

# Cloud Computing

Summer Term 2016

Tutorial Session 1



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Complex and Distributed IT-Systems

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# Organization

- Three tutorial sessions (14:00-16:00, Room EMH 225):
  - 29.05.
  - ~~12.06.~~ Update: 19.06.
  - ~~26.06.~~ Update: 03.07.
- Each session introduces one assignment
- Each assignment is due 2 weeks later (right before the next session)
- Written Exam:
  - 01.08.2017 (10:00-12:00)
- Exam counts 60% of the final grade, assignments count 40%

# Organization

- Projects are solved in teams of 4-5 students
- Register on ISIS, get in touch through your “Group Forum”
  - If you don't have a group, write in the “Discussion Board” 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**
  - Possible until May 31st
  - Required to submit assignments and write the exam!

# Project Assignments

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

# Project Assignment 1

- Due: ~~11.06.2017 23:59~~ Update: 18.06.2017 23:59
- Summary:
  - Create Amazon AWS account, apply for AWS Educate grant
  - Receive credentials for the OpenStack cloud hosted at the CIT department
  - Create and prepare VMs in both platforms
  - Benchmark the 2 platforms & your PC (CPU, disk, memory benchmarks)
  - Plot benchmarking results, answer questions
- Submission
  - Through ISIS
  - One single PDF file containing text, plots, code snippets
  - Format of the PDF is not relevant, but include your group number and names on top

# Amazon AWS Educate

- Amazon AWS accounts require a credit card
  - It will not be charged if you follow our instructions!
- AWS Educate grants 100\$ AWS credits per student per semester
  - More than enough to solve all assignments
  - **Most important thing: always shut down your VMs!**
- You can share an Amazon AWS account using IAM
  - <https://aws.amazon.com/iam/>

