CHOReVOLUTION Studio, an Eclipse environment for composing Internet of Everything Applications

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CHOREvOLUTION

• Title: Automated Synthesis of Dynamic and Secured Choreographies for the Future Internet

• Follow up FP7 EU project CHOREOS

• Period: January 2015 - January 2018

• Site: http://www.chorevolution.eu
Outline

• Setting the context

• Development approach (high-level view)

• Synthesis process

• CHOReVOLUTION platform

• CHOReVOLUTION Studio
Setting the context

**Service composition approaches**

**Orchestration (centralized)**

**Choreography (fully distributed)**

Local centralized view from the perspective of one participant

Global decentralized view from a multi-participant perspective (albeit without a central controller)
Setting the context (cont’d)

**Reusing** existing services and things
(often black-box)

**Distributed composition**

Support for **automation** is needed
(time-to-market, correctness by construction, etc.)

**Aiding** software producers to **realize**, **deploy**, **execute**, and **monitor** choreography-based systems
by (possibly) **reusing** existing services
Development approach

Choreography modelers cooperate each other to set business goals, e.g.,

- assisting travelers from arrival, to staying, to departure
Development approach (cont’d)

Identify tasks and participants required to achieve the goal, e.g.,

- reserving a taxi from the local taxi company,
- purchasing digital tickets at the train station,
- performing transactions through services based on near field communication in a shop
Specify how participants must collaborate as admissible flows of the identified business tasks through:

- **BPMN2 Choreography Diagrams**
Development approach (cont’d)

inventory contains services/things published by providers, e.g.,
- transportation companies
- airport retailers
Modelling phase

- Out of the specified business goal, and
- the set of services available in the inventory ...

Synthesis phase

CHOReVOLUTION Cloud Infrastructure

Synthesis Processor automatically produces (if possible) a choreography-based application achieving the specified goal
OVERALL GOAL provide automatic support to the realization of choreography-based systems by realizing a synthesis process.
GOAL check the choreography realizability and its enforceability by the process.
GOAL derive a (sub-) BPMN2 Choreography Diagram that contains only the choreography flows involving the considered participant
GOAL querying the Service Inventory in order to select concrete services (or things) that can play the roles of the choreography participant.
**GOAL**

generate BCs when the interaction style (e.g., REST) of a selected service (or thing) is different from SOAP
GOAL generate SFs to filter the services interactions according to the specified security requirements (e.g., different authentication & authorization attributes)
GOAL generate adapters that bridge the gap between the abstract interface and concrete interface of a selected service (or thing)
GOAL generate CDs that coordinate the interactions among the selected services (or things) in order to fulfill the global collaboration prescribed by the choreography specification, in a fully distributed way.
GOAL generate an architectural description of the choreographed system
GOAL generate the Choreography Deployment Description

Choreography Deployment Description of the use case
CHOReVOLUTION platform

**CHOReVOLUTION Front-end** provides

**CHOReVOLUTION Studio**
- design a choreography with BPMN2
- drive the generation of additional artifacts exploiting the Synthesis Processor

**CHOReVOLUTION Console**
- manage running services and choreographies
- monitor the execution of a choreography
CHOReVOLUTION platform

**CHOReVOLUTION Back-end** provides

- Generation of the Concrete Choreography specification and all the required BCs, Ads, CDs, SFs (**Synthesis Processor**)
- Deployment, configuration and control of BCs, Ads, CDs, SFs on the CHOReVOLUTION cloud infrastructure (**Enactment Engine**)
- Management of authentication and authorization for services at run-time that uses different security mechanisms at protocol level (**Identity Manager**)
- Propagation/synchronizion of service/user profiles to/from external resources and provision of managed services (**Federation Server**)
Execution time, for each choreography, in the CHOReVOLUTION cloud, there are

- A set of choreography instances at different execution states
- A set of virtual machines executing a custom-tailored mix of services and middleware components to serve different parts of the choreography
CHOReVOLUTION Studio
Try CHOReVOLUTION!
download the VM: https://l.ow2.org/cpvm
Visit us at the booth #9
Evaluate the Sessions

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