

The Standard for Program

of delivery are required. The topics covered in this section are presented along with their associated program management life cycle phase as follows:

Program Definition Phase:

8.1.1 Communications Planning

Program Benefits Delivery Phase:

8.1.2 Information Distribution

8.1.3 Program Performance Reporting

Program communications management and program stakeholder engagement (Section 5) are closely related program activities. Each activity may involve effort from one or more persons or groups based on the needs of the program. Each activity occurs at least once in every program and occurs in one or more program phases. Although the activities are presented here as discrete elements with well-defined interfaces, in practice they may overlap and interact in ways not detailed here. Basic communication activities, tools, and techniques described in detail in the *PMBOK® Guide* are adequate for use in program communications management.

8.1.1 Communications Planning

Communications planning is the activity of determining the information and communication needs of the program stakeholders based on who needs what information, when they need it, how it will be given to them, and by whom. Communications requirements should be clearly defined to facilitate the transfer of information from the projects to the program and then from the program to the proper stakeholders with the proper content and delivery methods. Stakeholders may include: suppliers, contractors, regulatory and auditing bodies, media and community, as well as users and customers.

As compared to projects, programs are generally more complex and have a greater degree of uncertainty. As the program progresses, other components are added and new stakeholders become known and addressed. This distinction should be considered when planning communications. Since programs generally take longer to complete, team members, project sponsors, project managers, and program managers often leave programs before they are completed. When multiple vendors are part of a program team, the number of stakeholders is increased. Cultural and language differences, time zones, and other factors associated with globalization should be considered when developing the communications plan. Although complex, communications planning is vital to the success of any program.

The outputs of this activity include:

- Communication plan, and
- Stakeholder register and corresponding communication requirements.

8.1.2 Information Distribution

Information distribution is the activity of providing timely and accurate information to program stakeholders in useful formats and appropriate media. Information is distributed to the receiving parties including the clients,

sponsors, component managers, and, in some cases, the public and the press. Distributed information includes the following:

- Status information on the program, projects, or other work including progress, cost information, risk analysis, and other information relevant to internal or external audiences. The “what’s in it for me?” question should be addressed when this information is distributed;
- Notification of change requests to the program and project teams, and the corresponding response to the change requests;
- Internal budgetary information for execution and control;
- External budgetary information for public disclosure;
- External filings with government and regulatory bodies as prescribed by laws and regulations;
- Presentations before legislative bodies with the required prebriefs;
- Public announcements communicating public outreach information;
- Press releases; and
- Media interviews and benefits updates.

8.1.2.1 Program Communication Considerations

Program managers need to be highly skilled in communicating. The program manager should translate the program’s strategic goals into day-to-day tactical and operational activities. It is important that the program manager effectively communicate at all levels. Although a program manager generally communicates at a higher level than project managers, program managers should be able to communicate details to program team members as easily as they describe concepts to executives. Given the wide range of communications scenarios that a program manager may experience, having excellent written and oral communication skills is important to a program’s success. Program managers should also have good presentation skills to ensure that information is communicated accurately and is clearly understood by the stakeholders. The way recipients could interpret the message and the effects of the message should be carefully considered before communicating.

Communications skills are part of general management skills and are used to exchange information. General management skills related to communications include ensuring that the right persons get the right information at the right time by the right distribution method, as defined in the communications management plan. General management skills also include the art of managing stakeholder requirements.

The program manager is the key communicator for the program. It is beneficial for the program manager to have a defined and documented strategy for the wide spectrum of communication requirements. This communication strategy is used throughout the duration of the program even if it is used as a quick reference to ensure that the appropriate message is delivered to the correct audience. This communication strategy should be updated regularly as audiences and messages change throughout the course of a program.

8.1.2.2 Information Gathering and Retrieval Systems

Information is gathered and retrieved through a variety of media including manual filing systems, electronic databases, project management software, and systems that allow access to technical documentation such as engineering drawings, design specifications, and test plans. When one database is used, it is important to analyze and assign access to the different files that are present. The same access requirement exists for a system that has several databases. The current IT environment allows for rapid dissemination of large amounts of data to a large number of recipients. That situation requires careful planning and setup of the program's storage and retrieval system.

8.1.2.3 Information Distribution Methods

The information distribution method is determined once the program's storage and retrieval system is determined. Information distribution management involves communicating information—and only the required information—to program stakeholders in a timely manner across the duration of the program. Program information is distributed using a variety of methods, including:

- Face-to-face meetings, hard-copy document distribution, manual filing systems, and shared-access electronic databases;
- Electronic communication and conferencing tools, such as e-mail, fax, voicemail, telephone, video and web conferencing, and web publishing;
- Electronic tools for program management, such as web interfaces to scheduling and project management software, meeting and virtual office support software, portals, and collaborative work management tools;
- Social media (Internet-based group communication tools), interviews, conference presentations, marketing, publication articles; and
- Informal communications such as e-mails, small group conversations, and staff meetings. These are the primary methods for communicating day-to-day activities but are not used to formally communicate the program's status.

Regardless of the distribution method, the information should remain in the program's control. An incorrect message to an audience may and often will cause problems to the program and in some cases lead to the stoppage of a program. Program communication management can be challenging and may require a full-time manager assigned to the task.

8.1.2.4 Lessons Learned Database

Lessons learned are a compilation of knowledge gained. This knowledge may be acquired from executing similar and relevant programs in the past, or it may reside in public domain databases. Lessons learned are critical assets to be reviewed when developing an effective communications management plan. The lessons learned database is updated at the completion of components as well as at the end of the program.

The outputs of this activity include:

- Program management information system (if applicable),

- Lessons learned, and
- Data archiving and retrieval instructions.

8.1.3 Program Performance Reporting

Program performance reporting is the activity of consolidating performance data to provide stakeholders with information about how resources are being used to deliver program benefits. Performance reporting aggregates all performance information across projects and non-project activity to provide a clear picture of the program performance as a whole.

This information is conveyed to the stakeholders by means of the information distribution activity to provide them with needed status and deliverable information. Additionally, this information is communicated to program team members and its constituent projects to provide them with general and background information about the program's performance. Communication should be a two-way information flow. Any communication from the customers or stakeholders regarding the program performance should be gathered by program management, analyzed, and distributed back within the program as required.

The outputs of this activity include:

- Contractually and/or sponsor-required data reports and accompanying formats,
- Customer feedback requests, and
- Periodic reports, presentations, and key performance indicators.

8.2 Program Financial Management

Program financial management includes the activities involved in identifying the program's financial sources and resources, integrating the budgets of the program components, developing the overall budget for the program, and controlling costs throughout the duration of both the components and the program. The topics covered in this section are presented along with their associated program management life cycle phases as follows:

Program Definition Phase:

8.2.1 Program Cost Estimation

8.2.2 Program Financial Framework Establishment

8.2.3 Program Financial Management Plan Development

Program Benefits Delivery Phase:

8.2.4 Component Cost Estimation

8.2.5 Program Cost Budgeting

8.2.6 Program Financial Monitoring and Control

Program Closure Phase:

8.2.7 Program Financial Closure

These activities and processes interact with program management supporting processes and activities throughout the duration of the program and with activities and processes at the component level, as described in the *PMBOK® Guide*.

8.2.1 Program Cost Estimation

Program cost estimating is performed throughout the course of the program. An initial cost estimate is prepared in the program definition phase to determine the feasibility of the organization's ability to perform the program. This initial, order-of-magnitude estimate allows financial decision makers to decide if the program should be funded. Many organizations use a tiered funding process with a series of go/no-go decisions at each major stage of the program. They agree to an overall financial management plan and commit to a budget only for the next stage at each governance milestone.

A weight or probability may be applied based on the risk and complexity of the work to be performed to derive a confidence factor in the estimate. This confidence factor is used to determine the potential range of program costs. When determining program costs, decision makers need to consider not only the development and implementation costs, but also sustainment costs that may occur after the program is complete. Calculating full life cycle costs and including sustainment costs result in total cost of ownership. Total cost of ownership costs are considered to be relative to the expected benefit of one program against another to derive a funding decision. There are numerous estimating techniques to derive program estimates.

