

# **Web Site Design: Best Practices for Managing a Web Site**

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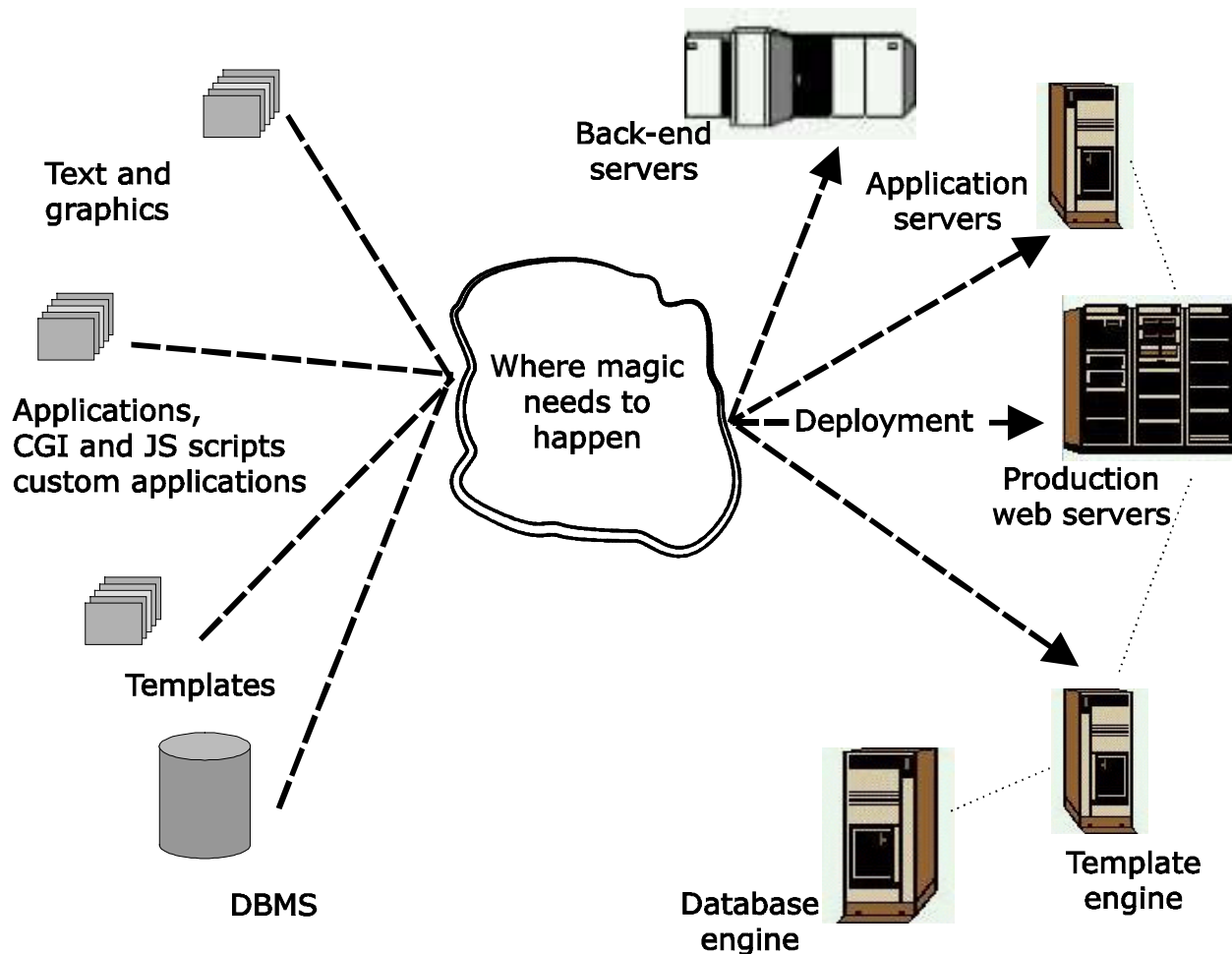
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**Note:** This paper is based on lengthy discussions with Peng Ong, Founder and Chairman of Interwoven, Inc. (<http://www.interwoven.com>) and a paper on best practices for web site management that I jointly developed with him.

