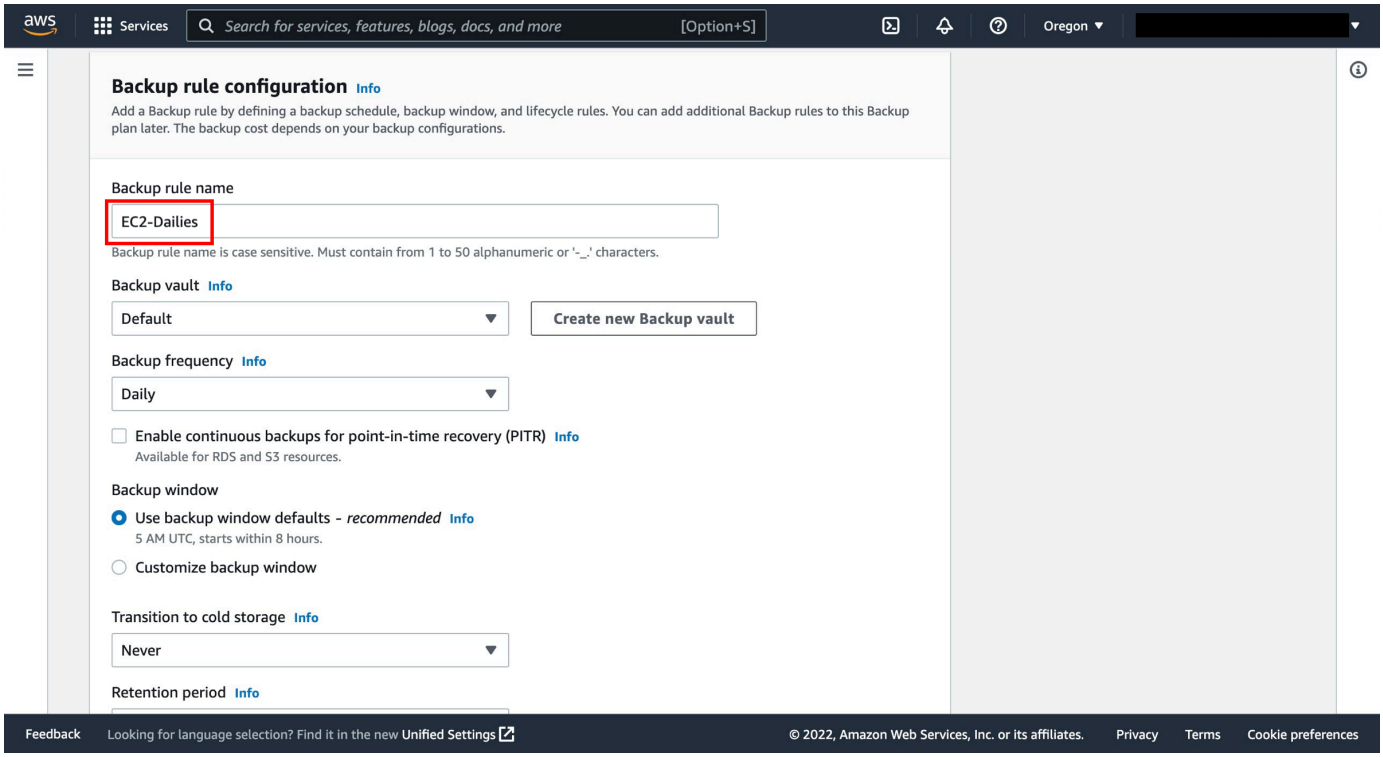
- **Build a new plan** — You can create a new backup plan by specifying each of the backup configuration details, as described in the next section. You can choose from the recommended default configurations.
- **Define a plan using JSON** — You can modify the JSON expression of an existing backup plan or create a new expression.

Backup plan name — You must provide a unique backup plan name. If you try to create a backup plan that is identical to an existing plan, you get an *AlreadyExistsException* error. For this tutorial, enter **EC2-webapp**.



5. Enter a backup rule name

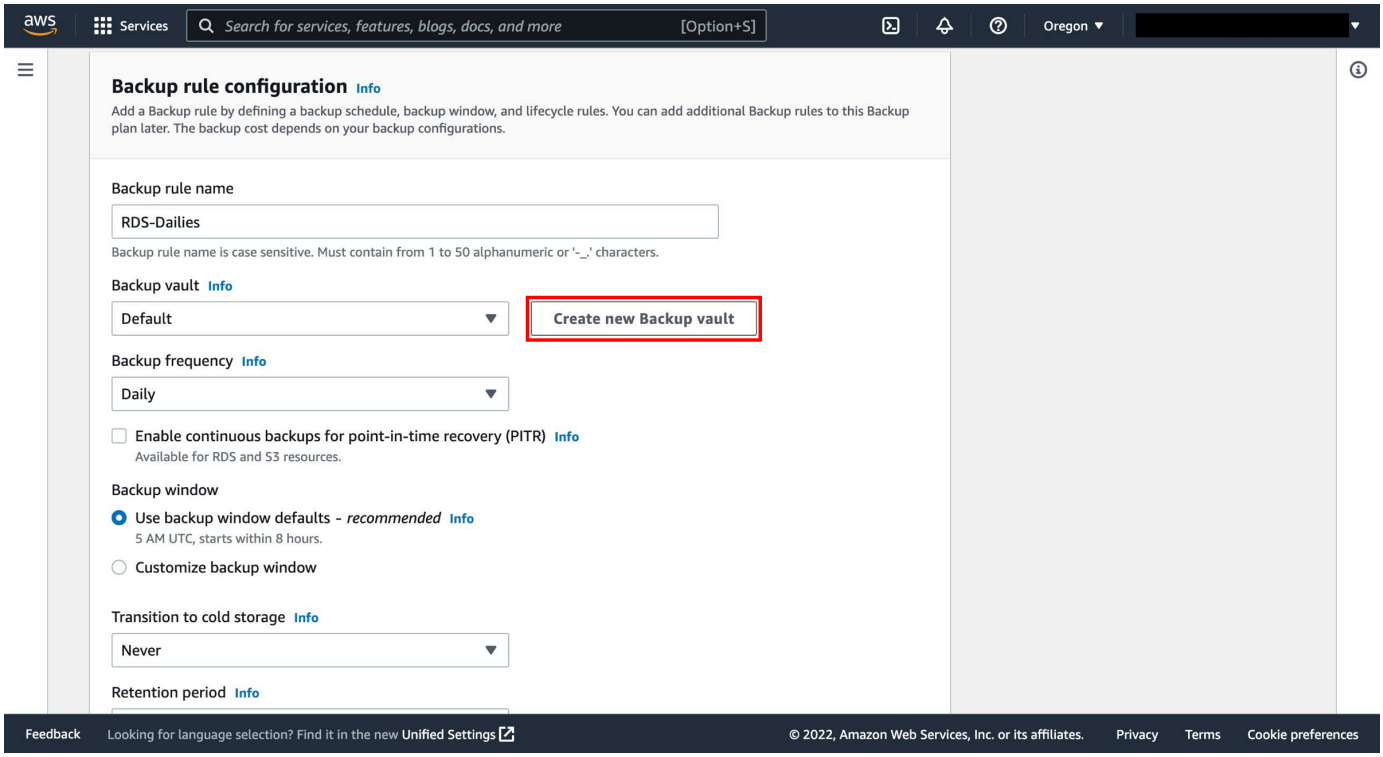
Backup rule name — Backup plans are composed of one or more backup rules. Backup rule names are case sensitive. They must contain from 1 to 63 alphanumeric characters or hyphens. For this tutorial, enter **EC2-Dailies**.



6. Create a backup vault

Backup vault — A backup vault is a container to organize your backups in. Backups created by a backup rule are organized in the backup vault that you specify in the backup rule. You can use backup vaults to set the AWS Key Management Service (AWS KMS) encryption key that is used to encrypt backups in the backup vault and to control access to the backups in the backup vault. You can also add tags to backup vaults to help you organize them. If you don't want to use the default vault, you can create your own.

Create new Backup vault — Instead of using the default backup vault that is automatically created for you in the AWS Backup console, you can create specific backup vaults to save and organize groups of backups in the same vault.



