

PACS RADIOLOGY SERVER LLD /HLD

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ABSTRACT

The interpretation of medical images plays a pivotal role in various medical applications, ranging from diagnostic assessments to therapeutic interventions. Specialized fields like radiotherapy and nuclear medicine demand the visualization of intricate images that result from the fusion of multiple layers. Additionally, the integration of artificial intelligence in medical imaging necessitates versatile viewers for research environments, adaptable by scientists.

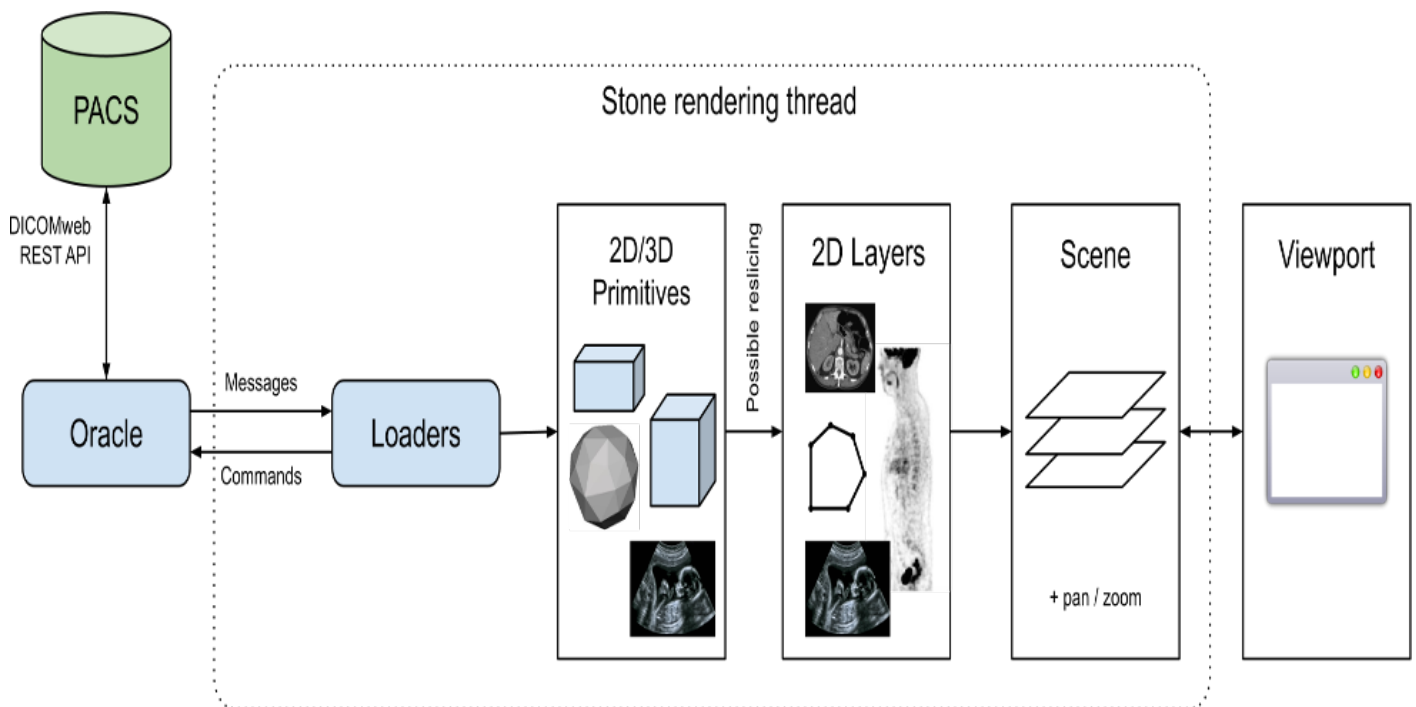
However, existing desktop viewers often employ technologies vastly different from those used in web-based counterparts. This dichotomy leads to a lack of code reuse and a division of expertise among development teams. This paper explores the potential of the emerging WebAssembly standard in addressing these challenges, advocating for a unified code base shared between robust desktop viewers and lightweight, web-based counterparts.

