**Bellcore**

Bell Communications Research

Bellcore Practice
BR 007-230-215
Issue 2, January 1989

# Documentation Guidelines for Centrally Developed Systems

Prepared by the Information Management Services Division,
Bellcore, January 1989

For further information, please contact:

Organization 25920
Computer Technology Support
Bellcore
Six Corporate Place
Piscataway, New Jersey 08854

# DOCUMENTATION GUIDELINES FOR CENTRALLY DEVELOPED SYSTEMS

## CONTENTS

## LIST OF FIGURES

# LIST OF TABLES

# 1. INTRODUCTION

## 1.1 Purpose

The purpose of this Bellcore Practice is to define the documents required to support Centrally Developed System (CDS) software developed for Bellcore Client Companies (BCCs).

The Practice contains four sections, as follows.

**Section 1 – Introduction** provides an introduction and some background information.

**Section 2 – Scope of Application** describes the scope of application for this Practice and some guidelines for responsibilities in the documentation process.

**Section 3 – Deliverable Documents and Document Users** defines documentation deliverables required to support software systems and the users for whom they should be designed.

**Section 4 – Deliverable Document Descriptions** contains detailed descriptions of each of the various types of documents.

> **NOTE**
> The medium for delivery and/or display of documents may be hard copy, electronic files, or various online computer-based systems. The term "document" is used here to refer to system documentation regardless of the medium used.

## 1.2 Reason for Reissue

This Practice is the single standard for Bellcore information delivered with Bellcore CDSs. This Practice is being reissued to incorporate new Bellcore documentation philosophies and the current Software Development Process. This Practice was formerly titled *System Deliverable Information* (SDI) and was renamed *Documentation Guidelines for Centrally Developed Systems* in order to more accurately reflect its use.

## 1.3 Applicability

This standard applies to CDSs and any entity responsible for the development of CDSs, including vendors under contract. It is issued under the auspices of the Computer Technology Advisory Group (CTAG).

## 1.4 Definition

"Deliverable documents" are defined as the information that must be delivered to customers involved with system planning and installation, operations and maintenance,

and technical support. (See Table 3-1.)

## 1.5 Restrictive Markings

All deliverable documents covered by this standard should carry the appropriate restrictive marking. (Reference *Proprietary Information and YOU*, SR-FAD-000073).

## 1.6 Practice Numbering

The deliverable information defined in this standard will be produced as Bellcore Practices. The control and assignment of Practice numbers are the responsibility of the Information Management Services Division.

# 2. SCOPE OF APPLICATION

## 2.1 Deployed/Nondeployed Systems

This standard applies to CDSs either deployed (i.e., installed and operated at a customer site) or nondeployed (i.e., installed and operated at a Bellcore location and accessed by the customer). This Practice defines the deliverable document requirements and options appropriate to each of these development/operation types. (See Table 3-2.)

## 2.2 Types of Computers

The documentation needs for information systems based on various types of computers (micro, mini, mainframe) are covered by this Practice.

## 2.3 System Releases

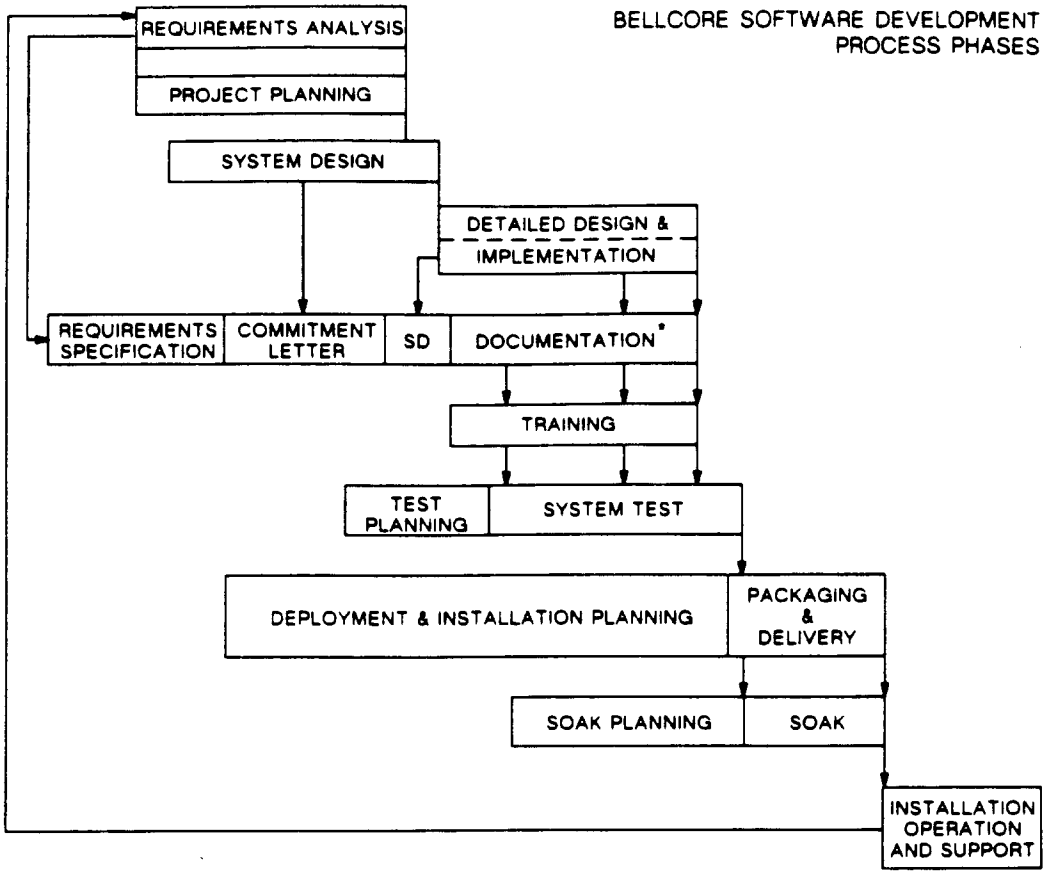
The deliverable documentation described herein applies to the initial release of a new CDS and all subsequent releases or generics. All deliverable documents produced for the initial release must be updated and maintained as required for each subsequent release of the system.

## 2.4 Development Process

This standard for deliverable software documentation is endorsed by Bellcore's Information Management Services Division and by the Software Development and Services Committee (SD&SC). This standard is an integral part of the *Bellcore Information Products Standards* document, CI-FAD-000031 and of Bellcore's *Software Development and Services Policies*, Version 2.0.

The *Bellcore Information Products Standards* defines all Bellcore deliverable information products and includes procedures for developing, producing, and distributing them.

The *Bellcore Software Development and Services Policies* is a collection of the major policies, guidelines, document outlines and references that supports the goal of achieving customer satisfaction. It is a strategic part of the work being done to develop key policies to help achieve customer satisfaction by producing high quality, cost-effective, and timely software systems and services. The waterfall chart in Figure 2-1 describes the development phases in the Software Development Process and specifies the timing within that process for deliverable documentation.




* The Documentation Phase of the Bellcore Development Process is defined as the period when documentation for the end user and system support area is prepared. It should be noted that the *Requirements Specification*, the *Commitment Letter*, and the *System Description* (SD) are prepared in connection with earlier processes. These three documents are planning documents, and although they are specified within the Documentation Guidelines, they are prepared and distributed with the Requirements Analysis Phase, the System Design Phase, and the Detailed Design Phase respectively.

**Figure 2-1.** The Software Development Process

## 2.5 Project Leader/Development Manager

The Bellcore user organization Project Leader, in consultation with the system Development Manager, determines the organizations responsible for producing the various documents and for packaging the deliverables.

The minimum set of documentation as specified in Bellcore's *Software Development and Services Policies* is adapted from this Bellcore Practice. The documents are:

1. *Requirements Specification* (produced during the Requirements Analysis Phase)
2. *Commitment Letter* (produced during the System Design Phase)
3. *System Description* (produced during the Detailed Design Phase)
4. *System Index* (produced during the Documentation Phase)
5. *Installation Planning Guide* (produced during the Documentation Phase)
6. *System Administration Guide* (produced during the Documentation Phase)
7. *System Operations Guide* (produced during the Documentation Phase)
8. *User Guide* (produced during the Documentation Phase)
9. *System Maintenance Guide* (produced during the Documentation Phase)
10. *Data Base Administration Guide* (produced during the Documentation Phase)
11. *Training Documents* (produced during the Documentation Phase)

Activities that should occur during the Documentation Phase are:

- Identify user documentation needs
- Identify documents to produce
- Identify documentors
- Prepare documentation plan
- Prepare documents
- Evaluate documents
- Issue documents through the Documentation Services Center
- Put documents under change control

# 3. DELIVERABLE DOCUMENTS AND DOCUMENT USERS

## 3.1 Document Target Audience

A list of 11 possible types of deliverable documents is presented in Table 3-1. Target audiences are shown for each document.

