Cloud Operations Plan

Trent J Broderick

University of Maryland Global Campus

December 8, 2020

**Executive Summary**

This document is a training and operations plan for the Cloud Operations Team of BallotOnline. This document will give the executive team an in-depth look into how the Cloud Operations team will operate regarding leveraging AWS Services in a responsible, project driven way that gives direct instruction into leveraging products in the AWS service catalog.

Through leveraging the catalog, Identity Access Management and policies, project managers will be able to control and template needed resources for cloud operations teams to provision only the required infrastructure needed in a simple and easily repeatable way that gives deep insights into cost controls and project life cycles.

The executive team is asked to read this document as it is a training guide for both admins and end-users of our operations teams. The executive team is welcomed to testing this guide on both ends themselves however, the guide is comprehensive and includes both instructions, screenshots and actual outcomes that are repeatable by any user who has administrative and or end user capabilities.

**Overview**

This training guide is meant to be used by members of both the administrative and end-user teams of the BallotOnline Cloud Operations Team. This document provides a high-level overview of the Amazon Web Services Service Catalog and how users can both configure and deploy the Service Catalog Portfolio and Products. Through instructions, screenshots and commentary, all users including admins and end-users will understand not only how to deploy the service catalog but the service catalogs value to our Cloud Operations team and our organization on a whole.

**AWS Service Catalog**

The Amazon Web Services Service Catalog is a service that allows IT teams to create a standard deployment that includes virtual servers, software and databases to build complete application architectures in a single management console (amazon). The service catalog provides deep and find grain access controls with the use of Identity Access Management (IAM), self-launch capabilities via CloudFormation templates, and standardization across deployments (Amazon).

Additional features of the Service Catalog service include versioning, which allows updates to the portfolio products and template and rollbacks in case a version is bugged or does not work as intended (Amazon). Constraints, which allow for Admins to set strict limits over the amount of resources provisioned or a particular cost budget to ensure there is not too much money being dedicated to a particular project then what was originally allocated (amazon). Lastly, service actions, which enables users to “perform operational tasks, troubleshoot issues, run approved commands, or request permissions in AWS Service Catalog on your provisioned products, without needing to grant end users full access to AWS services” (Amazon, 2020).

In the case of BallotOnline, this means that the administrative team for the Cloud Operations department can build out “portfolios” for teams with pre-configured resources such as a MySQL database, nginx server, and monitoring so teams can immediately deploy infrastructure when needed without the need for individual configuration.

**Configuration and Deployment**

For BallotOnline and use of this training guide both admins and end users will understand how to create IAM Users, IAM Groups, and how to create a Service Catalog Portfolio that will grant permissions and resources to end-users to provision and deprovision as needed. The configuration the service catalog will use is a pre-configured S3 bucket that will deploy into US-East-1 along with some additional resources such as a Website URL and an S3 Bucket Secure URL.

**Cloud Operations End-User Guide**

This portion of the training document is for the end-user of the BallotOnlne Cloud Operations team. The focus for the end-user is not how to configure the service catalog but how to launch the service catalog as the admin user has pre-configured all the resources needed. The pre-requisites needed to start this training are an IAM User account which is configured by an Admin, access to a service catalog portfolio, also configured by the Admin as well as a browser and working internet connection.

**Usability of AWS Service Catalog**

Graphical user interface

Description automatically generatedGraphical user interface, application, website

Description automatically generatedThe end-user will receive an email from their Administrator cont4aining an Account Number, Username, Password and link to sign in. Please note that the link provided automatically adds your account number into the sign in field for you, you do not need this link to access the AWS console however it is convenient.

Figure 2: AWS Console Menu (Amazon)

Figure 1: AWS Sign-in Console (Amazon)

Once you have signed in, you will be greeted with the AWS Console. In the search bar, search “Service Console” and select the service console option. When accessing the service console, select products from the left-hand menu and you will see products you are able to provision as configured by your Admin user.Graphical user interface, application

Description automatically generated

Figure : AWS End-User Service Catalog (Amazon)

Select the product you want to deploy and click “Launch Product” om the top right of the screen to continue. When you launch the product, a configuration screen will pop-up to continue.

Graphical user interface, text, application, email

Description automatically generated

Figure : AWS Service Catalog Confirmation Screen (Amazon)

Graphical user interface, application, Teams

Description automatically generatedGraphical user interface, text, application

Description automatically generated Ensure the provisioned product name is related to the project, skip tagging and event notifications unless instructed otherwise by your Administrator or Project Manager. When ready, click Launch Product and a screen will pop up to watch the resources be provisioned. Once the provision is successful, click into the product to learn more about what was provisioned.

