

ActivePresentation: A Model/Data Presentation Application

FY 2003 Proposal to the NOAA HPCC Program

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ActivePresentation: A Model/Data Presentation Application

Proposal for FY 2003 HPCC Funding

Prepared by: William S. Kessler

Executive Summary:

Scientists and managers must routinely present large quantities of data with complex inter-relationships to audiences at professional meetings, workshops, and conferences. The state of the art in presentations has advanced to the point that the largest percentage of presentations, by both scientists and managers are done with a notebook computer and projector using presentation software, most commonly Microsoft PowerPoint.

It is our observation that conference rooms at professional society meetings and even within conservative research organizations now include facilities for connecting a notebook computer to a projector for presentations. Currently, presentations are done with static images made from the original data sources, often presented in a multi-panel format to enable the presenter to compare several variables or measurement techniques at the same time. While this approach has worked adequately in the past, today new technologies and high-speed networks make a new and better approach possible.

The proposed ActivePresentation will enable a presenter working with popular presentation packages such as Microsoft PowerPoint or a web page to embed images/graphics actively connected to the data and to work with them interactively during the presentation. This has several advantages over one working from static images. Active graphics will allow the presenter to zoom in to a sub-region of the data and have all linked panels follow the zoom. Active generation of the plot means that the axes used to describe the plot also zoom, leaving them in the view and allowing the audience to follow the zoom operation. Active graphics also allow the presenter to determine the value of a point on the graph or animate the graph while zoomed in on a region of interest.

Problem Statement:

Scientists and managers must routinely present large quantities of data with complex inter-relationships to audiences at professional meetings, workshops, and conferences. This data comes from many sources including observational programs, climate modeling efforts, and satellite measurements. Currently, presentations are done with static images made from the original data sources. Often several related images are presented in a multi-panel format to enable the presenter to compare several variables or measurement techniques at the same time. While this approach has worked adequately in the past, today new technologies and high-speed networks make a new and better approach possible.

We propose to build an application, ActivePresentation, which can generate interactive graphics live during a presentation. ActivePresentation will be able to connect to remote datasets via the OPeNDAP protocol and use local data, either natively local or copied from the remote server. The scientist will use the ActivePresentation's design mode to initialize and establish data connections and graphics/presentation parameters. Embedded in a web page or PowerPoint presentation, ActivePresentation can generate interactive linked graphics live during the presentation.

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Relationship to NOAA HPCC objectives: This is a creative, original, and forward-looking and innovative application which applies advanced technologies (Java, XML, OPeNDAP/DODS networking) to enable scientists and managers to easily embed live interactive graphics of local or remote data into presentations with popular software packages such as PowerPoint for use in seminars, science program reviews, research workshops and professional society meetings. As such, it clearly supports the primary HPCC goal to make NOAA data holdings more accessible to a larger audience in a new way, advancing the technology for access to NOAA data in a manner that increases mission effectiveness.

Proposed Solution:

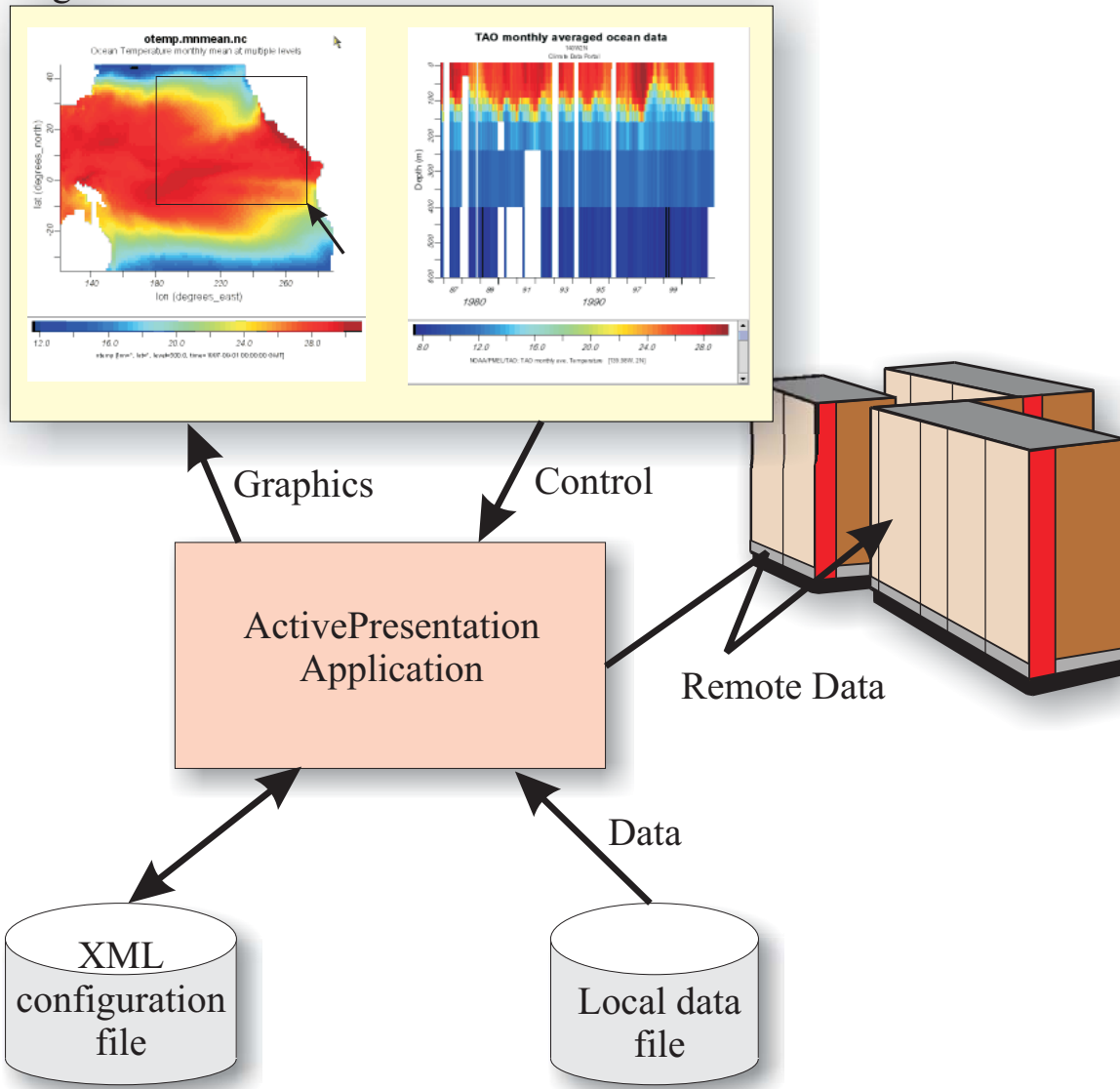
Synopsis: We propose to build an application, ActivePresentation, which can generate graphics live during a presentation. ActivePresentation will be able to connect to remote datasets via the OPeNDAP protocol and use local data, either natively local or copied from the remote server. ActivePresentation will have a design mode during which the presenter can set the number of pages and panels on each page, connect to the desired datasets and extract subsets to present in 1-D, 2-D or 3-D plots. In design mode, labels can be added to the presentation, axis properties set, and attributes that control the rendering of the data can be modified. Actions can be defined, which can be triggered by a mouse click on the graph or a button, to change variables, zoom the plot to a predefined region, or add annotations to the plot (for example, lines, comments, arrows, etc). The layout of the pages and panels and other actions can be saved to disk (or read from disk to modify an existing presentation) and read from disk during the presentation.

ActivePresentation will also have a presentation mode. During presentation mode the presentation cannot be modified, but predefined actions can be preformed. ActivePresentation can access data either from an OPeNDAP server or from local copies of the data (for presentations on machines with either poor or no network access).

