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By looking at the kinds of jobs a CMS requires, you can get a lot of insight into what it will take to make one happen. You can classify the jobs involved in a CMS in the following ways:

- ✂ ✂ Each phase of the CMS process (collection, management, and publishing) has its own jobs and responsibilities. In a well-planned CMS, the people in these three areas can do their jobs without becoming overly entangled in the jobs of people in the other areas.
- ✂ ✂ CMS jobs generally break down into analysis and implementation. Analyzers figure out what to do and implementers do it.
- ✂ ✂ There are jobs that you need to design and start up a CMS and there are those you need to run one. Often it takes a large team to start up a CMS but a small team to run it. A common method is to outsource all or parts of the CMS design and implementation effort to an outside vendor while simultaneously putting together the longer-term team that will run the system once it's complete.
- ✂ ✂ CMS jobs can be categorized by discipline, including managers, information architects, infrastructure staff, and software developers.

In this white paper I use the last system here to categorize the jobs in a CMS because it balances being comprehensive with dividing the jobs into more than just a couple of categories.

About the CMS Jobs

Your CMS may affect the jobs of numerous people, in diverse areas, throughout your organization. Few of the tasks that need to be accomplished to start up or run a CMS require full-time long-term staff. Rather, you start up your system with a large short-term staff and run it with a small full-time staff and a larger casual and part-time staff.

Content management is a difficult task - not only does it bring together a large number of people from quite diverse backgrounds, but it also requires individuals who are personally split in their skills and attitudes between different, often conflicting, disciplines. You will find that almost all of the jobs in this white paper call for at least two widely different skills.

The array of jobs I present assumes a very large organization with a big team. I do this to show the most complete picture of the jobs that need to be accomplished. Obviously, in smaller organizations, or in large projects in earlier stages, one person will do many of these jobs. Understand, however, that each job does need to get done in its entirety, even if there is only one person to do them all.

Note

I apologize in advance for leaving out your current job title.

In addition, my intention is not to write job descriptions that you can cut and paste and send to your HR department to be filled. Rather, I am grouping the necessary tasks involved in the startup and running of a CMS into logical clusters around personality and task types. You will need to look carefully at your particular situation. Depending on whom you have already at your disposal, who you are yourself, how many people you can feasibly bring onto the team, and how long you have to accomplish the project, the cutting and pasting you are most likely to do ranges from the many positions I have outlined here to the few that you can afford or desire.

Finally, my goal is to be complete, but not exhaustive. You will find the most detail about the jobs that are particular or most pivotal to a CMS and little or no detail about those that are the same with or without a CMS.

Table 11-1 shows how the various positions I detail in this white paper might be distributed between the startup phase of your CMS, where you plan and implement the system, and the run phase of the CMS after it is live. The positions I do not list in a particular column may still be needed, but are not the core jobs in the startup or run phase of a CMS.

Table 11-1 CMS Jobs at a Glance

Staff Position	CMS Startup	CMS Run
Managers	Content manager Project manager	Content manager Production manager
Business analysts	High level of participation	Periodic participation
Information architects	Content analyst	Metator
Infrastructure staff	Deployment analyst Trainer and documentation specialist	CMS administrator
Software developers	Software analyst Template and CMS developer Custom application developer Software integrator Test analyst and test engineer	Template and CMS developer Test engineer
Publications staff	Publication analyst Publication designer Page developer User interface specialist	Publication designer Page developer
Content processing staff	Conversion analyst Tool developer Content processor	Content processor Content QA specialist

Content QA specialist

Content creation staff	Writers and other content creators	Acquisitions manager
	Editor	Traffic cop
		Writers and other content creators
		Editor

Managers

As in all group efforts, someone must be in charge. Clearly, an enterprise CMS is too big not to have its share of chiefs. In addition, as you can see from the number and range of positions in this white paper it is not reasonable to expect that your management staff themselves will have the skills to do all of the work behind a CMS.

Content manager **The job of the content manager encompasses all of the parts of a content management system**

More and more, organizations are realizing that content management exists, and that someone ought to be responsible for it. That job has loosely come to be called Content Manager (or Director/VP/Chief of Content Management). Although this job sometimes falls to someone with a loftier title, such as Chief Information Officer (CIO) or VP of Electronic Media, the idea is the same. Conversely, the title Content Manager might be given to someone who functions more like an acquisitions specialist, or, in a smaller organization, even a Web page creator. Variations in usage notwithstanding, a Content Manager's responsibilities might include the following:

- ✂ ✂ **Fully understanding the discipline** of content management. For example, they might be required to actually understand everything in this white paper!
- ✂ ✂ **Leading the planning and execution** of the organization's CM initiatives. They might be the lead of the CM project team and the person with ultimate responsibility for a successful CMS implementation.
- ✂ ✂ **Representing the needs of the CMS** to departments throughout the organization. This person must teach, negotiate, and pester groups throughout the organization to get them to help, or, at least, not stand in the way of, the CMS.
- ✂ ✂ **Representing the needs of the CMS** to the outside world. The Content Manager is likely to be the person to preside over the selection of CMS hardware and software and to be the official interface between the CMS system and third-party products with which the CMS interoperates.

All in all, the Content Manager is the head of the CM endeavor in the organization. Because there is no degree (that I know of) in content management, there are no recognized curricula to pass to get credentials for this position. In addition, few people can say they have much experience being in such a position. Still, there is a core set of skills that you can look for in a Content Manager. The person must be capable of understanding the multiple disciplines involved in CM. They ought to have a good head for at least the following subjects:

- ✍ ✍ **Web technologies**, including server and client software and the construction of Web sites and Web applications. She does not need to be a Web developer, but a good Content Manager understands the Web.
- ✍ ✍ **Editorial processes**, including the writing and review process. She does not need to be a writer or artist, but a good Content Manager must recognize well-constructed content when she sees it.
- ✍ ✍ **Cataloging and information organization**. A Content Manager does not need to be a librarian, but she does need to be good at finding structure and making sure it is enforced.
- ✍ ✍ **Information technology infrastructure**, including database and network administration. Because the system has to integrate with the enterprise communication infrastructure and because the collection, management, and publishing systems of a CMS are all network and database applications, some knowledge in this area is a must.
- ✍ ✍ **Analysis and abstraction**. This may be the most important, but least measurable, skill of a Content Manager. If you haven't noticed, content management requires you to think very abstractly about information. If you get too stuck in the concrete details of how one page or another looks, you will lose sight of the main goal of CM, which is to break information away from its presentation and instead focus on its structure and how that structure can be used to make any of a range of pages. If this lightbulb has not appeared over your Content Manager's head, you will never have a robust system.

