Web 2.0: W.I.I.F.C.M.
What's In It for Construction Management

Collaboration Creates Success
CMAA Convention Instructional Session

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Introduction

Collaborative project management is happening on jobs today, so what is the buzz about the "Web 2.0"; is it warranted and does it have application to your business?

Challenges

As a construction or project manager, you likely don't have time to investigate technologies which *may* benefit your project. Quickly understand what to evaluate and understand key performance indicators to measure.

Historical Premise & Web 2.0 Opportunity

No more changing your business process to match how a software package operates, consider the reality of having a tool adapt to your individual best practices of getting your job done.

Web 2.0 Project Management

Defining the technical aspects of Web 2.0 Project Management to address:

Efficiency of Resources

Referencing resources of both hard and soft costs, Web 2.0 drives quantifiable gains measured in volume of work processed, IT investment, PM time and effort.

Simplicity of Use

Usability is paramount to acceptance and utilization in the field. Moving from monolithic, heavy applications which require lengthy training cycles is fundamental to Web 2.0 intuitive design.

Added Protection

Ecosystem models offer advantages in protecting legal rights. Documentation made accessible and intuitive, ensures completion and consistency, offering substantive benefits in conflict resolution.

Summary

Evaluating Web 2.0 tools in construction management is a manageable process with a structured plan of action and tangible bottom-line benefits.

Introduction

Evaluating Web 2.0 applications and their importance to the construction industry calls for demystifying terminology and translating use in concrete fashion to the requirements of project management.

Historically, the term Web 2.0 is attributed to Tim O'Reilly of O'Reilly Media in 2004 who defines the concept as not having "a hard boundary, but rather, a gravitational core"[i]. Said gravitational core being defined by a continuum of options along a set of principles including:

1. Use of web as access/delivery platform;
2. Centralizing collective knowledge;
3. Data itself is of fundamental value – creating 'infoware' vs. software;
4. Enhancements are user-driven;
5. Lightweight programming models (not as taxing on local resources);
6. Platform independent programs; and,
7. Rich user experience.

In translating these principles for the construction industry, it becomes increasingly apparent as to why enterprises now are focused on obtaining the benefits of Web 2.0 applications to:

- Facilitate collaboration internally and externally;
- Accelerate information access;
- Improve knowledge management capture and transfer;
- Respond to the speed and agility of today's market demands; and
- Communicate in real time with varied stakeholders.

The majority of owners, construction managers, contractors, project managers, subcontractors, superintendents and suppliers are technologically connected today. Cell phones with Internet access, handheld computers, laptops, dummy terminals and desktops are but a few of the tools of choice in the industry. Leveraging the web as a common denominator across industry adopted tools, makes practical sense in increasing application of these tools in achieving project success. A superintendent documenting weather's impact on schedule using his PDA, alerting the PM to contact impacted subcontractors from the office, while updating a schedule the owner may access on his trip abroad makes functional sense.

Achieving common understanding of project status is key to resolving issues, making sound decisions and keeping the numerous stakeholders informed. This is of heightened value in the case of alternative delivery methods and also with public/private partnerships now becoming more and more prevalent. Web delivery and software as a service (SaaS) infrastructure meet these requirements. In an ecosystem model, centralizing access to project details also speaks to the value of the data itself. Having real-time access to the key performance indicators can drive business to achieve new accomplishments. For example, a Work-in-Progress (WIP) report created on-the-fly versus 15 days post close of the month may change management processes and/or decisions. The usability of timely data is part of the transition from software to 'infoware'.

The goal of a rich user experience and user-driven enhancements is to have tools that are used. Web 2.0 methods explicitly engage users in developing the application and exhibit cooperative rather than controlled services and interfaces. The resulting "architecture of participation <in> software development"[ii] contrasts legacy tools, many of which can be complex to navigate, unwieldy to use, are slow and/or are limited in how they can be accessed, thus not fully realizing acceptance and offering diminished value to the business.

Wikipedia summarizes (and embodies) O'Reilly's concept in stating "Web 2.0 refers to a perceived second generation of web-based communities and hosted services…which facilitate collaboration and sharing between users"[iii].

Exposure to multiple perspectives of what Web 2.0 is allows further discussion around its' value to construction and project management.

