

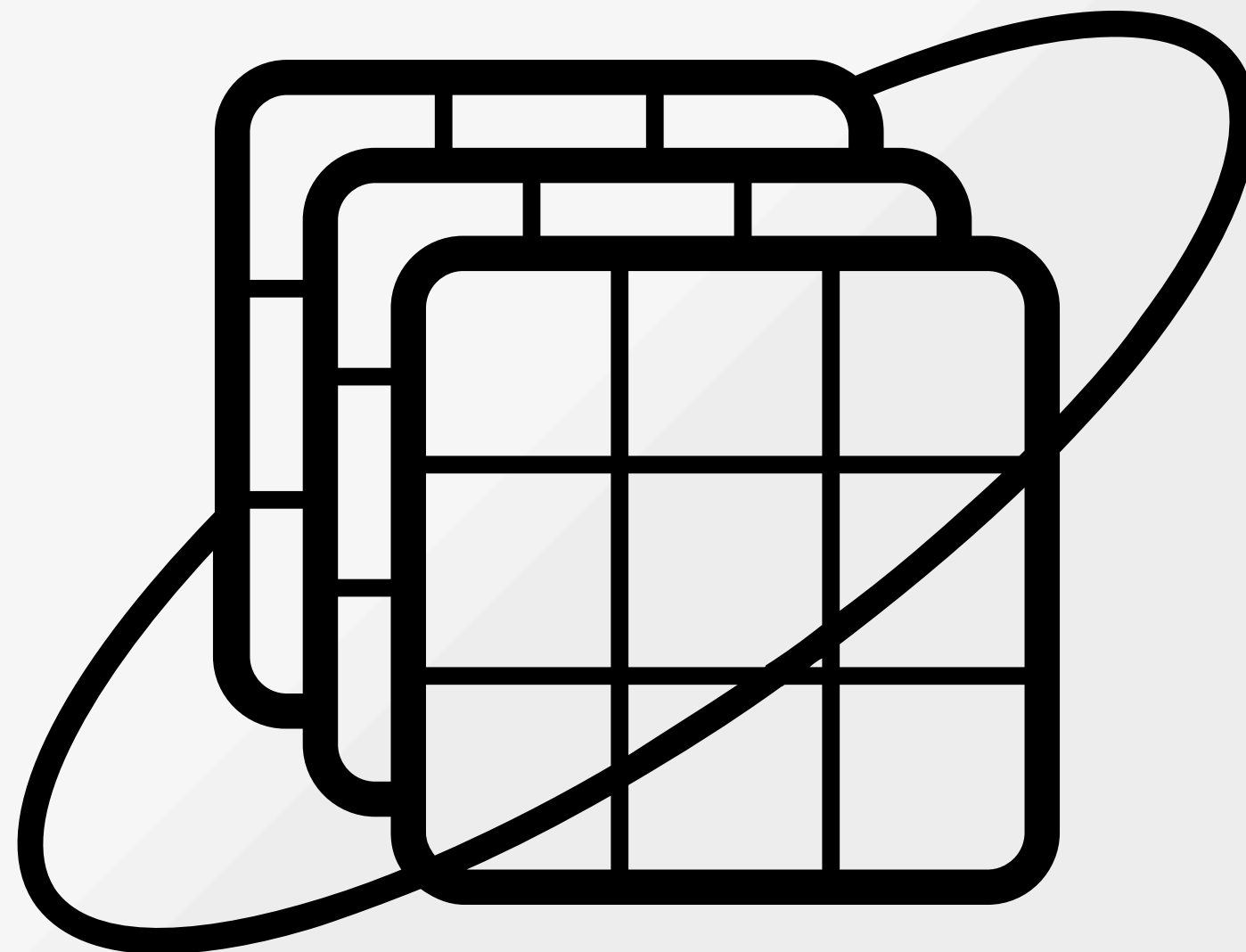


