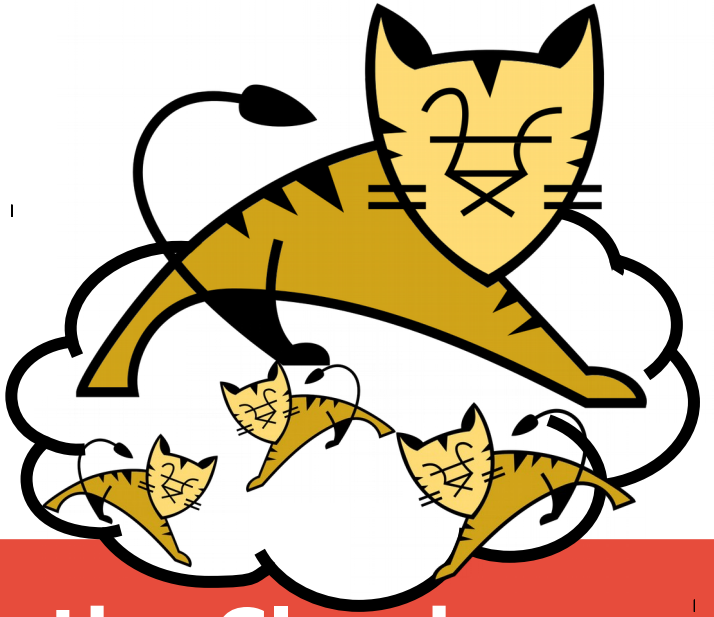

R&D Workshop @ Red Hat

Tomcat Session Replication in the Cloud
Final presentation

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redhat

UNIVERSITÉ DE NEUCHÂTEL

Outline

- Reminder
- What has been done
- Solution
- Demo
- Issues and future improvements

Reminder: Goal

Extend Tomcat's session replication to work in a cloud environment

- Create a simple test application
- Provide documentation
- Use OpenShift as cloud platform

