

# **data.all - User Guide**

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**v2.7.0**

*None*

*None*

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# 1. Introduction

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This section defines what is data.all, what is the challenge that it is trying to overcome and the value that it can bring to your teams.

## 1.1 What is data.all?

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A modern data workspace that makes collaboration among diverse users (like business, analysts and engineers) easier, increasing efficiency and agility in data projects ✨

## 1.2 Why did we built data.all?

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Data teams can be diverse: analysts, scientists, engineers, business users. Diverse people, with diverse tools and skillsets — diverse "DNAs". All leading to chaos and resulting in titanic efforts spent in **Collaboration Overhead**.

Using data.all, any line of business within an organization can create their own isolated data lake, produce, consume and share data within and across business units, worldwide. By simplifying data discovery, data access management while letting more builders use AWS vast portfolio of data and analytics services, data.all helps more data teams discover relevant data and let them use the power of the AWS cloud to create data driven applications faster.

## 1.3 How can data.all help data teams?

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**Teams can easily DISCOVER AND UNDERSTAND data 🌐**

data.all makes all your datasets easily discoverable! No more Slack messages saying "Where's that dataset?" or long email threads for approvals. With data.all, you can simply browse the data catalog.

*Key Capabilities: Discovery and Search, Data Preview & Worksheets and Notebooks*

**Teams can easily SHARE AND COLLABORATE with data 💬**

Data practitioners spend 30-50% of their time finding and understanding data. data.all cuts that time by 95%. Your data team will be shipping 2-3 times more projects in no time.

*Key Capabilities: Data Profiling & Data Sharing and Subscriptions*

**Teams don't have to worry about SECURING their data 🛡️**

Don't lose sleep trying to figure out if your sensitive data is secure. Build ecosystems of trust, make your team happy, and let data.all manage governance and security behind the scenes.

*Key Capabilities: Granular Access Control*

## 2. Main components

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This section introduces the main components of data.all which are divided in 3 groups. This is an overview, for more details please refer to their specific sections.

- **Administate:** used by team and data lake administrators to organise and manage teams and users inside data.all
- **Discover:** used by all users to contribute with data, search for data and share data.
- **Play:** once data is in data.all, all users can use these tools to work with data.

### 2.1 Administrate

#### 2.1.1 Organizations

[Organizations](#) are high level constructs where business units can collaborate across different AWS accounts at once. An organization includes environments (see below). Organizations are abstractions, they **don't** contain AWS resources, consequently there is no CloudFormation stack associated with them.

*Organizations usually correspond to whole organizations, organization divisions or a separated geographical region within an organization.*

#### 2.1.2 Environments

An [environment](#) is a workplace where a team can bring, process, analyze data and build data driven applications. This workspace is mapped to an AWS account in one region. It is possible to have more than one environment in the same AWS Account, however we recommend to stick to one environment - one account.

*An environment usually corresponds to a business unit or a department. Inside an environment we add teams and assign them different levels of permissions.*

#### 2.1.3 Teams

A [team](#) corresponds to an IdP group that has been onboarded to data.all. A special case for the administration of data.all is the **Tenant**, an IdP group with high level application (tenant) permissions. As with IdP groups, users can belong to multiple teams.

*Teams corresponds to real teams.*

#### but really, what are teams?

Data in data.all is isolated at team level, meaning that all members of a team can access all team's datasets. Thus, a team is any group of users that can access the team's datasets. We can have bigger teams with generic data and project-based teams owning data that requires more restrictive access to only members of the project.

### 2.2 Discover

#### 2.2.1 Datasets

A [dataset](#) is a representation of multiple AWS resources that helps users store data. When data owners create a dataset on data.all the following resources are created:

- Amazon S3 Bucket to store the data on AWS.
- AWS KMS key to encrypt the data on AWS.
- AWS IAM role that gives access to the data on Amazon S3.
- AWS Glue database that is the representation of the structured data on AWS.

*Inside the dataset we can store structured data as tables or unstructured data in folders.*

## 2.2.2 Catalog

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data.all centralized [Catalog](#) is an inventory of datasets, tables, folders and dashboards. It contains metadata for each of the mentioned data assets and thanks to its search capabilities, users can filter based on type of data, type of asset, tags, region and on glossary terms.

*We use the Catalog to search and discover data*

## 2.2.3 Glossaries

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A [Glossary](#) is a list of terms, organized in a way to help users understand the context of their datasets. For example, terms like "cost", "revenue", etc, can be used to group and search all financial datasets.

*Glossaries are used to add meaning to data assets metadata facilitating and enhancing Catalog searching*

## 2.2.4 Shares

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A [Share](#) is an access request to a data asset. Users search and discover data in the catalog and for those data assets that belong to other teams, users can create a Share on behalf of a team (remember, data access: at team level!!!). Then, the owners of the asset can accept or reject the share.

*We use Shares to collaborate and share data with other teams.*

## 2.3 Play

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### 2.3.1 Worksheets

Worksheets are AWS Athena sessions that allow us to query our datasets as if we were in the AWS Athena Query editor console.

### 2.3.2 Notebooks

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Data practitioners can experiment machine learning algorithms spinning up Jupyter notebook with access to all your datasets. data.all leverages [Amazon SageMaker instance](#) to access Jupyter notebooks.

### 2.3.3 ML Studio

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With ML Studio Notebooks we can add users to our SageMaker domain and open Amazon SageMaker Studio

### 2.3.4 Pipelines

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In order to distribute data processing, data.all introduces data.all pipelines where: - data.all takes care of CI/CD infrastructure - data.all offers flexible pipeline blueprints to deploy AWS resources and a Step Function

### 2.3.5 Dashboards

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In the Dashboard window we can start Quicksight sessions, create visual analysis and dashboards.

## 3. Administrate

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### 3.1 Tenant and Organizations

data.all manages teams' permissions at four levels:

1. Tenant team
2. Organization
3. Environment (next section)
4. Teams (next section)

#### 3.1.1 Tenant

data.all has a super user's team which is a group from your IdP that has the right to manage high level application (tenant) permissions for all IdP groups integrated with data.all.

This super user's team maps to a group from your IdP that's by default named "**DAAdministrators**", any user member of this group will be able to:

- create organizations
- manage tenant permissions on onboarded teams (IdP groups) as shown below.

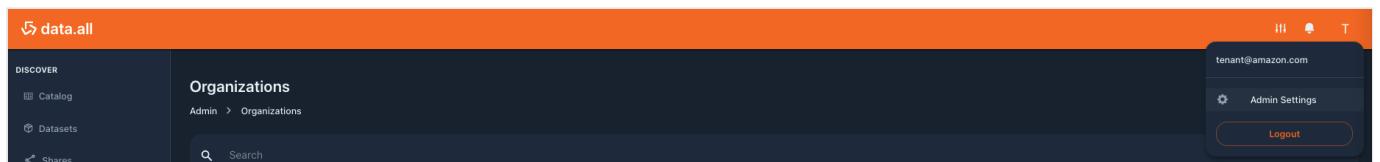
#### Manage tenant permissions

As a user part of "**DAAdministrators**" on your IdP you can access the settings menu from the profile icon.

For example, Maria Garcia is not part of "**DAAdministrators**", therefore she sees nothing



On the other hand, Tenant user is part of this group and can navigate to **Admin settings**



In **Admin Settings**, the Tenant user can manage tenant permissions. In the following picture, the user is NOT granting the *DataScienceTeam* that John belongs to permissions to create an organization.

The screenshot shows the 'Team DataScienceTeam' configuration page. At the top, it says 'A Team is a group from your identity provider that has access to data.all. Administrators can manage permissions for each team.' Below this, there's a section titled 'Tenant Permissions' with a list of items. Most items have orange circular icons next to them, indicating they are enabled. The 'Manage organizations' item has a grey circular icon, indicating it is disabled. At the bottom right of the page is a large orange 'Save' button.

If the tenant revokes the permission of a team to manage an object, that team won't be able to perform any action on that particular object. For the given example, assuming that John only belongs to the *DataScienceTeam*, he is not able to create organizations:

The screenshot shows the 'Create a new organization' page. On the left is a sidebar with 'Discover' and 'Play' sections. The main area has a 'Create a new organization' title and a 'Details' section with an 'Organization Name' field containing 'example'. To the right is an 'Organize' section with a 'Team' dropdown set to 'DataScienceTeam'. An error message at the top right reads: 'An error occurred (UnauthorizedOperation) when calling MANAGE\_ORGANIZATIONS operation: User: john Doe@amazon.com is not authorized to perform: MANAGE\_ORGANIZATIONS on dataall.' A 'Create Organization' button is at the bottom right.

### 3.1.2 Organizations

Organizations are high level constructs where business units can collaborate across many different AWS accounts at once. An organization includes environments and teams (see next section). Organizations are abstractions, they **don't** contain AWS resources, consequently there is no CloudFormation stack associated with them.

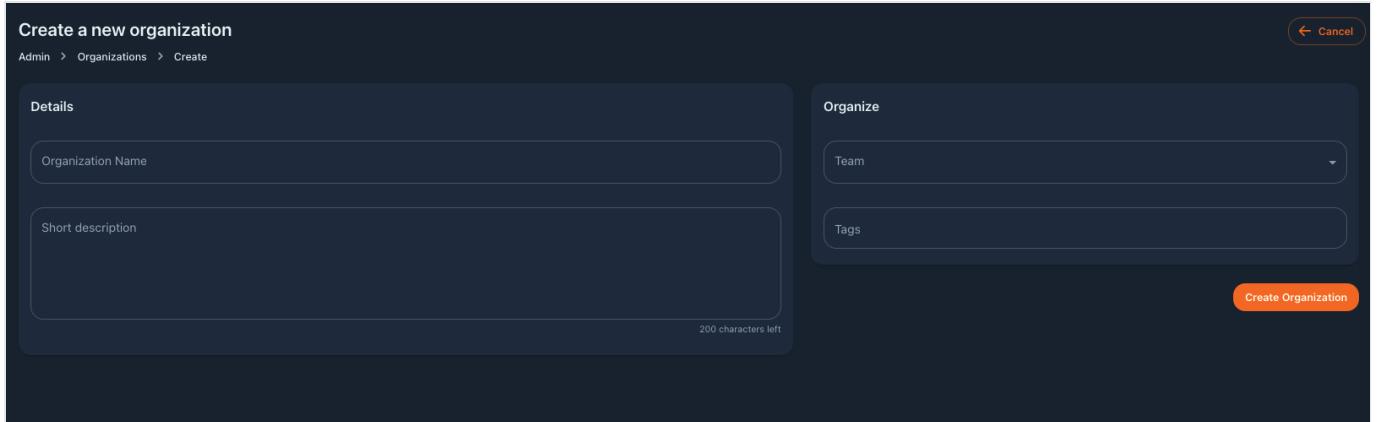
*Organizations usually correspond to whole organizations, organization divisions or a separated geographical region within an organization.*

## Create an organization

### Organization permissions

Any user can create an organization as long as he or she belongs to a group with tenant permission "Manage Organizations" (see previous chapter, "Manage tenant permissions").

To create an organization, on the left pane select **Organization**, click **Create** and complete the following form.



Field	Description	Required	Editable	Example
Organization name	Name of the organization	Yes	Yes	AnyCompany EMEA
Short description	Short description about the organization	No	Yes	AnyCompany EMEA region
Team	Name of the team managing the organization	Yes	No	EMEAAdmin
Tags	List of tags	No	Yes	fin,rnd,mark,sales

The next step to onboard your IdP groups is to link an environment and add teams, check [Link an environment](#) and [Add a team to an environment](#)

## Edit and update an organization

On the organisation window we can check the organization metadata, as well as the environments and teams that belong to this organisation (we will come back to this in [Environments and teams](#)).

To edit the metadata of the organisation, click in **Edit** and update the information. Name, description and tags are editable, however the organisation team cannot be updated.

## Delete an organization

### Warning

Make sure that you delete the organisation environments before deleting the organisation. Otherwise, orphan environments might run into conflicts.

To archive an organisation, click on the **Archive** button next to the Edit button. A window with the previous warning will appear. If you want to go ahead and delete the organization, type *permanently archive* in the box and submit.

## 3.2 Environments and Teams

An environment is a **workplace** where a team can bring, process, analyze data and build data driven applications. Environments comprise AWS resources, thus when we create an environment, we deploy a CDK/CloudFormation stack to an AWS account and region. In other words, **an environment is mapped to an AWS account in one region, where users store data and work with data.**

### One AWS account, One environment

To ensure correct data access and AWS resources isolation, onboard one environment in each AWS account. **We strongly discourage users to use the same AWS account for multiple environments.**

### 3.2.1 AWS account Pre-requisites

*data.all* does not create AWS accounts. You need to provide an AWS account and complete the following bootstrapping steps. Only the first step, CDK bootstrap, is mandatory; the rest are needed depending on your deployment configuration or on the features enabled in the environment.

#### 1. CDK Bootstrap

*data.all* uses AWS CDK to deploy and manage resources on your AWS account. AWS CDK requires some resources to exist on the AWS account, and provides a command called `bootstrap` to deploy these specific resources in a particular AWS region.

In this step we establish a trust relationship between the *data.all* infrastructure account and the accounts to be linked as environments. *data.all* codebase and CI/CD resources are in the *data.all* **tooling account**, and all the application resources used by the platform are located in a **infrastructure account**. From the infrastructure account we will deploy environments and other resources inside each of our business accounts. We are granting permissions to the infrastructure account by setting the `--trust` parameter in the cdk bootstrap command.

To bootstrap the AWS account using AWS CDK, you need the following (which are already fulfilled if you open AWS CloudShell from the environment account).

1. to have AWS credentials configured in `~/.aws/credentials` or as environment variables.
2. to install cdk: `npm install -g aws-cdk`

Then, you can copy/paste the following command from the UI and run from your local machine or CloudShell:

```
cdk bootstrap --trust DATA.ALL_AWS_ACCOUNT_NUMBER -c @aws-cdk/core:newStyleStackSynthesis=true --cloudformation-execution-policies arn:aws:iam::aws:policy/AdministratorAccess aws://YOUR_ENVIRONMENT_AWS_ACCOUNT_NUMBER/ENVIRONMENT_REGION
```

### Which account should I put in the command?

Let's check with an example: the **tooling account** is 11111111111 and *data.all* was deployed to the **infrastructure account** = 22222222222. Now we want to onboard a **business account** = 33333333333 in region eu-west-1. Then the cdk bootstrap command will look like: `bash`

```
cdk bootstrap --trust 22222222222 -c @aws-cdk/core:newStyleStackSynthesis=true --cloudformation-execution-policies arn:aws:iam::aws:policy/AdministratorAccess aws://333333333333/eu-west-1
```

#### RESTRICTED CDK EXECUTION ROLE

In the above command we define the `--cloudformation-execution-policies` to use the `AdministratorAccess` policy `arn:aws:iam::aws:policy/AdministratorAccess`. This is the default policy that CDK uses to deploy resources, nevertheless it is possible to restrict it to any IAM policy created in the account.

A more restricted policy named `DataAllCustomCDKPolicyREGION` is provided and directly downloadable from the UI. This more restrictive policy can be optionally passed in to the parameter `--cloudformation-execution-policies` instead of `arn:aws:iam::aws:policy/AdministratorAccess` for the CDK Execution role.

```
aws cloudformation --region REGION create-stack --stack-name DataAllCustomCDKExecPolicyStack --template-body file://cdkExecPolicy.yaml --parameters ParameterKey=EnvironmentResourcePrefix,ParameterValue=dataall --capabilities CAPABILITY_NAMED_IAM && aws cloudformation wait stack-create-complete --stack-name DataAllCustomCDKExecPolicyStack --region REGION && cdk bootstrap --trust 225091619433 -c @aws-cdk/core:newStyleStackSynthesis=true --cloudformation-execution-policies arn:aws:iam::ACCOUNT_ID:policy/DataAllCustomCDKPolicyREGION aws://ACCOUNT_ID/REGION
```

## ENVIRONMENTS IN MULTIPLE REGIONS

v2.4.0 allows the creation of multiple environments in the same AWS account and in multiple regions. We need to bootstrap every region that will host an environment.

### Regional CDK Execution Policy

Every CDK execution role requires its own `DataAllCustomCDKPolicyREGION` IAM policy. If you are using restricted CDK execution roles you need a different `DataAllCustomCDKEcPolicyStack` for each region used.

## 2. (For manual) Pivot role

`data.all` assumes a certain IAM role to be able to call AWS SDK APIs on your account. The Pivot Role is a super role in the environment account and thus, it is protected to be assumed only by the `data.all` central account using an external Id.

Since release V1.5.0, the Pivot Role can be created as part of the environment CDK stack, given that the trust between `data.all` and the environment account is already explicitly granted in the bootstrapping of the account. To enable the creation of Pivot Roles as part of the environment stack, the `cdk.json` parameter `enable_pivot_role_auto_create` needs to be set to `true`. When an environment is linked to `data.all` a nested stack creates a role called `dataallPivotRole-cdk`.

For versions prior to V1.5.0 or if `enable_pivot_role_auto_create` is `false` the Pivot Role needs to be created manually. In this case, the AWS CloudFormation stack of the role can be downloaded from `data.all` environment creation form. (Navigate to an organization and click on link an environment to see this form). Fill the CloudFormation stack with the parameters available in `data.all` UI to create the role named `dataallPivotRole`.

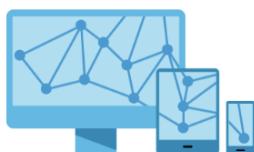
### Upgrading from manual to cdk-created Pivot Role

If you have existing environments that were linked to `data.all` using a manually created Pivot Role you can still benefit from V1.5.0 `enable_pivot_role_auto_create` feature. You just need to update that parameter in the `cdk.json` configuration of your deployment. Once the CICD pipeline has completed: new linked environments will contain the nested cdk-pivotRole stack (no actions needed) and existing environments can be updated by:

- manually, by clicking on "update stack" in the environment --> stack tab
- automatically, wait for the `stack-updater` ECS task that runs daily overnight
- automatically, set the added `enable_update_dataall_stacks_in_cicd_pipeline` parameter to `true` in the `cdk.json` config file. The `stack-updater` ECS task will be triggered from the CICD pipeline

## 3. (For Dashboards) Subscribe to Amazon Quicksight

This is an optional step. To link environments with **Dashboards enabled**, you will also need a running Amazon QuickSight subscription on the bootstrapped account. If you have not subscribed to Quicksight before, go to your AWS account and choose the Enterprise option as shown below:



Your AWS Account is not signed up for QuickSight. Would you like to sign up now?

AWS Account 

[Sign up for QuickSight](#)

To access QuickSight with a different account, [log in again](#).

Create your QuickSight account		
Edition	<input checked="" type="radio"/> Enterprise	<input type="radio"/> Enterprise + Q <a href="#">Learn more</a>
Team trial for 30 days (4 authors)*	<b>FREE</b>	<b>FREE</b>
Author per month (yearly)**	\$18	\$28
Author per month (monthly)**	\$24	\$34
Readers (pay-per-Session)	\$0.30 / session (max \$5)****	\$0.30 / session (max \$10)****
Additional SPICE per month	\$0.38 per GB	\$0.38 per GB
QuickSight Q regional fee	N/A	\$250 / mo / region
Personalized Q authoring workshop	N/A	Starting from \$199
Natural language query with QuickSight Q	N/A	INCLUDED
Single Sign On with SAML or OpenID Connect	✓	✓
Connect to spreadsheets, databases & business apps	✓	✓
Access data in Private VPCs	✓	✓
Row-level security for dashboards	✓	✓
Secure data encryption at rest	✓	✓
Connect to your Active Directory	✓	✓
Use Active Directory groups***	✓	✓
Send email reports	✓	✓
Embed QuickSight	✓	✓
Capacity-based pricing	✓	✓
Supported regions	<a href="#">Learn more</a>	<a href="#">Learn more</a>

#### 4. (For ML Studio) Specifying a VPC or using default

If ML Studio is enabled, data.all will create a new SageMaker Studio domain in your AWS Account and use the domain later on to create ML Studio profiles.

Prior to V1.5.0 data.all always used the default VPC to create a new SageMaker domain. The default VPC had then to be customized to fulfill the networking requirements specified in the Sagemaker [documentation](#) for VPCOnly domains.

In V1.5.0 we introduce the creation of a suitable VPC for SageMaker as part of the environment stack. However, it is not possible to edit the VPC used by a SageMaker Studio domain, it requires deletion and re-creation. To allow backwards compatibility and not delete the pre-existing domains, in V1.5.0 the default behavior is still to use the default VPC.

In V2.2.0, we introduced the ability to select your own VPC ID and Subnet IDs to deploy the VPC-Only Sagemaker Studio domain to.

Data.all will follow the following rules to establish which VPC to use for Sagemaker Studio domain creation:

- If MLStudio enabled with VPC and subnet IDs specified
- Use the specified VPC and subnet IDs
- If MLStudio enabled with no VPC/subnet IDs specified
- default VPC exists --> Uses default VPC and all subnets available
- default VPC does not exist --> Creates a new VPC and uses with private subnets

Pre-existing environments from older versions of data.all will have their Sagemaker Studio domain remain unchanged if already enabled. Users can get a better understanding of what VPC configuration is being used by navigating to the environment --> MLStudio Tab in the data.all UI once the environment stack is created.

