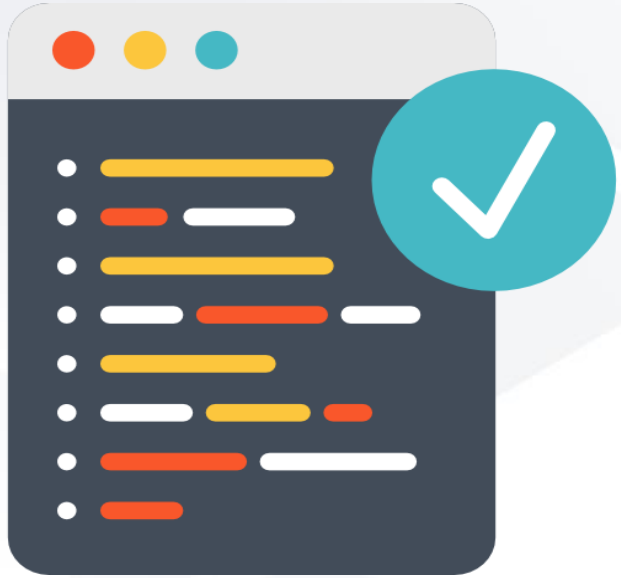
MÓDULO VI

Super Lab

BLOCKCHAIN
DEVELOPER
HYPERLEDGER

Fluxo do Lab

- Pré-requisitos
- Instalação
- Ativação da rede
- Criação de 1 canal
- Criação de vários canais
- Join do canal
- Deploy do chaincode
- Invocação de transações
- Entendimento do cenário



BLOCKCHAIN DEVELOPER HYPERLEDGER

Pre-reqs

- Editor de texto
- Ideal conhecer um pouco de Java ou programação
- Conhecimento básico de Blockchain, bases de dados, assinaturas e hashes

Ferramentas

- Ubuntu 16 ou acima ou MacOs 10.12
- curl
- git
- Docker versão acia de 17
- Docker compose acima de 1.29
- golang 1.17.x
- node verão 8.9 ou acima
- npm versão 5.x ou acima
- python 2.7x

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Instalações

Curl e Golang

- sudo apt-get install curl
- sudo apt-get install golang
- export GOPATH=$HOME/go
- export PATH=$PATH:$GOPATH/bin

Instalação de node, npm e python

- sudo apt-get install nodejs
- sudo apt-get install npm
- sudo apt-get install python

Instalações

Docker e Docker-compose

- sudo apt-get remove docker docker-engine docker.io containerd runc
- sudo apt-get update
- sudo apt-get install \
  ca-certificates \
  curl \
  gnupg \
  lsb-release
- curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg
- sudo apt-get update
- sudo apt-get install docker-ce docker-ce-cli containerd.io
- sudo docker run hello-world
- sudo apt-get install docker-compose

Verificações

Docker e Docker-compose

- Node –v
- Npm –v
- Go version
- Docker –version
- Docker-compose –version
- Python –v

Instalação de Blockchain

- Clonar https://github.com/hyperledger/fabric-samples
- mkdir -p $HOME/go/src/github.com/<your_github_userid>
- cd $HOME/go/src/github.com/<your_github_userid>
- curl -sSL https://bit.ly/2ysbOFE | bash -s

Execução da rede

- cd fabric-samples/test-network
- ./network.sh –h
- ./network.sh down
- ./network.sh up