Reminder: Technology

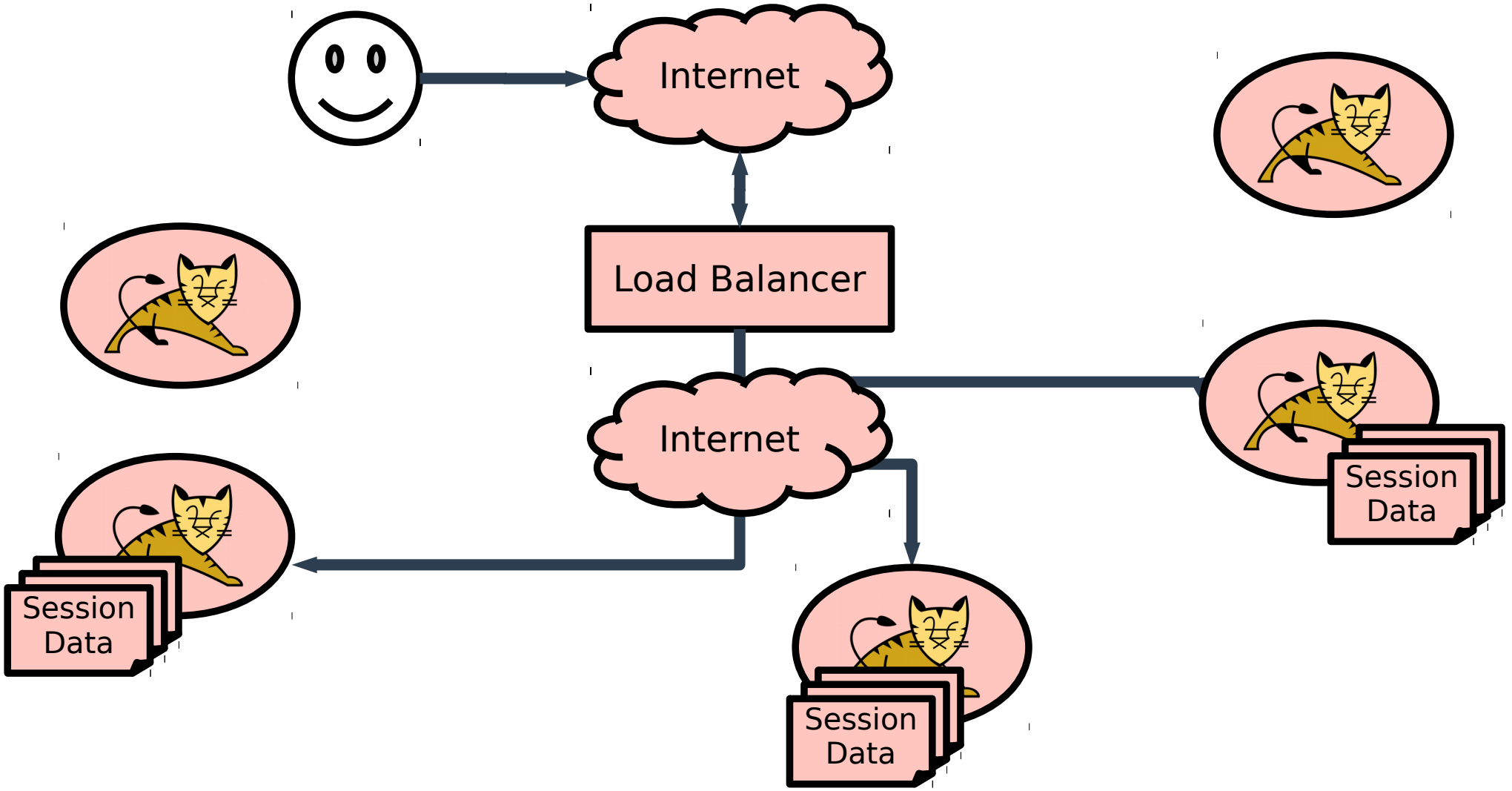
Tomcat 

- Open-source Java Servlet Container
- Has built-in session replication
  - But is not cloud-ready

OpenShift 

- Red Hat Open source cloud/PaaS suite
- Built on Docker containers and with Kubernetes as cluster manager.

Reminder: Cloud Architecture



What has been done

- **First part of the project: discovery of technologies**
- **Exploration of possible solutions**
- **Implementation of test applications:**
  - Based on: tomcat-embedded, spring-boot, external session manager, Infinispan,...
- → **Finally Infinispan shows us a possible solution**