Furthermore, we present a comprehensive web viewer developed using WebAssembly, suitable for integration into research projects or teleradiology applications. The availability of the source code for this web viewer as free and open-source software promotes accessibility and collaborative development in the medical imaging community.

This can be achieved using Orthanc library equips developers with essential primitives essential for crafting medical imaging applications. This library, in particular, provides functionalities for retrieving images from a DICOM server, with support for DICOMweb standard usage, and the flexibility to interact with a custom REST API.

Within the Stone of Orthanc, C++ classes are employed to encapsulate both 2D and 3D medical images. These classes are populated by another set of C++ classes known as "Loaders." In the context of 3D dense volumes, these associated Loaders autonomously arrange the individual 2D slices, streamlining the process for developers.

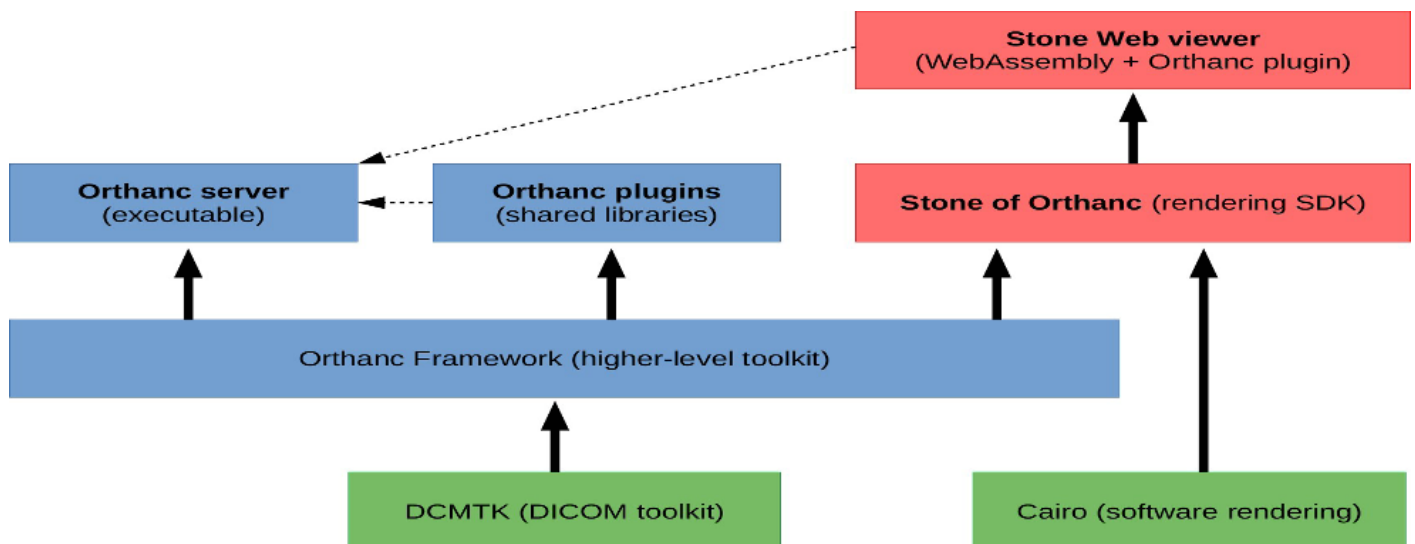
PACS High Level Design



High-level view of the components of the PACS Imaging library. The Oracle abstracts the runtime environment. The Loaders are responsible for loading the graphical primitives that have to be displayed. These primitives are converted into a set of 2D Layers (in particular, primitives corresponding to 3D volumes can be sliced along a cutting plane). The Layers are then assembled as a Scene that is finally composed onto the rendering surface of the Viewport. The user can

interact with the Viewport to update the affine transform (pan/zoom) that is associated with the Scene

PACS LOW Level Design



The Overview of the LLD of the PACS Web viewer. The green boxes indicate third-party libraries, the blue boxes represent components provided by the Orthanc project, and the red boxes correspond to the Orthanc

project.