7. Configure your backup vault

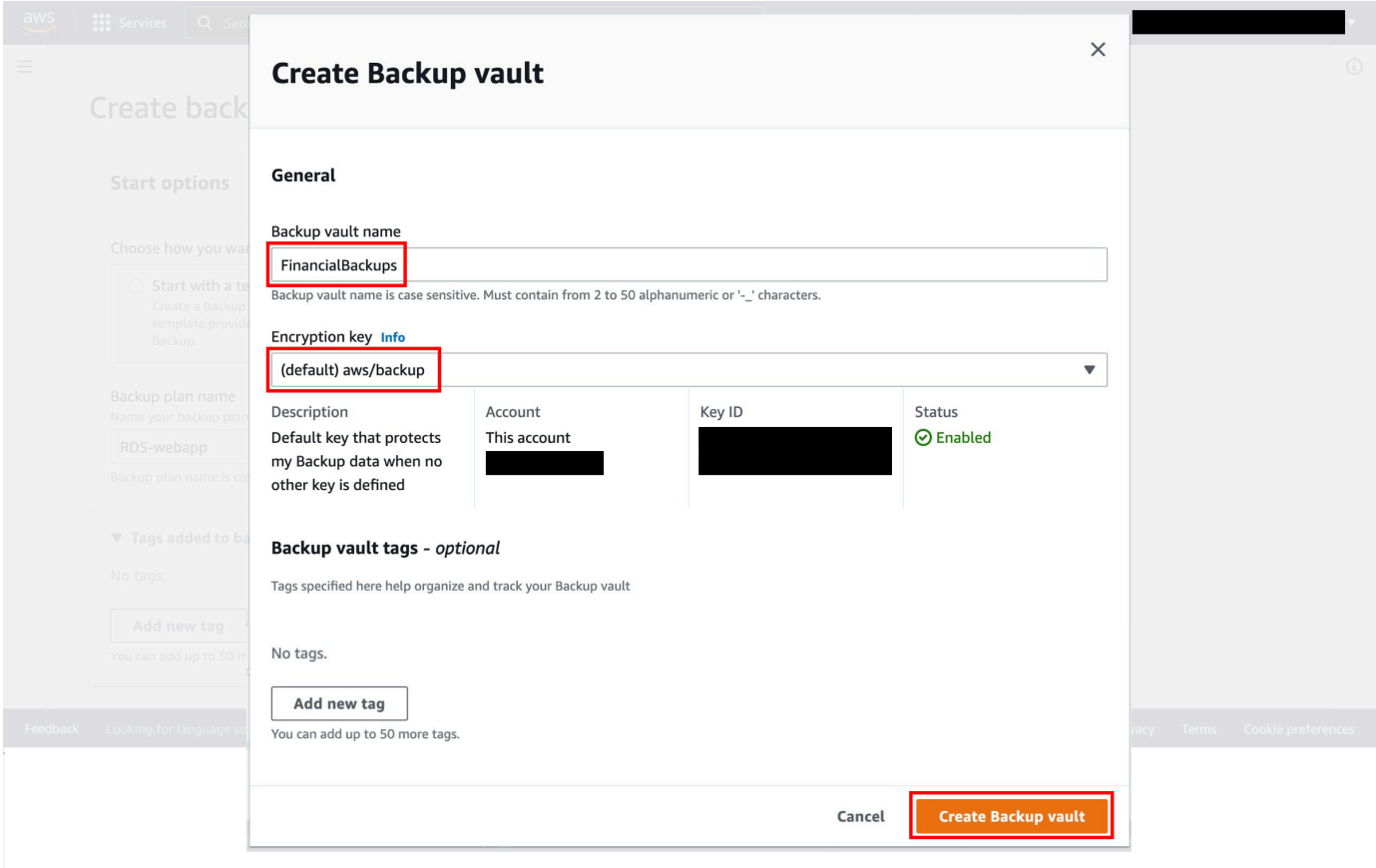
   a. To create a backup vault, choose **Create new Backup vault**.

   b. Enter a name for your backup vault. You can name your vault to reflect what you will store in it, or to make it easier to search for the backups you need. For example, you could name it **FinancialBackups**.

   c. Select an AWS KMS key. You can use either a key that you already created or select the default AWS Backup KMS key.

   d. Optionally, add tags that will help you search for and identify your backup vault.

   e. Choose the **Create Backup vault** button.

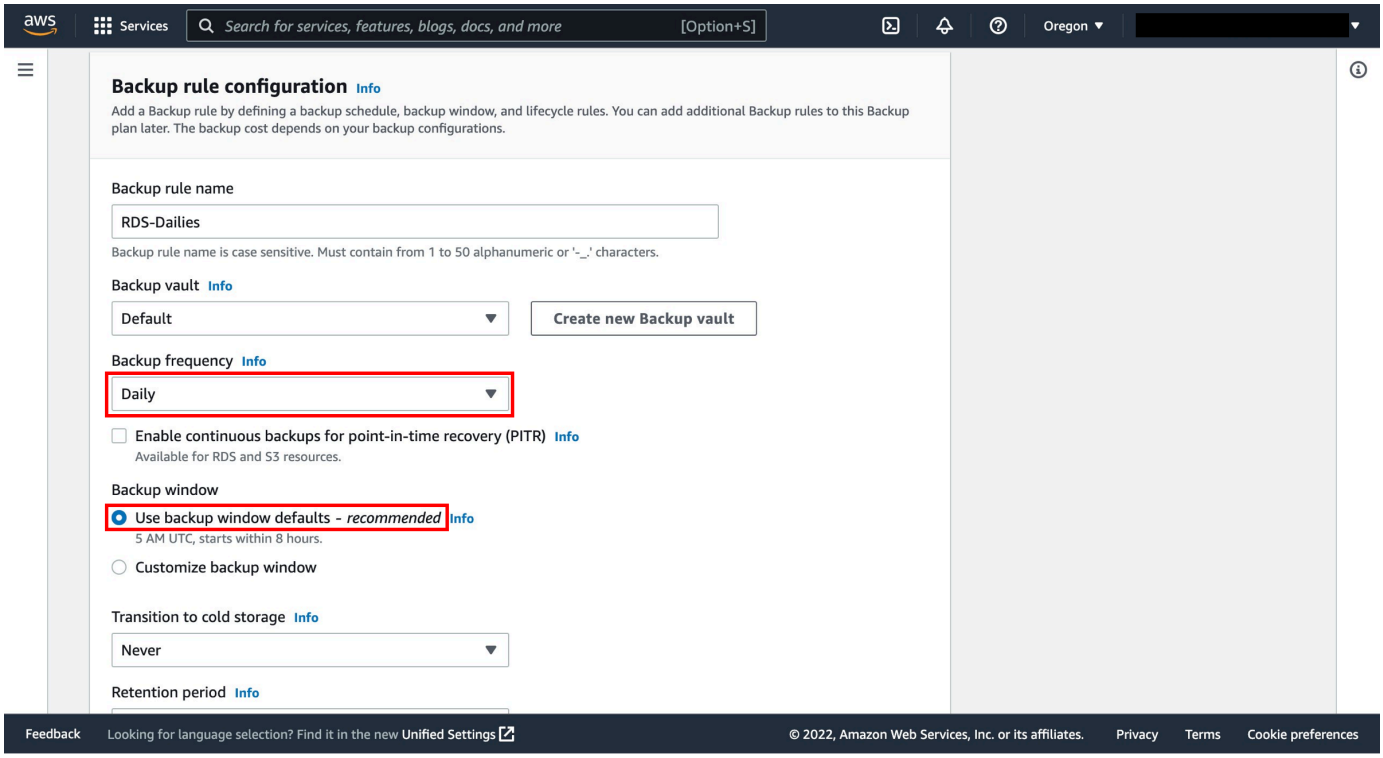


8. Configure backup schedule

Backup frequency — The backup frequency determines how often a backup is created. You can choose a frequency of every 12 hours, daily, weekly, or monthly. When selecting weekly, you can specify which days of the week you want backups to be taken. When selecting monthly, you can choose a specific day of the month.

Enable continuous backups for point-in-time recovery — With continuous backups, you can perform point-in-time restores (PITRs) by choosing when to restore, down to the second. The most time that can elapse between the current state of your workload and your most recent point-in-time restore is 5 minutes. You can store continuous backups for up to 35 days. If you do not enable continuous backups, AWS Backup takes snapshot backups for you.

