

Assuring Quality in a Large-team Hypermedia Online Help Product

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TRADEMARKS

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ABSTRACT

This paper addresses two problems: (1) Maintaining consistency and quality in large-team projects. (2) Producing quality online documentation using a hypermedia approach. *Online* refers to any documentation that a user can view on a computer screen. *Hyper* online documentation enables the reader to jump, or link, between informational units; *hypermedia* (as contrasted with *hypertext*) documentation can include text, graphics, sound, motion, and interaction as techniques for conveying information. This presentation stresses the attributes and processes that contribute to the relative quality of hypermedia as an information vehicle.

After reading this paper, the Computer Task Group (CTG) Systems Engineer (SE) should have an understanding of how a *documentation* team works toward maximum product usability and esthetics. As part of their challenge, large team of documentation specialists, artists, editors, testers, and SEs as developers must produce documentation that looks to the user as though it has only one author.

As the Symposium addresses the CTG SE, this paper both (1) lists the effects of large-team approach to the SE's procedure in developing software or hardware and (2) informs SEs about their responsibilities to the documentation effort.

Examples are taken from the online documentation prepared for the OS/2TM operating system, Version 2.0, developed at International Business Machines Corporation (IBM), a company that emphasizes Market Driven Quality (MDQ) as the basis for its product-development strategy. As a major client of CTG, IBM wields considerable influence in establishing quality guidelines for the CTG Systems Engineer and Information Analyst..

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WHAT IS HYPERMEDIA ONLINE DOCUMENTATION?

FAMILIES OF DOCUMENTATION

Hardcopy refers to information printed on a tangible medium, such as paper, that you can hold in your hands, turn the pages of, and place on a shelf while not in use.

Softcopy refers to information displayed on a computer video screen. A softcopy library might have the same types of information as a hardcopy library, but you cannot hold any of it in your hands. Instead, you use keyboard keys or (preferably) a mouse to leaf through information.

What elements set hypermedia documentation apart from hardcopy manuals?

Library contents

The term *online documentation* encompasses a variety of materials. The OS/2 product includes the industry-typical information components described here. As you read this section, consider whether one or more of these formats would enhance your product's quality for a particular target market. Will your product be used by computer novices or persons who must "unlearn" a similar product? Will you have technically-adept users who want to quickly reference a command syntax or peripheral-device setup?

A Tutorial is a series of lessons that might have animated illustration and interactive exercises for the learner. The Tutorial might instruct beginners or persons migrating from similar products, but rarely targets experienced users of the product.

Object-oriented information describes the object, window, field, or control currently pointed to. (See Figure 1.) This type of information is incorporated into a software product, and may even be written by an SE. Task-oriented procedures list steps for accomplishing a task. Some products provide both object-oriented and task-oriented information *contextually*, which means that information displayed describes the particular item or task associated with the location of the user's pointer. In OS/2 2.0, procedures are collected into the centralized *Master Help Index* shown in Figure 2, which the user must proactively search.