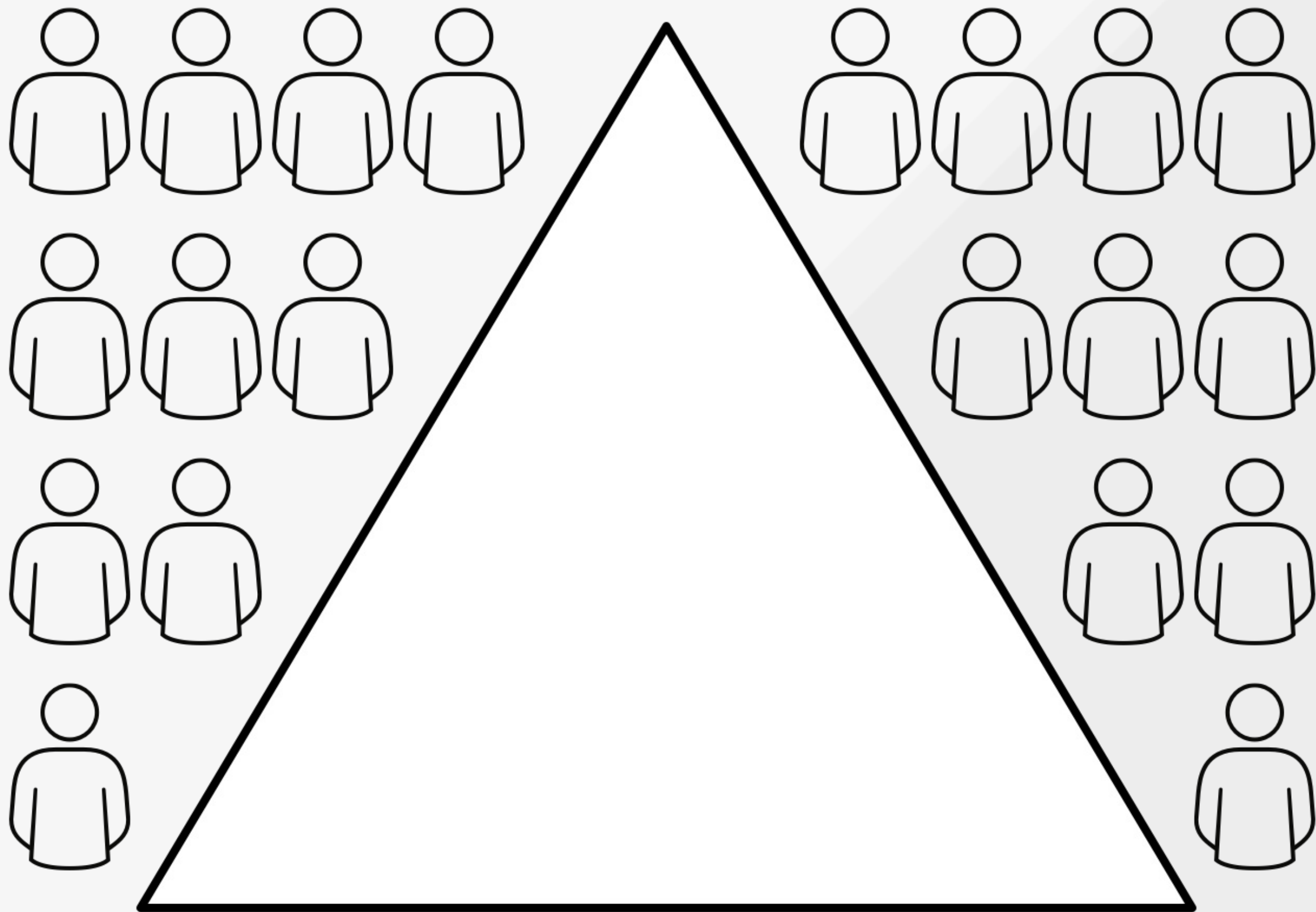
# JAVA DEVELOPMENT IN THE AGE OF THE WHALE

