



LarKC

*The Large Knowledge Collider:
a platform for large scale integrated reasoning and Web-search*

FP7 – 215535

D9.4 – First draft of Exploitation and IPR Plan

Coordinator: Armando Beffani

**With contributions from: LarKC License Task Force:
Alessio Carenini, Armando Beffani, Frank van Harmelen, Georgina
Gallizo, Michael Witbrock**

**Quality Assessor: Federico M. Facca
Quality Controller: Armando Beffani**

Document Identifier:	LarKC/2008/D9.4
Class Deliverable:	LarKC EU-IST-2008-215535
Version:	V1.1
Date:	May 26 th , 2009
State:	Final
Distribution:	Public



EXECUTIVE SUMMARY

This deliverable report describes the most suitable business model and licenses for the LarKC platform and its plugins. To reach this goal, a suitable task force was set up and the discussion was conducted, both via a dedicated mailing list and periodically phone conferences, in order to take a final decision on these issues.

It was decided that the issue of discussing about LarKC Business Model and Licensing Policy couldn't be delayed till the initially scheduled delivery date of D9.4 (M36), since it is quite a central issue for the whole project. For those reasons, this deliverable was therefore anticipated to include the findings of those activities. The Final Exploitation and IPR Plan (D9.6) will be delivered at M42 as planned in the DoW.



DOCUMENT INFORMATION

IST Project Number	FP7 - 215535	Acronym	LarKC
Full Title	The Large Knowledge Collider: a platform for large scale integrated reasoning and Web-search		
Project URL	http://www.larkc.eu/		
Document URL			
EU Project Officer	Stefano Bertolo		

Deliverable	Number	9.4	Title	First draft of Exploitation and IPR Plan
Work Package	Number	9	Title	Exploitation and Standardization

Date of Delivery	Contractual	M 36	Actual	M 12
Status	version 1.0		final X	
Nature	prototype <input type="checkbox"/> report X dissemination <input type="checkbox"/>			
Dissemination level	public X consortium <input type="checkbox"/>			











Authors (Partner)	LarKC License Task Force			
Responsible Author	Name	Armando Beffani	E-mail	armando.beffani@cefriel.it
	Partner	CEFRIEL	Phone	+39 02 23954 303

Abstract (for dissemination)	This deliverable reports describes the most suitable business model and licenses for the LarKC platform and its plugins.
Keywords	Business model, Licenses, Exploitation Plan

Version Log			
Issue Date	Rev. No.	Author	Change
23-3-2009	0.1	CEFRIEL	Document initialization
23-3-2009	0.2	CEFRIEL	First version of contents and TOC
24-3-2009	0.3	CEFRIEL	Added licenses section
24-3-2009	0.4	CEFRIEL	Added the Business Model images
25-3-2009	0.5	CEFRIEL	Corrected the licensing models and added first description for the Business Model
25-3-2009	0.6	CEFRIEL	Completed the Business Model chapter
26-3-2009	0.7	CEFRIEL	Included comments from CYCORP
31-3-2009	1.0	CEFRIEL	Inclusion of quality assessor's feedbacks and comments
26-5-2009	1.1	CEFRIEL	Minor rephrasing for clarification on data licenses