Project manager

All project managers attend to the scope, schedule, and budget of their projects. It is really no different in a CM project. Project managers usually appear most in the start-up phase of a CMS. After the CMS is running, the other sorts of managers tend to step in and take charge.

Project managers do the following:

- ✍ ✍ **Manage project staff**, apprising them of their deliverables and schedules. Perhaps the most difficult thing in managing a CMS project is the potentially long list of characters whose input is needed. Especially during the requirements-gathering phase for the CMS, there are a lot of meetings, phone calls, e-mail messages, and small documents that have to be scheduled, accomplished, and accounted for.
- ✍ ✍ **Manage budgets**, assuring that the money allotted for the project lasts as long as the project does. Conversely, a good project manager will see an overrun a mile away and let the world know that some sort of change is needed long before the money actually runs out.
- ✍ ✍ **Create and enforce the project plan**. It might well be beyond the ability of a project manager to create the plan for a large CMS, but it should be fully within her ability to make sure it is updated and adhered to.

The kind of project manager that you want is the kind that can keep a lot of balls in the air and make sure a thousand little things get accomplished and no one is left out. Project managers with strong technical skills but little ability to negotiate competing constraints need not apply.

A good CM project manager (PM) will have strong negotiation skills and a streak of insistence. The successful CM project is a careful balance of stopping the unending conversation about what content and functionality will be included, and assuring that all relevant and necessary content and features are fleshed out and used. Finally, although your PM need not be an expert in any of the CM skill areas, she should have somewhat the same ability as the Content Manager to understand the staff's subject matter enough to know a big problem from a little one.

Production manager

A production manager ensures that content flows into the system at an established rate and quality. I have seen production managers most often in the context of acquisition source conversion, where large bulks of source content have to be processed under tight deadlines. Production managers are called for, however, wherever there is a steady, high volume of content to be produced. If, for example, you need 100 images drawn, checked, converted, and deployed each week, then you might want to put a production manager in place to assure that the volume and quality you expect is consistently accomplished. Production managers work both in the start-up phase of a CMS, to convert the backlog of information, and during the "run" phase of a CMS, to assure the required throughput of content.

Production managers do the following:

- ✂✂ **Manage production staff.** They hire, fire, promote, and motivate. You may think that in a production environment, the staff is expected to act like cogs in the machine. On the contrary, a strong production team is one where people's individual skills are recognized and used. Staff can move from entry-level jobs that require little initiative and skill but high-focus, to more advanced jobs managing the newcomers, handling the special cases that arise, and designing more effective processes.
- ✂✂ **Design production processes** that make the most efficient use of people and the most effective use of automation. A good production manager knows when something is worth programmer time to automate. She can tell when a problem is due to inattention, rather than bad input or faulty procedures.
- ✂✂ **Create and enforce production schedules,** ensuring that content creation proceeds like a well-oiled machine. She will also have methods at her disposal to even out, as much as possible, the inevitable lows and highs in content flow through her system.
- ✂✂ **Create and enforce quality** and speed metrics. In a production environment, you must create a set of gauges that tell you at any moment how the process is going. After creating such gauges, a good production manager will pay close periodic attention to her gauges to catch problems before they snowball.

A good production manager is a cross between an editor, a programmer, and a factory manager - not the easiest person to find. The editor in her understands the way information is constructed and can design processes that editorial staff can, and want, to use. The programmer is always looking for a way to do it more quickly and knows the hallmarks of a process that can be automated. The factory manager understands the dynamics of the "floor," where emotions as well as tools determine how much gets done in a day.

Business Analysts

Someone must recognize or create the wider business strategy into which the CMS must fit. I call that person the CMS business analyst. Without someone to do this job, a CMS project team can quickly become unmoored in the organization and may find itself in the position of asking for a lot of money for a project that does not seem to do much more than save your group some time. The business analyst is most active in the very early stages of a CMS implementation project, when the business case and mandate for the project are being crafted.

The business analyst does the following:

- ✂✂ **Figures out how the content management project fits** into the overall strategy of the organization. Part of the job is finding justifications for the plans you may already have, but the more important part is finding out how to change your plans so that the project fits cleanly into the organization's most important goals.

- ✂✂ **Finds out what has been accomplished to date** in the organization. The analyst must be able to track down and document the existing efforts that might contribute to the CMS.
- ✂✂ **Creates a strategy for cooperation and support** in the organization.
- ✂✂ **Presides over the mandate process.** Although the analyst might not actually facilitate the mandate meetings, she is responsible for ensuring that they reach a successful conclusion. At the end of the process, it is the business analyst's responsibility that there be widespread consensus and support for the CM initiative.
- ✂✂ **Creates and promulgates the project mandate.** The analyst is likely to draft the project's mandate statement, solicit feedback, and distribute the final version. She can serve as the point person for any discussion in the organization about what the project is or how it will be done.
- ✂✂ **Devises a strategy,** in consultation with others in the organization, for how the workload and budget of the startup and running of the CMS will be shared in the organization.
- ✂✂ **Works with the project team** to ensure that the project mandate is fully embraced and specifically acted on.

