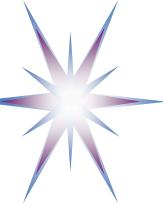




Practice 1 Guidelines

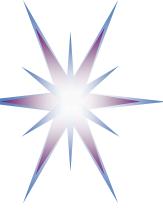
Getting Started with AWS: EC2, S3, Monitoring with CloudWatch Lambda

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University of Amsterdam



Outline

- AWS Academy Sandbox
- EC2
 - Creating webserver on VM instance (deploying LAMP server)
- Configuring SSH client
 - Setting up tunnel to access cloud based services
- S3
- Adding monitoring to EC2 and S3
- Lambda
- Setting up CLI environment



AWS Academy Sandbox – Download Access Credentials

The screenshot shows the AWS Academy interface with the following details:

- Page Title:** Lab 6 - Scale & Load Balance
- URL:** https://awsacademy.instructure.com/courses/7751/modules/items/761034
- Left Sidebar:** AWS Academy navigation menu with links to Account, Dashboard, Courses, Calendar, Inbox, History, and Help.
- Current Path:** ACFv2EN-... > Modules > Module 10... > Lab 6 - Scale & Load Balance your Architecture
- Main Content:** A modal window titled "Credentials" is open, showing "Cloud Access" details:
 - AWS CLI: Show
 - Cloud Labs:
 - Remaining session time: 03:59:40 (240 minutes)
 - Session started at: 2022-02-23T02:24:47-0800
 - Session to end at: 2022-02-23T06:33:01-0800
 - Accumulated lab time: 1 day 00:43:14 (1484 minutes)
 - SSH key: Show, Download PEM, Download PPK
 - AWS SSO: Download URL
- Download Dialog:** An overlay dialog titled "Opening labsuser.ppk" asks what to do with the file:
 - You have chosen to open: labsuser.ppk
 - which is: PuTTY Private Key File (1.4 kB)
 - from: data:
 - What should Firefox do with this file?
 - Open with PuTTY SSH authentication agent (default)
 - Save File
 - Buttons: OK, Cancel

- Start Lab or Sandbox
- Dropdown Details > AWS > Show
- Download SSH key
- Optionally, you can use SSO service by AWS
- Test WebServer URL
- Use AWS CLI



Sandbox Access: SSH client and AWS CLI

The screenshot shows a web browser window with the following details:

- Title Bar:** Lab 6 - Scale & Load, Welcome to Academy Clo X, Problem loading page X.
- Address Bar:** https://awsacademy.instructure.com/courses/7751/modules
- Page Content:**
 - Cloud Access:** AWS CLI: Show
 - Cloud Labs:** Remaining session time: 03:48:33(229 minutes), Session started at: 2022-02-23T02:24:47-0800, Session to end at: 2022-02-23T06:33:01-0800
 - Accumulated lab time: 1 day 00:54:21 (1495 minutes)
 - SSH key, Download PEM, Download PPK
 - AWS SSO, Download URL
 - BEGIN RSA PRIVATE KEY-----
MIIEpAIBAAKCAQEArnkwkP+gBcMdtwXn0PsbnHYFommXm1DdRx/6ngUokr/oyAh6
R1f3H6K5qQBaP5pNmIDNJuMrEgZa3f/TFR9kk+gkYL+j4jqZSLkS3Nl2Ty9IKDeL
TSyclbR22Zf6bsuTJEd9MsZm5M4Y2mWC10IwwXuNEhzrxDKK9kh4BcEI2aF8u0G8
yd0jqMxLfH3CRsze3HF5caAGGx/YebTk/Biqns0gUtIYDQn0kT7tmDCzzJnTW58F
 - Elastic Load Balancing automatically distributes incoming application traffic across multiple Amazon EC2 instances. It enables
- Bottom Navigation:** Previous, Next.

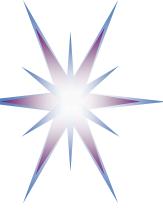
- For SSH client
 - Download SSH key
- For AWS CLI
 - Install AWS CLI
 - Modify/paste SSH key into ~/.aws/credentials

The screenshot shows a web browser window with the following details:

- Title Bar:** Lab 6 - Scale & Load I X, Welcome to Academy Clo X, Problem loading page X.
- Address Bar:** https://awsacademy.instructure.com/courses/7751/module
- Page Content:**
 - Cloud Access:** AWS CLI: Show
 - Credentials:** Copy and paste the following into ~/.aws/credentials

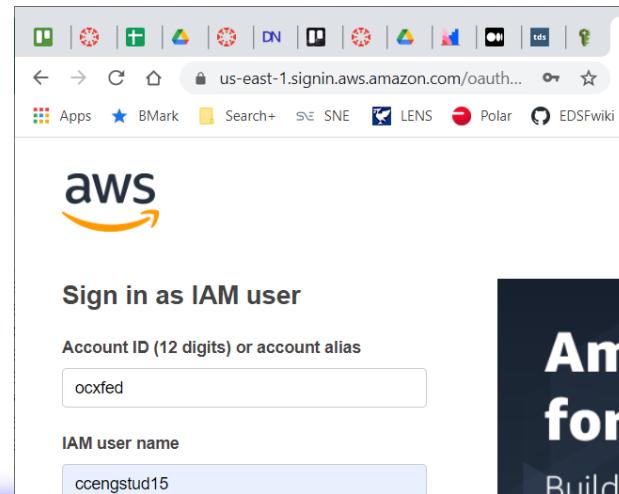
```
[default]
aws_access_key_id=ASIAUEF2HQFP05QMFFN6
aws_secret_access_key=Wuzd66d8NGx2ZrXytrDgYx0bbq7+cR3rD1fjruE
aws_session_token=FwoGZXivYXdzECwaDFQnuUhTx0pyhZ0AFSK+AY70+TejjP3fs
LZRLVkJ22F/p1Gn18p4f3sle4iYFB9v0WueK62TmQ8ly/tX9Vv2tBV+1c7TXPxssqwlk
NOZZa/qoBK1ZPFzQfn0arNHN6D+hU0HK3xnghY1BefGbVSe5ILNFOE0dB0UeWeFow2w
5GadOmqtYDQIsJUHxucXigJyhrYpkoBkvUHyC6Bgvle5FWsYnLLrju/DmK9r+VUxh
M1QYurff9+09u1kW5XLDFGMF+DhHPVdkL7jn7VI3co8JB0YkAYyLVVMdB4A0hDlH2Soj
9Ha0li1WwcY5hJ0R41Eeyl0H1390I0lyXIMprKT3c4Ejw==
```

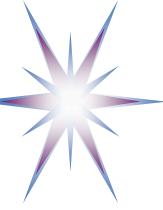
- Bottom Navigation:** Previous, Next.



Accessing AWS portal

- From AWS Academy Lab sandbox
 - Use AWS class Sandbox
 - Start lab and access directly from the lab sandbox
- For separately configured class or project
 - Create AIM group and obtain group signin link
 - Example: Class or project Portal access: link, username, password
 - <https://ocxfed.signin.aws.amazon.com/console>
 - IAM user: cceng#
 - Password: *****





AWS Portal - Services

The screenshot shows the AWS Management Console Services page. At the top, there's a navigation bar with tabs for 'My Classrooms', 'Workbench', and 'AWS Management Con...'. Below the navigation bar is a toolbar with various icons and links. The main content area is titled 'Services' and 'Resource Groups'. It features a search bar with placeholder text 'Find a service by name or feature (for example, EC2, S3 or VM, storage)'. To the right of the search bar are 'Group' and 'A-Z' buttons. The services are organized into several groups:

- Compute:** EC2, Lightsail, Lambda, Batch, Elastic Beanstalk, Serverless Application Repository, AWS Outposts, EC2 Image Builder.
- Storage:** S3, EFS, FSx, S3 Glacier, Storage Gateway, AWS Backup.
- Database:** RDS, DynamoDB, ElastiCache.
- Blockchain:** Amazon Managed Blockchain.
- Satellite:** Ground Station.
- Quantum Technologies:** Amazon Braket.
- Analytics:** Athena, EMR, CloudSearch, Elasticsearch Service, Kinesis, QuickSight, Data Pipeline, AWS Data Exchange, AWS Glue, AWS Lake Formation, MSK.
- End User Computing:** WorkSpaces, AppStream 2.0, WorkDocs, WorkLink.
- Internet Of Things:** IoT Core, FreeRTOS, IoT 1-Click, IoT Analytics, IoT Device Defender, IoT Device Management, IoT Events, IoT Greengrass, IoT SiteWise, IoT Things Graph.
- Management & Governance:** AWS Organizations, CloudWatch, AWS Auto Scaling, CloudFormation, CloudTrail, Config, OpsWorks, Service Catalog, Systems Manager, AWS AppConfig.
- Security, Identity, & Compliance:** IAM, Resource Access Manager, Cognito, Secrets Manager, GuardDuty, Inspector, Amazon Macie, AWS Single Sign-On, Certificate Manager.
- Game Development:** Amazon GameLift.
- Containers:** (represented by a building icon).

- Navigate through offered AWS cloud services
- Investigate services in each group Compute, Storage, Databases, Management, Security, Machine Learning, others



EC2 VM Instance: Naming and Tagging

- VM instance configuration and deployment best practices
- Use recognizable names for VM names, metadata, tags, etc
- E.g., in the shared class environment use identifiable VM names, e.g.
 - ccengstud10fist, ccengstud02test*, cceng08fist
 - where “ccengstud**” is your account ID
- Use similar naming for tags

Select your AMI configuration When launching new VM instance

The screenshot shows the AWS EC2 Management Console interface. On the left, there's a sidebar with various navigation links like 'New EC2 Experience', 'EC2 Dashboard', 'Instances', 'Launch Templates', etc. The main area is titled 'EC2' and has a 'Resources' section with links for 'Running instances', 'Dedicated Hosts', 'Volumes', 'Key pairs', and 'Placement groups'. Below this is a 'Launch instance' section with a 'Launch instance' button. A central modal window is open, titled 'Step 1: Choose an Amazon Machine Image (AMI)'. It lists several AMI options under 'Quick Start':

- Amazon Linux** (Free tier eligible): Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0fc61db8544a617ed (64-bit x86) / ami-0f90a34c9df977efb (64-bit Arm). Root device type: ebs, Virtualization type: hvm, ENA Enabled: Yes. Select button.
- Amazon Linux** (Free tier eligible): Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-09a5b0b7edf08843d. Root device type: ebs, Virtualization type: hvm, ENA Enabled: Yes. Select button.
- Red Hat Enterprise Linux** (Free tier eligible): Red Hat Enterprise Linux 8 (HVM), SSD Volume Type - ami-0c322300a1dd5dc79 (64-bit x86) / ami-03587fa4048e9eb92 (64-bit Arm). Root device type: ebs, Virtualization type: hvm, ENA Enabled: Yes. Select button.
- SUSE Linux** (Free tier eligible): SUSE Linux Enterprise Server 15 SP1 (HVM), SSD Volume Type - ami-0df6cfabfe4385b7 (64-bit x86) / ami-0e83525f58b2878f0 (64-bit Arm). Root device type: ebs, Virtualization type: hvm, ENA Enabled: Yes. Select button.

