

The 5ESS® Switch U.S. Market Front End Process

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The 5ESS® switch U.S. market front end process (FEP) is a new method AT&T uses to work in partnership with its customers during the early stages of new product planning and development. The FEP is a disciplined approach to evaluating new product or service opportunities, and ensures that development and deployment resources are allocated to the best available opportunities for AT&T and the local exchange carriers (LECs). Customer input and feedback is emphasized throughout the FEP. The process gives management the basis to make informed decisions about the products and services AT&T offers its customers, and improves the company's responsiveness to those customers by decreasing time to market, and by improving customer satisfaction with the new features and services offered.

Introduction: Front End Process Overview

The 5ESS switch U.S. market front end process (FEP) is a disciplined method to evaluate new product and service opportunities. It was implemented in August 1990 to help AT&T make informed decisions about the products and services it offers its customers. The new process was designed to improve the company's understanding of its customers' wants; its communications with those customers throughout the product planning process; its responsiveness to customers on decisions about new products; and communications within the AT&T product planning organizations. It insures accountability, followthrough, and clear decision-making criteria on new product offerings.

The FEP will improve AT&T's responsiveness to its customers by decreasing time to market, and by improving customer satisfaction with the new features and services offered. It also will incorporate AT&T's and its customers' strategies and goals in the products and services that are developed.

The FEP begins when a customer asks AT&T to develop a new feature or service offering on the 5ESS switch; it ends when AT&T and the customer decide that the new feature or service represents a good business and technical opportunity. It emphasizes external customer input and feedback throughout the evalu-

ation of new feature or service offerings. The FEP's external customers are the LECs that purchase 5ESS switches for their telecommunications networks. Its internal customers are developers and product realization organizations that produce and deploy the product defined during the process.

The FEP ensures that the best opportunities for AT&T and its customers receive maximal development and deployment resources. Key to the FEP is its structured definition of the feature or service request that includes customer need, marketability, technical feasibility, strategic fit, and financial attractiveness. Within the AT&T U.S. Switching Customer Business Unit (CBU), the FEP is divided into five subprocesses outlined in Figure 1:

- *Customer Interface Process.* The purposes of the customer interface process (CIP) are to gather knowledge of the customer's needs, and understand the intended use and benefit of the feature or service requests. The CIP also will evaluate customer requests and provide communication, commitment, follow-through, and feedback between the customer and FEP organizations.
- *Feature Administration Process.* The feature administration process screens requests for high quality input and routes

those requests to the responsible service managers. The feature administrator also maintains the FEP database.

- **Service Offering Process.** The purpose of the service offering process is to financially, strategically, and technically evaluate and recommend features or services for development and deployment that meet both the customer's needs and the U.S. Switching CBU's objectives and goals.
- **Portfolio Offering Process.** The purposes of the portfolio offering process are to ensure the profitability of the U.S. 5ESS switch product line, and to respond quickly to customer requests for new products.
- **Requirements and Planning Process.** The purposes of the requirements and planning process are to work with the customer to write the requirements documents, and complete detailed resource plans for staffing, capital, and equipment needed to design, develop, manufacture, and deploy the new product or service.

FEP Objectives. The objectives of FEP are to:

- Improve customer satisfaction and 5ESS switch business unit's responsiveness to a request for a new feature or service.
- Insure that 5ESS switch resources are deployed on projects that meet both AT&T's and the customer's strategy and profit objectives.

Furthermore, detailed customer responsiveness objectives have been established to provide a framework for sound management decisions, and to ensure effective introduction of the FEP process. The following is a summary of the FEP's overall customer responsiveness objectives:

- All customer feature and service requests are defined by the AT&T account team and AT&T customer advocates working with their customer.
- All features and services committed for development have one or more identified paying LEC customers.
- The customers approve all features and services they have requested.
- All customer feature requests follow the FEP.
- All features and services committed to customers meet their delivery dates.