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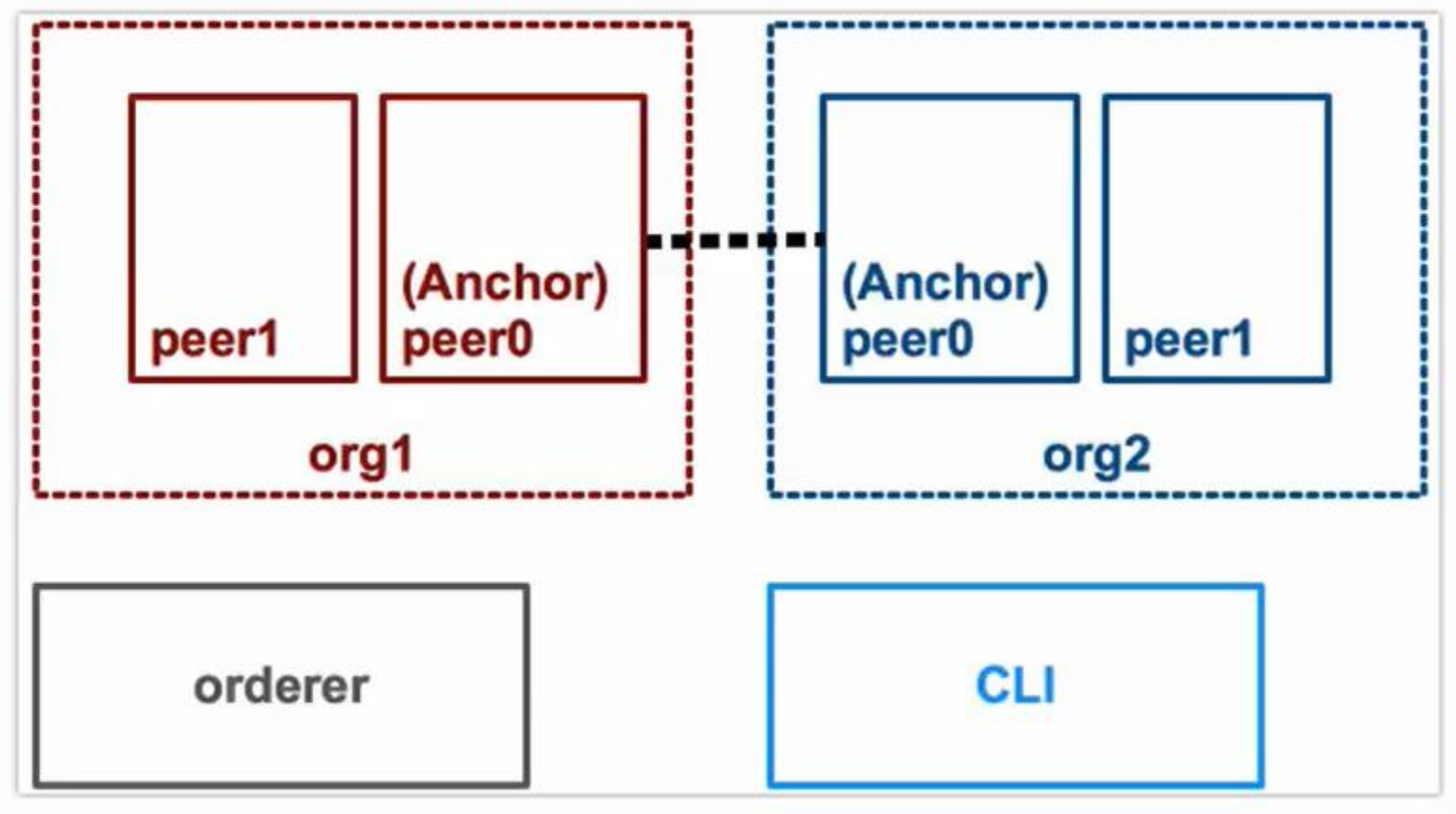
Estrutura da Rede



- Anchor comunica entre organizações
- Orderer gera o consenso
- CLI permite enviar comandos para a rede

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Output

```
Using docker and docker-compose
Starting nodes with CLI timeout of '5' tries and CLI delay of '3' seconds and using database 'leveldb' with crypto from 'cryptogen'
LOCAL_VERSION=2.4.2
DOCKER_IMAGE_VERSION=2.4.2
/root/go/src/github.com/bernardo9999/fabric-samples/test-network/../bin/cryptogen
Generating certificates using cryptogen tool
Creating Org1 Identities
+ cryptogen generate --config=./organizations/cryptogen/crypto-config-org1.yaml --output=organizations
org1.example.com
+ res=0
Creating Org2 Identities
+ cryptogen generate --config=./organizations/cryptogen/crypto-config-org2.yaml --output=organizations
org2.example.com
+ res=0
Creating Orderer Org Identities
+ cryptogen generate --config=./organizations/cryptogen/crypto-config-orderer.yaml --output=organizations
+ res=0
Generating CCP files for Org1 and Org2
```

Output

```
Generating CCP files for Org1 and Org2
Creating network "fabric_test" with the default driver
Creating volume "compose_orderer.example.com" with default driver
Creating volume "compose_peer0.org1.example.com" with default driver
Creating volume "compose_peer0.org2.example.com" with default driver
Creating peer0.org1.example.com ... done
Creating orderer.example.com    ... done
Creating peer0.org2.example.com ... done
Creating cli                    ... done
```

Criação de canais

- ./network.sh createChannel

Channel 'mychannel' joined

Vamos criar mais de um canal

- ./network.sh createChannel -c channel1
- ./network.sh createChannel -c channel2

Caso se queira levantar o ambiente com o canal

- ./network.sh up createChannel

Execução - chaincode

Em Hyperledger o Smart contract chama-se chaincode

- Instala o **chaincode peer chaincode install** (procurar) para ambos peers
- Instância o chaincode **peer chaincode instantiate** e envia argumentos para o método (procurar comando e identificar métodos
- Consulta o peer com o comando **peer chaincode query**
- Executa o invoke **peer chaincode invoke** – transfere asset6 para Christopher
- Instala o chaincode em outro peer **chaincode peer chaincode install**
- Consulta o chaincode em outro peer (peer1 org2)
- Retorna o valor de asset6

