CS6750 Project

Redesigning the AWS Management Console

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1 INTRODUCTION

This project will investigate and redesign the interface of AWS Management Console to help users better find AWS services they want to access. Users can access the Console at console.aws.amazon.com with their AWS account. On this interface (See *Figure 1*), users can use search bars and buttons under the "AWS Services" section to open the interfaces of different computing services that AWS offers. For example, if users want to create a new database, they can click on "All Services" and then "RDS" under the "Database" category. After that, the interface will jump to the "Amazon RDS" interface. Once users are done with creating the database, they can click the "AWS" icon on the top left button to go back to the Console interface. In addition, they will find the "RDS" button in the "Recently visited services" after they use the RDS service.

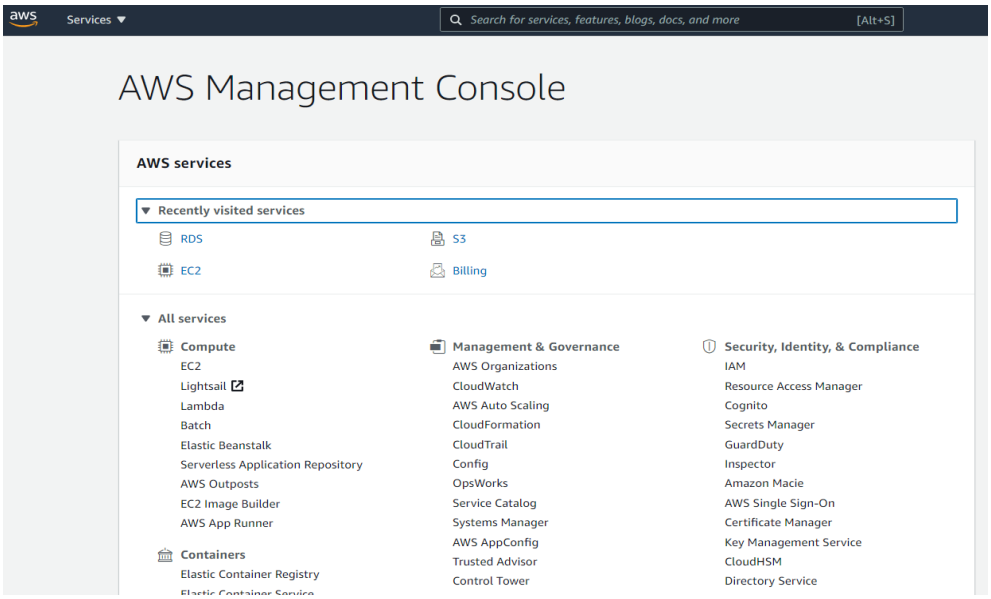

Figure 1—Screenshot of my AWS Management Console (Region: us-east-1)

2 INITIAL NEEDFINDING

Since cloud computing is becoming more and more prevalent, many people start to learn and use AWS as it offers a variety of computing services flexibly at a reasonable price. However, from my personal experience, the Console interface intimidated me when I first started to explore AWS. The items under "All Services" looked like a long laundry list to me and the names were not intuitive of their functions. Also, under the "Recently visited services" section, the interface only shows the names of service items. However, I would expect to know what is the project that I created the services for. So it would be useful to group the recent services by projects that I am working on when I have multiple projects using AWS services.

As a result, I conducted two types of needfinding to better understand the users of AWS and their tasks.

2.1 Types of Needfinding

I chose surveys and product reviews to find users' needs as they are efficient ways to gather diverse feedback given a short period of time.

2.2 Problem Space

The task occurs when users want to find the services that they need for their projects. It takes place when they are sitting in front of the Console interface in the browser. Sometimes they might have time pressure, such as when the website is down and they need to quickly check the virtual server status. The segment of the target domain that this project develops for is the "Recently visited services". The redesign will try to help users better manage their current services and thus make it easier to succeed in their tasks.

2.3 User Types

The majority of the AWS users would be technical people, such as software developers who use virtual services and databases, data scientists who use the machine learning services, data engineers who build pipelines and manage databases, and so on. The users will be from regions where AWS offers services. They might either use AWS for their day job or use it for their side projects.