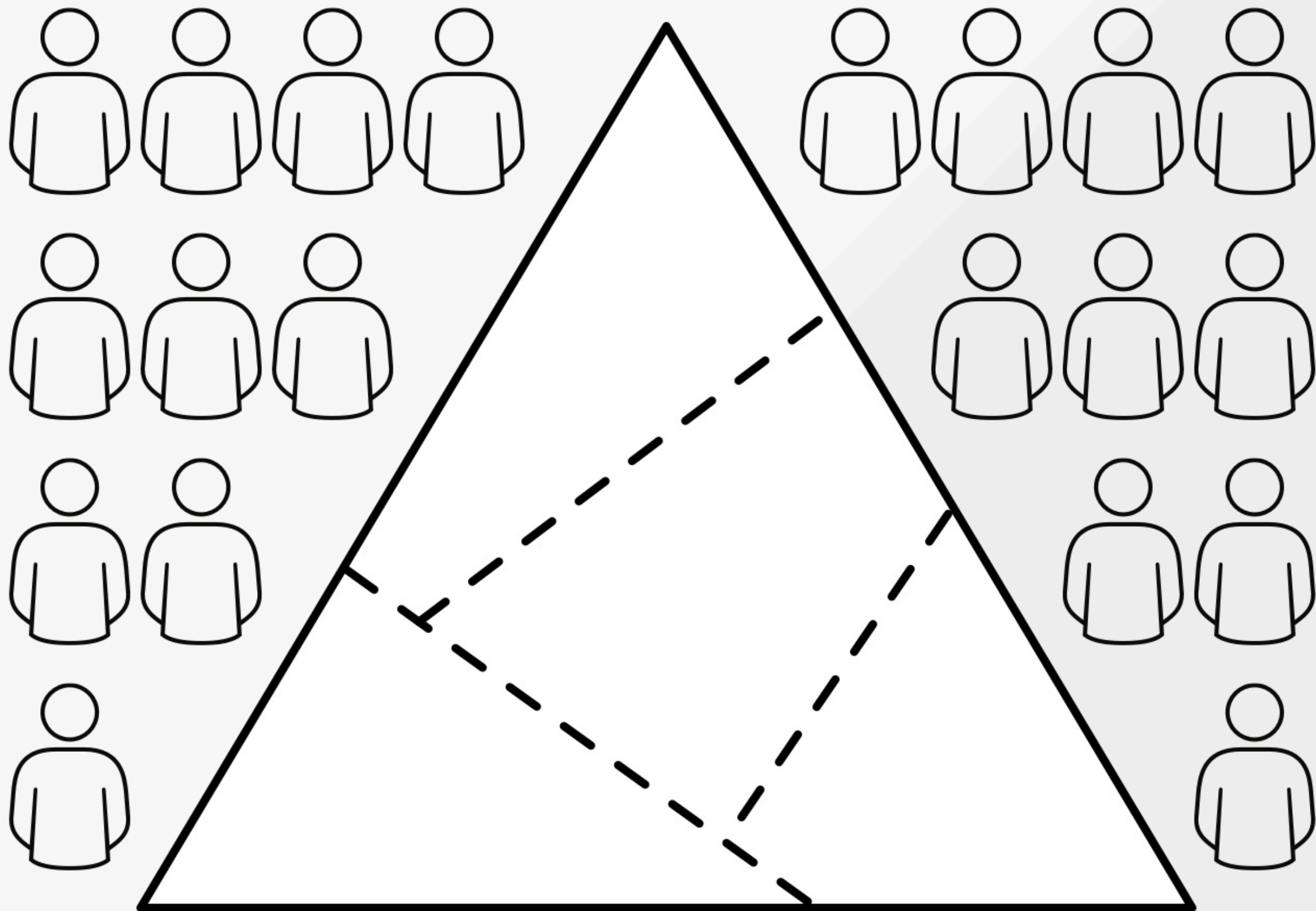
JavaLand 2018, München

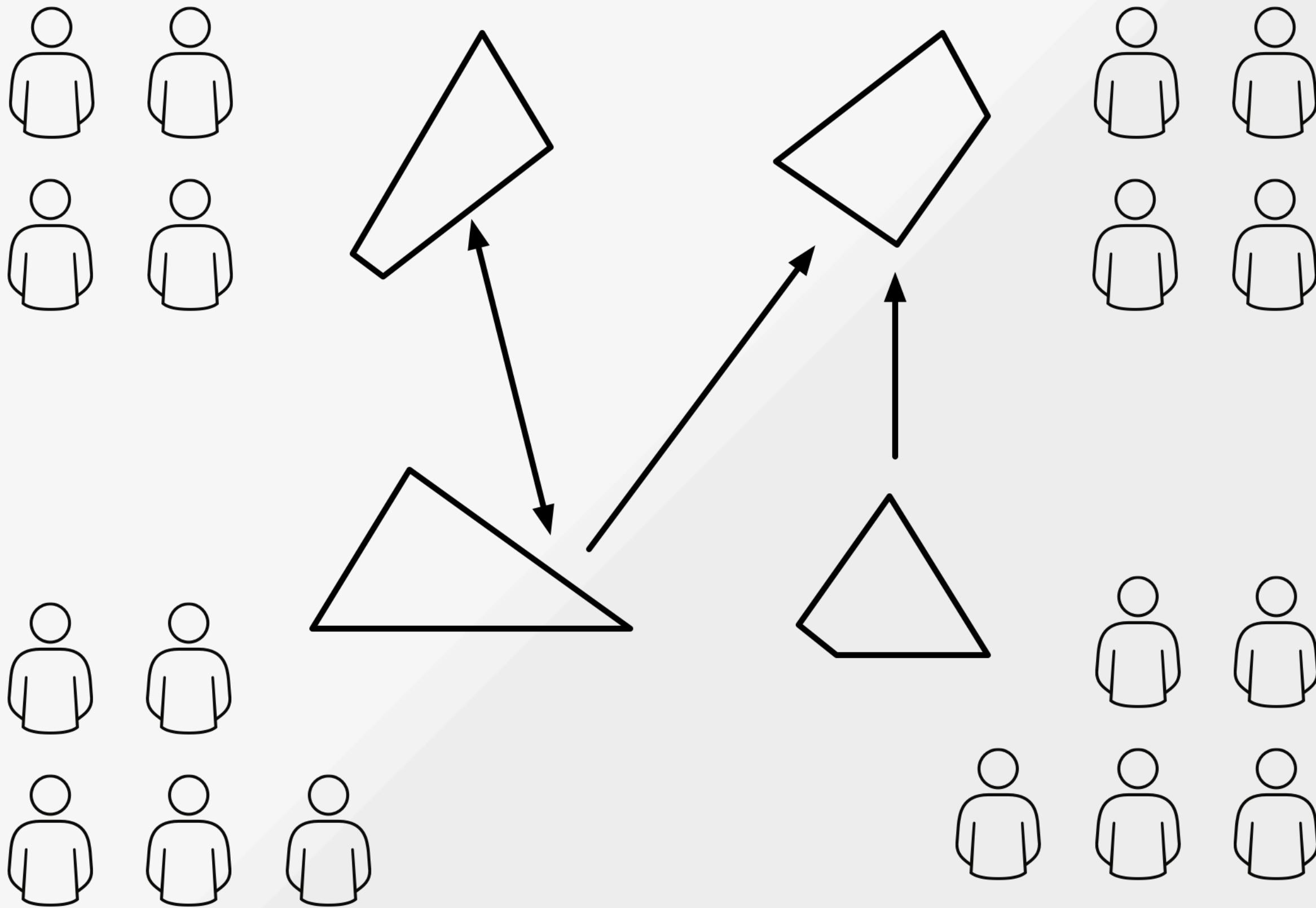
