FUNCTIONAL ROLES IN A SYSTEMS ENVIRONMENT

INFORMATION SYSTEMS

1. GENERAL

1.01 The purpose of this section is to define a set of functional roles that should exist in any environment involving computer-based information systems and to describe the general duties and responsibilities of the people filling the functional roles which have been grouped within the categories of:

- Planning, approval, and control

- Technical support

- Development team

- Operations and maintenance.

1.02 This section is being reissued to update previously defined functional roles and to add new functional roles to reflect the current systems environment. Revision arrows are used to denote significant changes.

♦**1.03** This guideline can be used by any organization involved with computer-based information systems. The four categories of functional roles describe work activities which could be performed within segments/departments and information systems organizations (ISOs). For the most part, this BSP does not seek to specify the organization where a functional role should exist. It does identify the functional roles that must be staffed to maximize the usefulness of information systems in helping to meet corporate objectives. Refer to Part 3 for the various ways this guideline can be used.♦
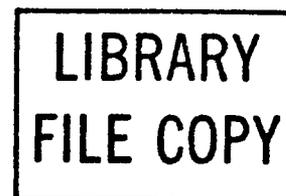
2. DEFINITION OF FUNCTIONAL ROLE

2.01 A functional role is described in terms of a set of work activities and responsibilities that contribute to the development and/or operation of a system. It is not intended that functional roles equate to jobs, though they may depending upon the individual company environment. ♦Based on this premise, more than one person may be performing a functional role, or one person could be performing multiple functional roles. For example, 12 people may be performing the functional role of system design. Many of those people may also perform other functional roles such as Personnel Subsystem (PSS) design, Computer Subsystem (CSS) design, data base design, or data communication design. As another example, one person may be performing more than one functional role, such as information systems standards and information systems training, or performance analysis and computer center support.♦

2.02 The description of the activities included in each functional role will assist in the determination of the skill and knowledge requirements for the individual(s) filling the role. However, no at-

tempt has been made in this practice to define the skill requirements explicitly.

3. HOW TO USE THE FUNCTIONAL ROLES

3.01 The functional roles defined in this practice may be used as an aid to:

(a) Develop system development project staffing requirements

◆(b) Determine potential producers of development documentation components◆

(c) Determine system development project interfaces to planning, approval, support, and operations functions

(d) Define staffing requirements for system operation

(e) Identify potential recipients of system deliverable documentation

(f) Develop job and organizational structures

◆(g) Develop training programs for personnel engaged in systems work.◆

Each of these uses of functional roles is described in paragraphs 3.01 through 3.08.

3.02 *Developing System Development Project Staffing Requirements:* Project management should analyze the technical requirements of the project and identify the specific functional roles that must be represented on the project team. The functional roles that are typically required have been defined in the development team category. However, specific projects may also require participation from people performing functional roles in the technical support and operations categories.

◆3.03 *Determining Potential Producers of Developmental Documentation Components:* Developmental information must be documented to record the results of analysis and design activities. The functional roles should be used as a basis for assigning developmental work and producing related developmental documentation components. (Refer to Section 007-227-310.)◆

3.04 *Determining System Development Project Interfaces:* A development team

cannot function independently. It must interface with a variety of other functional roles in the categories of planning, approval, and control; technical support; and operations and maintenance. Project management must analyze developmental activities and informational requirements to assure that all project interface requirements have been identified.

3.05 *Defining Staffing Requirements for System Operation:* With the exception of application-specific and support positions, this practice defines the functional roles that would normally be required for system operation and maintenance. In developing system staffing requirements, the manager should select the specific functional roles that will be required and state the staffing needs for each. Central developers may have to develop algorithms to permit the operating company to tailor the staffing estimates for a specific processing location. By providing staffing requirements in terms of standard functional roles, the individual operating company retains the freedom to organize the roles in a manner that is consistent with its local operational environment.

3.06 *Identifying Potential Recipients of System Deliverable Documentation:* A deliverable document must have a target audience. The functional roles defined in this section represent the range of possible users of system deliverable documentation. In addition, central developers must also prepare deliverable documentation to support installation activities. The functional role descriptions will provide guidance in determining the appropriate recipients of the various deliverable documents. (Refer to Section 007-230-210.)

