



15 GODINA NORDEUSOVE INFRASTRUKTURE

STRAHINJA KUSTUDIĆ, SENIOR DIRECTOR OF ENGINEERING

@ RSN OG 2025

O NORDEUSU



OSNOVAN 2010.
OD JUNA 2021. DEO
TAKE-TWO INTERACTIVE



2 LIVE HIT IGRE:
TOP ELEVEN i **GOLF RIVAL**



1 SPORTSKA IGRA U
SOFT-LAUNCH: **TOP GOAL**



280+ ZAPOSLENIH
300M+ KORISNIKA
ŠIROM SVETA



[NORDEUS.COM](https://nordeus.com)



NAŠE IGRE



9. MAJ 2010. TOP ELEVEN NA FACEBOOK-U

Manager Level: 4 - Dreamer
League Position: 1st
41.6K 41M 29

Nordeus

League Match
VS
5 minutes
FC Hollywood


Season 17, Day 6/28
Stretching available now
192 6 224

Squad
Formations
General info
Tactics (MyTactic)
Condition

Pos	No	Name	Roles	Nat	Tran	Statu	Spec	Qty
GK	2	M Partenadze	GK	Ge				★★★★
DC	4	J Pedrosa	DC DR	Sp				★★★★
DC	10	J Tichy	DL DC	Cz				★★★★
DC	7	N Platero	DC	Es				★★★★
DML	1	L Gómez	DML ML	Ar				★★★★
DMR	8	A Delporte	DR DMR	Fr				★★★★
MC	13	M Cox	MC	En				★★★★
MC	11	A Arnaudovic	MC	Fr				★★★★
ST	12	M Andrei	ST	Ro				★★★★
ST	3	J Banderas	ST	Sp				★★★★
ST	5	P Kovács	ST	Hu				★★★★
S1	6	W Niewiado...	MR	Pl				★★★★
S2	9	J Pérez	MC	Es				★★★★
S3	14	R Gyurkó	DR	Hu				★★★★





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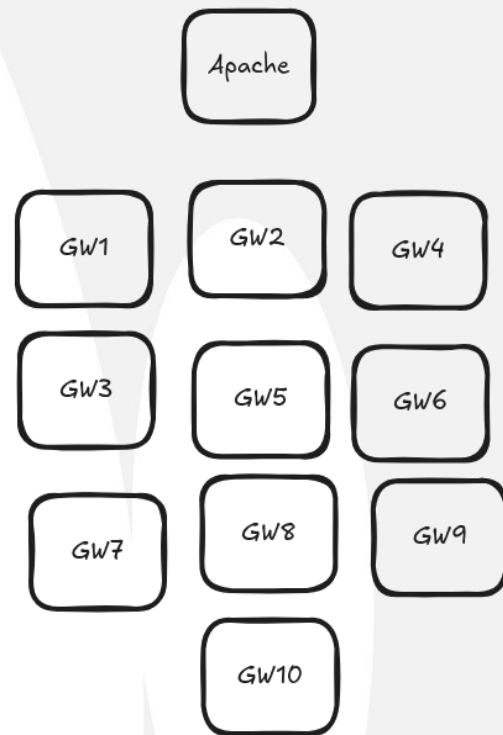
2010. – POČETAK

- 1x bare metal web server (Apache)
- 1 x bare metal dedicated server (Gameworld)
 - CPU: 2x Xeon (6 jezgara)
 - RAM: 24GB
 - Disk: 2x Intel SSD (120GB)
- CentOS 5
- Data centar u Nemačkoj