Dr. Roland Huß, Red Hat, @ro14nd

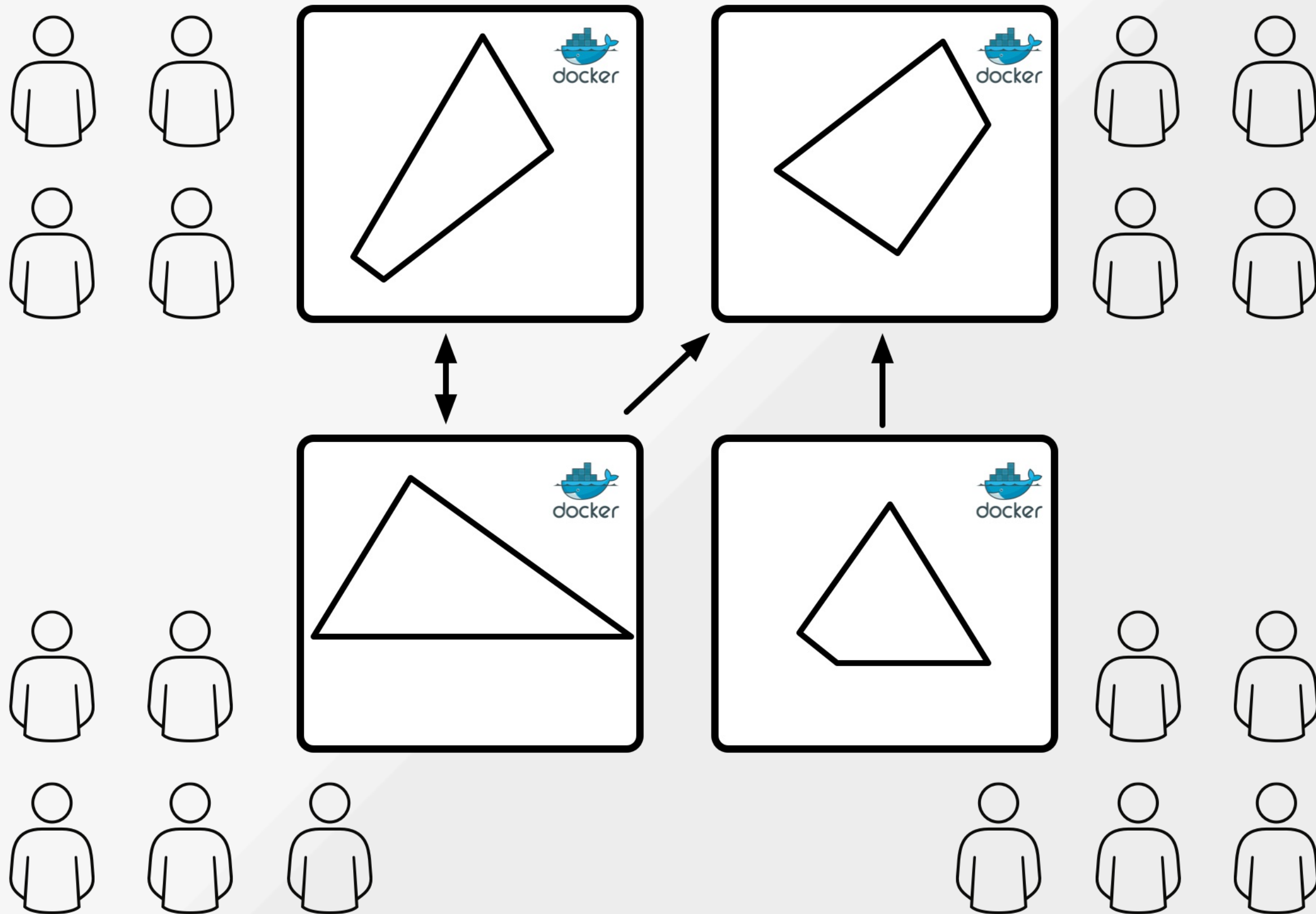


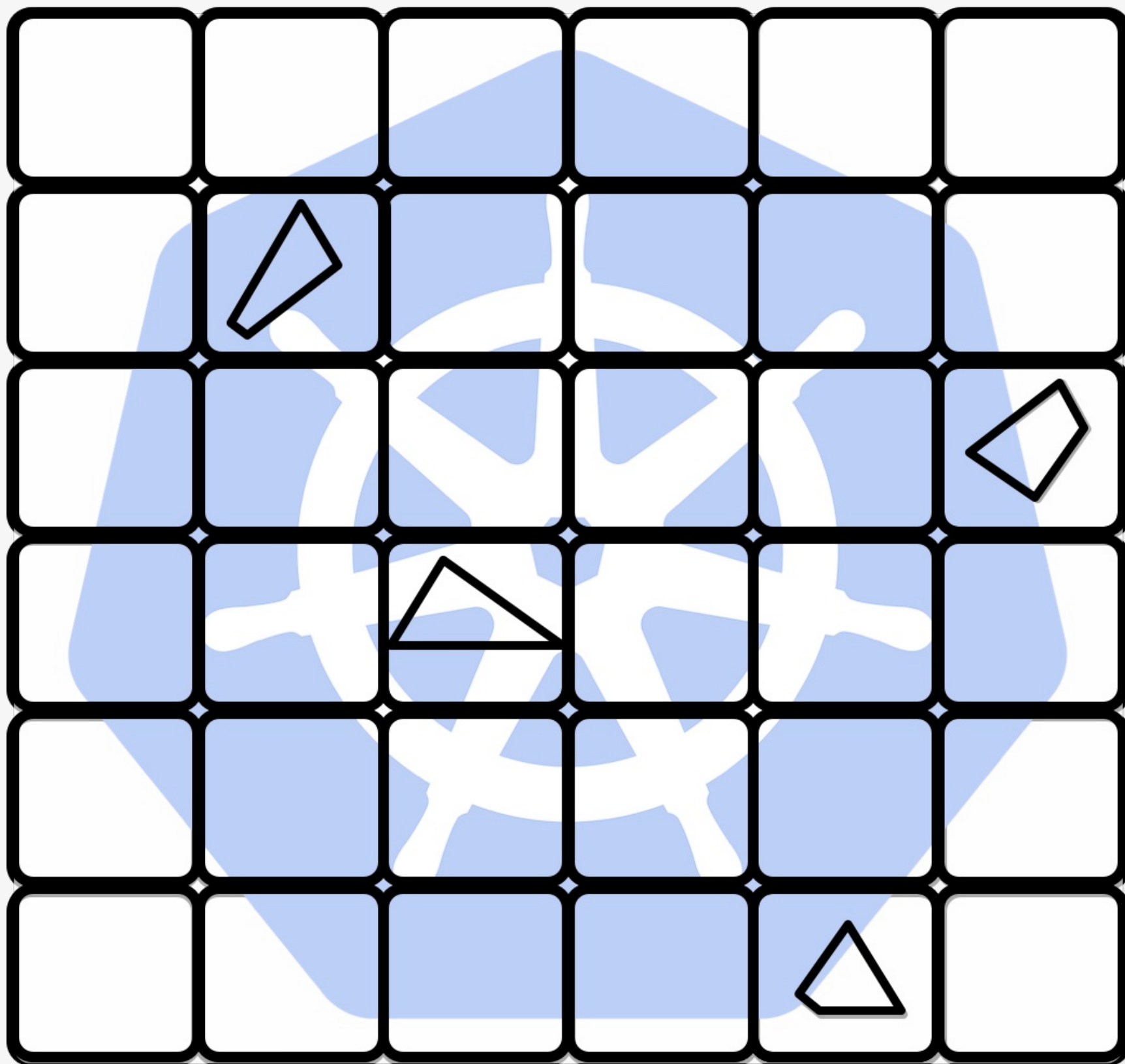














