Guideline to Evaluating
Web-Based Documentation and
Information Management Systems

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Web-based systems for handling all types of business matters are becoming more and more pervasive these days. For engineering companies, there are many different systems available for managing documentation and information. What differentiates the Online-Projects system from others is the way in which documentation and information are organized and the ease and intuitiveness with which one accesses this information.

Because there are so many systems, each with its many features, advantages, and disadvantages, trying to evaluate them can become a major undertaking. All systems have a single purpose, however, and that, simply stated, is to have a place to store information and a means to retrieve it when needed … quickly. The following guideline is designed to assist those who are evaluating such systems to understand their options.

1. Summary

In the following pages, I outline the fundamental issues that I believe should be considered when evaluating your options with regard to web-based document and information management systems. I look at integrated systems with their built-in applications and the ability to automatically link data in one activity or business area with another. I compare them to less complex repositories which act as storage banks for information. I then go on to explore in detail the major issues confronting the decision maker when trying to compare different systems.

The approach involves first deciding what it is you want to do with a documentation and information management system, and then assessing how each system stacks up on the most important issues. To be most effective a documentation and information management system will be intuitive and easy to use, take a minimal effort to manage, offer exemplary service and support, require little training, offer the utmost in security, be extremely reliable, have no restrictions on its use, include all necessary features for rapid and effective communication, collaboration and control, offer the ability to add and customize features to meet the customers needs, provide continual maintenance and software upgrades at no cost, and be scalable to meet the growing needs of the customer.

The Online-Projects system meets these criteria in every respect. The system tries to achieve a balance between essential and auxiliary features, and automated and manual procedures, with an emphasis on the "essentials" and ease of use. The Online-Projects system is considered a repository for documentation and information. Its primary function is to handle engineering documents; however, because it is a database driven system, there are endless possibilities for expansion into other areas.

In deciding which way you want to go - integrated system or repository - you must question whether your in-house applications are satisfactory to accomplish your business tasks, and if not, whether you want to develop the needed applications in-house or obtain them through investment in an integrated system. If you opt for the in-house approach, most applications can be included in the Online-Projects system with little or no investment.

2. What Do You Want to Do and Why

Before beginning the evaluation process, it is most important to decide just what it is that you are trying to do. In engineering terms that is analogous to defining your scope and objectives before beginning the design process. It's also like buying a digital camera for the first time. You can spend $50, $500, or $5000 on a camera, depending on its features. You must decide how you intend to use the camera and which features you need before buying it; otherwise you may be wasting your money. All of the cameras take good pictures.

As an engineering company, your business is most likely segregated into the following three areas of operation, the majority of your effort being applied to the engineering area.

- Administration: Timekeeping, payroll, invoicing, accounting, taxes, personnel and human resources, office and building management, contracts, litigation, patents, insurance, health and safety, community involvement.

- Engineering: Design, consulting, project management, scheduling, document control.

- Business Development: Marketing, business proposals.

Documentation and information management systems can assist you in your business activities in various ways. They can create and link documentation and information through built-in applications, or they can act simply as repositories for the storage and retrieval of information. A system that functions as a repository can also be used to control and monitor business operations.

In answering the question, "What do you want to do and why", you must first decide whether you need a software supplier's built-in applications to perform your daily operations, or whether your current in-house methods and applications are adequate. If your current in-house methods and applications are adequate, you must then decide how important it is to automate the process of linking data from one area of operation or activity to another. Systems that automate this process are commonly referred to as integrated systems.

If your in-house methods and applications satisfactorily handle your individual engineering, administrative and business development tasks, you probably do not need an integrated system of documentation and information management. The integration process, if needed, can usually be carried out manually. Only if the manual integration process requires a significant percentage of your staff's time relative to other business activities, should consideration be given to automating that process with an integrated system. Otherwise you are likely to be making ineffective use of your resources.

If your in-house methods and applications for handling your business functions are incomplete or inadequate, you probably have two choices. You could consider investing in or developing additional in-house tools to correct the deficiency, or go with an integrated system with the applications you require built in. If developing the in-house tools is a possibility, consideration can be given to incorporating them into the Online-Projects system.

