# Bloomen

## Blockchains in the new era of participatory media experience

## HORIZON 2020

## 762091 – BLOOMEN - H2020-ICT-2016-2
## ICT-19-2017 Media and content convergence

### D1.3 Interim project report

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# 1 Explanation of the work carried out by the beneficiaries and Overview of the progress

In this section, we provide the details of the objectives addressed during this period and in what extent they have been addressed (see Section 1.1), as well as the work carried out on a WP-basis (see Section 1.2), including the submitted deliverables.

## 1.1 Objectives

In this section we describe progress of the project against respective objectives achieved during the reporting period. In summary, the project started by defining in detail the three use cases, music, photo and web TV, and the related requirements for the Bloomen platform. The work continued with the design of the Bloomen architecture and the initial development of the defined services, Bloomen platform and mobile clients. In parallel to these technical developments, the use cases have been also defining their roadmap towards the deployment of the Bloomen infrastructure in pilot demonstrations with real users, and therefore have started their user engagement process. This activity has been complemented with an extensive dissemination campaign involving the most significant events and communities related to the Bloomen objectives.

Here following there is a more detailed overview of state of advancement against each of the project stated objectives.

| Objective | Sub-objective | Com-pletion % | Description |
|---|---|---|---|
| Obj.1 - Design and implement a distributed multiplatform architecture for content creation, sharing and consumption based on blockchains | Design of the architecture | 90% | The consortium has already defined the initial approach of the overall Bloomen architecture, with all the different layers and modules. This design of the Bloomen architecture is the basis that is being used to build the whole Bloomen framework. In any case, this design is not static, instead it is permanently updated through the feedback coming from the different services and modules implementation, as well as from the pilots requirements and deployment. By the end of the project, the final architecture will be provided, as a consequence of all the received feedback and the corresponding modifications to the architecture design. |
| | Implementation and integration of the architecture modules | 20% | All the implementation tasks are started at this point, including the implementation of the different services, and the different modules that constitute the Bloomen platform and the Bloomen mobile components. |
| Obj.2 - Provide a set of innovative services | Blockchain operations, transactions and micropayments | 60% | Once the main blockchain technology has been selected for the project, Quorum, different services for blockchain operation have been defined and demonstrated for each of the three Bloomen use cases. |

| | Anonymous personalization | 50% | The distributed and decentralized approach adopted by Bloomen for the identity management framework, including the anonymity and personalization functionalities, has been defined, and a first software prototype has been developed. |
|---|---|---|---|
| | Copyright management, preservation and monitoring | 60% | Based on previous developments from Kendraio, the mechanisms for implementing copyright management in Bloomen have been further developed considering the decentralised nature of the P2P architecture adopted by the project. Specific focus has been put into the music use case and its specific requirements in terms of copyright management. |
| Obj.3 - Validate the new Bloomen offering through real life use cases | Music use case | 30% | The description and specification of the music use case was completed, and work has continued by defining the data models and related workflows for copyright management. The plan for user engagement and pilot deployment has also been completed, and first contacts have already been established. |
| | Photo use case | 30% | The description and specification of the photo use case was completed, and a first demonstrator has been prepared to show it to potential stakeholders, in particular photographers and editors working for media companies. The plan for user engagement and pilot deployment has also been completed. |

| | WebTV use case | 30% | The description and specification of the WebTV use case was completed, and a first demonstrator has been prepared to show it to potential stakeholders, in particular media users, but also media industry experts, blockchain enthusiasts and, most significantly, tax authorities. The plan for user engagement and pilot deployment has also been completed. |
|---|---|---|---|
| Obj.4 - Provide a blueprint of best practices and disruptive use case business models | Demonstrator to show how to set-up and operate exchange of content using blockchains | 50% | The initial business model for each of the three use cases has already been defined, with special focus on the detailed definition of the different customer segments and the value proposition that Bloomen offers to each of them. This very early description of each business model has allowed the project to better focus the functionalities and demonstrations addressing the key aspects of each use case. |
| Obj.5 - Maximize the impact of Bloomen results | Dissemination and community building | 40% | Huge amount of effort and activities have been undertaken for the dissemination of Bloomen and attract the interest of and create awareness to related communities around blockchain and media sectors close to Bloomen use cases. |
| | Exploitation of the Bloomen platform | 40% | An initial analysis of the potential exploitation of the Bloomen platform is already available, including a market research and the identification of exploitable modules and assets and how they related to the different use cases. |

## 1.2 Explanation of the work carried per WP

### 1.2.1 WP1 Project Management

Task 1.1 Project Management & Administration

The management tasks during this period can be classified into the following groups of activities:

- Contractual: Negotiation and signature of the Consortium Agreement before the project started, signature of the Grant Agreement, and implementation of a contract amendment to fix the starting date of the project.
- Financial: Reception of the pre-financing payment from the Commission, agreement on the payment plan with all partners, management of payments to all partners, management of the biannual financial report from each partner, detailing personnel and other direct costs for the period, and start the procedure for the production of the financial statements for the project first period.
- Administrative: Allocation of the effort and cost budget of partners throughout the project into the different periods; preparation and follow-up on the internal quarterly progress reports from partners; preparation of the reporting for the Commission (this deliverable); and formal delivery to the Commission of completed project deliverables.
- Communication: Establishment of all the means for internal communication inside the consortium, such as permanent teleconference bridge, intranet collaborative space (based on Confluence) and distribution lists for different project activities (general, administrative, and technical). Keeping formal communications with the Commission.
- Organization: Set-up of the management bodies of the consortium, and organization of consortium meetings, review meetings, and specifically focused technical meetings whenever necessary. Particularly, we had the Kick-off meeting at the beginning of the project, five consortium meetings approximately every three months, and the first technical review meeting. We are now currently organizing the midterm review and another consortium meeting to take place at the end of March'19. In addition to all these face to face meetings, bi-weekly teleconferences take place to follow-up on project progress and discuss any relevant issue.

The only partner participating in this task is Worldline, which has been in charge of all these activities.

Task 1.2 Scientific and Technical Coordination

This task refers to all activities for coordinating and ensuring the high scientific quality of the project results and for resolving technical issues. This task closely follows the project developments and provides supports as required (ensuring that outputs of one work package are adequate inputs for the following work packages' tasks, making sure

that all technical work packages work towards accomplishing the project's objectives, etc.). During the reporting period, the scientific and technical coordination activities took place in the frame of the regular telcos and physical meetings.

Task 1.3 Quality and Risk Management
We have established and put in place all the quality review and assessment procedures of the project. In particular, it has defined a quality procedure for project deliverables, which includes an internal review from partners not involved in the production of that deliverable, a procedure which considers both contents and formatting. This procedure has already been applied to all project deliverables. We have also defined the risk management procedures and we are continuously collecting and taking action on all potential project risks.

The only partner formally participating in this task is Worldline, which has been in charge of the formal definition of all these activities, but the whole consortium has been involved in the execution of these procedures in the frame of their respective tasks.

Task 1.4 Data Management
Since Bloomen participates in the H2020 Open Research Data Pilot (ORD Pilot), this task is related to the definition of the Data Management Plan (DMP) of Bloomen, with the aim to provide an overview of the available research data arising from the project, the data accessibility, management and terms of use. The initial version of the DMP provided the structure and approach, and the document is being updated with new contents whenever new datasets from the project become available. At this point in the project, the music use case is the most advanced in this respect, with the structure of some datasets already defined (see Section 3 on this document).

The only partner formally participating in this task is Worldline, which has been in charge of the formal set-up of the DMP, but the use case partners have a key role in the definition of the data that they are going to manage in their respective pilots.

## 1.2.2 WP2 Bloomen Use Cases, requirements and architecture

Task 2.1 Use cases description and KPIs
Bloomen explores the usability of blockchain technologies with a focus on three use cases: Music, photos and video. Each of the use cases essentially belongs to a different area of media management. Music is a large market in-itself with multiple challenges regarding rights management, based on the disruption of the market towards digital streaming. Photos are an area of disruption, too, but the details are very different. The key goal of the Bloomen photo use case is to enable fair, reliable and trustable exchange of photos between creators (photographers here) and media organisations. Finally, the video use case caters to the needs of TV station like project partner Antenna to find alternatives to very large and dominating streaming platforms, such as being able to offer specific content based on new payment methods, enabled by blockchain.

Each of the use cases has defined specific KPIs, though some of these measurements are subject to change while the demonstrators evolve. The work on demonstrators is the currently most important activity, as to move from theory to practice and to work details for all three demos/markets described above.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T2.1 |
|---------|--------------------------------------|
| WLI | <ul><li>Contribution to the discussions on deliverable D2.1 for the definition of the three project use cases, taking into consideration both the technical and business perspectives and the underlying technologies from which the use cases may take advantage.</li><li>Organization of weekly calls for common discussions and follow-up on the D2.1 deliverable.</li><li>Start working on demos for the underlying technologies that will be showed at the technical review meeting, in particular demonstrations related to the MultiChain blockchain technology.</li><li>Attendance to the first technical meeting on 20 December 2017 in Madrid of the Spanish blockchain initiative Alastria (https://alastria.io/), in order to better understand potential synergies with this initiative.</li></ul> |
| ICCS | <ul><li>Participated actively in the use cases definition that will be used in the project. The main focus of the work was put on the identification and assessment of the respective blockchain technologies that can be candidates to be deployed in the project.</li><li>Examined theoretically different blockchain mechanics and technologies such as Bitcoin and Ethereum platform.</li><li>Provided contribution to deliverable D2.1.</li></ul> |

| | |
|---|---|
| DW | • Organisation of a DW internal use case workshop and the analysis of the results.<br>• Initial use case related market research (Blockchain and News Media/Journalism) and summarised the results in a presentation that was used at the workshop.<br>• As deliverable leader, DW provided the content structure for the Deliverable D2.1 "Use Case Descriptions and KPIs" with detailed instructions for partner contributions.<br>• Updated definition of its Photo use case, further research, and on this basis the production of DW's own chapter with a detailed use case description, including a business oriented summary (chapter 2) and a detailed use case scenario (chapter 3).<br>• DW reviewed the other two use case partners contributions, provided general editorial chapters and produced the deliverable D2.1 for use in project-internal architecture definition and technical requirements planning.<br>• Management by DW to describe use cases and define relevant KPIs specific for the Bloomen photo use case<br>• D2.1: Deliverable management, liaison with all partners, integration of contributions, development of general editorial chapters, final document production and organisation of two internal reviews.<br>• Production of final DW chapters for D2.1 (Photo Use Case Description)<br>• Extensive work and consultation for the Bloomen photo use, e.g. flow diagrams as to how blockchain based components are needed by stakeholders |
| BMAT | • Music Industry Use Case definition (along with Kendraio)<br>• Contribution to D2.1: Describing Music Industry Use Case, Industry context, Market Situations, Bloomen Opportunities, Business Objectives and a draft version of KPIs (reviewed and completed by ATC) |
| Kendraio | • Worked on Music Industry Use Case definition (along with BMAT).<br>• Contributed to D2.1 document added Kendraio App description in sections 3.2, 3.3.6, 3.4.6 and 3.5.5.<br>• Contributed to D2.1 document general review of whole document. |

| ATC | • Research on Blockchain technology performance and affecting factors<br>• Deciphering of use cases demands and performance factors and its demands from the Bloomen Blockchain Platform<br>• Contribution to D2.1 defining the methodology to lead to the definition of KPIs<br>• Contribution to D2.1 defining with use cases responsibles contribution, the Critical Success Factors (CSFs) for each service offering and the Bloomen Platform along with the associated KPIs addressing CSFs. |
|---|---|
| ANTENNA | • Definition and description of the WeBTV Use Case, and contribution to D2.1: Describing WebTV Industry Use Case, Industry context, Market Situations, Bloomen Opportunities, Business Objectives and a draft version of KPIs. Cooperation with DW which was the leader of the specific task.<br>• Extensive work and consultation for the Bloomen WebTV Use Case, e.g. flow diagrams as to how blockchain based components are needed by stakeholders<br>• Definition of relevant KPIs specific for the Bloomen WebTV use case |

Task 2.2 Elicitation and Analysis of requirements

The purpose of this task is to elicit the technical requirements for the three use case pilots in Bloomen, which were finally documented in deliverable "D2.2 Bloomen Requirements Analysis". For this purpose, a requirement engineering process was defined, including four phases (elicitation, analysis, validation and management), from which the two first ones were developed under this task, producing both specific use case requirements and generic technical requirements. The work in this task also included a first version of the pilots operation plan, including among others, a timing framework, evaluation KPIs, and risks and contingency plans.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T2.2 |
|---------|-------------------------------------|
| WLI | • Contribute to deliverable "D2.2 Bloomen Requirements Analysis" from the technological perspective, and organize and lead contributions from partners.<br>• Organize weekly calls for discussions and decisions related to deliverable D2.2 until its completion.<br>• Finalize the contributions to deliverable "D2.2 Bloomen Requirements Analysis" and proceed to the formal delivery of the document. |
| ICCS | • Started to examine Hypeledger Fabric hands-on with complementary Hyperledger projects such as Explorer & Composer by Exploiting new VMs for Hyperledger blockchain network simulation. ICCS Started to examine Ethereum platform hands-on for actual micropayments: metamask extension, remix editor, token creation via ERC20 interface, ropsten testnet and others, and started also to examine Ethereum platform hands-on for copyright preservation: metamask extension, remix editor and others.<br>• Provided an extensive contribution to deliverable D2.2. It provided also Landscape/Expectations/SWOT presentation for Blockchain technologies (Eth, HL, MUL) |
| DW | • DW took an active part and provided extensive contributions to technical requirements. Working with ATC as the technical partner DW extended work done in D2.1 for the Bloomen Photo Use Case.<br>• D2.1 provides a detailed overview of potential stakeholders, roles and workflows affected by blockchain based applications.<br>• The description of the stakeholders describes motivations, workflows today and how they could be changed in the future.<br>• DW Photo use case related market research<br>• DW use case and business model related market research<br>• Participation in Deliverable D2.2 |
| BMAT | • Conversations with tentative stakeholders: TEOSTO, SGAE and Native Instruments with the aim of engage them to act as participants of the future activities for the Music Use Case and pilots.<br>• First versions of D2.2 - Requirements Analysis<br>• Definition of Pilot use cases and technical requirements for D2.2 - Bloomen Requirements Analysis, including: Users, Stakeholders and Roles; Data Models; Security and Privacy; Activities; and Requirements.<br>• Contribution and review to D2.2 - Bloomen Requirement Analysis |

| Kendraio | • Internal discussions about Kendraio App regarding requirements and architecture – essentially how to move the old Kendra Hub prototype to a modern framework with better tooling for building desktop and mobile apps.<br>• After discussions with Worldline decided to proceed with Angular framework and Ionic.<br>• Contributed to D2.2 initial talks, and to D2.2 document and added copyright requirements to all use cases. |
|---|---|
| ATC | • Analysis of Requirements of potential end-users, especially of News Media use case.<br>• Contribution to D2.2 identifying the functional requirements of News Media use case in collaboration with DW.<br>• Contribution to D2.2 for generic requirements for Bloomen Platform. |
| ANTENNA | • Informal discussions with some of the biggest producers for Television at the MIPCOM 2017 conference, with the aim of engaging them with our ideas in regards to the WebTV use case.<br>• Definition of Pilot use cases and technical requirements for D2.2 - Bloomen Requirements Analysis, including: Users, Stakeholders and Roles; Data Models; Security and Privacy; Activities; and Requirements. |