Preparando para interagir com o Chaincode

- export CORE_PEER_TLS_ENABLED=true
- export CORE_PEER_LOCALMSPID="Org1MSP"
- export CORE_PEER_TLS_ROOTCERT_FILE=${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt
- export CORE_PEER_MSPCONFIGPATH=${PWD}/organizations/peerOrganizations/org1.example.com/users/Admin@org1.example.com/msp
- export CORE_PEER_ADDRESS=localhost:7051

Deploy do Chaincode

- ./network.sh deployCC -ccn basic -ccp ../asset-transfer-basic/chaincode-go -ccl go

Preparando para interagir com o Chaincode

- export PATH=${PWD}/../bin:$PATH
- export FABRIC_CFG_PATH=$PWD/../config/

Exportemos as variáveis para nos conectarmos com a primeira organização

- export CORE_PEER_TLS_ENABLED=true
- export CORE_PEER_LOCALMSPID="Org1MSP"
- export CORE_PEER_TLS_ROOTCERT_FILE=${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt
- export CORE_PEER_MSPCONFIGPATH=${PWD}/organizations/peerOrganizations/org1.example.com/users/Admin@org1.example.com/msp
- export CORE_PEER_ADDRESS=localhost:7051

Interagindo com o Chaincode

Vamos inicializar o ledger

- peer chaincode invoke -o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafile "${PWD}/organizations/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem" -C mychannel -n basic --peerAddresses localhost:7051 --tlsRootCertFiles "${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt" --peerAddresses localhost:9051 --tlsRootCertFiles "${PWD}/organizations/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt" -c '{"function":"InitLedger","Args":[]}’

-> INFO 001 Chaincode invoke successful. result: status:200

Interagindo com o Chaincode

Vamos a consultar o ledger

- peer chaincode query -C mychannel -n basic -c '{"Args":["GetAllAssets"]}'


```
[
  {"ID": "asset1", "color": "blue", "size": 5, "owner": "Tomoko", "appraisedValue": 300},
  {"ID": "asset2", "color": "red", "size": 5, "owner": "Brad", "appraisedValue": 400},
  {"ID": "asset3", "color": "green", "size": 10, "owner": "Jin Soo", "appraisedValue": 500},
  {"ID": "asset4", "color": "yellow", "size": 10, "owner": "Max", "appraisedValue": 600},
  {"ID": "asset5", "color": "black", "size": 15, "owner": "Adriana", "appraisedValue": 700},
  {"ID": "asset6", "color": "white", "size": 15, "owner": "Michel", "appraisedValue": 800}
]
```

Interagindo com o Chaincode

Vamos a gravar no ledger

- peer chaincode invoke -o localhost:7050 --ordererTLSHostnameOverride orderer.example.com --tls --cafile "${PWD}/organizations/ordererOrganizations/example.com/orderers/orderer.example.com/msp/tlscacerts/tlsca.example.com-cert.pem" -C mychannel -n basic --peerAddresses localhost:7051 --tlsRootCertFiles "${PWD}/organizations/peerOrganizations/org1.example.com/peers/peer0.org1.example.com/tls/ca.crt" --peerAddresses localhost:9051 --tlsRootCertFiles "${PWD}/organizations/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt" -c '{"function":"TransferAsset","Args":["asset6","Christopher"]}'

-> INFO 001 Chaincode invoke successful. result: status:200

Trocando de Organização

Exportemos as variáveis para nos conectarmos com a segunda organização

- export CORE_PEER_TLS_ENABLED=true
- export CORE_PEER_LOCALMSPID="Org2MSP"
- export CORE_PEER_TLS_ROOTCERT_FILE=${PWD}/organizations/peerOrganizations/org2.example.com/peers/peer0.org2.example.com/tls/ca.crt
- export CORE_PEER_MSPCONFIGPATH=${PWD}/organizations/peerOrganizations/org2.example.com/users/Admin@org2.example.com/msp
- export CORE_PEER_ADDRESS=localhost:9051

Interagindo com o chaincode da 2da Organização

- peer chaincode query -C mychannel -n basic -c '{"Args":["ReadAsset","asset6"]}'

{"ID":"asset6","color":"white","size":15,"owner":"Christopher","appraisedValue":800}

Você concluiu o laboratório!

