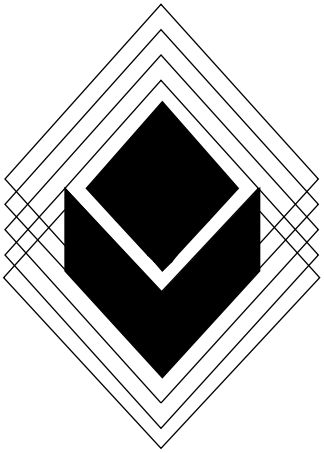
Developing & Delivering Government Services on the World Wide Web

Recommended Practices for New York State



Center for Technology in Government

Developing & Delivering Government Services on the World Wide Web:

Recommended Practices for New York State

Internet Services Testbed Report ISG-1

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Acknowledgments

This book is a result of the cooperative efforts of many members of the New York State government community. It reflects their thinking and their concerns about the challenges that we all face when trying to make sound IT decisions in an environment pressuring us all to try the latest and greatest technologies before their value to the organization and ultimately to the customer is given adequate consideration.

The core of the book was drawn from the experiences of the participants in the Internet Services Testbed Project conducted by the Center for Technology in Government. The project helped the agencies identify and address the policy, management, and technology issues associated with developing and delivering Web-based services. This book is a compilation of the tools we used and lessons we learned. Seven agencies participated in the project. They are:

- Governor's Traffic Safety Committee
- Hamilton County and the NYS Performance Measurement, Reporting, and Improvement System Project
- NYS Division of Housing and Community Renewal
- NYS Division of Military and Naval Affairs
- NYS Motion Picture and Television Development Office
- NYS Office of Real Property Services
- Office of Alcoholism and Substance Abuse Services

This book also benefited greatly from review by a wide variety of readers. The Internet Policy Work Group from the Governor's Task Force on Information Resource Management provided useful guidance on the structure and focus of the document. Members of the NYS Forum for Information Resource Management and Testbed Project participants reviewed several drafts and offered many helpful suggestions. We are grateful to all.

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Introduction

The Internet can help government agencies communicate with the public, with businesses, and with one another. The anytime, anywhere character of the Internet allows government information and services to be more available to more people with greater convenience and lower cost to customers. These guidelines were created to help government organizations in New York State achieve these benefits at reasonable cost and effort.

What this book is about

These guidelines focus on one major aspect of the Internet: the World Wide Web (WWW or Web) which has emerged as an interconnected network of information sources located all around the world. These guidelines present principles to help government agencies in NYS decide how best to design, manage, and market Web services. There are many excellent resources on-line and in print that deal with the technologies of the Web. We have not set out to create another one. Instead, we emphasize important topics that are often neglected: setting service objectives and policies, organizing and managing staff and other resources, assessing costs and effectiveness. In short, we attempt to supply government managers with a set of planning tools and good practice guidelines for approaching the WWW as a mode of service delivery.

Who the book is written for

We've written these guidelines with a particular audience in mind: the agency team responsible for designing, developing, and managing a Web service. Our approach is based on the experiences of similar teams in New York State who participated in the Internet Services Testbed project at the Center for Technology in Government during 1996. These guidelines reflect their experiences and include the practical tools and techniques that were used, tested, and refined during the project.

How the book is organized

Each chapter outlines a key decision or action a government organization will face as a Web service developer or provider. We cover such topics as how to define a service that is relevant to your customers, how to identify likely costs and benefits, how to assemble the right professional team, and how to manage information effectively in this new environment. Technology topics include how to decide whether to "make or buy" your services, how to apply good design principles, and

how to assess your infrastructure needs. Appendices give some examples and references that illustrate and further explore these topics. We refer back and forth among these chapters to highlight the interconnected nature of the topics.

Key concepts

As you read through and try to apply these guidelines, keep four basic ideas in mind:

A new kind of service

This is a new kind of service, not just a new technology. It is very easy to think exclusively of the WWW as a new technology. It is far more useful to think of it as a new kind of service delivery mechanism for government organizations. WWW services combine several traditional functions (such as publishing, information gathering, business transactions, data search and retrieval, and others) into a single form of presentation. This ability to integrate services and information from many organizational units and programs requires that WWW services be guided by enterprise-level strategies and managed by teams with a broad range of expertise. Web services have some unique characteristics that require special policy, management, and technical attention. The most obvious of these is the speed of technological change and the rapidly expanding variety of tools and technologies that come into play. A less obvious, but perhaps more important, characteristic is the completely public nature of the interaction between an agency and a WWW user. There is no selection process that brings a user to the service. In theory, anyone, any time, anywhere can have access. Your service can be linked to others without your permission or knowledge. Material can be copied, distributed, and used in ways you have neither planned nor expected. This characteristic gives the Web its excitement and vitality, but it means a new way of thinking for most government organizations.

Policies are needed

New and updated policies are needed in a variety of areas. New York State has adopted an Internet Use Policy to guide agencies in using the Internet to deliver services to citizens. Agencies also need to create specific policies and practices of their own to take best advantage of this powerful new tool for their particular needs and objectives. The New York State policy includes a model that agencies can follow in developing their internal policy guidelines. In addition, some traditional policy areas take on new meaning when the Web is involved: Freedom of Information, copyright, records management, and security are a few topics that need to be re-evaluated in light of the WWW and its capacity to distribute and present information to both known and unknown audiences.

The Web itself is a resource

Many resources are available to help you design and manage effective Web services—and most of them are on the Web itself. Practically anything you need to know about using the WWW or developing Web services is readily available to you on the Web itself. You can easily find and take advantage of white papers, tutorials, style guides, discussion groups, software, indexes, search tools, and many other resources. Perhaps most valuable is the ability to find and explore applications that other organizations have developed to meet objectives similar to yours. It is easy to find best (and worst) practices and to emulate and borrow from others. The WWW also makes it easy for others to borrow from your best ideas.

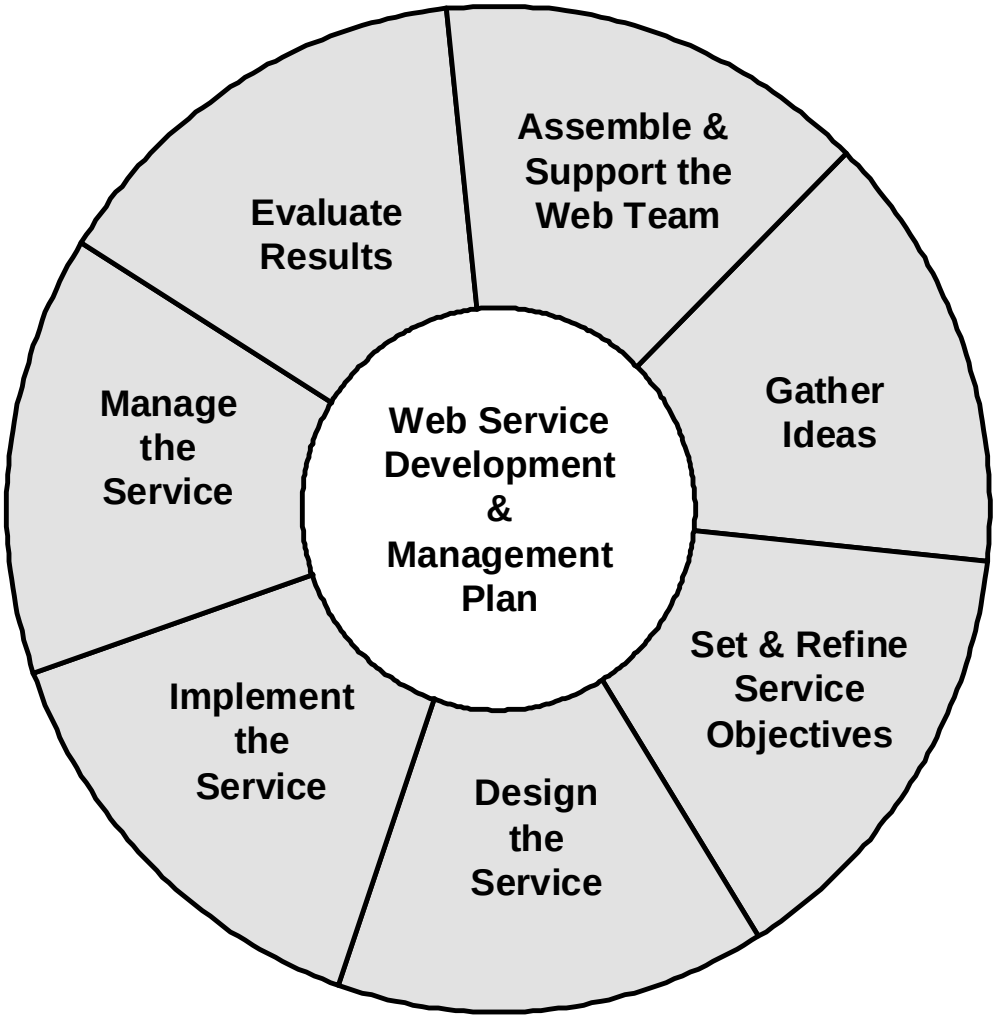
An incremental and iterative process

There are several critical considerations in defining, developing, and managing a Web service, but there is no one "correct" formula for addressing them. These guidelines cover most of the important topics that you need to understand and consider, but you will not necessarily encounter them in the order they are presented. The process is both incremental and iterative. You will probably start small and build your service gradually. But you will also learn things at one stage that will cause you to return to earlier work with revisions or refinements. Just remember that policy, technology, and management considerations all need your serious attention. Avoid concentrating your attention in only one area.

Major topics

The process of designing, developing, and then managing a Web service is not linear. You won't find yourself progressing neatly from step to step, but rather, moving among activities in more recursive fashion. You will need to deal with all the topics, but some topics need to be returned to several times as you acquire more information and experience. The figure below helps to illustrate the elements of a Web service plan. We strongly urge you to begin in the upper right quadrant of the wheel: form a strong team to gather ideas and specify your initial service objectives as the first order of business. Beyond that, however, there are many variations that will make sense in different situations.

We use this "wheel" throughout the book to help orient you to the various topics. In each chapter, we emphasize one topic, but also try to show how others may come into play or need to be anticipated or revisited. You will find many references back and forth to Chapter 3 especially since your service objectives are the whole reason for engaging in this work.


Web Service Development & Management Plan
Assemble & Support the Web Team
Gather Ideas
Set & Refine Service Objectives
Design the Service
Implement the Service
Manage the Service
Evaluate Results

The following table lists the major topics covered in each of the following chapters. Several detailed appendices are included. The appendices are also mapped to the major topics to help you find more information and reference sources.

Chapters, Topics, and Related Appendices		
Chapter	**Main Topics**	**Related Appendices**
Introduction	Key concepts	
1. Assembling the Right Team	Why Web Work is Different Skills Needed Core Team & Other Teams Roles & Responsibilities Training Internal Marketing	A1. Communications Capabilities A5.5. Tutorials on the Web
2. Gathering Ideas	Technology Awareness Best Practice Reviews	A1. Communications Capabilities A4. Other NYS Resources
3. Setting & Refining Objectives	Stakeholder Analysis Strategic Framework Cost & Performance Measures	A2. Cost Worksheet Explanation
4. Designing the Service	Information & Service Content Creating Hypertext documents Two-way Communications Information Structure Style guidelines Browsers Statistical tools	A1. Communications Capabilities A3. NYS Style Guide A5.5. Tutorials on the Web A5.6. Style Guides
5. Implementing a Web Site	Prototyping & Phasing Technical Infrastructure Web Servers Internet Service Providers Network Infrastructure Security Domain Names Testing External Marketing	A1. Communications Capabilities A4. Other NYS Resources A5.4. Web Servers
6. Managing the Service	Integration with Business Processes Editorial control Managing Records Reliable Services Keeping up with Technology Policy Framework	A4. Other NYS Resources A5. Useful WWW Sites
7. Evaluating Results	Collect Actual Costs Performance Data Assess Efficiency & Effectiveness Refine or Revise Service	A2. Cost Worksheet Explanation A5.4. Web Servers

Basic terms

Throughout these guidelines we use several terms with specific meanings:

Web service

The entire array of information, technology, policies, processes, and human resources needed to provide information or other services over the World Wide Web.

Web site

The physical computer(s) which house a Web server and the electronic pages or documents that constitute the information content of the Web service.

Web server

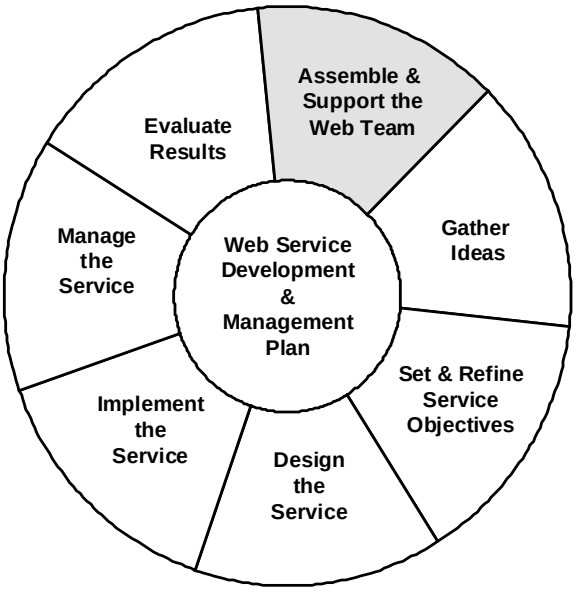
A software application that organizes the content and manages the communications that provide access to the content.

Web page

An electronic hypertext file that contains information content and (usually) links to other pages, electronic files, or servers. The page that contains the highest level overview of a Web site is called the "home page." The home page is considered the logical entry-point to a Web site, but users may also enter the site on many other pages.

Chapter 1.

Assembling the right project team



Successful Web implementation depends in large measure on the formation of a strong project team. This team will carry the project from inception to implementation to promotion and will have responsibility for a wide range of duties. The team will need to set objectives, garner organizational support, perform cost/benefit analysis, analyze and implement security measures, define information content, design and manage the Web site, and keep it up to date. To be successful, the team needs to draw upon the expertise and enthusiasm of a broad cross-section of your organization. Understanding the unique characteristics of Web services, clarifying team member roles, and providing specialized training all contribute to the team's ability to deliver effective service. This chapter discusses these staffing-related topics.

What is different about developing and delivering services on the World Wide Web?

Web services have some distinguishing characteristics which set them apart from more traditional computer applications. Understanding these characteristics will help you put together the right mix of people for your project team.

Higher visibility

Web services generally come with a high degree of public visibility (unless access too your site is purposely limited to a select group). This means that your application should blend effective service delivery with a good dose of public information skills. Presentation, ease of use, accuracy of content, good graphic design, and overall attention to detail are more important than in an application designed for in-house use only.

Rapidly changing technologies

The technologies and standards employed in Web service delivery change continually and new products and tools are introduced almost every day. It is important that the team remain flexible and open to new ideas since this field is likely to be evolving for years to come. However, it is also important to avoid chasing every new development as soon as it appears. Select a set of tools and get familiar with them and how they work together before making significant changes.

Iterative, non-linear process

Since Web technologies change so rapidly, it is impossible to lay out a comprehensive detailed application design ahead of time, accompanied by a highly structured implementation plan. Instead, the Web service is most often developed in pieces, with one part building on or contributing to another. Team members need to be comfortable with a non-structured approach and at the same time have a very clear understanding of the ultimate purpose, ensuring that the activities are continually moving in the direction of program goals.

Increased need for security

Security considerations are an important component of Web-based service delivery. The hardware, software, local network, and the wider network are all vulnerable to public exposure and compromise. In addition, security breaches may come under public scrutiny, affecting the credibility of your organization. While no security measures can be 100% effective (on or off the Internet), it is important to realize that security issues can be understood and risks managed. Different applications present different levels of security risk, ranging from very minimal to very high. Understanding these risks can prepare you for the effect of minor or major breaches so that the impact can be minimized.

Higher degree of collaboration and integration

The World Wide Web offers an organization the opportunity to present a wide array of information and services from a single entry point. To be most effective, this presentation needs to reflect the customer's point of view rather than the agency's underlying structure. Such an integrated approach to information and service delivery will require the participation and dedication of a broad cross-section of functional units within your agency. When combined with the project's technical demands and security considerations, it is easy to see why the project team will need to draw upon the talents and expertise of many areas within your agency. Coordinating so many different areas of expertise calls for an experienced project leader who is well-versed in the communication, team-building, and group decision process skills that will be needed to succeed.

Opportunity to extend beyond the organization

The opportunity for collaboration extends beyond the agency walls. Information should be presented with the customer in mind and this often means that your Web pages need to incorporate information from sources other than your own agency. This integration can take the form of simple passive links to related sites or can take the form of a more comprehensive user-focused presentation of information and services ("one stop shopping") which will require the active collaboration of several organizations.

Skills required

The skills required will vary somewhat, depending on the scope and complexity of the service you intend to build. Most Web service implementations, however, will require significant contributions from the following areas of expertise:

- Project management
- Business planning (setting objectives, cost/benefit modeling, and evaluation)
- Policy review and development
- Research (best practices and innovations)
- Content creation (writing / editing / public relations)
- Graphic arts
- Customer support services
- User services
- HTML (hypertext mark-up language) coding
- Programming (Common Gateway Interface scripting in languages like C, C++, Perl, or Java)
- Application design

- Systems administration and programming - UNIX, Windows NT, Windows 95, MacOS, Sun OS, Sun Solaris, Linux, HP, DEC-OSF, BSD, AIX
- Local and wide area networking and connectivity (TCP/IP)
- Internet security
- Marketing and promotion

Essential members to have on the team

Team members should be selected both for the skills they can contribute toward project completion and for the commitment they bring on behalf of their organizational units. It is most likely that different team members will need to be involved at different levels of participation. One approach is to assemble both a core working group and an advisory group. These can then be supplemented by outside consultants (when necessary) and additional support from the "virtual team" that already resides on the WWW. Suggestions about who might be included at each level are shown below.

