

CHOReOS

Large Scale Choreographies
for the Future Internet

ICT IP Project

Deliverable D10.5.1

Plan of CHOReOS standardisation activities and groups

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Abstract
This deliverable address initial plans for influencing related standards.

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Glossary, acronyms & abbreviations

Item	Description
CA	Consortium Agreement
DL	Deliverable Leader
DOW	Description of Work
IAC	Industrial Advisory Committee
MST	Management Support Team
OASIS	Organization for the Advancement of Structured Information Standards
OMG	Object Management Group
OSOA	Open Service Oriented Architecture
OSS	Open Source Software
PL	Project Leader
PMC	Project Management Committee
PO	Project Officer
PTC	Project Technical Committee
SL	Scientific Leader
W3C	World Wide Web Consortium
WP	Work Package
WPL	Work Package Leader

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1. Introduction

The standardisation plan described in this report covers the planned activities within the CHOReOS project when influencing standardisation bodies. Here, only *de jure* standards, i.e. released by recognized entities (known as “standardisation bodies”) with processes for development and maintenance of standards in a national (e.g. BSI, ANSI) or international (e.g. ISO, CEN, IEEE, W3C, OMG) scope, are considered on account of to their capability at maintaining results after the end of the CHOReOS project. *De facto* standards as well as voluntary standards from groups of companies or academics (e.g. the Service Component Architecture – SCA –, before going to the OASIS¹ under the name of Open CSA², was such a voluntary standard from the OSOA³ group of company) are therefore out of scope.

These CHOReOS standardisation activities will be based on the project's results and encompass the following activities (as defined in task 10.3 of the DoW):

- Presenting CHOReOS at OMG technical meeting(s) and other standardisation bodies;
- Initiating process for CHOReOS-related standards in one or several of standardisation bodies;
- Participating in activities on developing and evolving CHOReOS-related standards.

This plan must be envisioned in the larger scope of the transfer activities among which can be found:

- Dissemination activities (D9.3.1 to D9.3.3);
- Open source community building (D9.7.1 to D9.7.3);
- Exploitation activities (D10.1.1 to D10.1.4); and
- Collaboration activities (D9.9.1 to D9.9.4).

More specifically, this deliverable presents the CHOReOS plan for standardisation, including the specific standardisation bodies CHOReOS will participate to. It will be followed by annual deliverables, detailing the activities done and updating the plans for the next period.

This deliverable is organized as follow:

- Section 2 delivers the main foreseen areas of standardisation;
- Section 3 appreciates standardisation bodies, their working groups and their current activities with regards to the preceding areas; and
- Section 4 presents the planned activities and who will perform them.