**Table 3-1.** Deliverable Documents and Their Target Audiences

| TECHNICAL TITLES FOR DOCUMENTS | DOCUMENT'S TARGET AUDIENCE |
|---|---|
| 1. *Requirements Specification* | Computer Center Administration<br>ISO Planning<br>Project Management<br>Project Panel<br>User Planning<br>User System Management |
| 2. *Commitment Letter* | ISO Planning<br>Project Management<br>Project Panel<br>User Planning |
| 3. *System Description* | Any System User |
| 4. *System Index* | Computer Center Administration<br>Maintenance<br>Project Management<br>User System Management |
| 5. *Installation Planning Guide*<br>Acceptance Test Information Appendix<br>System Release Description Addendum | Computer Center Technical Support<br>Installation Team<br>Project Management<br>User System Management |
| 6. *System Administration Guide* | Computer Center Administration<br>User System Management |
| 7. *System Operations Guide* | Computer Operations |
| 8. *User Guide* | System User |

| TECHNICAL TITLES FOR DOCUMENTS | DOCUMENT'S TARGET AUDIENCE |
|---|---|
| 9. *System Maintenance Guide* | Computer Center Technical Support<br>Data Communications Control<br>Maintenance |
| 10. *Data Base Administration Guide* | Data Administration<br>Data Base Administration |
| 11. Training Documents: | |
| *Training Program Description* | |
| *Training Administration Manual* | Training Administration |
| *Instructor Manual* | Course Instructor |
| *Student Manual* | Course Instructor<br>Student |

## 3.2 Categories of Use

The deliverable documents are subdivided into three basic uses, as shown in Table 3-2: (1) Planning and Installation; (2) System Operations and Maintenance; and (3) Support. Table 3-2 also shows the CDS operation environment and which of the deliverables are required (X) and optional (O) for each type. For the nondeployed category, the figure also shows whether recipients of documents are at the customer site, at Bellcore, or both. Explanatory notes about various types of documents within each operation environment are included in Table 3-2.

Table 3-2. Deliverable Documents and CDS Operation Environment

| DELIVERABLE DOCUMENTS | OPERATION ENVIRONMENT | | |
|---|---|---|---|
| | DEPLOYED | NONDEPLOYED | |
| | | BCC | OPERATIONS |
| **PLANNING AND INSTALLATION** | | | |
| 1. *Requirements Specification* | X | X | O |
| 2. *Commitment Letter* | X | X | X |
| 3. *System Description* | X | X | X |
| 4. *System Index* | X | X | X |
| 5. *Installation Planning Guide* | X | O | X |
| Acceptance Test Information Appendix | X | O | X |
| System Release Description Addendum | X | O | X |
| **SYSTEM OPERATIONS AND MAINTENANCE** | | | |
| 6. *System Administration Guide* | X | O | O |
| 7. *System Operations Guide* | X | O | X |
| 8. *User Guide* | X | X | O |
| 9. *System Maintenance Guide* | X | O | X |
| **SUPPORT** | | | |
| 10. *Data Base Administration Guide* | X | O | X |
| 11. *Training Documents* | X | X | X |
| Key<br>X = Required<br>O = Optional | | | |

Note 1. DEPLOYED

5. *Installation Planning Guide* – If the installation is to be done by the developer, this document needs to provide only that information which the operating company needs in order to plan for the installation.

7. If the *System Operations Guide* is for a system that will run on a minicomputer/ superminicomputer, an operator's handbook should be prepared in accordance with BR 007-230-216.

Note 2. NONDEPLOYED

5. *Installation Planning Guide* – This document may not have to be produced depending upon the specific installation arrangements. The entire document needs to be addressed by the developers in order to determine how much, if any, information needs to be delivered based on who does the installation.

6. *System Administration Guide* – Production of this document is dependent on the size and complexity of the system and therefore the identification of specific system administration requirements.

## 3.3 Documentation Packaging

The size of a system, the type of computer (micro, mini, mainframe) and/or the number of people involved in its use, operation and support, may have an impact on how the deliverable documentation is packaged. For small systems, it may be appropriate to combine some document types into a single document. For example, the *System Operations Document* and the *System Maintenance Document* might be combined into one document. The titling must reflect the contents of the final set, for example, *System Operations/Maintenance Guide*. For a relatively small PC package, it may even be possible to combine all of the documents into a single document. In this case, the document should contain sections that provide the information in each of the document types represented in Table 3-1 and described in Section 4.

Conversely, packaging may involve the breaking down of large or complex sets of work activities into subsets of work. The related documents would be broken down accordingly. In this case, the titling must indicate the prime document and the particular work activity for which the document is targeted. For example, a system might have two user guides entitled *User Guide - System Order Entry* and *User Guide - Report Features*.

## 3.4 Guidelines For Procedural Information

Procedural information, when provided, may be presented in various levels of detail depending upon the type of work activities, how specifically the procedures can or must be described, and the type of people performing the work. Appendix A describes three levels of procedural information and guidelines for formatting procedures in each level.

## 3.5 Documentation Delivery

Documentation may be delivered using media other than an 8-1/2 by 11 inch hard copy, e.g., media such as tapes, disks, microform, and electronic transmission. Additionally, it may be embedded as part of the system software and available online or through a file access. The information content requirements specified in this Practice are flexible enough to accommodate the various means of delivery. The actual size of hard copy delivered documents, primarily those related to operations and maintenance, may be other than 8-1/2 by 11 inches, depending on the workstation design where a document will be used.

## 3.6 Format of Deliverable Document Descriptions

Each of the 11 deliverable document types is fully described in Part 4 of this Practice. The Section number, e.g., 4.1, corresponds with the number of the document as shown in Tables 3-1 and 3-2. For example, Section 4.1 covers the *Requirements Specification.* Each description is in the following format:

### GENERAL

This section presents an overview of the document, its contents, and purpose.

### CONTENT AND ORGANIZATION

This section specifies the information to be contained in the document and the organization or sequence of that information.

### DELIVERY

This section identifies the time frame within the development process when the documents for a new system should initially be available for delivery to the target audience. Also, it specifies whether the documents must be delivered with subsequent system releases or only as necessary for changes required by the release. Documents may be revised at any time. The document identification block at the top of the page will identify the issue and may include the related software release.

### DOCUMENTATION TARGET AUDIENCE

This section identifies the users for whom the documentation is targeted.

# 4. DELIVERABLE DOCUMENT DESCRIPTIONS

## 4.1 Requirements Specification

### GENERAL

The *Requirements Specification* provides the initial system requirements for a new system or major enhancements to an existing system. This includes information on system objectives, environment, and expected performance capabilities.

### CONTENT AND ORGANIZATION

The *Requirements Specification* contains the information described in the following paragraphs and in the sequence shown. In addition, the content can include other information judged to be useful to the users. *This information should be at a level of detail to satisfy the needs of the primary documentation target audience for planning and approval.* It is not intended to be the detailed system requirements to be passed to the system designers.

#### Introduction

The introduction provides general information about the document and how it is to be used. It also identifies the target audience. Definitions, lists of acronyms, and references may be included in this section, but if the volume of these items is large and interrupts the flow, they should be included as attachments.

**Purpose and Scope.** In this section, present the document's purpose and specify the products and client programs involved. If this document is part of a larger set of documents, explain how they relate and where this document fits. If prerequisite reading is required, items may be listed here (or in an attachment).

**Target Audience.** Requirements are often written for multiple audiences; for example, end-user representatives, testers, planners, customer and development managers, as well as developers. If appropriate, use this section to identify individuals or groups who should read or react to this document. (See Documentation Target Audience.)

**Structure and Use of This Document.** The requirements writer is free to augment or delete the headings in the template in order to present the material most effectively. Explain the chosen organization here as a guide to the reader. Include a description of any attachments.

**Disclaimer.** Some products include a formal disclaimer in their documents. If your product does so, include it here.

### General Information

This section contains high-level, contextual, and qualitative information about the product. Only the "big picture" view is included here, but the information presented must be consistent with the detailed requirements that follow. The information presented in this section may meet the needs of many different audiences, and will help all readers to put in context the detailed requirements that follow.

**Problem/Opportunity.** Include a brief overview of the problem or opportunity that this product or release is to address. A reference to the strategic architecture plan and/or Bellcore prospectus is appropriate for new products.