Core Group

This group carries out the day-to-day activities which move the project forward. It has the primary responsibility for project completion. In addition to a program/project manager who has the confidence of senior executives, members of this group might include staff from:

- Program offices (experts in the service areas and providers of related information content)
- Public information office
- Applications development unit
- Computer operations
- Networking unit

Advisory Group

This group contributes the approvals, advice, and special expertise needed to carry out the project. They should meet regularly with the core group. This group could include:

- Executive management
- Legal counsel
- Human resources
- User support services

Outside Consultants

It sometimes may be necessary to acquire help from outside the organization in order to provide faster start-up and completion, to outsource the hosting of your site, or to supplement your team with experience in a specialized skill area. This group might include:

- Internet service provider (ISP)
- Graphic artists
- Internet security experts

The "Virtual Team"

The Internet community includes many organizations and individuals who are willing to lend the benefit of their experience to your project. It is important to tap into this valuable resource. Some methods for making these useful contacts are:

- Search for related sites on the Web to find others who have done similar work. Make phone calls and send email to learn more from them. Trade magazines and associations also provide leads to contacts that may be useful.
- Browse and post to Internet news groups focused on related topics.
- Join electronic mail lists which discuss the topics of interest.
- Consult with colleagues in New York (See Appendices A.4 and A.6 for contact information).

Organizational roles and responsibilities

Since team members come from many parts of the organization, the following checklist can help you identify and assign responsibilities:

Assigned Responsibilities for Web Service Development & Operation		
Responsibility Area	**Organizational Unit(s)**	**Name(s)**
Overall responsibility for the Web service		
Best practice review & other research		
Information content & structure		
Editorial control		
Templates & page design		
Authoring & page development		
Maintenance of the Web site		
Maintenance of the Web server		
User support & training		
System management for the system upon which the server resides		
Management of the network which provides access to your Web site		
Security		
Budgeting & expenditure control		
Evaluation		

Additional questions that should help you compose the right team at the outset are listed below. Return to these questions periodically as your service develops and adjust the team membership and responsibilities accordingly:

- **Are there others already on your team who have not been identified with one of the responsibility areas listed above? Account for their participation.**
- **For those responsibility areas where only an organizational unit has been identified, how will you identify the individuals who will have ongoing and specific responsibility? For example, if information content is assigned to the XYZ Program Office, who within that office will be involved?**

- How will the whole team work to ensure a high quality and highly available Web service?
- What upper management support has been garnered for this project? What plans are in place to increase and sustain that support?
- Is the information to be posted on your Web site governed by an agency policy regarding information release? If yes, who approves release of information?
- Is the design of the service governed by a design policy or style guide? If so, what is the policy or style guide? If no, who is involved in the design process and who gets final say on site design questions?
- What plans do you have to expand your Web site beyond the initial design? How would expansion affect assigned responsibilities?
- Whose budget covers the costs associated with providing the Web service? What limits are there on how much can be spent on the site, including support?
- Who is responsible for assessing the cost/benefit value of the service? To whom must the cost/benefit case be made?
- What level of service will you provide? 7x24 (24 hours a day, seven days per week)? 5x8 (8 hours a day, five days per week)? Other service levels? What are the management and human resource implications of the service level you plan to adopt?
- Is a security policy in place governing the development of your Web site and service? If not, who is responsible for developing and implementing one?

Training required

Training is an often overlooked or under-valued element in any system development project. Failure to invest in adequate and appropriate training for Web service developers and users will result in wasted time and money as they struggle to grasp and employ new concepts, tools, and procedures. Since the technologies associated with the Web are new and often different from those most technical staff are familiar with, you need to allow enough time for basic learning and experimentation before expecting solid development to take place. Similarly, agency staff who will become content providers, direct users, or customer service representatives should be trained in the use of new communications tools. They may also need new desktop computers and help in applying new policies regarding their use.

Plan to provide several kinds of training over the course of development such as:

- Technology awareness sessions that broadly introduce people (especially decision makers and program staff) to the possibilities of the Web.
- Hands-on training for developers in the tools they will use. (On-line tutorials are often available for software tools used in Web service development.)
- User training to help people understand the Internet, the WWW, browsers, and other new technologies, as well as training related to the content of your service.

Internal marketing

Because the World Wide Web is so new and dynamic, and because there is so much hype surrounding its use, your team will likely have to do a significant amount of educating to help agency decision-makers, managers, and staff learn about the pros and cons of investing in the technology before you can begin discussing the particular features of the Web service you plan to develop.

Effective, realistic marketing to agency staff is critical to getting the project off to a good start. As a first step, do a best practices search (see Chapter 2) to discover instances in which other governments or private organizations have used the Web in innovative ways to improve service to citizens or customers. Find out how other organizations use the Web to conduct business at lower cost or with fewer steps. Identify features that are time-sinks, cost-drains, and user-unfriendly. Be realistic. It is easy to oversell a Web service and once people's appetites have been whetted, they may be unwilling to retreat to lower expectations.

It is often helpful to have a mock up or simple prototype to show people at this stage. Here are some suggestions:

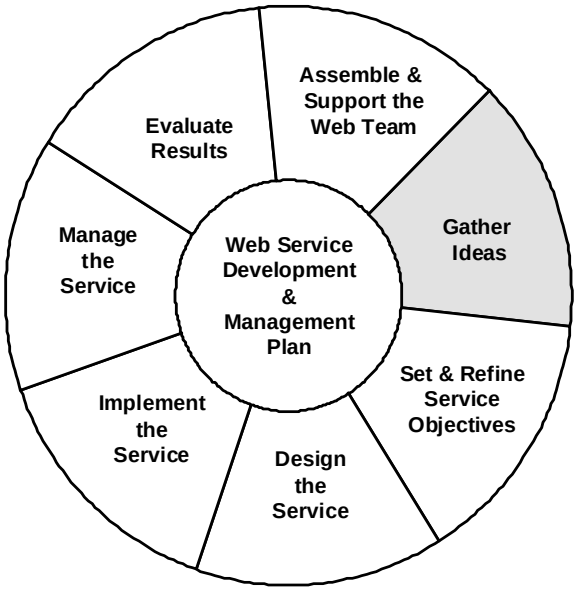
- A single Web page designed to meet the expectations of one critical decision-maker.
- A simple application that is available only to internal staff (an "Intranet" application), assuming you have internal networking infrastructure already in place.
- An application that makes available information that is already distributed publicly in paper form.
- A home page that illustrates the range of information and services you want to offer.

Once you've laid the groundwork of enthusiasm for innovative (but realistic) applications, the hard work of analyzing the complete picture can begin. Prepared with your analysis of objectives, stakeholders, environment, costs, and benefits, (all covered in Chapter 3) and a plan for developing, implementing, managing, and evaluating the service (covered in Chapters 4 - 7), you can approach the decision with an informed staff and minimize the risk of investing in the wrong project.

The next chapters contain suggestions about defining, developing, and implementing your project. Our advice is to proceed slowly and cautiously, starting small and growing as your experience with the Web develops.

Chapter 2.

Gathering ideas: Technology awareness and best practice reviews



There is a wealth of information and experience available to both new and veteran Web service developers. The tools, technologies, and innovations associated with the WWW are readily accessible to you in two ways: by becoming familiar with the Web itself and by tapping the experiences of others. This chapter suggests ways to understand the basics and explore the potential of the WWW.

Technology awareness: getting familiar with the basic tools and terminology

In order to create an effective Web site, you need to know something about the Internet itself. The Internet is the network of networks which allows you to correspond, conduct research, and share information and ideas all over the world. Several key communications technologies are associated with the Internet (electronic mail, listservs, gopher services, file transfers or FTP, and, of course the WWW). An Internet-based service can be as simple as electronic mail or as complex as an interactive, multi-media, distributed classroom. It can be open to the world, or limited to selected users who are connected to an "Intranet." The explosive growth of the WWW was touched off by the development of a user interface called a "browser," which creates a unified point of access

and retrieval for both home and office activities. Appendix A.1 explains some of the communications and service delivery capabilities that these technologies offer. It also lists many other resources that you can review to learn more about the technologies that make WWW services possible.

In general, getting your organization ready to take advantage of WWW technology is a substantial task. Agency management and staff need to be prepared to invest in a technology that is relatively new and rapidly changing. Agency networking and support infrastructure must be in place and technical skills must be available. Most important, a high level of institutional cooperation is necessary to create an effective WWW service. Help your agency understand that the Web presents many opportunities for service and information integration. Even though an agency may remain highly structured organizationally, it can take advantage of the power of the Web to present itself to customers in a more simplified, holistic way.

It's likely that many of the people in your agency will have little first-hand experience with the Web besides what they've read in the press. In order to show how the technology can lead to improved services, you will probably have to demonstrate some of the innovative ideas you've found. A demonstration of useful sites that others have developed, or a quick-and-dirty prototype, complete with agency logo and agency public documents, can often help people get over the hump and see that the Web can be more than a toy. First-hand accounts from fellow agencies that have used the Web strategically can help you build on the experience of others. Informal gatherings, at brown-bag lunches or agency staff meetings, can begin the discussion of how the technology can be used to achieve significant objectives in your agency.

Don't skip or rush this basic learning step. It is time well spent and will pay dividends throughout the development process.

Best practice review: what can you do with a World Wide Web service on the Internet?

A good way to become an effective WWW content provider is to be an active WWW user, because most of the information needed to develop and maneuver around the Web actually lies within it. Visit as many existing sites as you can to see what people in organizations like yours have done. Use directories and search engines to locate existing sites that seem to have a purpose, audience, or product similar to yours. Search engines and directories are Internet tools that help you locate Web sites that match certain criteria or fall into specific categories. There are many to choose from, but it's a good idea to become very familiar with a few good ones. (See Appendix A.5.1 for more information about specific directories and search tools.) When you visit other WWW sites that deal with topics that interest you, ask yourself:

- Do these people seem to know who their customers are?
- Do they make it easy for their customers to navigate and find useful information?
- Have they made it easy for people to contact them or ask questions?
- Do they waste their visitors' time?
- Are they providing a useful service?
- Are you glad you found them?
- Would you visit this site again?

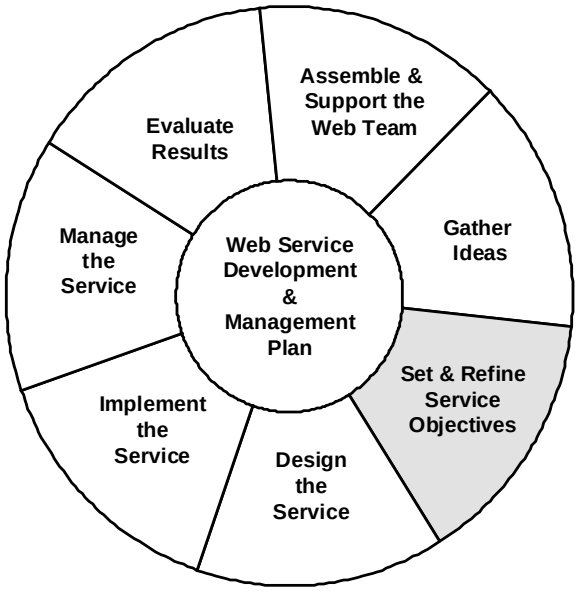
Make notes as you travel around the Web. Keep track of best (and worst) practices as well as innovations you encounter. Correspond with the Webmasters (individual charged with managing a Web site) of sites you like. Find out how they do what they do and what investment in staff and other resources they have made in order to produce their results.

It is often helpful to use a checklist like the one presented below as you move among various WWW sites to keep track of good and bad practices. Some agencies find it helpful to prepare a written review complete with color printouts of other sites to illustrate key points. You can also construct an electronic "tour" of the Web to use as a presentation to agency staff and executives. This can be an excellent way to share findings and achieve a base level of understanding about what is possible and reasonable for your organization.

Best Practice Checklist					
Web Site Name:					
URL:					
	Assessment				
COMPONENTS	**Clarity**	**Ease of Access**	**Good Looks**	**Efficiency**	**Effectiveness**
Graphics					
Main graphic					
Buttons					
Supporting images					
Image maps					
Background					
Bullets, pointers, etc.					
Text-only option					
Page Presentation					
Titles					
Labels					
Indexing					
Highlighting					
Standard page layouts					
Navigation					
Within pages					
Within site					
Links to external sites					
Content					
Text					
Images/video					
Sound					
Databases					
Tools					
Email					
Searching					
Transaction processing					
Downloading					
Forms					

Chapter 3.

Setting objectives: Why should your organization have a Web service?



In some respects, a Web service is no different from any traditional public service. It must be crafted to meet the well-defined needs of a specific target group; the service needs to be supported with human, technical, information, and financial resources; and it needs to have measurable performance goals and reasonable costs given its audience and objectives. This chapter presents some practical tools for setting objectives, identifying stakeholders, setting priorities, specifying resources, and defining costs, benefits, and performance measures. These are essential steps for developing and delivering effective Web services.

No decisions will be more important than the ones that answer this question: "What service or information do you want to deliver over the Web, to what audience, for what purpose?" Unlike most other technologies, the WWW is extremely appealing to ordinary people. It is universally available, surprisingly easy to use, and services are often very attractively presented. The ease of use and seemingly simple apparatus behind a World Wide Web home page, for example, can encourage novices to engage in a one-time rush to create a Web service of their own. Unfortunately, the result often lacks both customer focus and coherent, useful content. Such efforts frequently result in a Web presence that is not actively managed and quickly becomes stale. The tools presented here will help you analyze who your customers might or should be and what kinds of Web-based services will benefit them. They will also help you identify the kinds of resources you need to achieve success.

Before you investigate any technology at all, you need to think through the answers to these questions:

- What information or information-based services offered by your agency are suitable for electronic delivery over the World Wide Web?
- Who wants this kind of information or service? Who will benefit from a Web service and how will they benefit? Are these potential customers likely to be connected to the Web?
- Who in your agency is responsible for the information resources you want to put on the Web? Are they on your team?
- What kind and level of skill and effort will it take to turn existing information resources into Web-friendly ones? Are those resources available?
- What will it cost in terms of dollars, people, and technology to build and operate an effective Web site?

The following sections offer three tools to help you answer these questions.

Stakeholder analysis: who are the players and how will they be affected by your WWW service?

A stakeholder analysis is a structured assessment of the main logic of a program or systems initiative. Some might call it a programmatic assessment, others would recognize it as a business case. The objects of a stakeholder analysis include all kinds of stakeholders, including direct customers, units of government, and others; the products or main features of an innovation (in this case, your Web site); and the effect that each product or feature will have on each kind of stakeholder.

Sometimes, information system projects are defined in terms of only one stakeholder—the agency that will build it. This results in a very myopic view of the costs, benefits, and other effects of the project. More often a project will be defined in terms of two stakeholders—the agency and the direct customer of the service. This is better, but still ignores a whole host of factors that will impinge on the final result. There are many stakeholders in your environment and your Web site is likely to have features that will affect these different stakeholders in different ways. Some will see increased access to services, or better quality service. Others may experience higher costs or more competition for scarce resources. In short, some will win and some may lose, and it is impor-

tant to know something about these effects before a full-blown development project gets underway. A stakeholder analysis is a simple evaluation tool that gives system planners and reviewers a rough, but fairly robust picture of how a proposed system might affect the variety of customers and other players. This analysis can help you:

- Understand the external environment of your agency and program
- Discriminate among stakeholder groups
- Specify the possible results of an innovation
- Match stakeholders with results
- Estimate impacts on stakeholders
- Identify the high priority combinations of features and stakeholders
- Make a rough assessment of data availability and the data needed for a more complete evaluation

A stakeholder analysis in not a complete assessment, but it is a good starting point for defining your WWW service and one worth revisiting periodically. It has some important limitations to keep in mind:

- Makes assumptions about causal relationships and processes
- Mixes qualitative and quantitative impacts
- Does not gather or generate enough hard data to draw rock-solid conclusions

Conducting a stakeholder analysis

A stakeholder analysis can be prepared by one knowledgeable person and then reviewed and refined by others. It can also be prepared in facilitated group meetings where consensus decisions are made about impacts and estimates. To complete a stakeholder analysis, take the following steps:

1. Enter the system features or expected products in the first column of a spreadsheet like the one illustrated below.
2. Enter the names of the key stakeholder groups at the top of the remaining columns.
3. In each cell where a stakeholder will be affected by a product or feature, enter a descriptive phrase and one or more of the following codes:
   IQ: improves the quality of services to that stakeholder
   IA: increases access to services for that stakeholder
   EP: enhances the productivity of the stakeholder
   GS: generates savings for the stakeholder
   GR: generates revenue for the stakeholder
   EB: offers an extended benefit to the stakeholder (e.g. creates a new service)

Stakeholder Analysis

Project:_____

Agency:_____

	Stakeholders								
		Direct Customers			Units of Government			Other Stakeholders	
Products & Features									

6. Continue to refine your estimates as you acquire better data.
7. Your final products should include:

    - a completed matrix,
    - a statement of assumptions,
    - a set of quantitative impact estimates,
    - a set of qualitative impact estimates,
    - a statement of unavailable data and how you accounted for it, and
    - a narrative summary.

A strategic framework: identifying partners and other resources

A strategic framework is another structured way to understand a WWW service proposal. Like the stakeholder analysis, the strategic framework considers customers and other stakeholders. But it also helps you identify resources, partners, and innovations that might help you achieve your goals. It considers both internal and external factors. To be most effective, the strategic framework should work with one specific objective at a time. Strategic frameworks can be devised by one person and then presented and reviewed by others, or they can be created through facilitated group processes.