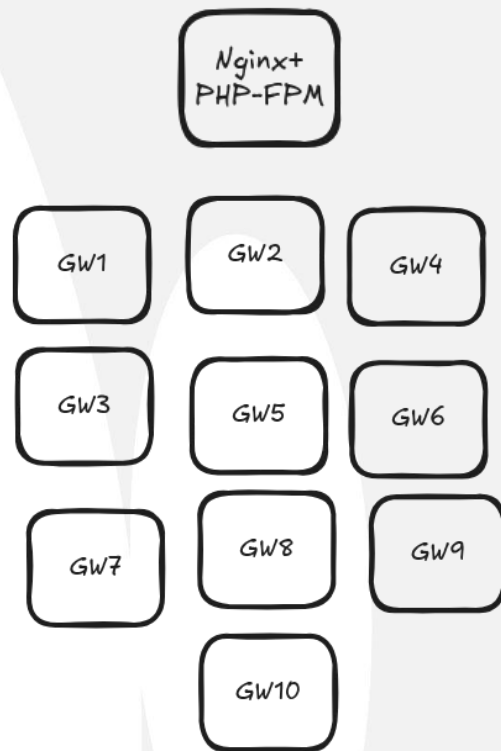
2010. – NASTAVAK

- Do kraja godine raste broj servera na 10
- Serveri dobijaju imena po glavnim gradovima (Beograd, Pariz, London,...)
- Korisnici biraju server za igru



