

AWS General Immersion Day (MIRRI)

Vladimír Šimek, vladimir.simek@trustsoft.eu

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Dnešný plán

09:00-09:45 Privítanie, úvod do cloudu (45 min) 09:45-10:30 Virtuálne Servery - EC2 (45 min) 10:30-10:45 prestávka (15 min) 10:45-11:30 Lab 1 - EC2 Hands on LAB (Linux) (45 min) 11:30-12:30 obed (60 min) <u>12:30-13:15 Úložné riešenia v AWS (45 min)</u> 13:15-14:00 Lab 2 - Amazon S3 Lab (45 min) 14:00-14:15 prestávka (15 min) 14:15-15:00 Databázy v AWS (45 min) 15:00-15:45 Lab 3 - RDS MySQL Lab (45 min) 15:45-16:00 prestávka (15 min) 16:00-16:45 Kontajnery v AWS + demo (45 min) 16:45 -17:00 Záverečné Q&A (15 min) Amazon Web Services. Inc. or its Affiliates





Vladimír Šimek,

Principal Cloud Architect @ TrustSoft

20+ years of professional IT experience

2015-2021 Senior Solutions Architect for CEE @ AWS, Luxembourg

2022-2023 Senior Cloud Solutions Architect for PS, CZE @ Microsoft

ex-AWS Community Builder

Passionate about Python, Linux, Cloud computing (AWS), and Data Analytics

https://www.linkedin.com/in/vlad-in-the-cloud/









Who we are?

AWS Advanced Partner & MAP Eligible Partner

The unique dedicated AWS Migration team

One of the biggest AWS partners in the region

- > 150 cloud experts
- **100+** certifications

350+ projects delivered across Europe >

Slovak team:

- Jaroslav Jacko Regional Sales manager
- Lukáš Pastva Solution Cloud Architect
- Vladimír Šimek Principal Cloud Architect © 2020. Amazon Web Services. Inc. or its Affiliates.





aws certified

DevOps Engineer Professional

Advanced Networking



Predstavenie

- Meno
- Pracovná pozícia
- Skúsenosti s cloudom





Introduction to Amazon Cloud & EC2 Overview



What is cloud computing?

Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services (AWS).

Available

Benefits of cloud computing:

- Agility
- Elasticity
- Cost savings
- **Global Reach**
- Security







Figure 1: Magic Quadrant for Cloud Infrastructure and Platform Services



AWS Recognized as a Cloud Leader for the **12th Consecutive Year**

cture & Platform Services, Raj Bala, Bob Gill, Dennis Smith, David Wright, Kevin Ji, 1 September 2020, Gartner does not endorse any vendor, product or service does not advise technology users to select only those vendors with the highest ratings. Gartner research publications consist of the opinions of Gartner's research strued as statements of fact. Gartner disclaims all warronties, expressed or implied, with respect to this research, including any warranties of merchantability or fitness for and should not b is a trademark and service mark of Gartner. Inc., s affiliates, and is used herein with ne





Different Types of Cloud

Based on functionality:

- laaS (Infra)
- PaaS (Platform)
- SaaS (Software)

Based on locality

- Public
- Private (Virtualization)
- Hybrid



Pricing Philosophy

High volume / low margin businesses are in our core DNA

Trade CapEX for variable expense

Pay for what you use

Our economies of scale provide us with lower costs

> 129+ price reductions since 2006

S3 in 2006: 15 cents / GB S3 in 2022: 2.3 cent / GB 84.67% price reduction

Pricing model choice to support variable and stable workloads

On-demand Reserved Instances Spot



Custom pricing

Volume discounts

Tiered pricing

Save more money as you grow bigger



AWS Global Reach

Regions





550+

Amazon CloudFront Points of Presence



115+

AWS Direct Connect locations





Availability Zones

- A region is comprised of multiple Availability Zones (typically 3) \bullet
- An Availability Zone (AZ) is one or more discrete data centers with redundant power, \bullet networking, and connectivity in an AWS Region
- High throughput, low latency (<10ms) network between Availability Zones \bullet
- All traffic between AZ's is encrypted \bullet
- Physical Separation < 100km





Availability Zones







EC2 Overview

Choices for Compute







Amazon EC2

Virtual server instances in the cloud

Amazon ECS, EKS, and Fargate

Container management service for running Docker on a managed cluster of EC2

Serverless compute for stateless code execution in response to triggers





AWS Lambda



Amazon EC2



Amazon EC2

Linux | Windows

x86 architectures (Intel & AMD) and ARM

General purpose and workload optimized

Bare metal, disk, networking capabilities

Packaged | Custom | Community AMIs

Multiple purchase options: On-demand, RI, Spot





EC2 Terminology







Storage

What about storage?