Task 2.3 Bloomen overall Architecture and Specification

The purpose of this task is to describe the decentralized P2P architecture proposed by the project, which will enable the media convergence under the Bloomen concept. This architecture will provide the basis for multiple application types (e.g. the use cases described in Task 2.1) and will satisfy requirements for decentralized, secure transaction, identity management & control, and data privacy and management. The main outcome of the specific task is the deliverable D2.3 Initial Bloomen overall architecture. It is the main reference guide to feed with the appropriate specifications the development of the Bloomen frameworks and enablers.

The consortium partners have provided a reference architecture and specification of the Bloomen Architecture, the software components needed and their mapping to the Requirements. A brief summary of the requirements analyzed on deliverable "D2.2 Bloomen Requirements Analysis" is given together with their possible association with the architecture conception and design. All the different layers and modules are analyzed and explained in detail.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T2.3 |
|---------|--------------------------------------|
| WLI | • Contribute to the analysis of the different blockchain technologies that are being considered as potential candidates to be used in Bloomen.<br>• Prepare the MultiChain demonstration for the review.<br>• Prepare the MoBlo presentation methodology for blockchain modelling.<br>• Contribute to the architecture discussions, including the final decision on the selection of the blockchain technology that is going to be used in Bloomen.<br>• Contribution to deliverable D2.3 providing the first version of the Mobile APP wireframes. |
| ICCS | • Preparation and circulation of the Bloomen Architecture Initial Draft.<br>• Creation and circulation of the Initial Bloomen Overall Architecture Deliverable (D2.3). Contribution to D2.3, organization and finalization of the deliverable.<br>• Cyprus Meeting architecture presentation: WebTV Use Case Architecture+UML for it+message sequence diagram for each architecture module(Asset, KYC, Login-Account) & whole webtv architecture. |
| Kendraio | • Contributed to D2.3 document and added sections for copyright and Kendraio App.<br>• Discussed with WLI the use of Adapters being used independently of the Kendraio App and referred to independent repository. |
| ATC | • Preliminary contribution to the specification of Bloomen overall Architecture, using News Media use case as a basis.<br>• Contribution to the final decision for the blockchain technology to be used<br>• Contribution to D2.3 - Initial Bloomen overall Architecture (REST APIs, smart contracts) |

## 1.2.3 WP3 Bloomen blockchain for media and content convergence

Task 3.1 Blockchain operation: transactions, blocks, micropayments for media content
The main focus of this task is to implement the Bloomen blockchain framework, tackle the research challenges and issues that stem from the need to facilitate through blockchains the functionality to support the Bloomen infrastructure for media convergence and, finally, implement a library of routines for building, maintaining, and disseminating different types of blockchains. During the reporting period the partners

involved in the specific task experimented with a wide set of blockchain technologies including Multichain, Quorum, Ethereum, Hyperledger and others. In overall the developments of the reporting period concluded to the first prototype deliverable of the respective tasks which is D3.1 Blockchain transactions and payment basic services - 1st cycle.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T3.1 |
| --- | --- |
| WLI | <ul><li>Preparation of ToC for deliverable D3.1, contribution with the full description of the Multichain demonstrator (DEMO2), integration of all contributions from the other partners, and preparation of the final version of the document.</li><li>Development and setup of the demonstrator based on the Multichain technology.</li><li>Creation of an Alastria node (Arrakis testnet) , which is based on Quorum (the blockchain technology selected by the project), provide the other technological partners with instructions on how to do it, and support them in the process.</li><li>Creation of a connection gateway that prevents direct communication between users and the Quorum node to avoid unwanted access.</li><li>Migration of the demonstrator that was based on the Multichain technology (DEMO2) to Quorum and deployment in an Alastria node.</li><li>Definition of payments and prepaid cards, to be used initially by the WebTV use case.</li><li>Creation of a contract generation tool that allows you to store JSON documents within them.</li><li>Creation of a demonstration website to study high concurrence situations in relation to the end user's expectations (200 concurrent users).</li><li>Creation Alastria node on mainnet (Telsius).</li><li>Creation of a transaction monitor with GRAYLOG for future monitoring tool.</li><li>Start of the construction of a desktop application with the ability to interact directly with smartcontracts without mediators. This demonstration tool is inspired by the requirements of the music usecase.</li><li>Load tests with the demonstrator website.</li></ul> |

| ICCS | • Forked Bitcoin source code and created new experimental cryptocoin for testing and research purposes named 'NTUACOIN'. |
|---|---|
| | • Started working on a Ethereum demo for News Media Use Case (integration with MongoDB, gridfs framework): demonstrator was about purchasing online media content and preserving the corresponding content provider copyrights through blockchain networks. Multichain full demonstrator with UI: researching and deploying platform provided functionalities such as streams, granting permissions and others. |
| | • Preparation of the Demo Hyperledger for WebTV Use Case (demo1.bloomen.io: presented at the Review Meeting at Brussels 19-4-2018). |
| | • Provided contribution to deliverable D3.1. Moreover, ICCS started to examine Quorum blockchain platform and its mechanics |
| | • Research on blockchain implementation using Neo4j graph database and Python programming language. Different consensus algorithms were implemented and examined such as Proof of Work, Proof of Stake and one we proposed, taking advantage of features and advantages of Neo4j graph database, called proof of Motion. |
| | • Implementations based on Quorum blockchain framework:<br>  o we created an environment with 7 Quoreum nodes and a demo application running on top of these nodes.<br>  o we experimented with implementation exploiting the features of public and private transactions within a Quorum network of many nodes.<br>  o learned/used Truffle framework to deploy smart contracts we created to Quorum. Using this framework, we could also deploy to Qurum smart contracts we had already created for Ethereum blockchain framework.<br>  o Experimented with the integration of database solutions with Quorum blockchain such GridFS.<br>  o Experimented with the integration of IPFS within Quorum blockchain.<br>  o Created Quorum applications based on Vagrant.<br>  o Created a dynamic, dockerized Quorum applications, without using Vagrant, with many nodes as docker images. It includes all the related libraries and prerequisites (Quorum, Constellation, Python, Docker Composer etc.) and it is easily maintained and expanded for the needs of Bloomen.<br>  o We created a Qurum/Alastria Node and connected to Alastria network. |

| ANTENNA | • Research and collaboration with industry experts, regarding the economics of the virtual currency to be used on the WebTV Pilot. |
|---------|---------------------------------------------------------------------------------------------------------------------------------------|

Task 3.2 Anonymous personalization over open, trustless media platforms

The specific task focuses on the research issues and the development of the Identity and privacy management framework, including the anonymity and personalization functionalities. Three issues are addressed: First, given the decentralized nature of the P2P architecture proposed by the project, we will address how to distribute and decentralize the identity management functionality that is present in current centralized media sharing frameworks. Second, we address how to achieve anonymization in distributed ledger technologies where, by nature, data are being shared in the blockchain. Finally, we investigate how, with the complexity induced by both the decentralization and the two levels in the architecture, identity management can be made to be universal, i.e., how it can extend across very dissimilar use cases. The outcome of the development work is a set of software modules that provide the desired functionality for the Bloomen use cases. The outcome of the work for the reporting period is presented in the deliverable D3.4 Anonymous personalization services -1st cycle.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T3.2 |
|---------|-------------------------------------|
| WLI | • Start working on identity and smart contracts that have ownership capabilities.<br>• Proof of concept of use of HD Wallets for the anonymization of purchases and prevent the creation of buyer profiles. |
| ICCS | • Provide a first Anonymous Personalization Study: 1) research on anonymity & security over blockchain networks (coin mixing, privacy preserving smart contracts, user anonymity over blockchain networks 2) presentation and internal discussion with ICCS team 3) AnonPers Architecture V1.1.<br>• Organize, edit and finalize deliverable D3.4. Moreover created the demonstrator of it: demo5.bloomen.io: AnonPers Demo<br>• Anonymization and personalization tool implementation based on Hyperledger Fabric, Composer and Explorer.<br>• Further implementations on the anonymous personalization service. Initiation on the related Quorum blockchain implementations |

| ATC | • Research on the identity management of the Bloomen framework<br>• Creation of the demonstrator for News Media Use case<br>• Contribution to D3.1-Blockchain transactions and payment basic services - 1st cycle with the description of News Media demonstrator – full description of the News Media demonstrator<br>• Examination of Quorum platform<br>• ATC is moving the demo of News Media on Alastria. It has also updated and tested News Media demo to ensure that it is ready for News Media Pilot. |
|---|---|
| ANTENNA | • Feedback towards the developments done by ICCS on the WebTV platform demonstrator. |

Task 3.3 Copyright management, preservation and monitoring

This task focuses on the issues related to copyright management, preservation and monitoring across the entire Bloomen ecosystem. Development has continued on data models and software prototypes of potential mechanisms for implementing the required features. This relates, in a general sense, to addressing the needs of the Bloomen platform as a whole, and in specific ways as required by the three use cases. During the reporting period, further development has been done on the copyright management features already in development by Kendraio. This has included work on tagging of media assets with rights, credit, and scene metadata. Further work has been done on adapters (API clients) in preparation for processing data feeds from third-parties with varying schemas and formats. Work has also been started on deeper analysis and prototyping of potential solutions for the claims process that will be required by the music use case.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T3.3 |
|---|---|
| WLI | • Start working on identity and data ownership<br>• Collaborate with Kendraio and BMAT to align the requirements of document D2.2 to the planned developments. |
| ICCS | • Preliminary work on the integration of copyright management work in the blockchain infrastructure of Bloomen |

| BMAT | • Meetings in Nicosia about copyright management.<br>• Peer-review of D3.7 - Copyright management, preservation and monitoring - 1st cycle.<br>• Definition of rights metadata data model for sound recordings and musical works. |
|---|---|
| Kendraio | • Preliminary conversations with tentative stakeholders: Mycelia, Real World Records, PRS, PPL and others.<br>• Created and set up GitHub Kendraio App repository for coding prototype.<br>• Coded upload screen for Kendraio App to demonstrate multiple assets being uploaded to different service providers simultaneously.<br>• Continued preparation of the Kendraio App as https://demo4.bloomen.io (to be presented at the Technical Review Meeting<br>• Created, commenced and completed work on D3.7 document "Metadata and Copyright Data Creation". Described various sections of Kendraio App, the history and the future.<br>• Continued work on the Kendraio App: moving from Ionic for Material for more consistent development experience; and moved image tagging code from web-extension to main Kendraio App.<br>• Started internal discussions and work on D3.8 "Copyright management, preservation and monitoring - 2nd cycle": Created ToC for D3.8 document.<br>• Discussed music case with BMAT and need for user interface for Rights Collective – as demonstrated by BMAT. |
| ATC | • Research on methods and techniques of rights management of the products of different users<br>• Examine methods of monetisation of digital content. |

## 1.2.4 WP4 Bloomen platform and modules

Task 4.1 Web platform and service end points
Task 4.1 develops the Bloomen platform, which hosts the Bloomen services for the different use cases. Based on the user requirements defined in D2.2 and on close collaboration with the owners of use cases, the technical partners finalized the big picture of the platform, while they have also mapped the available methods/components on one or multiple use cases.

The architecture of the platform, along with the technology stack have been defined and the first cycle of the implementation, that followed an agile methodology, has been already completed. The project is already offered open source and the same applies for

the set of smart contracts that has been built and deployed onto the Blockchain. The developments of the reporting period concluded to the first prototype deliverable of the respective tasks: D4.1 Bloomen Web platform and service end-points - 1st cycle.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T4.1 |
| --- | --- |
| WLI | • Start contributing to the definition of the Bloomen platform.<br>• Creation of a basic implementation with the development framework selected by the consortium (NestJS).<br>• Preparation of screen designs for the music use case. |
| ICCS | • Initial development efforts for the development of relevant APIs to be used for the Web platform - blockchain integration<br>• Contribution in the definition of the APIs and functional components integrated with the blockchain framework of Bloomen. |
| BMAT | • Participate in discussions in Nicosia about Bloomen common blockchain technologies<br>• Adaptation of WLI Bloomen developments for the specific music use case - UI/UX design<br>• Review of Music Use case Requirements and KPIs for platform integration |
| Kendraio | • Reviewed D4.1 with comments and suggestion for internal review. (@Daniel Harris) |
| ATC | • Initial work on the design of Bloomen platform, hosting the different Bloomen services<br>• Meetings with technical partners to finalise web platform approach.<br>• Working on Bloomen API.<br>• ATC proposes an approach for Web platform, discussed during Berlin meeting<br>• Finalise platform requirements.<br>• Provide platform architecture.<br>• Platform implementation.<br>• Deliverable 4.1-preparation, adding contributions, finalisation. |
| ANTENNA | • Participated on the discussions for the Bloomen API.<br>• Contributions in the finalization of the platform requirements. |

Task 4.2 Mobile clients
The purpose of this task is to develop a blockchain enabled digital wallet for mobile applications that allows any mobile application to process and accept blockchain transactions aimed at micropayments. The first iteration of this task has been focused on the construction of a generic wallet that facilitates the creation of decentralized applications (Dapp) through the use of Blockchain (BC) technology. As part of this solution, Smart Contracts (SC), built on top of Quorum as BC technology, have been defined that take advantage of a cryptocurrency that has been created (ERC20) to solve the needs for micropayments, as it was established in the requirements document (D2.2).

