

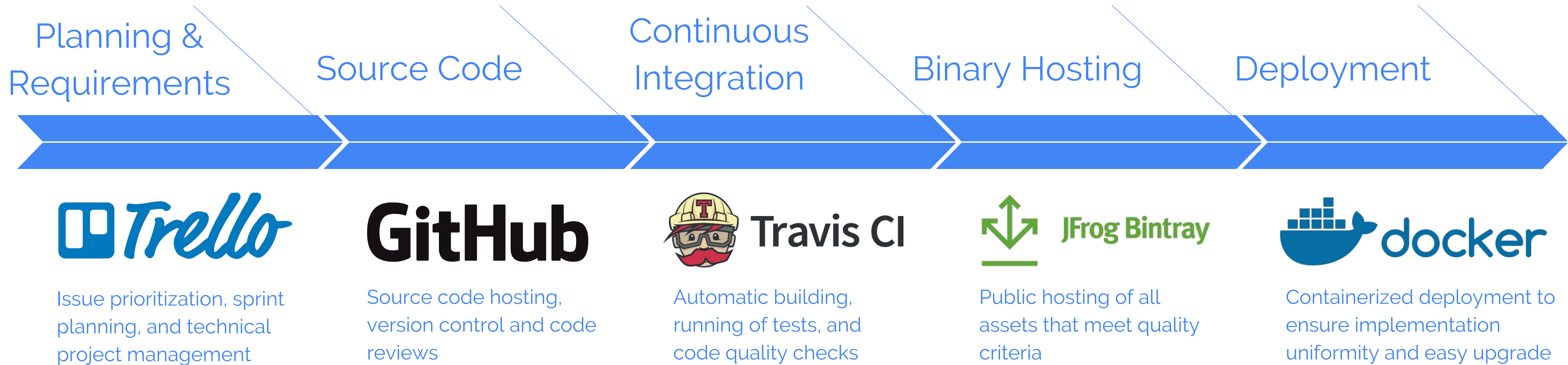
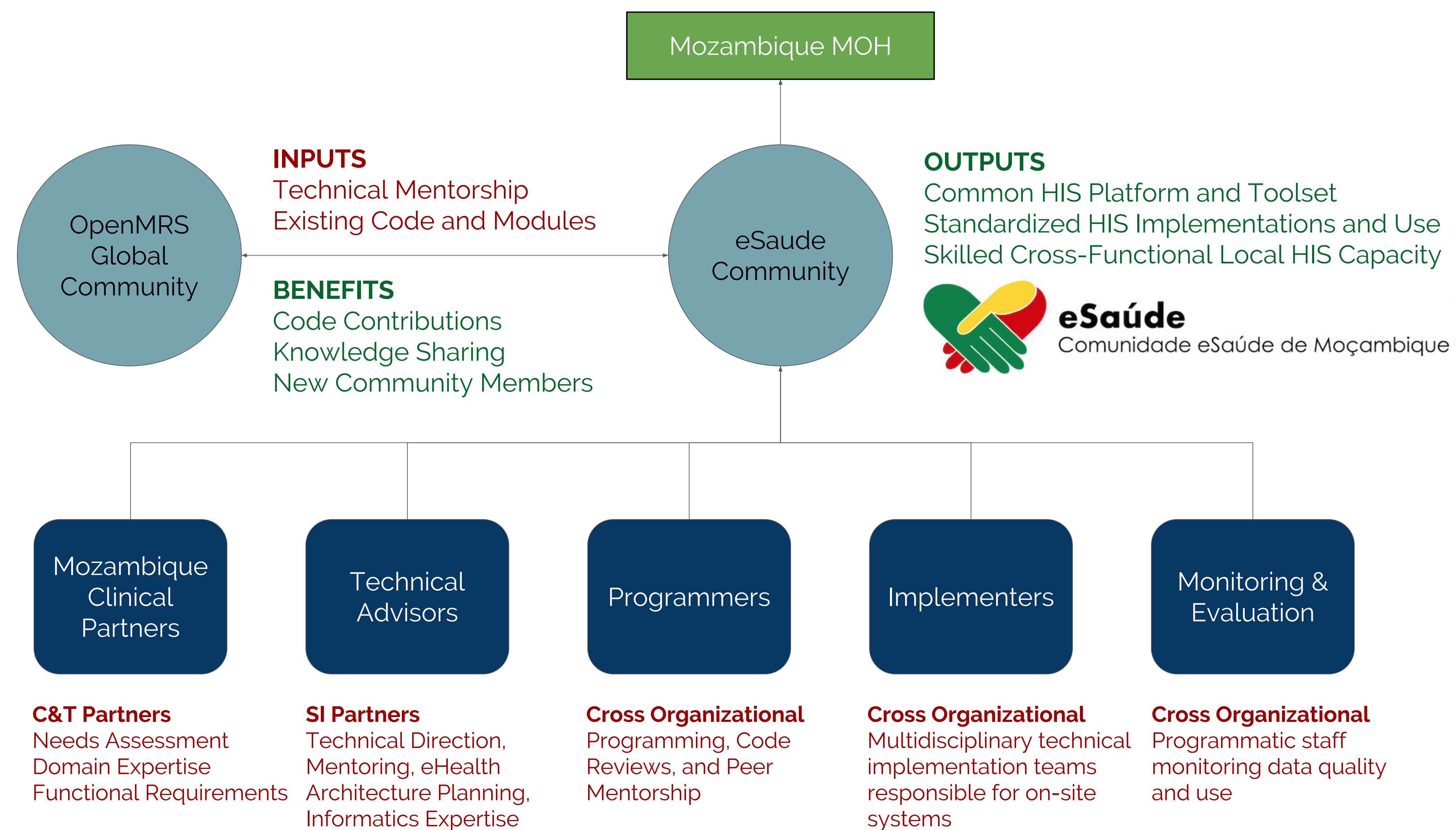
Enabling Collaboration for Building High Quality, Sustainable and Scalable National Health Information Systems in Resource-Limited Settings