Challenges

A challenge facing construction today is the slow rate of technology adoption as a collective industry. Speaking directly to the voiced pains of today's PM tools, Web 2.0 does not require construction professionals or stakeholders to become IT professionals, or mandate lengthy training sessions. Instead organizations are empowered to realize immediate benefits with low barriers to Web 2.0 adoption.

Top Pains for CM Professionals Using PM Tools

1. *Lack of team utilization*
2. *Field reporting*
3. *Learning curve investment*

Schemesoft Survey ~ May 2007

Web 2.0 does *not* have to be about huge hardware and software installations and compatibility. Web 2.0's platform independence and nimble code can operate without proprietary dependencies and adapt to your technical environment – with a lower total cost of ownership and maintenance expense.

"Efficiency drove my selection of a PM tool to write contracts, change orders and purchase orders. Selecting a Web 2.0 tool has made a significant difference in our business, even being the single user in my organization"

Terri Patrick, Contract Administrator
Allred Metal Products

Further, a one person entity can benefit from Web 2.0 tools in the same way a 10,000 national workforce can, differentiated by scale. "BE&K… anticipated saving up to 27,000 man-hours per year"[iv] with an enterprise Web 2.0 solution. Web 2.0 products level the competitive barriers of technology expertise and investment by being accessible to *all* members of the construction industry.

Web 2.0 is here and here to stay as a disruptive force "propelling all industries towards a new way of doing business characterized by user participation, openness and network effects"[v]. Web 2.0 application evaluations and implementation in construction can be very manageable and offer quantifiable benefits in time saved, work accomplished and margin retained.

Historical Premise & Web 2.0 Opportunity

Historically construction and project management have functioned using time consuming manual processes and/or independent functional product silos that do not communicate externally. Estimating, scheduling, project management, payment applications and accounting may be distinctly supported by individual tools and/or notable non-industry specific tools such as Microsoft Office®.

The legacy of using multiple software tools includes high administrative overhead expenses. Duplicative data entry requirements and an enduring reliance upon static, paper-based information collection and communication processes have resulted. As projects continue to grow in scope and volume, legacy processing methodologies become increasingly unwieldy. Further, the technical infrastructure of multiple tools can be challenging to support – both financially and with human resource cost-wise.

The construction industry's need to improve efficiency aligns directly to the opportunity and promise of Web 2.0 business process reengineering, similar to building information modeling (BIM). BIM is another technology catalyst similar to Web 2.0 which "drives collaboration, the procurement supply chain, scheduling and construction techniques" and brings with it "the potential to bolster efficiency, as well as create more disruption"[vi]. The construction industry is better served viewing Web2.0 technology adoption as a competitive advantage and potential profit center to achieve rather than a barrier or expense to overcome.

Web 2.0 Project Management

Defining the technical aspects of Web 2.0 project management includes the distinction between synchronization and real-time access. A common thought is that using your mobile phone to daily synchronize contacts and calendar applications to a centralized server is considered real-time updating. Contrary, synching is an aging collaborative process, circa Web 1.0. Computerworld forecasts that "by 2010…applications will need to work with data that is within 15 minutes of being current, according to Gartner"[vii], technology industry analysts. Synching relies upon human and technical factors, rendering said definition of real-time reporting likely unachievable. By contrast, Web 2.0 net-native tools allow secure access to live data, including mobile access, thereby meeting the business need for timely data.

Designing applications from the start to integrate services across PCs, Internet servers and mobile devices further differentiates Web 2.0 applications from more traditional software ported to the net. A resulting impact of Web 2.0 project management now becomes a business management issue of how having real time access to project data may change decision-making processes and outcomes with impact (ideally positive) on profitability.

Software as a service (SaaS) is an attribute of many Web 2.0 applications. SaaS embodies the aforementioned Web 2.0 attributes of web delivery and maintenance given a one-to-many technical architecture. SaaS differs from an application service provider (ASP) model in that ASP was client-server in disguise; third party hosting of HTML front-ends of front-end heavy applications.

ASPs manage servers, not applications, whereas native SaaS models are developed intentionally as net-native and deliver agility by being able to respond and modify code

in real-time, even same day. SaaS uses this functional advantage to support a "wide range of customization within a basic set of functions"[viii] while providing economic advantages including low cost bandwidth to support a scalable offering for one or one million users.

Efficiency of Resources

Referencing resources of both hard and soft costs, Web 2.0 drives quantifiable gains measured in volume of work processed, IT investment, project managers' time and effort.