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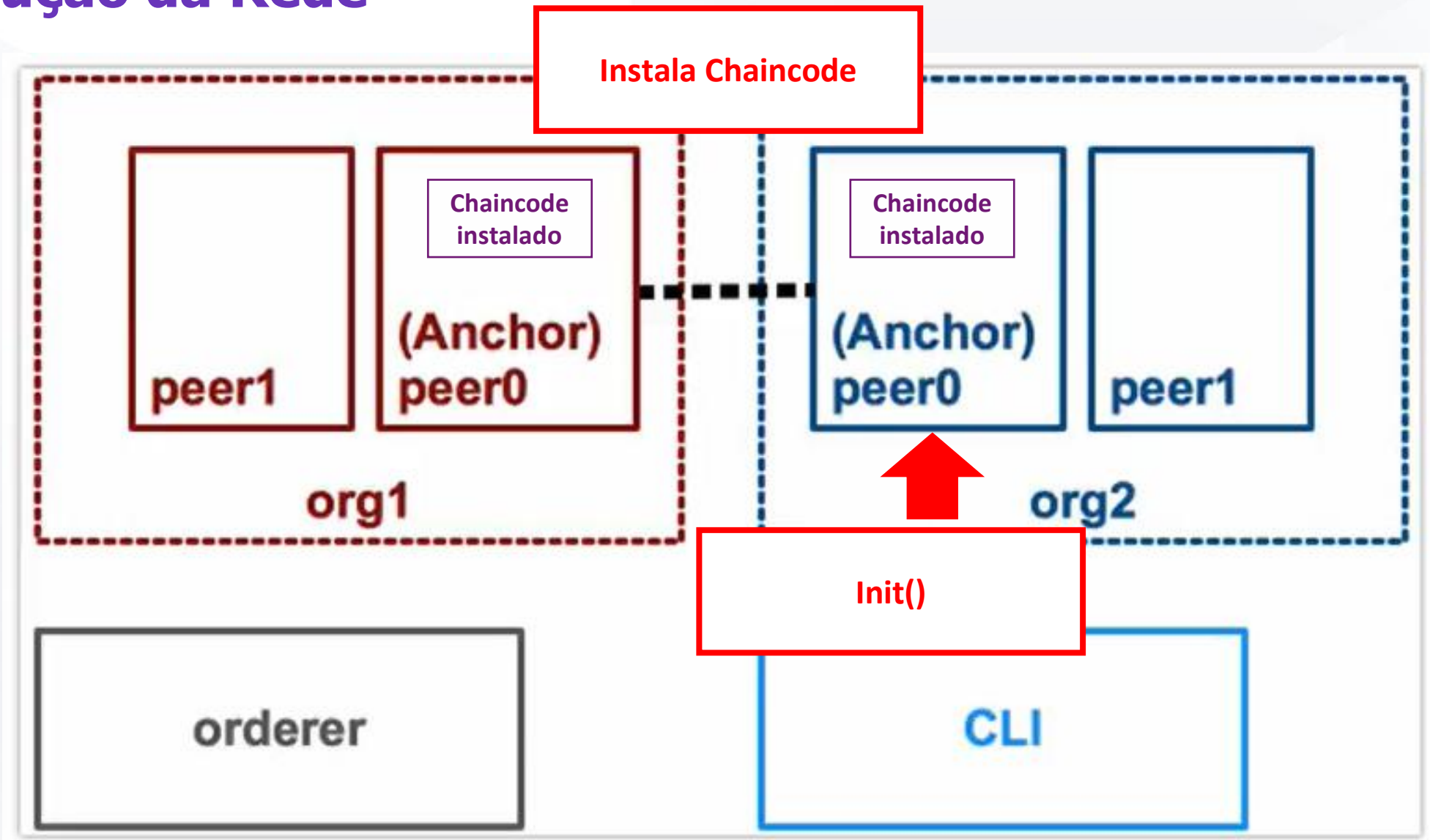
Execução da Rede