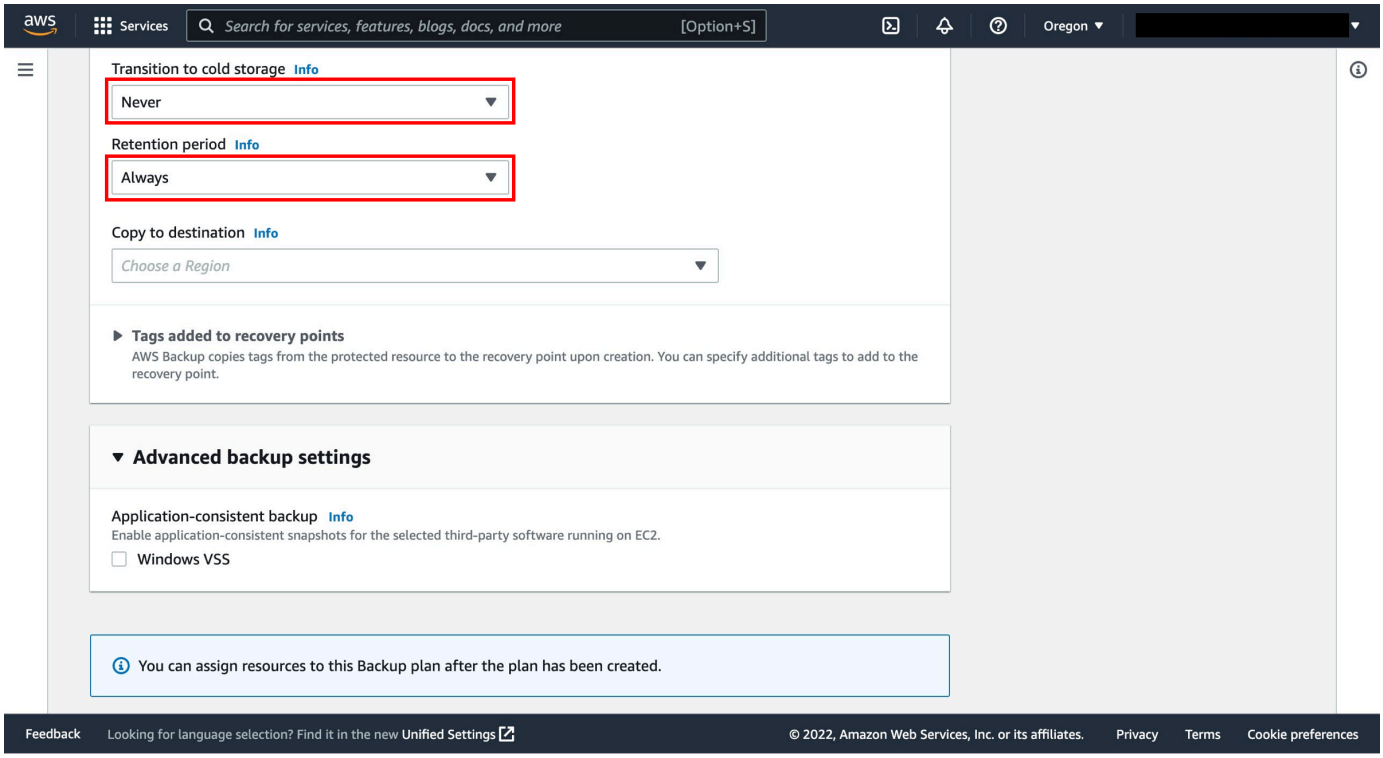
Backup window — Backup windows consist of the time that the backup window begins and the duration of the window in hours. The default backup window is set to start at 5 AM UTC (Coordinated Universal Time) and lasts 8 hours.



9. Configure retention settings

Transition to cold storage — Currently, only Amazon Elastic File System (Amazon EFS) backups can be transitioned to cold storage. The cold storage expression is ignored for the backups of Amazon Elastic Block Store (Amazon EBS), Amazon Relational Database Service (Amazon RDS), Amazon Aurora, Amazon DynamoDB, and AWS Storage Gateway.

Retention period — AWS Backup automatically deletes your backups at the end of this period to save storage costs for you. AWS Backup can retain snapshots between 1 day and 100 years (or indefinitely, if you do not enter a retention period), and continuous backups between 1 and 35 days.

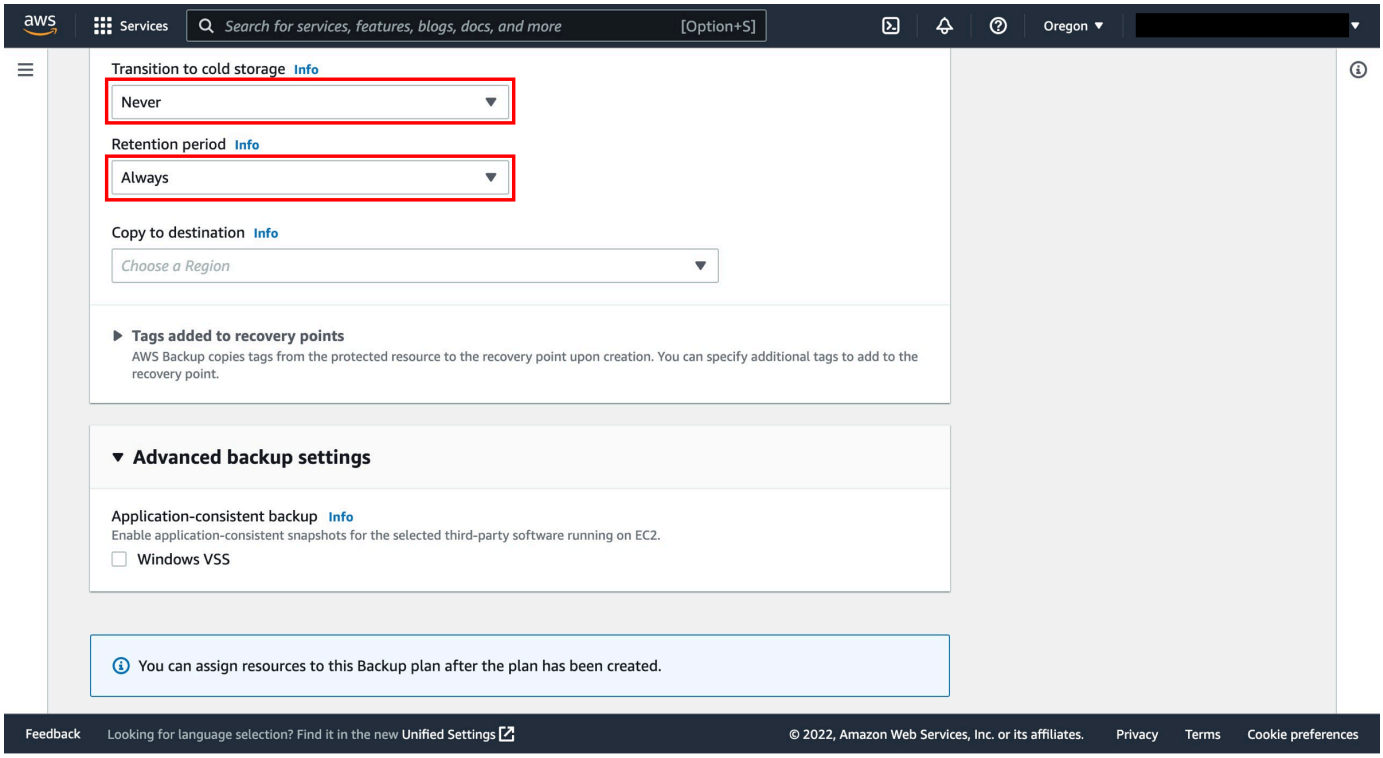


10. (Optional) Copy a backup to multiple regions

Copy to destination — As part of your backup plan, you can optionally create a backup copy in another AWS Region. Using AWS Backup, you can copy backups to multiple AWS Regions on-demand, or automatically as part of a scheduled backup plan. Cross-Region Replication (CRR) is particularly valuable if you have business continuity or compliance requirements to store backups a minimum distance away from your production data. When you define a backup copy, you configure the following options:

- Copy to destination — The destination Region for the backup copy.
- Destination Backup vault — The destination backup vault for the copy.
- (Advanced Settings) Transition to cold storage
- (Advanced Settings) Retention period

> **Note**
>
> Cross-Region Copy incurs additional data transfer costs. You can refer to the AWS Backup pricing page for more information.