Target customer responsiveness timeframes are set for the FEP. They start when a Feature Definition and Assessment Form (FDAF) is submitted to the feature administrator by the AT&T account team or AT&T customer advocate. They end when AT&T has responded to

Panel 1. Acronyms in This Paper

ACD	automatic call distribution
CBU	customer business unit
CIP	customer interface process
CPRP	corporate product realization process
FDAF	feature definition and assessment form
FEP	front end process
IPOP	individual portfolio offering plan
LEC	local exchange carrier
OA&M	operations, administration and maintenance
OSPS	operator services position system
PQMI	process quality measurement and improvement
SM	service manager
SME	subject matter expert
SMP	sales management plan

the customer with a formal business proposal, or with a response that the company does plan to develop the feature. The 1992-1993 target goals range from 8 to 28 weeks, depending on the size and complexity of the feature. These goals are reduced from the 15 to 32 weeks set for 1991 because, as AT&T and its customers gain more experience and make improvements in FEP, the intervals should decrease. (Note: an *interval* is the time between steps, or between when a request is made and answered.) The time it takes the customer to respond to planning information is not included in these intervals.

FEP Quality. The FEP team uses the process quality measurement and improvement (PQMI)¹ approach to define FEP and each subprocess. The team identifies ownership, responsibility, and accountability for the processes; defines inputs and outputs; and defines process metrics. The latter are defined to measure the overall FEP as well as individual subprocesses. The quality measurements defined determine how well the process conforms to customer requirements, and provide a basis for process improvement efforts.

The FEP team also defines quality levels to provide checkpoints in the process flow (see Figure 2). Each quality level includes many benchmarks from within the process: completions, accomplishments, and approvals. When the internal and external customers of each FEP subprocess have determined that the quality benchmarks at their level are complete, then the feature or service request is said to have passed from one FEP process to

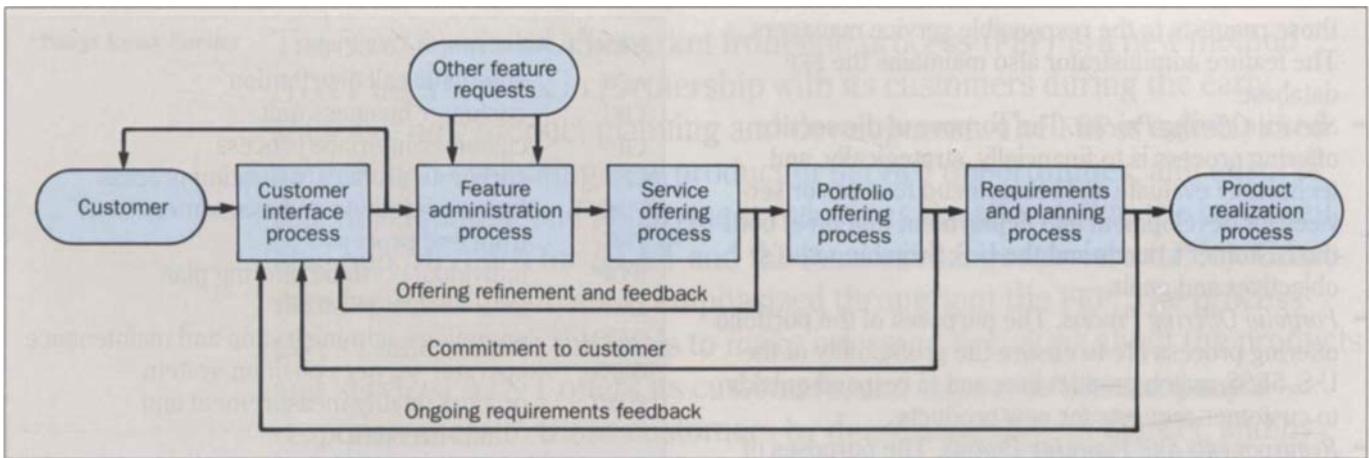


Figure 1. The 5ESS switch front end process. This diagram show a high level view of the 5ESS switch front end process subprocesses and the communication feedback loops to the customer. A key to successful implementation of the FEP process is constant communication with the customer on technical and business decisions as we move through the planning subprocesses.

the next. (The description of each FEP subprocess gives more detailed FEP quality metrics.)