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T4.2 |
|---------|-------------------------------------|
| WLI | • Start the design of the mobile APP, starting first by designing the wireframes. Once wireframes were completed, we started the visual mockup design of the app.<br>• Complete the visual design of the mobile APP and start its development.<br>• Development of the first iteration of the mobile client<br>• Creation of a demonstration tool to complete the demo cycle of the mobile client. |
| Kendraio | • Reviewed D4.3 with comments and suggestion for internal review. (@Darren Mothersele) |
| ANTENNA | • Collaboration with WLI on the mobile wallet specifications.<br>• Tested the mobile wallet prior to the launch of the 1st WebTV Pilot. |

Task 4.3 Multiplatform interoperability and scalability framework
The aim of this task is to develop a framework for interoperability and scalability to be used across the entire Bloomen platform. Task 4.3 has only just started in month 17 so progress is at early stages. Preparatory work has been done analysing the potential for interoperability across all the project requirements. Further processes are now underway to gather the requirements from all partners involved in the task. This includes agreement and standardisation of data schemas, formats and workflows.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T4.3 |
|---------|-------------------------------------|
| Kendraio | • Split out GitHub Kendraio Adapter repository from Kendraio App to enable independent use of Adapters without needing the app. This enables batch data processing use of Adapters that may be needed with the Music pilot.<br>• Created and work on D4.5 "Multiplatform interoperability and scalability framework" document. Defined outline of description to foster understanding of the task. In Berlin meeting discussed deliverable with various partners and assigned tasks for contributions to the deliverable: Created ToC for D4.5 document.<br>• Continued working on Kendraio Adapter code and working on processes for onboarding new service providers and analysing APIs.<br>• Created GitHub Kendraio Console repository for prototype to enable batch data processing use of Adapters. |

Task 4.4 Overall integration and validation

The goal of this task is to integrate all modules for the blockchain operation into the Bloomen web platform and mobile clients. Although T4.4 has just started, some initial discussions have already taken place between the owners of different components, Worldline, which is responsible for Mobile clients (T4.2) and ATC, which is responsible for the web platform (T4.1) and is also the leader of the current task, in order to facilitate the smooth integration of all Bloomen modules and the delivery of the 1st cycle of Bloomen overall integrated system (D4.7).

## 1.2.5 WP5 Use Cases pilot validation and evaluation

Task 5.1 Music industry use case - pilot operation management and evaluation

BMAT is working together with WLI to adapt their preliminary developments to build a valid MVP that meets the necessary features, defined in the requirements of the use case, for a first iteration of the Bloomen Music pilot.

The efforts are divided into two main blocks:
- On the one hand the correct definition of a data model for the core metadata of the two asset types involved in the musical rights management: the musical work and the sound recording, together with the modeling of their corresponding rights structure.
- On the other hand, the UI/UX design of the web platform where the pilot will run, defining the different screens, workflows, and representation of the data defined in the previous block. At this stage it is important to have a mockup of the application so we can explain the case in a visual way and engage user for the pilot.

The current workflows of the rights management in the Music Industry are complex and entail processes in different parts of the value chain. One of the major challenges we face in the music use case is how to offer a simple yet realistic tool to the pilot user, leaving aside superfluous features and focusing on the ones that are relevant in the context of what we are interested to explore in the Bloomen project. There has been an important amount of work identifying and prioritizing the most important features and translating them into formal specifications for the project's technical developers. This allows us to implement and try first basic operations like inserting assets in the system with a minimal data model, making right claims on them, and on subsequent iterations, introduce new features that bring a better user experience, like batch processing, merging of duplicate assets, or the introduction of mechanisms to resolve claim conflicts, as well as expanding the data model to introduce new information that can be relevant for the use case.

The aim is to provide as early as possible in the pilot phase a tool with working basic functionalities for right management organizations, record labels, publishers and creators. Right management organizations are the main user target for the test, as they can control the whole workflow, act as gatekeepers and invite their members to participate. As they are complex organizations, the times of response are slow, so we have decided to start the first tests with BMAT as a first user, given that the solution is aligned with the services it offers to their customers.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T5.1 |
| --- | --- |
| WLI | • Contribution to the implementation of the music use case, providing the visual design for the applications to be developed in this use case. |
| BMAT | • Music Pilot coordination.<br>• Meeting in Nicosia about pilot updates and use case prototype<br>• Review demo2 with WLI<br>• Adaptation of WLI Bloomen developments for the specific music use case<br>• Music Pilot Kick-off: BMAT being the first pilot tester |
| Kendraio | • Internally discussed and analysed workflows and requirements and how Kendraio can support pilot. |

| ATC | • A first approach of pilot time planning. Discussions with BMAT for the first phase of the pilot.<br>• Music pilot time planning, discussion about what types of pilot users are necessary, what training should be done, when the first phase is expected.<br>• Needs' identification |
|---|---|

<u>Task 5.2 News Media use case - pilot operation management and evaluation</u>
The news media use case is focused on the handling of photos between the creator and a user/consumer organisation, such as a large private or public media company. Bloomen Photo has developed towards a specific demo since the technical review. The design of the application is based on the work done on user requirements in earlier WPs.

As of March 2019 the demonstrator is early, but functional. There are two main views for two different user types:

A. Photographers. They are able to upload photos and offer those for sale. There is a module enabling a verification/identification, such as uploading an official document. The module can of course be extended or connected to country-specific services for identification, for example those for mobile phone/card verification.
B. Editors working for a media company. They can see photos offered, buy them and then use them. Further they can verify the identity of a photographer and thus enable them to sell photos.

This is the demo which is now extensively tested, primarily with photo editors who currently have no options to "just buy" a photo from a photographer they don't know. Further, through the blockchain technology and the future addition of "smart contracts" or something similar, there is the promise of simplifying the handling of photos.

The feedback from early presentations for both newsroom management and technical management were very encouraging. One sentence from an executive from the newsroom: "If this works, we want to use it". To provide a reason why Bloomen photo is attractive, one example: Most large media companies work with picture services, such as Getty, Reuters, Picture Alliance. But those feeds are often underrepresented in many parts of Asia, East Europe and Africa. Pictures of important politicians from Africa are often very difficult to come by, the same is true for non-generic or stock pictures for many other countries.

Prior to the review meeting both ATC and DW are confident that the use case is on the right track and will lead to meaningful results.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T5.2 |
|---|---|
| DW | • Ongoing market observation for solutions and approaches<br>• Collection of market documents regarding revenue development for creators through digital channels<br>• Extensive visualisation of workflows<br>• Participation in DW-Team and project teleconferences<br>• Ongoing development of strategy for Bloomen Photo demo<br>• Features and functionalities of the demo<br>• Organisation of feedback sessions with users<br>• Organisation of workshops, internal DW with photo editors<br>• Regular exchange with technical partner ATC<br>• Monitoring of blockchain based solutions for photo management<br>• Feature reviews and further development of needs, specifically for public broadcasters<br>• Review of API Description for DW Use Case<br>• Team planning meeting for development of user testing approach<br>• Review of first version of Bloomen Photo Application |
| Kendraio | • Internally discussed and analysed workflows and requirements and how Kendraio can support pilot. |
| ATC | • First approach of News Media use case.<br>• Preliminary demo during Brussels Technical review (19/04)<br>• First demonstrator of News Media use case, in order to be used to the first phase of the pilot.<br>• News Media pilot time planning, discussion about what types of pilot users are necessary, what training should be done, when the first phase is expected. Adaptation of the News Media demonstrator for the first phase.<br>• Finalisation of questionnaire, scenario, and first phase of the pilot. |

Task 5.3 WebTV use case - pilot operation management and evaluation

The 1st pilot of the WebTV use case has initially had some delays in starting but it has progressed well in the sense that users had enough time to be trained and have a lengthy hands-on experience with the Mobile Wallet and the WebTV demonstrator.

The diversity of the types of users proved to be both challenging as well as useful in testing and evaluating the various components of the pilot. The twenty participants ranged from the following functions:

- Media industry experts (IT, upper management, continuity, art directing, media production).
- Media users (fans of TV, Cable TV, OTT).
- Blockchain enthusiasts (Community, Project managers, Investors).

The pilot officially started at the 18th of February with training and actual usage and testing of the tools commenced on the 25th of February.

Coming as a non-surprise, 80% of the users insisted on pointing out that it is not really the technology that matters most for a WebTV service but the content provided. However, it has been noted by at least 14 users that the tools work fantastically well and that they could see themselves using the platform if the content was readily available on TV and the content is up to par.

At least 5 users were happy that there is an anonymous way to pay for content online and 15 people thought that it would probably make economic sense for them to be able to access content on an "only pay for what you see". At the same time though, 50% of the users have said that they don't really mind sharing their personal information such as credit card details and what really matters for them is the ease of the UX.

Perhaps the most interesting group of users were the Tax Commissioner's department of the Ministry of Finance of Cyprus, in collaboration with the Department of Information Technology Services. The purpose of this half-day meeting was to demonstrate the progress of the project, showcase the assets but also inform them of the smart contract implementation that treats tax (VAT) as per the laws and regulations of Cyprus. It was stated and agreed that the transactions system of the use case has 2 functions:

A)   It is an auditable system that can provide easy reconciliation between the transactions and the actual payments in Euros to the Tax authorities.

B)   It can provide a future pathway into a system whereby token mechanisms might be overseen by the Central Bank  and tokens of company "X" can be swapped with other forms of money such as a digital national currency so it can be reusable by the government when this money has been received as a tax payment.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T5.3 |
|---|---|
| WLI | • Contribution to the implementation of the WebTV use case, through the implementation of a first version of the mobile app, related assets such a prepaid cards, and a basic cli interface for the use case management. |
| ICCS | • Regarding the support of use cases we created smart contracts, deployed them to local and public Ethereum Networks and Quorum as well. The implementations and smart contracts are related to:<br>  ○ Registration of assets to blockchain by suppliers (upload metadata and hash of asset)<br>  ○ Searching uploaded media content by id<br>  ○ Support of KYC on blockchain (consumer provided KYC, supplier approves KYC)<br>  ○ Browsing all the uploaded media content<br>  ○ Purchase asset by id: change ownership in smart contract, update metadata and copyright info<br>  ○ View balance of account<br>  ○ View all previous transactions and payments<br>  ○ Transfer funds to accounts<br>  ○ Upon asset purchase, payment with percentages of the ownership of the asset |
| Kendraio | • Internally discussed and analysed workflows and requirements and how Kendraio can support pilot. |
| ATC | • A first approach of pilot time planning. Discussions with ANT1 for the first phase of the pilot.<br>• WebTV pilot time planning, discussion about what types of pilot users are necessary, what training should be done, when the first phase is expected.<br>• Needs' identification |

| | |
|---|---|
| ANTENNA | • Interaction with partners for the WebTV media use case<br>• Ongoing market observation for solutions and approaches<br>• Collection of market documents regarding revenue development for creators through digital channels<br>• Extensive visualisation of workflows<br>• Initial planning for the WebTV 1st pilot that included describing types of users, how the training would be performed and the approximate dates the pilot would run.<br>• Described the final needs for the readiness of the pilot, in collaboration with ATC.<br>• Adapted the questionnaire for the evaluation of the WebTV<br>• Started the pilot in the final week of February with relevant stakeholders and potential users. |

Task 5.4 Overall evaluation and pilots coordination

Although T5.4 officially starts at M24 (August 2019), it is decided that a general pilots' coordination is necessary even from the beginning of the pilots. Some general guidelines have been set, applicable to all the three pilots, concerning mainly the type of users to be recruited, the users' training sessions, the phases of the pilots and the feedback to technical partners. We should also note that, although the approach is common for all the three pilots, it is also adapted to the needs of every pilot. The results of the first phase will be described in three different deliverables (D5.1, D5.3, D5.5), one for every pilot.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T5.4 |
|---|---|
| DW | • Participation in task, regular feedback and updates<br>• Minor, but regular exchange with other use cases to align and specify effort as a whole |
| BMAT | • Pilot Calls and planning |
| ATC | • Organization of Pilot Calls and planning |
| ANTENNA | • Pilot Calls and planning |

## 1.2.6 WP6 Dissemination, Exploitation and Innovation Management

<u>Task 6.1 Dissemination and Communication activities</u>

Dissemination and communication for the project is executed according to plan. The current focus is on raising the awareness for Bloomen and blockchain with a focus on experts, who are part of the relatively small blockchain community.

Again, based on the original planning the project now has started a regular, bi-weekly newsletter which aims to build a specific audience for Bloomen, blockchain in media and the exploitable results of the project.