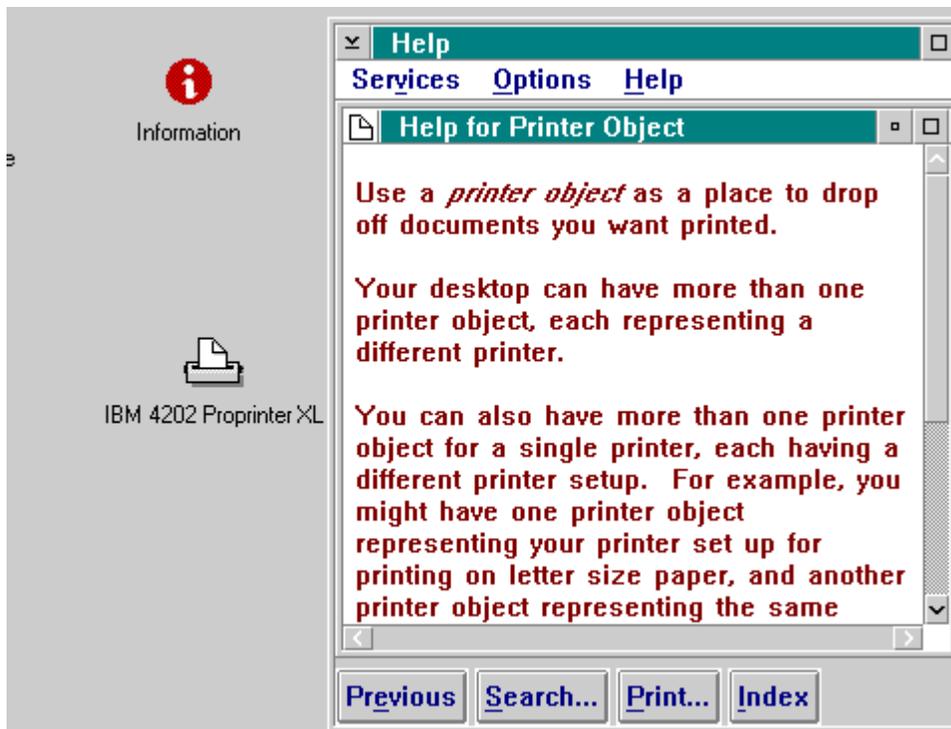


Figure 1: Object help panel for the printer object.
{Description}

A printer-object icon is shown to the left of the help window. An icon represents a closed object. The style for this library stipulates that help for a closed object explain its purpose.

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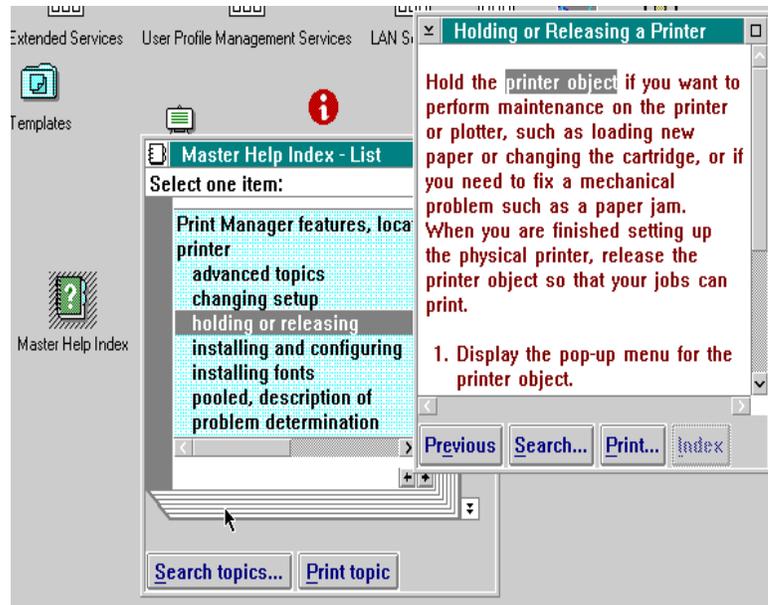


Figure 2: Master Help Index panel

{ Description }

- (1) Open the Index icon. (2) Select a letter tab. (3) Select a title from the alphabetic listing. (4) The procedure window opens.

An online Glossary of terms describes new terms for the beginner who needs to understand them to read the remaining online documentation. The experienced user might look up a term to determine if a product attributes a specific definition to it that precludes other meanings.

Any book can be divided into dynamically-linked windows for online reference. In contrast to other forms of online information, a book retains its table of contents to indicate the sequential structure of the information. Figures 3a and 3b show the online *OS/2 Command Reference*, provided for persons who prefer typing operating-system commands to the simpler graphical interface provided with OS/2.

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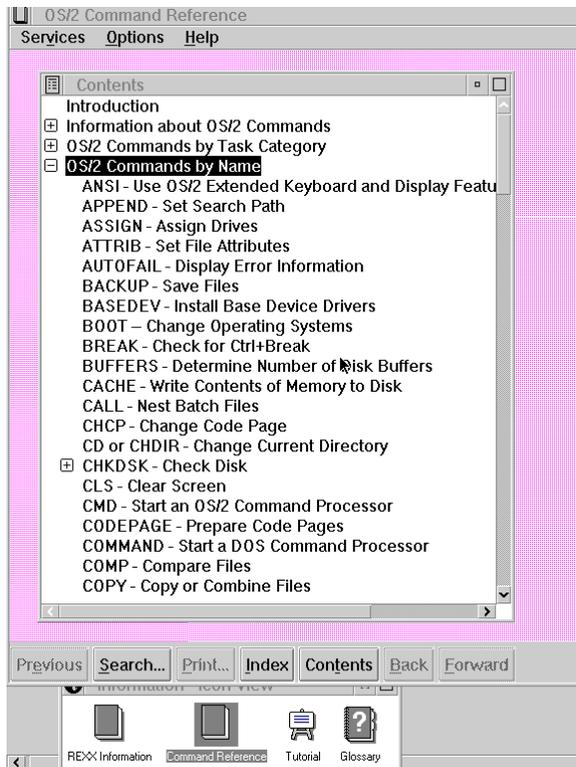