The outputs of this activity include program cost estimates.

8.2.2 Program Financial Framework Establishment

The type of program and the funding structure dictate the financial environment for the duration of the program. Funding models vary, from those:

- Funded entirely within a single organization,
- Managed within a single organization but funded separately,
- Funded and managed entirely from outside the parent organization, and
- Supported with internal and external sources of funding.

Often the program itself may be funded by one or more sources, and the program components may be funded by altogether different sources. In addition to funding sources, the timing of funding has a direct impact on a program's ability to perform. To a much greater extent than in components, program costs occur earlier (often years earlier) than their related benefits. The objective of financing in program development is to obtain funds to bridge the gap between paying out monies for development and obtaining the benefits of the programs. Covering this large negative cash balance in the most effective manner is a key challenge in program financing. Due to the large amount of money involved in most programs, the funding organization is rarely a passive partner but instead has significant inputs to the program management and to decisions made by the business leads, technical leads, and by the program manager. Due to this, communications with the program sponsor and other key stakeholders should be proactive and timely.

A program financial framework is developed early in the definition phase and serves as the high-level initial plan for coordinating available funding, determining constraints, and determining how the money is paid out. The financial framework defines and describes the program funding flows so that the money is spent as efficiently as possible.

As the program financial framework is developed and analyzed, changes may be identified that impact the original business case justifying the program. Based on these changes, the business case is revised with full involvement of the decision makers (see Section 3.1.1).

It is important to understand the specific and unique needs of the program sponsor and the funding organizations' representatives with regard to financial arrangements. The communications and stakeholder engagement plans may need updates to reflect these needs.

The outputs of this activity include:

- Program financial framework,
- Business case updates, and
- Updates to the communications management and stakeholder engagement plans.

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8.2.3 Program Financial Management Plan Development

The program financial management plan is a component of the program management plan and documents all of the program's financial aspects: funding schedules and milestones, initial budget, contract payments and schedules, financial reporting activities and mechanisms, and the financial metrics. The program financial management plan expands upon the program financial framework and describes the management of items such as risk reserves, potential cash flow problems, international exchange rate fluctuations, future interest rate increases or decreases, inflation, currency devaluation, local laws regarding finances, trends in material costs, contract incentive and penalty clauses, and extent to retain contractor payments. For programs that are funded internally, either through retained earnings, bank loans, or the sale of bonds, the program manager should consider scheduled contract payments, inflation, the aforementioned factors, and other environmental factors.

When developing the program financial management plan, the program manager should also include any component payment schedules, operational costs, and infrastructure cost.

It is important to develop financial metrics by which the program's benefits are measured. This is usually a challenge as cause-effect relationships are often difficult to establish in an endeavor the size and length of a program. One of the tasks of the program team and governing board will be to establish and validate these financial performance indicators.

As changes to cost, schedule, and scope occur throughout the duration of the program, these metrics are measured against the initial metrics used to approve the program. Decisions to continue the program, to cancel it, or to modify it are based, in part, on the results of these financial measures.

The outputs of this activity include:

- Program financial management plan,
- Program funding schedules,

- Component payment schedules,
- Program operational costs, and
- Program financial metrics.

8.2.4 Component Cost Estimation

Because programs have a significant element of uncertainty, not all program components may be known when the initial order-of-magnitude estimates are calculated during the program definition phase. In addition, given the typically long duration of a program, the initial estimates may need to be updated to reflect the current environment and cost considerations. It is a generally accepted good practice to calculate an estimate as close to the beginning of a work effort as possible. This way, if the cost of the output is lower than originally planned, the program manager may present an opportunity to the sponsor for additional products that would be acquired later in the program. Conversely, if the cost is significantly higher, a change request may be generated. In the approval activity, the benefit of additional products can be weighed against the new cost to determine the proper action.

Cost estimates for the individual components within the program are developed. The component costs are baselined and become the budget for that particular component. If a contractor is performing this component, this cost is written into the contract.

The outputs of this activity include component cost estimates and documentation.

8.2.5 Program Cost Budgeting

Developing the program's budget involves compiling all available financial information and listing all income and payment schedules in sufficient detail so that the program's costs can be tracked as part of the program budget baseline. Once baselined, the budget becomes the primary financial target that the program is measured against. The majority of the program's cost is attributable to the individual components within the program and not to managing the program itself. When contractors are involved, the details of the budget come from the contracts. The program overhead is added to the initial budget figure before a baseline budget can be prepared.

Two important parts of the budget are program payment schedules and component payment schedules. The program payment schedules identify the schedules and milestone points where funding is received by the funding organization. The component payment schedules indicate how and when contractors are paid in accordance with the contract provisions. Once the baseline is determined, the program management plan is updated.

The outputs of this activity include:

- Program budget baseline,
- Program payment schedules, and
- Component payment schedules.

8.2.6 Program Financial Monitoring and Control

Since programs are, by definition comprised of multiple components, program budgets should include the costs for each individual component as well as costs for the resources to manage the program itself. Once the program receives initial funding and begins paying expenses, the financial effort moves into tracking, monitoring, and controlling the program's funds and expenditures. This is a responsibility of the program manager with oversight by the governance board.

Monitoring the program's finances and controlling expenditures within budget are critical aspects of ensuring the program meets the goals of the funding agency or of the higher organization. A program whose costs exceed the planned budget may no longer satisfy the business case used to justify it and may be subject to cancellation. Even minor overruns are subject to audit and management oversight, and should be justified. Typical financial management activities include:

- Identifying factors that create changes to the budget baseline,
- Monitoring the environmental factors for potential impacts,
- Managing changes when they occur,
- Monitoring costs reallocation impact and results between components,
- Monitoring contract expenditures to ensure funds are disbursed in accordance with the contracts,
- Implementing earned value management (schedule performance index, cost performance index),
- Identifying impacts to the program components from overruns or underruns,
- Communicating changes to the financial baseline to the governance groups and to the auditors (at both the program and component level), and
- Managing the expenditure on the program infrastructure to ensure costs are within expected parameters.

As part of this activity, payments are made in accordance with the contracts, with the financial infrastructure of the program, and with the status of the contract deliverables. Individual component budgets are closed when each component completes its work. Throughout the program, as changes are approved that have significant cost impacts, the program's budget baseline is updated accordingly and the budget is rebaselined. New financial forecasts for the program are prepared on a regular basis and communicated in accordance with the stakeholder engagement plan. Similarly, approved changes either to the program or to an individual component are incorporated into the appropriate budget. All of these activities may result in updates to the program management plan.

The outputs of this activity include:

- Contract payments,
- Component budgets closed,
- Program budget baseline updates,
- Approved change requests,

- Estimate at completion,
- Program management plan updates, and
- Corrective actions.

8.2.7 Program Financial Closure

Prior to closing the program, estimates may be required to determine costs of sustaining the benefits created by the program. While many of these costs are captured in operations, maintenance, or other activities initiated in the program benefits delivery phase as components are delivered, there may be residual activities required to oversee the ongoing benefits. This stewardship may be structured as an individual project, a resulting program, or may be incorporated as new work under a separate portfolio or program or in new or existing operations.

Program financial closure commences once sustainment budgets are developed, benefits are delivered, and sustainment has commenced.

The outputs of this activity may include:

- Input to final performance reports,
- Updates to the program financial management plan,
- Input into the knowledge repository,
- Documentation of new tools and techniques used in the course of the program into the knowledge management system,
- Financial closing statements, and
- Closed program budget.

As the program nears completion, the program budget is closed and the final financial reports are communicated in accordance with the stakeholder engagement plan. Any unspent monies are returned to the funding organization.

