

BERGEN CLOUD USER GROUP - 2020.08.15



Introduction to Cloud Computing

Using Amazon Web Services (AWS)



tieto *Evy*

mathiasmoberg



ABOUT ME

Karl Mathias Moberg

 Cloud Ambassador



- Bergen, Norway 
- Cloud Consultant @ TietoEVRY
- Student @ Noroff University College
- AWS Certified Solutions Architect
- 30 Years old, 2 Kids
- ❤️ DevOps
- Developer, Photographer, Aviation Geek 

 @mathiasmoberg   kmoberg

What is Cloud Computing?



Source: <https://bit.ly/visiblecloud>



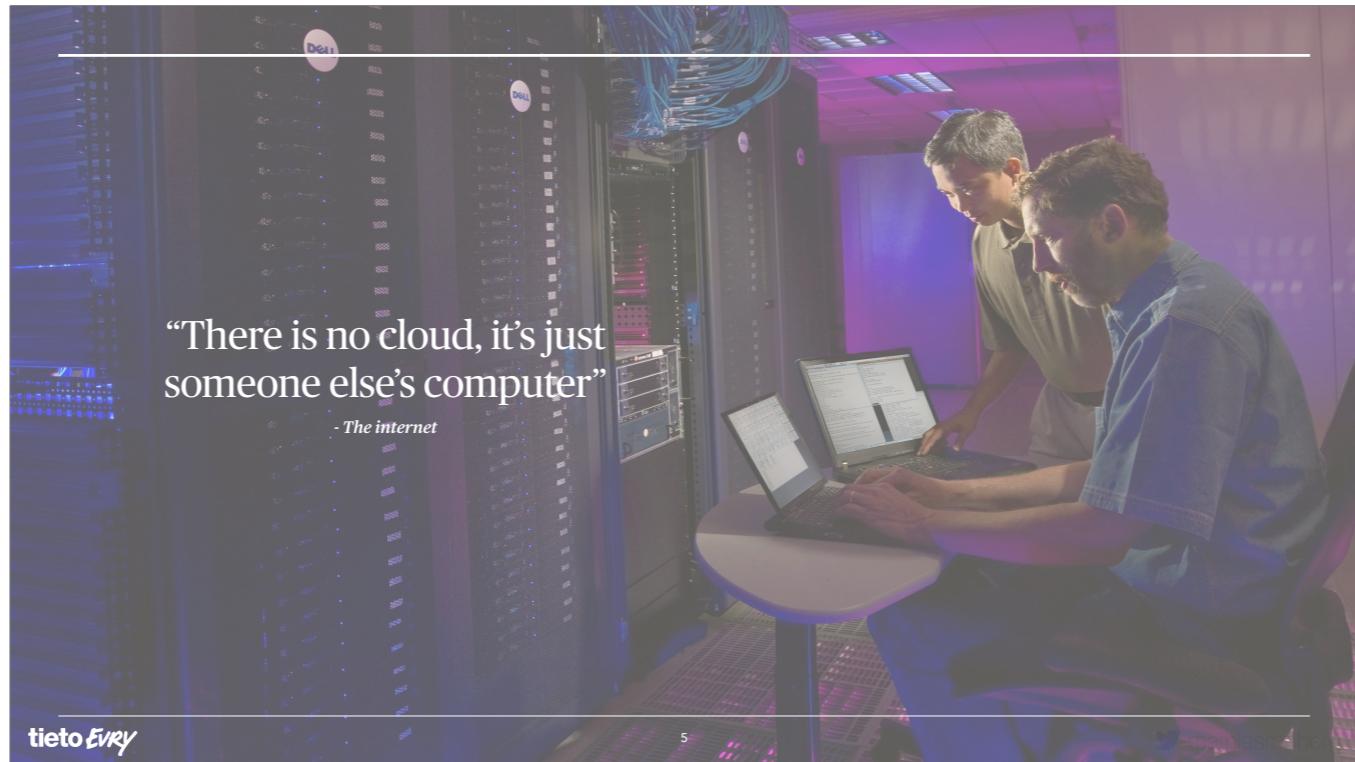
"Due to less Pollution, the files stored on cloud are now Clearly Visible. 😊"