PROJECT CONSORTIUM INFORMATION

Participant's name	Partner	Contact
Semantic Technology Institute Innsbruck, Universitaet Innsbruck	 	Prof. Dr. Dieter Fensel, Semantic Technology Institute (STI), Universitaet Innsbruck, Innsbruck, Austria, E-mail: dieter.fensel@sti-innsbruck.at
AstraZeneca AB		Bosse Andersson AstraZeneca Lund, Sweden Email: bo.h.andersson@astrazeneca.com
CEFRIEL - SOCIETA CONSORTILE A RESPONSABILITA LIMITATA		Emanuele Della Valle, CEFRIEL - SOCIETA CONSORTILE A RESPONSABILITA LIMITATA, Milano, Italy, Email: emanuele.dellavalle@cefriel.it
CYCORP, RAZISKOVANJE IN EKSPERIMENTALNI RAZVOJ D.O.O.		Michael Witbrock, CYCORP, RAZISKOVANJE IN EKSPERIMENTALNI RAZVOJ D.O.O., Ljubljana, Slovenia, Email: witbrock@cyc.com
Höchstleistungsrechenzentrum, Universitaet Stuttgart		Georgina Gallizo, Höchstleistungsrechenzentrum, Universitaet Stuttgart, Stuttgart, Germany, Email: gallizo@hlrs.de
MAX-PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.		Dr. Lael Schooler Max-Planck-Institut für Bildungsforschung Berlin, Germany Email: schooler@mpib-berlin.mpg.de
Ontotext AD		Atanas Kiryakov, Ontotext Lab, Sofia, Bulgaria Email: naso@ontotext.com
SALTLUX INC.		Kono Kim, SALTLUX INC, Seoul, Korea, Email: kono@saltlux.com
SIEMENS AKTIENGESELLSCHAFT		Dr. Volker Tresp, SIEMENS AKTIENGESELLSCHAFT, Muenchen, Germany, E-mail: volker.tresp@siemens.com
THE UNIVERSITY OF SHEFFIELD		Prof. Dr. Hamish Cunningham, THE UNIVERSITY OF SHEFFIELD Sheffield, UK, Email: h.cunningham@dcs.shef.ac.uk



<p>VRIJE UNIVERSITEIT AMSTERDAM</p>		<p>Prof. Dr. Frank van Harmelen, VRIJE UNIVERSITEIT AMSTERDAM, Amsterdam, Netherlands, Email: Frank.van.Harmelen@cs.vu.nl</p>
<p>THE INTERNATIONAL WIC INSTITUTE, BEIJING UNIVERSITY OF TECHNOLOGY</p>		<p>Prof. Dr. Ning Zhong, THE INTERNATIONAL WIC INSTITUTE, Mabeshi, Japan, Email: zhong@maebashi-it.ac.jp</p>
<p>INTERNATIONAL AGENCY FOR RESEARCH ON CANCER</p>	 <p>International Agency for Research on Ca Centre International de Recherche sur le Ca</p>	<p>Dr. Paul Brennan, INTERNATIONAL AGENCY FOR RESEARCH ON CANCER, Lyon, France, Email: brennan@iarc.fr</p>
<p>INFORMATION RETRIEVAL FACILITY</p>		<p>Dr. John Tait INFORMATION RETRIEVAL FACILITY Vienna, Austria Email : john.tait@ir-facility.org</p>



TABLE OF CONTENTS

LIST OF FIGURES	7
LIST OF TABLES	8
1. INTRODUCTION	9
2. LICENSING MODELS	10
2.1. REQUIREMENTS FOR THE LICENSING MODELS	10
<i>Requirements for the Platform Licensing Models</i>	<i>10</i>
<i>Requirements for the Plugins Licensing Models</i>	<i>10</i>
<i>Requirements for the Use Cases Licensing Models</i>	<i>11</i>
2.2. ANALYSIS AND SELECTION OF THE LICENSING MODELS	11
<i>Analysis and Selection of the Licensing Models for the Platform</i>	<i>11</i>
<i>Analysis and Selection of the Licensing Models for the Plugins</i>	<i>12</i>
<i>Analysis and Selection of the Licensing Models for the Use Cases</i>	<i>12</i>
2.3. FINAL STATEMENT	12
3. PRELIMINARY BUSINESS MODEL	13
3.1. VALUE CHAIN	13
3.2. PRIMARY MARKETS	14
3.3. SECONDARY MARKETS	15
4. CONCLUSIONS	16
APPENDIX A.	17



List of Figures

Figure 1: Value-Chain of LarKC technology	13
Figure 2: Service-flow and Cash-flow with the Primary Markets.....	14
Figure 3: Service-flow and Cash-flow with the Secondary Markets.....	15



List of Tables

Table 1 : Consumer and Enterprise applications targeted within initial Market Analysis14



1. Introduction

During the October's Consortium Meeting in Stuttgart, the EPMB decided that the issue of discussing about LarKC Business Model and Licensing Policy couldn't be delayed till the initially scheduled delivery date of D9.4 (M36), since it is quite a central issue for the whole project.