8.3 Program Integration Management

Program integration management includes the activities needed to identify, define, combine, unify, and coordinate multiple components within the program. It coordinates the various program management activities across the program management life cycle. The activities covered in this section include:

Program Definition Phase:

8.3.1 Program Initiation

8.3.2 Program Management Plan Development

8.3.3 Program Infrastructure Development

Program Benefits Delivery Phase:**8.3.4 Program Execution Management****8.3.5 Program Performance Monitoring and Control*****Program Closure Phase:*****8.3.6 Program Transition and Benefits Sustainment****8.3.7 Program Closure**

Throughout the program integration activities there are numerous interactions with the other program domains and program supporting activities. This section provides common interactions and makes references as practicable.

8.3.1 Program Initiation

Program initiation activities generally occur during the program definition phase of the program management life cycle. The purpose of program initiation is to define the program, secure financing, and demonstrate how the program will deliver the desired organizational benefits. The program sponsor assigns a program manager to conduct and manage the initial work for the program. Typical program initiation activities include:

8.3.1.1 Program Sponsor Selection and Financing

The sponsoring organization selects a program sponsor to oversee the program, secures financing as appropriate for the organization, and ensures the program delivers the intended benefits with the agreed-upon cost, scope, and schedule. Initial program financing is secured and additional financing may be needed as new components are introduced to the program across its duration.

8.3.1.2 Program Manager Assignment

The assignment of a program manager, defined role, and organizational interfaces should be performed as early in the program initiation phase as is possible. A skilled and knowledgeable program manager effectively guides the initiation activity and facilitates the development of the outputs for this activity.

8.3.1.3 Estimates of Scope, Resources, and Cost

Studies of scope, resources, and cost are determined early in the program to assess the organization's ability to execute the program. At this time, the candidate program is compared with other organizational initiatives to determine the priority of the program under consideration. The program may be assessed later or component initiatives may be used for other program initiatives. For more information, see Sections 8.2 on Program Financial Management, 8.6 on Program Resource Management, and 8.9 on Program Scope Management.

8.3.1.4 Initial Risk Assessment

An initial risk assessment is conducted during the program initiation phase. Threats and opportunities are analyzed to determine the probability for the program's successful delivery of organizational benefits. Risk response strategies and plans are considered at this time. For more information, see Section 8.7 on Program Risk Management.

8.3.1.5 Business Case Update

The activity of assessing the feasibility of forming a program to achieve intended benefits and objectives may result in the creation (if it was not developed by a portfolio management function) or updates to the business case. If the business case is available, it is revised and updated accordingly, regardless of whether the program charter is approved or rejected. If the organization cannot successfully perform the program or it is a lower priority, the program is generally ended.

8.3.1.6 Program Roadmap and Program Charter Development

During the program initiation phase, key documents are developed to communicate the overall program direction. These include the program roadmap and program charter:

- **Program roadmap.** The program roadmap is a chronological representation of a program's intended direction. It depicts key dependencies between major milestones, communicates the linkage between the business strategy and the planned and prioritized work, reveals and explains gaps, and provides a high-level view of key milestones and decision points (see Section 4.2.2 for more information on program roadmap).
- **Program charter.** The program charter is the primary document reviewed by the governance board to decide if the program will be authorized. The contents of the charter generally include:
 - **Justification.** Why is the program important and what does it achieve?
 - **Vision.** What will the end state look like and how will it benefit the organization?
 - **Strategic fit.** What are the key strategic drivers and the program's relationship with organizational strategic objectives and other ongoing strategic initiatives?
 - **Outcomes.** What are the key program benefits required to achieve the vision?
 - **Scope.** What is included within the program and what is considered to be outside the scope?
 - **Benefit strategy.** What key benefits are sought and how are their realizations envisioned?
 - **Assumptions and constraints.** What are the assumptions, constraints, dependencies, and external factors considered to shape or limit the program?
 - **Components.** How are the projects and other program components configured to deliver the program? This may also include a high-level program plan for all components.
 - **Risks and issues.** What are the initial risks and issues identified during the preparation of the program brief?
 - **Timeline.** What is the total length of the program, including all key milestone dates?
 - **Resources needed.** What are the estimated program costs and resource needs (i.e., staff, training, travel, etc.)?
 - **Stakeholder considerations.** Who are the identified stakeholders, who are the most important stakeholders, what are their attitudes toward the program, and what is the initial strategy to engage them? This should be complemented with a draft of the program communications management plan.

- **Program governance.** What is the recommended governance structure to manage, control, and support the program? What are the recommended governance structures to manage and control projects and other program components, including reporting requirements? What authority does the program manager possess?

Approval of the program charter formally authorizes the commencement of the program, provides the program manager with the authority to apply organizational resources to program activities, and links the program to the organization's ongoing work and strategic priorities. If the program is not authorized, the event should be recorded in the program charter and stored in lessons learned.

8.3.2 Program Management Plan Development

The program management plan development activity integrates the program's subsidiary plans and establishes the management controls and overall plan for integrating and managing the program's individual components. This set of plans includes the following subsidiary plans:

- Benefits realization plan (see Section 4.2.1)
- Stakeholder engagement plan (see Section 5.2)
- Governance plan (see Section 6.2.4)
- Communications management plan (see Section 8.1)
- Financial management plan (see Section 8.2)
- Program management plan (see Section 8.3)
- Procurement management plan (see Section 8.4)
- Quality management plan (see Section 8.5)
- Resource management plan (see Section 8.6)
- Risk management plan (see Section 8.7)
- Schedule management plan (see Section 8.8)
- Scope management plan (see Section 8.9)

Program management plan development is an iterative activity (along with all of the other planning activities) as competing priorities, assumptions, and constraints are resolved to address critical factors, such as business goals, deliverables, benefits, time, and cost.

Updates and revisions to the program management plan, its subsidiary plans, and the program roadmap are approved or rejected through Program Governance (see Section 6).

8.3.3 Program Infrastructure Development

The purpose of this activity is to investigate, assess, and plan the support structure that will enable the program to successfully achieve its goals. This activity is invoked in the program definition phase and may be invoked again at any time during the program in order to update or modify the infrastructure to support the program. Activities include:

8.3.3.1 Program Organization and Core Team Assignments

Although the program manager is assigned in the program initiation subphase, the program management team is designated as part of establishing the program infrastructure. Although not necessarily assigned full time to the program, these key stakeholders are instrumental in determining and developing the program's infrastructure requirements.

8.3.3.2 Program Resource Plan Development

The program requires resources such as personnel, tools, facilities, and finances that will be used to manage the program. These are separate and distinct from the resources required to manage the individual components within the program (See Section 8.6). The majority of the resources and costs of the program are managed at the component level.

8.3.3.3 Program Management Activity Definition

Program resources select and document program management activities required for implementing and managing the defined program infrastructure.

8.3.3.4 Program Management Office

For many programs, the program management office is a core part of the program infrastructure. The program management office supports the management and coordination of the program and component work. For more information about program management offices, see Sections 1.5 and 6.6.1.

8.3.3.5 Program Management Information Systems

Program management information systems collect information needed to manage and control the program (see Section 6.6.2). Effective program management information systems incorporate:

- Software tools,
- Document, data, and knowledge repositories,
- Configuration management tools,
- Change management system,
- Risk database and analysis tools,
- Financial management systems,
- Earned value management activities and tools,
- Requirements management activities and tools, and
- Other tools and activities as required.

8.3.4 Program Delivery Management

This activity includes the management and integration of program components throughout the program benefits delivery phase. The following activities initiate, change, transition, and close program components:

8.3.4.1 Component Initiation

A component initiation request is presented by the component manager or sponsor. This request is used by the program manager and governance board to evaluate the component against the organization's approved selection criteria. A decision is made utilizing the governance function on whether the component should be initiated. The program manager may redefine priorities of program components. Component initiation may be delayed or accelerated as defined by the program team and its needs.

8.3.4.2 Change Requests

Change requests that fall within the program manager's scope of authority are approved or rejected as a part of this activity.