Figure : AWS Service Catalog Provisioning Menu (Amazon)

Figure : AWS Service Catalog Product Information Menu (Amazon)

At this point, the resources provisioned can be accessed and there no configuration or launching of products needed. The end-user can now move onto the project needs without worry of ensuring the correct resources have been provisioned.

**Cloud Operations Admin Guide**

This portion of the document will instruct Administrators and Project Managers on how to create IAM Users, IAM Groups and assign these groups to Service Catalog Portfolios that can deploy specified products and templates. Admins and Project Managers must have predetermined products, configurations, and budgets to ensure Service Catalogs are used correctly and effectively. It is required all service admins submit requests for service catalog usage to the Office of the CTO for budgeting approval. There will be additional documentation and forms to be available in our Drive as the cloud implementation comes closer to deployment.

**Configuration and Deployment of AWS Service Catalog**

Graphical user interface, application

Description automatically generatedGraphical user interface, application, website

Description automatically generated First, sign into the AWS Console, from here search for IAM (Identity Access Management) and click into it. Before the Service Catalog can be utilized, the groups of employees who will be working on cloud projects must be identified and given specific explicit allowances to allow the use of resources without needing administrative approval for each deployment.

Figure : AWS IAM Console (Amazon)

Figure : AWS Console (Amazon)

Graphical user interface, application

Description automatically generatedGraphical user interface, text, application

Description automatically generatedGraphical user interface, application

Description automatically generated From the IAM Dashboard, select groups and click “Create New Group”. From here a Group Name, set of Permissions and final review is needed. In the case here, I created a Backup Operations Group name, since this is the Backup Operations team, I provided full S3 bucket access for storage as well as access to the Service Catalog so they can deploy the service catalog. It is extremely important to grant Service Catalog access to every group that is created when using groups for Service Catalog deployments.

Figure : IAM Group Name (Amazon)

Figure : IAM Permissions Console (Amazon)

Figure : IAM Groups Dashboard (Amazon)

Once everything has been selected, continue to the review page and click create. Once created, the group will populate in the Groups Tab. Next, we will need to create users to be added into the group to be able to utilize the permissions that were just created. On the left-hand menu, select “Users” the click “Add Users”. For user details, create the username(s), the BallotOnline standard will be first initial and last name. In the event it is taken, first and last name will work as well. Please note that you do not need to do this one by one, you can add multiple users at a time. Next, set the user to AWS Management Console and set a custom password “BallotOnline123” and set the Require Password Reset button. Then, we will set the Graphical user interface, text, application, email

Description automatically generatedGraphical user interface, text, application, email

Description automatically generatedPermissions.

Figure : AWS User Creation Console (Amazon)

Figure : AWS IAM User Creation (Amazon)

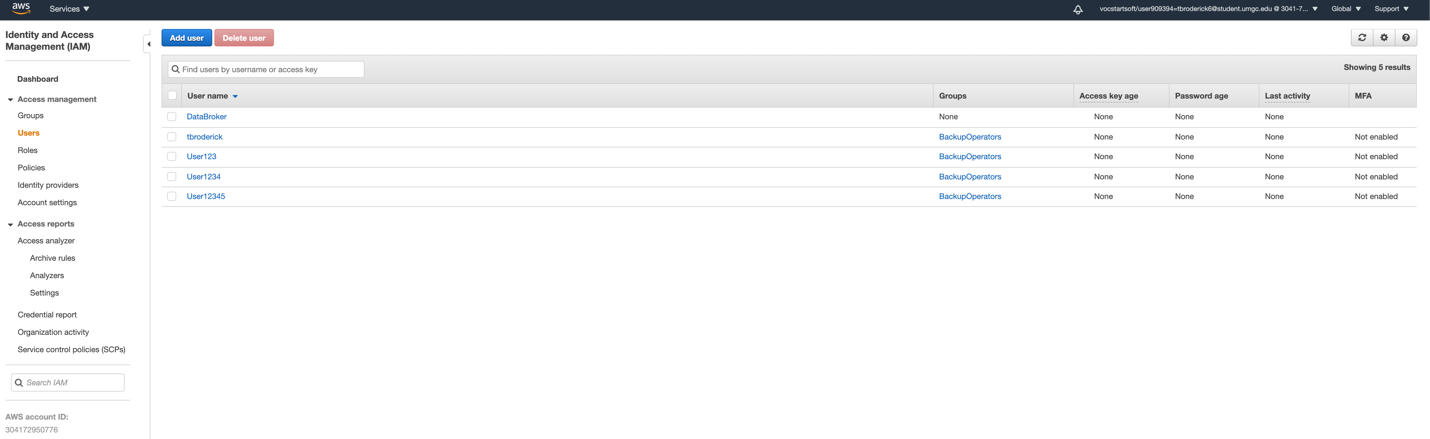
When setting the user permissions, select the group that is appropriate for this group of users. In this case, the newly created Backup Operators group. As of today, there is no need for Tagging, this will change as BallotOnline continues to develop its cloud strategy and training. From this point, move on to the review stage and create the users.

