

Amazon Web Services

Data at Scale

Why

- We should learn about AWS
 - Example for Cloud Computing
 - Reasonably cheap
 - Most covered in the free tier

How

- You need to use a credit / debit card
 - But most activities are covered by the free tier
 - Set up billing alerts (Use US North Virginia!)
 - You can work in groups

What

- AWS is a confusing conglomerates of different services
- Most prominent
 - EC2 — virtual machines
 - S3 — Storage capacity
- We will also use a Hadoop cluster to do exercises with Pig
 - **Those can cost a bit of money if you forget to take down your cluster when you are done**
 - If you make a mistake, the costs are less than 10\$ per day

Use cases for AWS

- Machine learning
 - A specialized machine with large GPU costs several thousands dollar
 - If you don't do a lot of neural network computation, AWS is cheaper
- Setting up and hosting a web server
- Running a Hadoop cluster without the hazzle
- Running Apps in a private network
- Running highly available systems
- Lowering costs for compute infrastructures
- ...

Alternatives to AWS

- Azure Virtual Machines
- Google Compute Engines & Google Cloud Storage

Billing

- AWS (and other cloud service providers) bill:
 - Per second
 - Per GB stores
 - Per GB moved

Interacting with AWS

- By hand:
 - Use the AWS management console
- Using a command-line interface
 - Allows to automatize the renting of AWS resources
- SDK
 - Programmatic access
 - Available in various languages
- Blueprints
 - Description of your system
 - Compares with current state and figures out how to get additional resources

Signing up with AWS

- Provide login credentials (including strong password)
- Provide contact information
 - Your phone number is checked
- Provide payment details
- Verification of identity via phone
- Support plan

Activity

- Use your web-browser to access aws.amazon.com
- *Create a Free Account*
- Use a strong password (at least 20 characters)



Sign In or Create an AWS Account

What is your email (phone for mobile accounts)?

E-mail or mobile number:

- I am a new user.
- I am a returning user and my password is:

[Sign in using our secure server](#)

[Forgot your password?](#)



**AWS Accounts Include
12 Months of Free Tier Access**

including use of Amazon EC2,
Amazon S3, and Amazon DynamoDB

Visit aws.amazon.com/free for full offer terms

Activity

- Create accurate contact information

The screenshot shows the 'Contact Information' section of the Amazon Web Services Sign Up process. At the top left is the Amazon Web Services logo, and at the top right are links for 'Sign In' and 'Amazon Web Services Sign Up'. The form is titled 'Contact Information' and includes radio buttons for 'Company Account' and 'Personal Account'. Below this, a list of 'Required Fields' includes: 'Full Name*', 'Country*' (with a dropdown menu), 'Address*' (with a placeholder 'Street, P.O. Box, Company Name, etc.' and a sub-field for 'Apartment, suite, unit, building floor, etc.'), 'City*', 'State / Province or Region*', 'Postal Code*', and 'Phone Number*'. A 'Security Check' section displays a distorted image of the word 'GUTER' and a text input field with the prompt 'Please type the characters as shown above'. At the bottom, there is an 'AWS Customer Agreement' section with a checkbox and a link to the agreement, followed by a yellow 'Create Account and Continue' button.

Activity

- Create payment information

The screenshot shows the 'Payment Information' step of the AWS Sign Up process. At the top left is the Amazon Web Services logo. At the top right, there is a language dropdown set to 'English' and a 'Sign Out' link. Below the logo is the title 'Amazon Web Services Sign Up'. A progress bar below the title shows five steps: 'Contact Information' (completed with a checkmark), 'Payment Information' (current step with a red dot), 'Identity Verification', 'Support Plan', and 'Confirmation'. The main content area is titled 'Payment Information' and contains the following text: 'Please enter your payment information below. You will be able to try a broad set of AWS products for free via the Free Tier. We will only bill your credit or debit card for usage that is not covered by our Free Tier.' Below this is a link for 'Frequently Asked Questions'. The form fields include: 'Credit/Debit Card Number' (text input), 'Expiration Date' (two dropdown menus for month and year, currently showing '01' and '2017'), 'Cardholder's Name' (text input), and two radio button options: 'Use my contact address' (selected) and 'Use a new address'. At the bottom of the form is a yellow 'Continue' button.