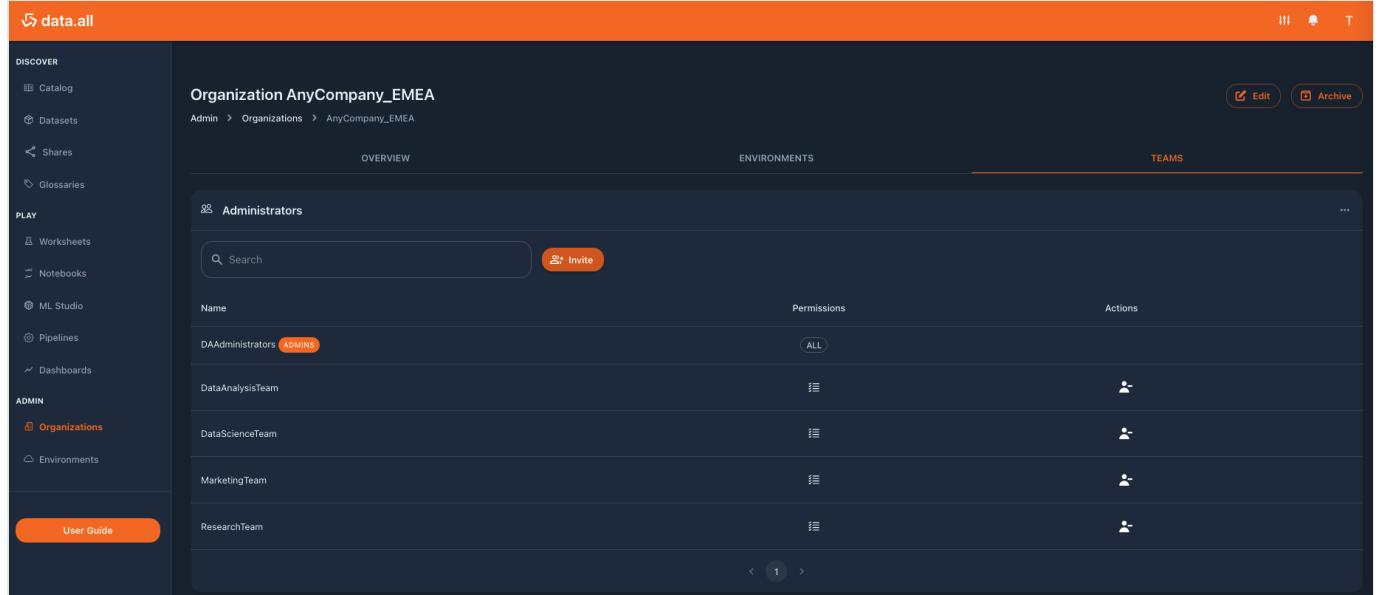
### 3.2.2 NEW Link an environment

#### Necessary permissions

##### Environment permissions

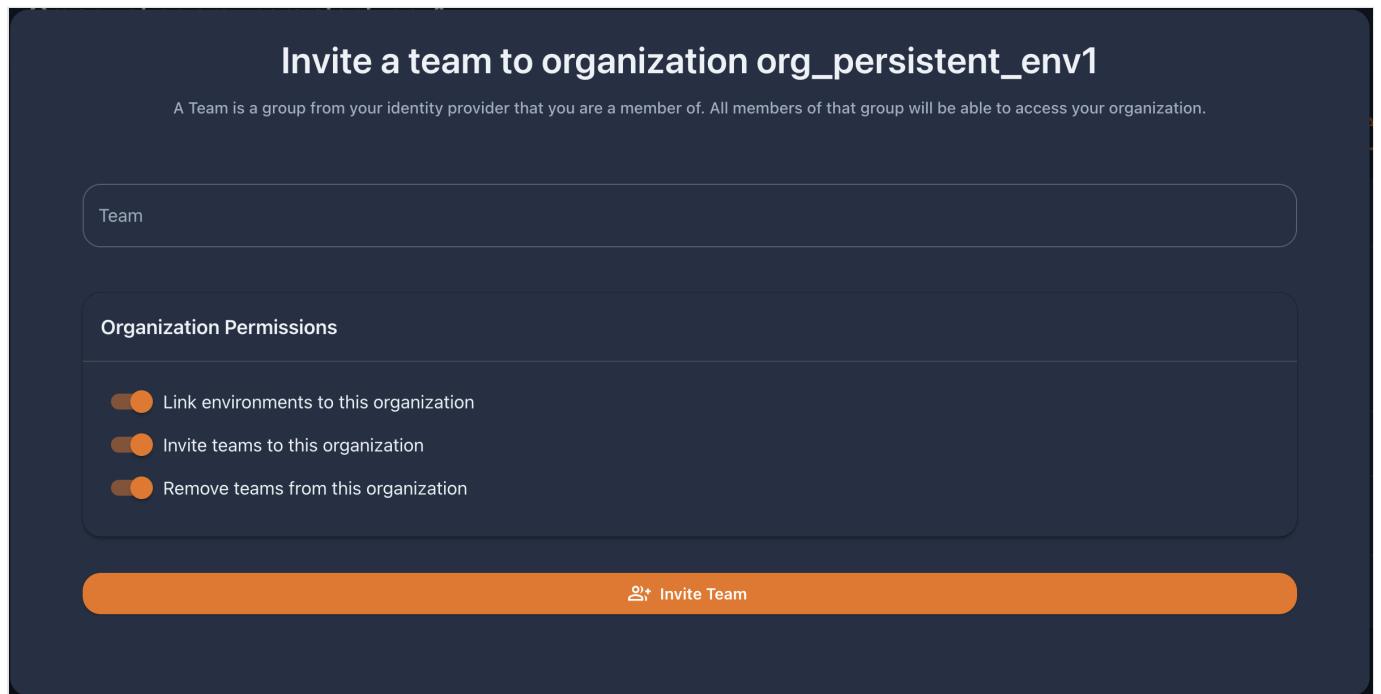
Only organization Administrator teams can link environments to the Organization. The Organization creator team is the by default Organization Administrator team, but users of this group can now invite other teams and grant them permission to manage organization teams, and link environment to the organization.

Managing organization teams can be done through the UI or APIs. From the UI, navigate to your organizations and click on the **Teams** tab.



Name	Permissions	Actions
DAAdministrators <span style="border: 1px solid red; padding: 2px;">ADMINS</span>	ALL	
DataAnalysisTeam		
DataScienceTeam		
MarketingTeam		
ResearchTeam		

Invite button opens a dialog that gives the organization creators the possibility to invite one of the IdP groups they belong to, which will appear in a dropdown when we click on **Teams**. They can also invite an IdP group that they don't belong to, as long as they type the exact group name (**case sensitive**):



**Organization Permissions**

- Link environments to this organization
- Invite teams to this organization
- Remove teams from this organization

 **Invite Team**

You can check the Organization administrators teams in the Organization's **Teams** tabs and remove a team if necessary on the icon in the Actions column.

The screenshot shows the AWS Organizations console with the following details:

- Organization:** AnyCompany Global
- Path:** Admin > Organizations > AnyCompany Global
- Tab:** TEAMS (highlighted)
- Section:** Administrators
- Search Bar:** Search (placeholder: Search)
- Buttons:** Edit (orange), Archive (orange), ... (three dots)
- Table Headers:** Name, Permissions, Actions
- Table Rows:**
  - DHAdministrators (ADMIN) - Permissions: ALL
  - DataAnalyticsTeam - Permissions: ALL
  - DataScienceTeam - Permissions: ALL
- Action Column:** Actions (contains icons for Invite, Delete, and other team management)
- Bottom:** Pagination (page 1 of 1)

### Link environment

Once the AWS account/region is bootstraped and we have permission to link an environment to an organization, let's go! Navigate to your organization, click on the **Link Environment** button, and fill the environment creation form:

Field	Description	Required	Editable	Example
Environment name	Name of the environment	Yes	Yes	Finance
Short description	Short description about the environment	No	Yes	Finance department teams
Account number	AWS bootstraped account maped to the environment	Yes	No	111111111111
Region	AWS region	Yes	No	Europe (Ireland)
IAM Role ARN	Alternative name of the environment IAM role	No	No	anotherRoleName
Resources prefix	Prefix for all AWS resources created in this environment. Only (^[a-z]*\$)	Yes	Yes	fin
Team	Name of the group initially assigned to this environment	Yes	No	FinancesAdmin
Tags	Tags that can later be used in the Catalog	Yes	Yes	finance, test
ML Studio VPC ID	VPC to host the environment sagemaker studio domain (if mlstudio is enabled) instead than the default VPC or the VPC created by <i>data.all</i>	No	No	vpc-.....
ML Studio Subnet ID(s)	Subnet(s) to host the environment sagemaker studio domain (if mlstudio is enabled) instead than the default subnets or the subnets created by <i>data.all</i>	No	No	subnet-....

### Features Management

An environment is defined as a workspace and in this workspace we can flexibly activate or deactivate different features, adapting the workspace to the teams' needs. If you want to use Dashboards, you need to complete the optional third step explained in the previous chapter "Bootstrap your AWS account".

This is not set in stone!

Don't worry if you change your mind, features are editable. You can always update the environment to enable or disable a feature.

Click on Save, the new Environment should be displayed in the Environments section of the left side pane.

### 3.2.3 Manage your Environment

Go to the environment you want to check. You can find your environment in the Environments list clicking on the left side pane or by navigating to the environment organization. There are several tabs just below the environment name:

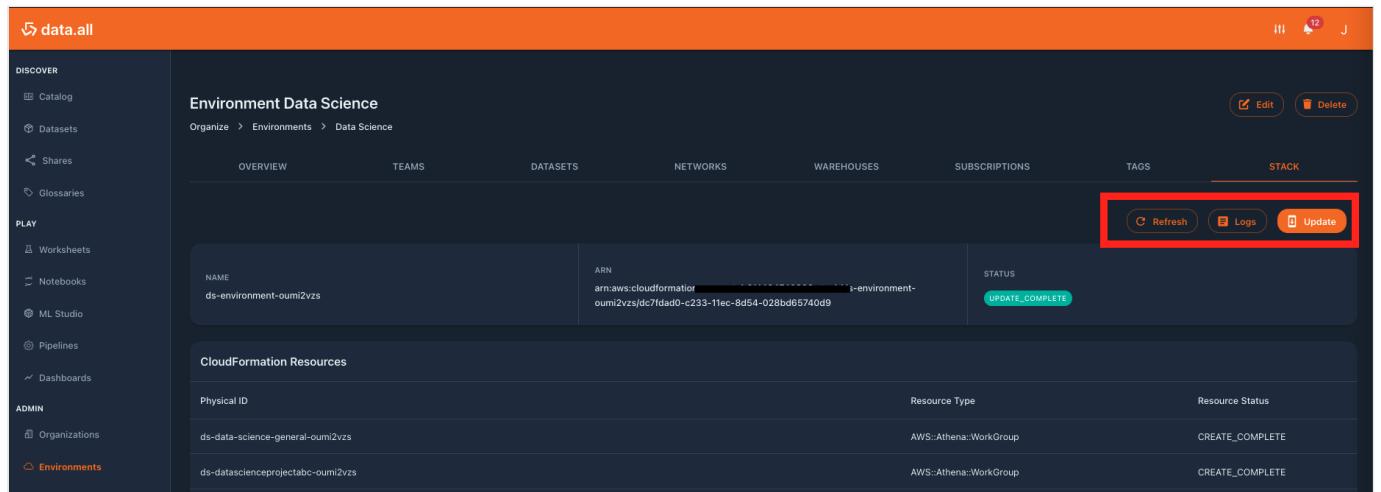
- Overview: summary of environment information and AWS console and credential access.
- Teams: list of all teams onboarded to this environment.
- Datasets: list of all datasets owned and shared with for this environment
- MLStudio: summary of Sagemaker Studio domain configuration (if enabled)
- Networks: VPCs created and owned by the environment
- Subscriptions: SNS topic subscriptions enabled or disabled in the environment
- Tags: editable key-value tags
- Stack: CloudFormation stack details and logs

#### Environment access

If **none** of the teams you belong to (IdP groups) has been onboarded to the environment, you won't be able to see the environment in the environments menu or in the organization environments list. **Check the "Manage teams" section**

#### Check CloudFormation stack

After linking an environment we can check the deployment of AWS resources in CloudFormation, click on the environment and then on the **Stack** tab. Right after linking an environment you should find something like the below picture.



Physical ID	Resource Type	Resource Status
ds-data-science-general-oumi2vzs	AWS::Athena::WorkGroup	CREATE_COMPLETE
ds-datasciencuprojectabc-oumi2vzs	AWS::Athena::WorkGroup	CREATE_COMPLETE

After some minutes its status should go from "PENDING" to "CREATE\_COMPLETE" and we will be able to look up the AWS resources created as part of the environment CloudFormation stack. Moreover, we can manually trigger the update in case of change sets of the CloudFormation stack with the **Update** button.

#### Pro Tip

If something in the creation or update of an environment fails, we can directly check the logs by clicking the logs button. No need to navigate to the AWS console to find your logs!

After being processed (not in `PENDING`), the status of the CloudFormation stack is directly read from [CloudFormation](#).

## Edit and update an environment

Find your environment in the Environments list or by navigating to the corresponding organization. Once in your selected environment, click on **Edit** in the top-right corner of the window and make all the changes you want.

Finally, click on **Save** at the bottom-right side of the page to update the environment.

### Automatically updates the CloudFormation stack

Clicking on Save will update the environment metadata as well as the CloudFormation stack on the AWS account

## Delete an environment

In the chosen environment, next to the Edit button, click on the **Delete** button.

### orphan *data.all* resources

A message like this one: "*Remove all environment related objects before proceeding with the deletion!*" appears in the delete display. Don't ignore it! Before deleting an environment, clean it up: delete its datasets and other resources.

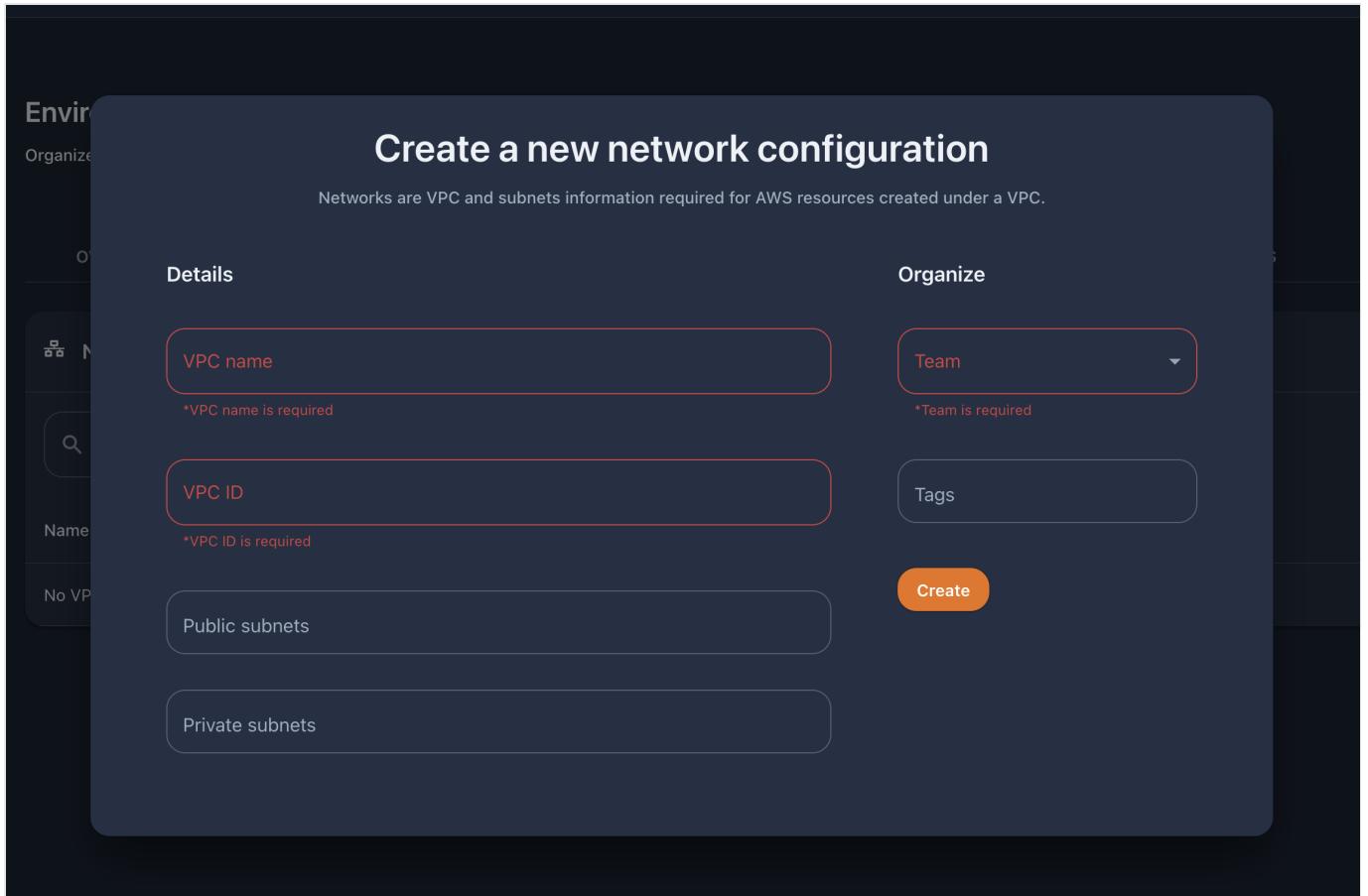
Note that we can keep the environment CloudFormation stack. What is this for? This is useful in case you want to keep using the environment resources (IAM roles, etc) created by *data.all* but outside of *data.all*

## Create networks

Networks are pre-existing VPCs that are onboarded to *data.all* and belonging to an environment and team. To create a network, click in the **Networks** tab in the environment window, then click on **Add** and finally fill the following form.

### Using Networks

After onboarding your network(s) in *data.all*, users can easily select the VPC and Subnet information of that network to seamlessly deploy new resources in *data.all* that require VPC configurations, such as *data.all* Notebooks. For example, if a User wants to create a notebook in their environment after onboarding a network, the VPC and Subnet ID fields in the create notebook form on *data.all* will auto-populate with the VPC and subnet information for the user to easily to select (rather than navigating to and from the AWS Console)!



#### Create Key-value tags

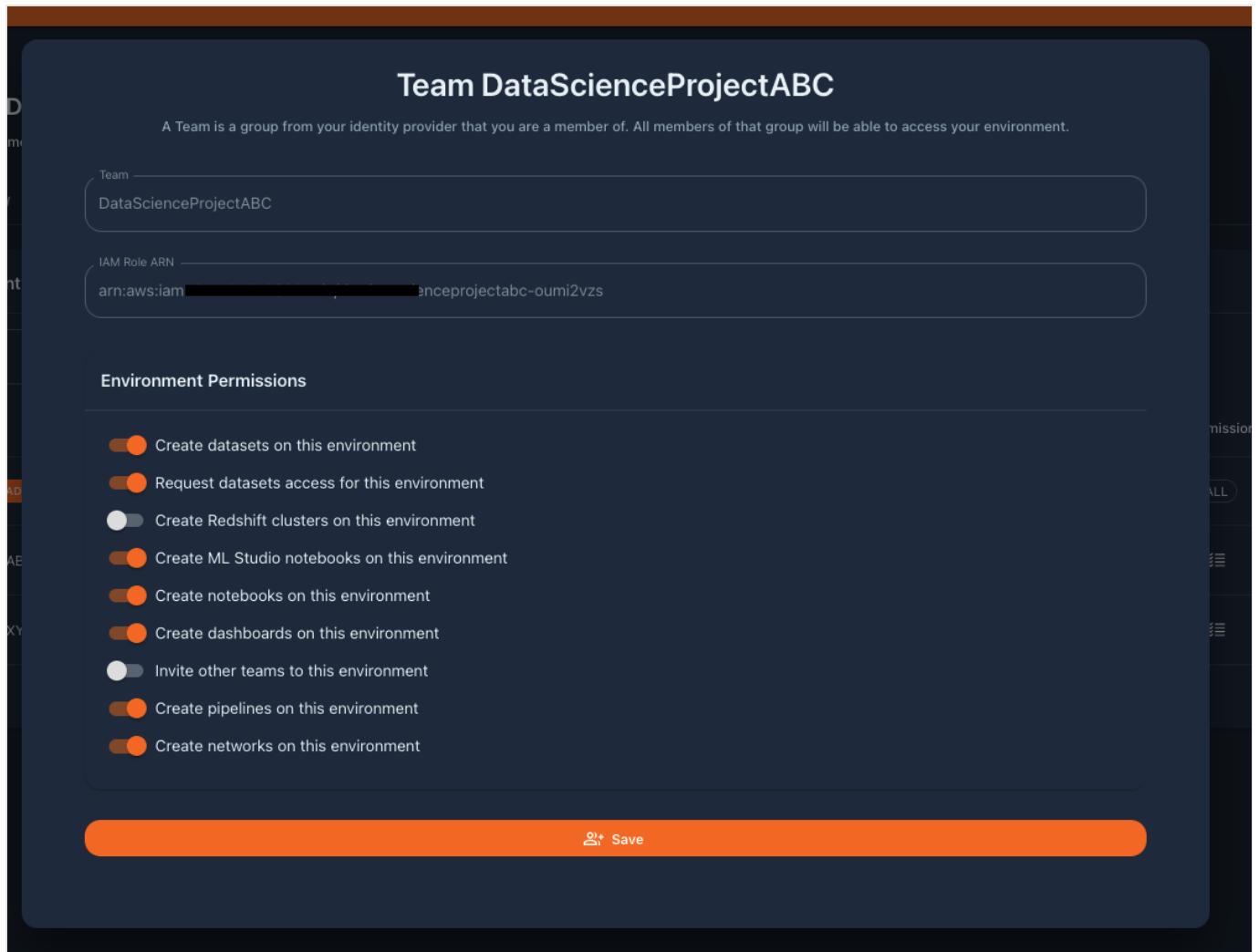
In the **Tags** tab of the environment window, we can create key-value tags. These tags are not *data.all* tags that are used to tag datasets and find them in the catalog. In this case we are creating AWS tags as part of the environment CloudFormation stack. There are multiple tagging strategies as explained in the [documentation](#).

#### 3.2.4 Manage Teams

Environment creators have all permissions on the environment, and can invite other teams to the onboarded environment. To add an IdP group to an environment, navigate to the **Teams** tab of the environment and click on the **Invite** button.

The screenshot shows the "Teams" tab of the "Environment Data Science" environment. The top navigation bar includes "Organize", "Environments", and "Data Science". On the far right are "Edit" and "Delete" buttons. Below the navigation is a header with tabs: "OVERVIEW", "TEAMS" (which is active), "DATASETS", "NETWORKS", "WAREHOUSES", "SUBSCRIPTIONS", "TAGS", and "STACK". A sub-header "Environment Teams" is shown above a search bar and an "Invite" button. The main area lists teams with columns for "Name", "IAM Role", "Athena WorkGroup", "Permissions", and "Actions".

A display will allow you to customize the AWS permissions that the onboarded group will have, adapting to different types of users (data scientists, data engineers, data analysts, management). The customizable permissions can be enabled or disabled as appears in the following picture.



When the invitation is saved, the environment CloudFormation stack gets automatically updated and creates a new IAM role for the new team. The IAM role policies are mapped to the permissions and are granted to the invited team (e.g., a team invited without "Create ML Studio" permission will not have Sagemaker permissions on the associated IAM role). To remove a group, in the *Actions* column select the minus icon.

#### ⚠ Automated permission assignment

Groups retrieved from the IdP are automatically granted all application high level permissions by default to accelerate the onboarding process.

Users will only be able to see the environments where a team that they belong to has been onboarded (either as creator of the environment or invited to the environment). In the following picture, John belongs to the *DataScienceTeam* that owns the *Data Science* environment, but on top of that he can access the *Data Analysis* environment because her team has been invited by Maria.

#### ✓ Pro tip!

You know whether you are `OWNER` or `INVITED` in an environment by checking **your Role** in that environment. This information appears in the picture in each environment box in the field "Role".

### Difference between invited and owner

A team that has been invited to an environment has slight limitations, because well, it is not their environment! Invited teams cannot access the **Stack** tab of the environment because they should not be handling the resources of the environment. Same applies for **Tags** and **Subscriptions**. Other limitations come from the permissions that have been assigned to the team.