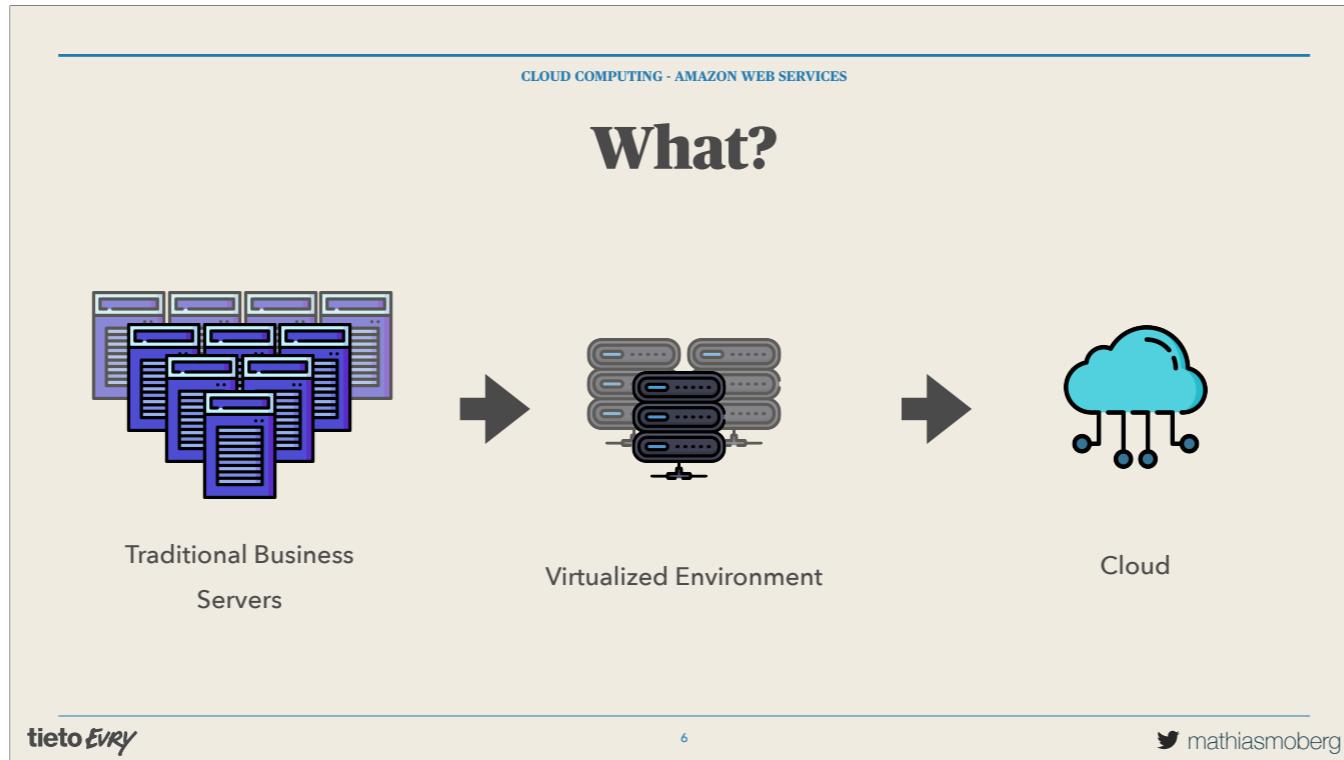
@Shah_Rizvi97, 2020.05.05

tieto *EVERY*

4

mathiasmoberg





Went from:

- * Traditional server farm
 - * One service per server
 - * Lots and lots of low-specced servers consuming a LOT of energy and taking up a LOT of space.
 - * Extremely low efficiency per server. CPU Util often in 20% range.
 - * VERY long lead times for new servers or services.