amazon web services

English Sign Out

Amazon Web Services Sign Up

Contact Information Payment Information Identity Verification Support Plan Confirmation

Payment Information

Please enter your payment information below. You will be able to try a broad set of AWS products for free via the Free Tier. We will only bill your credit or debit card for usage that is not covered by our Free Tier.

[Frequently Asked Questions](#)

Credit/Debit Card Number **Expiration Date**

01 2017

Cardholder's Name

Use my contact address

Use a new address

Continue

Activity

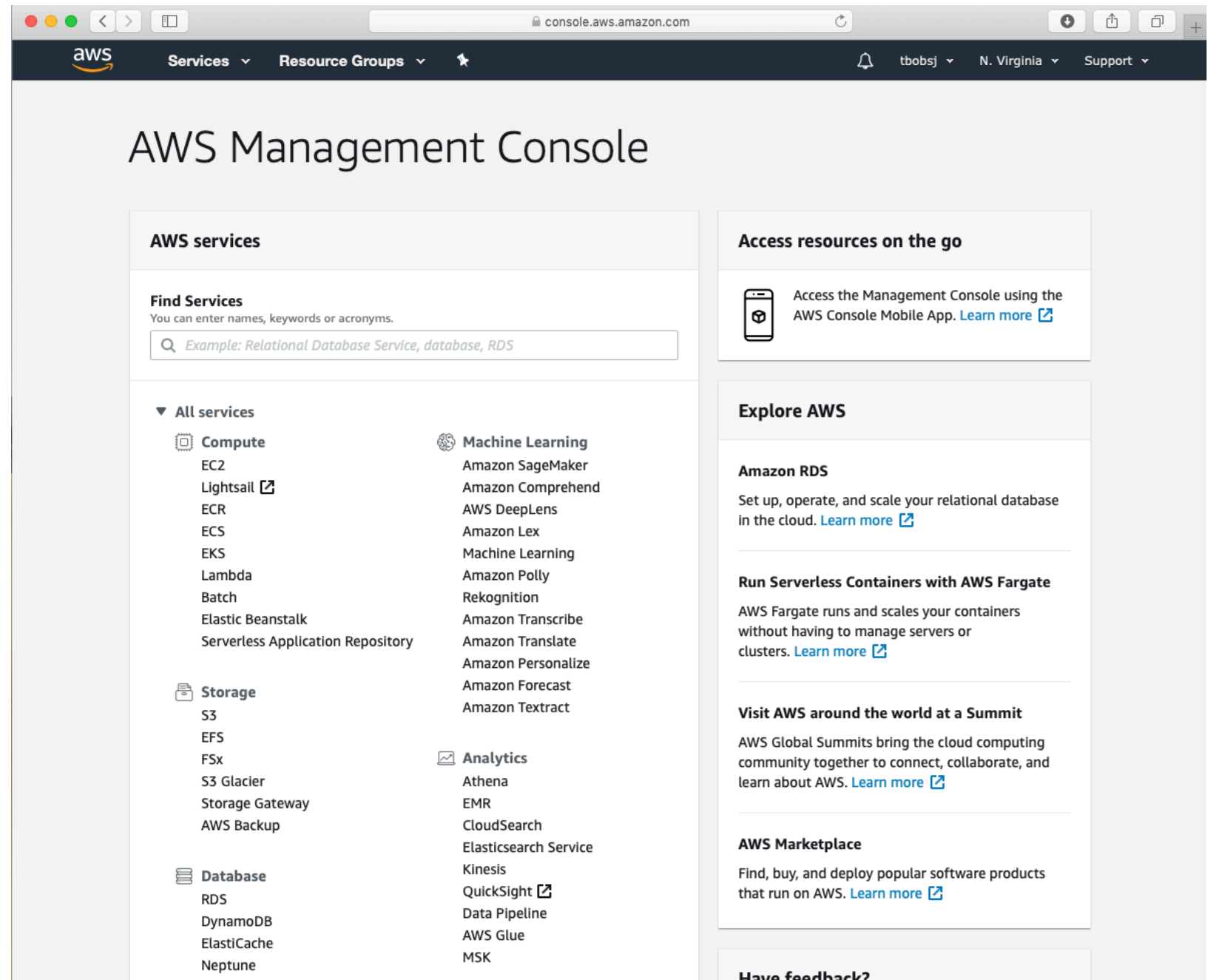
- Verify Identity
 - Message through smart-phone ...

