Hyperledger Overview and Fabric 1.0

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About Me

- **Researcher in IBM**
  - Fintech, Cloud and Analytics
- **Open-Source contributor**
  - OpenDaylight, OpenStack, Hyperledger, etc.
- **Hyperledger fan**
  - Code committer to fabric, sdk, Cello etc.
  - PTL of Cello project and fabric-sdk-py project
  - Chair of Hyperledger Technical Working Group China
  - Drafter of fabric sdk spec and multi-channel consensus spec
 - Mentor of Summer Intern Program

Outline

- Hyperledger Projects
- Hyperledger Community
- Fabric 1.0 Introduction
- Fabric 1.0 in Action
- Technical Working Group China
- Q&A
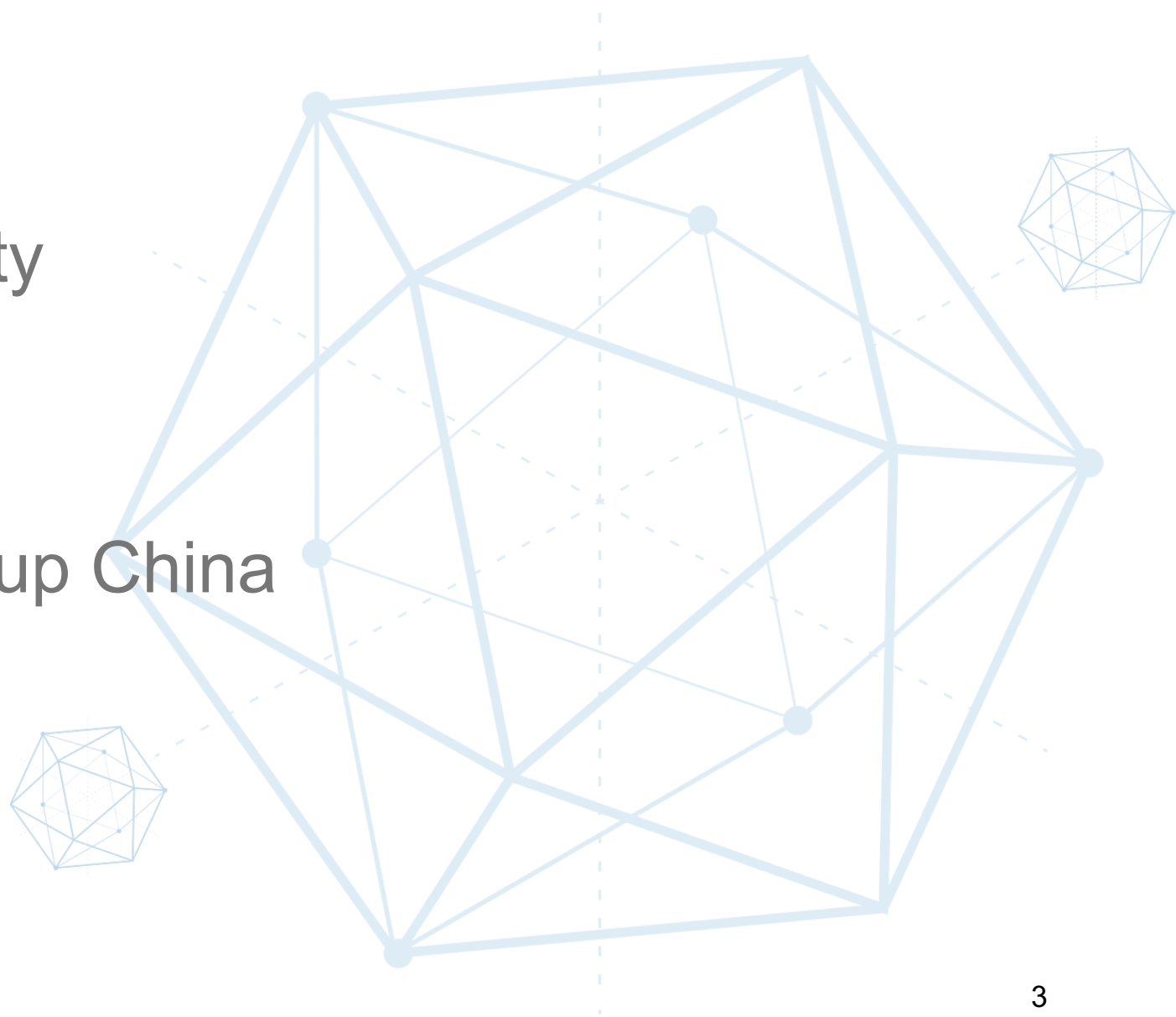
Hyperledger Projects

- Since Dec 17, 2015
- [Apache v2 License](#)
- 30 founded members
- 29/122 (China) members
- 5 main projects
- 200+ contributors
- 8000+ commits

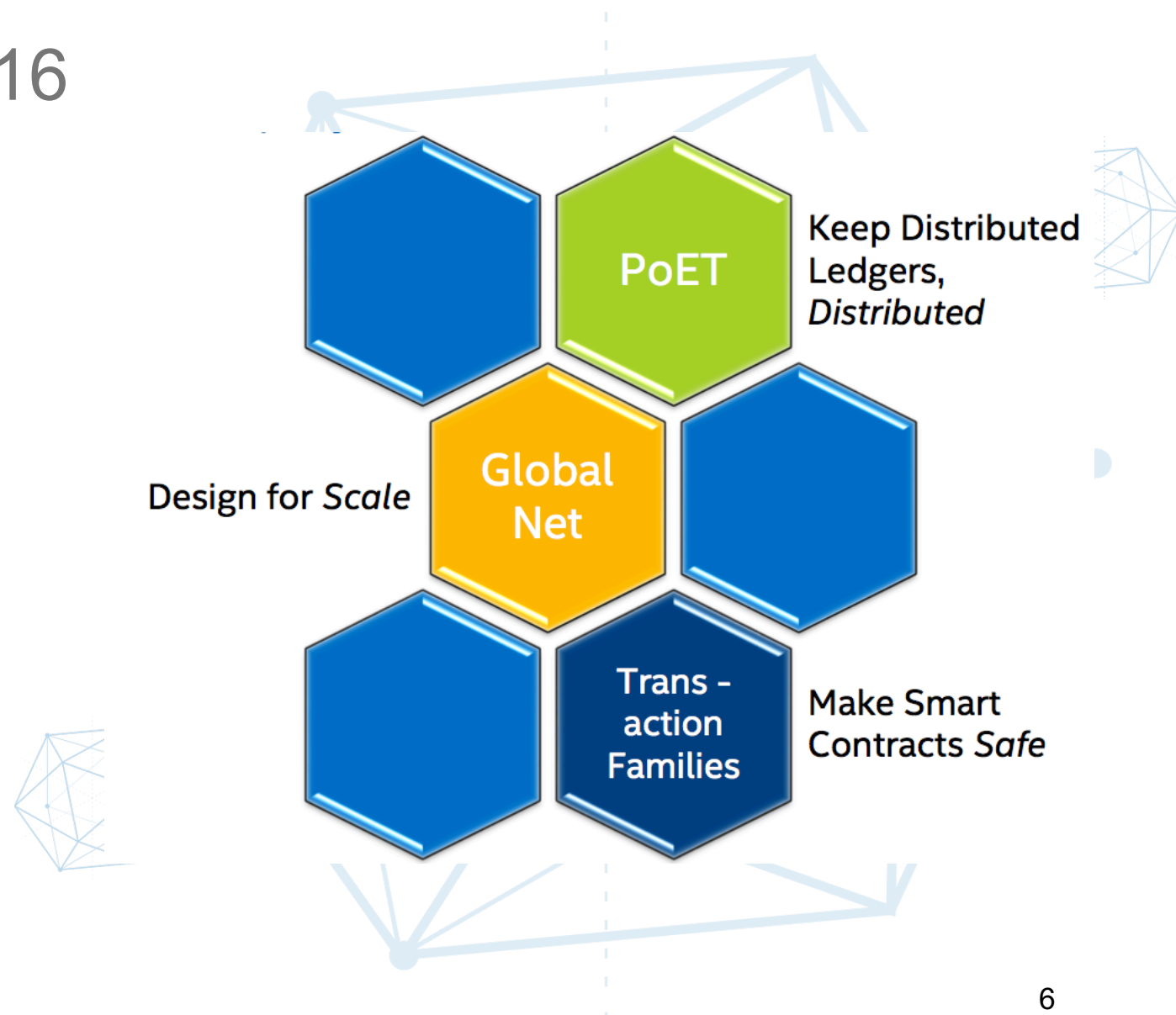Enterprise grade, open source distributed ledger framework!
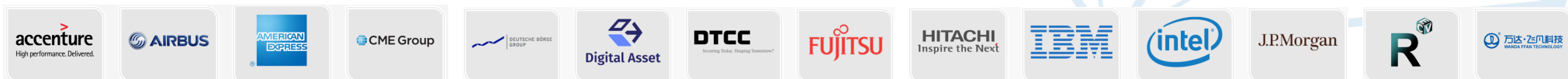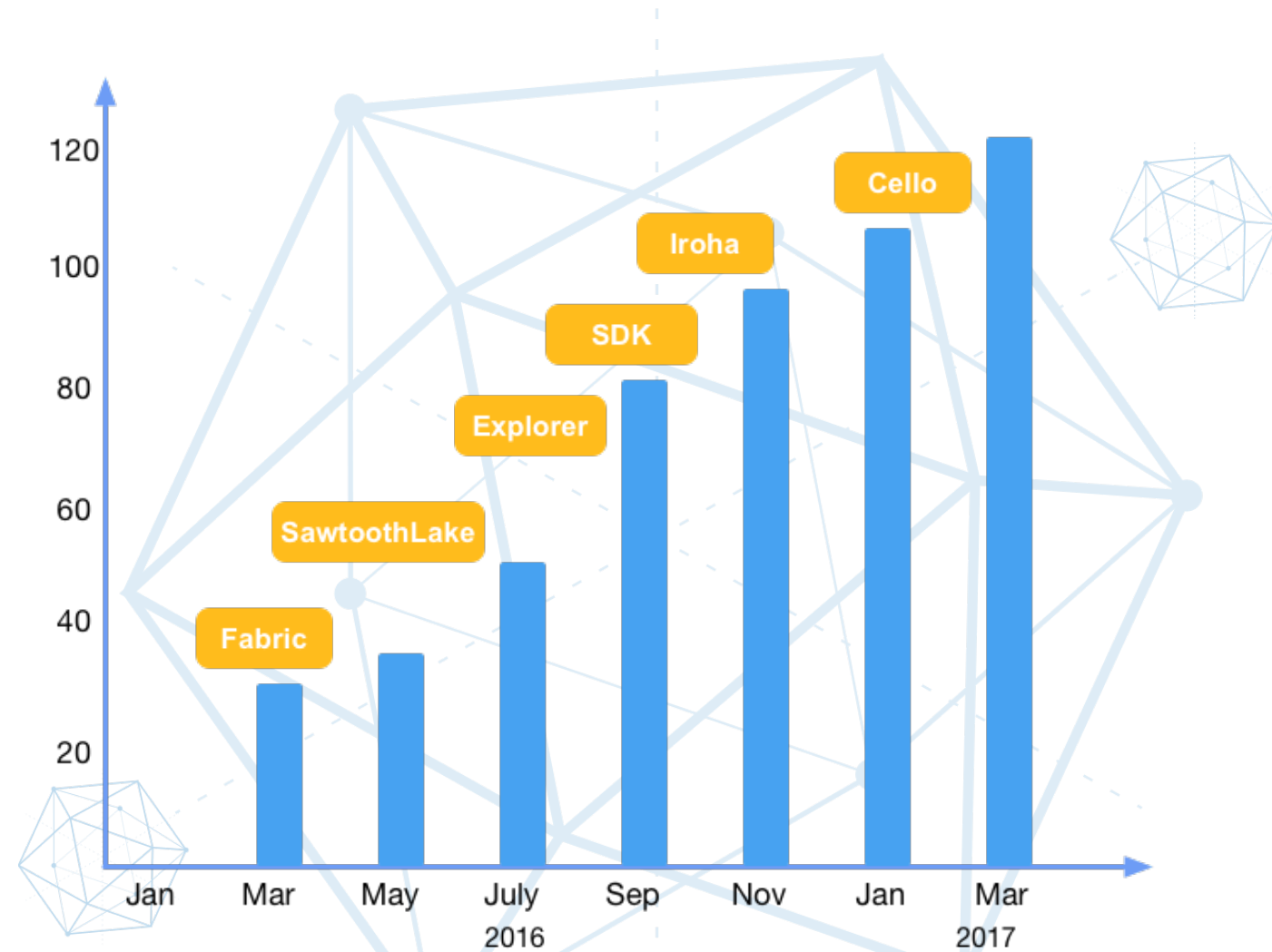
Hyperledger Fabric