¹ <http://www.oasis-open.org>

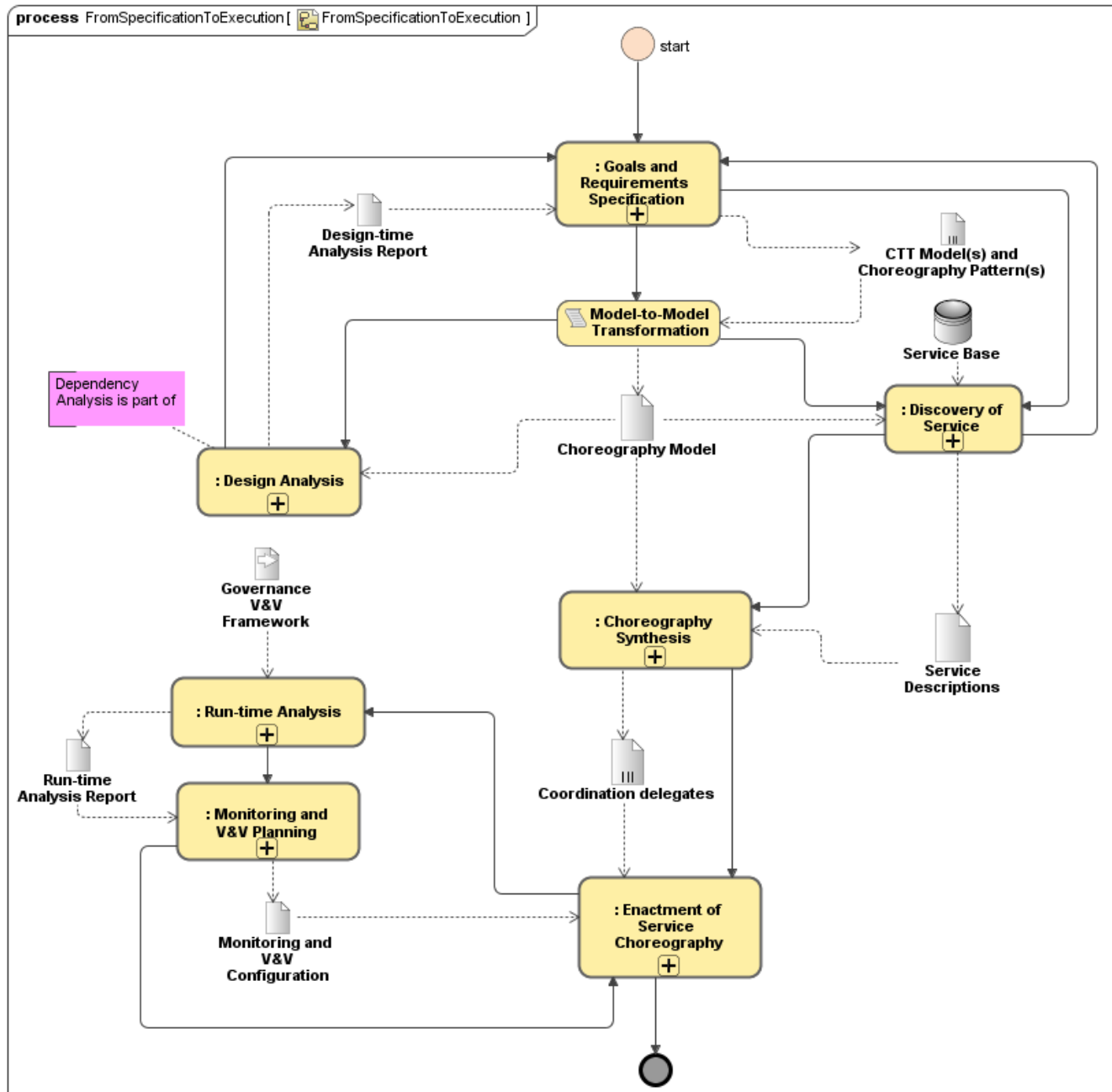
² See <http://www.oasis-opencsa.org/sca>

³ See <http://www.osoa.org/display/Main/OSOA+Supporters+Home>

2. Main areas of standardisation

Overall, CHOReOS aims at assisting the engineering of software service compositions in the networking environment created by the Future Internet.

More specifically, as described in deliverable D2.1 “CHOReOS dynamic development model definition”, in designing service choreographies a sequence of activities are performed and a number of artefacts are generated depicted in the following diagrams (from D2.1):



A Dynamic Process "Design Choreography Specifications"

Since the main goal of software standards is to provide interoperability when using software systems from different vendors, our standardisation efforts will be focused on the data exchanged among these phases, thus fostering the implementation of these different phases by different vendors.

As illustrated in the figure above, the main data exchanged among the phases of the development process are:

- CTT Models and Choreography Patterns;
- Choreography Model;
- Service Base (including Service Descriptions);
- Design-time and run-time analysis reports;
- Coordination Delegates;
- Monitoring and V&V configuration.

Among these data formats, and in order to avoid spreading our efforts on too many tasks, we chose the last three items.

The *Choreography Model* will be an extension of the BPMN2 metamodel taking into account special CHOReOS choreography properties, which enable the actual enactment (i.e. execution) of choreographies. Indeed today's BPMN2 specification of choreographies focuses on modelling of services composition rather than enacting them. The OMG is a natural place for socializing such extension. Although we chose BPMN2 as the main modelling standard for expressing choreographies, some of the choreography aspects, e.g. message models, are better modelled with UML (Unified Modelling Language). The OMG is also in progress of finalizing another modelling standard, SoaML (Service Oriented Architecture Modelling Language), which is implemented as a UML profile. Since CHOReOS preference goes to refining and integrating already existing standards rather than create brand-new ones, our contribution will focus on the standardisation of UML profile for BPMN2. This standardisation should enable easy integration of BPMN2, UML, SoaML, and CHOReOS specific extensions in available UML-based modelling platforms such as MagicDraw™, which is an official modelling solution for CHOReOS project.