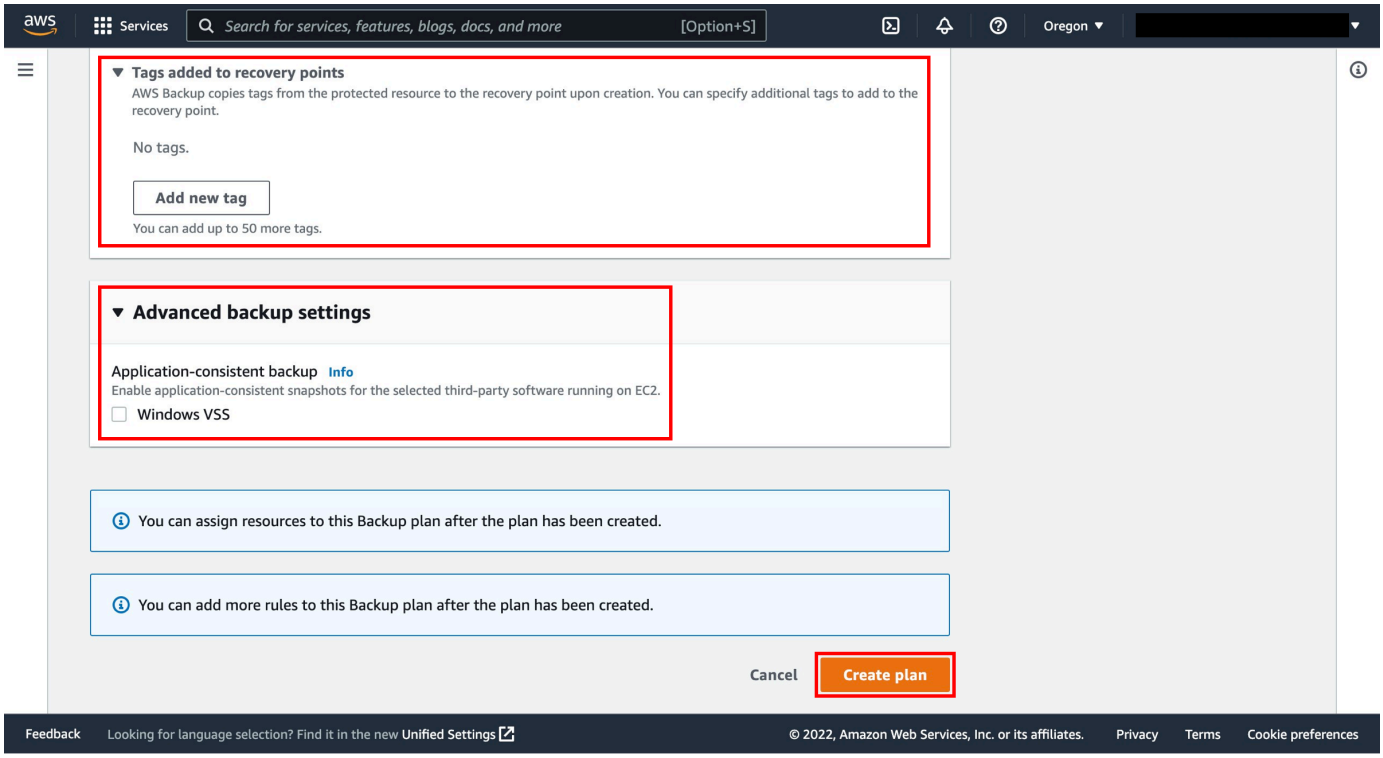


11. Create the plan

    Tags added to recovery points — The tags that you list here are automatically added to backups when they are created.

    Advanced backup settings — Enables application-consistent backups for third-party applications that are running on Amazon EC2 instances. Currently, AWS Backup supports Windows VSS backups. This is only applicable for Windows EC2 Instances running SQL Server or Exchange databases.

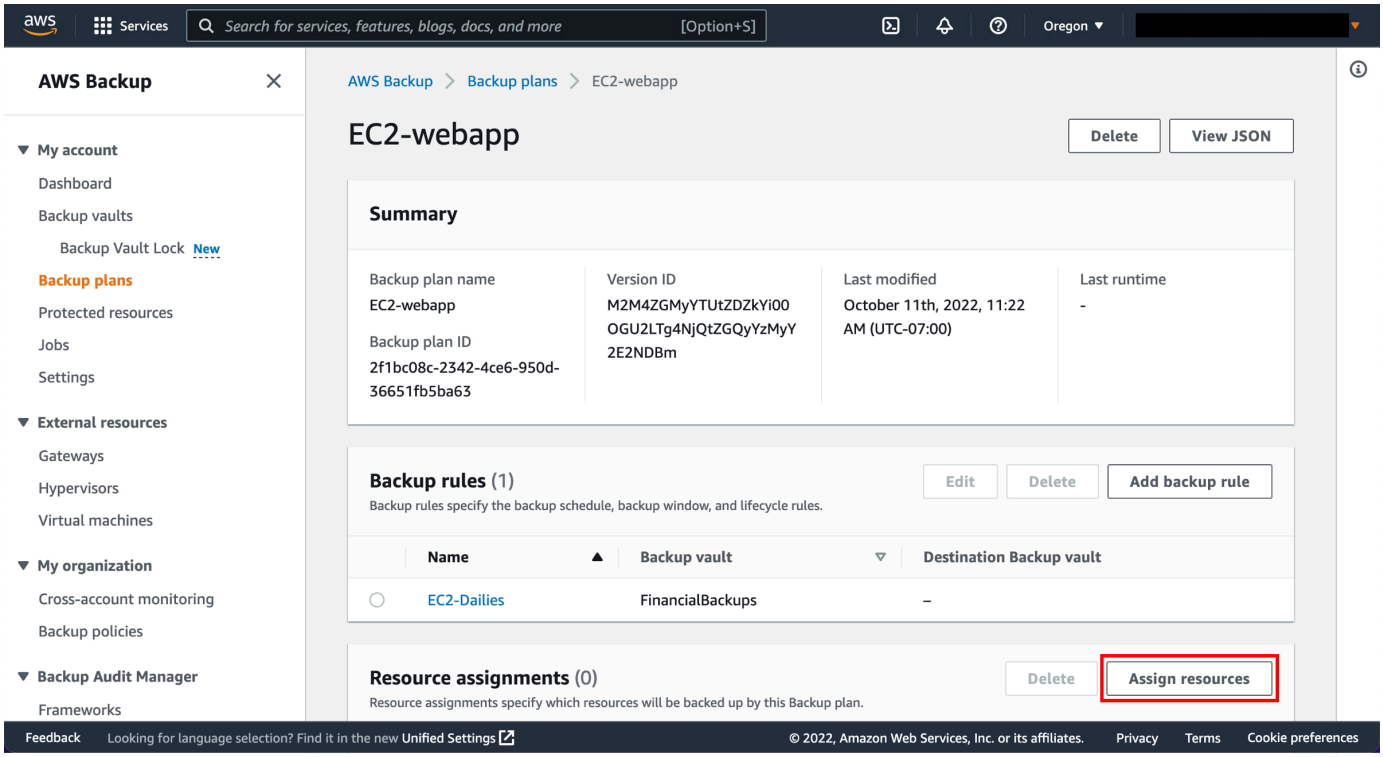
    Choose **Create plan**.



12. Assign resources

    When you assign a resource to a backup plan, that resource is backed up automatically according to the backup plan. The backups for that resource are managed according to the backup plan. You can assign resources using tags or resource IDs. Using tags to assign resources is a simple and scalable way to back up multiple resources.

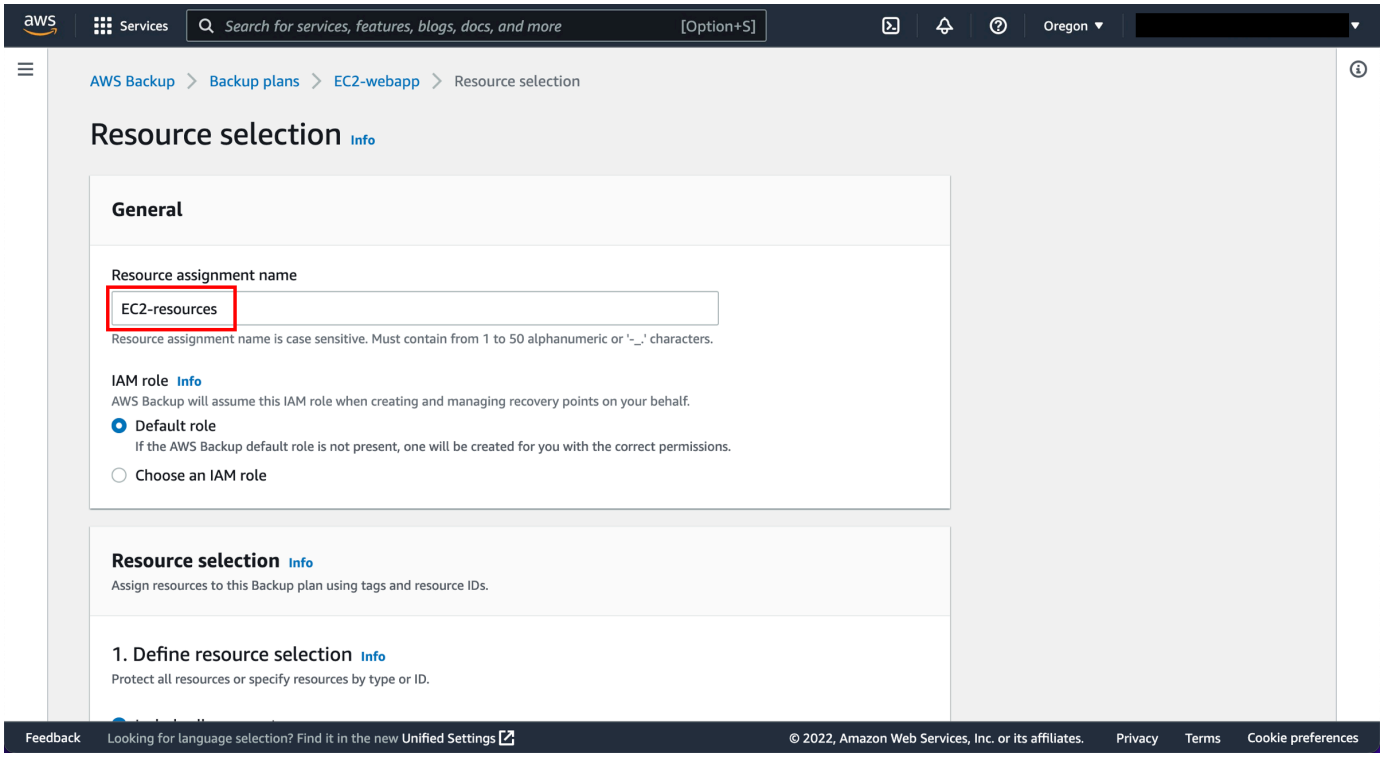
    Select the created backup plan and choose the **Assign resources** button.