In short, the strategic framework tool helps you take a high-level view of the full array of internal and environmental factors that can support your WWW service by:

- Refining objectives in light of what the environment has to offer
- Getting more specific about the customers of the service
- Identifying information and other resources that will be needed
- Identifying potential partners to help achieve those objectives
- Identifying innovative products and services that might apply
- Thinking "outside the box"

Like the stakeholder analysis, a strategic framework has its limitations. Bear in mind that it:

- Focuses on "enablers," but ignores barriers
- Does not deal directly with the availability or cost of identified innovations, resources, or partners. You will need to collect more data to understand these topics. (See cost and performance measures below)
- Lacks the detail necessary to craft a complete project work plan or design a system

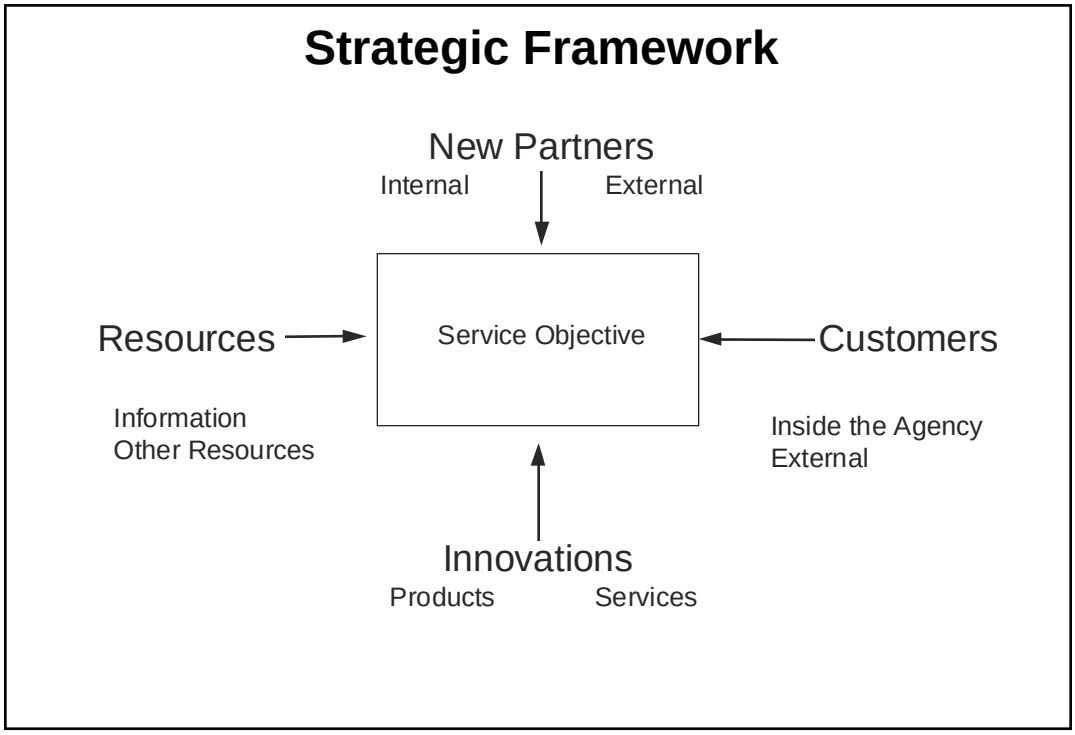
Using the Strategic Framework tool

The Framework tool is easy to use and generates a great deal of information. To use it, follow these steps:

1. Using the figure below, state your service objective as clearly as possible in the center box. If you have more than one objective, do more than one framework. Your objective(s) should flow directly from the high-priority cells of the stakeholder analysis.
2. Then fill in the factors that are important in achieving that objective:

   - Who are or will be the customers of the service? Are they external, internal, or both?
   - What information and other resources (human, material, financial, political) will you need?
   - What innovative service approaches, technologies, or other products might be useful?
   - Who might be your partners in this endeavor?

   Note that the same people or organizations can appear several times in different roles (a customer might also be a resource supplier, for example).



3. Look at the results and ask yourself the following questions:

   - Who needs to be on the development team?
   - Do we have or can we get the required resources?
   - Is there a good match between our customers' capabilities and the technologies we propose to use?
   - How will we engage in partnerships?
   - Have we pushed ourselves to think broadly about each factor, or are we unnecessarily staying with what we already know best?
   - Does this picture make sense?

4. Based on your answers, refine your approach and decide when and how to proceed with your project.

Cost and performance measures: is this a worthwhile investment?

Creating an effective Web service requires a significant investment of resources. It's easy to underestimate the costs and overstate the benefits because the technology is so attractive. Once you've investigated the capabilities that the Web provides, and decided that it can provide significant benefits to important stakeholders, the next question is "Is it worth it?" In this section, we present a framework for estimating these benefits and expected costs that will help you determine whether you should make the investment.

This exercise serves two purposes. First, it identifies expected costs and benefits that are ingredients in the investment decision. Second, it quantifies these predictions in the form of explicit expectations that will enable an assessment of whether the project has achieved its goals once implemented. Explicit qualitative and quantitative forecasts of costs and performance improvements will help ensure informed decisions about using the Web as a means of service delivery.

Performance measures

The benefits of a WWW initiative typically fall into three performance categories: services that are better, cheaper, or faster. WWW technologies can enable all three types of improvements, depending on the specific goals and objectives of the proposed service. The following types of performance improvements were drawn from a number of sources, including the experience of the seven NYS agencies that particiated in CTG's Internet Services Testbed.

Cheaper

(for own agency)

- Time savings: personnel
- Cost savings (direct): telephone, mailing, printing, travel
- Cost savings (indirect): avoiding/reducing other present costs; avoiding/reducing future costs

Example: Reduce operator-assisted requests for standard program information by 50%.

Faster

(for customers, for general public, for other agencies, for own agency)

- Response/waiting time: inquiries, requests, processing, transactions (24-hour availability; on demand)
- Information distribution time

Example: Reduce response time for course registration from 14 days to 24 hours.

Better

(for customers, for general public, for other agencies, for own agency)

- Consolidation of services: one-stop shopping, fewer steps in a process
- Convenience: more accessible hours and locations
- Improved accuracy, fewer errors, greater consistency, more standardization, always up-to-date
- Enhanced information or service quality, more useful information or service
- Innovation: new services, new ways of using information
- More frequent information distribution (same people)
- Wider information distribution (to more people)
- Larger number of inquiries, requests, processing, transactions (from more people)
- Increased use of services (more people use services; same people use more services)
- User satisfaction
- Revenue generation (from customers, general public, other agencies)
- Better management practices
- Greater participation/input/involvement in administrative processes

Example: Update reference manual electronically to improve consistency of decisions made in the field.

We encourage you to think as much as possible in terms of outcomes and results rather than outputs. For example, think in terms of improvements from the perspective of an agency staff member, a business partner, or a constituent, rather than how many hits your WWW pages will receive. While this will often be difficult, a focus on the end results can help to clarify your objectives and sharpen your efforts.

Some measures will be relatively easy to describe in quantitative terms, especially those in the cheaper and faster categories. Others will need to be described in more qualitative terms that, nonetheless, can be translated into empirical measures that can be quantified. For example, "increased client satisfaction" can be operationalized by "a 25% increase of clients who answer 'Satisfied' or 'Highly satisfied' on the customer feedback questionnaire." While collecting this information can often require time-consuming methods such as interviewing and surveying, it can contribute significantly to your ability to assess real impact. (See more about this in Chapter 7.)

It is important to make your expectations explicit so you can assess whether your expectations were met. Concrete statements of how you will serve citizens can help build realism into your plans. As much as anything else, grappling with the issue of performance will help build ownership within the agency, and subject your ideas to additional scrutiny and discussion that will help fine-tune your efforts and clarify your expectations.

Cost categories

Because it is easy to use, people often tend to underestimate the cost of developing an effective WWW service. Many agencies are surprised when they add up the amounts spent in developing their service. The implementing technology is relatively inexpensive. The expensive part is coordinating its development and creating or reconstituting all the information that will be provided in the WWW site. In addition, advanced features such as forms access to agency databases require customer support and technical support that may drastically affect the cost of hosting the WWW site and operating the service.

In our experience, personnel and technical infrastructure costs comprise the bulk of expenses. The cost of such items as WWW development tools and WWW servers is usually small compared with the human effort to define and develop the content of the service and the base level of computing and networking that needs to be available in the agency. In addition, such services as database access that may require hosting the WWW server in-house raise the cost substantially over applications that can be outsourced. (See Chapters 4 and 5 for more about these topics.)

In general, costs for developing an Internet-based service fall into five categories: resources to get the organization ready to support the service, Internet access for end-users of the system, training and help desk support for the end-users, resources to develop the content of the service, and computer facilities to host the system. In each of these categories, there may be one-time costs that are necessary to get the project started, as well as annual maintenance and development costs to operate the service and keep it current.

Organizational readiness

Public agencies can vary tremendously in their preparedness to take advantage of this technology. Some have experience with networking and the Internet, either through work assignments or by personal experiences. Others have little experience with Web-based services, and lack the computing infrastructure needed to develop content. Public information officers and other agency staff who are responsible for public outreach in the agency often have not experimented with the variety of services available on the Web. Agency managers in general need to become educated about the potential costs and benefits of developing these services. Developing this awareness among all levels of the agency staff may be necessary in order to enable meaningful discussion of the merits of a proposed service. (Chapters 1 and 2 outline some of the activities that fall in this cost category.)

Access for agency staff and other users

In considering this category of costs, the needs of both information providers and information users need to be addressed. Some staff will provide the technical support for the service, others will participate in the development of content. Access will need to be provided for both. Depending on the goals of the project, it may be necessary for agency staff to be able to browse the WWW, receive and respond to electronic mail, communicate with other staff, and have access to specially developed internal Intranet applications. Agencies may have this infrastructure in place, or it might need to be developed. While this equipment might also serve other purposes (such as general office automation and communication), if it is necessary for the success of the Web service, its cost must be considered in the cost of the entire project. How much of the cost is charged to the Web project varies depending on circumstances.

In all cases, an agency will need to purchase the services of an "Internet Service Provider" or "ISP" who can provide access to the Internet in a number of ways. Individual accounts with dial-in access to an ISP provides an inexpensive starting approach that can grow as the number of users increases. This approach requires modem access, either directly or through a LAN, for each user of the services. Alternatively, an agency's LAN or mainframe computers may be connected to the ISP, through either a dial-up or leased connection, at a higher cost but with

increased flexibility. This method involves security considerations because, depending on the configuration, agency resources may be available to other Internet users. (See the infrastructure discussion in Chapter 5 for more about these choices.)

End user support

Staff and other users of the system will need training and help-desk support to make effective use of the resources. Studies have indicated that formal training is less costly than self-learning. This training and day-to-day support may be provided in-house, or outsourced to a separate organization. In the latter case, the cost of establishing and monitoring the contract must be included.

Content development and maintenance

Developing a suite of information and services that will be provided on the Web entails, at a minimum, converting existing information into a form that can be delivered by WWW servers. At present, this often requires "mark-up" activities that require special skill and can be time-consuming. This is an area in which the support tools are rapidly changing, and should be assessed based on current technology. (See Chapters 4 and 5 and Appendix A.5 for more information.)

If the intended application involves two-way communication, (via electronic mail, by fill-in forms that users can access via the WWW, or by specialized applications that link agency databases and other applications to the WWW front end) then the cost of developing the service may be substantial. Customer service staff will need to handle these contacts and specialized programming skills and on-site hosting of the WWW site may be required.

Development of the content, because it is so tightly integrated with agency operations, is usually done completely in-house. (Read more about this in Chapters 4 and 6.) However, some specialized applications can be outsourced (Texas, for example, outsources the tourism feature of its statewide Web service). Basic design templates and perhaps the home page might also be contracted out to get a jump-start on developing the service.

Host of site

Once the content is ready to be installed on the Internet, a system containing a WWW server and space to store the information must be available, usually on a 24 hour a day, seven day a week basis. This may be accomplished through outsourcing or connection of an agency's WWW server to the Internet. While outsourced hosting can support simple informational Web pages and electronic mail, more advanced two-way applications typically require development of a custom WWW server application that may require in-house hosting. (The Web server and technical infrastructure sections of Chapter 5 and Appendix A.5.4 provide more information.)

The five categories of cost are identified in the worksheet that follows: organizational readiness, Internet access for staff and other users, support for those users, development and maintenance of WWW content, and physical hosting of the WWW site. Some costs are incurred during development and implementation; others continue on an annual basis as the system is maintained. These cost categories are outlined below and explained further in Appendix A.2.

Each category contains two types of costs: infrastructure and human resources. You are likely to find that the human resource costs dwarf the cost of the electronic infrastructure. In making your estimates, you should account for all the staff time necessary to launch and operate the service. For example, we identify two costs you should consider in estimating training costs: the cost to buy or develop and deliver the training program, and the cost of having staff actually attend the training classes.

The cost worksheet can be a useful tool for planning the evolution of your Web site. Consider completing a worksheet to represent the costs of a service which includes very modest services such as providing general information and pop-up email. Then do one for a more complex service which provides interactivity such as on-line requests for information or on-line registration. Finally, complete a worksheet outlining the costs associated with an elaborate service which includes support for transactions and real time database querying. Outlining the costs associated with your short term goals (6 months to 1 year) as well as with longer term goals (1 to 2 years) will be useful as you plan the evolution of your Web service.

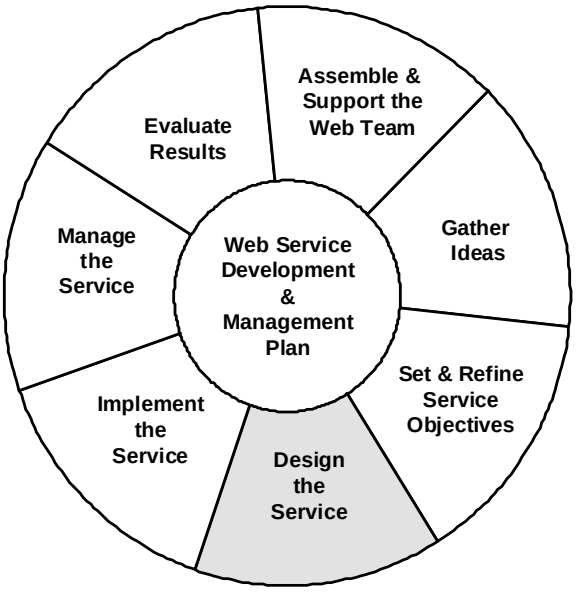
Appendix A.2 gives complete instructions for using this worksheet.

Cost Worksheet

		One-time Cost	Annual Cost
Organizational Readiness			
Planning for Internet Presence	1		
Training for Technology Awareness	2		
Access for Agency Staff and other users			
Hardware for End Users	3		
Software for End Users	4		
Network and Internet Access for End Users	5		
Other Vendor Services	6		
Human Resources			
Start-up Process for Equipment Procurement	7		
Establish and Manage Vendor and ISP Contracts	8		
End User Support			
Vendor Services	9		
Human Resources			
Establish and Manage Vendor and ISP Contracts	10		
Development and Delivery of User Training	11		
User Time in Training	12		
Help Desk for Users	13		
Content Development and Maintenance			
Hardware for Content Developers	14		
Software for Content Developers	15		
Network and Internet Access for Content Developers	16		
Other Vendor Services	17		
Human Resources			
Start-up Process for Equipment Procurement	18		
Establish and Manage Vendor and ISP Contracts	19		
Development and Delivery of Staff Training	20		
Webmaster	21		
Content Creators/Providers	22		
Content Coordinators	23		
Web Site Design and Development	24		
Editorial Review	25		
Program Area Liaisons	26		
Database Administration	27		
Other Management Support	28		
Other Clerical Support	29		
Host of Site-Infrastructure			
Hardware	30		
Software	31		
Network and Internet Access	32		
Other Vendor Services	33		
Human Resources			
Front-end Research and Technical Evaluation	34		
Start-up Process for Equipment Procurement	35		
Establish and Manage Vendor and ISP Contracts	36		
Development and Delivery of Staff Training	37		
Network Administrator	38		
Systems Administrator	39		
Server Manager	40		
Operations Staff	41		
Programming Staff	42		
Clerical Staff	43		
HUMAN RESOURCES SUBTOTAL			
INFRASTRUCTURE AND OTHER SUBTOTAL			
TOTAL COSTS			

Chapter 4.

Design considerations



An effective Web service has a clear service objective and target audience. It should be necessary, informative, uncluttered, and take the customer's point of view. It should provide an easy means of communication with visitors. Tools such as buttons, search engines, email, forms, and links, can help visitors navigate your site and make it more functional and powerful in delivering your message. Visitors to your Web site should come away feeling that they have conversed or transacted business with a friendly, responsive representative of your organization.

What should you put on your Web site? This seemingly simple question must be answered initially and repeatedly by any organization considering a Web service. The answer must be based on your service objectives, the cost of delivering this service, the appropriateness of the Web as a delivery mechanism, and the impact this new service delivery approach will have on your organization — all topics covered in Chapter 3. The Web may be a substitute for a traditional service delivery mechanism, but it is often an additional mechanism instituted to reach a wider, different, or segmented audience. This chapter presents guidance on selecting, structuring, and inter-linking the information content of your Web site.

Selecting content

Many organizations have rushed to create a Web presence without a full consideration of the opportunities available for improved or expanded services. The services provided by these organizations are often little more than electronic brochures. They don't take advantage of the potential of the Web to offer new, enhanced, or streamlined services to customers. In order to take advantage of these benefits of the Web, an organization must consider its use within the context of a clear service objective. (We recommend the Strategic Framework tool introduced in Chapter 3 as a useful way to do this.)

The selection of information or services must include an analysis of the customers to be served. For example, will the Web be used to deliver services to internal customers, to other public agencies, to the public, or possibly to all of the above? Each potential customer group has characteristics that must be considered in the selection of the information and services to be provided and in the design of the Web service itself. This analysis must identify the source(s) of the information or service to be presented, the format and accessibility of that content, and the ability of customers to actually use the Web. Additionally, the ongoing management and maintenance of the content must be considered.

In choosing information content, you are looking for (or creating) material that satisfies both a clear service objective and is accessible to your intended audience. Here are some examples from the Internet Services Testbed Project:

Service Objective	Information Content	Intended Audience
Achieve more timely and accurate real property assessments	On-line real property assessment manual and training tools	Local assessors and real property directors
Prevent alcoholism & substance abuse among teens	On-line ordering for videos and other educational material about alcoholism & substance abuse	Substance abuse educators in schools
Increase public awareness of highway safety for children	Up-to-date car seat information	The driving public

In these three examples, it will be easiest to assess the success of the real property application because the audience consists entirely of known public officials. It will be most difficult to assess the highway safety application because the audience is not specifically known. Features of this service will need to assume a level of generality that will not be necessary in the others. All three are good uses of the Web, but the types of information they provide to customers are quite different.

Here are some important questions to help you decide what information content makes sense for you:

- Who are or will be the customers of the service? Are they external, internal, or both? What do you know about their ability to use the Web?
- What information will you provide as part of this service?
- What units and individuals are responsible for the creation and maintenance of the necessary information?
- What limitations or constraints exist regarding the use of the necessary information (security, copyright, liability, Freedom of Information, format)?

Creating hypertext documents

Hypertext documents are the hallmark of the Web. Hypertext documents are electronic text files which have been tagged with Hypertext Markup Language (HTML). It is through the use of these tags that documents are prepared for presentation over the Web and linked with other information resources to form the Web. The concept of using tags embedded in text is not a new one. It, like many other technologies, has been adapted for use in the Internet environment. In the old days before word processors and graphical user interfaces, documents were processed for printing using text processing languages such as Runoff and Troff. UNIX-based tools such as Tex and LaTex continue to be used to prepare documents for printing. Today, tags are used in hypertext documents to provide links among related resources, as well as to direct the look and feel of a document on the Web.