8.3.4.3 Component Transition

As program components reach the end of their respective life cycles and/or planned program-level milestones are reached, the program manager, in collaboration with the customer/sponsor, agrees and secures resources to undertake the component transition activities. This formal request is sent to the program governance board for approval.

The processing of component transition is completed with updates to the program roadmap to reflect both go/no-go decisions and approved change requests affecting high-level milestones, the scope, or timing of major stages or blocks of the program.

8.3.5 Program Performance Monitoring and Control

Monitoring and controlling activities are performed throughout the course of a program by both the program and component management organizations. This includes collecting, measuring, and disseminating performance information and assessing overall program trends. This activity provides program management with the data necessary to determine the program's state and trends, and may point to areas in need of adjustment or realignment. Based on the thresholds defined by the program manager, requests for corrective or preventive action and adaptive change may be approved at the component or program level. If the requests exceed program-level thresholds, the requests may be taken to the program governance board for approval. Typical outputs of this activity include program performance reports and forecasts.

8.3.5.1 Program Performance Reports

Performance status reports at the program level include a summation of the progress of its components, describes the program's status relative to benefits, and identifies resource usage to determine if the program's goals and benefits will be met. This report generally contains high-level statements about what work has been accomplished (especially milestones and gates), earned value status, remaining work, and any risks, issues, and changes under consideration.

8.3.5.2 Forecasts

Forecasts enable the program manager and stakeholders to assess the likelihood of achieving planned outcomes.

8.3.6 Program Transition and Benefits Sustainment

A program is established to produce certain benefits. Some components produce immediate benefits and others require a handoff to another organization for the ongoing benefit to be realized. Benefit sustainment may be achieved through operations, maintenance, new projects, or other efforts. As the program is closed, the stewardship of sustaining the benefits may need to transition to another organization.

8.3.7 Program Closure

The program ends either because its charter is fulfilled or conditions arise that bring the program to an early close. When a program has fulfilled its charter, its benefits may have been fully realized or benefits may continue to be realized and managed as part of organizational operations. The program may close following the transition of any remaining sustainment efforts and the approval of the sponsoring organization. Program closure activities include:

8.3.7.1 Final Reports

A final program report documents critical information that may be applied toward the success of future programs and projects, as well as data that senior management requires to perform corporate governance. Items that may be included in the final report are:

- Financial and performance assessments,
- Successes and failures,
- Areas for improvement,
- Risk management outcomes,
- Unforeseen risks,
- Customer sign-off,
- Reason(s) for program closure,
- Technical and programmatic baseline history, and
- Program documentation archive plan.

8.3.7.2 Knowledge Transition

Upon program completion, the program manager assesses the program's performance and shares lessons learned with all team members. If additional lessons learned are reported during this meeting, this information should be added to the final program report. Lessons learned should be readily accessible to any existing or future program to facilitate continuous learning and avoid pitfalls encountered in other programs. This also includes knowledge transfer activities to support the ongoing benefit by providing the new supporting organization with documentation, training, or materials.

8.3.7.3 Resource Disposition

Efficient and appropriate release of program resources is an essential activity of program closure. At the program level, program governance releases resources as a part of activities leading to program closure approval.

Component resource disposition includes transitioning resources to another component in execution or another program in the organization that requires similar skills or to match the needs of resource being dispositioned.

8.3.7.4 Program Closeout

The program is formally closed by either canceling the program or receiving formal closure acceptance from the program governance board and/or program sponsor that the program has achieved its objectives. The program may be canceled due to poor performance or by changes in the business case that make the program unnecessary. Successful completion of the program is judged against the actual business case and the current goals of the program. All components should be completed and all contracts formally closed before the program is closed.

8.4 Program Procurement Management

One of the many tools at a program manager's disposal is the ability to procure products and services to assist in the delivery of program benefits. Program procurement management addresses the activities necessary to acquire products and services.

Program procurement management addresses specific procurement needs that are unique to managing the overall program and the needs of the constituent projects/components. For example, the program manager and program management team may determine that there is a need to procure the services of a product integrator to best bring together the product outputs of various projects, or they may determine that they have a need to procure services to support an overarching program level activity such as program risk management. All procurement activities at the program level should be targeted at optimizing procurements for the components.

Acquisitions, procurement, and contract management are all specialized disciplines with unique skills and training. The program manager should ensure the program correctly implements all organizational policies and standards when handling significant financial transactions that involve legally binding agreements. Organizations often have specialized procurement or acquisition departments that work closely with financial and legal departments to ensure all applicable laws, regulations, and statutes are followed.

The topics covered in this section are presented along with their associated program management life cycle phase as follows:

Program Definition Phase:

8.4.1 Program Procurement Planning

Program Benefits Delivery Phase:

8.4.2 Program Procurement

8.4.3 Program Procurement Administration

Program Closure Phase:

8.4.4 Program Procurement Closure

Procurement management for programs is similar to that of project procurement, which is described thoroughly in Section 12 of the *PMBOK® Guide*. What makes program-level procurement actions different from project-level procurements is the focus of this section.

8.4.1 Program Procurement Planning

A program manager should understand the resources required for the delivery of benefits expected of the program. Techniques such as make-or-buy decisions and program work-breakdown-structure charts aid in this activity. The program manager needs to be cognizant of the available funding and the needs of all components.

As with project procurement management, early and intensive planning is critical for successful program procurement management. Through the planning activity, the program manager looks across all program components and develops a comprehensive plan that optimizes the procurements to meet program objectives and for the delivery of program benefits. To do this, program procurement management addresses commonality and differences for the various procurements across the program scope and determines:

- Whether some of the common needs of several individual components could best be met with one overall procurement rather than several separate procurement actions;
- The best mix of the types of procurement contracts planned across the program; at the project level, a particular type of contract (e.g., firm-fixed-price) may appear to be the best procurement solution, but a different contract type (incentive fee) may be more optimal for that same procurement when viewed at the program level;
- The best program-wide approach to competition; the risks of sole source contracts in one area of the program could be balanced with the different risks associated with full and open competition in other areas of the program; and
- The best program-wide approach to balancing specific external regulatory mandates; for example, rather than setting aside a certain percentage of each contract in the program to meet a small-business mandate, it may be more optimal to award one complete contract to achieve the same mandate.

Often, the planning stage may conduct an analysis of alternatives. This may include requests for information (RFI), feasibility studies, trade studies, and market analysis to determine the best fit of solutions and services to meet the specific needs of the program.

Due to the inherent need to optimize program procurement management and the requirements to adhere to all legal and financial obligations, it is essential that all of the personnel responsible for procurement at the project level work closely together, especially during the planning phase.

The outputs of this activity include:

- Program procurement standards,
- Program procurement plan, and
- Program budget/financial plan updates.

8.4.2 Program Procurement

Program managers have a host of tools and techniques at their disposal for conducting program procurements, but the key aspect of conducting program level procurement is to set standards for the components. These standards may come in the form of qualified seller lists, prenegotiated contracts, blanket purchase agreements, and formalized proposal evaluation criteria.

One common structure used by the program manager is to direct all procurements to be centralized and conducted by a program-level team rather than assigning that responsibility to individual components.

The outputs of this activity include:

- Request for quote (RFQ),
- Request for proposals (RFP),
- Invitation for bid (IFB),
- Proposal evaluation criteria,
- Contracts management plan, and
- Awarded contracts.

8

8.4.3 Program Procurement Administration

Once the program standards are in place and the contracts are awarded, administration and closeout of many of those contracts is transitioned to the components. The details of contract deliverables, requirements, deadlines, cost, and quality are handled at the component level. The individual managers at the component level report procurement results and closeouts to the program manager.

The program manager maintains visibility in the procurements to ensure the program budget is being expended properly to obtain program benefits.

The outputs of this activity include:

- Performance/earned value reports,
- Monthly progress reports, and
- Vendor/contract performance reports including key performance indicators assigned to contractors.