**General Description.** Provide an overview of how the new products or release features address the problem or opportunity, and summarize the impact on the existing product and user environment. Suggestions on how to do this include the following:

- Describe the present method of operation and explain how it will change. (existing products)
- Summarize new features and functions. (new products)

**Assumptions and Dependencies.** List here any assumptions, dependencies, and constraints that are known. New features, for example, may be predicated on the implementation of earlier features or releases. As another example, the human interface for a product may assume that end users have certain specific levels of training or ability.

**Supporting Information.** Include here, or reference here (and include as attachments, if appropriate), any additional information that will help the reader understand the detailed requirements that follow in subsequent sections. Typical information provided here or referenced includes the architectural structure (for existing products) and methods and approaches used in requirements analysis.

### Detailed Requirements

This section contains detailed requirements for the product or release. They should be arranged to suit each product's needs. Overall requirements, if any, and functional requirements, are addressed as required.

**Overall Requirements.** This section contains requirements whose definition is central to the requirements being documented. Examples include the data model for data base requirements or the human interface for user layer building block requirements.

**Functional Requirements.** This section is divided into subsections, one for each distinct functional requirement. Include within each functional requirement all of the elements unique to it.

**Functional Requirement 1.** Provide an overview of the function to be performed. More detail is to be provided in the subsections below. For existing products, the subsections below may be repeated for each product building block or architectural unit affected by the function.

The subheadings below – "input," "process," and "output" – may not always be appropriate for the function described, and the requirements writer may choose alternate terms.

Provide additional subheadings for external interfaces or other requirements unique to this functional requirement. Additional optional subsections may be added to record site-dependent conversion issues or testing considerations that the requirements writer wishes to pass along to the developers and testers.

**Input.** Specify the inputs, whether entered by a product user or by another product through a contract interface, that cause this function to be performed. Describe input data validations and error processing.

**Processing.** Describe the processing required in conjunction with this functional requirement. Identify or include any required algorithms. Specify error handling requirements.

**Output.** Describe the outputs, if any, and their destinations.

**Functional Requirement 2.** Continue the pattern of Functional Requirement 1 until all functional requirements have been documented.

### External Interfaces

This section specifies external interfaces with other products. Recall that if individual functional requirements have unique external interfaces, the requirements writer may include them in the section above.

**Product or Building Block Interfaces.** For each product or building block involved, specify the interface. Note that this description is usually high-level or contractual in nature. Lower level descriptions, including transmission protocols, are usually included in separate documents that are shared by the products involved. Be sure to reference them.

**Conversion or Bulk Interfaces.** New products will typically require a mechanism to capture and process existing business data at conversion time. Describe any such requirements here.

### Other Requirements

These are other characteristics or attributes the product must have. Requirements writers should augment this section with additional subsections (e.g., portability) that are needed for their products. Include a subsection for the human interface, if it has not been covered previously. Subsections in this section are typically not required for a new release of an existing product unless the original requirements in these areas have changed, but documents detailing these original requirements must be clearly referenced.

**Availability/Reliability.** State here any required availability and reliability constraints. These will strongly influence the selection of an operating environment for a new product.

**Performance.** State any performance related requirements; e.g., required processing rates and response time limits.

**Security.** State the level of security required. Describe any required user authorization and access process. Describe any required measures to prevent unauthorized access to or tampering with sensitive client data.

**Environmental Constraints.** Include here any environmental constraints on the product, such as room conditioning or unique power requirements.

**Customer or Site-Specific Requirements.** Include here any requirements unique to a particular customer or site.

### Attachments

Include as appropriate. Attachments may include definitions, acronyms, references, data dictionaries, etc.

## DELIVERY

The *Requirements Specification* is prepared and delivered at the end of the Requirements Analysis Phase* of the software development. It can be used both for internal development and for customer personnel.

## DOCUMENTATION TARGET AUDIENCE

- Computer Center Administration
- ISO Planning
- Project Management
- Project Panel
- User Planning
- User System Management

* See Figure 2-1 - Bellcore Software Development Process

## 4.2 Commitment Letter

### GENERAL

The *Commitment Letter* announces the impending availability of a new system or enhancements to an existing system. It provides advance information such as: system features, architecture, capacity planning data, availability, cost/benefit information, and installation/conversion considerations. This information can be used by BCCs to assess the system's economic and operational feasibility and to make decisions regarding acquisition. Furthermore, the *Commitment Letter* should provide announcements of: development status, estimated completion date, priorities of project development, reasons for changes in the original system or design requirements, and the estimated availability date. The *Commitment Letter* can be used at any time during the system life cycle as a communications vehicle. However, it must be delivered at a point where the system design is firm enough that the capacity planning information as described below can be delivered.

### CONTENT AND ORGANIZATION

The *Commitment Letter* contains the information specified in the following paragraphs and in the sequences shown. Additional information, judged to be useful to the target audience, may also be included.

#### Introduction

This section contains an Executive Summary of the product being delivered or upgraded. This should be an overview aimed at client management and nontechnical personnel who do not require or want detailed technical descriptions of the system, but who require a summary of product operation and development to aid in purchasing and implementation decisions. The target audience should be defined in this section. (See Documentation Target Audience.)

#### Technical Information

(a) **Synopsis** – Provide a brief overview sufficient to convey the concept of the system or the enhancements. Identify the relationship of the system to the overall operations architecture plan.

(b) **Description** – Describe the new system or the enhancement. This description should be in terms of system functions, personnel, performance specifications, and how the system or enhancement is to be used. It can include:

(1) A description of the differences between general types of existing systems (manual or mechanized) and the new system or enhancement.

(2) A description of optional features and/or any system alternatives.

(3) Technical support planning information for hardware/software, especially in regard to capacity planning and sizing, and hardware configuration planning. Since developers should use established Standard Operating Environments (SOEs), refer to the chosen SOE at development time for specifics. Include information to help determine estimated hardware sizing and configurations relating to SOE and non-SOE items (e.g., number of disk and tape drives, number of remote terminals and lines, recommended number of buffers and buffer size).

(4) Software type and function, and its capabilities as compared to a standard. For each case, the description should provide any formulas for making adjustments to the sizing or capabilities based on local environments. Any cycle variations in terms of resource requirements (e.g., daily, monthly, low versus peak usage) should be included.

(5) A schedule of availability, including proposed start and end of trial dates and/or proposed date of general availability to post-trial BCCs.

(6) A description of required interface restrictions and limitations that may depend upon other systems (manual or machine).

(7) A description of the types of personnel and a method of determining the number of personnel required for an operational system.

(8) A summary of advantages: cost/benefits, maintenance, space, and personnel savings.

(9) A description of conversion, installation, maintenance, and test considerations (costs, personnel, time factors) including any special hardware (peripherals, test equipment, interface devices) or software required.

(10) Procedures for planning and evaluating alternative geographical configurations of computer facilities to operate the system.

(c) **Training** – Provide an overview on the types of training required and when the training material or information will be available. Provide other supportive information, such as references and exhibits, as appropriate.

## DELIVERY

The *Commitment Letter* is prepared and delivered at a point when the basic design of the system is completed for initial system development and for each subsequent release. It is delivered during the System Design Phase* of the software development process.

## DOCUMENTATION TARGET AUDIENCE

- ISO Planning
- Project Management
- Project Panel
- User Planning

* See Figure 2-1 - Bellcore Software Development Process

## 4.3 System Description

### GENERAL

The *System Description* provides a broad overview of the scope, objectives, and capabilities of a system, and enables the reader to gain a general understanding of the system.

### CONTENT AND ORGANIZATION

A *System Description* presents a broad overview of the system, including high-level flow and/or block diagrams. The recommended content level and organizational sequence are described below. In addition, the content can include other information judged to be useful to the target audience.

#### Introduction

This section provides a general description of the system. It should begin with an Executive Summary aimed at giving an overview to client management and nontechnical personnel who do not require or want detailed technical descriptions of the system. It includes information such as purpose and objectives (system and service), intended use, major inputs and outputs, capabilities, and features. It also provides the manual and/or machine interfaces among functions within the system, and between the system and other systems. This section also specifies the role of the system as it relates to other systems and/or centers, as described in various operations plans. When documentation is via media other than hard copy, this section describes the documentation delivery and display mechanisms. The target audience should be defined in this section. (See Documentation Target Audience.)

#### Hardware Configuration Description

This section describes the hardware configuration, including the computer, peripherals, control equipment, and any associated equipment, such as telemetry, responders, multiplex units, etc.

#### Software Description

This section describes the system's software (operating-control, utility, and application programs). The description identifies the program and/or load modules and their functions and relationships to each other and to any associated data base. This section may also briefly describe each data base, including general content, type (tape or disk), intended use, and related data security features.

