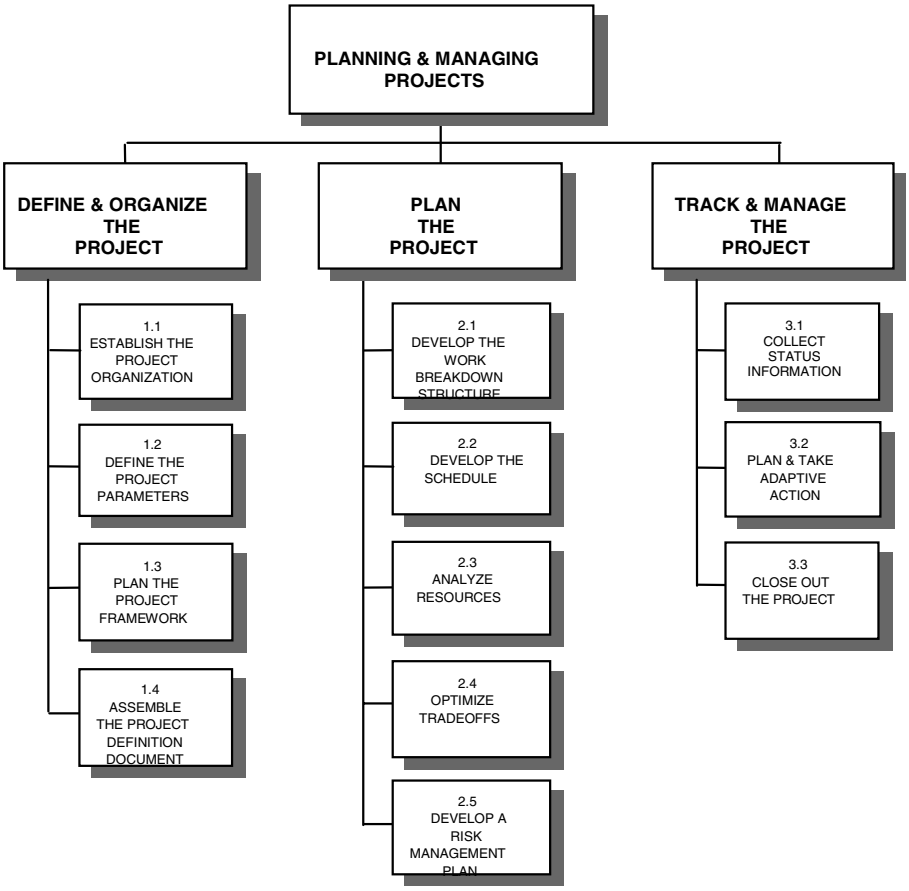
Project Management Manual



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Brief History of Project Management

Imagine that you are commissioned to complete a sophisticated worldwide market study that will form the basis of an important customer's global expansion strategy; or charged to develop the product that will determine whether your firm is able to go public. Or that you are made responsible for handling your firm's merger. If your task is attended by a strict budget and precise schedule, you are involved in a project—precisely, in *managing a project*. You are responsible for deliverables that must be completed according to a usually aggressive schedule and within a usually fixed budget.

This module will introduce to you a set of techniques and processes that has evolved to help people efficiently manage the undertakings associated with the fulfillment of projects.

The Origins of Project Management

"Work" was first scientifically studied by Frederick Taylor (1856-1915), who was the first to consider process design. But not until the early 1950s were project management techniques assembled into a single, coherent system. The focus of that enormously complex effort was the U.S. Defense Department's development of the Polaris missile. The entire set of techniques, including the charting methodology developed by Henry Gant to manage Army logistics, was essential to managing the intricacies of scheduling and handing off work among an array of specialists. At the center of this effort was a project "war room" in which were prominently displayed huge Program Evaluation Review Techniques (PERT) charts.

Following quickly in the military's footsteps were the automotive and movie industries, private and public engineering organizations, all of which found that project management techniques helped cross-functional teams define, manage, and execute the work needed to realize unique outcomes. Early practitioners of project management not only employed such techniques as histograms and network diagrams but also the concept of a project life cycle and began to incorporate that thinking into the generation of complex Work Breakdown Structures (WBSs) that comprehensively identified the *individual tasks* required to achieve an objective.

New project management techniques, such as those used for creating cross-functional schedules, managing shared resources, and aligning project portfolios, together with the widespread use of personal computers and growing sophistication and availability of project management software tools have improved the effectiveness of a *methodology* for addressing a variety of project problems.

The Emerging Importance of Projects

In the face of powerful competitive pressures to manage and reduce product cycle times and respond to the globalization of many markets, projects are increasingly recognized to be the key link between an organization's strategic goals and the tactical work performed by its discrete functions. Consequently, industries as diverse as computer manufacturing, consulting services, pharmaceuticals, photography, and natural resource management have aggressively implemented project management. These industries, and a myriad of others, are using project management as a way to better understanding both customer requirements and how best to meet them. Ultimately, project management has a potent effect on a firm's bottom line.

An international study found that "when companies increased their pre-development emphasis, they increased the predictability of successful new product commercialization by a 2-to-1 ratio." That

is to say, when pre-development activities—primarily project definition and planning—increased, so did the likelihood of product success. Differentiating factors included the following:

- "Winners spent more than twice as many resources on pre-development activities as did losers.
- Seventy-one percent of new-product development was delayed due to poor definition and understanding of customer requirements.
- Changing product requirements induced more delays in product development than any other cause" (Boznak, 1994).

Project management affects the bottom line by helping cross-functional teams work smarter. It enables them to better draw upon the individual strengths of team members by providing an efficient infrastructure for defining, planning, and managing project work regardless of the structure of the organization. Because it channels specialization into clearly defined cooperative and contributory activities and clarifies ambiguous roles and responsibilities, project management is particularly useful in specialized functional and highly matrixed environments. Karl Wiegers (1994) observed:

> Team members derive value from the summary data for project planning, estimation of tasks, and identifying improvement opportunities, such as activities that ought to have more (or less) time devoted to them. The data provides a quantitative understanding of the group's development process as well as a way to monitor of the process over time. It has been enlightening to many team members to compare where they think they spend their time with where they actually spend their time.
>
> "Successful firms," according to Bowen et al. (1994), "have mastered the art of melding the power of human will and organization. But the key to their vitality is their world-class capabilities in selecting, guiding, and completing development projects, which are the building blocks of renewal and change. The companies that can repeat this process again and again have discovered the manufacturer's perpetual motion machine."

Further examples of the impact of project management include two unpublished studies conducted by Integrated Project Systems in which one computer manufacturer earned a 500% return on investment by creating a project plan template for repetitive projects and another an estimated 900% return on investment through early cancellation of a troubled project. ROI on the implementation of project management appears to be significant.

Project Management Process Overview

Project management is a formal management discipline whereby projects are planned and executed according to a systematic, repeatable, and scaleable process. A project is defined as

> **A unique set of activities meant to produce a defined outcome within an established time frame using specific allocation of resources.**

Because a project is bounded by its results, time, and resources, it is often necessary to make tradeoffs among results, time, and resources, the three elements (or "parameters") by which a project is bound. *Thus, project management is the process of developing substantive, systematic data about each parameter in order to maximize the effectiveness of the tradeoff decision.* The project management process is itself a series of steps typically represented by a "project management process model."

The model used at HBS for project management, depicted in **Figure A**, consists of three global sets of activities (*Define and Organize*, *Plan*, and *Track and Manage*). Within these sets of global activities are the specific steps for defining, planning, and managing the project.

1. Define and Organize the Project

The success of a project is usually determined by the clarity of its objectives and how well team members coordinate project activities. We assume, therefore, that to effectively complete a project we need to know the objectives, the people who will work as a team to achieve them, and the manner in which they will be carried out. Much lies behind this assumption.

Notwithstanding universal agreement across industries, it is essential to define the objectives and organization before beginning a project. An astounding proportion of projects fail because the desired outcome is poorly defined and the organization and procedures to accomplish it are ill understood. With dismaying frequency, people complete the "wrong" project, producing at best a somewhat less than desired result or, at worst, completely wasting time and resources. Tales of unclear assignments, unproductive meetings, poor communication, and interpersonal conflict, being rampant in most project environments, suggest that even a small amount of time spent clearly defining and organizing project might be expected to generate tremendous benefits. The key steps are *Establish the Project Organization*, *Define the Project Parameters*, *Plan the Project Framework*, and *Assemble the Project Definition Document*. These define the "who," "what," and "how" of a project. These steps are treated in detail in subsequent sections.