### AWS access - Environment IAM roles

For the environment admin team and for each team invited to the environment *data.all* creates an IAM role. From the **Teams** tab of the environment we can assume our team's IAM role to get access to the AWS Console or copy the credentials to the clipboard. Both options are under the "Actions" column in the Teams table (these options are only available if `core.features.env_aws_actions` is set to `True` in the `config.json` used for deployment of *data.all*).

Name	IAM Role	Athena WorkGroup	Permissions	Actions
Scientists (ADMIN)	arn:aws:iam::█████████████████████:role/dataall-local3-zbv2swu1	dataall-local3-zbv2swu1	ALL	
Engineers	arn:aws:iam::█████████████████████:role/dataall-engineers-zbv2swu1	dataall-engineers-zbv2swu1		

### Usage

- Assumed by Team members from *data.all* UI to explore and work with data
- Credentials can be copied in *data.all* UI to explore and work with data
- Assumed by *data.all* Worksheets to query data using Athena
- Credentials can be copied in *data.all* Pipelines to develop the pipeline

### IAM Permissions

### Default permissions

- read permissions to profiling/code folder in the Environment S3 Bucket
- Athena permissions to use the Team's workgroup
- CloudFormation permissions to resources tagged with Team tag and prefixed with environment `resource_prefix`
- SSM Parameter Store permissions to resources tagged with team tag and prefixed with environment `resource_prefix`
- Secrets Manager permissions to resources tagged with team tag and prefixed with environment `resource_prefix`
- read permissions on Logs and IAM
- PassRole permissions for itself to Glue, Lambda, SageMaker, StepFunctions and DataBrew

### Data permissions

- read and write permissions to the Team-owned Dataset S3 Buckets
- encrypt/decrypt data with the Team-owned Dataset KMS keys
- read and write permissions Dataset Glue databases - governed with Lake Formation

### Feature permissions

Depending on the features enabled in the environment and granted to the Team, additional AWS permissions are given to the role. Permissions for any AWS service need to be defined to allow access only to resources tagged with team tag and prefixed with environment `resource_prefix`.

#### **⚠ Access denied? You need to tag resources when you create them**

Since permissions to AWS services are restricted to team-tagged resources, you need to tag any new resource that you create at creation time.

Let's say you are using the "Engineers" IAM role in an environment that prefixes all resources with the `resource_prefix` = "dataall" as in the following picture.

Name	IAM Role	Athena WorkGroup
Scientists <span style="background-color: orange; border-radius: 50%; padding: 2px;">ADMINS</span>	arn:aws:iam::[REDACTED]:role/dataall-local3-zbv2swu1	dataall-local3-zbv2swu1
Engineers <span style="border: 2px solid red; padding: 2px;">[REDACTED]</span>	arn:aws:iam::[REDACTED]:role <span style="border: 2px solid red; padding: 2px;">[REDACTED]</span> dataall-engineers-zbv2swu1	<span style="border: 2px solid red; padding: 2px;">[REDACTED]</span> dataall-engineers-zbv2swu1

Assuming the IAM role you will be able to create parameters prefixed by "dataall" and tagged with a tag Team=Engineers, otherwise you will get AccessDenied errors.

AWS Systems Manager > Parameter Store > Create parameter

## Create parameter

**Parameter details**

Name   

Description — *Optional*

Tier  
Parameter Store offers standard and advanced parameters.

<input checked="" type="radio"/> Standard Limit of 10,000 parameters. Parameter value size up to 4 KB. Parameter policies are not available. No additional charge.	<input type="radio"/> Advanced Can create more than 10,000 parameters. Parameter value size up to 8 KB. Parameter policies are available. Charges apply
--	--

Type  
 String  
Any string value.  
 StringList  
Separate strings using commas.  
 SecureString  
Encrypt sensitive data using KMS keys from your account or another account.

Data type

Value  
  
Maximum length 4096 characters.

**Tags — *Optional***  
You can use tags to organize and restrict access to your parameter.

Key	Value	
<input type="text" value="Team"/>	<input type="text" value="Engineers"/>	<span style="border: 1px solid black; padding: 2px;">Remove tag</span>

Add tag

All the resources created in the environment stack are tagged with the tag `Team=EnvAdminTeam`, which means that environment admins can access and manage the environment baseline AWS resources.

### Data Governance with Lake Formation

We use AWS Lake Formation to govern Glue databases and tables. Using Lake Formation, we grant permissions to the Environment teams IAM roles to read and write the Glue databases and tables that the Team owns. In other words, each environment team IAM role can only access the Glue databases and tables of the Datasets that the team owns.

### 3.2.5 Manage Consumption Roles

`data.all` creates or imports one IAM role per Cognito/IdP group that we invite to the environment. With these IAM roles data producers and consumers can ingest and consume data, but sometimes we want to consume data from an application that already has an execution role. To increase the flexibility in the data consumption patterns, `data.all` introduces Consumption Roles.

Any IAM role that exists in the Environment AWS Account can be added to `data.all`. In the **Teams** tab click on *Add Consumption Role*

OVERVIEW TEAMS DATASETS NETWORKS SUBSCRIPTIONS TAGS STACK

**Environment Teams**

Name	IAM Role	Athena WorkGroup	Permissions	Actions
SBResearch <span style="background-color: orange; border-radius: 50%; padding: 2px 5px;">ADMINS</span>	arn:aws:iam::[REDACTED]	rch-dev-2-y1q4tz5y	dataall-research-dev-2-y1q4tz5y	<span style="border: 1px solid #ccc; border-radius: 50%; padding: 2px 5px;">ALL</span> <span style="color: #3399FF; font-size: small;">aws</span> <span style="font-size: small;">[Edit]</span>

**Environment Consumption IAM roles**

Name	IAM Role	Role Owner	Action
No Consumption IAM Role added			

A window like the following will appear for you to introduce a name for the consumption role in `data.all`, the arn of the IAM role, the Team that owns the consumption role and whether `data.all` should manage the consumption role. Enabling "data.all managed" on the consumption role allows `data.all` to attach IAM policies to the role used for `data.all` related activities, such as sharing data, rather than having a user manually add those policies to the role.

Only members of this team and tenants of `data.all` can edit or remove the consumption role.

## Add a consumption IAM role to environment TEST-EnvironmentA1

An IAM consumption role is owned by the selected Team. The owners team request access on behalf of this IAM role, which can be used by downstream applications.

Consumption Role Name  
Example SageMaker DS Role

IAM Role ARN  
arn:aws:iam::111111111111:role/RoleSagemakerStudioExample

Owners  
groupA1

Data.all managed  
Allow Data.all to attach IAM policies to this role

Add Consumption Role

**Environment Consumption IAM roles**

Name	IAM Role	Role Owner	Policy Management	IAM Policies	Actions
CR_A1	arn:aws:iam::[REDACTED]role/consumption-role-testing	groupA1	Data.all managed	ATTACHED	<span style="color: #3399FF; font-size: small;">[Edit]</span> <span style="font-size: small;">[Delete]</span>

✓ Existing roles only

`data.all` checks whether that IAM role exists in the AWS account of the environment before adding it as a consumption role.

**Data Access**

- By default, a new consumption role does NOT have access to any data in *data.all*.
- The team that owns the consumption role needs to open a share request for the consumption role as discussed more in the Discover --> Shares section.

## 3.3 Maintenance Window

---

When deploying new releases, patch updates, etc there may arise a situation in which a user may be performing an action, and, at the same time some AWS resources might be getting updated. This can put data.all created components (Environments, Datasets, Dataset Shares) into broken state. Also, there might be a need to debug (or patch update few things in data.all) when the data.all administrators may want to restrict actions taken by users in data.all. In order to protect such a deployment and create a safe environment for deployment / patch updates, data.all can be put into maintenance mode.

In order to enable use of maintenance mode into your deployment of data.all, modify the config.json and add this to the modules section

```
"maintenance": {  
    "active": true  
}
```

**Note:** Only data.all administrators can start the maintenance mode. Maintenance window is available in the `Admin Settings` section. Data.all currently supports two maintenance modes.

**Read-only :** In this mode, a user can visit data.all and navigate through data.all but won't be able to update/modify any data.all related components. **No-Access :** In this mode, a user is shown a blank page after the user logs into data.all. In this mode, all user actions are blocked.

**Note -** During both the maintenance modes, data.all admins can perform all data.all actions ( i.e. an admin can login and modify data.all related components where they have access)

The following happens when a maintenance mode / window is started in data.all

1. All Scheduled ECS tasks ( such as Catalog-Indexer, Share Verifier, etc) are disabled
2. If there is any running ECS task at the time of starting maintenance window, the status of that ECS task is polled and only when all the ECS tasks have completed , the maintenance mode status is changed to ACTIVE - indicating that it is safe to deploy or carry out any maintenance activities.
3. GraphQL calls are blocked depending on the maintenance mode. If the maintenance mode is Read-Only, then only mutation graphql calls are blocked. In case of No-Access maintenance mode, both mutation and query graphql calls are blocked for the user.

### 3.3.1 Enable / Disable Maintenance mode

---

In order to enable maintenance mode, goto `Admin Settings` page - which is only accessible to data.all administrators - and navigate to the `Maintenance` tab. Once you are on the maintenance tab, select the mode and click on `Start Maintenance`.

Please wait for the maintenance window status to change from PENDING to ACTIVE before taking actions.

You can disable maintenance mode the same way it was enabled by clicking on `End Maintenance`.

## 4. Discover

---

### 4.1 S3 Datasets

In *data.all*, a S3/Glue Dataset is a representation of multiple AWS resources that helps users store data in a data lake and establish the basis to make this data discoverable and shareable with other teams.

When data owners create a S3/Glue dataset the following resources are deployed on the selected environment and its linked AWS account:

1. Amazon S3 Bucket to store the data on AWS.
2. AWS KMS key to encrypt the data on AWS.
3. AWS IAM role that gives access to the data on Amazon S3 (Dataset IAM role, see below)
4. AWS Glue database that is the representation of the structured data on AWS.

#### Dataset IAM role

##### Usage

- Assumed by Dataset owners from *data.all* UI to quickly ingest or access Dataset data
- Assumed by Dataset Glue crawler
- Assumed by the Dataset Glue profiling job

##### IAM Permissions

- read and write permissions to the Dataset S3 Bucket (ONLY this bucket)
- encrypt/decrypt data with the Dataset KMS key (ONLY this key)
- read and write permissions to the Dataset Glue database and tables (ONLY this database)
- read permissions to profiling/code folder in the Environment S3 Bucket (ONLY this folder)
- read and write permissions to profiling/results/datasetUri folder in the Environment S3 Bucket (ONLY this folder)
- put logs permissions to log crawler and profiling jobs results

##### Data Governance with Lake Formation

In addition to restricting the access via IAM policies, Dataset Glue database and tables are protected using AWS Lake Formation. With Lake Formation, the Dataset IAM role gets granted access to the Dataset Glue database only.

#### Glue Tables and S3 Folders

Inside a S3/Glue dataset we can store structured data in Glue tables and unstructured data in S3 folders.

- Tables are the representation of **AWS Glue Catalog** tables that are created on the dataset's Glue database on AWS.
- Folders are the representation of an **Amazon S3 prefix** where any type of file can be stored. Such as images, unstructured text formats...

#### Dataset ownership

Dataset ownership refers to the ability to access, modify or remove data from a dataset, but also to the responsibility of assigning these privileges to others.

- **Owners:** When you create a dataset and associate it with a team, the dataset business ownership belongs to the associated team.
- **Stewards:** You can delegate the stewardship of a dataset to a team of stewards. You can type a name of an IdP group or choose one of the teams of your environment to be the dataset stewards.

### Note

Dataset owners team is a required, non-editable field, while stewards are optional and can be added post the dataset has been created. If no other stewards team is designated, the dataset owner team will be the only responsible in managing access to the dataset.

### Dataset access

In this case we are referring to the ability to access, modify or remove data from a dataset. Who can access the dataset content? users belonging to...

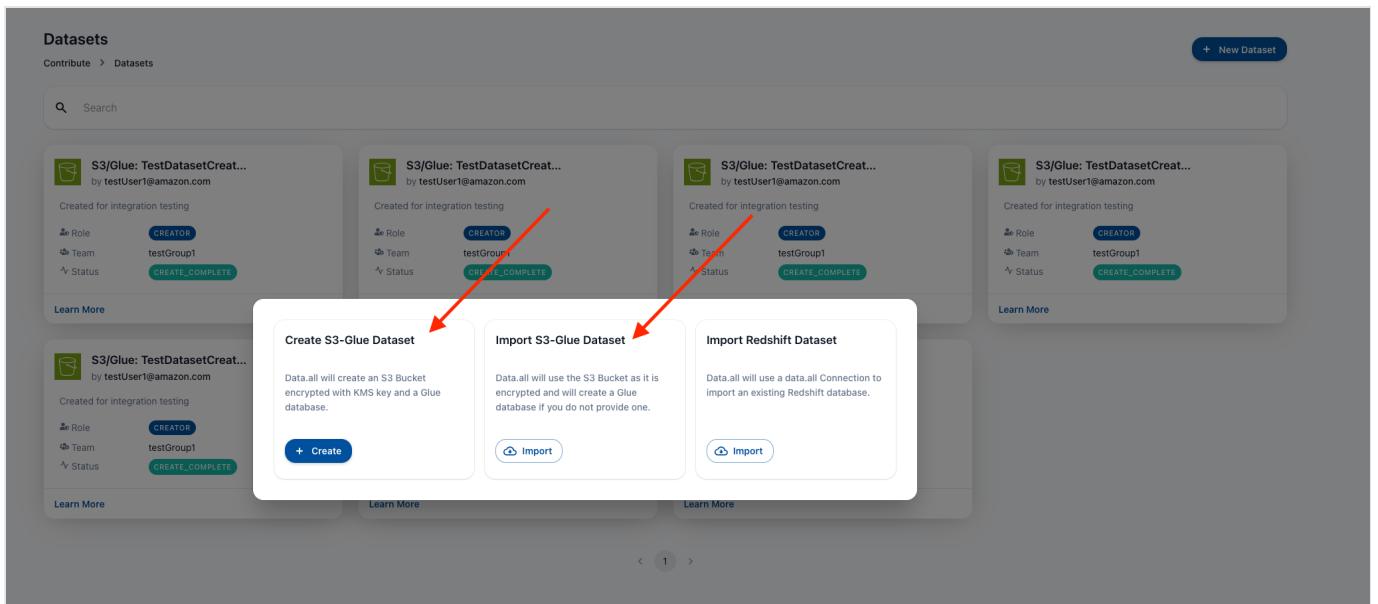
- the dataset owner team
- a dataset steward team
- teams with a share request approved to dataset content

### Note

Dataset metadata is available for all users in the centralized data catalog.

## 4.1.1 NEW Create a dataset

To create a new dataset, navigate to the Datasets view and click on **New Dataset**. A window like the one in the picture will allow you to select the type of Dataset you want to create or import. In this case you need to select the Create S3/Glue Dataset option.



Create a new dataset

Contribute > Datasets > Create

**Details**

Dataset name

Short description  
200 characters left

**Classification**

Confidentiality

Topics

Tags

Auto Approval  
Disabled

**Deployment**

Environment

Region

Organization

**Governance**

Owners

Stewards

**Create Dataset**

Field	Description	Required	Editable	Example
Dataset name	Name of the dataset	Yes	Yes	AnyDataset
Short description	Short description about the dataset	No	Yes	For AnyProject predictive model
Environment	Environment (mapped to an AWS account)	Yes	No	DataScience
Region (auto-filled)	AWS region of the environment	Yes	No	Europe (Ireland)
Organization (auto-filled)	Organization of the environment	Yes	No	AnyCompany EMEA
Owners	Team that owns the dataset	Yes	No	DataScienceTeam
Stewards	Team that can manage share requests on behalf of owners	No	Yes	FinanceBITeam, FinanceMgmtTeam
Confidentiality	Level of confidentiality: Unclassified, Official or Secret	Yes	Yes	Secret
Topics	Topics that can later be used in the Catalog	Yes, at least 1	Yes	Finance
Tags	Tags that can later be used in the Catalog	Yes, at least 1	Yes	delete me, ds
Auto Approval	Whether shares for this dataset need approval from dataset owners/stewards	Yes (default Disabled)	Yes	Disabled, Enabled

#### 4.1.2 Import a dataset

If you already have data stored on Amazon S3 buckets in your data.all environment, data.all has got you covered with the import feature. In addition to the fields of a newly created dataset you have to specify the S3 bucket and optionally a Glue database and a KMS key Alias. If the Glue database is left empty, data.all will create a Glue database pointing at the S3 Bucket. As for the KMS key Alias, data.all assumes that if nothing is specified the S3 Bucket is encrypted with SSE-S3 encryption. Data.all performs a validation check to ensure the KMS Key Alias provided (if any) is the one that encrypts the S3 Bucket specified.

### Imported KMS key and S3 Bucket policies requirements

Data.all pivot role will handle data sharing on the imported Bucket and KMS key (if imported). Make sure that the resource policies allow the pivot role to manage them. For the KMS key policy, explicit permissions are needed. See an example below.

#### KMS key policy

In the KMS key policy we need to grant explicit permission to the pivot role. At a minimum the following permissions are needed for the pivotRole:

```
{
  "Sid": "Enable Pivot Role Permissions",
  "Effect": "Allow",
  "Principal": {
    "AWS": "arn:aws:iam::111122223333:role/dataallPivotRole-cdk"
  },
  "Action": [
    "kms:Decrypt",
    "kms:Encrypt",
    "kms:GenerateDataKey*",
    "kms:PutKeyPolicy",
    "kms:GetKeyPolicy",
    "kms:ReEncrypt*",
    "kms:TagResource",
    "kms:UntagResource"
    'kms:DescribeKey'
  ],
  "Resource": "*"
}
```

### Update imported Datasets

Imported keys is an addition of V1.6.0 release. Any previously imported bucket will have a KMS Key Alias set to `Undefined`. If that is the case and you want to update the Dataset and import a KMS key Alias, data.all let's you edit the Dataset on the **Edit** window.

**Import a new dataset**

Contribute > Datasets > Import

**Details**

Dataset name

Short description  
200 characters left

**Classification**

Confidentiality

Topics

Tags

Auto Approval —  
Disabled

**Deployment**

Environment

Region

Organization

Amazon S3 bucket name

Amazon KMS key Alias (if SSE-KMS encryption is used)

AWS Glue database name

**Governance**

Team

Stewards

**Import Dataset**

Field	Description	Required	Editable	Example
Amazon S3 bucket name	Name of the S3 bucket you want to import	Yes	No	DOC-EXAMPLE-BUCKET
Amazon KMS key Alias	Alias of the KMS key used to encrypt the S3 Bucket (do not include alias/, just )	No	No	somealias
AWS Glue database name	Name of the Glue database tht you want to import	No	No	anyDatabase

#### (Going Further) Support for Datasets with Externally-Managed Glue Catalog

If the dataset you are trying to import relates to Glue Database that is managed in a separate account, data.all's import dataset feature can also handle importing and sharing these type of datasets in data.all. Assuming the following pre-requisites are complete:

- There exists an AWS Account (i.e. the Catalog Account) which is:
- Onboarded as a data.all environment (e.g. Env A)
- Contains the Glue Database with Location URI (as S3 Path from Dataset Producer Account) AND Tables
- Glue Database has a resource tag `owner_account_id=<PRODUCER_ACCOUNT_ID>`
- Data Lake Location registered in LakeFormation with the role used to register having permissions to the S3 Bucket from Dataset Producer Account
- Resource Link created on the Glue Database to grant permission for the Dataset Producer Account on the Database and Tables
- There exists another AWS Account (i.e. the Dataset Producer Account) which is:
- Onboarded as a data.all environment (e.g. Env B)
- Contains the S3 Bucket that contains the data (used as S3 Path in Catalog Account)

The data.all producer, a member of EnvB Team(s), would import the dataset specifying the S3 bucket as the bucket name that exists in the Dataset Producer Account and specifying the Glue database name as the Glue DB resource link name in the Dataset Producer Account.

This dataset will then be properly imported and can be discovered and shared the same way as any other dataset in data.all.

#### 4.1.3 Navigate dataset tabs

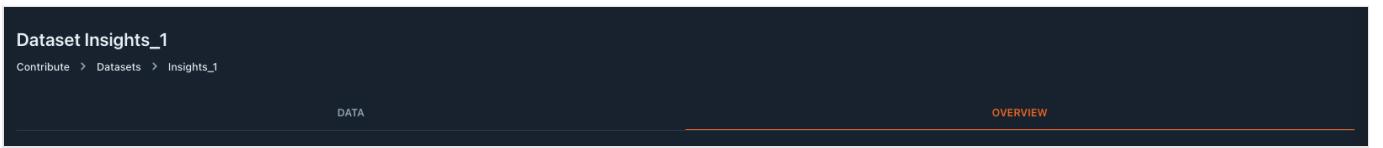
##### When we belong to the dataset owner team

After creating or importing a dataset it will appear in the datasets list (click on Datasets on the left side pane). In this window, it will only be visible for those users belonging to the dataset owner team. If we select one of our datasets we will see the following dataset window:



##### When we DON'T belong to the dataset owner team

How do we access a dataset if we don't have access to it? IN THE CATALOG! on the left pane click on Catalog, find the dataset you are interested in, click on it and if you don't have access to it, you should see only some of the tabs in comparison with the previous pic, something like:



#### 4.1.4 Edit and update a dataset

Data owners can edit the dataset by clicking on the **edit** button, editing the editable fields and saving the changes.

#### 4.1.5 Delete a dataset

To delete a dataset, in the selected dataset window click on the **delete** button in the top-right corner. As with environments, it is possible to keep the AWS CloudFormation stack to keep working with the data and resources created but outside of data.all.

#### 4.1.6 Check dataset info and access AWS

The **Overview** tab of the dataset window contains dataset metadata, including governance and creation details. Moreover, AWS information related to the resources created by the dataset CloudFormation stack can be consulted here: AWS Account, Dataset S3 bucket, Glue database, IAM role and KMS Alias.

You can also assume this IAM role to access the S3 bucket in the AWS console by clicking on the **S3 bucket** button. Alternatively, click on **AWS Credentials** to obtain programmatic access to the S3 bucket (only available if `modules.dataset.features.aws_actions` is set to `True` in the `config.json` used for deployment of data.all).

#### 4.1.7 Fill the dataset with data

##### Tables

###### Quickly upload a file for data exploration

Users may want to experiment with a small set of data (e.g. a csv file). To create tables from a file, we first upload the file, then run the crawler to infer its schema, and finally, we read the schema by synchronizing the table. Upload & Crawl & Sync

1. Upload data: Go to the **Upload** tab of the dataset and browse or drop your sample file. It will be uploaded to the dataset S3 bucket in the prefix specified. By default, a Glue crawler will be triggered by the upload of a file, however this feature can be disabled as appears in the picture.

S3 Upload

Prefix: s3://ds-january-od779vcv/

Infer Schema: Enabling this will automatically start a crawler to infer your file schema.