### Human Performance Description

This section describes the human performance aspects of the system. The description should summarize the system work activities and describe the types of personnel required to operate, support, and use the system.

### Glossary

This information will be the last section of the document. It contains definitions of all words, expressions, abbreviations, and acronyms that apply to the system. The order of appearance is alphabetic and then numeric in accordance with the first character.

## DELIVERY

The *System Description* is prepared and delivered during the Detail Design Phase* of the software development process.

## DOCUMENTATION TARGET AUDIENCE

- Any System User

* See Figure 2-1 - Bellcore Software Development Process

## 4.4 System Index

### GENERAL

The *System Index* specifies all of the documents and software associated with each system release and lists the following data about each: (1) The issue, (2) the scope or number of pages, and (3) any restrictive markings applicable. This document is designed to be used as a control tool by BCC personnel for all delivered products.

### CONTENT AND ORGANIZATION

The *System Index* contains the information specified in the following paragraphs. The information is in recommended sequence.

#### Title Page

The title page contains the following information:

- System type, name, and release
- Document title, identification number, and issue
- Page number and total number of pages of the *System Index* (depending upon the format used).

#### Introduction

This section describes the purpose and use of the *System Index* as well as the target audience. (See Documentation Target Audience.) Also included in this section is a description of the Appendix on Acceptance Test Information and reference to future distribution of Addenda that will cover subsequent system releases, i.e., System Release Description.

#### Issue Notes

Issue Notes provide a clear, concise statement of the changes made to the *System Index* each time it is revised. A running record of Issue Notes shall be maintained for supported system releases appearing in the Index. A notation may be included that designates how long the previous release will be supported.

#### System Notes

System Notes provide information pertaining to the documents and/or software related to the system. For example, the System Notes might include an alphabetical list of subject areas with a cross reference to the document(s) that include those areas. Number the notes sequentially.

### System Documentation/Software

List system documents and software on separate pages. Include all system deliverable documents, applicable vendor documents required (vendor program listings), and software (tapes, executable load modules) applicable to each system release. Identify documents required by line personnel (operations, maintenance, administration, users) by a double asterisk.

System documents and software pages contain the following information.

(a) **System Release** – Each supported release number of the system. A system release shall be assigned only when there is new or changed software.

(b) **Identification** – Each document and software identification number.

(c) **Issue** – The issue numbers of all documents and software associated with a System Release.

(d) **Title** – Titles of all documents and software.

(e) **Delivery Mechanism** – For all documents, indicate how the information will be made available: hard copy, embedded in application software, independent documentation system, or a combination of the above.

## DELIVERY

The *System Index* is prepared during the Documentation Phase* and is delivered with the initial system release, during the Packaging & Delivery Phase.*

## DOCUMENTATION TARGET AUDIENCE

- Computer Center Administration
- Maintenance
- Project Management
- User System Management

* See Figure 2-1 - Bellcore Software Development Process

## 4.5 Installation Planning Guide

### GENERAL

The *Installation Planning Guide* defines in detail all the installation and conversion activities that must be performed to install the initial system release. It also provides information on the suggested makeup of the installation team. An Appendix will contain the Acceptance Test Information. Also, information on subsequent major releases or generics will be produced as addenda to this document, will be titled System Release Description, and will include the release or generic to which it applies.

### CONTENT AND ORGANIZATION

The *Installation Planning Guide* contains the information as specified in the paragraphs below. The required information is in recommended sequence.

#### Introduction

This section describes the purpose and use of the document as well as the target audience. (See Documentation Target Audience.) Also included in this section is a description of the appendix on Acceptance Test Information and reference to future distribution of Addenda which will cover subsequent system releases, i.e., System Release Descriptions. This section should contain an Executive Summary aimed at giving an overview to client management and nontechnical personnel who do not require or want detailed technical descriptions of the system.

#### General Description

This section provides a summary, sequence, and typical interval of significant installation activities such as:

- Installation team selection
- Conversion
- Hardware/software installation
- Testing
- Training
- Personnel planning.

Show activities and events in tabular or chart form to indicate sequences, dependencies, and intervals. Cover all options associated with an activity (e.g., total or phased conversion).

For each activity, specify the organization responsible and show references to other documents that provide the details for that activity. For example, the installation of software is a significant activity; however, the details concerning the setup and initialization of software are covered in the *System Operations Guide*. For activities not covered by other documents, specify details in the *Installation Planning Guide*.

### Installation Team

Provide detailed information on the numbers and types of personnel from affected customer departments who should be represented on the installation team and the activities for which they will be responsible. When applicable, include outside personnel requirements also.

### Conversion

(a) **Data Conversion** – Provide information relative to existing manual records or mechanized data base(s) that must be converted for use with the system. Describe the procedures for conversion, including translation to machine language and record purification. Also, identify any software that may be used for this purpose.

(b) **Hardware and Facilities** – Describe any hardware and facilities that will be required only during conversion.

(c) **Local Development Activities** – Provide information concerning local development and/or modification of forms, programs, manual procedures, controls, etc., so that the new system or release can be accepted. Also, identify any legal, FCC, or PUC requirements.

(d) **Interface Coordination** – Specify the applicable release levels of other software based systems that must be present and that interface with the system being installed. Include information such as physical connections, link protocols, etc., that are required to establish the interfaces.

### Hardware/Software and Facilities

Since developers should use established SOEs, refer to the chosen SOE at development time for specifics.

Provide information to assist the customers in determining specific installation configurations that may be required relative to SOE and non-SOE items (number of disk and tape drives, number of remote terminals and lines, recommended number of buffers and buffer size).

Include information on any special requirements or conditions not covered by the vendor's equipment installation practices. These requirements may include additional environmental considerations, personnel safety, etc.

Provide the requirements on the data communication network that must be available as part of the system, including terminal types, terminal options, and data set (modem) options.

### Glossary

This information is optional and will be the last section of the document. It contains definitions of all words, expressions, abbreviations, and acronyms of a unique nature used in the document. The order of appearance should be alphabetic and then numeric in accordance with the first character.

### DELIVERY

The *Installation Planning Guide* is prepared during the Documentation Phase* and is delivered with the initial system release and each subsequent release as required.

### DOCUMENTATION TARGET AUDIENCE

- Computer Center Technical Support
- Installation Team
- Project Management
- User System Management

* See Figure 2-1 - Bellcore Software Development Process

### 4.5.1 Acceptance Test Information Appendix

#### GENERAL

The Acceptance Test Information Appendix provides information on certification tests whose successful completion indicates that the installed system is working properly and therefore meets design objectives. This information forms one of the bases for customer acceptance of an installed CDS.

#### CONTENT AND ORGANIZATION

This Appendix contains the information as specified in the following paragraphs. The required information is in a recommended sequence.

##### Introduction

This section describes the purpose and use of the Appendix as well as the target audience. (See Documentation Target Audience.)

##### General Description

This section identifies the types of tests and their sequence. It also specifies any equipment and/or documentation required for the tests.

##### Test Requirements

The following information is provided as applicable for each test (live or simulated) to be performed:

- Description
- Performance details
- Data to be used
- Expected results based on service objectives
- Conditions that may cause the system to fail a test.

Where equipment and/or software test packages have been specified, they are identified and instructions for their use included. When testing information is covered by vendor information, only additional application-specific information need be documented, along with a reference to the vendor documentation.

Flow diagrams, tables, illustrations, etc., may be included to augment the requirements.

### Reports

Information is provided on any required reports for the system (reports of test results, trouble reports, verification reports, acceptance reports, etc.) and their disposition.

## DELIVERY

The Acceptance Test Information should be delivered as an Appendix to the *Installation Planning Guide* with the initial system release and updates, as required, for subsequent releases. The Appendix can be sent out after the *Installation Planning Guide* if more appropriate.

## DOCUMENTATION TARGET AUDIENCE

- Computer Center Technical Support
- Installation Team
- Project Management
- User System Management

### 4.5.2 System Release Description Addendum

#### GENERAL

The System Release Description Addendum provides information on the official release of a new system or a major change release to an existing system. It provides pertinent information on features, changes, troubles corrected, and special installation procedures. All modification requests (MRs) resolved by the release will be referenced.

#### CONTENT AND ORGANIZATION

A System Release Description Addendum consists of a title page and succeeding page(s) containing information as specified in the paragraphs below, as applicable. In addition, it may contain other information that may be required by the various documentation users.

##### Title Page

The title page contains the following information:

- System type and name
- Title, system index identification number, and system release number
- Page number and total number of pages
- Reason for release
- Transmittal data (e.g., T-TRAN transmittal information), if applicable
- Release authorization signature.

