# What is Binary Hub?

**UR Binary Hub** is the **innovation and incubation hub** of the **University of Rwanda**, currently hosted within the **School of ICT** at the **College of Science and Technology (CST)**. It is a conducive environment for nurturing student, staff, experts and alumni-led innovations focused on **developing homegrown digital solutions** that address national and institutional challenges.

## Vision:

To establish a sustainable and institutionally recognized software development center that nurtures student and staff innovations, builds practical skills, and contributes to national and institutional digital transformation.

## Specific Objectives:

* Foster interdisciplinary collaboration among students, staff, alumni, and industry experts.
* Focus on Edu-tech and other priority development areas aligned with national and UR strategies.
* Provide mentorship and career development pathways for students through real-world project experience.
* Strengthen UR’s position as a digital solutions provider for internal use and external clients.

## Goals:

* Develop a pipeline for developing home-grown solutions within and outside UR
* Engage students from all UR colleges in software development and innovation.
* Formalize collaboration with existing innovation units including the AI & IoT Hub, Grid Innovation and Incubation Hub, Uni-Pod, and others.
* Create a feedback loop between academia and product development based on industry needs assessment.

### **Key Features of UR Binary Hub:**

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| **Feature** | **Description** |
| **Incubation Support** | Offers mentorship, training, and working space for tech innovators. |
| **University-Backed** | Operates under the University of Rwanda; aligned with national development goals. |
| **Multidisciplinary Teams** | Engages students, academic staff, alumni, and external experts. |
| **Focus Area** | Primarily software development for public institutions and national systems. |
| **Co-Ownership Model** | Solutions are co-owned by the University and the developers. |
| **Real-World Impact** | Works on projects addressing public service delivery, governance, and education. |

### **Flagship Projects Developed at Binary Hub:**

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| **System** | **Description** |
| **UMUTUNGO Box** | Asset Management System for public institutions to track assets, value, and depreciation. |
| **IMOTRAK** | Fleet Management System for monitoring usage, maintenance, and cost of institutional vehicles. |
| **INUMA App** | Request flow management system for submitting and following up on staff inquiries in institutions. |
| **Customer Support System – Rwanda FDA** | Helps citizens submit and track requests to Rwanda FDA; integrated with email and SMS. |
| **Academic Records System (Under Dev)** | Tool for managing student marks, transcripts, and academic validation processes at CST. |

### **Current Structure and Operations:**

* Coordinated by a team of Volunteers from the School of ICT.
* Operates with project managers, front-end and back-end developers, testers, and documentation specialists.
* Offers an environment where students work on live projects, contributing voluntarily.
* Solutions are to be first used within the **University of Rwanda** and also made available to other **government institutions**.

# STAFF ROLES/ Project Mentors

* The University staff will be supporting and guiding students on the best way to search and select the suitable projects and will be coaching them on the techniques used to develop useful and maintainable software apps. They will also be responsible in analyzing the software before students start to develop.
* The Academics and researchers with the support of the University will be the one to negotiate the partnership with other institutions / Industries. This will require the support of Schools, Colleges, Center of Excellences and University of Rwanda.
* The staff will be responsible on reporting to the research and innovation team and their departments who will in turn report to the Research and innovation team at the school level.
* The staff will also bring new ideas to be developed.

# STUDENTS ROLES/Innovators

Post graduate students will work closely with undergraduate students to conducts research under the research and Innovation coordination office

Students will be requested to work and present their innovative ideas, get comments from their supervisors and mentors until the project is approved and working. They will also be responsible for the development of the project. The selected students will be requested, to weekly report on the progress, challenges, for any approved innovation project. Each project will have the schedule of activities, start and ending dates for each activity and the availability in the shared lab to facilitate the management of sharing of resources.**Key**

# ****BENEFITS TO WORK WITH THE BINARY HUB****

## **Access to Skilled Talent**

* With Binary Hub, you get access to **experienced developers, designers, testers**, and mentors.
* Teams often include a mix of **students, alumni, and professional engineers** with innovative thinking.

## **Cost Efficiency**

* Development costs are significantly reduced because **some services are** provided for free.
* Shared infrastructure and tools (e.g., cloud services, licenses, hosting).

## **Mentorship & Technical Guidance**

* Get mentorship from **industry experts, professors, and senior developers**.
* Access to regular reviews and feedback improve software quality and project direction.

## **Infrastructure & Workspace**

* Free Access to **office and working space, internet, devices, testing tools**, and meeting rooms.
* Encouraged collaborative working in a **professional and creative environment**.

## **Structured Project Management**

* Binary Hub follows **agile/scrum or hybrid methodologies** to keep projects on track.
* Teams get support in **planning, documentation, version control, and reporting**.

## **Institutional Support & Credibility**

* Projects gain legitimacy by being linked to a **recognized university or institution**.
* Easier to **secure partnerships, pilot opportunities, and endorsements**.