Select file: Drop file [browse](#) through your machine.

bestsellers\_with\_categories\_2022\_03\_27.csv  
64.01 KB

Remove All [Upload](#)

1. Crawl data: the file has been uploaded but the table and its schema have not been registered in the dataset Glue Catalog database. If you have disabled the crawler in the upload, click on the **Start Crawler** button in the Data tab. If you just want to crawl one prefix, you can specify it in the Start Crawler feature.

Dataset January

Contribute > Datasets > January

[DATA](#) [OVERVIEW](#) [SHARES](#) [UPLOAD](#) [TAGS](#) [STACK](#)

**Tables**

[Search](#) [Synchronize](#) [Start Crawler](#)

Name	Database	Location	Actions
raw	ds_january_od779vcv	s3://ds-january-od779vcv/raw/	<a href="#">Edit</a> <a href="#">View</a>
videogames_sales	ds_january_od779vcv	s3://ds-january-od779vcv/videogames_sales/	<a href="#">Edit</a> <a href="#">View</a>
supermarket_sales	ds_january_od779vcv	s3://ds-january-od779vcv/supermarket_sales/	<a href="#">Edit</a> <a href="#">View</a>

[1](#)

**Folders**

[Search](#) [Create](#)

Name	S3 Location	Description	Actions
january-sales-pdfs	s3://ds-january-od779vcv/pdfs	PDF prints of sales reports	<a href="#">Edit</a> <a href="#">View</a>

1. Synchronize tables: Once crawled and registered in the Glue database, you can synchronize tables from your dataset's AWS Glue database by using **Synchronize** tables feature in the Data tab. In any case, data.all will synchronize automatically the tables for you at a frequency of **15 minutes**.

You can preview your small set of data right away from data.all, check [Tables](#).

### Ingest data

If you need to ingest larger quantities of data, manage bigger files, or simply you cannot work with local files that can be uploaded; this is your section!

There are multiple ways of filling our datasets with data and actually, the steps don't differ much from the upload-crawl-sync example.

- Crawl & Sync option: we can drop the data from the source to our dataset S3 bucket. Then, we will crawl and synchronize data as we did in the previous steps 2 and 3.
- Register & Sync option: we drop the data from the source to our dataset S3 bucket. However, if we want to have more control over our tables and its schema, instead of starting the crawler we can **register the tables** in the Glue Catalog and then click on Synchronize as we did in step 3.

**How do we register Glue tables?** There are numerous ways:

- manually from the [AWS Glue console](#) in your environment account
- Using [AWS Glue API](#), [CreateTable](#).
- In a Glue Job leveraging Glue [PySpark DynamicFrame](#) class
- With [boto3](#)
- Or with [AWS Data Wrangler](#), Pandas on AWS.
- Also, you can deploy Glue resources using [CloudFormation](#)
- Or directly, [migrating from Hive Metastore](#).
- there are more for sure :)

#### (GOING FURTHER) CREATING FILTERS ON TABLES

Additionally, dataset owners can create column-level or row-level filters on their dataset tables to more granularly restrict data access when sharing with other teams.

To do so dataset owners can navigate to the **Filters** Tab for a given table and select **Add New Filter**:

The screenshot shows the AWS Glue Data Catalog interface for a table named 'book\_reviews\_2'. At the top, there are three buttons: Chat, Edit, and Delete. Below the table name, the breadcrumb navigation shows: Discover > Datasets > research-booksdata-2 > book\_reviews\_2. Underneath, there are tabs for PREVIEW, OVERVIEW, COLUMNS, METRICS, and DATA FILTERS. The DATA FILTERS tab is highlighted with a red border. In the 'Data Filters' section, there is a search bar labeled 'Search' and a blue button labeled 'Add New Filter' which is also highlighted with a red box. Below this, there is a table with columns: Filter Name, Description, Filter Type, Included Columns, Row Expression, and Actions. The table body displays the message 'No rows'. At the bottom right of the table area, it says '0-0 of 0'.

When creating filters, you have the choice to create a column-level filter or a row-level filter. Column-level filters prompt the user to select a subset of columns to include for the table. Row-level filters use row expressions to specify the rows to include in for the table.

An example of creating a column filter is below:

## Add a new data filter for table book\_reviews\_2

Data filters allow you to restrict access to a table in data.all. They are owned by the dataset owners and can be applied on data shares in the data.all UI. Each data filter is specific to a particular table.

Filter Name  
column\_filter

Data Filter Description  
Filter for Book Id, Author, Publisher Only

158 characters left

Filter Type  
 COLUMN  ROW

### Select Which Columns To Include on Filter:

	Name	Type	Description
<input checked="" type="checkbox"/>	bookid	bigint	No description provided
<input type="checkbox"/>	title	string	No description provided
<input checked="" type="checkbox"/>	authors	string	No description provided
<input type="checkbox"/>	average_rating	double	No description provided
<input type="checkbox"/>	isbn	string	No description provided

4 rows selected

Rows per page: 5 ▾ 1–5 of 12 &lt; &gt;

 Add Data Filter

This filter restricts access on the table to only the 3 selected columns: `book_id`, `author`, and `publisher`.

An example of creating a row filter is below:

## Add a new data filter for table book\_reviews\_2

Data filters allow you to restrict access to a table in data.all. They are owned by the dataset owners and can be applied on data shares in the data.all UI. Each data filter is specific to a particular table.

Filter Name: row\_filter

Data Filter Description: Filter for non null book ids about Harry Potter and over 100 pages long  
129 characters left

Filter Type: ROW

COLUMN  ROW

### Create a Row Filter Expression

+ Add Row Expression

Column Name	Operator	Value	Actions
bookid	IS NOT NULL		
title	LIKE	'%Harry Potter%'	
num_pages	> (greater than)	100	

1-3 of 3 < >

This filter restricts access to only rows where `book_id` is not null, `title` is LIKE `%Harry Potter%` AND `num_pages` is greater than `100`. It is important to note that: - The row filter acts as the intersection (logical 'AND') of the row expression(s) - if you need the union (logical 'OR') of multiple expressions you can create separate filters here and apply multiple to the table share item - When creating a new row expression be sure to save the row expression by clicking the save icon (highlighted in red in the above) before creating the filter

Once the filters are created, they will show in the Filters Table Tab:

Table book_reviews_2					
Discover > Datasets > research-booksdata-2 > book_reviews_2				Chat  Edit  Delete	
PREVIEW		OVERVIEW		COLUMNS	METRICS
Data Filters					
Search					
Filter Name	Description	Filter Type	Included Columns	Row Expression	Actions
row_filter	Filter for non null book ids about Harry Potter and over 100 pages long	ROW		"bookid" IS NOT NULL AND "title" LIKE '%Harry Potter%' AND "num_pages" > 100	
column_filter	Filter for Book Id, Author, Publisher Only	COLUMN	bookid,authors,ratings_count,publisher		

Table filters are not editable. To update an existing filter you must:

1. Revoke all associated share items using the filter (if applicable)
2. Delete the table filter
3. Create a new table filter with any updates as necessary

These filters can be used when reviewing and approving share objects with table share items to more granularly limit data access.

## Folders

As previously defined, folders are prefixes inside our dataset S3 bucket. To create a folder, go to the **Data** tab and on the folders section, click on **Create**. The following form will appear. We will dive deeper in how to use folders in the [folders section](#).

The screenshot shows the 'Create a new folder' dialog box overlaid on the 'DATA' tab interface. The dialog has a dark blue header with the title 'Create a new folder' and a subtitle 'Creates an Amazon S3 prefix under the dataset bucket'. It is divided into 'Details' and 'Organize' sections. The 'Details' section contains fields for 'Folder name' (with placeholder 'ds\_january\_od779vcv'), 'Amazon S3 prefix' (with placeholder 'raw'), and 'Short description' (with a 200 character limit). The 'Organize' section includes 'Tags' and 'Glossary Terms' dropdowns. At the bottom is an orange 'Create folder' button. The background shows a list of existing datasets and their S3 locations.

Name	S3 Location	Description	Actions
january-sales-pdfs	s3://ds-january-od779vcv/pdfs	PDF prints of sales reports	<span>⋮</span> <span>→</span>

## 4.1.8 ✉️ Leave a message in Chat

In the **Chats** button users can interact and leave their comments and questions on the Dataset Chat.

The screenshot shows the AWS Data Studio interface. On the left, the 'Dataset Demo' page is displayed with tabs for DATA, OVERVIEW, SHARES, UPLOAD, and TAGS. The DATA tab is selected, showing a list of tables and folders. A red arrow points from the top right towards the Chat tab in the top navigation bar. On the right side, there is a 'Chat' sidebar where a message from 'mariagarcia@amazon.com' (OWNER) is visible, reading: 'Is this the dataset for the workshop on ticket XYZ?'. Below the message input field, there is a 'Leave a message' placeholder.

#### 4.1.9 Create key-value tags

Same as in environments. In the **Tags** tab of the dataset window, we can create key-value tags. These tags are not data.all tags that are used to tag the dataset and find it in the catalog. In this case we are creating AWS tags as part of the dataset CloudFormation stack. There are multiple tagging strategies as explained in the [documentation](#).

## 4.2 Glue Tables and S3 Folders

### 4.2.1 Glue Tables

In this section we will go through the different tabs in the Table window. We can reach this view:

1. by selecting a table from the data Catalog
2. or in the dataset view, in the **Tables** tab clicking on the arrow in the *Actions* column for the chosen table.

Name	Database	Location	Actions
raw	ds_january_od779vcv	s3://ds-january-od779vcv/raw/	<span>⋮</span> <span>→</span>
videogames_sales	ds_january_od779vcv	s3://ds-january-od779vcv/videogames_sales/	<span>⋮</span> <span>→</span>
supermarket_sales	ds_january_od779vcv	s3://ds-january-od779vcv/supermarket_sales/	<span>⋮</span> <span>→</span>

#### Check table metadata

Also in the table window, go to the **Overview** tab where you will find the following information:

- URI: unique table identifier
- Name: name of the registered table in the Glue Catalog
- Tags
- Glossary terms
- Description
- Organization, Environment, Region, Team: inherited from the dataset
- Created: creation time of the table
- Status: `INSYNC`

#### Description, Tags and Glossary terms are not inherited!

If a dataset is tagged with Tags and Glossary terms, the child tables do not inherit these tags and terms. In the Overview tab, by clicking on **Edit** is where you can add them. Same applies for the description. Adding tags and terms to your tables will make them more discoverable in the Catalog.

#### Add or edit table metadata

Edit your table metadata by clicking on the **Edit** button.

## Preview data

Data preview gives you the ability to preview a subset of the data available on data.all. Preview feature is available for data you own or data that's shared with you.

Just select a table and in the **Preview** tab you will find the results of an SQL select subset of the table.

Table supermarket_sales															 Chat	 Edit	 Delete
PREVIEW				OVERVIEW					COLUMNS					METRICS			
invoice id	branch	city	customer t...	gender	product line	unit price	quantity	tax %	total	date	time	payment	cogs	gross margi...	gross income	rating	
750-67-8...	A	Yangon	Member	Female	Health an...	74.69	7	26.1415	548.9715	1/5/2019	13:08	Ewallet	522.83	4.7619047...	26.1415	9.1	
226-31-3...	C	Naypyitaw	Normal	Female	Electronic ...	15.28	5	3.82	80.22	3/8/2019	10:29	Cash	76.4	4.7619047...	3.82	9.6	
631-41-31...	A	Yangon	Normal	Male	Home and...	46.33	7	16.2155	340.5255	3/3/2019	13:23	Credit card	324.31	4.7619047...	16.2155	7.4	
123-19-11...	A	Yangon	Member	Male	Health an...	58.22	8	23.288	489.048	1/27/2019	20:33	Ewallet	465.76	4.7619047...	23.288	8.4	
373-73-7...	A	Yangon	Normal	Male	Sports an...	86.31	7	30.2085	634.3785	2/8/2019	10:37	Ewallet	604.17	4.7619047...	30.2085	5.3	
699-14-3...	C	Naypyitaw	Normal	Male	Electronic ...	85.39	7	29.8865	627.6165	3/25/2019	18:30	Ewallet	597.73	4.7619047...	29.8865	4.1	
355-53-5...	A	Yangon	Member	Female	Electronic ...	68.84	6	20.652	433.692	2/25/2019	14:36	Ewallet	413.04	4.7619047...	20.652	5.8	
315-22-5...	C	Naypyitaw	Normal	Female	Home and...	73.56	10	36.78	772.38	2/24/2019	11:38	Ewallet	735.6	4.7619047...	36.78	8.0	
665-32-9...	A	Yangon	Member	Female	Health an...	36.26	2	3.626	76.146	1/10/2019	17:15	Credit card	72.52	4.7619047...	3.626	7.2	
692-92-5...	B	Mandalay	Member	Female	Food and ...	54.84	3	8.226	172.746	2/20/2019	13:27	Credit card	164.52	4.7619047...	8.226	5.9	
351-62-0...	B	Mandalay	Member	Female	Fashion ac...	14.48	4	2.896	60.816	2/6/2019	18:07	Ewallet	57.92	4.7619047...	2.896	4.5	

Rows per page: 100 ▾ 1-50 of 50 < >

## Leave a message in Chat

As with datasets, in the **Chats** button users can interact and leave their comments and questions on the Table Chat.

## Add column description

Metadata makes more sense when columns description fields are not empty. With data.all you can add columns description and avoid the pain of figuring out fields purpose.

Select one table and in the **Columns** tab, directly type the description in the Description column as shown in the picture.

Table supermarket_sales															 Chat	 Edit	 Delete										
PREVIEW				OVERVIEW					COLUMNS					METRICS													
Name	Type	Description																									
invoice id	string	No description provided																									
branch	string	No description provided																									
city	string	No description provided																									
customer type	string	premium, standard																									
gender	string	No description provided																									

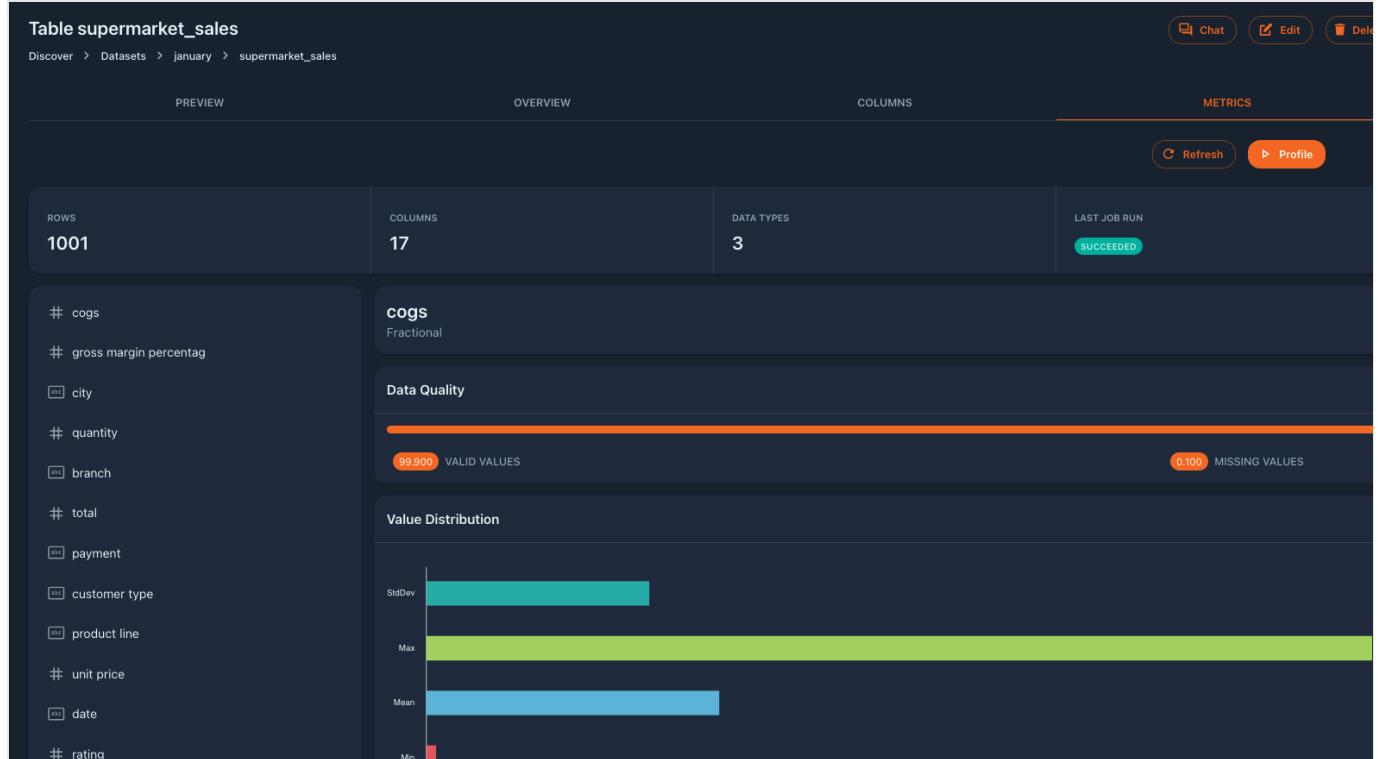
## Profile data

Data profiling refers to the process of examining, analyzing, and reviewing the data available in the source by collecting statistical information about the data set's quality and hygiene. This process is called also data archaeology, data assessment, data discovery, or data quality analysis. Data profiling helps in determining the accuracy, completeness, structure, and quality of your data.

Data profiling in data.all involves:

- Collecting descriptive statistics like minimum, maximum, mean, median, and standard deviation.
- Collecting data types, along with the minimum and maximum length.
- Determining the percentages of distinct or missing data.
- Identifying frequency distributions and significant values.

By selecting the **Metrics** tab of your data table you can run a profiling job (click in the **Profile** button) , or view the latest generated data profiling metrics:



The screenshot shows the AWS Glue Data Catalog interface for the 'supermarket\_sales' table. The top navigation bar includes 'Discover', 'Datasets', 'january', and 'supermarket\_sales'. On the right, there are 'Chat', 'Edit', and 'Delete' buttons. Below the navigation, there are four tabs: 'PREVIEW', 'OVERVIEW', 'COLUMNS', and 'METRICS'. The 'METRICS' tab is active, showing the following details:

- ROWS:** 1001
- COLUMNS:** 17
- DATA TYPES:** 3
- LAST JOB RUN:** SUCCEEDED

Under the 'COLUMNS' section, the 'cogs' column is highlighted. It shows the following data quality metrics:

- Valid Values:** 99.900
- Missing Values:** 0.100

Below the 'Data Quality' section, there is a 'Value Distribution' chart. The chart shows the distribution of values for the 'cogs' column across five metrics: StdDev, Max, Mean, and Min. The 'Max' value is represented by a long green horizontal bar, while the other metrics have shorter bars.

## Profiling Job Prerequisite

Before running the profiling job you will need to ensure that the **default** Glue Database exists in the AWS Account where the data exists (by default this database exists for new accounts). This is required to enable the Glue profiling job to use the metadata stored in the Glue Catalog.

## Delete a table

Deleting a table means deleting it from the data.all Catalog, but it will be still available on the AWS Glue Catalog. Moreover, when data owners delete a table, they are **not** deleting its data from the dataset S3 bucket. Teams with shared access to the dataset cannot delete tables or folders, even if they are shared.

It is possible to delete a table from the dataset **Tables** tab with the trash can icon next to each of the tables in the *Actions* column.

The screenshot shows the AWS Glue Tables list interface. At the top, there are tabs for DATA, OVERVIEW, SHARES, UPLOAD, TAGS, and STACK. Below the tabs is a search bar labeled 'Search' and buttons for 'Synchronize' and 'Start Crawler'. The main area displays a table with columns: Name, Database, Location, and Actions. The 'Actions' column contains icons for each row. A red arrow points from the top right towards the 'Actions' column.

Name	Database	Location	Actions
ds_january_od779vcv	ds_january_od779vcv	s3://ds-january-od779vcv/	
books_sales	ds_january_od779vcv	s3://ds-january-od779vcv/books_sales/	
raw	ds_january_od779vcv	s3://ds-january-od779vcv/raw/	
videogames_sales	ds_january_od779vcv	s3://ds-january-od779vcv/videogames_sales/	
supermarket_sales	ds_january_od779vcv	s3://ds-january-od779vcv/supermarket_sales/	

Another option is to go to the specific table (on the above picture click on the arrow icon next to the trash can icon). Click on the **Delete** button in the top right corner and confirm the deletion.

The screenshot shows the AWS Glue Table details page for 'ds\_january\_od779vcv'. The top navigation bar includes 'Discover > Datasets > january > ds\_january\_od779vcv'. Below the navigation is a table with columns: invoice\_id, branch, city, customer\_t..., gender, product\_line, unit\_price, quantity, tax\_5%, total, date, time, payment, cogs, gross\_margi..., gross\_income, rating, and partition\_. A modal dialog box titled 'Delete ds\_january\_od779vcv ?' is displayed, containing the message '⚠️ Table will be deleted from data.all catalog, but will still be available on AWS Glue catalog.' and a red 'Delete' button. A red arrow points from the top right towards the 'Delete' button in the modal. The bottom right of the page shows 'Rows per page: 100' and '1–50 of 50'.

**An error occurred (ResourceShared) when calling DELETE\_DATASET\_TABLE operation: Revoke all table shares before deletion**

To protect data consumers, if the table is shared you cannot delete it. The share requests to the table need to be revoked before deleting the table. Check the [Shares](#) section to learn how to grant and revoke access.

## 4.2.2 S3 Folders

To open the Folder window you can either find your chosen folder in the Catalog or navigate to the dataset and then in the **Folders** tab click on the arrow in the **Actions** column of your folder:

Name	S3 Location	Description	Actions
january-sales-pdfs	s3://ds-january-od779vcv/pdfs	PDF prints of sales reports	

### Check folder and S3 metadata

The **Overview** tab of the folder contains folder metadata: - URI: unique folder identifier - Name: name of the folder, it is made out of the dataset name concatenated with the S3 prefix - Tags - Glossary terms - Description - Organization, Environment, Region, Team: inherited from the dataset - Created: creation time of the table

OVERVIEW	
<b>Details</b>	CREATED BY john doe@amazon.com  Organization  Environment  Region eu-west-1  Team DataScienceTeam  Created 5 days ago
<b>S3 Properties</b>	S3 URI s3://ds-january-od779vcv/pdfs/  S3 ARN arn:aws:s3:::ds-january-od779vcv/pdfs/  Region eu-west-1

### Add or edit table metadata

Edit your folder metadata by clicking on the **Edit** button.

#### Description, Tags and Glossary terms are not inherited

Careful, those 3 fields are not synced with their dataset metadata. Just click on the **Edit** button of the folder to complete any missing information. This is especially useful to improve Catalog search of your folders.

### Check the content of your folder

To check what kind of files does our prefix content, we can access the AWS S3 console on the **S3 Bucket** button of the Folder **Overview** tab.