Figure 3a: Table of Contents

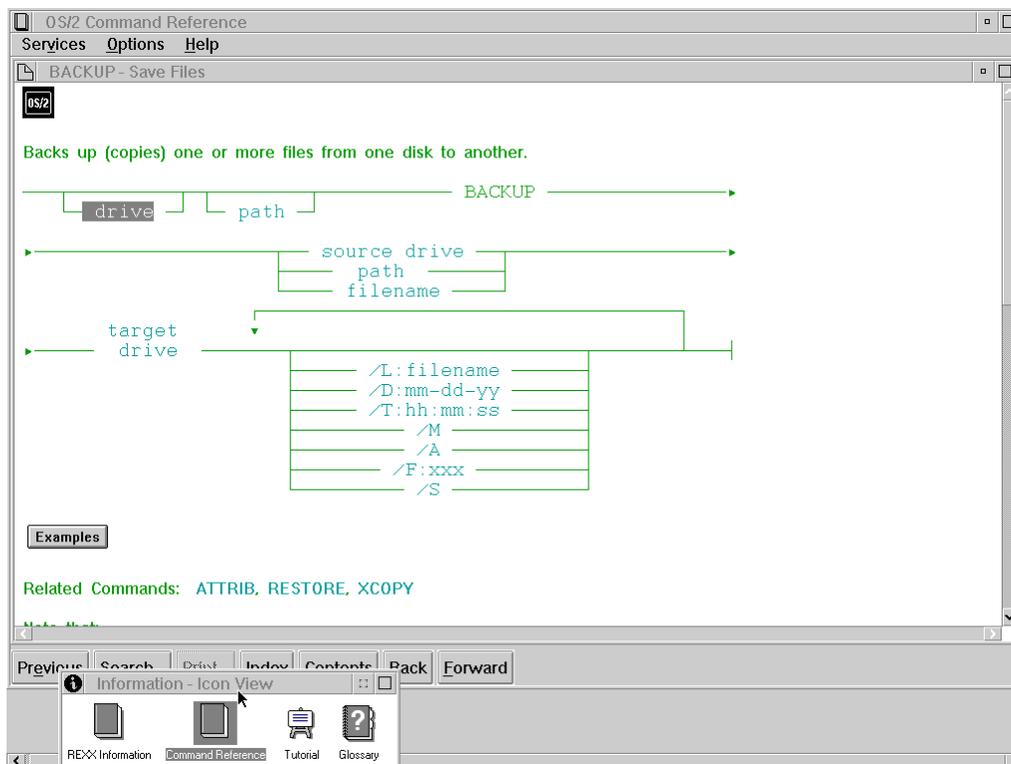


Figure 3b: Hyperlinked command-syntax diagram

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Construction

In designing online documentation, a writer grapples with considerations quite different from those available for communicating in hardcopy.

Access to information

The designated Help key (often F1) displays a description of the currently selected object or menu choice. An object or application window generally has a menu listing Help as an option. In OS/2, each dialog window also has a button labeled *Help* that a user can select to view information about the window.

Dynamic linking

Hypermedia information contains "hot" places, words, phrases, or graphic controls that mark a link to an additional information window. (See Figure 3b.) Hypermedia permits the user to display information from interconnected parts of the online library, such as glossary definitions, related procedures or command syntax, and even to an appropriate section of a tutorial. Each place jumped from can remain visible in an open window, so the user can switch focus back and forth between the various related chunks.