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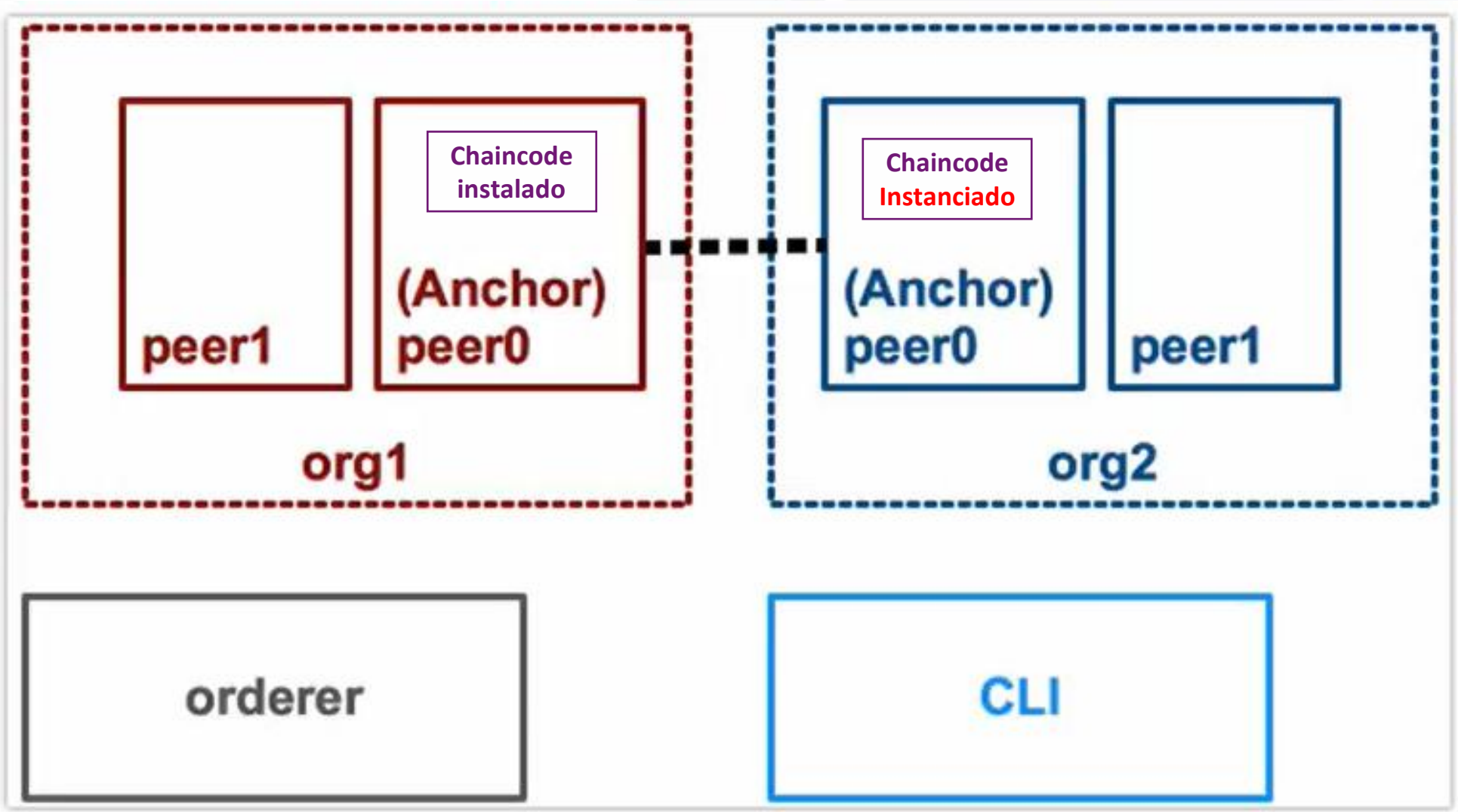
Execução da Rede