Figure :AWS IAM User Menu (Amazon)

Graphical user interface, application

Description automatically generatedGraphical user interface, text, application

Description automatically generated Now that the IAM Users have been added to an IAM Group, it is now time to create a Service Catalog for these users to deploy. From the AWS console, search Service Catalog and select the Service Catalog option. From the Service Catalog page select getting started, if that does not take you to portfolio creation, click on portfolio on the left side menu and click Create Portfolio.

Figure : AWS Service Catalog (Amazon)

Figure : AWS Service Catalog Create a Portfolio (Amazon)

Ensure the Portfolio has the appropriate information as I have put above, your project will have a different name and description. The project managers name is the owner in every scenario. Once the portfolio is created, click into it and navigate to the products tab and click Upload a new Product.

Graphical user interface, application, email

Description automatically generated

Figure 18: AWS Upload a Product Menu

Figure : AWS Portfolio Menu (Amazon)

Graphical user interface, application, Teams

Description automatically generated

On this screen, the product name should be the name of the project. Again, the Owner must be the project manager. The project manager is expected to have a preconfigured CloudFormation template saved that can be uploaded into the product console as shown here. The Version File can be AWS, but the description must include the products in the CloudFormation template. For support, please ensure our support teams information has been included here. After this screen is filled out, continue to review and create. The product will generate in the product tab. Next, continue onto the Groups tab and click Add Groups so we can now add a group that can deploy the preconfigured product. The group will populate in the menu, select it and press add.

Graphical user interface, application

Description automatically generatedGraphical user interface, application

Description automatically generated We are now successful in setting up the service catalog. Please distribute access information to the IAM users so they will be able to deploy the infrastructure that is needed for them to complete their project.

Figure : AWS Groups Added Confirmation

Figure : AWS Add Groups to Portfolio (Amazon)

**Limitations and Resources**

Mid-way through the project, I had to switch to a personal account and risk incurring personal cost. Using my educational account prohibited me from adding users or editing IAM functions which was frustrating considering I may not have been the only student with this issue. This is something that should be looked into further if more students are going to continue to need work arounds for a university sponsored class. After already paying north of $4,000 or a class, I do not want to be expected to spend even more money on resources to complete projects. In a professional environment, such limitations would not exist, so this is a purely educational limitation. However, the resources and instructions for this project were extremely clear and helpful.

**Summary**

To smize, both end and admin users should fully understand the expectations and roils around leveraging IAM and Service catalogs. End-users simply must navigate to the catalog to launch resources while it is on the Admin to provide access, give special permissions and add products to the catalog. Admins are required to interface directly with decision makers and budget holders before creating Catalogs for projects. This way of provisioning will help standardize across all Cloud Operations departments how to provision resources for budgeted projects.

**References**

Amazon. (2020a). *AWS IAM Overview*. Amazon Web Services, Inc. https://aws.amazon.com/iam/

Amazon. (2020b). *AWS Service Catalog Features - Amazon Web Services*. Amazon Web Services, Inc. https://aws.amazon.com/servicecatalog/features/

Amazon. (2020c). *Identity and Access Management in AWS Service Catalog - AWS Service Catalog*. https://docs.aws.amazon.com/servicecatalog/latest/adminguide/controlling\_access.html

Amazon. (2020d). *Managing Portfolios - AWS Service Catalog*. https://docs.aws.amazon.com/servicecatalog/latest/adminguide/catalogs\_portfolios.html

Amazon. (2020e). *Setting Up for AWS Service Catalog - AWS Service Catalog*. https://docs.aws.amazon.com/servicecatalog/latest/adminguide/setup.html

Amazon. (2020f). *What Is AWS Service Catalog? - AWS Service Catalog*. Amazon Web Services. https://docs.aws.amazon.com/servicecatalog/latest/adminguide/introduction.html

UMGC. (2020). *Deploy the Service Catalog*. https://leocontent.umgc.edu/content/umuc/tgs/cca/cca630/2208/course-resource-list/deploy-the-service-catalog.html?ou=516113