Chunking

Chunking refers to the way in which informational material is broken into segments. Hardcopy has one set of proven rules, such as use short paragraphs, profuse white space, and lots of subheadings to guide the user. Softcopy has another set of rules, based on the constraints of screen size and the ability of the user to organize information dynamically.

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A hardcopy book usually contains sections that are subdivided into smaller sections, all marked by different levels of heading. One page in a book might contain several sections or less than one. By contrast, a hypermedia document presents one topic at a time, each in a separate window.

Navigation

Clues, links, and controls help the reader travel back and forth through the chunks. Because the user selects a non-sequential, rarely-duplicated path through online information, the information should also enable the user to return. The system holds open each referenced chunk of information and remembers the order in which the reader transverses the information windows. Lacking this intelligence, hardcopy must rely on a sequential presentation that has only occasional bridges to cross-referenced pages.

Special effects

Hypermedia affords techniques such as animation and sound that can improve the communication of information by appealing to diverse senses. Some online information provides a method for the user to interact with animation and thereby learn by experiencing. By analogy, a book can contain practice exercises.

WHAT ATTRIBUTES CONTRIBUTE TO QUALITY?

In the previous section, you read some of the basic attributes of hypermedia and how these compare to the attributes of a hardcopy document. This section explores the advanced attributes that distinguish quality online hypermedia documentation from other softcopy.

Consistency

Esthetics: One writer cannot possibly compose all the information required by a software system that has many components. To help you grasp the enormity of an OS/2 system, consider this incomplete list of components, each documented by a different writer: control program, device drivers, print spooler, video display, keyboard, mouse, DOS-compatibility, network access, and the information-display facility itself. Although several writers must divide responsibility for individual

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components, the documentation for all components must look to the reader as though it was written by a single individual. To produce the one-writer appearance, all team writers use the same window layout and vocabulary. The team even has standard sentences for repetitious instructions.

Speed reading: On the average, screen text takes 30% longer to read than the same text on paper (Microsoft, 1990, p.16-9). By adapting quickly to consistently-placed cues and standard sentences, the user saves reading time.

Translation: Consistent, repetitious vocabulary and format also facilitate translation to other languages. OS/2 2.0 documentation was translated into 10 languages including some having characters that are very different from English and a different direction for scrolling.

Conciseness

Restricted viewport: Typically, a user opens one or more application windows, displays a pop-up menu or dialog of fill-in fields in another window, and also consults one or more help windows. All this pertinent information must fit within the width and height of the video screen. Ideally, the entire content of any one window should be visible without scrolling.

Mixture of experience: The content of one information panel must be sufficiently short to avoid intimidating novices or frustrating super-users. Consequently, instructions must give novice users only what their level of understanding can absorb while providing time-efficient access for experienced users to more sophisticated information.

Translation: Consider the expansion of text when translated to other languages. Unless the writer uses words sparingly, a topic heading that fits the width of a window title bar when displayed in English might be truncated to fit in the same space after translation.

Readability

Reading level: Computer-system information is generally aimed at an eighth-grade reading level.

Viewport: A reader will likely forget the first screen of information soon after scrolling down to browse additional concepts, so the writer attempts to limit the hidden information to one or two

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scrolls. If the amount of essential information exceeds the recommended number of scrolls, the user needs a means to enlarge an information window of interest to full-screen size. After opening several windows, the reader needs a means to rearrange the placement of windows so that both a task window and the instructions for using it remain in view.

Linking strategy

Number of links: A window can contain many or few links—a trade-off between providing flexible access to additional topics and cluttering the window display with too many highlights.

Placement: By assigning a standard placement for each type of link writers can provide a clue about where a link will lead. Figures 4 shows the related topics and glossary links that adhere to the standards for OS/2 help windows.

Help for Printer Object

Use a printer object as a place to drop off documents you want printed.

Your desktop can have more than one printer object, each representing a different printer.

You can also have more than one printer object for a single printer, each having a different printer setup. For example, you might have one printer object representing your printer set up for printing on letter size paper, and another printer object representing the same printer set up to print envelopes.

Double-click on the printer object to display the jobs waiting to print.

Related Information:

- o [Setting printer-object settings](#)



Setting Printer-Object Settings

1. Display the pop-up menu for printer object.
2. Select the arrow to the right of Open.
3. Select Settings.
4. Select the appropriate tabs for the properties you want to view or change.

