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Plan for a renewed PaaS Orchestration solution in the DataCloud Project at INFN

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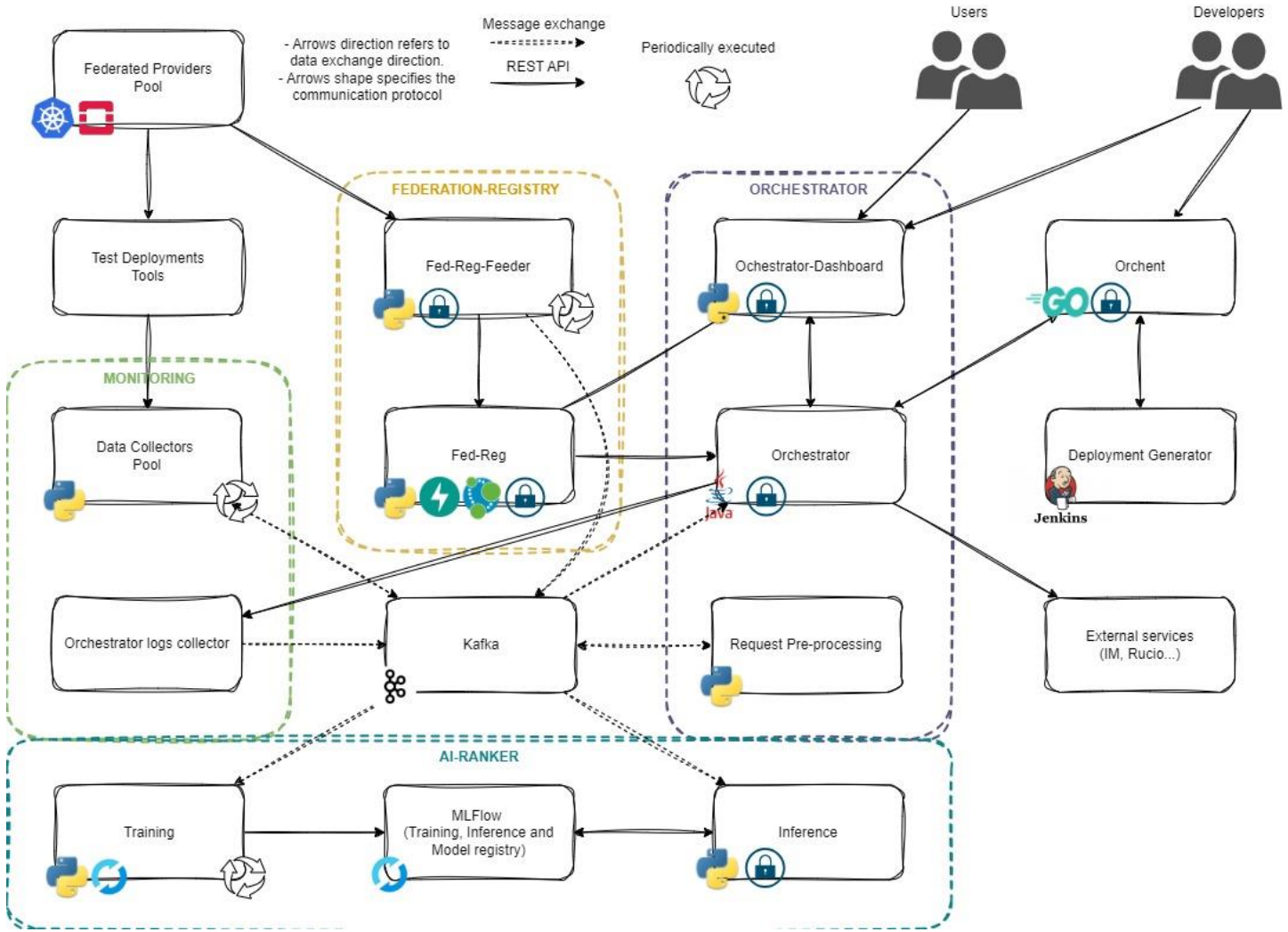
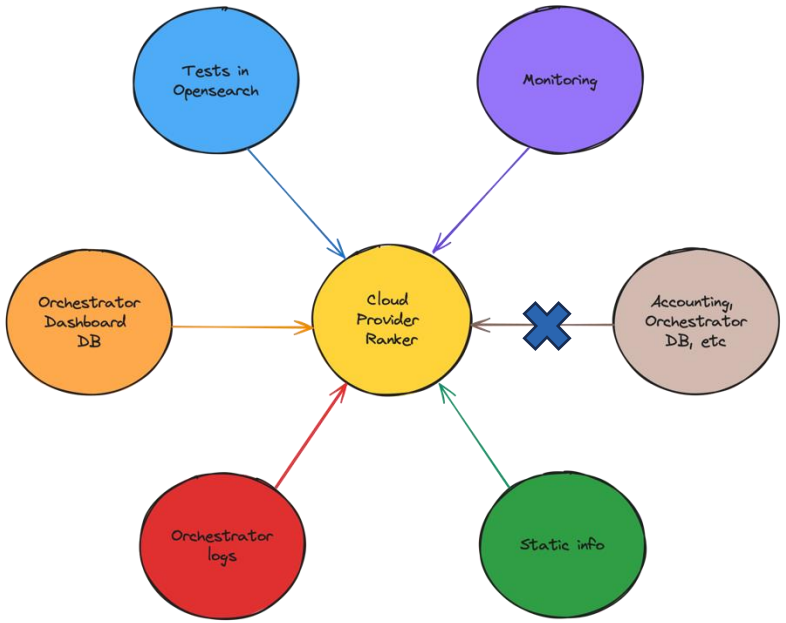
Starting Point

