

Open Call for Proposals

2nd VPH NoE Workshop on Toolkit Hands-on Training

Medical Imaging Toolkit: Tools & Interoperability

21-23 November 2011

INRIA, Sophia Antipolis, France

Introduction

The VPH NoE has designed a flexible training strategy to address priorities that will develop over time. Short-term activities include a series of training events to address particular needs, featuring Study Groups, Workshops on the use of the VPH ToolKit, Summer Schools on VPH models and modelling techniques, and Erasmus Bilateral Student Exchanges. The main objectives of these activities are:

- To start to deliver training activities that bring together researchers from different backgrounds and institutions, promoting the consolidation of a VPH community whilst providing valuable information on these experiences to direct and inform future training activities;
- To meet the need for tuition on critical aspects of VPH expertise, not least in training on the VPH ToolKit.

The Workshops are intended to be quite distinct from the Study Groups (whose primary aim is to answer specific scientific research questions in a multidisciplinary setting). In contrast, ToolKit Workshops will focus on the identification of 'gaps' in existing tools used by the VPH Community, will promote the use and re-use of these tools in problem-solving activities, and will ultimately encourage the collaborative improvement of such tools.

Workshop Objectives

- To be a forum for **discussions around medical imaging software**.
- To help the development of **practical interoperability** between different tools in an environment shared by researchers and developers.
- To **disseminate a best-practice** approach to imaging tool development, in particular for incorporation into the VPH ToolKit. The different **VPH Guidelines** (e.g. on Interoperability¹) will serve as a basis and will be improved based on this experience.
- **To publish relevant results** in a journal, such as the Insight Journal.

Call for Participants

The workshop organisers invite interested researchers and practitioners to propose their participation in this 2011 Workshop in either or both of two distinct categories, focusing on interoperability:

- Presenting an imaging software solution, or
- Submitting a problem-solving requirement

The workshop organisers invite interested researchers and practitioners to submit solutions and/or problems identified in their current or recent research projects that would expose, or benefit from, increased interoperability with other participants or third party software systems. Proposers will be invited to **work closely with the workshop organisers** or fellow participants **in the preparation of the workshop activities** aimed at addressing their specific topics of interest. The organisers will try to facilitate interaction between participants prior to the event.

¹ http://toolkit.vph-noe.eu/component/docman/cat_view/3-toolkit-guidelines

The scope of this 2nd workshop will focus on the medical imaging contribution to the virtual physiological human. Several examples in this context of successful interactions between tools currently included in the VPH ToolKit are described below. The workshop is orientated towards gathering information on the project or the plan of research and the problem (ideally the workflow) that the applicants would like to address.

Prospective proposers should expect that this workshop will offer a set of potential solutions to their technological problem, based on tools currently included in the ToolKit, or tools that may become candidates for inclusion in the ToolKit, as motivated by this workshop. Developers of tools in the ToolKit will jointly work with proposers, leveraging the experiences gained in the past applying such tools to solve workflow-oriented VPH-related technological problems (see next Section). This workshop is better seen as a gathering of scientists and developers having a common goal of enabling practical interaction between their tools, in order to disseminate them further, and share more knowledge.

The organisers here wish to act as ‘match-makers’ between two types of candidates:

- Producers of tools looking for new software to interoperate with, or who would like to increase the popularity of their tools by making them useful to third parties;
- Consumers in search of a functionality present in another tool that they would like to use to solve a particular problem.

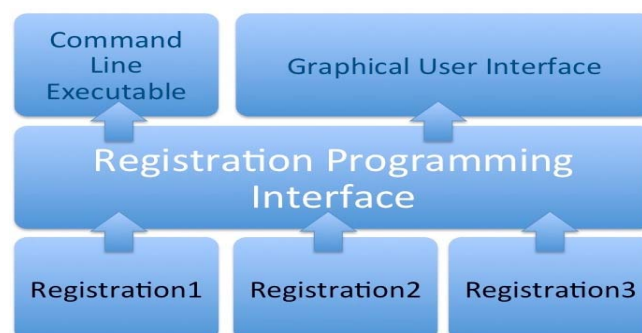
It may be that a particularly appropriate problem could be the target for multiple attempts at a solution, based on different sets of available tools.