2. Plan the Project

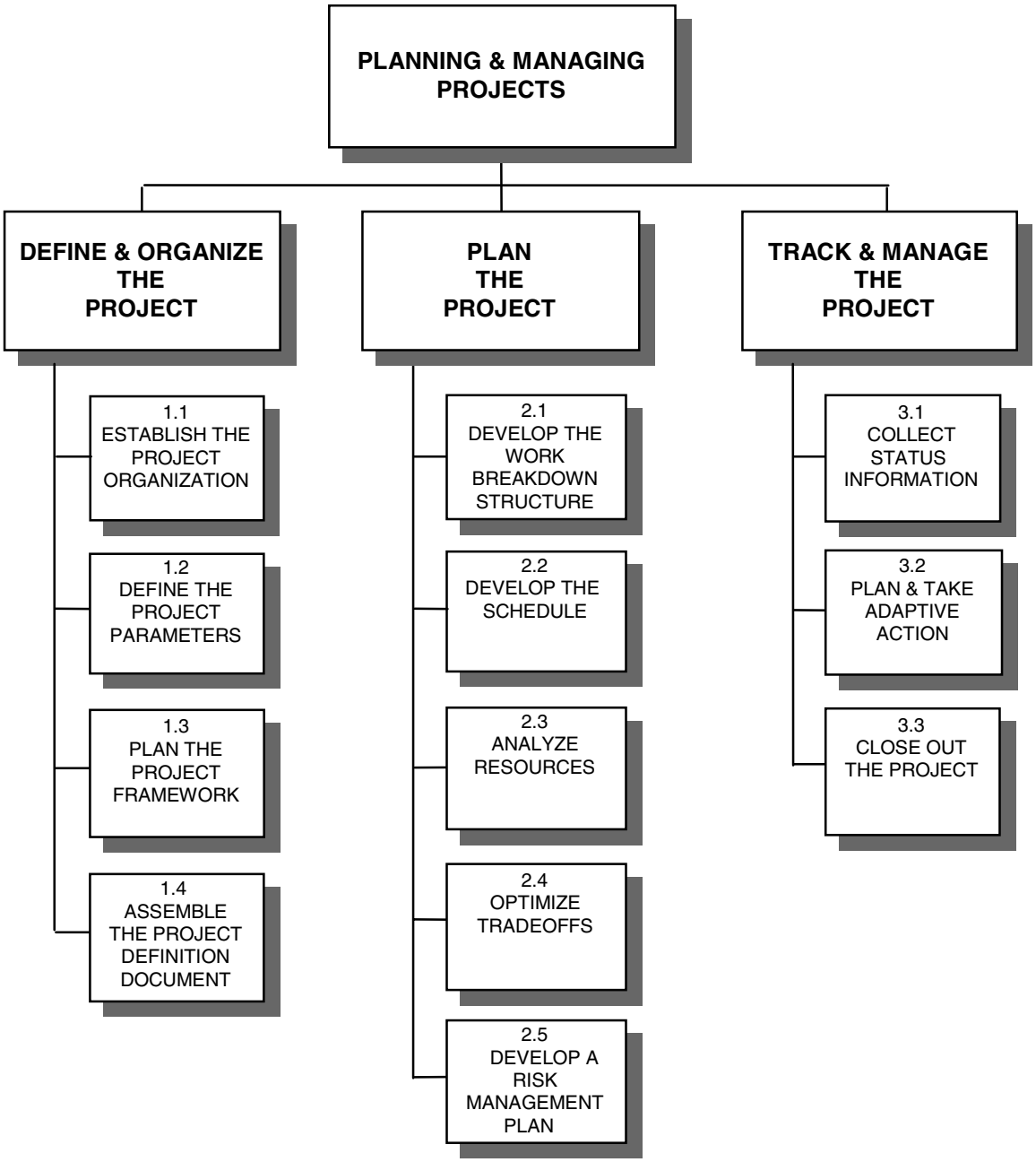
A source of considerable conflict in nearly every project is the tension between the time frame established for completing the project and the risks involved in compressing it. A *credible* project plan takes account of both the demands of managers outside the project team for as aggressive a schedule as possible and the awareness of those on the project team of the difficulties of the task at hand.

A credible project plan based on a reliable, systematic process enables senior managers to understand and trust the schedule and make better management decisions about project tradeoffs. Because it had both a credible schedule and a risk management plan, a consulting firm, in close cooperation with its client, was able to systematically narrow the scope of its reengineering initiative when it learned that the effort would miss a critical corporate date. Important to the particular effort, this flexibility saved the relationship between the firm and its client.

Unreliable, unpredictable schedules, based on guesswork, top-down pressure, or failure to account for risk often invite financial disaster. When a poorly conceived schedule caused a company's new product to be announced prematurely, purchases of the old product dried up 18 months before the new product was ready. The result? The company, which had been first in market share prior to the announcement, experienced *10* consecutive quarters of losses and dropped to third in share.

A systematic planning process provides the specific data for the decision makers' need to be effective. The key steps in this set of activities—*Develop the Work Breakdown Structure*, *Develop the Schedule*, *Analyze Resources*, and *Develop Risk Management Plans*—enable a project manager and team to identify the tasks required to meet the project objectives, their optimal sequence, duration of each (and of the project overall), how resources will affect the schedule, and what major risks the project entails. These steps ensure that all members of the team are acquainted with the tasks and schedules of their teammates as well their own project work. Each is treated in detail in a subsequent section.

Figure A Project Management Process Model



3. Track and Manage the Project

"Managing the plan" seems a simple enough notion, yet too often as soon as the plan is done (if a plan is done) project management typically ceases as the impulse to "get the work done" takes over. As the project gains momentum, team members find it easier to work on discrete tasks that produce tangible results than to manage an intangible process. But by not tracking the project, both project manager and team miss the opportunity to collect critical project data and take timely actions that will be crucial to success. An inability to control a project diminishes a team's authority and status. Conversely, tracking and managing a project, albeit often viewed by project personnel as "extra work," enhances control over a project and, thereby, the status and authority of the project management and team members.

A credible plan achieves efficiencies by making it possible to know, with great precision and little bureaucratic overhead, what project work has been completed, what *planned* work still needs to be done, and what actions might be dictated by the natural dynamics of project work. It generates further efficiencies by facilitating the systematic tracking and management of project work against the benchmark of original expectations. This is possible because tracking provides specific data to support focused, discrete interventions.

The key steps in tracking and managing a project—*Collect Status Information*, *Plan and Take Adaptive Action*, and *Close Out the Project*—focus project managers on the information needed to keep key participants informed of progress, realign the project effort if necessary, and use the learning from one project to improve the performance of the next. These steps are treated in detail in subsequent sections.

Key Process Points

The process model depicted in **Figure A**, although presented linearly, should be conceptualized cyclically; it is meant to be iterative and self-checking. For example, if the schedule in the *Develop the Schedule* step exceeds the schedule objective established in the *Define the Project Parameters* step, it might be appropriate to return to and modify the objective or to change the definition of a major deliverable to shorten the schedule. Similarly, Specification of Task sequences in the *Develop the Schedule* step often highlight omitted tasks, causing an iteration back to the *Develop the Work Breakdown Structure* step. The process model naturally checks and promotes the increasing refinement of the plan with a correlated increase in its reliability and credibility.

We now elaborate the process model's three sets of global activities and their constituent steps.

1. Define and Organize the Project

1.1 Establish the Project Organization

Knowing who is to do what is essential in any project. The *Establish the Project Organization* step ensures that all roles and responsibilities are clearly understood and all members of the team are identified and committed to the project effort. In particular, this step assures that the authority and responsibilities of a designated leader (the project manager) are delineated.

Key Questions for *Establish the Project Organization*

- Who is the project manager?
- What are the project manager's responsibilities?
- In which areas does the project manager have decision-making authority?
- Have the project manager's responsibilities and authority been agreed to, written down, and distributed to the team?
- Who is on the team?
- What is each team member's expertise?
- Is everyone who is performing work for the project identified?
- What are the team's responsibilities?
- Has a team roster been completed?
- Who sponsors the team? To whom does it report?

The official beginning of most projects is signaled by the designation of a project manager. The best project managers are

- good motivators and leaders, coaches, and teachers;
- "big picture-oriented";
- effective communicators;
- good organizers;
- goal-oriented;
- knowledgeable about and committed to the use of project management procedures.

Effective project managers do not have to be technical specialists. Indeed, specialization can impede project management to the extent that a technical specialist becomes involved primarily in the content of the project and loses focus on managing the process. Effective project management unleashes the *team* to do the content work.

In particular, the project manager is responsible for seeing that the project management process as elaborated in **Figure A** is effectively executed. This entails

- assuring that team members understand and practice project management;
- assuring that all team members understand and accept their responsibilities;
- keeping team resources focused on developing and executing the plan;
- making timely adjustments to the plan;

- maintaining the project file;
- arbitrating and resolving conflicts;
- reporting on project status to team members and others;
- maintaining an issues log.