Each AMI entry includes a 'Select' button and two radio buttons for '64-bit (x86)' and '64-bit (Arm)'. The URL in the browser bar is https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#LaunchInstanceWizard.



AWS Marketplace offers 3rd party VMs

The screenshot shows the AWS Launch Instance Wizard with the first step selected: "1. Choose AMI". The page title is "Step 1: Choose an Amazon Machine Image (AMI)". A sub-instruction says: "An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs." Below this is a search bar with placeholder text "Search for an AMI by entering a search term e.g. "Windows"".

The screenshot shows the AWS Marketplace homepage. The left sidebar includes links for "Quick Start", "My AMIs", "AWS Marketplace" (which is highlighted), and "Community AMIs". Under "Categories", it lists "All Categories", "Infrastructure Software (2476)", "DevOps (1949)", "Business Applications (872)", "Machine Learning (109)", "IoT (92)", and "Industries (231)". The main content area features sections for "Featured Software" (Barracuda CloudGen Firewall for AWS, Juniper vSRX Next Generation Firewall) and "Popular Software". At the bottom, there are "Feedback" and "English (US)" buttons.

The screenshot shows the "Step 1: Choose an Amazon Machine Image (AMI)" list. It includes three items:

- WordPress with NGINX and SSL Certified by Bitnami and Automatic**
Rating: ★★★★☆ (7) | Version: 5.3.2-3 on Ubuntu 16.04 | Previous versions | By Bitnami
Description: WordPress with NGINX and SSL enhances WordPress with SSL auto-configuration and the high-performance NGINX web server. This image is certified by Bitnami as secure, up-to-date, and packaged using industry best practices, and approved by Automatic, the experts behind WordPress.
More info | Select
- WordPress Multisite Certified by Bitnami and Automatic**
Rating: ★★★★☆ (24) | Version: 5.3.2-4 on Ubuntu 16.04 | Previous versions | By Bitnami
Description: WordPress Multisite makes it simple to manage multiple WordPress websites from the same server and interface. This image is certified by Bitnami as secure, up-to-date, and packaged using industry best practices, and approved by Automatic, the experts behind WordPress.
More info | Select
- LAMP Certified by Bitnami**
Rating: ★★★★☆ (37) | Version: 7.3.16-2 on Ubuntu 16.04 | Previous versions | By Bitnami
Description: Up-to-date and secure image. LAMP is an open source software stack that provides a framework for creating PHP-based high-performance websites and applications with ease. Its core components are Linux, PHP, Apache, and MySQL.
More info | Select



Go through instance configuration details: Start from selecting instance type (Micro types for education purposes)

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix they can meet your computing needs.

Filter by: General purpose ▾ All generations ▾ Show/Hide Columns

| Currently | All instance types | vCPUs, 0.613 GiB memory, EBS only | | |
|--------------------------|---------------------------------|-----------------------------------|--------------|---------------|
| | Micro instances | vCPUs | Memory (GiB) | Instance (GB) |
| <input type="checkbox"/> | General purpose | 1 | 0.5 | |
| <input type="checkbox"/> | Compute optimized | 1 | 1 | |
| <input type="checkbox"/> | FPGA instances | 1 | 1 | |
| <input type="checkbox"/> | GPU instances | 1 | 1 | |
| <input type="checkbox"/> | Machine learning ASIC instances | 1 | 1 | |
| <input type="checkbox"/> | Memory optimized | 1 | 1 | |
| <input type="checkbox"/> | Storage optimized | 1 | 1 | |
| <input type="checkbox"/> | General purpose | t2.small | 1 | 2 |
| <input type="checkbox"/> | General purpose | t2.medium | 2 | 4 |
| <input type="checkbox"/> | General purpose | t2.large | 2 | 8 |

- Pay attention to configuration details
- Select new or already created VPC and subnet
- Enable detailed CloudWatch monitoring
- Decide on tenancy option

Step 3: Configure Instance Details

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of Instances: 1 Launch into Auto Scaling Group

Purchasing option: Request Spot instances

Network: Loading... Create new VPC

Subnet: No preference (default subnet in any Availability Zone) Create new subnet

Auto-assign Public IP: Use subnet setting

Placement group: Add instance to placement group

Capacity Reservation: Open Create new Capacity Reservation

IAM role: None Create new IAM role

Step 3: Configure Instance Details

Shutdown behavior: Stop

Stop - Hibernate behavior: Enable hibernation as an additional stop behavior

Enable termination protection: Protect against accidental termination

Monitoring: Enable CloudWatch detailed monitoring Additional charges apply.

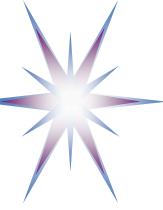
Tenancy: Shared - Run a shared hardware instance Additional charges will apply for dedicated tenancy.

Elastic Inference: Add an Elastic Inference accelerator Additional charges apply.

T2/T3 Unlimited: Enable Additional charges may apply

File systems: Add file system Create new file system

Cancel Previous Review and Launch Next: Add Storage



Add tags and Select Security Group: Use already created Security Group for your application

The screenshot shows two side-by-side browser windows for the AWS Launch Instance Wizard.

Left Window (Step 5: Add Tags):

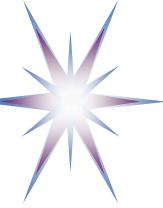
- Header: My Classrooms, Workbench, Launch instance wizard
- Step 5: Add Tags
- Description: A tag consists of a case-sensitive key-value pair. A copy of a tag can be applied to volumes, instances, and snapshots. Tags will be applied to all instances and volumes.
- Form fields:
 - Key (128 characters maximum): purpose
 - Type: type
 - Add another tag (Up to 50 tags maximum)

Right Window (Step 6: Configure Security Group):

- Header: My Classrooms, Workbench, Launch instance wizard
- Step 6: Configure Security Group
- Description: A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.
- Assign a security group:
 - Create a new security group
 - Select an existing security group
- Security group name: launch-wizard-1
- Description: launch-wizard-1 created 2020-04-08T13:50:20.197+02:00
- Table: Type (SSH), Protocol (TCP), Port Range (22), Source (Custom, 0.0.0.0/0), Description (e.g. SSH for Admin Desktop)
- Add Rule button
- Warning message: Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.
- Buttons: Cancel, Previous, Review and Launch

Bottom Note:

- Note: If you plan to deploy webserver, add inbound rules for ports HTTP/80 and HTTPS/443
- You can also change this later by modifying inbound rules for security groups
- Hint: Think about Security group as firewall



Final Step 7 before launch

Screenshot of the AWS Launch Instance Wizard Step 7: Review Instance Launch.

The browser title bar shows "Launch instance wizard | E X". The URL is "https://console.aws.amazon.com/ec2/v2/home?region=us-east-1#LaunchInstanceWizard".

The AWS navigation bar includes "Sign out", "Thread: DS Drafts and dis...", "My Classrooms", "Workbench", and "Launch instance wizard".

The main content area shows the progress bar: 1. Choose AMI, 2. Choose Instance Type, 3. Configure Instance, 4. Add Storage, 5. Add Tags, 6. Configure Security Group, 7. Review (highlighted).

Step 7: Review Instance Launch

Please review your instance launch details. You can go back to edit changes for each section. Click **Launch** to assign a key pair to your instance and complete the launch process.

⚠ Improve your instances' security. Your security group, launch-wizard-1, is open to the world.

Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only. You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)

AMI Details [Edit AMI](#)

Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-00ddb0e5626798373

Free tier eligible Ubuntu Server 18.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>). Root Device Type: ebs Virtualization type: hvm

Instance Type [Edit instance type](#)

| Instance Type | ECUs | vCPUs | Memory (GiB) | Instance Storage (GB) | EBS-Optimized Available | Network Performance |
|---------------|------|-------|--------------|-----------------------|-------------------------|---------------------|
| t2.micro | - | 1 | 1 | EBS only | - | Low to Moderate |

Buttons: Cancel, Previous, Launch



Launching AMI and downloading keypair

Step 7: Review Instance Launch

Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-09a5b0b7edf08843d

Free tier eligible

The Amazon Linux AMI is an EBS-backed, AWS-supported AMI. Its repositories include Docker, PHP, MySQL, PostgreSQL, and more.

Root Device Type: ebs Virtualization type: hvm

Instance Type

| Instance Type | ECUs | vCPUs | Memo |
|---------------|----------|-------|------|
| t2.micro | Variable | 1 | 1 |

Security Groups

| Security group name | Description |
|---------------------|--|
| launch-wizard-1 | launch-wizard-1 created 2020-07-20T10:45:00Z |

Type: SSH Protocol: TCP

Feedback English (US)

Select an existing key pair or create a new key pair

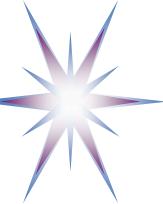
A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Create a new key pair
Key pair name: keypair2020bdit4da
Download Key Pair

You have to download the **private key file (*.pem file)** before you can continue. **Store it in a secure and accessible location**. You will not be able to download the file again after it's created.

Cancel Launch Instances



Launching Spot Instances – Is not eligible to AWS Academy Educate account

The screenshot shows the AWS Launch Instance Wizard at Step 7: Review Instance Launch. Two warning messages are displayed:

- ⚠ Improve your instances' security. Your security group, launch-wizard-2, is open to the world.**

Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only. You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. [Edit security groups](#)
- ⚠ Your instance configuration is not eligible for the free usage tier**

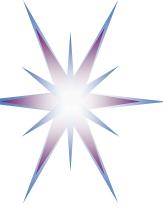
To launch an instance that's eligible for the free usage tier, check your AMI selection, instance type, configuration options, or storage devices. Learn more about [free usage tier](#) eligibility and usage restrictions.

In the AMI Details section, it shows:

- Ubuntu Server 20.04 LTS (HVM), SSD Volume Type - ami-0885b1f6bd170450c**
- Free tier eligible**
- Ubuntu Server 20.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).
- Root Device Type: ebs Virtualization type: hvm

At the bottom right, there are buttons for **Cancel**, **Previous**, and **Launch**.