The *Coordination Delegates* are the data shaped by the choreography synthesis and used to support choreography enactment in a distributed way. Enacting such a service composition comes down to the execution of these coordination delegates in the context of the specific middleware used (Grid, Cloud, ESB, IoT...) to coordinate the flows of invocations and eventually to access the composed services. The use of coordination delegates is a technique which is envisioned to be pervasive in the Future Internet as an enabler of distributed heterogeneous service invocation. The standardisation of an interchange format for coordination delegate is so worthwhile all the more so since, in CHOReOS, it allows the use of heterogeneous multi-vendors middleware to enact choreographies. At the time of writing, this interchange format is envisioned to be either the extension of an already known standard such as WS-CDL or BEPL, or, if the previous way is technically not suitable, as a new standard of its own.

The *Service Descriptions* are the service metadata used mainly during the choreography synthesis and the governance phases. These metadata are used to synthesize the preceding coordination delegates and during the run-time assessment of QoS properties.

3. Relevant groups & activities

This section lists the standardization bodies which are relevant to CHOReOS and to which at least one of the CHOReOS partners actively participate. Along with these standardization bodies, this section describes the groups within each body which may be of interest for CHOReOS outcomes as described in the previous section.

3.1. OMG

3.1.1. Introduction

The Object Management Group (OMG) is the most influential organization focusing on standardising modelling languages. OMG promotes Model-Driven Architecture (MDA™) as a specific version of Model-Driven Engineering (MDE) based on OMG standards such as UML™, BPMN™ and others. CHOReOS sees MDE as a key enabling technology for implementing a dynamic user-centric development process for large-scale service choreographies. CHOReOS prefers evolutionary approach, which tries to build on the top of existing modelling standards as opposed to suggesting new ones. Therefore contributing to evolution of relevant OMG standards is of high importance for CHOReOS technology transfer. For CHOReOS project, the following OMG standardization groups and the standards maintained by them are of particular interest:

- Analysis and Design Platform Task Force (ADTF):
 - Unified Modelling Language (UML);
 - Service oriented architecture Modelling Language (SoaML).
- Business Modelling and Integration Domain Task Force (BMI DTF) and the following modelling standards evolved by this group:
 - Business Process Model and Notation (BPMN);
 - UML Profile for BPMN Processes.

3.1.2. Service Modelling

OMG has recently finalized SoaML as the future standard for SOA-based modelling. SoaML is defined as UML profile. SoaML is a simple profile mostly focusing on terminology and lacking capabilities to specify quality of service, which is important in CHOReOS. Even if SoaML has been criticized for a lack of integration with BPMN 2.0 and still lacks adoption in industry, CHOReOS sees SoaML as a starting point for modelling services and intends to propose improvements of the standard based on specific needs of CHOReOS development process and IDRE.

This activity will have to be led in common with W3C activities around USDL (see sections 3.2.1 and 3.2.2) with a goal to stand SoaML as a profile for the information contained in USDL.

3.1.3. Choreography Modelling

BPMN 2.0 is a major revision of the BPMN standard from the OMG, which introduces capabilities for modelling choreographies. Due to the increasing popularity of BPMN, CHOReOS has chosen BPMN 2.0 as a starting point for choreography modelling. However, BPMN 2.0 lacks capabilities to integrate choreographies with service specifications or trace it to requirements or actual runtime indicators. CHOReOS foresees that some improvements in BPMN language might be necessary and intends to contribute to its further evolution. However, it is very important not to over-specify BPMN itself by stuffing in it capabilities which already exists in other modelling languages such as UML, SoaML, SysML, etc. As UML is still probably the most popular modelling standard and other modelling languages such as SoaML and SysML are defined as UML profiles in OMG, there is an ongoing

initiative to standardize the *UML Profile for Business Processes*. Such a profile would make it possible to integrate BPMN models with models based on UML and its numerous profiles. CHOReOS sees standardization of UML Profile for BPMN Processes as an important enabler for CHOReOS dynamic development process, especially for interchange of model-based requirements, service, and choreography specifications used as income/outcome of various development activities supported by CHOReOS IDRE.

3.2. W3C

3.2.1. Introduction

The World Wide Web Consortium (W3C⁴) is an international community where Member organizations, a full-time staff, and the public work together to develop Web standards. The W3C is led by Web inventor Tim Berners-Lee and CEO Jeffrey Jaffe.