For additional help, select the **Help** push button after the window is displayed.

Related Information:

- o [Displaying pop-up menus](#)

Figure 4: Links to related topics and the glossary

The left-hand window of Figure 4, from the Master Help Index, has a typical procedure with steps for accomplishing a task. Double-click links to the Glossary, where the reader can learn what

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this action means. Throughout the body of the information, we provided immediate glossary lookup from new or product-specific terms. These short glossary blurbs pop up in half-height windows leaving the material that uses the term in view.

According to the IBM OS/2 style, links to other help topics do not appear in the body of the information. We gather these into a list at the end of the window, under the words "Related Information", which are shown in both windows of Figure 4. While reading the substantive body of information, the user cannot accidentally activate a link that diverts attention or hides what is being read.

Navigation aids

A well-designed hypermedia document contains markers that indicate sequencing, such as frame numbers. The more common hypermedia document at least offers directional controls such as a *Previous* button (shown in Figures 1, 2, and 3). The types of cues offered to help users find their way through information and back again are decisions that form part of the online library style guideline.

Each link object should call attention to itself in at least two ways. Text that activates a jump might appear both underlined and in a color reserved for "hot spots." OS/2 help links appear in green.

Accessibility

Exposure: The packaging and placement of each volume determines how easily a user will find information. Will the user look for all documentation to be grouped together? Would the novice prefer that a "getting started" vehicle stand out? Should the most commonly-used item, such as the users' manual, have a particularly visible placement?

On the very first use of the OS/2 system, an open window onto the Tutorial covers a large area of the screen, inviting the user to explore. On subsequent startups, the user sees the OS/2 desktop with two icons that point to the *Master Help Index*. One icon, labeled *Start Here*, presents a list of common tasks that most users will want to learn. The icons that open other online

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documents, including the Tutorial, are gathered into an *Information* folder. (Figure 5 shows the icons for each type of reference, and their placement on screen.) The user can drag any document from the Information folder onto the main desktop for handy reference.

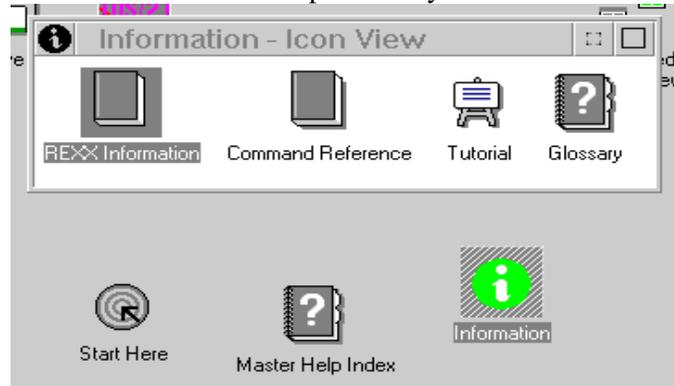


Figure 5: Information Folder Icons

Centralized index: As described earlier, the Master Index contains procedures for every component in the system. The user can browse information related to any component at any time. Contrast this with an operating environment that has no central index, which forces the user to find and activate a component (such as the Print Manager) to access procedures for using that component. The centralized OS/2 2.0 Master Index contains procedures that involve multiple components and has links from information about one component to information about another component. Suppliers of applications software or peripheral devices can add procedures to the Master Index for using their products.

Connected documents: Index panels can contain links to other online volumes. Object help can contain links to the Index's procedures for using the object. Every type of help information can contain links which allow the user to read the definition of a term without opening the Information folder, or having to leaf through the Glossary alphabetically. Any type of help information can also have links that open windows onto the Command Reference so that the reader quickly reads details about a needed command, again without opening the Information folder or having to scan the Table of Contents of the reference manual.

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Buttons: The Search button in the open Index window speeds access to information for accomplishing a particular task. The Print button produces a hardcopy version of the information for users who prefer to have a paper copy to reference.

Indexing techniques.

Location: In the OS/2 2.0 product, we decided to have an index substitute for the table of contents as the reader's introduction to our procedural guide. The guide has little sequential structure as each information topic can be reached by multiple linked paths. Further, an alphabetic index follows the currently-popular encyclopedic model for documents that arranges "everything you ever wanted to know about our product" alphabetically rather than dividing instructions into chapters by subsystem.