Project managers should be officially announced—and their roles and responsibilities completely described—in writing. The announcement should emanate from senior management and stipulate the project manager's authority to resolve disputes between team members or to declare "breakdowns" that invoke assistance from others with authority.

Example: A "mission critical" project for a television production equipment division of a *Fortune* 500 company was slipping and would miss the market window. Senior corporate management threatened that the division would be closed and all personnel laid off if the project was not completed by the specified date.

Analysis of the project revealed that the project had "leads" (i.e., people representing different functions, such as marketing, engineering, manufacturing, etc.) but no single project manager. The project leads, who reported to their respective functional managers, each of whom held a different view of the project's priority and expected outcomes, were having an extremely difficult time agreeing on objectives, resolving issues, establishing schedules, and managing hand-offs between functions. With no one person in charge, the project was in utter chaos.

Once senior management recognized the problem, the division vice president formally appointed a well-regarded manager as project manager with explicit authority to resolve differences. After aggressively informing all leads that further conflict was unacceptable, the project manager led a two-day planning workshop, during which he and the team clarified and refined the project objective, agreed upon a revised project schedule, and developed and approved an issues-management process. Rigorous exercise of project management brought completion six weeks ahead of the project deadline.

To ensure that all work is "owned" by someone and that redundant work and role conflict are minimized, the project team should also be clearly identified and assigned specific roles and responsibilities. Everyone who performs work for a project should be included on the project team, recognizing that some will perform considerably more work than others. Primary responsibilities of the project team include

- understanding project management processes and tools;
- helping to create the project plan;
- being committed to the project's success;
- performing project tasks;
- reporting on progress, risks, issues, and problems;
- adjusting effectively to project changes.

A Project Team Roster (**Figure B**) should be completed for each project. This powerful tool, which identifies team members and their roles and responsibilities, provides a convenient and efficient way to maintain logistical information, such as telephone numbers and e-mail addresses. Typically, when a team roster is first completed the team is surprised by the number of different people and roles involved in the project, the extent of redundancies, and how some key responsibilities have been overlooked. Completing a roster forces members to more comprehensively define their team. A team roster should be completed for every project.

Figure B Project Team Roster

Name & Title	Role(s)	Organization	Phone & Fax Numbers	E-Mail Address	Location/ Maildrop

Example: The project manager for a large, complex software development project was feeling overwhelmed by the amount of work he faced. Although constantly racing between meetings and communicating with diverse groups, he was being increasingly criticized for leaving key people and departments out of his communication. An analysis of his situation indicated that he did not know who was actually participating in the project.

Upon completing a team roster, in response to the analysis, he discovered that he was dealing with 64 different departments and more than 200 people! He had been trying to manage the project by, in effect, "brute force," with few designations of team responsibilities. Once the team roster was completed and he was able to impose more structure on the project, he explicitly defined a core team of 12 people with responsibilities for representing the other functions and people. The team became much more effective and soon produced a drastic and timely re-scoping of the project.

Key Questions for *Establish the Project Organization*

- Appoint, in writing, a project manager.
- Describe, in writing, the project manager's role, authority, and responsibilities.
- Identify and assign roles and responsibilities to the project team.
- Create and publish a team roster.

1.2 Define the Project Parameters

Perhaps the most important element of any project plan is knowing its objectives and deliverables. The *Define the Project Parameters* step ensures that energies are expended on the "right" project, defined in terms of expected outcomes or scope, schedule, and allocated resources. This data is captured in the *Project Objective Statement* (POS) and *Major Deliverables*, both of which include the powerful "Is/Is Not" process.

The first pass at these data establishes preliminary targets—a project's components which should not be finalized until substantive information about the feasibility of achieving the objectives is made available in the complete detailed plan, including the risk management component.

Key Questions for *Define the Project Parameters*

- What is the scope of the project?
- When will the project be completed?
- What resources will be allocated to the project?
- Is there a clear, concise *Project Objective Statement* of 25 words or less?
- What are the project's major deliverables or outcomes?
- Are the major deliverables well defined?
- Is there a written "Is/Is Not" list for each major deliverable?
- Do the major deliverables have target completion dates?

The *Project Objective Statement* (POS) establishes a project's scope, schedule, and resources. All POS's should include these three parameters.

The desired results are articulated in the scope portion of the POS. The scope of NASA's Moonshot project was "Put a man on the moon and return him safely." Were this to have been omitted (e.g., the part about returning him safely), the project could have accomplished the defined result (put a man on the moon) but would hardly have been perceived as successful. To be effective, the scopes statement must capture the essence of the successful outcome.

The schedule portion of the POS establishes the desired completion date (only a target until the full schedule is developed) for the project. The schedule portion of the Moonshot POS was "by the end of the decade." While this captured people's imagination, as a schedule target for a project it would be too vague. "By the end of the decade" could mean a year early, or six months early, or the very last day of the decade. Similarly, schedule targets such as "by Q2, 1998" might be interpreted by some to mean the beginning, by others the end, of the quarter. A precise date, such as "by June 30, 1998," should always be used for the schedule component of the POS.

A project's resource allocation is specified in the the resources portion of the POS. It is often represented as a dollar figure (e.g., "at a cost of $3M"), a figure in person months or full-time equivalents (e.g., "using 32 person months"), or some combination thereof. The resource portion of

the Moonshot POS was $531M in 1961 and $7B-$9B by the end of the decade. It is important that the metric used be commonly accepted in the relevant environment. Beware statements such as "with existing resources," which presumes resources to be available, that might not. Nor do such statements provide useful information for later tradeoff decisions. The resource portion of the POS should reflect the *total* target amount of resources needed for a project.

An effective POS embodies a number of other important characteristics:

- It is composed in 25 or fewer words (this restriction forces precision).
- It uses plain language, avoiding jargon and acronyms.
- It is clear and concise.
- Ideally, it is visionary, creating a challenge and generating excitement.

All of the characteristics are observed in the Moonshot:

Put a man on the moon and return him safely by December 31, 1969, at a cost of $9B.

The POS is clear, concise, and quite effective.

Example: The senior manager, responsible for a key project in a large medical products company, asked the team to craft a POS to ensure that they all agreed on the objectives. The team initially wrote a 65-word statement that included multiple dates and varying resource requirements. With considerable effort, the team reduced the POS to 25 words.

When she read it, the senior manager was stunned. The team was embarking on the wrong project! Buried in the original 65 words were at least three possible alternative projects. The team had focused on the wrong alternative. The senior manager and team were able to quickly re-focus and the project was completed early and deemed a great success. The senior manager estimated that use of the POS had saved a 40-person team three months of potentially lost work, at a full load of $750 per person per day, about $1.8M. A good POS can directly affect the bottom line.

Major deliverables refine the definition of scope as stated in the POS. These primary project outcomes or results are the central focus of management attention. For example, the first draft of a financial analysis might be a major deliverable of a merger project; clinical trials might be a major deliverable of a pharmaceutical project; a market strategy definition might be the major deliverable of a marketing department's research project. Major deliverables typically become the basis for judging a project's success.

Because major deliverables serve primarily as a tool for focusing management attention on key project results, there are few specific guidelines about what they should be and how often they should occur. There is a basic "rule of thumb": the project manager and team should establish in advance the key tangible outcomes on which they wish to concentrate. The "first pass" design of the shop floor may be a major deliverable for a project charged to create a new and complex production line. (If, however, the line is simple, the complete design might be a better major deliverable.) The team should select outcomes that facilitate a project's planning and management.

Major deliverables, being central to a project's success, should be well defined and clearly understood. A simple, but amazingly powerful technique for systematically defining major deliverables is the *Is/Is Not* process.

Consider this common situation. You turn on the television and get a picture but no sound. You might turn up the volume. If you still get no sound you might switch channels. If at that point you have sound, you have learned something about the boundary condition. The presence of sound on the second channel indicates that the problem *Is Not* the television; the problem *Is* the transmission. The *Is/Is Not* process clarifies deliverables by explicitly defining boundary conditions. Compared with more formal specification processes or no specifications at all, it is a tremendously efficient means of defining major deliverables.

To use the *Is/Is Not* process, a team lists (usually on a flipchart with *Is* and *Is Not* columns) everything included (Is) or excluded (Is Not) from its project. The lists are generated by rapid brainstorming. *Is* comes to mind when you think: What is *this* deliverable? If, for example, the deliverable is a consulting report, the *Is* list might include length (it Is 5 pages), packaging (it Is spiral bound), content (it Is two sections on marketing and finance), and anything else that will clarify the expected outcomes.