8.4.4 Program Procurement Closure

Program procurement closure are those activities that formally close out each contract on the program after ensuring that all deliverables have been satisfactorily completed, that all payments have been made, and that there are no outstanding contractual issues.

The outputs of this activity include:

- Contract closeout reports,

- Updates to lessons learned, and
- Closed contracts.

8.5 Program Quality Management

Program quality management includes the activities of the performing organization that determine program quality policies, objectives, and responsibilities so that the program will be successful. It implements the quality management system through policy and procedures with continuous improvement activities conducted throughout, as appropriate. In Section 8 of the *PMBOK® Guide*, the Project Quality Management activities listed are adequate, with minor modifications, to use for this activity. The modifications are required because, in a program, there may be several component projects or other programs, and the prime program should ensure that the proper quality specifications are applied and the proper quality control is exercised on each. For example, in a program, a modification to the quality management activity could be batch quality inspections and bonded storage to save time, or one final acceptance test instead of several staged quality tests on each deliverable. Every component contributes to the program quality, and the overall program quality activities should be monitored and controlled. The topics covered in this section are presented along with their associated program management life cycle phase as follows:

Program Definition Phase:

8.5.1 Program Quality Planning

Program Benefits Delivery Phase:

8.5.2 Program Quality Assurance

8.5.3 Program Quality Control

8.5.1 Program Quality Planning

Program quality planning is the first step in program quality management. It identifies the standards that are relevant to the program as a whole and specifies how to satisfy them across the program. Often within a program, there are many differing quality assurance requirements as well as differing test and quality control methods and activities. Program management coordinates these varying specifications and adds additional ones should they be required to ensure overall program quality. It is good practice for the program manager to document the overall program's quality policy in a distributed quality policy shared with all program components. Program management is responsible for the planning of the proper quality assurance criteria throughout the course of the program, which may in fact exceed the timeline of the individual component projects. New quality control tools, activities, and techniques may have to be introduced into the program and employed when appropriate if, for example, new laws and specifications change during the program's life.

When initiating the program, the cost of the level of quality requirements should be evaluated and incorporated into the business plan. Quality is a variable cost in all component projects and should be considered as such in the program quality plan. It is beneficial to analyze program quality in order to evaluate it across the program with the goal of combining quality tests and inspections in order to reduce costs, where feasible. Often, many products and

deliverables are tested throughout a program and a cost is incurred with no benefit realized. It should be noted that the output of this activity is a quality management plan that provides the quality assurance controls that will be placed on the program and the methods of inspection based on the program scope.

Quality management should be considered when defining all program management activity as well as for every deliverable and service. For example, when developing a program resource plan, it is recommended that a program quality manager participate in the planning activity to verify that quality activities and controls are applied and flow down to all the component programs and projects, including those performed by subcontractors.

The output of this activity is a program quality plan that may contain:

- Program quality policy,
- Program quality standards,
- Program quality estimates of cost,
- Quality metrics, service level agreements, or memorandums of understanding,
- Quality checklists, and
- Quality assurance and control specifications.

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8.5.2 Program Quality Assurance

Program quality assurance is the activity of evaluating overall program quality on a regular basis to provide confidence that the program will comply with the relevant quality policies and standards. Once the initial quality assurance specifications are decided upon in the preparation and planning phase, quality should be continuously monitored and analyzed. Programs often conduct quality assurance audits to ensure proper updates are performed. New government laws and regulations may create new quality standards. The program management team is responsible for implementing all required quality changes. The lengthy duration of programs often requires quality assurance updates throughout the program's duration. Program quality assurance focuses on cross-program, interproject quality relationships and how one project's quality specification impacts another project's quality, if they are interdependent. Program quality assurance also includes the analysis of the quality control results of the program components to ensure overall program quality is delivered.

The outputs from this activity may include:

- Quality assurance audit findings,
- Quality assurance standards reports, and
- Quality assurance change requests.

8.5.3 Program Quality Control

Program quality control is the activity of monitoring specific component project or component program deliverables and results to determine if they fulfill quality requirements that lead to adequate benefits realization. The quality control activity ensures that quality plans are implemented at projects levels, by the use of quality

reviews usually performed with constituent project management reviews. Quality control is performed throughout the duration of the program. Program results include products and services deliverables, management results and cost schedule, and performance, as well as benefits realized by the end user. End user satisfaction is a powerful metric that should be obtained to gauge the program quality. The fitness for use of the benefits, product, or service delivered by the program is best evaluated by those who receive it. To that end, programs often use customer satisfaction surveys as a quality control measurement.

Outputs from this activity may include:

- Quality change requests,
- Quality control completed checklists and inspection reports, and
- Quality test reports or measurement results.

8.6 Program Resource Management

Resource management at the program level is different than resource management at the component level; a program manager needs to work within the bounds of uncertainty and balance the needs of the components for which he or she is responsible. Program resource management ensures all required resources (people, equipment, material, etc.) are made available to the project managers as necessary to enable their projects to deliver benefits for the program.

Resources include people, office space, laboratories, data centers, other facilities, equipment of all types, software, vehicles, and office supplies. Some resources, such as office supplies, are consumed by the program and should be managed as an expense at the program level. The program manager should work to ensure all resources are accounted for and allocated appropriately to all components when needed.

The topics covered in this section along with their associated program management life cycle phase are as below.

Program Definition Phase:

8.6.1 Resource Planning

Program Benefits Delivery Phase:

8.6.2 Resource Prioritization

8.6.3 Resource Interdependency Management

8.6.1 Resource Planning

Resource planning is the activity of determining which resources are needed, when they are needed, and in what quantities, in order to allow the effective execution of all components. Resource planning involves identifying existing resources and the need for additional resources. In case of human resources, the sum of resources needed to successfully complete each component can be less than the total quantity of resources to complete the program. The program manager analyzes the availability of each resource and understands how it is allocated across components to ensure the resource is not overcommitted. Historical information may be used to determine the types of resources that were required for similar projects and programs.

If resources are unavailable within the program, the program manager calls upon the larger organization for assistance. If necessary, the program manager will work with the organization to develop a statement of work (SOW) to contract the necessary resources.

The outputs of this activity include:

- Program resource requirements, and
- Program resource plan.

8.6.2 Resource Prioritization

Resource prioritization allows the program manager to prioritize critical resources that are not available in abundance and to optimize their use across all components within the program. Frequently, this involves human resource planning to identify, document, and assign program roles and responsibilities to individuals or groups.

During program execution, the need for staff, facilities, funding, equipment, and other resources change. These fluctuations are similar to the economics of supply and demand. The program manager manages resources at the program level and works with the project managers who manage resources at the component level to balance the needs of the program with the availability of resources.

A program manager will often create a program resource plan that describes the use of scarce resources and the priority for which each component can plan for that resource.

The outputs of this activity include:

- Program resource priorities and
- Program resource plan.

8.6.3 Resource Interdependency Management

Resources are often shared among different components within a program, and the program manager should work to ensure that the interdependencies do not cause delay in benefits delivery. This is achieved by carefully controlling the schedule for scarce resources. The program manager ensures resources are released for other programs when they are no longer necessary for the current program.

The program manager may have to work with the component managers to ensure the program work breakdown structure (see Section 8.9.1) accounts for the timed use of interdependent resources when developing a schedule for scarce program resources.

The output of this activity includes the program resource plan.

8.7 Program Risk Management

A program risk is an event or series of events or conditions that, if they occur, may affect the success of the program. Positive risks are often referred to as opportunities and negative risks as threats. These risks arise from

the program components and their interactions with each other, from technical complexity, schedule and/or cost constraints, and with the broader environment in which the program is managed.

Risk monitoring involves tracking program-level risks identified in the program risk register and identifying new risks that emerge during the execution of the program, for example, unresolved component-level risks that demand resolution at the program level. Required actions may include determining if new risks have developed, current risks have changed, risks have been triggered, risk responses are in place where necessary and are effective, and program assumptions are still valid.