Given the heterogeneity of LarKC partners that include both academic and industrial expertises, the EPMB decided to set up a task force to early define the licensing models of the LarKC results. The task force was made up by some representative people from the following 6 partners:

- CEFRIEL (as leader) with both industrial and academic expertises
- HLRS with academic expertises
- VRIJE UNIVERSITEIT AMSTERDAM with academic expertises
- ONTOTEXT with industrial expertises
- SIEMENS with industrial expertises
- CYCORP with industrial expertises

The task force collaborated during October-November and December by exchanging emails¹ and discussing during phone calls. This deliverable reports about the results obtained by the task force that include the suggested licensing models for the LarKC results and a first draft of the business model for the LarKC exploitation.

This deliverable is structured as follows: Chapter 2 presents the requirements, the discussion and the suggestions provided by the Task Force about the licensing, as well as the final decision taken by the EPMB; Chapter 3 introduces the early findings of the work carried on within WP9 about the Business Model for Larkc; this model will be used to draw the final exploitation plan of the project. Finally Chapter 4 presents some conclusions.

¹ The mailing list of the license task-force is available at: https://lists.sti2.at/mailman/listinfo/larkc-license_task_force



2. Licensing Models

One of the goals of the LarKC project is the development of new technological solutions to support reasoning at large scale. Since those technologies will be developed jointly by the partners of the consortium, it's important to select the most suitable licensing model in advance to avoid misunderstandings and to clarify the exploitation chances of the produced results.

The technologies developed by LarKC can be grouped in 3 main groups:

- The *platform* that provides a common middleware for the LarKC technologies
- The set of *plugins* that leverage over the platform and extend its functionalities. Plugins may be considered both as internal or external components that use the platform and are used by the platform.
- The set of *use cases* that demonstrate the feasibility and business value of the LarKC technologies in real-domain contexts. In order to use such technologies, use cases may develop additional plugins or specific external components (thus falling in the previous group) or may adopt and modify any data with specific digital rights.

Each group poses a set of requirements to be met by the licensing model. The following section describes the requirements of those 3 groups of technologies. Then, accordingly to those requirements, we analyze the most suitable licenses and select the most appropriate.

2.1. Requirements for the Licensing Models

Each group of technologies has its own requirements for the licensing model.

Requirements for the Platform Licensing Models

- Req 1) The platform is made up by several components and almost all the partners contribute to it. Furthermore, the components are so tightly connected; for these reasons, it's unfeasible to define a licensing model for each specific component. The platform **MUST** have a single license.
- Req 2) The platform is the result of a research activity and it will act as a basis for further developments. Thus, its licensing model **MUST** permit inspections and modifications of the source code.
- Req 3) The platform is released without any warranty. Thus, the authors of the platform code **MUST** not be responsible of any usage of the code.
- Req 4) The platform is designed in order to be used by a different set of plugins or external components. For this reason, the platform license **MUST** permit the development and use of plugins and external components without setting any constraints over their licenses.
- Req 5) The platform is designed in order to be used in different use cases. For this reason, the platform license **MUST** not set any constraints over the licenses of the resulted data or service obtained.