3.07 *Developing Job and Organizational Structures:* The functional roles defined in this section should be used as the building blocks for forming job and organizational structures. Depending upon the individual company or the specific application being installed, a functional role could represent a complete job, or several functional roles could be combined to form a job.

◆3.08 *Developing Training Programs for Personnel Engaged in Systems Work:* Performing a functional role effectively requires certain skills and knowledge. Training courses can be identified which will provide a basis for acquiring the skills and knowledge for those functional roles involved in systems development work. Based on the

identified courses, a program of training can be developed for individuals assigned a given functional role. (Refer to the AT&T Data Systems Education Center Course Catalog.)◀

4. FUNCTIONAL ROLE DESCRIPTIONS

4.01 The following pages contain functional role descriptions within the categories of planning, approval, and control; technical support; development team; and operations and maintenance.

A. Planning, Approval, and Control Functional Role Descriptions

4.02 A description of each functional role in this category is given below. Additional information can be found in Sections 007-110-300 and 007-110-350.

▶(a) *User Planning:* This functional role:

- Develops strategic and tactical plans for each information system

- Identifies new mechanization requirements

- Evaluates existing and planned centrally developed systems (CDSs) to determine suitability for the company

- Prioritizes the costs and benefits of proposed locally developed systems

- Prioritizes information systems development work and approves budgeting expenditures accordingly

- Participates in the approval process for the corporate information systems plan and corporate strategic plans for various related resources (eg, data communications) through representation on an interdepartmental/segment approval authority.

(b) *Data Systems or ISO Planning:* This functional role:

- Develops and evaluates the corporate information systems plan incorporating mechanization requirements of all users

- Develops and evaluates strategic and tactical resources plans (eg, hardware, data commu-

nications, force) in support of the corporate information systems plan

- Participates in the approval process for the corporate information systems plan and related resource plans through representation on an interdepartmental/segment approval authority; provides necessary staff support.◀

▶(c) *Interdepartmental/Segment Approval and Control:* This functional role:

- Establishes corporate policy regarding information systems development and deployment

- Approves allocation of ISO development resources for information systems development work

- Approves the corporate information systems plan and related corporate resource plans (eg, corporate data, communications strategic plan)

- Assures proper funding of approved plans

- Reviews progress against approved plans.◀

B. Technical Support Functional Role Descriptions

4.03 A description of each functional role in this category is given below.

(a) *Hardware Support:* This functional role:

- Determines total hardware/equipment requirements for multiple applications by using a capacity planning process and selects the specific hardware or equipment to meet those needs, both shared and dedicated

- Evaluates new hardware/equipment offerings, including human factors considerations

- Analyzes contractual options and selects the most attractive means of acquisition

- Is responsible for hardware test and acceptance

- Monitors equipment/hardware performance, reliability, and compatability as stipulated by vendor

- ♦Participates in long-range hardware planning.♦

(b) *Software Support:* This functional role:

- Determines total software requirements for multiple applications and selects specific vendor software to meet those needs, both shared and dedicated

- Evaluates new system software products

- Assists in evaluating other software products, including human factors considerations

- Generates, customizes, tests, maintains, and tunes system software

- Monitors the performance and reliability of system software

- Is responsible for coordination of application conversion to new software

- Participates in long-range software planning.

(c) *Time-Share Support:* This functional role:

- Administers in-house time-share system access, availability, utilization, trouble resolution, and billing

- ♦Evaluates time-share software products, including human factors considerations♦

- Tests and maintains time-share software, including utility packages

- Assists designer/user in effective use of time-share facilities, via technical support, publications, and training.

(d) *Data Administration:* This functional role:

- ♦Evaluates data management products

- Designs and maintains data structures which service current and projected information storage and access needs♦

- Develops entity-relation models

- Reviews data usage

- Coordinates simulation testing

- Develops sizing documentation

- Defines storage and access software specifications

- Develops data base integrity procedures

- Monitors data base or related performance and initiates any required corrective action.