In particular, the user that I am redesigning for would be users who have multiple projects using AWS services. They probably represent a majority of all users and want to manage their running services easily.

2.2 Needfinding Plan 1 - Surveys

I plan to distribute surveys using the PeerSurvey tool (http://peersurvey.cc.gatech.edu/). The classmates in the OMS-CS6750: Human-Computer Interaction class are great candidates as they are likely AWS users or at least have some experience with it either from work or classes. They are from all over the world and work at different professions. For those who are working professions, their tasks using AWS are probably developing and maintaining their companies' services. Their goals are making sure the services are running properly and adjusting specific settings. For those who are self-learning AWS, their tasks using AWS are probably getting familiar with different services and trying out some side projects. Their goals are mastering AWS to become more efficient at their tasks.

The survey (link) has the following questions:

1. Which age group are you in?
2. What is your job type?
3. Have you used AWS services before?
4. Have you used other cloud computing vendors, such as Azure and GCP?
5. If you have experience with AWS and Azure/GCP, which cloud computing has the best main interface?
6. What do you use AWS for?
7. How often do you use AWS?
8. Do you think the AWS Management Console is easy to navigate?
9. How do you like the layout of the "Recently visited services" session?
10. How do you like your running services to be grouped by projects?
11. Anything else that you like or dislike about the AWS Management Console?

One potential bias is the response bias that participants answer falsely to earn the participation credit even without the AWS experience. To reduce this bias, I will

make it clear in the survey title and description that the survey is for people who have prior AWS familiarity only.

2.3 Needfinding Plan 2 - Product Reviews

I plan to collect some product reviews of AWS from market research sites such as Gartner (link). The people who commented there are also from all over the world and might be enthusiastic AWS users if they left reviews. They are anonymous and I can classify the reviews into positive and negative ones based on the star ratings that reviewers gave.

One potential bias is the voluntary response bias as usually only users who have strong opinions would leave the reviews. To mitigate this bias, I will try to select reviews that look authentic and contain useful content for the data inventory, such as the ones that are about users' contexts, goals, needs, tasks, subtasks, and so on.

2.4 Needfinding Conclusion

Here is the report based on the 22 survey result analysis and 25 product reviews. In the survey results, 86% of the respondents have used AWS services before. Thus, the survey respondents are a good sample of the large AWS user base. In the product reviews, I selected the ones that have substantial content as they are more likely written by experienced AWS users.

2.4.1 Who are the users?

According to the survey, users are likely around 25 - 35 years old and work as software engineer, data scientist, or data analyst. Half of the users also have experience using other cloud computing services similar to AWS, such as Azure and Google Cloud Platform.

2.4.2 Where are the users?

The users will be from all over the world where AWS provides services. As it is unclear whether the Console interface is different in non-US regions, I narrow down the user group to be the US users who would see the interface as shown in *Figure 1*.

2.4.3 What is the context of the task?

According to the survey, 60% of the users use AWS for the day work and 36% of the users use it for side projects. Some others use it for class projects or self-learning purposes.

2.4.4 What are their goals?

The main goal for the user to use AWS Management Console is to find specific services that they need to use for their projects.

2.4.5 What do they need?

They will need a working computer with a browser app. To open AWS from the browser, they will also need Internet access and a personal or work AWS account. If the computer does not have the touch screen, they will also need the mouse to interact with the interface.

2.4.6 What are their tasks?

For most of the users, their tasks are to start new projects or continue working on existing projects that rely on AWS services.

2.4.7 What are their subtasks?

2.4.7.1 Starting a new project

Firstly, they will need to have a broad understanding of the AWS services, such as S3 is the storage service and EC2 is the computing service. Secondly, they will need to evaluate what services they will need for creating a new project, such as hosting a web application that connects with the on-prem database. Thirdly, they will have to add a payment method if they want to use the paid services. Fourthly, they will open those services from the Console and create new instances.

2.4.7.1 Continue with a existing project

Firstly, they will identify the services that they want to open. Secondly, they can access the service either from the "Recently visited services", "All services", or search bar on the top.

