H2020 5GASP Project
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D7.4 5GASP Intellectual Property Rights (IPR) Framework

Abstract

The 5GASP Intellectual Property Rights (IPR) Framework aims to set guidelines for IPR management with the project and builds upon the 5GASP Grant and Consortium agreements. Presented are procedures covering identification of potential inventions, lifecycle tracking and protection of Intellectual Property as produced by the 5GASP project.

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Disclaimer

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List of Acronyms

3GPP	3rd Generation Partnership Project
5G	Fifth Generation (mobile/cellular networks)
5G PPP	5G Infrastructure Public Private Partnership
ACM	Association for Computing Machinery
CA	Consortium Agreement
DMP	Data Management Plan
DOI	Digital Object Identifier
E2E	End-to-end
EC	European Commission
EG	ETSI Guide
eMBB	enhanced Mobile Broadband
EN	European Standard
ES	ETSI Standard
ETSI	European Telecommunications Standards Institute
EU	European Union
GA	Grant Agreement
GR	ETSI Group Report
GS	ETSI Group Specification
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IDF	Invention Disclosure Form
IP	Intelectual Property
IPR	Intellectual Property Rights
KPI	Key Performance Indicator
mMTC	massive Machine Type Communications
NetApp	Network Application in context of 5GASP (see D2.1 Ref.Architecture)
OA	Open Access
OSS	Open Source Software

Executive Summary

This deliverable discloses the guidelines for Intellectual Property Rights (IPR) management as derived and complemented to the 5GASP Grant Agreement and Consortium Agreement. Definitions, forms, and processes are presented covering identification of potential innovations, documentation, tracking and protection of Intellectual Property during the course of the 5GASP project, including consideration for Network Applications created by individual consortium partners.

1 Introduction

Based on the 5GASP Consortium Agreement and as stated in the project's Grant Agreement, this document is aimed at providing guidelines on how Intellectual Property Rights will be managed by the 5GASP consortium. More specifically, the objective of this task, started in M1 and to be carried out until the end of the project in M36, is to provide consortium members with a clear guidance, identification, and fair allocation of intellectual rights and patent contributions.
Additionally, this document establishes rules for the use of foreground and background knowledge and its distribution within the project as well as the rules for handling sensitive and confidential information.
This document also sets the framework for monitoring the protection of IPR within and outside the Consortium and will be integrated in 5GASP overall Communication, Dissemination and Exploitation Work Package 7.

1.1 Objective of this Document

To bring the 5G business concept to the market, it is essential that all consortium Intellectual Property (IP) that derives from the project is properly identified and managed. We envisage all interested parties will contribute in tangible and intangible assets according to their level of involvement and gained expertise during the project. Adequate IPR management will take place and will take care of issues such as:

- IP related rights and conditions of partners.
- Background brought by each partner, foreground developed in parallel, ownership of foreground.
- Access rights to background.
- Management of IPR through patent filing, determination of optimal licencing schemes, etc.

In order to enhance the compliance and understanding of most relevant matters related to the consortium IP, the document addresses relevant terminology and background, formats in which internal disclosure is created, as well as relevant existing and incoming intellectual property related to the different NetApps that are part of the project.

1.2 Organisation of the document

The document is organized in several sections: section 2 discusses the IPR management in the context of the particular project including definitions, ownership scheme, and internal consortium tracking documents. Section 3 proceeds to describe governance of IP protection during project execution, and section 4 details individual Network Applications (NetApps) IP protection provisions in regards to the fact that individual partner entities (or groups) will continue the creation and enhancement of participating NetApps.

2 IP Rights Management Foundations in 5GASP

2.1 Definitions

The following definitions will be used for our consortium colloquia and employed for partners' operational context and understanding for documentation in regard to project IP in addition but not superseding definitions already accepted by Consortium Agreement.