**Objects (5)**

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 Inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

<input type="checkbox"/>	Name	Type	Last modified	Size	Storage class
<input type="checkbox"/>	airlines/	Folder	-	-	-
<input type="checkbox"/>	pdfs/	Folder	-	-	-
<input type="checkbox"/>	raw_airlines/	Folder	-	-	-
<input type="checkbox"/>	raw/	Folder	-	-	-
<input type="checkbox"/>	website/	Folder	-	-	-

### Leave a message in Chat

Exactly the same as with tables. Allow your teams to discuss directly on the Folder Chat.

### Delete a folder

Deleting folders is analogous to deleting tables. Deletion means deletion from the data.all Catalog and the content of the S3 prefix remains in the dataset S3 bucket. Only dataset owners can delete dataset folders.

The steps to delete a folder are exactly the same as with tables. You can either go to the dataset and in the **Folders** tab click on the can trash icon on the *Actions* column of the selected folder; or you can navigate to the Folder and click on the **Delete** button.

**An error occurred (ResourceShared) when calling DELETE\_DATASET\_FOLDER operation: Revoke all folder shares before deletion**

To protect data consumers, if the table is shared you cannot delete it. The share requests to the table need to be revoked before deleting the table. Check the [Shares](#) section to learn how to grant and revoke access.

The screenshot shows the AWS Data Studio interface for managing S3 buckets. The main view displays the details of a folder named "airlines\_pdfs". The "OVERVIEW" tab is selected. Key details shown include:

- URI:** mMd0Fv
- Name:** airlines\_pdfs
- Tags:** -
- Glossary terms:** Canada
- Description:** registration forms

In the top right corner, there are "Edit" and "Delete" buttons. A red arrow points from the text "Delete S3 Bucket" in the caption to the "Delete" button.

**S3 Properties**

- S3 URI:** s3://ds-airlines-pfr3jm/pdfs/
- S3 ARN:** arn:aws:s3:::ds-airlines-pfr3jm/pdfs/
- Region:** eu-west-1
- Account:** [REDACTED]

**Actions**

- S3 Bucket**

A detailed sidebar on the right provides metadata about the folder's creator:

- CREATED BY:** john doe <johndoe@amazon.com>
- Organization:** -
- Environment:** -
- Region:** eu-west-1
- Team:** DataScienceTeam
- Created:** 2 days ago

## 4.3 Redshift Datasets

Data producers can import their Redshift tables into data.all and make them discoverable and shareable in an easy and secure manner.

In data.all we will work with 2 main constructs: - **Redshift Connections**, which store the necessary metadata to connect to a Redshift namespace - **Redshift Datasets**, group of tables imported into data.all Catalog using a data.all Redshift Connection.

### 4.3.1 Redshift Connections

Data.all Redshift Connections are metadata used by data.all and by data.all users to connect to Redshift namespaces. 1) Both Redshift Serverless and Provisioned clusters are supported 2) Connections use AWS Secrets Manager secrets or Redshift users to connect to the namespace. Check the [documentation](#) to understand each mechanism. Additional connection mechanisms might be considered in the future. 3) There are 2 types of Redshift Connections, `ADMIN` and `DATA_USER` - `ADMIN` - the user whose credentials are provided has permissions to all namespace tables that can be managed in data.all and can create and manage Redshift datashares and redshift role permissions. In data.all it will be used to process share requests. - `DATA_USER` - the user whose credentials are provided has permissions to read the tables that the data user wants to import. In data.all it will be used to import datasets.

**Pre-requisites** data.all requires Redshift clusters and users to be managed by a dedicated team and infrastructure created outside of data.all. For this reason, data.all will work "importing" existing infrastructure and users, requiring the following information on import: - Redshift Serverless namespace/workgroup or Provisioned cluster: the user creating the connection must know the `namespace ID` and the `workgroup` for Redshift Serverless or the `cluster ID` for the case of Redshift Provisioned clusters. - Redshift user: Redshift administrators manage Redshift users outside of data.all. Our recommendation is to create a dedicated `ADMIN` user for data.all in each onboarded cluster. Data users can be reused. - Connection details: - Redshift user (only valid for Provisioned clusters): data.all will generate a temporary password to connect to the database. In this case no password or secret needs to be provided to data.all. - AWS Secrets Manager Secret (recommended): the username and password for the Redshift user can be stored in a Secret that **MUST** be tagged with 2 tags. Check the pictures below to see how it should look in the AWS Console. - tagKey: `dataall`, `tagValue: True` - Needed for data.all to be able to access the Secret - tagKey: `Redshift`, `tagValue: Any` - Needed by Redshift to use as connection

**Secret value** Info

Retrieve and view the secret value.

Key/value	Plaintext
<b>Secret key</b>	<b>Secret value</b>
<code>password</code>	[REDACTED]
<code>username</code>	<code>awsuser</code>

Overview	Rotation	Versions	Replication	Tags
<b>Tags</b>				
<input type="text"/> Find by key or value...				
Key	▲	Value		
aws:secretsmanager:owningService		redshift		
aws:redshift:primaryClusterArn		arn:aws:redshift:eu-west-1:[REDACTED]:cluster:redshift-cluster-1		
dataall		True		
Redshift		arn:aws:redshift:eu-west-1:[REDACTED]cluster:redshift-cluster-1		

Redshift Connections are created inside the Environment view. Select an Environment and navigate to the **Connections** tab. Here you can click on the **Add Connection** button to create a new Redshift Connection.

Environment C-LOCAL													
OVERVIEW		TEAMS		DATASETS		CONNECTIONS		ML STUDIO DOMAIN		NETWORKS	SUBSCRIPTIONS	TAGS	STACK
Redshift Connections													
Name	Connection Type	Team	Redshift Type	Namespace Id	Workgroup/ClusterId	Database	SecretArn/Redshift user						Actions
another-user	<span>DATA_USER</span>	Engineers	cluster	[REDACTED]	redshift-cluster-1	dev	[REDACTED]						
cluster	<span>DATA_USER</span>	Engineers	cluster	[REDACTED]	redshift-cluster-1	dev	[REDACTED]						
cluster-admin	<span>ADMIN</span>	Engineers	cluster	[REDACTED]	redshift-cluster-1	dev	[REDACTED]						
second	<span>ADMIN</span>	Engineers	serverless	[REDACTED]	second	dev	[REDACTED]						
second-same-namespace	<span>DATA_USER</span>	Engineers	serverless	[REDACTED]	integration	dev	[REDACTED]						
serlrvle	<span>ADMIN</span>	Engineers	serverless	[REDACTED]	integration	dev	[REDACTED]						
third	<span>ADMIN</span>	Engineers	serverless	[REDACTED]	third	dev3	[REDACTED]						

Then, fill in the following form:

C-LOCAL

## Add a Redshift connection to environment C-LOCAL

The Redshift connection is owned by the selected Team. It is used to import Redshift Datasets.

connection Name

Connection type

Team

Redshift type

database

You can choose to provide a Redshift user (for Provisioned Cluster) or a Secrets Manager secret.

Redshift User

OR

Secrets Manager Secret Arn

 Add Connection

Field	Description	Required	Editable	Example
Connection name	Name of the Redshift connection	Yes	No	main-cluster-admin
Connection type	Level of access of the connection. It can either be <code>ADMIN</code> or <code>DATA_USER</code> . See definitions above.	Yes	No	ADMIN
Team	Team that owns the connection. This team is the only team that can use this connection to import datasets.	Yes	No	DataScienceTeam
Redshift type	Type of Redshift Namespace. It can either be <code>serverless</code> or <code>cluster</code> .	Yes	No	serverless
Cluster Id	If the Redshift type is <code>cluster</code> , we need to introduce the cluster Id.	Yes	No	redshift-cluster-1
Namespace Id	If the Redshift type is <code>serverless</code> , we need to introduce the namespace Id.	Yes	No	000000-0000-0000-0000-000000000000
Workgroup	If the Redshift type is <code>serverless</code> , we need to introduce the workgroup.	Yes	No	workgroup1
Database	Database that we will connect to inside the cluster.	Yes	No	dev
Redshift User	Only available for <code>cluster</code> Redshift type. This is the user	Yes	No	user1
Secret Arn	Secrets Manager secret arn storing username and password for the connection. See prerequisites section above.	Yes	Yes	arn:aws:secretsmanager:eu-west-1:000000000000:redshift:redshift-cluster-1-awsuser

Data.all will verify the connection upon creation. If the database does not exist or if the connection details are not accessible or do not correspond to cluster it will notify the user in the error banner.

**Delete a Connection** To delete a connection, click on the trash icon next to the item in the Actions column. If the Connection has been used to import datasets it cannot be removed until all associated datasets are deleted.

#### 4.3.2 Import a Redshift Dataset

To create a new dataset, navigate to the Datasets view and click on **New Dataset**. A window like the one in the picture will allow you to select the type of Dataset you want to create or import. In this case you need to select the Import Redshift Dataset option.

The screenshot shows the Data.all interface with the 'Datasets' page selected. On the left is a sidebar with various navigation options like Catalog, Datasets, Shares, Glossaries, Metadata Forms, etc. The main area displays several datasets cards, each with a thumbnail, name (e.g., Redshift: CLUSTER-DB, Redshift: Mercoles, Redshift: NEW\_DB), creator (anonymous@amazon.com), and team (Engineers). Below these cards are three buttons: 'Create S3-Glue Dataset', 'Import S3-Glue Dataset', and 'Import Redshift Dataset'. The 'Import S3-Glue Dataset' button is highlighted with a red arrow.

Next, fill in the creation form with the Dataset details. Data.all will list the Redshift connections owned by the selected team in the environment and fetch the schemas and tables from Redshift. It is possible to select all tables or a subset of tables as appears in the picture.

This screenshot shows the 'Import a new Redshift dataset' form. The form is divided into several sections: 'Details' (Dataset name: My Dataset, Short description: Contains some sales data), 'Classification' (Confidentiality: Unclassified, Topics: Finances), 'Governance' (Environment: C-LOCAL, Organization: NEWINE, Team: Engineers, Stewards), and 'Deployment' (Redshift Connection: second-same-namespace [DATABASE: dev], Redshift database schema: public). In the 'Deployment' section, there is a 'Redshift tables' dropdown menu with several options: customer, customer2, lineitem, lineitem2 (which is checked), nation (which is checked), and nation2. A red box highlights this 'Redshift tables' section.

### Generic dataset fields

Field	Description	Required	Editable	Example
Dataset name	Name of the dataset	Yes	Yes	AnyDataset
Short description	Short description about the dataset	No	Yes	For AnyProject predictive model
Environment	Environment (mapped to an AWS account)	Yes	No	DataScience
Organization (auto-filled)	Organization of the environment	Yes	No	AnyCompany EMEA
Team	Team that owns the dataset	Yes	No	DataScienceTeam
Stewards	Team that can manage share requests on behalf of owners	No	Yes	FinanceBITeam, FinanceMgmtTeam
Confidentiality	Level of confidentiality: Unclassified, Official or Secret	Yes	Yes	Secret
Topics	Topics that can later be used in the Catalog	Yes, at least 1	Yes	Finance
Tags	Tags that can later be used in the Catalog	Yes, at least 1	Yes	deleteme, ds
Auto Approval	Whether shares for this dataset need approval from dataset owners/stewards	Yes (default Disabled)	Yes	Disabled, Enabled

### Redshift Dataset fields

Field	Description	Required	Editable	Example
Redshift Connection	Name of the Redshift connection used to read the Redshift tables	Yes	No	main-cluster-userA
Redshift database schema	Name of the Redshift schema where the tables are stored	Yes	No	public
Redshift tables	List of tables to be imported. They can be added at a later stage	No	Yes	customer, orders

Once a Redshift dataset has been imported, the dataset and its imported tables can be searched by any user in the Catalog.

### 4.3.3 Navigate Redshift dataset tabs

#### Overview

This tab includes meaningful metadata about the dataset and the Redshift connection used.

**Redshift Dataset My Dataset**

Contribute > Datasets > My Dataset

**OVERVIEW** **DATA** **SHARES**

**Details**

- URI: easy026j
- Name: My Dataset
- Description: Contains some sales data

**A CREATED BY anonymous@amazon.com**

**Organization**: NEWINE

**Environment**: C-LOCAL

**Region**: eu-west-1

**Created**: 2 hours ago

**Classification**

- Confidentiality: UNCLASSIFIED
- Topics: Finances
- Tags: test
- Glossary terms: -

**Governance**

- Owners: Engineers
- Stewards: Engineers
- Auto-Approval: DISABLED

**AWS Information**

- Account: [REDACTED]
- Redshift Connection: second\_same\_namespace
- Redshift type: Redshift Serverless
- Namespace Id: [REDACTED]
- Workgroup Id: Integration

## Data

This tab shows the Redshift database, schema and tables imported. From here we can add, edit, delete and see the details of a table.

**Redshift Dataset My Dataset**

Contribute > Datasets > My Dataset

**OVERVIEW** **DATA** **SHARES**

Database	Schema
dev	public

**Tables**

Name	Description	Actions
customer	No description provided	[Open table schema] [Edit] [Delete]
nation	No description provided	[Open table schema] [Edit] [Delete]
orders	No description provided	[Open table schema] [Edit] [Delete]

**Shares** Show a list of the share requests for this Dataset. It is possible to verify the health and reapply shares for the entire Dataset

## Manage Redshift Tables

### Add tables

**Add tables to dataset: My Dataset**

Redshift tables	Already added	1 active filter
customer2	false	
lineitem	false	
lineitem2	false	
<input checked="" type="checkbox"/> nation2	false	
orders2	false	
part	false	
part2	false	
partsupp	false	
partsupp2	false	
region	false	

1 row selected      1-10 of 13      <    >

**Add Tables**

#### View and edit tables

We can view the schema of a table directly from the Data tab, by clicking on the **Open table schema** button.

**Redshift table: customer**

Name	Type	Length	Nullable	Default value
c_custkey	int8	19	false	
c_name	varchar	25	true	
c_address	varchar	40	true	
c_nationkey	int8	19	true	
c_phone	varchar	15	true	
c_acctbal	numeric	18	true	
c_mktsegment	varchar	10	true	
c_comment	varchar	117	true	

1-8 of 8      <    >

We can also see a full view of the table by selecting the arrow in the Actions column. A new window for the table will open. In this view we can edit the metadata of the table in data.all (Tags, glossary, description) and we can see the schema in full-width in the Columns tab.

Column	Value
CREATED BY	anonymous@amazon.com
Organization	NEWINE
Environment	C-LOCAL
Region	eu-west-1
Team	Engineers
Created	2 hours ago

#### Delete a table

We can delete Redshift tables by clicking on the trash icon next to the table we want to "un-import". Un-import is a better word to describe what will happen: the metadata of the table will be deleted from data.all Catalog, but the original Redshift table still exists in Redshift.

Dataset owners need to revoke access to the table before deleting. Data.all prevents deletion of a table if there are share requests currently sharing the table.

#### 4.3.4 Edit and update a dataset

Data owners can edit the dataset by clicking on the **edit** button, editing the editable fields and saving the changes.

#### 4.3.5 Delete a dataset

To delete a dataset, in the selected dataset window click on the **delete** button in the top-right corner. data.all Redshift Datasets don't deploy any CloudFormation stack, no additional resources need to be cleaned up. The original Redshift tables will still exist in Redshift.

In the same way as it happens with single tables, Dataset owners need to revoke access to all tables before deleting. Data.all prevents deletion of a dataset if there are share requests currently sharing any dataset table.

## 4.4 Centralized Catalog and glossaries

### 4.4.1 Catalog

In the Catalog we have a record with metadata for each dataset, table, folder and dashboard in data.all. Users come to this centralized Catalog to search and find data owned by other teams. Once users find a data asset they are interested in, they will create a [Share](#) request.

#### How do users find the data that they need?

Data needs to be discoverable, for this reason data.all Catalog offers a variety of filters that use business context to improve your search:

- **Type of data:** `dataset`, `table`, `folder` and/or `dashboard`
- **Tags:** tags of the data asset.
- **Topics:** filter by general topics created by the user.
- **Region:** AWS region where the data asset is located.
- **Classification:** `unclassified`, `official` and/or `secret`
- **Glossary:** filter datasets by the glossary terms created by users. This helps in two ways: It lets you narrow down results quickly using granular glossary terms like "sales", "profit", etc. Traditionally, a data glossary is just used to organize data. However, data.all uses it to power its search. This further encourages users to enrich and maintain the glossary regularly.

The screenshot shows the data.all interface with the 'Catalog' tab selected. The left sidebar includes sections for DISCOVER (Catalog, Datasets, Shares, Glossaries), PLAY (Worksheets, Notebooks, ML Studio, Pipelines, Dashboards), and ADMIN (Organizations, Environments). A prominent orange 'User Guide' button is at the bottom of the sidebar. The main area is titled 'Catalog' and shows a search bar with 'Search' placeholder text. Below the search bar, a message says 'No filters applied'. A dropdown menu allows filtering by Type, Tags, Topics, Region, Classification, and Glossary. The results section displays eight dataset cards with the following details:

Dataset Name	Owner	Created	Description	Team	Environment	Region
<code>pdःfs</code>	marlagarcia@amazon.com	3 days ago	No description provided	DataAnalysisTeam	data-analysis-general	euwest1
<code>january_sales_pdfs</code>	johndoe@amazon.com	5 days ago	PDF prints of sales reports	DataScienceTeam	data-science-general	euwest1
<code>Insights_2</code>	marlagarcia@amazon.com	5 days ago	No description provided	DataAnalysisTeam	data-analysis-general	euwest1
<code>cannes_dates_3</code>	marlagarcia@amazon.com	5 days ago	No description provided	DataAnalysisTeam	data-analysis-general	euwest1
<code>raw</code>	marlagarcia@amazon.com	3 days ago	No description provided	DataAnalysisTeam	data-analysis-general	euwest1
<code>Demo</code>	marlagarcia@amazon.com	2 days ago	No description provided	DataAnalysisTeam	data-analysis-general	euwest1
<code>ds_johny_2_yngfwzpb</code>	johndoe@amazon.com	5 days ago	No description provided	DataAnalysisTeam	data-analysis-general	euwest1
<code>supermarket_sales</code>	johndoe@amazon.com	5 days ago	No description provided	DataAnalysisTeam	data-analysis-general	euwest1

### 4.4.2 Glossaries

A Glossary is a list of terms, organized in a way to help users understand the context of their datasets. For example, terms like "cost", "revenue", etc, can be used to group and search all financial datasets.

The use of familiar terminology helps in quickly understanding the data and its background. It is a crucial element of data governance as it helps in bringing the business understanding closer to an organization's data initiatives.

On data.all, glossary terms can be attached to any dataset and can be leveraged to power quick and ease data discovery in the Catalog.

## Spotlight

Glossaries are built hierarchically. They are made of categories and terms. This structure allows for glossaries from multiple domains to co-exist.

### Term:

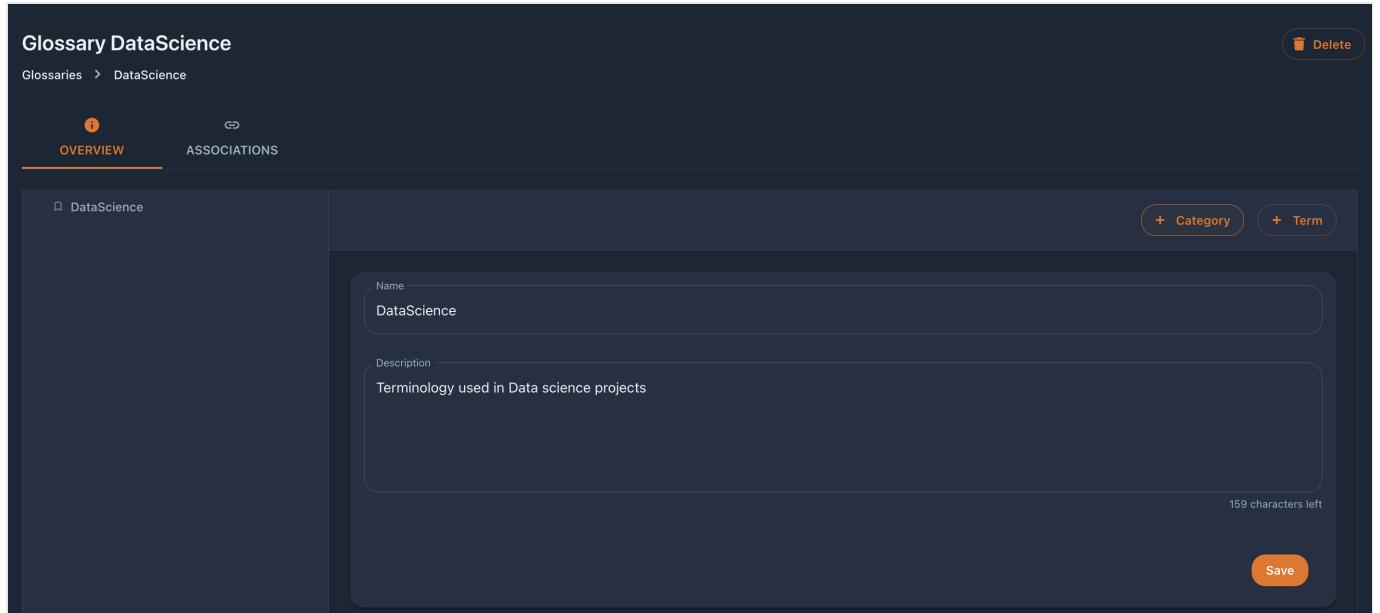
- A term is the lowest unit which is unique inside each glossary.
- It describes the content of the data assets in the most useful and precise way.
- It can exist independently, without belonging to any particular category or sub-category.

### Category:

A category is used to group the terms of a similar context together. it is just a way of organizing terms.

### Create a new glossary

1. Go to **Glossaries** menu on the left side pane.
2. Click on **Create**.
3. Fill the form and add a new glossary.



The screenshot shows the 'Glossary DataScience' creation interface. The 'OVERVIEW' tab is selected. The 'Name' field contains 'DataScience' and the 'Description' field contains 'Terminology used in Data science projects'. There are buttons for '+ Category' and '+ Term' at the top right, and a 'Save' button at the bottom right.

### Add a category inside a Glossary

1. Click on the button "Add category" to add a new category.
2. Add a name and description to your category for better understanding.

**Glossary DataScience**

Glossaries > DataScience

**OVERVIEW** ASSOCIATIONS

- DataScience
- **Supervised Learning**
- ▽ Classification
- ▽ Regression

Name  
**Supervised Learning**

Description  
Terms included in supervised learning models. Supervised learning is when the model is getting trained on a labelled dataset. A labelled dataset is one that has both input and output parameters.