- Note: If any cloud resource is not eligible, report this in your practice report
- Try to find a solution, e.g. change region, use another instance type



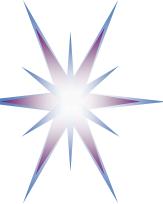
VM Instance Overview

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with navigation links for New EC2 Experience, EC2 Dashboard, Events, Tags, Reports, Limits, Instances (selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations, Images (AMIs, Bundle Tasks), Elastic Block Store (Volumes, Snapshots), and Network & Security (Security Groups). The main content area has tabs for Launch Instance, Connect, and Actions. A search bar at the top says "Filter by tags and attributes or search by keyword". Below it is a table with columns: Name, Instance ID, Instance Type, Availability Zone, Instance State, Status Checks, and Alarm Status. One row is shown: i-0230615234265584f, t2.micro, us-east-1c, running, 2/2 checks ..., None. The detailed view for this instance shows fields like Public DNS (ec2-18-233-97-213.compute-1.amazonaws.com), Instance ID (i-0230615234265584f), Instance state (running), Instance type (t2.micro), Private DNS (ip-172-31-81-135.ec2.internal), Private IPs (172.31.81.135), VPC ID (vpc-7b6d3f01), Subnet ID (subnet-fc5458d2), Network interfaces (eth0), IAM role (-), Key pair name (keypair2020bdfit4da), Public DNS (IPv4) (ec2-18-233-97-213.compute-1.amazonaws.com), IPv4 Public IP (18.233.97.213), IPv6 IPs (-), Elastic IPs (-), Availability zone (us-east-1c), Security groups (launch-wizard-1, view inbound rules, view outbound rules), Scheduled events (No scheduled events), AMI ID (amzn-ami-hvm-2018.03.0.20200318.1-x86_64-gp2 (ami-09a5b0b7edf08843d)), Platform details (-), Usage operation (-), Source/dest. check (True), and T2/T3 Unlimited (Disabled).



Example EC2 Instance Network Configuration

- Public DNS (IPv4): ec2-3-86-208-32.compute-1.amazonaws.com
- Public IPv4: 3.86.208.32
- Private DNS: ip-172-31-87-72.ec2.internal
- Private IP: ip-172-31-87-72.ec2.internal
- VPC ID: vpc-e3247699
- Subnet ID: subnet-449d906a



Accessing EC2 VM Instance with SSH client

- SSH is a Secure Shell protocol
- Uses PKI based authentication
- You need to have private and public key
- Private key is only known to the user and used for authentication
- Public key is stored at the client/remote side



Configuring PuTTY SSH Client for Windows

The image shows two side-by-side screenshots of the PuTTY Configuration window. The left screenshot displays the 'Session' category, where the host name is set to 'ec2-3-86-208-32.compute-1.amazonaws.com' and the port is 22. The connection type is selected as SSH. The right screenshot shows the 'Auth' section under the 'SSH' category, which includes options for pre-authentication banners, bypassing authentication entirely, and various authentication methods like Pageant, TIS/CryptoCard, and keyboard-interaction.

PuTTY Configuration

Category:

- Session
- Logging
- Terminal
 - Keyboard
 - Bell
 - Features
- Window
 - Appearance
 - Behaviour
 - Translation
- Selection
- Colours
- Connection
 - Data
 - Proxy
 - Telnet
 - Rlogin
 - SSH
 - Serial

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address) Port

Connection type:
 Raw Telnet Rlogin SSH Serial

Load, save or delete a stored session

Saved Sessions
Default Settings

Load Save Delete

Close window on exit:
 Always Never Only on clean exit

About Help Open Cancel

PuTTY Configuration

Category:

- Session
- Logging
- Terminal
- Window
- Selection
- Colours
- Connection
- SSH
 - Kex
 - Host keys
 - Cipher
 - Auth
 - GSSAPI
 - TTY

Options controlling SSH authentication

Display pre-authentication banner (SSH-2 only)
 Bypass authentication entirely (SSH-2 only)

Authentication methods

Attempt authentication using Pageant
 Attempt TIS or CryptoCard auth (SSH-1)
 Attempt "keyboard-interactive" auth (SSH-2)

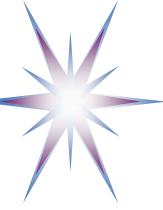
Authentication parameters

Allow agent forwarding
 Allow attempted changes of username in SSH-2

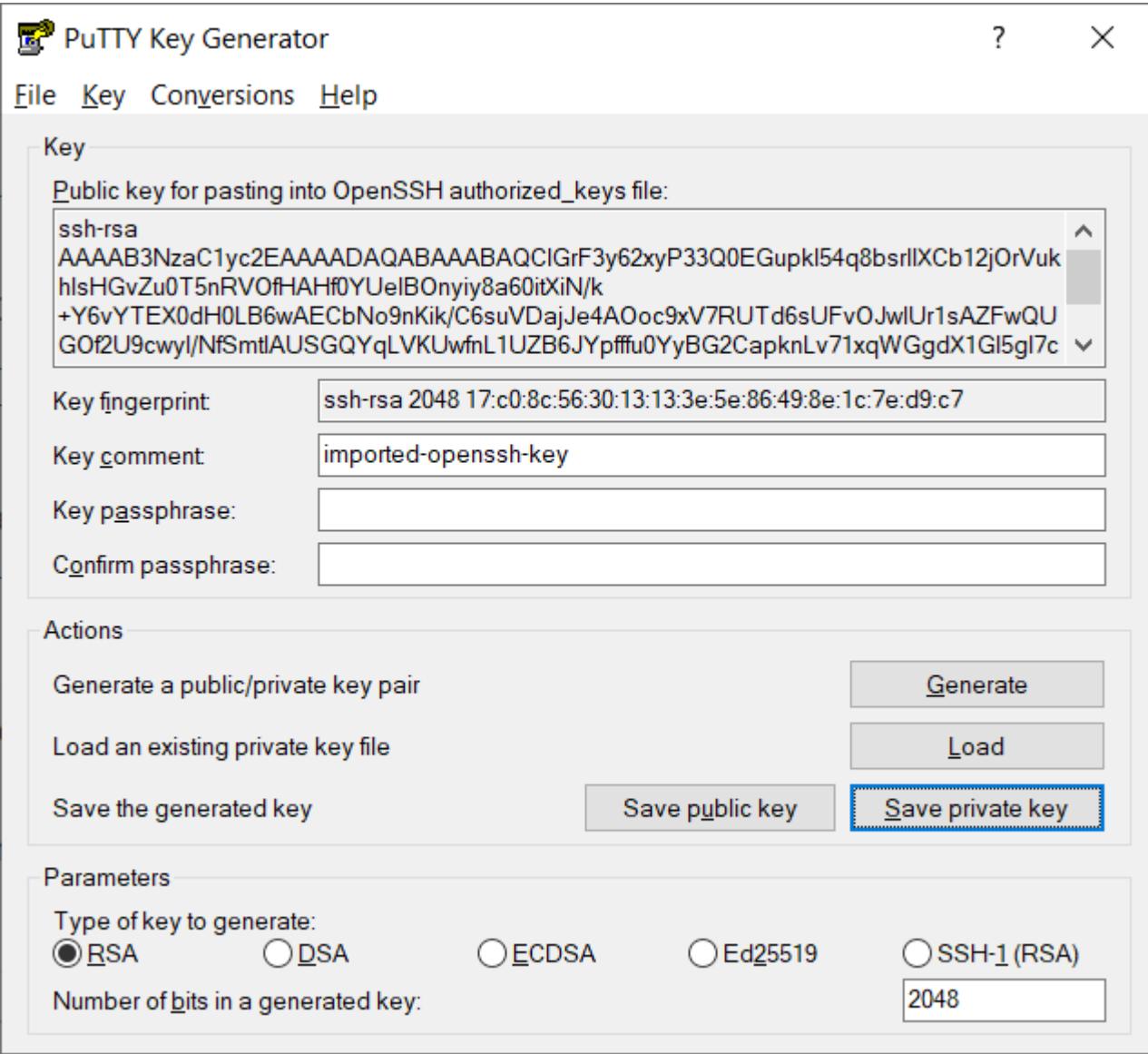
Private key file for authentication:

About Help Open Cancel

- AWS EC2 generate .pem keypair
- AWS Academy sandbox provides both .pem and .ppk
- PuTTY SSH uses .ppk format
- Use PUTTYGEN.EXE to convert key



Using PuTTY Key Generator



- Transform .pem key to .ppk
- Use recognizable key names
- Set password, e.g. pswd (optional)



Bitvise SSH Client

<https://www.bitvise.com/ssh-client-download>

Bitvise SSH Client 8.49

Default profile

Load profile

Save profile as

New profile

Reset profile

Login Options Terminal RDP SFTP Services C2S S2C SSH Notes About*

Closing and minimization

Server

Host: webtech-teachers.webtech-uva.nl

Port: 22 Enable obfuscation

Obfuscation keyword:

Authentication

Username: ydemsch1

Initial method: none

Elevation: Default

Kerberos

SPN:

GSS/Kerberos key exchange

Request delegation

gssapi-keyex authentication

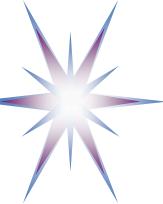
Proxy settings Host key manager Client key manager Help

Copyright (C) 2000-2021 by Bitvise Limited.

- i 12:13:16.866 Visit www.bitvise.com for latest information about our SSH software.
- i 12:13:16.866 Run 'BvSsh -help' to learn about supported command-line parameters.
- i 12:13:16.866 Cryptographic provider: Windows CNG (x86) with additions
- i 12:13:17.842 Optional update available.
- i 12:13:17.938 Loading default profile.
- i 12:13:18.520 Automatic check for updates completed successfully.
- w 12:13:18.520 Version status: Known issues
 - Memory issue in DH group exchange. There is a compatible 8.xx update with fixes, improvements. A 9.xx release is also available.
- i 12:13:18.520 Recommended update available.
- i 12:13:21.397 New version installer has been downloaded.

