

PROPOSAL FOR FORMATION OF WEB APPLICATIONS THRUST AT NCSA

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SUMMARY

The computing industry as a whole is moving towards web applications delivery, enabled by interaction technologies like AJAX, increasing use of interchange standards built on XML, and the use anywhere mindset of the Web 2.0 world. NCSA helped pioneer the Web 1.0 world by collecting a set of existing standards and tying them together under an innovative interface, and NCSA needs to once again attain leadership in web applications development through the formation of a Web Applications Thrust (WAT). This group would essentially act as a technologies integrator, bringing together the wide range of expertise at NCSA, as well as outside applications and technologies, towards the development of specific community solutions and embracing the situations and accepted practices of those communities. For example, in many of the scientific computing communities that NCSA works with, Java JSR-based portlets are an accepted standard for web applications implementation, while in the education field, the Moodle plugin framework has become widely adopted for application development. However, beyond the underlying technologies, the centerpiece of Web 2.0 development is its interactivity and innovative combination of technologies. Google Maps redefined what was expected of online applications, and the static page-by-page-refresh model of data-driven web sites has become outdated. This new model of applications delivery requires a crossdisciplinary focus, bringing together interface designers, programmers with AJAX, JSR, Moodle, and other programming expertise, and, most importantly, a general mindset of how to develop applications in the Web 2.0 spirit. More than an amagelden of technology, the Web 2.0 world is a way of thinking about things, a thought process of how to bring applications to the web in innovative ways.

ON STANDARDS

While it is important to evaluate existing standards and embrace them where possible, it is also just as important to appreciate the differences in standards and accepted practices between disciplines. While JSR portlets may be the accepted application model in many scientific disciplines, Moodle plugins have become a key development framework in the education discipline, and applications developed for those communities must take these issues into account. The WAT must therefore remain cognizant of the various standards and technologies in use in each discipline, but focus its energies on how best to develop solutions to specific problems, realizing those solutions as specific technology offerings appropriate to each discipline. A JSR portal that uses SRB and grid services may be entirely appropriate for a bioinformatics system, but may impose significant barriers to entry when used as a framework for humanities tools, whose departments may lack the necessary expertise to operate them effectively.

We must also be careful not to allow the focus of development to shift from solving a problem to the underpinnings of software to the detriment of achieving the end goal, as pioneers like Michael Hawley have lamented in recent speeches. A recent example of this may be found in the aftermath of Hurricane Katrina, where the magnitude of the devastation resulted in a renewed push for electronic health records (EHRs). Significant effort was spent in developing a standard for interoperable EHRs, resulting in the selection of the Continuity of Care Record (CCR) format as the standard for several major early EHR projects in the affected region. Unfortunately, while CCR is an established standard adopted by many commercial packages, it was never developed for use as a full HER, and lacks the ability to encapsulate medical imagery, documentation, lab reports, and the myriad critical documents that comprise the majority of a patient's medical record (though from personal correspondence with the CCR technical team, I have been told they are focusing on this issue in their next release). In their focus on finding an interchange standard, the technical teams involved in those Hurricane Katrina relief efforts lost track of the end-goal, which was the complete digital representation and availability of health records.

It is also important that such a group not build their applications around standards, but rather integrate them in a way that is most appropriate for each situation. A compelling lesson in this may be found in the field of LIS, where Dublin Core became the established standard for metadata representation. While a number of projects built around Dublin Core as their internal storage format, and focused on ways of working around its limitations in their applications, others, such as the Inscriptifact project, created their own internal metadata format that was extensible to their needs, and simply wrote import/export filters to provide interoperability with Dublin Core systems. As Dublin Core has been depreciated in support of newer emerging standards, systems which based themselves around the DC format have had to be rewritten, while projects like Inscriptifact are able to simply drop in replacement filters. While this may seem rather simplistic, it is especially important in the web applications arena, where a myriad of standards are at odds with each other and different disciplines have settled on opposing models.

THE WEB 2.0 VISION

However, as noted earlier, the Web 2.0 vision is not about standards, but rather the innovative applications those standards enable. This new world has shifted the focus from technology-centric development to solution-centric development, migrating traditionally desktop-bound applications to the access-anywhere world of the web, and the new kinds of capabilities those models enable. For example, a scientist discussing a new discovery with colleagues at a conference by pulling up an interactive 3D visualization on her Java-enabled cellphone, which is connected to a framework running on her home institution's supercomputers in another country.

The focus should be on applications. Take google maps, for example: at their core they rely on several established standards (AJAX communication, XML format), but like any

pioneering application, the standards merely support the application, it is the innovative application of those standards that makes the killer app. Hooking together existing applications can be extremely powerful (ala Web 2.0 mashups), and underpinning that capability is a strata of standards, but what has driven the Web 2.0 world is the wave of innovation on top of those standards, of new ways of connecting and leveraging this connectivity.

There is also the need for recognition of the varying technology capabilities available to different disciplines. In the bioinformatics arena, it may be fine to expect that adopters have SRB storage infrastructures, grid expertise, JSR portal programmers, etc, while a history department or small school would most likely be better served through a simpler interface. **Underlying this initiative is the recognition that technologies and their underpinning standards are merely tools with which to craft solutions to the world's problems, and each has an appropriate place and use. This new division would apply the tools appropriate to each discipline, focusing on the development of cutting-edge web applications delivery platforms.**

We must embrace the full range of standards, from JSR in the scientific world to Moodle in the education discipline. Various technologies like AJAX and Web 2.0 delivery and interactivity models, regardless of the underlying technology. Regardless of the underlying programming language, implementation model, etc, we need a group that focuses on helping us deliver these kinds of applications and embrace this mindset.

In the corporate world, most tools are moving to online access-anywhere distribution models, ranging from office productivity tools to advanced IT management and analytic suites. Tools which do not offer "Web 2.0" interfaces are considered obsolete in many markets. There are a myriad standards and technologies in any area, and often different disciplines standards on different ones. The key is to realize that what makes an application is not the standards themselves, but rather how they are brought together. Mosaic, which laid the groundwork for the web we know today, was, at its core, just an innovative way of bringing together established standards under an innovative framework and interface.

Michael Hawley, one of the founders of the Things that Think and Toys of Tomorrow labs at MIT, said in a speech late last year, organizations and developers these days are getting sidetracked focusing on XML and supporting technologies, rather than "keeping their eyes on the ball" and tackling the applied problems. He made a point of saying that instead of identifying problems and developing direct solutions to them, we are spending all our time getting wrapped up in thinking about the enabling technology, when, in fact, there are many ways of solving the problem, and we need to just move forward and solve the problem.