Introduction

The Cloud Based Image Analysis and Processing Toolbox project, which is executed by CSIRO, runs on the National eResearch Collaboration Tools and Resources (NeCTAR) [1,2] cloud infrastructure. It is designed to give access to biomedical image processing and analysis services to Australian researchers via remotely accessible user interfaces. The toolbox is based on software packages and libraries developed over the last 10-15 years by CSIRO scientists and software engineers:

**HCA-Vision** [3]: developed for automating the process of quantifying cell features in microscopy images - it can reproducibly analyse complex cell morphologies:

**MILXView** [4]: a 3D medical imaging analysis and visualisation platform allowing researchers and medical specialists to analyse and visualise a variety of multi-modality images including MRI, PET and CT:

![Image](https://cloudimaging.blogspot.com.au)

By providing user-friendly access to cloud computing resources and new workflow-based interfaces, our solution will enable the researchers to carry out more challenging image analysis and reconstruction tasks.

Software Architecture

The architecture comprises of a collection of physical and virtualised resources connected through networks, including the NeCTAR cloud resources, cloud enabled image analysis and processing platform, and CSIRO developed image analysis services, which can be accessed by users through a web portal. Figure 4(a) presents a high-level architectural view of the proposed system.

The image analysis and processing platform represents the development and runtime environment where the image analysis and processing tools are executed. The platform also provides the basic management features of the single node and leverages all the other operations on the services that it is hosting. The services include task submission, job and resource scheduling, error handling, reporting (traffic, client demands and usage), execution of the tools, operation status and progress monitoring, results returning etc. The platform encapsulates a layer of software and provides it as a service that can be used to build high level image analysis and reconstruction services.

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**REFERENCES**


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**Figure 1:** Neuron Analysis (a) input image, (b) resulted image; (c) diagram of the algorithm.

**Figure 2:** (a) Brain Tumor - PRE stage and NSE methods; (b) CT scan of a patient scanned with radiation dose; (c) Generated 3D view of a brain allowing study of intraparenchymal characteristics of diseases such as Alzheimer’s disease.

**Figure 3:** (a) X-TRACT based system; (b) The use case of the workflow environment.

**Figure 4:** (a) Software architecture of the system; (b) The use case of the workflow environment.

**Figure 5:** Sample processing imaging workflow prepared in Galaxy [5].

**Figure 6:** Visualization, workflows and Galaxy UIs.