The project is further active on selected social media platforms, has a (small) presence on LinkedIn and an regularly updated Twitter account.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T6.1 |
|---------|-------------------------------------|
| WLI | • Preparation of the Worldline press release "Worldline leads the European Commission's Bloomen Project on Blockchain", which was posted on Worldline International, French and Spanish websites and be distributed to the International, French and Spanish medias on 2 October 2017.<br>• Participation in the workshop of the ISO blockchain WG in Brussels on 12-13 September 2017.<br>• Participation in the Media Projects workshop that the EU organized on 17 October 2017 in Brussels, and on which a project poster was presented.<br>• Start contacts and get involved in the Spanish blockchain initiative Alastria (https://alastria.io/), which may have synergies with Bloomen in a near future.<br>• Comments to the project website (http://bloomen.io), which was finally formalized through deliverable D6.1.<br>• Contribute to deliverable "D6.2 Initial Communication and Dissemination Plan", and act as internal reviewer of the document.<br>• Start preparation of Worldline Techforum, an internal annual Worldline event where the most innovative projects and technologies are presented and in which Bloomen will be presented and demonstrated.<br>• Presentation and demonstrations of Bloomen at the Worldline Techforum, and at the Atos booth in the Mobile World Congress.<br>• WLI participated in the Concertation event of the Media related projects (organized by the EC Unit in Brussels). |

| ICCS | • ICCS (Antonis Litke) participated in the Media Projects Workshop meeting, organized by the the European Commission in Brussels on 17 October 2017, as part of a Bloomen project delegation. A poster with a description of the Bloomen project and its concept was presented. |
|---|---|
| | • A detailed review of the Bloomen website has been delivered during the reporting period. |
| | • Provided a linkedin post on Bloomen project. |
| | • Preparation and submission of a paper entitled 'Deploying blockchains for a new paradigm of media experience' at '15th International Conference on the Economics of Grids, Clouds, Systems, and Services (GECON 2018). |
| | • Provided contribution and internally reviewed the deliverable D6.3. |
| | • Presentation of paper in international scientific conference GECON 2018, which was submitted and accepted for publication after peer review process. |
| | • Presentation of paper in international scientific conference NOF 2018, which was submitted and accepted for publication after peer review process. |
| | • Presented our work for personalization over blockchain to the Decentralized 2018 blockchain event. |
| | • Participated in the Concertation event of the Media related projects (organized by the EC Unit in Brussels). |

| DW | • DW has compiled and delivered a comprehensive plan for dissemination and communication activities. The plan is structured in a way that allows for updates as the project develops further. |
|----|---|
| | • Set-up of the website and planning for marketing & communication materials, and website updates with articles and profiles, and with use cases |
| | • DW related dissemination activities |
| | • Research and organisational planning and implementation and attendance of DW dissemination event at Annual Hits Summit in London, including related dissemination activities/materials, with presentation outline |
| | • Extraction of reach via all channels |
| | • Production of presentation "Blockchain and Media" |
| | • Analysis of market research for presentation and development of key messages |
| | • D6.3: Development of content structure, managing contributions, editorial chapters, final production and organisation of internal reviews |
| | • Ongoing communication updates through Twitter, Website and other channels (e.g. LinkedIn) |
| | • Task Management T6.1 and dissemination monitoring |
| | • Establishment of Dissemination Activity Monitoring System |
| | • Application, organisation, presentation and attendance for Panel at IABM Conference |
| | • Application, organisation, presentation and attendance for Workshop at Revision Summit |
| | • Update of market research related to dissemination activities |
| | • Promotional articles for dissemination events |
| | • Information collection related to partners' dissemination activities |
| | • Set-up and Communication of Event Planning System |
| | • Research upcoming Blockchain, Music, Photo, News and TV Events |
| | • Application for and Organisation of participation at Blockchain Summit |
| | • Strategy for regular, bi-weekly newsletter focusing on building an audience specifically for Bloomen |
| | • Set-up of newsletter platform, initial communication |
| | • Editing of newsletter Issue 1 and 2 |

| BMAT | • News feed, Twitter and newsletter updates about Bloomen project<br>• Dissemination of BMAT Bloomen activities through Social Media, Newsletters and Meetings with stakeholders.<br>• Gather sources and interesting music industry stakeholders to contact for Dissemination and Communication activities.<br>• Draft a questionnaire for the music industry stakeholders.<br>• Blockchain Panel at Barcelona Music Summit (SUMMUS) by BMAT |
|---|---|
| Kendraio | • Registration of Bloomen social media properties in conjunction with DW.<br>• Posted Bloomen project updates via Kendraio properties: Twitter, Facebook and email newsletter.<br>• Participated as invited panellist at IBC2017 Blockchain and Broadcasters: Exploring the opportunities 16 September 2017.<br>• Comments to the project website (http://bloomen.io), which was finally formalised through deliverable D6.1.<br>• Contributed to deliverable D6.2 Initial Communication and Dissemination Plan with corrections for English.<br>• Participated as invited expert in Global Blockchain Business Council (GBBC) Blockchain Central Media and Entertainment panel running parallel with the World Economic Forum in Davos (21-25 January 2019). 21 Jan 2019 to 25 Jan 2019.<br>• Participated as invited expert in Open Music Initiative Member Meeting Los Angeles 2019 (6 February 2019). [Not funded by Bloomen]<br>• Participated in Digital Entertainment World Los Angeles 2019 (4-5 February 2019). [Not funded by Bloomen] |
| ATC | • Updates in ATC site about Bloomen project<br>• Dissemination of Bloomen concept to ATC contacts.<br>• Contribution to D6.3 - First Report on Communication and Dissemination activities<br>• Internal review of D6.3<br>• ATC presented Bloomen in IFRA World Publishing Expo and DCX Digital Content Expo (parallel events) - October 2018.<br>• ATC presented Bloomen in IFRRO World Congress 2018 - October 2018.<br>• Twitter and LinkedIn posts. |

| ANTENNA | • Dissemination of ANTENNA Bloomen activities through Social Media, Newsletters and Meetings with stakeholders.<br>• Ongoing communication updates through Twitter, Website and other channels (e.g. LinkedIn)<br>• ANTENNA was a media sponsor of Decentralized 2018, where the involvement of ICCS and Worldline was communicated through ANT1 TV, ant1.com.cy and ant1.com.cy social media profiles<br>• Had an important meeting with the Tax Commissioner of the Ministry of Finance, Cyprus, to report on the developments on the project as well as discuss on the handling of VAT for mobile wallet transactions. |
|---|---|

Task 6.2 Exploitation activities and Business Plans
The work done on this area has been structured around four key areas: market research, exploitation of the common platform, individual exploitation plans and use case business models.

In the market research we have looked at the current state of the Blockchain technology and we have identified specific examples of implementations in the three verticals for which we are developing solutions (i.e. Music, Photos and WebTV).

Concerning the exploitation of the common platform, we have done special emphasis on the common assets developed, as well as the future sustainability of the platform and a general description of how we are managing innovation and IPR.

Furthermore, each partner has also described its strategy to exploit their participation in the project and we have also worked on a first draft of the definition of a business model of each vertical, using the business model canvas methodology.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T6.2 |
|---------|--------------------------------------|
| WLI | • Start preparing the business models for the three use cases, based on the Canvas methodology. Lead and motivate the exercise of preparing a canvas for each use case, organizing dedicated meetings with each of the three partners representing each use case.<br>• Finalization of the first version of the business models for the three use cases, based on the Canvas methodology.<br>• Start working on the contents for deliverable D6.6, including market research, individual exploitation plans, strategies for the exploitation of the Bloomen platform, and the use case business models.<br>• Finalization of the first version of Bloomen exploitation plan, documented in deliverable D6.6. |
| ICCS | • Contribution to the deliverable D6.6 |
| BMAT | • Start the definition of the Business Model Canvas with WLI.<br>• Define our priorities in order to obtain a MVP<br>• Review on BMC, and evaluation of Bloomen Music Exploitation possibilities (internally and with clients). |
| ATC | • Initial work on the market context of Bloomen results, especially for Media sector |

Task 6.3 Innovation Management

Bloomen has defined a *Schedule of Innovations*, which entails key components to be developed during the project. This schedule is maintained throughout the project as a collaborative effort, also informing exploitation activities. One key objective is the assessment of opportunities with regard to applying for patents or declaring copyrights. Another purpose is the management of intellectual property rights (IPR) issues, taking into account the collective interests of the participating partners. First, the consortium generated and discussed a wider list of innovative aspects in Bloomen, which were then narrowed down to 12 key components to form the Bloomen *Schedule of Innovations*. This also defined the respective owners (partners) and related Bloomen work plan tasks. Currently, none of the owners of the 12 components are reporting any critical IPR issues related to their components. Next steps include the collection of IPR status and other information on Copyright, Licensing or Patent opportunities (see D6.6 for more details).

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T6.3 |
|---------|-------------------------------------|
| WLI | • WLI contributed to the definition of the innovation items of Bloomen project. |
| ICCS | • Contribution to the definition of the innovation items of Bloomen project. |
| DW | • Development and communication of Innovation & IPR Monitoring System<br>• Tracking of activities, per partner, for project as a whole<br>• Task Management T6.3<br>• Discussion, selection and communication of Bloomen Innovation Schedule<br>• T6.3-chapter contribution for Exploitation Deliverable (D6.6) |
| BMAT | • BMAT internal discussions about IPR opportunities and individual and joint exploitation. |
| ATC | • Internal discussions about individual and joint exploitation |

Task 6.4 Community involvement and sustainability

Kendraio coordinated the production of the community involvement and sustainability report (D6.8). In that report various methods were described for ways for consortium members to interact with stakeholders and other potential participants of the Bloomen project - specifically in the context of gaining feedback to the project's goals and deliverables. Also D6.8 detailed community involvement already carried out and also proposed going forward. A number of community engagement took place during the period, as detailed in D6.8, ranging from individual meetings to participating in cross-organisation developer code days.

The following table provides a list of activities undergone by each partner participating in this task during this period:

| Partner | Description of contribution to T6.4 |
|---------|-------------------------------------|
| ICCS | • Provided contribution to the deliverable D6.8. |
| DW | • Contribution to Deliverable D6.8 |

| BMAT | <ul><li>Conversations with tentative stakeholders: TEOSTO, SGAE and Native Instruments with the aim of engage them to act as participants of the future activities for the Music Use Case and pilots.</li><li>Meeting in Nicosia about T6.4 activities - Bloomen Community, Focus Group, Stakeholders and further engagement strategies.</li><li>Contribution to D6.8.</li><li>Define focus groups for music pilot and open discussions with Kendraio.</li></ul> |
|---|---|
| Kendraio | <ul><li>Participated as invited expert at industry exclusive Mycelia World Tour Pilot 08/Dec/2017</li><li>Preliminary conversations with tentative stakeholders: Mycelia, Real World Records, PRS, PPL and others.</li><li>In all cases demonstrated the old Kendra Hub prototype as an idea for what was coming.</li><li>Participated as invited member at Open Music Initiative London Artists' Workshop: Explore the Future of Artistry on 27/Apr/2018.</li><li>Participated as invited developer at Mycelia Creative Passport developer focused meeting / meetup 02/May/2018.</li><li>Participated as invited member at Mycelia Creative Passport Workshop-2 09/May/2018.</li><li>Initiated, organised and participated in the Music Networks Lab London Summer 2018 series of co-working spaces for music tech related projects for 6 dates.</li><li>Participated at Open Music Initiative workshop to test the OMI API located at Red Bull offices in London. 25/May/2018</li><li>In all cases demonstrated Kendraio App early stage prototype and was met with interest.</li><li>Created first draft, contributed and complete of D6.8 document "First Bloomen Community: Focus Group, stakeholders and further engagement strategies". Started with table of contents and created sections. Invited all partners to contribute to various sections requiring contributions. Coordinated partner contributions. Contributed on all sections with main content.</li><li>Contacted a number of music/media service providers to start the process of creating Adapters for them – such as SkyTracks.</li><li>Participated as invited expert at Music Tech Fest Stockholm incorporating Mycelia workshop (4-9 September 2018). 04 Sep 2018 to 09 Sep 2018.</li><li>Met with stakeholder: Mike Large (COO of Real World Records) - 07 Nov 2018 in Box, near Bath.</li><li>Met with stakeholder: Peter Harris (CEO of Resonate) 11 Dec 2018 in</li></ul> |

Berlin. Resonate want to have an Adapter (third party service).
- Participated as invited expert in Global Blockchain Business Council (GBBC) Blockchain Central Media and Entertainment panel running parallel with the World Economic Forum in Davos (21-25 January 2019). 21 Jan 2019 to 25 Jan 2019.
- Participated as invited expert in Open Music Initiative Member Meeting Los Angeles 2019 (6 February 2019). [Not funded by Bloomen]
- Participated in Digital Entertainment World Los Angeles 2019 (4-5 February 2019). [Not funded by Bloomen]

## 1.2.7 WP7 Ethics requirements

This Work Package was added by the European Commission to set out the ethics requirements that the project must comply with, and in particular in relation to monitoring the state of personal data and sensitive data security, as well as data anonymization. The outcome of this activity was deliverable D7.1 "Protection of Personal Data (POPD) – Requirement No.1", which details how Bloomen project is addressing this particular issue.

## 1.3  Impact

Bloomen intends to create measurable impact through communication, dissemination and exploitation. In order to reach this goal the specific situation regarding blockchain technologies needs to be taken into account. On this basis the project will structure the actual work regarding impact.

**Very new technology, innovative potential not fully understood:** Blockchain and related technologies (tokens, coins, payment, trust, private services) touch on many relevant areas. Further, the option to issue a coin and perform has led to a number of high-profile projects which got funding, but need to show that they reach the intended goals. All this has created a "hype" around blockchain, which makes it not easier, but more difficult to perform research.

**Focus on small, but highly interested audience:** Consistent with the dissemination plans formulated at the very beginning of the project Bloomen aims to communicate, inform and - potentially - exploit the results of the project in the best way possible. To get there Bloomen proposed a strategy of reaching out to a clearly defined, small, but highly interested community based on blockchain and media interests. The community basically consists of people working on media-related blockchain projects, or in the media looking for technology platforms with innovation potential.