Moved to:

- * Virtualization!
 - * Fewer high-specced servers
 - * Much better util. Closer to 80-90%.
 - * Virtual Machines
 - * Often longer lead times to deploy new virtualization hosts.
 - * Extremely high up-front costs.

Future:

- * Cloud!
 - * Pioneered by Salesforce , AWS launched in 2002.
 - * In practice, unlimited potential CPU and Storage capacity
 - * No up-front costs.

- * Near instant deployment
- * Number of PaaS solutions, no need for entire OS anymore.
- * Managed Services - no need to maintain servers.
- * MUCH better security - don't fool yourself. AWS is better than you at security IF you follow their instructions.



*“Our move to the cloud costs *how much per month??*”*

- Executives after they see their cloud bill, a month after lifting 100 servers to the cloud

tieto *every*

Moving to the cloud is NOT cheaper using “lift and shift”.

You need to consider what you are putting in the cloud and how you do it. Most traditional server deployments are much more expensive in the cloud, than the cloud-native solutions.

Why?



Elasticity



Efficiency



Strategic Value

Elasticity or Flexibility:

- * Scalability
- * Storage Options
- * Control Choices
- * Tool Selection
- * SECURITY FEATURES

Efficiency:

- * Accessibility
- * Speed to market
- * Data security
- * Savings on equipment
- * Pay as you go

Strategic Value:

- * Cloud Provider manage infrastructure, allowing business to focus on app development
- * Regular updates
- * Collaboration
- * No upfront-costs, pay as you go, easier to get started.
- * Global distribution in minutes

What is Cloud Computing?



Acronym-Extravaganza

Types of Cloud Services

- IaaS - *Infrastructure as a Service*
Technical infrastructure maintained by provider, such as Networking, Physical Machines, Power, etc.
- PaaS - *Platform as a Service*
Focus on the code and not about the server, operating system and storage.
- SaaS - *Software as a Service*
Complete software packages, run and maintained by provider.
- XaaS - <You Name It> as a Service
Backup as a service? Sure! 🔥aaS? Why not?

