

# Transforming Australian Energy trading using web 2.0 technologies

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## Abstract

Energy Traders need to understand, and react to, large amounts of information in order to do their job effectively. The nature and variety of these information sources means that traders must spend most of their time manually sifting through data instead of planning strategies and making crucial decisions in a 24 hour market that is extremely volatile.

By using WEB 2.0 technologies, this project used a SaaS (Software as a Service) approach to cost effectively build a series of small applications in-house, which deliver aggregated information in a simplified format to the Trading community in a more cost effective and flexible way than using off the shelf software.

Typical approaches require the deployment of expensive/complex application frameworks. Our approach shows how to achieve similar results on time and at lower costs by using dynamic html and iframes to present information to the user. The utility of our approach is demonstrated through a case study showing how we integrated diverse unsynchronized data sources in to a near real-time information system that supports rapid decision making.

## Introduction

### The Trading environment

- Extremely volatile market, prices can range from -\$1,000 to +\$10,000
- Market settles every half-hour
- Large amounts of trade value associated with a small set of half-hour (HH) events
- If these events are not properly managed, a participant "...can see their earnings for the whole year evaporated in a few hours." (Blanco & Soronow 2001)

NEM Region	2007			Jan-2008		
	Market value \$M	Six Sigma Events	Value of Six Sigma Events \$M	Market value \$M	Six Sigma Events	Value of Six Sigma Events \$M
NSW	\$ 5,956	35	\$ 1,179	\$ 241	2	\$ 2
QLD	\$ 3,749	48	\$ 743	\$ 239	4	\$ 76
SA	\$ 866	24	\$ 81	\$ 215	12	\$ 162

Table 1. Financial contribution of price spikes to total market value (NEMCO 2008)

### Responsive information systems

To manage risks in this market systems must be:

- Flexible and responsive with respect to the way they display information
- Secure, accessible and expandable

## System

### Problem Domain

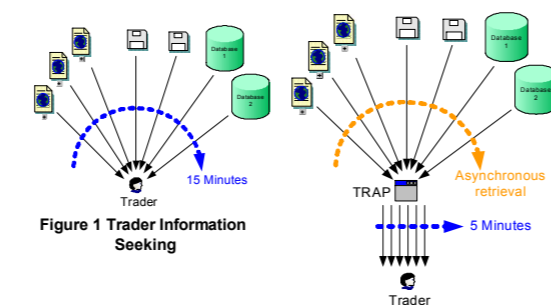


Figure 1 Trader Information Seeking

Figure 2 Trader Information Seeking with TRAP

- A portal-based approach has been identified as being an effective strategy for integrating diverse information streams in to a single application (Wege 2002).
- TRAP brings together a number of information sources and presents them to our Energy Traders
- Achieves near real-time response by using Software as a Service (SaaS) approach for data collection and redistribution
- Improves response time from 15 minutes to 5 minutes
- Automates the access and synthesis of information in to a single application
- Follows similar approach as that taken by Netvibes [HREF4] or iGoogle [HREF5].

### Constraints

- Users must be able to access the system without the need to install client software or update as new version became available
- New data sources and visualisation can be added to the system as they became required or available
- The system needs to be easy to manage within a secure framework

### Addressed by

- Using a web-based user interface.
- Access to the system is not restricted to particular machines or configurations
- Portal-like pages, each presenting SaaS based views onto the information sources.
- Leads to pages that are easily maintained and extended
- Customised to different screen resolutions
- Leveraging existing infrastructure provided by ISS and windows domains.
- Integrated authentication sufficient, as the application will only be accessible within the company's intranet.

## Framework

### Evaluating existing options

- A software framework approach would give us the reusability and extensibility we required (Fayad 1999).
- No ready available solution satisfies our key requirement of accessibility, expandability and security
- Publicly hosted solutions, like those of Netvibes and iGoogle, failed to adequately provide a security framework for sensitive information.

### Accessibility and expandability

- Expandability encompassed the principles of reusability and separation of concern which have been identified as being important to web-based frameworks (Schwabe 2001)
- To integrate the diverse technologies into a single system we imposed three key constraints on the design of components
  - Each application was treated as a stand-alone DHTML unit, with no dependencies on other DHTML components in the system
  - Look and feel was governed by style sheets, enforcing a separation of user interface from the data being presented
  - We enforced a rule that each component manages its own database interaction
- These constraints allow us to develop and maintain components independently of one another, meaning that we can readily add new or modify existing components

### Community engagement

- A significant contributor to the success of our approach was the conscious identification and cultivation of community within the stakeholder groups.
- Through this combination of technology and community engagement that we have been able to develop our framework successfully

## References

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- Fayad, M.E., Schmidt, D.C. & Johnson, R.E. (1999). Building application frameworks: object-oriented foundations of framework design, 1st edn, John Wiley & Sons, New York.
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## Implementation

### Trading Risk Analysis Portal – TRAP

- TRAP integrates diverse information streams into a single portal
- System is based on and framework principles described above
- Demonstrates the utility of these concepts.

### Recommendations for building secure web 2.0 communities in-house

- Make use of community involvement and a set of development guidelines to allow effective ongoing growth
- Engage with the stakeholders using RAD methodologies
- Use of script-based technologies facilitated responsiveness to changes in user requirements.
- Use vertically independent components.
- Flexibility and responsiveness was a key factor in the success of our implementation

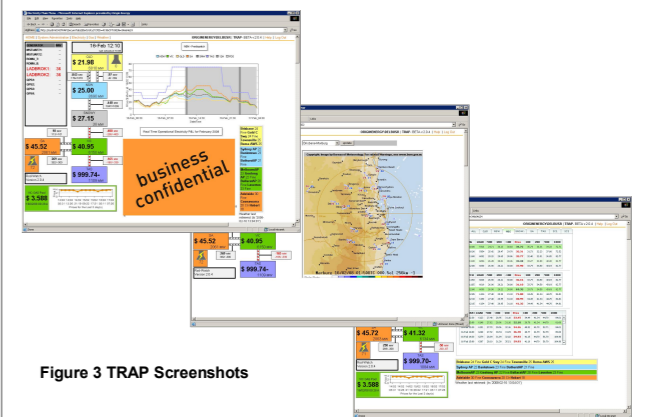


Figure 3 TRAP Screenshots

## Hypertext References

- HREF1 <http://www.originenergy.com.au/>
- HREF2 <http://www.uts.edu.au/>
- HREF3 <http://www.nemmco.com.au/>
- HREF4 <http://www.netvibes.com/>
- HREF5 <http://www.google.com.au/ig>
- HREF6 [http://www.fea.com/resources/pdf/a\\_jump\\_diffusion\\_processes.pdf](http://www.fea.com/resources/pdf/a_jump_diffusion_processes.pdf)
- HREF7 [http://ieeexplore.ieee.org/xpl/freeabs\\_all.jsp?arnumber=1236470](http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=1236470)
- HREF8 <http://www.w3.org/TR/2004/NOTE-ws-arch-20040211/>

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