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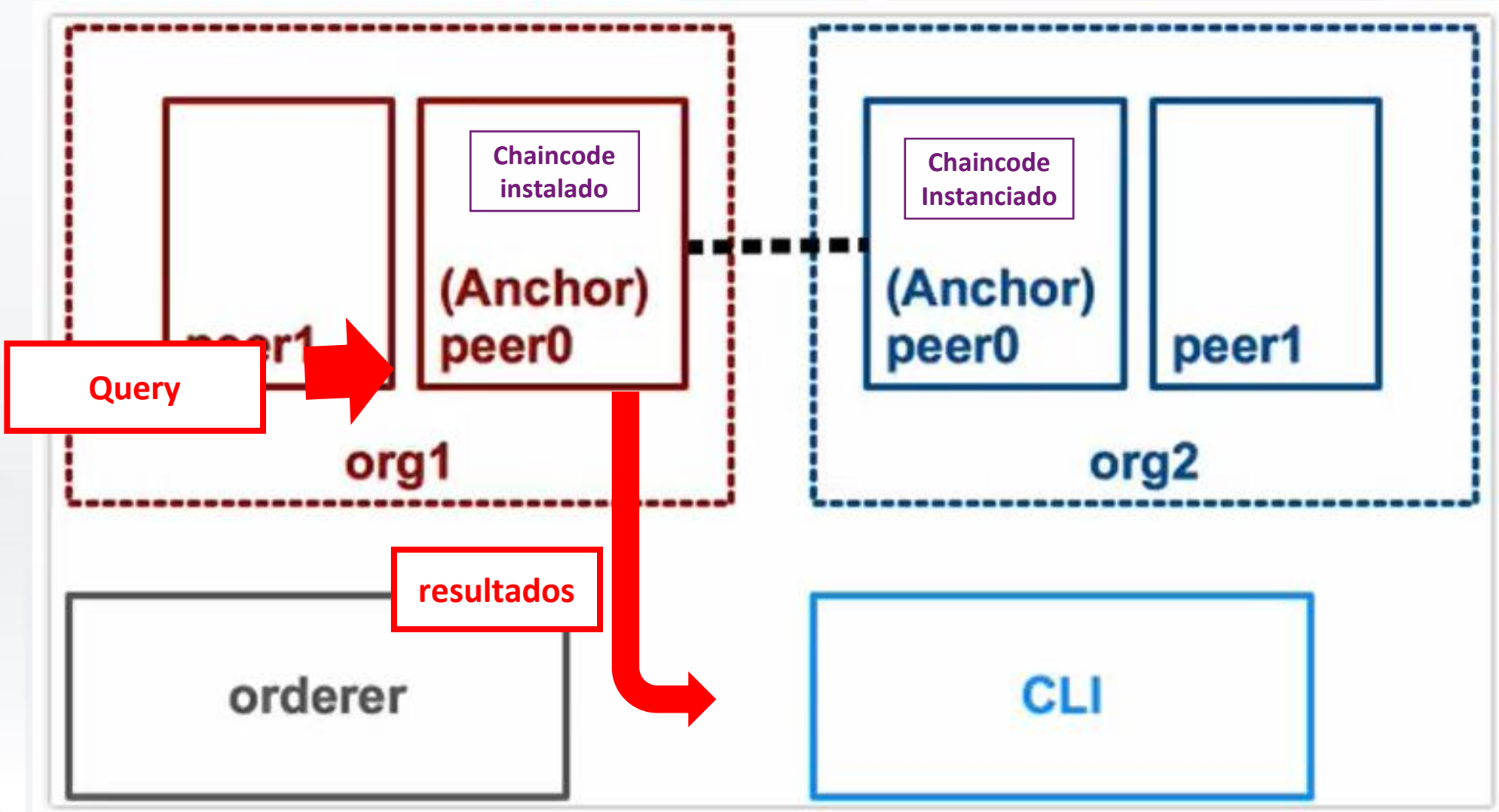
Execução da Rede