♦(e) *Data Communications Support:* This functional role:

- Determines internal data communications needs based on planning documents, user interaction, and new developments in data communications products

- Participates in service agreement negotiations and results reporting

- Develops and evaluates data communications network design

- Implements designs through configuration modification

- Evaluates new data communications products

- Monitors data communications performance data

- Resolves persistent service problems through adjustment of design and configuration

- Coordinates test and installation of new services or changes in existing service.♦

(f) *Testing Support:* This functional role:

- ♦Evaluates testing support products♦

- Administers test facility, including test submission and distribution, test procedures, and test libraries

- Analyzes new testing techniques, software, and hardware

- Monitors utilization of test facilities and coordinates specific test requirements with development and maintenance projects

● Assists projects with test design and running tests.

(g) *Performance Analysis:* This functional role:

● Monitors and evaluates the overall utilization of computer resources, including hardware, software, applications, and procedures

● Analyzes resource usage data to diagnose hardware configuration problems, design and coding inefficiencies, ineffective or inefficient operating procedures, and utilization trends

● ◆Monitors Users Service Reporting System (USERS) reports to detect performance problems◆

● Identifies and/or develops performance improvement measures

● ◆Monitors and evaluates effectiveness of human/machine interfaces, job structures, operating procedures, and support materials (eg, documentation and performance aids)◆

● Assists in implementation of new procedures.

(h) *Computer Center Support:* This functional role:

● Evaluates computer center methods and procedures, including performance of work functions, security, disaster and recovery policies, performance indexes, etc

● Evaluates new tools and procedures that can improve computer center effectiveness

● Assists in the implementation of new methods.

(i) *Information Systems Standards:* This functional role:

● Develops methods and procedures to be utilized by the ISO

● Establishes basic operating and control procedures

● Develops new procedures necessitated by changes in the operational environment

● Develops techniques to aid in the performance of information systems functions (eg, development, maintenance, documentation, operations, etc).

(j) *System Development Support:* This functional role:

● Assists project management in selecting and implementing development techniques

● Evaluates or identifies the need for new development methods, and coordinates with Information Systems Standards and Information Systems Training on implementation of new methods

● Provides project support in the application of system development procedures for systems analysis, human factors considerations, project management, documentation, and design review.

(k) *Computer Subsystem (CSS) Support:* This functional role:

● Provides technical advice and consultation to project members on the development of the CSS, including subsystem design, program design, coding, and testing

● Identifies the need for improved procedures and/or training in the CSS area.

(l) *Personnel Subsystem (PSS) Support:* This functional role:

● Provides technical advice and consultation to project members on the development of the PSS, including subsystem design, work module design, documentation, testing, and training development

● Identifies the need for improved procedures and/or training in the PSS area.

(m) *Information Systems Training:* This functional role:

● Provides training in information systems procedures

● Identifies new training requirements, establishes training objectives, and develops or obtains course materials

- Coordinates training provided by outside sources

- Evaluates course effectiveness and student performance.

(n) *Quality Assurance Support:* This functional role:

- Provides project support in the identification of system quality requirements

- Identifies various means by which system controls might be designed and implemented to assure the continuing quality of the system.

(o) *Legal Support:* This functional role:

- Reviews contracts for hardware, software, or service acquisition

- Provides consultation on legal or regulatory system requirements.

▶(p) *EDP Security Coordination:* This functional role:

- Is responsible for coordinating overall security requirements for EDP

- Develops data security guidelines and procedures

- Develops physical security guidelines and procedures

- Develops disaster recovery guidelines and procedures.