Integrated systems will include many built-in applications for handling numerous operational tasks. They have an advantage, in theory, that once you enter data for one area of operation or activity, it is linked through a common database to the other areas and activities. With an integrated system, for instance, progress on engineering tasks could be linked to timekeeping, payroll, invoicing, and accounting through the engineering work breakdown structure. Or, revising the schedule on a given

project could automatically flag changes to the resource requirements on other projects. As a further example, work flow on engineering drawings can be tied to the project schedule to show progress.

Integrated systems can do much more, often including a multitude of built-in applications to handle every facet of your business, e.g. engineering, cost control, financial and accounting, procurement, materials and expediting, QAQC, documentation, and project management functions. These modules may include such features as weight and equipment controllers; cost and schedule controllers; timekeeping and expense systems; purchasing, logistics, and inventory controllers; automated document management, content querying, workflow management, and document distribution systems; lifecycle management systems; printing, publishing and digital security systems; change and risk management controllers; engineering standards administrators and quality surveillance systems; and special customization tools. The list goes on and on.

So you must ask yourself, "Do we really need any of this stuff and why?" The answer to the first part of the question is likely to be "We need some of it". The answer to the second part should be "Because it's essential for running our business". For the applications that you need, you should evaluate whether your current in-house version is satisfactory. And if you don't happen to have an in-house version, you may wish to reconsider the requirement because you are likely not to need the application in the first place.

A serious drawback to integrated systems is that their myriad of built-in applications may not perform as well, or in the same manner, as your in-house, stand-alone versions. Additional downsides include a very steep learning curve, the very significant expense, the need to convert from existing to new applications, and the extraordinary effort required to review and act upon all of the data that these systems generate. And don't forget, even with all of the automated applications, someone must still input the volumes of data.

Repositories are much simpler and considerably more cost effective. They take the information you generate using your in-house methods and applications and store it for instant retrieval in a variety of formats. It's the same information generated by the integrated systems, but now you have control over how you use it. You may use it to communicate and collaborate, track and monitor, and review and approve. The flexibility that you have in using this information allows you to manage your projects much more effectively, resulting in greatly increased productivity.

Whether it's integrated systems or repositories there are still a few other questions that should be answered in order to narrow down your wish list of things you want to do. These include:

- What type of documentation and information are you primarily creating and trying to access? Administrative, engineering, business development, or all of the above.

- Do you insist on maintaining centralized control over content, or will you consider the advantages of allowing more decentralized control.

- How much automation do you really need? Do you prefer that system operations are automated (i.e. fixed format input) or are you willing to let individual users decide options and formats?

- Do you want outside clients and third-parties to have access to the system or should it be accessible mainly to internal company personnel? If outsiders are to have access, you must account for the fact that they will require training on the use of the system.

- How many users, including outside clients and third-parties, do you expect will use the system.

- What features and capabilities would you like the system to include? There are many to choose from. Not all are useful.

The following may have an impact on the organizational structure of a selected system.

- What is the typical size of your projects? $5k to $100k, $100k to $500k, $500k to $1000, greater than $1000k.

- What is the maximum size of project you expect to undertake and how many per year?

- How many projects do expect to undertake during a year?

- How many documents do you expect are generated in your typical project? Less than 100, 100 to 1000, greater than 1000.

- How many documents do you expect are generated in your maximum size projects? Less than 1000, 1000 to 10000, greater that 10000.

Once you know what you want to do, you will have the criteria on which to base your evaluation and the following issues may then be addressed.

3. **Ease of Use and Document Access**

A very important issue for a critical evaluation is ease of use. Simply stated, if the system is difficult to use, it won't be. Some systems try, under the pretense of simplification, to automate nearly all functions. Automation may seem a good idea, but it is a two-edged sword. A highly automated system is actually less flexible, not more. The more flexibility that is built into an automated system, the more complex and difficult to use it becomes. The converse is true. The less automation, the more flexible and less complex the system becomes. An intuitive, easy-to-use system will have a proper balance of automated and manual features, applying automation only to those features that are true time savers. Flexibility and ease of use will be maintained with manual functions so as not to tie a user's hands to a particular method of operation.