New products supporting both the creation of original HTML documents and the conversion of existing documents to HTML formats are available. These “authoring” tools vary widely in orientation, capabilities, and learning curve. Although the authoring tools have relieved quite a bit of the tedium associated with creating HTML documents, there is currently no completely point-and-click automated authoring system. Authoring HTML documents still requires some rudimentary knowledge of programming logic.

Authoring tools are available as shareware and as commercial products. Downloadable trial copies are available for many of the commercial products. Choosing a suitable authoring tool takes some research on the part of the Web author. Selection depends upon the services you are trying to provide and the platform your Web services will reside on. Plan to evaluate several before choosing the ones you like best.

Use links to integrate information from other places into your information structure

The ability to link resources through the use of HTML is a key component of the WWW. Establishing a link in an HTML document is a simple process of identifying the spot where you want the link, the type of resource you are linking to and the Uniform Resource Locator (URL) of the resource you are linking to. When the user clicks on the "link" the Web server identifies and then retrieves the appropriate resource.

A Web site designed to deliver public services can take full advantage of links to provide a more comprehensive and integrated service. The additional information may be located within your own Web site or at any other site in the world that provides access to the Web. For example, assume you are a Parks Department and your customers are boating enthusiasts. You can provide information on your site about public launch areas and related campgrounds. But you can also give your customers access to today's weather forecast, tide information, and storm warnings—not by providing them yourself, but by linking to the US Weather Service Web site. The Weather Service, an acknowledged expert, manages all that additional information, but your customers get access to it simply by communicating with you.

As in our boating example, the use of links allows for the decentralized management of related information. No one organization must be responsible for all information, nor must all information provided by an organization be located on one server or even in one building. Through the use of links we create virtual Web sites. The key to success in this kind of linking is a clear understanding of the quality and relationships among the different pieces of information. Use links to connect your customers to information that is relevant and accurate and regularly review them to be sure they are still active and applicable.

Links can also help you offer "one-stop shopping" to your customers. This kind of linking, however, represents a much more demanding level of effort. If links are used to integrate the services of different organizations, then each organization must agree on definitions, goals, and methods. Their efforts must be synchronized and interconnected so that the presentation to customers is logical, smooth, and effective. Don't confuse this very complex work with the simple links that are used to add passive information content from other sites.

Understand how and where to use different formats

Information on a Web page can be presented in several different formats. Each has its own features, advantages, and disadvantages. One of the challenges of designing a Web site is matching presentation format to your service objective and audience. Effectively integrating graphics, text, downloadable files, forms, audio, and video to meet your service objective is essential to providing a usable and useful Web site. For example, sometimes users are better served by having access to a document which they can download in the native format and print locally for review rather than having access to the document on-line only. Sometimes a picture, diagram, or map is more useful than text. But, be careful that your use of graphics, maps, audio, or video adds value, not just splash.

Providing for two-way communication

The level of interaction provided on a Web site governs the types of services it can deliver. Basic Web sites, such as personal home pages or sites which provide only descriptive information about programs or services, typically do not provide for interaction between the site sponsors and their customers. Intermediate level sites may provide for batched interactions such as electronic mail, registration for events, and on-line requests for printed information or other products. Sites offering advanced services such as access to databases or transaction processing provide for real-time interaction with customers.

Electronic forms

Electronic forms are a common way to provide for two-way communication. Using forms as a way to communicate with customers requires the establishment of procedures for responding to on-line requests for services. Program staff as well as technical staff must be prepared to respond to inquiries. Traditional service response procedures must be modified to accommodate on-line requests. You must decide for example which requests can be accommodated on-line and which require additional processes to take place in the agency, what procedures must be developed to ensure that service requests are routed to the appropriate staff member, and whether requests should receive an automatic acknowledgement. The use of forms to support two-way communication creates a new avenue of access for the customer, but it also creates a new point of entry for work for the agency. This new point of entry for work must be well understood and planned for by the agency.

The Common Gateway Interface

The search is carried out through the use of a Common Gateway Interface (CGI) program. CGI's are used to process the input submitted by an HTML form. When a form is submitted to the Web server, the server calls the CGI program which has been identified within the HTML code of the form. Input from the form is then made available to the CGI program using the Common Gateway Interface Standard. The CGI program can process the input data itself or call on other programs such as database interfaces or electronic mail programs. Thus, information submitted by the form can be saved in a database or emailed to an appropriate person for further processing. (See Figure 1; adapted from Michael Dieckmann, When Worlds Collide: The Internet Meets the Corporate Database, Database Programming and Design, August 1995, 49-54.) The CGI program can also dynamically create HTML pages to be passed back to the client. A database search could be conducted using the input fields, for example, and the results passed back to the user in a dynamically generated Web page. See Appendix A.5.3 for additional information on the use of CGIs.

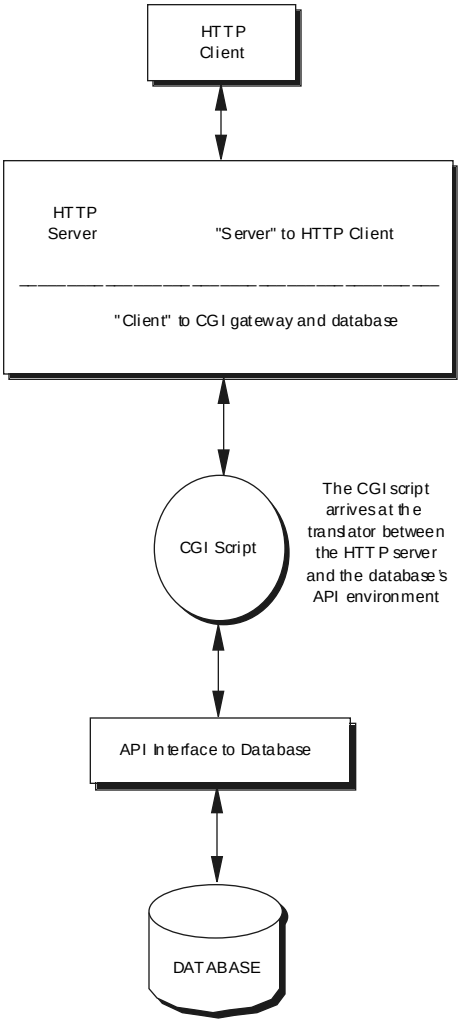


Figure 1.

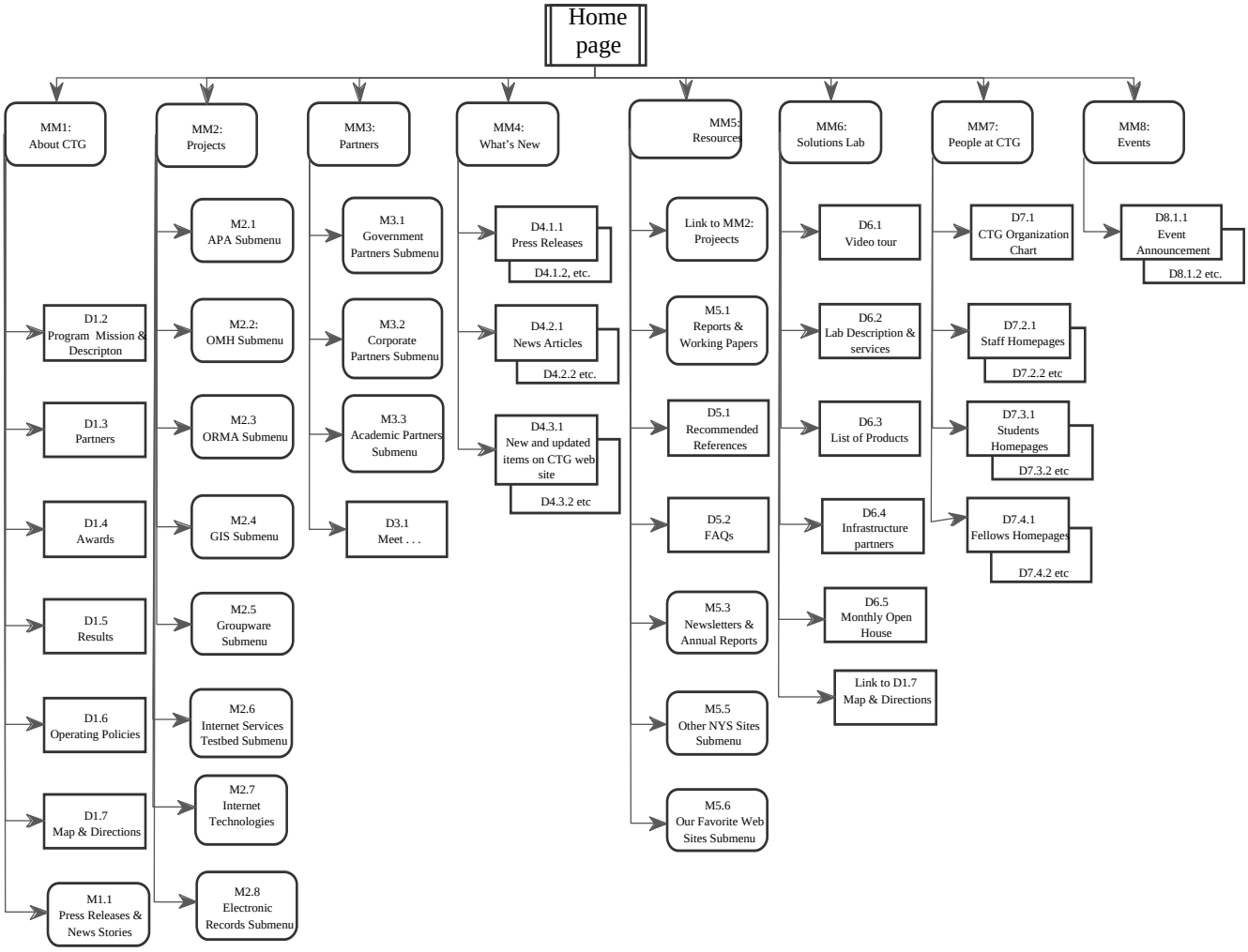
Determining your information structure

We are regularly asked to represent information in graphical ways; for example, in organization charts or workflow diagrams. These renderings are useful in testing understanding of the information or processes represented. A graphically depicted Web site can help you design the structure and scope of the information and services to be provided. You can think of the Web as a set of linked documents. The links embedded in the documents form the Web. However, since the Web is ever-changing, growing and richly interlinked, it cannot be fully represented in a simple diagram. Consequently, many organizations find a hierarchical rendering of the information content of a proposed site to be a useful way to bo begin.

Most of us are quite familiar and comfortable with a hierarchical representation of an information resource. A table of contents or an index is structured hierarchically. The following graphic representation of the Center for Technology in Government Web site illustrates how such a picture helps organize the content of a Web service. It shows all the elements of content, but not all the intended or possible links. When new pages are added or information on existing pages is updated, this kind of picture makes it easier to identify links that should be added or related material that should be updated at the same time.

A Web site is a dynamic resource, so pictures like these need to be living documents. Some new Web site management tools offer the ability to electronically map a Web site, generating displays that identify all the pages and the links among them. You may find this very useful as a site management tool, but the complexity it reveals may not be necessary at the design stage of your service.

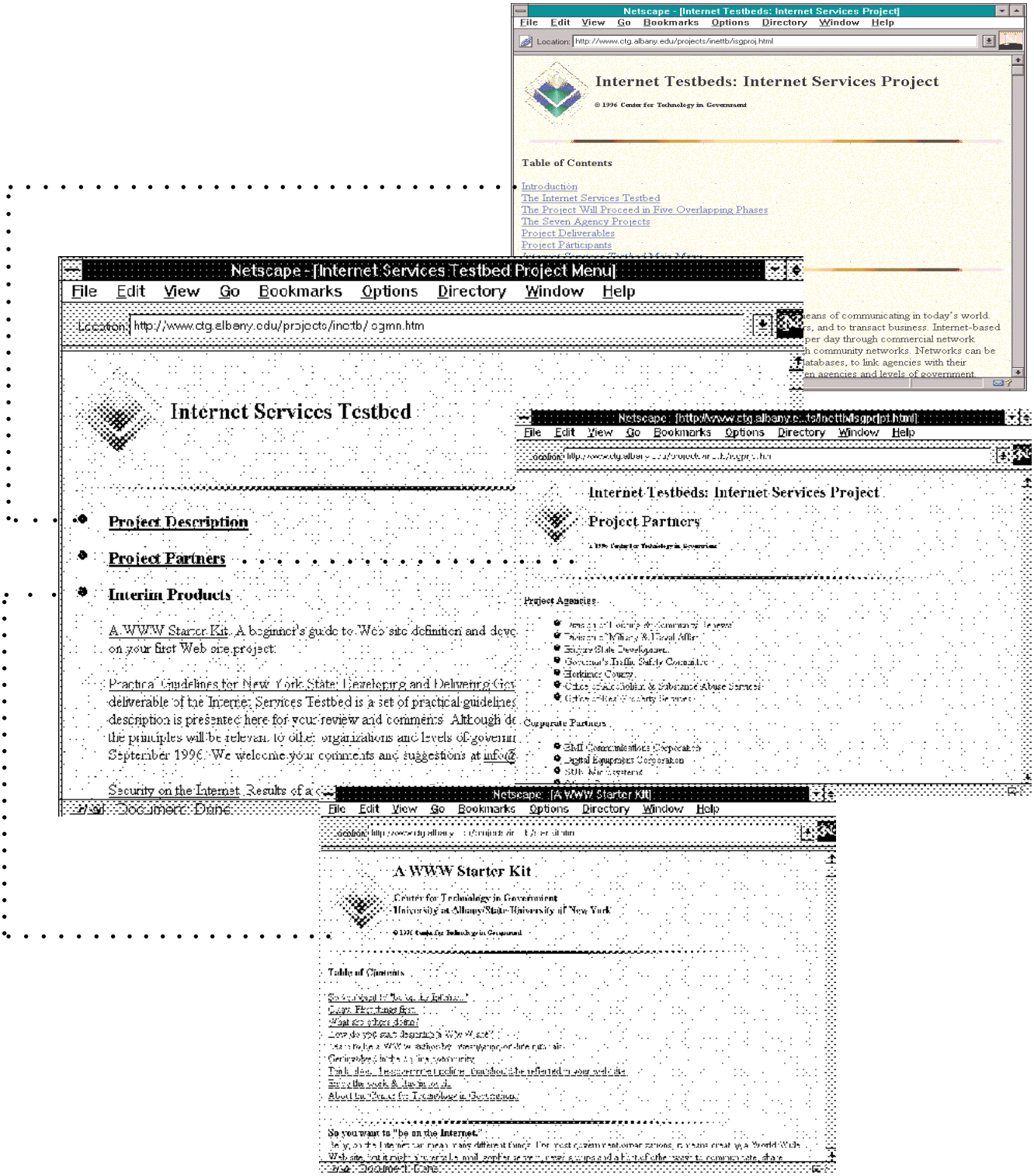
Organization of CTG Web Site



Legend:

Menus consist mainly of links to other menus, documents, or websites.
Documents may or may not contain such links.
All menus and documents link back to the CTG home page.

This example, which depicts information from the Internet Services Testbed, illustrates how detailed topical pages are linked to the project main menu page:



Using style guidelines for a consistent, customer-oriented presentation

Just like any brochure, advertisement, or report, a Web service makes a statement about your agency. Customers judge a Web service not only on information content but also on appearance and style. A few questions to consider might be: Is your information of value to your stakeholders? Do links follow a logical flow? Can customers get what they need? Have you taken into consideration the aesthetics of the site? Have you considered the human factors associated with information retrieval and processing? A comprehensive look at these and other topics covered in this section may be found in many on-line and printed Web style guides. We list some good ones in Appendix A.5.6. A basic style guide recommended for State agencies to follow is included in Appendix A.3. Some key considerations are outlined below.

Identify yourself

Through the power of links, a visitor can enter your site at any page. Be sure every page identifies your organization.

Make it easy to communicate

Include forms and electronic mail links for visitors to use. Forms may be used to solicit information from visitors, for on-line registration for events, or for subscribing to a newsletter, listserv, or bulletin board. Email message forms should be available for visitors to contact your Webmaster or others in the agency who can help them with problems or questions about particular pages or documents.

Use templates

Menus and document pages in your site should have a consistent look and feel. Templates that standardize fonts, footers, and background give them a recognizable structure.

Date stamp your pages

Let visitors know when the material they are viewing was last refreshed by displaying the last date of update on each page.

Use graphics judiciously

Graphics are attractive, but often overused. Too many or too large graphics slow down the communications process and frustrate users. Include only those that add information value to your service.

Give help

Use indexes, tables of contents, and search tools to help orient users and guide them to the information they want.

Include useful links

Links are what make the Web a web. Link to useful resources both within your own site and on other sites. A few briefly described, well-chosen links are often more valuable to users than long lists of links of unknown value.

Avoid dead ends

Use navigation aids freely. Don't let your visitors get stuck in dead ends with no way to navigate around. Provide top-of-page, return-to-home, next-page, previous-page and similar text commands or buttons.

Offer low-tech options

Not every user has the computing technology to take advantage of a graphical interface. Be sure your service is usable by text-only browsers and by people who can't take advantage of advanced features, like forms. Remember, the higher the tech, the lower the number of potential users.

A word about browsers

Visitors to your site use a software interface called a browser that controls the presentation of your material on their desktops. The browser interprets and displays your content. Since not every user chooses the same browser, your information can look different on different desktops. Colors, the placement of graphics, and other elements may look different. More importantly, not every browser can take advantage of every feature that is possible to build into a Web service. Advanced features that include automation, windows (panels), sound, and the like require the most advanced browsers (and usually higher powered computers and more bandwidth) from your users. If you design a service that uses these features, you need to be quite confident that your users can take advantage of them. Our best advice is to install several of the most common browsers, including a text-only

version, and become familiar with how they interpret different kinds of material while you are still in the design stage. When you move to construction, testing, and implementation, be sure to use a variety of browsers before you decide how your finished product should be built.