- [Open-sourced](#) at Dec, 2015
- Proposed by IBM
- Written in Golang
- 70+ contributors
- 4000+ commits
- v0.6: ~80k loc; v1.0: ~120k loc

- Now in 1.0 pre-release (alpha)
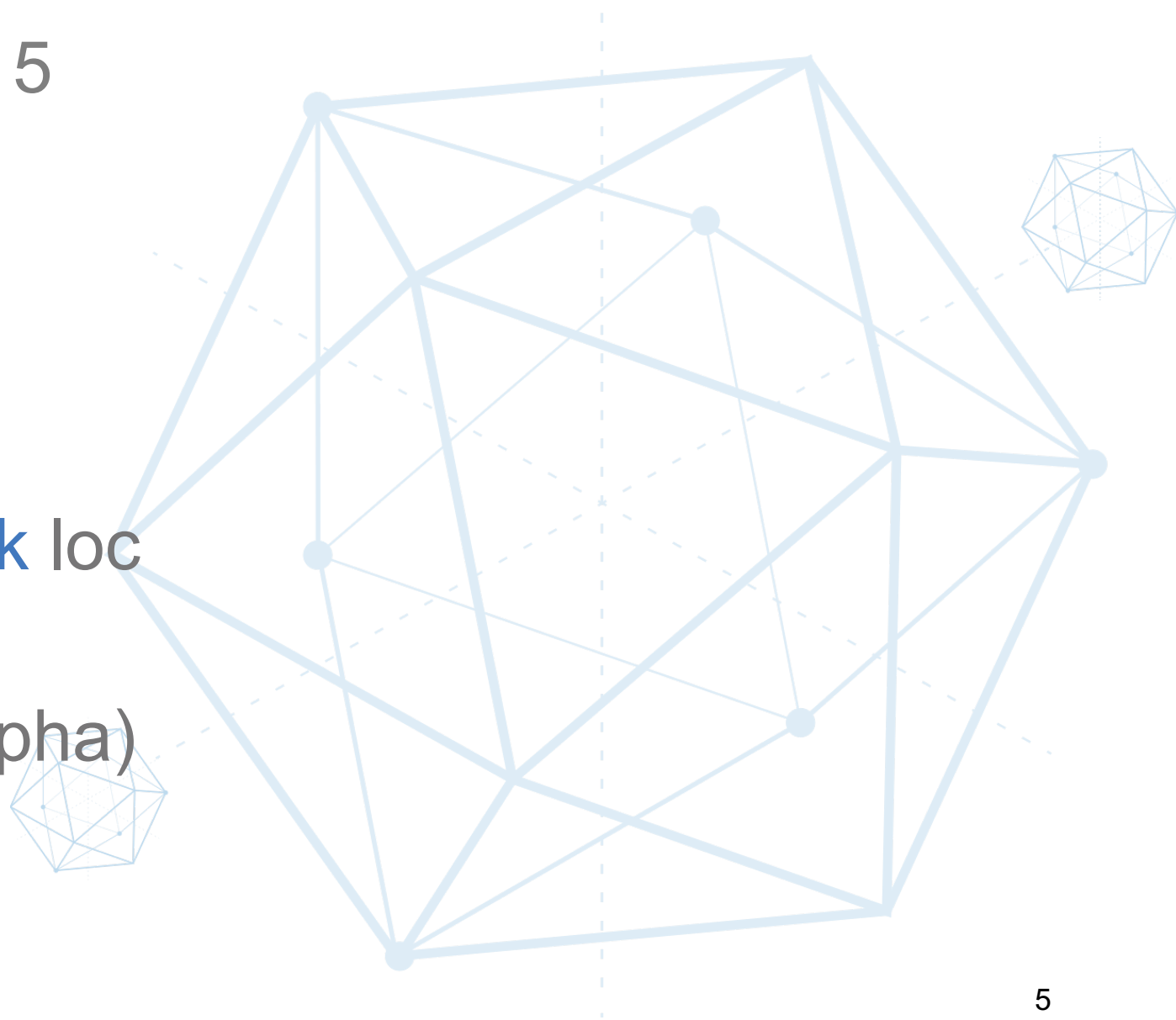
Hyperledger SawtoothLake

- [Open-sourced](#) at April, 2016
- Proposed by Intel
- Python
- 20+ contributors
- 2000+ commits
- Key features
  - PoET consensus
  - Transaction Families
  - Scalability