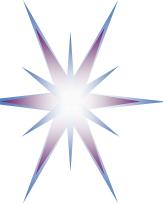
Log in Exit

- Supports SSH, SFTP
- Key formats .pem and .ppk
- Multiple keys management

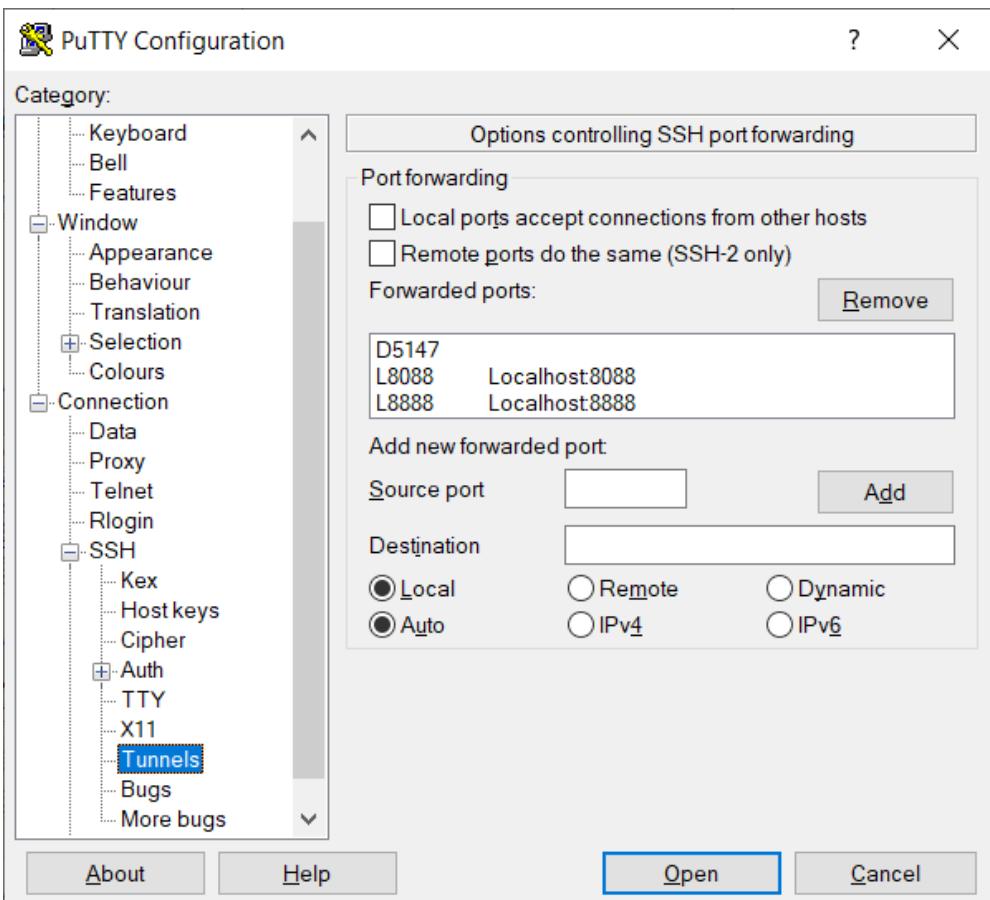


Setting up SSH Tunnel

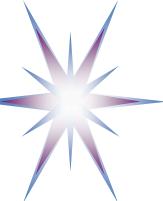
- SSH Tunnel is required to access many cloud based services from the local/laptop client
 - Hadoop cluster, RDS database, SQL Workbench
- Configure SSH client for tunnel



Configuring Tunnels for known Ports



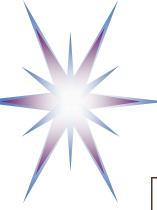
- Using PuTTY SSH client
- First, configure dynamic tunnel to remote cluster (RDS or EMR)
 - Port 8157
 - Using Source port and Dynamic radio button
 - Example:
 - D5147
 - Source L8088
Destination Localhost:8088
 - Source L8888
Destination Localhost:8888
- Configure other local ports
 - See EMR ports table
- This will create a secure tunnel by forwarding a port (the “destination port”) on the remote server to a port (the “source port”) on the local host (127.0.0.1 or localhost).



Configuring SSH tunnel on Windows for phpMyAdmin

<https://docs.bitnami.com/virtual-machine/faq/get-started/access-phpmyadmin/>

- In order to access phpMyAdmin via SSH tunnel, you need an SSH client. In the instructions below we have selected PuTTY, a free SSH client for Windows and UNIX platforms.
 - The first step is to configure PuTTY.
- Once you have your SSH client correctly configured and you have confirmed that you can successfully access your instance using SSH, you need to create an SSH tunnel in order to access phpMyAdmin. Follow these steps:
 - In the “Connection -> SSH -> Tunnels” section, add a new forwarded port by introducing the following values:
 - Source port: 8888
 - Destination: localhost:8888
 - Remember that if you are redirecting HTTP requests to the HTTPS port, you must use destination port 443 instead of 80.
 - This will create a secure tunnel by forwarding a port (the “destination port”) on the remote server to a port (the “source port”) on the local host (127.0.0.1 or localhost).
 - Click the “Add” button to add the secure tunnel configuration to the session. You’ll see the added port in the list of “Forwarded ports”.
- PuTTY configuration
 - In the “Session” section, save your changes by clicking the “Save” button.
 - Click the “Open” button to open an SSH session to the server. The SSH session will now include a secure SSH tunnel between the two specified ports.
- Access the phpMyAdmin console through the secure SSH tunnel you created, by browsing to <http://127.0.0.1:8888/phpmyadmin>.
- Log in to phpMyAdmin by using the following credentials:
 - Username: root
 - Password: application password. (Refer to our FAQ to learn how to find your application credentials).



Access VM Instance from Linux (Mac systems)

```
demch@DOMA: ~
__|__|__|_
https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
4 package(s) needed for security, out of 7 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-13-161 ~]$ pwd
/home/ec2-user
[ec2-user@ip-172-31-13-161 ~]$ exit
logout
Connection to ec2-3-125-114-161.eu-central-1.compute.amazonaws.com closed.
demch@DOMA:~$ ssh -i "aws2020bbit02frankfurt.pem" hadoop@ec2-52-59-150-213.eu-central-1.compute.amazonaws.com
ssh: connect to host ec2-52-59-150-213.eu-central-1.compute.amazonaws.com port 22: Resource temporarily unavailable
demch@DOMA:~$ ssh -i "aws2020bbit02frankfurt.pem" ec2-user@ec2-3-125-114-161.eu-central-1.compute.amazonaws.com^C
demch@DOMA:~$ ssh -i "aws2020bbit02frankfurt.pem" ec2-user@ec2-3-125-114-161.eu-central-1.compute.amazonaws.com
Last login: Mon May  4 18:28:59 2020 from g139127.upc-g.chello.nl

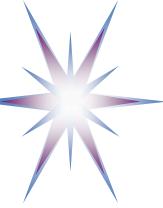
__|__|__|_ ) Amazon Linux AMI
__|__|__|_

https://aws.amazon.com/amazon-linux-ami/2018.03-release-notes/
4 package(s) needed for security, out of 7 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-13-161 ~]$ exit
logout
Connection to ec2-3-125-114-161.eu-central-1.compute.amazonaws.com closed.
demch@DOMA:~$ ssh -i "aws2020bbit02frankfurt.pem" hadoop@ec2-52-59-150-213.eu-central-1.compute.amazonaws.com
ssh: connect to host ec2-52-59-150-213.eu-central-1.compute.amazonaws.com port 22: Resource temporarily unavailable
demch@DOMA:~$ chmod 400 aws2020bbit02frankfurt.pem
```

- Your key must not be publicly viewable for SSH to work. Use this command if needed:
`chmod 400 aws2020bbit02frankfurt.pem`
- To establish a connection to the master node, type the following command.
`ssh -i ~/aws2020bbit02frankfurt.pem hadoop@ec2-52-59-150-213.eu-central-1.compute.amazonaws.com`

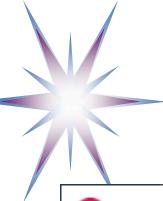


Configuring VM instance to run Webserver



Configuring VM instance to run Webserver

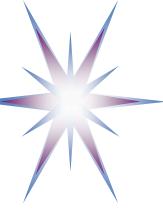
- Connect to ec2 instance with ssh: all commands below are for the VM instance
- Install Apache webserver with PHP (for testing)
 - **\$ sudo yum update -y**
 - **\$ sudo yum install -y httpd.x86_64 php56 php56-mysqlnd**
- Start the HTTP server
 - **\$ sudo service httpd start**
- Open web browser to check if server is running
 - <http://xxxxxxxxx.compute-1.amazonaws.com> – Use public DNS name for your ec2 instance
 - Note: Check that your security group allows inbound traffic for ports HTTP/80 and HTTPS/453. If no connection available, modify inbound rules: Select security group (default – launch-wizzard-1) > Actions > Edit inbound rules
- Auto start the webserver server with each restart of instance
 - **\$ sudo chkconfig httpd on**
 - **\$ chkconfig --list httpd** -- verify
- Setting permissions for the Apache web server
 - **\$ sudo groupadd www**
 - **\$ sudo usermod -a -G www ec2-user**
 - **\$ sudo chown -R root:www /var/www**
 - **\$ sudo chmod 2775 /var/www**
 - **\$ find /var/www -type d -exec sudo chmod 2775 {} +**
 - **\$ find /var/www -type f -exec sudo chmod 0664 {} +**



Installing HTTP and PHP packages

```
@ ec2-user@ip-172-31-13-161:~  
Verifying : php56-common-5.6.40-1.143.amzn1.x86_64 1/12  
Verifying : php56-mysqlnd-5.6.40-1.143.amzn1.x86_64 2/12  
Verifying : php56-jsonc-1.3.10-1.20.amzn1.x86_64 3/12  
Verifying : php56-process-5.6.40-1.143.amzn1.x86_64 4/12  
Verifying : php56-cli-5.6.40-1.143.amzn1.x86_64 5/12  
Verifying : apr-1.5.2-5.13.amzn1.x86_64 6/12  
Verifying : php56-pdo-5.6.40-1.143.amzn1.x86_64 7/12  
Verifying : apr-util-ldap-1.5.4-6.18.amzn1.x86_64 8/12  
Verifying : httpd-tools-2.2.34-1.16.amzn1.x86_64 9/12  
Verifying : php56-xml-5.6.40-1.143.amzn1.x86_64 10/12  
Verifying : httpd-2.2.34-1.16.amzn1.x86_64 11/12  
Verifying : apr-util-1.5.4-6.18.amzn1.x86_64 12/12  
  
Installed:  
httpd.x86_64 0:2.2.34-1.16.amzn1          php56-mysqlnd.x86_64 0:5.6.40-1.143.amzn1  
  
Dependency Installed:  
apr.x86_64 0:1.5.2-5.13.amzn1           apr-util.x86_64 0:1.5.4-6.18.amzn1  
apr-util-ldap.x86_64 0:1.5.4-6.18.amzn1    httpd-tools.x86_64 0:2.2.34-1.16.amzn1  
php56-cli.x86_64 0:5.6.40-1.143.amzn1     php56-common.x86_64 0:5.6.40-1.143.amzn1  
php56-jsonc.x86_64 0:1.3.10-1.20.amzn1     php56-pdo.x86_64 0:5.6.40-1.143.amzn1  
php56-process.x86_64 0:5.6.40-1.143.amzn1   php56-xml.x86_64 0:5.6.40-1.143.amzn1  
  
Skipped (dependency problems):  
httpd24.x86_64 0:2.4.41-1.88.amzn1        httpd24-tools.x86_64 0:2.4.41-1.88.amzn1  
php56.x86_64 0:5.6.40-1.143.amzn1  
  
Complete!  
[ec2-user@ip-172-31-13-161 ~]$ sudo yum install -y httpd.x86_64 php56 php56-mysqlnd --skip-broken
```

- sudo yum install -y httpd24 php72 mysql57-server php72-mysqlnd



Uploading Webserver content

The screenshot shows a web browser window with the URL <http://ec2-3-125-114-161.eu-central-1.compute.amazonaws.com>. The page content is as follows:

The Pulpit Rock (Preikestolen)

[The Drive](#)
[The Walk](#)
[The Return](#)
[The End](#)

The Walk

The walk to the Pulpit Rock will take you approximately two hours, give or take an hour depending on the weather conditions and your physical shape.

