Feasibility of Web-based Data Management Systems

Should time and resources be allocated to investigate the implementation of web-based data management solutions through-out the school site/community?

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TO: Ian Davies (Principal)

CC: All HTs

SITE: Kadina High School

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Nutshell

Presently our educational institution (site) outlays annual license fees to a number of software vendors to use products such as TimeChart, RISC, and ReportCard for administrative data management. These products cannot be directly used on DER devices as application installation is prohibited on these devices.

However, alternative web-based products and services which perform similar functions may reduce annual license fees, and enable staff to access and manage teaching resources and administrative data globally from any web-enabled computer.

Proposal

A delegated team or individual investigate, design, develop, and/or implement web-based alternatives to data management systems currently utilised onsite, such as:

- TimeChart
- ClickView
- RISC
- ReportCard
- SAMS
- Helpdesk
- Resource Booking (MRBS)
- Network document management

Approval

Question

Should time and resources be allocated to investigate the implementation of web-based data management solutions through-out the site and/or Community of Schools, as an alternative to current data management systems?

RSVP

Please respond by Fri 29-Apr-2011.

Feasibility

The feasibility of web-based data management from organisational, financial, and technical stand-points will be considered. Strengths and weaknesses, opportunities and threats, and future implications will be discussed.

Organisational Feasibility

This section will consider how the implementation of web-based data management systems may impact on the site's users and participants, and how it may impact on data used by the site in conjunction with other sites in the Community of Schools, the Region, and the Corporate environment.

Advantage: Operational Access

Web-based data management systems can be accessed from any web-enabled computer from any location.

Currently site applications such as TimeChart and RISC cannot be accessed on DER devices due to the restricted-application policy implemented by DERNSW. Although an application-approval mechanism may be developed at some future date, web-based applications will not require any approval process, and should not present any installation issues.

Web-based applications also allow for restricted authenticated access by students, or public access to the local and global community. Thus students and care-givers can access timetables, student welfare reports, student academic reports and other relevant data through web-based technologies while onsite and offsite.

Several currently data management applications can be accessed only by onsite devices. See Figure 1. DER devices cannot access applications due to DERNSW's restricted-application policy. Offsite devices cannot access applications as they cannot retrieve the application or the data from the site network.
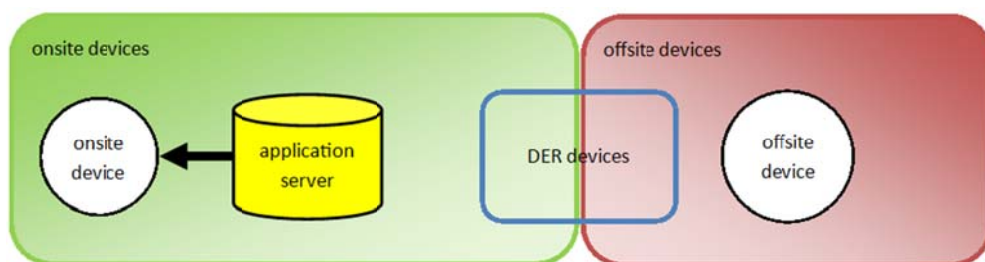

Figure 1

One immediate solution is the introduction of Terminal Services, which enables any authenticated user to access applications as if working at an onsite device. See Figure 2. Onsite devices continue to access data via locally installed application software. All other devices can access the application as a remote desktop. This solution would probably only allow access for staff to manage site data.
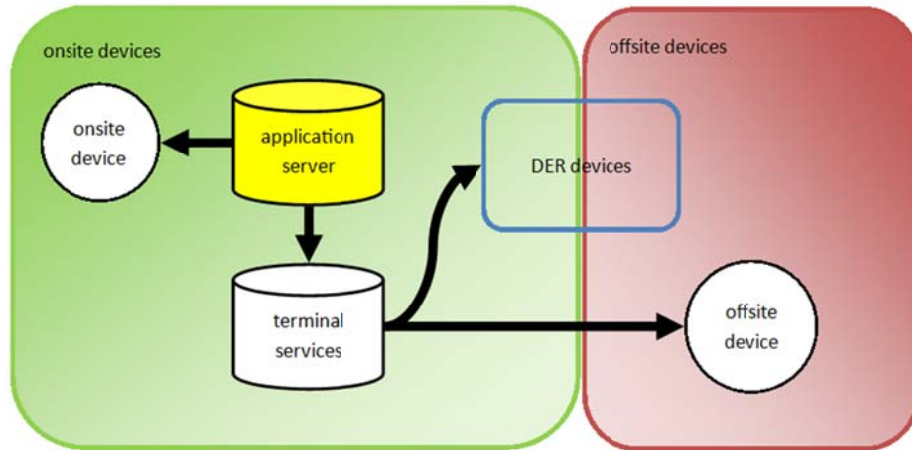
Figure 2