Keep Distributed Ledgers, *Distributed*

PoET

Design for *Scale*

Global Net

Trans - action Families

Make Smart Contracts *Safe*

Hyperledger Iroha

- [Open-sourced](#) at Oct, 2016
- Proposed by [Soramitsu](#)
- C++
- 10+ contributors
- 1000+ commits
- Key features
  - C++ environment
  - Mobile and Web application Support
  - Sumeragi consensus
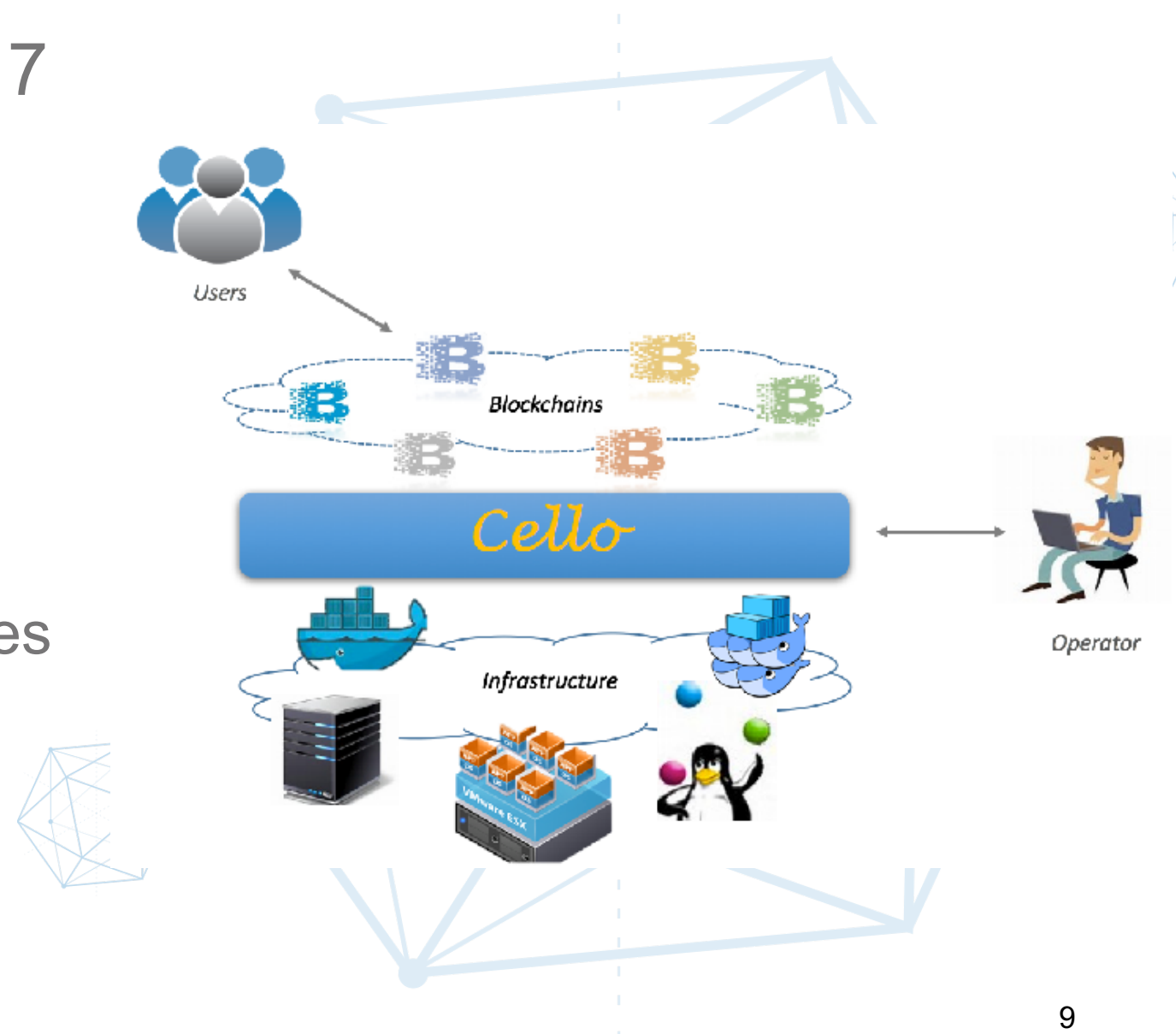
Hyperledger Blockchain-Explorer

- [Open-sourced](#) at Aug, 2016
- Proposed by Intel, DTCC, IBM
- UI to interact with ledger
- Node.js
- Under-development
- Key features
  - Web UI to explorer a blockchain
  - Single-Page Application
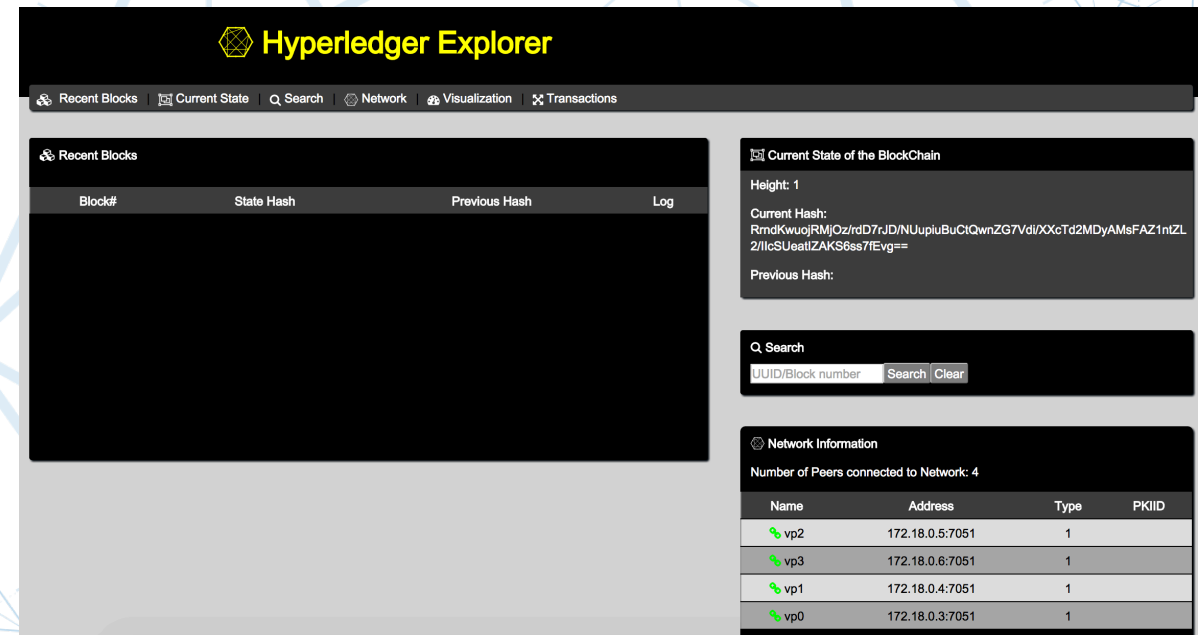
Hyperledger Cello

- [Open-sourced](#) at Jan, 2017
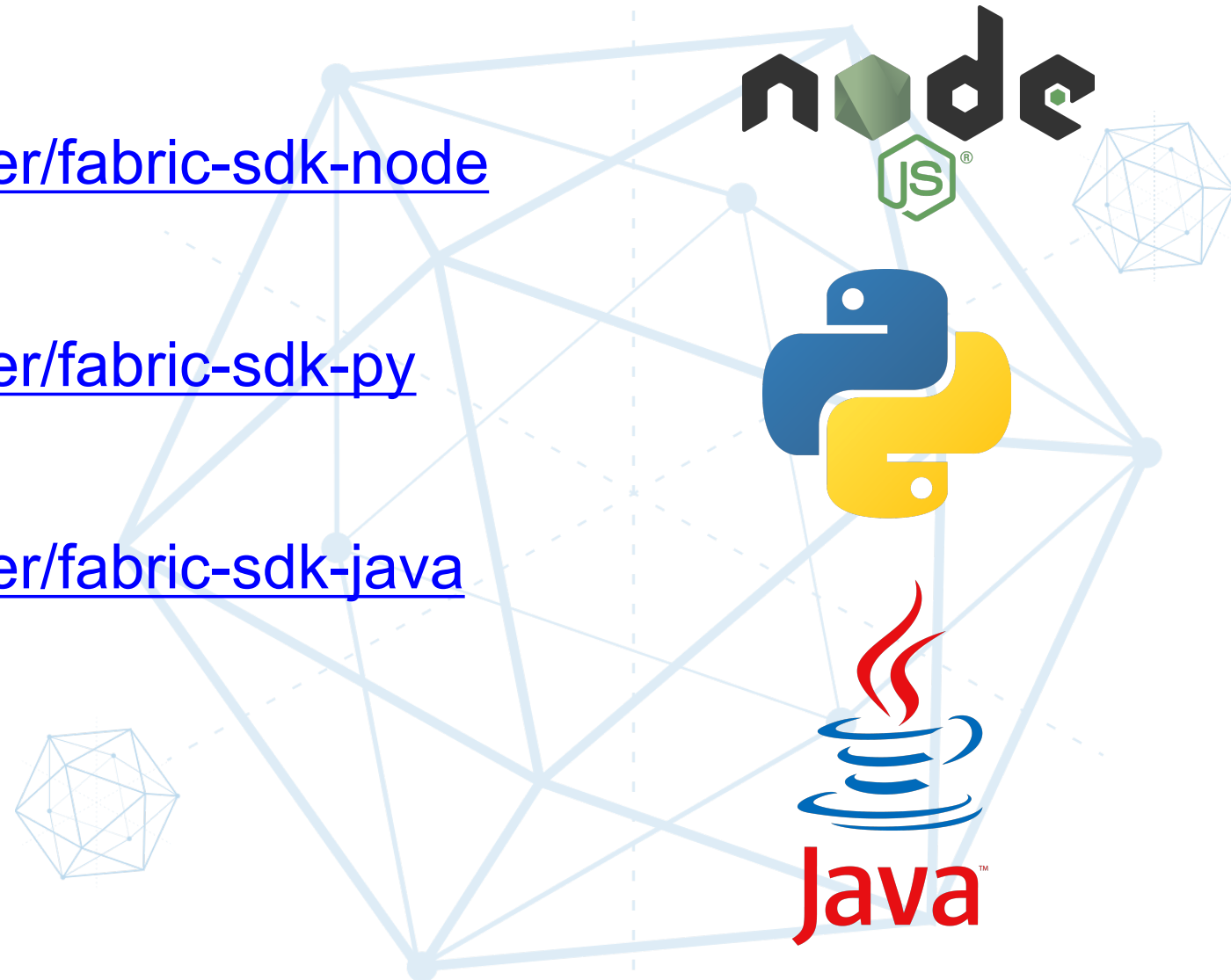- Proposed by IBM
- Python, JavaScript
- 270+ commits
- Key features
  - Blockchain as a Service
  - Support various infrastructures
  - High-performance
  - Scalability
  - Pluggability