What?

The Pulpit Rock (Pfriekestolen in Norwegian) is a part of a mountain that looks like a pulpit.

Where?

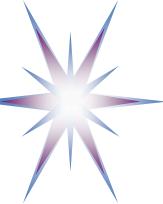
The Pulpit Rock is in Norway.

Price?

The Walk is free!



- Placing your test content in `/var/www/html/`
- Use SCP or SFTP configured with access key similar to PuTTY
-



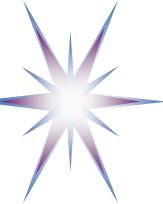
Commands for controlling services

- Two officially adopted methods for controlling services:
- `systemctl`: CentOS, Ubuntu, Redhat, Fedora
 - `sudo systemctl stop httpd`
 - `sudo systemctl start httpd`
 - `sudo systemctl restart httpd`
- `service`: Debian
 - `sudo service httpd start`
 - `sudo service httpd stop`
 - `sudo service httpd restart`



Working with S3 Storage

- Create Bucket
- Configure security
- Add monitoring



S3 Storage: Create bucket & Select Region

The screenshot shows the AWS S3 Management Console interface. The top navigation bar includes links for My Classrooms, Workbench, and S3 Management Consol. Below the navigation bar, a toolbar has icons for LOE - DS, Map of Norway gjem, Laureate Lens, Amex, ING, 9292, ZelfUvA, W Visa4ua, MijnSNS, UrenFNWI, and Thalys FAQ - Reserve. The main header displays the AWS logo, Services, Resource Groups, and user information (vocstartsoft/user604969=dem...). A bell icon indicates notifications.

Amazon S3

Buckets

- Batch Operations
- Access analyzer for S3
- Block public access (account settings)
- Feature spotlight (2)

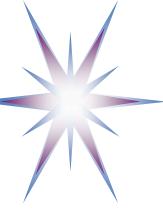
Bucket name: mybucket4bdit

Region: US East (N. Virginia) us-east-1

A dropdown menu lists various AWS regions:

- Asia Pacific (Hong Kong) ap-east-1
- Asia Pacific (Mumbai) ap-south-1
- Asia Pacific (Seoul) ap-northeast-2
- Asia Pacific (Singapore) ap-southeast-1
- Asia Pacific (Sydney) ap-southeast-2
- Asia Pacific (Tokyo) ap-northeast-1
- Canada (Central) ca-central-1
- EU (Frankfurt) eu-central-1
- EU (Ireland) eu-west-1
- EU (London) eu-west-2
- EU (Paris) eu-west-3
- EU (Stockholm) eu-north-1
- Middle East (Bahrain) me-south-1
- South America (São Paulo) sa-east-1
- US East (N. Virginia) us-east-1
- US East (Ohio) us-east-2
- US West (N. California) us-west-1
- US West (Oregon) us-west-2

Warning: Turning off block all public access might result in this bucket and the objects within becoming public. AWS recommends that you turn on block all public access, unless public access is required for specific and verified use cases such as static website hosting.



Configure S3 Bucket Properties and Management aspects (monitoring and metrics)

The screenshot displays two side-by-side views of the AWS S3 Management Console for a bucket named "mybucket4bdit".

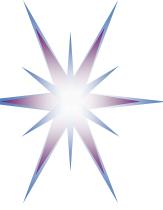
Left Panel (Bucket Properties):

- Versioning:** Keep multiple versions of an object in the same bucket. Status: Disabled.
- Server access logging:** Set up access log records that provide details about access requests. Status: Disabled.
- Object-level logging:** Record object-level API activity using the CloudTrail data events feature (additional cost). Status: Disabled.
- Default encryption:** Automatically encrypt objects when stored in Amazon S3. Status: Disabled.

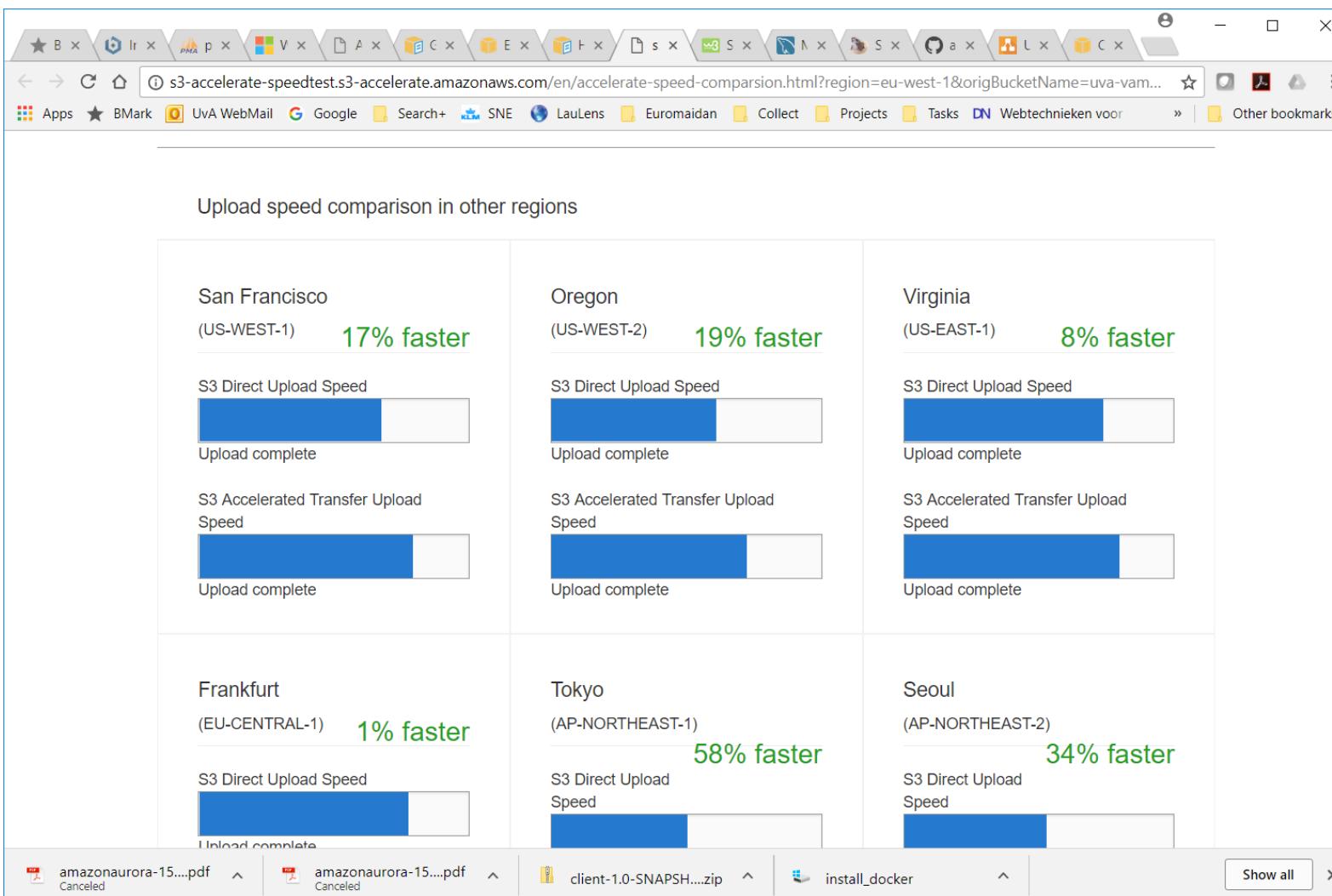
Right Panel (Metrics and Monitoring):

- Metrics Tab:** Shows tabs for Lifecycle, Replication, Analytics, Metrics, and Inventory. The Metrics tab is selected.
- Metrics Sub-Panel:** Displays metrics for Storage, Requests, Data transfer, and Replication. A message states: "Expect a delay of up to 15 minutes before metrics can be retrieved for newly added filter." Another message indicates: "No metrics are currently available for Data transfer."
- Select Metrics Dialog:** A modal window allows users to choose metrics. It lists:
 - Storage metrics (2) (free)
 - Request metrics (10) (paid feature)
 - Data transfer metrics (6) (paid feature)

Both panels include standard AWS navigation elements like the top bar, sidebar, and footer.