# 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 

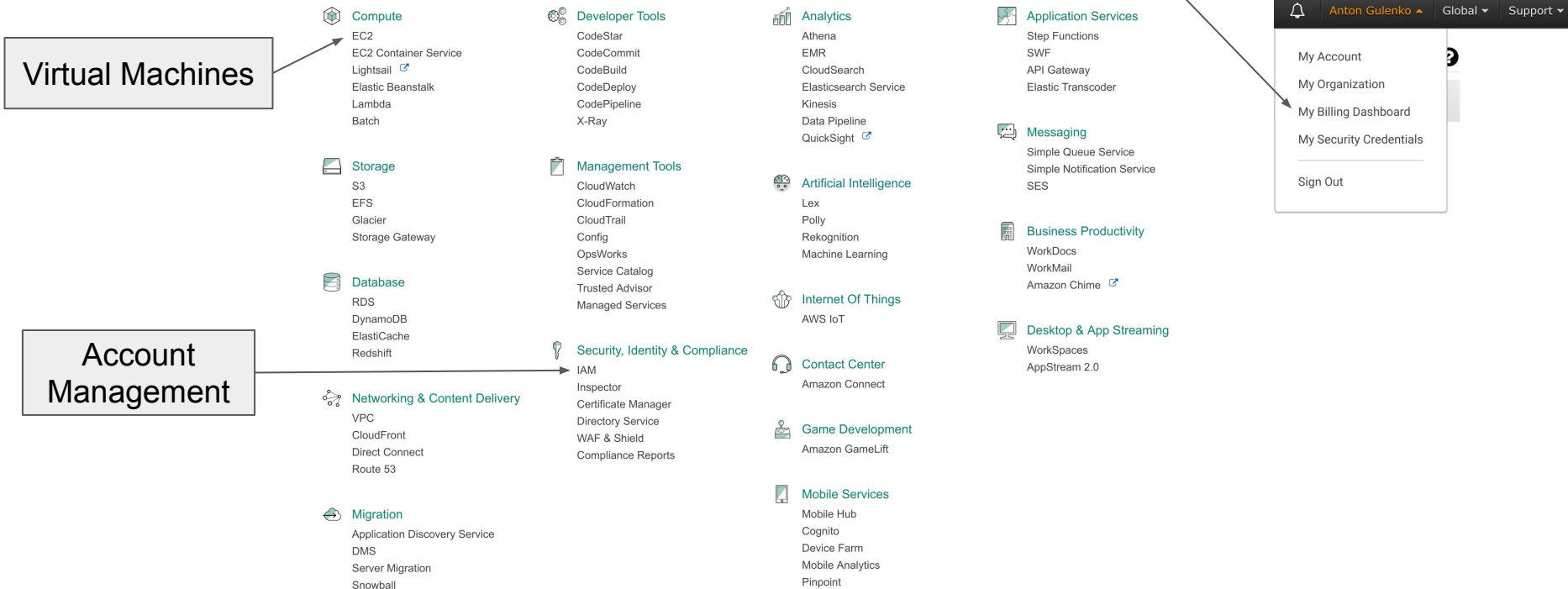
 My Account

 My Organization

 My Billing Dashboard

 My Security Credentials

 Sign Out

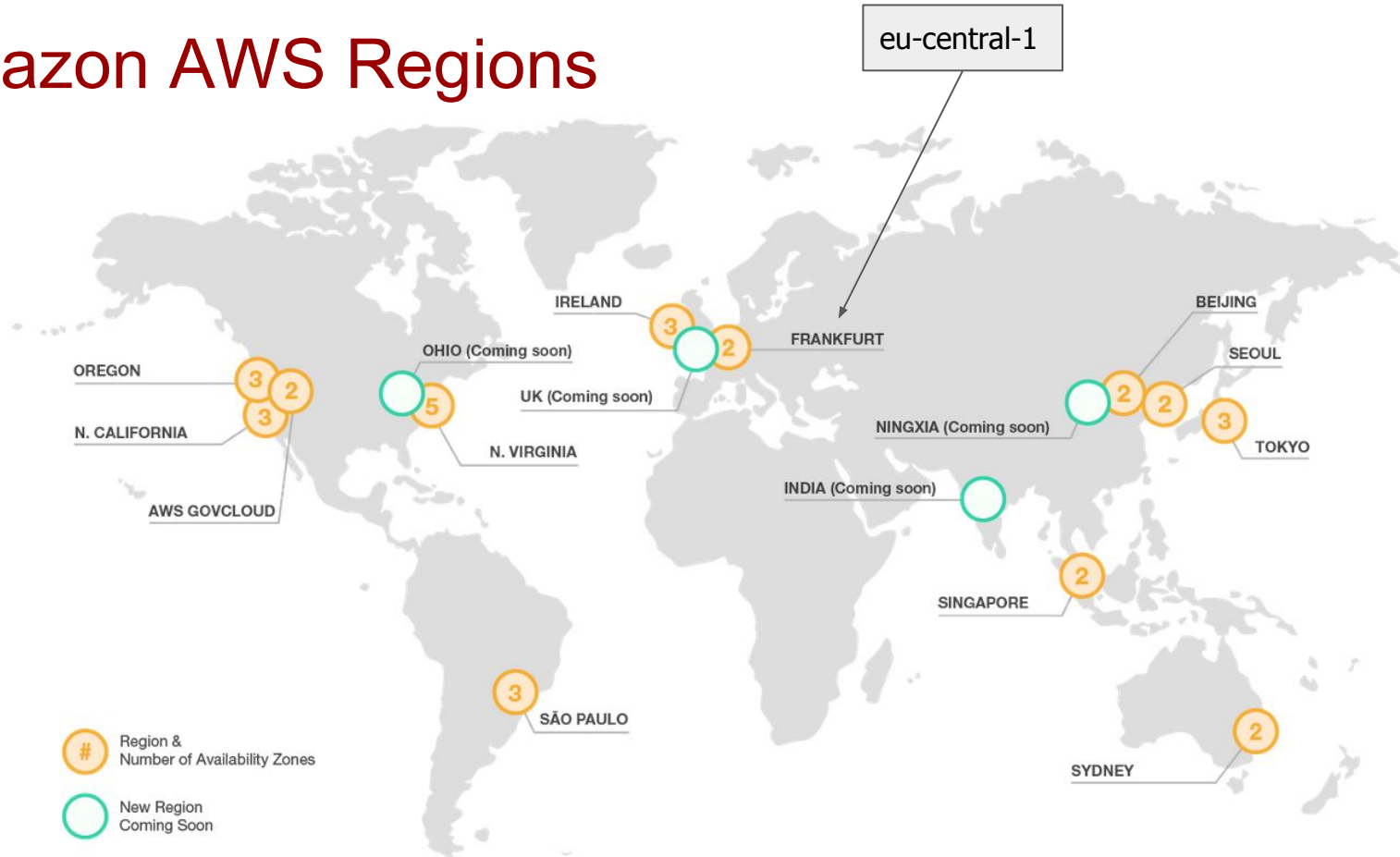


# Amazon AWS

- Pay-as-you-go model:
  - Pay by the hour, megabyte, request, ...
  - Expensive, but many possibilities without much configuration
- Administration possible via:
  - Browser (Management console):
    - <https://console.aws.amazon.com/console/home>
  - Command Line
    - Based on web-service API
    - Required to solve the project assignments
  - REST API



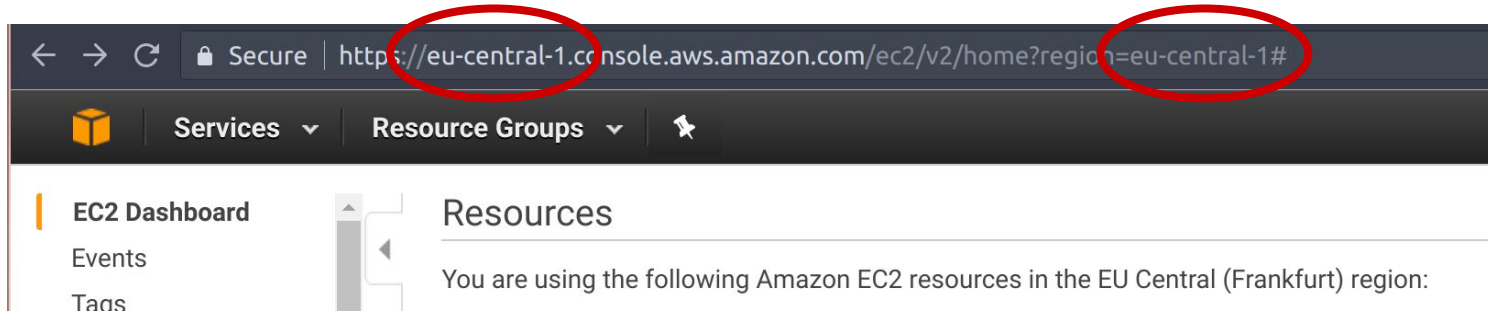
# Amazon AWS Regions



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



# AWS Command Line Tools

- You will have to set up an environment for connecting to the AWS API
  - <http://docs.aws.amazon.com/cli/latest/userguide/installing.html>
- We recommend to use a Linux environment
- Read the docs
- Use the command line tools to create all resources described in the assignment



## Last Reminder

Always remember to shut  
down your EC2 instances!