Hyperledger Fabric SDK

- Node.Js
  - https://github.com/hyperledger/fabric-sdk-node
- Python
  - https://github.com/hyperledger/fabric-sdk-py
- Java
  - https://github.com/hyperledger/fabric-sdk-java

Hyperledger Projects

- Open Communications
  - [Mail-list](#)
  - [Rocket chat](#)
  - [Meetings](#)
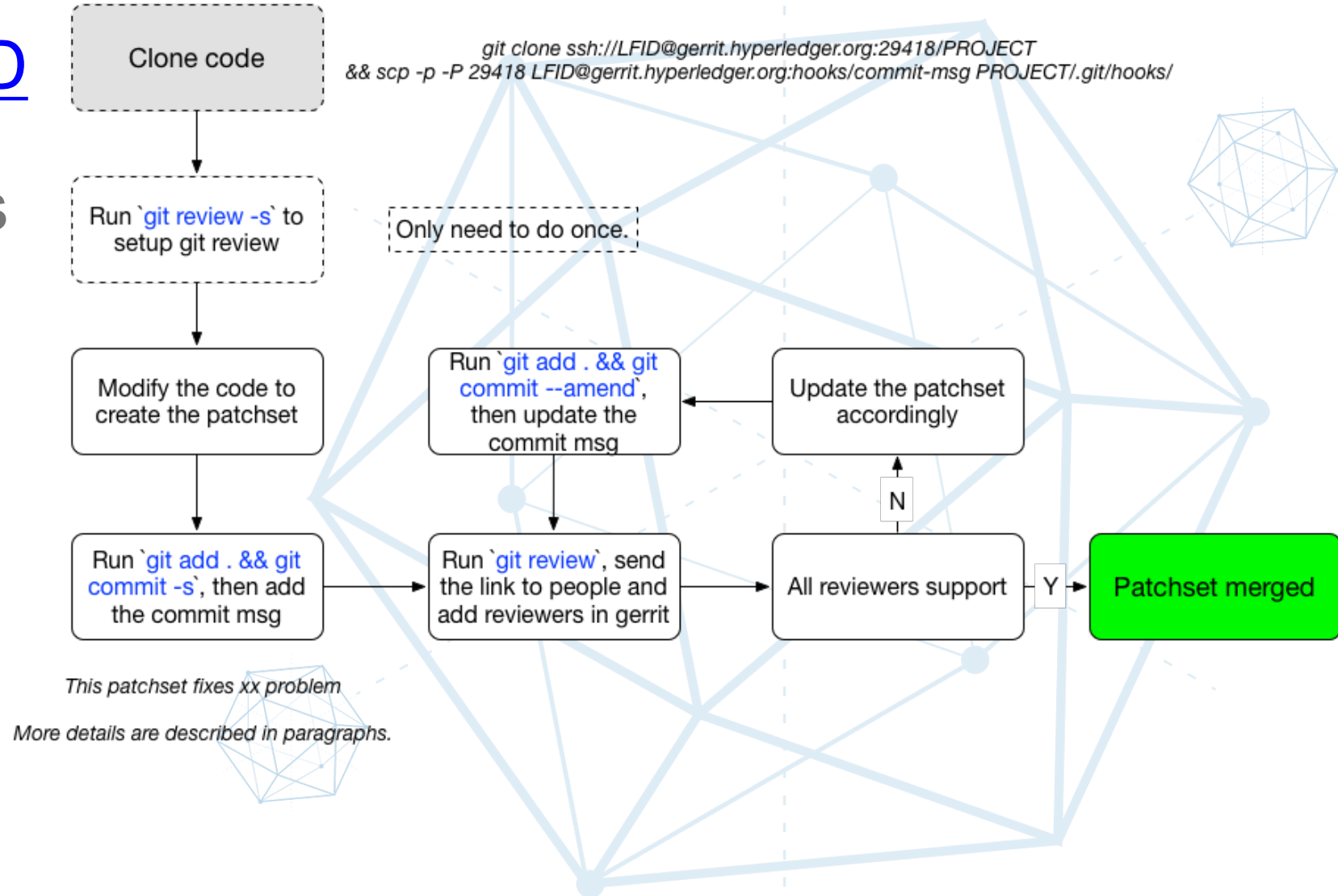
| Blockchain Explorer |
| Fabric | STL | Iroha |
| Cello |

How to Contribute

- [Linux Foundation ID](#)

- [Jira](#) to mange tasks

- [Gerrit](#) to host code

- [RocketChat](#)

Clone code

git clone ssh://LFID@gerrit.hyperledger.org:29418/PROJECT
&& scp -p -P 29418 LFID@gerrit.hyperledger.org:hooks/commit-msg PROJECT/.git/hooks/

Run `git review -s` to setup git review

Only need to do once.

Modify the code to create the patchset

Run `git add . && git commit --amend`, then update the commit msg

Update the patchset accordingly

N

Run `git add . && git commit -s`, then add the commit msg

Run `git review`, send the link to people and add reviewers in gerrit

All reviewers support

Y

Patchset merged

This patchset fixes xx problem

More details are described in paragraphs.

Hyperledger Community

- Linux Foundation Support
- Organizations
  - Technical Steering Committee
  - Governing Board
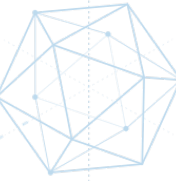 - Linux Foundation Staffs
- TWG-China
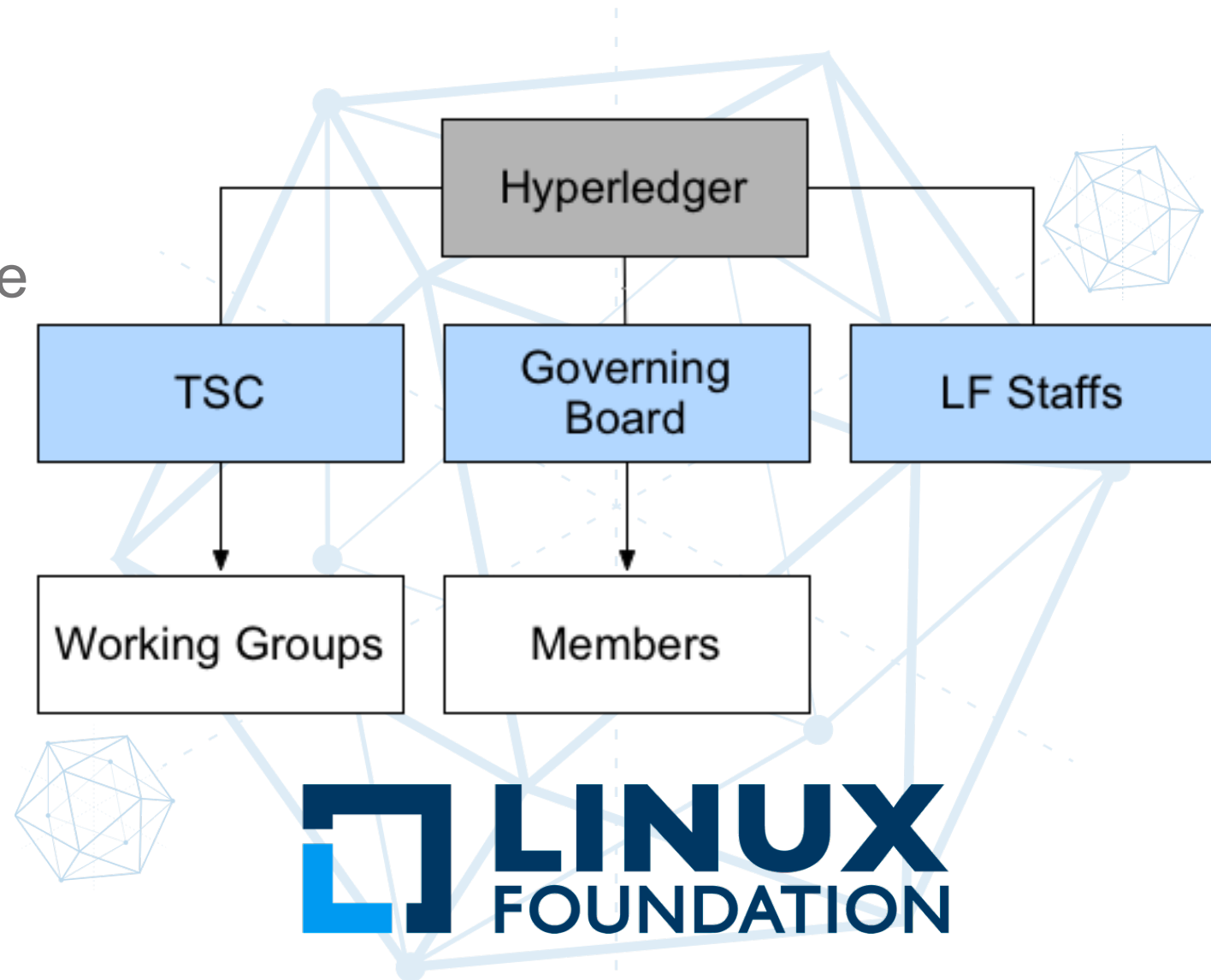
Hyperledger Community

