NPTEL ONLINE CERTIFICATION COURSES

Blockchain and its applications

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Lecture 49: Hyperledger Indy 1

CONCEPTS COVERED

- Hyperledger Indy Overview
- DIDs in Indy
- Hands-on tutorial on Indy

KEYWORDS

- Identity
- Indy
- DIDs

Hyperledger Indy

Hyperledger Indy provides

- tools
- libraries
- reusable components

for providing **digital identities rooted on blockchains** so that they are interoperable across administrative domains, applications, and any other silo.

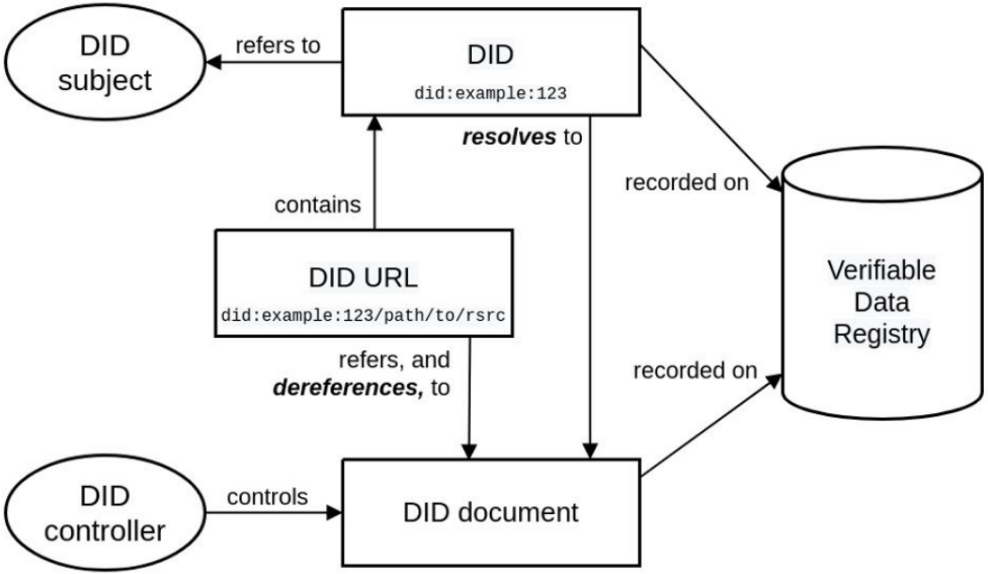
https://wiki.hyperledger.org/display/indy

Indy Key Characteristics

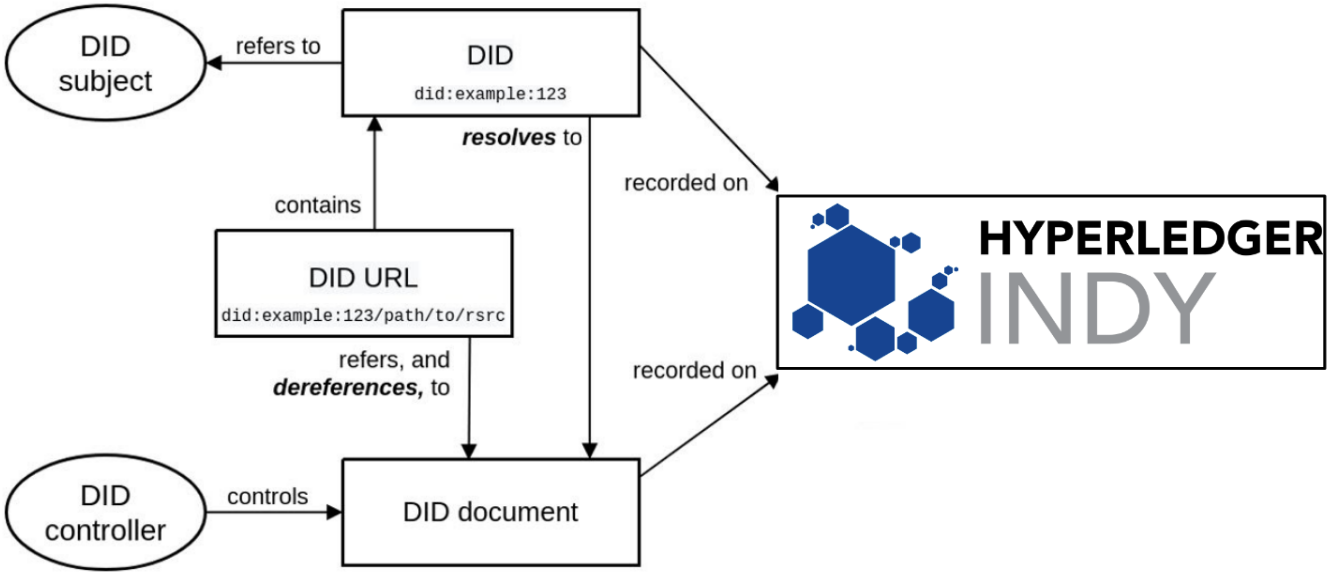
- **Distributed ledger purpose-built for decentralized identity**
- BFT by design
- DIDs that are globally unique and resolvable (via a ledger) without requiring any centralized resolution authority
- Verifiable Credentials in an interoperable format
- **Zero Knowledge Proofs** for Verifiable Presentations, which prove that some or all of the data in a set of Claims is true without revealing any additional information, including the identity of the Prover

