

# Cloud Computing

Winter Term 2019/2020

Tutorial Session 1



Anton Gulenko

Complex and Distributed IT-Systems

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# Organization

- Four tutorial sessions (14:00-16:00, Room MA 004):
  - 11.11.
  - 02.12.
  - 13.01.
  - 27.01.
- Each session introduces one assignment
- Each assignment is due 2-3 weeks later
- Written Exam:
  - 19.02.2020 (13:00-15:00)
- Exam counts 50% of the final grade, other 50% divided by assignments

# Organization

- Assignments are solved in teams of 4 students
- Register on ISIS, get in touch through your “Group Forum”
  - If you don’t have a group, write in the “Group Search” forum or contact us



## Group Selection

- The three project assignments have to be completed in groups of 4-5 students. Please indicate which group you want to be in, by choosing one below.
- You can change your group without further notification up until the deadline of the first project assignment. After that, please notify Anton Gulenko.



## Group Forum

- Please use this forum to contact your group members
- Do not write messages in the sub-forums of other groups
- You will also receive some group-specific material required for the assignments over this forum

- **Important: QISPOS Registration**
  - Email us (or Jana Bechstein [jana.bechstein@tu-berlin.de](mailto:jana.bechstein@tu-berlin.de)) if there are problems
  - Required to submit assignments and write the exam!

# Practical Assignments

- Topics covered
  - Usage of Infrastructure-as-a-service clouds (dashboard and CLI API)
  - Benchmarking the performance of different platforms
  - Benchmarking the cloud API
  - Infrastructure-as-code orchestration
  - Container virtualization (Docker)
  - Container-based orchestration (Kubernetes)
- Sources of Information:
  - Assignment sheet
  - Online documentation
  - Online forums (<https://stackoverflow.com/>)
  - ISIS forum: ask your fellow students!

# Practical Assignment 1

- Due: 28.11.2019
- Summary:
  - Create accounts on Amazon AWS and Google Cloud Platform
  - Apply for Amazon AWS Educate and receive a coupon for Google Cloud credits
  - Create and prepare VMs in both platforms
  - Write performance benchmarks (CPU, disk, memory benchmarks)
  - Benchmark the 2 platforms regularly and collect the results
  - Plot the results with a script provided by us
  - Answer questions related to your measurements

# Assignment Submission: ISIS

- Submit all required files on ISIS
- Resubmissions are possible: only the last submission will be counted
- Submission will be partially validated automatically:
  - Use exactly the correct file names
  - Submit exactly the 9 required files described in the assignment

# Assignment Submission: ISIS

## Cloud Computing 19/20

[Dashboard](#) ▶ [My courses](#) ▶ [CC19/20](#) ▶ [Assignment 1 Submission](#)

### Assignment 1 Submission

#### Submission status

Group	Test
Attempt number	This is attempt 1.
Submission status	Nothing has been submitted for this assignment
Grading status	Not graded
Due date	Thursday, 28 November 2019, 11:59 PM
Time remaining	17 days 11 hours
Last modified	-

#### Submission comments

[+](#) Comments (0)

ADD SUBMISSION

You have not made a submission yet.

# Assignment Submission: ISIS

Cloud Computing 19/20

[Dashboard](#) > [My courses](#) > [CC19/20](#) > [Assignment 1 Submission](#) > [Edit submission](#)

## Assignment 1 Submission

Online text

Question 1

Lorem ipsum...

Question 2

Lorem ipsum...