Activity

- Choose your support plan
 - **BASIC**
- unless you want to pay for something you'll probably do not need

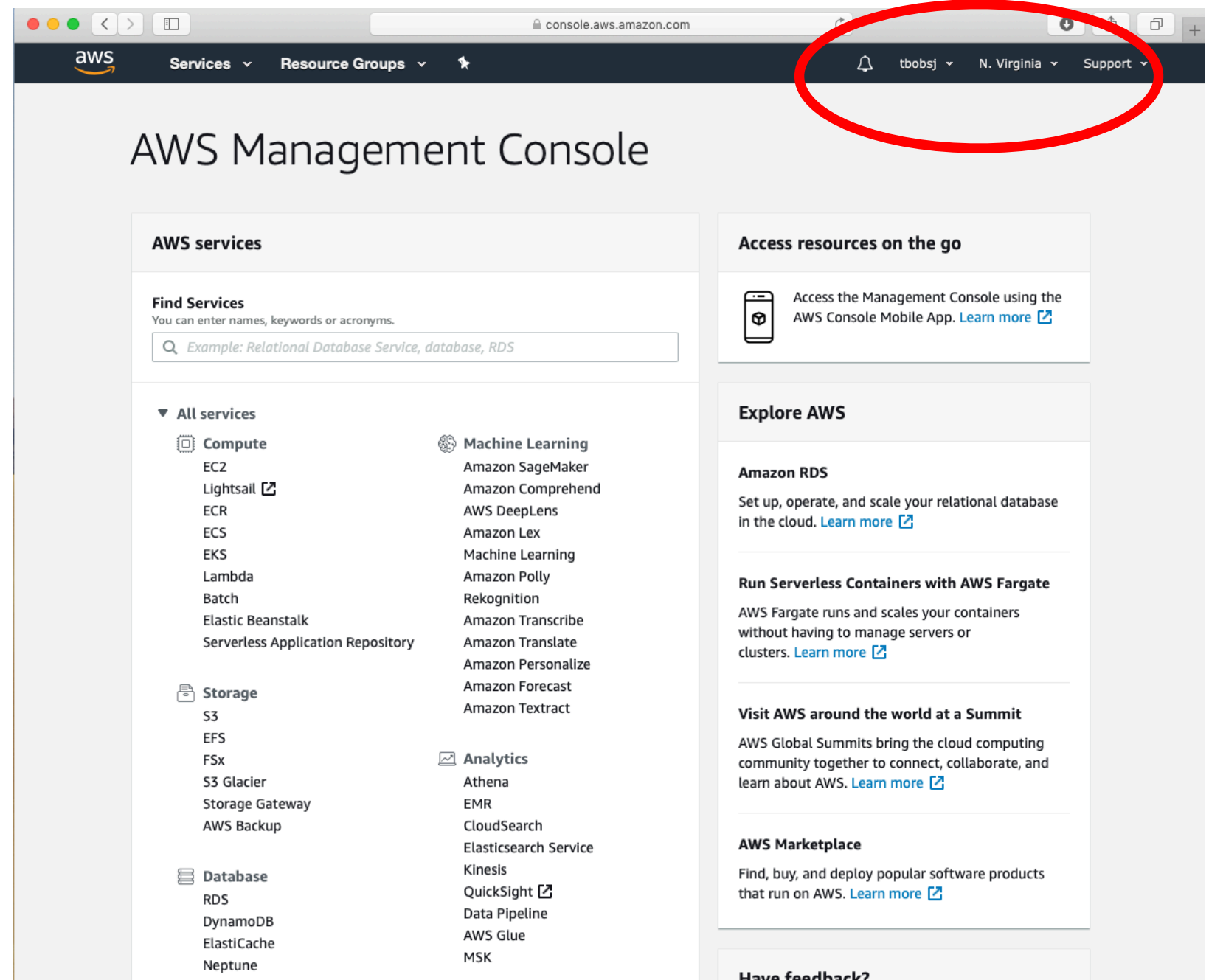
Activity

- Now you can sign on to AWS
- Go to the AWS management console



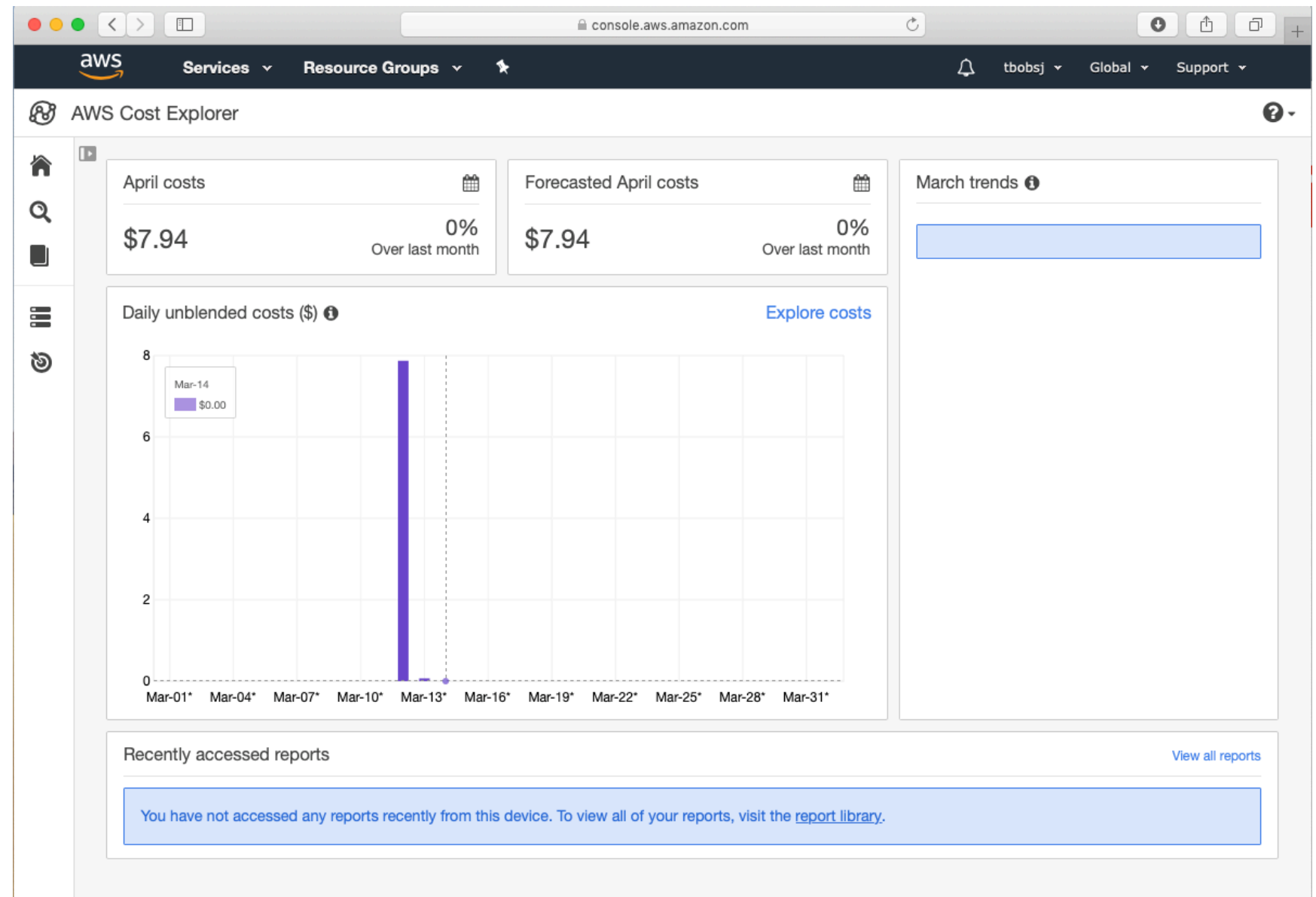