There is a lot of responsibility in this position, and it is by no means cut out for a lone ranger who works in isolation. In fact, what the business analyst really must do is ensure that these tasks are accomplished - not do them herself. Most of these tasks require other people to come together and agree. The best person for this job, then, will be someone who has the following qualities:

- ✂✂ **Knows the business.** Obviously, to accomplish the tasks I laid out, this analyst must be able to move nimbly throughout the organization. It really helps if this person knows a lot of people (or at least makes friends quickly).
- ✂✂ **Knows how to negotiate.** All of the analyst's tasks require consensus-building. It is essential that the analyst be considered neutral. It is a great help to her if she is already well-respected in the organization.
- ✂✂ **Understands the concepts and execution of a CMS.** The analyst must have a solid understanding of what a workable mandate looks like if she is to facilitate its creation. Without such an understanding, all of the negotiation talent in the world might still lead to an agreement that will not work or be too expensive.
- ✂✂ **Can synthesize and motivate.** The analyst will be faced with a lot of opinion and fact. She will have to quickly distinguish one from the other, sort them, relate them, and suggest ways to combine them into the best approach. Unfortunately, she will not always have time to think first. Therefore, a good ability to think on the move and, also, acknowledgement of how to postpone a decision on issues that do require more thought, as well as the stature to be listened to when she speaks, is a must for this position.

The obvious place to look for business analysts is among the MBA/consultant types who have considerable business, communication, and Web skills. These people are likely to have the interpersonal skills. But remember, they also need the respect of your organization.

Information Architects

Information architects (IA) create and implement strategies for structuring, accessing, and displaying information. They know, and can harness, the "mechanics" of information to create methods and models for how to structure the content within the CMS, and within each publication that the CMS will produce.

Like content management itself, information architecture is a new and evolving discipline. Where you find most IAs practicing today is on the Web, creating layout and access schemes for important sites. Thus, many IAs have worked previously in graphic design, editorial services, or

web development. A few universities are beginning to take IA seriously enough to start to formulate and teach its principles. The Argus Center for Information Architecture (<http://argus-acia.com/>) is a good place to get information from the guys who "wrote the book."

An IA with good experience on a large (10,000-plus page) Web site ought to have the right experience to work on a major CMS project.

Note

The same caveat applies to IAs as applies to content managers. Content management requires you to think very abstractly about information. If you get too stuck in the concrete details of how one page or another looks, you will lose sight of the main goal of CM, which is to break information away from its presentation and, instead, focus on its structure and how that structure can be used to make any of a range of pages.

For the kinds of work that you need done in a CMS, I differentiate IAs into content analysts and metatators.

Content analyst

The content analyst does, or oversees, the middle phase of a CMS implementation project, including:

- ✂✂ **Gathering content requirements** and organizing them into a unified system.
- ✂✂ **Conceptualizing the logical design** for the content aspects of the system.
- ✂✂ **Translating the logical design** into a physical design in the implementation specifications.
- ✂✂ **Creating staffing estimates** and plans for the collection effort.
- ✂✂ **Planning the architecture** and the organization behind localization.

Logical design is the center of the content analyst position and it results in what I call the metatorial guide. But the content analyst can participate throughout the project, helping from the first readiness assessment to the final training during deployment. Wherever the content analyst is, she is ensuring that the content you manage can be, and is, divided and tagged for maximum access and flexibility. The IA analysts will be central in gathering and processing the content requirements and turning them into a solid content model.

To do the job I have laid out, IA analysts need these sorts of skills:

- ✂✂ **Business process design.** The collection system of a CMS is a business process for interacting with content authors and sources. To account for this in her metatorial framework, the content analyst must understand the people and processes that can, or should, be used.
- ✂✂ **Cataloging, storage, and retrieval.** Clearly, this is the heart of the content analyst's world. Without a solid focus and passion for cataloging schemes, the analyst will not succeed. It is not enough, however, to know how to divide and categorize information; the analyst also must understand the technology you intend to use to store and deliver that information. Thus, a strong focus on database or XML technologies is a must.
- ✂✂ **Publication systems.** In the end, the content analyst is there to ensure that the right content can be rendered in the right way in each publication. To do so, the analyst must understand the mechanics of each publication to be produced. For Web sites, this means a very good knowledge of Web applications and, in particular, the concepts and mechanics of Web templates. For print, this means a strong understanding of the particular print publication application that the organization uses. An end-user understanding is a start, but, to be successful, the analysts must also understand publication from the standpoint of one who wants to automate its layout and content structure.

The best content analyst is a librarian or editorial type who has a demonstrated ability to understand and apply technology. The content segments and metadata that the analyst proposes must be collected, stored, and published using programming and networking technology. To succeed, therefore, the analyst must not only know how information should be structured in general, but how it needs to be structured for the particular collection, management, and publishing systems the organization will use.

Metator

A content analyst creates a metatorial framework, and a metator applies it. Metators are quite analogous to editors (as you might have guessed by now). An editor reviews an author's work for style, usage, grammar, and so on, and makes changes to bring the work into compliance with the organization's standards. A metator does the same thing, but for metadata rather than for editorial qualities.

A metator might be expected to do the following:

- ✂ ✂ **Review an author's submission** of a component to ensure that its metadata fields were filled in correctly.
- ✂ ✂ **Review the output of content conversion** processes to ensure that they correctly identify, divide, and tag components.
- ✂ ✂ **Fill in metadata fields** that authors don't understand how to complete, or that conversion processes can't locate.
- ✂ ✂ **Train and guide others** on what metadata is, how it is used by the CMS, and how to choose the right values for particular components.
- ✂ ✂ **Distribute and update the metatorial guide.** Metators are in the best position to see what is working, and what is not, in the system created by the content analyst. They will also be closest to those who must use the guide in their daily work.

A good metator is a content analyst in training. She has the same basic skills as the analyst, but less experience or talent. Of course, the analyst often must be the metator as well. Metators can serve as CMS front-line support to the content contributors, so it is a good idea to choose metators who have the skill eventually to be considered "power-users" of the CMS.

Tip

A content analyst can gain good insight into how well her system works by doing the job of the metator every so often.

You can treat the job of metator as an entry-level position - that is, because they are applying already-created guidelines, they need not know as much about the CMS or its technology. This is not to say that they need no relevant experience. Rather, the perfect person for the job of metator is someone who has had ample experience as:

- ✂ ✂ A technical writer who has had to focus on highly structured material
- ✂ ✂ An indexer who has had experience with electronic publications
- ✂ ✂ An editor (of course)
- ✂ ✂ A librarian or archivist who has a knack for technology

Infrastructure Staff

The infrastructure staff defines and builds the system on which the CMS will run. They are in charge of deploying the completed CMS, and its related software and hardware, and of administering the system once it is running.