## **Funding Opportunities**

* Early-stage grants, stipends, or **seed funding** are often available.
* Binary Hub may connect promising projects to **investors, donors, or innovation funds** (e.g., MasterCard Foundation, GIZ, ENABEL).

## **Faster MVP & Prototyping**

* With focused resources and support, development of **minimum viable products (MVPs)** is faster.
* Binary Hub Helps teams test ideas quickly and gather user feedback in a simple way.

## **Networking & Exposure**

* Through Binary Hub, you get connected and access to **hackathons, demos, exhibitions, Seminars, meetings, and conferences**.
* Opens doors for partnerships, internships, and real-world implementation.

## **Long-Term Ownership & Sustainability Models**

* **Co-ownership of the Intellectual Property** (IP) between the University of Rwanda and innovators.
* Support in creating **business models** and planning for **scaling or commercialization**.

## **Post-Incubation Support**

* Assistance with **launching, registering companies, marketing**, or even transitioning into accelerators.
* Continued access to alumni networks and advisors.

# Key Stakeholders and their expected contributions

| **Stakeholders** | **Role & Contribution** |
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| **University of Rwanda** | Policy oversight, institutional alignment, and high-level coordination |
| **UR Data Center** | Support on providing required resources for testing and hosting developed solutions |
| **Ministry of ICT and Innovation / RISA** | Through a collaborative needs assessment, support in identifying priority key result areas which are aligned with the national digital transformation agenda and plans. |
| **University of Rwanda Colleges** | Hosting satellite units or branches, engaging college members and students to participate in the innovation ecosystem |
| **Mastercard Foundation, UR Sweden Program and other Stakeholders** | Financial and technical support for space customization, management, project support, workshops, seminars, bootcamps, hackathons, demo days and student empowerment. |
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| **ACEIoT, AI & IoT Hub, GIIH and other initiatives at UR** | Collaboration on technical mentorship, resource sharing, awareness of project, registration and protection of new projects to avoid conflicts, support on timely reporting. Etc. |
| **Center for Innovation** | Innovation management and alignment with national goals and facilitate in securing the Intellectual Property Rights at Rwanda Development Board |
| **Directorate of Research** | Supporting in accessing research funds through grants |
| **Private Sector, Industry Partners, Alumni & Citizens** | Mentorship support, co-development, project sponsorship, and co-ownership of innovations. |
| **Binary Hub Coordination Team** | Daily operations, program management, reporting, and student mentorship, industrial partnership engagement |

## **KEY BINARY HUB INITIATORS & VOLUNTEERS**

Here the list of the **Binary Hub initiators, Innovators and voluntary supporters**, based on their expertise, current roles, and contribution to the hub's mission.

## Administrators **& Strategic Coordinators**

| **Name** | **Role** | **Key Tasks & Responsibilities** |
| --- | --- | --- |
| **MBONABUCYA Celestin**  (ACADEMIC STAFF) | Founder, Initiator, and Hub Coordinator |  Define and oversee the strategic direction of the hub.   Coordinate partnerships with the University, government, and external stakeholders.   Supervise overall progress and resource allocation across all projects.   Draft policies, guidelines, and reporting templates for hub operations.   Support project evaluation, selection, and onboarding processes.   Mobilize resources and facilitate capacity-building workshops.   Mentor junior innovators on systems thinking, proposal writing, and innovation leadership. |
| **NDAYISHIMIYE**  **Habibu**  (STUDENT) | Assistant Coordinator |  Assist the Hub Coordinator in day-to-day operations and team management.   Track task assignments, deadlines, and milestones for all active projects.   Maintain communication between teams and escalate project blockers.   Prepare activity reports and assist in documenting outcomes for stakeholders.   Support coordination of training, events, and technical reviews.   Step in as acting coordinator when required |
| **ISHIMWE KARLISE Lucie** (STUDENT) | Assistant Administrator |  Manage and organize hub documentation, attendance, and resources.   Maintain project records, proposals, and team progress logs.   Support logistics for meetings, workshops, and innovation showcases.   Manage internal communication channels and scheduling.   Assist with writing and formatting reports, letters, and funding applications.   Help coordinate new member onboarding and registration. |