(q) *Corporate Security:* This functional role:

- Provides assistance and guidance on computer system security and privacy controls

- Assists in physical security evaluations of computer/minicomputer systems

- Provides consultation in physical security planning

- Investigates cases of fraud, theft, dishonesty, unauthorized access, use modification,

destruction of data or programs, and wiretapping or other criminal or quasi-criminal acts involving mechanized functions of the business.◀

C. Development Team Functional Role Descriptions

4.04 A description of each functional role in this category is given below.

(a) *Project Management:* This functional role is frequently performed by a project management team. Members of this team may include project director, project manager, and project leader(s). Section 007-208-310 further describes these project management team members. This functional role:

- Is responsible for management and administration of the development project

- Determines overall project strategy

- ▶Coordinates with organizations developing Operations Center(s) which will be supported by the information system◀

- Determines necessary phase products and activities, including support requirements

- ▶Is responsible for ensuring that system deliverable documentation is developed, tested, and delivered in conjunction with the delivery of software◀

- Controls project quality, schedule, and expenses

- ▶Negotiates initial service agreement◀

- Is responsible for overall direction and ultimate result of development effort.

▶(b) *User Representation:* This functional role:

- Advises on existing methods and procedures in business area supported by the application, including organizational objectives and measurements

- Represents user organization in specification of user needs (eg, informational and opera-

tional needs) and the objectives to be met by the system

- Assists in data collection efforts

- Assists in developing test plans and cases and coordinates user organization participation in testing

- Provides ongoing validation of system requirements and specifications.◀

(c) *System Analysis:* This functional role:

- Analyzes the existing environment to identify opportunities for improvement or problems resulting from inefficient processes or ineffective products

- Analyzes user needs to be addressed by a system and develops alternative system models to satisfy those needs

- Defines informational (data), functional, and performance requirements of a proposed system

- Defines system boundaries and interfaces.

(d) *System Design:* This functional role:

- Develops the functional architecture and related data structures needed to support the system requirements

- Allocates system functions to the appropriate resource (people, equipment, software, hardware) in a manner that optimizes total system performance

- Analyzes system functions to determine basic processing logic (human and machine), including system control, reliability, and recovery processes

- ▶Develops human/machine interface requirements.◀

(e) *CSS Design:* This functional role:

- Designs the module(s), program(s), and job structure(s) for the CSS

- Develops the procedural specifications for application programs

- Determines hardware and software requirements for the application.

(f) *PSS Design:* This functional role:

- Designs the task(s), work module(s), and recommended job structure(s) for the PSS

- Develops the procedural and performance aid specifications for human processes

- ▶Develops human/machine interfaces including screen design◀

- Determines training, work station, and physical facility requirements for system personnel.

(g) *Data Base Design:* This functional role:

- Analyzes data, data relationships, and data usage requirements in order to develop logical data base specifications

- ▶Converts entity-relation models to structure models◀

- Defines constraints and system use requirements for operational data base administration function.

(h) *Data Communication Design:* This functional role:

- Determines data communication requirements for the application, including interfaces with other applications

- Identifies traffic volumes, characteristics, and specific network performance requirements

- Specifies number, location, and types of terminals

- Evaluates application requirements with regard to available data communications products and capabilities

- Communicates requirements to data communications support function (technical support)

- Participates in design of terminal/operator interface.

◆(i) *Deliverable Documentation Prepara-*
tion: The development, testing, production and distribution of system deliverable documentation involves many functional roles on the development team and in technical support. The Project Manager, with the project management team, is responsible for assigning and coordinating the activities required to develop, test, and deliver the required system documentation in conjunction with the delivery of the software.◆

(j) *Programming:* This functional role:

- Develops code for computer processing

- Performs unit testing of codes and outputs to ensure that program specifications have been met.

(k) *Training Development:* This functional role:

- Develops training specifications

- Develops training modules, texts, instructional aids, etc

- Determines training resource requirements, training sequences, and prerequisites

- ◆Develops means for evaluating student performance◆

- Tests training modules to ensure that they meet training specifications.

(l) *Testing:* This functional role:

- Determines overall testing requirements and specifications for the proposed system

- Develops test plans and schedules

- Sets up test structure and procedures

- Designs individual test cases and test data

- Maintains test library (ie, test data, test cases and required deliverable documentation)

- Performs integration and system testing

- ◆Coordinates the efforts of user and operations personnel in performing system acceptance testing.◆

◆(m) *Change Management:* [See paragraph 4.05 (n).]◆

D. **Operations and Maintenance Functional Role Descriptions**

4.05 A description of each functional role in this category is given below.

(a) *Position Supervision:* This functional role:

- Supervises manual work functions

- Negotiates media schedules for work unit

- Monitors position performance, including quality, proper use of procedures, schedules, productivity, and control measures

- Identifies operational problems via trouble reports or system modification requests.