### In the beginning ....

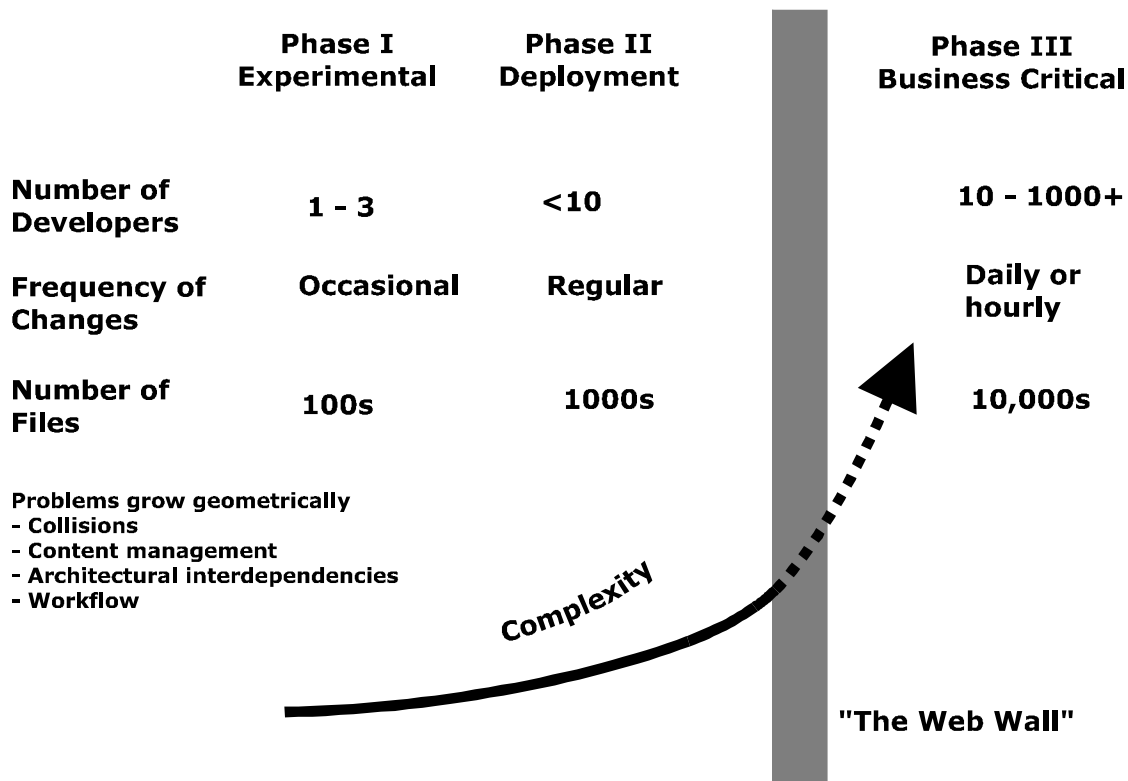
- ◆ February 1999 - **www.etrade.com** ... website goes down, twice
- ◆ November 1998 - **stats.bls.gov** ... October's job statistics data are posted one full day ahead of schedule
- ◆ November 1998 - **www.abcnews.com** ... False election results inadvertently posted
- ◆ June 1998 - **www.ap.org** ... Associated Press accidentally runs Bob Hope's obituary
- ◆ February 1998 - **www.msnbc.com** ... MSNBC announces Frank Sinatra's death, three months before he really died
- ◆ 1997 - **www.berkshirehathaway.com** ... Warren Buffet's annual shareholders' letter shows up a day early



Avoiding disasters such as these is a matter of developing best practices for managing your enterprise's web site. In this article, we will describe the pitfalls facing enterprise web managers when their site becomes large enough to have more than a few content contributors and developers.

### How things are in many places

A typical enterprise web operation is shown on the previous page. In this schematic, the various content contributions are shown on the left and the various servers are shown on the right. We will address what happens in the middle where enormous opportunities for undesirable events exist and where all of the disasters mentioned at the beginning of this paper were caused. Often those outside of the enterprise web production process view this as a magical process. But, those involved realize a significant amount of work is required to cause the magic to happen.



All enterprises with a significant web presence will eventually hit the web wall. As an enterprise decides that it will investigate creating a web site, a very small number of people are typically charged with the task of developing the content, setting up the software, and, in general, keeping things up-to-date. Changes to the site at this stage are very infrequent. Management typically regards this as an experiment and does not consider the problems that may arise as the site grows. When the site is deployed, more

and more people begin developing content to the point where regular updates to the site become necessary. At this point hundreds of files may be deployed.

Hitting the web wall happens when collisions between content developers, managing the deployment of content, and managing architectural interdependencies and workflow has become such a problem that best practices must be developed. Best practices ensure that the return on the website investment is positive and that it presents the enterprise's best face to the world.

To arrive at these best practices involves understanding the production and development challenges of enterprise web production as well as the stages an enterprise goes through to arrive at its own set of best practices.

## **The Challenges of Web Development**

Seven changes challenge enterprise web production:

1. Moving from tens to hundreds of contributors
2. Changing to diverse skill sets of contributors
3. Frequently changing the site content
4. Short to very short production cycles
5. Using multiple kinds of files (text, graphics, scripts, programs, and multimedia are some)
6. Different kinds of tools used to create and deliver content
7. Increasingly large numbers of files, often as many as tens of thousands

Each of these means that, as websites evolve, they have new requirements and more features. They feel competitive pressures from the outside and new business initiatives from inside the company. To understand these complex interrelationships requires an understanding of the five evolutionary stages of web development so that the enterprise can avoid hitting the web wall.

