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QUADRATURE

Scalable multi-chip architectures enabled by cryogenic wireless/quantum-coherent network-in-package [†]

D6.1: Setup of public project website, communication channels and project logo

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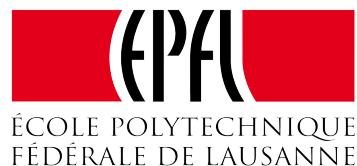
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Executive Summary

The deliverable D6.1: Setup of public project website, communication channels and project logo (M2) involves creating the project website, setting up internal and external communication channels, and designing the project logo. All these items have been successfully delivered and details are presented in the subsequent sections.

The QUADRATURE consortium is composed by

| | | |
|----------|--------------------|-------------|
| UPV | Coordinator | Spain |
| UPC | Beneficiary | Spain |
| TU Delft | Beneficiary | Netherlands |
| UoS | Beneficiary | Germany |
| UNICT | Beneficiary | Italy |
| EQUAL1 | Beneficiary | Ireland |
| BSC CNS | Beneficiary | Spain |
| NUID UCD | Beneficiary | Ireland |
| EPFL | Associated partner | Switzerland |



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1. Introduction

In this report, we present the outcome of Deliverable 6.1 of the EU Pathfinder project named QUADRATURE. In particular, we present the setup of the public project website and other communication channels. The report is organized into three main sections:

- Website structure.
- Communication Channels.
- Logo.

2. Website Structure

The project website was launched under the link <https://www.quadrature-project.eu/>. The domain name was purchased by Sergi Abadal (UPC) and the website is hosted for free in a Github Pages repository created by Avishek Nag (UCD). The content of the website was created by UCD, UPV, and UPC. UCD will be the project webmaster and will be responsible for updating the website content. The website contains the tabs below. Each tab will be explained in detail in the following subsections of the report.

- Home
- Research
- Team
- Publications
- Events
- News
- Downloads
- Contact

2.1 Home

The tab *Home* contains the project name, the project logo, and a brief description of the overall vision of the project. It also has links to the project's LinkedIn page, the project's GitHub repository, and the contact email of the project. This tab also lists the partners of the project including hyperlinks to their respective websites. We made sure that the website is properly visualized in any device (e.g. computer or mobile phone). A picture of the *Home* tab is shown in Fig. 2.1.

2.2 Research

The research tab discusses the overall vision and goals of the project as well as all the technical work packages of the project and shows how they are linked to each other (see Fig. 2.2).



Figure 2.1: Website Tab: Home as it shown from a computer (left) and from a mobile phone (right).

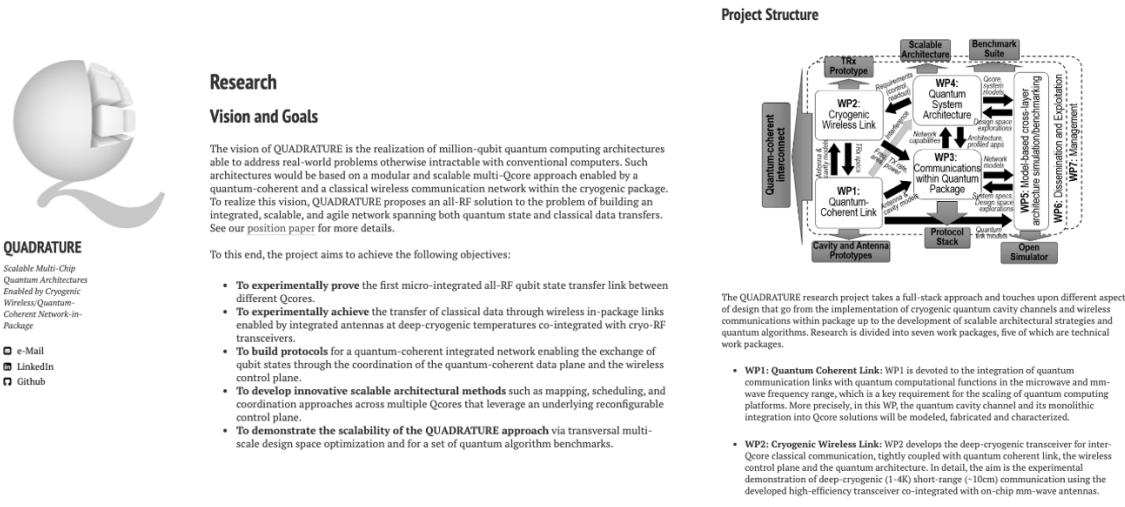


Figure 2.2: Website Tab: Research

2.3 Team

This tab describes the team in detail. It includes the list of partners discussing their complementary expertise as well as the names of the PIs of the project along with links to their individual websites/LinkedIn profiles (Fig. 2.3). It also contains the link to a partner project WiPLASH and we will be adding the logos of any new partner project.

