

Web 2.0 for Ground Resource Allocation

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Abstract—A set of analysis tools has been created in a community-based team environment to support ground resource allocation planning. This new tool, called GRAPE, combines analysis, monitoring, and search capability into an existing community environment where wikis, blogs, document libraries, calendars, discussion forums, lists, progress management, and email repositories are available in a web site which assists users with their communication, analysis, and collaboration needs.

Index Terms—resource management, planning, Internet

I. OBJECTIVES

SOCIAL networking has been very successful in the Web 2.0 era. In large organizations, it facilitates communication and team collaboration among distributed groups. The resource allocation process in NASA's Deep Space Network (DSN) has increasing needs for resource allocation and scheduling collaboration in various stakeholder organizations. A community-based environment helps to address domain issues such as team communication and knowledge sharing. However, it does not address daily analysis needs. Users still require separate tools for daily work ranging from operations and analysis to status monitoring and reporting. In order to provide a complete and working team environment, these capabilities need to be integrated into a single social application, so team members can conduct daily business and share information efficiently. Thus, simple analysis tools must be developed and seamlessly integrated into this shared web environment to maximize its effectiveness. These tools must also link to visualization components and be conveniently accessible through a browser in common operating systems.

II. DESCRIPTION OF THE RESEARCH, ENGINEERING, OR OPERATIONS APPROACH

The Jet Propulsion Laboratory (JPL) and California Institute of Technology manage NASA's Deep Space Network, which tracks and communicates with interplanetary and earth-orbiting spacecraft. JPL's Office of the Chief Information Officer (OCIO) recently adopted Microsoft SharePoint 2007 as one of the components in its institutional team collaboration space. It provides popular community-based communication tools such as document management, calendars, wikis, blogs, lists, progress and issue tracking, discussion forums, workflow management, alerts/notifications, and search capabilities. To further customize this environment for DSN resource allocation-specific usage, a set of "web parts" were developed. Web parts can be thought of as small components which can be combined into a web page. These web parts consist of front-

end interfaces connecting to existing back-end DSN web services which process data and provide functionality. Users can use these web parts to create personalized and focused web pages to perform operations, analysis, and monitoring at the same site as all team collaboration functions. Since users can freely compose web pages using web parts, a security scheme was also developed to control access to the web parts.

III. RESULTS

A site collection, GRAPE (Ground Resource Allocation Planning Environment), was created by building upon existing SharePoint server functionality for supporting community-based team collaboration. The hardware, software, and maintenance are provided by JPL's OCIO. The DSN resource allocation development team created a set of GRAPE web parts to provide functionality for the DSN resource allocation community in order to perform daily operations such as scheduling, view period analysis, tracking, and monitoring. These web parts were also integrated with third-party charting tools which allowed for richer visualization while reducing development time. Currently, GRAPE is used by various scheduling groups in many DSN and mission organizations.

IV. IMPACT / BENEFITS FOR SPACE SYSTEMS

The current DSN resource allocation tools are either client-server or 3-tier applications which provide independent functionality. The use of web parts allows the individual functionality provided by the various legacy tools to be integrated through web services and placed in a community-based environment. Users can not only share their knowledge, but also perform daily operations in the same place. This integration provides a one-stop portal for users to access both functionality and information. Because web parts are easy to construct from back-end web services, various GUIs can be quickly developed for specific purposes. Users can use these web parts to compose their own web pages without any programming knowledge. Providing all this functionality in a browser environment reduces deployment and platform issues.

V. FUTURE DIRECTION

Our goal is to host all major DSN resource planning operations in a single community-based portal so all users are empowered and can work collaboratively using a common and customizable toolset covering functionality required for daily work. Additionally, as JPL's OCIO provides new features in this environment, such as instant messaging and on-line conferencing, GRAPE will be utilizing these capabilities.