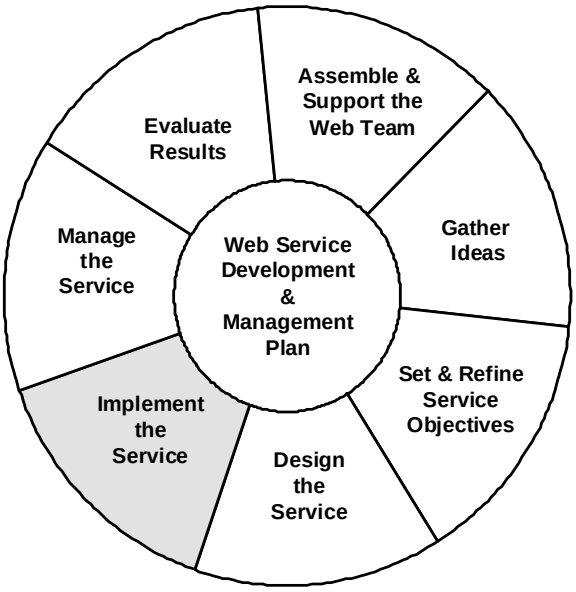
Counters and other statistical tools

Counters and statistical tools are added to Web sites to let you know something about who is accessing your site and how often. These programs will look at factors like the times of day that your site is accessed. They will tell you how often your site was not available, and how many times someone reached a link that was not working. Other useful information includes identification of the documents users downloaded most often, and which pages and directories were accessed most. These statistics give you information about what seems to be most useful about your service. Many people boast about the number of "hits" at their sites, but this is not a very useful piece of information since every piece of a page that is represented by a separate file (including a graphic, a bullet, etc.) constitutes a "hit." It is much more useful to look at the number of user sessions or pages served to understand how many visitors you've had and what they looked for.

You can find more information on this subject by searching the Web with keywords such as 'Web counters' and 'Web statistics.'

Chapter 5.

Implementing your Web site



You have done your homework — you've thought carefully about your purpose, audience, and content; assembled and trained your team; and designed an information structure for your Web site. You've chosen authoring tools, navigation aids and communications features. Now it is time to bring it all together in a cohesive and useful product. Constructing a Web site is a very challenging, time-consuming, and detail-oriented enterprise. This chapter covers several aspects of implementation including prototyping, technical infrastructure, testing, and marketing.

Prototyping and a phased approach

Web site implementation needs to complement the unique characteristics of Internet technologies. Traditional methods which force exhaustive design and development on paper before coding, testing, and release ensue are not practical when the technologies are changing so rapidly and when your customers are often outside the organization and unknown to you. Instead, a more iterative approach of prototyping and phased implementation can provide you with the flexibility and feedback you need to reduce risk and increase your probability for success. Don't confuse this iterative approach with a lack of direction. In fact, a sound, shared understanding of program objectives is more important than ever in this loosely structured environment.

Prototyping is an important tool for reducing risk. If your project team is unfamiliar with a particular technology or tool, it often helps to create a quick implementation and then analyze the results before going further. Prototyping often helps staff who are unfamiliar with the Web to visualize end results. Additionally, having a concrete product which demonstrates how the Web site can support organizational goals may be an important factor in garnering necessary support and resources.

Diverse project teams, rapidly changing technologies, and highly visible results all serve to increase the uncertainties associated with a Web service. Employing a phased approach to your implementation will help you to minimize these uncertainties. Building your project one component at a time reduces risk and raises confidence. Results can be seen and evaluated more rapidly and the lessons you learn in one phase can be applied to the next.

Use the phased approach and prototyping to your best advantage. Stay flexible and be willing to experiment with new methods for implementing subsequent components of the project. Release your product to the public in small steps and pay careful attention to the feedback you receive. Most importantly keep your business objectives firmly in mind. These should provide the foundation for your implementation decisions.

Providing the technical infrastructure

Now that you've developed a suite of Web-ready information and services, you will need to install them on a computer connected to the Internet for others to access them. This can be done in two ways: load the services on an agency computer or computers and acquire a telecommunications connection to connect them to the Internet, or contract with an outside vendor to host your services and make them available to the larger Internet community. Each is appropriate in different situations; each has its own set of costs and benefits, and, over time, an organization may use both. If your application involves giving agency staff access to the Internet, then your internal computing and communications infrastructure may also need attention. This section discusses some of the infrastructure issues you are likely to encounter.

Service options: to build or to buy?

In order to make your Web service available to users, you will use some or all of the following services:

- A WWW server to host your HTML documents
- Search engines, forms, and other additional browsing services that augment the basic features provided by the WWW

- Electronic mail service
- Telecommunications facilities to connect your services to the users
- Administrative details such as an Internet domain name

Depending on your application, it may be possible for you to provide all of these services yourself. If your application involves users outside your agency, you will need to acquire a telecommunications connection from an Internet Service Provider (ISP). All these services may be outsourced. Many ISP's will provide them at an additional charge. The section below describes the range of services that ISP's may offer. Choosing what to outsource, particularly at the inception of a project, is an important decision. The cost factors worksheet in Chapter 3 will help you understand the differences among these options.

Internet Service Providers

Internet Service Providers offer a range of services

An Internet Service Provider is an organization that provides individuals and organizations with access to the Internet. An ISP may be a public agency such as New York State's Office of General Services, or a private company. Different ISP's focus on different market groups. Some focus on dial-up access for individual subscribers who want to use services and acquire information on the Internet. Others focus on supporting organizations and individuals that want to provide those services and information. Some provide only telecommunications, others offer a suite of services including WWW content design and Internet marketing consultation. Some focus on small organizations, others focus on Fortune 500 companies. Unless your project is strictly an Intranet project and involves only users and information within your agency, you will use an Internet Service Provider as a component of your project.

Telecommunications

Your ISP provides your gateway to the outside world of the Internet. This connection can be intermittent with a connection only when data is being exchanged or it can be permanent leased lines that provide access around the clock. Intermittent connections can be dial-up lines using modems on ordinary phone lines or higher-speed ISDN phone lines. These may be used to connect individual users, or, more rarely, to connect entire LANs to the Internet. Typically, a LAN or server connection would use a leased line which is more expensive but necessary for continuous services.

The speed of the connection between you and your ISP is only one of several factors that go into making an effective telecommunications service. Issues such as how the ISP is connected to other parts of the Internet, how much availability is guaranteed, and other services described below are important factors when choosing an ISP.

Consultation and user support

Depending on your in-house expertise and level of connection to the network, you may need expert advice in connecting to the Internet. For an individual dial-up user, applications support such as how to install the software and debug problems may be critical. For a LAN connection, routing and security support may be essential. Basic help desk support is typically provided with the telecommunications contract, but additional consultation and help desk support may need to be acquired as a separate service.

Hosting of WWW servers and other services

An ISP may be able to provide a WWW server to make your content available to the larger Internet. Depending on the provider, other services such as electronic mail and access to discussion groups or news services may be available. Typically, such customized applications as database access and search engines are not available through ISPs, but require in-house hosting of the service.

Developing WWW pages

Many ISP's provide Web Site development services. These may range from simple conversion of your documents to HTML documents, to designing your overall site. Some ISP's can create content, implement your site, and conduct marketing activities.

Selecting the correct service option for your organization

Typically, you will engage an ISP to provide telecommunications service. Often, especially at the beginning of a project, you may acquire other services, either on a permanent basis or temporarily to help "jump start" your project. How much you do in-house and how much you outsource depends on a number of factors. These include the availability of in-house expertise, the urgency of your timetable, the suitability of interested providers that meet your needs, and your long-term plans for the project.

The ISP market is one that is changing quickly, with new providers appearing weekly and markets consolidating very quickly. In this environment, it is important to evaluate your options carefully and consider your long-term needs. Advice similar to that for any high-tech procurement applies: talk with each vendor's customers, talk with their competitors, talk with other agencies, find out how long the ISP has been in business, ask what hours their support staff is available to you, treat them like any other IT provider. There is no easy substitute for homework when choosing such a critical partner.

Choosing a Web server

A Web server or a Hypertext Transport Protocol (http) server is an application program which resides on a computer and provides the interface between the user's browser software and your Web site.

Web servers, like most software, are available both in the public domain and from commercial providers. The table below lists several popular Web servers now being used on different platforms. Also see Appendix A.5.4 for a list of available resources to assist you in selecting a Web server.

Popular Web Servers	
Web Server	**Platform**
CERN httpd	UNIX, VMS
NCSA httpd	UNIX
Netscape Commerce	UNIX, Windows NT
WebSTAR/MacHTTP	Macintosh OS

A range of issues must be considered in selecting Web server software. These issues include:

- Expected number of concurrent users
- Processing power required to support the expected number of concurrent users
- Access controls
- User authentication requirements
- Usage statistics and analysis capabilities
- Time required for maintenance of the server software
- Additional software available to support the Web server
- Type of licensing available

Web server software must be compiled and installed on a computer connected to a network. If your Web service is serving users over the Internet, the computer must be connected to the Internet. If your Web site will service users over an Intranet, the computer must be connected to an internal network.

Although each Web server has different requirements, there are some general conventions regarding such things as naming and server port configurations that must be followed in the installation and configuration of all server software. Review the installation and configuration instructions for your Web server software closely for these conventions.

Web server installation includes establishing access control and user authentication. A clear understanding of the level of access to be provided to users and the authentication that will be required to use the services must be established prior to installing the server.

Network infrastructure

Often, an agency LAN will be connected to the wider Internet as part of the Web project, either to provide agency staff with access to the Internet or to provide external users with WWW or email access to resources or people at the agency. This will increase network traffic at the agency. Pro-active and flexible planning can help manage the impact on your agency. The most important considerations are to provide sufficiently-powered PC's (most experts recommend at least a 486 processor) and network connections for your staff, and sufficient security for agency resources. Networking consultants can provide assistance in planning this infrastructure.

Bandwidth considerations

Planning the amount of traffic you can support on your Internet connection(s) is more art than science. Moreover, it is an important and sometimes expensive decision. Traffic will depend on many factors that may be difficult to predict, especially access by external users. Insufficient bandwidth can mean agency staff waste time waiting for WWW pages to come up, and (more significantly) clients become frustrated because they can't access the applications you offer.

You can get some idea of what to expect by contacting other similar agencies that already have Internet services or asking ISPs for ideas. Start small and expand as you build a clientele of users in the community.

Should you connect your LAN to the Internet?

Connecting an entire agency LAN to the Internet is an important decision that has significant cost implications. This will be necessary if you decide to host your own WWW server (to allow search engines, database applications, or other sophisticated services), or may be desirable if there are a large number of agency users who require access to the Internet as part of your program. A LAN or server connection requires a sophisticated connection to your telecommunications line (typically through a router), requires technical support staff to maintain and manage the

connection, and potentially opens your LAN up to other users on the Internet. While it is possible to ensure the smooth operation and security of your LAN resources, this approach introduces substantial costs into the equation. The issue of security is discussed below.

Security technologies

The security needs of your installation should receive serious attention when building your network infrastructure. Opening up your agency's LAN to the Internet can expose your LAN assets to access and modification by other Internet users if not done properly. The first step in addressing security issues is recognizing that vulnerabilities exist in all computer systems and all Internet services. Although intrusion by Internet hackers has received a lot of press, internal attacks represent a danger as well; over 80% of all break-ins come from internal staff or staff that have recently left an organization. The Computer Emergency Response Team (CERT) reports a 77% increase in break-ins between 1995 and 1996. Part of the problem is that many break-ins often go undetected.

To determine security goals, scope, and procedures, you must first know the extent of your vulnerability — what is the value of your data and systems, what are your risk factors? In developing a security approach, proper administrative and physical security are a first step. A security policy should be developed detailing who should have access to what information and which services, and establishing management and staff expectations. Everyone in the organization must understand security issues and the need for security safeguards. The technical staff must stay up to date on new tools as the security industry tries to keep up with those who try to break into systems.

Based on an understanding of Internet risks, you or your ISP can implement any of a number of security measures. These can incorporate router controls, firewalls, authentication and encryption, and a number of other technologies. If you match your security measures to your security risks you can avoid most problems and keep costs in line with the assets you want to protect.

See Appendix A.5.2 for additional resources on security topics.

Registering your domain name

When your site goes on line, it will need an Internet address that distinguishes it from all others. This is your domain name, which you register with the InterNIC. The InterNIC Registration Service is located at Network Solutions, Inc., Herndon, VA, and is funded by a cooperative agreement from the National Science Foundation to provide assistance in registering networks, domains, and other entities that are part of the Internet community. See Appendix A.1 for more detailed information on InterNIC.

Naming conventions

Computers communicate using binary codes. However, these codes tend to be long and rather difficult to remember. To simplify this and allow individuals to remember Internet addresses more readily, the Domain Name System (DNS) was created. Domain names consist of a series of words separated by periods. You can learn a lot about a site by looking at the parts of its name: host.domain(s).extension. The extension tells you either what kind of institution is hosting the site

.com	commercial organizations
.edu	educational institutions
.gov	US government organizations
.int	international organizations
.mil	military organizations
.net	network backbone systems and information centers
.org	non-profit organizations

or it gives you a geographic locator

.us	United States
.uk	United Kingdom
.ca	Canada, and so on

The domain term(s) tell you about the organizational home for the service. And the host term tells you the name of the host server. Most state and local government organizations follow the geographic model. New York State's domain name is "state.ny.us". The State Health Department domain name is "health.state.ny.us." Other agencies follow similar naming conventions.

Testing your Web service

Before making your site available to the public, it is important to test it thoroughly. The application should be tested among project members first, then among a selected audience outside of your project team, and finally by the public. Test both the underlying soundness of the application (does it work as you intended?) as well as the user's response to the interface (is it easily understood and does it create the reaction you expected?). Creation of a formal testing plan is a useful way to manage the complexity of the testing process.

Content creators should test their material to be sure it presents itself as intended. They also need to do plain old proof reading to be sure the material is error free. Other testers might include selected users (if you know who they are) or staff members who are equipped with computers, browsers, and modems that are similar to those you expect your users to have.

Some specific things to test for are:

- graphic file locations (e.g., are the right graphics showing up in the right places?)
- links to other resources (e.g., do they link to the right and best places?)
- ease of use including context statements (e.g., is useful introductory information included on menus that link to content pages?)
- accuracy of programs such as CGI and Java (e.g. do they work as intended?)
- response times for downloading graphics, executing CGI scripts, etc. (e.g. do they exceed acceptable limits for your intended users?)
- usability on a variety of platforms that you have determined are in your target audience range (e.g. do you need a high bandwidth connection, or will relatively slow modems be sufficient?)
- security assumptions (e.g. are the security features operating as planned?)

Remember, testing at initial launch is only part of the job. Every update to your service and every new document page needs to be tested before being added to your site. In addition, you should periodically test the site to be sure that you've included new links that will help your users, and that existing links still work both within the site and between your site and others.

Marketing your service to the outside world

Your organization has spent months planning and implementing your Web site, but how will anyone know you are out there? Do you want the world to know about you all at once, or do you want to try out your Web site first in friendly territory? Whatever approach you choose, when notifying the world that you exist, you need to follow the same thoughtful process that you observed when creating your Web site. The Web provides several mechanisms for getting your site "on the map:" all-inclusive search services, individual or specialized search services, listservs related to your field, and contacting other Web sites with requests that they link to yours. This section outlines how to market your site, and what to expect from different kinds of marketing efforts.

Get a little help from your friends

Now that you're ready for the big time, don't leave it to chance that someone may wander across your path. Identify who you are currently communicating with (listservs, mail, databases), notify them that you have a new Web site, provide them with the URL, and ask for honest opinions and feedback — this is marketing to your "friendly territory." Opinions will most often be positive, but don't take it personally if they aren't; learn from other's points of view and experiences.

Get other services and directories to point to you

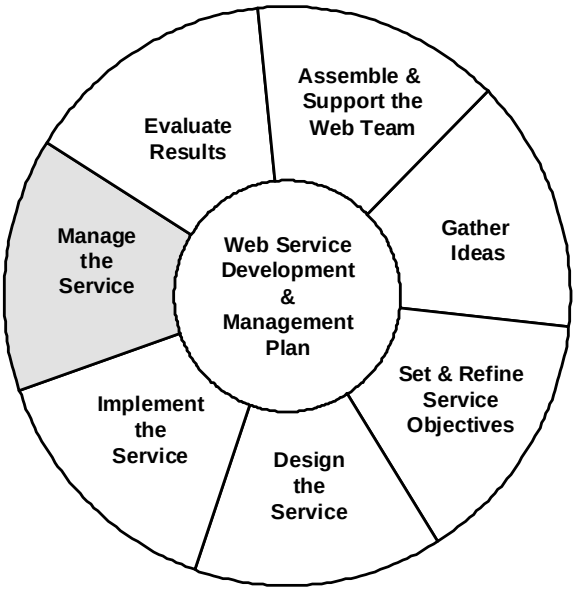
The Web provides several mechanisms for getting your site onto as many lists as possible. This is done by contacting an all-inclusive search listing service such as the one provided by Yahoo to ask them to put links to your URL onto the net. (See Appendix A.5.7.) Or you may prefer a more limited listing and choose to contact certain search and directory services individually. Contact these services to find out what portions of your site are regularly scanned to pick up descriptive information and try to put the right information in the right places so your material is indexed automatically by their software.

Choosing just a few listing services isn't a guarantee that you will not end up on everyone's list. Expect the unexpected from search engines. The web is loaded with applications called Spiders, Worms, Wanderers, Robots, and Crawlers, all of which are capable of placing links to your web site and pages in places where you never intended them to be.

It is a good idea to periodically search the Web yourself using your domain name as the search term. You will probably be surprised by the number of links to your site that others have implemented.

Chapter 6.

Managing your Web service



Web services can fundamentally change the way your organization delivers information and services to the public. As information systems, Web services require all of the organizational support afforded traditional information systems. Policies, procedures, and clearly assigned organizational responsibilities must be in place to ensure smooth delivery of services. Web services, however, require additional organizational attention for a variety of reasons. First, Web services are publicly visible information systems. Second, they change the nature of communication with customers. Third, the rapid rate of change in the underlying technologies offers many opportunities for enhancing services, but it also demands a high degree of organizational flexibility and constant learning. This chapter provides guidance for managing the impact of Web services on your organization and its customers.

Integrating a Web service with agency business processes

The content of a Web service should be based on the service objectives identified by your Strategic Framework (Chapter 3). The selection of existing information resources and services or the development of new content result from an analysis of agency business processes that support those service objectives.