The next section details the individual FEP processes by outlining the objectives, descriptions, and high level quality metrics of each FEP subprocess.

Customer Interface Process

The primary objectives of the customer interface process are to improve customer satisfaction, and AT&T's responsiveness to its customers. The company wants to be recognized as an innovative, cost-effective, and high-quality supplier. Achieving this goal requires a thorough knowledge of the customer's present and future needs. Thus, a critical element of CIP is the formation of a field team composed of marketing systems consultants (MSCs), account executives (AEs), technical consultants (TCs), the regional marketing teams (RMTs), and AT&T customer advocates.

Customer advocates are members of the 5ESS switch business management organization assigned to a specific customer to help handle feature requests and communication between customers, account teams, and service and portfolio managers. The account team and customer advocates work with customer subject matter

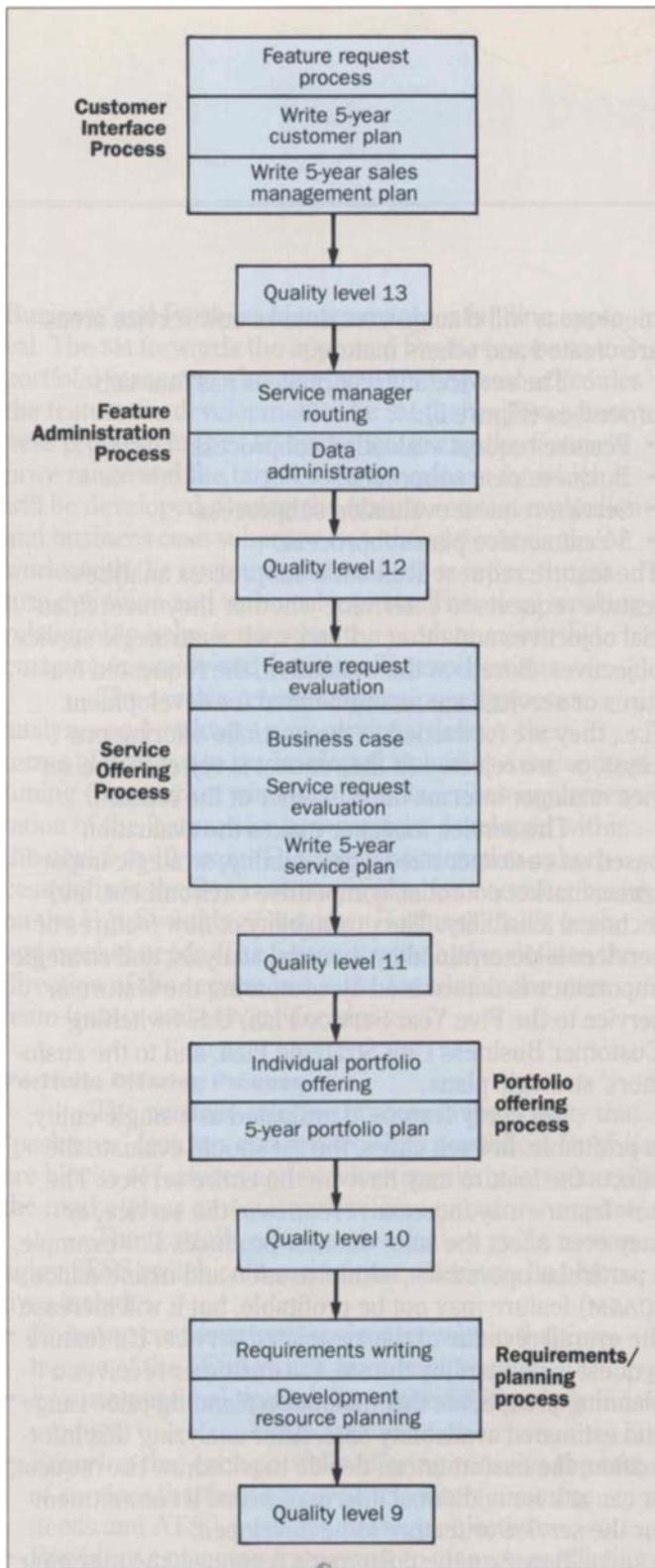
experts (SMEs) to define the necessary technical feature requirements and assess feature marketability. The field team organizational structure aligns the account teams and customer advocates, and provides an efficient means to analyze various feature ideas from both technical and marketing perspectives. It also ensures that the account teams have the tools and information to deliver committed sales. Specific quality metrics for this process are listed below:

- All FDAFs should be completed and sent to the feature administrator within three weeks of the customer feature request.
- All FDAFs adhere to a specific set of quality measurements.
- All requests are screened by the account team and customer advocates.

The CIP is the focal point of increased communication with AT&T's customers. It is a systematic method to receive and evaluate customer requests for new features and services, and consists of three subprocesses (Figure 2):

- Feature request subprocess
- 5-year customer plan process
- 5-year SMP process

In the feature request subprocess, new feature and service requests are defined and documented using the FDAF. The FDAF contains sections for documenting feature functionality, applications, end-user perspective, background and history, and marketing and economics of the new feature or service request. The field team works with customer SMEs to insure the FDAF represents the customer's needs, not AT&T's interpretation of them.



Accurately documenting customer needs is critical to make sure the new feature or service meets a customer's needs and expectations. The FDAF allows early assessment of the technical feasibility and profitability of feature concepts, before development resources are allocated. This process helps ensure that development and

Figure 2. Flowchart of the 5ESS switch front end process. This diagram shows a detailed view of the 5ESS switch FEP subprocesses and quality level checkpoints between them. Each quality level contains benchmarks from within the process, including completions, accomplishments, and approvals. These checkpoints are key to meeting the FEP objectives because each subprocess is dependent on its supplier for quality inputs to complete the subprocess quickly and with high quality. Subprocesses may be transpiring simultaneously within the FEP.

production resource allocations are based on customer need as well as on strategic and financial attractiveness to AT&T's customers and to the company itself. At the end of the feature request subprocess a completed FDAF is submitted by the AT&T customer advocate to the feature administrator.

In the 5-year customer plan subprocess, the field team documents the customer's strategic plans for a 5-year period. Then, the field team works closely with the various service managers to ensure that the customer's strategic plans are incorporated into the U.S. Switching Customer Business Unit's business plan. The 5-year SMP process ensures that the Network Systems account teams have the marketing tools and information to deliver sales and contributions.

Feature Administration Process

The primary objectives of the feature administration process are to:

- Route feature and service requests to the responsible service manager.
- Manage the FEP database and generate FEP reports.
- Handle nonstandard requests.

The specific quality metrics for this process are:

- The interval for routing FDAFs to the appropriate service manager.
- The number of FDAFs routed to the incorrect service manager.

Feature administration consists of two subprocesses (Figure 2):

- Service manager routing
- Data administration

The service manager routing subprocess ensures that incoming feature and service requests, as described in FDAFs, meet quality screening criteria, and are routed to the responsible service manager. Data administration

includes data entry, updating, reporting, and maintenance services in support of the FEP process. The data administration subprocess consolidates data entry and updating tasks in one group. It also manages the production and distribution of reports generated from a FEP database that contains information and milestones on all FDAFs received as they proceed through the FEP. By having one database of FEP information, similar requests can be identified, and all tracking is consistent and centralized for quick retrieval of information.

Service Offering Process

The objectives of the service offering process are:

- Responsiveness to customers needs.
- Recommend development of features or services that are either profitable or strategically important.

Responsiveness to customers is measured in terms of intervals. Profitability is determined by comparing the projected contribution against the contribution assigned to the service or feature by portfolio management.