Impact planning: Now in the first half of the second year Bloomen is currently intensely reaching out to testers for the demonstrators, in order to fulfil the goals for impact described above. In parallel members of the consortium are taking part in a high number of relevant public events, in order to inform, discuss and connect. Finally, the project reaches out via Social media platforms and its website.

## 2    Update of the plan for exploitation and dissemination of result (if applicable)

### 2.1  Update to the Dissemination Plan

The focus of dissemination has the level of presentations and tests with users, which have started in February 2019 and will now be ongoing. Initial results, specifically from presentations to middle management of the newsroom as well as photo editors are promising. One big point is that from the user view the "complexity" of the blockchain is in the background, while the utility of the application to sign contracts with photographers in a new way is very present.

The demonstrator for Bloomen Photo will of course evolve further, but the application and the features developed seem to fulfill a real need for the newsrooms we talked too.

The next steps are now to extend the number of presentations as well as tests with users. Regarding participation in conferences we have a number of events already lined up. Further, the plan is to start reaching out to other public broadcasters, as planned, to show the demo and discuss needed additions and features.

### 2.2  Update to the Exploitation Plan

Regarding the exploitation of the common platform, we have advanced on the development of some of Bloomen initial asset, such as the Bloomen wallet or the REST API, as we get closer to the piloting phase.

The initial demonstrators developed, such as the one for the WebTV use case, and the feedback received from the tested targets (for instance, during the in Barcelona last February) has extended our initial scope to include new assets. For instance, during last Mobile World Congress (MWC) in Barcelona last February we have received very good feedback on the web portal and the mechanism to buy tokens in advance. This successful test has encouraged Antenna to follow a similar procedure in the WebTV pilot to come.

## 3    Update of the data management plan

### 3.1   Data in Music use case

### 3.1.1 Data summary

For all the data managed under this use case, the following questions need to be answered:

*1. What is the purpose of the data collection/generation and its relation to the objectives of the project?*

The data itself is the purpose of the project. In the music use case, we want to explore if the users can create and consume better music rights data with the tools the project provides.

*2. What types and formats of data will the project generate/collect?*

The project will interact mainly with data that models 2 kinds of musical assets: musical works and sound recordings, represented in JSON format. The data will contain core metadata describing the asset and rights metadata describing right holder information.

*3. Will you re-use any existing data and how?*

Yes. There will be functionalities to import existing data to the project, for example a dataset of musical works.

*4. What is the origin of the data?*

The data will be provided by the users of the platform.

*5. What is the expected size of the data?*

Depending on the phase of the project and its success, it can greatly range from small datasets to be used as demonstrators to an undetermined amount of assets introduced by the users.

*6. To whom might it be useful ('data utility')?*

The data collected and generated by the system will be useful for interested parties on the musical assets represented in there, mainly right holders, as well as the stakeholders that make use of it as part of their workflows, like right management organizations.

### 3.1.2 Data models and Identified datasets

In deliverable D2.2 "Bloomen Requirements Analysis", several data models for the music use case were already identified, which are copied here for convenience:

| Preliminary Music Data Model | |
|---|---|
| **User** | Contains all necessary information of the user of the system |
| **Musical Asset** | The entity that represents Musical Works (MW) or their Sound Recordings (SR). They are defined by a set of core metadata (international identifiers, title, contributors, etc), and they have rights holders attached to them. |
| **Metadata** | **Musical Work (MW):**<br>    **Core:**<br>        ISWC code<br>        Original Title<br>        Alternative Titles (Title, Title Type, Language)<br>        Creators (Name, IP-number, Role Code)<br>        Derivation Information (Derivation Code, ISWC codes, Titles)<br>    **Other:**<br>        Alternative ISWC codes<br>        Associated Performers<br>**Sound Recordings (SR):**<br>    **Core:**<br>        ISRC code<br>        Title/Subtitle (Title, Title Type, Language)<br>        Duration<br>        Performers (Name, ISNI, Role Code)<br>        Date of Recording<br>        Territory of Recording<br>        Date of Mastering<br>        Type of Recording (Sound Recording / Music Video)<br>    **Other:**<br>        Alternative ISRCs<br>        Release Information |
| **Merged Asset** | Contains all the information relative to an asset that has been merged into another. The original asset becomes deprecated. |
| **Asset Link** | The entity that represents a link between assets. Links can be between entities of same type (i.e. SR to SR / MW to MW), or entities of different types (i.e. MW to SR).<br>        Source asset<br>        Target asset<br>        Relation (e.g. underlying composition, radio edit, remaster...) |

| Rights Holder | The entity that represents the information of a rights holder for a musical asset.<br><br>    Name<br>    Code (Code, Type)<br>    Contact Information<br>    Role<br>    Rights Type<br>    Territory<br>    Start Date<br>    End Date<br>    Share |
|---|---|
| Rights Claim | The entity that represents a claim over a musical asset.<br><br>    Rights Holder<br>    Musical Asset<br>    Status (Accepted/Rejected/Pending) |

From these initial data models the music use case has already identified and detailed the following datasets:

| Dataset reference and name | Bloomen Music Dataset |
|---|---|
| Dataset description | The dataset will contain 2 types: musical work and sound recording, containing core metadata to describe the asset and right holder information.<br>It will be represented in JSON format.<br>The user will be in charge of generating the data, and it will be useful for the right holder of the asset as well as for the organization appointed to manage the royalties generated by the assets in the dataset.<br>It will have the following structure (this structure can suffer small variations as the project progresses):<br><br>`"musicalWork": {`<br>    `"ISWC": <text> (ISWC format),`<br>    `"originalTitle": <text>,`<br>    `"creators": [{`<br>    `"name": <text>,`<br>    `"IPINameNumber": <text> (IPI format),`<br>    `"role": <enum>`<br>    `}],`<br>    `"alternativeTitles": [<text>],`<br>    `"associatedPerformers": [<text>],`<br>    `"associatedISRCs": [<text> (ISRC format)],` |

```
        "rights": [{
         "rightsHolder": {
              "name": <text>,
              "IPINameNumber": <text> (IPI format),
              "role": <enum>
         },
         "rightsHolderOriginalPublisher": {
              "name": <text>,
              "IPINameNumber": <text> (IPI format)
         },
         "rightsHolderProprietaryId": <text>,
         "territories": [<enum>],
         "startDate": <date>,
         "endDate": <date>,
         "mechanical": {
              "affiliationSociety": <enum>,
              "ownershipSplit": <float> (percentage),
              "collectionSplit": <float> (percentage)
         },
         "performance": {
              "affiliationSociety": <enum>,
              "ownershipSplit": <float> (percentage),
              "collectionSplit": <float> (percentage)
         },
         "synchronisation": {
              "affiliationSociety": <enum>,
              "ownershipSplit": <float> (percentage),
              "collectionSplit": <float> (percentage)
         }
        }]
}

"soundRecording": {
     "ISRC": <text> (ISRC format),
     "mainArtist": <text>,
     "featuredArtists":[<text>],
     "title": <text>,
     "versionTitle": <text>,
     "duration": <int>,
     "yearOfRecording": <int>,
     "territoryOfRecording": <enum>,
     "languageOfPerformance": <enum>,
     "originalReleaseDate": <date>,
     "originalReleaseLabel": <text>,
     "creators": [<text>],
     "isVideo": <bool>,
```

| | |
|---|---|
| | `    "releases": [{`<br>`    "title": <text>,`<br>`    "artist": <text>,`<br>`    "ICPN": <text> (ICPN format),`<br>`    "numberOfTracks": <int>,`<br>`    "label": <text>,`<br>`    "duration": <int>,`<br>`    "isCompilation": <bool>`<br>`    }],`<br>`    "rights": [{`<br>`     "rightsHolder": <text>,`<br>`     "rightsHolderProprietaryId": <text>,`<br>`     "rightsOwner": <text>,`<br>`     "rightsOwnerProprietaryId": <text>,`<br>`     "territories": [<enum>],`<br>`     "startDate": <date>,`<br>`     "endDate": <date>,`<br>`     "split": <float> (percentage),`<br>`     "useTypes": [<enum>]`<br>`    }]`<br>`}` |
| Standards and metadata | There are 2 main standards that deal with this kind of information: CISAC's CWR for musical works and DDEX MLC for sound recordings.<br>These standards define not only the data structure but also the protocols for communicating this kind of information. They are very complete but complex in excess for a first proof of concept of the system. They could be adopted as the standard way to import and export data to and from the system as following steps. |
| Data sharing | The data will be shared among participants in the platform, applying some privacy rules depending on the role of the user (e.g. restricted access to musical rights claiming data).<br>There will be tools developed in the project to enable import and export of data in JSON format.<br>The repository will be stored in the platform servers.<br>The part of the dataset that contains right holders information cannot be shared without prior consent of the right holders. |
| Archiving and preservation | The data will be preserved during the project lifetime. Due to the nature of the system, there will be copies of the repository on several nodes.<br>For the expected volume of data, and considering that the dataset contains only text, the associated costs for preserving the data are negligible. |

Work in datasets identification and the definition of their main characteristics in terms of Findability, Accessibility, Interoperability and Re-usability are still in progress and will be reported in following data management reports.

## 3.2 Data in Photo use case

### 3.2.1 Data summary

The purpose of data collection for the Bloomen Photo use case spans several key aspects: Identification, verification, trustable rights management and simplification of workflows. These are the key reasons. The type of data collected will be:

- Personal and institutional with a scope on reliable identification (Who is the owner/creator? Who is the user?);
- item-based as to determine and verify that a photo has been created, is owned by a photographer or an agency;
- personal data combined with item-based data help to determine a trustable level of rights, ownership and usage rules;
- finally, based on deploying blockchain technologies, the application has a higher chance of exploitation when in effect the complexity of managing people and assets in high volume are simplified, e.g. through the use of rules-based systems or "smart contracts".

**Re-use:** Some of the data can be re-used from existing sources. For example, should there be a third party service for reliable identification which is trustable, we could agree to anonymity (e.g. not naming the author/creator of a photo). Though it has to be kept in mind that in the media industry, authors and creators usually want to be associated with their work, with very few exceptions (e.g. whistleblowing, unstable political situations).

Other data will have to be generated, e.g. a reliable system to identify and collect data about photos, ranging from available EXIF data to creation data/ownership and potentially other data point adding to the searchability of photos (e.g. Artificial Intelligence applications "looking" at photos and providing information about persons, places, angle, color, size of the photo, resolution, geographic location, etc.). We expect such data to be available sometimes, but often in an inconsistent status, which poses a problem.

Origin of the data: The data will be either auto-generated, either from other systems, databases or cameras when taken (e.g. mobile phones) and in other cases will be sourced from the creator/photographer or the media company using the photos (when? where? How long? How often? etc.).

**Size of the data:** This is at this moment it is not possible to reliably determine the size of the data. The expectation is that a successful, deployed system will handle Gigabytes of photo data. In principle there will be two data collections, one with primarily metadata and blockchain generated hashes, another with the items itself. It is not clear yet, whether the photo items can and should be stored in the blockchain itself. Given performance issues the general direction as of early 2019 is to separate the photo files from the blockchain-based identification and metadata. In effect, the data can grow to large sizes, given the number of photos taken and used in a typical media organization. At the same time these storage needs are already covered and can be handled by existing systems, on premise or in a cloud.

**Data Utility:** It should be understood that the purpose of the data collection and the usefulness of the data is to make it beneficial for both sides - the creator/photographer and the media organisation. Only when this is achieved there is good chance of commercial exploitation or other lasting ways to further develop the approach of Bloomen photo. Further, very different to an advertising-based/"free" offering the data is not collected without, but with the consent of all participants.

Beyond this more general approach Bloomen Photo has identified a number of more specific data aspects, listed below.

## 3.2.2 Data models and Identified datasets

In D.2.2 "Bloomen Requirement Analysis" basic data models to describe the users, the assets and the transactions where already described. They reflect an early status, most of which has already become functional in the current Bloomen Photo demonstrator.

| Preliminary Photo Data Model | |
|---|---|
| **Users** | Distinguish two roles: Publisher or photographer<br>Authorisation data (username, password, etc)<br>Name & Address<br>Settings (privacy, payments, etc)<br>Role (Consumer, Contributor)<br>Reputation (reputation of the user, can be applied to both creators and media organisations over time) |

| Assets | Url (public file url) |
|---|---|
| | Type of asset: UGC, photo, special photo |
| | Rights (list of users that have rights using this file) |
| | Owner (the owner of the file) |
| | Date/time added |
| | Price (price to pay for publishing rights) |
| | Usage rights time (how long?) |
| | Usage rights region (where in the world?) |
| | Analytics (number of views, likes, etc) |
| | Keywords |
| | Description |
| | Geo-coordinates |
| | Hash for organisation |
| **Transaction** | From |
| | To |
| | Date |
| | Amount |

At this point in time, work in the Photo use case has been more focused in the functional aspects and user interface, while the detailed definition of datasets is still in progress and will be reported in following data management reports as soon as these datasets are properly characterized.

## 3.3 Data in WebTV use case

### 3.3.1 Data summary

For all the data managed under this use case, the following questions need to be answered:

*1. What is the purpose of the data collection/generation and its relation to the objectives of the project?*
The purpose of the data collection/generation is to explore whether users' engagement will be increased through the WebTV use case via the tools created by the technical partners. The usage of the mobile wallet as a complementary tool to the WebTV platform will be key in assessing the value the technology generates.

*2. What types and formats of data will the project generate/collect?*
The project will interact with various kinds of data:
- Video files
- Video consumption analytics

- Purchases of virtual currency and blockchain transactions.

*3. Will you re-use any existing data and how?*
We will use existing data regarding video analytics to compare engagement from users.

*4. What is the origin of the data?*
The origin of the data is the users of the WebTV Platform and the mobile wallet.

*5. What is the expected size of the data?*
Especially for the 2nd iteration of the WebTV pilot, it is expected that data will be generated from up to a hundred users of the WebTV Platform and the mobile wallet.