CMS administrator

Someone must set up and run the CMS. I call that person the CMS administrator.

Note

I might have chosen to list this position under information architecture, even though most often it is thought of as an IT position. Here is why. The basic purpose of the CMS is to organize information and make it as available and flexible as possible. Thus, the person who runs the CMS should have this perspective above all else. Just as it is preferable to have a person with a background in finance running your enterprise accounting system, so it is preferable to have someone with a background in content running your CMS. This is not to say that CMS administrators do not need to be quite technical - of course, they do. Rather, it is to say that they need to be able to confront content problems as well as infrastructure problems.

The administrator is responsible for all of the end-user tasks required to set up and run the system. Like all administrators, the CMS administrator is neither a programmer nor a network professional (although experience in these areas helps). Rather, CMS administrators are responsible for tasks such as the following:

- ✍✍ **Configuring the chosen CMS.** The administrator enters or imports all of the component definitions, user profiles, publication definitions, and other data that the CMS needs to begin working.
- ✍✍ **Inputting content.** Where content comes into the system in bulk (for example, as the result of a conversion process), the administrator oversees the process and takes action when anything fails. Where content comes in one component at a time (for example, when authors fill in Web forms), she is responsible for ensuring that the proper methods are up and working. This may entail creating new Web input forms, distributing appropriate end-user software, or simply receiving e-mail attachments and importing them into the system.
- ✍✍ **Fully understanding the chosen CMS software.** The administrator ought to be able to make the CMS do anything it can do without additional programming. In many commercial systems, there is quite a bit that does not require programming. Much of what a CMS is capable of, however, requires you to understand content management concepts and to be able to find the right combination of options (which are often buried in text files and the system registry).
- ✍✍ **Maintaining users and workflows.** The administrator is responsible for ensuring that all staff that have access to the system are accounted for by the system. Staff may need to be profiled and added to groups in order to get access to the resources they need. In addition, the administrator needs to set up and maintain the system workflows. This may be as simple as dragging and dropping icons onto a page, or as complex as modifying a massive XML structure in a text editor.
- ✍✍ **Triaging bugs and finding fixes.** After the system is running, the administrator will be the first line of defense against problems that arise. From rebooting after a crash to spending days tracking down why one user can't seem to log in, the administrator must ensure that the train keeps running. Of course, many problems will need to be escalated past the administrator, but like the triage nurse in an emergency department, she sees them all first.
- ✍✍ **Ensuring data hygiene.** The administrator ensures that the content stored in the repository is in the best state possible. This responsibility includes making sure that required data is supplied, that content is archived or deleted on the specified schedule, and that periodic reviews and updates to content and system configurations happen as scheduled.

So, what sort of person can do all of this? Well, I see two basic ways to go: start technical and train on content, or start content-oriented and train technical. Either of these ways could work, given the right person. One woman I know, who graduated with a degree in library science,

craved technology so much that she all but gave up on cataloging to pursue a career in programming. I know of a man who began as a network professional but gave it up to write. Either of these two people would make a great CMS administrator. If you can't find a hybrid soul like the ones I described, look for the following qualities:

- ⚡⚡ **Someone who is a super power-user** of every application they use. The power-user is always looking for a way to make the application do something more, different, or more easily, and will stop at nothing until it all works. That is the attitude the administrator needs in order to deal with the powerful, but vaguely documented and obscurely located, functionality that many CMS products provide.
- ⚡⚡ **Someone who is not afraid to get technical** but knows where to stop. A good administrator will open up a programming script to see where it is crashing. A bad administrator will try to fix the script and not turn it over to the programmer who created it.
- ⚡⚡ **Someone who is not afraid of people and process.** At least half of the problems an administrator will encounter concern people, not machines. A good administrator will not always reply with a technology fix, but may change process, or simply diffuse emotions to solve a problem.
- ⚡⚡ **Someone who is meticulous.** The administrator is running a highly tuned, very complex machine. She must be careful that at all times the machine is well oiled, all the parts are moving as they should, and no dirt (bad content or data, that is) can foul up the gears.

Deployment analyst

A CMS can, but usually does not, stand alone in the organization. As likely as not, it will be connected to many of the organization's main computer systems, such as the staff information systems (network user directories), security protocols, network and database systems, and any of a number of enterprise applications for financial or employee transactions. Someone has to figure out all of these connections. I call that person the deployment analyst. This person's responsibilities include the following:

- ⚡⚡ **Determining what supporting hardware and software** the CMS will need and how to procure it.
- ⚡⚡ **Determining what platform and configuration requirements** the organization has for the CMS (supported databases, required operating systems, and the like).
- ⚡⚡ **Figuring out the integration of the organization's other computer systems** with the CMS. The analyst will need to work closely with the owners of the other systems to forge an agreement and alliance.
- ⚡⚡ **Determining how to deploy the collection system** of the CMS across as much of the organization as needed.
- ⚡⚡ **Determining how to deploy the publishing and Web-server system** of the CMS across as much of the world as needed.
- ⚡⚡ **Planning and overseeing the rollout** of the system in the organization.
- ⚡⚡ **Determining the appropriate training and technical support** infrastructure for the CMS.
- ⚡⚡ **Creating estimates and plans for staffing** the management system of the CMS.

Many of these tasks are common to any deployment of enterprise software. And, unlike many of the other CMS jobs, there are plenty of people out there who have done this sort of thing before. Although the level of integration and the depth of penetration of a CMS can be larger than other enterprise systems, the skills required to perform the integration are the same. Thus, people with a strong IT and enterprise deployment background (with a focus on the Internet) are the ones to find.

Trainer and documentation specialist

By the time a large CMS is deployed, a tremendous amount of effort has been directed toward organizing information and creating processes to collect, manage, and publish it. Someone needs to write all of this down so that users can read it. Moreover, someone must develop and deliver training to the variety of people who need to interact with the system.