Infinispan and KubePing

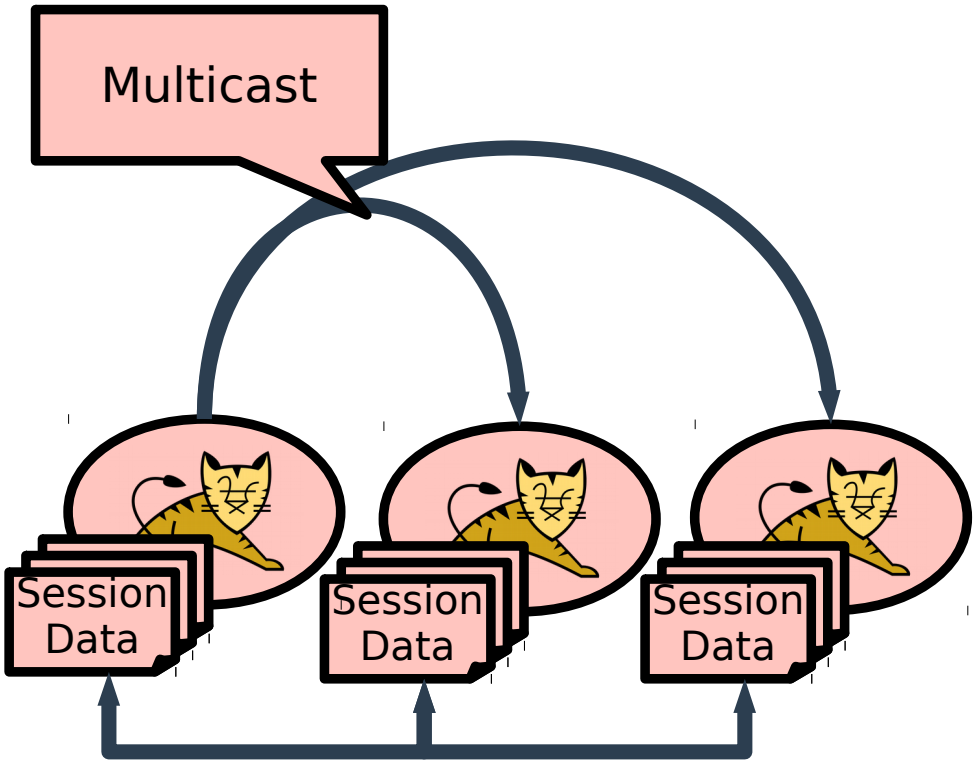
- **Infinispan has a replicated mode**
  (data replicated to all instances)
  - Can be compared to how DeltaManager in Tomcat works
  - By default, peer discovery through multicast
  - **KubePing** project adds peer discovery for Kubernetes
  - KubePing uses the Kubernetes downward API
- **It does what we wanted to achieve**
  - We studied KubePing's architecture
  - Implemented a similar solution for Tomcat