Intellectual property (IP)	A category of property that includes intangible creations of the human intellect.
Intellectual property rights (IPR)	The rights given to persons over the creations of their minds. They usually give the creator an exclusive right over the use of his/her creation for a certain period of time.
Foreground intellectual property	A newer property that develops over a project's duration.
Background Intellectual Property	Any IP that's created, invested, authored or developed and owned or created by the owner before the date of the agreement.
Patent	An exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem.
Copyright	A type of intellectual property that gives its owner the exclusive right to make copies of a creative work, usually for a limited time.
Digital rights management (DRM)	A set of access control technologies for restricting the use of proprietary hardware and copyrighted works.
Trademark	A recognizable sign, design or expression which distinguishes products or services of a particular trader from similar products or services of other traders
Patent infringement	Typically caused by using or selling a patented invention without permission from the patent holder.
Copyright infringement	Reproducing, distributing, displaying or performing a work, or to make derivative works, without permission from the copyright holder, which is typically a publisher or other business representing or assigned by the work's creator.
Design	A unique creative form that you can protect by registering it.
Open-source software (OSS)	Software that is released under a license in which the copyright holder grants users the rights to use, study, change, and distribute the software and its source code to anyone and for any purpose
GNU AGPL license	The GNU Affero General Public License is a free, copyleft license for software development that guarantees the degree of freedom to share and change the versions of the opensource code and making sure it remains free for all users.

As a consortium, we recognize that some types of IP are time-consuming to pursue; for example, patent applications are particularly time consuming, however selected NetApp owners are already actively pursuing filing of patents to protect their IP during the lifetime of this project so that they can pursue additional funding (such as Venture Capital backing), as well as to reduce their time-to-market after the end of the project, considering time as a very critical aspect given the evolving competition in the relevant patents. As it has been discussed in WP7 meetings, some consortium partners (this is reflected in the relevant tables in section 4) are considering filing their patents either to the European Patent Office (EPO) and / or to Unites States Patent and Trademark Office (USPTO).

2.2 IPR ownership scheme

Intellectual Property created during the lifetime of the project and beyond will belong to the partners developing the relevant software unless there are cases of joint inventions which shall be protected via joint IPR management procedures in respect to ownership.

Two types of IPR ownership schemes are envisaged for 5GASP:

- **Type A:** Individual ownership. Individual owned intellectual property rights strictly belong to the partner producing the foreground IP. Commercial exploitation can only be pursued by the partner whilst any information disclosure for the purpose of the implementation of the 5GASP project is protected via the Consortium Agreement and is adhered to European laws and the court specified in the Consortium Agreement.

- **Type B:** Joint ownership. Jointly owned intellectual property rights are possible in the scope of 5GASP especially in the co-working of NetApps to achieve the technical and business objectives of a 5GASP use case, as defined in WP4 in the DoW. In such joint works, two or more partners share the ownership of the joint intellectual property rights. A joint decision is required by all involved partners to determine collaboration schemes related to the exploitation of the foreground. A list of indicative collaboration schemes is the following:
  - Sharing of revenues of the commercial foreground with a contract between the parties that specifies the terms and conditions of the sharing and the percentages.
  - Licensing of rights from a party to other parties. A contact must be signed between the parties to specify the terms and conditions of the licensing.
  - Sub-licensing of rights from a party to other parties once again via a contract between the involved parties.

In section 4 “5GASP IP Protection Framework” we will present all the foreground IPs and their ownership schemes, along with their associated IP types, as they have been discussed in section 2.1 above.

2.3 Tracking

This section sets the Invention Disclosure Forms (IDF) between partners and how it will be tracked, background, OSS license tracking.

Project IDF Tracking Form (Table 2):

Internal Matter ID	*internal project ID of matter, sequential as assigned by project coordinator*
Partner(s) Name	*list of names*
Invention Title (if applicable)	*provisional name of invention*
List of Inventors (if applicable)	*list of names of inventors*
Public Disclosure / Date	*date where matter was published outside consortium documents*
Foreground Patents:	
Problem Context	*description of challenge the invention will solve*
Description of Invention	*method of how the invention solves given challenge*
Alternative methods of solutions by 3rd parties (including patent # if available)	*brief discussion how other solutions differ*
Related patent filing/grant	*assigned when matter has been submitted externally to a Patent Office*
Foreground/background OSS:	
OpenSource Software repository	*URL link to OSS repository for the project on foreground/background*
OpenSource Software license	*OSS license type used for the project*

For each foreground patent IP originating from the consortium and for each new background or foreground IP when concerting project-relevant OSS originating from a partner and brought into or originating natively during consortium efforts (where project-relevant is defined as linked or used otherwise in the project software), the partners will provide the above Invention Disclosure Forum filled out to the best of abilities and store it into the consortium Project Repository alongside other consortium documents and deliverables.

3 IP Management Framework

This section delineates process and procedures on how members of the consortium and consortium leadership will track, promote protection, and resolve internal ownership in an operational capacity for inventions related to 5GASP.