Specific quality metrics on the service offering process are:

- 100 percent of business cases approved before a feature is committed.
- A specific development-to-sales ratio for a service offering.
- Intervals for responding to customer feature or service requests.

The service offering process is managed by a service manager (SM) who is responsible for a service—including all planning and revenue—throughout its life-cycle from new service planning through development and sales. The following major service areas with assigned service managers are:

- Integrated voice services
- Intelligent network and signaling services
- Automatic call distribution/operator services (ACD/OSPS)
- Core evolution
- Operations, administration, and maintenance planning
- Access and switching interfaces.

From service management's point of view, a *service* is a collection of related features. These features usually are additions to already deployed services that provide new capabilities. For example, the Calling Name Delivery feature is an addition to the existing service Local Area Signaling Services (LASS). Service manage-

ment areas will change over time as new service areas are created and others mature.

The service offering process has four subprocesses (Figure 2):

- Feature request evaluation subprocess
- Business case subprocess
- Service request evaluation subprocess
- 5-Year service plan subprocess.

The feature request evaluation subprocess analyzes feature requests to determine whether they meet financial objectives and other criteria such as strategic service objectives. Based on the evaluation, the requested features or services are recommended for development (i.e., they are forwarded to the portfolio offering process), or are rejected. If the request is rejected, the service manager informs the customer of the reason.

The service manager makes the evaluation based on customer needs, profitability, strategic importance, market potential, competitive environment, and technical feasibility. The profitability of new features or services is determined by financial analysis, and strategic importance is determined by comparing the feature or service to the Five Year Service Plan, U.S. Switching Customer Business Unit Strategic Plan, and to the customers' strategic plans.

Not every feature, if evaluated as a single entity, is profitable. In such cases, the SM should evaluate the effects the feature may have on the entire service. The new feature may increase revenues of the service, or may even affect the sales of other products. For example, a particular operations, administration and maintenance (OA&M) feature may not be profitable, but it will increase the overall revenue of the associated service. If a feature request is pursued by the SM, the customer receives a planning prospectus that includes a planning price range and estimated availability date. After analyzing this information, the customer can decide to withdraw the request, or can ask for additional information and a commitment for the service or feature to be developed.

Based on the customer's response, the SM either writes the business case (i.e., starts the business case subprocess) or updates the FEP database and ends the process. The business case describes features to be developed in a given software release, provides complete financial analysis, market assessment, technical assessment, risk analysis, and operational implementation strategies. The completed business case is presented to

Business and Portfolio Management for funding approval. The SM forwards the approved business case to the portfolio manager, who approves funding and schedules the feature for development. The SM then writes a business proposal to the LEC customer, giving the feature's price range and the target software release for which it will be developed. During the feature request evaluation and business case subprocesses, the systems engineer works with the customer SME to further refine the feature definition and technical aspects. This close working relationship helps insure that the product meets the customer's quality and functionality expectations.

The service request evaluation subprocess analyzes and evaluates new services, defines them in terms of features to be developed, specifies development timing (i.e., market windows), and describes implementation of the features for new services developed within the next 5 to 10 years. The 5-year service plan subprocess defines the 5-year strategic plan for a service, based on the U.S. Switching Customer Business Unit's goals and market needs. The 5 year strategic plan defines the direction of the service and is the foundation for near team feature and service decisions.

Portfolio Offering Process

The portfolio offering process is the activity that "packages" features and services into portfolios. *Portfolios* are blocks of features and services regularly introduced to the marketplace as a software release or software update.

The portfolio offering process is a guide to managing 5ESS switch software release offerings. Its objectives include:

- Ensuring customer responsiveness within the time-frames of the 5ESS switch front end process.
- Ensuring optimal profitability of the 5ESS switch product.
- Ensuring that each portfolio offering contains the mix of services that best meets 5ESS switch customer needs and AT&T business strategy objectives.
- Providing a planning framework to manage conflicting service resource demands.
- Approving funding of resources requested by service managers.