Solution

Tomcat built-in solution

Peer discovery through multicast heartbeat messages

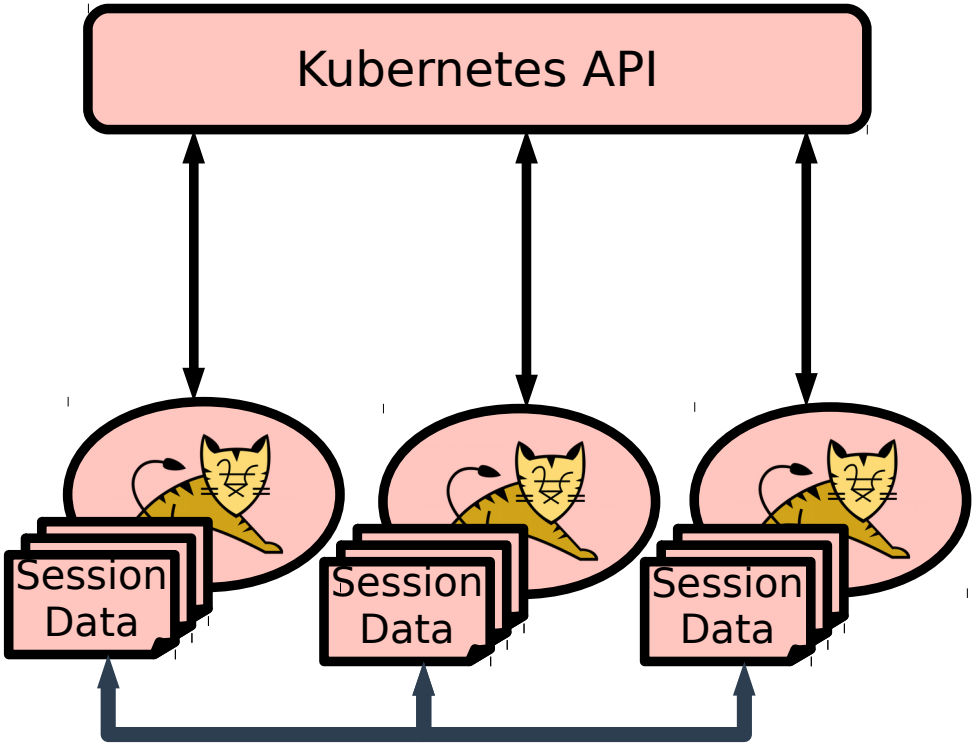
Does not work in a cloud environment



Our solution

Peer discovery through Kubernetes Downward API