*6. To whom might it be useful ('data utility')?*
There are various stakeholders who might find the data useful. From content creators, to streaming platforms, as well as authorities researching the area of blockchain technology.

## 3.3.2 Data models and Identified datasets

In deliverable D2.2 "Bloomen Requirements Analysis", several data models for the WebTV use case were already identified, which are copied here for convenience:

| Preliminary WebTV Data Model | |
|---|---|
| **Users** | Contains all necessary information of the user of the system.<br>• Authorization data [username & password]<br>• Role (can be a consumer,a copyright owner or both)<br>• KYC documents<br>• Financial information<br>• Wallet data and public addresses |
| **Assets** | An entity that represents copyrighted content available for commercialization, distribution and access.<br>**Video Content:**<br>• Video Title<br>• Year of production<br>• Production company name<br>• Available subtitles (by language)<br>• File location (URL)<br>• Tags for indexing<br>• Video Analytics (Views, Likes, etc)<br>• Hash |

| Rights Holder | An entity that represents the information of a rights holder for an asset.<br>• Name<br>• Contact Information<br>• Role<br>• Rights Type<br>• Territory<br>• Start Date<br>• End Date |
|---|---|
| Tokenization | Entities which represent store of value, means of reimbursements as well as cryptographic delivery of the content.<br>• Virtual Currency<br>• Transaction Info (Source, Destination, Amount, Timestamp, Transaction Hash)<br>• Video Server Delivery Access Control |

At this point in time, work in the WebTV use case has been more focused in the functional aspects, user interface and monetization, while the detailed definition of datasets is still in progress and will be reported in following data management reports as soon as these datasets are properly characterized.

## 4   Follow-up of recommendations and comments from previous review

### 4.1   Recommendation 1

**KPIs and success criteria need revision, and to be grounded on more clearly measurable and appropriate indicators especially music and news cases.**

The consortium has already identified, in deliverable D2.1, various Critical Success Factors (CSFs), from a qualitative point of view, which reflect the success of the Bloomen platform and the use cases service offerings. Secondly, a series of Key Performance Indicators (KPIs) has been defined in the same deliverable which addresses the CSFs in a more quantitative way and provide a reference to validate technical performance and/or potential business success. A KPI is defined by one or more associated monitored metrics while success criteria are defined by a target or threshold value for the respective KPI value. The CSFs and KPIs across use cases mostly capture the performance validation and successful operation of the Bloomen platform facilitating all considered use cases. The related KPIs provide the means of monitoring Bloomen technical performance and business potential within iterative evaluation stages from the first prototype version to a more elaborate, tested minimal viable product at the end of the project. The evaluation of the platform and the use cases will take place within the tasks of WP5: Use Cases pilot validation and evaluation.

It should be noted that for example the Bloomen photo use case is driven by specific KPIs, for example based on the the ability demonstrator to handle 100 photos, then 1.000 and later 10.000 photos for a media organisation. These thresholds will of course be reviewed and refined as the demonstrators of all use cases will evolved towards higher maturity.

As the project work plan progresses towards the real deployments in the pilots that are going to be operated by the respective end users (Antenna, BMAT, DW) the particular partners will update the CSF and KPIs into more quantitative ones according the their plan of users/stakeholders engagement. The updated CSFs/KPIs will be reflected in the deliverables D5.1, D5.3 and D5.5.

### 4.2   Recommendation 2

**A detailed market analysis for each use case, e.g. considering the ongoing transformations in the media market, could be valuable in informing planned developments.**

As indicated in point 1.2.6 concerning Task 6.2 (Exploitation activities and Business Plans), a market research action has been undertaken covering both the general status

of the technology as well as the identification of current applications relevant to the different verticals covered by the Bloomen development (i.e. Music, Journalistic Photos and WebTV).

## 4.3 Recommendation 3

**A detailed analysis of scalability issues for each use case may usefully contribute to early risk reduction.**

The Quorum platform, which runs on the Ethereum (ETH) Blockchain and is modeled after the Ethereum Go client, is used by pharmaceutical companies Pfizer and Genentech as well as Microsoft Azure, among others. Relying on the proven dynamics of the ETH blockchain which is proven in production environments the Quorum implementation has the design features to be scalable in such scales. Through a preliminary study performed by the consortium partners before proceeding with the adoption of the Quorum blockchain platform, it has been identified that the scalability characteristics of the specific blockchain are sufficient in order to support the Bloomen use cases in a real production environment. Quorum by default scales almost linearly for all workloads for the transaction send rates that have been tested for (up to 2100 tx/sec). Differences are met in the transaction latencies. While reads have the lowest latencies, latencies of null and write workloads are largely dependent on the block time parameter (as expected). In case of the RAFT consensus algorithm, the throughput of the system does not change much by lengthening the block time, however latencies increase proportionally. RAFT and IBFT are comparable in terms of throughput. Private contracts in Quorum result in lower throughput at higher load on the system due to extra overhead involved in secure communication and encryption/decryption operations employed between peers for confidentiality. The throughput is lower compared to public contracts when the input transaction rate increases beyond 600 tx/sec. Based on the scalability requirements provided by the end users of the Bloomen project, it is expected that Quorum will not introduce any limitation in supporting the specific use cases.

## 4.4 Recommendation 4

**The advantages of proposed technological contributions, particularly with respect to decentralisation and its implementation, should be more clearly understood/articulated in the context of the selected business models.**

Across global supply chains, financial services, media, government and many other industries, innovators are exploring ways to use blockchain to disrupt and transform traditional business models. Many industry leaders have already achieved significant business benefits, including greater transparency, enhanced security, improved

traceability, increased efficiency and speed of transactions, reduced costs and, eventually, identification of new revenue streams. In the context of Bloomen, benefits such as the reduction of cost will be achieved by the elimination of supervision costs as well as the reduction of friction in the sharing of asset information among the different participants. This information could enable, in use cases such as the one provided by ANTENNA and BMAT, an automated compensation mechanism that would facilitate new business models such as pay per use. The adoption of blockchain, as it is articulated in Bloomen, increases therefore the transparency of all transactions as they become visible to the participants of the blockchain network, something which is of paramount importance as denoted by the use case providers DW and BMAT. At the same time, the binome of anonymization and personalization achieved through the Bloomen implementations is contributing to increase security, efficiency and traceability of the content that is consumed by the end-users. It is expected that the WP5 deliverables will detail and provide evidence about the different benefits that Bloomen will provide to each use case implementation.

## 4.5  Recommendation 5

**The scope of the WebTV business case should be more clearly defined, together with the expected benefits beyond the current state of the art. This business case needs to be reconsidered. Initial approach for this use case is very broad.**

The scope of the WebTV Use case was initially very broad since we did not know which part of the uses case would be best deserved by Blockchain technology and which Blockchain tools would best fit the functionalities explored.

A clear example of how our analysis on technology-functionality fit has evolved along the project could be the use of tokens. At the early stages we had disregarded the use of cryptocurrencies due to its speculative nature, which makes them prone to extreme price variability and hence not sustainable for accessing the service. We deepen then our analysis on the different types of tokens and found that utility tokens, used within a closed-loop economy, could help reduce costs and improve transparency among participants in the new ecosystem. Furthermore, utility tokens could enable business models such as pay-per-view, even for small operations, in a secure and user-friendly manner, which was positively looked at during close examination by the Ministry of Finance of Cyprus, a team of which actually participated in the first pilot of the WebTV use case.

ANTENNA, as the WebTV use case provider, had a strong interest in using the fundamental functionalities of blockchain technology, such as wallets, smart contracts and immutable database registry, rather than for example attempting to solve a specific problem or completely disrupting the current state of art. The current scope of the

WebTV use case seems to be fitting to other aspects of the project, such as the utilization of mobile wallets.

Finally, by having a solid WebTV 1st pilot at the Month 18, one that already incorporates most of the popular features of blockchain technology, we are already exploring further opportunities, such as:

- Incorporation of the anonymous personalization technology.
- Designing even better user experience.
- Testing the solution on a larger scale.
- Incorporating user gratitude provision features for the content creators (tipping).
- Explore the enhancement of the tokenomics (reusability).

## 4.6 Recommendation 6

**Further cross-talks between the business and the technological components of the consortium will strengthen a common understanding of the use cases and further foster the sharing of multidisciplinary expertise.**

Exchange of ideas, discussion of business requirements and presentation of different technical components constituted the main agenda items during the F2F meetings and the teleconferences. In addition to these, bilateral meetings have been also organized for a better common understanding, mainly between the technical partners and the use case owners.

DW, BMAT, ANT1 and Kendraio explained the particularities of Media companies during photo search, of Music industry and of WebTV, helping the technical partners to adapt the design of the components to the corresponding requirements.

Furthermore, every use case was examined separately and, based also on the user requirements defined in D2.2 (Bloomen Requirements Analysis), a different set of components have been combined to fulfill its needs. This combination was realized mainly through a live document in the common space at Bloomen Confluence. By close collaboration of the whole consortium, we have broken down the functionality of each use case and mapped the different methods/components to every one of them.

The work done in the framework of WP5 (Use Cases pilot validation and evaluation) has also contributed to the mutual understanding of technical partners and the owners of pilots, since, during the pilots' programming and having in mind the real users we recruited, the real needs of every pilot became more clear for the technical partners, under the guidance of pilot owners.

## 4.7 Additional questions to use case pilots

All these questions were already answered in Annex 2 of Deliverable D2.2.

## 5 Deviations from Annex 1 and Annex 2 (if applicable)

## 5.1 Tasks

**Deviation in T3.3 Copyright management, preservation and monitoring**
There is an overspending in this task that comes from an overspending of partner Kendraio. This overspending comes in part from the fact that it has been decided that Kendraio participation in WP3 shall focus on this task T3.3 and concentrate all Kendraio effort in it, while no real participation is required in task T3.1. Another reason for this overspending comes also from the fact that task T3.3 is completely transversal to all use cases, and hence the expected contributions of Kendraio to use cases in WP5 will essentially come from this task, instead of being split among use cases.

**Deviation in T5.1 Music pilot**
In the initial calendar of the pilot execution (detailed in the pilot plan in D2.2 - Bloomen Requirement Analysis), we planned to train recruited participants on M19, however, the delivery of an initial mockup of the web platform has been delayed, and thus the time plan affected. We will adjust the times for the following phases, shortening the iteration periods.

## 5.2 Use of resources

The following tables show the use of resources by the consortium for this first period and for the whole duration of the project, both in terms of efforts and costs, detailed by partners and by Work Packages and Tasks. At the time of providing this report, all costs are based on the best possible estimations provided by our partners.