If a Web service is to remain a dynamic and valuable resource to users, it must keep pace with the evolution of related business processes. To accomplish this, you must continually consider Web content as an integral part of those processes. The following questions may help:

- Has a program or policy decision been made that affects the content of your Web service?
- Is there potential for a Web service in any new or existing program area?
- What kind of service or services would most effectively be delivered over the Web?
- What impact will a new or enhanced Web service have on program staff, operations staff, and others?
- Will a new or enhanced Web service expand your customer base or provide more effective service to existing customers?
- If you attract a new set of customers, will you be able to handle the new demand for service?
- How should policies and procedures be revised to ensure that customers seeking services over the Web receive them?

You may find it helpful to return to the "roles and responsibilities" section of Chapter 1 to assess the organizational impact of these questions.

Maintaining editorial control over content

Managing the content of a complex Web service requires focused and sustained effort. Staff and managers need to be conscious of the need to reflect new and changed information on the Web as well as in traditional formats.

Be sure each page or related group of pages on your site has a content "owner." Make this an explicit part of the information structure we described in Chapter 4. This person or unit should take continuing responsibility for the accuracy of the information on those pages and needs to be responsible for testing changes and updates before they are implemented. Failure to maintain accuracy could have significant ramifications ranging from lost customers to liability issues.

An editorial board can be a helpful way to manage the content of your Web service. It can help ensure that content is consistent when presented in Web and other formats, that priorities for changing or adding content to the Web service are assigned, that useful links to new or

changed content are identified and implemented, and that policies and standards governing the use of the Web are consistently applied. If you create an editorial board, draw its members from different parts of your agency including senior management, public information, program management, and information services. The board should meet regularly, no less than once a month. Don't let it become a bottleneck.

Managing the records that result from electronic communication

The use of the Web as a mechanism for service delivery represents a new challenge for the agency that needs to keep a record of transactions. Managing the record created when a user completes an on-line form is a good example of the record keeping challenge represented by the Web. Users may register for events and apply for services through the use of on-line forms. The forms often support business transactions and therefore should contribute to the record of that transaction. The on-line form itself, however, is not a discrete file; it is a visual representation of a form. The data is actually entered into a database used in further processing. Understanding how the form captures information and integrates it into business processes is the first step toward managing the business-oriented records that may be needed. (See Appendix A.5.3 for more detail.)

Electronic mail messages also represent a record keeping challenge. Electronic mail may or may not be printed, may or may not interact with a database, and may or may not be saved. Sometimes mail represents a quick person-to-person communication, "Can you attend a meeting on Wednesday at 2:00?" Sometimes mail includes information that documents an action or decision, "Your application for benefits has been received and will be acted on in 30 days." These messages need to be handled differently. The second is probably a record, the first is probably not.

The State Archives and Records Administration (SARA) offers many resources to help agencies deal with the record keeping implications of electronic information. The Governor's Task Force recently adopted an electronic mail policy that includes the record keeping elements of this technology. SARA staff can help you identify and develop plans to address record keeping issues raised by the these technologies and offer written guidelines such as a "System Record Keeping Evaluation Worksheet." See Appendix A.4 for contact information.

Maintaining stable and reliable services

Active customer use is an obvious goal for most Web services. In order to achieve this goal, agency Web teams must design an attractive, focused, and user-friendly Web site and commit to providing an appropriate level of access. As with any service, users won't come back if services are not stable and reliable.

Selecting an appropriate level of accessibility should be based in part on the characteristics of your intended customers and in part on your organizational capacity to offer reliability and availability of the service. For example, the Office of Real Property Service (ORPS) will be providing access to the Real Property Services Manual for local assessors. Based on current practice, ORPS expects demand for access to the manual will most likely take place during work hours, possibly extending into early evening. Little late night or weekend use is expected. By contrast, the Division of Military and Naval Affairs (DMNA) will focus its first efforts on supporting military recruitment. It is likely that the DMNA site will be used intermittently and at all hours.

The planning job for the staff at the Office of Real Property Services is made easier by the fact that they have a defined set of known users, whose use can be predicted. The Division of Military and Naval Affairs, however, will have greater difficulty in selecting times to perform site maintenance and updating. Its customer group is unknown and potentially very large and their usage is not predictable. In both cases, the agency needs to define and commit to a level of service availability based on expectations about customers and its own organizational capacity. If DMNA does not now offer 24 hour service, but wants to, it will need to adjust staffing or engage in outsourcing, or take some other action in order to deliver.

A final note on this topic: all systems require some downtime for updates and for preventative maintenance. Schedule these activities as needed with adequate notice or establish a standard downtime for preventative maintenance and post the schedule on your site so visitors will know you are not broken, just practicing good management.

Keeping up with technology trends

Agency staff responsible for Web services need to maintain currency with Internet technologies and applications. Managers need to help staff strike a healthy balance between maintaining a reliable service and exploring ways to improve it. Try to provide your Web team with:

- time to use the Web itself to gather information and see what others are doing
- access to journals and magazines that discuss Internet developments
- opportunities to evaluate new technologies that may be relevant to your service objectives
- time to attend professional conferences and workshops

It is important to know how these technologies are evolving, but before moving to adopt them, be sure to revisit your business objectives. Not all services delivered over the Web need the latest and greatest technologies. On the other hand, some technologies do a much better job of achieving certain goals. You need to be well-informed to know the difference.

Building and maintaining a policy framework

Before beginning active use of the Internet, for either internal use or external service delivery, be sure you have policies in place to cover the following major areas of concern:

- Purpose of Internet use in agency business
- Appropriate use by staff
- Privacy and confidentiality of personal or sensitive information
- Security of computing and network resources
- Public access to agency records
- Records management and preservation

The first step in developing policies in these areas is to review existing policies that already apply to your agency. For example, the NYS Governor's Task Force policy statement entitled "New York State Use of the Internet" covers the overall coordination of Internet activities among state agencies and identifies agency-level responsibilities. The policy calls for a professional, comprehensive, and coordinated presence for New York State and offers a model agency-level policy that you can use as a guide.

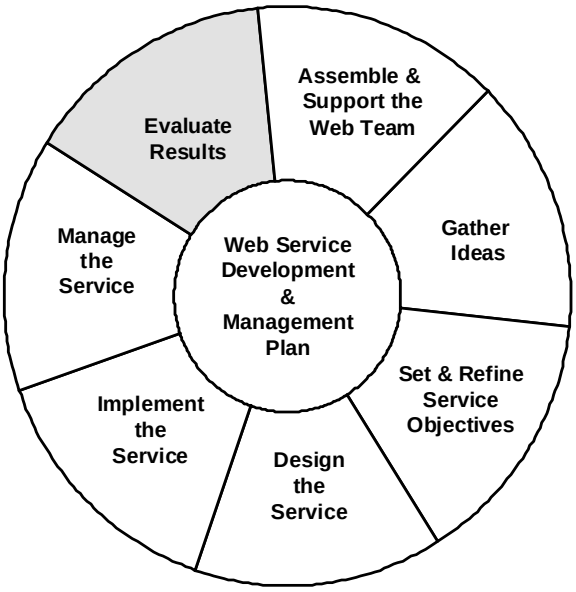
You should also review any existing policies that your agency has in place about computing, telecommunications, records management, copyright, and similar topics. Some will continue to serve you well and others will need to be updated to take the Web into account.

Specific programmatic policies, especially ones about handling personal information, may need to be updated—or may impose limits on your ability to use the Web in those program areas.

Think of policies as guiding principles, not as technology-specific procedures. The rate of change in the underlying technologies requires that policy statements focus on service objectives rather than on the technologies themselves. To the extent possible, policies should focus more on programmatic goals and less on specific mechanisms for implementation. Policies guiding the use of technology resources should be reviewed regularly (at least annually) to ensure that they remain useful and appropriate.

Chapter 7.

Evaluating the impact of your service



You've set clear service objectives, identified your customers, and designed and implemented your Web service. Now comes the big question: Is it effective? The cost and performance measures you identified along the way will help you answer this critical question.

Collect actual cost and performance data

The most important point to keep in mind when evaluating your service is the match between your performance measures and your service goals. If your intention was to publicize important information about an issue or service, then it may be appropriate to measure the number of times those pages were accessed. If your performance goal was to reduce the amount of phone support needed to answer customer inquiries, then you need to assess whether this actually occurred. If you intended to reach a new or larger audience, you must try to identify who the new customers are and whether your existing customer base has been affected as well. You need to do some serious data collection.

You can use some of the features of your Web site to help you with this task. Statistical programs and counters will keep track of the source and number of access attempts, downloads, and other activities on your Web site. You can also include feedback forms on your site, asking visitors to respond to evaluation questions.

It is also likely that you will need to collect data related to service objectives (i.e., increased "business," fewer calls to your information hotline, increased customer satisfaction) by measuring other units of work (e.g., number of phone calls or referrals), conducting surveys, collecting cost data, interviewing staff or customers, or other similar methods. Whatever methods you choose, the main point is to get empirical data to support your evaluation.

Assess efficiency and effectiveness against baseline data

Often, government agencies lack hard baseline data that can serve as a foundation for measuring performance changes. If you don't already collect performance data related to your Web service objectives, begin as soon as you identify the measures that are important to you. While your service is under development, try to get baseline data to compare to performance after implementation. Apply both efficiency (cheaper and faster) measures and effectiveness (better) measures. Does the Web service cost more or less than the traditional version of the same service? Does the Web service reach the same or different customers? Does the Web service make possible some service goal that cannot be achieved at all by traditional means? Review the material about cost and performance measures in Chapter 3 to help you focus on these tasks.

Refine or revise your service

Be prepared to refine or revise your Web service based on your evaluation results. If the evaluation indicates certain aspects of your service are burdensome or too expensive to sustain, you may want to change or drop them. If other parts are very popular or generating savings or revenue, you may want to enhance them. If you suspect more people could take advantage of your service if it were less technologically advanced, you may want to offer a simpler version. If it costs a great deal to prepare information for the Web, but customers don't seem to want it, you might return to more traditional formats. If customers seem happy with certain kinds of information, you might decide to develop additional resources of that kind. There are many possibilities that the data will suggest to you. Take the time to analyze and understand these outcomes and make your decisions accordingly.

Appendices

A.1 A Brief Catalog of Communications Capabilities Provided by the Internet

A.2 Cost Worksheet Explanation

A.3 Style Guide for New York State Web Pages

A.4 Other NYS Resources

A.5 Useful WWW Sites and Other References
- 5.1 Search Engines and Directories
- 5.2 Security
- 5.3 Common Gateway Interface
- 5.4 Web Server Resources
- 5.5 Tutorials
- 5.6 Style Guides
- 5.7 General Reference Materials

A.6 A Sampling of New York State on the Web

Appendix A.1.
A Brief Catalog of Communications Capabilities Provided by the Internet

Electronic Mail

Electronic mail refers to the electronic transfer of information typically in the form of electronic messages, memoranda, and attached documents from a sending party to one or more receiving parties via an intermediate telecommunications system. Email is helping State agencies improve the way they conduct business by providing a quick and cost-effective means to create, transmit, and respond to messages and documents electronically. Well-designed and properly managed email systems expedite business communications, reduce paperwork, and automate routine office tasks thereby increasing productivity and reducing costs. These opportunities are, however, at risk if email systems are not managed effectively.

The New York State Policy on Use of Electronic Mail, is available at the Governor's Task Force Web site, http://www.irm.state.ny.us

Listservs

There is more to email than sending one-to-one messages; one of the appeals of the Internet is to access many of the discussion groups that converse completely by email. LISTSERV is a mailing list server designed to make group communication easier. People with a common interest can join a list, and then communicate with each other by sending email to the appropriate list on LISTSERV. This mail is automatically distributed by the list server to each person on the list. It is a very convenient way to meet people and participate in interesting discussions and forums. The design of LISTSERV stresses decentralization, in terms of both management and distribution. Users are grouped into three categories, Postmasters, List Owners and Subscribers.

A comprehensive 'list of lists' may be found at ftp://sri.com/netinfo/interest-groups.txt; this list identifies each mailing list by name and includes a description of the list, and how to subscribe to it. This list is very long and may take some time to completely download to your browser. You may also get information about all known mailing lists by

typing list global at a prompt; you will receive names of more that 5,000 mailing lists. If you want more information about a specific list, type in info and the name of the list you are interested in. More detailed information about Listservs may be found at http://www.iss.nus.sg/Internet_Links/Guide_to_LISTSERV.html

Gopher

A Gopher is a public information server that provides electronic access to many information sources. It is a form of electronic document publishing; a document can be anything and may be anywhere on the Internet. Differences cannot be seen between a locally stored document, and one that is stored on a server on the other side of the world. There are some programs which scan Gopher space regularly, and then they make a searchable database of all scanned Gopher document names. These databases are searchable via a Gopher search type, and the result is a gopher menu, so everything stays within the gopher environment. Jughead and Veronica are two techniques for scanning and searching Gopher space. Jughead is a database of Gopher links, it accepts word searches and the search result can be used to access menus on gophers. Veronica is a searchable index of the titles of menu items on gopher servers.

FTP

The File Transfer Protocol is an application program which moves files between computers connected to the Internet independent of machine type or operating systems. 'Monster FTP Sites List' may be found at http://hoohoo.ncsa.uiuc.edu/ftp/.

More information about FTP may be found at ftp://nic.merit.edu/documents/rfc/rfc0959.txt, or by typing "definition of FTP" (use the quotes in your search) in the entry line of any of the search engines that are available on the Internet.

WWW

The World Wide Web is an information and communication environment which uses hypertext to organize, connect, and present information and services located throughout the Internet; it is a system for finding and accessing information resources.

The Web contains documents in many formats, those documents which are hypertext contain links to other documents, or places within documents. To follow a link, a reader selects the highlighted and/or underlined word or phrase in order to reach the linked word(s) or documents.

The WWW browsers can access many existing data systems via existing protocols (FTP, NNTP) or via HTTP and a gateway. In this way, the critical mass of data is quickly channeled, and the increasing use of the system by readers and information suppliers fulfill each other.

The WWW model gets over the frustrating incompatibilities of data format between suppliers and reader by allowing negotiation of format between a smart browser and a smart server. This should provide a basis for extension into multimedia, and allow those who share application standards to make full use of them across the Web.

Intranets

Intranets are private networks that use the infrastructure of the Internet and the World Wide Web but are cordoned off from the public Internet to transparently deliver the informational resources of an organization to each individual's desktop.

InterNIC

In cooperation with the Internet community, the National Science Foundation developed and released in the Spring of 1992 a solicitation for one or more Network Information Services Managers (NIS Manager(s) to provide and/or coordinate services for the NSFNET community. As a result of this solicitation, three separate organizations were competitively selected to receive cooperative agreements in the three areas of Registration Services, Directory and Database Services, and Information Services. Together these three awards constitute the InterNIC. Network Solutions, Inc. (NSI) provides REGISTRATION services, AT&T provides DIRECTORY and DATABASE services, and General Atomics/CERFnet provides INFORMATION services.

InterNIC provides:

- Registration Services: domain name registration and IP network number assignments
- Directory and Database Services: white pages and publicly accessible databases

- Support Services: outreach, education, and information services for the Internet community
- Net Scout Services: presenting the Scout Report and Net-happenings publications

InterNIC is available at http://rs.internic.net

Appendix A.2.
Cost Worksheet Explanation

		One-time Cost	Annual Cost
Organizational Readiness			
Planning for Internet Presence	1		
Training for Technology Awareness	2		
Access for Agency Staff and other users			
Hardware for End Users	3		
Software for End Users	4		
Network and Internet Access for End Users	5		
Other Vendor Services	6		
Human Resources			
Start-up Process for Equipment Procurement	7		
Establish and Manage Vendor and ISP Contracts	8		
End User Support			
Vendor Services	9		
Human Resources			
Establish and Manage Vendor and ISP Contracts	10		
Development and Delivery of User Training	11		
User Time in Training	12		
Help Desk for Users	13		
Content Development and Maintenance			
Hardware for Content Developers	14		
Software for Content Developers	15		
Network and Internet Access for Content Developers	16		
Other Vendor Services	17		
Human Resources			
Start-up Process for Equipment Procurement	18		
Establish and Manage Vendor and ISP Contracts	19		
Development and Delivery of Staff Training	20		
Webmaster	21		
Content Creators/Providers	22		
Content Coordinators	23		
Web Site Design and Development	24		
Editorial Review	25		
Program Area Liaisons	26		
Database Administration	27		
Other Management Support	28		
Other Clerical Support	29		
Host of Site-Infrastructure			
Hardware	30		
Software	31		
Network and Internet Access	32		
Other Vendor Services	33		
Human Resources			
Front-end Research and Technical Evaluation	34		
Start-up Process for Equipment Procurement	35		
Establish and Manage Vendor and ISP Contracts	36		
Development and Delivery of Staff Training	37		
Network Administrator	38		
Systems Administrator	39		
Server Manager	40		
Operations Staff	41		
Programming Staff	42		
Clerical Staff	43		
HUMAN RESOURCES SUBTOTAL			
INFRASTRUCTURE AND OTHER SUBTOTAL			
TOTAL COSTS			

Organizational Readiness

Often, the development of the first Internet-based project in an agency requires a great deal of planning and support to get off the ground. The Internet is relatively new, few government agencies have first-hand experience with Internet services, the technology is rapidly changing, there is a lot of both good and bad press about the Internet, and the user base is quickly developing.

This category includes the resources necessary to get the agency to the point where implementation of the Internet-based service is feasible. It includes training, demonstration projects, and other educational activities designed to help agency management and staff make sound decisions about the proposed project and its technology.

Line	Human Resources Costs	Description
1	Planning for Internet Presence	This category includes the management, technical, program, and policy staff resources to plan for the service. This includes project development, review, and fiscal analysis on the project. The plan should include a front-end evaluaton of inhouse versus outsourcing options. Specific tasks include: strategic planning for services/identification and structuring of information/cost-performance analysis/internal marketing/team formation/identify liaisons for program areas/define roles and responsibilities/develop staff expertise/promote intraorganizational cooperation/assure executive level support/conduct successful pilot/guarantee post-implementation web site support/advance public relations.
2	Training for Technology Awareness	This category includes the training and demonstration activities necessary to acquaint the agency management and staff with the potential of Internet-based services. It includes exploratory investigations and trials of the Internet, best practices research and demonstrations, development and demonstration of preliminary prototypes, and training and self-study of staff involved in the decision-making.