Number of entries: Restricted to a small, windowed area of the screen, a index list cannot exceed two levels without jeopardizing readability. Window size also imposes a limit on the number of subheadings per topic. Scrolling through lengthy lists of subtopics scrolls the main heading out of view, possibly causing the user to forget the topic of the search.

An index entry refers to only one chunk of text because the user can click on it to reach a topic. Contrast this with a book index, in which an entry might point to multiple page numbers and the index might have 3 to 4 levels of subheads

Debugging Topic headings: Debugging the index is a team effort. Because each team member worked independently on information about a particular component, we sometimes found when our separate panels were combined that different writers used the same title text preventing the index from successfully compiling. We also found the need for one person to scrutinize and edit the combined, compiled index, ensuring consistency of style among the entries in the index listing.

Number of search hits: In testing our information, users voiced two contradictory complaints. They expressed frustration when the system did not recognize the search string they typed. When searching succeeds, the number of topics listed as found overwhelmed them. The constraints of the Help engine forced us to choose between providing robust search capability and limiting the

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number of topics that could match a particular search string. We recommended the enhancement of search algorithms to permit *and* and *or* combinations so users could narrow a search objective with delimiting criteria. We also requested alterations to the help-engine software that would eliminate multiple references to the same panel.

WHAT TOOLS, GUIDELINES, AND PROCEDURES CONTRIBUTE TO QUALITY?

For composing content

Often, the product manufacturer provides guidelines. When a CTG client has no defined guidelines, the consultant-writer can suggest them. At IBM, a writer absorbs and obeys at least the guidelines described in this section.

A software or hardware specification describes, how the developers expect their part of the product to look and to work. An *information-design* specification, such as the *OS/2 2.0 Online Information Design Guide*, describes how the Information portion of that product line should look.

An official *IBM Style* and the *Chicago Manual of Style* list corporate preferences for spelling and punctuation.

An *IBM Dictionary of Computing* and the supplementary glossary at the back of the Systems Application Architecture guidelines give the corporate-sanctioned definitions for computer technical terms. These dictionaries posed a problem in the newest OS/2, because some of the terms just did not suit the interface. We included some of the terms in the online glossary intact, but wrangled, with some amount of committee appeal, the approval to alter some. Those that OS/2 altered online are likely to be changed in the next addition of the aforementioned manuals.

If you have software involvement at IBM, you are probably familiar with the *Common User Access* (CUA) guides to interface design. Remember that the interface includes online documentation.

If you develop software at IBM, you are also familiar with translation requirements, might have read the *Translation Procedures* guide, and have certainly received requests for corrections from translators and foreign testers.

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Corporate lawyers from Intellectual Property Law research trademarks, component names, and references to external products, selecting names and symbols that hopefully avoid lawsuits. The lawyers also dictate how and how often writers must flag trademarked terms. The Corporate Graphics staff renders decisions regarding approved color schemes and icons.

If you anticipate developing any type of product for IBM, you might scan **References** list at the end of this article for other guidelines that affect your approach to design

Each of these guidelines undergoes its own draft, review, rewrite, and acceptance procedure. A volatile guideline adds considerable revision and retranslating overhead, and sometimes delays information completion. Changes in CUA design, approved icons, and legal decisions regarding references to compatibility with Microsoft™ Windows™ contributed to the infamous delays in OS/2 2.0's release.

For reviewing

A help compiler translates the text into the format needed to integrate it into the product and resolves the hyperlinked references. Proofreading on paper is inadequate, since only a view through a window can give the writer a feel for the effects of the window size on the meaning of content, the number of scrolls required, and the quantity of information found by search strings.

Individual writers review their own material, and test that the links connect properly. On screen, the writer will also check illustrations, animation, and other effects for appropriateness. Additionally, possibly iteratively, the writers convene as a panel to view and offer suggestions for each other's work. Even a well-written component help can lose its impact if its style stands out from the overall look of the whole library.

For testing

Despite all the guidelines and editing, testing yields the most influential contribution to quality. IBM, Boca Raton has an elaborate usability test laboratory. Potential users sit under video cameras in soundproof offices with one-way glass, where they attempt to complete tasks with the product and its documentation. A proctor records each action and comment, while watching the test

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participant's face, hands, and the test-system display on separate viewing screens. After each task, a test participant completes questions about likes, dislikes, and suggestions for improvement.