### **Stage I - The Direct Edit Environment**

This very first stage is usually characterized by editing files directly on the production web server. Neither quality assurance nor versioning occurs so that no way exists to return to a previous edition of the site in the event that a significant problem is found within the site. This kind of environment may be suitable for one or two developers, but it is certainly for an enterprise to bet the company's business.

### **Stage II - The Stage and Deploy Environment**

In this model of web production environments, at least two systems are involved. The first is a development environment where all files are "staged" before they are deployed. Unfortunately, in this environment, one content developer's changes frequently overwrite another's changes so that, again, incorrect pages can be deployed. This environment requires a manual deployment, that is, an analyst must FTP or copy the pages to the production system. This obviously also has the same problem as a Stage I environment that previous versions are overwritten so there is no way to recover to a previous state of the web site. Because there is no way to fall back to an earlier version of the site, it is VERY important to back up the website frequently.

### **Stage III - The Private Copies Environment**

This middle stage of enterprise web production results in each developer's having a private copy of the pages necessary to change his or her portion of the enterprise web site. These files are edited as necessary. Then, manual updates and resolution of changes among several developers are required. This obviously can be extremely error-prone and time-consuming as so many steps are required to put the revised pages out to the production web site. Perhaps, as many as ten developers can manage to work effectively in this kind of environment; but, more than that will nearly always result in disaster.

### **Stage IV - The Basic Enterprise Web Environment**

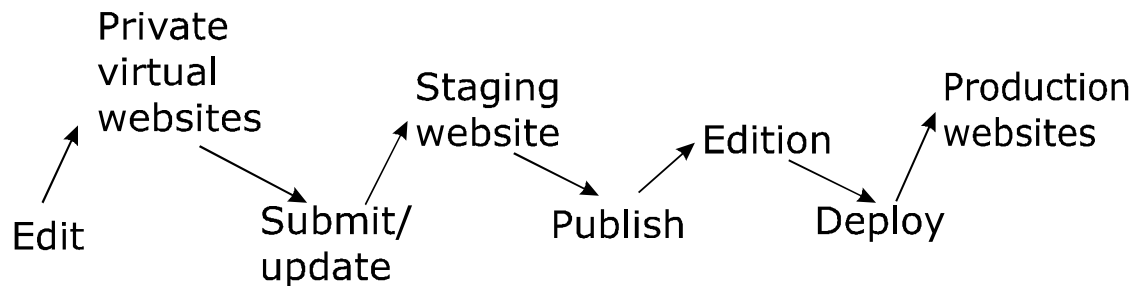
At this point, the enterprise is starting to use its website competitively. In order to do this effectively, the enterprise necessarily adopts tools and techniques that support enterprise-wide applications. In this environment, as many as hundreds of developers and content contributors may contribute materials to the enterprise websites. They may have as many as several hundred thousand files and many distinct files on the active site which are accessed by diverse tools and applications. This type of web production is characterized by frequent updates and often by parallel development. Both tools and content may be developed in parallel.

The important characteristic of the site that differentiates this environment from earlier environments is the sheer size of things. For example, these sites are often run on multiple, large, SMP machines with 16 or more gigabytes of RAM per machine. The development hard disks may be as large as multiple terabytes and the active content may be as much as 30 gigabytes or more. Thousands of applications are developed and content created by hundreds of developers. E-commerce sites of this size typically process multimillion dollars in e-business every day.

The other major characteristic of this environment is that activities involved in building the website become more structured. First, private workareas are developed which give each application or content developer a complete virtual copy of the website in their

private workarea. Each developer works in the context of the entire website, without having to interrupt others' work. Second, changes from each developer's workarea are synchronized, if necessary, integrated and shared in a staging area. Third, at any time, the website manager can take a "snapshot" of the staging area and publish it as an edition. In most enterprises, each edition is deployed to the production website so that the production is kept current.

The combination of these characteristics makes basic enterprise web production efficient, reproducible, and scalable. The content flow is shown below.



### **Stage V - The Multi-level Enterprise Web Production Environment**

The multi-level enterprise web production environment is quite similar to the Stage IV model, except that multiple levels of development may co-exist. These multiple levels are usually related to different business functions in the corporation. For example, levels may exist for human resources, e-business, technical support, corporate communications, and marketing among others. This situation effectively creates a unique set of all the locations and functions except the production web site shown for Stage IV. In some instances, multiple web sites may also be used.

### **Managing Workflow**

Two kinds of workflow are necessary to manage enterprise web production effectively: editorial workflow and project workflow.