A web-based data management alternative could be implemented with the web-based application server located onsite or facilitated offsite. See Figure 3 and Figure 4.
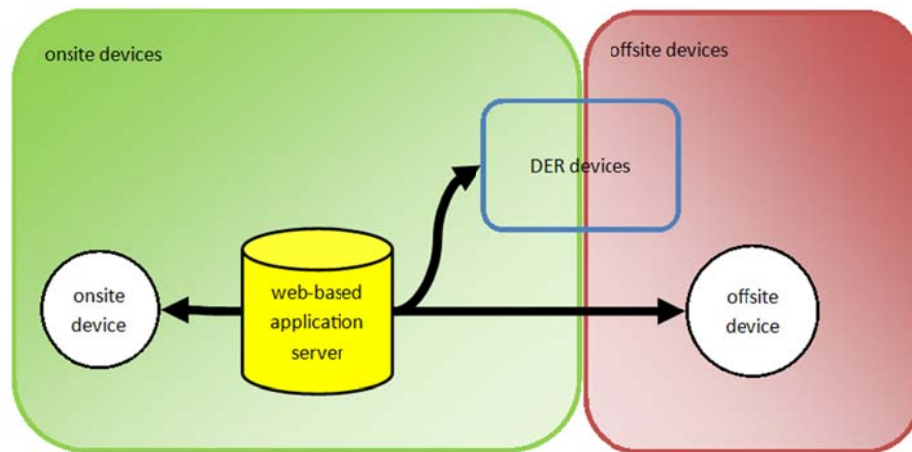

Figure 3

Figure 3 outlines the use of an onsite web-based application server. All devices can equally access the web-based applications via web-based technology such as a web-browser, and manage data via web-based forms. Credentialed accounts to different communities of users may allow staff, students, and parents, to access and manage the data.
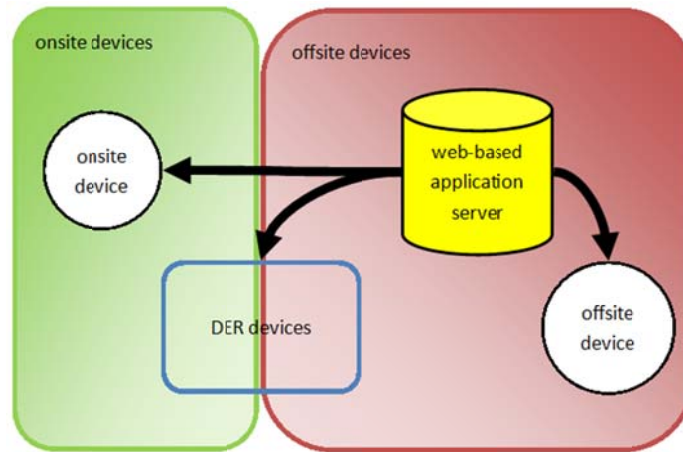
Figure 4

Figure 4 demonstrates the use of an offsite web-based application server. Similar in function to the onsite server solution, this model may be possible through an application service provider, where technical infrastructure and data backup are out-sourced from either the Corporate environment or from a commercial vendor. However, the transfer of DET data to an offsite server may present issues, and my cause difficulties when attempting to create secure web-access.

Advantage: Corporate Solutions

Any systems developed as corporate solutions would be sanctioned and supported on all DET sites. Thus training, support, and maintenance would be unified throughout the corporate environment.

Advantage: Knowledge and Training Legacy

Expertise gained via a corporate-sponsored or commercially-developed web-based approach should provide onsite application managers with skills and understanding which can be utilised in similar DET environments.

Additionally, staff transferring onto the site would benefit if they had previous knowledge of or are familiar with, data management systems used onsite.