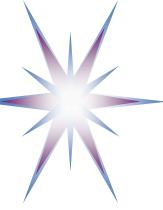
S3: Upload acceleration (example)





Adding Monitoring to EC2 and S3

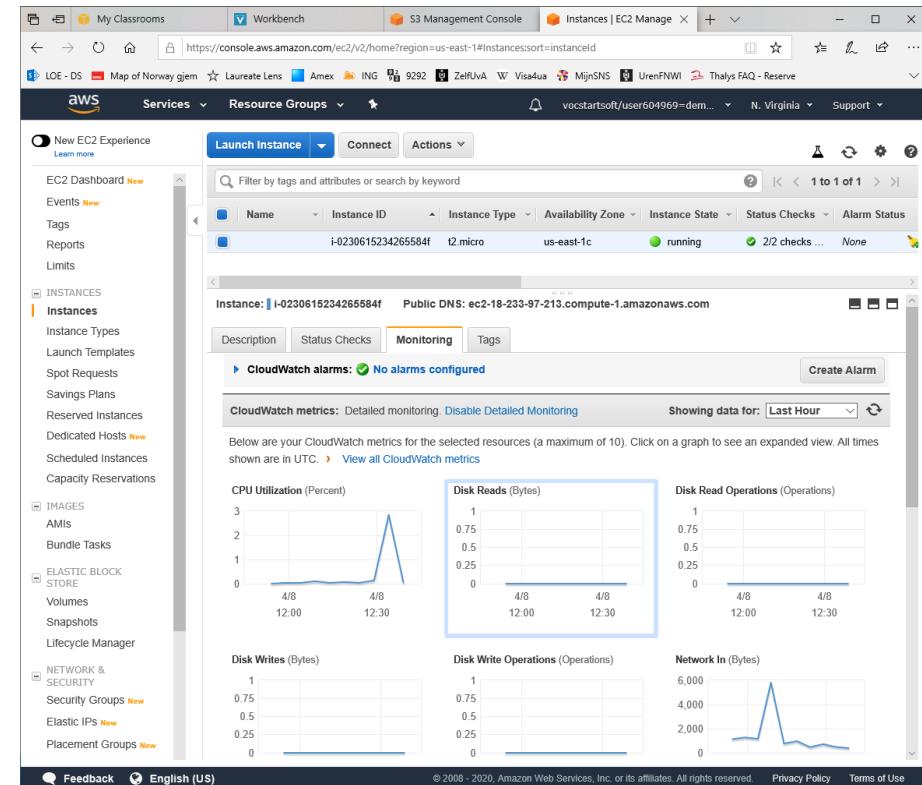
- For EC2: Enable detailed monitoring for EC2 instance during deployment
- For S3: configure monitoring after S3 bucket is created



EC2 instances and Monitoring - Prepare

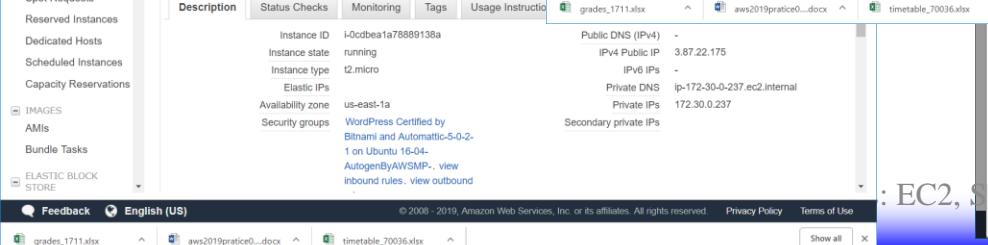
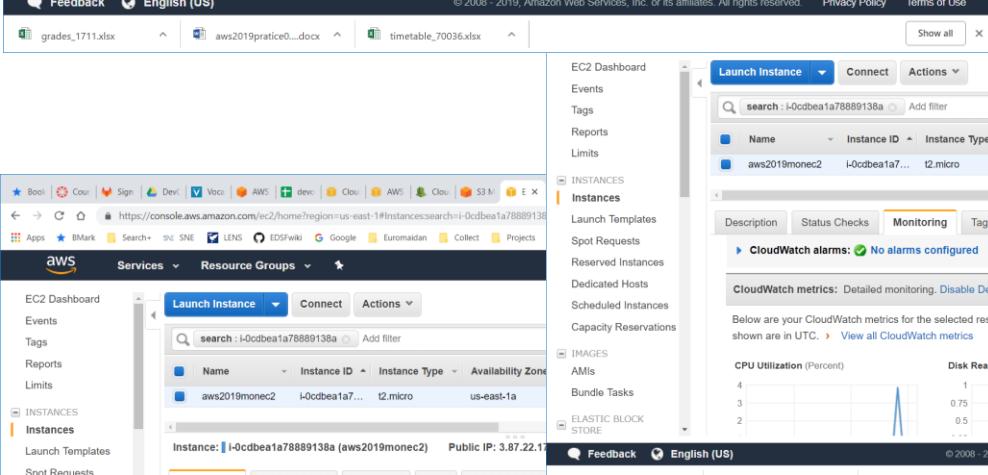
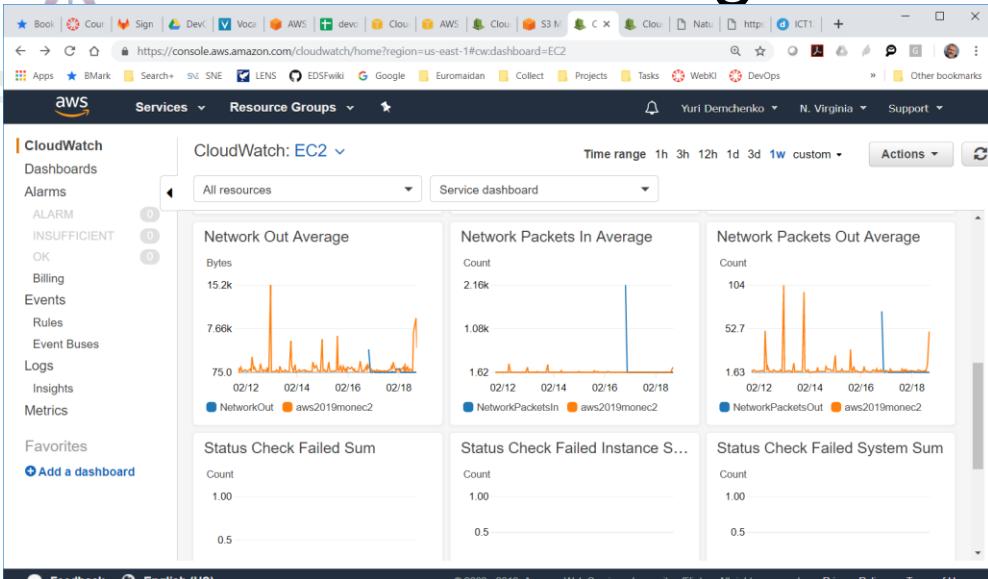
- Create/download Key Pair
 - aws2020mon: fingerprint c9:98:3b:a9:a4:ed:3e:da:94:51:8a:c0:80:0b:4b:10:5e:e4:7e:bf
- Create Instance: Wordpress by Bitnami
 - vpc-4fcc132a – subnet-85003ead | us-east-1a

The screenshot shows the AWS EC2 Instances dashboard. A context menu is open over an instance named "aws2019monec2". The "CloudWatch Monitoring" option is selected, with a submenu showing "Enable Detailed Monitoring", "Disable Detailed Monitoring", and "Add/Edit Alarms". Below the menu, there are two line graphs: "CPU Utilization (Percent)" and "Disk Reads (Bytes)".





EC2 Monitoring Dashboard



- Configure EC2 metrics – Many
- Create dashboard

Add metric graph

CloudWatch metrics: Detailed monitoring. Disable Detailed Monitoring

CloudWatch alarms: No alarms configured

CloudWatch metrics: Showing data for: Last 3 Hours

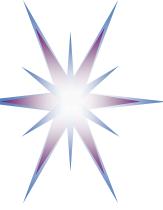
Statistic: Average Period: 5 Minutes Remove all

| | Statistic | Period | Y Axis | Actions |
|-------------|-----------|-----------|---|---------|
| i-023... | Average | 5 Minutes | <input type="button" value="<"/> <input type="button" value=">"/> <input type="button" value="Create alarm"/> | |
| i-023061... | Average | 5 Minutes | <input type="button" value="<"/> <input type="button" value=">"/> <input type="button" value="Create alarm"/> | |
| i-02306... | Average | 5 Minutes | <input type="button" value="<"/> <input type="button" value=">"/> <input type="button" value="Create alarm"/> | |
| i-02306... | Average | 5 Minutes | <input type="button" value="<"/> <input type="button" value=">"/> <input type="button" value="Create alarm"/> | |
| i-02306... | Average | 5 Minutes | <input type="button" value="<"/> <input type="button" value=">"/> <input type="button" value="Create alarm"/> | |
| i-02306... | Average | 5 Minutes | <input type="button" value="<"/> <input type="button" value=">"/> <input type="button" value="Create alarm"/> | |

: EC2, S3, Lambda, RDS

36

Cancel Create widget



S3 Bucket properties and monitoring

Advanced settings

- Name arn:aws:s3:::s3retentionsample-s3bucket-198nq9ci8nwle
- s3retentionsample-s3bucket-198nq9ci8nwle

Settings: Metadata

Object lock
Prevents objects from being deleted.
Learn more

Tags

| Key | Value |
|-------------------------------|---|
| aws:cloudformation:stack-id | arn:aws:cloudformation:us-east-1:123456789012:stack/S3RetentionSample |
| aws:cloudformation:stack-name | S3RetentionSample |

Permissions

Amazon S3 > s3retentionsample-s3bucket-198nq9ci8nwle

Overview Properties Permissions Management

Public access settings Access Control List Bucket Policy CORS configuration

Public access settings for this bucket
Use the Amazon S3 block public access settings to enforce that buckets don't allow public access to data. You can also configure the Amazon S3 block public access settings at the account level. Learn more

Manage public access control lists (ACLs) Manage public bucket policies

- Tagging: instances to track and clean
- Permissions/access control
- Management

- Lifecycle rules e.g. move to Gleischer
- Transition – expiration

Analytics

Metrics

- Storage metrics (Free)
- Request metrics (paid)
- Data transfer (paid)

Inventory

Metrics

Metrics

Search for filter/prefix/tag

Lifecycle Replication Analytics Metrics Inventory

Storage Requests Data transfer 1h 3h 12h

Operations

Feedback English (US)

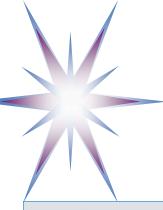
Inventory name Filters Destination bucket Destination prefix Frequency Last export

Output format CSV Choose this format for listing 1 million or fewer objects, or if you plan to analyze S3 Inventory with tools like Excel.