Is Nots are everything that might reasonably be expected to be included in the deliverable. *Is Nots* for the consulting report might include the not formal presentation, not formal analyses (a certain statistical analysis/analyses is not performed). *Is Nots* define and restrict major deliverables, thereby better focusing effort.

Is/Is Not lists display consistent patterns of management challenges. *Is* lists, typically being quite long, lead immediately to the recognition that they must be pared down to make a project feasible. On the other hand, something on the *Is Not* list invariably is deemed by one or more team members to be of critical importance. Shifting entries between the *Is* and *Is Not* columns is the essence of management tradeoffs, as every switch simultaneously changes the focus of or expands the project, offends or excites people, and has a direct impact on the schedule and resource requirements. The *Is/Is Not* process facilitates discrete decisions about a project by the team and project and senior managers.

Example: The human resources department of a *Fortune* 500 company was starting a major reengineering project. During a two-day workshop the HR team used *Is/Is Not* process to identify and define the project's major deliverables. These included, among other things:

- analysis of all current key corporate processes;
- process redefinition for each;
- formal implementation plan;
- separate staffing plan;

When team members employed the *Is/Is Not* process (see below) for the first major deliverable (analysis of all current key corporate processes), they quickly discovered that senior management really meant "all" of the corporate processes simultaneously.

Is	Is Not
• Product Development	• A strategic plan
• Order Fulfillment	• A computer simulation
• Marketing	
• Customer Service	

The *Is* list was extensive, the *Is Not* list was tiny. This led to a substantive discussion of what was possible and, ultimately, to the prioritization of order fulfillment as the initial focus of the project. The major deliverables were modified to reflect the focus on order fulfillment. The *Is* list defined what was meant by "all" in a way that promoted more effective decision making about the scope of the project

Key Actions for *Define the Project Parameters*

- Write a *Project Objective Statement*.
- List the major deliverables.
- Generate an *Is*/*Is Not* list for each major deliverable.

1.3 Plan the Project Framework

Members of project teams typically complain about two things: that there are far too many meetings, and that it is difficult to make decisions. Both are indicative of poorly defined operational procedures. Projects are well defined when operational procedures tend to be efficient and the morale of team members high. Such projects are characterized as "well run." The *Plan the Project Framework* step defines how a project team will operate. Agreement has a direct impact on project success.

Key Questions for *Plan the Project Framework*

- Has the team specified when and where it will meet, who will attend meetings, and what topics will be discussed?
- Have attendance rules been established?
- Have participation guidelines been established?
- Is the team regularly logging all issues?
- Is the issues log being regularly updated and reviewed?
- How will the team resolve disagreements and conflicts?
- Is there an escalation path for unresolved issues?
- Who owns and maintains the project file?
- Where will the file be stored?
- How will the team communicate (e-mail, telephone, etc.)?
- Have these agreements been written down and stored in the project file?

Of the many possible operational procedures, a few are particularly important for projects:

- meetings and their management;
- issues management (including "escalation");
- maintenance of a project file;
- communication processes.

For most project teams, meetings are both the primary means of communication and a significant part of the project work. They are also widely perceived in a negative light. Rigorously defining some simple but critical aspects of meetings can make them more productive and positive experiences. For example, establishing a standard project meeting time, agenda, and attendance policy can yield invaluable dividends. Also, managing issues aggressively and *consciously*, logging them but not trying to solve them during the meeting, and abiding by established decision-making procedures (e.g., consensus or a majority vote) are other important contributors to a project's success.

Formal issues management is equally important. Systematic logging tends to focus issues (see **Figure C**) and thereby facilitate decision making. The issues log, typically initiated and maintained by the project manager, records any problems that cannot be immediately resolved. The person who raises the issue (the originator) records the issue and its potential impact. The team or project manager identifies an "owner" of the issue and a date by which it is to be resolved. The log is made available to everyone on the team and reviewed during status meetings so that all are kept informed.

The process of assigning "owners," establishing due dates for resolution, and logging resolutions, generates pressure to close issues quickly and in a manner that is mutually acceptable. An escalation

path should be established for open or unresolved issues. Defined by the team at the commencement of the project, it should identify when and to whom open issues will be "escalated."

The practice of escalating open issues to a higher authority tends to motivate team members to resolve their disagreements. Reluctance to resolve issues usually stems from concern about potential conflicts with functional responsibilities, unwillingness to risk making mistakes, or conviction that the issue at hand is more properly the responsibility of a senior manager.

Figure C Issues/Action Items Tracking Form

Issues Tracking Form

Issue #	Date	Originator	Description and Impact	Owner	Due Date	Status or Resolution

One member of a project team should be assigned to maintain a project file in a designated location. The repository for all project documents, this file is an extremely useful resource when mediating disputes that arise in the heat of project work. Whether kept in a binder or an on-line file, owner, location, and access policy should be formally designated.

All projects generate a large volume of communication. Time can be saved by pre-determining how team members are to communicate with one another using which types of media, and how often. Is e-mail, for example, to be used for formal status reports and messages that are not time sensitive and voice mail for short-term needs? What information is to be communicated to senior managers, by whom, and how often? Each team should establish its own communication strategy.

Example: A project team of a consortium of 14 companies was in trouble. Because the team comprised personnel from all of the companies, each of which had its own approach to decision making, project issues were quickly raised but slowly resolved. Many were escalated to the chief operating officer, whose staff always seemed to give priority to departmental needs.

In response to these difficulties, the project team developed a formal issues-management process that included time-tracking of open issues, and an automatic escalation process that would kick in for issues that remained unresolved after two weeks. Escalation was first to the project manager, then to the COO. Almost immediately two trivial issues were escalated to the COO, who made it clear that he expected the team to work more cooperatively to resolve issues before escalating them.

Soon thereafter issue resolution time dropped dramatically. As a consequence of the implementation of this and other project management processes, the project, which had been expected to be three months late, finished six weeks early. Effective framework processes can significantly improve teamwork and speed project completion.

Key Actions for *Plan the Project Framework*

- Agree to, and write up, meeting management procedures.
- Manage issues aggressively, using a formal issues log.
- Designate an owner, location, and access policy for the project file.
- Define, and write up, a communications strategy.

1.4 Assemble the Project Definition Document

Organizing a project, defining its parameters, and specifying its framework, feed the compilation of a Project Definition Document (PDD). A compendium of Define and Organize information, the PDD is used throughout a project as a reference tool to facilitate understanding and help focus and anchor decision making. A sample PDD is reproduced in the **Appendix**.

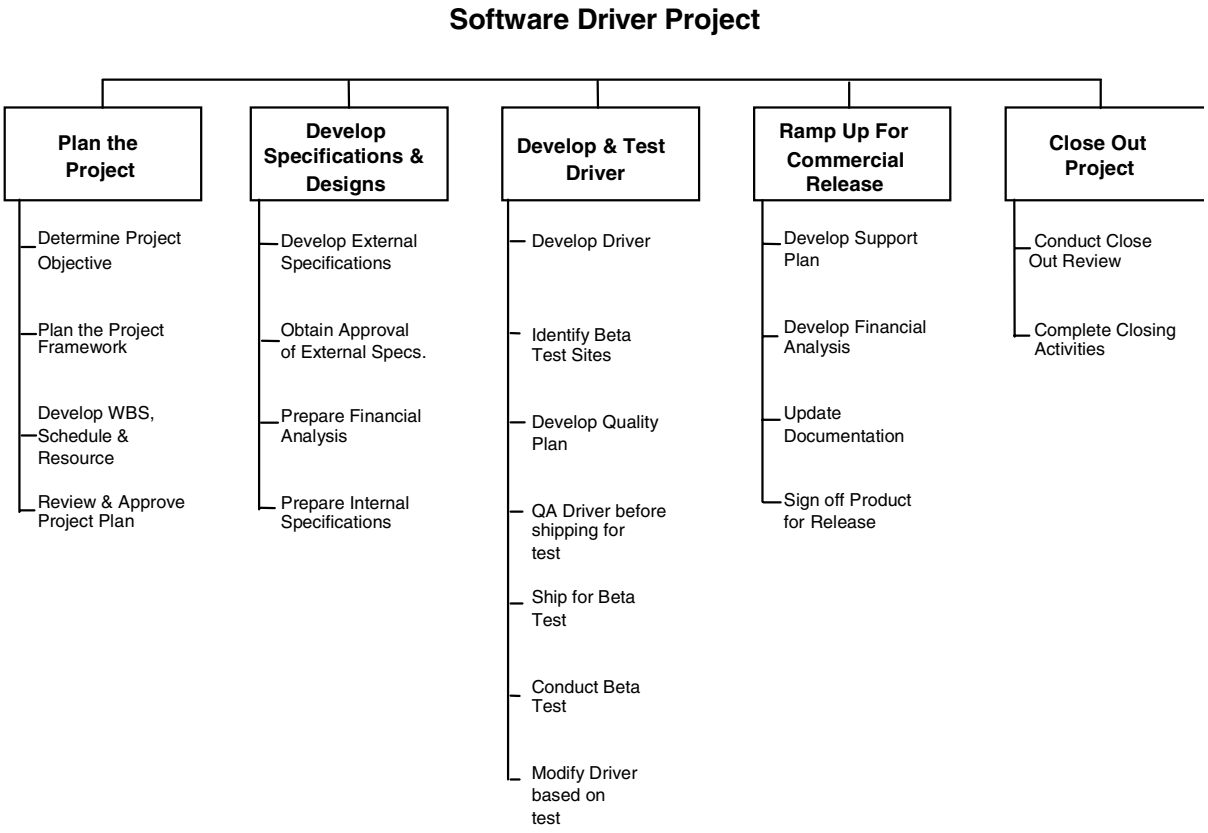
2. Plan the Project

2.1 Develop the Work Breakdown Structure

The single greatest source of project delays is work that is inadvertently forgotten or omitted. A credible project plan accounts for every task required to achieve the objective. The *Work Breakdown Structure* (WBS) step systematically accomplishes this. Only tasks that have been identified can be assigned to "owners" who can be charged to define criteria for completing them.