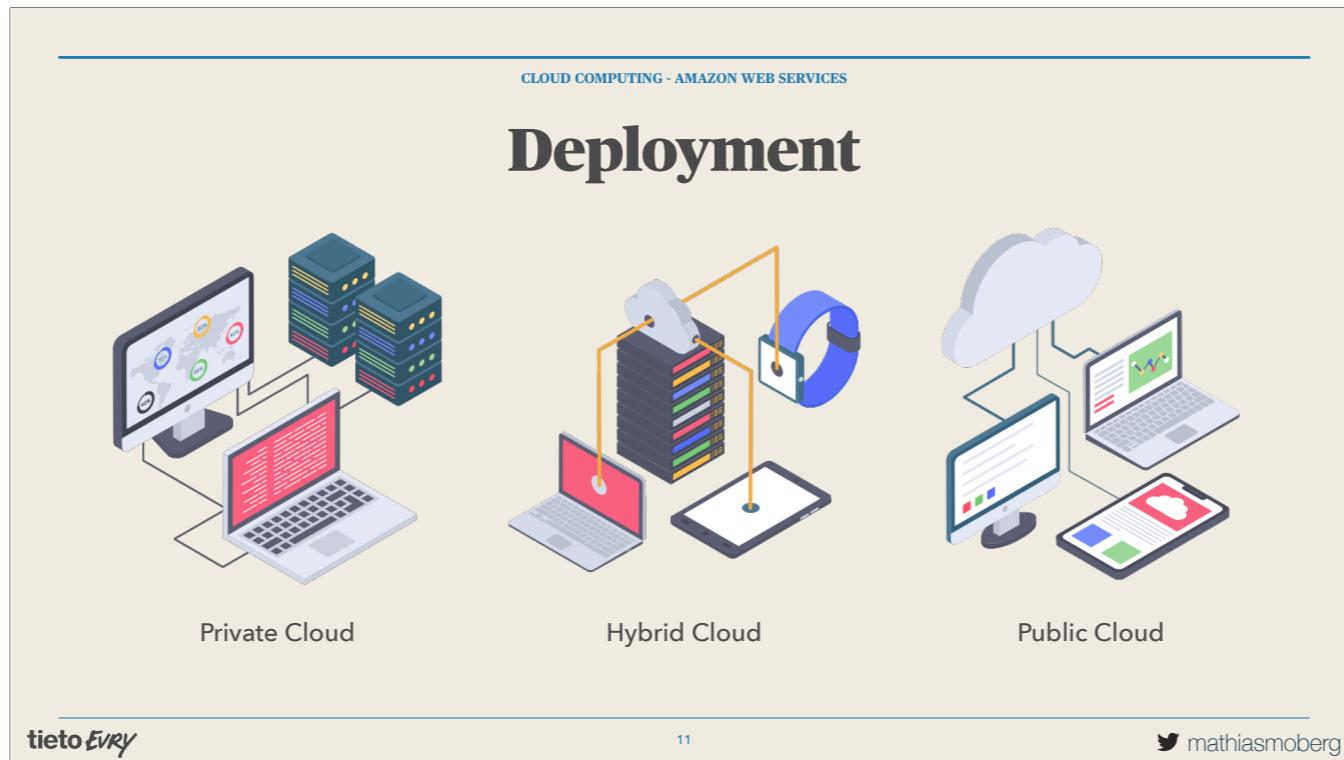


IaaS - AWS, Azure, GCP, Digital Ocean

PaaS - AWS Elastic Beanstalk, Google App Engine, RedHat OpenShift,

SaaS - Office 365, G-Suite, Salesforce, Adobe Creative Cloud, Survey Monkey, Slack

XaaS - TONS of other names, Backup, Networking, Containers, Desktop, Pizza.



Private Cloud - “On-Prem”:

- * All Infrastructure in on-prem at the client, or with a private service provider.
- * Many or most applications are only available if on-prem or via VPN.
- * Long Deployment Times for new hardware, or servers.
- * Security - for companies that have highly sensitive data.

Hybrid Cloud:

- * Mix of both worlds - servers both on-prem and in the cloud.
- * On-Prem can help speed up applications that are locally needed.
- * Can benefit from cloud deployment speed.
- * Can be hampered by some applications not being able to scale to the cloud.
- * Allows for longer migration periods for existing companies.
- * ... Security?
- * Can be expensive!

Public Cloud:

- * Perfect for startups and companies with little or no technical debt.
- * Elasticity, instant deployments, speed.
- * Perfect for SaaS Companies that need the ability to scale quickly
- * No up-front costs.