Consideration: Ownership and Management

All data generated by any new system must remain the property of the site and of DET. This data should be stored and accessed in a transportable format, so that it can be retrieved and implemented into any other future system if so desired.
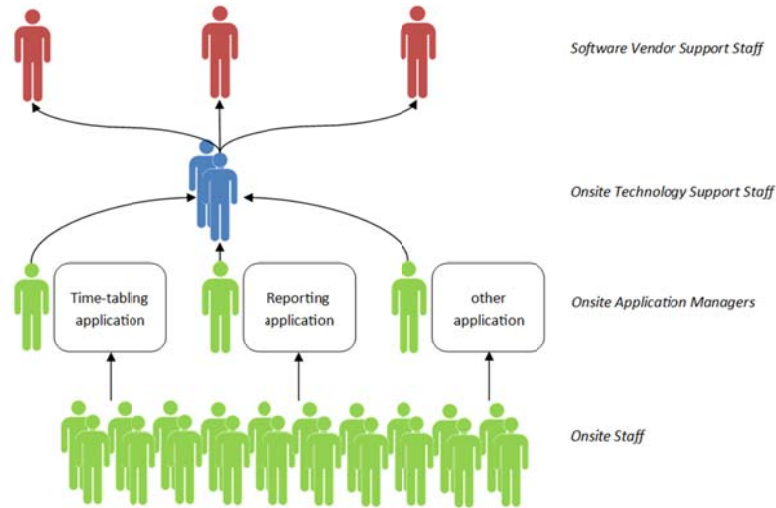

Figure 5

Figure 5 outlines the current management structure for application software. Onsite application managers prepare data for use by onsite staff. Technical issues are often referred to the onsite technology support staff, which may then be escalated up to the various vendors.
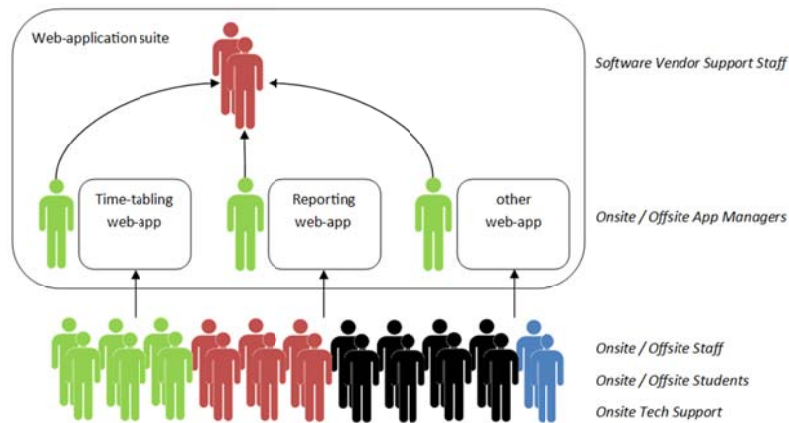
Figure 6

Figure 6 outlines how a comprehensive and integrated web-application suite could be used by all onsite and offsite staff and students to access and manage data. With an integrated web-based solution all application managers could directly discuss data collection, processing, reporting, and management issues with a single vendor. Technology support staff would be only required to tend to onsite hardware and ensure web-browser technology is functional for each onsite client-side machine.

Components of any new system should be facilitated by executive and/or delegated staff as application managers, with technical support provided by the vendor (possibly via a nominated onsite coordinator).

For example, one staff member may be delegated the role of application manager and coordinator of the reporting component of the system. Another delegate may be assigned the task of application management of the time-tabling component. An onsite suite manager may act to coordinate contact with the vendor to resolve any technical issues, or application managers may directly seek support from the vendor via the application suite.

Consideration: Corporate Situating – Community of Secondary Schools

As the site is a member of a Community of Secondary Schools it is appropriate to consider the impact the introduction of a web-based data management system may have on Community administrative and teaching staff.

How such a system could be used to enhance the delivery of course content and management of course data across all Community sites should also be considered. Potentially, all Community teaching staff could manage data of any course, from any site.

Consideration: Data Legacy

When selecting a possible web-based solution, the data format used to collect and store data needs be considered. The data should be in a web-standard format (i.e. non-proprietary) to allow standardised methods of backup, archiving, and retrieval, and to enable easy transfer to any other future system (e.g. in the event of service provider or vendor ceasing operation).

Disadvantage: User Training

Dedicated initial training and ongoing support will be required to introduce all administrative and teaching staff to any new web-based applications.

This will require training resources for application managers, site leaders, teaching staff, administrative staff, and potentially for students and parents.

Disadvantage: Participant Affects

As with the introduction of any new management scheme, staff would be required to learn and operate unfamiliar systems. Training during the implementation phase should be followed by ongoing support.

Staff nearing end-of-career may find it difficult and unnecessary to expend time and resources on learning new systems.

Early career teachers and new site staff would be required to learn a new system in any case, but may benefit from and more readily understand the concepts of a system which is online and integrated.

