Towards Blockchain Interoperability with Hyperledger

› Introduction

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› **Mentors:** Prof Rui Cruz, Rafael Belchior, Sara Rouhani

› **Hyperledger Project:** Hyperledger Fabric, Besu, Caliper, Explorer
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Project Description:

- Why blockchain interoperability is important?

- Research questions:
  - How can we interoperate Hyperledger technologies with other blockchains?
  - What are the main design principles of a blockchain interoperability solution?
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Project Objectives:

- Obj 1: Design a blockchain interoperability solution that can be used by Hyperledger technologies.
- Obj 2: Implement a proof of concept for the design
- Obj 3: Compare with other interoperability solutions
- Obj 4: Write a research paper
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Project Deliverables:

- Deliverable 1: System design documents
- Deliverable 2: Code for the implemented proof of concept
- Deliverable 3: Technical documentation
- Deliverable 4: Research paper
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Project Execution & Accomplishments:

1. Enroll as a publisher
2. Create a new topic
3. Enroll as a subscriber
4. Subscribe to a topic
5. Update topic
6. Publish to the created topic
7. Fetch subscribers
8. Notify subscriber
9. Topic is updated
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Project Execution & Accomplishments:

- **Broker Blockchain:**
  - Implementation ➔ Hyperledger Fabric v2.2
  - Performance Analysis ➔ Hyperledger Caliper
  - Monitoring ➔ Hyperledger Explorer

- **Publisher Blockchain:**
  - Implementation ➔ Hyperledger Fabric v2.2

- **Subscriber Blockchains:**
  - Implementation ➔ Hyperledger Fabric v1.4
  - Implementation ➔ Hyperledger Besu

[GitHub Repository](https://github.com/hyperledger-labs/pubsub-interop)
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Project Execution & Accomplishments

Topics

<table>
<thead>
<tr>
<th>Key</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>'BLOCKCHAIN3_0'</td>
<td></td>
</tr>
<tr>
<td>'BLOCKCHAIN3_1'</td>
<td></td>
</tr>
</tbody>
</table>

Record:

- **doctype**: 'topic'
- **message**: 'Initial message!' (Fabric 1)
- **name**: 'FirstTopic'
- **publisher**: 'BLOCKCHAIN3_0'
- **subscribers**: ['Fabric1', 'Fabric2']

Record:

- **doctype**: 'topic'
- **message**: 'Initial message!' (Fabric 2)
- **name**: 'FirstTopic'
- **publisher**: 'BLOCKCHAIN3_1'
- **subscribers**: []

Subscribing to the topic on the publisher blockchain...

Querying topic from broker blockchain...

Creating an equivalent topic on the subscriber blockchain...

No topics found in the subscriber blockchain.

Transaction has been submitted.

Querying topic from broker blockchain...

Creating an equivalent topic on the subscriber blockchain...

No topics found on the broker blockchain.
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› Project Execution & Accomplishments:
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Recommendations for future work:

- Adding support for other permissioned blockchains
- Adding an access control layer
- Enhancing the performance
- Possible integration with Hyperledger Cactus
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Insights Gained:

› Do your research first.

› Always ask questions.

› People want to help you.

› Even the small contributions can teach you a lot.
THANK YOU!