The Online-Projects document transmittal system is a good example of an automated function that is easy to use. The automated process of preparing, sending, distributing, notifying and acknowledging the receipt for, forwarding, filing, and tracking document transmittals cuts what is usually a one-hour operation down to about three minutes. Manual operations that are essential for describing what is being transmitted are maintained; however, a semi-automated procedure that allows the user to predefine, in accordance with their personal preferences, much of the information required for each transmittal is also available.

The important thing to remember about any documentation system is that it must be well organized and intuitive and provide quick and easy access to the documentation. Quick and easy document access is essential to most users who otherwise are likely to avoid using the system. The Online-Projects Quick Search feature is a good example of how to simplify, as well as speed up, the document access procedure. Directly from the Home page, even a novice user can normally find any document of interest within seconds.

The Online-Projects system emphasizes simplicity and ease of use.

4. Site Management

When deciding on a documentation and information management system, a thorough evaluation will consider the question, "Who takes care of the system?" Most systems require an experienced site master, or perhaps the IT department, to keep the site well organized and free of trash documents, and to make corrections and edit site content as needed. The Online-Projects system requires no special person to do anything. The site is designed as a decentralized tool that allows anyone, with proper permissions, to add, update or delete site content. We recommend that at least one person be knowledgeable in operation of the system, but it is not essential to assign dedicated personnel to the site. Means are built into the system to allow monitoring of activities, primarily to assist in understanding what a user may have inadvertently done or to aid in trouble shooting.

5. Service and Support

A through evaluation is not complete without looking at service and support. With any system help and support are essential. A slow response from the help desk can easily cause project delays resulting in unnecessary costs, whereas a rapid response can be a true money saver. The ability of a company to provide the help you need, when you need it, is certainly worth high marks. Online-Projects prides itself on being able to respond to any situation usually within minutes, not days, of a request for help. And, of course, service and support is included with no extra charge.

Besides providing unparalleled service and support, we listen to our users. Eliciting your opinions is essential for maintaining our system's relevance. Even if we don't follow through on every suggestion or criticism, we believe it's important to show you that we care about what you think. After all, the site exists to serve you.

6. Training

A system is useless if the people who are to use it do not know how. No system, halfway capable of doing the job, can be operated out of the box without some training. Most software suppliers often recommend days of formal training to learn how to operate only a small portion of their systems. To make matters worse, even after considerable training, many users can be expected to forget how to operate the system if they do not use it frequently enough. Training on most systems is a massive expense, frequently not accounted for, and unfortunately often wasted because users cannot retain the knowledge they learned.

The Online-Projects system also requires training. The difference is that training for the Online-Projects system should probably be termed "orientation". All that is required is a few hours instruction after which a newly instructed user will not only be capable of easily using the system but will be able to instruct others to do so as well. Furthermore, once learned, the Online-Projects system is not likely to be forgotten.

7. Security, Site Permissions, and Document Access

To be considered worthwhile any system of documentation and information management must also be secure. This is an important consideration in any evaluation. I have technical data available describing the security provisions in use and available on the Online-Projects system. Suffice to say that system security for the server is one of the best in the country. I can provide any level of security you desire if you simply state your requirements. In other words, the Online-Projects security system is customizable up to and including the mission critical level.

Control of site access is also very important, but should not be so complex as to create incentives to ignore access procedures. I believe the Online-Projects access procedures are not only very tight but also straightforward and easy to implement. Access is controlled by user type, permission level, username, and user password. To gain access to the site an automated procedure permits new users to request site access online. Evaluation of requests is done manually, but notification of user access privileges is again automated. User privileges are granted first by type, i.e. Employee, Client, or Third-Party, and then by permission level. There may be different levels within a user type. For example, Administrator and Manager are two permission levels within the Employee type. Users are assigned usernames and passwords which permit them access to the site itself. User types and permission levels are then used as the primary means of controlling access to site content.

Additional levels of protection are also provided for documentation. Individual documents may be locked (made inaccessible) to certain types or levels of users, or they may be classified. Classified documents may be accessed only by personnel with the appropriate user classification.