Concentrating Skills and Experience

This event will take place right after the [Common Toolkit](#) Hack-fest, which will be also hosted by INRIA in Sophia-Antipolis the previous week (November 14-18th 2011). This proximity will allow exchange between the 2 communities, and participants from each event are encouraged to collaborate with or attend the other. Participants to the CTK hack-fest include from companies such as [Kitware](#), [Isomics](#), [Offis](#), [Siemens](#)... or research institutions such as the DKFZ, Harvard Medical School, Laboratorio di Tecnologia Medica (Bologna, Italy), and others. The buzzing activity from this hack-fest is expected to generate a most positive atmosphere and encourage all the attempts to connect every possible piece of code together.

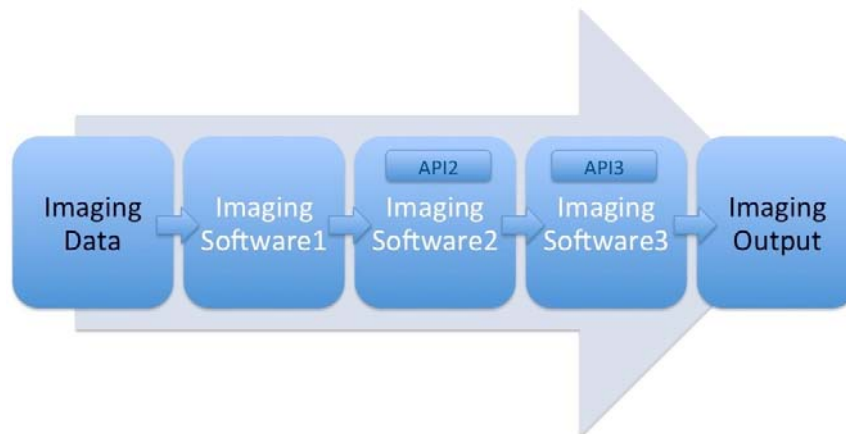
Exemplar Work-flows

A first exemplar interoperability application could be the demonstration of different image registration algorithms through a common API dedicated to this medical application. A first version of this **Registration Programming Interface** was just released for the VPH NoE². It can serve as a basis to build this interoperability feature.



²<http://www-sop.inria.fr/asclepios/software/RPI/>

A second exemplar interoperability application will be to **concatenate different processing tasks** originating in different software systems into a single pipeline.



Concatenating algorithms in the pipeline can be achieved in different ways:

- The Common Toolkit has a plug-in architecture that can be the common glue. Each algorithm issued from the 3 libraries can be interfaced through CTk. This would allow for a CTk based application to run the partners' algorithms, driving the pipeline.
- Each of the partners' executables or libraries could also be taught to load CTk plug-ins. In this case it would be the partners' application that would drive the pipeline, and load external functionalities.
- The CTk also included recently an event bus mechanism from the Multimod Application Framework ([MAF](#)³). It is mainly used inside MAF to exchange models, but can in principle exchange any kind of data (input / output) between executables using web services (XML-RPC). This framework has the advantage of not requiring any binary dependency, at the price of heavy formalism to serialise data. A more formalised, constrictive but powerful version of this paradigm is of course the DICOM Application Hosting.
- And a more simple and straightforward coupling between the three libraries using an alternate API could be used as an initial demonstrator, if the existing solutions do not seem suitable as a first step.

NoE Toolkit Success Stories

Tools included in, or destined for, the ToolKit have already played important roles in the successful completion of significant workstream-based solutions to data processing and analysis problems in many projects. To select just a few examples:

- FP project COPHIT: 3D toolchain for respiratory drug deposition
- FP project @:neurIST: 3D openMAF/GIMIAS toolchain for aneurysm rupture
- GIMIAS integrates the [Slicer 3 Execution Model](#) to allow the creation of plugins from a GUI description and a command line program
- BBTK (Black Boxes Toolkit), part of Creatools⁴ suite (CREATIS-CNRS), succeeded to wrap CTk plugins and exchange data. In opposite way, CTk has run with success processing images scripts from BBTK.