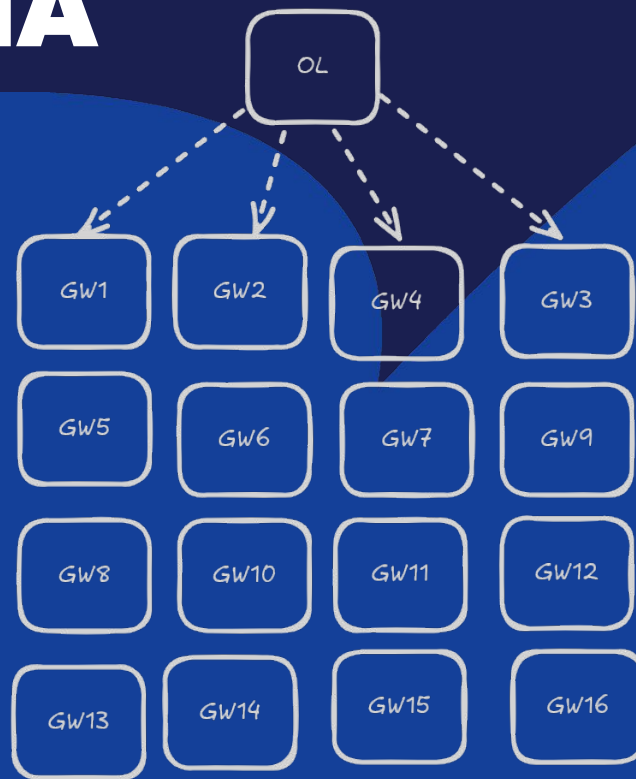
2010. – NASTAVAK

- Apache → Nginx + PHP-FPM
- Limelight CDN
- Nagios



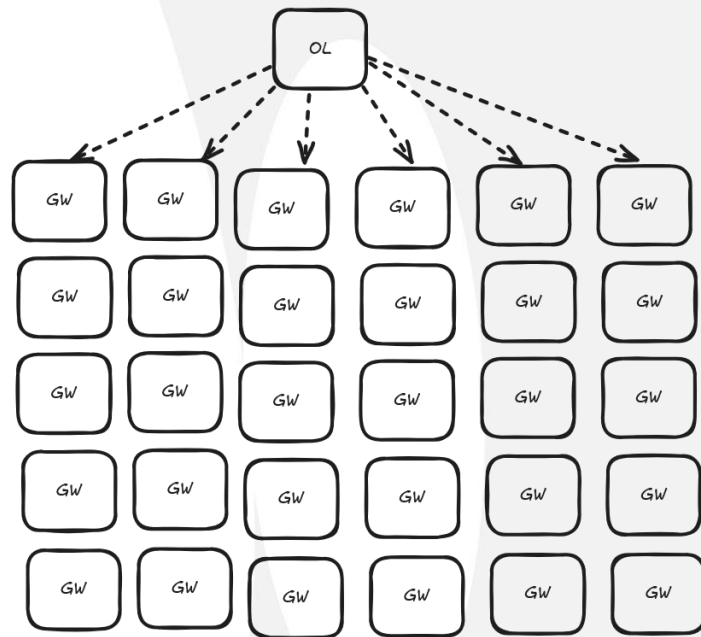
2011. – PRVA POLOVINA

- Dodajemo login server (Overlord)
- Raste broj Gameworlda na 16



2011. – DRUGA POLOVINA

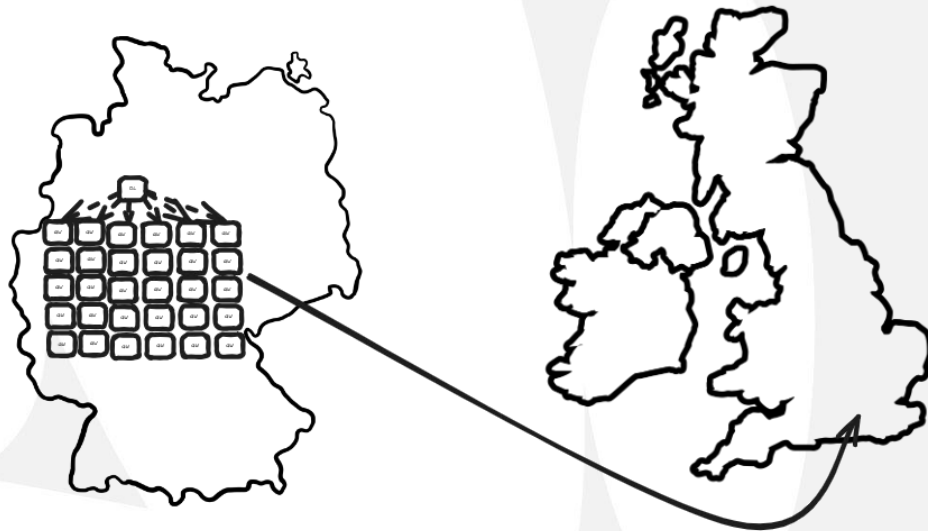
- Dolazim u Nordeus
- Oktobar 2011. puštamo Android
- Novembar 2011. puštamo iOS
- Broj servera skače na preko 30
- Prva automatizacija sa BASH



2011. – DRUGA POLOVINA (DEO 2)

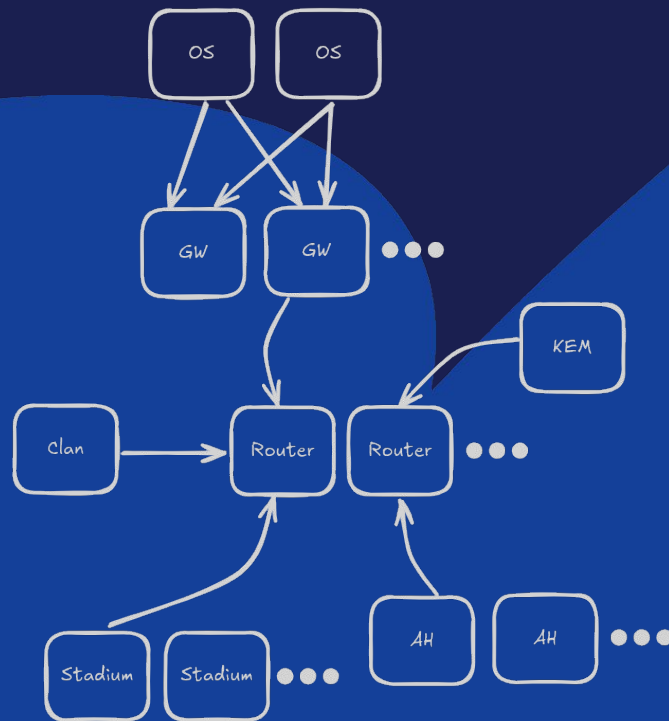
Kvar rashladnog sistema u data centru u Nemačkoj

- Migracija svih servera u UK
- Nagios → Icinga



2012. – 2014.

