Automated Synthesis of Dynamic and Secured Choreographies for the Future Internet
Challenge Integrate existing services from a large number of providers into large scale applications that can support a great diversity of consumers. Manage the heterogeneity of the re-used services and things.

Solution CHOReVOLUTION develops a new software engineering and execution environment based on the dynamic and distributed coordination of services.

Benefits CHOReVOLUTION will enable the development of new societal applications re-using existing resources and enabling from innovative business models.
Choreographies vs Orchestration

Orchestration (centralized)

Choreography (fully distributed)
Setting the Context

Need for innovative and revolutionary everyday-life scenarios within smart cities

different users  fully connected  different environments  fully connected  different stakeholders

Expected:
Smart mobility: ecosystem and scenarios
Plus flexible, secure and distributed computing

Dynamism, Heterogeneity
New value added services
e.g., route guidance, speed advisory, parking availability, POI suggestions
CHOReVOLUTION Tools and Process

- Coordination and evolution (Coordination Delegates)
- Adaptation (Adapters)
- Security Filtering (Security Filters)
- Heterogeneous Communication (Binding Components)

Choreography design and modeling (BPMN)

Choreography-enabling software artefacts

Cloud deployment
The New Technology Stack

- Device Management
- Heterogenous Connectivity
- Application Enablement
- Data Management
- Cloud Computing

- Moving toward a platform model
- Business applications on top of IoT resources
The CHOReVOLUTION platform is a toolbox of well-integrated front-end applications and back-end (middleware) components enhanced by a flexible cloud infrastructure.
The CHOReVOLUTION Studio is an eclipse-based IDE that allows choreography designers and service providers to:

A. **design** a choreography exploiting the CHOReVOLUTION notation (based on BPMN2);

B. **define** all the details needed for instrumenting the interaction among the services involved in the choreography (e.g. service signatures, protocols, QoS, identity attributes and roles);

C. **drive** the generation of Binding Components, Security Filters, Adaptors, and Coordination Delegates exploiting the Synthesis Processor and the eVolution Service Bus (VSB) REST APIs.
The CHOReVOLUTION Console is a web-based application that allows choreography owners to:

A. configure, administer and trigger corrective actions on running services and choreographies;

B. monitor the execution of a choreography with respect to some parameters of interest
The CHORoeVOLUTION backend is composed by middleware components that exposes REST APIs that:

A. **generate** the Concrete Choreography specification and all the related BCs, Ads, CDs, SFs.

B. **deploy configure and control** BCs, Ads, CDs, SFs on the CHORoeVOLUTION cloud infrastructure.

C. **manage authentication and authorization for** services at run-time that uses different security mechanisms at protocol level by storing different credentials on behalf of the caller and managing authorization policies.

D. **propagate/synchronize service/user profiles** to/from external resources and provides managed services.
All the described components aim at putting into execution concrete service choreography instances on a cloud infrastructure and at adapting the execution based on the actual application context.

Thus, at execution time, for each choreography, in the CHOReVOLUTION cloud there are:

A. a set of choreography instances at different execution states;

B. a set of virtual machines executing a custom-tailored mix of services and middleware components to serve different parts of the choreography.
Smart Tourism Use Case
CHOReVOLUTION at a Glance

- Distributed service composition
  - Service choreography
  - BPMN 2.0+ modelling
- Validation use-cases
  - Smart tourism
  - Smart mobility

- Model to runtime platform
  - Eclipse-based studio
  - OpenStack cloud
- First release
  - January 2017
  - Open source
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Check out CHOREvOLUTION at

www.chorevolution.eu

Download CHOREvOLUTION from
AppHub.eu.com
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