The WBS is a hierarchical breakdown of all work required to achieve the scope portion of the project objective (see **Figure D**). The hierarchy can be created either top down—starting with the largest work groupings of the project, termed the major components, or Level 1, and breaking them into progressively smaller tasks—or bottom up, by brainstorming the smallest tasks and grouping them into larger groupings. These are called, respectively, top-down and bottom-up. Both work equally well. The team should decide which approach it prefers.

Figure D Work Breakdown Structure for a Software Application Driver



Key Questions for *Work Breakdown Structure*

- Are all tasks identified?
- Are often-forgotten tasks such as planning the project, approval cycles, testing, printing, and so forth, included?
- How long will the tasks take? Hours? Days? Weeks?
- Have owners been assigned to the lowest-level tasks?
- Is there only one owner per task?

The following are common rules of thumb for how refined the level of task identification should be for the "lowest level" tasks (those at the bottom of any given branch):

- take approximately two days to two weeks (this scales to from one hour to half a day for student projects);
- have a single owner.

An effective way to create a WBS is to gather the entire team, provide each member with a packet of Post-Its®, and ask: "What tasks must be completed to accomplish the major deliverables?" The primary components and tasks are identified, written on Post-Its®, and stuck on the wall in various groupings. By the end of the animated discussion, generated by this process, the entire team has a far better understanding of the work needed to meet the project objective.

Example: A division of a major test equipment manufacturer assigned a project team to completely re-vamp its product line. As they created the WBS, the team members realized that they had identified only what had to be done at division headquarters, and that more than half the work required to achieve the objective—work that needed to be done in 20 field service repair centers scattered around the world—had been omitted. Once that additional work was sequenced and added to the project schedule, the team realized that its expectations for completing the project were substantially off and began to take corrective action. The team was reformulated to include field personnel and the project restructured into phases, with the most important changes to the product line introduced sooner, and less important changes deferred indefinitely. In other words, creating a WBS changed the team's *view* of the project itself.

"Whose job was that anyway?" is a question frequently voiced by the project manager. Tasks without owners don't get done. The team must have a formal process by which task ownership is assigned (by consensus or by the project manager). Assigning task ownership eliminates much project confusion, but can also significantly reduce "finger-pointing" and blame. Because it also increases accountability, efforts to do so sometimes encounter resistance.

Task owners, because it is they who do the work, should be the people best qualified to perform a task. It is critical that task owners define outputs and commit to performing and reporting progress on their work. Recording owner names with tasks on the Post-Its® used as input to WSB ensures that both go forward together during the development of the plan.

Example: A large information systems project for a major telecommunications company was floundering. A plan had been developed by a central project management group but little progress was being made. Although the plan included tasks, these had been assigned to departments, not individuals. Consequently, many team members, when asked about their work, were surprised to learn that their efforts were not advancing the project.

In response, the project manager called a team meeting and led the group through an exercise in which each team member identified a task and committed to "owning" its completion. Team members with specific technical expertise quickly signed up for tasks that matched their skills. Others, seeking to expand their skills repertoire, signed up for tasks they had never done before. Yet others took responsibility for time-sensitive tasks they had performed in other projects and were certain they could accomplish within the deadline. Team members wrote their names next to their assumed tasks on the project board, thereby committing to them. The group briefly discussed which tasks were dependent on the completion of others' tasks. Almost immediately the rate of progress on the project improved.

Key Actions for *Work Breakdown Structure*

- Assemble and use Post-Its® with the team to create a Work Breakdown Structure (WBS).
- Assign owners to the lowest-level tasks.

2.2 Develop the Schedule

A central question for most projects is: "When will it be done?" The *Develop the Schedule* step employs a systematic process to generate a project schedule that is predictable and credible. It promotes effective management by illuminating specific, tactical decisions about tasks, sequencing, and the time required to meet project objectives.

Key Questions for *Develop the Schedule*

- Have all "dependencies" been identified?
- Were any new tasks identified that need to be added to the plan?
- Was a network diagram created?
- Were durations assigned to the lowest level-tasks?
- Were estimates for longer or more ambiguous tasks reviewed by the team?
- Was a Gantt Chart created?

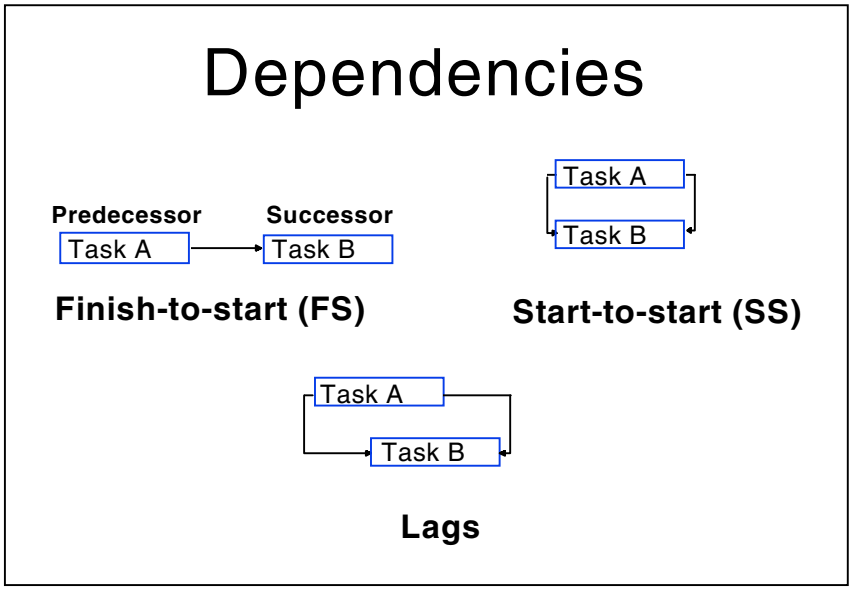
A schedule is created from two elements: logical relationships between tasks (i.e., dependencies) and time estimates for each task. When overlaid on a time line, these two pieces of data, become the project schedule.

Logical relationships (e.g, PERT [Program Evaluation and Review Technique], network diagrams, dependencies, and logical diagrams) describe the sequence or flow of project work. They are usually displayed in a dependency diagram (**Figure E**). A classic example of a logical relationship is putting on socks before putting on shoes. There is a logical flow to the effort: socks before shoes. (It is, of course physically possible to put on shoes before socks, but at a risk of public embarrassment—appearing with one's socks over one's shoes. Tradeoff decisions that incur risk involve changing a logical relationship.) Sequencing the lowest-level tasks is a key step in creating a project schedule. When it reveals omitted work, task sequencing will cause an iteration back to the *Work Breakdown Structure* (WBS) step.

Among the many types of logical relationships between tasks are three more useful and common ones:

- Finish-Start;
- Start-Start;
- Start-Start with a Lag.

Figure E Dependencies



The most common and easiest to use logical relationship is finish-start (FS). In an FS relationship, a dependent or successor task (Task B) cannot begin until a previous or predecessor task (Task A) has been completed. For students there is a finish-start relationship between receiving directions (a predecessor task) and beginning work on an assignment (a successor task). An FS relationship is easy to manage because it is highly linear. But not all work is neatly linear, necessitating other logical relationships.

The more difficult-to-use intertask relationship models activities that can be done in parallel, with a relationship between their starts, are the Start-start (S-S) ones. In an S-S relationship, work on one task cannot begin until work on another has begun. Once begun, both tasks can *proceed* in parallel. In some merger and acquisition projects, a preliminary list of acquisition targets is drawn up but not finalized. Financial analysis (the successor) is dependent on the start, but not the finish, of the listing task (the predecessor). Once both tasks have been started, they can proceed simultaneously, resources permitting. The schedule displays an S-S relationship between such tasks.