As with hardware security, site and document access procedures are fully customizable, a service not normally included with competing systems.

8. Reliability and Operations

When considering the pros and cons of a documentation and information management system, one should always take into account the reliability and operability of the system. That is, does it work as it should; is the system available and online most of the time; are the connection speeds adequate; and is there sufficient backup in an emergency.

Except for connection speed, I have no experience with the reliability and operability of other systems. What I know for fact is that the Online-Projects system has never been down. It has operated 24/7 for more than a year on a major project without a single incident. Except for scheduled maintenance, the host server has never been down, even for a minute, in the past five years. During maintenance there was never an impact on our web sites. 100% uptime!

The backup system is straight forward. Daily backups are stored offsite and become, for the documents at least, a redundant backup system to your own. And finally, there is connection speed. All I can say about this is that the Online-Projects system is the fastest of any system I've ever seen.

9. Cost and User Limitations

Is cost a concern? Well, it can be if it is significant. Many suppliers will attempt to show you a certain return on investment (ROI) to justify the cost of their systems. They will show annual returns of 50%, 100% or even higher. This probably means they are pocketing much of the cost to fund their operations.

Most ROI calculations include, or at least should include, not only the capital investment of the software and system licenses, but also the cost of maintenance, software upgrades, your IT department involvement, hardware, training, and other associated costs. I do not know what the ROI will be for the Online-Projects system. What I know is that the cost is extremely affordable and for what you are getting will probably lie within 1/5th to 1/50th of the cost of competing systems. With the Online-Projects system, you do not need to budget for maintenance, upgrades, the IT department, additional hardware, or any other associated costs except for training. And as mentioned above, training should be minimal, amounting to 1 to 2 hours for most personnel, and 4 to 5 hours for those that may be more heavily involved.

Our estimated cost savings come in the form of increased productivity. For instance, I can show you how to save an hour in preparing and sending a document transmittal, and if you have 300 transmittals on a project, then that results in a $25,000 savings. And this does not include the additional benefits resulting from time saved by being able to find that transmittal when you want it! This is only one example. There are many others which lead me to believe that an ROI of 1,000% is not unreasonable.

Regarding user limitations: There are no limits on storage, access, or number of users. Most software suppliers can not and will not say that.

10. **Features, Capabilities, and User Interface**

As a counterpart to the issue "Ease of Use and Document Access", the features, capabilities, and look and feel of the site are also very important considerations in any evaluation. System features and capabilities must match as closely as possible the wish list developed above in the section, "What Do You Want to Do and Why". The user interface must be simple, unencumbered, and intuitive and should include a navigation system that enables users to find information quickly and directly.

Help screens to assist in using the site should be short, to the point, and available without having to search through indices or tables of contents using keywords. This is a tremendous time saver for it alleviates the need for personal instruction and minimizes the amount of misuse that can occur on these sites.

The Online-Projects system contains various features that assist in communicating with project team members, clients and third-parties. These features are used to convey information about or collaborate on different types of documents. To do this we make use of opinion polls, the user forum, an action list, and RFI forums. We create engineering tasks and expenditure reports with which we track progress on engineering projects. We have a document transmittal system and a system for transferring custody of document files. There is the system for intuitively editing all types of content on the web site – from the initial project setup to handling user requests for access to updating project data to troubleshooting. Auxiliary features of the site include the project news column, the site notification log, the project calendar page, and the extremely versatile quick search capability. For a more in-depth understanding of Online-Projects' features and capabilities, please consult the "Web Site Overview" accessed from the link on the Home page of the Online-Projects demo site.

Of course a primary requirement of any documentation system should be to handle all types of documentation. However, to maximize intuitive use, the system should do so without the user having to define, understand, remember, or refer to file directory trees or folder structures. Documentation on the Online-Projects system is organized by type and includes project deliverables, non-deliverables, and non-project-specific documents. These documents are usually typified as correspondence, email, drawings, specifications, reports, photos, and the like. As one of the manual procedures of the site, the user is able to define at any time the types of documents he wants the system to refer to.