Risk control focuses on threats that could develop into actual problems, or issues, and opportunities that could add value to the program. Risk control involves implementing the actions and contingency plans contained in the risk response plan.

When risks remain unresolved, the program manager ensures that these risks are escalated progressively higher on the authority scale until resolution can be achieved. Program Governance and escalation procedures should be in place to allow risks to be assessed as necessary for possible impact across the organization.

Program risk situations, plans, and the status and effectiveness of ongoing or completed risk responses should be included in program reviews. All modifications resulting from reviews and other changes in risks should be entered in the risk response plan.

The program risk management activities include:

Program Definition Phase:

8.7.1 Program Risk Management Planning

Program Benefits Delivery Phase:

8.7.2 Program Risk Identification

8.7.3 Program Risk Analysis

8.7.4 Program Risk Response Planning

8.7.5 Program Risk Monitoring and Control

Although the activities are presented as discrete elements with well-defined interfaces, in practice, they may overlap and interact in ways not detailed here.

These activities and processes interact with program management supporting processes and activities throughout the duration of the program and with activities and processes at the component level, as described in the *PMBOK® Guide*.

8.7.1 Program Risk Management Planning

Program risk management planning identifies how to approach and conduct risk management activities for a program by considering its components. The risk management plan—the output of this activity—defines the approach to be used for managing risks.

Planning risk management activities ensures that the level, type, and visibility of risk management are appropriate for the risks and importance of the program to the organization. It identifies the resources and time required for risk management activities. In addition, it establishes an agreed-upon basis for evaluating risks.

The program risk management planning activity should be conducted early in the program definition phase. It is crucial for the successful performance of other activities described in this section. It may also need to be repeated whenever major changes occur in the program.

It is essential to define risk profiles of organizations to construct the most suitable approach to managing program risks, adjusting risk sensitivity, and monitoring risk criticality. Risk targets and risk thresholds influence the program management plan. Risk profiles may be expressed in policy statements or revealed in actions. These actions may highlight organizational willingness to embrace high-threat situations or its reluctance to forego high opportunity choices. Market factors that apply to the program and to its components should be included as an environmental factor. The culture of the organization and stakeholders also play a role in shaping the approach to risk management.

Organizations may have predefined approaches to risk management such as risk categories, common definition of concepts and terms, risk statement formats, standard templates, roles and responsibilities, and authority levels for decision making. Lessons learned from executing similar programs in the past are also critical assets to be reviewed as a component of establishing an effective risk management plan.

The output from this activity includes the program risk management plan.

8.7.2 Program Risk Identification

The program risk identification activity determines which risks might affect the program, documents their characteristics, and prepares for their successful management. Participants in risk identification activities may include the program manager, program sponsor, program team members, risk management team, subject matter experts from outside the program team, customers, end users, project managers, managers of other program components, stakeholders, risk management experts, and external reviewers, as required.

Risk identification is an iterative activity. As the program progresses, new risks may evolve or become known. The frequency of iteration and involvement of participants may vary, but the format of the risk statements should be consistent. This allows for the comparison of risk events in the program. During risk identification, each program team member forecasts the outcomes of current strategies, plans, and activities, and exercises their best judgment to identify new risks. It is important to include contextual information that narrates how or why the risk may affect the program's success; the identification activity should provide sufficient information to allow the risk to be analyzed and prioritized.

Program files from previous programs may be used to gather information. This includes actual data and lessons learned. These data may also include or lead to the generation of templates to document the risk statements.

The output of this activity includes the program risk register.

8.7.3 Program Risk Analysis

Risk analysis at the program level should integrate relevant program component risks. Managing the interdependencies among the component risks and the program provides significant benefits to the program and the projects.

Both the qualitative and quantitative risk analysis techniques are useful to support program management decisions. This step in the risk management activity produces the best information supporting the contingency reserve and management reserve that should be set aside to deal with risks that actually occur (see Section 8.7.4). The assessments should include costs, schedules, and performance outcomes for the component projects as well as their interdependencies. This is necessary when the project objectives are not based on full-cost estimates. Life cycles should include transition to operations, maintenance, and other recurring costs during the utilization of project products and closure activities. For programs, the life cycle over which risks are managed may include an entire product life cycle or the life cycle of a services group.

The impact of the negative risks (threats) and positive risks (opportunities) on the achievement of benefits and delivery of value to the organization should be considered at the program level. One essential difference between programs and projects is the time scale; project level risks should be dealt with within a relatively short time frame (i.e., at the end of a phase or a project), while program risks may be applicable at a point in the potentially distant future.

Additionally, in long-running programs, it is important to establish a management process that leads to an increase in opportunities over time, using common innovative management methods. A systematic engagement of project teams and stakeholders and a budget for opportunity development may not only lead to improvements in projects, but also to the addition of projects or replacement with more effective ones (with respect to benefits generation) than initially planned when the program was started. This program innovation strategy, which is built into the program definition or as a component of the program management plan, should be dimensioned and budgeted to compensate for threats and efficiency losses through the changing environment over time, that is, it becomes more important as the program environment changes at a faster rate and the program runs longer.

The program management team should not assume the authority and responsibilities of the component level management team by managing risks that should be managed at the component level. Component managers manage project level risks. They are escalated to the program level only when (1) project level risks cannot be resolved by the project management team at the component level, or (2) project level risks would be managed more effectively at the program level because they affect more than one project or require a higher level of authority to be resolved. Risks are further analyzed at the component level to determine if they will have an impact outside of the component. Risks escalated to the program level may be managed at the component level upon analysis by the program management team.

The program management team assists risk analysis by providing an environment conducive for effective risk management of its components. Five factors are crucial:

- **Availability of information.** Providing an effective means of storing and retrieving information on the projects, stakeholders, environmental characteristics, and other information.

- **Availability of resources.** Maximizing and coordinating the effective use of resources. The program management team negotiates with the executives who control the funds and other resources, such as human resources, infrastructure, information, and applications.
- **Time and cost.** Providing the long-term view for effective project scheduling at a macro level and managing reserves to take into account the effects of individual project failures or shortfalls.
- **Quality of Information.** Ensuring risk analysis is based on reliable, verifiable information. Ensuring additional time and effort is available to validate the quality of the data, if necessary.
- **Control.** Devising mechanisms to keep apprised of work that is outside the direct control of project teams, to which they are dependent. This may include regular and effective communication by establishing command and control channels between components and with other programs.

The program management team and risk managers should continually be aware of, and manage, these five factors.

The outputs of this activity include:

- Updated risk register, and
- Periodic risk reports showing threat and opportunity key performance indicator trends.

8.7.4 Program Risk Response Planning

The program manager identifies risks that can threaten the program existence and develops a mitigation plan, such as environmental changes or governmental policies and regulations. The program manager may hold contingency reserves as response risk at the program level. The program contingency reserve is not a substitute for the component project contingency reserve, which is held at the component level.

Components of the program risk register that may be updated at this point include:

The outputs of this activity include:

- Definitive response plans,
- Risk register updates,
- Contingency budgets, and
- Change requests (if required).

8.7.5 Program Risk Monitoring and Control

Planned risk responses should be continuously monitored for new and changing risks. Program risk monitoring and control is the activity of identifying, analyzing, and planning for new risks; tracking identified risks and those on the watch list; and reanalyzing existing risks. It includes monitoring trigger conditions, contingency plans, residual risks, and evaluating the effectiveness of risk responses. Monitoring reduces the impact of a threat and maximizes the impact of an opportunity by identifying, analyzing, reporting, and managing risks on a continuous basis. Risk monitoring and control is an ongoing activity for the duration of the program.

Risk monitoring is also conducted to determine if:

- Program assumptions are still valid;
- Assessed risk has changed from its prior state, with analysis of trends;
- Proper risk management policies and procedures are being followed; and
- Cost or schedule contingency reserves are modified in line with the risks of the program.