13. Enter an assignment name

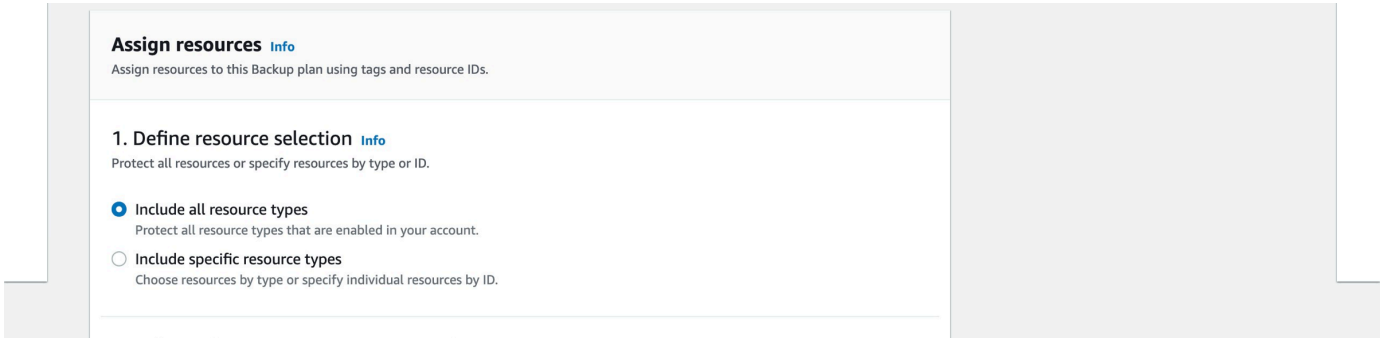
Resource assignment name — Provide a resource assignment name.

IAM role — When creating a tag-based backup plan, if you choose a role other than Default role, make sure that it has the necessary permissions to back up all tagged resources. AWS Backup tries to process all resources with the selected tags. If it encounters a resource that it doesn't have permission to access, the backup plan fails.



14. Choose resource selection type

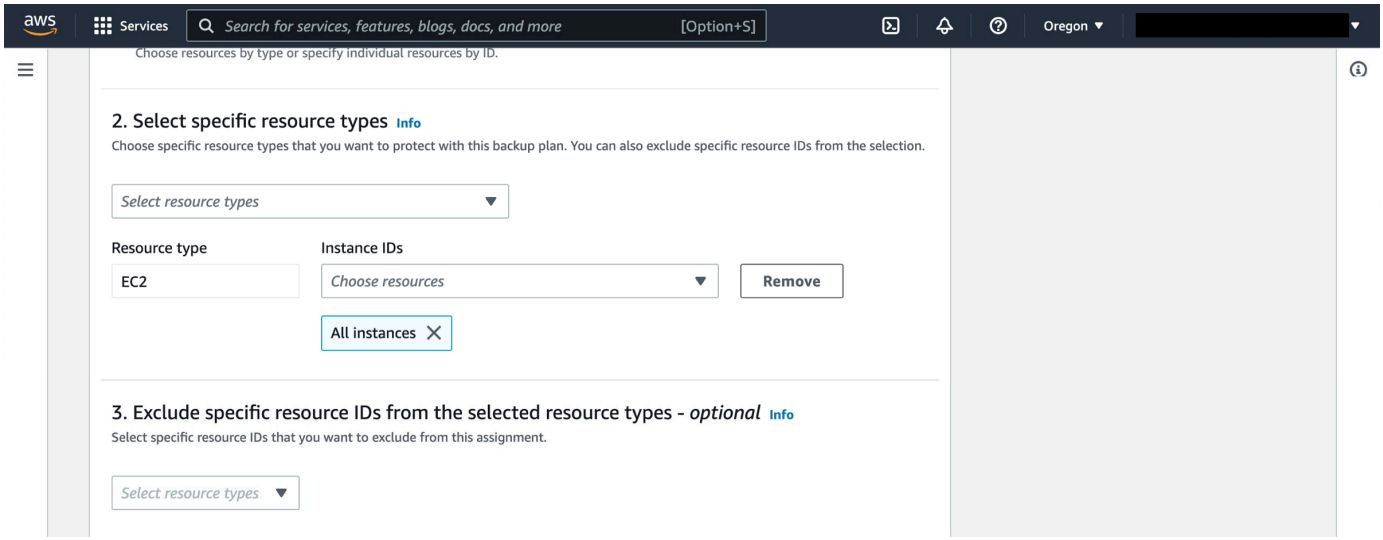
    Define resource selection — You can choose to include all resource types or specific resource types.



15. Define resource assignments

    For resource ID-based assignment, select **Resource type** and the name of the resource.

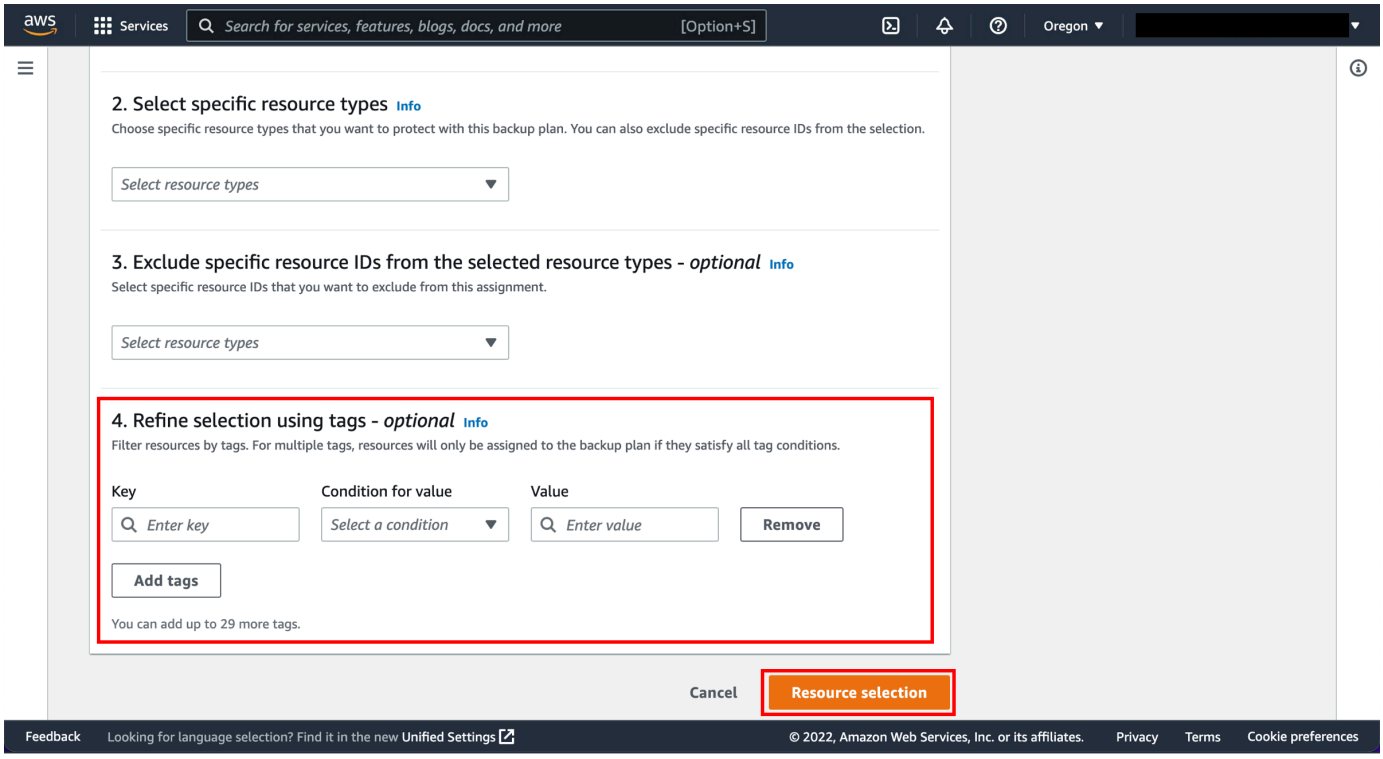
    To exclude specific resource IDs, select **Resource type** and the name of the resource.