(b) *Position Operation:* Performs position procedures for the system's application and support position functions, both clerical and management.

◆(c) *Computer Operations:* This functional role:

- Operates the master console for all types of computers (to release all jobs to the processing complex), responds to all operating system console messages, allocates proper resources for problem determination, and allocates resources for job processing

- Performs tape pool operations which include response to all tape drive mount messages, mounting of tapes, cleaning of tape drives, handling/routing tapes for subsequent functions, and reviewing tape drive performance statistics for preventive maintenance program

- Performs tape library functions which include the management of all tape volumes, tape quality/refurbishment, tape file retention, off-site backup storage requirements, and foreign and out-of-area tape control.◆

◆(d) *Data Communications Processor Operations:* This functional role:

- Initializes and shuts down data switcher computers

● Assists in loading data communications software

● Monitors performance of data switcher computers and initiates appropriate corrective actions if required.◀

◆(e) *Computer Center Technical Support:* This functional role:

● Performs system resource measurement/tuning which includes reviewing system statistics regarding utilization, utilizing commercial packages for system monitoring, making job mix recommendations, and interfacing with the technical support functional roles

● Acts as vendor liaison to schedule preventive/corrective maintenance and hardware changes and conducts vendor meetings

● Is responsible for change control involving all hardware and software changes within the computer center

● Is responsible for EDP security as it relates to the computer center including the implementation and operation of physical security, data security, and disaster recovery procedures developed by EDP Security Coordination (technical support functional role)

● Is responsible for interfacing with personnel responsible for environmental planning including air-conditioning requirements, power, motor generators, alarm systems, construction activities, and shutdown activities associated with the environment

● Is responsible for interfacing with the technical support functions in all matters regarding system software, including generating and maintaining system and data base software

● Performs hardware/software problem determination, which includes analyzing problems to determine the source of the problem, applying a fix to the problem to ensure that the incident does not recur, and interfacing with the appropriate vendor, technical support, or application support personnel

● Administers the training for computer center operations personnel

● Is responsible for space (DASD) management including migration of data between storage hierarchies, monitoring resource utilization, maintenance activities, etc; coordinates with other technical support personnel as required.◀

◆(f) *Computer Center Application:* This functional role:

● Is responsible for application scheduling which involves establishing priorities, accounting for interdependencies of application processing, daily gathering of data from the user population and inputting all of the above into a mechanized scheduling system

● Acts as a user interface to provide the user population with a central contact to coordinate all service levels for that application

● Is responsible for job setup including the preparation of the job control language and assembling of the input media, as required

● Performs application problem determination involving job control language error resolution, core dump analysis, and coordination with the application specialist for programming and file modification error corrections

● Is responsible for program update control including receipt, review, and proper cataloging of all application program module changes, as well as user coordination with respect to the program change

● Is responsible for application console operation including responding to application console message, checking printouts for proper run completion codes, and performing interim control balancing

● Performs application tuning including data base sizing, data set deployment across I/O devices, file blocking, job streaming, and determination of optimal performance levels

● Is responsible for application quality assurance which involves controlling the output, ensuring that run controls balance, checking input parameters and sampling outputs for correctness

● Participates in service agreement negotiations with the user community.◀

(g) *Computer Center Data Handling:* This functional role:

- Is responsible for computer output microfiche operation

- Is responsible for providing keyed data for the computer center

- Is responsible for operation of the print/punch facilities of the data center

- Performs the distribution of all printed media to the user community (may include mailing customer bills, etc).

(h) *System User:* This functional role:

- Utilizes system outputs or system capabilities

- May provide input to the system

- Is responsible for proper use of the system

- Participates in preparation of service agreements

- Identifies system change and improvement requirements.