3.1 On-going Project Phase

Drawing a concrete IP mapping and planning of publication activities first of all requires the identification of relevant 5GASP IP assets: all expected IP values within the project, as above mentioned, have to be identified and listed, in a systematic way, in order to have a sort of project IP portfolio.
Therefore, the 5GASP project will create and maintain an IPR document repository for IDFs, alongside internal project documentation. This repository will represent the current state-of-the-art of IPR during the project's implementation. It will identify project inventions or relevant OSS background knowledge and provide traceable ownership.
As defined in the Invention Disclosure Form, for each new relevant result, elements should be identified, like partners directly contributing to its development, background needed and owner, rights to use such result and license scheme. This will pave the way to a further identification of actionable inventions and will allow the partners to have the most complete information in order to decide about the sustainability and options for extending or further IP protection once the project is finished.

In schematic form, the IP process lifecycle during project completion takes the following shape:

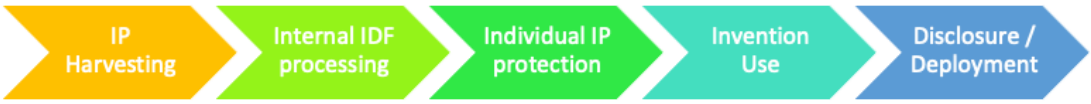

Figure 1: 5GASP IPR process phases

IP Harvesting: at deliverable milestones and/or during semi-annual plenary sessions, consortium members who participated in deliverables conduct an IP 'harvesting' session in which novel additions to the project are analysed for IP (foreground/background).

Internal IDF processing: once relevant inventions or new background is identified, Invention Disclosure Forms are created and filed per the template in section 2 in the IP repository of the project. The project coordinator notifies all consortium members at end of plenaries when IP listed in the repository has been added or amended (for example, adding external matters identifiers when pursuing a patent).

Individual IP protection: where applicable, inventors (as represented by their consortium members) may pursue additional IP protection in case of patents or trademarks with relevant authorities.

Invention Use: the novel additions to 5GASP are meant to enhance the project and system being developed, so they are used by individual NetApps or the system.

Disclosure/Deployment: Inventions are used in the project and part of the system, relevant data is published externally or disseminated, and open-source projects are listed or upstream contributions merged.

3.2 Post-project Phase

The mission of the 5GASP project is to become the leading European initiative for enabling SMEs & start-ups to automate the development, validation and certification of their innovative NetApps. This mission is actively pursued within the project and shall be demonstrated within the 36 months project via the eleven (11) NetApps of the project which shall be developed, validated and certified within the 5GASP platform, leveraging its novel NetApp onboarding and CI/CD tools. Moreover, the eleven NetApps shall be uploaded in the project's NetApp marketplace and community portal. As it has been discussed in the consortium and according to the type of IP protection of each NetApp, public information (that does not hinder any danger to the IP of the NetApps) shall be uploaded on the NetApp community portal, in order that 3rd party developers are provided with examples of onboarded and validated NetApps, so that the 3rd party NetApp developers shall be able to onboard and validate their NetApps in the 5GASP or in similar 5G environments.

The mission of the project is not intended to be last only for the 36-months duration of the project. On the opposite, the 5GASP consortium actively pursues to achieve sustainability of selected 5GASP innovations to ensure that 5GASP can be leveraged by 3rd party NetApp developers, after the end of the project. To that end, ITAV has agreed to support the project website and the community portal for at 5 years after the end of the project.

To achieve the 5GASP mission, the project is already working on free- and freemium-based business models that will ensure that the after the end of the project, a suitable business model shall be incarnated to sustain the 5GASP ecosystem. WP7 meetings are held on a weekly basis with a major topic for discussion being aspects related to the '5GASP Business Plan' deliverable (D7.5 / Month 24). In this document, the consortium shall firstly thoroughly analyse the relevant market via our ongoing market research process (whose first outcomes have been discussed in deliverable D7.3 at month 9 of the project). The market analysis shall include determination of market size, major competitors and level of their service, state of service delivery, including description of the services offered and their Value Propositions and competitive advantages. Secondly, the innovations of 5GASP that shall constitute its competitive advantages and shall be included in its Value Proposition, shall be associated with their agreed IPR, including latest IDFs, and disclosures as part of the process described in sub-section 3.1. In general, going forward, the legal framework of the Consortium and Grant Agreements shall apply to 5GASP members; public documentation under copyright in regards to service documentation already disclosed on the public website, public APIs, etc. will be kept in line with the long-term project mission. In the case of the 5GASP innovations publicly released as Open-source Software, their licensing terms shall be decided carefully within the consortium before the publication time. Thirdly, the business plan shall discuss the finally chosen free- and/or freemium- based revenue streams (e.g. paid consulting services to 3rd party NetApp developers by committed project members) that shall aid in covering costs related to sustaining and supporting the 5GASP innovations after the end of the project.