A variation of the S-S relationship is the S-S with a lag relationship. This accommodates a delay typically between the start of tasks (other types of lags are possible but not often used). In the development of a new computer, software development typically has an S-S with a lag relationship with hardware development. The software team needs at least a hardware design to begin its work, but once that exists, the development of the hardware and software can proceed in parallel. "Lags," therefore, model delays between tasks.

Although S-S with a lag relationship has the advantage of accommodating both parallel work and delays, it has the disadvantage of being ambiguous about *when* successor tasks begin. It is therefore usually better to convert S-S with lag relationships to F-S relationships by splitting the larger parallel tasks into smaller ones that can be so modeled as F-S.

A dependency diagram that displays logical relationships (**Figure F**) is created by having the team move around the Post-Its® for the lowest-level tasks in the WBS until they align in the desired sequence. Expect them to be moved around many times before the team agrees on the flow.

Example: A distribution company's project team was sequencing its WBS when it discovered that a key portion of the project was dependent on work done by a vendor (in the middle of its dependency diagram were tasks labeled "Vendor Does Stuff"). Because the team had not previously recognized the extent of its dependence on the vendor's work, the vendor's contribution had been perceived as minimal. Once it was made visible, the team contacted the vendor and asked about its expectations and progress, only to discover that the vendor had no intention of performing the tasks identified in the plan. The team was able to restructure the project to eliminate the vendor's tasks well before they became a problem. The dependency diagram had highlighted a significant, previously hidden risk in the project plan.

The concept of the milestone is closely related to that of logical relationships. A milestone is a significant event in a project to which management attention is drawn. "Complete Pilot Test" is a common milestone for many manufacturing companies, "Complete First Draft Report" is a common milestone for many consulting companies. Milestones are important because they often signify the culmination of many dependent relationships and, thus, mark progress on a project.

A sampling of milestones might include

- the start and finish of a project;
- completion of major deliverables;
- formal reviews;
- key events, such as presentations and trade shows;
- dependencies on, or deliverables to, organizations outside the project environment.

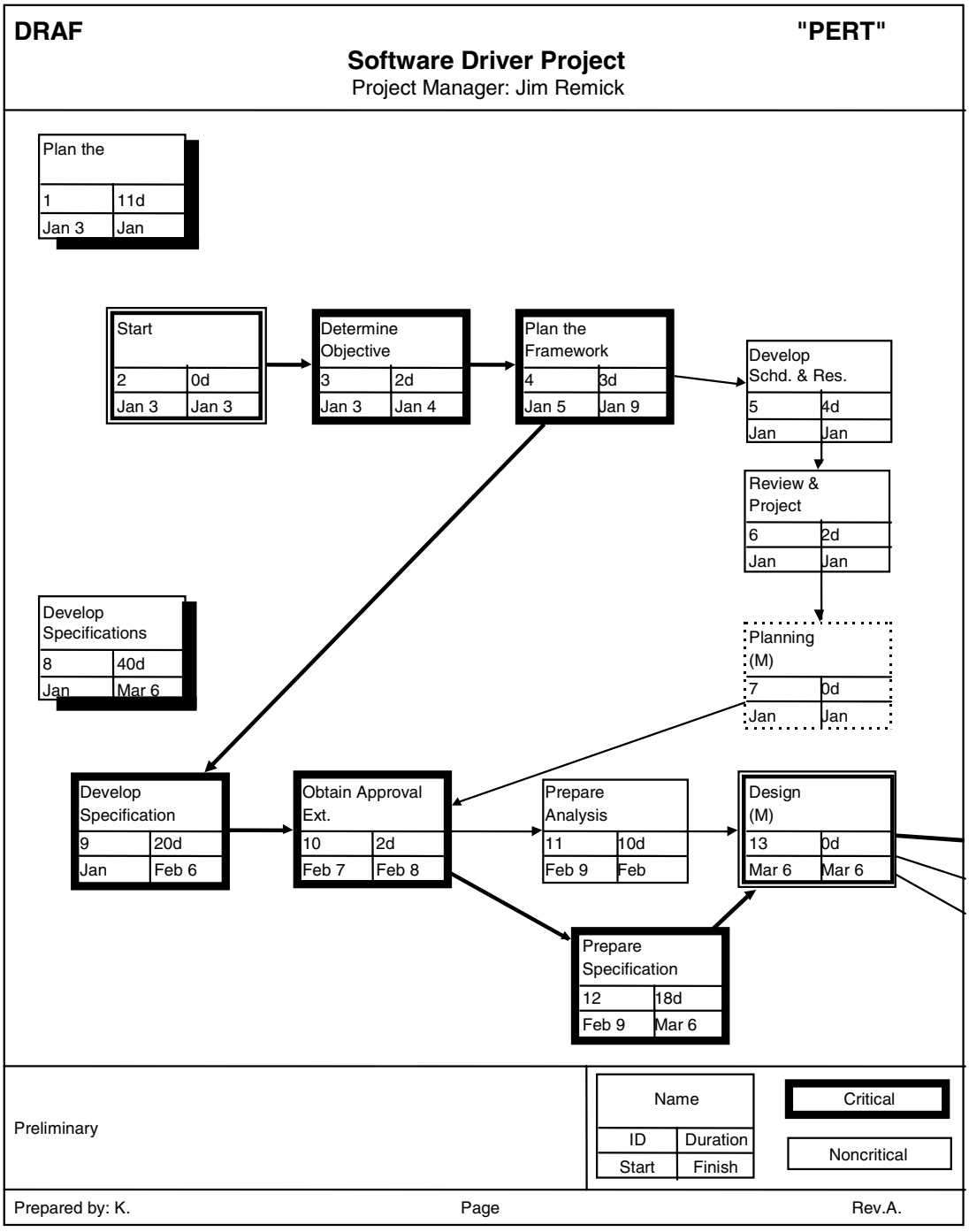
Example: A project at a small ($50M) medical equipment company included the milestone of "gain FDA approval" to introduce a new respirator. As the project progressed and senior management began to focus increasing attention on the FDA milestone, the team discovered that the tasks for gaining FDA approval had not been as well specified and sequenced as those in other parts of the plan. Requests were made for greater detail and a more consistently articulated completion date. In response to the aggressive management of this milestone, the team discovered that it had omitted from the plan an essential element—the clinical trials—which would have caused significant delays. The team was able to correct the oversight and eventually brought the project in two months ahead of schedule. The use of milestones had highlighted critical project information.

Estimating task length is the focal point of much and often-vehement project criticism, even though research (and experience) indicates that omitted tasks are a much greater problem. Effective task estimation involves

- completing a WBS;
- quickly approximating task durations for the lowest-level tasks.

Technically, duration is the number of work periods (hours, days, weeks, and so forth) required to complete a task. A good WBS typically incorporates sufficient preliminary information about task length to support a "quick and dirty" estimate of duration adequate for most project needs. Task owners should pencil in their best estimates of duration on task Post-Its®.

Figure F "PERT" Chart



A credible schedule should be an almost trivial end product of the *Plan the Project* step. The key inputs are a carefully constructed dependency diagram and task duration estimates derived from a well-defined WBS. If, however, any steps have been omitted, the reliability and predictability of the schedule decrease sharply.

A schedule is created by superimposing the dependency diagram and estimated task lengths on a calendar or time line. The most common means of doing this is by creating a Gantt Chart (**Figure G**), which plots tasks over time. These charts are popular because they are easy to create and intuitively read and understand. Gantts can be created by hand by drawing tasks in sequence for the defined durations and drawing lines to indicate dependencies against a time line, or they can be generated by project management software packages.

Gantts are well-accepted tools, but the results of systematic planning typically a longer-than-expected schedule are consistently less well received. "This is too long!" is the almost universal reaction (termed "schedule shock") to a systematically constructed schedule. When a schedule has been so carefully constructed, opposition to projected completion dates is soon abandoned in favor of making focused tradeoff decisions.