> *"Implementing a Web 2.0 Project Management Tool prevented us from having to hire additional administrators while increasing project volume."*
> *Chris Bailey, Project Manager*

Not having to enter company and contact information into both bidding/estimating and project management applications is a time saver of impact. And having the same data roll-over into pay application processing and retention billing further illustrates the value of single point of data entry.

Simplicity of Use

Usability is paramount to acceptance and utilization in the field. Moving away from monolithic, clunky applications requiring lengthy training cycles is fundamental to Web 2.0 intuitive design.

> *"We needed a system that our employees would actually use. The ability to monitor all of our projects status at any time, from anywhere, with accurate information at our fingertips, is invaluable to running our business"*
>
> *Keith Wilson*
> *President*
> *Palisade Construction*

Many hyper-robust legacy project management applications rely upon equally excessive training requirements; even self-described 'universities' of coursework over a period of days or weeks and thousands of dollars.

By contrast, Web 2.0 attempts to provide an intuitive and logical folksonomy of organization, rather than technical taxonomies forced on users by back-end processes. Interactive help processes and online multi-directional communications are key indicators of a second-generation, user-friendly interface and demonstrate a key Web 2.0 principle that the service "automatically gets better the more people who use it."[ix]

Added Protection

A Web 2.0 ecosystem model offers advantages in protecting construction management legal rights. Documentation made accessible and innate, ensures completion and consistency, offers substantive benefits in conflict resolution.

> *"If you call an attorney about a dispute, within 10 minutes you will be asked 'Did you document that _____?'"* [1]
>
> *Josh Grabel*
> *Construction Litigation Attorney*
> *Snell & Wilmer LLP*

Having both an accepted, thus regularly used, system of documentation mitigates risk. "Properly documenting a project by obtaining complete copies of contracts… keeping daily logs, ASI logs, Change Order logs, and RFI logs, submitting appropriate change orders and payment applications, making timely objections to incomplete and/or defective work and obtaining lien waivers can, in many cases, determine whether a project is truly profitable and successful." [x]

Having anytime access to granular data to summarized data and documents - in a centralized location, accessible with security from virtually anywhere - makes preventing or responding to issues or project conflicts less challenging.