6 characters left

Save Delete

#### Add terms to a category

1. Click on the button "Add term" to add a new term to the category.
2. Give it an appropriate name and description.

**Glossary DataScience**

Glossaries > DataScience

**OVERVIEW** ASSOCIATIONS

- DataScience
- **Supervised Learning**
- ▽ **Classification**

Name  
**Classification**

Description  
Classification models are a subset of supervised machine learning . A classification models make predictions on DISCRETE data. A classification model reads some input and generates an output that classifies the input into some category.

-36 characters left

Save Delete

#### Remember!

The term will be used to recognize and filter the datasets. Hence, keep it short and precise.

#### Link your data with appropriate glossary terms

You can associate a glossary term to a dataset or a table. Go to a dataset click on "edit" and update the glossary terms field as shown below

**Edit dataset January**

Contribute > Datasets > January > Edit

**Details**

Dataset name: January

Short description:

200 characters left

**Classification**

Confidentiality: Unclassified

Topics: Operations

Glossary Terms: Classification

Tags: prod

**Deployment**

Environment: Data Science

Region: eu-west-1

Organization: AnyCompany\_EMEA

**Governance**

Team: DataScienceTeam

Stewards: DataScienceTeam

**Save**

### Approve and Check all data related to a glossary

To see a list of all datasets and tables that have been linked with terms of a specific glossary, go to Glossaries and select the glossary. In the **Associations** tab it is possible to check the related data assets (target name), their types (e.g. dataset) and the specific term that they have used.

**Important:** Glossary owners need to approve the association. If it is not approved it won't be used as filter in the catalog.

**Glossary DataScience**

Glossaries > DataScience

**OVERVIEW**

**ASSOCIATIONS**

**Term Associations**

Term	Target Type	Target Name	Approval
Classification	Dataset	January	<b>Approve</b>

## 4.5 Shares

---

Teams can browse data.all catalog and request access for data assets. data.all shares data between teams securely within and environment and across environments without any data movement.

### Concepts

- Share request or Share Object: one for each dataset and requester team.
- Share Item refers to the individual Redshift table, Glue table, folder or S3 Bucket that is added to the Share request.

### Shareable items

In data.all there are 2 types of datasets: S3 Datasets and Redshift Datasets. Here is an overview of the items that can be shared using data.all by type of dataset. A detailed explanation of the technical details for each type can be found in the AWS data sharing technical details section.

- From S3 Datasets we can share:
  - S3 Bucket of the Dataset - using IAM permissions and S3/KMS policies
  - one or multiple Glue Tables (Tables) - using [Lake Formation](#) to create access permissions to tables, meaning that no data is copied between AWS accounts.
  - one or multiple S3 Prefixes (Folders) - using S3 access points to manage granular S3 policies.
- From Redshift Datasets we can share:
  - one or multiple Redshift Tables - using Redshift datashares

### Sharing workflow

Requesters create a share request and add items to it. Both requesters and approvers can work on this `DRAFT` of the request and add and delete items to the request Draft. Items that are added go to the `PENDINGAPPROVAL` status.

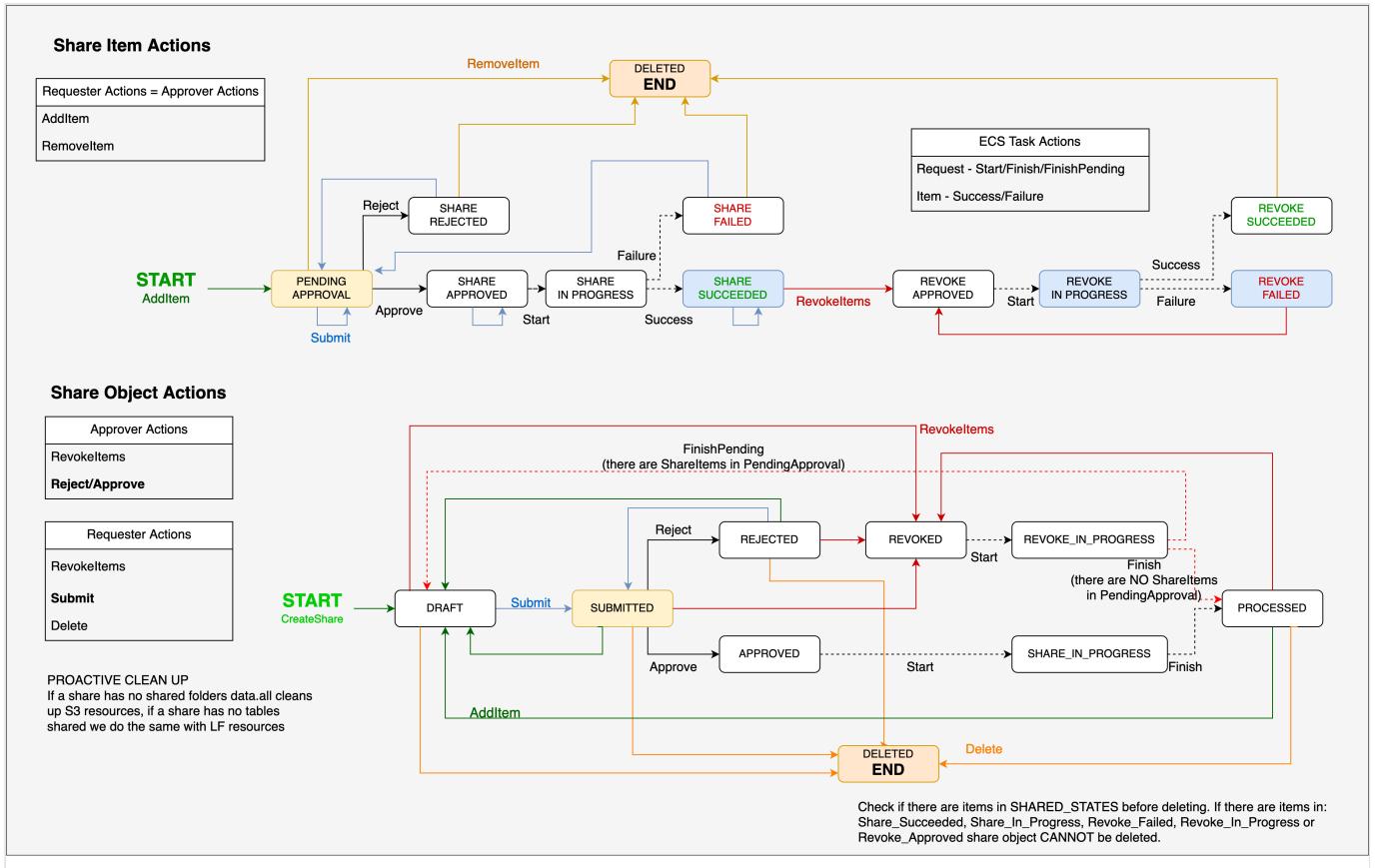
Once the draft is ready, requesters **submit** the request, which moves to the `SUBMITTED` status. Then, approvers **approve** or **reject** the request which will go to `APPROVED` or `REJECTED` status and its items to `SHARE_APPROVED` or `SHARE_REJECTED` correspondingly.

When the sharing task starts in the backend, both items and the share object move to `SHARE_IN_PROGRESS`. Once all items have been processed, the Share object is `PROCESSED` and each of the items is in either `SHARE_SUCCEEDED` or `SHARE_FAILED`. New items can be added to the share requests, the request will go back to `DRAFT` to be re-processed.

Both approvers and requesters can revoke access to shared items. They open the revoke items window and select which items should be revoked from the share request. The items move to `REVOKE_APPROVED` while the share is in `REVOKED` status.

While the revoking task is executing, the items and the request remain in `REVOKE_IN_PROGRESS` until the revoke is complete and items go to `REVOKE_FAILED` or `SUCCEEDED`. If there are share items in `PENDINGAPPROVAL` in the share request, it will go back to `DRAFT`. Otherwise, it will go to `PROCESSED`.

Requesters can delete the share request with the **delete** button. However, the request cannot contain any shared items. Users must revoke all shared items before deletion.



#### 4.5.1 Create a share request (requester)

On left pane choose **Catalog** then **Search** for the table you want to access. Click on the lock icon of the selected data asset.

The screenshot shows the data.all catalog interface. On the left, there's a sidebar with sections like DISCOVER, PLAY, and ADMIN. Under DISCOVER, Catalog is selected. The main area shows a search bar and a list of datasets. A red arrow points to the lock icon of the 'DatasetSB2' card, which is highlighted with a red box.

Dataset	Owner	Created	Description	Team	Environment	Region	Energy	Last Update
DatasetSB1-preupdate	johndoe@amazon.com	13 days ago	No description provided	SB2Research	research-a	euwest1	none	0
folder1	johndoe@amazon.com	13 days ago	No description provided	SB2Research	research-a	euwest1		0
raw	johndoe@amazon.com	13 days ago	No description provided	SB2Research	research-a	euwest1		0
DatasetSB2	johndoe@amazon.com	an hour ago	No description provided	SB2Research	research-a	euwest1	demo	0

The following window will open. Choose your target environment and team.

## Request Access

Data access is requested for the whole requester Team or for the selected Consumption role. The request will be submitted to the data owners, track its progress in the Shares menu on the left.

Dataset name: Test1

Environment: MyEnv

Team: testGroup1

Consumption Role (optional): No additional consumption roles owned by this Team in this Environment.

**Create Draft Request**

**Cancel**

The screenshot shows a dark-themed dialog box titled 'Request Access'. It contains four input fields: 'Dataset name' with value 'Test1', 'Environment' with value 'MyEnv', 'Team' with value 'testGroup1', and 'Consumption Role (optional)' which displays the message 'No additional consumption roles owned by this Team in this Environment.' Below the fields is a large orange button labeled 'Create Draft Request' with a right-pointing arrow icon. At the bottom of the dialog is a 'Cancel' button.

If instead of to a team, you want to request access for a Consumption role, add it to the request as in the picture below.

**NOTE:** If the consumption role selected is not data.all managed - you will have the option to allow data.all to attach the share policies to the consumption role for this particular share object (if not enabled here you will have to manually attach the share policies to be given access to data).

## Request Access

Data access is requested for the whole requester Team or for the selected Consumption role. The request will be submitted to the data owners, track its progress in the Shares menu on the left.

Dataset name

Test1

Environment

MyEnv

Team

testGroup2

Consumption Role (optional)

ConsRole [arn:aws:iam::637423210447:role/Consumer1]

Let Data.All attach policies to this role

► Create Draft Request

Cancel

Finally, click on **Create Draft Request**. This will create a share request or object for the corresponding dataset and if you have requested a table or folder it will add those items to the request. After that the modal window will switch to share edit form.

## Share status: Draft

The request for the selected principal is currently in draft status. You can edit and submit the request for approval.

Type	Name	Status	Health Status	Action
S3Bucket	dataall-test1-800s0esz	PENDINGAPPROVAL	Item is not Shared	Delete
Table	raw	Not requested	Not requested	Include

< 1 >

**Request purpose** —  
Purpose up to 200 symbols

175 characters left

Submit request

Draft request

Here you can edit the list of items you want to request access to. Note that the request is in `DRAFT` status and that the items that we add are in `PENDINGAPPROVAL`. They are not shared until the request is submitted and processed. The share can not be submitted if the list of items is empty.

`Request purpose` is optional field, recommended length is up to 200 symbols.

When you are happy with the share request form, click **Submit Request** or click **Draft Request** if you want to return to this form later.

The share needs to be submitted for the request to be sent to the approvers.

### 4.5.2 Check your sent/received share requests

Anyone can go to the Shares menu on the left side pane and look up the share requests that they have received and that they have sent. Click on **Learn More** in the request that you are interested in to start working on your request.

**Share Requests**

Shares > Share Requests

RECEIVED SENT

mariagarcia@amazon.com  
DRAFT | For datasetb2 | 2023-01-24 12:34:55.669354

Read access to Dataset: datasetb2 for Principal: SB2Marketing [arn:aws:iam::...:role/dataall-marketing-b-t4zxupvl] from Environment: Marketing-B

Currently shared items: 0  
Revoked items: 0  
Failed items: 0  
Pending items: 0

Learn More

#### 4.5.3 Add/delete items

If the request is not being processed, it can be edited by clicking the **Edit** button on top of the page.

**data.all**

DISCOVER Catalog Datasets Shares Glossaries PLAY Worksheets Notebooks ML Studio Pipelines Dashboards ADMIN Organizations Environments User Guide

Shares > Shares > test1

Share object for test1

Requested Dataset Details

Dataset test1  
No dataset description

Dataset Owners  
testGroup1

Dataset Environment  
MyEnv

Your role for this request  
Requesters

Comments

Request Purpose  
test reason update 2 update

Reject Purpose  
-

REQUEST CREATED BY  
testUser2@amazonaws.com

Principal  
testGroup2 [arn:aws:iam::637423210447:role/dataall-testg...]

Requester Team  
testGroup2

Requester Environment  
MyEnv

Creation time  
2024-07-11 11:09:59.974442

Status  
**PROCESSED**

Shared Items

Type	Name	Status	Action	Health Status	Health Message
S3Bucket	dataall-test1-800s0esz	SHARE_SUCCEEDED	Revoke access to this item before deleting	<b>HEALTHY</b> (2024-07-12 10:43:33)	-

**Edit** button opens the modal window with the Share Edit Form, same as upon creating the share. Here you can edit list of shared items and request purpose. To remove an item from the request click on the **Delete** button with the trash icon next to it. We can only delete items that have not been shared. Items that are shared must be revoked, which is explained below.

#### 4.5.4 Submit a share request (requester)

Once the draft is ready, the requesters need to click on the **submit** button. The request should be now in the **SUBMITTED** state. Approvers can see the request in their received share requests, alongside the current shared items, revoked items, failed items and pending items.

#### 4.5.5 (Optional Pre-Approval Work) Adding Filters to Glue Table Share Items (approver)

As an approver, you will also see the option to **Edit Filters** for Glue Table share items:

Shared Items						
Type	Name	Status	Data Filters	Action	Health Status	Health Message
Folder	book-images-2	PENDINGAPPROVAL		<button>Delete</button>	Item is not Shared	-
GlueTable	book_reviews_2	PENDINGAPPROVAL		<button>Delete</button> <button>Edit Filters</button>	Item is not Shared	-

Here an approver can attach one or more filters that were created on the table previously to the table:

Filter Name	Description	Filter Type	Included Columns	Row Expression
row_filter	Filter for non null bo...	ROW		"bookid" IS NOT NULL AND "title" LIKE "%Ha...
column_filter	Filter for Book Id, A...	COLUMN	bookid,authors,ratings_count,publisher	

2 rows selected

Rows per page: 5 ▾ 1-2 of 2 < >

**Assign Filters** **Remove Filter(s)**

Once assigned, the filter will appear in the share object view and can be clicked on to view the underlying associated data filters assigned

Shared Items						
Type	Name	Status	Data Filters	Action	Health Status	Health Message
Folder	book-images-2	PENDINGAPPROVAL		<button>Delete</button>	Item is not Shared	-
GlueTable	book_reviews_2	PENDINGAPPROVAL	harrypotterfilter	<button>Delete</button> <button>Edit Filters</button>	Item is not Shared	-

Data filters assigned to book_reviews_2						
Filter Name	Description	Filter Type	Included Columns	Row Expression		
row_filter	Filter for non null book...	ROW		"bookid" IS NOT NULL AND "title" LIKE '%Harry ...		
column_filter	Filter for Book Id, Auth...	COLUMN	bookid,authors,ratings_count,publisher			
Rows per page: 5 ▾ 1–2 of 2 < >						

Before sharing as the table - approvers can also edit the assigned filter and remove underlying data filters or attach new ones as needed. Once the share is approved there is no longer the ability to edit filters and the table item must be revoked and re-shared to assign new filters.

**NOTE:** If more than 1 filter is assigned to a table share item, the resulting data access is evaluated as the union (logical 'OR') of the filters assigned.

**NOTE:** If assigning filter(s) to a table share item, the **Item Filter Name** specified will be used in naming the table resource link for the consumer, meaning the consumer will be reading for table named - `tablename_filtername`

#### 4.5.6 Approve/Reject a share request (approver)

As an approver, click on **Learn more** in the **SUBMITTED** request and in the share view you can check the tables and folders added in the request. This is the view that approvers see, it now contains buttons to approve or reject the request.

The screenshot shows the 'Share object for datasetsb2' page. At the top right are four buttons: Refresh, Approve, Reject, and Delete. The main area is divided into two sections: 'Requested Dataset Details' and 'Shared Items'.

**Requested Dataset Details:**

- Dataset: datasetsb2
- Dataset Owners: SB2Research
- Dataset Environment: Research-A
- Your role for this request: Approvers

**Shared Items:**

Type	Name	Status	Action
Folder	iot_files	PENDINGAPPROVAL	<button>Delete</button>
Table	supermarkets	PENDINGAPPROVAL	<button>Delete</button>

If the approvers **approve** the request, it moves to the `APPROVED` status. Share items IN `PENDINGAPPROVAL` will go to `SHARE_APPROVED`.

The screenshot shows the 'Share object for datasetsb2' page after the request has been approved. The 'Status' field in the 'Requested Dataset Details' section now shows `APPROVED`. The 'Shared Items' table shows three items, all of which have moved to the `SHARE_APPROVED` state.

Type	Name	Status	Action
Folder	iot_files	SHARE_APPROVED	<button>Delete</button>
Table	supermarkets	SHARE_APPROVED	<button>Delete</button>
Table	books	SHARE_APPROVED	<button>Delete</button>

Data.all backend starts a sharing task, during which, items and the request are in `SHARE_IN_PROGRESS` state.

**Share object for datasetsb2**

Shares > Shares > [datasetsb2](#)

**Requested Dataset Details**

- Dataset: datasetsb2
- Dataset Owners: SB2Research
- Dataset Environment: Research-A
- Your role for this request: Approvers

**REQUEST CREATED BY**  
mariagarcia@amazon.com

Principal	SB2Marketing [arn:aws:iam::...]	role/dataall-marketing-b-t4zxu...
Requester Team	SB2Marketing	
Requester Environment	Marketing-B	
Creation time	2023-01-24 12:34:55.669354	
Status	SHARE_IN_PROGRESS	

**Shared Items**

Type	Name	Status	Action
Folder	iot_files	SHARE_SUCCEEDED	Revoke access to this item before deleting
Table	supermarkets	SHARE_IN_PROGRESS	<span style="color: red;">Delete</span>
Table	books	SHARE_APPROVED	<span style="color: red;">Delete</span>

When the task is completed, the items go to `SHARE_SUCCEEDED` or `SHARE_FAILED` and the request is `PROCESSED`. To understand what happens under-the-hood when each share item is processed, check out the AWS data sharing technical details section.

**Share object for datasetsb2**

Shares > Shares > [datasetsb2](#)

**Requested Dataset Details**

- Dataset: datasetsb2
- Dataset Owners: SB2Research
- Dataset Environment: Research-A
- Your role for this request: Approvers

**REQUEST CREATED BY**  
mariagarcia@amazon.com

Principal	SB2Marketing [arn:aws:iam::...]	role/dataall-marketing-b-t4zxu...
Requester Team	SB2Marketing	
Requester Environment	Marketing-B	
Creation time	2023-01-24 12:34:55.669354	
Status	PROCESSED	

**Shared Items**

Type	Name	Status	Action
Folder	iot_files	SHARE_SUCCEEDED	Revoke access to this item before deleting
Table	supermarkets	SHARE_SUCCEEDED	Revoke access to this item before deleting
Table	books	SHARE_SUCCEEDED	Revoke access to this item before deleting

If a dataset is shared, requesters should see the dataset on their screens. Their role with regards to the dataset is `SHARED`.

# Datasets

Contribute > Datasets



Search



DatasetSB2

by johndoe@amazon.com

No description provided

Role

SHARED

Team

SB2Research

Tables

3

Folders

2

Status

CREATE\_COMPLETE

Learn More

0

#### 4.5.7 Verify (and Re-apply) Items

As of V2.3 of data.all - share requestors or approvers are able to verify the health status of the share items within their share request from the data.all UI. Any set of share items that are in a shared state (i.e. `SHARE_SUCCEEDED` or `REVOKE_FAILED` state) will be able to be selected to start a verify share process.

**Share object for test-datasets3importedb1**

Shares > Shares > test-datasets3importedb1

**Requested Dataset Details**

Dataset	test-datasets3importedb1	REQUEST CREATED BY	UserA1@mai.ru
Dataset Owners	groupB1	Principal	A1-cons-test [arn:aws:iam:█████████████████████]
Dataset Environment	TEST-EnvironmentB1	Requester Team	groupA1
Your role for this request	Approver	Requester Environment	TEST-EnvironmentB1
Creation time	2024-03-07 16:43:09.605824	Status	PROCESSED

**Dataset Description**

created by data.all cli

**Share Object Comments**

Request Purpose: -

Reject Purpose: [Edit](#)

**Data Consumption details**

S3 Bucket name (Bucket sharing): test-importedb1

S3 Access Point name (Folder sharing): x3d78xb0

Glue database name (Table sharing): dataall\_test\_datasets3importedb1\_x3d78xb0\_shared

**Shared Items**

Type	Name	Status	Action	Health Status	Health Message
Folder	folder1	SHARE_SUCCEEDED	Revoke access to this item before deleting	2024-03-08 00:08:13	-

**Verify access to items from share object test-datasets3importedb1**

After selecting the items, click Verify on Selected Items

Name	Type	Status
folder1	Folder	Share_Succeeded

[Verify Selected Items](#)

[Verify Item\(s\) Health Status](#)

[Re-Apply Share](#)

Upon completion of the verify share process, each share item's healthStatus will be updated with an updated healthStatus (i.e. `Healthy` or `Unhealthy`) as well as a timestamp representing the last verification time. If the share item is in an `Unhealthy` health status, there will also be included a health message detailing what part of the share is in an unhealthy state.

In addition to running a verify share process on particular items, dataset owners can run the verify share process on multiple share objects associated with a particular dataset. Navigating to the Dataset --> Shares Tab, dataset owners can start a verify process on multiple share objects. For each share object selected, the share items that are in a shared state for the associated share object will be verified and updated with a new health status and so on.

The screenshot shows the 'Dataset TEST-datasetS3ImportedB1' overview page. At the top, there are several action buttons: 'AWS Credentials', 'S3 Bucket', 'Edit', and 'Delete'. Below these are tabs: 'DATA', 'OVERVIEW' (selected), 'SHARES', 'UPLOAD', 'TAGS', and 'STACK'. A prominent button labeled 'Verify Share Objects Item(s) Health Status' is visible. The 'SHARES' section displays two items:

Request owner	IAM role name	Dataset	Dataset Owner
groupA1	validation-test-role	test-datasetS3importedb1	groupB1
groupA1	consumption-role-testing	test-datasetS3importedb1	groupB1

An orange 'Open Share Request' button is present next to each row. A modal window titled 'Verify health status of all items for selected share object(s) from dataset TEST-datasetS3ImportedB1' is displayed. It contains a message: 'After selecting the items, click Verify Selected Shares'. Below this is a table with three rows:

<input type="checkbox"/> requestOwner	IAMRole	Status
<input type="checkbox"/> groupA1	validation-test-role	Processed
<input type="checkbox"/> groupA1	consumption-role-testing	Processed

At the bottom of the modal are buttons for 'Rows per page: 5' and 'Verify Selected Shares'.