Amazon Web Services

tieto Every

mathiasmoberg

Cloud Providers



Google Cloud



32.4%

AWS Q4 2019 Marketshare

Source: Canalys Cloud Channel Analysis, January 2020



14

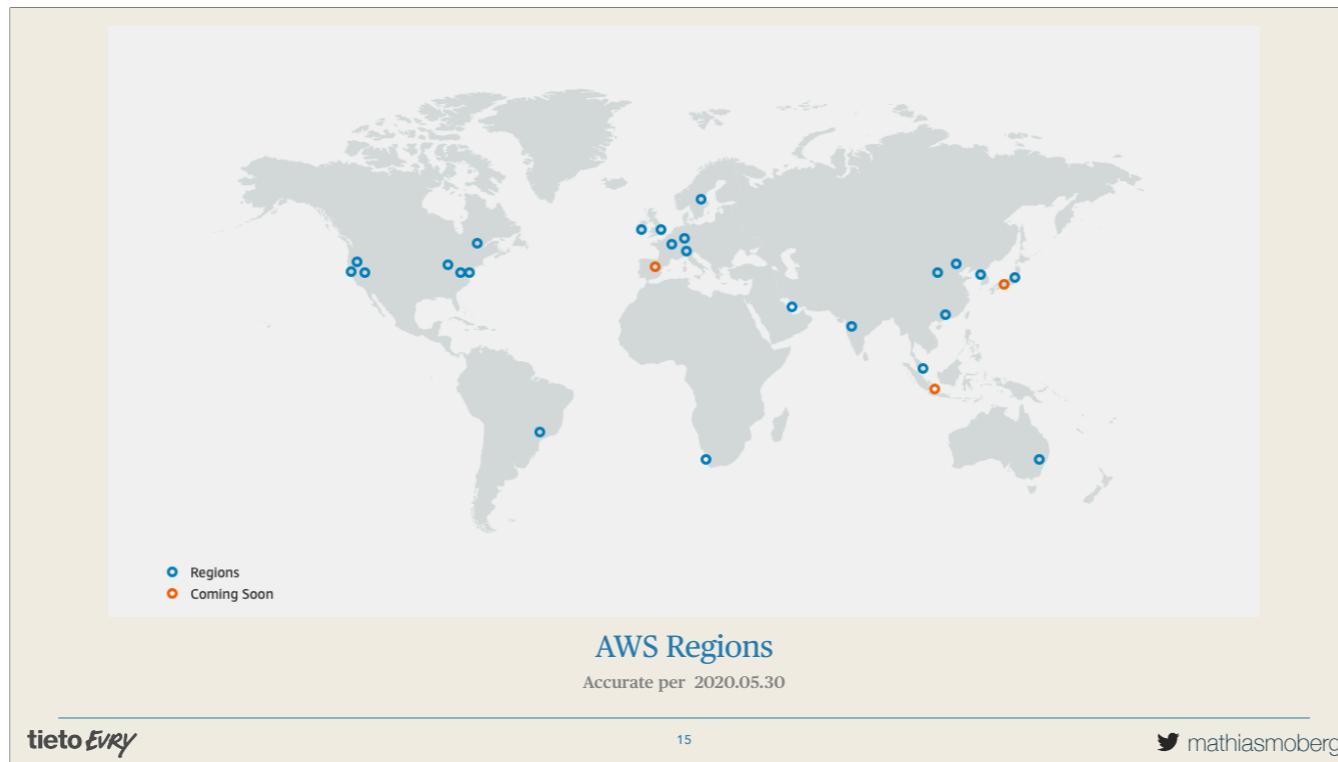


Q4 2019 Estimates:

Cloud Service Provider	Q4 2019 (US\$ Billion)	Q4 2019 Market Share	Annual Growth
AWS	9.8	32.4%	33.2%
Microsoft Azure	5.3	17.6%	62.3%
Google Cloud	1.8	6.0%	67.6%
Alibaba Cloud	1.6	5.4%	71.1%
Others	11.6	38.5%	24.4%

Google + Azure Marketshare = 23.6%

GCP + Azure + Alibaba Marketshare = 29%.



“So what *is* AWS?... Well, physically AWS is a global network of data centers...”

Global Infrastructure:

- * 24 Regions
- * 76 AZs

Announced:

- * 3 More regions
- * 9 More AZs.

Region:

- * Physical Location with two or more AZs

Availability Zone (AZ):