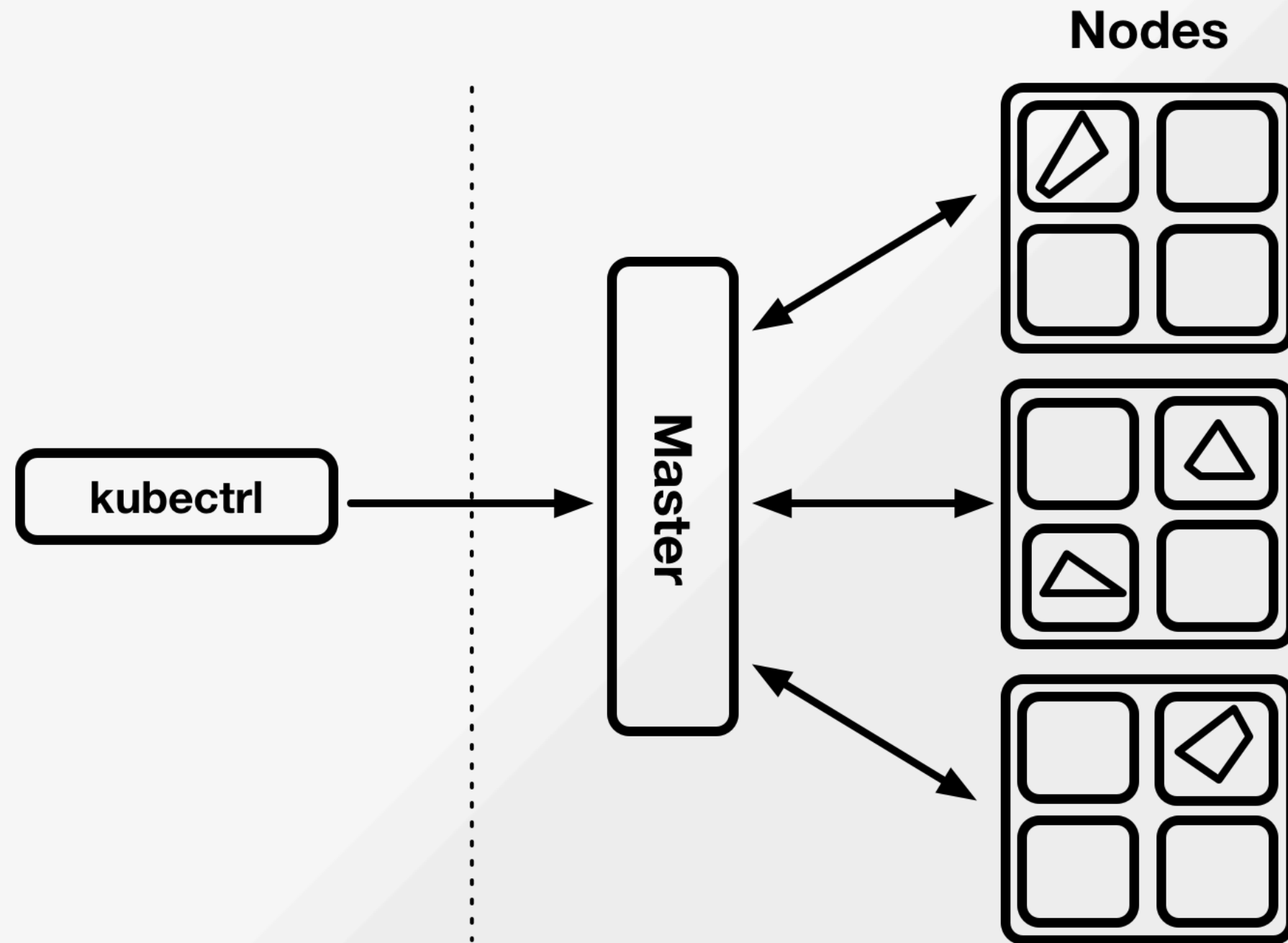




# KUBERNETES

- Open Source orchestration system for containers
  - Scheduling
  - Horizontal scaling
  - Self-healing
  - Service discovery
  - Automated rollout and rollbacks