Not unlike other enterprise implementations, CMS documentation and training will likely be a combination of the materials supplied by commercial product companies and the custom processes you have developed. The person (or people) in this position has the unenviable need to be able to offer education to everyone from the most novice content contributor to the most expert developer who needs to know how a sophisticated integration was performed.

Software Developers

Some day, it may be that you can buy a CMS that does not require you to do large amounts of programming. Until that day (and most likely beyond), you will need a development staff. This staff creates the custom software behind a CMS. They create the templates that a CMS product needs. In addition, they create the code to implement custom features, integrations with non-CMS systems, and custom authoring and conversion programs and routines.

Software analyst

Like the other analysts I have described, the software analyst strategizes and plans. The software analyst plans how best to accomplish all of the programming that must be accomplished to start and run the CMS.

In particular, the software analyst is responsible for the following:

- ✂✂ **Choosing the development environment** (or environments) that will be used. There are quite a few competing environments from which to choose. The right one is the one (or ones) that requires the least retraining of the programmers you intend to use, fits most cleanly into the required system architecture supplied by the deployment analyst, and, of course, provides the tools you need to create the needed functionality.
- ✂✂ **Creating a development framework.** In a CMS, there is code everywhere. From the programming macros in a Microsoft Word document template, to the stored procedures in an enterprise resource planning (ERP) database, there are more programming sites than anyone in her right mind would call a single system. It is the job of the software analyst to get all of these different parts of the system corralled into a single programming framework. The framework organizes the creation of code, its versioning and testing, its deployment, and the sharing of code modules and objects between applications. This is no small task in an enterprise CMS.
- ✂✂ **Deciding which features of the CMS should be custom-coded** and which should be done using commercially available tools. For example, should the organization use the database connectivity code supplied by the CMS manufacturer or should they extend the code they have now, which works well with their ERP system?
- ✂✂ **Writing the specifications** and development plans for the programming tasks that require them.
- ✂✂ **Creating estimates and plans for the staffing** needed to accomplish all of the programming to start and run the CMS.

As with the deployment analyst, there are people in the world who have done this sort of thing before. Still, someone who is a good general analyst but also has significant experience programming content-manipulation applications would serve you best. This is not a rare skill set, but it is not the most common. People of this ilk can be found in the back rooms of Web sites that

use Perl extensively, or in the documentation groups of large companies that have had to use Structured Generalized Markup Language (SGML) to structure and manipulate massive document databases. In any case, stay away from the people who think that content can be treated just like data. They will underestimate the complexity of their task every time.

In addition, like the other analysts, this person cannot be a back-roomer. She must be able to negotiate among the competing development interests (which are no less, and often more, vehement than the business interests) and come to a workable compromise between competing platforms.

Finally, be careful not to choose someone who is more interested in writing code than getting other programmers organized. Note that the software analyst's job description does not say "writes a lot of programs." Even if you are in a position to have only one person who is both analyst and developer, because there are so many different places where code will live, it is essential that this person really be interested in staying organized, creating standards, and adhering to them, rather than simply writing code.

Template and CMS developer

You will need entry- to mid-level programmers who have learned the templating language and associated programming tasks of a particular CMS. These people are responsible for the following:

- ❏ **Implementing publication templates**, given the specifications the software analyst and publication analyst have created. To do the implementation, the programmers use standard programming environments (such as JSP and ASP), the syntax of the CMS's templating language, and any custom objects that have been created by custom application developers.
- ❏ **Implementing input templates**, given the specifications the content analyst has created for content components and metadata. Most input templates are standard Web forms that are enhanced with custom objects supplied by the CMS product you use.
- ❏ **Doing the smaller programming-like tasks** associated with a CMS that are too technical for the CMS administrator, such as creating workflow scripts using an XML editor, or writing event triggers that fire when a new file is added to the system.

Custom application developer

You will need mid- to high-level programmers to create any custom functionality that you need added to a CMS. These programmers are generally responsible for the following sorts of tasks:

- ❏ **Programming to enhance collection**, including extensions to word processors, special tagging tools, and complete custom authoring environments when a standard tool will not suffice. In addition, programmers may be called upon to create other collection tools, such as automated acquisition routines and collaboration applications for authors to jointly work on content.
- ❏ **Programming for management**, including enhancements, extensions, and (unfortunately) replacements to the CMS's standard database environment, programs for automated review and archiving of content, and special indexing and retrieval routines.
- ❏ **Programming for publishing**, including enhancements, extensions, and replacements to the CMS's standard templating system, custom server objects that provide extra functionality for particular publications, and custom browser objects (for example, Java applets) to deliver functionality locally in a Web page.

The most successful custom extensions do not fully supersede the CMS; rather, they integrate closely into the CMS's core architecture. To be good at custom extensions, therefore, a programmer must be familiar enough with the chosen CMS to use its application programming

interface (API) and be able to tie the new programs into the user interface (UI) of the CMS as needed. The kind of programmer you want in this position will not be afraid to go way beyond what the CMS can do out of the box, but will always try first to make the CMS do as much as possible without custom code.

Software integrator

You will need mid- to high-level programmers to write the code that glues the CMS to other systems. Like the custom application developers, these programmers will need to be versed in the API and other workings of the CMS. In addition, they will have to fully understand the other system and have skills in the appropriate language for connecting the two. Software integrators may be called upon to do the following:

- ✂✂ **Connect the CMS repository** and collection systems to other enterprise resources, such as the organization's user registry and the organization's ERP systems.
- ✂✂ **Connect the CMS's publications** to enterprise or outside resources. To create a full transaction system on the Web, for example, they may have to do a massive amount of integration between the CMS, inventory and fulfillment systems, financial and banking systems (inside and outside the organization), and product catalog systems.
- ✂✂ **Connect Web publications to the Web server.** The CMS may or may not come with the Web application server and Web database system that you intend to use. If it does not, then a programmer (with assistance from networking professionals) will have to make the connections either through configuration or through custom code.

Without a doubt, the main skill to look for here is proven expertise in the system or systems with which you want to integrate the CMS. If your integration is mainly on the Web, then experience with the target system *on the Web* is best.