The SE should recognize this test as a usability-lab process used to evaluate a software or hardware product. Only the emphasis changes, asking the participant to evaluate documentation, rather than product features or the suitability of the interface.

Off-site, selected IBM customers and vendors who agree to integrate their products with IBM's acquire and use various early releases of the product. Personnel at these test sites contribute their complaints, praise, and suggestions to a dial-up computer bulletin board (called the *Forum*). According to the official process, IBM staff and their CTG counterparts must scan Forum entries for reasonable complaints and suggestions, changing their components appropriately.

The test-revise process recycles until in-lab test participants complete the required percentage of tasks and bulletin boards accumulate favorable praise for the product.

WHO IS RESPONSIBLE FOR QUALITY?

This section merely samples the breadth of expertise that a hypermedia product might need. Note that "quality assurance" begins with planning, not with testing.

Administrators

The team works within a hierarchical personnel structure. At the top, corporate policy-makers and lawyers target markets, determine release dates, orchestrate publicity, and enforce wording and pictorial standards. Their policy decisions and revisions force the rest of the team to balance between adjusting their work and completing it on schedule. Because corporate policies affect *documentation* (the words), they also affect what appears on the *interface*, which puts the SE's part of the product into as much upheaval as the writers'. A company that can produce a quality product must have bi-directional communication between management at the top and the technicians at the foundation of a project. When technicians need more time or more resource than management provides, the quality will be jeopardized by shortcuts.

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In the middle, managers and planners submit budgets for resources, delegate components, enforce deadline schedules, and coordinate activities between information developers and other departments. A team lead maintains the current product's information style guide and coordinates inter-component consistency. Editors assert decisions regarding paragraph formatting, grammar, and spelling. Part of the editor's function involves consulting the various style guides and dictionaries sanctioned by the corporation and the team lead. As SE, you can assume that the editor who influences your product has considerable knowledge of computing technology, familiarity with your client's standards and guidelines, and the clout to enforce decisions about conformity.

Developers

We CTGers work together at the base of the hierarchy. This important foundation contains a variety of talent—software or hardware developers, writers, artists, testers, translators, and build technicians.

Software and hardware developers (including CTG SEs) have the job of articulating and circulating the product design, and then implementing the product. Their skills, known to this audience, are too diverse to list here. Add to what you know, the patience to read information and correct any technical errors.

Writers have skill in communicating with natural language, instructions for using a product. For the 1990's, a writer also understands how to enhance meaning through choices in page (or window) layout, font, and illustration. Technical writers vary as to specialty area. CTG SEs will generally interact with writers (including CTG IAs) who understand computer operating-system functions and programming languages, computer applications, hardware configuration, or all of these. They also have experience in tagging information so that the compiler can translate it.

Artists must both have graphic talent and know how to use computer software to render art. Today's artist might also need the skills for providing animation or interaction. Multimedia artisans specialize in audio effects or motion video.

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A build technician collects and combines team-members' work, then submits the results for product build. This person usually also sets up test equipment and nudges writers to fix reported errors before the next build.

There are several levels of testing at a large installation—system function testers, usability testers, and beta-site customers.

Testers

System testers perform quality-control analysis. They run a predefined group of scenarios using the product; then report any functional or performance problems. System-test skills echo those of the developer and CTG SEs can find positions in testing.

An information tester and usability tester both have skills in assessing and measuring product usability. A usability expert generally has a background in human-learning factors, test design, and statistical analysis. Naturally, testers must also understand the features of products they test. A tester has communication skills—to articulate test scenarios clearly, to debrief test participants orally, and to report the relationship of test results to product success or recommended changes.

Potential customers actually have the ultimate word in determining the goals for quality. The test group searches for a mix of skill levels from novice to experienced user for in-house usability tests. The selected customers who volunteer to act as beta testers might distribute the product to any of their employees, or might be SEs who use the product as a platform for developing their own computer product.

Translators speak at least two languages and the ability to use computer-translation utilities. They can use the product described by the information and are familiar with the style guidelines listed on page 18. In the process of converting English text to other languages, translators find discrepancies in the text and suggesting alterations that work better in other languages.