Economic Feasibility

This section will present a cost/benefit analysis of implementing web-based data management systems through-out the site.

Advantage: License Efficiency

License fees would be easier to track and manage if sourced from a single web-based solution provider.

Advantage: Reduced Cost of Integrated System

Currently the site outlays the following annual fees:

Vendor	Software Title	Annual Fee (ex GST)
AMIG Systems	TimeChart/Extra	$685.00[1]
AusMade Software	SAMS	$682.00
ClickView[2]	Secondary library	$2974.95
	Discovery library	$573.30
	4-Learning library	$347.90
GPTech Solutions	Sentral Moodle	$1000.00
Marillion Designs	RISC	$120.00
Quarx (ARC)	ReportCard/EAS	$666.55
	Maintenance	$334.54
	Support	$670.00
Total		$8654.24[3]

ClickView accounts for $3896.15 of the annual expense. When excluded, the annual license fee for the remaining data management systems is $4758.09.

As an example of a web-based data management systems, Sentral, hosted by GPTech Solutions, could manage the attendance, welfare, time-tabling, and reporting functions as a web-based solution for an initial setup fee of $11,000, and annual license of $2850.

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[1] TimeChart software upgrades occur every few years at ~$2950.00
[2] The sites use of ClickView will be discontinued in 2012. Possible options for video resource replacement are http://www.youtube.com, and curation sites such as http://topdocumentaryfilms.com
[3] Includes $600 as annual component for TimeChart version upgrade

Consideration: Corporate Solutions

Corporate developed solutions would be sanctioned and supported by DET, and could possibly be provided without cost, or at subsidised cost. For example, the School Website Service developed for DET has an annual fee of $400, much less than a commercial provider, and more coherent and developer-friendly than a home-grown solution.

No information has been released recently regarding corporate web-based data management solutions.

Disadvantage: Human Resource Commitment

Time will need to be allocated to enable coordinating staff to investigate, recommend, and implement web-based alternatives.

Time will also be required to assist all users and participants during the initial training phase, and ongoing support is recommended for teaching and administrative staff.

Technical Feasibility

This section will consider the expertise and technology required to implement and utilise a web-based data management system.

Advantage: License Efficiency

Currently onsite technicians are required to annually collect, validate, and incorporate a variety of registration numbers and software updates from various vendors.

The use of a single vendor to provide an integrated web-based system with a single annual license fee would reduce the workload of technical personnel.

Advantage: Reduced Hardware and Software Deployment Requirements

Dedicated hardware is currently required to deploy and implement onsite application software for data management. As new versions and updates are made available from each software vendor, Technology Support Staff are required to redeploy these to all onsite devices.

Web-based solutions would require a dedicated web-application server, but client-side devices would not require updating, as all client-side data management would be processed via standard web-technology. Any web-browser updates are deployed by DET ICT via the onsite CPC server.

Advantage: User Training

An integrated web-based data management system would require all users (staff and student) to have a basic knowledge of web-browsers and web-based form transactions. However, staff would no longer be required to learn and support a variety of different systems from a variety of different vendors.

Advantage: Web / Data Standards and Data Legacy

Data that is processed and stored according to web standards should be accessible in the future independently of the vendor or other proprietary mechanisms.

Any adopted solution should comply with W3C standards for both transmission and display (e.g. TCP/IP, TLS/SSL, and HTML/CSS), and data processing and storage (e.g. PHP/MySQL). By using standardised mechanisms all stored data can be retrieved using any web-standard system if the vendor or service provider should cease operation.

Consideration: Corporate Situating – Regional IT compliance

In the future, the site may choose, or be mandated, to conform with the Regional IT model, which may require all onsite devices to be returned to the corporate standard domain environment. Additional software applications are not currently part of the corporate environment, as DET does not have a corporate license for such software.

In this case, an integrated web-based solution would allow for the continued use of web-application software on all onsite devices.

Consideration: Security

As wireless technology is used extensively throughout the site, by both staff and students, web-security and data integrity is an important consideration in the prevention of data hijacking, data theft, or man-in-the-middle attacks.

Transport-Layer-Security (TLS) technology should be implemented as part of any web-based solution, to maintain data integrity during web-based form transactions. This would require the use of a TLS certificate, which could be self-signed by the site, or provided by the vendor from a Certificate-Authority. Verified certificates could only be used by a hosted environment outside of the Corporate network infrastructure, as a Certificate Authority could not verify the authenticity of a server within the network.