## Person-Month Status Table for Period 1 (M01-M18)

| Period 1 (M01-M18) Person-Month Status Table | | WLI | ICCS | DW | BMAT | Kendraio | ATC | ANTENNA | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| **TOTAL Table** (efforts in Person-Month) | | | | | | | | | |
| **WP1. Project Management (WLI)** | Planned | **12,0** | **3,0** | **0,0** | **0,0** | **0,0** | **0,0** | **0,0** | **15,0** |
| | Actual | **11,6** | **3,1** | **0,0** | **0,0** | **0,0** | **0,0** | **0,4** | **15,1** |
| T1.1 Project Management & Administration (WLI) | Planned | 9,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 9,0 |
| | Actual | 8,8 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,4 | 9,2 |
| T1.2 Scientific and Technical Coordination (ICCS) | Planned | 0,0 | 3,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 3,0 |
| | Actual | 0,0 | 3,1 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 3,1 |
| T1.3 Quality and Risk Management (WLI) | Planned | 2,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 2,0 |
| | Actual | 1,9 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 1,9 |
| T1.4 Data Management (WLI) | Planned | 1,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 1,0 |
| | Actual | 0,9 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,9 |
| **WP2. Bloomen Use Cases, requirements and architecture (ICCS)** | Planned | **8,9** | **8,8** | **6,0** | **6,0** | **6,6** | **4,9** | **7,3** | **48,5** |
| | Actual | **7,5** | **8,0** | **7,5** | **6,8** | **6,7** | **3,8** | **8,3** | **48,6** |
| T2.1 Use cases description and KPIs (DW) | Planned | 2,0 | 2,0 | 4,0 | 4,0 | 4,0 | 2,0 | 4,0 | 22,0 |
| | Actual | 4,2 | 2,9 | 7,5 | 3,5 | 3,9 | 2,0 | 4,0 | 28,0 |
| T2.2 Elicitation and Analysis of requirements (WLI) | Planned | 5,0 | 3,0 | 2,0 | 2,0 | 2,0 | 1,0 | 2,0 | 17,0 |
| | Actual | 2,2 | 2,3 | 0,0 | 3,3 | 1,9 | 1,0 | 3,1 | 13,7 |
| T2.3 Bloomen overall Architecture and Specification (ICCS) | Planned | 1,9 | 3,8 | 0,0 | 0,0 | 0,6 | 1,9 | 1,3 | 9,5 |
| | Actual | 1,1 | 0,0 | 0,0 | 0,0 | 0,9 | 0,8 | 1,3 | 6,9 |
| **WP3. Bloomen blockchain for media and content convergence (ICCS)** | Planned | **11,0** | **15,5** | **2,5** | **2,5** | **9,2** | **6,0** | **2,5** | **49,2** |
| | Actual | **12,4** | **14,7** | **0,0** | **3,8** | **18,8** | **5,9** | **2,4** | **57,9** |
| T3.1 Blockchain operation: transactions, blocks, micropayments for media content (WLI) | Planned | 6,0 | 6,0 | 0,0 | 0,0 | 2,4 | 0,0 | 0,0 | 14,4 |
| | Actual | 11,6 | 7,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 18,5 |
| T3.2 Anonymous personalization over open, trustless media platforms (ICCS) | Planned | 2,5 | 6,0 | 1,0 | 1,0 | 0,0 | 3,0 | 1,0 | 14,5 |
| | Actual | 0,4 | 5,6 | 0,0 | 1,4 | 0,0 | 5,3 | 1,0 | 13,7 |
| T3.3 Copyright management, preservation and monitoring (Kendraio) | Planned | 2,5 | 3,5 | 1,5 | 1,5 | 6,8 | 3,0 | 1,5 | 20,3 |
| | Actual | 0,4 | 2,2 | 0,0 | 2,3 | 18,8 | 0,6 | 1,4 | 25,7 |
| **WP4. Bloomen platform and modules (WLI)** | Planned | **6,5** | **2,4** | **0,9** | **0,9** | **4,6** | **6,8** | **1,3** | **23,5** |
| | Actual | **8,1** | **2,7** | **0,0** | **1,6** | **0,5** | **7,7** | **1,7** | **22,3** |
| T4.1 Web platform and service end points (ATC) | Planned | 2,0 | 2,0 | 0,8 | 0,8 | 4,1 | 4,7 | 1,2 | 15,4 |
| | Actual | 2,4 | 2,4 | 0,0 | 1,5 | 0,0 | 7,7 | 1,0 | 15,1 |
| T4.2 Mobile clients (WLI) | Planned | 4,0 | 0,0 | 0,0 | 0,0 | 0,0 | 1,3 | 0,0 | 5,3 |
| | Actual | 5,7 | 0,2 | 0,0 | 0,0 | 0,0 | 0,0 | 0,5 | 6,3 |
| T4.3 Multiplatform interoperability and scalability framework (Kendraio) | Planned | 0,2 | 0,2 | 0,0 | 0,0 | 0,2 | 0,3 | 0,0 | 0,9 |
| | Actual | 0,0 | 0,1 | 0,0 | 0,0 | 0,5 | 0,0 | 0,0 | 0,6 |
| T4.4 Overall integration and validation (ATC) | Planned | 0,4 | 0,3 | 0,1 | 0,1 | 0,3 | 0,5 | 0,2 | 1,8 |
| | Actual | 0,0 | 0,0 | 0,0 | 0,1 | 0,0 | 0,0 | 0,2 | 0,3 |
| **WP5. Use Cases pilot validation and evaluation (ATC)** | Planned | **2,4** | **2,4** | **4,0** | **4,0** | **5,7** | **2,4** | **4,4** | **25,3** |
| | Actual | **3,5** | **2,4** | **0,6** | **3,6** | **4,6** | **3,1** | **3,4** | **21,1** |
| T5.1 Music industry use case - pilot operation management and evaluation (BMAT) | Planned | 0,8 | 0,8 | 0,0 | 4,0 | 1,9 | 0,8 | 0,0 | 8,3 |
| | Actual | 1,3 | 0,4 | 0,0 | 3,6 | 1,9 | 0,7 | 0,0 | 7,8 |
| T5.2 Media use case - pilot operation management and evaluation (DW) | Planned | 0,8 | 0,8 | 4,0 | 0,0 | 1,9 | 0,8 | 0,0 | 8,3 |
| | Actual | 0,0 | 1,0 | 0,6 | 0,0 | 1,7 | 1,7 | 0,0 | 4,9 |
| T5.3 Web TV use case - pilot operation management and evaluation (ANTENNA) | Planned | 0,8 | 0,8 | 0,0 | 0,0 | 1,9 | 0,8 | 4,4 | 8,7 |
| | Actual | 2,3 | 1,1 | 0,0 | 0,0 | 1,0 | 0,7 | 3,4 | 8,4 |
| T5.4 Overall evaluation and pilots coordination (ATC) | Planned | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| | Actual | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 |
| **WP6. Dissemination, Exploitation and Innovation Management (DW)** | Planned | **6,4** | **3,2** | **9,2** | **6,9** | **7,4** | **4,4** | **4,5** | **42,0** |
| | Actual | **8,5** | **3,4** | **12,3** | **4,9** | **5,1** | **3,0** | **4,3** | **41,4** |
| T6.1 Dissemination and Communication activities (DW) | Planned | 1,0 | 1,0 | 4,0 | 2,5 | 2,0 | 1,0 | 1,5 | 13,0 |
| | Actual | 1,7 | 2,4 | 12,3 | 1,8 | 2,2 | 1,7 | 1,5 | 23,6 |
| T6.2 Exploitation activities and Business Plans (WLI) | Planned | 3,2 | 0,8 | 1,6 | 1,6 | 1,6 | 1,6 | 1,2 | 11,6 |
| | Actual | 6,8 | 0,5 | 0,0 | 1,1 | 0,0 | 1,0 | 0,9 | 10,3 |
| T6.3 Innovation Management (DW) | Planned | 1,2 | 0,4 | 1,6 | 0,8 | 0,8 | 0,8 | 0,8 | 6,4 |
| | Actual | 0,0 | 0,5 | 0,0 | 0,6 | 0,0 | 0,3 | 0,6 | 1,9 |
| T6.4 Community Involvement and sustainability (Kendraio) | Planned | 1,0 | 1,0 | 2,0 | 2,0 | 3,0 | 1,0 | 1,0 | 11,0 |
| | Actual | 0,0 | 0,1 | 0,0 | 1,4 | 2,9 | 0,0 | 1,3 | 5,7 |
| **TOTAL** | **Planned** | **47,2** | **35,3** | **22,6** | **20,3** | **33,5** | **24,5** | **20,0** | **203,5** |
| | **Actual** | **51,6** | **34,4** | **20,4** | **20,7** | **35,6** | **23,5** | **20,4** | **206,5** |

## Person-Month Status Table for the whole project (M01-M36)

| TOTAL (M01-M36) Person-Month Status Table | | WLI | ICCS | DW | BMAT | Kendraio | ATC | ANTENNA | TOTAL | Spent |
|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL Table** (efforts in Person-Month) | | | | | | | | | | |
| **WP1. Project Management (WLI)** | Planned | 24,0 | 6,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 30,0 | 50% |
| | Actual | 11,6 | 3,1 | 0,0 | 0,0 | 0,0 | 0,0 | 0,4 | 15,1 | |
| T1.1 Project Management & Administration (WLI) | Planned | 18,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 18,0 | 51% |
| | Actual | 8,8 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,4 | 9,2 | |
| T1.2 Scientific and Technical Coordination (ICCS) | Planned | 0,0 | 6,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 6,0 | 52% |
| | Actual | 0,0 | 3,1 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 3,1 | |
| T1.3 Quality and Risk Management (WLI) | Planned | 4,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 4,0 | 47% |
| | Actual | 1,9 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 1,9 | |
| T1.4 Data Management (WLI) | Planned | 2,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 2,0 | 47% |
| | Actual | 0,9 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,9 | |
| **WP2. Bloomen Use Cases, requirements and architecture (ICCS)** | Planned | 10,0 | 11,0 | 6,0 | 6,0 | 7,0 | 6,0 | 8,0 | 54,0 | 90% |
| | Actual | 7,5 | 8,0 | 7,5 | 6,8 | 6,7 | 3,8 | 8,3 | 48,6 | |
| T2.1 Use cases description and KPIs (DW) | Planned | 2,0 | 2,0 | 4,0 | 4,0 | 4,0 | 2,0 | 4,0 | 22,0 | 127% |
| | Actual | 4,2 | 2,9 | 7,5 | 3,5 | 3,9 | 2,0 | 4,0 | 28,0 | |
| T2.2 Elicitation and Analysis of requirements (WLI) | Planned | 5,0 | 3,0 | 2,0 | 2,0 | 2,0 | 1,0 | 2,0 | 17,0 | 81% |
| | Actual | 2,2 | 2,3 | 0,0 | 3,3 | 1,9 | 1,0 | 3,1 | 13,7 | |
| T2.3 Bloomen overall Architecture and Specification (ICCS) | Planned | 3,0 | 6,0 | 0,0 | 0,0 | 1,0 | 3,0 | 2,0 | 15,0 | 46% |
| | Actual | 1,1 | 2,9 | 0,0 | 0,0 | 0,9 | 0,8 | 1,3 | 6,9 | |
| **WP3. Bloomen blockchain for media and content convergence (ICCS)** | Planned | 22,0 | 31,0 | 5,0 | 5,0 | 14,0 | 12,0 | 5,0 | 94,0 | 62% |
| | Actual | 12,4 | 14,7 | 0,0 | 3,8 | 18,8 | 5,9 | 2,4 | 57,9 | |
| T3.1 Blockchain operation: transactions, blocks, micropayments for media content (WLI) | Planned | 12,0 | 12,0 | 0,0 | 0,0 | 4,0 | 0,0 | 0,0 | 28,0 | 66% |
| | Actual | 11,6 | 7,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 18,5 | |
| T3.2 Anonymous personalization over open, trustless media platforms (ICCS) | Planned | 5,0 | 12,0 | 2,0 | 2,0 | 0,0 | 6,0 | 2,0 | 29,0 | 47% |
| | Actual | 0,4 | 5,6 | 0,0 | 1,4 | 0,0 | 5,3 | 1,0 | 13,7 | |
| T3.3 Copyright management, preservation and monitoring (Kendraio) | Planned | 5,0 | 7,0 | 3,0 | 3,0 | 10,0 | 6,0 | 3,0 | 37,0 | 70% |
| | Actual | 0,4 | 2,2 | 0,0 | 2,3 | 18,8 | 0,6 | 1,4 | 25,7 | |
| **WP4. Bloomen platform and modules (WLI)** | Planned | 28,0 | 14,0 | 4,0 | 4,0 | 18,0 | 31,0 | 6,0 | 105,0 | 21% |
| | Actual | 8,1 | 2,7 | 0,0 | 1,6 | 0,5 | 7,7 | 1,7 | 22,3 | |
| T4.1 Web platform and service end points (ATC) | Planned | 5,0 | 5,0 | 2,0 | 2,0 | 6,0 | 12,0 | 3,0 | 35,0 | 43% |
| | Actual | 2,4 | 2,4 | 0,0 | 1,5 | 0,0 | 7,7 | 1,0 | 15,1 | |
| T4.2 Mobile clients (WLI) | Planned | 12,0 | 0,0 | 0,0 | 0,0 | 0,0 | 4,0 | 0,0 | 16,0 | 40% |
| | Actual | 5,7 | 0,2 | 0,0 | 0,0 | 0,0 | 0,0 | 0,5 | 6,3 | |
| T4.3 Multiplatform interoperability and scalability framework (Kendraio) | Planned | 4,0 | 4,0 | 0,0 | 0,0 | 7,0 | 5,0 | 0,0 | 20,0 | 3% |
| | Actual | 0,0 | 0,1 | 0,0 | 0,0 | 0,5 | 0,0 | 0,0 | 0,6 | |
| T4.4 Overall integration and validation (ATC) | Planned | 7,0 | 5,0 | 2,0 | 2,0 | 5,0 | 10,0 | 3,0 | 34,0 | 1% |
| | Actual | 0,0 | 0,0 | 0,0 | 0,1 | 0,0 | 0,0 | 0,2 | 0,3 | |
| **WP5. Use Cases pilot validation and evaluation (ATC)** | Planned | 8,0 | 8,0 | 10,0 | 10,0 | 12,0 | 11,0 | 11,0 | 70,0 | 30% |
| | Actual | 3,5 | 2,4 | 0,6 | 3,6 | 4,6 | 3,1 | 3,4 | 21,1 | |
| T5.1 Music industry use case - pilot operation management and evaluation (BMAT) | Planned | 2,0 | 2,0 | 0,0 | 10,0 | 4,0 | 2,0 | 0,0 | 20,0 | 39% |
| | Actual | 1,3 | 0,4 | 0,0 | 3,6 | 1,9 | 0,7 | 0,0 | 7,8 | |
| T5.2 Media use case - pilot operation management and evaluation (DW) | Planned | 2,0 | 2,0 | 10,0 | 0,0 | 4,0 | 2,0 | 0,0 | 20,0 | 24% |
| | Actual | 0,0 | 1,0 | 0,6 | 0,0 | 1,7 | 1,7 | 0,0 | 4,9 | |
| T5.3 Web TV use case - pilot operation management and evaluation (ANTENNA) | Planned | 2,0 | 2,0 | 0,0 | 0,0 | 4,0 | 2,0 | 11,0 | 21,0 | 40% |
| | Actual | 2,3 | 1,1 | 0,0 | 0,0 | 1,0 | 0,7 | 3,4 | 8,4 | |
| T5.4 Overall evaluation and pilots coordination (ATC) | Planned | 2,0 | 2,0 | 0,0 | 0,0 | 0,0 | 5,0 | 0,0 | 9,0 | 0% |
| | Actual | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | |
| **WP6. Dissemination, Exploitation and Innovation Management (DW)** | Planned | 15,0 | 7,0 | 20,0 | 15,0 | 16,0 | 10,0 | 10,0 | 93,0 | 45% |
| | Actual | 8,5 | 3,4 | 12,3 | 4,9 | 5,1 | 3,0 | 4,3 | 41,4 | |
| T6.1 Dissemination and Communication activities (DW) | Planned | 2,0 | 2,0 | 8,0 | 5,0 | 4,0 | 2,0 | 3,0 | 26,0 | 91% |
| | Actual | 1,7 | 2,4 | 12,3 | 1,8 | 2,2 | 1,7 | 1,5 | 23,6 | |
| T6.2 Exploitation activities and Business Plans (WLI) | Planned | 8,0 | 2,0 | 4,0 | 4,0 | 4,0 | 4,0 | 3,0 | 29,0 | 35% |
| | Actual | 6,8 | 0,5 | 0,0 | 1,1 | 0,0 | 1,0 | 0,9 | 10,3 | |
| T6.3 Innovation Management (DW) | Planned | 3,0 | 1,0 | 4,0 | 2,0 | 2,0 | 2,0 | 2,0 | 16,0 | 12% |
| | Actual | 0,0 | 0,5 | 0,0 | 0,6 | 0,0 | 0,3 | 0,6 | 1,9 | |
| T6.4 Community Involvement and sustainability (Kendraio) | Planned | 2,0 | 2,0 | 4,0 | 4,0 | 6,0 | 2,0 | 2,0 | 22,0 | 26% |
| | Actual | 0,0 | 0,1 | 0,0 | 1,4 | 2,9 | 0,0 | 1,3 | 5,7 | |
| **TOTAL** | **Planned** | **107,0** | **77,0** | **45,0** | **40,0** | **67,0** | **70,0** | **40,0** | **446,0** | |
| | **Actual** | **51,6** | **34,4** | **20,4** | **20,7** | **35,6** | **23,5** | **20,4** | **206,5** | 46% |
| | **Spent** | **48%** | **45%** | **45%** | **52%** | **53%** | **34%** | **51%** | **46%** | |

The following chart shows a graphical summary of the actual efforts allocated to each WP, the efforts that had been planned for this first period, and the total efforts allocated for the whole duration of the project.