Team

Universitat Politècnica de València (UPV) (Project coordinator): The UPV team, which coordinates the project, has a broad expertise in the field of quantum computing architectures and the design and development of full-stack quantum systems as well as world-leading expertise in on-chip interconnection networks. UPV PI - Dr. Carmen G. Almudever.



Delft University of Technology (TU Delft): TU Delft has world-leading activity in qubit fabrication and scalable quantum hardware, RF and data conversion cryogenic ICs. TU Delft PIs - Dr. Fabio Sebastian and Dr. Masoud Babaei.



Universitat Politècnica de Catalunya (UPC): The UPC team has pioneering expertise in the design of nanotechnology-enabled miniaturized small-scale short range wireless systems, as well as design space exploration methodologies for complex multi-layer systems. UPC PIs - Prof. Dr. Eduard Alarcón and Dr. Sergi Abadal.



University of Siegen (UoS): The UoS team has a broad expertise in the field of microwave/mm-wave/THz devices, systems and applications and superconductor cavity deposition techniques. UoS PIs - Dr. Prof. Peter Haring Bolívar and Xin Jiang.



University of Catania (UNICT): UNICT has a long-time experience in the design and optimization of on-chip communication systems through multi-objective design space exploration and mapping techniques. UNICT PI - Dr. Maurizio Palesi.



Equal1 Labs: Equal1 is a commercial company with a mission to build the world's first fully integrated CMOS quantum computer. The founders and top technical staff have over 100 years of aggregated high-tech industry experience, in addition to extensive research experience, particularly in the field of integrated circuits and RF transceivers. Equal1 PIs - Dr. Elena Blizhina and Dr. Dirk Leipold.



Barcelona Supercomputing Center (BSC): BSC has a strong background in simulation of physical systems, and in particular the simulation of quantum computation processes. BSC PI - Dr. Artur Garcia.



University College Dublin (UCD): The UCD team has a strong background on quantum-key distribution, design and development of optimisation models, meta-heuristic methods, deep reinforcement learning, network graph algorithms, communications channel modelling, and network resource allocation and optimisation. UCD PIs - Dr. Prof. Bogdan Staszewski and Dr. Avishek Nag.



École Polytechnique Fédérale de Lausanne (EPFL): The EPFL team has extensive cryo-CMOS experience with strong ties with TUD with whom they co-authored recent advances in cryogenic control of quantum processors. EPFL PI - Dr. Prof. Edoardo Charbon.

The PIs of the Project**Partner Projects**

WiPLASH WiPLASH - Architecting More Than Moore: Wireless Plasticity for Massive Heterogeneous Computer Architectures.

Figure 2.3: Website Tab: Team

2.4 Publications

This tab enumerates all the publications derived from the project and are categorized into journal articles, conference proceedings, preprints, technical reports, and others (e.g., book chapters, etc.). See Fig. 2.4 for details.

2.5 Events

This tab provides information about all invited talks and panels as well as workshops and tutorials that the QUADRATURE consortium organizes. The tab currently looks as shown in Fig. 2.5.

2.6 News

This tab provides all information about press releases and news related to the QUADRATURE project. Currently, this tab appears as shown in Fig. 2.6.

2.7 Downloads

In this tab, the codes and other publicly shareable resources, e.g. slides of different presentations, talks, tutorials, public deliverables, etc. will be hosted. A preliminary screenshot of this tab is shown in Fig. 2.7.