Example: A professional services firm was working with a client to construct a schedule for a major reorganization. The client wanted the reorganization completed by the end of the fiscal year so that the new departments would be correctly aligned with their budgets. Using the scheduling process, the consultants created a schedule that missed the target date by three months. The client deemed this "unacceptable," insisting that the consultant meet the deadline at the same cost and without reducing the scope. The consultant patiently walked the client through the WBS, dependency diagram, and task estimation, asking:

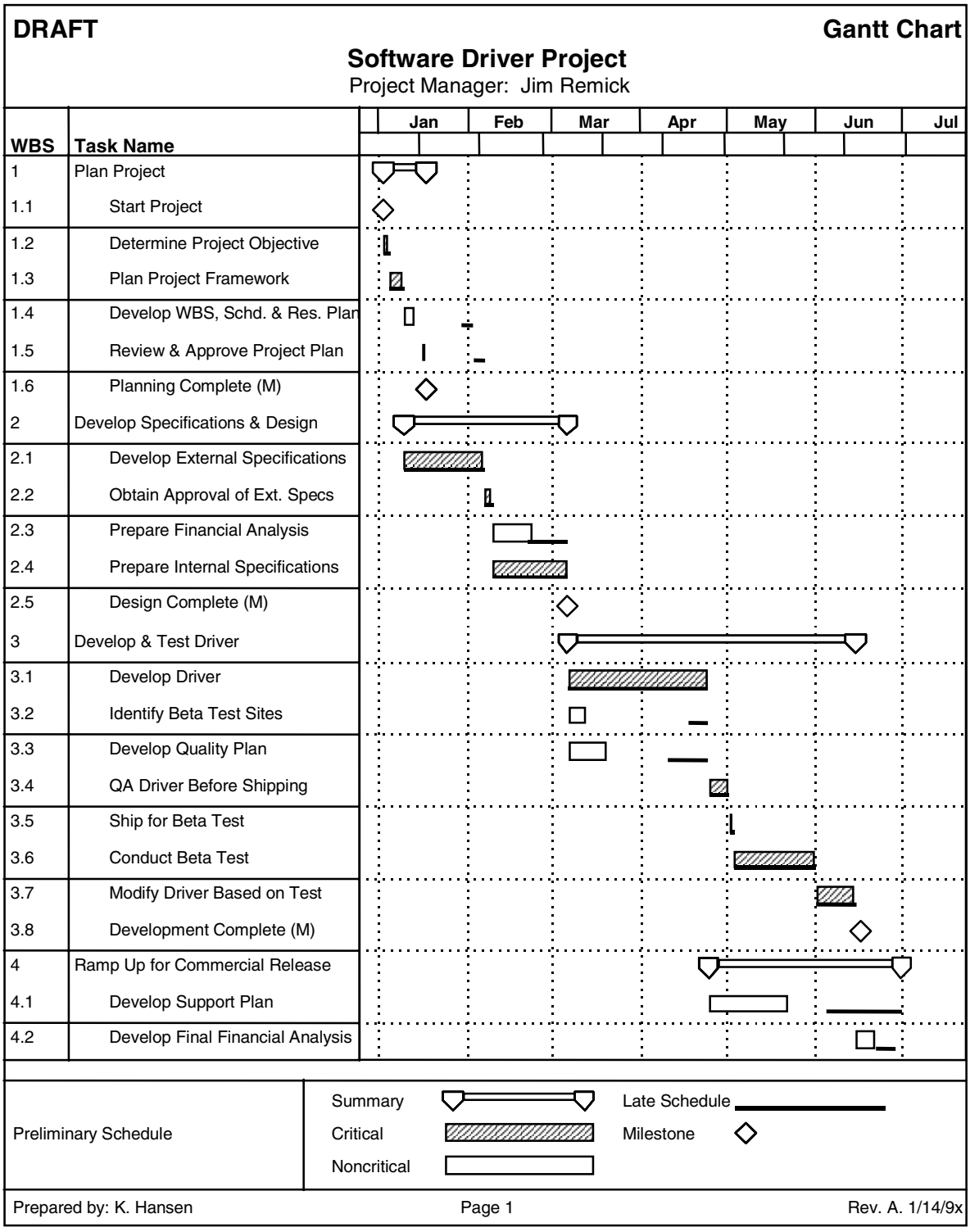
- Is there any work here (in the WBS) that does not need to be done to achieve the objective?
- Is there any way to change the sequence of work?
- Is there anything about the task estimates that strikes you as grossly inaccurate?

The client, recognizing the comprehensiveness of the consultant's work, began to engage in more substantive discussion about the true tradeoffs: accepting the impacts of the schedule slip; adding more resources; or reducing the project's scope. The systematic scheduling process saved the consulting engagement.

Key Actions for *Develop the Schedule*

- Use the WBS Post-Its® to create a dependency diagram from the lowest-level tasks.
- Quickly approximate task durations (in hours).
- Create a Gantt chart showing the schedule.

Figure G Gantt Chart



2.3 *Analyze Resources*

"If I only had more resources!" is the traditional cry of the frustrated project manager. Yet even with additional resources, the resource problem persists. Simply adding resources rarely improves project performance. Instead, project managers need to systematically analyze their resource *requirements*. Taking the *Analyze Resources* step provides project managers with better information about the real resource situation and facilitates more effective decision making about the three parameters.

Key Questions for *Analyze Resources*

- Is one resource carrying a disproportionate amount of the workload?
- Are any resources underutilized or overlooked?
- Are any resources affected by parallel work?
- Do all task owners have the requisite skills to perform the work?

Effective resource management, based on a comprehensive analysis of the resources, is a key element of project success. Although most of the many tools available to analyze and manage resources are not cost-effective for smaller projects, more informal means of analysis have almost as much utility at considerably lower cost.

The Gantt chart, with owners assigned, is one basis for informal resource analysis. A project manager and team scan the Gantt looking for assignment patterns, such as:

- the same person listed as the owner of most tasks;
- the same person listed as owner of several parallel tasks;
- some people seldom listed;
- many tasks stacked in parallel;
- tasks are ownerless.

As there can be many different patterns, providing guidelines for interpreting all of them would be impractical. But, each pattern will naturally suggest a problem or issue that the team must manage. Resource usage patterns are consolidated with scope and schedule data and used to inform tradeoff decisions.

Example: The plan for a project in the information systems department of a large automaker was nearing completion. The scope had been well defined and the schedule completed. When resources were analyzed, however, the team learned that one of the programmers was expected to do more than 80% of the work and that much of that work was supposed to be done in parallel. Moreover, the project manager knew that the programmer had recently been working extremely long hours to save another project, had barely seen his spouse and newborn child for the last four weeks, and was becoming disgruntled. She was quite sure that the programmer would not be able to sustain the type of effort required for the project and might well leave the company.

In response to the analysis, the project manager and team restructured the plan. They reduced some of the deliverables for which the programmer was responsible by switching some *Is's* to *Is Nots*, forced the parallel work into FS relationships, and secured some assistance from another department. Although these changes created other problems, the resource analysis had revealed a severe potential problem that once identified was able to be more effectively managed.

Key Actions for *Analyze Resources*

- Analyze the Gantt chart for resource patterns.

2.4 Optimize Tradeoffs

The primary reason for practicing project management is to generate better data for decision making. Yet the data typically present choices that are difficult to make. In good project management it is almost always necessary to give up something highly desired to achieve an optimum result. The *Optimize Tradeoffs* step formalizes and legitimizes the decision-making process.

Key Actions for *Optimize Tradeoffs*

- Are you within the POS?
- Can you reduce scope?
- Can you change the sequence?
- Can you reassign or obtain more resources?
- Is there a way to work better and smarter to achieve the same result?

Effective optimization is achieved by examining an entire project plan and developing creative means to make it more efficient. Virtually anything about a plan can be changed, but changes should be systematic and visible to all project participants. Among the more common changes are:

- move items in the *Is* to the *Is Not* list;
- eliminate one or more major deliverables;
- develop an alternative way to perform task work;
- alter dependencies;
- change resource allocations;
- accept new parameters.

As might be apparent, the optimizing process is not simply described. It is a process of sensible analysis and reasonable judgment. Inasmuch as it involves making the truly difficult tradeoff decisions, optimizing is the essence of project management.

Example: A team building a specialized parallel processing computer had as an *Is* that the unit would contain eight microprocessors. This exceptionally powerful design element, however, was premised on substantial technical innovation and development. It was a great idea, but extremely risky. As it developed the project plan, the team discovered that the project would miss the market window by nearly a year.

Team members tried several different "what if" strategies to optimize the plan, including bringing some of the work into parallel and adding more people. Unfortunately, none of these strategies met the schedule requirement. Moreover, they were extremely expensive.

After considerable debate, the team reexamined the need for eight processors. It was determined that reducing the number to two might enable the computer to be introduced on time and be sufficient, if less than ideal, to establish its place in the target market segment. The team made the difficult decision to reduce the scope of the project and ultimately hit the market window.

Key Actions for *Optimize Tradeoffs*

- Analyze the entire project plan.
- Create some "what if" scenarios.
- Make tradeoff decisions.

2.5 Develop a Risk Management Plan

All projects involve risk. Yet to an astonishing degree project personnel ignore risk. The *Develop a Risk Management Plan* step draws attention to project risks and the need to manage them.