- **Federation-Registry**
  - Federated sites configurations
  - SLA details
- **Orchestrator**
  - Legacy component
  - Request pre-processing
- **Dashboard**
  - Legacy Graphical User Interface
- **Monitoring**
  - Rally results collector
  - Orchestrator Logs collector
  - Kafka server
- **AI-Ranker**
  - ML based ranking service



The AI-Ranker service

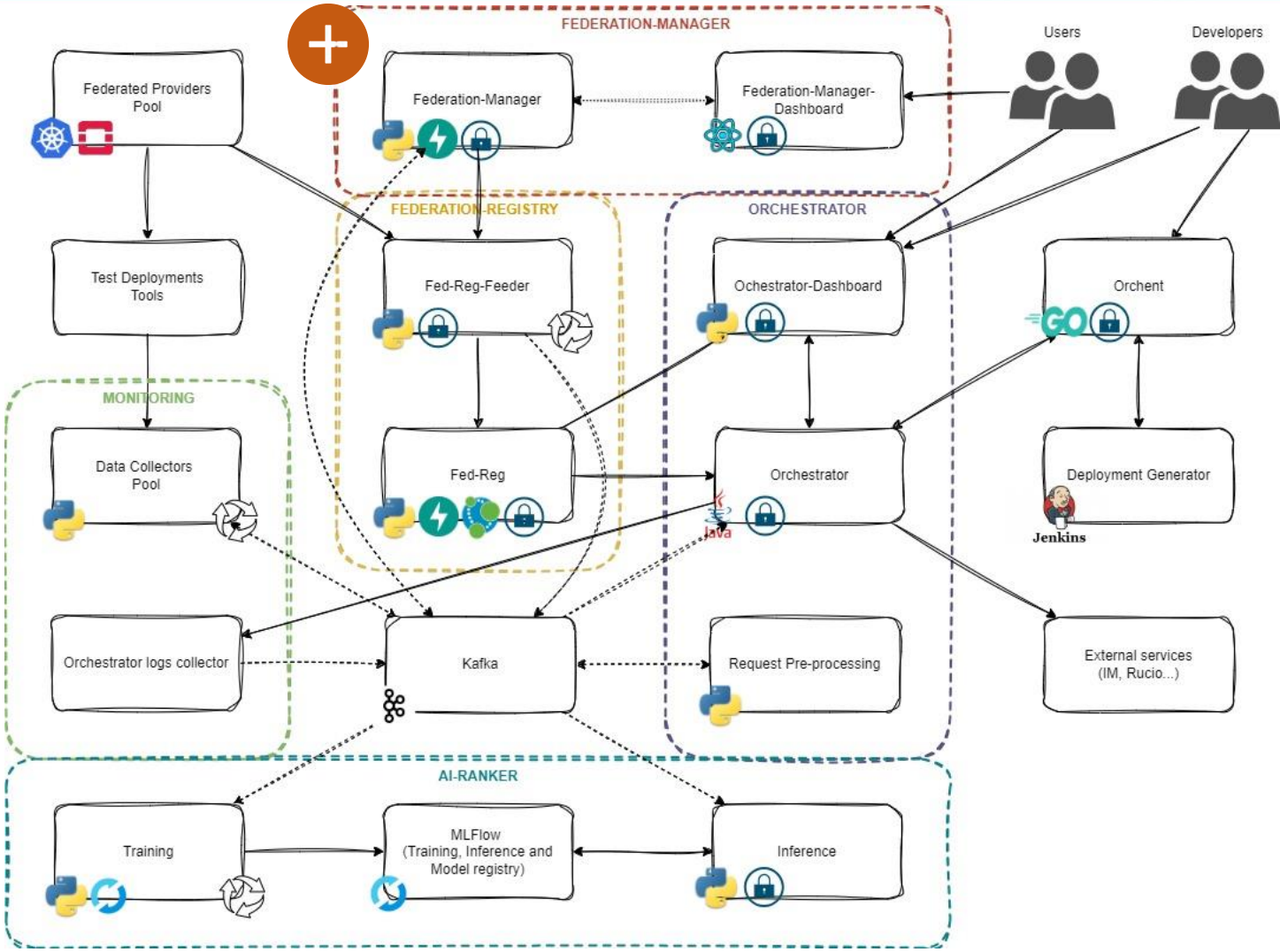
- Preliminary work has been carried out to evaluate the integration of **AI** into the Cloud Provider ranking system
  - Problem understanding
  - Identification of data sources
  - Identification of features
  - Data collection and dataset creation
  - Data exploration
  - Data cleaning
  - Data transformation and feature engineering
  - Model design, training, and performance evaluation
- A PoC has been developed using six months of data



- The creation of the AI-Ranker service (preprocessing + training + inference) is well underway
  - It will contact the Kafka server to retrieve data