[HOME](#)[RESEARCH](#) [TEAM](#) [PUBLICATIONS](#) [EVENTS](#) [NEWS](#) [DOWNLOADS](#) [CONTACT](#)**QUADRATURE**

*Scalable Multi-Chip
Quantum Architectures
Enabled by Cryogenic
Wireless/Quantum-
Coherent Network-in-
Package*

[e-Mail](#)
 [LinkedIn](#)
 [Github](#)

Publications**Preprints****Journals****Conferences**

- M. Bandic, L. Prielerger, J. Nüßlein, A. Ovide, S. Rodrigo, S. Abadal, H. van Someren, G. Vardoyan, E. Alarcón, C.G. Almudever, and S. Feld, “Mapping quantum circuits to modular architectures with QUBO,” Proceedings of the IEEE QCE 2023, Bellevue, USA, September 2023.
- E. Alarcón, S. Abadal, F. Sebastian, M. Babaie, E. Charbon, P. H. Bolívar, M. Palesi, E. Blokhina, D. Leipold, B. Staszewski, and A. Garcia-Sáez, “Scalable multi-chip quantum architectures enabled by cryogenic hybrid wireless/quantum-coherent network-in-package,” Proceedings of the IEEE ISCAS 2023, Monterey, USA, May 2023.
- A. Ovide, S. Rodrigo, M. Bandic, H. Van Someren, S. Feld, S. Abadal, E. Alarcón, and C.G. Almudever, “Mapping quantum algorithms to multi-core quantum computing architectures,” Proceedings of the IEEE ISCAS 2023, Monterey, USA, May 2023.

Figure 2.4: Website Tab: Publications

[HOME](#)[RESEARCH](#) [TEAM](#) [PUBLICATIONS](#) [EVENTS](#) [NEWS](#) [DOWNLOADS](#) [CONTACT](#)**QUADRATURE**

*Scalable Multi-Chip
Quantum Architectures
Enabled by Cryogenic
Wireless/Quantum-
Coherent Network-in-
Package*

[e-Mail](#)
 [LinkedIn](#)
 [Github](#)

Talks and Events**Workshops and Tutorials**

- E. Alarcon, S. Abadal and C.G. Almudever, Workshop: “Modular Quantum Comuting Architectures: Bridging the Quantum Networks and Quantum Computing Communities”, IEEE International Conference on Quantum Computing and Engineering (QCE23), September 2023.

Invited Talks, Lectures and Panels

- C.G. Almudever, “Quantum Compilation: Crossing the NISQ era”, Invited talk at the 5th International Workshop on Quantum Compilation, Paris, France, July 2023.



This project has received funding from the European Union’s Horizon Pathfinder program, under grant agreement No 101099697.

Figure 2.5: Website Tab: Events

[HOME](#)[RESEARCH](#) [TEAM](#) [PUBLICATIONS](#) [EVENTS](#) [NEWS](#) [DOWNLOADS](#) [CONTACT](#)**QUADRATURE**

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Quantum Architectures
Enabled by Cryogenic
Wireless/Quantum-
Coherent Network-in-
Package*

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News and Press**Press**

- Equal1 Wins Major Pathfinder Grant Award

Project News

- Kick-off meeting: The Kick-off Meeting of the Horizon Europe project QUADRATURE was held at UPV in Valencia on the 6-7 of July 2023. We had two days of very exciting discussions to kickstart the project with diversity of experts in the fields of quantum hardware, cryo-CMOS , NoCs, antennas for wireless on-chip communication, quantum computer architecture and quantum algorithms.



Figure 2.6: Website Tab: News

[HOME](#)[RESEARCH](#) [TEAM](#) [PUBLICATIONS](#) [EVENTS](#) [NEWS](#) [DOWNLOADS](#) [CONTACT](#)**QUADRATURE**

*Scalable Multi-Chip
Quantum Architectures
Enabled by Cryogenic
Wireless/Quantum-
Coherent Network-in-
Package*

[e-Mail](#)
 [LinkedIn](#)
 [GitHub](#)

Downloads**Codes**

The project codes are hosted in the github repository for the project. Here is the link: <https://github.com/quadrature-eu>.

Documents

Public Deliverables will be posted here.



This project has received funding from the European Union's Horizon Pathfinder program, under grant agreement No 101099697.

Figure 2.7: Website Tab: Downloads

2.8 Contact

In the contact tab the general project email address for general queries is shown. The screenshot of the tab is shown in Fig. 2.8.

The screenshot shows the 'Contact' section of the QUADRATURE website. At the top, there is a navigation bar with links: HOME, RESEARCH, TEAM, PUBLICATIONS, EVENTS, NEWS, DOWNLOADS, and CONTACT. Below the navigation bar is the QUADRATURE logo, which features a stylized white 'Q' composed of geometric shapes. To the right of the logo, the word 'QUADRATURE' is written in a bold, sans-serif font. Underneath 'QUADRATURE', there is a detailed project description: 'Scalable Multi-Chip Quantum Architectures Enabled by Cryogenic Wireless/Quantum-Coherent Network-in-Package'. Below this text are three social media links: 'e-Mail', 'LinkedIn', and 'Github'. To the right of the 'LinkedIn' link is a small blue square icon containing the European Union flag. To the right of the icon, the text reads: 'This project has received funding from the European Union's Horizon Pathfinder program, under grant agreement No 101099697.'