Requirements for the Plugins Licensing Models

- Req 6) The plugins licenses **MUST** be compatible with the platform license.
- Req 7) Due to the tight and bidirectional relations between plugins and platform, it's unfeasible to define clearly if the plugin uses the platform or if the platform uses the plugins. As platform license don't set any constraint to plugin licenses, plugins licenses **MUST** not set any constraint to platform license.
- Req 8) Given the nature of plugins, there could be several different plugins that interact one with the others. Even if it's possible to define a unique license for all the plugins adopted in a specific use case, we recommend that plugin licenses **SHOULD** be independent, thus not setting any constraint to the licenses of other plugins.



Requirements for the Use Cases Licensing Models

- Req 9) Use-cases MUST be free to make use of data with any type of digital right protection (that could be copyleft, copyright, or any “some rights reserved” approach) under their own responsibility.
- Req 10) Use-cases licenses MUST not limit or impact in any form the platform license.

2.2. Analysis and Selection of the Licensing Models

This section provides the list of chosen licenses for the 3 groups of technologies.

Analysis and Selection of the Licensing Models for the Platform

Req 1) implies that the LarKC platform will have a unique license.

Req 2) and Req 3) narrow the selection of licensing models to open source licenses. The Open Source Initiative has provided a concise list of all the approved Open Source licenses². At the time of writing this report, there are 63 licenses. Restricting the choice to the most popular licenses for software and services, it results in 10 licenses.

- Apache License 2.0
- New and Simplified BSD licenses
- GNU General Public License (GPL) 2.0
- GNU General Public License (GPL) 3.0
- GNU Library or "Lesser" General Public License (LGPL) 2.1
- MIT license
- Mozilla Public License (MPL) 1.1
- Common Development and Distribution License
- Common Public License (CPL) 1.0
- Eclipse Public License

Req 4) excludes the adoption of the GPL 2.0, CPL and MPL licenses, because they require any linked software to be released under the same license.

Req 5) excludes the GPL 3.0, because it sets some constraints if the component is provided as SaaS (Software as a Service).

Thanks to the discussions held within the task force, among the six remaining licenses, we end up with a restricted selection of two licenses: Apache License 2.0 and LGPL 2.1. Both those licenses meet the previous requirements and those have been submitted to the EPMB of the LarKC project for the final decision. The final decision about the platform license was influenced by the following two opinions, respectively from an industrial and an academic perspective.

From an industrial point of view, the adoption of the LGPL poses some constraints that may lower the adoption of the results. For example, if a company adopts any code released under the LGPL, the company becomes legally forced in advance to release under the same license any modification to the code. This may not be a strong limitation for companies, but the “in advance” constraint is a limit that the company has to take into account since the beginning of its activities.

From an academic point of view, the task force agreed that it’s better to optimize the chance that anybody takes advantages by LarKC results than to optimize the conditional chance that the LarKC project and the community take advantages by receiving back any third-party improvement.

Given the previous perspectives, the final decision for the platform license was the adoption of the **Apache License 2.0**. This implies that, even though LarKC is a research project, the consortium

² The complete list is available at: <http://www.opensource.org/licenses/alphabetical>



encourages anyone to adopt (and eventually publicly contribute to) its technologies. For this reason, the platform license should not pose any constraint to the commercialization of results based on it. In particular, any company adopting and modifying the platform should be able to keep preserved its industrial knowledge and the modified source code.

Analysis and Selection of the Licensing Models for the Plugins

Given the wide range and the heterogeneous context of development and use of plugins, the consortium decided to not define in advance the license of each plugin. For this reason, any plugin responsible MUST define the license model of their plugin assuring the compatibility with requirements Req 6), Req 7) and Req 8).

Both Apache License 2.0 and LGPL 2.1 for plugins are compatible with those requirements. GPL, CPL and MPL licenses remains incompatible. Moreover, both Apache License 2.0 and LGPL 2.1 licences are compatible with the use of commercial or closed source components in the plugins. A particular attention should be put in using LGPL software, since it requires to release all modifications applied to the LGPL-licensed software with the same license.