3.3 Open-source software, Data, and Documentation

As discussed in detail in D7.1, which governs contributions to open-source initiatives, data and documentation ownership, the consortium will take the following approach to each, in addition to new background/foreground knowledge described above:

The consortium will follow strictly the license terms of the open-source project in question. The main open-source initiatives considered by 5GASP, for example OpenSlice, ONAP and OSM, have released their code under exploitation-friendly licenses, such as Apache 2.0. Contributions to the code base of such projects will follow the target license terms.
5GASP NetApp providers who aim to offer their solutions as open source under specific licenses and terms that their respective owners will decide according to any existing IPR.

The owner initiates the process determining the distribution terms. To facilitate this process, and in order to easily maintain an overview of open-source contributions of 5GASP results, all partners acknowledge that any result submitted to the target software repository will be provided under the corresponding license terms of the open source project. An electronic copy of the license terms will be made available at the hosting repository of each open-source project. There will be a 5GASP-managed OSS repository on GitHub that will host eventual forks of OSS where contributions are expected.

At the end of this step, an IDF for tracking new IP that will be open-sourced is also saved as described in section 2 to the project document repository.

During the course of 5GASP, NetApp developers will typically create data during the usage of the testbed and 5GASP services either directly via NetApps to be run on the testbed, or by attaching entities to the infrastructure that may be used to generate data, e.g. attached databases, user equipment (UE) or sensors, application logs. The terms of use of the 5GASP services will include a waiver statement that gives the 5GASP project and the testbeds sites' operators the right to collect, store and evaluate the gathered data in specified ways. Data ownership always remains with the NetApp developer or experimenter.
Production logs of the 5GASP platform and testbeds may also constitute an interesting source of information for others, so in accordance with D7.1 plans, datasets with anonymized information will be created containing this information. Such dataset will be released through our project webpage and eventually submitted to public repositories such as data.europa.eu; this data will be considered as public and as such will not be tracked further by consortium IPR framework or provided further protection than what is stipulated in the CA.

The documentation of 5GASP services and APIs will be publicly available, where the external developers can get access to the required information. This information will be typically part of 5GASP public deliverables in the form of aggregates and statistical information; this data will also be considered as public and as such will not be tracked further by consortium IPR or protected further except by existing provisions in the CA.

4 5GASP IP Protection Framework

In the following tables, we present the expected protectable IP arising from the 5GASP project from the viewpoints of i) the 5GASP platform; ii) individual NetApps to be developed by partners; iii) collaborative NetApps or software methods and tools jointly developed by more than one partner of the 5GASP consortium. Note that all following tables are including the following details:

- Short description of the foreground to be protected.
- Involved partner(s).
- Type of IP. The type typically belongs to one of the types defined in section 2.1.

IPR ownership schemes: **Type A** (individual ownership) or **Type B** (joint ownership) as defined in section 2.2.

TABLE 3: EXPECTED PROTECTABLE IP ARISING FROM THE 5GASP PROJECT IN RESPECT TO THE 5GASP PLATFORM AND ITS ASSOCIATED TOOLS

Protectable result	Involved partners	Type of IP	IPR ownership scheme
Architecture of the 5GASP platform	All partners	Creative Commons	Type B
DevOps tools	OdinS, ITAv	Open-source software (OSS)	Type B
CI/CD tools	OdinS, ITAv	Open-source software (OSS)	Type B
5GASP Certification Pipeline	OdinS,EANTC	Creative Commons	Type B
5GASP High-level Technical Methodology (test plan)	OdinS,EANTC	Creative Commons	Type B
5GASP Low-level Methodology (implementation of tests)	OdinS,EANTC	Copyright	Type B
5GASP Certification Mark/Program	OdinS,EANTC	Trademark	Type B