##### Introduction

This section describes the purpose and use of the Addendum as well as the target audience. (See Documentation Target Audience.)

##### Description

This section contains the following information:

- Concise description of the features provided by a new system or a new feature(s) and/or improvements to a previously released system.
- Concise descriptions of trouble conditions being corrected.
- An updated cross-reference table, which provides the relationship of the changes to the system as reflected in the various component systems.

### Impact

Impact information is provided about the system release to show significant effects on the involved organizations and potential problems in the installation, use, and maintenance of the system. For example:

- Special installation and/or conversion procedures and schedules which are not covered in the *Installation Planning Guide* and/or *System Operations Guide.* Included are human performance activities which may be affected by the release.
- Training requirements.
- Coordination information (shared data bases, system interfaces, new hardware).
- Modification requests (MRs) not incorporated that necessitate changes to existing system operations.
- Effect on service locations having different operating features and/or configurations.
- System releases that will be supported.

### Supplementary Information

This section provides a list of all new, changed, and/or deleted documents/software, including a description of what was changed or deleted, and their respective identification issues, or reference to the *System Index* and its issue. Also included is a list of all MRs that have been resolved with this release.

## DELIVERY

The System Release Description is prepared during the Documentation Phase* of the software development process and delivered as an addendum to the *Installation Planning Guide,* at the end of the trial or soak testing for the initial release, and for all subsequent major system releases.

## DOCUMENTATION TARGET AUDIENCE

- Computer Center Technical Support
- Installation Team
- Project Management
- User System Management

* See Figure 2-1 - Bellcore Software Development Process

## 4.6 System Administration Guide

### GENERAL

This document provides procedures and descriptive information to manage the system, and to help assure effective use, operation, and control of the system. Both user and data systems managers are the intended audience. This document may be broken out into separate documents for user management and data systems management when appropriate to effectively meet the informational and procedural needs.

### CONTENT AND ORGANIZATION

The *System Administration Guide* contains the information specified in the paragraphs below. It may also contain other information that may be required by system administration personnel. The information is in recommended sequence.

#### Introduction

This section describes the purpose and use of the document as well as the target audience. (See Documentation Target Audience.)

#### General Description

This section includes a brief description of the procedures and techniques provided for system administration personnel to assist them in the effective use and operation of the system. When work activities are designed, a description is provided that includes the name of the activity, a statement of recommended minimum qualifications for performing the work, a brief narrative of tasks to be performed, and related information (e.g., performance aids, available training courses).

#### Management and Coordination

This section contains a description of the system procedures and controls required and available to administer the system operations. Typical items included are:

(a) Identify critical operations (scheduled report generation, disk to magnetic tape dumps, etc.) that may be required by system users and/or operations personnel.

(b) Identify data network interface(s) (access procedures and administrative inputs/outputs).

(c) Describe contingency plan(s) to be followed by user and operations personnel as back up during inoperative conditions.

(d) List cautions that apply to the installation and testing of new and changed releases.

(e) Describe system protection and security measures, including assignment of user identification numbers and data security features.

(f) Describe plans for changing the system configuration to provide user alarm and message routing.

(g) Provide guidelines for resolving operator and user questions and complaints.

(h) Provide methods that will be employed to advise the customers of supplier initiated hardware changes.

(i) Explain the process for submitting modification requests (MRs) for maintenance and enhancements. If this process is unique to this project, i.e., not part of a centralized function for multiple projects, include the process and procedures or refer to documentation covering the process.

### Scheduling

This section identifies those system activities that must be scheduled, the information that must be gathered to develop the required schedules, and how the schedule is developed, monitored, and controlled. Typical parameters to include are as follows:

(a) Provide the required main memory for peak and low loads at different transaction volumes

(b) Provide the frequency, sequence, and volume of inputs expected from the user and outputs to the user

(c) List the frequency and dependency of system processes

(d) Provide estimated run times for each type of process, including the type(s) of hardware configuration(s) used as a basis for the estimates.

### System Controls Summary

This section should be a listing of controls (protective mechanisms) associated with the system. Controls designed into the application system must be included. Controls integral to the operating and data management systems may be included with an indicator showing which software they are a part of, i.e., the OS or DBMS. Other software packages used for control or security must be listed.

Controls will be listed under one of two categories: (1) software based; (2) manual procedures. Any interrelationships between or among controls will be described. Graphics, such as diagrams, flowcharts, etc., and expanded descriptions may be used in support of the summary listing.

### System Examination Capabilities

All capabilities available to management, both user and data systems, to perform periodic checks on the application system should be described in this section. Periodic checks (system examinations) may be geared to installation activities and/or daily operations. If

specific capabilities are unique to installation or daily operations, these should be indicated; otherwise it will be assumed the described capability is available for both situations.

Examination capabilities may include testing facilities or test packages, management (audit) trails, performance reports, and manual procedures. All such capabilities delivered with the system will be briefly described. Each capability described will include information on: how to exercise the capability or a reference to another document where this is included; when the capability may or should be used; the types of information or data that will result from exercising the capability; guidance on interpreting the results.

### Glossary

This information is optional and should be the last section of the document. It should define all words, expressions, abbreviations, and acronyms of a unique nature used in the document. The order of appearance should be alphabetic and then numeric in accordance with the first character.

## DELIVERY

The *System Administration Guide* is prepared during the Documentation Phase* and is delivered with the initial system release. It is updated, as required, for each subsequent release.

## DOCUMENTATION TARGET AUDIENCE

- Computer Center Administration
- User System Management

* See Figure 2-1 - Bellcore Software Development Process

## 4.7 System Operations Guide

### GENERAL

The *System Operations Guide* contains procedures and descriptive information required to keep the system fully operational and capable of processing and producing any required system outputs. Procedures associated with repair of the system can be found in the *System Maintenance Guide,* and procedures associated with the use of the system by personnel outside the system boundary can be found in the *User Guide.*

> **NOTE**
> If the system is to operate on a minicomputer/superminicomputer, the *Operator Handbook* will be delivered in lieu of the *System Operations Guide.* (See BR 007-230-216.)

(a) Typical procedures and descriptive information in the *System Operations Guide* are: system hardware configuration, installation of new software releases, data base procedures (generation, updating, and correction), interpretation of error messages and alarms, exercising of backup/recovery procedures, input preparation, error correction, and output processing procedures.

(b) The *System Operations Guide* must also include a complete list of system input and output messages.

(c) When operations information is covered by vendor documentation, only additional, application-specific information need be documented, along with a reference to that vendor documentation.

(d) System operation information may be combined with system maintenance information to form a single document, *System Operations/Maintenance Guide.*

### CONTENT AND ORGANIZATION

The *System Operations Guide* contains the information specified in the following paragraphs. In addition, the document may contain other information required by system operations personnel. The information is in a recommended sequence.

#### Introduction

This section describes the purpose and use of the document as well as the target audience. (See Documentation Target Audience.)

### General Description

This section provides a brief description of the hardware/software and operations activities to be performed in operating the system. Any interfaces, limitations, cautions, etc., that apply are identified. When work activities are designed, a description is provided that includes the name of the activity, a statement of recommended minimum qualifications for performing the work, a brief narrative of tasks to be performed, and related documentation (work activity instruction, performance aids, available training courses).

### Hardware/Software Operations

This section contains details on all operations activities that pertain to keeping the system fully operational. Typical operations activities that should be covered are specified in paragraphs (a) through (e). For each activity, any hardware/software features that aid in carrying out the activity and any messages associated with the activity are included.

(a) **Initialization** – Procedures and information necessary to ready (booting, configuring) the system for operations. Details on the following:

  (1) Hardware: computer, peripherals, telemetry, multiplex units, etc.

  (2) Software: tapes, disks, data sets, etc.

  (3) Parameters: memory addresses, terminal assignments, space allocations, security codes, etc. (Details of the foregoing should identify those parameters that are to be supplied by the customer.)

  (4) Commands, control statements, setting of switches, etc.

(b) **Software Installation** – Information and procedures necessary for installation of new and changed software releases.

(c) **System Restarts/Reruns** – Information and procedures necessary to restart the system.

(d) **Backup Data/Recovery** – Procedures for creating and maintaining backup data. Data retention requirements unique to the application are also identified. Procedures for recovering the system.

(e) **Monitoring** – Description of system functions (browsing, alerting, filtering, etc.) that enable the system to be operated effectively. Information that aids operations personnel to help assure that the functions are operating satisfactorily is included. Also included are procedures and information necessary to identify marginally operating computer and peripheral hardware, other equipment, and software. Details on the types of indicators (alarms, messages, lights, etc.) indicating marginal or trouble conditions are also provided, along with trouble reporting procedures.