Analysis and Selection of the Licensing Models for the Use Cases

Given the wide range and the heterogeneous context of adoption and modification of data by the LarKC technologies, the consortium cannot define in advance the license for the use case data. For this reason, any use case responsible MUST define the license model of their use-case results assuring the compliance with Req 9) and Req 10).

Whenever feasible, we encourage the use of non-viral “some rights reserved” licensing for the data, such as the Creative Common “Attribution” license (see <http://creativecommons.org/licenses/by/3.0>).

2.3. Final Statement

Here we report the final statement that justifies the selection of the licensing model for the LarKC results:

The LarKC Platform and its source code will be released under the Apache License, Version 2.0 (<http://www.apache.org/licenses/LICENSE-2.0.html>). LarKC plugins, and other code produced by the LarKC consortium may be released under any license which does not have the effect of imposing any copyleft requirement whatsoever on code to which it is linked, connected, or otherwise associated. For the purposes of clarity, "copyleft requirement" here signifies a requirement to license such associated code under a license identical or similar to the license asserting the copyleft requirement. Licenses that are acceptable for release of code produced for the LarKC project include, but are not limited to: the Apache License Version 2.0, the BSD License, the MIT License, the LGPL and the Creative Commons Attribution License without the Share Alike feature. Licenses that are unacceptable for release of code produced for the LarKC project include, but are not limited to: any version of the GNU General Public License (GPL).

3. Preliminary Business Model

This chapter describes the preliminary version of the LarKC Business Model. The aim of this model is to provide a first step and a process towards the identification of the LarKC exploitation opportunities. The chapter is structured into three subsections: firstly it defines the value chain of the LarKC project, then it describes the primary markets in which LarKC can do business. Then, it considers the existence of secondary markets where LarKC results may be exploited.

3.1. Value Chain

The value generated by the LarKC technologies can be seen as a joint contribution by all the parts that made up the technology. In the following figure, we describe the value chain of the LarKC project taking into consideration the value provided by developers (acting as technology suppliers) and providers (acting as suppliers of services based over the technologies).

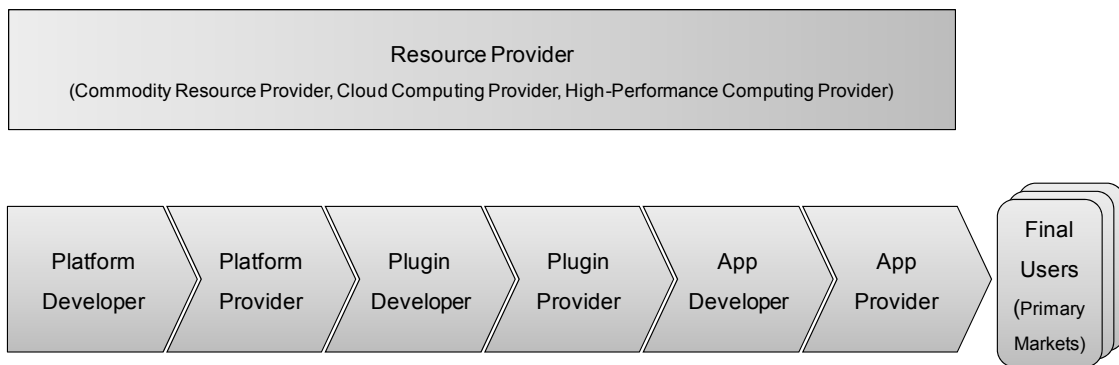


Figure 1: Value-Chain of LarKC technology

Platform developers represent the first stage of the chain. Such developers are both researchers and industrial engineers working together to create new innovative solutions. Platform Providers take those results and provide services over them. Such services may include both the sale of the technology as a software product and the provision of the technology as *Software as a Service* (SaaS)³. Behind both approaches, there are other peripheral services useful to increase the provider businesses, such as: training, consultancy, customizations...

The value chain continues with a similar path for plugin and application developers and providers. The value created by the previous stage is used as basis to create value for the following stages. At the end of the value chain there are the final users of the LarKC applications that are initially identified in section 3.2.