Figure 2.8: Website Tab: Contact

3. Communication Channels

This section introduces the internal and external communication channels for the project.

3.1 Internal Communication Channels

The internal communication channels (general mailing list, official document repository, code repository, and Slack communication channel) are described in detail below.

3.1.1 General Mailing List

The general mailing list quadrature@upv.es is created by Carmen G. Almudever (UPV). The list includes the email addresses of all team members of the project partners. UPV is responsible for keeping the mailing list up-to-date.

3.1.2 Official Document Repository

The official document repository was created under the link <https://quadrature.cba.upc.edu:8443/> by Sergi Abadal (UPC). The repository is hosted by UPC. UPC is responsible for maintaining the official document repository. The repository is organized by work packages. Access to the repository is provided to all members of the project partners' team. A screenshot of the document repository is shown in Fig. 3.1.

3.1.3 Code Repository

The code repository has been created on the GitHub platform under the link <https://github.com/quadrature-eu> by Sergi Abadal (UPC). Any partner can contribute to the repository. It is shown in Fig. 3.2.

3.1.4 Slack Communication Channel

A Slack channel 'quadrature' under the link quadrature-project.slack.com is created by Avishek Nag (UCD). All team members of the project partners are invited to the channel. UCD will be responsible for maintaining the channel. Figure 3.3 provides a screenshot of the slack channel.

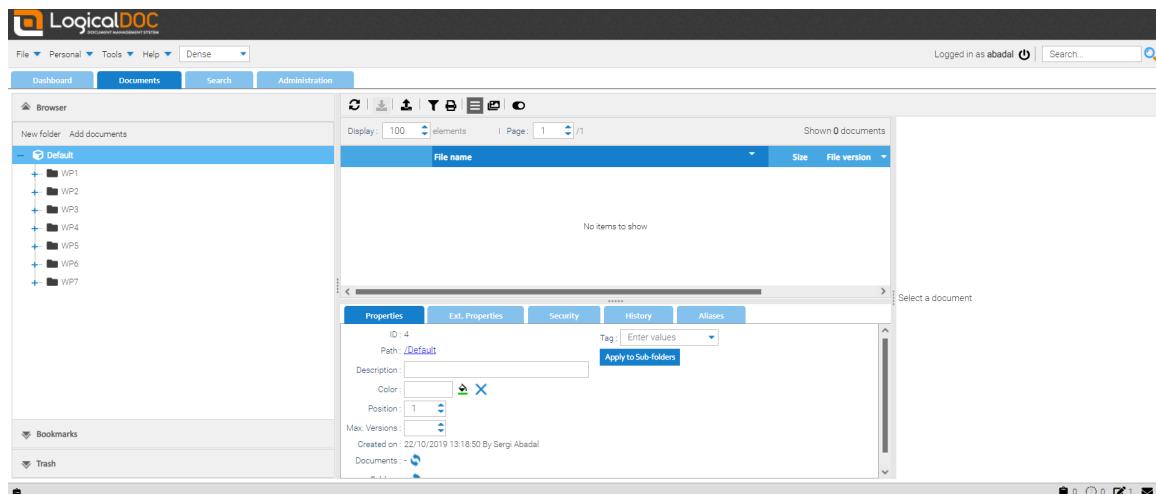


Figure 3.1: Internal Document Repository

Figure 3.2: GitHub Repository

Figure 3.3: Slack Communication Channel

3.2 External Communication Channels

3.2.1 External Email Address

The contact e-mail address is established as info_quadrature@upv.es by Carmen G. Almudever, (UPV). UPV will be responsible for maintaining the e-mail account and any communication through this e-mail address. This e-mail address also appears on the project website.

3.2.2 LinkedIn Page

The LinkedIn page for the project is under the link <https://www.linkedin.com/company/quadrature-eu/> by Sergi Abadal (UPC). UPC and UCD will be responsible for maintaining the LinkedIn page. The screenshot of the LinkedIn page is shown in Fig. 3.4. Note that, at the time of preparing this deliverable, we already have 87 followers for the LinkedIn page.