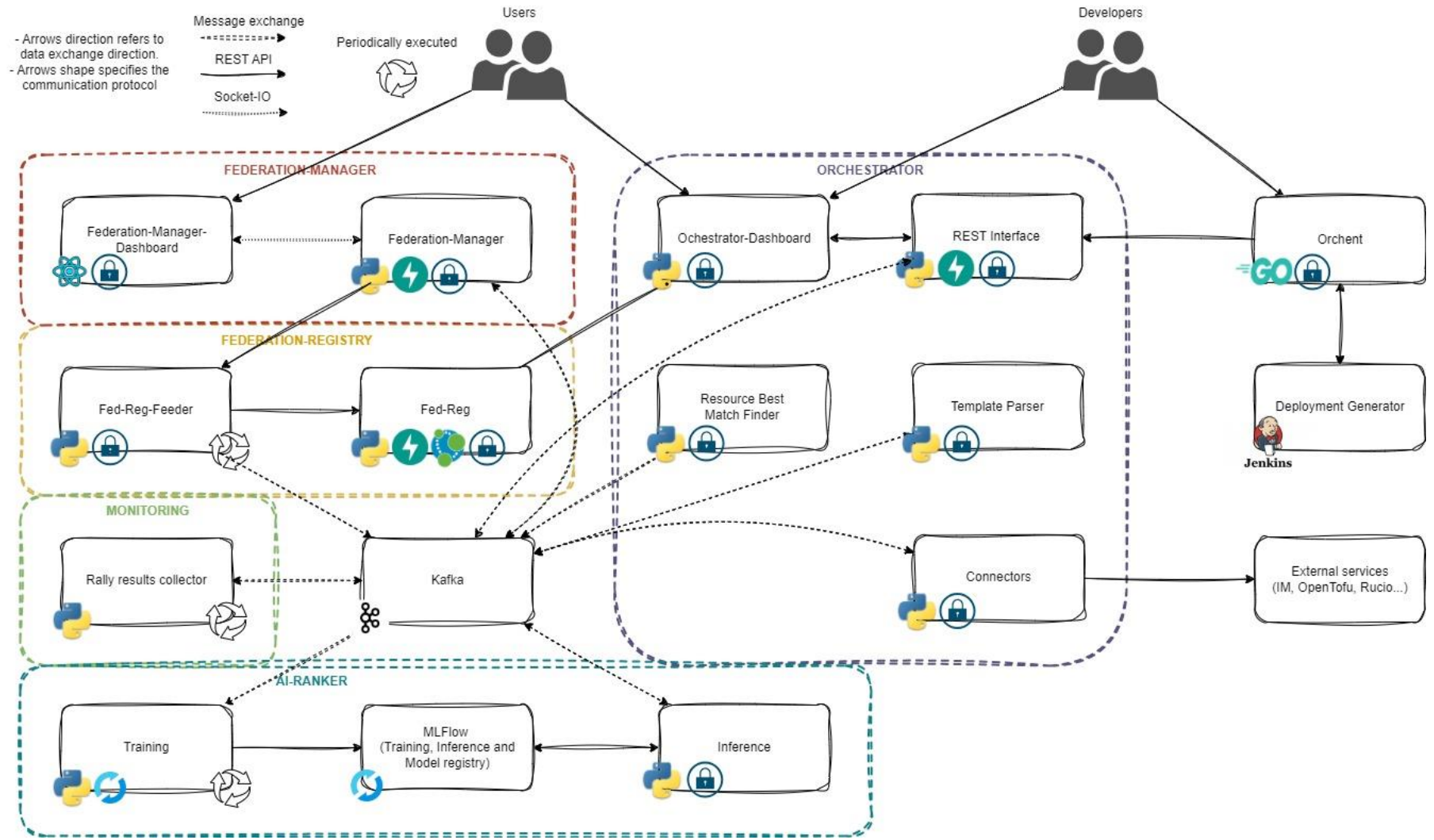
New Tool: Federation Manager

- **Standardize**
  - Sites federation procedure
  - New communities on-boarding and SLA definition
- **Monitoring integration** (through Kafka)
  - Triggers federated sites evaluation
  - Triggers long running monitoring procedures



Core refactoring

- **Change language**
  - Java -> Python
- **Tasks delegation**
  - REST API Interface
  - TOSCA Parser
  - Resource Best Match Finder
  - Multiple Connectors
- **Message exchange based**
  - Kafka



Backward compatibility, new tools and features

- The PaaS services remain **TOSCA** based
- REST API for end user access (orchent, dashboard)
- Integration with **Rucio** for Data Management
- Integration with **IM** for deployments on **K8s** and **Openstack**
  - Evaluation of using **Opentofu**
- More detailed logs and procedure errors recovery
- New portfolio services (Rucio, K8s with Interlink…)

New Dashboard and services provisioning

- Move the dashboard DB data inside the REST API DB
  - Make the dashboard a stateless component
- Change Language
  - Python -> JavaScript
  - Improve dashboard responsiveness
  - Simplify code
- New DevOps stategies for automatic deployment
  - Ansible roles and playbooks improvement
- Cluster k8s provisioning
  - HA
  - Reduce independent VM management

Thank you

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