### Processing Operations

Details on all operations activities that pertain to processing of system data are provided in this section. This includes only the information unique to a specific process. If information about a process has been included as part of hardware/software operations, it

should not be repeated. For each system process, as applicable, the information in paragraphs (a) through (e) below is specified and includes any hardware/software features, utilities, and messages that will aid in carrying out the process.

(a) **Process Description** – Brief description of the system processing including inputs, outputs, interfaces, dependencies, load modules, normal end-of-job conditions, etc.

(b) **Setup Procedures** – The information in the four following paragraphs is required in the setup of a process.

(1) **Hardware/Software Requirements** – Typical requirements are as follows:

- Stratus XA2000, IBM 3090
- Peripherals: disk device, line printer, etc.
- Operating system: MVS, VM/CMS
- Data set/file identification and file names
- Source of mountable data sets and procedures and destination, e.g., data set VS120210 derived from VS120231 and VS12345, VS120210 returned to peripheral (tape/disk) library
- Form number or code of output paper and description of paper, e.g., line paper, multiple part paper, etc.
- Tape information including tape number, channel, and line number punching instructions
- File organization: sequential, random, direct access.

(2) **Scheduling** – Information necessary to enable scheduling of processes, such as:

- Frequency: daily, weekly, etc.
- Content: one or more computer runs
- Sequence and dependencies (e.g., concurrent, required sequence, priorities)
- Device types and quantity
- Estimated execution time, e.g., CPU minutes by base processor for a given number of messages or transactions, input files, or activity
- Estimated storage requirements
- Estimated number of print lines generated.

(3) **Preprocessing Requirements** – Instructions for handling all variable conditions (those conditions that change from process to process) that must be considered in setting up the control requirements in order to initiate a specific process. Typical variable conditions to be identified and described are as follows:

- Setting of control switches
- Site dependent variables: central office codes
- Device assignments, data definition statements, priorities, etc.

- Preceding job dependencies: information that must be passed from preceding processes.
- **Control Statements** – All control statements (e.g., job control language) necessary to initiate and execute a process, and their sequence are specified. Those statements that were prepared or modified under preprocessing requirements, and where the statements should be inserted. Also provided is an explanation for all symbolic parameters, commands, or default values.

(c) **Restarts/Reruns** – The following information required to restart or rerun a process is provided:

(1) Description of the conditions under which a process should be restarted or rerun.

(2) Identification and description of check-point. information: program and step, frequency of check-points, etc.

(3) Identification and description of control statements and parameters needed to be changed.

(4) Description of procedures to be used in the restart, including "clean-up" activities.

(d) **Output Control** – An identification of any verification checks and instructions necessary to verify the accuracy of the output, e.g., volume limits, totals to be checked, posting methods, etc. Also the necessary actions to be taken if the proper or expected output is not obtained.

(e) **Media Disposition** – All media (tapes, printouts) produced by the system, and the instructions for their disposition including any security checks for authorized recipients, restrictive markings, etc.

### Data-Related Procedures

This section contains detailed information on generating and updating system data. It includes sources of data, data collection techniques, work sheet preparation, etc. Typical procedures may include:

- Preparing data in machine usable form
- Correcting errors and re-inputting data.

### Messages

All messages should be grouped and a description included of all input and output messages (commands, informational, warning, abend) intended for operations personnel. Included in this section for each input message are the format and the conditions under which the message is used. For each output message, the format, message display media (console, printer, channel, etc.), and the cause and action to be taken are specified, e.g., data recovery/system restart procedures.

### Glossary

This information is optional and should be the last section of the document. It defines all words, expressions, abbreviations, and acronyms of a unique nature used in the document. The order of appearance is alphabetic and then numeric in accordance with the first character.

### DELIVERY

The *System Operations Guide* is prepared during the Documentation Phase* and is delivered with the initial system release. It is updated, as required, for subsequent releases.

### DOCUMENTATION TARGET AUDIENCE

- Computer Operations

* See Figure 2-1 - Bellcore Software Development Process

## 4.8 User Guide

### GENERAL

The *User Guide* contains procedures and descriptive information, including input preparation and output/report usage, to enable a user to use the system effectively. System capabilities, functions, and control features for the user are included. These documents should be user and task-oriented, rather than focusing only on system capabilities and functions.

Multiple user documents may be prepared for specific work activities. If this is the case, the title of each document should also indicate what specific work activity is described in the document.

### CONTENT AND ORGANIZATION

The contents of each user document can be tailored to meet specific needs. The user document(s) will usually contain the types of information specified in the paragraphs below. In addition, it may contain other information required by user personnel.

#### Introduction

This section describes the purpose and use of the document as well as the target audience. (See Documentation Target Audience.)

#### General Description

This section provides a brief description of system capabilities and functions as they relate to the user. It includes a summary of interfaces with the system (e.g., terminals, system operations personnel) and any unique information processing procedures.

When work activities are designed, a description is provided that includes the name of the activity, a statement of recommended minimum qualifications for performing the work, a narrative of tasks to be performed, and related documentation (work activity instruction, performance aids, available training courses). When appropriate, extended examples of typical activities aid users considerably in understanding how to use the system.

#### System Functions

This section contains a detailed description of each system function (filtering, browsing, sorting) available to the user, how and when it can be used, its capabilities and constraints, and precautions for the user. The description of each function should include both input and output descriptions as indicated in the following text.

Inclusion of actual or sample forms, work sheets, and masks, should be used to augment the description of the function.

(a) **Input Description** – For each user-provided input, the following is described as applicable:

(1) Title and purpose of input.

(2) Procedures for accessing the system.

(3) Format of input, that consists of the layout of data fields, including field names, their definition and codes, labels, and symbols representing the data to be supplied. Each code, label, and symbol shall be explained.

(4) Format of input messages and the condition under which messages are used.

(5) Cautions or restrictions such as those pertaining to the sequence, frequency, and volume of input to be processed.

(6) Related corrective procedures.

(b) **Output Description** – For each output to the user, the following is provided as applicable:

(1) Title and user of output.

(2) Procedures for accessing the system and formatting retrieval messages.

(3) An explanation of the action required and when to generate the output (manually requested or automatically generated, scheduled or nonscheduled).

(4) Priority of output. The relative importance of all output should be fully specified.

(5) Format and content of the output, including codes and labels. These should be described in sufficient detail so that the output can be interpreted by the user.

(6) Format of output messages in sufficient detail so that the messages can be interpreted by the user. Also the conditions that cause the message to be generated and the action to be taken should be described.

(8) Related corrective procedures.

### Glossary

This information is optional and should be the last section of the document. It defines all words, expressions, abbreviations, and acronyms of a unique nature used in the document. The order of appearance is alphabetic and then numeric in accordance with the first character.

## DELIVERY

The *User Guide* is prepared during the Documentation Phase* and is delivered with the initial system release. It is updated, as required, for subsequent releases.

## DOCUMENTATION TARGET AUDIENCE

- System User

* See Figure 2-1 - Bellcore Software Development Process

## 4.9 System Maintenance Guide

### GENERAL

The *System Maintenance Guide* provides information on maintenance alternatives for the system, and procedures and data for performing scheduled (preventive) and unscheduled maintenance. It will include information on performance monitoring, recovery and reconstruction, software and utilities, data base, and data network.

When maintenance information is covered by vendor documentation, only additional application-specific information need be documented, along with a reference to the vendor documentation.

### CONTENT AND ORGANIZATION

The *System Maintenance Guide* contains the information as specified in the following paragraphs, as applicable. In addition, it may contain other information required by system maintenance personnel. The information is in recommended sequence.

#### Introduction

This section describes the purpose and use of the document and the target audience. (See Documentation Target Audience.)

#### General Description

This section describes the maintenance plans and the activities performed in maintaining the system. When work activities are designed, a statement of recommended minimum qualifications for doing the work is provided, along with a brief narrative of tasks to be done and related documentation (work activity instructions, performance aids, available training courses).

#### System Availability

This section contains a statement of overall system availability (objective hours/day, days/week). Downtime required for scheduled maintenance (preventive maintenance, hardware modifications or replacements, growth, etc.) is specified as well as anticipated frequency of system failures.

Information is included on all hardware and software design features (for example, duplex processor) available to provide continuous system operation in the presence of failures and maintenance activities directed at locating and clearing troubles.

### Scheduled Maintenance

This section provides information on recommended schedules and procedures for preventive maintenance.