- Events
  - Meetups
    - 9000+ attendees across 38 meetup groups
  - Hackathon
    - 1st Asia Hackathon at Shanghai on Mar 11,12
  - Hackfest
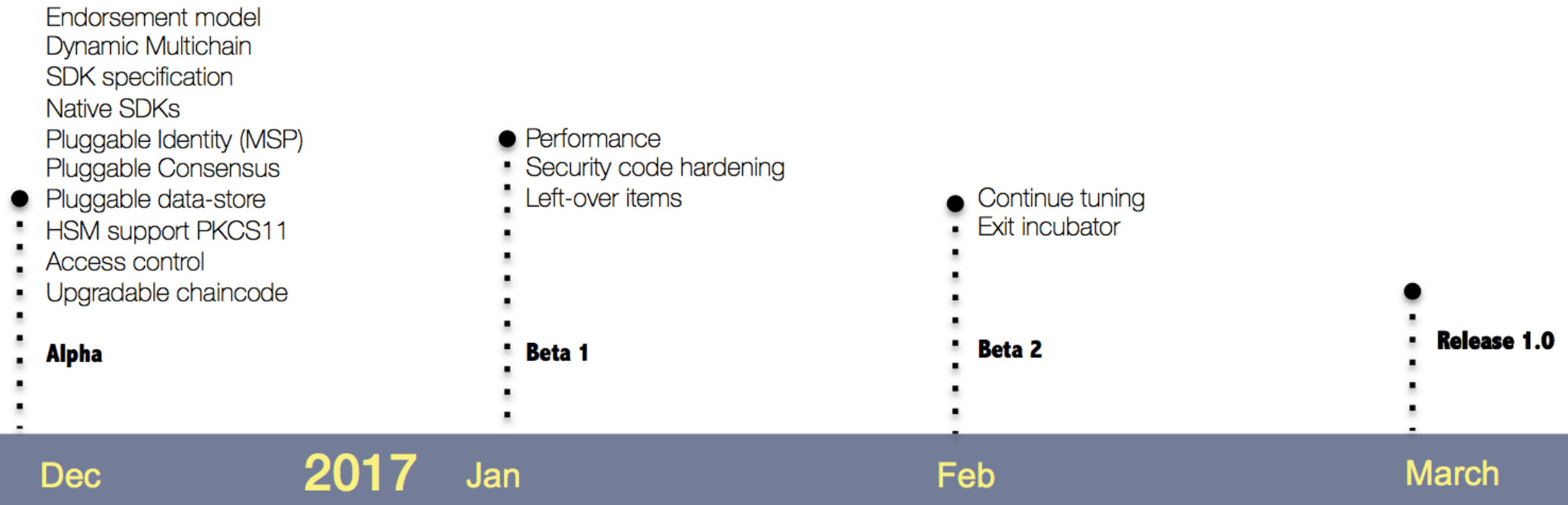   - Beijing inJune, TBD
- Wechat Public Number
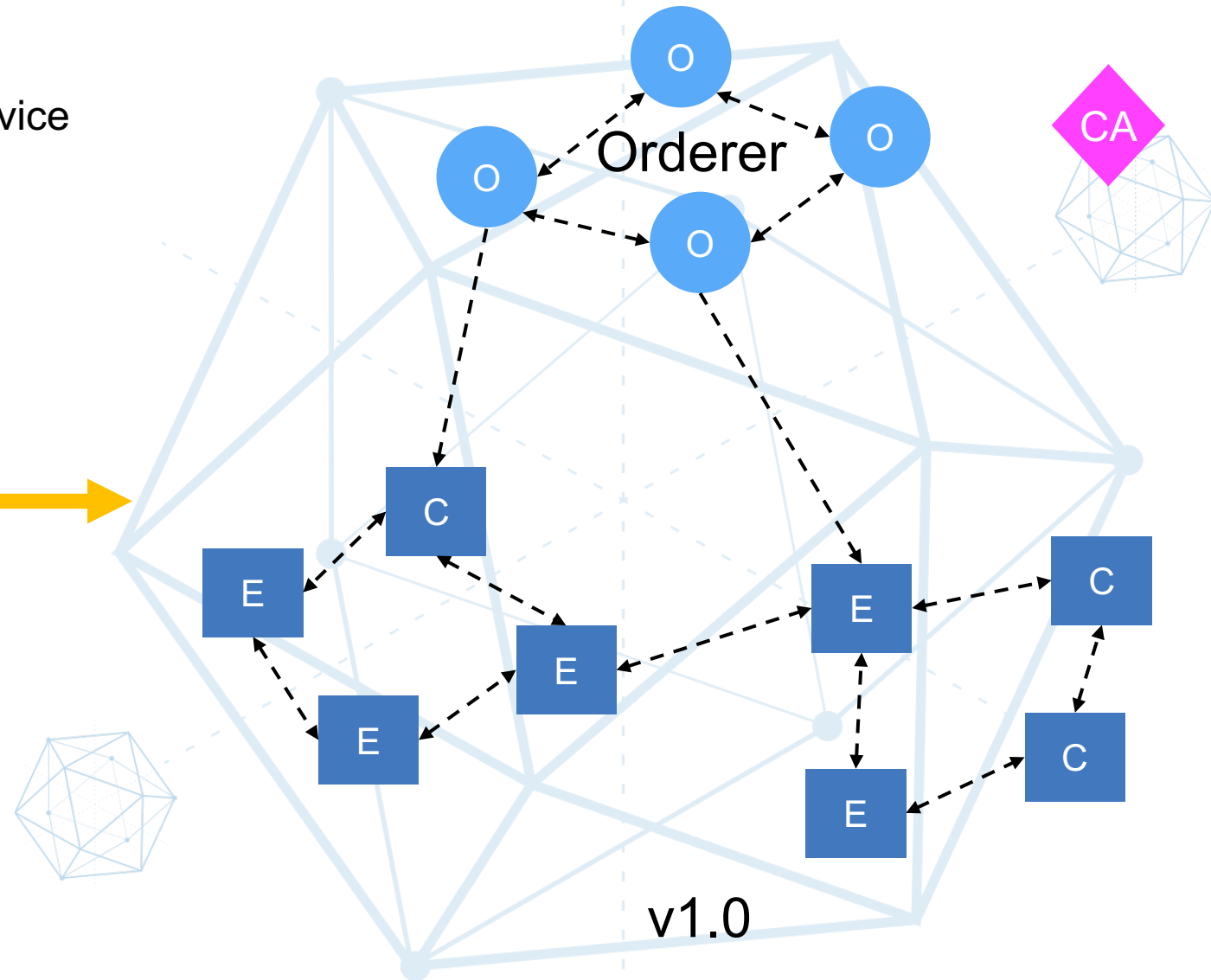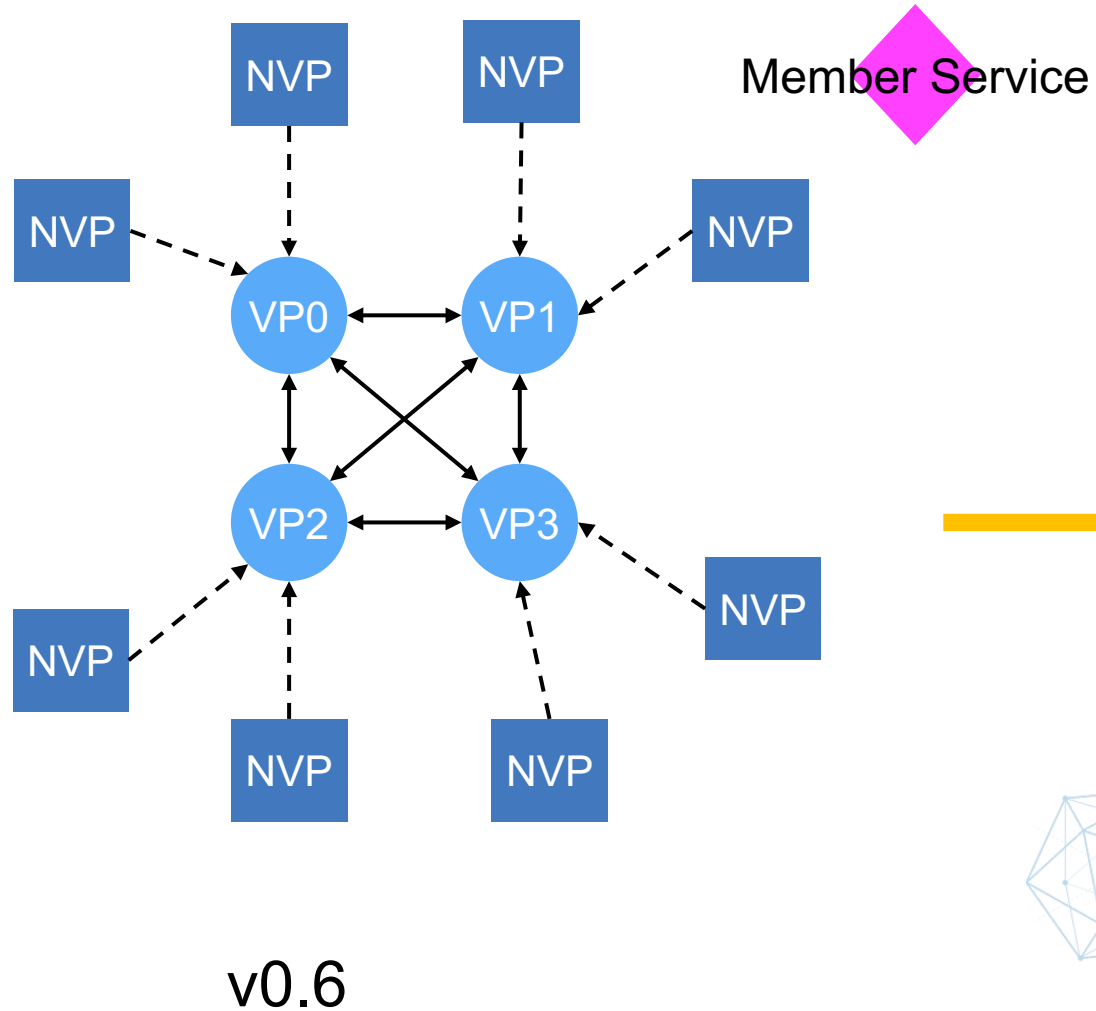
Fabric 1.0 Overview

- Design principles
  - Scalability
  - Performance
  - Security/Isolation
  - Pluggability
  - Operability
  - Compatibility?

