

Science interfaces for the Astroinformatics era

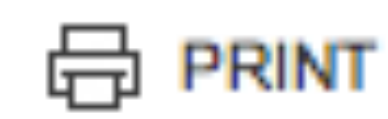
R. D'Abrusco and G. Fabbiano

Harvard-Smithsonian Center for Astrophysics



We are experiencing an explosive growth of IT-powered tools enabling new (and, hopefully, innovative) science. However, the techniques, standards and paradigms used to produce documentation for such tools, services and the derived scientific workflows are still dragging behind. These techniques are stuck to customary but mostly out-of-date conventions, and no sign of quick catch-up are visible in the near future. We discuss different options currently available for improving the usefulness, effectiveness and capacity of conveying information of scientific documentation from the point of view of both the final users and documentation developers. We propose a structured model for scientific documentation in the specific case of *Virtual Observatory* tools and services.

- Learning curve (for 'web-illiterate' and older generations);
- Not printer-friendly, discouraged offline consumption of content (is this really a con? Sure not for VO-enabled astronomy);
- Not-so-easy taking notes.



Sociological aspects

Most resistance to development of new communicational techniques and to the adoption of a comprehensive hypermedia approach comes from part of the astronomical community itself: older, more conservative astronomer are comfortable with the 'print, then read and test' approach and do not want to shift to the to 'read, listen, watch, test, experiment, share' model of hypermedia documentation.



A mixed approach to documentation can be effective at assuring a smooth transitioning from old to new standards without alienating a significant fraction of the users: providing classical hypertext versions of the hypermedia documentation at least for a number of fundamental documents.



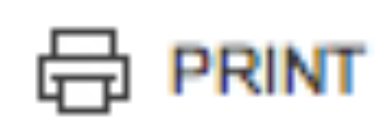
Introduction

The techniques used to create scientific documentation have not evolved at the same pace as scientific methodologies. Almost all scientific documentation is still static text or very low-complexity (i.e. printer-friendly) hypertext. This approach was reasonable in the past era of almost entirely off-line consumption of information, but it does not support the upcoming 'Seamless Astronomy' scenario (e.g., Goodman et al. 2010). In this new approach, all the steps of scientific research can be accomplished on-line through specific version of old tools and services, or completely new services. Documentation needs to evolve to best support the new emerging paradigm.



Hypermedia

Hypermedia is a generalization of the term hypertext in which audio, video, plain text, graphic and interactive tools are used together to generate a highly non-linear medium. We propose to use hypermedia to produce effective scientific documentation.



Pro's

- Common shared technology with most VO-enabled tools/services;
- Contextual interactive experimenting and testing of tools/services;
- Enhanced learning capability through a more immersive experience;

Con's

- Quality depends critically on the technical features of user's browser and network;

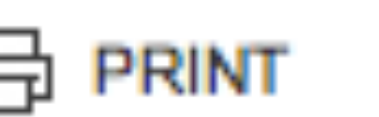
- 'Overviews': nontechnical documents, serving as "guided entry points" to the world of the VO astronomy. Starting from a large and general astronomical topic, tools/services that can be used on related data are featured;
- 'Use threads': single specific application of one tool/service is explained in details, using, when needed, common examples of applicator or template/user-provided data;
- 'Workflows': sequences of specific operations with a clear scientific goal, providing accurate and convincing scientific justifications and technical details of the procedure and tasks performed.

Overviews are 'horizontal' as they give a wide range of possible simple applications of VO tools/services inside a general common astronomical context. Workflows are strictly 'vertical' documents, since their purpose is to reproduce a credible scientific workflow and to mimic an entire pipeline (or a significant fraction of a pipeline) of operations wholly or mostly performed with VO tools/services, including data gathering, reduction and/or preprocessing of data, knowledge extraction from data and modeling of the data.



Conclusion

It appears unlikely that a completely hypermedia approach will replace the old standards for scientific documentation soon. Nonetheless, a mixed solution should be pursued based on the production of both old-style low-complexity printer-friendly hypertext documents and new hypermedia documents. The VO infrastructure is a suitable environment to test/ apply these guidelines. A change in the structure of the content of scientific documentation is also needed to achieve the goals of a more productive exchange of knowledge. We propose a new modular and layered model for documentation in the VO, consisting of three different classes of documentations with different goals, features and targets.



A model for VO documentation

'Media should adapt to content, and vice-versa.'

Accessibility and reception of scientific documentation depends not only on the medium, but also on the information content and how it is organized.

We present a new scheme for specific documentation of VO tools and services, based on a layered and diversified structure. This scheme fits very comfortably in the highly interactive hypermedia communication approach. We propose the creation of three classes of documents:

Post a Comment

Comment as:

Post Comment

Preview