Insert answers to questions here

File submissions

Maximum file size: 20MB, maximum number of files: 9



### > Files

Name	Last modified	Size	Type
benchmark.sh	11/11/19, 12:03	923 bytes	application/x-sh
create-aws.sh	11/11/19, 12:03	1009 bytes	application/x-sh
create-gcp.sh	11/11/19, 12:03	844 bytes	application/x-sh
plot-cpu.png	11/11/19, 12:03	33.5KB	Image (PNG)
plot-diskRand.png	11/11/19, 12:03	31.6KB	Image (PNG)
plot-diskSeq.png	11/11/19, 12:03	29.1KB	Image (PNG)
plot-mem.png	11/11/19, 12:03	27.3KB	Image (PNG)
results-aws.csv	11/11/19, 12:03	153 bytes	Comma-separated values
results-gcp.csv	11/11/19, 12:03	152 bytes	Comma-separated values

Accepted file types:

application/x-sh .sh  
Comma-separated values .csv  
Image (PNG) .png

SAVE CHANGES

CANCEL

Make sure all required files are uploaded correctly



# Amazon AWS Educate Starter

- You receive a small number of credits to use EC2 virtual machines
  - Limited feature set, but enough to solve assignments
- Alternative: full Amazon AWS Educate account
  - You receive 100\$ AWS credits for FULL AWS usage
  - More than enough to solve all assignments
  - Requires credit card!
  - It will not be charged if you follow our instructions. You are responsible!
  - **Most important thing: always shut down your VMs when you are done!**
- You can share an Amazon AWS account using IAM
  - <https://aws.amazon.com/iam/>

# Google Cloud: Education Grants

- 50\$ coupons received for education purpose
- Follow the instructions on the assignment sheet to receive the credits
- Most newly created accounts receive an additional 300\$ credits valid for one year
- Google Cloud might ask for a credit card, but it will not be charged

# Amazon AWS & Google Cloud

- Pay-as-you-go model:
  - Pay by the hour, megabyte, request, ...
  - Permanent use can be expensive, but many possibilities without much configuration
- Administration possible via:
  - Browser (Management console)
  - Command Line
    - Based on REST API
    - Required to solve the project assignments
  - REST API

# Amazon AWS

- >40 services, list growing...

## Virtual Machines

### Compute

EC2  
EC2 Container Service  
Lightsail  
Elastic Beanstalk  
Lambda  
Batch

### Storage

S3  
EFS  
Glacier  
Storage Gateway

### Database

RDS  
DynamoDB  
ElastiCache  
Redshift



### Networking & Content Delivery

VPC  
CloudFront  
Direct Connect  
Route 53



### Migration

Application Discovery Service  
DMS  
Server Migration  
Snowball



### Developer Tools

CodeStar  
CodeCommit  
CodeBuild  
CodeDeploy  
CodePipeline  
X-Ray



### Management Tools

CloudWatch  
CloudFormation  
CloudTrail  
Config  
OpsWorks  
Service Catalog  
Trusted Advisor  
Managed Services



### Security, Identity & Compliance

IAM  
Inspector  
Certificate Manager  
Directory Service  
WAF & Shield  
Compliance Reports



### Analytics

Athena  
EMR  
CloudSearch  
Elasticsearch Service  
Kinesis  
Data Pipeline  
QuickSight



### Artificial Intelligence

Lex  
Polly  
Rekognition  
Machine Learning



### Internet Of Things

AWS IoT



### Contact Center

Amazon Connect



### Game Development

Amazon GameLift



### Mobile Services

Mobile Hub  
Cognito  
Device Farm  
Mobile Analytics  
Pinpoint

## Billing



### Application Services

Step Functions  
SWF  
API Gateway  
Elastic Transcoder



### Messaging

Simple Queue Service  
Simple Notification Service  
SES



### Business Productivity

WorkDocs  
WorkMail  
Amazon Chime



### Desktop & App Streaming

WorkSpaces  
AppStream 2.0

## Account Management

Anton Gulenko Global Support

[My Account](#)

[My Organization](#)

[My Billing Dashboard](#)

[My Security Credentials](#)

[Sign Out](#)