Activity

- Select the N. Virginia service center



Activity

- Select Cost Explorer in Services



Activity

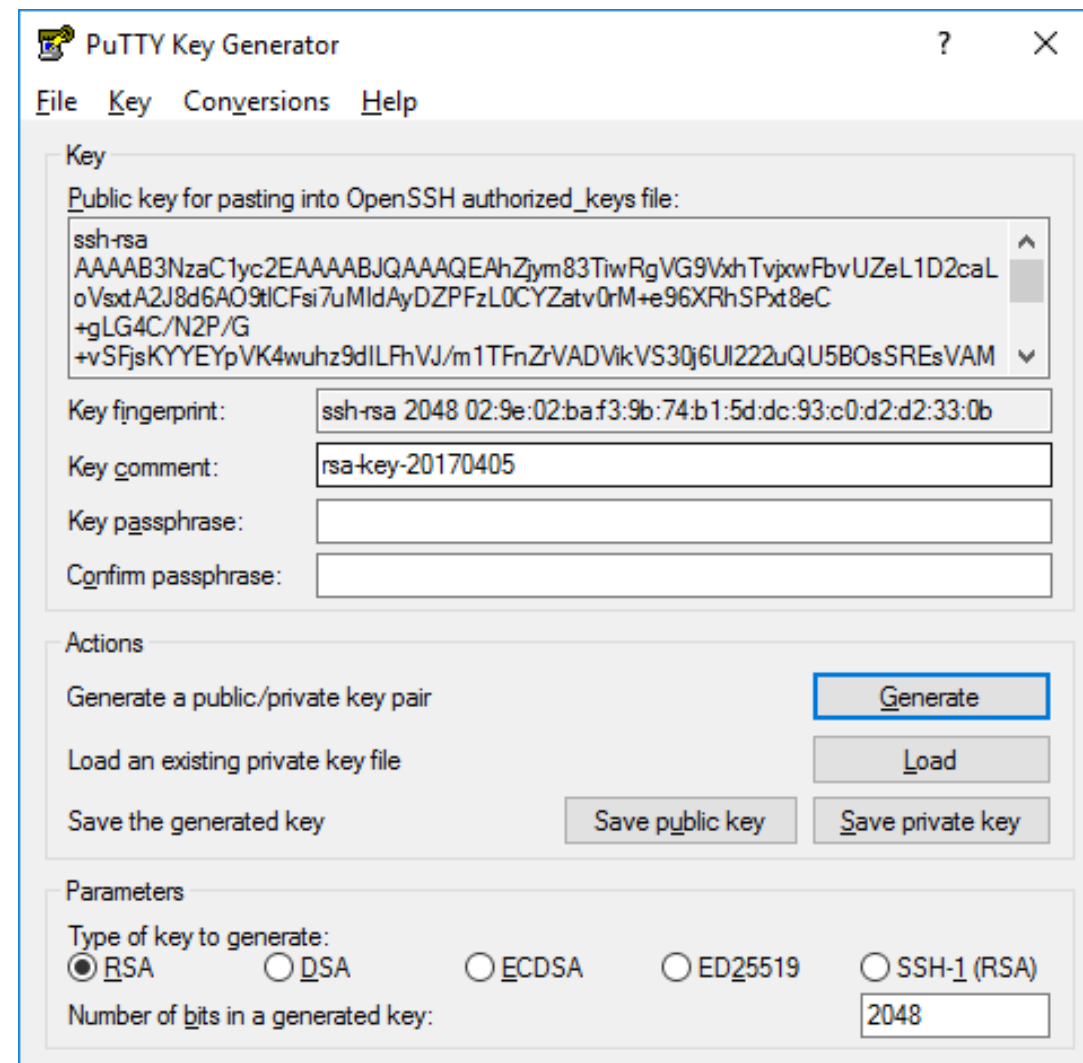
- Accessing AWS
 - MacOS and Linux: use SSH
- Access is via public—private key authentication
 - The public key is uploaded to your systems
 - The private key needs to be stored locally
 - Anywhere on your system, but you will need to provide the path to the key
 - The private key needs to have permission
 - **AWS does not** accepts keys that are publicly readable