By the side of all the chain, there are the supporting providers, in particular the resource providers such as: commodity resource providers, cloud computing providers and high-performance computing providers.

The following figure emphasizes the value-flow (dark arrows) and the cash-flow (white arrows) among all stages.

³ SaaS is becoming a popular model for deploying software as a service on demand. The provider hosts the application and defines a license to let customers use it.

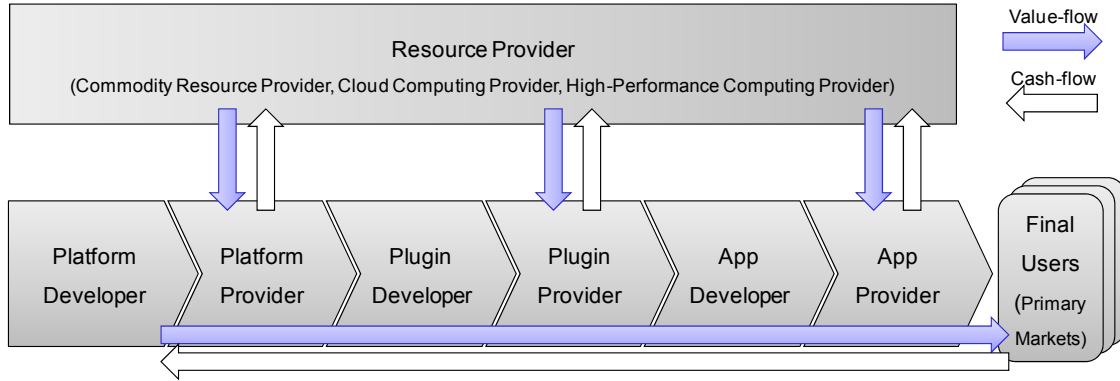


Figure 2: Service-flow and Cash-flow with the Primary Markets

The main value moves from platform developers to application developers going through all the intermediate stages. As reward of such value, cash is flowing in the opposite direction. Then, there are value and cash flows among the resource providers and the providers of the value chain.

There could be others parallel flows between the resource providers and the developers that are not shown in the figure. For example, developers may need to experiment their technologies over some demanding resources to evaluate their scientific and technical solutions. Anyway, those flows are secondary against those shown.

3.2. Primary Markets

As drawn in Figure 1 and in Figure 2, the value created by the LarKC value chain is sold to the final users that represent the primary markets for LarKC exploitation.

LarKC aims to contribute in providing new and refine technologies to move the current abilities of semantic technologies to a further level of performance and features. For this reason, we expect that the LarKC primary markets are represented by those applications that leverage on semantic technologies in general, including the three use case of the project.

Firstly, we identified the most common types of applications based on semantic technologies, categorizing them between consumer-oriented applications and enterprise-oriented applications. Table 1 reports the results of such categorization: the first column is for consumer applications and the second column is for enterprise applications.

Table 1 : Consumer and Enterprise applications targeted within initial Market Analysis

CONSUMER APPLICATIONS	ENTERPRISE APPLICATIONS
Semantic Social Networking	Information Sharing
Semantic Bookmarks	Semantic Data Interoperability / Integration
Semantic Search & QA	Semantic Search, Discovery & Navigation
Semantic Desktop / Webtop / Email & IM	Commodity
Semantic Blogs & Wiki	Semantic Mashups and Composite Applications
Semantic Mobility	Semantic Infrastructure / Middleware (SSOA, SBPM, SWS, Virtualization, Policy-based Computing)
Reality Browsing & Context-Aware Games	Semantic Business Intelligence
	Semantic ERP Applications (CRM, PLM, SCM, HRM)
	Semantic Governance Compliance & Risk
	Semantic Web Sites, Wikis, Collaboration, Interest Networking & Collective Knowledge Systems



CONSUMER APPLICATIONS	ENTERPRISE APPLICATIONS
	Semantic Advertising, Marketing, Personalization & Customization
	Intelligent Systems, Agents, Robots: Knowledge-based Research, Design Engineering, Simulation, Planning, Scheduling, Optimization & Decision Support

For each type of application, we are currently proceeding in collecting on the project blog⁴ any useful reference related to its usage, adoption, trend or opinion. Such information will act as basis to perform the analysis that we aim to do for the exploitation plan. In particular, we expect those information to be useful to understand which features of LarKC may provide benefits to the applications and how this may be fulfilled for some of them.