# Google Cloud

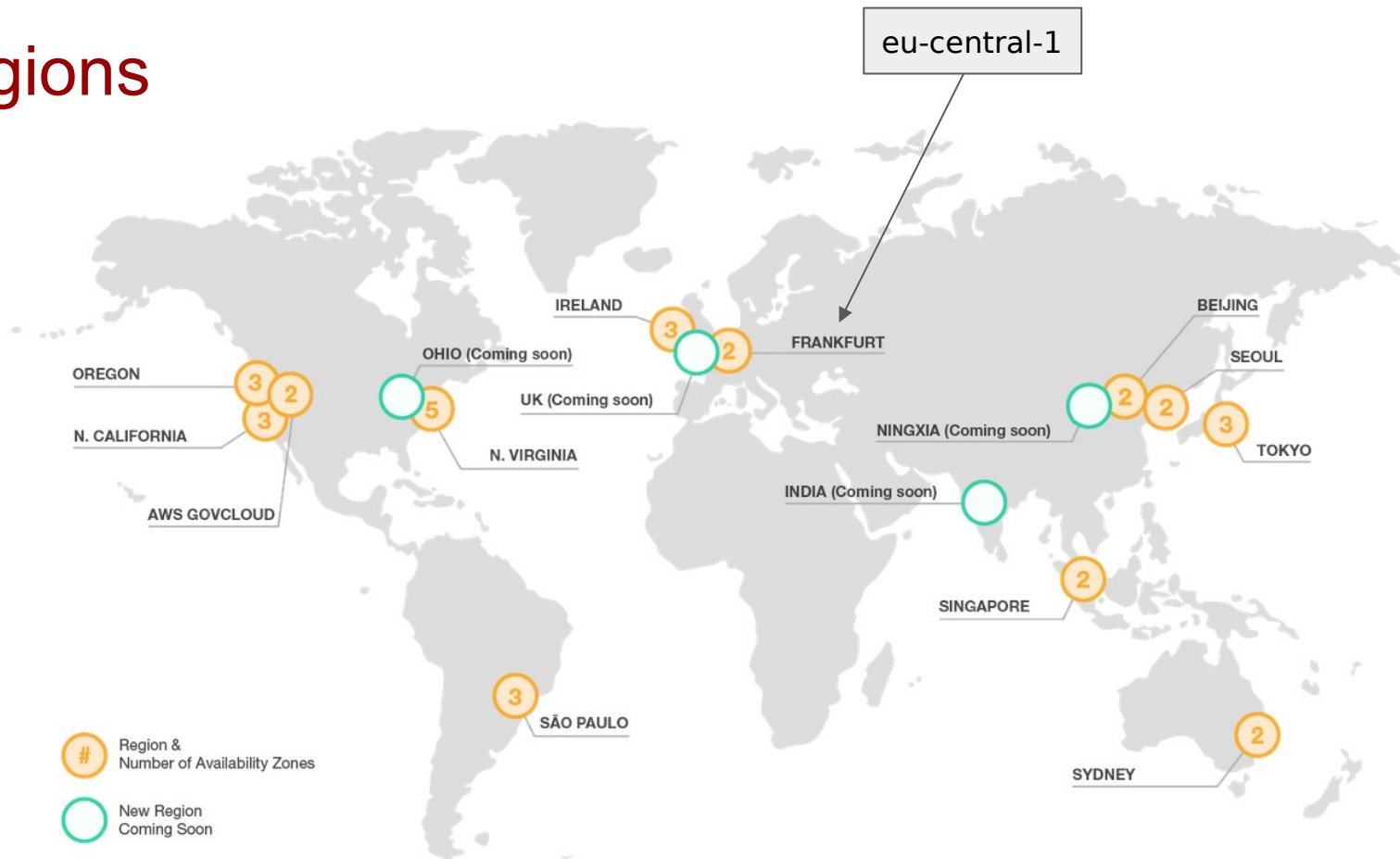
The screenshot shows the Google Cloud Platform console dashboard for a project named 'My First Project'. The interface is divided into several sections:

- Left Sidebar:** Contains navigation links for Startseite, Marketplace, Abrechnung, APIs & Dienste, Support, IAM & Verwaltung, Jetzt starten, Sicherheit, COMPUTING (App Engine, Compute Engine, Kubernetes Engine, Cloud Functions), and SPEICHER (Bigtable, Datastore, Firestore, Storage, SQL, Spanner).
- Top Bar:** Displays the Google Cloud Platform logo, the project name 'My First Project', a search bar, and various utility icons.
- Dashboard Content:**
  - Project Information (Projektinformationen):** Shows details like Projectname (My First Project), Project-ID (sodium-octane-221715), and Projektnummer (791070547693). A box labeled 'Account Management' points to this section.
  - Resources (Ressourcen):** Lists Compute Engine instances. A box labeled 'Virtual Machines' points to this section.
  - Trace:** Shows no trace data for the last 7 days.
  - First Steps (Erste Schritte):** Provides a checklist of tasks like activating APIs, setting up solutions, and creating storage buckets.
  - Status of Google Cloud Platform (Status der Google Cloud Platform):** Indicates that all services are normal.
  - Billing (Abrechnung):** Shows estimated costs of 0.00 EUR for the period 01.11.2018 - 12.11.2018. A box labeled 'Billing' points to this section.
  - Error Reports (Fehlerberichte):** States that no errors have been detected.
  - News (Nachrichten):** Lists recent updates and announcements.
  - Documentation (Dokumentation):** Provides links to various documentation resources.
- Right Sidebar:** Contains links to the Cloud Status Dashboard, Detailed Costs, Error Reports, and News.

Annotations with arrows point from text boxes to specific parts of the dashboard:

- Billing:** Points to the 'Abrechnung' section.
- Account Management:** Points to the 'Projektinformationen' section.
- Virtual Machines:** Points to the 'Ressourcen' section.

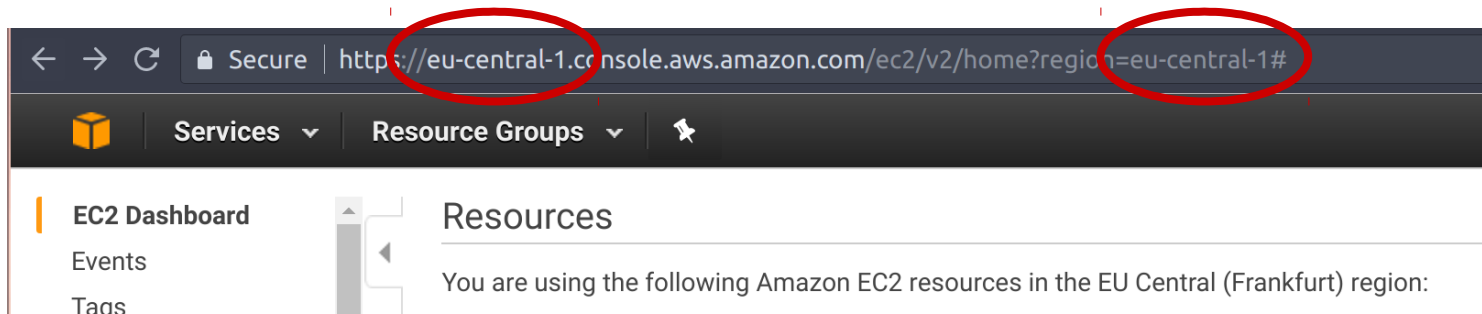
# Regions



Source: <https://awsinsider.net/articles/2016/01/07/aws-launches-region-in-korea.aspx>

# Amazon AWS Regions

- Make sure you are in the correct region in the Dashboard



# Command Line Tools

- You will have to set up an environment for connecting to the Cloud APIs
  - AWS: <http://docs.aws.amazon.com/cli/latest/userguide/installing.html>
  - Gcloud: <https://cloud.google.com/sdk/docs>
- Work on Linux!
- Read the docs
- Use the command line tools to create all resources described in the assignment



## Last Reminder

Always remember to shut  
down your unused VMs!