In Stages IV and V, editorial workflow is the part of the process where content creation and editing occurs. Each object is "managed" by an editor who assigns the object to an author. The author makes the in-context changes, saves the work, and tests the changes the context of the entire web site. When the author is satisfied with the changes, the object is returned to the editor for review. As the review is completed, the editor rejects or approves the changes. The review obviously results in return to the author or passing the

changed pages to an administrator who publishes the changes to the Edition. Ultimately, the site master publishes the changed Edition to the production web site.

Complex changes may require project management. For a complex change, such as a complete makeover of an enterprise web site, it is possible to create a separate branch of production. In this separate production branch, changes are incorporated and, ultimately integrated back into the main along with other changes made to the original since the separate production branch was established. Taking this approach allows testing, integration, and retesting before deployment of the complex changes.

It is important to understand that the responsibility for a number of tasks resides with individuals playing four different roles. In practice in certain situations, a single person may fill several roles. The various roles and capabilities are shown in the following table.

	Author	Editor	Administrator	Site master
View file	X	X	X	X
Create/modify file	X	X	X	X
Assign/delete file		X	X	X
Submit file		X	X	X
Update workarea		X	X	X
Publish edition			X	X
Create/delete branch			X	X
Define hierarchy				X

	EWP	SCM Tools	Document management/groupware	Web publishing systems
<b>Concurrency</b>	●	◐	◐	○
<b>Openness</b>	●	◐	◐	◐
<b>Ease of use</b>	●	○	◐	◐
<b>Scalability/perform.</b>	●	◐	◐	○
<b>Workflow</b>	●	○	●	◐
<b>In-context QA</b>	●	◐	○	○
<b>Versioning/rollback</b>	●	◐	◐	◐

The very flexible way of managing both editorial and project workflow is to customize enterprise web production. With such customization, it possible to automate many of the tasks associated with managing such a complex web environment. Among the tasks which can be automated are email notification of changes, event-triggered scripting, event

logging and reporting, managing application server content, database connectivity, overall document management, managing the template engine and the content review engine.

The second table shows four aspects of the overall enterprise web production environment and the degree to which there are typically requirements against these objects. The more complete the pie chart, the more important are the requirements.

### **Enterprise Web Production**

Enterprise web production environments help the magic happen. They help improve performance and administration of enterprise-scale web production, manage assets by version control, and provide reporting tools and database integration. But, only Interwoven's TeamSite is available to address the issues in the middle where magic happens because it allows the use of any creative tool from Star Office to Dreamweaver to animation tools to create content.

A number of large enterprises have adopted the enterprise web production environment to manage their very large sites. All of them are characterized by large websites with frequent changes and millions of hits on a typical day. In the next section are examples of the application of enterprise web production principles in two of these enterprises.

#### **Educational Testing Service: <http://www.ets.org>**

The mission of ETS web services is to improve the value of services they provide to multiple customers. Their goals are to make administrative processes more efficient; to provide multiple storefronts for their e-commerce applications; and to serve a multi-national audience 24x7.

Three aspects characterize their enterprise web production. First, their e-business development provides dozens of storefront with hundreds of different products and services. Second, it has empowered the staff, streamlined processes, and eliminated many bottlenecks. Third, ETS's existing content has been leveraged by using an open architecture.

#### **Salt River Project: <http://www.srpnet.com>**

The mission of the Salt River Project, an irrigation and hydroelectric project, is to complete through superior service. Their goals are to have web-based control over account activity and information; to educate their customers about critical issues such as pricing, alternative energy conservation, and Y2K; and to serve special customer markets, such as seasonal residents, non-English speakers, and business owners.



The SRP's enterprise web production is focussed on application development and legacy system integration, management of the development, maintenance, and timely updating of more than 40 thousand files, and concurrent development by dozens of diverse contributors.

**Los Angeles Times:** <http://www.latimes.com>

The mission of the Los Angeles Times, the largest daily newspaper in southern California, for its web site is to provide a complete newspaper environment online that contains the all of the content, except display advertising, that is in its paper edition.

The LA Times adds between 1500 and 2000 items to its web site each day with several hundred thousand items in its archive web site. The daily distribution is freely available over the web while the archive web site charges a small fee for delivering specific material. The fee is approximately the same as for obtaining a copy from microfiche or some other mechanism.

### **In conclusion**

The web wall is a real phenomenon. All websites evolve through stages; but Stages IV and V require breaking through the web wall to allow the enterprise to scale its website operations effectively. Customization of the production process allows each enterprise to adapt enterprise web production to its needs, whether they are focussed in workflow, legacy integration, or add-ons. Most major websites have some form of enterprise web production in place.

Interwoven offers a live online demonstration each Friday at:

<http://www.interwoven.com>