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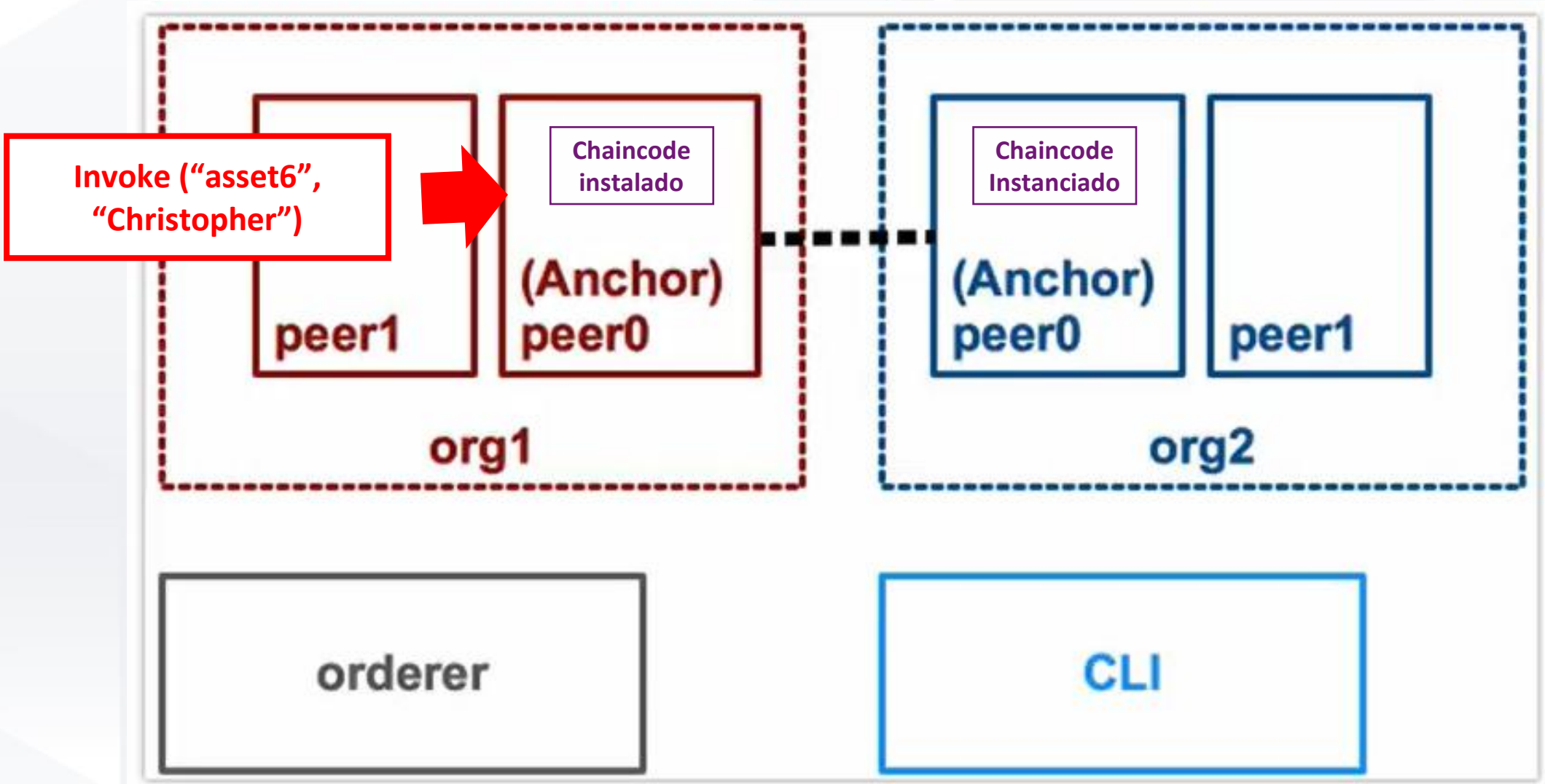
Execução da Rede