### Unscheduled Maintenance

This section contains information on failure detection and how maintenance personnel will be alerted to failures. Included are the procedures (e.g., how to employ available hardware and/or software features) that should be followed to offset the failure in order to continue system operations. Also included are the procedures necessary to restore the system to full service.

Diagnostic information is also contained in this section. Included are the use of diagnostic programs and the process that should be followed (for example, "Run disk diagnostic program").

Detailed procedures are also provided for verifying that repair has been made and that the equipment will function satisfactorily.

### Recovery and Reconstruction

The following information is provided in text, flow diagram, or tabular form:

(a) A cross-reference of system or program failures to recovery and reconstruction procedures and where necessary, a brief description of those types of failures.

(b) Back-up files required to recover and reconstruct the system.

(c) A description and application of each recovery and reconstruction procedure and/or utility (which may also be used with back-up tapes/disks) and any other information such as machine commands or special code required to recover and reconstruct the system.

(d) If any of the previously mentioned procedures contain options to be taken, each option is described (restart procedures – normal and emergency).

(e) Any modifications and/or exceptions to vendor software, hardware, procedures, or documentation.

### Data Management Guide

When data is not under control of a DBMS, the information specified in paragraphs (a) through (c) should be provided.

(a) A description of each file, which should include but not be limited to items such as the following:

(1) Name

(2) Purpose and application

(3) Physical or logical organization and/or method of access (random or sequential)

(4) Type of storage device (disk, tape)

(5) Block size or space allocation criteria (space estimation formula for disks).

(b) A description of each record/segment, which can be in narrative, diagrammatic, or tabular form (record layout, data division, etc.). The information should include but not be limited to items such as the following:

(1) Name

(2) Purpose and application

(3) Layout and size of record/segment and its fields containing:

- Name and description of each field including definitions of codes, qualifying information, indication of privacy and/or security status, etc.
- Class of data (numeric, alphabetic, alphanumeric)
- Accessing criteria (accessible to read only, write only, or both).

(c) Cross-reference information, including the relationship of files and records/segments (files to data bases, files or records/segments to programs, etc.), program module cross references, data base interrelationships, and identification of programs/transactions which access them.

### Supplementary Information

In this section, identify vendor documentation that should be available to maintain the system, with adequate cross reference to the maintenance activities applicable to each information set. Also included are all drawings, manuals, diagnostic programs, etc.

### Glossary

This information is optional and should be the last section of the document. It defines all words, expressions, abbreviations, and acronyms of a unique nature used in the document. The order of appearance is alphabetic and then numeric in accordance with the first character.

## DELIVERY

The *System Maintenance Guide* is prepared during the Documentation Phase* and is delivered with the initial system release. It is updated, as required, for subsequent releases.

* See Figure 2-1 - Bellcore Software Development Process

## DOCUMENTATION TARGET AUDIENCE

- Computer Center Technical Support
- Data Communications Control
- Maintenance

## 4.10 Data Base Administration Guide

### GENERAL

The *Data Base Administration Guide* provides criteria and techniques unique to the management of the specific system data base(s).

The *Data Base Administration Guide* is prepared for systems that have data base(s) under control of data management software.

NOTE
When data is not under control of a DBMS, data management information for a system should be covered in the *System Maintenance Guide.*

When the criteria and techniques are covered by vendor documentation, only additional application-specific information need be documented, along with a reference to that vendor documentation.

### CONTENT AND ORGANIZATION

The *Data Base Administration Guide* contains as a minimum the information specified in the following paragraphs. The required information is in recommended sequence.

#### Introduction

This section describes the purpose and use of the document and the target audience. (See Documentation Target Audience.)

#### General Description

This section provides a brief overview of the data management concepts employed in the system and the criteria and techniques necessary to maintain the operational capabilities of the data base(s).

It may also include the purpose, scope, use of the document, and a list of references cited within the document or considered useful to the subject.

#### Performance Monitoring

This section specifies the criteria for monitoring the performance of the data base management system and for data base reorganization (when reorganization is required). Information on data set/data base placement for efficient performance should be included.

### Protection

This section contains information relating to the physical protection of the data base, including backup and special data retention requirements.

The controls and procedures designed to establish and maintain the integrity of the data base are also included.

### Security

Sensitive information and transactions requiring the implementation of privacy keys and privacy locks are identified in this section.

### Glossary

This information is optional and should be the last section of the document. It defines all words, expressions, abbreviations, and acronyms of a unique nature used in the document. The order of appearance is alphabetic and then numeric in accordance with the first character.

## DELIVERY

The *Data Base Administration Guide* is prepared during the Documentation Phase* and is delivered with the initial system release. It is updated, as required, for subsequent releases.

## DOCUMENTATION TARGET AUDIENCE

- Data Administration
- Data Base Administration

* See Figure 2-1 - Bellcore Software Development Process

## 4.11 Training Documents

### GENERAL

The purpose of the training documents is to provide adequate information to customers so that they can either secure the training necessary for efficient operation of a system or conduct training themselves with the training support information contained herein.

The development, administration, and delivery of training is influenced by several factors such as funding arrangements, organizational responsibilities, location of training, and required facilities. The method of training delivery may also vary to include instructor-led classes, workshops, self-instructional/tutorial courses, and computer-assisted instruction. Based on these and other variables, training can be administered and delivered from any of the following sources:

(a) The customers

(b) A central training facility, e.g., Bell Communications Research Technical Education Center

(c) A vendor

(d) System developers

(e) Combinations of the above.

There are four categories of training documents: 1) *Training Program Description*; 2) *Training Administration Manual*; 3) *Instructor Manual*; and 4) *Student Manual.*

The Project Leader and the Development Manager must determine what training manuals, in addition to the *Training Program Description,* need to be delivered to the customers. The source(s) of training administration and delivery as well as the selected delivery method(s) will determine which categories of training manuals must be addressed and their specific content. However, for any training that is to be administered and delivered by the customers, the support information described in the following paragraphs will be provided. The content will be appropriate to the delivery mode(s) of the related training.

The following paragraphs specify the information contained in each category of training document.

### 4.11.1 Training Program Description

The *Training Program Description* is that information which will be provided, at a minimum, for each system regardless of training delivery method(s) or training administration source(s).

The major points addressed in this section are:

(a) Where the training will be delivered

(b) By whom the training will be administered and/or delivered

(c) The method(s) of training delivery that will be used

(d) Anticipated duration of the training

(e) A description of conditions or situations which might be dependent upon delivery mode and/or location

(f) The contact person within the system development group from whom more information can be obtained.

**NOTE**
This information may be contained within a training catalog if appropriate.

### 4.11.2 Training Administration Manual

The purpose of the *Training Administration Manual* is to provide the information needed to plan, establish, execute, and maintain a training program or curriculum.

#### CONTENT AND ORGANIZATION

The *Training Administration Manual* contains the information specified in the following paragraphs. The information is in recommended sequence.

##### Introduction

This section briefly describes the content, purpose, scope, organization, and usefulness of the *Training Administration Manual.* It also identifies the target audience for the documentation. (See Documentation Target Audience.)

##### Training Plan

The training plan is a sequence of training activities for system installation, operation, and maintenance. The plan addresses, but is not limited to, the following planning responsibilities, and should provide the information as appropriate:

(a) **Instructors/Tutors** – The number of instructors/tutors required, their relevant education and experience background, and any additional training they should receive before presenting the course. In some situations, the instructor/tutor may be a supervisor within a work unit.

(b) **Prerequisites** – Courses assumed to be available.

(c) **Recommended Sequence of Courses** – A plan for course scheduling, addressing course sequence, duration, place, instructor, and recommended number of students for each course.

(d) **Physical Facilities** – Facilities required for each course, including room size, electrical requirements, lighting, desks, and chairs.

(e) **Material and Equipment Ordering** – Procedures for ordering centrally developed instructional materials and equipment for courses.

(f) **Optional** – Course descriptions for course announcement purposes.

##### Training Course Summary

The following information is provided for each course:

(a) Course title

(b) Course description

(c) Course prerequisites (courses or relevant work experience that would benefit the student)

(d) Course objective(s)

(e) Local modifications required (if any)

(f) The numbers and names of other documents related to the course for the required instructor and student materials, including scoring keys

(g) Listing of classroom equipment required; e.g., pads of paper, rulers, slide projectors, tape recorders, TV monitors.

### Course Evaluation and Maintenance

The following information is provided:

(a) Procedures for evaluating the comments written on both the Trainee Feedback Form and the Instructor Feedback Form

(b) Method for conducting on-site evaluations

(c) Procedures for course maintenance.

### Optional Sections

Other supportive information, such as references, glossaries, and exhibits, may be included as appropriate.