ActivePresentation will be written in Java and use the Scientific Graphics Toolkit (SGT) JavaBeans currently being developed in a FY02 HPCC project. The flexibility and power of Java enable Active Presentation to be used in several ways. ActivePresentation can be

embedded in a web page as an applet, enabling a scientist to use ActivePresentation during web-based presentations, or within a web page available to the public. ActivePresentation can be used as a stand-alone application, run from the desktop. Finally, ActivePresentation will use the Sun Microsystems, Inc. “JavaBeans Bridge for ActiveX” to allow ActivePresentation to be embedded in Word documents or PowerPoint presentations.

Page



Implementation: ActivePresentation will be created using SGT JavaBeans to provide the interactive graphics and ncBrowse will provide OPeNDAP server access and sub setting capabilities. The presentations will be stored as structured XML documents and scripting will be implemented using Jython, an implementation of the high-level, dynamic, object-oriented language [Python](#) seamlessly integrated with the [Java](#) platform.

ActivePresentation features will include:

- Live connection to remote OPeNDAP datasets or local data files. Live connection to the data allows "new graphics" to be created by simply modifying or updating the source data.
- ActivePresentation can be embedded in a PowerPoint or Word document.
- ActivePresentation can be run from a web page using the Java 2 plug-in.
- Easily change the dataset used in the presentation.
- Each presentation consists of pages and panels. Each panel is a graph or text that can be dynamically linked (for zoom or parameter variation) with other panels on the same page.
- Annotations, labels, icons, can be created and added to the graph at the beginning or like PowerPoint, be animated to appear during the presentation.
- Simple controls for animations, changing datasets, and resetting the page to a known state can be embedded on the page.
- Users can add pages or edit existing presentations.

New feature needed in SGT:

- Jython scripting support.
- Geographic projections (Mercator, Polar Stereographic, etc.)
- Panel layout aides. JavaBeans to simplify laying out panels, labels, icons, etc on a page.

Leveraging: Leverages the JavaBeans development of SGT funded by HPCC in FY02. JavaBeans SGT will make developing this application much easier. The interface to SGT will be simplified and the ability to save configuration state will exist. This project also benefits from the development of ncBrowse funded by HPCC in FY01 and FY02.

Matching Funds: PMEL is supplying the PI salary at no cost.

Analysis:

Rationale: This solution was chosen because the authors know of no existing software that provides similar features. SGT, ncBrowse, and OPeNDAP were chosen for the implementation because these are all fairly mature technologies that are a very good match to the functional needs of the proposed application. SGT and ncBrowse are very well known to the authors and can be efficiently modified to add any new capability required in this proposal. Using SGT in this application will also enable the authors to extend the capabilities of other applications that presently use SGT for graphics.

Scope: This concept has been discussed with Dr. Michael J. McPhaden, a senior scientist in PMEL, Director of the TAO project and president of the Ocean Sciences Section of the American Geophysical Union. Dr. McPhaden has been making extremely effective use of notebook computer based presentations using PowerPoint for presentations, such as his recent keynote address at the American Geophysical Union (AGU) Western Pacific Geophysics Meeting. His response to ActivePresentation was both positive and supportive. It is our

intention to make ActivePresentation software readily available and to advertise it as widely as possible within the community. We believe that the response of others in the scientific and management community will correspond with that of Dr. McPhaden.

Performance Measures:

The following milestones reflect the iterative software design process where the requirements-design-development cycle may be repeated many times.

Milestones

Month 1 – Collect requirements for ActivePresentation.

Month 3 – Design ActivePresentation.

Month 7 – Initial release of ActivePresentation.

Month 8 – User feedback.

Month 9 – Modify existing design.

Month 12 – Final release of ActivePresentation

Month 12 – Present results at NOAA Tech

Deliverables

- ActivePresentation, a dynamic graphical application for scientific presentations.