Access for Agency Staff and Other Users

Depending on the goals of the project, it may be necessary for agency staff to be able to browse the WWW, receive and respond to electronic mail, communicate with other staff, and have access to specially developed internal Intranet applications. You may have this infrastructure in place, or it might need to be developed further for a successful project. While this equipment might serve other purposes in addition to the specific activities of the Internet-based project (such as general office automation and communication), if it is necessary for the success of the project its cost must be considered in the cost of the entire project. How much of the cost is charged to the Internet project varies depending on circumstances.

If the project provides support for access by others, these costs should be included here.

Line	Infrastructure Costs	Description
3	Hardware for End Users	The annual cost should include hardware upgrades.
4	Software for End Users	This includes network software, WWW browsers, other Internet software, security software. The annual cost should incude software upgrades.
5	Network and Internet Access for End Users	This category includes all capabilities needed to provide access to the Internet services from the end users' PCs. In almost all cases, a unit external to the agency that provides access to the Internet will be involved. This "Internet Service Provider" or "ISP" can provide access to the Internet in a number of ways. Individual accounts with dial-in access to an ISP provides an inexpensive starting approach that grows as the number of users increases. This approach requires modem access, either directly or through a LAN, for each user of the services. Alternatively, an agency's LAN or mainframe computers may be connected to the ISP, either through a dial-up or leased connection, at a higher cost but with increased flexibility. This method involves security considerations because, depending on the configuration, the agency resources may be available to other Internet users.What exactly is included depends on whether you intend to connect the LAN or use dial-in from individual PC's. Depending on the plan, this may include network interface cards, modems, hubs, routers, switches, and firewalls. Line charges for the access should also be included.
6	Other Vendor Services	This may include network design and installation, PC configuration, and maintenance.
Line	**Human Resources Costs**	**Description**
7	Start-up Process for Equipment Procurement	This should include costs of the purchasing department as well as the installation and testing of the network if that is to be done in-house.
8	Establish and Manage Vendor and ISP Contracts	This includes all costs related to managing the outsourced activities. One-time cost includes the front-end time to establish the contract. Ongoing costs include the site manager and contract administration/coordination.

End user support

Staff and other users of the system will need training and help-desk support to make effective use of the resources. Studies have indicated that formal training is less costly than self-learning. The training and day-to-day support may be provided in-house, or outsourced to a separate organization.

Line	Infrastructure Costs	Description
9	Vendor Services	If any components of the support are outsourced, include this cost here.
10	Establish and Manage Vendor Contracts	This should be included if line 9 is not-zero.
Line	**Human Resources Costs**	**Description**
11	Development and Delivery of User Training	This should include only the cost of development, not staff time in receiving the training.
12	User Time in Training	This should include staff time spent in both self-help and formal training
13	Help Desk for Users	This should include all costs of day-to-day support

Content development and maintenance

Developing a suite of information and services that will be provided on the Internet entails, at a minimum, converting the information into a form that can be delivered to recipients by WWW servers. At present, this often requires specialized "mark-up" activities that require special skill and can be time-consuming. This is an area in which the support tools are rapidly changing, and project plans need to be reassessed frequently to keep up with the current technology.

If the intended application involves two-way communication, either via electronic mail, by fill-in forms that users can access via the WWW, or by specialized applications that link agency databases and other applications to the WWW front end, then the cost of developing the service may be substantial. Specialized programming skills and on-site hosting of the WWW site may be required.

Once again, development of the content may be done completely in-house, or (portions of) it may be outsourced. The latter is often done for the initial development to get a jump-start on developing the services.

In the categories below, a number of different functions related to developing and maintaining the Internet service are detailed. In a large organization, these functions may be done by separate staff members; in a smaller agency one person may perform more than one of these functions.

Line	Infrastructure Costs	Description
14	Hardware for Content Developers	Similar to line 3.
15	Software for Content Developers	Includes page creation tools (graphics tools and HTML tools), application development tools (CGI scripting tools, VRML authoring tools, GIS), variety of web browsers, database interface, document creation and conversion software, design manuals and reference materials. The annual cost should include upgrades
16	Network and Internet Access for Content Developers	If a LAN connection has been provided for general users, this may suffice for the content providers as well. However, if individual dial-in accounts have been established, there may be an additional cost for the content providers.
17	Other Vendor Services	All other outsourced costs related to content development go here.
Line	**Human Resources Costs**	**Description**
18	Start-up Process for Equipment Procurement	Similar to line 7.
19	Establish and Manage Vendor Contracts	This should be included if line 17 is not-zero.
20	Development and Delivery of Staff Training	This includes the training of content providers, and may be done internally or contracted out. This should include the cost of the training only; staff time to attend the training should be included in the staff costs below.
21	Webmaster	This person is responsible for overall coordination of the WWW-based service.
22	Content Creators/Providers	These individuals provide information to be made available on the WWW service. Typically they are from the program offices or the public information office.
23	Content Coordinators	Managers that are involved in the selection and maintenance of content
24	Web Site Design and Development	Include initial time to be properly trained in one-time cost; include time of programers, page designers, graphic designers, HTML coders.
25	Editorial Review	Staff that ensure the consistency and quality of information that goes on the WWW site.
26	Program Area Liaisons	Staff that provide a coordination role in creating a coherent agency message.
27	Database Administration	Staff that manage the content of information provided in agency databases linked to the WWW.
28	Other Management Support	For coordination, approvals, auditing.
29	Other Clerical Support	For necessary typing and other routine tasks.

Host of site

A system containing a WWW server and space to store the information must be available, usually on a 24 hour a day, seven days a week basis to support a Web site. This may be accomplished through outsourcing or connection of an agency's WWW server. While outsourced hosting can support simple informational Web pages and electronic mail, more advanced two-way applications typically require development of a custom WWW server application to provide that service.

Again, several roles and responsibilities are defined below. Unlike the previous category, these are typically done by different individuals, although a very small organization may combine some of these roles.

Line	Infrastructure Costs	Description
30	Hardware	This may include security hardware such as firewalls and proxy servers.
31	Software	This may include database servers, WWW servers, search engines, monitoring tools, and security software.
32	Network and Internet Access	This may have already been included in earlier categories of network access.
33	Other Vendor Services	Outsourcing for design, installation, and maintenance.
Line	**Human Resources Costs**	**Description**
34	Front-end Research and Technical Evaluation	There are a number of technical considerations related to providing a WWW service, particularly whether to host the site in-house or outsource it. Typically the cost of performing this evaluation is significant since the technology and issues are so new.
35	Start-up Process for Equipment Procurement	Similar to line 7.
36	Establish and Manage Vendor Contracts	This should be included if line 33 is not-zero.
37	Development and Delivery of Staff Training	This does not include the time of the technical staff to attend the training which should be incorporated in lines 38-43.
38	Network Administrator	This will be a component whenever a LAN is involved in the Internet service.
39	Systems Administrator	The workload of maintenance staff on agency computers will be increased if the service is hosted on an agency computer.
40	Server Manager	Someone to install and maintain the operation of the WWW server, search engines, and other Internet services
41	Operations Staff	There may be an increase in workload due to such needs as backup and installation services.
42	Programming Staff	Many custom services such as database access and automatic form handling require programming activities.
43	Clerical Staff	There may be increased workload if such services as printing, mail-back, and other information services are included.

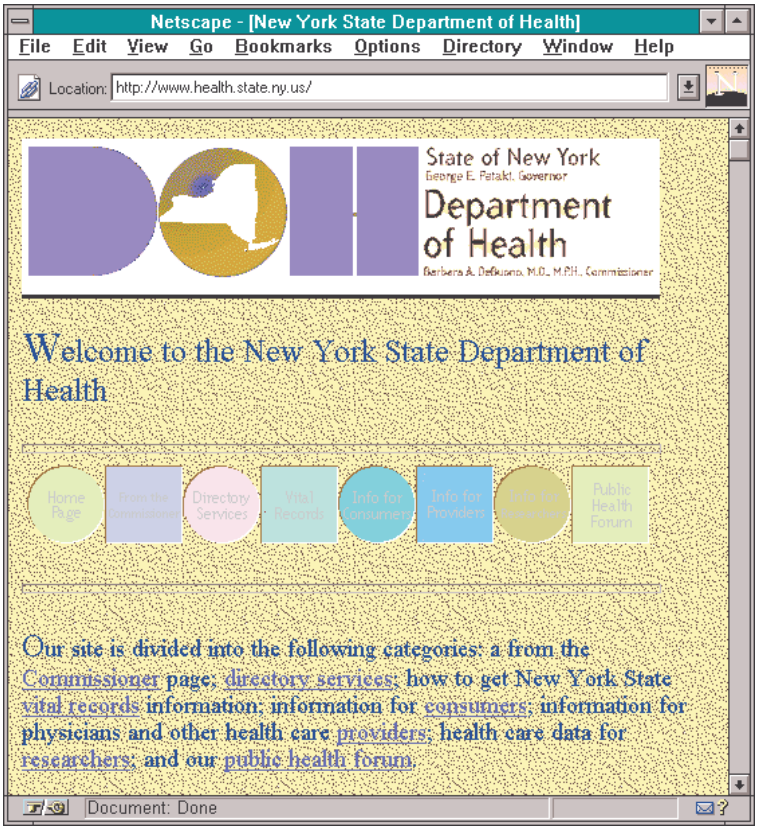
Appendix A.3.
Style Guide for New York State Government Web Pages

This style guide recommends standard practices that all New York State Government Web sites should observe. They are intended to ensure easy navigation and speedy downloading for users, standard identification of the responsible agency, and a minimally useful level of interconnection among New York State sites. Recommendations are listed for home pages, menu pages, content pages, page backgrounds, and graphics. Examples from real NYS Web sites are provided which demonstrate good practices in each of these areas. These illustrations only provide one screen view of the site. Please visit each of these sites to fully review the style implemented.

New York State agencies are required, as stated in the New York State Use of the Internet policy, to provide a link from their agency site to the New York State Home Page (**http://www.state.ny.us**)

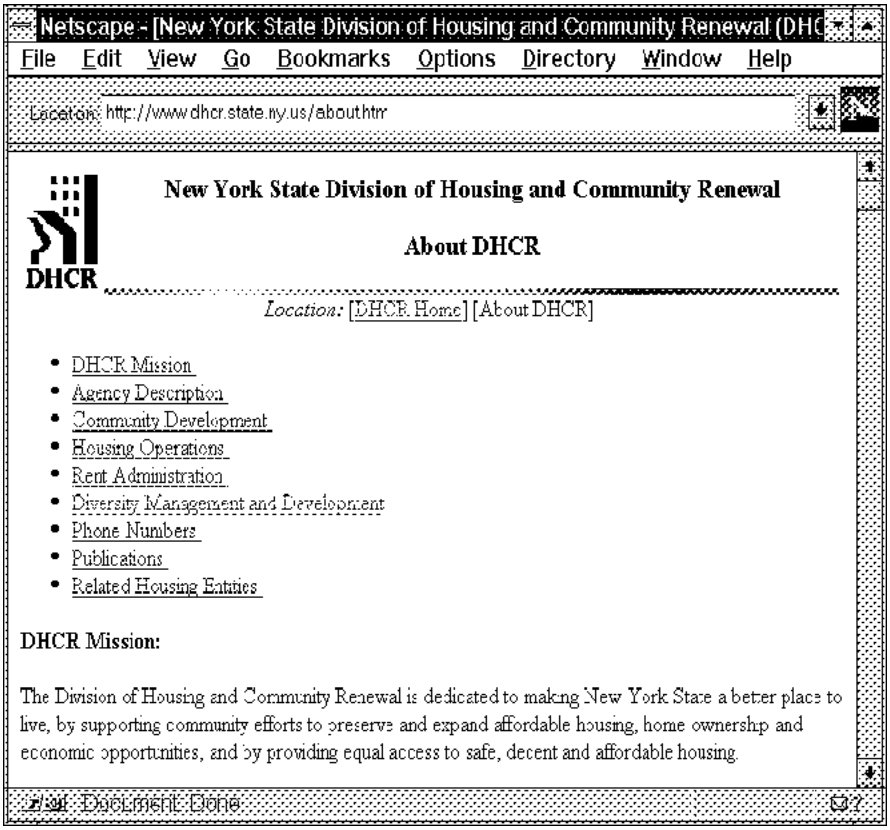
Home Page:

- Clearly identify your organization and give contact information
- Give an overview of the contents of your entire Web site through buttons, headings, or an illustrative map
- Use graphics judiciously; they can cause long delays in downloading



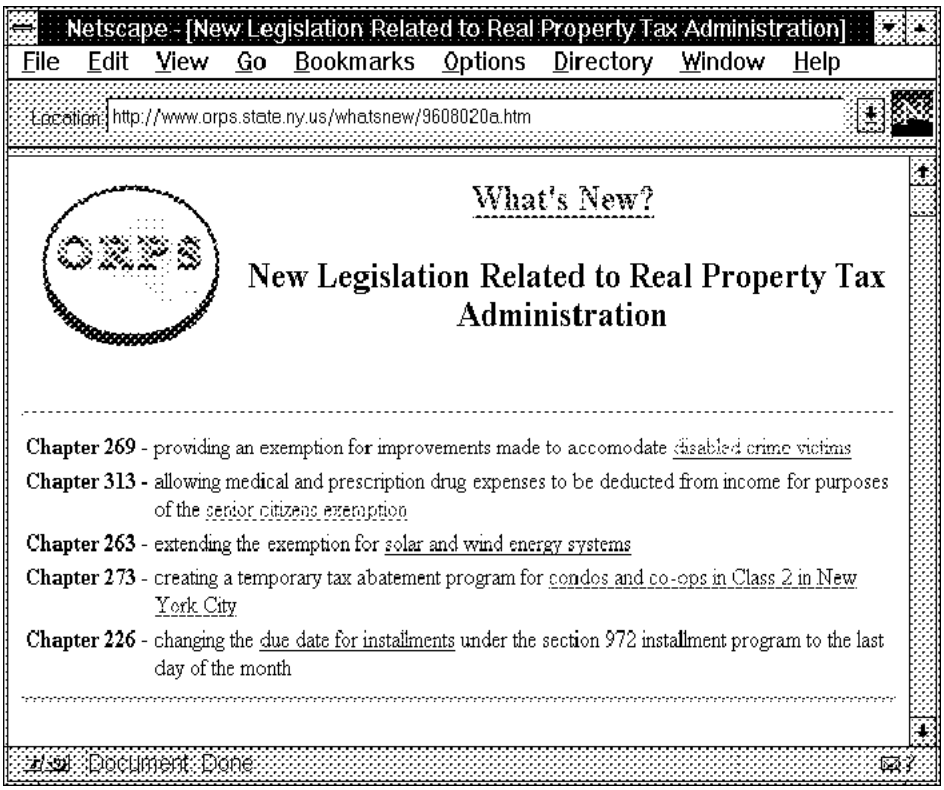
Menu Page:

- Page heading or title. Use the head and title tag in the HTML code so the page title appears in the page identification bar of the browser
- A brief description of the contents of each menu item
- A text navigation bar linked to the major segments of your Web site
- A graphic navigation bar linked to the major segments of your Web site
- A top of page icon or text command
- A home page icon or text command
- A standard identifying footer containing:
  - Organization name, mailing address, email address, fax and phone numbers
  - URL for the page
  - Date of last update to the page



Content Page:

- Page heading or title. Use the head and title tag in the HTML code so the page title appears in the page identification bar of the browser
- A table of contents if the page is more than two screens long
- Content arranged from the customer's point of view. Avoid long pages of text without subheadings. Avoid long lists of items that require linking to another page before the reader gets to any substantive information
- A text navigation bar linked to the major segments of your Web site
- A graphic navigation bar linked to the major segments of your Web site
- A top of page icon or text command
- A home page icon or text command
- A standard identifying footer containing:
  - Organization name, mailing address, email address, fax and phone numbers
  - URL for the page
  - Date of last update to the page

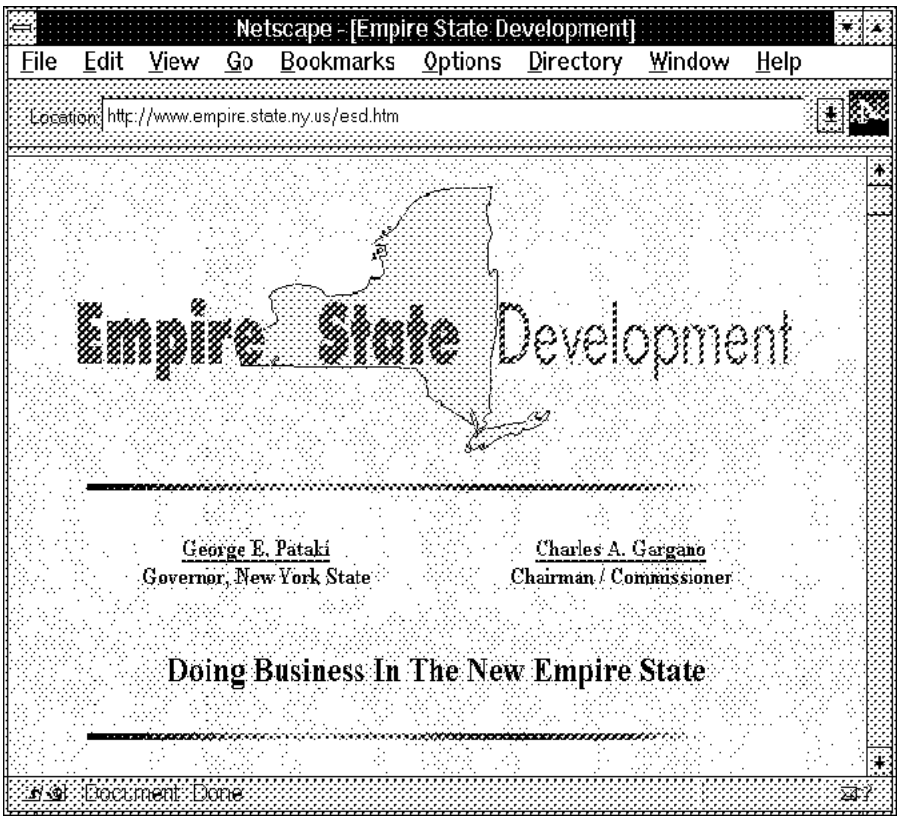


Links:

- Two links are required on all NYS Web sites. They may be located in any logical page within the site:
  - New York State Home Page [http://www.state.ny.us]
  - New York State Government Information Locator [http://www.nysl.nysed.gov/ils/]
- Include internal links that help a user move logically among the elements of your web site
- Include external links to other web sites that offer related information or services.
- Avoid useless links. It is much better to include a few links to valuable sites than to include many links to ones of questionable value.
- Test all links periodically to be sure they still work as intended.

