Compose and run new services without programming experience, with Eclipse-based Studio

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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)

Service A ➔ Composite Service ➔ Service B

Service D ➔ Composite Service ➔ Service C

Choreography (fully distributed)

Service A ➔ Receive ➔ Service B

Service A ➔ Send ➔ Service B

Global decentralized view from a multi-participant perspective (albeit without a central controller)

Local centralized view from the perspective of one participant
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**

BPMN2 Specification - [http://www.omg.org/spec/BPMN/2.0/]
inventory contains services/things published by providers, e.g.,
- transportation companies
- airport retailers
Out of the specified business goal, and the set of services available in the inventory ...

Synthesis phase

- 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
Synthesis Process (cont’d)

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
**Synthesis Process (cont’d)**

**GOAL** generate SFs to filter the services interactions according to the specified security requirements (e.g., different authentication & authorization attributes)
Synthesis Process (cont’d)

**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
Choreography Architecture Generation

Choreography Deployment Generation

Choreography Deployment Description

GOAL generate the Choreography Deployment Description

Choreography Deployment Description of the use case
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
- monitor the execution of a cloud
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/synchronization 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
References

- Web Site
  http://www.chorevolution.eu

- Twitter
  https://twitter.com/CHOR_eVOLUTION

- Source Code (GIT repositories)
  https://goo.gl/kQUXgk

- OW2 JIRA
  https://goo.gl/9FxVSj
That’s all folks

Evaluate the Sessions
Sign in and vote at eclipsecon.org