https://wiki.hyperledger.org/display/indy

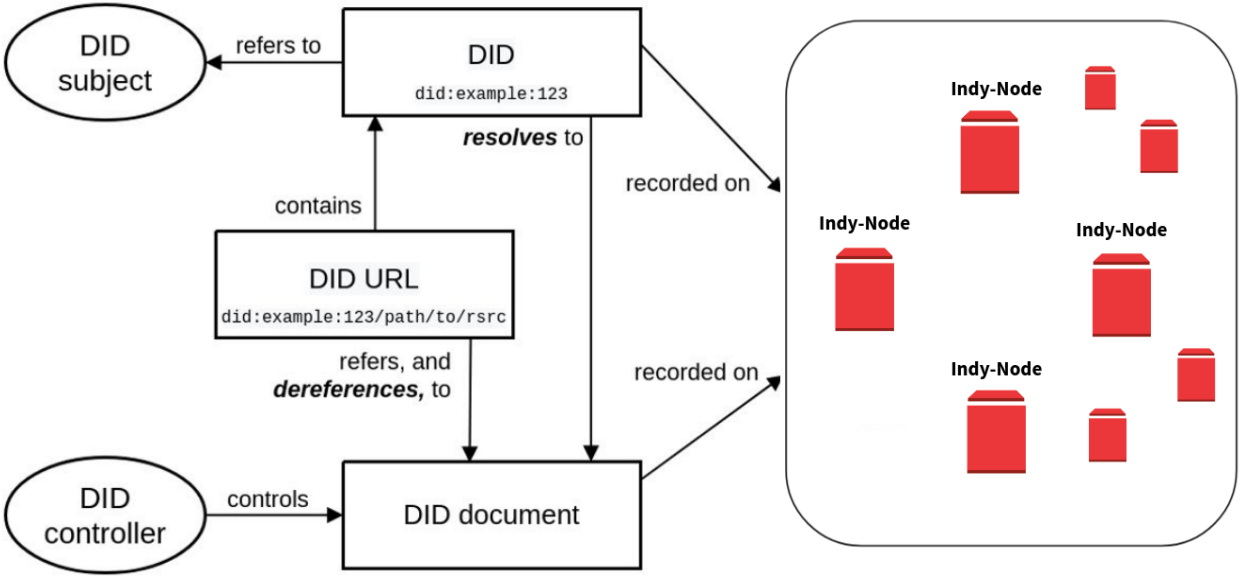
Indy Overview



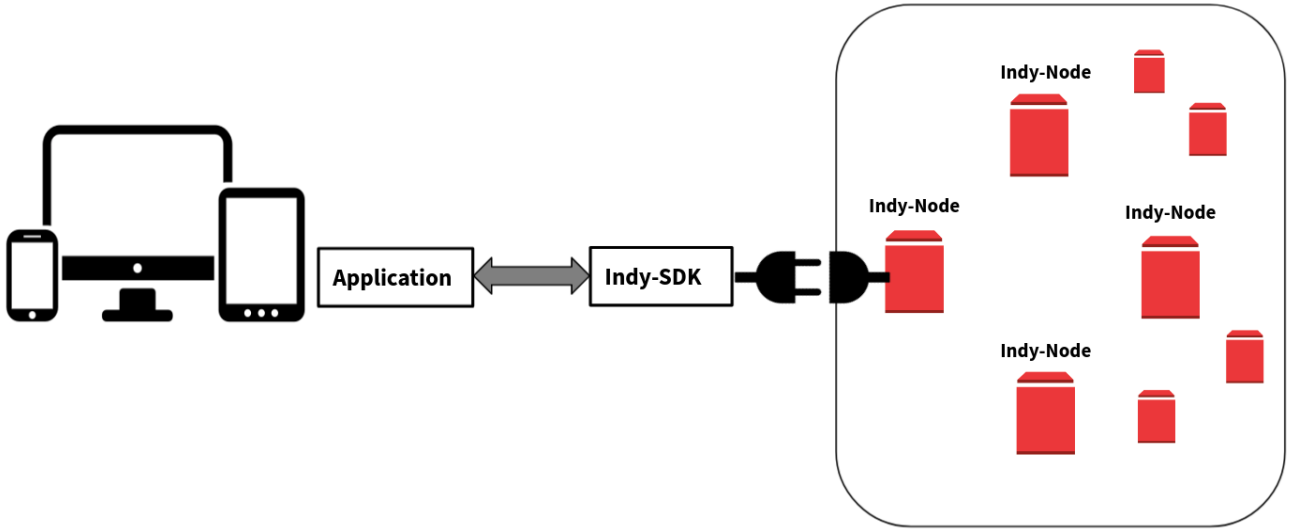
Indy Overview



Indy Overview



Indy Overview



Indy Projects

- **Indy-Plenum:**
  - Implements Byzantine Fault Tolerant Protocol
  - Used for consensus in Indy
  - Based on RBFT
  - https://github.com/Hyperledger/indy-plenum
- **Indy-Node:**
  - Implements the blockchain with Indy-Plenum consensus
  - Defines identity specific transactions.
  - https://github.com/Hyperledger/indy-node
- **Indy-SDK**
  - Provides APIs to applications for accessing Indy network
  - Indy- https://github.com/Hyperledger/indy-sdk

Install Indy – Starting an Indy Pool

Clone indy-sdk

```
git clone https://github.com/hyperledger/indy-sdk.git
cd indy-sdk
```

Build and run indy pool docker image

```
docker build -f ci/indy-pool.dockerfile -t indy_pool .
docker run -itd -p 9701-9708:9701-9708 indy_pool
```

Install Indy – Starting an Indy Pool

Easier Alternatives:

1. Starting a pre-configured docker image:

```
docker run -itd -p 9701-9708:9701-9708 ghoshbishakh/indy_pool
```

2. Start from indy-node repository:

Clone indy-node

```
git clone https://github.com/hyperledger/indy-node.git
```

Move to the directory indy-node/environment/docker/pool

```
./pool_start.sh [number of nodes in pool] [IP addresses of nodes]
[number of clients] [port for the first node]
```

Eg.

```
./pool_start.sh 4 10.0.0.2,10.0.0.3,10.0.0.4,10.0.0.5 10 9701
```

Install Indy SDK

Ubuntu based distributions (Ubuntu 16.04 and 18.04)

It is recommended to install the SDK packages with APT:

```
sudo apt-key adv --keyserver keyserver.ubuntu.com --recv-keys
CE7709D068DB5E88
sudo add-apt-repository "deb https://repo.sovrin.org/sdk/deb (xenial|
bionic) {release channel}"
sudo apt-get update
sudo apt-get install -y {library}
```

- {library} must be replaced with libindy, libnullpay, libvcx or indy-cli.
- (xenial|bionic) xenial for 16.04 Ubuntu and bionic for 18.04 Ubuntu.
- {release channel} must be replaced with master, rc or stable to define corresponded release channel. Please See the section "Release channels" above for more details.