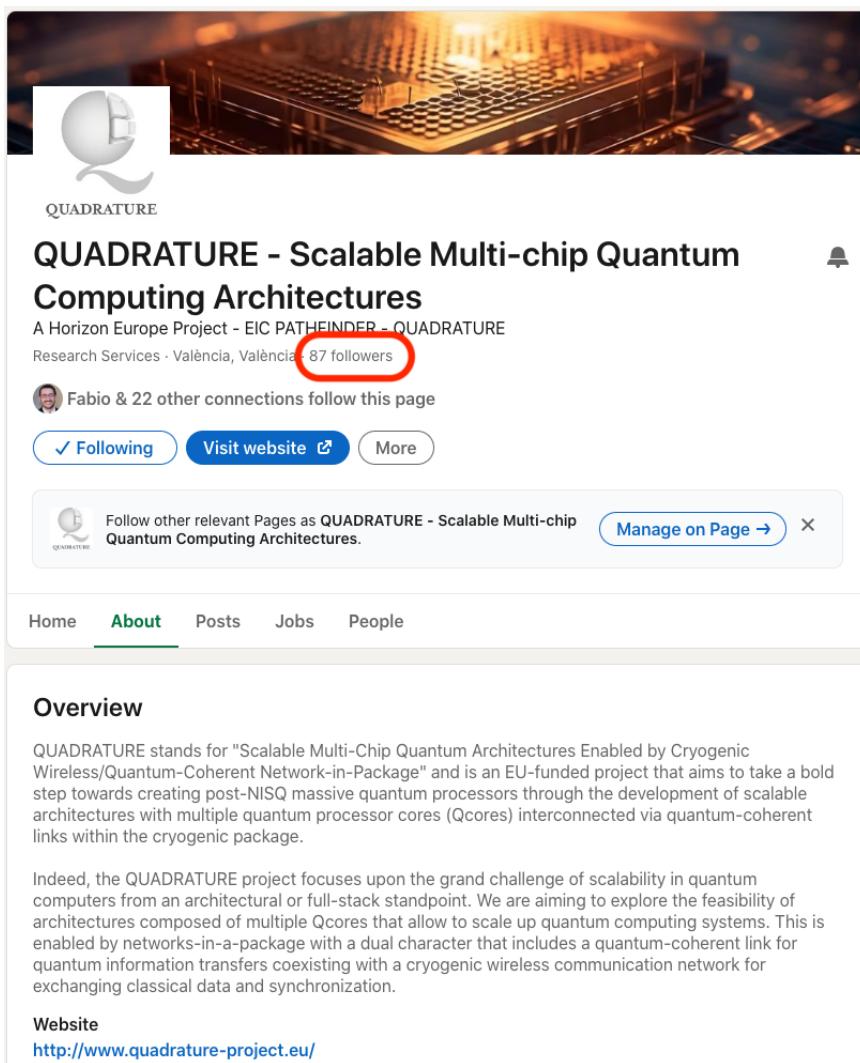


Figure 3.4: The LinkedIn page for QUADRATURE.

4. Logo

This section contains information on the project logo.

4.1 Logo Design and its Use

The logo design was coordinated by Eduard Alarcon (UPC) and Carmen G. Almudever (UPV). A graphic designer was employed and various logo options were shared with the project partners. The logo for the project was decided by majority voting of the project PIs. The selected project logo is shown in Figure 4.1.



Figure 4.1: The QUADRATURE project logo

The logo contains three key aspects of the project. First, the concept of quantum is represented by the Q, which also resembles the Bloch sphere (a geometrical representation of quantum states). Second, the acronym of the project 'QUADRATURE' (i.e. the process of making something square) is represented by the truncated sphere that corresponds to the quadrature of a sphere. Finally, the multi-core modular architecture of the overall system is featured as the cubes of the sphere.

The logo was incorporated into the website and the internal and external communication channels. The logo appears on the Home tab of the website, the GitHub repository, the Slack channel, and the LinkedIn page for the project. The logo will be featured in all official documentation and official external communication related to the project.

5. Conclusion

To conclude, the website for the project has been launched under the link <https://www.quadrature-project.eu/>. Internal communication channels (general mailing list, official document repository, code repository, Slack communication channel) and external communication channels (contact e-mail and LinkedIn page) were established. These communication channels and the website will be maintained by various project partners (UPV, UPC, UCD). The project logo was designed and is currently in use. D6.1: Setup of public project website, communication channels, and project logo (M2) was successfully delivered.