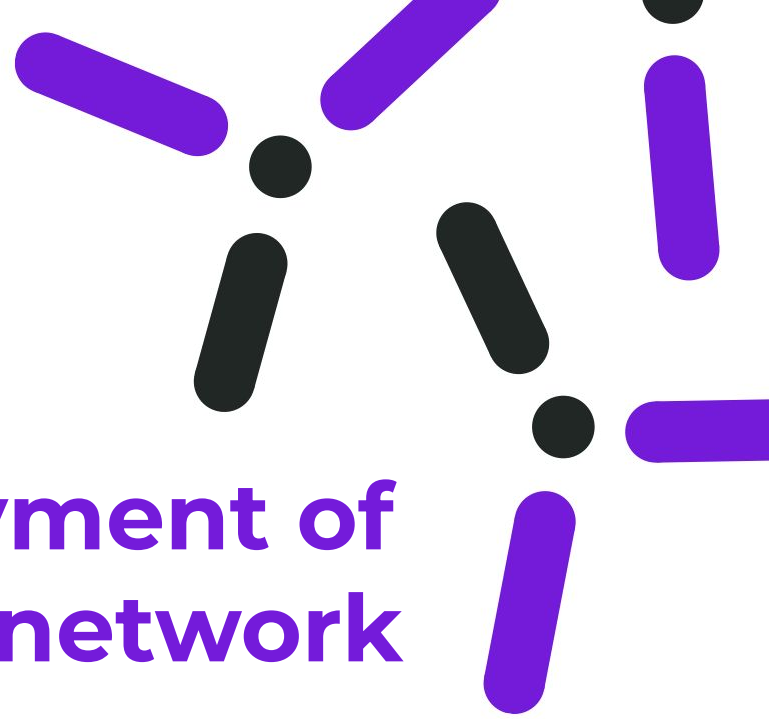


Multi-cluster deployment of Hyperledger Fabric network

Using Hyperledger Fabric operator



**Who we are and what will you
learn**



Agenda

- Brief introduction of the presenters and our the company
- The business problem
 - How did we find the client needs?
 - What problems were discovered?
- The programming solution
 - About HLF Operator
 - What did we achieve
- Demo
- Take home messages



After this meeting

- You will learn how we are discovering requirements
- How to evaluate if tools are meeting them
- How we have combined Hyperledger Fabric with Kubernetes
- What problems will you face if you want to implement a similar combination
- What are our take away lessons from the whole project



Espeo Blockchain: Who we are?

- We are **Hyperledger Fabric Certified Service Provider**
 - One of **17** worldwide!
 - With over **5 years of experience** in delivering a top quality products
 - We can help you with:
 - Blockchain **consulting**
 - Blockchain **development**



Who we are: Marcin



- Blockchain / Backend developer at Espeo
- Industries
 - Telecommunication
 - E-commerce
 - Fintech
 - Blockchain
- Current main technologies
 - Nest.js
 - Hyperledger Fabric



Who we are: Szymon



- Scientific background
 - Studied human brain architecture using neuroimaging
- Then engaged in creating IT solutions for Clients from fields like:
 - Finance
 - Data science
 - Marketing
 - HR
- Active on both: front and back-end
- Main language: JavaScript

Our method.
Understand Client's needs



Client's profile

- **Client** was from the business consulting sector
 - **With multiple independent branches**
 - At both levels, namely:
 - Technical
 - Organizational
 - **Strict security policy** of the data flow
 - The data coming **in** and **out** of the branch IT environment had to go through a high scrutiny



Client's needs

- Multiple partners needs to exchange information in **auditable form**
 - Each data **change needs to be registered**
 - Based on the changes the flow history needs to be possible to check
 - Changes need to be authenticated
- The possible solution needs to **scale** well
- The possible solution needed to enable:
 - **Monitoring**
 - **Admin administration** for in and out data flows

Our solution #1
Get right tools for Client's needs



Why use blockchain?

- Why during the initial phase of the project opted for a blockchain?
 - There were **multiple parties** involved
 - That needed to reach a **consensus** on some record
 - In a **secure**
 - And **trustworthy manner**

Sounds like a perfect requirements for a **blockchain!**



Why Hyperledger Fabric network?