# ARCHITECTURE



# KUBERNETES IN THE CLOUD

- Google Container Engine (GKE)
- Azure Container Service (AKS)
- OpenShift Online
- AWS EC2, Digital Ocean, ...
  - Stackpoint.io
  - CoreOS Tectonic
  - Kubernetes Operations (kops)

# RASPI CLUSTER

- 4 Raspberry Pi 3
- Wifi Router
- 6 Port USB charger
- 32 GB SD-Cards
- Costs: ~ 300 €
- Install via Ansible
- **kubeadm**



Full Story: <https://ro14nd.de/kubernetes-on-raspberry-pi3>

# MINIKUBE

- Single-node Kubernetes cluster inside a VM
- No Docker daemon required
- Ideal for local development
- Supports DNS, NodePorts, Volumes, ...
- <https://github.com/kubernetes/minikube>



# fabric8

# FABRIC8

- **Microservices Platform** for Kubernetes & OpenShift
- Upstream projects for openshift.io
- Themes:
  - Continuous Delivery
  - Management UI
  - Funktion
  - Quickstarts
  - Tooling



# FABRIC8-MAVEN-PLUGIN

- Creates **Docker images** and **resource descriptors**
- Zero-configuration with **opinionated defaults**
- Full-configuration with **enrichable fragments**
- <https://maven.fabric8.io>

# GOALS

<code>fabric8:build</code>	Build application images (Docker, S2I binary, S2I source)
<code>fabric8:resource</code>	Create Kubernetes and OpenShift resource descriptors
<code>fabric8:apply</code>	Apply resource descriptors to a running cluster

# CONFIGURATION

- Zero Config
  - Opinionated Defaults
  - Limited configuration options
- XML Configuration
  - Restricted configuration syntax
- Resource Fragments
  - Most powerful
  - Verbose

# ZERO CONFIG

- **Generators** for Image generation

```
<build>
  <plugins>
    <plugin>
      <groupId>io.fabric8</groupId>
      <artifactId>fabric8-maven-plugin</artifactId>
      <version>3.5.31</version>
    </plugin>
    <plugin>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-maven-plugin</artifactId>
    </plugin>
  </plugins>
</build>
```

# RESOURCE FRAGMENTS

- Resource fragment

src/main/fabric8/pong-rc.yml

```
spec:
  replicas: 1
  template:
    spec:
      containers:
      - name: pong
        ports:
        - containerPort: 8080
```

- **Enrichers** add missing pieces

# GENERATORS

- Extract Docker image configuration from pom.xml
- Supported technologies:
  - Spring Boot
  - Wildfly Swarm
  - Fat Jars
  - Eclipse Vert.x
  - Webapps
  - Karaf

# ENRICHERS

- Add default Kubernetes resources
- Update existing resources
- E.g.
  - Default Deployment and Service
  - Git information as labels
  - Add healthchecks
  - Add OpenShift routes
  - ....



# PROFILES

- Named collection of enrichers and generators
- -Dfabric8.profile to select

raw	No enrichment
explicit	Only default objects
minimal	Small enrichments
aggregate	Combine resources from dependencies

# K8S & OPENSIFT

- Kubernetes:
  - Docker builds
  - Deployments
  - Ingress
- OpenShift
  - S2I & Docker Binary Builds
  - DeploymentConfig
  - ImageStream
  - Template

# MISC

<code>fabric8:install</code>	Install local development environment
<code>fabric8:cluster-start</code>	Start minikube or minishift
<code>fabric8:watch</code>	Watch for changes and redeployments
<code>fabric8:debug</code>	Debug into pods