Test analyst and test engineer

Quality assurance (QA) ensures that all parts of the CMS system work properly and that the publications that the CMS produces have a minimum of bugs. This is not an easy job. (If you have read through all of these job descriptions, you are no doubt tired of hearing those words). A test analyst is the one who sets up your test plans and coordinates the effort, and a test engineer executes the plans. Test analysts and test engineers must do the following:

- ✂✂ **Develop and execute test plans** against a collection and management system that is constantly changing as the CMS grows and evolves.
- ✂✂ **Work with each user's different configuration** and set of access rights to the system to be sure that the CMS works under all configurations.
- ✂✂ **Be able to test a collection of loosely coupled**, independently operating components (the CMS, that is).
- ✂✂ **Be able to ensure the quality of publications** that are created on the fly or are constantly being updated. They must figure out how you can test publications when you can never see them completely.

Clearly, this is no task for a beginner. The kind of testers you need are comfortable in an ambiguous situation where the test plan is never complete and you can never test all possible cases. Of course, many organizations hardly test their CMS at all and leave the publication testing to the publication team (in other words, the person who develops the page, or the template, clicks around a bit and calls it a day). If you choose this path, you get what you get.

If you choose instead to get as organized about testing as you would about collection, management, and publishing, then find someone who knows how to test code and its potential to

create output rather than someone who must click through every page of a Web site each time it is produced to ensure that it is all right.

Publications Staff

The publication staff ensures that each publication is high quality, published on schedule, and makes the best use of the content in the CMS repository. Given the wide differences today between print publications groups and Web publications groups (and, for that matter, between the Internet and the intranet groups) in a large organization, you may very well start with a different group for each major publication. I imagine that as time goes on and the idea of content management takes hold, the various groups will coalesce into a single publications group (but, don't hold your breath).

Publication analyst

The publication analyst is a graphic designer or other design professional who is responsible for designing the CMS publication system so that it can automatically create compelling publications.

The publication analyst is responsible for these general areas:

- ✂ ✂ **Choosing the design tools and environment for the publications.** Like the software analyst, the publication analyst is likely to come into a situation where groups already have chosen tools and are not interested in switching. The analyst must weigh these considerations against the advantages of standardizing tools and using tools that are most amenable to automation by the CMS. Especially in the print publication world, there can be a tremendous difference between tools in the amount of effort it takes to automate them.
- ✂ ✂ **Choosing which publications to include in the CMS and when.** The analyst must balance between the two extremes to which people will want to draw her. On one side, people will say, "This can all be produced automatically if we dumb it down a little." On the other side, people will say, "Our publication is too complex and our readers expect too much crafting for this to ever be produced automatically." It is the unenviable job of the publication analyst to find the compromise that allows as much as is technically feasible, aesthetically advisable, and economically viable, to be produced by the CMS.
- ✂ ✂ **Creating the general publication specifications** that detail how a publication will be created by the CMS.
- ✂ ✂ **Creating estimates and plans for the staffing** needed to accomplish all of the design needed to start and run the CMS.
- ✂ ✂ **Creating the overall plan for how content will be targeted** and scheduled for publication. Given that a particular content component may find its way into any number of publications, all on different publication schedules, this can be a difficult task.

The publication analyst is the prime example of the schizophrenia that many CMS staffers must embrace and overcome. The analyst must be firmly in favor of beautiful, compelling, well-crafted publications. The analyst must also understand and believe in the philosophy of automated publication. This publication analyst is the key negotiator between the specific needs and requirements of a particular publication and the generalized and neutralized content that is in the CMS repository. To be successful, this person must know how to work with all of the creative staff, who will want handcrafted pages, and the technical staff, who will want fully automated pages. The result must be a design that can be configured and automated, but that still meets the qualitative design goals of the publication. Ideally, this person is someone who really can't decide if she likes art or science better, but has practiced both. Finding such a person may not be easy. Following are some of the things to look for:

- ⚡ **Someone with a strong background in at least two media.** Look for someone who has worked on the Web and in print, for example, or someone who has worked in film and on magazines. This ensures that the person is not "stuck" in one way of looking at the publication process.
- ⚡ **Someone who is process-oriented.** A highly creative and energetic designer who depends more upon the drop of inspiration than the downpour of perspiration is the wrong choice. The inspiration must be there, but the job mostly concerns getting the publication process organized and systematized.
- ⚡ **Someone who is not afraid of technology.** The best publication analyst is excited about the possibilities that new technologies can offer, but has a healthy cynicism about how soon, or how much, the technology will help.
- ⚡ **Someone, like the software analyst, who knows how to negotiate** within design, within technology, and between the two. This person must be respected and be able to deal with others, whether the room is full of creative people, technologists, or is split between the two.

Publication designer

A publication analyst creates a publication framework, and a publication designer applies it. This relationship is the same as between the content analyst and the metator. In both cases, the analysts' grand plans succeed or fail based on the day-to-day work done by their less lofty associates. In both cases, the analyst is a more experienced and organizationally savvy (and more respected) version of their associate.

The publication designer is responsible for these tasks:

- ⚡ **Creating the publication specifications** for how each particular publication will be produced by the CMS. These specifications include wire frame drawings, template designs, standard page and section elements, and the plain language version of the logic that will be needed to decide what goes where on the published page.
- ⚡ **Working with the page developer** and CMS template programmer to ensure that the pages she designed can be coded.
- ⚡ **Working with the content analyst** to ensure that the content that must get onto a page is segmented and tagged in such a way that it can be found and appropriately formatted.

The publication designer is a negotiator in the world of the template programmer, IA analyst, and page developer. She must find a fit between the best page design, the one that can be produced in the publication medium (Web page, magazine page, and so on), and the one that can be programmed in a publication template. Many of the global issues will have been worked out by the analyst before the designer is involved. But the devil is in the details, and, like the metator, the publication designer is in much closer contact with reality than the analyst.

You can find publication designers in the ranks of analyst "wannabes" and page developers at the top of their talents. Analyst wannabes are people who would like the job of analyst, but don't have quite the experience and maturity yet to fulfill the role. If you find yourself saying "She looks right for an analyst, but she's not quite there," you have found a good designer. You can find out more about the requirements for publication analysts in the preceding section.