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Problem Definition: In resource-limited settings, health information system development is often driven by donor funded organizations. These organizations **frequently work in silos** to meet specific grant requirements. As a result, efforts within a single country may be duplicated, and solutions **often lack technical oversight and a consistent architecture**. Standards and best practices may not be employed, and the software engineering approaches to promote **requirements-driven, maintainable, collaborative, and reusable code may be lacking**. As organizations scale their systems, they often end up with **multiple software versions and configurations that are difficult to support and manage** across facilities. Poor coordination between organizations and a lack of interoperability result in a fragmented national healthcare information system. This is especially damaging to delivering and monitoring health care in situations where Ministries of Health may be challenged to attract and retain sufficient health IT expertise.

Approach: Develop and implement a strategy for collaboration across government, donor, and developer organizations, in Mozambique, using **open source tools to implement a consistent approach to software engineering tasks** and collaborative software development. Our approach is based on lessons learned in collaboration within the OpenMRS community, and has been **in place in Mozambique since 2015**.

Stakeholder Partnerships: As a result of establishing the eSaude community in Mozambique, five HIV care & treatment implementing partners work together, in partnership with the Ministry of Health, to build shared and interoperable health information systems, using collectively agreed upon software development best practices. This cross-organizational community collaboratively generates functional requirements that meet the needs of all participants, and facilitates knowledge and information sharing between members. Additionally, this collaboration results in harmonization of efforts across organizations, and creates a scalable and manageable national platform of high quality HIS products. These partnerships leave the Ministry of Health with a less fragmented system, and therefore facilitate more effective management and use of all of these systems to support improved care and outcomes in Mozambique. This process is ongoing, and we have successfully released numerous versions of a growing set of facility-level clinical applications.



Shared Infrastructure: To enable collaboration, shared technical infrastructure and processes need to be in place to support health information system development. Implemented mechanisms should ensure the delivery of high quality products, and reliable automated delivery pipelines result in predictable release timelines and enable easy upgrading. The eSaude community uses a number of freely available software engineering tools to meet specific development, implementation and project planning needs. Using these low cost, but fit for purpose tools, lowers the barrier to entry, encourages the use of best practices, ensures predictable and reliable releases, and supports capacity development through collaboration.

Meet
Work together, across teams to exchange information, problem solve, share experiences and solutions, and to develop and refine our shared purpose.

UberConference

Message
Communicate asynchronously across distance and time zones to pose questions, maintain community, discuss, plan and collaborate.

slack

Document
Public facing documentation, editable by all community members, ensures that community knowledge remains accurate and up to date.

Dropbox Paper

Support
Ensure that implementers have the necessary mechanisms to leverage community support, by making use of a low cost helpdesk tool.

salesforce desk

Collaboration: To facilitate communication and coordination across multiple organizations, countries and time zones, free and low cost cloud services are used. These system are used for synchronous, realtime calls and screen sharing, instant messaging, documentation and implementation support. Along with well documented and collectively agreed upon processes, these tools enable teams with members that span multiple stakeholder groups to work closely together, and facilitate community scaling by simplifying the process of onboarding new members. Collaborative documentation ensures that processes and requirements meet the needs of all stakeholders, and forms the basis for a shared knowledge base. This knowledge base is further expanded as issues encountered in the field are resolved via the helpdesk system, since these solutions inform improved documentation. In addition to supporting collaboration within the eSaude community, using these tools gives team members the experience and confidence required to participate in other global open source communities, many of which use the same or similar tools. Finally, the collaboration enabled by these tools and processes are an essential step towards the development of interoperable systems and ultimately, health information exchange.

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