- To secure access to the data the chosen protocol needed to enables us to create a **private blockchain**
- Be **secure** be default
- Have **configurable administration options** on the spot
- The chosen tool should be easy to **monitor**
- Store data in **auditable format**
- Be **actively developed** and have **engaged community**

Hyperledger Fabric network check all the boxes!



Why Kubernetes?

- Requirements:
 - Our solution needed to **scale well** as our Client grow
 - Yet, be also **cost effective**
- **Kubernetes (K8)** is a tool that helps in **running complex application** that are consisted of many containers.
 - Thus, it fits well within the realm our task requirements

85%

of IT managers see
Kubernetes as a key
element in their cloud
architecture

Source: 2021 State of Enterprise Open Source

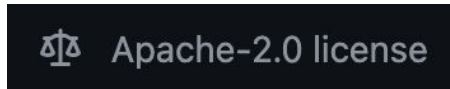


How we are evaluating tools?

- Check if open source
- Check the number of stars:



- Check the license:



- Check documentation
- Check if used in real business cases

- Check issues and PRs



- Check if actively developed



- Check if backed by some organization
 - Linux Foundation!

Our solution #2
Resolve problems



Problem #1: The need of server separation

- Independent branches of a company spread worldwide
- Keep the same/very similar pipeline for all branches
- Demanding security policy



Solution #1: Separate clusters for each organization

- One cluster per branch (and an additional CA server)
- The same network structure on all clusters
- Each branch is responsible for keeping the cluster running



Problem #2: Complexity of Kubernetes

- Tricky concept to understand
- Much more difficult than docker compose
- Huge amount of configurations
- Big yaml files to manage



Solution #2: Use HLF Operator

- Kubernetes deployments made easy
- Minimal knowledge of Kubernetes required
- Command line kubectl plugin
- Cryptographic material generated by operator



About HLF Operator

- Open source solution for deploying HLF network on Kubernetes
- Currently not very popular
- Vast documentation
- Backed by Hyperledger Labs

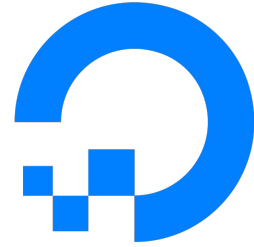
Our solution #3

Proof of Concept



PoC technologies

- K8s clusters - DigitalOcean
- DNS - Freenom



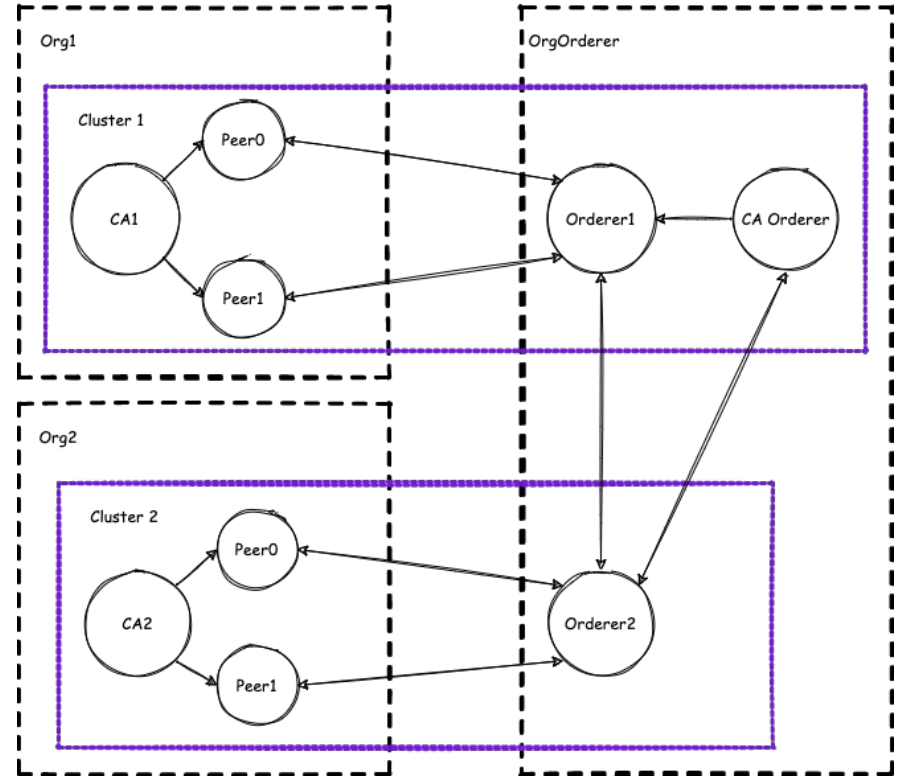
DigitalOcean

freenom



Architecture

- Easily expandable, just add another organization and cluster block
- CA Orderer can be moved to another cluster



**Our solution #4
Demo!**

Take home messages



What we have learnt?