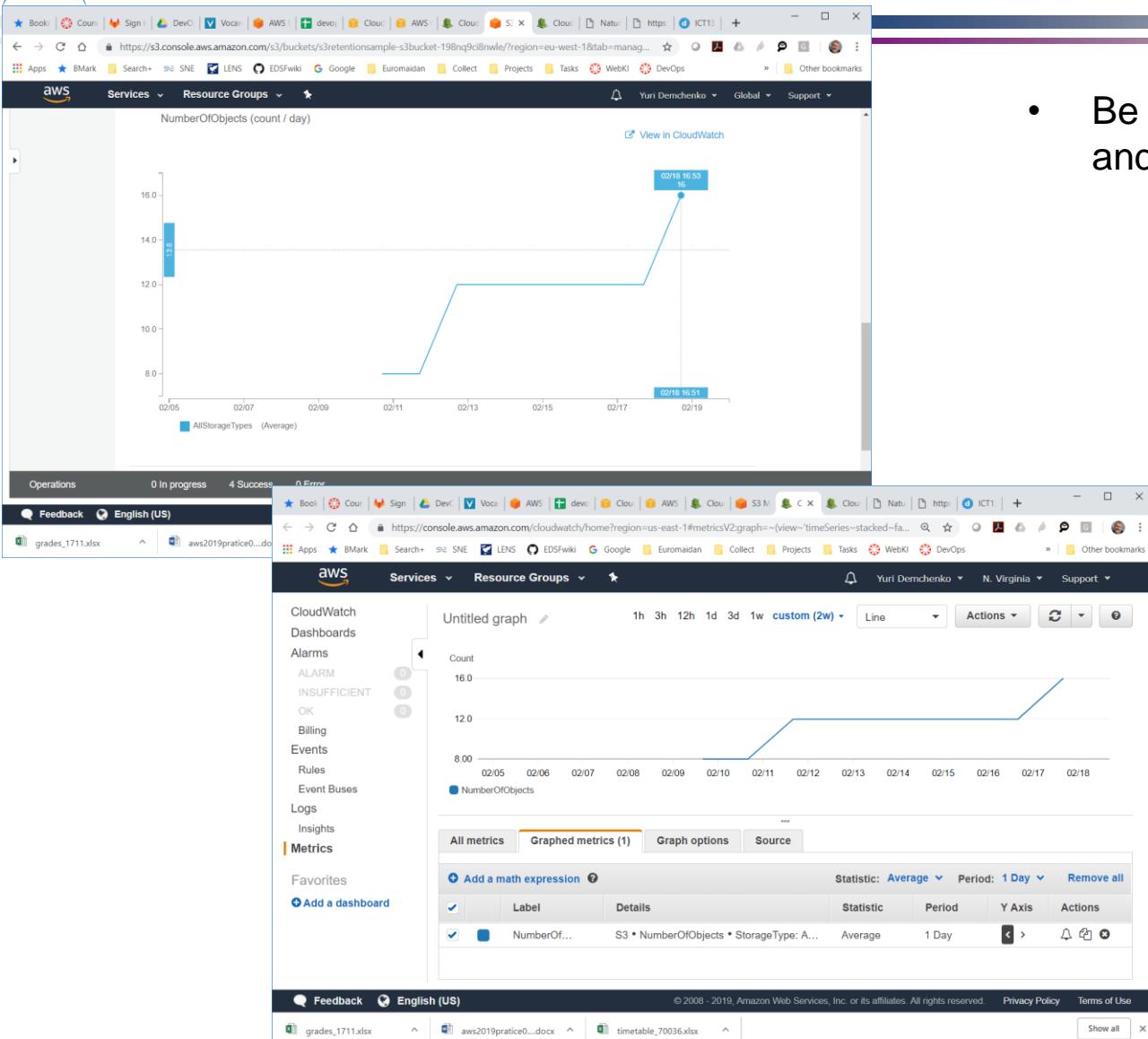
Apache ORC

Operations 0 in progress 2 Success 0 Error

Inventory



S3 metrics and Dashboard metrics



- Be aware of delay in collecting and displaying metrics



Amazon Lambda Serverless Computing



Starting with AWS Lambda (for Serverless Computing)

The screenshot shows the 'Create function' wizard in the AWS Lambda console. The user has selected the 'Author from scratch' option. The 'Basic information' section is filled out with a function name 'myTestFunction01' and a runtime 'Node.js 12.x'. The 'Permissions' section contains a link to 'Choose or create an execution role'. At the bottom right are 'Cancel' and 'Create function' buttons.

eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1#/create/function

Services Resource Groups Yuri Demchenko Ireland Support

Lambda > Functions > Create function

Create function Info

Choose one of the following options to create your function.

Author from scratch Start with a simple Hello World example.

Use a blueprint Build a Lambda application from sample code and configuration presets for common use cases.

Browse serverless app repository Deploy a sample Lambda application from the AWS Serverless Application Repository.

Basic information

Function name
Enter a name that describes the purpose of your function.

Use only letters, numbers, hyphens, or underscores with no spaces.

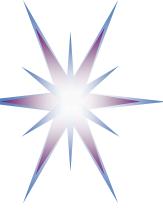
Runtime Info
Choose the language to use to write your function.

Permissions Info
Lambda will create an execution role with permission to upload logs to Amazon CloudWatch Logs. You can configure and modify permissions further when you add triggers.

▶ Choose or create an execution role

Cancel **Create function**

Feedback English (US) © 2008 - 2020, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use



Lambda FirstLabHello (1)

The screenshot shows the AWS Lambda console interface. The top navigation bar includes tabs like Box, Wi, Ind, ph, My, SQ, SQ, Un, Lar, Clc, EC, Clc, and Ale. The main title is "HelloBDAworld". The function name is "FirstLabHello". The code editor shows the "index.js" file:

```
3  console.log('Loading function');
4
5  exports.handler = (event, context, callback) => {
6    //console.log('Received event:', JSON.stringify(event, null, 2));
7    console.log('value1 =', event.key1);
8    console.log('value2 =', event.key2);
9    console.log('value3 =', event.key3);
10   callback(null, event.key1); // Echo back the first key value
11   //callback('Something went wrong');
12 };
13
```

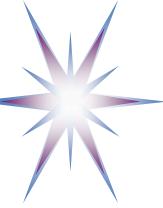
The "Execution Result" section shows the response: "value1". The status is "Succeeded" with a duration of 31.95 ms and memory usage of 20 MB. Function logs show the execution details:

```
Response:
"value1"

Request ID:
"e2424e4f-ee2b-11e7-bd70-d9c58984d0e7"

Function Logs:
START RequestId: e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 Version: $LATEST
2017-12-31T13:09:50.551Z e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 value1 = value1
2017-12-31T13:09:50.551Z e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 value2 = value2
2017-12-31T13:09:50.551Z e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 value3 = value3
END RequestId: e2424e4f-ee2b-11e7-bd70-d9c58984d0e7
REPORT RequestId: e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 Duration: 31.95 ms Billed Duration: 100 ms Memory Size: 128 MB Max Me
```

The bottom navigation bar includes links for Feedback, English (US), Privacy Policy, and Terms of Use. The taskbar at the bottom shows several open files: amazonaurora-15....pdf (Canceled), client-1.0-SNAPSHOT.zip (Canceled), and install_docker.

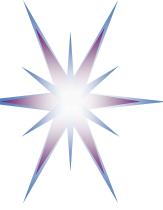


Lambda FirstLabHello (2)

The screenshot shows the AWS CloudWatch Log Groups interface. The left sidebar is collapsed, and the main area displays the log group `/aws/lambda>HelloBDWorld` for the date `2017/12/31`. The log entries are as follows:

| Time (UTC +00:00) | Message |
|-------------------|--|
| 2017-12-31 | No older events found at the moment. Retry. |
| 12:57:19 | 2017-12-31T12:57:19.049Z 222ef87e-ee2a-11e7-812b-dda311477d41 Loading function |
| 12:57:19 | START RequestId: 222ef87e-ee2a-11e7-812b-dda311477d41 Version: \$LATEST |
| 12:57:19 | 2017-12-31T12:57:19.053Z 222ef87e-ee2a-11e7-812b-dda311477d41 value1 = value1 |
| 12:57:19 | 2017-12-31T12:57:19.070Z 222ef87e-ee2a-11e7-812b-dda311477d41 value2 = value2 |
| 12:57:19 | 2017-12-31T12:57:19.070Z 222ef87e-ee2a-11e7-812b-dda311477d41 value3 = value3 |
| 12:57:19 | END RequestId: 222ef87e-ee2a-11e7-812b-dda311477d41 |
| 12:57:19 | REPORT RequestId: 222ef87e-ee2a-11e7-812b-dda311477d41 Duration: 19.91 ms Billed Duration: 100 ms Memory Size: 128 MB Max Memo |
| 13:09:50 | START RequestId: e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 Version: \$LATEST |
| 13:09:50 | 2017-12-31T13:09:50.551Z e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 value1 = value1 |
| 13:09:50 | 2017-12-31T13:09:50.551Z e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 value2 = value2 |
| 13:09:50 | 2017-12-31T13:09:50.551Z e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 value3 = value3 |
| 13:09:50 | END RequestId: e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 |
| 13:09:50 | REPORT RequestId: e2424e4f-ee2b-11e7-bd70-d9c58984d0e7 Duration: 31.95 ms Billed Duration: 100 ms Memory Size: 128 MB Max Memo |

At the bottom, it says "No newer events found at the moment. Retry."



Lambda FirstLabHello (3) – CloudWatch Monitoring

Secure | https://eu-west-1.console.aws.amazon.com/lambda/home?region=eu-west-1#/functions>HelloBDWorld?tab=monitoring

aws Services Resource Groups Yuri Demchenko Ireland Support

HelloBDWorld

Qualifiers Actions FirstLabHello Test Save

Configuration Monitoring

CloudWatch metrics at a glance (aggregated per hour)

View traces in X-Ray

Last 24 hours ▾

Invocation count

Jump to Metrics Jump to Logs

2017/12/31 13:00: Count: 1

Last 24 hours ▾

Invocation duration

Jump to Metrics Jump to Logs

Max Milliseconds
Avg Milliseconds
Min Milliseconds

Feedback English (US) © 2008 - 2017, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use

Show all

amazonaurora-15....pdf Canceled client-1.0-SNAPSHOT.zip install_docker



AWS Pricing Calculator

- Be aware of cloud cost
- Use AWS Pricing Calculator <https://calculator.aws/#/>



Simple Monthly Calculator – To be deprecated soon

<https://calculator.s3.amazonaws.com/index.html>

The screenshot shows a web browser window with three tabs: "Amazon Web Services Simple Mc" (active), "AWS Pricing Calculator", and another "AWS Pricing Calculator". The main content is the "SIMPLE MONTHLY CALCULATOR" page.

Header: AWS logo, "SIMPLE MONTHLY CALCULATOR", "Sign up for an AWS account", "Hours Per Month: 732", "Language: English".

Message Box: "Simple Monthly Calculator deprecation update: We appreciate your continuous feedback regarding the [AWS Pricing Calculator](#). The Simple Monthly Calculator's deprecation date is delayed to ensure the features requested from our customers are available in the AWS Pricing Calculator. We will continue to add services to the AWS Pricing Calculator to guarantee parity with the Simple Monthly Calculator. If you have any feedback, contact us by using the [Feedback](#) link in the AWS Pricing Calculator."

Services: A sidebar on the left lists services: Amazon EC2, Amazon S3, Amazon Route 53, Amazon CloudFront, Amazon RDS, Amazon Elastic Load Balancing, Amazon DynamoDB, Amazon ElastiCache, Amazon CloudWatch, Amazon SES, and Amazon SNS.

Estimate of your Monthly Bill (\$ 0.00): Shows "Choose region: US East (N. Virginia)" and a note: "Inbound Data Transfer is Free and Outbound Data Transfer is 1 GB free per region per month".