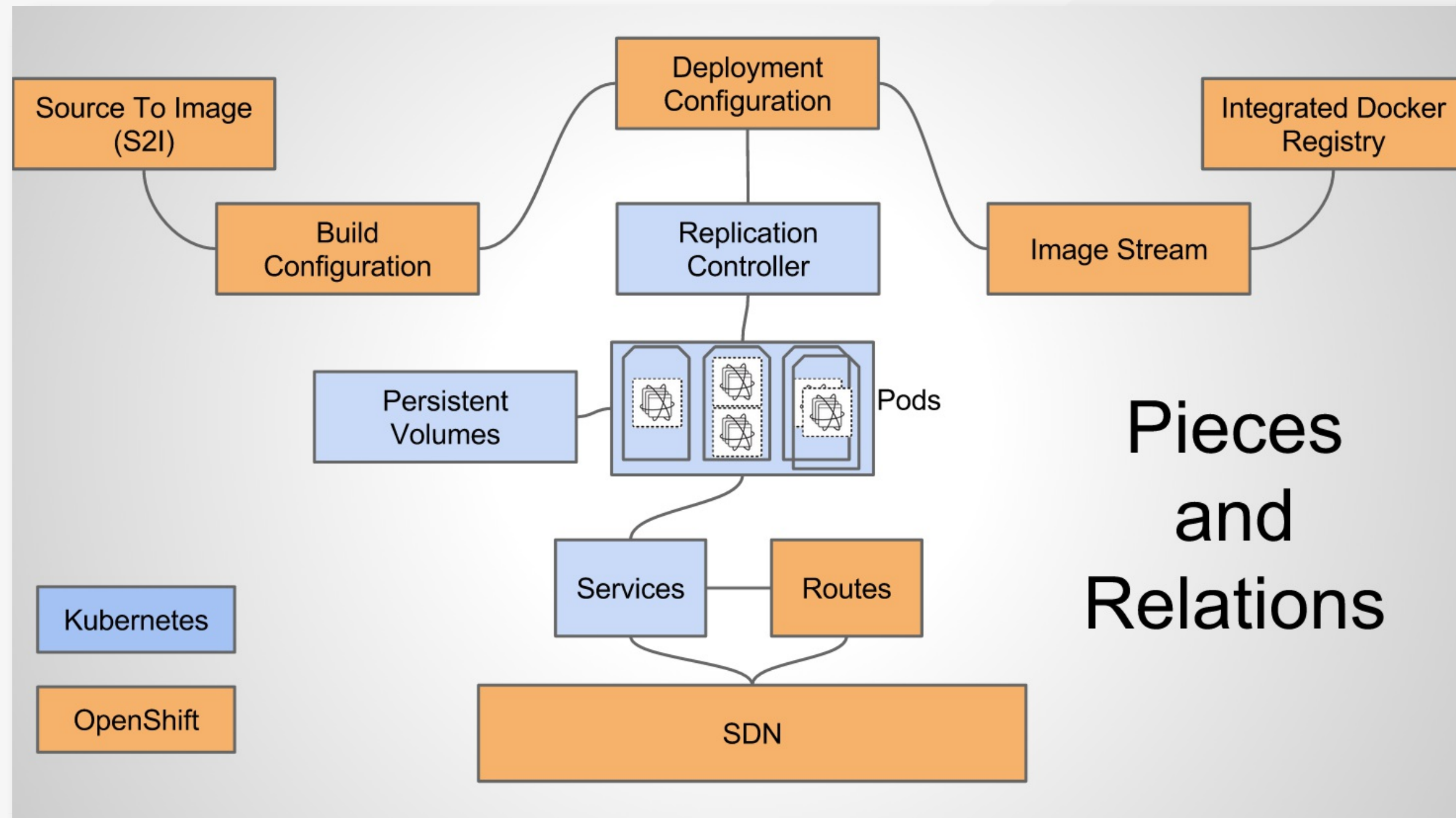


# OPENSHIFT

# OPENSHIFT

- Adds the **BUILD** to Kubernetes
- Infrastructure Services
  - Registry
  - Router
  - OAuth2 SSO
- Multi tenancy
- Management UI
- ...

# OPENSHIFT EXTRAS



# MINISHIFT

- Single-node OpenShift Origin cluster inside a VM
- Based on oc cluster up
- Supports routes, registry, s2i builds, ...
- <https://github.com/minishift/minishift>



# WRAP UP

- Starting with Kubernetes can be almost as easy as with Docker
- Kubernetes and OpenShift are powerful orchestration platforms with enterprise grade features.
- Use fabric8-maven-plugin for Java apps

# Kubernetes Patterns



Patterns, Principles, and Practices  
for Designing Cloud Native Applications

Bilgin Ibryam & Roland Huss

<https://leanpub.com/k8spatterns>



# QUESTIONS ?

Twitter @ro14nd

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Slides <https://github.com/ro14nd-talks/kubernetes-for-java-developers>