3 HEURISTIC EVALUATION

3.1 What works well?

Generally speaking, the Console has a good **structure.** It organizes the interface into several sections, including "AWS Services", "Build a solution", "Getting Started with AWS", "Stay connected to your AWS resources on-the-go", "Explore AWS", and "Have feedback?". Those section names are informative and useful for users to understand and decide what to use.

The interface is **predictable** and **consistent** for the hyperlink behavior. On the Console, clicking on the service name would open the specific page. If there is a  symbol next to the service name, it means the new page will open in a new tab in the browser. Otherwise, the current tab will be reloaded to show the specific page.

It also has a narrow **gulf of evaluation** as the buttons work as expected and the users can quickly evaluate whether the new page is opened or not from the screen.

3.2 What makes it work well?

The Console offers a lot of **affordances** by using the small icons on the left of the service names to hint what the service means. For example, the Compute services have a computer icon (Screenshot: 

) and the Storage services have a file drawer icon (Screenshot: 

).

The Console also provides enough **discoverability** as all services are visible under the "All services" section. When the user hovers over the service button, it will display a short description to indicate what the service offers so that users don't need to learn elsewhere.

3.3 What doesn't work well?

The Console intimates users and they feel a **gulf of execution** between their goal and identify actions to realize the goal . One survey respondent said: "For newer users like myself, the menu is very overwhelming. I needed A Cloud Guru and coworkers to help me understand where to go to do particular tasks." This partly

is because AWS offers so many services and it is hard to understand which service to use for a novice user.

The Console also doesn't provide enough **flexibility** for users to tailor the interface based on their project needs.

3.4 Why doesn't it work well?

As AWS keeps adding new services, it also makes the Console harder to navigate and loses a certain amount of **simplicity**. Users are given too much information and make it more difficult for them to understand. The Console also doesn't offer enough **ease** as users feel frustrated when being presented with loads of information.

One possible cause is **expert blindspot.** Software engineers and product managers at AWS might be very familiar with the product and lose the fresh perspective of designing the interface for users. Also, it could be that AWS focuses on the functionalities of the services instead of creating a user-friendly interface.

4 INTERFACE REDESIGN

According to the survey result, two-thirds of the respondents voted "Strongly Agree" or "Agree" for the redesign idea that the services are grouped by projects. As a result, I created a wireframe to prototype the redesigned interface (See *Figure 2*).