Works in OpenShift



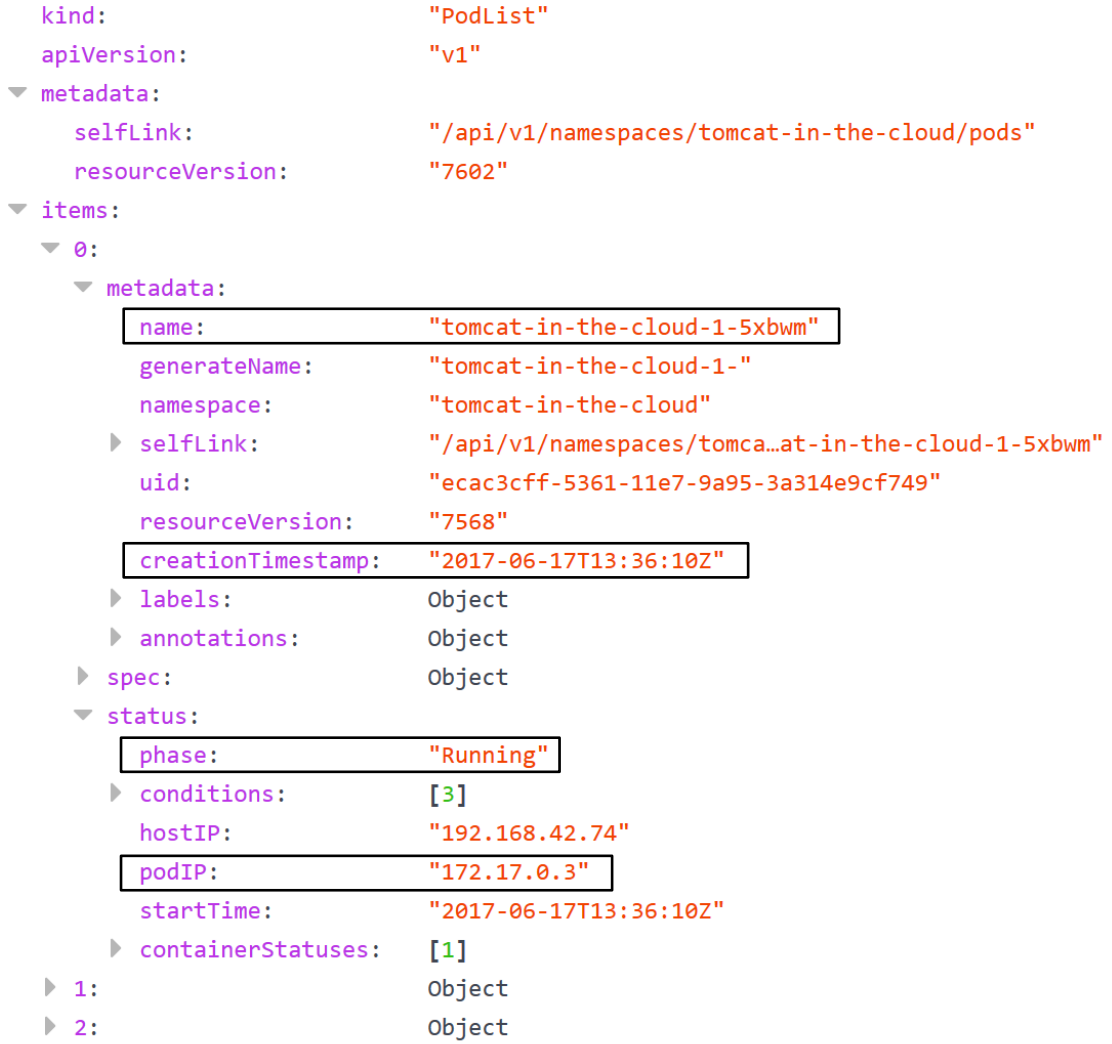
Kubernetes API

Tools for managing a Kubernetes cluster

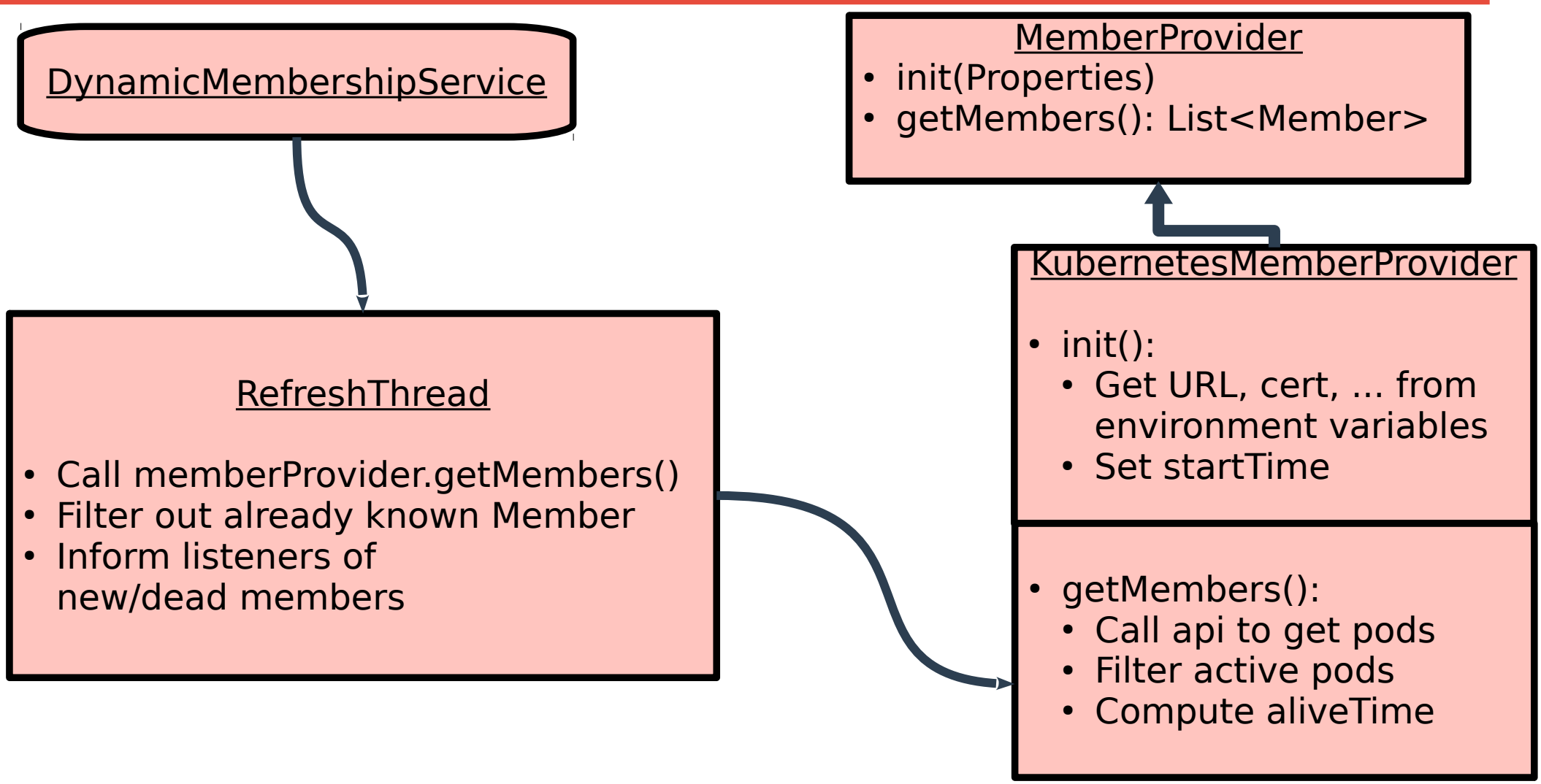
Accessible from the pods within the cluster