16. Assign the resources to the backup plan

    For tags-based resource assignment, provide the key-value pair of the Amazon EC2 instance.

    Choose the **Resource selection** button to assign the resources to the backup plan.



17. View the backup job

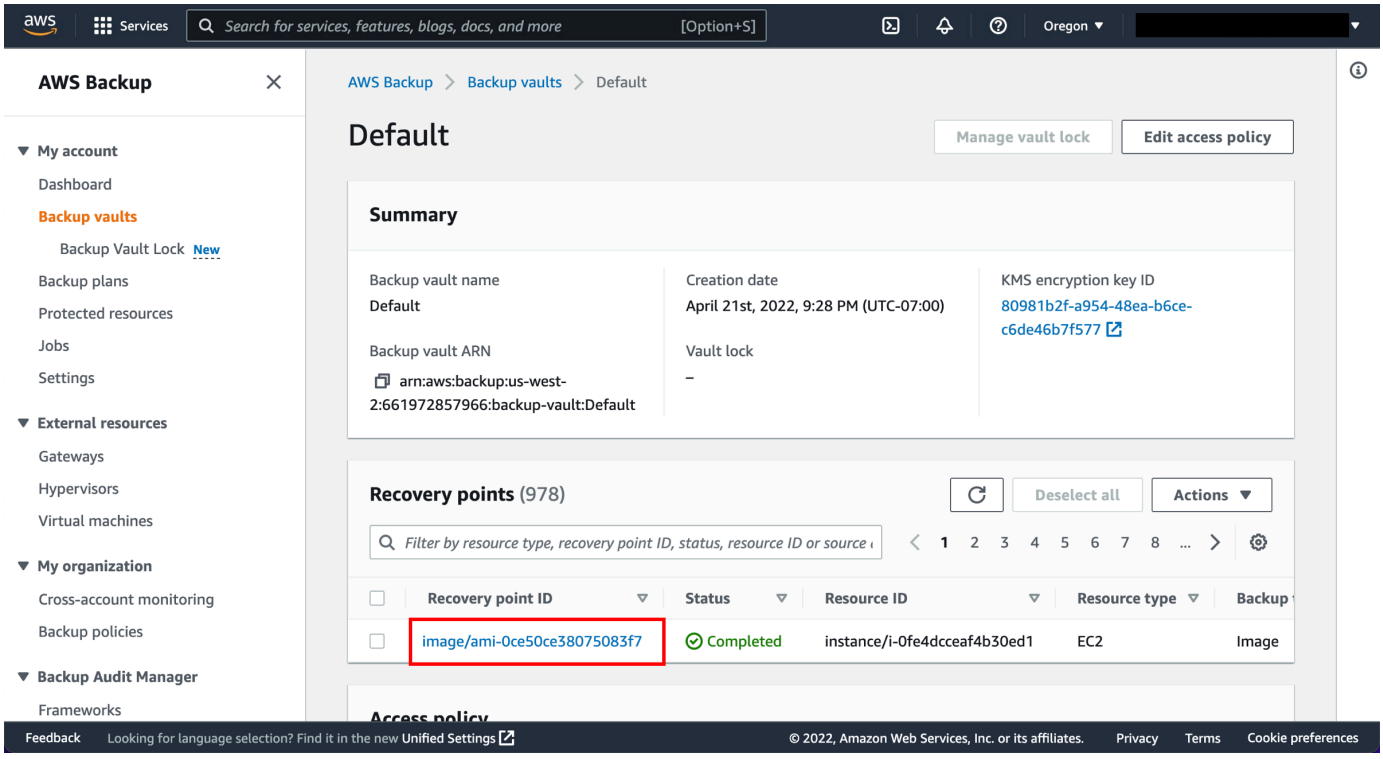
    Navigate to the AWS Backup console. The backup jobs will be seen under Jobs.

A backup, or recovery point, represents the content of a resource, such as an Amazon EC2 instance or Amazon RDS database, at a specified time. Recovery point is a term that refers generally to the different backups in AWS services, such as Amazon EBS snapshots and Amazon RDS backups. In AWS Backup, recovery points are saved in backup vaults, which you can organize according to your business needs. Each recovery point has a unique ID.

Step 3: Restore an Amazon EC2 instance using AWS Backup

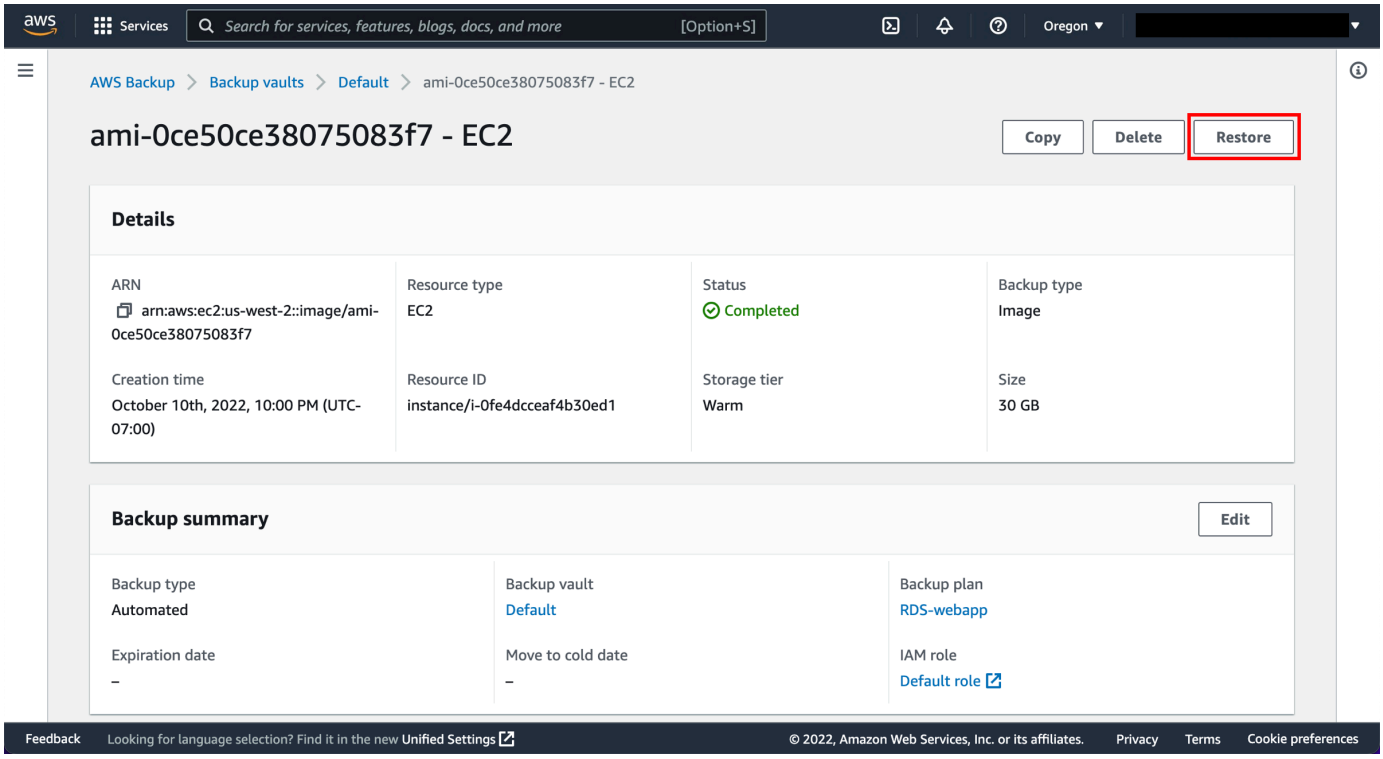
1. Select the backup

   Navigate to the backup vault that was selected in the backup plan and select the latest completed backup.



2. Restore the EC2 instance

   To restore the EC2 instance, select the recovery point ARN and choose **Restore**.