### Scheduled Share Verify Task

The share verifier process is run against all share object items that are in a shared state every 7 days by default as a scheduled task which runs in the background of data.all.

If any share items do end up in an `Unhealthy` status, the data.all approver will have the option to re-apply the share for the selected items that are in an unhealthy state.

**Share object for test-datasets3importedb1**

Shares > Shares > test-datasets3importedb1

**Requested Dataset Details**

Dataset: test-datasets3importedb1  
Dataset Owners: groupB1  
Dataset Environment: TEST-EnvironmentB1  
Your role for this request: Approver

**Dataset Description**  
created by data.all cli

**Share Object Comments**  
No items to re-apply share.

**Request Purpose**  
-

**Reject Purpose** ➔ Edit  
-

**Data Consumption details**

S3 Bucket name (Bucket sharing): test-importedb1  
S3 Access Point name (Folder sharing): x3d78xb0  
Glue database name (Table sharing): dataall\_test\_datasets3importedb1\_x3d78xb0\_shared

**Shared Items**

Type	Name	Status	Action	Health Status	Health Message
Folder	folder1	SHARE_SUCCEEDED	Revoke access to this item before deleting	2024-03-08 00:08:13	-

+ Add Item ⌂ Revoke Items 🛡 Verify Item(s) Health Status ⚙ Re-Apply Share

Upon successful re-apply process, the share items health status will revert back to a `Healthy` status with an updated timestamp.

#### 4.5.8 Revoke Items

Both approvers and requesters can click on the button **Revoke items** to remove the share grant from chosen items.

It will open a window where multiple items can be selected for revoke. Once the button "revoke selected items" is pressed the consequent revoke task will be triggered.

**Revoke access to items from share object datasetsb2**

After selecting the items that you want to revoke, click on Revoke Selected Items

Name	Type	Status
<input checked="" type="checkbox"/> iot_files	Folder	Share_Succeeded
<input checked="" type="checkbox"/> supermarkets	Table	Share_Succeeded
<input type="checkbox"/> books	Table	Share_Succeeded

2 rows selected      1–3 of 3

**Revoke Selected Items**

#### Proactive clean-up

In every revoke task, data.all checks if there are no more shared folders or tables in a share request. In such case, data.all automatically cleans up any unnecessary S3 access point or Lake Formation permission.

#### 4.5.9 View Share Logs

For the share Approvers the logs of share processor are available via Data.all UI. To view logs of the latest share processor run, click **Logs** button in right upper corner of the Share View page.

**Share object for test1**

Shares > Shares > test1

Requested Dataset Details		Comments		
Dataset test1	No dataset description	Request Purpose test reason update 2 update	Refresh	Logs
Dataset Owners	testGroup1	Reject Purpose -	Edit	Delete
Dataset Environment	MyEnv			
Your role for this request	Approvers			
		REQUEST CREATED BY testUser2@amazonaws.com		
		Principal testGroup2 [arn:aws:iam::637423210447:role/dataall-testg...]		
		Requester Team testGroup2		
		Requester Environment MyEnv		
		Creation time 2024-07-11 11:09:59.974442		
		Status PROCESSED		

#### 4.5.10 Delete share request

To delete a share request, it needs to be empty from shared items. For example, the following request has some items in `SHARE_SUCCEEDED` state, therefore we receive an error. Once we have revoked access to all items we can delete the request.

The screenshot shows the 'Share object for datasetsb2' page. A red banner at the top indicates an error: 'An error occurred (UnauthorizedOperation) when calling Delete operation: This transition is not possible, Share\_Succeeded cannot go to [Deleted]. If there is a sharing or revoking in progress wait until it is complete and try again.' Below the banner, the 'Requested Dataset Details' section shows the dataset name is 'datasetsb2'. The 'Shared Items' section lists three items: 'iot\_files' (Folder, Status: REVOKE\_SUCCEEDED), 'supermarkets' (Table, Status: REVOKE\_SUCCEEDED), and 'books' (Table, Status: SHARE\_SUCCEEDED). A red arrow points from the error message to the 'books' item, which is highlighted with a red box. A red button labeled 'Delete' is visible next to the 'books' item.

#### 4.5.11 AWS data sharing technical details

Here is a brief explanation of how each type of sharing mechanism is implemented in data.all. It is important to understand what really happens in AWS when dealing with downstream integrations that will consume shared data.

##### S3 Bucket sharing

In this type of share the permissions are granted to the IAM role specified in the request as principal. It can be either a data.all team IAM role or an external role defined as consumption role.

When processing a sharing task for an S3 Bucket, data.all will:

1. Update the S3 Bucket policy to add permissions to the principal IAM role
2. Create/Update the IAM policy "Share policy" that grants IAM permissions to the requested S3 bucket and KMS key. Attach this policy to the principal IAM role.
3. (If the Bucket is encrypted using a KMS key) Update the KMS Key policy to add permissions to the principal IAM role

##### Glue Table sharing

In this type of share the permissions are granted to the IAM role specified in the request as principal. It can be either a data.all team IAM role or an external role defined as consumption role.

When processing a sharing task for a Glue Table, data.all will:

1. Create a Glue database in the target account with name of the original database plus the suffix `_shared`. This database will be re-used if other share requests for the same source database are processed for other principals in the same environment.
2. (If the share is cross-account) Revoke IAMAllowedPrincipal permissions from the table to ensure Lake Formation is used in the management of the table access and update LakeFormation to use Version 3 if not already  $\geq 3$
3. Grant Lake Formation permissions on the original database and table to the IAM principals in the target. If the share is cross account this step will create a RAM invitation that data.all will identify and accept.
4. Create a resource link table from the original database table to the `_shared` database in the target account
5. Grant Lake Formation permissions to the resource link table for the IAM principals.

### S3 Prefix sharing (Folders)

In this type of share the permissions are granted to the IAM role specified in the request as principal. It can be either a data.all team IAM role or an external role defined as consumption role.

When processing a sharing task for a Folder, data.all will:

1. Update the Dataset Bucket policy to allow access point sharing. This is a one-time operation
2. Create/Update an S3 Access Point and its policy granting permissions to the requested S3 prefix (folder) in the bucket for the principal IAM role.
3. Create/Update the IAM policy "Share policy" that grants IAM permissions to the S3 Access Point and KMS key. Attach this policy to the principal IAM role.
4. (If the Bucket is encrypted using a KMS key) Update the KMS Key policy to add permissions to the principal IAM role

### Redshift Table sharing

In this type of share the permissions are granted to the Redshift role in the Redshift namespace specified in the request.

When processing a sharing task for a Redshift table, data.all will:

1. In the source namespace, create a Redshift datashare. Add requested schema and tables to the datashare.
2. Grant access to the datashare for the consumer namespace (same account) or for the consumer AWS account (cross account)
3. (If cross-account share) Authorize and associate datashare with the target namespace
4. In the target namespace, create local database for the datashare and grant permissions to the principal Redshift role.
5. In the target namespace, create external schema in local database and grant usage permissions to the principal Redshift role.
6. For the local database and for the external schema, grant select access to the requested table to the principal Redshift role.

## 4.5.12 Consume shared data

Knowing what we know from the previous section we can now define some ways of consuming the shared data for each type of shareable item.

### S3 Bucket sharing

For S3 bucket sharing, IAM policies, S3 bucket policies, and KMS Key policies (if applicable) are updated to enable sharing of the S3 Bucket resource. Therefore, we can use S3 API calls to access the data referring the Bucket directly. We need to assume or use the credentials of the principal IAM role used in the share request (team IAM role or consumption IAM role).

Here is an example using the AWS CLI:

```
aws s3 ls s3://<BUCKET_NAME>
```

### Glue Table sharing

Glue tables are shared using AWS Lake Formation, therefore any service that reads Glue tables and integrates with Lake Formation is able to consume the data.

We need to assume or use the credentials of the principal IAM role used in the share request (team IAM role or consumption IAM role).

### S3 Prefix sharing (Folders)

For the case of folders, the underlying sharing mechanism used is S3 Access Points. You can read data inside a prefix executing API calls to the S3 access point.

We need to assume or use the credentials of the principal IAM role used in the share request (team IAM role or consumption IAM role).

For example, we could use the AWS CLI with the following access point:

```
aws s3 ls arn:aws:s3:<SOURCE_REGION>:<SOURCE_AWSACCOUNTID>:accesspoint/<DATASETURI>-<REQUESTER-TEAM>/<FOLDER_NAME>/
```

### Redshift Table sharing

Redshift tables are shared through Redshift datashares and the principal of the share request is a Redshift role. Thus, we can consume data accessing the Redshift Query editor or other applications that consume from Redshift with a user that has access to the Redshift role.

#### 4.5.13 Email Notification on share requests

In data.all, you can enable email notification to send emails to requesters and approvers of a share request. Email notifications are triggered during all share workflows - Share Submitted, Approved, Rejected, Revoked.

The content sent in email notification is similar to the UI based notification.

For example the email body will look like,

```
User <USERNAME> <SHARE_ACTION> share request for dataset <DATASET_NAME>
where <SHARE_ACTION> corresponds to "submitted", "approved", "revoked", "rejected"
```

**Note** - In order to enable email notification, you need to configure it in `config.json` and setup the AWS services needed for during the deployment phase. Please review steps for setting up email notification on [data.all](#) webpage in the `Deploy to AWS` section

## 4.6 Metadata Forms

---

### Introduction

Metadata forms allow users to add structured contextual information to various entities in the data.all platform. By creating and attaching metadata forms, user can standardize and enrich metadata in a customizable way.

Metadata forms serve several key purposes:

- Improve data discovery by enabling more consistent, complete, and meaningful metadata
- Capture domain-specific or organizational metadata standards
- Streamline metadata management workflows
- Search among all entities in data.all based on attached metadata

### Metadata Forms visibility

Visibility setting defines who can view and attach a metadata form to an entity.

- Global visibility means the metadata form is visible and attachable to any entity by all users across the platform
- Organization/Environment-Wide visibility limits the form to a specific organization/environment - it can only be seen by members of this organization/environment and attached to entities in that organization/environment
- Team-Only visibility restricts the form to just members of a specific team, but does not restrict to which entities it can be attached to

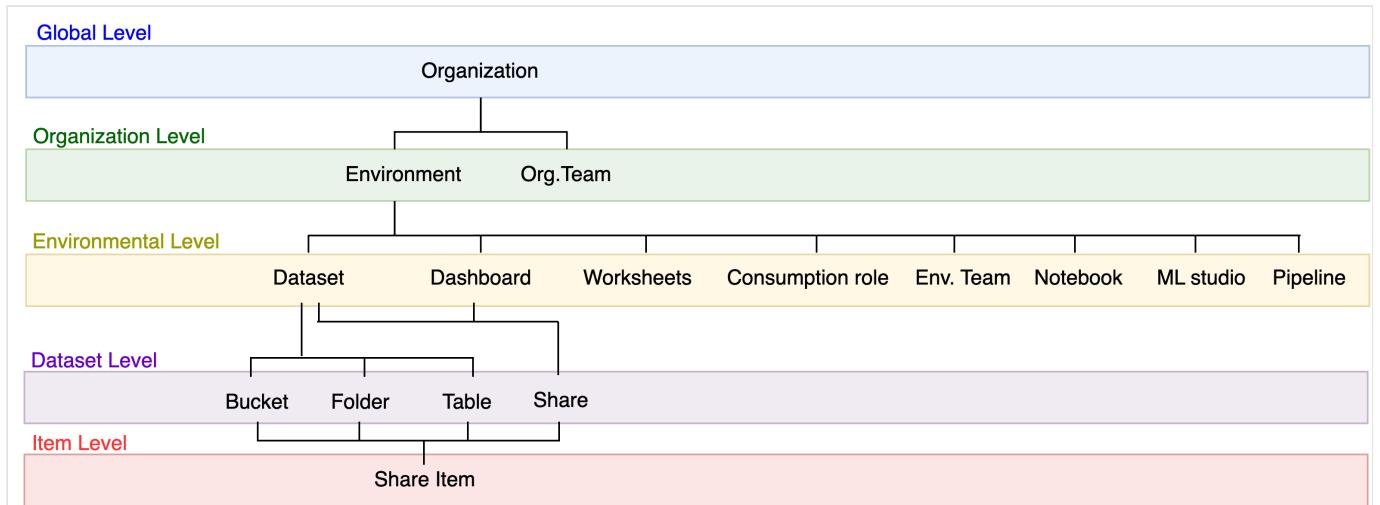
The same visibility restrictions apply to the attached metadata form. E.g. if userA can see Metadata Form A, but can't see Metadata Forms B, and both of these metadata forms attached to the dataset (attachedA and attachedB), so userA can view attachedA, but can not view attachedB.

### Metadata Form lifecycle and usage

1. User given the permission from data.all administrators can create metadata forms with the Global visibility and visibility for their teams. Owners and Admins of Organizations and Environments can create metadata forms with Environment-Wide and Organization-wide visibility for owned entities.
2. Once form is created, the owners can add enforcement rules (see the section below).
3. All changes in metadata form can be performed only by its owner.
4. In case owner deletes metadata form all its attached entities are deleted in cascade mode.
5. Metadata form can be attached to an entity by the user with sufficient permissions. Permissions are given by the owner or admin of the entity (in case of Environments and Organizations). In case of Datasets the owner and steward teams have these permissions and also the teams with whom the dataset was shared.
6. Attached metadata forms can be edited or deleted by any user with sufficient permissions.

### Metadata Forms levels and enforcement

Metadata forms can be obligatory to fill in on different levels. User can select the metadata form and entity types, that should have this form attached. Enforcement affects selected entity types on all lower levels hierarchically.



Who can enforce:

- Data.all admins can enforce any form on any level across the platform. They have full control over metadata form enforcement.
- Owners/admins of a data.all entity can enforce forms for this levels and levels below in the hierarchy. For example, an org admin can enforce a form for the org, all teams in that org, all environments in the org, all datasets in those environments, etc.
- Share approvers and requestors can enforce forms for a specific share they are involved with. However, they can only delete enforcement rules they created themselves - they cannot delete rules created by others

So in summary, enforcement capabilities cascade along with administrative privileges in the hierarchy. Global admins have full control, org/env admins can enforce for their sphere and below, dataset admins for the datasets and items in it, and share requesters and approvers for a specific share.

**View Metadata Forms** By clicking Metadata Forms in the Discovery section of the left side pane users can open a list of metadata forms visible for them. The criteria for visibility: 1. The group, that user belong to, is an owner of the metadata form. 2. Metadata form has Global visibility. 2. Metadata form has Team-Only visibility and the user is a member of this team. 3. Metadata form has Environment-Wide or Organization-Wide visibility and user has access to this environment/organization. 4. Administrators can view all metadata forms.

## Create Metadata Form

To create a new metadata form:

1. Navigate to the Metadata Forms page under the Discovery section.
2. Click the "New Metadata Form" button in the top right corner.
3. In the pop-up dialog, enter a Name and Description for the form.
4. Select the Owner Team responsible for managing this form.
5. Choose a Visibility level to control access to the form. Options are Team Only, Environment-Wide, Organization-Wide, or Global.
6. If Visibility is not Global, select the Organization, Environment or Team to scope the form.
7. Click "Create" to generate the form.

**Create Metadata Form**

Form name: Third Test Form

Description: Short description | 182 characters left

Owner: testGroup5

Visibility: Environment-Wide

Environment: persistent\_cross\_acc\_env\_1

**Create**

**Cancel**

You will be redirected to the metadata form page. It contains details overview, instruments to edit form fields and preview tab.

In the field editor, use the "Edit" button in the upper right corner of the table to update fields. When the editor mode is enabled, user can

1. add fields using the button '+ Add field' in the left upper corner of the table;
2. delete fields using 'bin' icon in the end of the table row. When the user pushes the button, the row is disabled, which indicates it is marked for deletion, but user can restore the field by clicking the button (now with "refresh") again;
3. arrange fields using drag and drop, fields will be shown in rendered metadata form in the order they appear in this list (from top to bottom);
4. edit all parameters of the field.

When finished, click "Save" to apply changes.

**FORM INFO**

**FIELDS**

**ENFORCEMENT**

**PREVIEW**

Search (temporary disabled)

+ Add field

Required	Name	Type	Description	Possible Values or Glossary Term
<input type="checkbox"/>	First 1	Type String	Free input field	Hit enter after typing
<input type="checkbox"/>	Second 2	Type String	Drop-down field	first <input checked="" type="checkbox"/> second <input checked="" type="checkbox"/> Hit enter ...
<input checked="" type="checkbox"/>	Third	Type Integer	Free input	Hit enter after typing
<input type="checkbox"/>	Fourth	Type Integer	Drop-down integer field	1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/> Hit ent...
<input type="checkbox"/>	Flag field	Type Boolean		Hit enter after typing
<input type="checkbox"/>	Glossary field	Type Glossa...	Drop down with glossay options	My Glossary

Save

In the "Preview" tab user can see, how the form will be rendered.

**FORM INFO**

**FIELDS**

**ENFORCEMENT**

**PREVIEW**

**Second Test Form**

First 1 Required. Free input string field

Second 2 Drop-down string field

Third Required. Free input integer

Fourth Drop-down integer field

Flag

Glossary Drop-down field with options from glossary

Attach  Cancel

The new metadata form can now be attached to entities and filled out by users with access. Forms can be edited later to modify fields and settings.

User can delete the form with button "Delete" in the upper right corner of the form view page.

#### Attach Metadata Form

User with required access can attach metadata form to Organization, Environment or Dataset. To attach new metadata form or view already attached use the tab "Metadata" on entity view page.

In the column on the left all attached metadata forms are listed. When user clicks on the form, its content appears on the right. The attached form can be deleted by click on "bin" icon next to form name in the list.

**Organization org\_persistent\_cross\_acc\_env\_1**

Admin > Organizations > org\_persistent\_cross\_acc\_env\_1

**OVERVIEW** **ENVIRONMENTS** **METADATA** **TEAMS**

**+ Attach form**

**Second Test Form**

First 1	eeee
Second 2	option 1
Third	1
Fourth	2
Flag	true
Glossary	u8i17uh9

If user has permission to attach metadata forms to this entity, the button "+ Attach Form" appears over the attached metadata form list. After user clicks this button and selects the available form from drop-down list, they can fill in the form displayed on the right. After all required fields are filled, press "Attach" button in the right upper corner of the editing area.

**Organization org\_persistent\_cross\_acc\_env\_1**

Admin > Organizations > org\_persistent\_cross\_acc\_env\_1

**OVERVIEW** **ENVIRONMENTS** **METADATA** **TEAMS**

**+ Attach form**

Select Metadata Form  X

No Metadata Forms Attached

**Second Test Form**

**► Attach** **Cancel**

First 1	Required. Free input string field
Second 2	Drop-down string field
Third	Required. Free input integer
Fourth	Drop-down integer field
<input type="checkbox"/> Flag	
Glossary	Drop-down field with options from glossary

## 5. Play

### 5.1 Worksheets

data.all offers a rich editor to write SQL queries and explore data. It is Athena on the backend that runs our queries on environments where our teams have been onboarded.

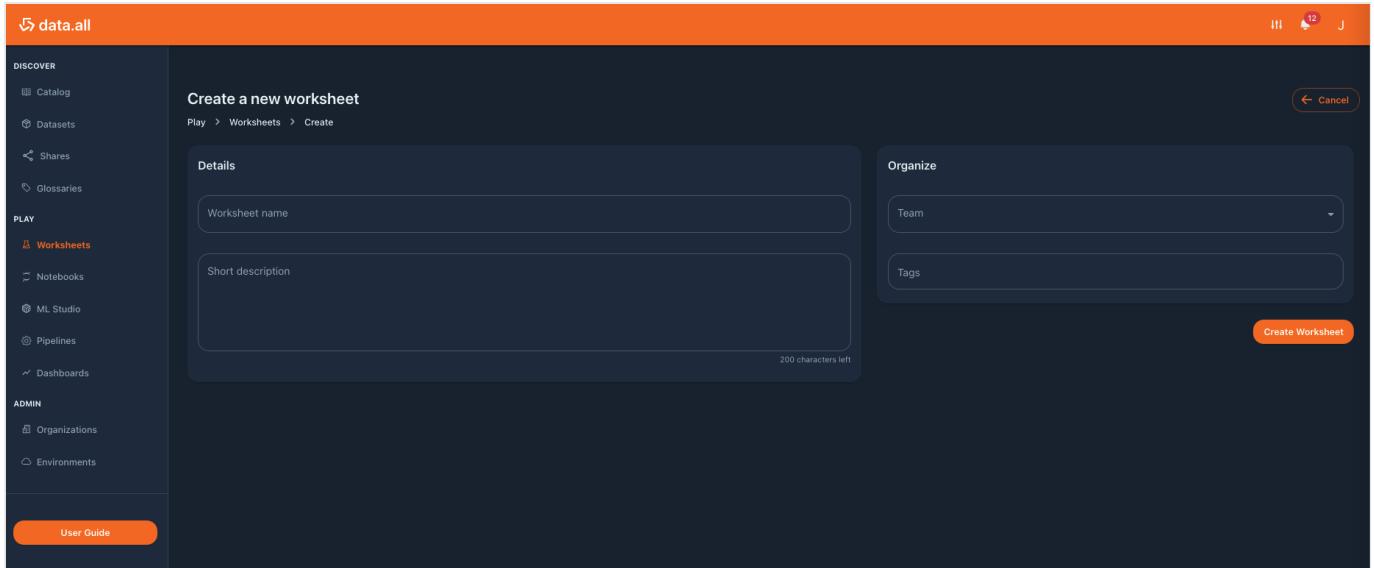
#### 5.1.1 NEW Create a Worksheet

On the left pane under **Play** click on **Worksheets** to go to the Worksheet menu. Here you will find all Worksheets owned by your teams.

##### Shared queries = Seamless Collaboration

Check, learn from and collaborate with other members of your team to improve your analyses and get insights from your data, directly from data.all worksheets. No need to send queries by email, no need to create views :)

To create a new worksheet click on the **Create** button in the top right corner and fill the Worksheet form:



Field	Description	Required	Editable	Example
Worksheet name	Name of the worksheet	Yes	Yes	PalmDor
Short description	Short description about the worksheet	No	Yes	Query used to retrieve Palm D'or winners
Team	Team that owns the worksheet	Yes	No	DataScienceTeam
Tags	Tags	No	Yes	adhoc

##### No AWS resources

When we are creating a worksheet we are NOT deploying AWS resources. We don't provision clusters, we are not creating tables or views. We simply store the query in data.all database and we run it serverlessly on AWS Athena.