- Storage is independent of compute
- You allocate drives known as EBS volumes
- Max 16 TiB per volume
- Some instance types provide physically attached (ephemeral) storage





EC2 Naming Explained

Instance generation



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Instance sizing







8 – c5.xlarge



Choose your processor and architecture



Intel[®] Xeon[®] Scalable (Ice Lake) processor



NVIDIA V100 Tensor Core GPUs



AMD EPYC processor



AWS Graviton Processor (arm)

Right compute for the right application and workload

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FPGAs for custom hardware acceleration



AWS Graviton2 Processor

Enabling the best price/performance for your cloud workloads

Graviton Processor



First Arm-based processor available in major cloud



Built on 64-bit Arm Neoverse cores with AWS-designed silicon using 16 nm manufacturing technology



Up to 16 vCPUs,10 Gbps enhanced networking, 3.5 Gbps EBS bandwidth

Graviton2 Processor



7x performance, 4x compute cores, and 5x faster memory



Built with 64-bit Arm Neoverse cores with AWS-designed silicon using 7 nm manufacturing technology



Up to 64 vCPUs, 25 Gbps enhanced networking, 18 Gbps EBS bandwidth



EC2 Operating Systems Supported

- Windows 2012/2012R2/2016/2019/2022
- Amazon Linux 2
- Debian
- SUSE
- CentOS
- Red Hat Enterprise Linux
- Ubuntu
- MacOS (Sonoma, Ventura, Monterey, BigSur)

for more OSes see: https://aws.amazon.com/marketplace/









Choosing an AMI

AWS Console

1. Choose AMI	2. Choose Instance Type	3. Configure Instance	4. Add Storage	5. Add Tags	6. Configure Security Group	7. Review			
Step 1: Choose an Amazon Machine Image (AMI) Cancel and Exit 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.									
Quick Start					< < 1 to	35 of 35 AMIs \rightarrow $>$			
My AMIs	Amazon	Amazon Linux ami-04681a	Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-04681a1dbd79675a5			Select			
AWS Marketpl	ace Free tier e	Free tier eligible Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14							
Community AM	MIs	2.26, Binutils	2.26, Binutils .29.1, and the latest software packages through extras.						
Free tier only	(i)	Root device typ	ebs Virtualization	n type: hvm EN	A Enabled: Yes				
	Amazon	Amazon Lii Linux ami-Off8a91	ux AMI 2018.03 07f77f867	8.0 (HVM), SSI	D Volume Type -	Select			
	Free tier	eligible The Amazon image include repositories ir	nux AMI is an EBS AWS command li lude Docker, PHP	S-backed, AWS- ine tools, Pythor , MySQL, Postgi	64-bit				
		Root device typ	e: ebs Virtualization	type: hvm EN	A Enabled: Yes				
	Red I	Hat Red Hat En	terprise Linux 7 15	.5 (HVM), SSI	D Volume Type -	Select			
	Free tier of	eligible Red Hat Ente Type	Red Hat Enterprise Linux version 7.5 (HVM), EBS General Purpose (SSD) Volume Type			64-DIT			
		Root device typ	e: ebs Virtualizatior	n type: hvm EN.	A Enabled: Yes				

AWS Marketplace



Use the AMI ID to launch through the API or AWS Command Line Interface (AWS CLI) aws ec2 run-instances --image-id ami-04681a1dbd79675a5 --instance-type c4.8xlarge --count 10 --key-name MyKey





Amazon EC2 purchase options

On-Demand

Pay for compute capacity by the second with no long-term commitments



Spiky workloads, to define needs

Reserved Instances

Make a 1 or 3 year commitment and receive a significant discount off On-Demand prices



Committed and steady-state usage

Savings Plan

Same great discounts as Amazon EC2 RIs with more flexibility



Committed flexible access to compute

Spot Instances

Spare Amazon EC2 capacity at savings of up to 90% off On-Demand prices



Fault-tolerant, flexible, stateless workloads



Simplify capacity and cost optimization



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On-Demand,

Use Reserved Instances for known/steady-state



AWS Batch





EC2 Design

Which hypervisor do we use?

Original host architecture: Xen-based

- Hypervisor consumed resources from the underlying host
- Limited optimization

AWS Nitro Hypervisor: Custom KVM based hypervisor

- AWS Nitro System (launched on Nov 2017)
- Less server resources used, more resources for the customer
- AWS optimized

Bare metal: Direct access to processor and memory resources

- Built on the AWS Nitro system
- Enables custom hypervisors and micro-VM runtimes





AWS Nitro System

Nitro Card



Nitro Security Chip



Local NVMe storage Elastic Block Storage Networking, monitoring, and security Integrated into motherboard Protects hardware resources

Nitro Hypervisor



Lightweight hypervisor Memory and CPU allocation Bare metal-like performance

Modular building blocks for rapid design and delivery of EC2 instances







AWS Nitro System



Nitro instances provide bandwidth, performance, and price **improvements** over previous instance generations

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M5 Instances

■ Instances with Nitro



EC2 Security Groups

Security Group Rules

- Name
- Description
- Protocol
- Port range
- IP address, IP range, Security Group name





Any Questions?



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Prestavka (15 min)

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Lab 1: LAB: EC2 Hands on Lab (Linux)

AWS console access – link, username, password in your emails

https://vlad.cloud/mirri.html

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Thank you!

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