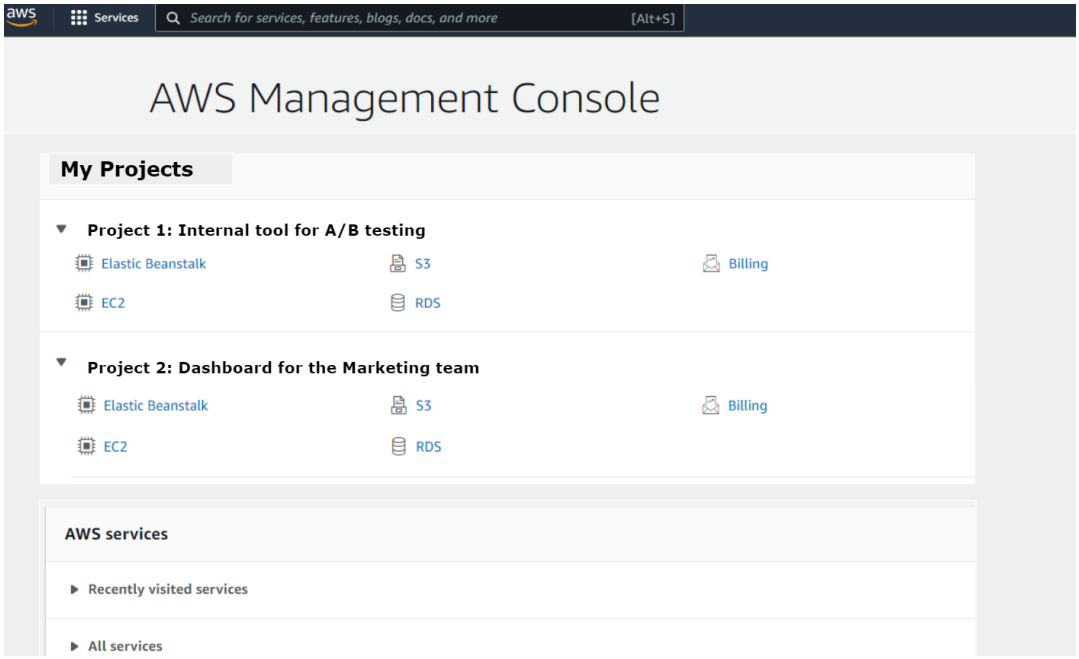

Figure 2—Prototype of the redesigned AWS Management Console

The redesigned Console offers the section "My Projects" which shows the current projects and related service instances. Users can easily click on the Project title to rename it. Also, when clicking on the service name, it will open the instance associated with this project instead of the service main page. Users can customize what to show under the projects by using the tags. The redesigned Console still keeps the other sections for consistency, such as "Recently visited services" and "All services".

5 INTERFACE JUSTIFICATION

5.1 How the redesign addresses the criticisms

The redesigned Console adds more **discoverability** as the users can find services at the most obvious location on the interface. It would offer more **ease** for AWS users as they can now easily jump to services within the project that they need to open. The "My Projects" sectio would offer users great **flexibility** to tailor the interface based on their project needs.

In general, it would help reduce the **gulf of execution** as users can now more easily identify actions to take to complete their tasks.

Users would also feel more sense of **direct manipulation** with this redesign as they would interact more directly with their ongoing projects instead of the services. Users would also feel the interface becomes **invisible** as they manage the projects just like they organize the files into different folders.

5.2 How the redesign preserves the positive element of the original interface

The redesign keeps a good **structure**. It essentially just adds the "My Projects" to the existing sections, including "AWS Services", "Build a solution", "Getting Started with AWS", "Stay connected to your AWS resources on-the-go", "Explore AWS", and "Have feedback?". "My Projects" section name is also informative and useful for users to understand and decide when to use.

The interface is still **predictable** and **consistent** for the hyperlink behavior. The texts under "My Projects" will behave the same as the ones in "AWS Services".

The redesign still offers a lot of **affordances** as it keeps the icons on the left of the service names to hint what the service means. It is also **consistent** with the original interface by using the collapsible effect where users can click the project title to toggle between showing and hiding the specific services.

6 EVALUATION PLAN

6.1 Select the method

I will conduct online surveys to evaluate the new interface as shown in *Figure 2*. Since the redesign adds a new mode of interactions to the existing interface, qualitative evaluation is more suited. I also choose surveys over interviews as I want to collect more diverse feedback.

6.2 Evaluation Plan

I plan to distribute surveys using the PeerSurvey tool (http://peersurvey.cc.gatech.edu/). The respondents will be classmates in the OMS-CS6750 class. The target sample size is 20.

6.3 Evaluation Content

The survey (link) has the following questions:

1. Select your age?
2. What is your job title?

3. Have you used AWS services before?
4. What do you use AWS for?
5. Do you think the current AWS Console interface is easy to use?
6. Here is the redesigned interface where there is a new section that groups services by projects. Does this new redesign look easier to use ?
7. What do you like about this redesigned interface?
8. What do you dislike about this redesigned interface?
9. Other feedback for improving the AWS Console interface?

6.4 Limiting the effect of bias

I will limit my own bias during the evaluation in the following two ways.

Firstly, I will try to avoid the confirmation bias if I only look for proof that the redesigned interface is better. For example, in Question 6, I offer respondents 5 choices including "Strongly Agree", "Agree", "Neutral", "Disagree", and "Strongly Disagree" instead of the simple "Yes" or 'No" choice. This would give me a better understanding of how many respondents might feel the redesigned interface is indifferent to the original interface. I also include Question 8 to ask respondents' opinion on things that they dislike about the redesigned interface. This information would be helpful to further improve the interface and understand users' needs.

Secondly, I will try to avoid the sampling bias if I only get the respondents sampled from a certain segment of the users instead of all. I will make sure the respondents are people I don't know so that they can provide more honest answers. In order to do that, I will collect responses using PeerSurvey from classmates instead of asking friends and families to fill out the survey or conduct interviews.