(i) *System Management:* This functional role:

- Manages overall use of the system

- Coordinates activities of all organizations involved in system operation

- Establishes system priorities and schedules

- Negotiates operational service agreement

- Monitors total system performance and effectiveness

- Coordinates trouble resolution and system recovery procedures

- Evaluates and coordinates prioritization of system modification requests

- Coordinates the test and installation of new system releases.

(j) *Information Systems Management:* This functional role:

- Is responsible for operation of the CSS portion of the system

- Coordinates with other data system groups to obtain/maintain the computer and technical resources needed to satisfy system performance requirements

- Coordinates the test and installation of new system releases for the ISO.

(k) *Application Specialist:* This functional role:

- Has detailed knowledge of the application and its operational characteristics

- Serves as consultant on application questions

- Diagnoses or participates in analysis of problems/opportunities

- Implements fixes for routine trouble situations or initiates alternative processing procedures

- Invokes other functions, as required, for problem resolution.

(l) *Operational Data Base Administration:* This functional role:

- Generates storage and access software for data base installation

- Is responsible for physical data base recovery

- Monitors resource utilization

- Performs data base maintenance activities (reorganization, etc).

(m) *User Data Administration:* This functional role:

- Is responsible for system data integrity

- Monitors data conversion activities

- Audits the accuracy of data

- Updates user-maintained tables

- Performs or coordinates data purification and/or resolution utilizing established system control procedures.

(n) *Change Management:* Since the activities for this functional role become more prominent once a system becomes operational, it is described under the operations and maintenance category. However, it should be recognized that several aspects of this functional role will be performed during system development by the development team. This functional role:

- Acts as the official point of interface between the central developer/release agent and the local installation

- Establishes and maintains official Product Library containing all user deliverable products (ie, documentation, program load modules, etc)

- Provides status information on system modification requests to all interested parties, eg, Project Manager, system developers, users

- Ensures that all changes are approved by the appropriate authority before updating an official product

- Coordinates system documentation and system release information (ie, scheduling, release contents, and product update packages) with users and maintenance and operations personnel

- Defines and documents application problems, establishes trouble priorities, and communicates problems to central location

- Coordinates problem resolution and transmits supporting problem information as required.

(o) *Data Communications Control and Trouble Isolation:* This functional role:

- Acts as a single point of user contact for data communications

- Routes user calls to the appropriate agency

- Isolates problems as indicated by software or hardware monitor alarms, trouble prevention information (nonacute failure), and user calls

- Monitors/performs trouble prevention activities

- Controls data communication systems (maintains data communication network connectivity, reacts to alarms, etc).

(p) *CSS Maintenance:* This functional role:

- Tests and installs CSS portion of the system release

- Monitors CSS performance

- Performs preventive, repair, and change maintenance functions

- Analyzes system modification requests to determine priorities and cost requirements

- Coordinates changes with PSS maintenance.

(q) *PSS Maintenance:* This functional role:

- Tests and installs PSS portion of the system release

- Monitors PSS performance

- Performs preventive, repair, and change maintenance functions

- Analyzes system modification requests to determine priorities and cost requirements

- Coordinates changes with CSS maintenance.

(r) *Audit:* This functional role can be performed *only* by officially designated internal auditors.

- Reviews system operation, procedures, controls, and documents periodically to assure operational integrity of system

- Identifies deficiencies and problem areas.

(s) *Training Administration:* This functional role:

- Schedules and coordinates resources for application training

- Maintains instructional staff and facilities

- Evaluates course effectiveness

- Identifies need for new or modified training materials based on student performance.

(t) *Course Instruction:* Conducts application training required by organizations operating or using the system.

5. RELATED BELL SYSTEM PRACTICES IN THE 007 SERIES

▶5.01 For additional information on these functional roles, refer to the following BSPs.

SECTION	TITLE
007-110-300	Information System Planning

SECTION	TITLE
007-110-350	Data Communications Strategic Planning
007-208-310	Project Management
007-227-310	Developmental Documentation Specifications
007-230-210	System Deliverable Documentation◀