The benefit of an externally hosted TLS certificate is that all devices, including onsite, DER, and offsite computers, could securely connect to and transmit data to the offsite web-based application server.

Disadvantage: Legacy Data

Data archived by current proprietary systems may not be directly retrievable via any new system. Thus welfare management software such as RISC may be required for the legally mandated term, in order to access past records.

Alternatively, home-grown processes may be developed to extract archived data from the proprietary system for inclusion in a web-based data management solution. Thus archived data could be accessed and managed within the new system without reliance on and license to the current software vendor.

Disadvantage: Human Resources for Implementation and Support

Implementation of any new system will require a setup and testing phase, and technical support for the delegated application managers of the system, as well as participants and users.

Possible Alternatives

Home-Grown

It is possible for a home-grown customised integrated web-based data management solution to be designed and implemented using currently available hardware and software. This would cost staffing time during both design and development, and consultation with managers and users.

This alternative is not recommended as it would be dependent on a single small group of developers providing ongoing maintenance and support. The final system may not be standards-compliant, and would not be familiar to new staff joining the site. A support succession system may be difficult to implement.

Commercial

The following alternatives have not been thoroughly investigated, and may not meet all the needs of the site, or of web-based data management. The outlines listed below are taken directly from websites of a number of possible vendors.

1. Academy

Staff have LIVE attendance history at their finger tips!

- Improve Student Behaviour & Reduce Truancy
- Period by Period Student Attendance Tracking System
- Reduce Paperwork & Increase Efficiency
- Save Time and Money
- Easy to use for Staff and Students
- Have the morning rolls marked and processed before 9am!

http://www.academyattendance.com.au

2. First Class

Feature-rich "what to do next" functionality that will help you take full control of the student attendance and welfare process with confidence. Packed with powerful and comprehensive reports, the system will help you identify and analyse the areas of risk in your school.

http://www.humanedge.biz

3. Millennium

Students and Parents login daily to access:

- Student Timetable
- Student Classes & Teacher
- Online Lessons
- Assessment Marks linked to related Resources
- Semester Reports
- Welfare & Achievement Summary
- Attendance Summary

http://www.millenniumschools.com.au

4. Sentral

Sentral is a combined operating system and software suite for running web-based applications, designed specifically with the needs of educators and students in mind. Its low administration overhead, facilitated by automatic updating and remote monitoring, means more time can be spent educating instead of administering and upgrading software.

http://www.gptech.com.au/products/overview

Corporate

Corporate released the School Website Service to enable schools to manage their own website content and automatically incorporate DET content. Similarly developed systems endorsed and supported by DET would be a viable option.

Corporate has not recently released information regarding the development of web-based data management systems.

Schedule

Investigate alternatives (approximately 10 weeks)

Investigation should be based on knowledge and experience of other DET institutions. These may include investigation of:

- Home-grown solutions (not recommended due to lack of long-term support)
- Corporate solutions (recommended if available)
- Commercial solutions

All possible solutions and recommendations must consider and acknowledge the future-directions at School Education Area, Regional, and Corporate levels.

Implementation (approximately 10 weeks)

Depending on the nature of any approved alternatives, implementation may require additional hardware and software. Remote administration is possible from some vendors.

Testing of alternatives and debugging site-specific issues may take several weeks.

User Training (approximately 10 weeks + ongoing)

Administrative and teaching staff would require transitional training to become familiar with an integrated web-based solution, and to modify application settings to meet the site curriculum and clientele specifications.

Glossary

Application manager	A delegated staff member who is authorised to modify settings and update data within a specific web-based application. For example: the current site TimeChart coordinator, or ReportCard manager.
Data legacy	The methodology of ensuring that newly generated data is stored in a standard and open framework such that is can be retrieved at any future time without relying on proprietary systems. For example: operating systems and commercial products.
Device	Any computing technology which can be used to process and display web technology based data. For example: desktop, laptop, mobile device.
Legacy data	Data which has been stored in an old or obsolete format, and which may be difficult to retrieve or display
Participant	A person who uses web-based technology to process and manage data. For example: administrative staff and teaching staff.
Transport-Layer-Secure (TLS)	a web-standard cryptographic protocol that provide communication security over the Internet. Used for the transfer of sensitive data by financial institutions and government agencies.
User	A person who interacts with web-based technology to display data. For example: local community or parent of a student.
Web-app	An application that can be accessed over a network such as the Internet. A software application that is hosted in a browser-controlled environment.
Web-based data management	A data processing system hosted as a web-application server that enables access and management of data using web-based technology over a network such as the Internet.