Page developers at the top of their talents are people who are ready to move on to more challenging and abstract work than creating pages, but may never be cut out for a job like analyst. They are likely to be extremely skilled in a particular medium (a QuarkXPress guru, for example, or an HTML junkie) but have little interest in moving beyond that medium. They may be very smart and able to negotiate with their current peers, but not ready in the foreseeable future to play at the level of the wider organization. These people are doing superior work in their

medium and could easily take on the added responsibility of entire publications. For more information on the job of page developers, read the next section.

Page developer

Someone has to take the design specification for a publication and turn it into actual template pages. I call this person the page developer. I choose the word developer here with a bit of trepidation. The page developer acts as a pseudo programmer. She doesn't actually write code, but she knows enough about it to recognize particular code modules, move them into, and around on, pages, and slightly modify them so they will work in a new context (changing their parameters, for example). True to CMS form, however, page developers also have an opposing skill: They are pseudo designers. They don't actually design the page, but they know enough about it to pay attention to a pixel's worth of detail, move design elements into, and around on, a page and make slight modifications to them so they will work in a new context (widening a table, for example, to fit a larger title). Page developers have the following responsibilities:

- ✂ ✂ **Turning the publication designer's specifications into files** that are usable by the CMS. A developer, for example, might take a drawing created by a designer in Macromedia FreeHand, illustrating layout and design elements, and turn it into an HTML file. Or she might create an Adobe InDesign file that includes all of the publication conventions that a particular publication requires.
- ✂ ✂ **Working the design to completion.** For example, a publication specification might call for a particular page to have ten variations. The developer actually creates those variations and ensures that they will all work. In this process, there is bound to be a fair amount of interaction with the publication designer.
- ✂ ✂ **Working with the CMS template developer to merge design with code.** At some point, the page developer and template developer must merge efforts and produce one file that has both design and programming in it. Anyone who has had to share the same file between two competing interests knows that this is always a pain. Nevertheless, the two developers must work hand-in-hand to bring a page to completion.

Page developers are less difficult to find than many of the other CMS staffers. In each major publication medium, are large numbers of people qualified for this position who congregate in interest groups and in the publication groups of large organizations. The ones to focus on are the ones who can span technology and design and like to play intermediary between the two.

User interface specialist

This person knows user interface design for a particular publication type. In the print world, this job falls on the publication designer. In the Web world, the publication designer may or may not have the skills to complete the following necessary tasks:

- ✂ ✂ **Web form layout**, including the naming of controls and their layout on the page.
- ✂ ✂ **Web application design**, including the logic and presentation of the functionality of the application in a Web page.
- ✂ ✂ **Usability and page parsibility**, including designing and running user tests to see how understandable and navigable a page is.
- ✂ ✂ **Resolving issues associated with the integration of text**, media, graphic design, and branding with the application interface.

You may be able to cross-train a publication designer to meet these needs. If your content analyst or metator has worked as an IA on a large or complex Web site, she too, may have these skills. On the other hand, you may have to hire or contract-out this position. In any case, it is worth your time to understand that this is a real need and find some way to staff for it.

Content Processing Staff

Your content processing (or content conversion) staff designs and implements a content processing system for dealing with acquired content. Information that is destined for the CMS that needs to be cut into components, have its format converted, or have its structure altered, flows through this group. The content processing staff analyzes the tasks needed to turn acquired information into content, designs tools to aid in the process, and trains and manages staffs of processors.

Conversion analyst

Someone must be responsible for the overall design and creation of the system you will use to change the raw information you acquire into finished content. I call that person the conversion analyst. Her responsibilities include the following:

- ☞ **Selecting or designing the tool set that the team will need.** Given the set of information inputs and content component outputs that the content analyst has specified, the conversion analyst will need to figure out what tools to buy, or create, to make the transformation as efficient as possible.
- ☞ **Creating the specifications for the programs** that tool developers will follow.
- ☞ **Designing the methods the team will use.** Given the inputs, outputs, and selected tool set, the analyst must determine the right set of methodologies to move information quickly through the system.
- ☞ **Designing the facilities and needed infrastructure** if the team is going to be large. For example, you might need to create a large work area where dozens of people can sit and easily interact.
- ☞ **Planning and estimating the staffing levels and skills** that you will need to process the expected throughput of information. It can be difficult to accomplish this task if (as often happens) there will be wide swings in the amount of information that will be received per week.

This job is the analyst companion to the production manager job I described earlier. Whereas the manager is responsible for the day-to-day operations of the processing group, the analyst is responsible for understanding the situation and getting the system set up. A good candidate for this position deeply understands text formats such as HTML, XML, PDF, and SGML. They must be very analytical and meticulous by nature. Because this person must write content processing specifications, she must be familiar with, if not well versed in, programming. Because she has to create procedures, she also must be familiar with, if not well experienced in, process management and the techniques used by data processing facilities.

Data processing facilities are one good place to look for people with this skill. Wherever teams of people have been brought together to make their way through masses of semi-structured or unstructured information, you may find people who have the analytical skills and experience to be a conversion analyst. In my experience, I have seen such people in the back rooms of CD-ROM companies that publish huge catalogs, as well as in large law firms that must process grand mounds of court documents.

Tool developer

A tool developer creates the programs that automate the conversion process. These people use whatever text formats and programming tools they need to make processes faster, cheaper, or higher quality. Tool developers create the following:

- ☞ **Programs that convert information** from one binary format to another.

- ⚡ Programs that create components by crunching through files and directories, automatically separating and storing individual chunks.
- ⚡ Programs that create elements within components by scanning the component content and inserting tags that separate one element from another.
- ⚡ Programs that infer the appropriate metadata to add to content and automatically insert it.
- ⚡ Programs that present choices to content processors and automatically carry out the result. These programs save the staff hours by doing all of the manual labor and presenting them with only simple choices (simple by human standards, but obviously too hard for the program to make).

Tool developers are strong programmers. But the kind of programmer you want for this position takes a sort of guerrilla attitude toward her work. In other words, she enjoys diving into a problem, applying a rapid response at just the right place to make a big impact, and then retreating to watch the effect. This attitude allows the tool developer to materially affect production processes when the problem occurs, rather than spending a lot of time automating things that are not worth the effort, or stopping ongoing production for too long a time while she hangs back and considers the best approach.