³http://www.biomedtown.org/biomed_town/MAF

⁴ <http://www.creatis.insa-lyon.fr/site/fr/node/43106>

Who can apply?

The present workshop is part of several activities undertaken by the VPH NoE in order to contribute to the consolidation of the VPH community. In this context, prospective applicants **do not** need to be core or associated members of the NoE, proposals from the VPH-related community at large will be welcome.

Submission procedure: Imaging Software Solutions or Problem Proposals

Interested researchers wishing to present an imaging software solution or submit a problem-solving activity are requested to provide the following information:

1. Name of the principal researcher who proposed this activity
2. Institutional information
3. Description (up to 4 pages):
 - a. For the imaging software presenters: the imaging software with an emphasis on the publicly available parts and how it could interoperate with other software.
 - b. For the solution seekers: the technological problem for which a solution is sought, together with the details of the project under which the problem proposed is framed, and potential partners, with whom you would be exchange functionalities, data. A workflow-oriented description⁵ would be helpful.
4. Description of the tools currently used, if any: existing plug-in mechanism, workflow, IPC/RPC framework...
5. Description of other tools you may wish to explore, or a description of how a series of such tools are/could be linked/integrated to do so.

Such descriptions should please be kept short, **not exceed 4 pages** in length, and should be sent to benoit.bleuze@inria.fr (cc: maxime.sermesant@inria.fr) **by October 1st 2011.**

*All those considering submitting a proposal are strongly encouraged to contact the organisers **before July 31st 2011**, even if the proposal is not fully developed. The organisers are keen to hold preliminary discussions without obligation, to ensure that workshop planning and facilities are optimised.*

Review & Selection Process

- Proposals will be sent to the reviewing panel within one week after the submission deadline.
- Proposed workflows will be considered together with the possible tools to be used in order to examine the feasibility to prepare them in the context of the workshop.
- Workflows and tools will be prepared prior to the final stage of collaboration during the dates of the workshop.
- Teams that will be likely to interact fruitfully during the workshop will be encouraged to make contact with one another prior to the event.
- The organisers will also try to contact teams responsible for tools mentioned in applications in order to invite them to the workshop, and increase the quality of the expert groups.

Evaluation & Follow up

- Once accepted, a problem-workflow will be prepared in collaboration with NoE Members and the toolkit developers, prior to the dates of the workshop.
- A short final report (not exceeding 5 pages) must be compiled and submitted in December, jointly developed between developers and proposers. Such reports will include:
 - a. A subjective evaluation of the workshop process from the point of view of the proposer.

⁵ P. Hunter, et al. *A vision and strategy for the virtual physiological human in 2010 and beyond*. Phil. Trans. Roy. Soc. 2010. dx.doi.org/10.1098/rsta.2010.0048

- b. The most significant outcome produced by the workshop
- c. Specific needs / gaps / limitations / needs identified thanks to the workshop.
- d. Planned actions in the near future as a direct consequence of the workshop experiences.

Logistics

- Workshop Dates: 21 to 23 November 2011.
- Preparation workflows and tools: October - November 2011
- Problem-workflows selection: Early October 2011
- Problem-workflows proposal: End of September 2011.
- Initial contact with organisers: From now onwards - before 31st July 2011 strongly encouraged.

The workshop will be co-located with another major Imaging event, namely the *CTK Hackfest*, to be held from the 14 to the 18 of November 2011 in Sophia Antipolis as well. For details, see: http://www.commonstk.org/index.php/Commonstk:Current_events

Costs

There is no charge for participation in the Workshop.

Expenses

Funding is not available to support attendees travel or subsistence. Although catering will be provided on site during the workshop, all travelling and accommodation expenses will need to be covered by the attendees themselves.

Location

INRIA, Sophia Antipolis, France.

Contacts, mailing addresses...

Local Coordinator: Benoît Bleuzé benoit.bleuze@inria.fr

WP3 Coordinator: Keith McCormack k.m.mccormack@sheffield.ac.uk