- Infra tim dobija drugog člana
- Automatizujemo sa Ansible
- Uvodimo Zabbix kao monitoring
- (Mikro)servisna arhitekturu
- TeamCity build i deploy automatizacija





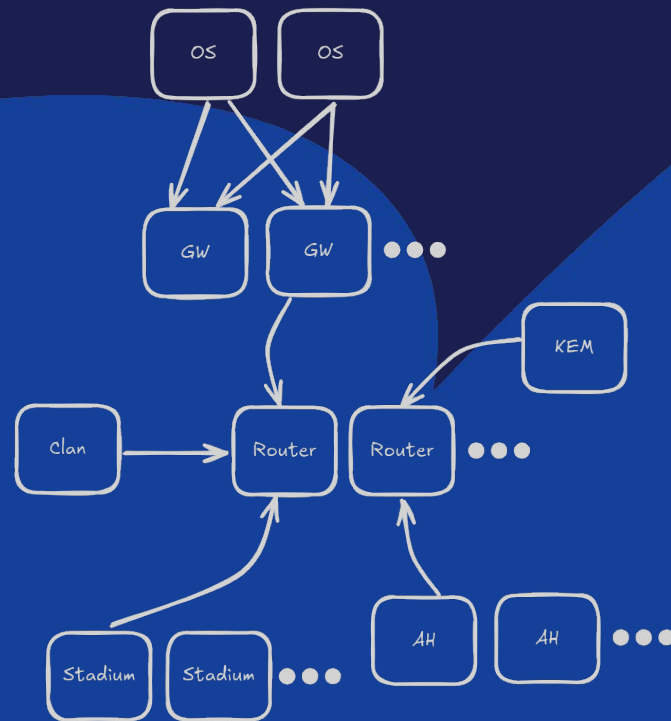
**BE A FOOTBALL
MANAGER**

José
Mourinho
J. Mourinho



2012. – 2014.

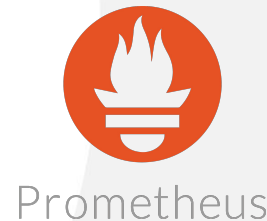
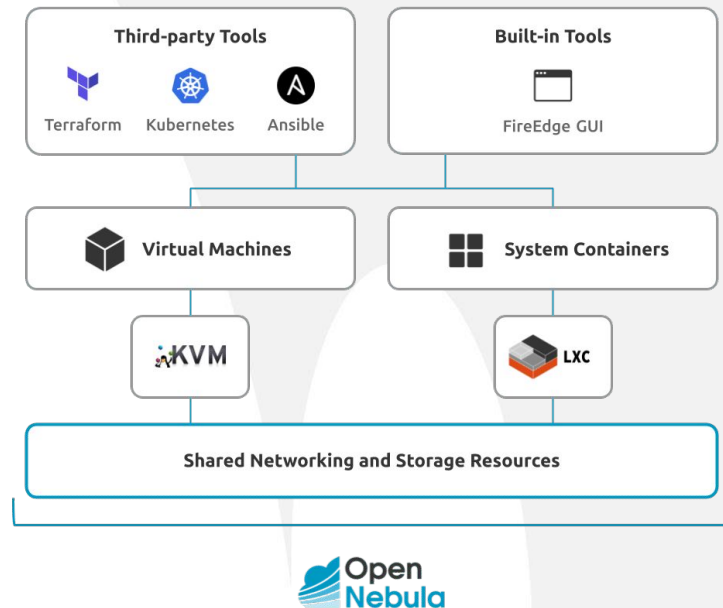
- Broj Gameworlda raste na preko 200
- Iznajmljujemo desetine server rekova
- Imamo naše kor rutere i svičeve
- Limelight CDN → Level 3 CDN



KAKO MOŽE BOLJE?

2015. – 2017.

- OpenNebula: privatni kloud
 - Ansible moduli za OpenNebula
- Prometheus: monitoring
- ElasticSearch: centralni log sistem
- 3 Hadoop klastera sa 500TB podataka



2015. – 2017.