GET /api/v1/namespaces/tomcat-in-the-cloud/pods

➔ Return a JSON representation of all the pods in the cluster



Architecture

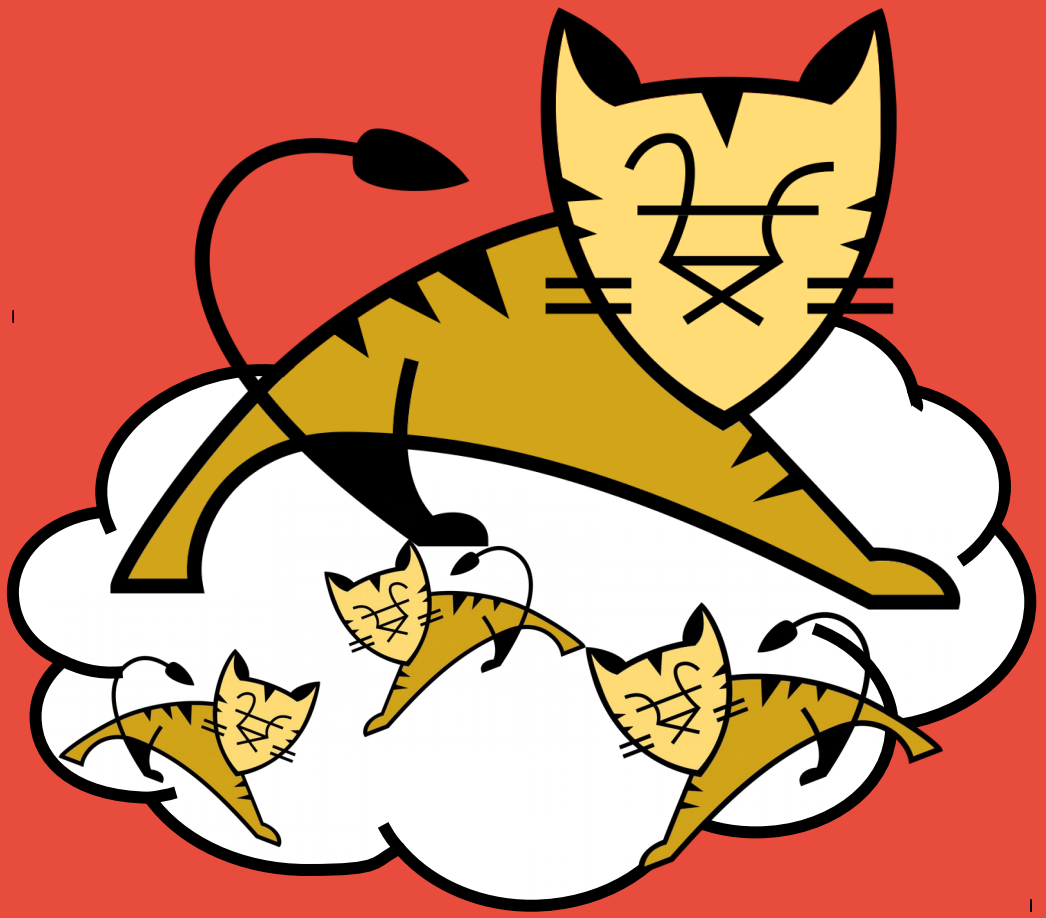


DEMO

Issues and future improvement

- **Session data is shared within all the applications of a project/namespaces**
  - → Performance/security issues
  - → Solution: use *labels*
- **Functional in Openshift, but not 100% sure within a pure Kubernetes cluster**
  - → Needs testing
- **Needs better error handling**
- **Better tests**
  - → Automated scripts
  - → Fault injection

Thank you for your attention!



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