Acceptable document file formats should be of any type, and on most systems include: pdf, dwg, doc, txt, zip, xls, ppt, mpp, etc. The issue here, however, is not how many file types can be handled, but whether users are able to open and read the files. Since nearly all users can open Adobe Acrobat pdf files, Acrobat is the Online-Projects file type of choice. There are other significant advantages to using the pdf file format, and these include the ability to make online annotations on documents and digitally sign and authenticate them. The digital signature feature adds a verifiable measure of authenticity to documents when required, whereas the annotation feature allows multiple users to

simultaneously collaborate on a single document while in different geographical locations. The annotation capability is a powerful feature indeed. Most software suppliers do not have the capability to handle Acrobat annotations, and therefore must resort to building proprietary collaboration capabilities; however, Acrobat annotation is enabled on the Online-Projects system. This is accomplished through WebDav (Web-based Distributing, Authoring, and Versioning), a protocol built into the Apache web server which operates the web site. More information on the techniques of Acrobat annotations can be found at the Acrobat link http://www.adobe.com/epaper/tips/acrannotate/main.html

11. Customization and Enhancements

There is a distinct advantage to dealing with companies who will customize and enhance their software. Most software suppliers will not customize established systems for a customer. They cannot because of the complexity of the software code and the time and expense involved. If a customer desires a custom application, they will generally have to pay for a one-off system. Enhancing the capabilities of any system will generally be at the discretion of the software supplier and will normally not take into consideration the needs of particular customers.

With Online-Projects, we can and will customize any part of the system upon request; and usually for no charge. The only catch is that the modifications must be in keeping with our overall objectives and philosophy toward the operation of the site. Simply stated, if you can define your requirements, we can build it into the system.

Currently there are plans in the making for such interesting enhancements as a user defined and searchable help screen; a three-level hierarchical knowledgebase; the automated setup of dedicated project sites; the utilization of the database in engineering tasks such as weight control and equipment cataloging; and the provision of graphical displays of data.

12. Maintenance and Upgrades

The cost of system maintenance and software upgrades should be included in any thorough evaluation. Some software suppliers require users to sign maintenance and upgrade contracts in order to benefit from these services. Online-Projects provides continual maintenance and periodic upgrades at no charge.

13. Scalability

System performance can be affected by the number of users, the amount of data being transferred, the size and speed of the database, and storage requirements. As the number of projects and system usage increase, the ability to accommodate the increases must be considered.

In Online-Projects' case, scalability should not a problem. The system's database can handle millions of records, whereas even for the largest of projects, most database tables will not see records exceeding tens of thousands. If there are many documents to be stored, then data storage may be of concern. One multi-million dollar project that we have hosted over the past year has utilized less than 5% of the 80 GB of RAM currently available. Larger projects may require additional storage devices, however. We have the ability to increase storage as needed up to a maximum of 50 TB.

14. The Company

To some customers the size of a company offering its services is a concern, and many times it is a very valid concern. This is especially the case when the services being offered depend heavily on the

rapid response of company personnel. If this is not the case, however, than size should be less of a concern.

In evaluating the importance of company size, you should consider the consequences and risk of the company you're doing business with going out of business. With the Online-Projects system, the consequences might be less than you would think. Look at the worst case scenario: I die suddenly, leaving you without support. In that case you still have three options:

1. Continue as is, uninterrupted but without technical support. (The system doesn't break, only I go away.)

2. Discontinue our agreement.

3. Take over the operation and maintenance of the system.

The consequences of option 2 are most dire, but in fact you will not lose any data (that which is important remains on your network) and you will only need to find a replacement system. The consequences of Option 3 require some input on your part, but you most likely have, or can easily acquire, the expertise and personnel to undertake the task.

When looking at risk, you are probably in a better position than I to evaluate that statistic, but considering what has happened lately with many software companies, I would argue that the odds of me going under are less than that for a large software company. The above notwithstanding, consideration might well be given to taking over the operation in any event after a short but planned period of enhancement and learning. I would be pleased to discuss this option, or answer any questions anyone may have on the Online-Projects system or its operation, at your convenience. I may be contacted at the numbers below.

I hope this guideline proves useful in your quest to find a documentation and information management system that best meets the needs of your company.

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