The key outputs of this activity include:

- Timely execution of a risk response when a risk event occurs,
- Monitoring the effects of the response with further action if required,
- Documented lessons learned, and
- An updated risk register.

8.8 Program Schedule Management

The program schedule management activity determines the order and timing of the components needed to produce the program benefits, estimates the amount of time required to accomplish each one, identifies significant milestones during the performance of the program, and documents the outcome. It includes determining the order

Once the component schedules are developed, the program master schedule may need updating. Throughout the program, there is interplay between the program and component schedules. Interdependencies between program components, key component milestones from projects, and non-project component milestones are all tracked at the program level to assess whether or not the program is on track to deliver program benefits as agreed upon and approved with the stakeholders.

While project managers concentrate on managing their project's deliverables to a baseline schedule, program managers concentrate on coordinating all of the component schedules within the program and integrating them to ensure the program itself completes on schedule. Rather than manage the details of any single project component, the program manager concentrates on the integration of each component project into the program master schedule and on the timely delivery of the program level components.

The dependencies among the various components have a significant impact on the overall schedule. A late completion of one component may impact other dependent components or integration activities. Early completion of a component may also present a program schedule challenge, requiring the program manager to address and resolve the gap between expected and actual completion of the component as well as its impact on other components, or may present an opportunity for early starts on other components, and may lead to early benefits delivery or enhanced benefits delivery. The topics covered in this section are presented along with their associated program management life cycle phase as follows:

Program Definition Phase:

8.8.1 Program Schedule Planning

Program Benefits Delivery Phase:

8.8.2 Program Schedule Control

These activities and processes interact with the program management supporting processes and activities throughout the duration of the program and with activities and processes at the component level, as described in the *PMBOK® Guide*.

8.8.1 Program Schedule Planning

Program schedule planning begins with the scope management plan and the program work breakdown structure whereby the program components that produce the program benefits are identified. The major program-level milestones and the order in which the components should be delivered are determined. The initial program master schedule is often created before the detailed schedules of the individual components are available. The program's delivery date and major milestones are developed using the program roadmap and the

The program master schedule should also include activities that are unique to the program including, but not limited to, activities related to stakeholder engagement, program-level risk mitigation, and program-level reviews. The program master schedule determines the timing of individual components, enables the program manager to determine when benefits will be delivered by the program, and identifies external dependencies to the program. The first draft of a program master schedule often only identifies the order and start/end dates of components. Later, it may be enriched with more intermediate component results as the component schedules are developed. Once the high-level program master schedule is determined, the dates for each individual component are identified and used to develop the component's schedule. These dates act as a constraint at the component level. If a component has multiple deliverables upon which other components rely, those deliverables and interdependencies should be reflected in the overall program master schedule.

The scheduling principles outlined in the *PMBOK® Guide* should also be applied to the program master schedule. Maintaining a logic-based program network diagram and monitoring the critical path for components with dependencies is essential to effective management of the program master schedule, while focusing on benefits realization based on deliverables along the critical path.

Figure 8-1 provides a notional overview of a program delivering benefits through projects and components:

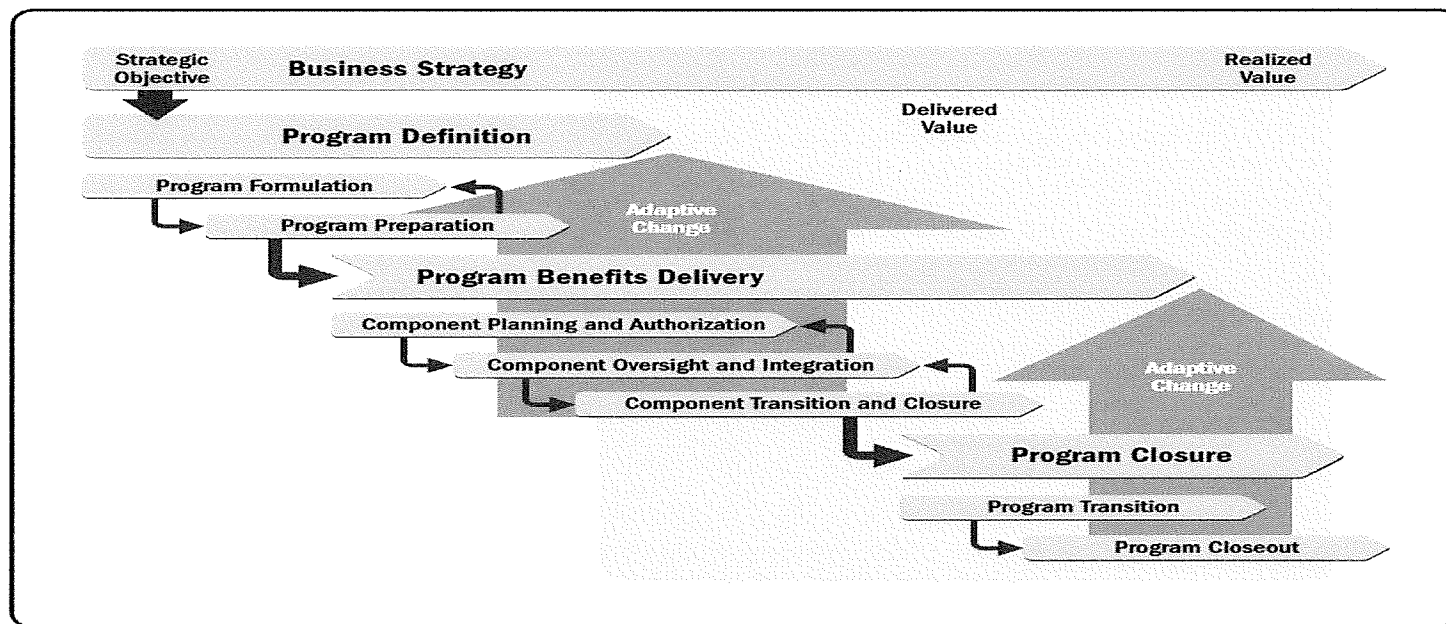


Figure 8-1. Notional Program

In addition to producing the program master schedule, this activity normally creates a plan by which the schedule is managed throughout the duration of the program. This is the schedule management plan, which becomes part of the program management plan. The program schedule management plan identifies the agreed-upon sequence of component deliverables to facilitate effective planning of the individual component deliveries. It provides the program team/stakeholders with the plan on how the program is going to be managed throughout the duration of the program and establishes a common set of standards to be applied across all components. The program may establish schedule standards that apply to all program components. These schedule standards may be included in the program's schedule management plan. It is a living document and provides the program manager with a mechanism to identify risks and escalate component issues that may affect the program goals.

Program schedule risk inputs are identified as part of the program master schedule development and should be incorporated into the program risk register. These risks may be a result of component dependencies within the schedule or on external factors identified as a result of the agreed program schedule management plan.

The program roadmap should periodically be assessed and updated to ensure alignment between the program roadmap and the program master schedule. Changes in the program master schedule might require changes in the program roadmap, and changes in the program roadmap should be reflected in the program master schedule.

The outputs of this activity include:

- Program schedule management plan,
- Program schedule standards,
- Program master schedule,
- Inputs to the program risk register, and
- Updates to the program roadmap.

8.8.2 Program Schedule Control

Program schedule control is the activity of ensuring the program produces the required capabilities and benefits on time. This activity includes tracking and monitoring the start and finish of all high-level component and program activities and milestones against the program master schedule planned timelines. Updating the program master schedule and directing changes to individual project schedules is required to maintain an accurate and up-to-date program master schedule.