W3C provides many well-known standards such as: HTML, CSS, SVG, WOFF, WSDL, SA-WSDL, etc.

Input to the W3C standards process may come from a variety of places, including:

- Working Groups: Working Groups typically produce deliverables (e.g., standards track technical reports, software, test suites, and reviews of the deliverables of other groups).
- Interest Groups: The primary goal of an Interest Group is to bring together people who wish to evaluate potential Web technologies and policies. An Interest Group is a forum for the exchange of ideas.
- Coordination Groups: A Coordination Group manages dependencies and facilitates communication with other groups, within or outside of W3C.
- Incubator Groups: Incubator Groups foster rapid development, on a time scale of a year or less, of new Web-related concepts. Target concepts include innovative ideas for specifications, guidelines, and applications that are not (or not yet) clear candidates for development and more thorough scrutiny under the current W3C Recommendation Track.
- W3C Community Group: A W3C Community Group is an open forum, without fees, where Web developers and other stakeholders develop specifications, hold discussions, develop test suites, and connect with W3C's international community of Web experts.
- W3C Business Group: A W3C Business Group gives innovators that want to have an impact on the development of the Web in the near-term a vendor-neutral forum for collaborating with like-minded stakeholders, including W3C Members and non-Members.

3.2.2. Service interface description

In CHOReOS we plan to use USDL (See Annex A for a deeper description of USDL and of the W3C USDL Incubator Activity) for service governance purpose in order to describe service life cycle as well as functional and non-functional properties.

Service Level Agreements (SLAs) are a common way to formally specify exact functional and non-functional conditions under which services are delivered.

The USDL Service Level Module introduces classes such as `ServiceLevelProfile`, which represents a set of service level specifications that are combined into one profile and that are offered, negotiated, or agreed with as a whole. Different profiles can be used to specify different options of how `ServiceLevels` may be specified and grouped. Further classes are

⁴ <http://www.w3c.org>

ServiceLevelAttribute, GuaranteedState, GuaranteedAction, etc., which are interrelated and linked to Service in the Service Module and Role in the Participants Module.

Work of the USDL incubator working-group is close to be finished. CHOReOS will try to be involved in the next steps that will start from the incubation phase to the standardisation phase.

3.2.3. Coordination delegates

To the best of our knowledge, coordination delegates are quite a new field of standardisation. The first step is thus to choose what to standardise around coordination delegates: vocabulary, interchange format, modelling profile, or interface for interchange... An interchange format is most certainly the best choice here on account of its obvious interest in our context.

Next steps are to choose a standardisation community and raise first interests for a coordination delegate interchange format. Given its past interest for choreography interchange formats as enabler of choreography execution, such as WS-CDL and WSCI, the W3C community seems a good target for this effort. Moreover the new W3C Community Group is a perfect opportunity to raise global interest in the community and start the work toward a future coordination delegate interchange format.

4. Conclusion: contribution to standardisation activities

The following table presents the planned activities.

Partner	Person	Body / Group	Contribution	When
NME	Edita Mileviciene	OMG / BMI	Contribute to development of a joint submission for UML Profile for BPMN Processes	Year 1
THA	Hugues Vincent	W3C	Create a W3C community group for standardizing a coordination delegate interchange format	Year 3
NME	Darius Silingas	OMG / BMI	Suggest/discuss improvements in BPMN 2.1 related to service choreographies	Year 2-3
NME	Edita Mileviciene	OMG / BMI	Contribute to standardization of UML Profile for BPMN Processes	Year 2
NME	Darius Silingas	OMG / ADF	Contribute to SoaML revisions related to service choreographies and better integration with BPMN	Year 2-3
EBM	Jean-Pierre Lorré	W3C	Follow USDL incubator working group work and try to contribute to the standardisation activity as far as it will be submitted	Year 2