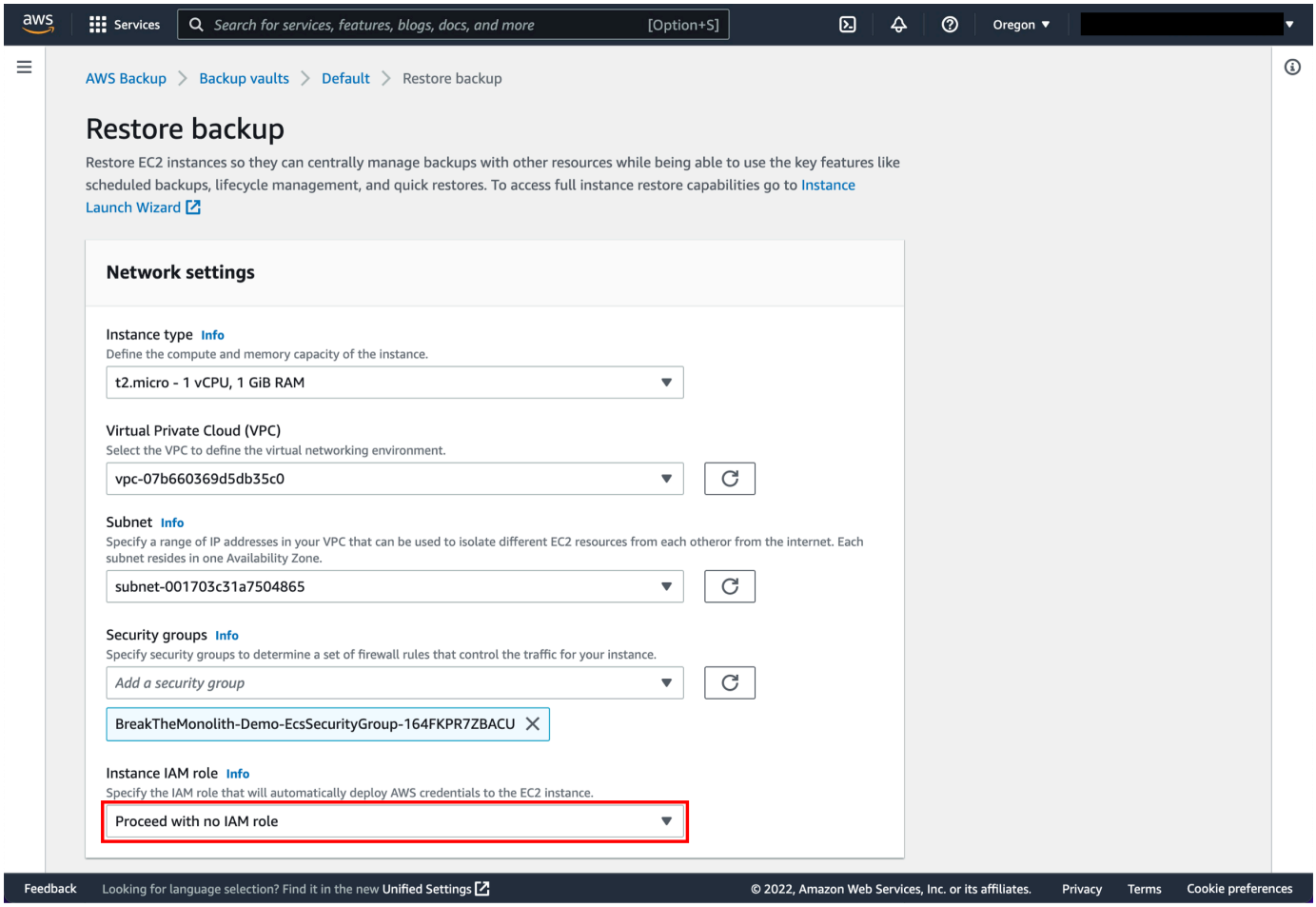
3. Review restore configurations

   The restore of the ARN will bring you to a **Restore backup** screen that will have the configurations for the EC2 instance using the backed-up AMI and all the attached EBS volumes.

   In the **Network settings** pane, accept the defaults or specify the options for the **Instance type**, **Virtual Private Cloud (VPC)**, **Subnet**, **Security groups**, and **Instance IAM role** settings.

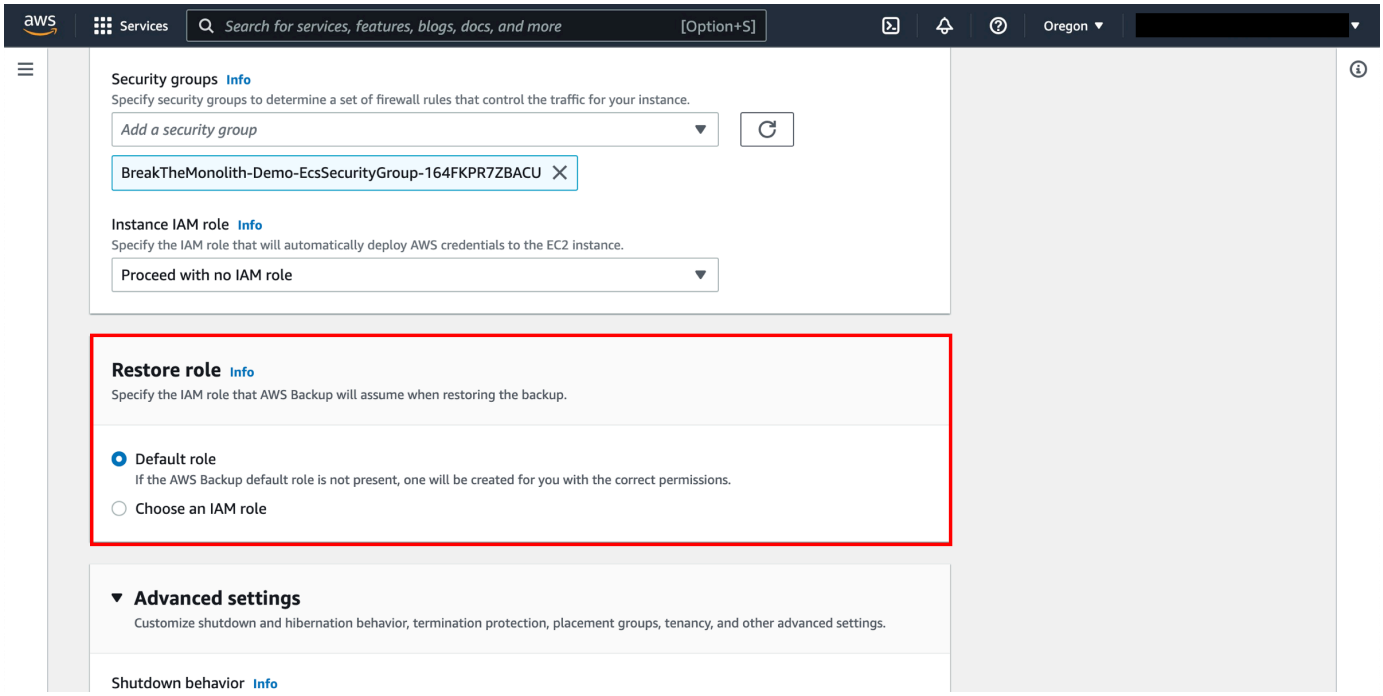
   This example proceeds with no IAM role. The IAM role can be applied to the EC2 instance after the restore process is completed.

   - To successfully do a restore with the original instance profile, you must edit the restore policy. If you apply an instance profile during the restore, you have to update the operator role and add the PassRole permissions of the underlying instance profile role to Amazon EC2. The default service role created by AWS Backup manages creating and restoring backups. It has two managed policies: AWSBackupServiceRolePolicyForBackup and AWSBackupServiceRolePolicyForRestores. It also allows “Action”: “iam:PassRole” to launch EC2 instances as part of a restore.



4. Choose a restore role

   In the **Restore role** pane, accept the **Default role** or **Choose an IAM role** to specify the IAM role that AWS Backup will assume for this restore.