- Razdvajamo baze i aplikativne servere
- Eureka service discovery
- Redis, Kafka, Couchbase

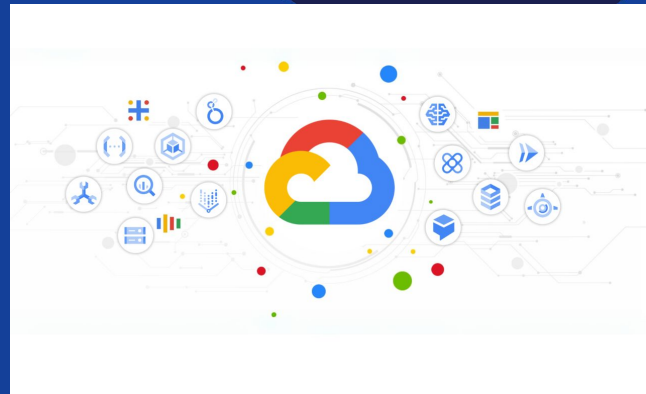




“NORDEUS JE GAMING KOMPANIJA!”

2018. – 2020.

- Google Cloud migracija
- Terraform (sve je “Infrastructure as Code”)
- TeamCity sad sve automatizuje
- Postgres HA sa automatski failoverom
- Hadoop → Google Cloud Storage



ŠTA JE IZA OBLAKA?

2021. – 2023.

- Kubernetes – Google Kubernetes Engine (GKE)
- Preko 50k kontejnera u produkciji (plus ~10k u testu)



Google Cloud



IN **3D**



TE — TE — TE — TE — TE — TE

TOP ELEVEN

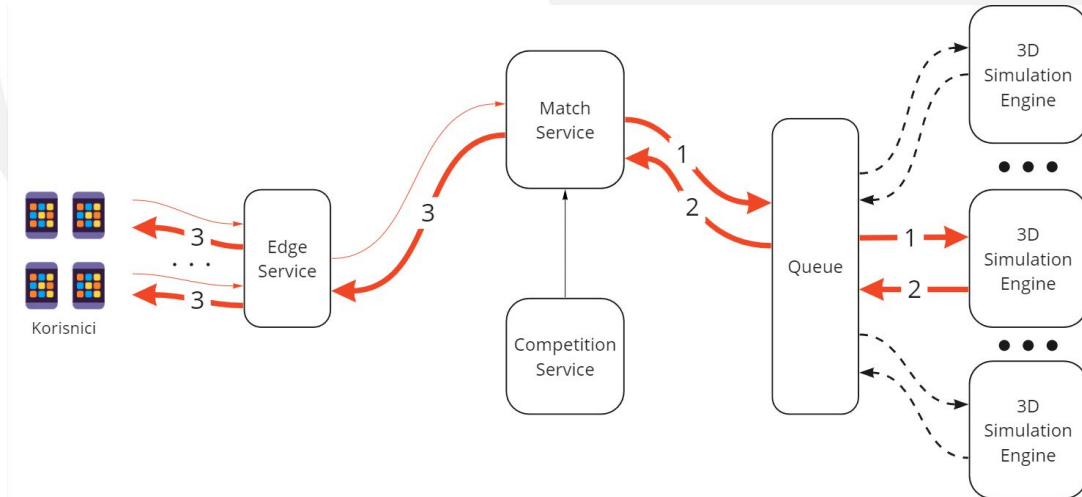
2021. – 2023.