Annex A: W3C Unified Service Description Language Incubator Activity

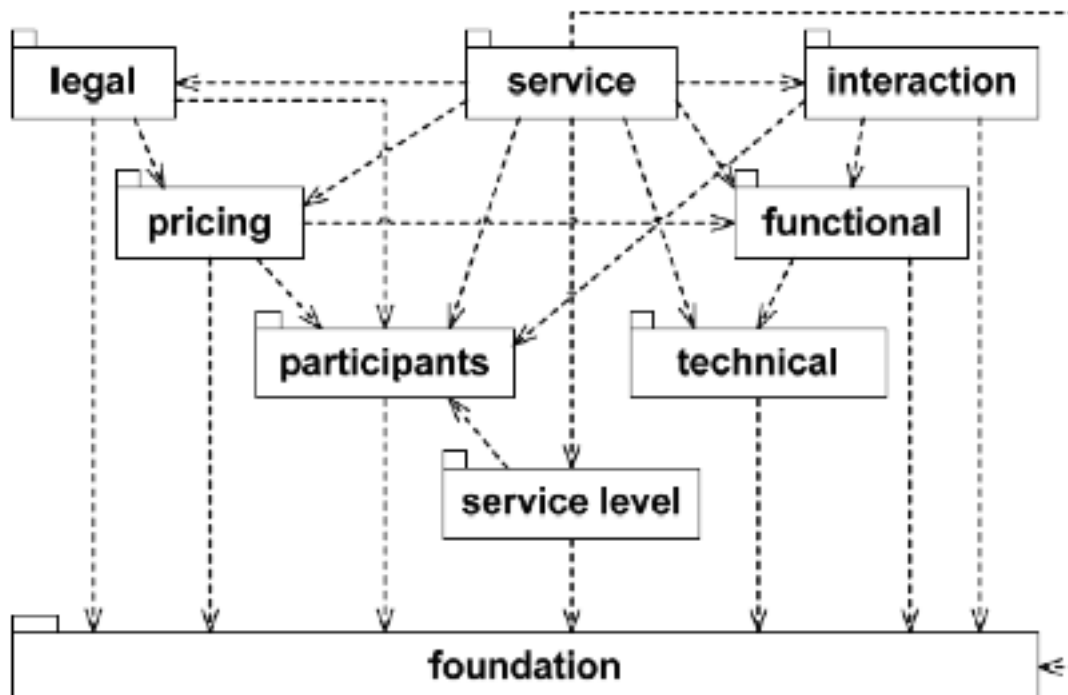
The aim of this part is to present the USDL (Unified Service Description Language) incubator group whose work is really relevant for CHOReOS service description in particular in the Choreography and service Governance aim.

The W3C USDL Incubator Group is trying to make USDL a standard language for describing services to allow them to become tradable and consumable. It provides several modules to model services from a business and operational views and aligns this with a technical perspective. These modules cover the main aspects of the overall service description and especially service lifecycle concepts which is not really the case for SoaML for example.

The Unified Service Description Language (USDL) is a general purpose service description language for various types of services ranging from professional to electronic services. The USDL aims at a 'holistic' service description, which serves the needs of different stakeholders over the entire service lifecycle (provisioning, discovery, consumption, composition, and trading). In addition to technical properties of service (such as the service interface for a Web service), the USDL puts a special focus on business aspects such as ownership and provisioning, release stages and dependencies in a service network, composition and bundling, pricing and legal aspects. The USDL has been initially developed by SAP and other partners based on results from different public funded research projects, including SOA4All.

The final outcome of the working group will be a report with a reworked USDL specification and an assessment of how to proceed with USDL in September 2011. USDL is one part of the Internet of Services initiative.

USDL organises service description features into packages as depicted by the following picture:



Name	Description
Foundation Module	Captures concepts that are common among several aspects, e.g., concepts of naming and identification, or concepts that are completely independent of “service,” e.g., organizations or persons.
Service Level Module	Captures concepts concerned with guarantees regarding quality of service operation, which are claimed/requested by different actors involved in the provisioning, delivery and consumption of a service
Participants Module	Captures concepts related to the actors that participate in the provisioning, delivery and consumption of services, e.g., provider, intermediary, stakeholder and consumer
Pricing Module	Captures concepts that explicate the pricing structure of a service, e.g., price plan, price component and price level
Legal Module	Captures licenses and copyrights according to German law. A version for US jurisdiction is in the works. The module will eventually also capture general terms and conditions.
Service Module	Captures central service concepts, e.g., service and service bundle, and their relation to other service description aspects
Interaction Module	Captures concepts that outline the sequence(s) of interactions between a consumer and a service (respectively the actors involved in delivery) – necessary to successfully complete service execution
Functional Module	Captures concepts that describe the functionality offered as a service, e.g., function, parameter and fault
Technical Module	Captures concepts that describe available means to access a service, e.g. interface and access protocols