Compute: Amazon EC2 Instances: A table with columns: Description, Instances, Usage, Type, Billing Option, Monthly Cost. A button "+ Add New Row" is present.

Compute: Amazon EC2 Dedicated Hosts: A table with columns: Description, Number of Hosts, Usage, Type, Billing Option. A button "+ Add New Row" is present.

Storage: Amazon EBS Volumes: A table with columns: Description, Volumes, Volume Type, Storage, IOPS, Baseline Throughput, Snapshot Storage. A row is shown with values: aa, 1, General Purpose SSD (gp2), 1 GB, 50, 128 MBs/sec, 0 GB-month of Storage. A button "+ Add New Row" is present.

Common Customer Samples: A sidebar on the right lists sample configurations: Free Website on AWS, AWS Elastic Beanstalk Default, Marketing Web Site, Large Web Application (All On-Demand), Media Application, and European Web Application.



New AWS Pricing Calculator -

<https://calculator.aws/#/>

The screenshot displays two browser windows for the AWS Pricing Calculator.

Top Window (Calculator Homepage):

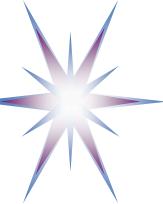
- Title Bar:** Shows tabs for "Amazon Web Services Simple M..." and "AWS Pricing Calculator".
- Address Bar:** Shows the URL "calculator.aws/#/".
- Header:** Includes the AWS logo, a search bar, and links for "Feedback", "English", and "Contact Sales".
- Main Content:** Features a large "Create an estimate" button and a "Getting started" section.
- Bottom Content:** A "How it works" diagram illustrating the four steps: "AWS Pricing Calculator", "Add services", "Configure service", and "View estimate totals".
- Footer:** Links for "Privacy", "Site terms", "Cookie preferences", and copyright information: "© 2021, Amazon Web Services, Inc. or its affiliates".

Bottom Window (Configuration Step):

- Title Bar:** Shows the URL "calculator.aws/#/createCalculator/amazonEC2".
- Header:** Includes the AWS logo, a search bar, and links for "Feedback", "English", and "Contact Sales".
- Content:** A "Configure Amazon EC2" form with sections for "Description" (with a placeholder "Enter a description for your estimate") and "Region".
- Region Selection:** A dropdown menu set to "US East (Ohio)".
- Estimate Options:** Two radio buttons: "Quick estimate" (selected) and "Advanced estimate".
- Advanced Estimate Description:** Text explaining the advanced estimate option for workload, data transfer costs, and other requirements.
- EC2 Instance Specifications:** A section starting with "EC2 instance specifications" and "Info".
- Operating System:** A link labeled "Operating system".



Automating AWS resources deployment with CloudFormation



Using CloudFormation for Resource Deployment

- CloudFormation is the internal cloud resources configuration and automated provisioning tool
- CloudFormation template describes configuration of a single or multiple resources
- CloudFormation template is re-usable but not composable



Creating S3 bucket via CF template

<https://docs.aws.amazon.com/AWSCloudFormation/latest/UserGuide/sample-templates-services-us-east-1.html>

The screenshot shows the AWS CloudFormation Designer interface. On the left, there's a sidebar with 'Name' and 'Description' for four sample templates: 'Amazon RDS DB instance with provisioned IOPS', 'Amazon RDS DB instance with a read replica', 'Amazon RDS DB instance with a deletion policy', and 'Amazon RDS DB instance'. Each template has 'View' and 'View in Designer' buttons, and a 'Launch stack' button. To the right is a 'Designer' canvas where you can drag and drop resources. A sidebar titled 'On this page' lists various AWS services like Auto Scaling, AWS Batch, AWS Config, etc.

The screenshot shows the AWS CloudFormation console. At the top, it says 'File: "template1"'. Below is a preview area with a red-bordered box containing a red bucket icon and the text 'S3B6SSQ Bucket'. On the left, there's a sidebar for 'Resource types' including Route53, Route53Resolver, S3, Bucket, BucketPolicy, SDB, and SES. At the bottom, there's a code editor for 'template1' with JSON/YAML tabs, showing the following template:

```

1 template1
2 {
3     "S3B6SSQ": {
4         "Type": "AWS::S3::Bucket",
5         "Properties": {}
6     }
7 }
  
```

Below the code editor, it says 'Choose template language: JSON YAML' and 'Successfully converted the template to JSON.'

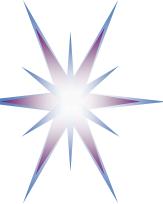
```

{
    "AWSTemplateFormatVersion" : "2010-09-09",
    "Description" : "AWS CloudFormation Sample Template
S3_Website_Bucket_With_Retain_On_Delete: Sample template
showing how to create a publicly accessible S3 bucket
configured for website access with a deletion policy of
retain on delete. **WARNING** This template creates an S3
bucket that will NOT be deleted when the stack is deleted.
You will be billed for the AWS resources used if you create
a stack from this template.",

    "Resources" : {
        "S3Bucket" : {
            "Type" : "AWS::S3::Bucket",
            "Properties" : {
                "AccessControl" : "PublicRead",
                "WebsiteConfiguration" : {
                    "IndexDocument" : "index.html",
                    "ErrorDocument" : "error.html"
                }
            },
            "DeletionPolicy" : "Retain"
        }
    },
    "Outputs" : {
        "WebsiteURL" : {
            "Value" : { "Fn::GetAtt" : [ "S3Bucket", "WebsiteURL" ] },
            "Description" : "URL for website hosted on S3"
        },
        "S3BucketSecureURL" : {
            "Value" : { "Fn::Join" : [ "", [ "https://", { "Fn::GetAtt" : [ "S3Bucket", "DomainName" ] } ] ] },
            "Description" : "Name of S3 bucket to hold website
content"
        }
    }
}
  
```

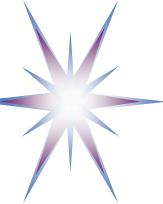
Create -> Upload Files -> Default properties for files

S3, Lambda, RDS



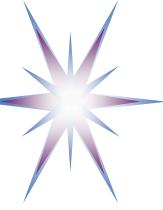
Closer look at S3 bucket template

```
{  
    "AWSTemplateFormatVersion" : "2010-09-09",  
  
    "Description" : "AWS CloudFormation Sample Template S3_Website_Bucket_With_Retain_On_Delete: Sample template showing how to create a publicly accessible S3 bucket configured for website access with a deletion policy of retain on delete. **WARNING** This template creates an S3 bucket that will NOT be deleted when the stack is deleted. You will be billed for the AWS resources used if you create a stack from this template.",  
  
    "Resources" : {  
        "S3Bucket" : {  
            "Type" : "AWS::S3::Bucket",  
            "Properties" : {  
                "AccessControl" : "PublicRead",  
                "WebsiteConfiguration" : {  
                    "IndexDocument" : "index.html",  
                    "ErrorDocument" : "error.html"  
                }  
            },  
            "DeletionPolicy" : "Retain"  
        }  
    },  
  
    "Outputs" : {  
        "WebsiteURL" : {  
            "Value" : { "Fn::GetAtt" : [ "S3Bucket", "WebsiteURL" ] },  
            "Description" : "URL for website hosted on S3"  
        },  
        "S3BucketSecureURL" : {  
            "Value" : { "Fn::Join" : [ "", [ "https://", { "Fn::GetAtt" : [ "S3Bucket", "DomainName" ] } ] ] },  
            "Description" : "Name of S3 bucket to hold website content"  
        }  
    }  
}
```



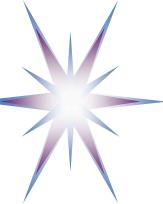
Setting up your Cloud Development Environment

- Python and PIP
- Windows PowerShell
- Windows Extension for Linux
- AWS CLI
 - On Windows and PowerShell
 - On Linux



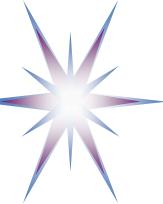
Python and PIP

- Ubuntu 18.04 ships with Python 3, as the default Python installation.
- Complete the following steps to install pip (pip3) for Python 3:
 - Start by updating the package list using the following command:
`sudo apt update`
 - Use the following command to install pip for Python 3:
`sudo apt install python3-pip`
The command above will also install all the dependencies required for building Python modules.
- Once the installation is complete, verify the installation by checking the pip version:
`pip3 --version`



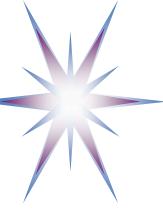
Installing Python 3.8 on Linux/Debian/Ubuntu

- **How to Install Python 3.8 on Ubuntu 18.04**
- <https://linuxize.com/post/how-to-install-python-3-8-on-ubuntu-18-04/>
- Check
 - \$ python3.8 –version
- **Installing pip for Python 3**
 - sudo apt install python3-pip
- Check
 - Pip3 –version
 - pip 9.0.1 from /usr/lib/python3/dist-packages (python 3.6)



Windows PowerShell and WSL

- <https://docs.microsoft.com/en-us/windows/wsl/faq>
- Available in Microsoft Store
- Install on Windows 10: From PowerShell
 - Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Windows-Subsystem-Linux
- Run WSL
 - **Set up a new Linux user account**
- Update and upgrade packages
 - sudo apt update && sudo apt upgrade
-
- Access local machine's filesystem from within the Linux Bash shell
 - Local drives mounted under the /mnt folder, e.g. C: drive is mounted under /mnt/c:



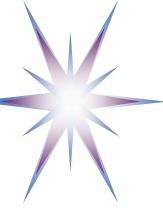
AWS CLI

- Download the AWS CLI MSI installer for Windows (64-bit) at <https://awscli.amazonaws.com/AWSCLIV2.msi>
- To confirm version
 - > aws –version
 - > aws-cli/2.0.6 Python/3.7.4 Windows/10 botocore/2.0.0
- Usage:
 - aws [options] <command> <subcommand> [<subcommand> ...] [parameters]
- To see help text, you can run:
 - aws help
 - aws <command> help
 - aws <command> <subcommand> help



AWS CLI on Linux

- Prerequisite: Python 3+ and python-pip
- From Windows Extension for Linux Debian
 - sudo apt-get install python-pip python-dev build-essential
- **\$ sudo apt install awscli**
 - Option: sudo pip install awscli
 - Other: sudo pip install --upgrade --user awscli
- Check
 - aws –version
 - aws-cli/1.16.113 Python/3.7.3 Linux/4.4.0-18362-Microsoft botocore/1.12.103



Copy key to working directory

- To copy a file from your current directory into another directory called /tmp/, enter:

```
$ cp filename /tmp
```

```
$ ls /tmp/filename
```

```
$ cd /tmp
```

```
$ ls
```

```
$ rm filename
```