## DELIVERY

The *Training Administration Manual* is prepared during the Documentation Phase* and is delivered with the initial system release. It is updated, as required, for subsequent releases.

## DOCUMENTATION TARGET AUDIENCE

- Training Administration

* See Figure 2-1 - Bellcore Software Development Process

### 4.11.3 Instructor Manual

The purpose of the *Instructor Manual* is to provide information and guidelines necessary to prepare and to deliver course content, and to review course effectiveness.

#### CONTENT AND ORGANIZATION

The *Instructor Manual* contains the information specified in the following paragraphs. The information is in recommended sequence.

#### Introduction

This section contains a brief description of the organization of the *Instructor Manual,* a brief summary of the course, and an explanation of instructional procedures. The target audience is defined here. (See Documentation Target Audience.)

#### Course Information

This section states the following (the order shown is recommended):

(a) Course organization and objectives

(b) Course length

(c) Instructor prerequisites and preparation

(d) Trainee prerequisite courses

(e) Instructor/trainee ratio (optional)

(f) Facility requirements

(g) Local requirements

(h) Course materials and equipment

(i) Plan of instruction, including training philosophies to be employed

(j) Instructor and trainee course evaluation feedback method (optional).

#### Course Units

Each course is subdivided into teaching segments called course units.

(a) **Introduction to Course:** This unit cues the instructor to give course orientation information to the student. It also suggests topics to be covered, such as review of course prerequisites, course objectives, course organization, course length, course relevance to job, and other administrative details, e.g., breaks, materials checklist.

(b) **Content of Course Unit:** The objectives of each course unit are provided.

(1) The objectives should be stated in terms that:

- Relate the objectives to previous instruction
- Specify the product or end results to be achieved
- Are relevant to post-training job performance.

(2) Course unit materials and equipment required for student performance are identified at appropriate places within each unit.

(3) The body of each course unit specifies what the instructional events in the unit should be and in what sequence they should occur. These events are identified in terms of instructor inputs (lecture, film, discussion, exercises) and the responses students are to make. The directions the instructor uses during the course may be an outline, a detailed script, or a combination of the two.

(4) A unit test is provided for each course unit. This unit test may be a written or a performance test (or a combination) as appropriate. Solutions, answers, scoring keys, and performance measurement criteria should be included. The test includes one or more test items measuring student performance for each unit objective.

### Final Test

A final test is provided for each training course.

(a) **Final Test Type:** The final test may be a written examination, a performance test, or a combination of both, as appropriate. Solutions, answers, scoring keys, and performance measurement criteria are included.

(b) **Test Items:** One or more test items are included in the final test to measure student performance on each end-of-course training objective.

(1) Test items will require the same inputs (e.g., equipment, triggering event, and student performance) as the objectives they are intended to measure.

(2) Test items will require the student to demonstrate learning that is relevant to his/her job.

(3) Test items include scoring criteria that describe completely what characteristics the student's performance must have and how the test item is to be scored.

(c) **Test Administration:** The instructor documentation provides instructions for the instructor and student to follow in administering and taking the test.

### Optional Sections

Other supportive information, such as references and exhibits, may be provided as appropriate.

## DELIVERY

The *Instructor Manual* is prepared during the Documentation Phase* and is delivered with the initial system release. It is updated, as required, for subsequent releases.

## DOCUMENTATION TARGET AUDIENCE

- Course Instructor

* See Figure 2-1 - Bellcore Software Development Process

### 4.11.4 Student Manual

The purpose of the *Student Manual* is to provide training matter to supplement documents (e.g., *System Administration Guide*), work activity documents, and/or other training documents. It may contain, as appropriate, course objectives, special instructions, course progress checklists, work sheets, exhibits, exercises, and tests.

#### CONTENT AND ORGANIZATION

The content and organization of the *Student Manual* will vary with the complexity of the course and the type of instructional strategy, e.g., instructor-led class or self-instructional /tutorial. Also, self-instructional courses may be supported in various ways, such as audiotapes, videotapes, and computer-assisted instruction.

The following paragraphs identify the information that will normally be provided to a student for either instructor-led or self-instructional/tutorial courses.

#### General Description

(a) For both instructor-led and self-instructional/tutorial courses (including computer-assisted instruction), this section briefly states the general course objectives. It also provides a summary of the content and form of the course and the organization and use of the *Student Manual.*

(b) For self-instructional/tutorial courses (including computer-assisted instruction), this section may further provide the student with a brief description of course materials, media, and equipment, and how to locate instructions, practice exercises, and testing. It may also provide a description of the role of the instructor/tutor and how the student may contact the instructor/tutor during training or an example of a self-instructional sequence.

#### General Content

(a) Instructor-Led Course: Materials in the *Student Manual* are to be provided on an as-required basis. These materials will be organized into instructional units and may include text materials, worksheets, practice exercises, forms, and selected copies of viewgraphs, slides, and charts.

(b) Self-Instructional/Tutorial Course (including computer-assisted instruction): The course should be divided into teaching segments called course units. The course content identified below is provided in the *Student Manual* and/or in the associated course media, i.e., videotape, slides, audiotape, film, computer-assisted instruction sequences.

   (1) Each course unit contains a statement of the unit objectives and content.

   (2) Throughout these units, course content is followed directly by student practice, with instructor feedback provided to the student.

(3) Skill mastery should be measured by exercises at the end of units or subunits. The exercises should call for student performance of all skills learned, with instructor feedback provided to the student.

(4) Each course unit should conclude with a test measuring accomplishment of all unit objectives. The *Student Manual* provides information regarding time limits and the use of forms.

NOTE
Unit testing is not required for an overview course.

(5) The *Student Manual* provides a Course Progress Checklist in a suitable format. This checklist identifies the purpose of the checklist, the major unit objectives, and the topics covered in the course.

### Final Test

Each course includes a mastery test for the course as a whole. Time limits, use of forms, and use of references are appropriately specified.

NOTE
A final test is not required for an overview course.

### Trainee Feedback Form

The *Student Manual* contains a trainee feedback form. The form contains instructions stating that it is to be filled out by the student at the completion of the course.

### Optional Sections

Other supportive information, such as references and exhibits, may be provided as appropriate.

## DELIVERY

The *Student Manual* is prepared during the Documentation Phase* and is delivered with the initial system release. It is updated, as required, for subsequent releases.

* See Figure 2-1 - Bellcore Software Development Process

## DOCUMENTATION TARGET AUDIENCE

- Course Instructor
- Student

# 5. APPENDIX A

### Procedural Information Format

Some of the documents discussed in this Practice, e.g., *System Administration Guide, System Maintenance Guide,* and *System Operations Guide,* may contain procedural information. This appendix discusses guidelines to be considered when preparing procedural information.

A number of variables need to be considered in developing procedural information. These variables include items such as task complexity, frequency of task execution, expected entry skill of the user, and operating environment. Procedural information may contain guidelines or specific step-by-step procedures, along with sample forms or other exhibits, for performing the tasks.

The following are examples of three levels of detail for procedural information.

**Level A** – the descriptive level – can be used to identify and describe the following:

- Capabilities and features of associated hardware/software interfaces, human/machine interfaces, etc.
- Input and output messages.

This level – which does not describe the work to be done in detail – could be an appropriate choice when the user is familiar with the detailed operation through experience, training, or documentation.

**Level B** – the guide level – covers the information described above and in addition, contains a narrative description of one or more of the tasks to be performed. This description can cover the relationships between sets of work activities, associated performance aids, tools, and training courses, as well as supportive information such as dependencies, criticalities, alternative courses of action, decision criteria, and caution statements.

**Level C** – the procedural level – covers tasks and procedural units within tasks, in order of their expected execution sequence. This level describes the work to be done in detailed procedures and refers to related performance aids.

Regardless of which of the above levels is selected, additional items may be added to amplify or supplement the text. These may be included in the text or attached as references (e.g., tables, figures, or sample forms).

# 6. GLOSSARY

| | | |
|---|---|---|
| BCC | = | Bellcore Client Company |
| CDS | = | Centrally Developed System |
| CPU | = | Central Processing Unit |
| CTAG | = | Computer Technology Advisory Group |
| DBMS | = | Data Base Management System |
| FCC | = | Federal Communications Commission |
| ISO | = | Information Systems Organization |
| MR | = | Modification Request |
| MMOC | = | Minicomputer Maintenance & Operations Center |
| MVS | = | Multiple Virtual Storage (Operating System) |
| PUC | = | Public Utilities Commission |
| OS | = | Operating System |
| SDI | = | System Deliverable Information |
| SOE | = | Standard Operating Environment |
| VM/CMS | = | Virtual Machine/Conversational Monotoring System |