- New Features
  - Peer roles decouple
  - Multi-channel ledger
  - Pluggable components
    - Dababase
    - CA
    - Consenus
    - BCCSP

- System chaincode
  - cscc
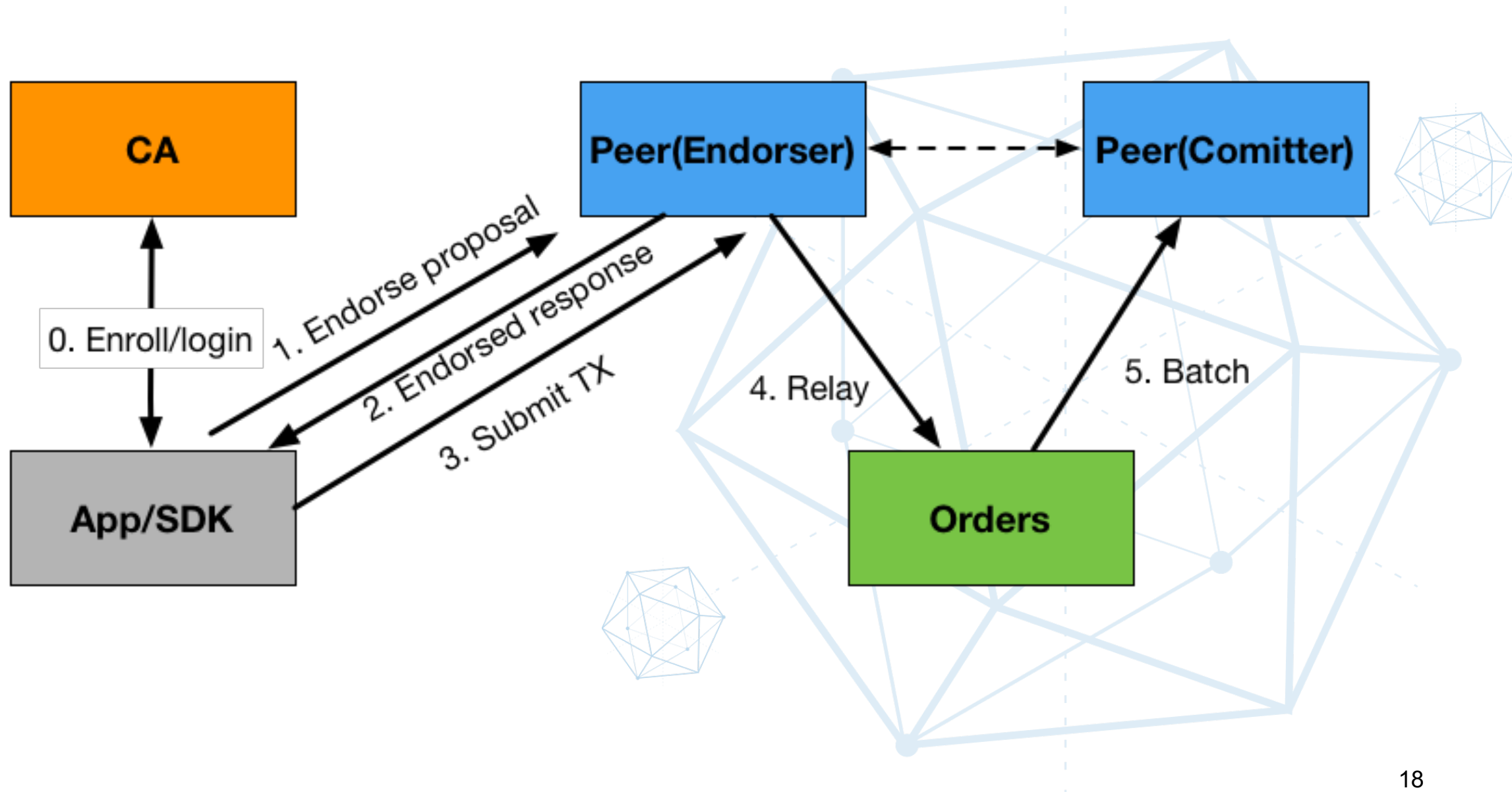 - escc
  - lccc
  - qscc
  - vscc

Fabric 1.0 Planned Roadmap

Endorsement model
Dynamic Multichain
SDK specification
Native SDKs
Pluggable Identity (MSP)
Pluggable Consensus
Pluggable data-store
HSM support PKCS11
Access control
Upgradable chaincode

Alpha

Performance
Security code hardening
Left-over items

Beta 1

Continue tuning
Exit incubator

Beta 2

Release 1.0

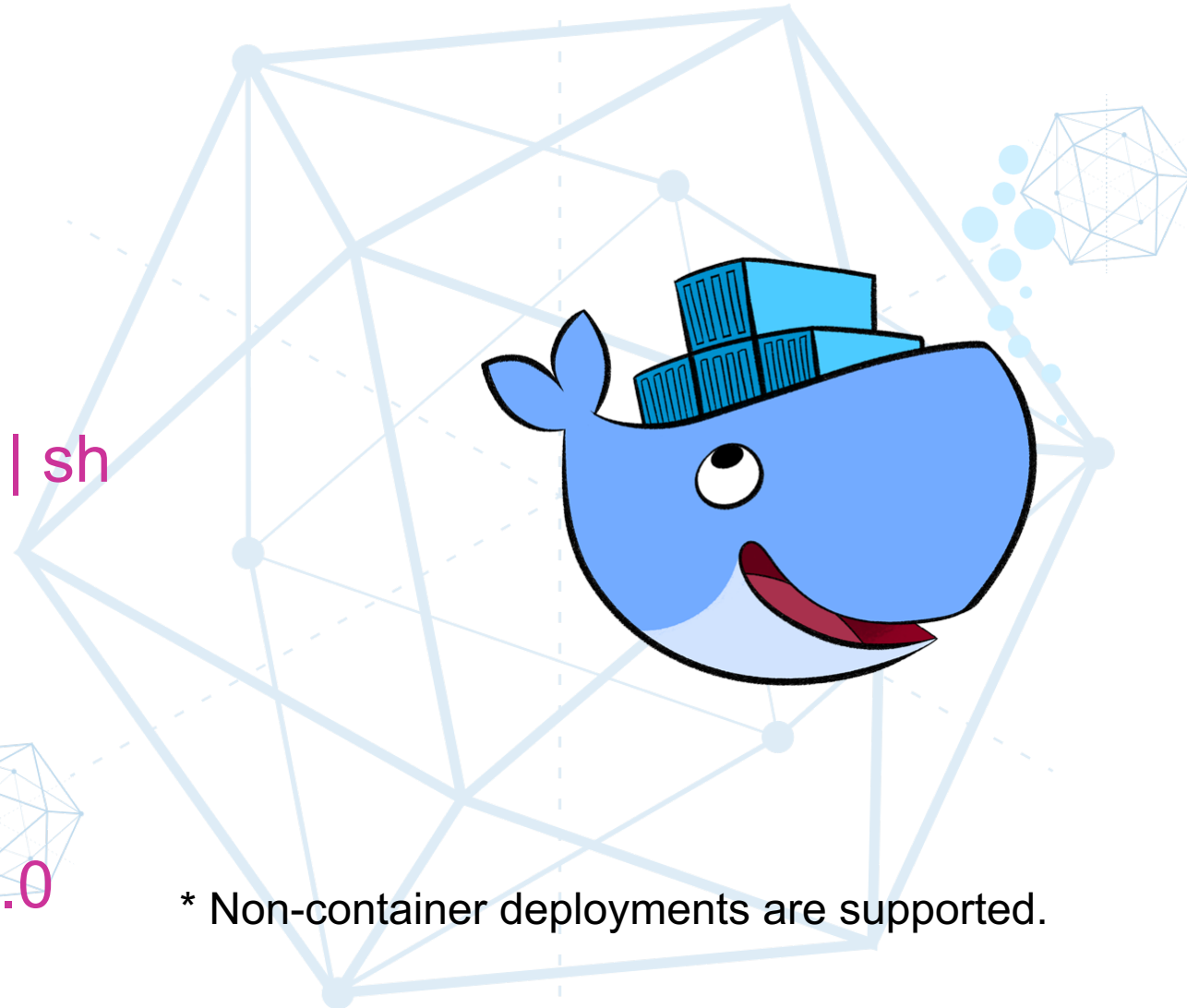| 2016 | Dec | 2017 | Jan | Feb | March |