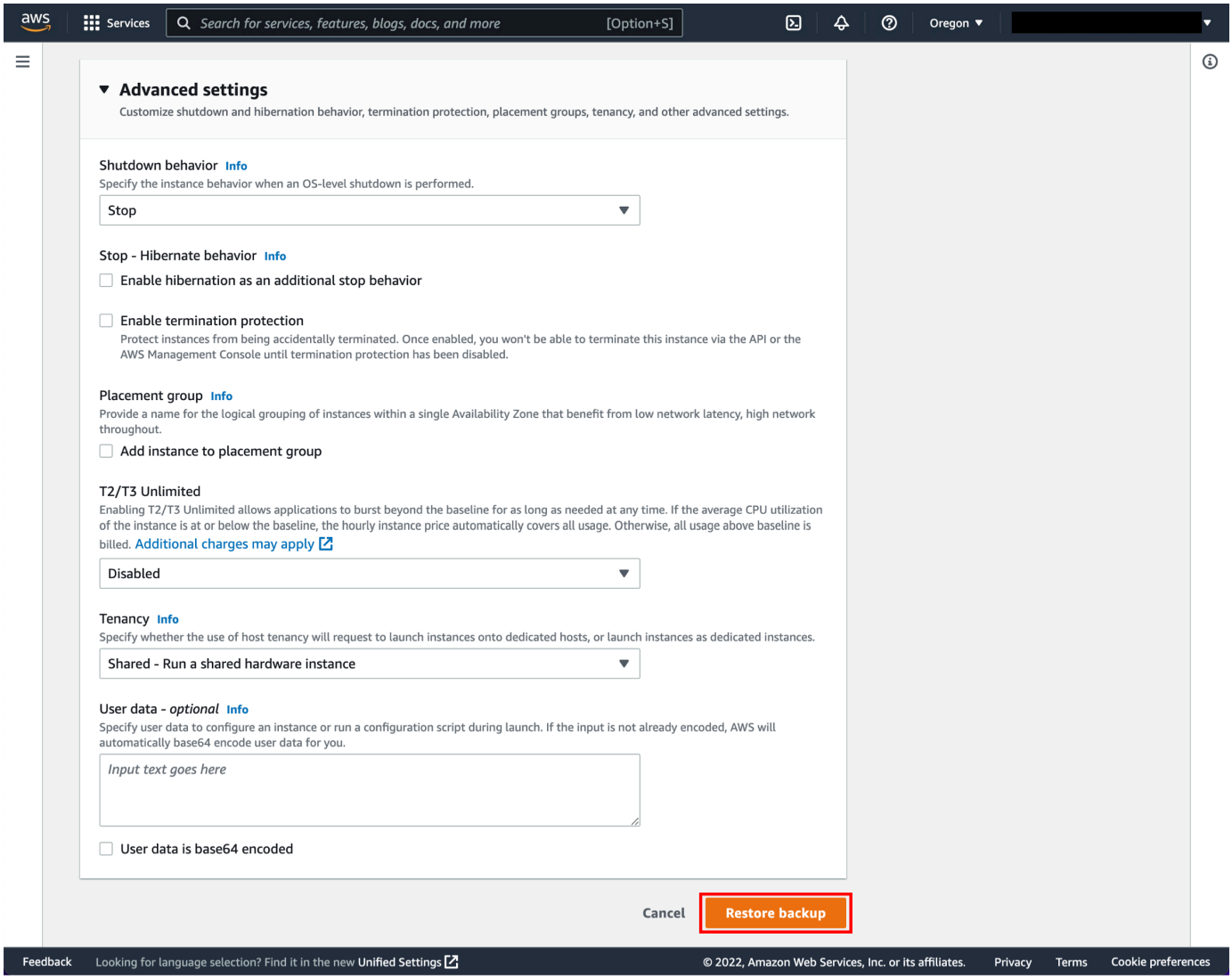


5. Restore the backup

   In the **Advanced settings** pane, accept the defaults or specify the options for **Shutdown behavior**, **Stop - Hibernate behavior**, **Placement group**, **T2/T3 Unlimited**, **Tenancy**, and **User data** settings. This section is used to customize shutdown and hibernation behavior, termination protection, placement groups, tenancy, and other advanced settings.

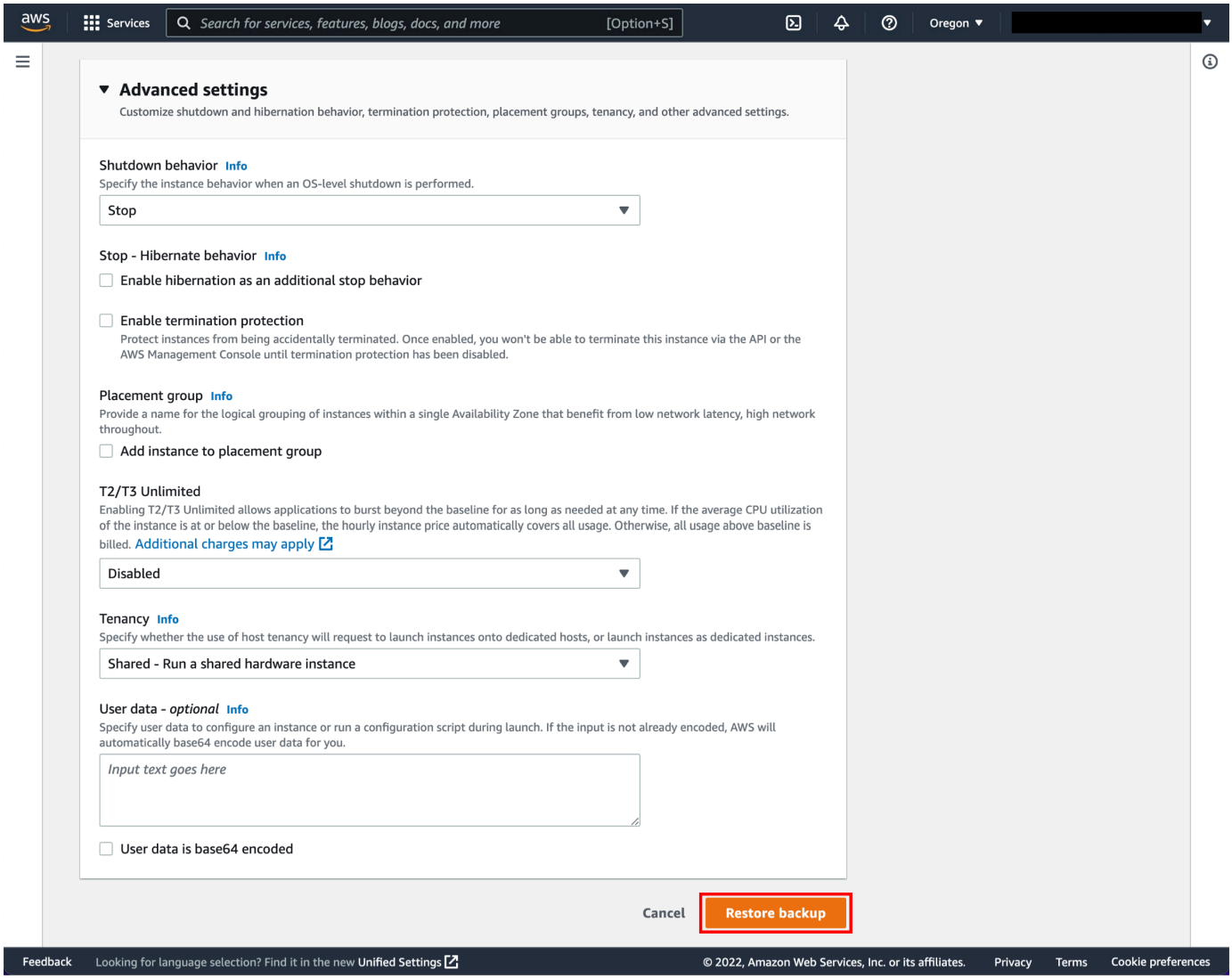
   AWS Backup will use the SSH key pair used at the time of backup to automatically perform your restore.

   After specifying all of your settings, choose **Restore backup**. The **Restore jobs** pane will appear, and a message at the top of the page will provide information about the restore job.



6. Monitor restore job

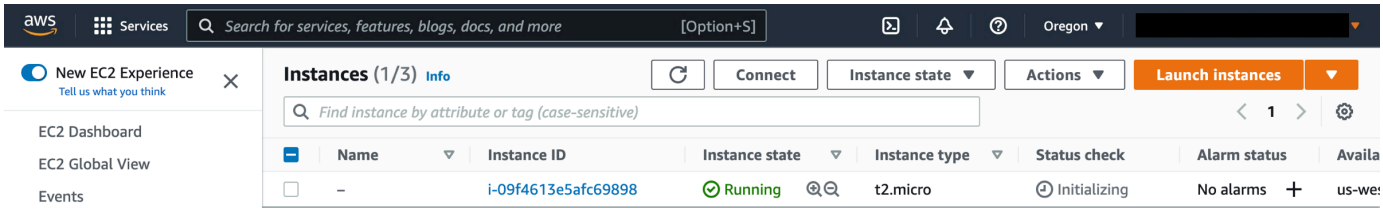
Check for your restored backup job under **Restore jobs** in the the AWS Backup console.



7. Confirm restoration

Once the job status appears as completed, navigate to the Amazon EC2 console and select **Instances** in the left navigation pane to see the restored EC2 instance. The EC2 instance is restored using the backup of the AMI and the attached EBS volume.

You can now connect to the public IP address if you restored your Amazon EC2 instance using SSH.



Clean up resources

In the following steps, you clean up the resources you created in this tutorial. It is a best practice to delete instances and resources that you are no longer using so that you are not continually charged for them.

1. Delete the instance

   Open the Amazon EC2 console.

   In the navigation pane on the left, choose **Instance** under Instances.

   Select the restored EC2 instance, and choose **Instance state**, then **Terminate instance**.

   Choose **Terminate** when prompted for confirmation.
2. Delete the AWS Backup recovery point

   Open the AWS Backup console and navigate to the vault where the recovery point is stored.

   Select the recovery point, then select Delete.

   > **Note**
   >
   > This process can take several seconds to complete.

Conclusion

Congratulations! You have created a backup of an Amazon EC2 instance and performed a restore using AWS Backup.