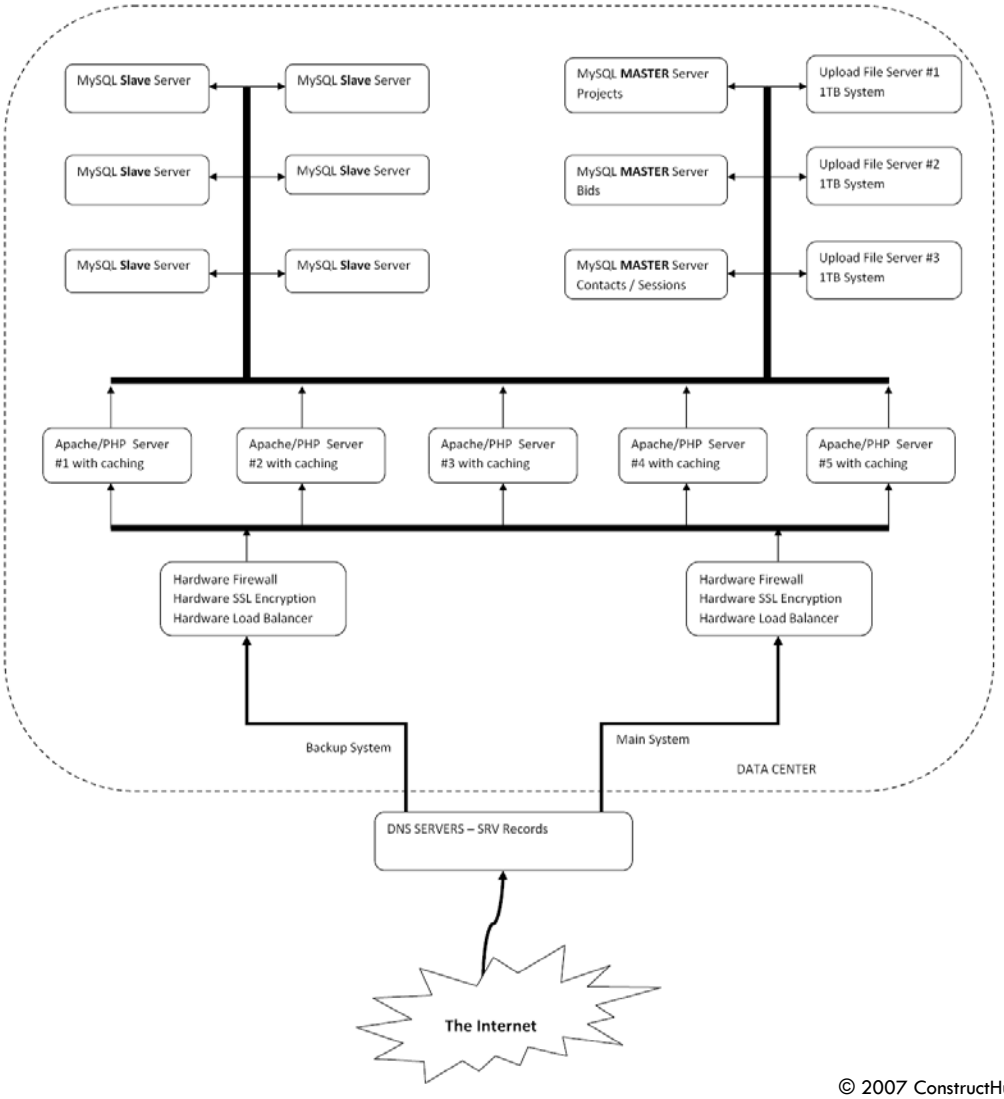
Evaluation and Key Indicators

The maturity of Web 2.0 and SaaS models varies by vendor and should be evaluated based upon customization of code, multi-tenancy, metadata controls, and load balancing optimization. Key evaluation points include:

Does the solution run individual versions of code per client or support multi-tenancy? More mature architectures handle "mass" customization using license-level metadata while enabling heightened functionality with significantly lower operational cost and departing from a "one size fits all" application design.

Scalability can be a concern for construction firms. Ensure a selected solution has a load balancing operational design such that the end-of-the-month doesn't mean increased processing time due to higher numbers of users accessing the application to meet financial deadlines.

Below is an example of a mature SaaS load balancing strategy, presented visually.



Further operational advantages of mature SaaS applications include greater data security, reliability (with redundancy inherent infrastructures), and disaster recovery options over those commonly available with internally run and managed tools.

Summary

From the late 1990's use of network-based collaborative tools[xi] to the innovative use of Web 2.0 project management tools, the construction industry is beginning to adopt new standards to meet the evolving needs for successful project management. The Construction Management Association of America underscores this heightened industry focus by devoting an entire conference to the theme of "Collaboration Creates Success".

In 2006, 96% of the UK Network for Construction Collaboration Technology Providers survey respondents planned to "re-use the <collaborative> technology on future projects" to benefit their business. A Harvard Graduate School of Design study reveals collaboration benefits of greatest value as being data accessibility, increased documentation, faster reporting and improved financial controls.

Web 2.0 project management tools offer a critical competitive tool, meeting the needs of construction managers in being secure, scalable, and cost effective information assets that address the velocity of business – today and in the future.

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[i] What Is Web 2.0.Design Patterns and Business Models for the Next Generation of Software, Tim O'Reilly, 09/30/2005

[ii] What Is Web 2.0.Design Patterns and Business Models for the Next Generation of Software, Tim O'Reilly, 09/30/2005

[iii] Web 2.0, Wikipedia, 08/27/07

[iv] Field Tested Technology, Constructech Magazine, 04/05/2007

[v] Why Web 2.0 Matters and How You Can Make the Most of It, O'Reilly Radar Report, 11/06

[vi] Where Does Collaboration Technology Go Next, Bill Gould, Construction Executive, 07/07

[vii] Computerworld Resource: Delivering Critical Information with Real-Time Reporting, 08/12/07

[viii] Software as a service, Wikipedia, 08/27/07f

[ix] What Is Web 2.0.Design Patterns and Business Models for the Next Generation of Software, Tim O'Reilly, 09/30/2005

[x] The Art of Papering Your Project, Josh Grabel, Snell & Wilmer LLP, 07/07

[xi] Where Does Collaboration Technology Go Next, Bill Gould, Construction Executive, 07/07