Program schedule monitoring and control works closely with other program activities to identify variances to the schedules and directs corrective action when necessary and as described in Section 8.3.4 on Program Execution Management. Successful program management is dependent upon the alignment of program scope with cost and schedule, which are dependent on each other. Schedule control involves identifying not only slippages but also

within the schedule to achieve program goals. Identification of both slippages and early deliveries are necessary as part of the overall program management function. Identification of early deliveries may provide opportunities for program acceleration. Approval of deviations to component schedules may be necessary to realize program benefits as a result of component performance deviations. Due to the complex nature and duration of programs, the program master schedule may need to be updated to include new components or remove components as a result of accepted change requests to meet evolving program goals. The program roadmap should be assessed for potential revision when there is significant change in the program master schedule.

The program schedule monitor and the control of the program master schedule activity include updates to the program master schedule, updates to the program roadmap, and identification of schedule risks as outputs to the activity.

The outputs of this activity may include:

- Updates to the program master schedule,
- Updates to the program risk register, and
- Updates to the roadmap.

8.9 Program Scope Management

Program scope defines the work required to deliver a benefit (major product, service, or result with specified features and functions) at the program level. Program scope management includes all of the activities involved in planning and managing the program's scope. Scope management aligns the program scope with the program's goals and objectives. It includes work decomposition into deliverable component products designed to deliver the associated benefits.

The scope definition activity starts with the program charter that outlines the program goals and objectives, the program scope statement, and the benefits realization plan. This input can be obtained from program sponsors or stakeholders through the portfolio management or stakeholder alignment activities. The objective of program scope management is to develop a detailed program scope statement, break down the program work into deliverable components, and develop a plan for managing the scope throughout the program. The scope management activities are:

Program Definition Phase:

8.9.1 Program Scope Planning

Program Benefits Delivery Phase:

A change management activity should be established to administer scope change. This activity should establish program policies and procedures that include an approach for capturing requested changes, evaluating each requested change, determining the disposition of each requested change, communicating a decision to impacted stakeholders, documenting the change request and supporting detail, and authorizing funding and work. When change requests are accepted and approved (see Sections 6.2.8 and 8.3.2), the program management plan and program scope statement are updated.

The program manager is responsible for determining which components of the program are affected when a program scope change is requested and should update the program work breakdown structure accordingly. In very large programs, the number of components affected may be substantial and difficult to assess. Program managers should restrict their activities to managing scope only to the allocated level for component projects and should avoid controlling component project scope that has been further decomposed by the project manager. Scope management within a component project should follow the activities defined in the *PMBOK® Guide*.

The outputs of the program scope control activity include:

- An updated program scope statement,
- Dispositions of requests with documentation of the rationale for the decision, and
- An updated program work breakdown structure.

8.9.1 Program Scope Planning

At the start of the program, the program manager ensures that the context and framework of the program are properly defined, assessed, and documented in the form of a program scope statement. Program stakeholders should verify and approve the program scope statement. The program scope statement establishes the direction taken and identifies the essential aspects that will be accomplished.

Program scope is typically described in the form of expected benefits but may also be described as user stories or scenarios depending on the type of program. Program scope encompasses all benefits (products and services) to be delivered by the program, which are reflected in the form of a program work breakdown structure.

A program work breakdown structure is a deliverable-oriented hierarchical decomposition encompassing the total scope of the program, and it includes the deliverables to be produced by the constituent components. Elements not in the program work breakdown structure are outside the scope of the program. The program work breakdown structure includes, but is not limited to, program management artifacts such as plans, procedures, standards, processes, major program milestones, program management deliverables, and program management office support deliverables. The program work breakdown structure provides an overview of the program and shows how each component contributes to the objectives of the program. Decomposition stops at the level of control required by the program manager (typically to the first one or two levels of a component project). The program work breakdown structure serves as the framework for developing the program schedule and defines the program manager's management control points. It is an essential tool for building realistic schedules, developing cost estimates, and organizing work. It also provides the framework for reporting, tracking, and controlling.

Program level deliverables should focus on those activities associated with stakeholder engagement, program level management (as opposed to management within its component projects), and component oversight and integration. Program scope includes scope that is decomposed and allocated into component projects. Care should be taken to avoid decomposing component level scope into details that overlap the project managers' responsibilities.

Once the scope is developed, a plan for managing, documenting, and communicating scope changes should be developed during the program definition phase.

The outputs of this activity include:

- Program scope statement,
- Program scope management plan, and
- Program work breakdown structure.

8.9.2 Program Scope Control

It is important for the program manager to address and control scope as the program develops in order to ensure successful completion. Scope changes that have significant impact on a component and/or the program may originate from stakeholders, components within the program, previously unidentified requirements or architecture issues, and/or external sources.

THIRD EDITION CHANGES

X1.1 About this Appendix

To fully appreciate the changes that have been made to the structure and content of *The Standard for Program Management*—Third Edition, it is important for the reader to be aware of the update committee's objectives as well as the approach that was taken for the development of the revision to this standard.

Through the planning and chartering process, it became clear that the growing importance of program management as an organizational competency was generating an increasing demand for clearer lines of distinction between *The Standard for Program Management* and PMI's other core standards, including *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, *The Standard for Portfolio Management*, and *Organizational Project*

- **Support alignment among PMI's core standards.** This objective ensures that each of PMI's core standards addresses fundamental concepts in the same way, and that the approach to these concepts is harmonized and shared among the active standards development efforts.

- **Second Edition:** The second edition of *The Standard for Program Management* retained some discussion of the three program management themes described in the first edition. Many of the updates, however, focused on expanding the presence of the program management life cycle. This approach positioned the program management life cycle as the predominant thread throughout the entire standard document. In addition, a structure for the standard was adopted that mirrored the layout and format of PMI's project management standard, the *PMBOK® Guide*. Within this structure, the program standard described specific program management Process Groups and Knowledge Areas. The second edition also included an additional convention that mirrored the

X1

Considering the previous two editions, emphasis for the third edition was on usefulness and readability. Careful analysis of the most effective elements of the earlier editions resulted in a decision to change from the second edition's structure that paralleled the *PMBOK® Guide's* Process Groups, Knowledge Areas, and Inputs/Tools and Techniques/Outputs in favor of the domain-oriented presentation of the first edition.

X1.3.2 Program Management Content

content. In addition, the outline and content were presented at three standards working sessions at PMI Global Congresses held throughout the world, where additional feedback and discussion further advanced the development effort.

X1

X1.3.6 Organizational Representatives

To balance the make-up of the project committee and to fully reflect the presence of program management practice as an organizational competence on a global scale, six organizational program management executive representatives were invited to participate as leadership members of the project committee's Core Committee to complement the individual practitioners who were also Core Committee members. These representatives, invited

follow. A high-level view of the framework for the third edition illustrates the orientation toward the performance of programs in organizations and includes discussions for each of the performance domains. By approaching the standard in this way, each section contributes to the content of the document as a complete thought; yet, each is an integral component of the whole, tying and linking the standard together from the initial section through the glossary. At the highest level, the framework for the third edition is illustrated in Table X1-1.

<i>The Standard for Program Management—Third Edition</i>	
High-Level Framework	
Section 1	Introduction
Section 2	Program Management Performance Domains
Section 3	Program Strategy Alignment
Section 4	Program Benefits Management
Section 5	Program Stakeholder Engagement
Section 6	Program Governance
Section 7	Program Life Cycle Management
Section 8	

Sections X1.4.1 through X1.4.8 describe each section of the standard and detail the changes the reader will find when comparing the second and third editions.

X1.4.1 Introduction

Sections 1.2, 1.4, and 1.6 were realigned and harmonized with the first sections in the *PMBOK® Guide* and *The Standard for Portfolio Management*. This harmonization ensures the information regarding the relationships between projects, programs, and portfolios are treated consistently across all three standards. Section 1.4 was revised to clarify the relationship between programs and portfolios, whereas the discussion of the program management office in Section 1.5 was removed and replaced by a harmonized discussion of the relationships among program management, operations management, and organizational strategy. Discussions of the program management office in Section 1.5 were largely removed from this edition of the standard to reflect the fact that many widely divergent views exist today about the appropriate construct and purpose of the program management office, and acknowledges the extensive literature that now exists on the purpose, configuration, and value of the program