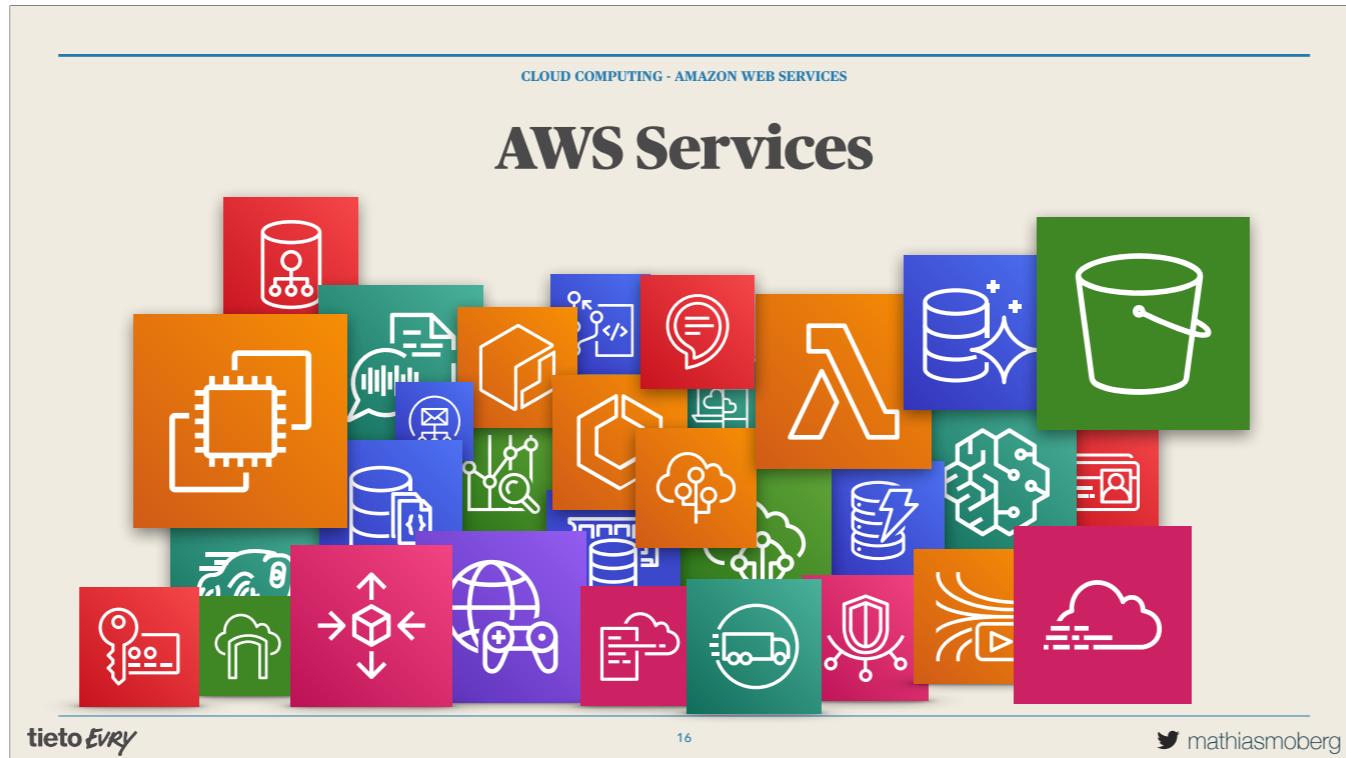
- * A discrete data center with independent power and internet connections.
- * Physically separated from another AZ by many KMs, but all within 100 km (60 miles) of each other.
- * Interconnected with all other regions AZs by high-bandwidth, low-latency connections.
- * Allows for HA.

AWS Edge Location:

- * CloudFront Global Edge Network, CDN locations in 216 Points of Presence.

AWS Local Zones:

- * Only in Los Angeles! More to come.
- * AWS Local Zones place compute, storage, database, and other select AWS services closer to end-users. With AWS Local Zones, you can easily run highly-demanding applications that require single-digit millisecond latencies to your end-users such as media & entertainment content creation, real-time gaming, reservoir simulations, electronic design automation, and machine learning.
- * Each AWS Local Zone location is an extension of an AWS Region where you can run your latency sensitive applications using AWS services such as Amazon Elastic Compute Cloud, Amazon Virtual Private Cloud, Amazon Elastic Block Store, Amazon File Storage, and Amazon Elastic Load Balancing in geographic proximity to end-users. AWS Local Zones provide a high-bandwidth, secure connection between local workloads and those running in the AWS Region, allowing you to seamlessly connect to the full range of in-region services through the same APIs and tool sets.