**Bloomen**

**Period 1 Efforts by WP**
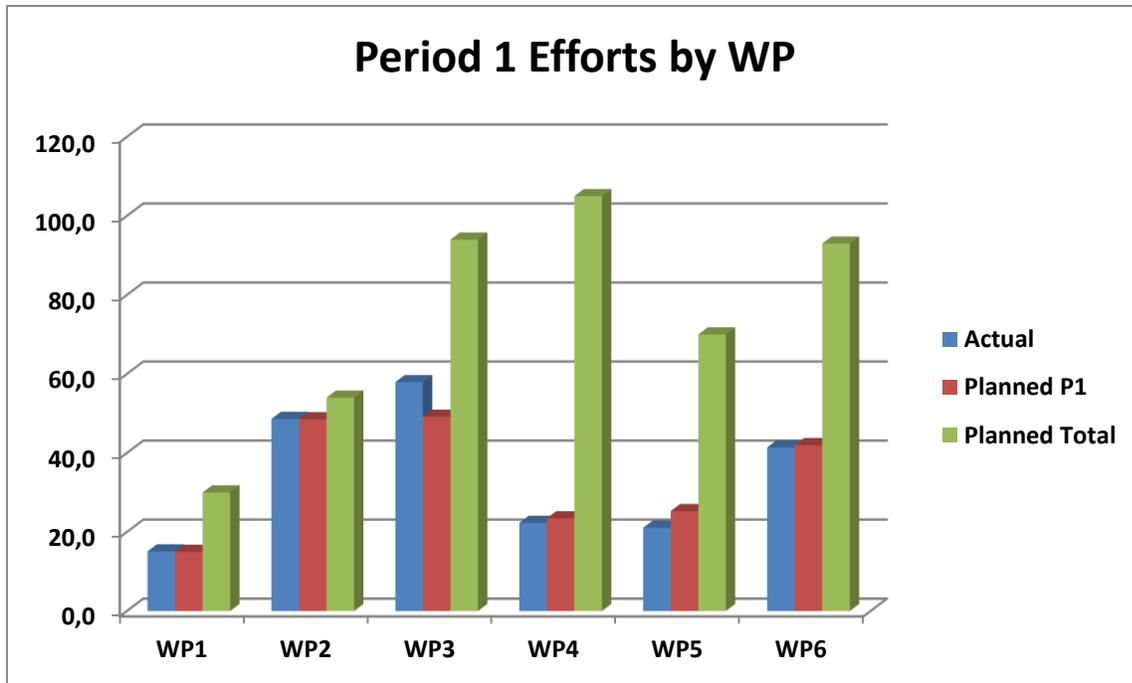


The following chart shows a graphical summary of the actual efforts allocated to each Partner, the efforts that had been planned for this first period, and the total efforts allocated for the whole duration of the project.

**Period 1 Efforts by Partner**
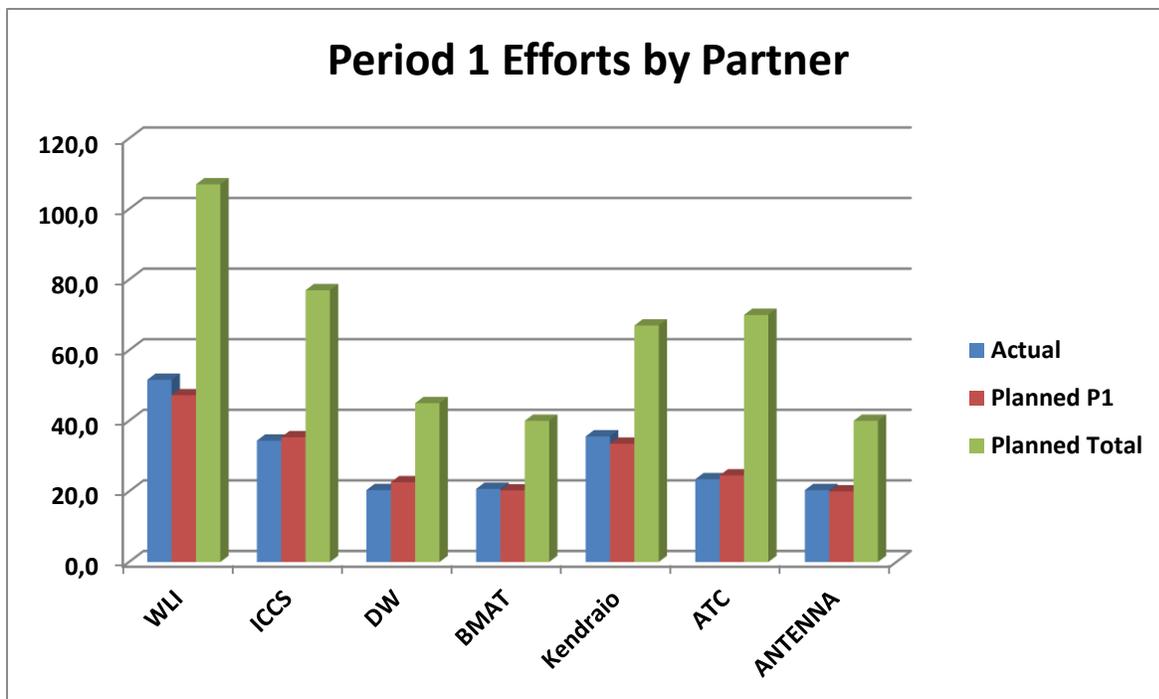
## Cost Budget Follow-up Table

| Cost Budget Follow-up Table | Expenditure | Budget | Actual Costs | | | % Spent | Remaining Budget |
|---|---|---|---|---|---|---|---|
| | | | Period 1 | Period 2 | TOTAL | | |
| **WLI** | Personnel | 556.400,00 | 262.376,40 | 0,00 | 262.376,40 | 47% | 294.023,60 |
| | Other direct costs | 92.000,00 | 26.014,40 | 0,00 | 26.014,40 | 28% | 65.985,60 |
| | Indirect costs | 162.100,00 | 72.097,70 | 0,00 | 72.097,70 | 44% | 90.002,30 |
| | **TOTAL costs** | **810.500,00** | **360.488,50** | **0,00** | **360.488,50** | **44%** | **450.011,50** |
| **ICCS** | Personnel | 385.000,00 | 226.490,91 | 0,00 | 226.490,91 | 59% | 158.509,09 |
| | Other direct costs | 24.000,00 | 13.147,77 | 0,00 | 13.147,77 | 55% | 10.852,23 |
| | Indirect costs | 102.250,00 | 59.909,67 | 0,00 | 59.909,67 | 59% | 42.340,33 |
| | **TOTAL costs** | **511.250,00** | **299.548,35** | **0,00** | **299.548,35** | **59%** | **211.701,65** |
| **DW** | Personnel | 299.250,00 | 162.450,29 | 0,00 | 162.450,29 | 54% | 136.799,71 |
| | Other direct costs | 20.000,00 | 13.395,38 | 0,00 | 13.395,38 | 67% | 6.604,62 |
| | Indirect costs | 79.812,50 | 43.961,42 | 0,00 | 43.961,42 | 55% | 35.851,08 |
| | **TOTAL costs** | **399.062,50** | **219.807,09** | **0,00** | **219.807,09** | **55%** | **179.255,41** |
| **BMAT** | Personnel | 208.000,00 | 107.640,00 | 0,00 | 107.640,00 | 52% | 100.360,00 |
| | Other direct costs | 15.000,00 | 5.681,91 | 0,00 | 5.681,91 | 38% | 9.318,09 |
| | Indirect costs | 55.750,00 | 28.330,48 | 0,00 | 28.330,48 | 51% | 27.419,52 |
| | **TOTAL costs** | **278.750,00** | **141.652,39** | **0,00** | **141.652,39** | **51%** | **137.097,61** |
| **Kendraio** | Personnel | 482.400,00 | 270.509,75 | 0,00 | 270.509,75 | 56% | 211.890,25 |
| | Other direct costs | 32.000,00 | 12.538,10 | 0,00 | 12.538,10 | 39% | 19.461,90 |
| | Indirect costs | 128.600,00 | 70.761,96 | 0,00 | 70.761,96 | 55% | 57.838,04 |
| | **TOTAL costs** | **643.000,00** | **353.809,81** | **0,00** | **353.809,81** | **55%** | **289.190,19** |
| **ATC** | Personnel | 350.000,00 | 111.843,03 | 0,00 | 111.843,03 | 32% | 238.156,97 |
| | Other direct costs | 20.000,00 | 8.684,96 | 0,00 | 8.684,96 | 43% | 11.315,04 |
| | Indirect costs | 92.500,00 | 30.132,00 | 0,00 | 30.132,00 | 33% | 62.368,00 |
| | **TOTAL costs** | **462.500,00** | **150.659,99** | **0,00** | **150.659,99** | **33%** | **311.840,01** |
| **ANTENNA** | Personnel | 120.000,00 | 61.793,70 | 0,00 | 61.793,70 | 51% | 58.206,30 |
| | Other direct costs | 15.000,00 | 7.868,99 | 0,00 | 7.868,99 | 52% | 7.131,01 |
| | Indirect costs | 33.750,00 | 17.415,67 | 0,00 | 17.415,67 | 52% | 16.334,33 |
| | **TOTAL costs** | **168.750,00** | **87.078,36** | **0,00** | **87.078,36** | **52%** | **81.671,64** |
| **TOTAL** | Personnel | 2.401.050,00 | 1.203.104,08 | 0,00 | 1.203.104,08 | 50% | 1.197.945,92 |
| | Other direct costs | 218.000,00 | 87.331,51 | 0,00 | 87.331,51 | 40% | 130.668,49 |
| | Indirect costs | 654.762,50 | 322.608,90 | 0,00 | 322.608,90 | 49% | 332.153,60 |
| | **TOTAL costs** | **3.273.812,50** | **1.613.044,49** | **0,00** | **1.613.044,49** | **49%** | **1.660.768,01** |

The following chart shows a graphical summary of the actual costs consumed by each Partner versus the total costs budgeted for the whole duration of the project.
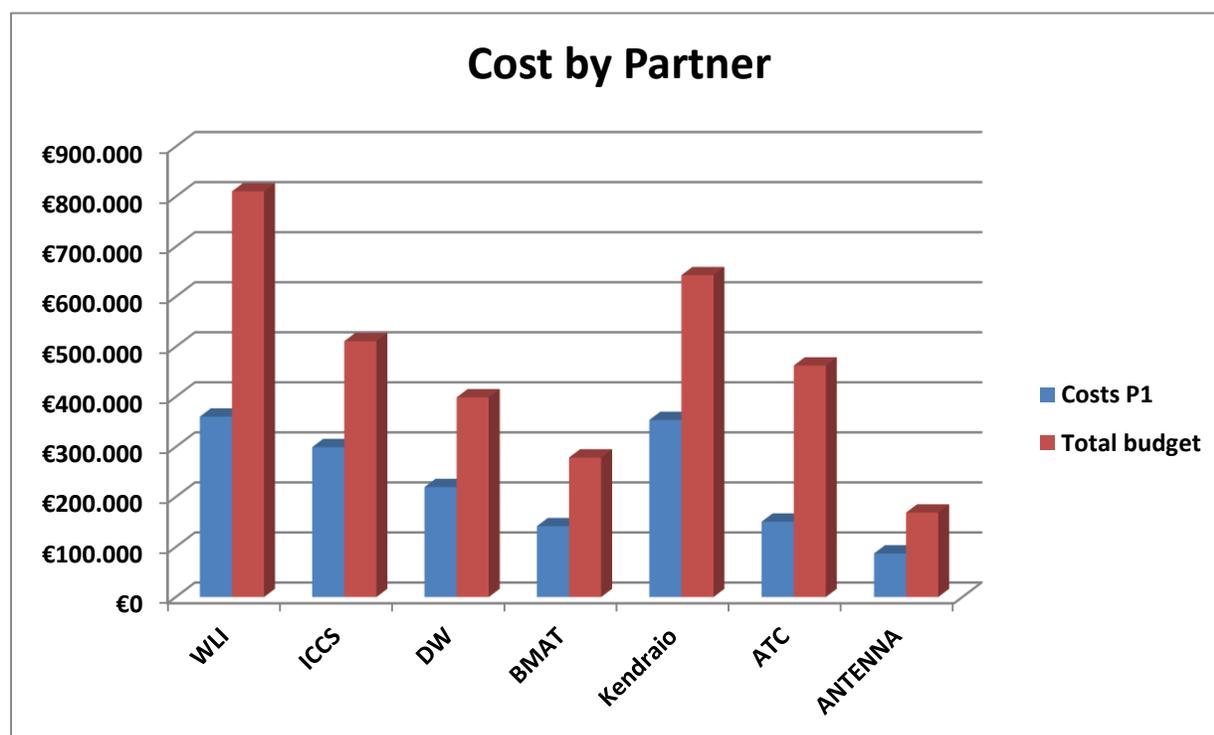
### 5.2.1 Unforeseen subcontracting (if applicable)

No unforeseen subcontracting has been performed.

### 5.2.2 Unforeseen use of in kind contribution from third party against payment or free of charges (if applicable)

No unforeseen in kind contributions have been made.