## **Technical Leadership & Development Teams**

| **Name** | **Role** | **Key Tasks & Responsibilities** |
| --- | --- | --- |
| **NIYONGABO Emmanuel (EXTERNAL EXPERT)** | Frontend Developer |  Mentor junior developers in HTML, CSS, JavaScript, and React.   Review frontend codebase of ongoing projects and provide technical guidance.   Create reusable components and standard UI libraries for hub projects.   Lead frontend design sessions and pair programming.   Ensure UI responsiveness and accessibility across devices.   Support deployment of frontend modules and integration with backend services. |
| **SHYIRAMBERE Joseph (EXTERNAL EXPERT)** | Backend & Database Developer |  Lead database design, optimization, and maintenance strategies for all projects.   Mentor junior backend developers in Node.js, Express, PostgreSQL, MongoDB, and REST APIs.   Review and validate backend architecture of hub projects for scalability and security.   Oversee authentication, authorization, and data encryption standards.   Assist in the integration of third-party services (e.g., email, payment, SMS).   Set up CI/CD workflows for backend code deployment. |
| **David TUYISHIME** (STUDENT) | Backend Developer Team Leader |  Assign backend tasks to developers and manage timelines.   Facilitate backend peer code reviews and architecture discussions.   Identify and resolve critical backend issues across projects.   Organize weekly standups and technical feedback sessions.   Ensure code quality and consistency with version control best practices (e.g., Git).   Mentor junior developers on testing and debugging technique |
| **Edison UWIHANANYE** (STUDENT) | UI/UX & Frontend Team Leader |  Coordinate the activities of frontend and UI/UX developers.   Assign design and implementation tasks with deadlines.   Review frontend code and UI designs before handoff.   Organize design sprints and frontend integration sessions.   Encourage design collaboration between UI and development teams.   Ensure design fidelity between mockups and live builds |
| **Eric TUYISHIMIRE**  **(EXTERNAL EXPERT)** | UI/UX Designer |  Lead design thinking sessions with project teams.   Create wireframes, user flows, and prototypes using tools like Figma or Adobe XD.   Conduct user interviews, surveys, and usability tests to inform design decisions.   Establish a hub-wide UI/UX style guide and design system.   Mentor new designers on accessibility, typography, and interaction design.   Review all major designs before approval for development |
| **Derrick IRADUKUNDA** (STUDENT) | Systems Administrator |  Manage internal infrastructure (servers, networks, access control).   Deploy and maintain testing and staging environments.   Monitor system uptime, backups, and incident logs.   Set up domain names, SSL certificates, and security patches.   Assist developers with hosting, FTP, and deployment issues.   Document and standardize hosting/deployment procedures. |
| **Igor IHIMBAZWE** (STUDENT) | DevOps Tools Advisor | - Recommend and set up DevOps pipelines (CI/CD)  - Guide cloud deployment and containerization (e.g., Docker)  - Document deployment strategies and tool configurations |
| **Danny HATEGEKIMANA** (STUDENT) | Promotional Materials Designer |  Design flyers, posters, social media graphics, and event banners.   Collaborate with communication team on branding and visibility.   Maintain a branding kit (logos, colors, fonts) for Binary Hub and its projects.   Create pitch decks and presentation templates for project demos.   Produce video teasers or animations for product launches (when needed).   Train new team members on design tools and branding guidelines. |

## **Supportive Coordination Roles**

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| **Name** | **Role** | **Key Tasks & Responsibilities** |
| **Marie Claire UWIRINYIYIMANA** (STUDENT) | Health & Sports Activities Coordinator | - Organize physical wellness and team-building activities  - Promote mental health awareness and well-being  - Coordinate volunteer participation in social events |

## **22.4 Junior Volunteers (Learning & Contribution Support Team)**

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| Members | Roles | Key Tasks and responsibilities |
| Denis UWIHIRWE, Jado Fils SEZIKEYE, Olivier BYIRINGORO, Poli NDIRAMIYE, Michael MUNEZERO NTAGANIRA, Clement NSENGIYUMVA, Obed UWIHANGANYE, TUYISHIME KAYITSINGA Hertillan, Eric TUYISHIME, Merci RUYANGA  (ALL ARE STUDENTS) | Junior Volunteers / Trainee Contributors | * Participate in active project teams as junior developers, testers, or content creators * Support senior team members in documentation, design, or frontend/backend modules * Attend capacity-building workshops and contribute to demo presentations * Engage in community events and represent the hub as ambassadors * Contribute to research and innovation challenges with guidance from mentors |

## Summary Organizational Clusters

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| **Cluster** | **Leads / Contacts** |
| Strategic Coordination | MBONABUCYA Celestin, Habibu NDAYISHIMIYE |
| Technical Frontend | Edison UWIHANANYE, NIYONGABO Emmanuel |
| Backend & Database | David TUYISHIME, SHYIRAMBERE Joseph |
| UI/UX & Design | Eric TUYISHIMIRE, Edison UWIHANANYE |
| DevOps & Deployment | Igor IHIMBAZWE, Derrick IRADUKUNDA |
| Admin & Logistics | ISHIMWE Karlise Lucie |
| Branding & Communication | Danny HATEGEKIMANA |
| Sports & Welfare | Marie Claire UWIRINYIYIMANA |
| Learning & Support | All junior volunteers under guidance of leaders |