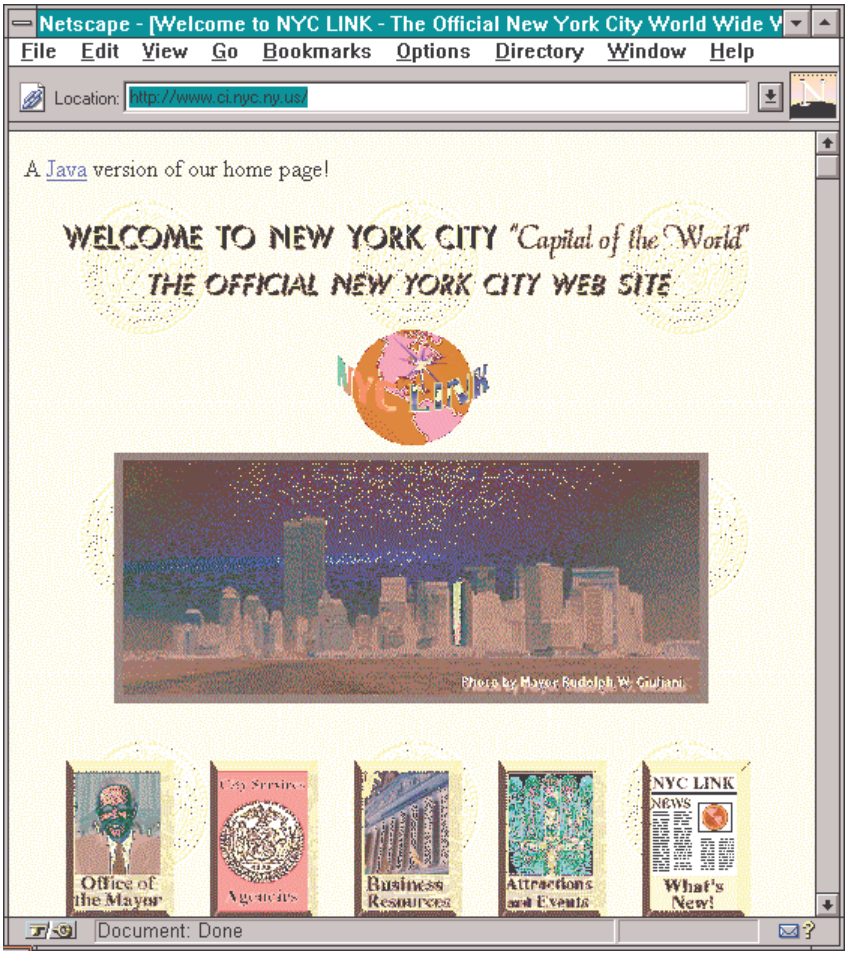
Page Backgrounds:

- **Keep backgrounds simple so they do not delay downloading or interfere with the user's ability to read the text**
- **A background that repeats an embossed New York State seal is available for optional use. Most browsers allow access to information about the files in use at a Web site and support retreival of copies of appropriate files. Visit a Web site like the one below and use the features of your browser to obtain a copy of the background file.**



Graphics:

- Use graphics only when they add value to the page. Use the smallest graphic possible to convey your message. Include the size of each graphic in the HTML code to speed up downloading. Use thumbnail-size graphics and photos wherever possible and give users the option of viewing them as full size.
- Most browsers allow access to information about the files in use at a Web site and support retreival of copies of appropriate files. Visit a Web site like the one below and use the features of your browser to obtain a copy.



Appendix A.4.
Other NYS Resources

Governor's Task Force on Information Resource Management
Camaron Thomas, Director
Executive Chamber
State Capitol
Albany, NY
Phone (518) 474-0865
Fax (518) 473-3389
http://www.irm.state.ny.us

Center for Technology in Government
Sharon Dawes, Director
Performing Arts Center 264
University at Albany
Albany, New York 12222
Phone (518) 442-3892
Fax (518) 442-3886
Email: info@ctg.albany.edu
http://www.ctg.albany.edu

ICEDP
Susan Herrmann, Chairperson
Chief of Data Processing Services
NYS Department of Civil Service
State Campus Building 1A
Room 225
Albany, NY
Phone (518) 457-0952
Fax (518) 485-5752
Email: smk@mail.cs.state.ny.us
http://www.icedp.org
Special Interest Groups
- **Technology**
- **Information Management**

Local Government Telecommunications Initiative
Tony Pascarella, Project Director
Hudson Valley Community College
HRAC Bldg. Room 523
80 Vandenburgh Avenue
Troy, NY 12180
Phone (518) 270-1519
Fax (518) 270-1546 or 7587
Email: pascarea@nyslgti.gen.ny.us
http://nyslgti.gen.ny.us/

New York State Forum for Information Resources Management
Terrence Maxwell, Executive Director
NYS Forum
411 State Street
Albany, NY
Phone (518) 443-5001
Fax (518) 443-5006
Email: info@nysfirm.org
http://www.nysfirm.org/

New York State Library
Kathleen DeMers, Web Coordinator
NYS Library
Cultural Education Center
Albany, NY
Phone (518) 486-2666
Fax (518) 474-5786
Email: kdemers@unix2.nysed.gov
http://www.nysl.nysed.gov/

State Archives and Records Administration and the Information Locator Service
Thomas Ruller, Associate Archivist
Department of Education
Cultural Ed. Ctr. Room 9C71
Empire State Plaza
Albany, NY
Phone (518) 474-6771
Fax (518) 473-7573
Email: TOM@UNIX6.NYSED.GOV
http://www.sara.nysed.gov/
http://www.nysl.nysed.gov/ils/

Appendix A.5
Useful WWW Sites and Other References

Appendix A.5.1 Search Engines and Directories

Appendix A.5.2 Security

Appendix A.5.3 Common Gateway Interface

Appendix A.5.4 Web Server Resources

Appendix A.5.5 Tutorials

Appendix A.5.6 Style Guides

Appendix A.5.7 General References

Note: It is the nature of the Web that links move or become inactive over time. The URLs provided here were all active and relevant in August 1996.

Appendix A.5.1
Search Engines and Directories

Infoseek ..... http://guide.infoseek.com/Home/

Excite ..... http://www.excite.com/

Open Text Index ..... http://www.index.opentext.net/

Point ..... http://www.pointcom.com/

Hot Bot ..... http://www.hotbot.com/

IBM Info Market ..... http://www.infomarket.ibm.com/

Lycos http://a2z.lycos.com/

Yahoo! ..... http://www.yahoo.com/

Alta Vista ..... http://altavista.digital.com/

C|Net's Shareware.com ..... http://www.shareware.com/?netscape.swbtn

100 Hot Websites http://www.100hot.com/

Magellan ..... http://www.mckinley.com/

The Electric Library http://www.elibrary.com/id/2525/

Accu Find ..... http://nln.com/

Appendix A.5.2
Security

Center for Technology in Government ... http://www.ctg.albany.edu/projects/inettb/security.html

CIAC - US Department of Energy,
Computer Incident Advisory Capability ..... http://ciac.llnl.gov

NIST - National Institute of Standards and Technology,
Computer Security Resource Clearinghouse ..... http://csrc.ncsl.nist.gov/

NCSA - National Computer Security Association ..... http://www.ncsa.com/ncsamain.html

Firewalls - Internet Firewalls
Frequently Asked Questions .....http://www.greatcircle.com/firewalls/info/FAQ.html

The World Wide Web Security FAQ,
The Whitehead Institute, MIT ..... http://www-genome.wi.mit.edu/WWW/faqs/
..... www-security-faq.html#contents

Appendix A.5.3
Common Gateway Interface

Complete details on the construction of the search mechanism for the New York State Spatial Data Clearinghouse, including sample documents and the program code, is available on the NYS Clearinghouse under URL
..... http://www.ctg.albany.edu/gis/srchdoc.html

The Common Gateway Interface ..... http://hoohoo.ncsa.uiuc.edu/cgi/primer.html

The Common Gateway Interface standard ..... http://hoohoo.ncsa.uiuc.edu/cgi

Appendix A.5.4
Web Server Resources

Internet World's Web Server Comparison Site ..... http://webcompare.iworld.com/

Web Server Comparative Benchmarking -
Independent Source ..... http://www.strom.com/places/bench.html

A Comparison of HTTPD -
Server Daemons ..... http://union.ncsa.uiuc.edu/HyperNews/get/www/httpd.html

SunWorld Online -
Web Server Article http://www.sun.com/sunworldonline/swol-05-1996/swol-05-
..... webservers.html

Appendix .5.5
Tutorials

Writing HTML ..... http://www.mcli.dist.maricopa.edu/tut/lessons.html

Advanced HTML, Tables and Forms ..... http://www.stars.com/Tutorial/HTML/

How to create a homepage' ..... http://www.umich.edu/how-to-homepage.html

A Guide to HTML Commands ..... http://www.woodhill.co.uk/html/html.htm

Another Forms tutorial ..... http://robot0.ge.uiuc.edu/~carlosp/cs317/ft.2.html

Books, Tutorials & Hint Sheets
For Internet Learning ..... http://www.charm.net/learning.html

Forms Tutorial ..... http://www.webcom.com/webcom/html/tutor/forms/start.html

HTML Resource List ..... http://www.unb.ca/web/wwwdev/neil.html

HTML Table Tutorial ..... http://www.charm.net/~lejeune/tables.html#TABLE01

Internet Resources ..... http://www.sjca.edu/~filitis/htmprog.htm#help

Learning to Publish http://www.ece.utexas.edu/lrc/lrc1/web/HTMLhelp.html

Mailto 1.5 ..... http://www.cold.org/~brandon/Mailto/

Network Resources ..... http://hiwaay.net/~crispen/us/net.html#Tutorials

Science Universe—
HTML, INFO, APPS AND IMAGES ..... http://rio.atlantic.net/~sinclair/schtml.htm

Search Engine Tutorial for Web
Designers ..... http://www.digital-cafe.com/~webmaster/nw01 05.htm

Tutorials ..... http://www.nauticom.net/tutorials.html

Unix Tutorials gopher://jake.esu.edu/11/Help/Tutorials

Using HTML—QUE ..... http://www.sdsc.edu/vrml/

VRML Repository ..... http://rosebud.sdsc.edu/SDSC/Partners/vrml/software/textures.html

Where to Learn About Creating Webpages .. http://rio.atlantic.net/~bombadil/nuthin/create.htm

Appendix A.5.6
Style Guides

Web Style Manual,
Yale Center for Advanced
Instructional Media,
Patrick J. Lynch, MS ..... http://info.med.yale.edu/caim/StyleManual_Top.HTML

U.S. Department of Education,
World Wide Web (WWW)
Server Standards and Guidelines ..... http:/inet.ed.gov/~kstubbs/wwwstds.html

World Wide Web Consortium http://www.w3.org/pub/WWW/Style/

NASA / Marshall
Space Flight Center ..... http://www.msfc.nasa.gov/webmasters/webmasters.html

National Center for
Supercomputing
Applications (NCSA) ..... http://www.ncsa.uiuc.edu/Pubs/StyleSheet/NCSAStyleSheet.html

The HTML Writers Guild ..... http://www.hwg.org/resources/html/

Yahoo HTML Guide Index ..... http://www.yahoo.com/Computers/World_Wide_Web/
..... Page_Design_and_Layout/

Appendix A.5.7
General Reference Materials
Topic Reference

Site Announcement Services ..... www.yahoo.com/computers_and_
..... Internet/Internet/World/World_Wide_Web/
..... Announcement_Services

What is the World-Wide Web? .... http://www.iss.nus.sg/Internet_Links/Summary_WWW.html

Internet Tools Summary http://www.december.com/net/tools/toc1.html

InterNIC ..... http://www.internic.net/pub/InterNIC-info/internic.info

Useless Links http://www.webweek.com/96July22/news/deadlink.html
..... http://info.med.yale.edu/caim/StyleManual_Top.HTML
..... http://www.pippin.com/English/Search/allkiosk.htm

Unix Reference ..... **Unix for Dummies,** 2nd Edition;
..... by John R. Levine and Margaret Levine Young

HTML Reference ..... **HTML Sourcebook**; by Ian S. Graham

Internet Reference ..... **The Internet Roadmap** 2nd Edition; by Bennett Falk

Beyond Bookmarks:
Schemes for Organizing
the Web ..... http://www.public.iastate.edu/~CYBERSTACKS/CTW.htm

Design of HTML Pages to
Increase Their Accessibility
to Users with Disabilities http://www.trace.wisc.edu/00/ftp/PUB/TEXT/
..... CURBCUT/WORKING/HTML_DSN.TXT

Text Based Web Conferencing ..... http://freenet.msp.mn.us/~drwool/webconf.html

The Net: User Guidelines and Netiquette ..... http://www.fau.edu/rinaldi/netiquette.html

InterNIC Directory and Database Services ..... http://www.internic.net/tools/

InterNIC Directory of Directories ..... http://ds.internic .net:80/ds/dsdirofdirs.html

Webmaster Job
Description ..... http://jazz.sci.csupomona.edu/Web_Development/Webmaster.html

Appendix A.6
A Sampling of New York State on The Web

Adirondack Park Agency ..... http://www.northnet.org

Center for Technology in Government ..... http://www.ctg.albany.edu/

Commission on Correction ..... http://crisny.org/government/ny/nysscoc/index.html

Court Administration ..... http://nyslgti.gen.ny.us/oca

Department of Civil Service ..... http://www.cs.state.ny.us/

Department of Correctional Services ..... http://www.corcraft.gov/

Department of Health ..... http://www.health.state.ny.us/

Department of Labor ..... http://www.labor.state.ny.us/

Department of Labor, America's Job Bank ..... http://www.ajb.dni.us/

Department of Social Services ..... http://www.state.ny.us/dss/

Department of State ..... http://www.state.ny.us/access.html
..... http://www.state.ny.us/dos

Division of Housing and Community Renewal ..... http://www.dhcr.state.ny.us/

Division of Human Rights ..... http://www.dhr.nysed.gov/

Division of Military and Naval Affairs ..... http://www.dmna.state.ny.us/

Dormitory Authority ..... http://crisny.org/government/ny/nysdorm/index.html

Empire State Development ..... http://www.empire.state.ny.us/
..... http://www.iloveny.state.ny.us/

Governor's Office of Regulatory Reform ..... http://www.state.ny.us/

Higher Education Services Corporation ..... http://hesc.state.ny.us/

NYS Assembly ..... http://assembly.state.ny.us/

New York State Library ..... http://www.nysl.nysed.gov/

NYS Senate ..... http://www.senate.state.ny.us/

NYS Forum for Information Resource Management ..... http://www.nysfirm.org/

Office for the Aging ..... http://www.aging.state.ny.us/nysofa/

Office of Alcoholism and Substance Abuse Services ..... http://www.oasas.state.ny.us/

Office of General Services ..... http://www.ogs.state.ny.us/

Office of Mental Health ..... http://www.omh.state.ny.us/

Office of Mental Health, Wadsworth Center ..... http://www.wadsworth.org/

Office of Real Property Services ..... http://www.orps.state.ny.us/

Office of the State Comptroller ..... http://www.osc.state.ny.us/

Public Service Commission ..... http://www.dps.state.ny.us/

State Archives and Records Administration ..... http://www.sara.nysed.gov/

State Education Department http://unix6.nysed.gov/
..... http://www.nysed.gov/

SUNY at Albany ..... http://www.albany.edu/

SUNY Research Foundation ..... http://www.rf.sunycentral.edu/home.htp

SUNY System Administration ..... http://infostu.suny.edu/
..... http://www.suny.edu/

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Center for Technology in Government

Handbook Evaluation

We would like to have your feedback on our handbook.
Please take 5 minutes to fill out this short and return it to us by fax or mail. Thank you.

Handbook Title: _____ Date: _____

1. Where did you hear about the handbook?

☐ Corporate partner ☐ Newsletter
☐ CTG Program ☐ Press Release
☐ Web site ☐ Word of mouth, if so who?_____

☐ Other: _____

2. Did you buy/download any other CTG handbooks? ☐ Yes ☐ No

If yes, which one(s):
☐ Making Smart IT Choices
☐ Tying a Sensible Knot: A Practical Guide to State-Local Information Systems
☐ Developing and Delivering Government Services on the WWW
☐ A Cost/Performance Model for Assessing WWW Service Investments

3. If you downloaded a handbook, did you experience any problems? ☐ Yes ☐ No

If yes, please explain_____

4. Do you think you will buy/download another one if it suits your interest? ☐ Yes ☐ No

If no, why?_____

5. Who in your organization read/used the handbook?

☐ Technical Staff ☐ Program Managers ☐ Other: _____
☐ Senior Managers ☐ Project Management Specialists

6. Please rate the following statements about the handbook:

The handbook was easy to read and understand:	1 Strongly Agree	2	3	4	5	6	7 Strongly Disagree
The handbook was useful for my current work:	1 Strongly Agree	2	3	4	5	6	7 Strongly Disagree
The handbook should be more technical:	1 Strongly Agree	2	3	4	5	6	7 Strongly Disagree
The examples in the handbook were useful for my organization:	1 Strongly Agree	2	3	4	5	6	7 Strongly Disagree

7. How did you or how are you planning to use the handbook?

☐ Personal development ☐ Staff training
☐ Reference ☐ Other: _____

_____

8. Did you implement any of the practices/methods described in the handbook? ☐ Yes ☐ No

If yes, which ones: _____

If no, why: _____

9. Are you planning to implement any of the practices/methods described in the handbook?

☐ Yes ☐ No

If yes, which ones: _____

If no, why: _____

10. Please describe how the handbook affected or will affect your department:

_____

_____

11. Would you be interested in attending a one-two day professional development workshop based on the handbook?

☐ Yes ☐ No

Any other comments?

_____

Name: _____

Title: _____

Organization: _____

Type of organization: ☐ Corporate ☐ Local Gov't ☐ State Gov't ☐ Other

Address: _____

City: _____State: _____ Zip: _____

E-mail address: _____

Would you like to be added to our paper mailing list? ☐ Yes ☐ No

Would you be interested in being added to the CTG Web site update distribution list? ☐ Yes ☐ No

Please return to:

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University at Albany, SUNY
1535 Western Avenue
Albany, NY 12203
Phone: (518)-442-3892
Fax: (518)-442-3886