Specific quality metrics for the portfolio offering process are:

- A specific development-to-sales ratio for each 5ESS software release.

- Highest possible score on a matrix that measures customer satisfaction with the features committed.
- An "A" grade on feature selection section of customer evaluations.

The portfolio offering process has two subprocesses (Figure 2):

- Individual portfolio offering plan (IPOP)
- 5-year portfolio plan.

The 5-year portfolio plan determines timing and the overall strategic theme of each individual portfolio based on 5ESS switch strategic objectives and resource availability over the 5-year planning period. Each individual portfolio allocates resources within the specific software release for feature development of individual services. The grouping of the features and services is done by the 5ESS switch individual and 5-year portfolio managers. The individual portfolio manager must ensure that the set of features and services achieves the required financial return and meets the strategic objectives for the individual portfolio. During the commitment process, this manager may negotiate placing a feature or service with the 5-year portfolio manager and service manager to achieve those objectives by moving a feature to another individual portfolio.

Requirements and Planning Process

The requirements and planning subprocess ensures that customer requirements are detailed enough for committed features, and are communicated to development and performance verification so the final 5ESS switch feature meets the customer's needs. Another objective is to ensure that all development and planning information will be available to corporate product realization process (CPRP) organizations so they can plan and track the product's development and deployment.

Specific quality metrics for this subprocess are:

- 100 percent of the customer requirements documents are approved according to established milestones in the requirements document plan.
- 100 percent of the development resource and other plans are completed and supplied to CPRP on their committed schedule.

The requirements and planning process consists of two subprocesses, the requirements writing subprocess and resource planning subprocess (Figure 2).

The requirements writing subprocess prepares the customer requirements documents (Feature Specifi-

cation Documents, or FSDs) and specifies the requirements that will be implemented. The requirements and planning process starts when a software release portfolio or an individual feature has been committed to the customer. The requirements writing subprocess translates the customer needs for the feature into product requirements. These customer needs are gathered in the customer interface process and service offering process through the FDAF, service planning prospectus (SPP), customer SMEs, standard bodies and other sources of information. The key customer input is the customer SME. The requirements document:

- Records the external customer's needs and wants
- Defines a product to meet those customer's needs and wants
- States what is being built from the external customer's perspective.

The requirements document is a major deliverable from systems engineering that defines what is to be built by the development and performance verification organizations.

The function of the resource planning subprocess is to complete detailed development resource plans and any other information necessary for transition to the CPRP. Resource plans include staffing, equipment, capital, and technical resources. CPRP plans and tracks the implementation of the product.

Conclusion

This paper has described the new 5ESS switch U.S. market front end process. The process—developed using the PQMI approach—provides a method to evaluate new products or service opportunities working with the customer during the product planning process. The new FEP was also used as the blueprint for reorganizing the U.S. 5ESS switch product management and systems engineering organizations. It was implemented in August 1990, when the reorganization went into effect.

Since then, over 350 FDAFs have been submitted by customers. Many features have progressed through the entire FEP and have been committed for development. AT&T's LEC customers are also working cooperatively with the company to better align their planning processes with its FEP.

The process focuses on increasing customer satisfaction by maintaining technical and business dis-

cussions with the customer throughout its life. AT&T's external customers benefit from quicker response to new feature or service offering requests, more information on new features or service offerings, and new features and services that better meet customer needs because those customers are directly involved in defining the new feature or service.

Internal quality is improved by making accountability and decision criteria clearer in the FEP organizations, and by making business management decisions based on facts and increased customer input. AT&T costs have also been reduced in some areas by a factor of 4 because of the clearer decision making implemented through FEP. There is less wasted effort spent on features AT&T speculated that the customers wanted.

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Reference

1. R. B. Ackerman, R. J. Coleman, E. Leger, and J. C. MacDorman, *Process Quality Management and Improvement Guidelines: Issue 1*, Select Code 500-028, AT&T Customer Information Center, Indianapolis, Indiana, 1987.

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