Content processor

I use the title content processor for the people who come in every day to move information through the processes designed by the analyst. Content processors do the following:

- ⚡ Check the results of automated processes to ensure that they worked as expected.
- ⚡ Perform manual processes where automation cannot be applied or where it has not yet been employed.
- ⚡ Add metadata to masses of content following prescribed rules.

You might be tempted to describe the work of a content processor as repetitive and rote - like a line worker at a factory. This is true in the sense that they work on parts moving through a larger process and perform the same function over and over. In a more telling sense, it is not true. For, if the procedure a content processor is doing is repetitive and rote, you should be able to get the tool developer to write a program to do it. In fact, the hallmark of a good processor is someone who has the patience to apply good judgment in a consistent way without losing focus or ceasing to care (qualities that forever bar me from the ranks of the processing elite).

On the other hand, these jobs do not require a lot of experience and only rarely require any subject matter expertise. That's good, because you can't afford to pay too much for these positions, especially if you need a lot of staff quickly. It's also bad, because the person best suited to this position is not your run-of-the-mill temporary placement staffer. You need to find people who are both conscientious and underskilled, wise and underpaid - yet another example of the contrary qualities of CMS staff.

Content QA specialist

Quality assurance is a mandatory part of content processing. You need people whose main (or at least most important) job is to go over the work of automation routines or other people and assess how close it is to the quality targets you have set. Generally, these people can be drawn from the upper ranks of the content processing staff. You can usually spot the high-accuracy people pretty quickly and give them the task of checking the work of others.

To find good QA people, look for graduates from the ranks of the content processors.

Content Creation Staff

Content creation is the process of inventing new text, pictures, sound, or other media. I won't attempt to catalog all of the jobs that might be involved in creating content. Rather, here are brief descriptions of some of the creation jobs that are most central to a CMS.

Acquisitions manager

An acquisitions manager handles your relationship with all content acquisition sources. This person does the following:

- ✂✂ **Negotiates and forms an agreement** with the source. The agreement includes quantity and schedule terms and may also include payment if the source is not free.
- ✂✂ **Keeps abreast of the deliveries** from the source and is the point of contact for any discussions of delay or changes to the quantity or quality of the source.

This manager should be skilled at project management and negotiations. She should know enough about electronic content formats and publishing processes to be able to understand the agreements she is forming.

Traffic cop

There can be a dizzying number of separate pieces of content flying around when a CMS is in full swing. You may very well need a person to coordinate and keep all of this information straight. I call this person the traffic cop. Her main responsibilities are as follows:

- ✂✂ **Overseeing the delivery** of content from authors and acquisition sources.
- ✂✂ **Keeping abreast of the CMS workflows** and ensuring that everyone is on schedule.
- ✂✂ **Resolving any bottlenecks** that may be affecting the flow of information.
- ✂✂ **Resolving any disputes** about who is responsible for what.

A good cop has experience in large-scale task management. She is not afraid to pressure people to meet commitments, but knows how to do so in a way that does not alienate contributors.

Writers and other content creators

Writers, illustrators, sound artists, videographers, animators, and the like (artists, for lack of a better word) create content for you from scratch. Aside from knowing their own trade well enough to ensure that you are getting the best product from them, they must also be able to understand and embrace the abstractness of the CMS process. For professionals, this ought to present little problem. Most have had experience being hired to create something whose end form they never see until it is finished. For some, especially non-professional artists, it takes some cajoling to get them to pull away from the final product and just create content.

Artists with whom you are likely to have the least problems have the following characteristics:

- ✂✂ **They are used to creating for a purpose.** Writers who have written for a particular marketing purpose or graphic artists who have done illustration for magazine articles are examples.
- ✂✂ **They are used to creating for multiple audiences.** If a candidate does not ask you about audiences in the first few minutes, beware. If they wrinkle their noses at the list of your audiences, stay away.
- ✂✂ **They have created for more than one medium.** For example, people who have only done graphics for the Web may not understand the different constraints of print. People who have only written for print may not grasp the right style for the Web.

✂✂ **They don't mind working on a team.** Artists who want to hold on to their work for as long as possible and be its shepherd through every stage of the process will be trouble in a distributed and multistage process.

Editor

Most of the same caveats that I gave you for writers apply equally well to editors. The problem of the editor, relative to content creators, reminds me of the following quip:

"If you think Fred Astaire was good, consider Ginger Rogers. She was doing all the same stuff backwards!"

A good editor knows how to keep in synch with the creator and gently push her in the right direction. The problem is compounded by the fact that a single editor may be responsible for many creators and many types of content (text, pictures, sound, and motion). Professional editors are no strangers to this situation and are generally able to roll with the waves. Still, in the context of a CMS - where the content in not only does not look like what comes out, but must come out in a variety of forms, juxtaposed with who knows what other content - the editor must be able to think extra-abstractly about the content she reviews.

In addition, editors who are tied to particular methods (for example, being able to make changes to the text in the final publication rather than in the copy that is stored in the repository) will have to change their ways even if the new ways are not as foolproof as the older ways. Clearly, an editor who is comfortable only with pencil marks on a piece of paper would be a poor choice for your CMS staff.

Summary

There are a lot of potential positions in a CMS project. You may not need one person (or more) in each position, but you will need someone to cover each of the major roles in a CMS:

- ✂✂ CMS types tend to have multiple, sometimes conflicting, skills.
- ✂✂ Content managers and other types of managers direct and oversee the construction and maintenance of the system.
- ✂✂ Business analysts figure out how to fit the CMS into the organization.
- ✂✂ Information architects figure out the structure of the content you will manage and help out, tagging content as it comes into the system.
- ✂✂ Software developers write the programming code behind CMS templates and integrations.
- ✂✂ The publications staff designs and creates the publications that the CMS will produce.
- ✂✂ The content processing staff creates and runs conversion processes.
- ✂✂ The content creation staff writes the text and creates the media that the CMS manages.