Activity

- MacOS and Linux
 - Create the key
 - Put the private key in an easily remembered location
 - Use `chmod 400 mykey.pem` to change permissions

Activity

- Windows: Need to install and use PuTTY
- PuTTY has a tool PuTTYgen that changes key format
 - Open PuTTYGen
 - Select RSA
 - Use Load
 - Switch file type to all
 - Select mykey.pem file
 - Click save private key



Activity

- Enable billing alarm
 - Select your name (in US Virginia)
 - Select “My Billing Dashboard”
 - Go to preferences
 - Select Receive Billing Alerts
 - Save preferences

Activity

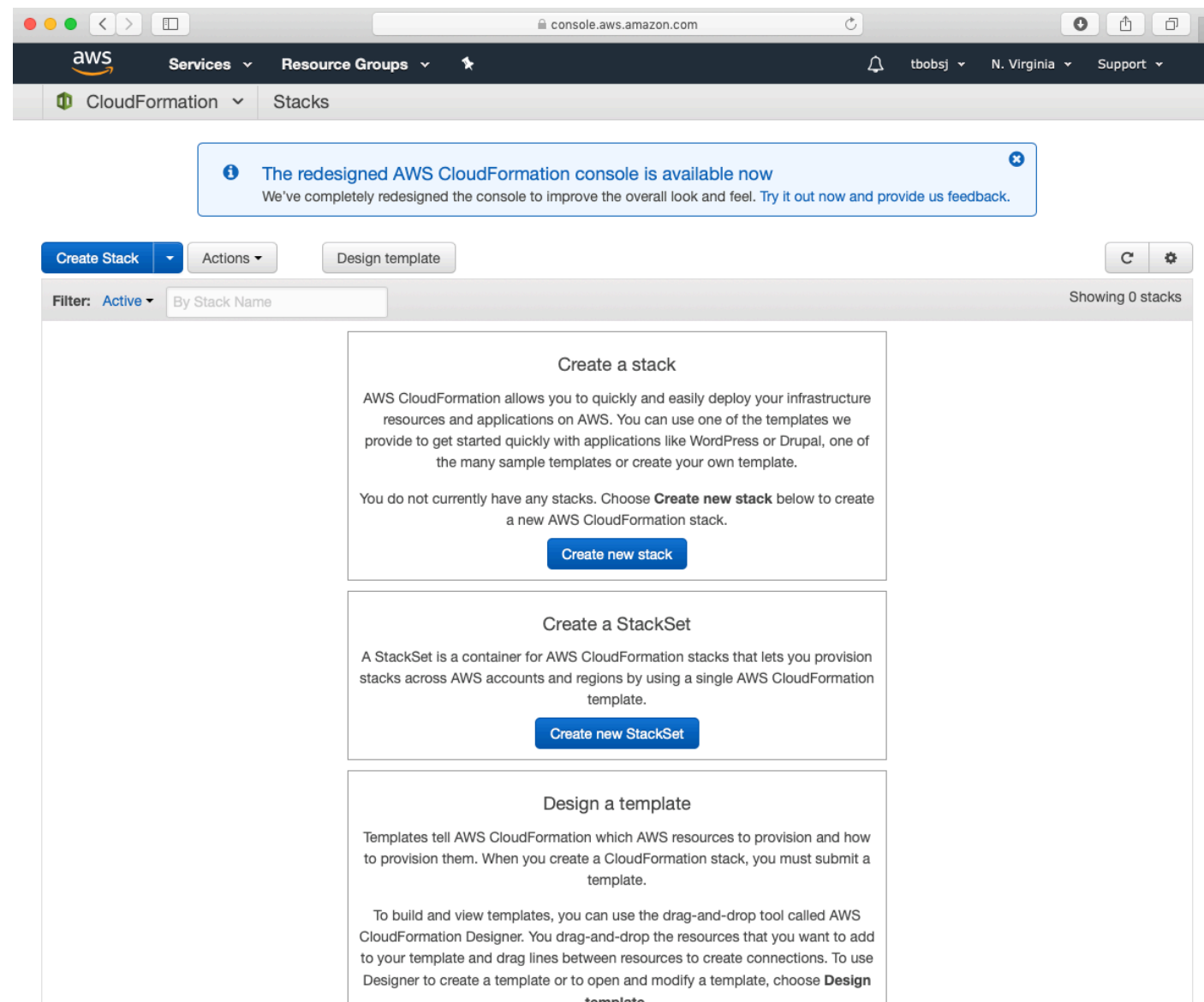
- Now we are ready to use AWS
 - We create a simple webpage
 - This means installing PHP, MySQL, ...
 - Use a number of services:
 - Elastic Load Balancing
 - Elastic Compute Cloud
 - Relational Database Service
 - Elastic File System
 - Security Groups

Activity

- Use AWS CloudFormation to do a number of things in the background
 - Create ELB (elastic load balancer)
 - Create RDS (relational database server)
 - Create and attach firewall rules
 - Create two virtual machines running web services
 - Create two VM
 - Mount file system
 - Install Apache and PHP
 - Install WordPress
 - Start the Apache Webserver

Activity

- In the AWS Management Console —>Services —> Cloudformation



Activity

- Create the stack and select the template
 - Use template from a book