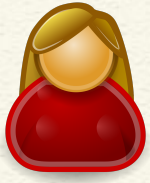
Install Python3 Wrapper

```
pip install python3-indy
```

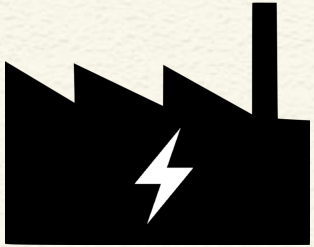
https://github.com/hyperledger/indy-sdk

Scenario

University

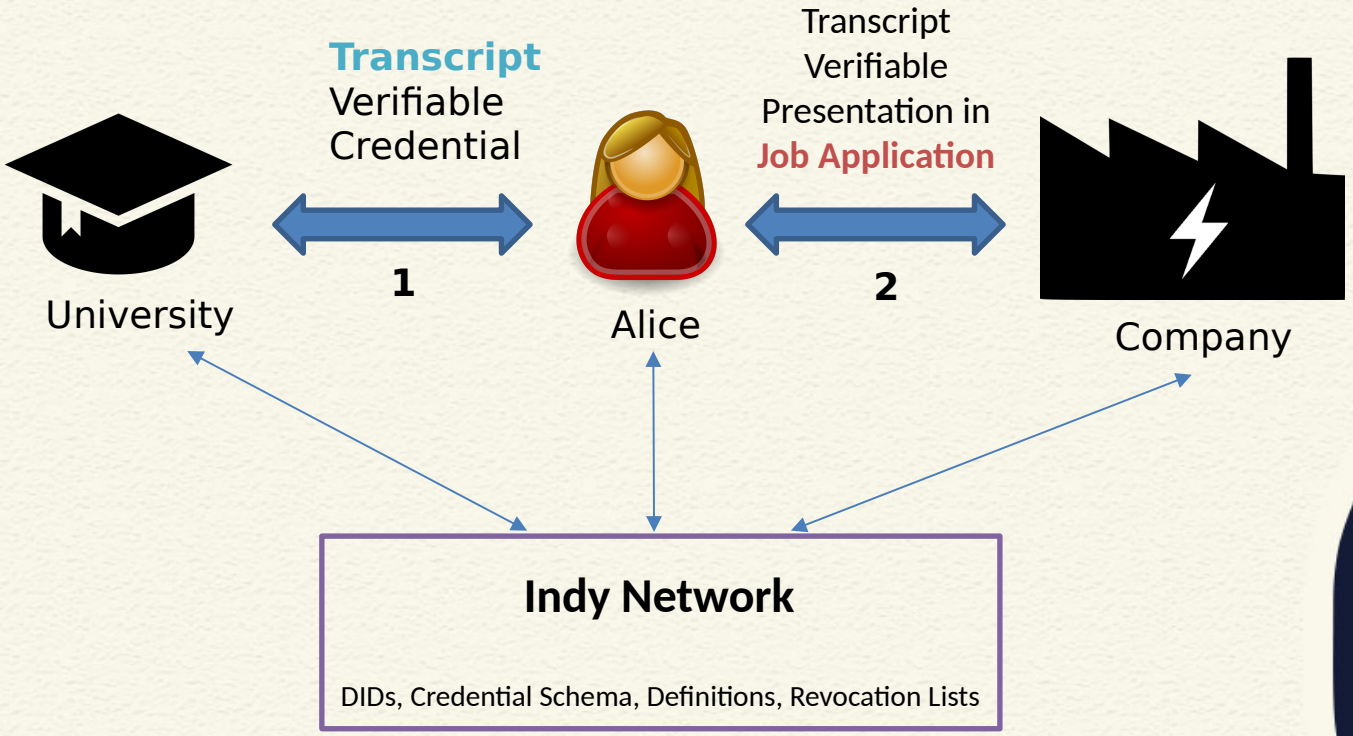


Alice



Company

Scenario


Transcript
Verifiable
Credential
Transcript
Verifiable
Presentation in
Job Application
University
1
Alice
2
Company
Indy Network
DIDs, Credential Schema, Definitions, Revocation Lists

Configuring Identities in Indy

Roles:

STEWARDS

- **Public permissioned network**
- Only pre-approved participants, known as **stewards**, are permitted to participate in the validation process.

Trust Anchor(TA)

- Link between User and Stewards.
- E.g. banks, universities, hospitals, service providers, insurance companies.
- Onboarded by approvals of Stewards.
- Accepts the request from user and forwards this request to Stewards in case of writing into the ledger.

Configuring Identities in Indy

STEP1 - Connect to Indy Pool

- Genesis txn

STEP2 - Get ownership of Steward's DID

STEP3 - Register DID for Government, University and Company

- Nym Transactions

Conclusion

- Indy – public permissioned network
- Stewards and Trust anchors
- DID registration through Stewards


Thank
you