- Hyperledger Fabric network could be deployed even in **complex scenarios**
- There are **sophisticated tools** like: Kubernetes or HLF Operator which take away most of the burden during the work
- It is possible to create a **distributed network** that helps in monitoring and registering the flow of information between different parties
- Even if you are implementing a novel scenario:
 - There are **many tools** that could help you
 - Created by the **active community**
- Hyperledger Fabric could be implemented in the **cloud environment** with relative ease

We are hiring!



We are hiring!

Senior Blockchain Developer

[See job offer →](#)

REQUIREMENTS

Here's a (not exclusive) set of skills we would appreciate you own:

- **Blockchain expertise:** (1) An excellent knowledge of Blockchain (2) At least 2 years of commercial experience (3) Will to develop within that technology,
- **Technical knowledge:** Node.js, GO, Hyperledger or Solidity,
- **Team Spirit:** (1) Leadership attitude (2) Willingness to cooperate with others and to share both experience & knowledge within the team (3) Drive for technical excellence towards yourself and the team,
- **Communicative and proactive attitude:** (1) challenge orientation (2) good communication skills,
- Excellent spoken and written English.

Sounds like you? **Don't wait & apply!** We are waiting for you to join EspeoCrew.

We are hiring!



Join Espeo Blockchain Academy

Your starting point as a Blockchain Developer

Whether you are an experienced developer or a newcomer to the field, this will be an excellent program dedicated to your development. Once you've completed the training, you will come onboard and take part in the leading blockchain projects in Europe.

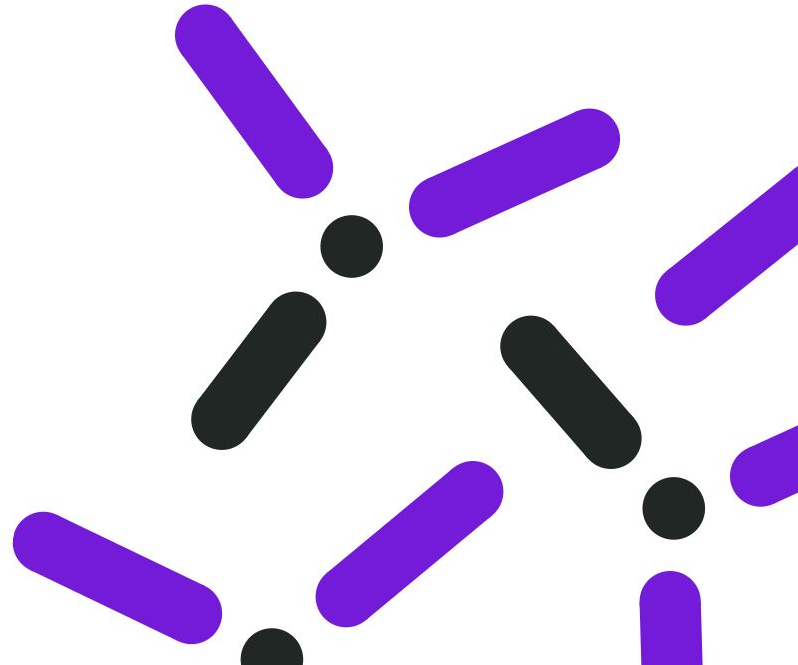
[APPLY TO THE ACADEMY](#)

We are hiring!

Thank you!



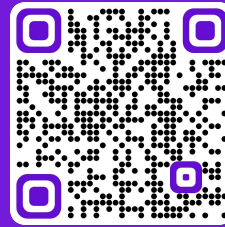
Poznań / Helsinki / San Francisco



Happy to answer your questions.



David Viejo webinar



Aditya Joshi tutorial playlist