- Top Eleven 3D

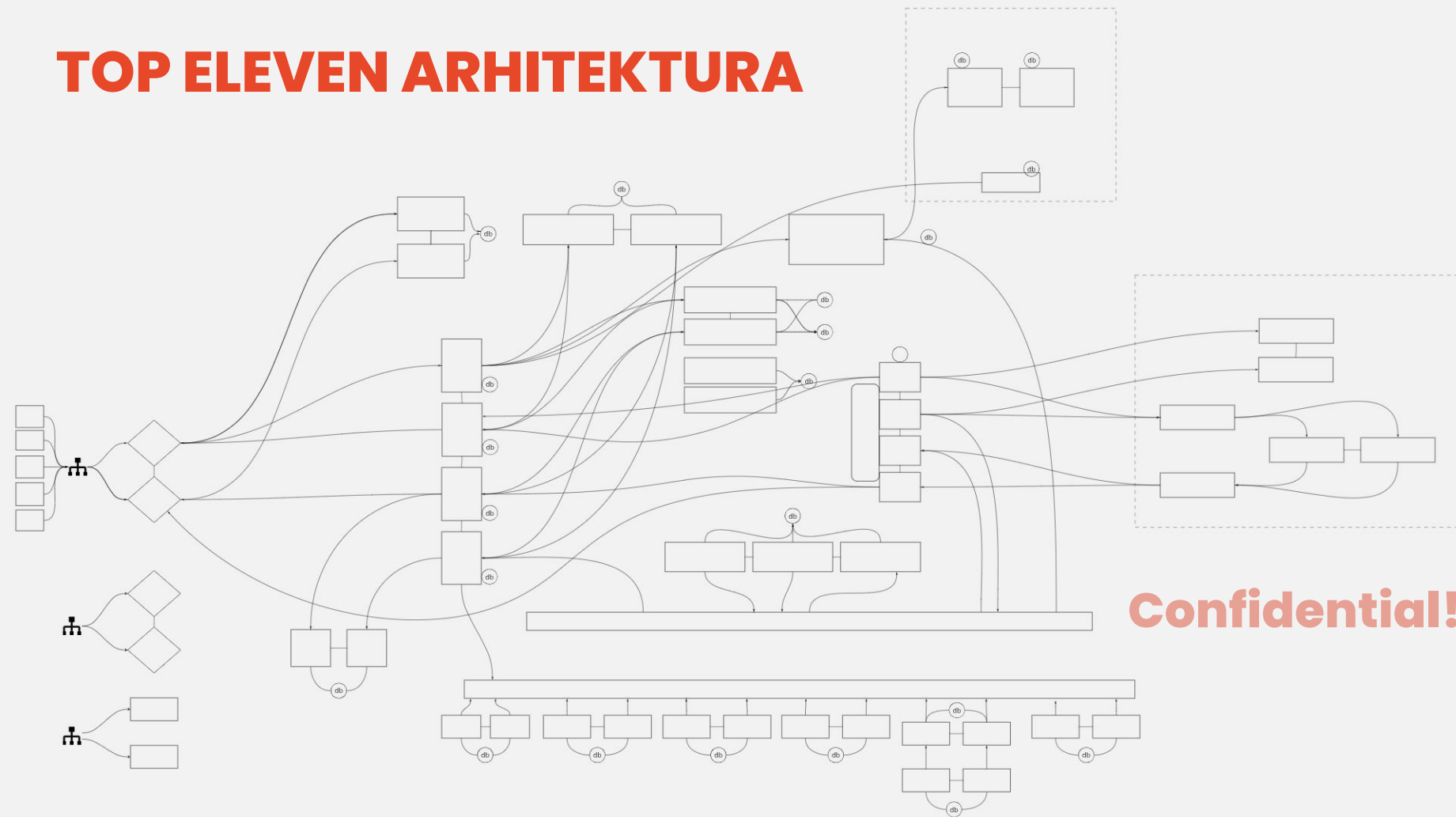
- 3D simulacija na serveru

- Auto-skaliranje

- Od nekoliko stotina CPU do nekoliko desetina hiljada CPUs

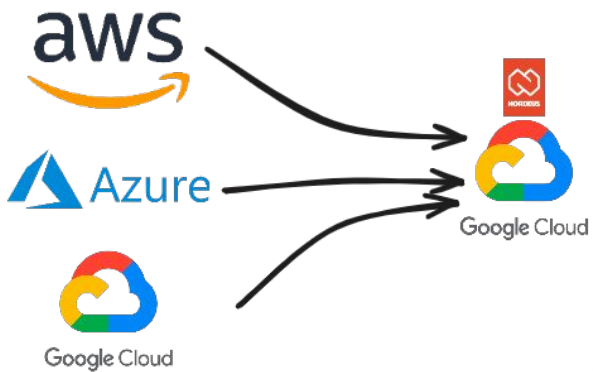


TOP ELEVEN ARHITEKTURA



2024. GOLF RIVAL

- Migracija na GCP



2024. TOP GOAL

- Real-time PvP low latency
- Agones
- Više regiona



Google Cloud Network



DANAS

- Google Cloud
- Više regiona
- Kubernetes
- Dinamično i fleksibilno
- Infrastructure as Code
- Continuous integration/delivery
- BigQuery
- Razni GCP servisi



ŠTA JE SLEDEĆE?



Q&A

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