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WHEN AND HOW DO THEY PURSUE QUALITY?

To achieve quality goals, a development process emphasizes coordination and feedback between team members, as well as iterative testing followed by revision. Quality-assurance efforts permeate the entire process, not just the testing phases.

After the software or hardware developers design a product and release a specification, that specification goes through a process of corporate-wide assessment and preliminary approval. The writers' team lead prepares an information style guide to fill in details not provided by other corporate style guidelines, such as examples of panel layout, standard sentences, tagging, and so forth. The writers familiarize themselves with the specification the style guide, and possibly a prototype. They begin to write.

The editor reviews each writer's work, online and on paper, as does the software or hardware developer (such as yourself) responsible for each component. After marking up the work, the editor and developer return it to the writer, who makes or rejects each of the requested corrections. The writers proofread the compiled panels and test the links. The team lead edits the whole for consistency; the team meets together to review the whole (called a *peer review*).

The build team assembles revamped versions of the product on a cyclical basis, submitting each build to the various groups who test for integrity, performance, and usability. Translators report inconsistencies or inaccuracies; beta-testers report these as well as their assessment of information usability. Test results might lead to changes in product design or might just indicate the need for documentation revision. In either case, rewrites occur. In the case of OS/2, and beta-site feedback drove interface and function changes continually throughout the months of version 2.0 development. Additionally, the public requested increasing numbers of hardcopy references as the functionality of the product expanded. Under the Market Driven Quality banner, we strove always toward customer satisfaction.

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IS HYPERMEDIA APPROPRIATE FOR YOUR PRODUCT?

To help you decide, you might read published literature comparing online, linked media with the more traditional hardcopy. Some of these are listed in the **References** section.

Drawbacks

Hypermedia presents only a small chunk of insight at a time. It is difficult to present an overview or summary, and there is no conclusion.

Hypermedia windows overlap component windows and icons, which might hamper the viewer's understanding. By contrast, an open book can present instructional information on one page and illustrations on the page opposite.

With hypermedia, the reader potentially takes a different path through the information with each consultation and might well become lost. Hypermedia has an unfamiliar feel compared with books.

Hypermedia consumes online resources, such as disk space, and can raise the price the customer pays for hardware that will support your product.

A system that exhibits poor performance can slow down information search or display noticeably, frustrating the person who wants help to complete a task.

Advantages

On a well-behaved system, hypermedia quickly accesses information of immediate interest within the context of a user's current activity. Hypermedia is interesting to use; it is vivid, interactive, sometimes moves and sings.

A vendor can continually update and improve hypermedia data without incurring publishing expenses. Users update their systems by overwriting help files; no books go in the trash.

Compromise

Probably a supplier should not weigh hypermedia versus hardcopy, but rather include portions of both, as well as other mechanisms such as training courses. The computer-using population contains many types of learners. Although IBM prepared all (except installation) OS/2 2.0

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documentation as softcopy, after tests of early releases, the team added several short hardcopy books.

WHAT DID YOU LEARN?

In summary, you discovered that a large group of experts comprise a hypermedia information team. As computer-system engineers, you have an important advisory role on that team. You learned that the writer and artist must respond many other mentors as well as yourselves. Between your technical opinion and the information lie layers of official guidelines, editors who enforce these, testers and test participants who determine how well the information works for them. Remember, too, that information analysts study their public and can suggest the clearest means to document your good work.

Perhaps you discerned that the information team has deadlines imposed by marketing requirements. Try not to make on-the-fly changes to your product that do not agree with the published specification. If you need to make a change, keep your writer informed. Try to respect the writer's need for your attention, despite the mountain of work you face in developing the product. Documentation personnel will in turn treat your schedule load with delicate respect.

You learned, too, that hypermedia does not always work. Participate in choosing the media through which people learn to use your product. Sample some hypermedia in your prototypes. Assess how you feel about its contribution to your product's quality.

In reading about the skills of writers, artisans, editors, and testing experts, you discovered the types of expertise available from Documentation Support Services Group (DSSG) of CTG. Add CTG-DSSG personnel when you propose flexible-staffing solutions to your clients. Because DSSG is the branch of CTG that focuses on documentation, its experts augment the quality of your team.

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