Fabric 1.0 Deployment Scenarios

Fabric 1.0 Basic Workflow
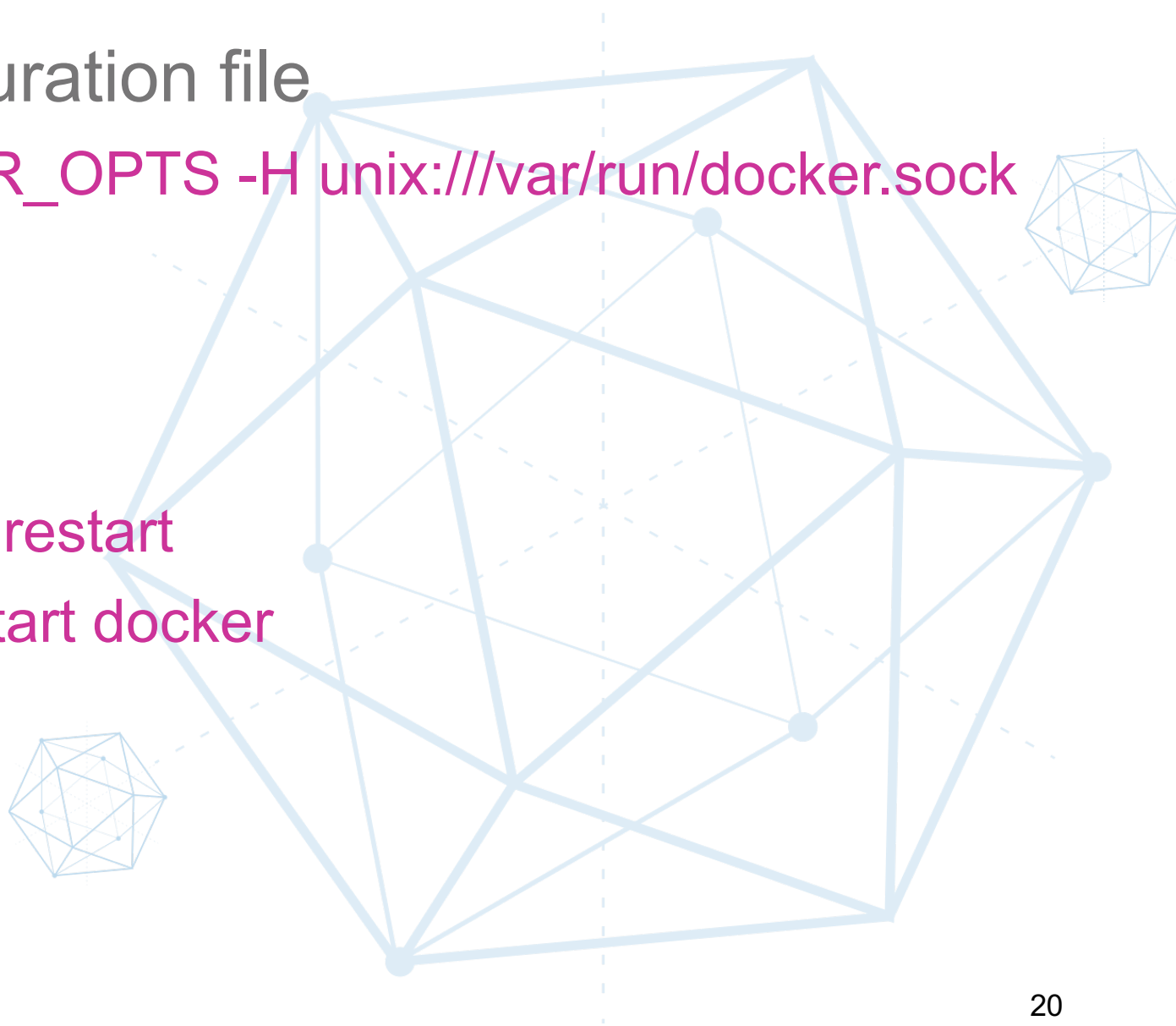
Environment Setup – Docker Installation

- Docker 1.12+
- Linux
  - 64 bit
  - kernel 3.10+
  - curl -sSL https://get.docker.com/ | sh
- Mac
  - [Docker for Mac](#)
- Docker-Compose 1.7.0+
  - pip install docker-compose>=1.7.0

* Non-container deployments are supported.

Environment Setup - Configuration

- Update the Docker configuration file
  - DOCKER_OPTS="$DOCKER_OPTS -H unix:///var/run/docker.sock -H tcp://0.0.0.0:2375"

- Restart Docker Daemon
  - Upstart: sudo service docker restart
  - Systemd: sudo systemctl restart docker

Fabric 1.0 Bootup in 3 steps

- Get Docker images
  - https://github.com/yeasy/docker-compose-files/tree/master/hyperledger/1.0
  - http://ibm.com/ibm/cn/blockchain/
  - https://hub.docker.com/r/hyperledger

- Get Compose file
  - git clone https://github.com/yeasy/docker-compose-files

- Start fabric
  - cd hyperledger/1.0 & docker-compose up

Play Transactions

- Check container status
  - watch docker ps
- Enter peer container
  - docker exec -it fabric-peer0 bash


```
$ docker ps -a
CONTAINER ID        IMAGE                          COMMAND
2367ccb6463d        hyperledger/fabric-peer        "peer node start"
02eaf86496ca        hyperledger/fabric-orderer     "orderer"
71c2246e1165        hyperledger/fabric-ca          "fabric-ca server ..."
```
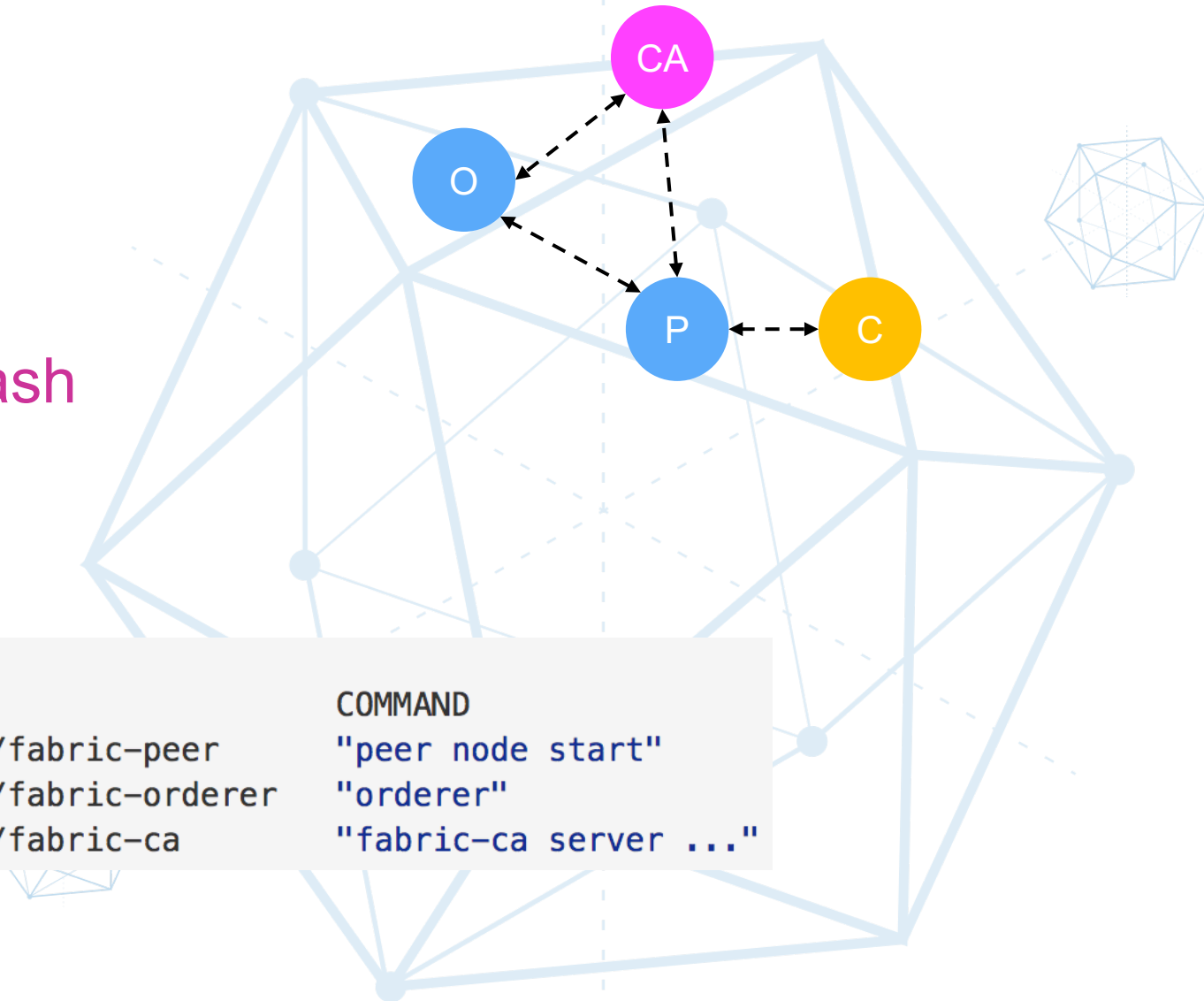
Play Transactions cont.