TABLE 4: EXPECTED PROTECTABLE IP ARISING FROM THE 5GASP PROJECT IN RESPECT TO THE 5GASP INDIVIDUALLY-OWNED NETAPPS

Protectable result	Involved partners	Type of IP	IPR ownership scheme
NetApp 1: Virtual On-Board Unit provisioning NetApp (vOBU)	OdinS	Copyright/Software Registration	Type A
NetApp 3: ITS station NetApp	Yokogo	Copyright/Software Registration	Type A
NetApp 4: Multi-domain Migration NetApp	OdinS	Copyright/Software Registration	Type A
NetApp 7: Efficient MEC handover NetApp	UNIVBRIS	GNU AGPL license	Type A
NetApp 8: PrivacyAnalyzer NetApp	Lamda Networks	Copyright/Software Registration	Type A

NetApp 9: 5G Isolated Operation for Public Safety NetApp (5G IOPS NetApp)	ININ	Copyright/Software Registration	Type A
NetApp 10: Vehicle Route Optimizer NetApp	Neobility	Copyright/Software Registration	Type A

TABLE 5: EXPECTED PROTECTABLE IP ARISING FROM THE 5GASP PROJECT IN RESPECT TO 5GASP JOINTLY DEVELOPING OR INTERWORKING / COLLABORATIVELY DEVELOPED SOFTWARE METHODS AND TOOLS

Protectable result	Involved partners	Type of IP	IPR ownership scheme
NetApp 2: Virtual RoadSide Unit provisioning NetApp (vRSU)	Odins/YoGoKo	To be agreed between the two partners.	Type B
NetApp 5: Vehicle-to-Cloud (V2C) Real-Time Communication NetApp	BLB/DriveU	Patent US20210114616A1 "Device, system, and method of wireless multiple-link vehicular communication".	Type B
NetApp 6: Remote Human Driving NetApp - Teleoperation for assisting vehicles in complex situations	BLB/DriveU	Patent US20210116907A1 "Device, System, and Method of Autonomous Driving and Tele-Operated Vehicles".	Type B
NetApp 11: Fire detection and ground assistance using drones (FIDEGAD)	UoP / Lamda Networks	To be agreed between the two partners.	Type B
Privacy analysis of networked messages in MEC environments	UNIVBRIS / Lamda Networks	To be agreed between the two partners.	Type B

5 Conclusions

In 5GASP, all participating consortium members and project management are aware of the strategic importance of intellectual property rights and how fundamental and impactful in the economy they can be. IP rights and innovation management are at the base of the creation of commercial value both in the world of business and academic research institutions and thus, the approach and handling of Intellectual Property in 5GASP will respect the overall IPR rules as outlined in all relevant EU-level regulations.

The present document sets up the framework, context, and guidelines of a management of knowledge and IP plan within the 5GASP project, with the following objectives:

- Align partners on processes and terms necessary to produce inventions based on the advances on the project research objectives.
- Mark the different types of new knowledge and how to process and protect information and inventions for the public good.
- Promote patenting and open-source project when the public good is best served by it or for providing incentives to partners to continue innovation activities via proprietary protected knowledge safeguarded by patent or copyright instruments

In order to achieve the mentioned objectives and as described in the present IPR management plan, each consortium member in the project will make reasonable and good faith efforts to:

- Identify documents and share the existence of any relevant background Intellectual Property or any prior contractual agreements that may affect rights of the project
- Expedite disclosure and evaluation of project Intellectual Property, background and foreground Intellectual Property, open-source projects, relevant public experimentation data and related documentation to facilitate the effective categorisation of the project Intellectual Property
- Inform, on a periodic basis, staff involved in the project of the expectation that the research is to serve the public benefit and the importance of prompt disclosure of developments and potential inventions.
- Encourage researchers to disclose to the publications, including presentations, website postings, and article submissions, prior to disclosure for publication (submission or presentation), related to the project to ensure timely filing of patent, trademark or copyright applications for Project Intellectual Property.

In conclusion, we have successfully established the necessary strategy for IPR management as a best practice to achieve the overall project goals. We have also outlined the process of record keeping, as well as the intended IPR foreground schemes for the 5GASP NetApp vendors. The processes and mechanisms outlined in this document reflect the 5GASP spirit to make the overall foreground as accessible and open as possible, while keeping individual NetApp IP protected, within the restrictions of the Consortium Agreement.