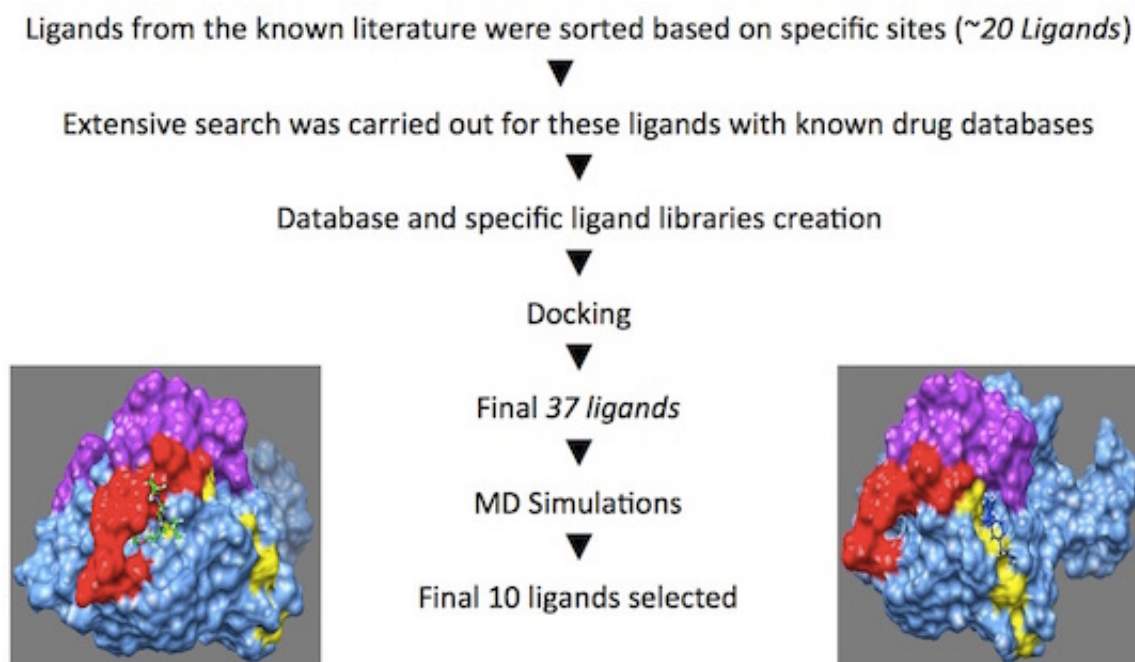


ICTBioMed: Use Cases

Scientific Use cases : [ICTBioMed](#) consortium and its participants believe in decentralization and democratization of science. The consortium believes in the strategies to develop ready to use research initiative and helps all to join in bridging the gap between Research, Implementation and ready to use science.

We identify actual science use cases which uses the collaborative partners with shared data and methods to identify how best to articulate those use cases so they are useful in shaping the real life scientific work.