3.3. Secondary Markets

Besides the final users of LarKC technologies, we expect the possibility to make revenues with other markets (named secondary markets) by leveraging on the know-how grown up during the project, by selling some LarKC results as prototypes or as commercial products.

For example, there are nowadays several applications based on semantic technologies that exist without being based on LarKC technologies. It's realistic to think that some of those applications can be further improved by including some LarKC technologies.

Moreover, we also expect the existence of external competitors able to satisfy the same users' needs of LarKC applications adopting similar or different technical solutions. Also in this case, LarKC can collaborate with such competitors by selling its know-how or its technologies. Figure 3 highlights some of the most prominent value and cash flows between the LarKC's value chain and the external competitors' value chain.

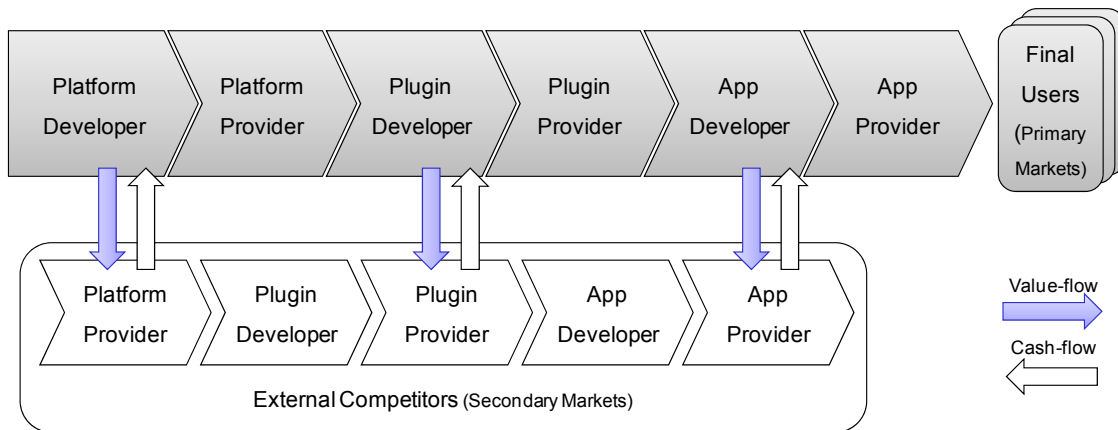


Figure 3: Service-flow and Cash-flow with the Secondary Markets

⁴ The blog page that reports this categorization is: http://blog.larkc.eu/?page_id=831



4. Conclusions

This deliverable represents the first draft of the Exploitation and IPR Plan for the LarKC project. Because of the relevance of the IPR issue, this deliverable was anticipated from M36 to M12 and a specific Task Force was set up to discuss and take a decision about the software and data licensing for the project and the Consortium partners.

The results of this discussion as well as the first draft of the Business Model are included in this document. An updated and enriched version will be released at M42 with deliverable D9.6.



Appendix A.

Apache License
Version 2.0, January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable



copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

- a. You must give any other recipients of the Work or Derivative Works a copy of this License; and
- b. You must cause any modified files to carry prominent notices stating that You changed the files; and
- c. You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and
- d. If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.



7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

How to apply the Apache License to your work

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

```
Copyright [yyyy] [name of copyright owner] Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at http://www.apache.org/licenses/LICENSE-2.0 Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.
```