- Install/instantiate chaincode
  - CC_PATH= github.com/hyperledger/fabric/examples/chaincode/go/chaincode_example02
  - peer chaincode install -v 1.0 -n test_cc -p $CC_PATH -c '{"Args":["init","a","100","b","200"]}'
  - peer chaincode instantiate -v 1.0 -n test_cc -p $CC_PATH -c '{"Args":["init","a","100","b","200"]}'
- Invoke chaincode
  - peer chaincode invoke -n test_cc -c '{"Args":["query","a"]}'
  - peer chaincode invoke -n test_cc -c '{"Args":["invoke","a","b","10"]}'

```
$ docker ps
CONTAINER ID        IMAGE                       COMMAND
edc9740c265c        dev-peer0-test_cc-1.0       "/opt/gopath/bin/t..."
2367ccb6463d        hyperledger/fabric-peer     "peer node start"
02eaf86496ca        hyperledger/fabric-orderer  "orderer"
71c2246e1165        hyperledger/fabric-ca       "fabric-ca server ..."
```

More on Using Fabric

- Application interactions
  - APIs: gRPC
  - SDK: Node, Python, Java
- Commands
  - Peer start/stop
  - Channel create/join
  - User enroll/login
  - Chaincode install/instantiate/invoke
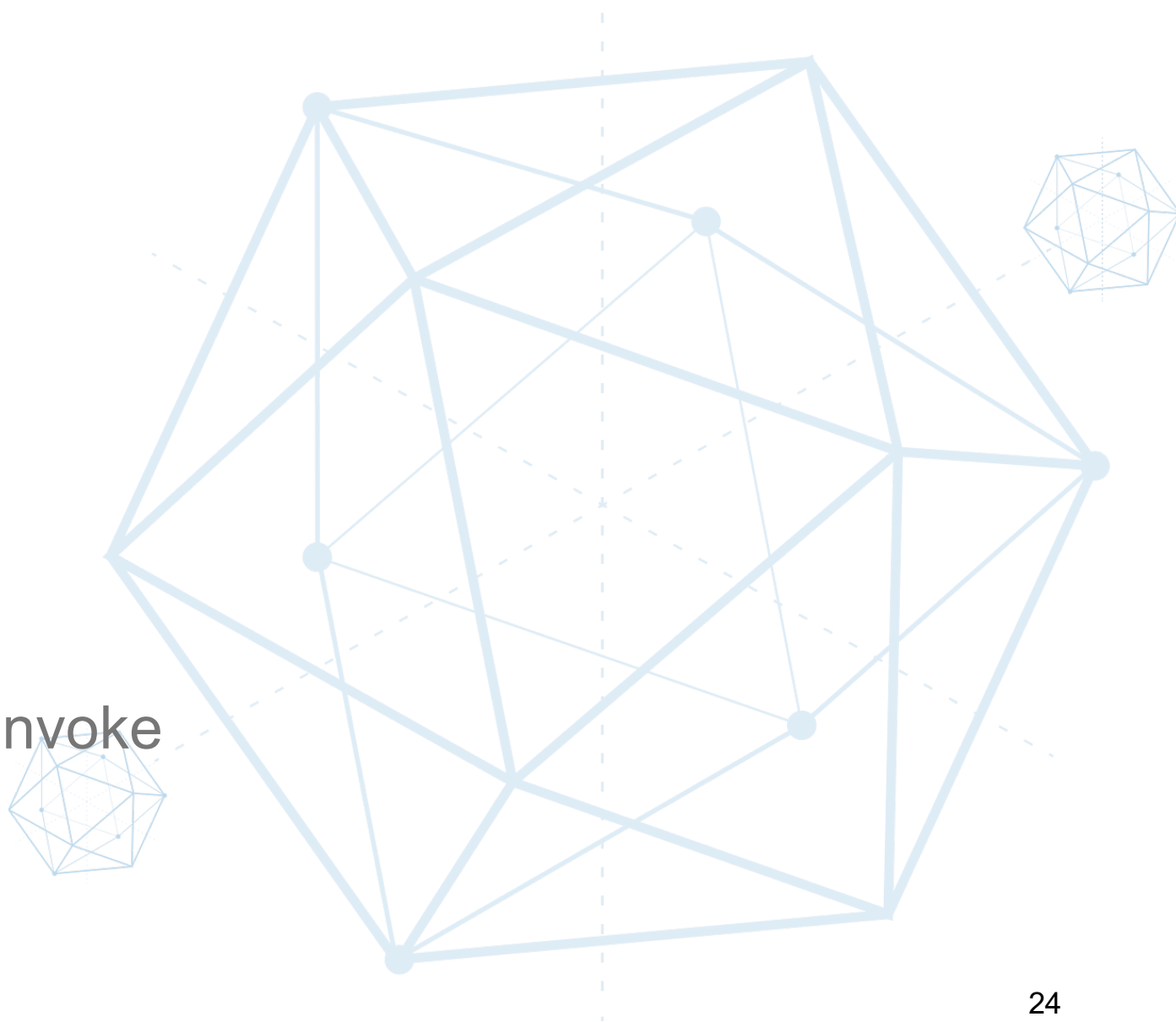
Technical Working Group China

- About TWG-China
  - Since Dec 1, 2016
  - wiki.hyperledger.org/groups/tsc/technical-working-group-china
- Email
  - lists.hyperledger.org/mailman/listinfo/hyperledger-twg-china
  - hyperledger-twg-china@lists.hyperledger.org
- Online Chat
  - twg-china

Technical Working Group China

- 1st Asia Hackathon
  - [Mar 11/12, 2017, Shanghai](#)
- Meetups
  - Beijing, Shenzhen, Shanghai
- Educations/Trainings
  - Welcome for volunteers
- Projects
- i18n Team
- Summer Open-Source Internship

Reference

- Hyperledger Wiki&Documentation
  - wiki.hyperledger.org
  - hyperledger-fabric.readthedocs.io
- IBM 区块链
  - ibm.com/ibm/cn/blockchain/
- Hyperledger Fabric Compose files
  - github.com/yeasy/docker-compose-files#hyperledger
- 《区块链技术指南》
  - github.com/yeasy/blockchain_guide
- 《Docker 从入门到实践》
  - github.com/yeasy/docker_practice
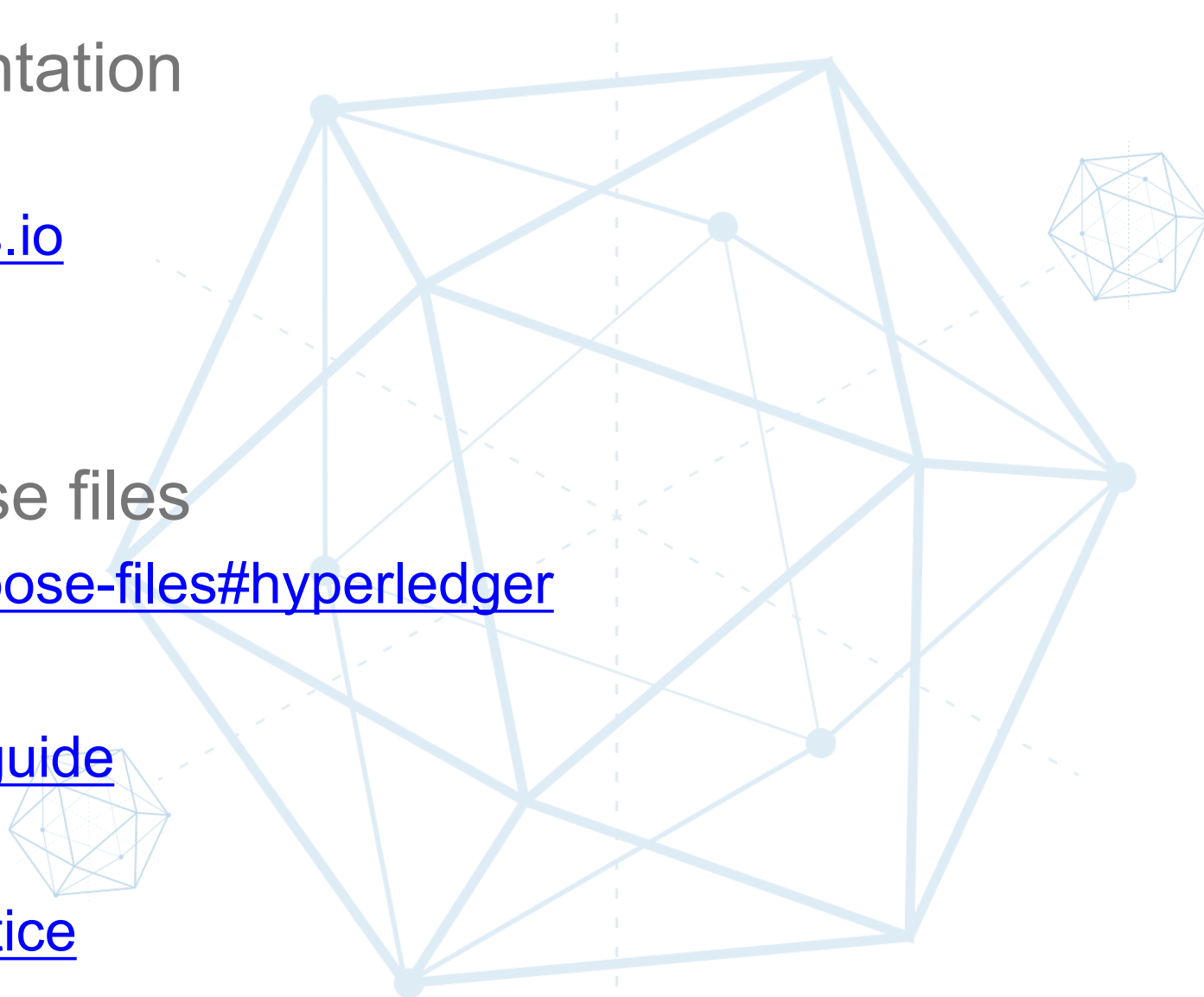
Questions?

Thank You!
@baohua

Slides available after the event