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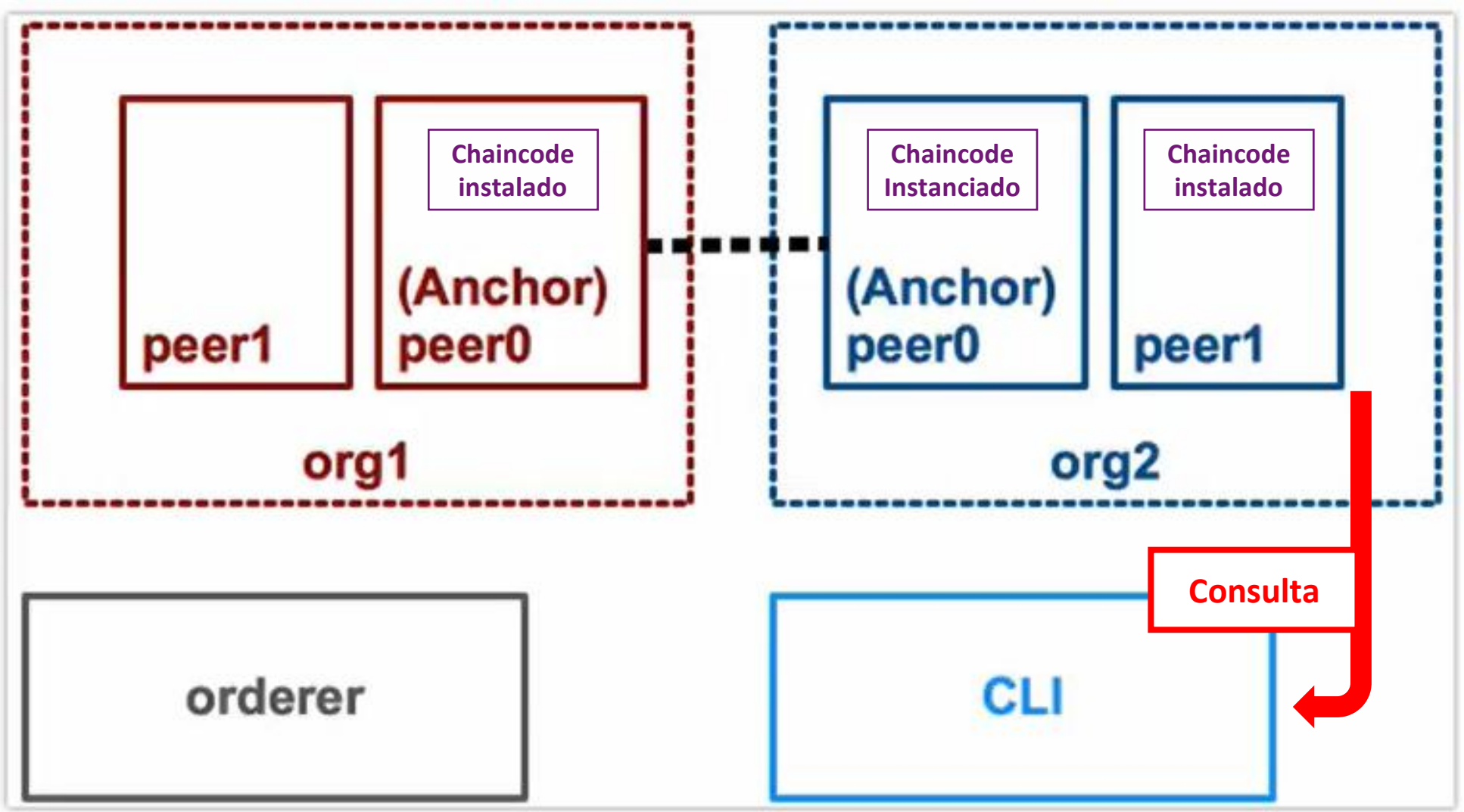
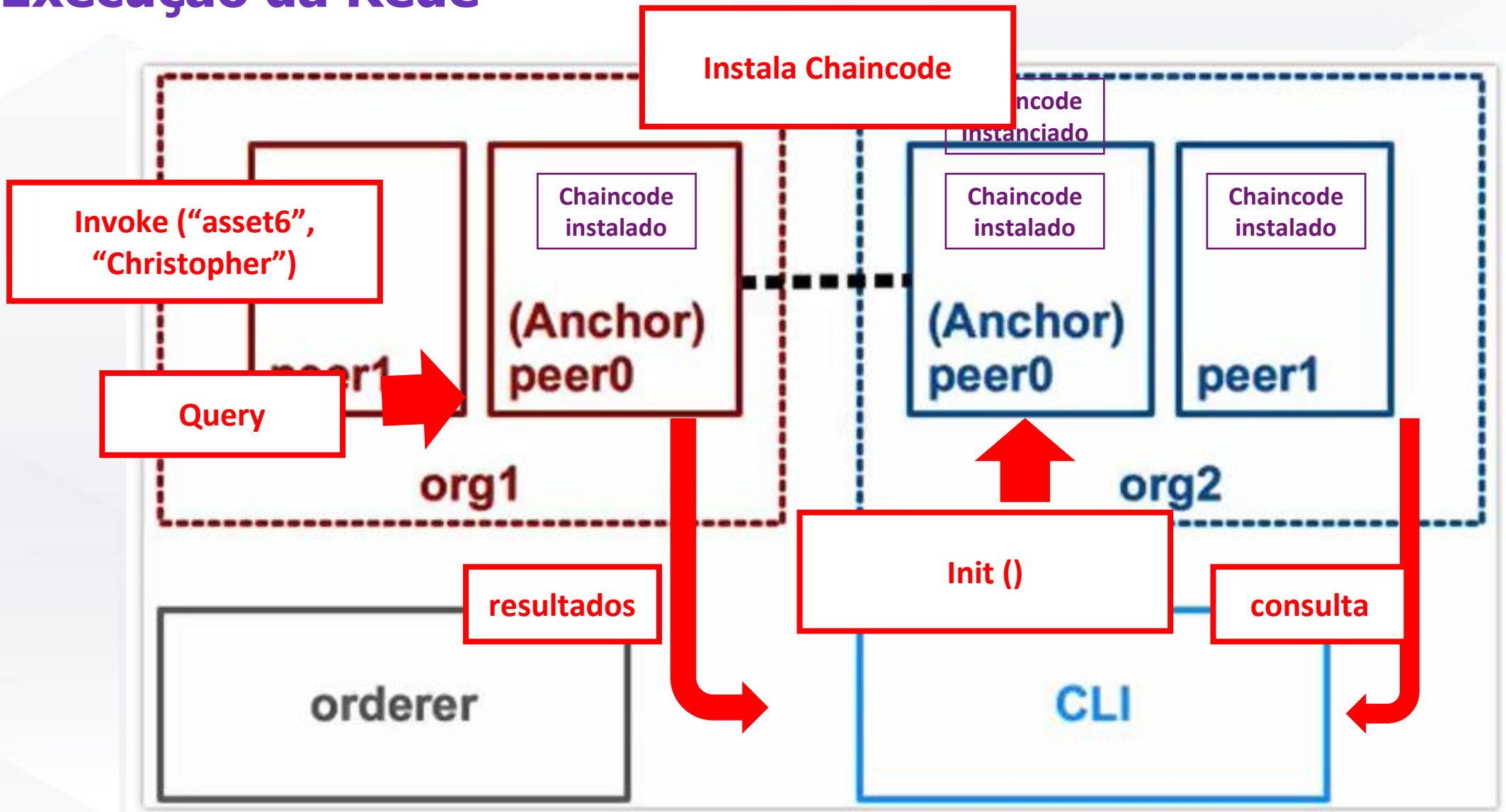
Execução da Rede



Execução da Rede



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