1) Radiation sensitizers: NCI and Indian Consortium initiative

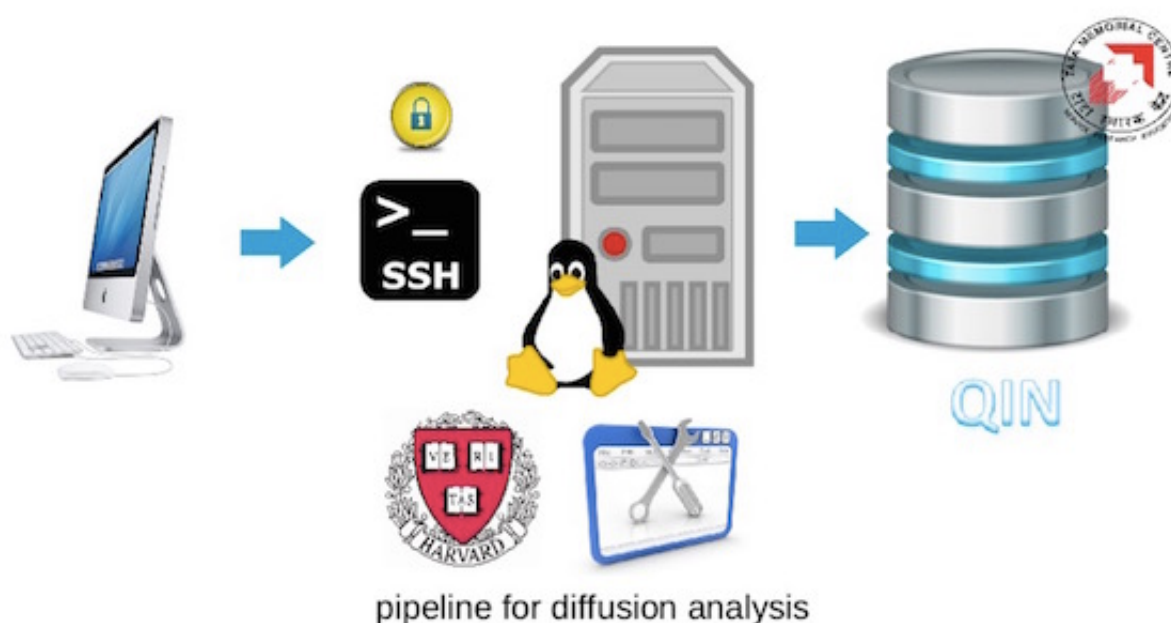


Possible tasks of [ICTBioMed](#) as the partner infrastructure is to set up global cloud infrastructure for clinical information/datasets to support in-silico screening of radio sensitizers providing network performance monitoring toolset and expertise. Integrating the computing workflows and

setting-up a pilot of drug design software within global infrastructure used through a science gateway view. The group can enhance the synergy with other in-silico assessments like impact of protein structural changes on drug bindings.

2) QIN Diffusion analysis use case

The most common method of biomedical data management is to download a local copy of required datasets and do analysis on local computers. This method works flawlessly for smaller datasets but when we consider the 26 million radiologic images and several thousand pathology images are contained in the TCIA repository it is impossible to create local copies of such huge dataset. One of the important principles of Big Data analytics helps us in this situation which tells us to move computation to the data rather than moving huge data to the computing facility. This mechanism can be achieved easily with QIN Cloud where the analytics tools can be moved near raw data and the processed results can be moved through the network across the collaborative researchers. The QIN Cloud can connect the entire QIN community and help in leveraging valuable resources. Collaboration across the boundaries are required to take advantage of the data intensive computation research with variety of knowledge and skill bases needed to realize the scientific and public health benefits to the masses. Data sharing makes the individual research multiply and opens new avenues of data dissemination and validation. It also opens new avenues for future collaborations across the countries to solve common problems like cancer. The proposed reference architecture as shown in the Fig consists of a common agreement among the collaborating partners viz. TMH and Harvard of Cloud middle-ware technologies software. The various locations should be connected by a high-speed link capable of transfer of the required data. All the locations can be accessed by using and Cloud Interface which has an additional security and authentication mechanism for the user accessing the cloud. The model works on resource sharing mechanism and all the resources are transparent to the user.



3) Transcriptome analysis Use case:

Data Samples generated at Tata Memorial Hospital Mumbai India were Sequenced at NIBMG Kolkata India. The data was analysed at BRAF at C-DAC Pune India. The analytic Pipeline developed at NCI USA. NGS Data Management convenes hardware/software engineers, database architects, storage managers, systems integrators and analysts who are managing the data, as well as biological/medical researchers who are generating the sequences and the bioinformaticians who are analyzing and interpreting the data. The use is designed to provide perspectives from each specialty, with an emphasis on how they can be integrated into a cohesive, comprehensive team to manage the sequencing data deluge.



4) Science Gateway Use Case

Science Gateways are used to give convenient access to data and tools with a single point of entry for multiple organizations. We designed a use case around the biomedical community popular framework Galaxy which can be used as a science gateway. Galaxy has access to various openly available public datasets as well as the participating organizations like ACTREC can share their own datasets also. Computational facilities at C-DAC and PSNC can be used to execute the pipeline designed by the researchers at Chalmers and accessed by using the Science gateway expertise at Notre Dame. Internet2 Community binds all through their widely used network and OHSL acts as binding force of all the organization by forming cooperative policies.



Conclusion

[ICTBioMed](#) has expertise as an aggregate of all its participating organizations including supercomputing centres, academic universities as well as hospitals. The borderless collaboration has been made a reality including Asia, Europe and America with a focus on biomedical research. The main goal is to solve real life biomedical problems by facilitating international collaborative research.