AWS Services:

- * EC2
 - * S3
 - * AWS Lambda
 - * ElastiCache

30 Services in total listed. Per 2020, 212 available services.

CLOUD COMPUTING - AMAZON WEB SERVICES

Amazon S3

Simple Storage Service

The slide is titled 'CLOUD COMPUTING - AMAZON WEB SERVICES' at the top. Below it, 'Amazon S3' is prominently displayed with its subtitle 'Simple Storage Service'. To the left of a central green icon of a bucket, there are three columns of text: 'Object Storage', 'Unlimited Storage', and '99.99999999% Durability'. To the right of the bucket icon, there are three more columns: '3 Storage Classes', 'S3 Replication', and 'Simple Website Hosting'. The word 'Buckets' is written below the bucket icon. At the bottom of the slide, there is a logo for 'tietoEVRY' on the left, the number '17' in the center, and a Twitter handle 'mathiasmoberg' on the right.

Object Storage
Unlimited Storage
99.99999999% Durability

3 Storage Classes
S3 Replication
Simple Website Hosting

Buckets

tietoEVRY 17 mathiasmoberg

S3

“There has never been an S1 or S2” Also known as “Simple Storage Service”

- * Object Storage - You cannot install an OS on S3. Objects only.
- * Unlimited storage, however, max 5TB per file.
- * 11 9's of durability - chances of losing data is extremely slim.
- * Files stored in Buckets
- * 3 Storage Classes
 - * Standard
 - * Infrequent Access
 - * Glacier
- * Replicate data globally, or within region.
- * Host static websites directly from bucket.

CLOUD COMPUTING - AMAZON WEB SERVICES

EC2

Amazon Elastic Compute Cloud

Virtual Machines

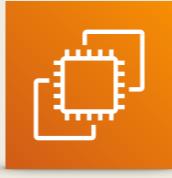
Placed in an AZ

Vertical and Horizontal Scaling

4 Pricing Models

AMIs

Private or publicly available



tieto *Every*

18

 mathiasmoberg

EC2

Again, there has never been an “EC1”. I hate AWS naming.

- * Virtual Machines.
- * An EC2 instance lives in a single AZ.
- * Can be scaled vertically or horizontally using AWS Auto Scaling
- * 4 Pricing Models
 - * (Most Flexible) On Demand Instances
 - * (Save up to 75%) Reserved Instances
 - * (Cheapest) Spot Instances
 - * (Most Expensive) Dedicated Server
- * Amazon Machine Images - select your OS and go
- * Can get a public IP or just a private if you need.

Amazon Aurora

Managed Relational Database

MySQL & Postgres Compatible

Five times faster than MySQL

Distributed, fault-tolerant



Instant Replication across 3-AZs

Up to 15 read replicas

Fully Managed

AWS Lambda

Run Code without managing servers

Serverless Compute

Pay only for compute time

Continuous Scaling



Subsecond Metering

Multiple language support

Up to 15 minutes per execution

AWS Lambda

- * Automatically runs your code without having to provision or manage servers
- * No paying for idle-time! Pay only for the execution time.
- * Supports: Java, Go, Powershell, Python, Node.js, C# and ruby.
- *

AWS Free Tier

tieto *every*

 mathiasmoberg



CLOUD COMPUTING - AMAZON WEB SERVICES

Free Stuff!

“What’s in it for me?”

- EC2
- S3
- Elastic Beanstalk
- OpsWorks
- CodeStar
- Auto-Scaling
- Many, many more

Free AWS Service

Always Free

Free Tier

750 Hours

Amazon EC2, Per Month

tieto *Every*

 mathiasmoberg

EC2:

750 Hours per month of T3.Micro

How you use that time, is up to you - 10 Instances for 75 hours or 1 instance for 750 hours - up to you...