 - <https://s3.amazonaws.com/awsinaction-code2/chapter02/template.yaml>
 - Look at the specification: A simple document
 - Specify wordpress as stack name
 - Set the key name to the key that you created
 - Should use tags, e.g. to say that this is a wordpress system
 - `system: wordpress`
 - Specify URL in Template URL

Activity

- Cloudformation is now creating your resources
- The wordpress stack will be in status `CREATE_IN_PROGRESS`
- After a while, status changes to `CREATE_COMPLETE`

Activity

- Investigate your stack
 - Resource groups are collections of of AWS resources
- Create a resource group
 - Set group name to wordpress group
 - Tag `system: wordpress`
 - Select the region: North Virginia
 - Save

Activity

- Select instances in EC2 to see the virtual machines
- Get details on the virtual machines

Activity

- Select load balancer
 - Automatically created

Activity

- Go back to resource group wordpress
- Select DBinstances under RDS
- Get details of your SQL database

Activity

- Network file system EFS
- Cannot access through the resource group
- Need to go through EFS on the service menu

Activity

- Select the cost estimator
 - It will tell you that you have to pay about \$35.00 per month for this instance

Activity

- Delete your blogging infrastructure
 - Go to CloudFormation Service in Management Console:
 - Select your wordpress stack
 - Open the action menu (Actions)
 - Click Delete Stack