### 5.1.2 Edit worksheet metadata

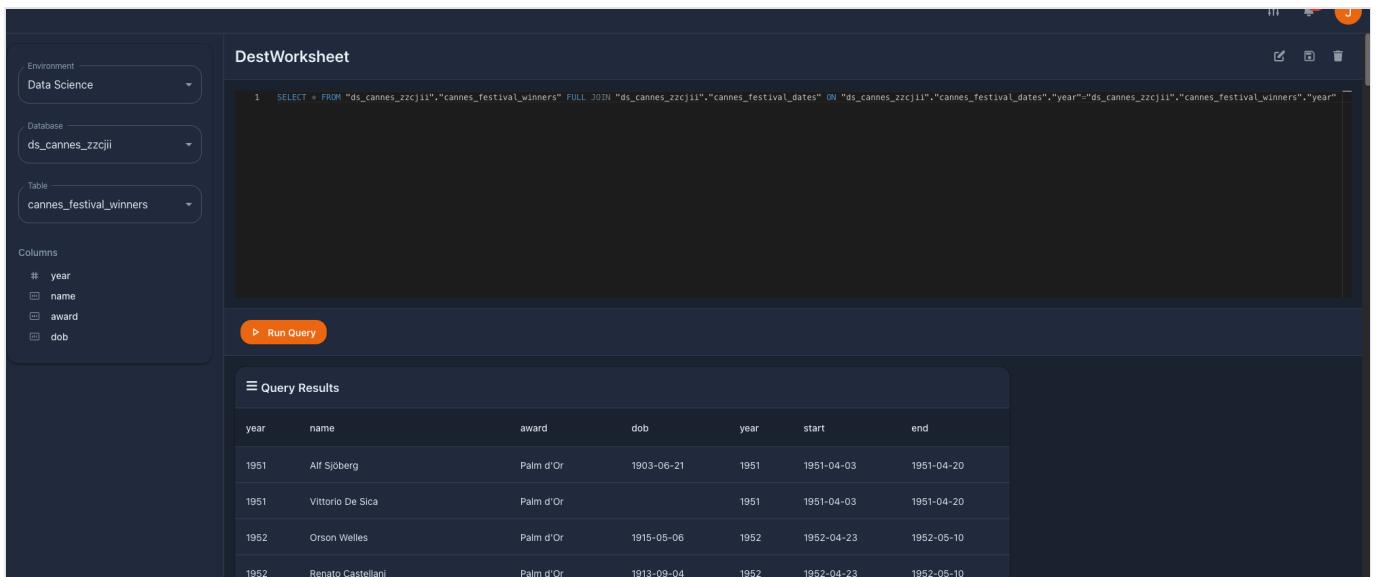
Select a worksheet and click on the pencil icon to edit the metadata of the worksheet. This includes worksheet name, description and tags. The ownership of the worksheet, its team, is not editable.

### 5.1.3 Delete a worksheet

Next to the edit button, there are 2 other buttons. To delete a worksheet click on the trash icon one. Worksheets are not AWS resources, they are a data.all construct whose information is stored in the data.all database. Thus, when we delete a worksheet we are not deleting AWS resources or CloudFormation stacks.

### 5.1.4 Write and save your queries

Select your worksheet and choose any of the environments, datasets and tables of your team to list column information. In the query editor write your SQL statements and click on **Run Query** to get your query results. Error messages coming from Athena will pop-up automatically.



The screenshot shows the DestWorksheet interface. On the left, there are dropdown menus for Environment (Data Science), Database (ds\_cannes\_zzclii), Table (cannes\_festival\_winners), and Columns (year, name, award, dob). Below these is a 'Run Query' button. The main area is titled 'DestWorksheet' and contains a query editor with the following SQL code:

```
1 SELECT * FROM "ds_cannes_zzclii"."cannes_festival_winners" FULL JOIN "ds_cannes_zzclii"."cannes_festival_dates" ON "ds_cannes_zzclii"."cannes_festival_dates"."year"="ds_cannes_zzclii"."cannes_festival_winners"."year"
```

Below the query editor is a 'Query Results' section with a table:

year	name	award	dob	year	start	end
1951	Alf Sjöberg	Palm d'Or	1903-06-21	1951	1951-04-03	1951-04-20
1951	Vittorio De Sica	Palm d'Or		1951	1951-04-03	1951-04-20
1952	Orson Welles	Palm d'Or	1915-05-06	1952	1952-04-23	1952-05-10
1952	Renato Castellan	Palm d'Or	1913-09-04	1952	1952-04-23	1952-05-10

If you want to save the current query for later or for other users, click on the **save** icon (between the edit and the delete buttons).

#### More than just SELECT

Worksheets can be used for data exploration, for quick ad-hoc queries and for more complicated queries that require joins. As far as you have access to the joined datasets you can combine information from multiple tables or datasets. Check the [docs](#) for more information on AWS Athena SQL syntax.

## 5.2 Notebooks

Data practitioners can experiment machine learning algorithms spinning up Jupyter notebook with access to all your datasets. `data.all` leverages [Amazon SageMaker instance](#) to access Jupyter notebooks.

### 5.2.1 Create a Notebook

#### Pre-requisites

To use Notebooks you need to introduce your own VPC ID or create a Sagemaker Studio domain inside a VPC (read the [docs](#)). Provisioning the notebook instances inside a VPC enables the notebook to access VPC-only resources such as EFS file systems.

To create a Notebook, go to Notebooks on the left pane and click on the **Create** button. Then fill in the following form:

Field	Description	Required	Editable	Example
Sagemaker instance name	Name of the notebook	Yes	No	Cannes Project
Short description	Short description about the notebook	No	No	Notebook for Cannes exploration
Tags	Tags	No	No	deleteme
Environment	Environment (and mapped AWS account)	Yes	No	Data Science
Region (auto-filled)	AWS region	Yes	No	Europe (Ireland)
Organization (auto-filled)	Organization of the environment	Yes	No	AnyCompany EMEA
Team	Team that owns the notebook	Yes	No	DataScienceTeam
VPC Identifier	VPC provided to host the notebook	No	No	vpc-.....
Subnets	Subnets provided to host the notebook	No	No	subnet-....
Instance type	[ml.t3.medium, ml.t3.large, ml.m5.xlarge]	Yes	No	ml.t3.medium
Volume size	[32, 64, 128, 256]	Yes	No	32

If successfully created we can check its metadata in the **Overview** tab. Unlike other data.all resources, Notebooks are non-editable.

Notebook Cannes exploration

Play > Notebooks > Cannes exploration

**OVERVIEW** TAGS AWS STACK

**Details**

URI: iloNk8

Name: Cannes exploration

Tags: -

Description: Some

**Instance Properties**

Instance type: ml.t3.medium

Volume size: 32 Go

VPC: [REDACTED]

Subnet: [REDACTED]

Instance Profile: arn:aws:iam::-----:role/ds-data-science-rykpp5

**Stack**

CREATED BY: john doe@amazon.com

Organization: AnyCompany Global

Environment: Data Science

Team: DataScienceTeam

Created: an hour ago

Status: INSERVICE

## 5.2.2 Check CloudFormation stack

In the **Stack** tab of the Notebook, is where we check the AWS resources provisioned by data.all as well as its status. As part of the Notebook CloudFormation stack deployed using CDK, data.all will deploy:

1. AWS EC2 Security Group
2. AWS SageMaker Notebook Instance
3. AWS KMS Key and Alias

## 5.2.3 Delete a Notebook

To delete a Notebook, simply select it and click on the **Delete** button in the top right corner. It is possible to keep the CloudFormation stack associated with the Notebook by selecting this option in the confirmation delete window that appears after clicking on delete.

## 5.2.4 Open JupyterLab

Click on the **Open JupyterLab** button of the Notebook window to start writing code on Jupyter Notebooks.

jupyter

Open JupyterLab | Quit | Logout

Files Running Clusters SageMaker Examples Conda

Select items to perform actions on them.

Upload New

Name	Last Modified	File size
Untitled.ipynb	Running seconds ago	72 B

### 5.2.5 Stop/Start instance

As we briefly commented, `data.all` uses AWS SageMaker instances to access Jupyter notebooks. Be frugal and stop your instances when you are not developing. To do that, close the Jupyter window and click on **Stop Instance** in the Notebook buttons. It takes a couple of minutes, just refresh and check the Notebook Status in the overview tab. It should end up in `STOPPED`.

#### Save money, stop your instances

This feature allows users to easily manage their instances directly from `data.all` UI.

Same when you are coming back to work on your Notebook, click on **Start instance** to start the SageMaker instance. In this case the Status of the notebook should first be `PENDING` and once the instance is ready, `INSERVICE`.

### 5.2.6 Create Key-value tags

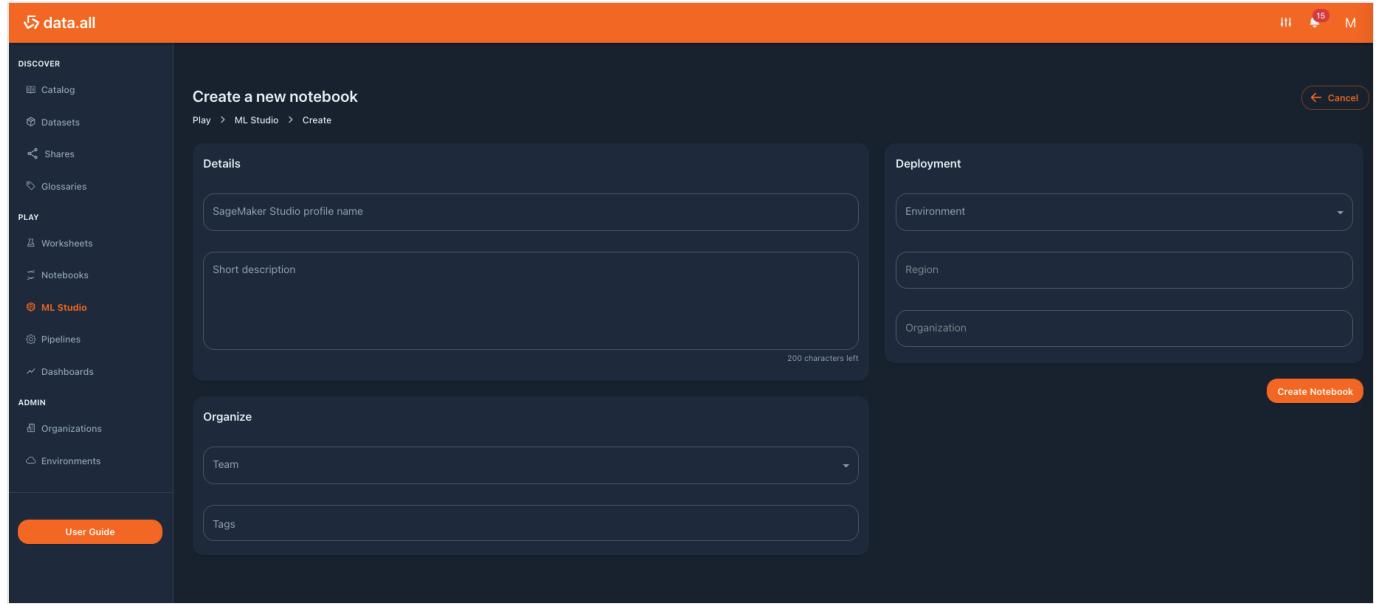
In the **Tags** tab of the notebook window, we can create key-value tags. These tags are not `data.all` tags that are used to tag datasets and find them in the catalog. In this case we are creating AWS tags as part of the notebook CloudFormation stack. There are multiple tagging strategies as explained in the [documentation](#).

## 5.3 ML Studio

With ML Studio Profiles we can add users to our SageMaker domain and open Amazon SageMaker Studio. The SageMaker Studio domain is created as part of the environment stack.

### 5.3.1 Create an ML Studio profile

To create a new ML Studio profile, go to ML Studio on the left side pane and click on Create. Then fill in the creation form with its corresponding information.



The screenshot shows the 'Create a new notebook' page within the data.all ML Studio interface. The left sidebar has sections for DISCOVER (Catalog, Datasets, Shares, Glossaries), PLAY (Worksheets, Notebooks, ML Studio, Pipelines, Dashboards), and ADMIN (Organizations, Environments). The 'ML Studio' section is highlighted. The main area has tabs for 'Create a new notebook' (selected), 'Edit notebook', and 'View notebook'. The 'Create a new notebook' tab has sub-sections for 'Details' (SageMaker Studio profile name, Short description), 'Deployment' (Environment, Region, Organization), and 'Organize' (Team, Tags). A large orange 'Create Notebook' button is at the bottom right.

Field	Description	Required	Editable	Example
Sagemaker Studio profile name	Name of the user to add to SageMaker domain	Yes	No	johndoe
Short description	Short description about the user profile	No	No	Notebook for Cannes exploration
Tags	Tags	No	No	deleteme
Environment	Environment (and mapped AWS account)	Yes	No	Data Science
Region (auto-filled)	AWS region	Yes	No	Europe (Ireland)
Organization (auto-filled)	Organization of the environment	Yes	No	AnyCompany EMEA
Team	Team that owns the notebook	Yes	No	DataScienceTeam

### 5.3.2 Check CloudFormation stack

In the **Stack** tab of the ML Studio Profile, is where we check the AWS resources provisioned by data.all as well as its status. As part of the CloudFormation stack deployed using CDK, data.all will deploy some CDK metadata and a SageMaker User Profile.

### 5.3.3 Delete an ML Studio user

To delete a SageMaker user, simply select it and click on the **Delete** button in the top right corner. It is possible to keep the CloudFormation stack associated with the User by selecting this option in the confirmation delete window that appears after clicking on delete.

The screenshot shows the AWS ML Studio interface. At the top, it says "Notebook johndoe". Below that, the navigation bar includes "Play", "ML Studio", and "johndoe". On the left, there's a sidebar with "OVERVIEW" (which is selected) and "STACK". The main area has a "Details" section with fields like "URI" (THKIJm), "Name" (johndoe), "Tags" (empty), and "Description" (some). To the right, there's a detailed view of the notebook's creation information, including "CREATED BY" (johndoe@amazon.com), "Organization" (AnyCompany Global), "Environment" (Data Science), "Team" (DataScienceTeam), "Created" (an hour ago), and "Status" (NOTFOUND).

### 5.3.4 Open Amazon SageMaker Studio

Click on the **Open ML Studio** button of the ML Studio notebook window to open Amazon SageMaker Studio.

The screenshot shows the Amazon SageMaker Studio interface. The top navigation bar includes "File", "Edit", "View", "Run", "Kernel", "Git", "Tabs", "Settings", and "Help". The main area features a "Get started" dashboard with three main sections: "Explore solutions, models, algorithms, and tutorials" (with links to "SageMaker JumpStart" and "Go to SageMaker JumpStart"), "Build models automatically" (with links to "SageMaker Autopilot" and "New autopilot experiment"), and "Instantly prepare data for ML" (with links to "SageMaker Data Wrangler" and "Start now"). Below this, there are sections for "ML tasks and components" (including "New compilation job", "New feature group", "New data flow", and "New project"), "Notebooks and compute resources" (with options to "Select a SageMaker image" and "Select a start-up script"), and "Utilities and files" (with icons for "Show Contextual Help", "System terminal", "Text File", and "Markdown File").

## 5.4 Pipelines

Different business units might have their own data lake and ingest and process the data with very different tools: Scikit Learn, Spark, SparkML, AWS SageMaker, AmazonAthena... The diversity of tools and use-cases result in a wide variety of CICD standards which discourages development collaboration.

In order to distribute data ingestion and processing, data.all introduces data.all pipelines:

- data.all takes care of CICD infrastructure
- data.all integrates with [AWS DDK](#), a tool to help you build data workflows in AWS
- data.all allows you to define development environments directly from the UI and deploys data pipelines to those AWS accounts

### Focus on value-added code

data.all takes care of the CICD and multi-environment configuration and DDK provides reusable assets and data constructs that accelerate the deployment of AWS data workflows, so you can focus on writing the actual transformation code and generating value from your data!

### 5.4.1 Multi-environment Pipelines

In some cases, enterprises decide to separate CICD resources from data application resources, which at the same time, need to be deployed to multiple accounts. Data.all allows users to easily define their CICD environment and other infrastructure environments in a flexible, robust way.

Let's see it with an example. In your enterprise, the Research team has 3 AWS accounts: Research-CICD, Research-DEV and Research-PROD. They want to ingest data with a data pipeline that is written in Infrastructure as Code (IaC) in the Research-CICD account. The actual data pipeline is deployed in 2 data accounts. First, in Research-DEV for development and testing and once it is ready it is deployed to Research-PROD.

#### Pre-requisites

As a pre-requisite, Research-DEV and Research-PROD accounts need to be bootstrapped using AWS CDK, trusting the CICD account (`--trust` parameter). Assuming 111111111111 = CICD account the commands are as follows:

- In Research-CICD (111111111111): `cdk bootstrap`
- In Research-DEV (222222222222): `cdk bootstrap --trust 111111111111`
- In Research-PROD (333333333333): `cdk bootstrap --trust 111111111111`

In data.all we need to link the AWS accounts to the platform by creating 3 data.all Environments: Research-CICD Environment, Research-DEV Environment and Research-PROD Environment.

NOTE: In practice, the cdk bootstrap command would already be run once when linking an environment. For example, if bootstrapping an environment with the default AdministratorAccess CDK execution policy, the command run before linking a new environment would look similar to:

```
cdk bootstrap --trust DATA_ALL_AWS_ACCOUNT_NUMBER -c @aws-cdk/core:newStyleStackSynthesis=true --cloudformation-execution-policies arn:aws:iam::aws:policy/AdministratorAccess aws://YOUR_ENVIRONMENT_AWS_ACCOUNT_NUMBER/ENVIRONMENT_REGION
```

In order for the DEV and PROD accounts to also trust the CICD account without impacting the initial bootstrap requirements, the Research-DEV and Research-PROD accounts need to edit the aforementioned bootstrap command similar to the following:

```
cdk bootstrap --trust DATA_ALL_AWS_ACCOUNT_NUMBER --trust Research-CICD_AWS_ACCOUNT_NUMBER -c @aws-cdk/core:newStyleStackSynthesis=true --cloudformation-execution-policies arn:aws:iam::aws:policy/AdministratorAccess aws://YOUR_ENVIRONMENT_AWS_ACCOUNT_NUMBER/ENVIRONMENT_REGION
```

## Creating a pipeline

data.all pipelines are created from the UI, under Pipelines. We need to fill the creation form with the following information:

- Name, Description and tags
- CICD Environment: AWS account and region where the CICD resources will be deployed.
- Team, this is the Admin team of the pipeline. It belongs to the specified CICD Environment where the pipeline is defined as IaC
- CICD strategy: This is the development strategy that determines the type of CICD Pipeline that is created by data.all. Currently the following 4 types are supported depending on your use case:
  - CDK Pipelines - Trunk-based**: A CICD pipeline based on [CDK Pipelines library](#). It defines a DDK Core construct which deploys Continuous Integration and Delivery for your app. Specifically, it provisions a stack containing a self-mutating CDK code pipeline to deploy one or more copies of your CDK applications using CloudFormation with a minimal amount of effort on your part.
  - CodePipeline - Trunk-based**: A CICD pipeline similar to CDK Pipelines and with a trunk-based approach but is not self-mutating.
  - CodePipeline - Gitflow**: A Gitflow branching strategy where each branch of the source repository has a corresponding CICD Pipeline that deploys resources for that branches environment.

Finally, we need to add **Development environments**. These are the AWS accounts and regions where the infrastructure defined in the CICD pipeline is deployed.

The screenshot shows the 'Create a new pipeline' interface. In the 'Details' section, the pipeline name is 'My Pipeline'. The 'CICD' section includes fields for CICD Environment ('Research-CICD'), Team ('Engineers'), Region ('eu-west-2'), Organization ('new'), and CICD strategy ('CDK Pipelines - Trunk-based'). The 'Development environments' table lists two environments: 'Research-DEV' and 'Research-PROD', each assigned to the 'Scientists' team. A 'Create Pipeline' button is at the bottom right.

## CDK Pipelines Overview

### CODECOMMIT REPOSITORY

When a pipeline is created, an AWS CodeCommit repository with the code of an AWS DDK application is created in the CICD environment AWS account. It contains an set up for a multi-account deployment, as explained in its [documentation](#).

In the deployed repository, data.all pushes a `ddk.json` file with the details of the selected development environments:

```
{
  "tags": {
    "dataall": "true",
    "Target": "PIPELINE_NAME"
  },
  "environments": {
    "cicd": {
      "environments": [
        {
          "name": "Research-DEV",
          "team": "Scientists"
        },
        {
          "name": "Research-PROD",
          "team": "Scientists"
        }
      ]
    }
  }
}
```

```
        "account": "111111111111",
        "region": "eu-west-1"
    },
    "dev": {
        "account": "222222222222",
        "region": "eu-west-1",
        "tags": {
            "Team": "DATAALL_GROUP"
        }
    },
    "prod": {
        "account": "333333333333",
        "region": "eu-west-1",
        "tags": {
            "Team": "DATAALL_GROUP"
        }
    }
}
```

In addition, the `app.py` file is also written accordingly to the development environments selected in `data.all UI`. It will look similar to the following:

```

# !/usr/bin/env python3

import aws_cdk as cdk
import aws_ddk_core as ddk
from dataall_pipeline_app.dataall_pipeline_app_stack import DataallPipelineStack

app = cdk.App()

class ApplicationStage(cdk.Stage):
    def __init__(
        self,
        scope,
        environment_id: str,
        **kwargs,
    ) -> None:
        super().__init__(scope, f"dataall-{(environment_id.title())}", **kwargs)
        DDKApplicationStack(self, "DataPipeline-PIPELINENAME-PIPELINEURI", environment_id)

id = f"dataall-cdkpipeline-PIPELINEURI"
cicd_pipeline = (
    ddk.CICDPipelineStack(
        app,
        id="dataall-pipeline-PIPELINENAME-PIPELINEURI",
        environment_id="cicd",
        pipeline_name="PIPELINENAME",
        cdk_language="python",
        env=ddk.Configurator.get_environment(
            config_path="./ddk.json", environment_id="cicd"
        ),
    )
    .add_source_action(repository_name="dataall-PIPELINENAME-PIPELINEURI")
    .add_synth_action()
    .build_pipeline()
    .add_stage(
        stage_id="dev",
        stage=ApplicationStage(
            app,
            "dev",
            env=ddk.Configurator.get_environment(config_path=".ddk.json", environment_id="dev")
        )
    )
    .add_stage(
        stage_id="prod",
        stage=ApplicationStage(
            app,
            "prod",
            env=ddk.Configurator.get_environment(config_path=".ddk.json", environment_id="prod")
        )
    )
    .synth()
)

```

## CICD DEPLOYMENT

data.all backend performs the first deployment of the CICD stack defined in the CodeCommit repository. The result is a CloudFormation template deploying a CICD pipeline having the aforementioned CodeCommit repository as source. This CodePipeline pipeline is based on the [CDK Pipelines library](#).