750 Hours

Amazon RDS, Per Month

tieto *Every*

 mathiasmoberg

RDS:

750 Hours per month of T3.Micro

How you use that time, is up to you - 10 Instances for 75 hours or 1 instance for 750 hours - up to you...

Does NOT include Aurora!!!

5 GB

Amazon S3, Per Month

tieto *Every*

 mathiasmoberg

1 Million

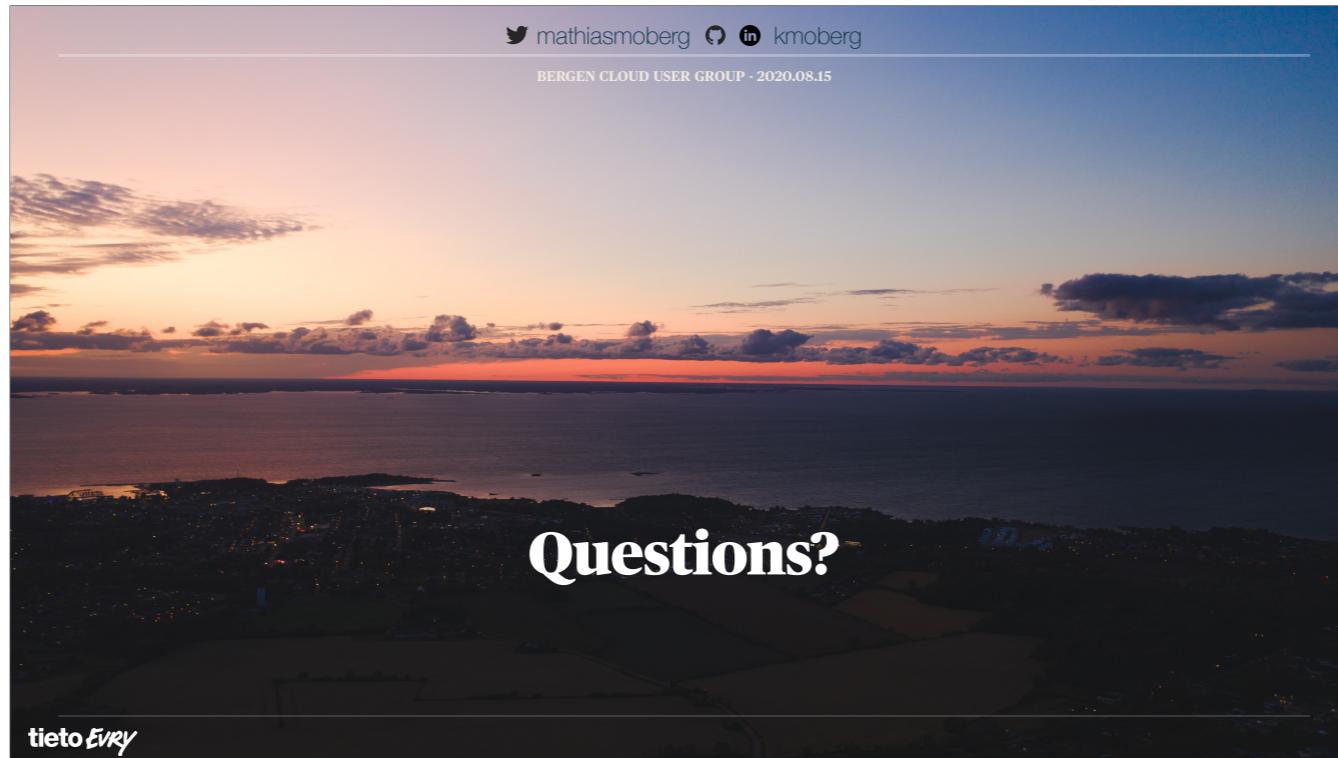
Amazon Lamdba Requests, Per Month

tieto *Every*

 mathiasmoberg

Lambda:

Up to 3.2 million seconds of compute time per month



Questions?