7 EVALUATION EXECUTION

7.1 Evaluation as a whole

I collected 11 survey responses to evaluate the prototype during 11/28/21 - 12/5/21. Organizationally, I would start the survey earlier to collect more responses.

7.2 Survey results

7.2.1 Who are the users?

According to the survey result, users are likely around 25 - 35 years old and work as software engineer (64%), data scientist (10%), or other (18%). 82% of the respondents have experience with AWS before.

7.2.2 What is the context of the task?

45% of the users use AWS for the day work and 36% of the users use it for personal side projects. Some others use it for class projects, self-learning, and other purposes.

7.2.3 General opinion

The average opinion of respondents towards the original AWS Management Console is Neutral (raw score: 3.36). In comparison, the average opinion of respondents towards the redesigned interface is Agree (raw score: 4). 9 out of 11 respondents thought the redesigned interface looks easier to use than the original interface.

7.3 Analyze results

7.3.1 Main takeaways

The survey results suggest that the redesigned interface would be easier for users to use and help them achieve their tasks.

7.3.2 Surprising feedbacks

It is surprising that respondents who strongly agree or agree that the redesigned interface is easier to use are also more likely to use AWS in multiple contexts, such as for both day work and side projects. This suggests that the new "My Projects" section would be more appealing and useful for heavy AWS users as they might have to manage many projects either for work or for personal projects at any given time.

Also, it is surprising that users would find sections in the original interface like "Recently visited services" and "All services" to be useful as well. This indicates that the redesigned interface should be **consistent** with the original interface by keeping the major sections that users are already familiar about.

7.3.3 Expected feedbacks

It is expected that many respondents mentioned the pain points that the redesign tried to address. For example, some respondents wrote explicitly that they like things to be sorted by projects and the redesigned interface would enable them to find things easier and faster.

7.3.4 About the interface

The feedback indicates that the redesigned interface is indeed better than the original interface for users to complete the tasks. Also, as I didn't include any description of the redesign in the survey question, the results suggest the "My Projects" section on the new interface is informative enough for users to understand its purpose.

7.4 Changes for next iteration

Here is my plan for the next iteration through the design life cycle based on the evaluation results.

7.4.1 Additional information

As users use AWS in multiple contexts (such as day work, side projects, class projects, etc), it will be helpful to further distinguish their different needs when interacting with the AWS Management Console under different contexts.

It will also be useful to gather more information on what types of tasks users of different job functions use AWS for. For example, software engineers might mainly use AWS to build websites and APIs, data scientists might mainly use AWS to train machine learning models, data analysts might mainly use AWS to answer analytics question by querying data from the data warehouse, data engineers might mainly use AWS to build data pipelines and warehouses, and so on.

7.4.2 Design alternatives

There are several possible wrinkles to the existing prototype.

First, the interface should show the instance name instead of the service name. For example, under the project, it could be "CompanyA Sales Database" instead

of the generic database service name “RDS” and “VM for Sales Dashboard” instead of the generic computing service name “EC2”.

Second, the interface could possibly add more information to help users recall project details. For instance, it could allow users to add a note to keep track of project’s purpose and progress, such as “Internal tool for Sales team; 50 daily users; Currently done connecting the database; Need to improve UI; Deadline: 2/20/22”.

7.4.3 Brainstorming revisions

I would revise the prototype to a higher level of fidelity, such as using multiple wireframes that show the interfaces given different user inputs. This would help me better evaluate how users like the process of creating and managing the projects. For example, I would include the following wireframes to fully describe the process:

1. On the Console page, show the “+” button next to the “My Projects” section to illustrate that users can create a new project
2. On a service page like EC2 or RDS, show that users can categorize the instance into created projects
3. On a new Console page, show that the instance is under the new project
4. Show the instance page that that user would see when they clicks on the hyperlink text of the instance
5. On a new Console page, show the note under the project

7.4.4 Type of evaluations

I would use interviews to evaluate the revised prototypes. In particular, I will show the participants the interfaces from the screen over Zoom. At each step, I will ask participants what they would click on if they need to do a certain task to evaluate the **gulf of execution**. I will also ask participants what they predict the interface will show after certain interactions to evaluate the **gulf of evaluation**.