Key Questions for *Develop a Risk Management Plan*

- Have risks been identified?
- Have they been prioritized?
- Have actions been taken to reduce the probability of risk?
- Have contingency plans been formulated?
- Who is responsible for managing risk?

Asked at the beginning of a project, virtually all team members can describe some key risks, and in projects that have failed it will almost always be said that the reason for the failure was known to be a distinct possibility, but no action was taken to prevent it. Project risks are known, but rarely is any effort made to manage them.

Among the apparent reasons for this are

- failure to accept that risks attend the project at hand;
- time is too precious to expend on identifying and managing risk;
- recovery is believed possible from any failures;
- people do not like to manage risk.

A risk management scheme must be seen to be consistent with both latent optimism and the available time. The scheme presented here below has two components:

- risk assessment;
- risk management.

Risk assessment consists of spending a few minutes brainstorming the risks that might attend a project. Team members informally select the top two or three risks that present the greatest threat to the project and develop a plan for managing them.

Risk management plans should incorporate both actions that can be taken to reduce the likelihood of failure (i.e., preventive actions), and actions that can be taken in the event of failure (i.e., contingency plans). Preventive actions might add tasks to the plan; contingency plans require a triggering metric that informs the team that they need to invoke them. For example, a set amount of slippage in a project's end date might be made to invoke a contingency plan to reduce the project's scope.

Typically, brief risk management plans are drafted and included in the project file. In many cases, a team member is assigned responsibility for monitoring trigger metrics and informing the project team of the need to invoke the contingency plan.

Example: A company had a project to wire an entire school system with fiber-optic cable to enable computers to be installed in all classrooms and offices. The job had to be finished before the start of school.

Miles of cable would be needed. The risk assessment indicated that availability of cable from the primary vendor was a substantial risk since demand was extremely high and the vendor had just settled an acrimonious labor dispute. The project manager and team took the following preventive actions:

- visited the vendor to determine the true state of its capability;
- stockpiled extra cable (at considerable additional expense);
- established relationships and placed small orders with other vendors.
- set aside some "emergency" funds for late, premium-priced cable purchases.

When, shortly before the schools were to open, the vendor was unable to deliver all the needed cable, the project manager invoked the contingency plan for using emergency funds to purchase cable from other vendors. The resulting lost profit margin was fairly small and the project was completed the day before school opened. The risk management plan had contributed directly to the project's success.

Key Actions for *Develop a Risk Management Plan*

- Identify and prioritize project risks.
- Create a risk management plan that includes preventive actions and contingency plans.
- Assign someone to manage project risks.

3. Track and Manage the Project

3.1 Collect Status Information

Staying on track once a project begins is a greater challenge than developing the initial project plan. The *Collect Status Information* step focuses the attention of the project manager and team on the areas that provide the best information about project progress. In turn, with good information, the project manager and team can make better adaptive decisions to the dynamic changes that occur in all projects.

Key Questions for *Collect Status Information*

- How often will "collect status information" be formally done?
- How will it be done?
- What information will be monitored?

The real payoff of good planning is superb, "real time" project management. Effective tracking promotes so much focus and concentrated energy that teams often become highly enthusiastic and motivated to examine a project's progress and make timely tradeoff decisions. Not everyone likes to track projects. For many, tracking implies rigid accountability, excessive bureaucracy, and time diverted from project work. Tracking, for these, is a nuisance and should be minimized or altogether eliminated.

To reconcile these seemingly opposed views is easy, however. A tracking system simple enough to take little time to maintain, yet powerful enough to provide the project manager and team with almost all the data required to make effective decisions, can make tracking efficient and even enjoyable. Such a simple system must focus only on the data that makes a difference to decision making; surprisingly, that is not much data at all.

A good tracking system collects status information on only three limited topics: schedule status, open issues, and risks.

Schedule status includes the following:

- Have tasks scheduled to start in this time period started?
- If not, why not, and what can be done to get them started?
- Have tasks scheduled to finish in this time period finished?
- If not, why not, and what can be done to get them finished?

Open issues include the following:

- What is the status of all open issues?
- What can be done to close them?
- Are there any new open issues?

Risks include the following:

- What is the status of the risk?
- Are there any new risks?

The answers to the foregoing questions will provide virtually all the project information required to effectively manage a project. Collecting the data is easily done using voice mail, or e-mail, or in meetings (although it is better collected before and used to define problems and assign actions during

meetings). Typically, status information is collected weekly. In short or particularly important projects, it might be collected more frequently, and in longer projects, less frequently.

Although more complex and comprehensive tracking systems are available, the one described here is sufficient for most project needs.

Key Actions for *Collect Status Information*

- Determine how frequently status information will be collected.
- Determine how it will be collected (e.g., via e-mail, voicemail, meetings, etc.).

3.2 Plan and Take Adaptive Action

The status information drives decisions to adjust the plan and take adaptive actions. Decision making in this step is much like the decision making in the *Optimize Tradeoffs* step. A team might

- move items in the *Is* list to the *Is Not* list;
- eliminate one or more major deliverables;
- develop an alternative way to perform task work;
- alter dependencies;
- change resource allocations;
- accept new parameters.

The need to make difficult decisions based on substantive project data persists throughout the life of a project.

Key Questions for *Plan and Take Adaptive Action*

- What decisions will be made?
- What actions will be taken?
- How will these decisions and actions be communicated?

Example: A project team for a consulting company had been commissioned to do a worldwide market study for a client that was introducing a significant new product line. At the time of the commission, a primary market of interest was Eastern Europe and the Soviet Union. But just as the team was to begin the tasks associated with this portion of the project, an attempted coup in the Soviet Union accelerated the country's breakup. The tasks associated with the Eastern European and Soviet markets were delayed, and upon review, the team concluded that the value of doing the study under those conditions was minimal.

The consulting team and client reviewed several options and decided to defer the Eastern Europe and Soviet Union portion of the study and concentrate on the Pacific Rim instead. Although this represented a change in scope, schedule, and resources, it was the best business decision possible under the circumstances. The reports of task delays had triggered some critical business decision making.

Key Actions for *Plan and Take Adaptive Action*

- Analyze the impact of status information on the project.
- Take adaptive action.

3.3 Close Out the Project

Much learning occurs during a project that, if formally captured, will significantly improve the management of succeeding projects. The *Close Out the Project* step formally captures key learning and reflections in the hope of improving future project performance.

Key Questions for *Close Out the Project*

- Which elements of project management were effective?
- Which elements might be improved?
- How might they be improved?
- Is all of the paperwork complete?
- Has key learning been recorded in the project file?
- How will key learning be used in future projects?
- Has the project file been archived somewhere?
- How will the project's completion be acknowledged and celebrated?

Project managers and team members are usually too busy with the next project to formally close out a project. Yet this haste represents a lost opportunity for both personal and team growth and improvement. Teams that take the time (it can be as little as a few hours) to formally close out the project are substantially more efficient in the next project.

Typical project closeout activities include

- assessment of practices that contributed to the project's effectiveness;
- assessment of practices that were not as effective as expected;
- development of process improvements for future projects;
- acknowledgment of team members' contributions;
- completion of project paperwork;
- archiving of the project file;
- celebration of the project's completion.

Assessing effective and less-than-effective practices, developing process improvements, and celebrating a project's successful completion often have a direct impact on efficiency in subsequent projects.

Example: A project team at a paper company conducted a one-day "closeout" workshop during which members captured key learning on flipcharts, discussed options for improvement, generated an action plan, and had a great party. During the following week the team members were feeling quite positive and began systematically implementing their process improvements.

Key Actions for *Close Out the Project*

- Conduct a formal debriefing.
- Complete paperwork and archive the project file.
- Acknowledge and reward team members' contributions.
- Celebrate the project's completion.

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Appendix: All Star Movie—Project Definition Document

Introduction

This document presents a definition of the All Star Movie Project. It includes the following sections:

Project Objective Statement

Major Deliverables—Definition

Major Deliverables—Target Dates

Project Team Roster

Major Risks

Key Framework Processes

Together with the optimized project schedule plan, this Project Definition Document represents the engagement baseline. All changes will be applied to this baseline.

Project Objective Statement

Create and launch an action movie by June 1, 1997, at a cost of $35M.

Major Deliverable(s)—Definition

Final Deliverable

The final deliverable for this project is a complete, edited, and launched movie. *Is* and *Is Not* lists for the final deliverable and each major deliverable are in the **Appendix**.

Major Deliverables

There are three major deliverables for this engagement.

1. Comprehensive pre-production arrangements

The team will analyze all pre-production work required for the film. The team will create a written plan for executing the pre-production work. The plan will be approved by both the director and producer. The team will complete all pre-production work, including signing the "talent," finalizing the script, and hiring the production staff.

2. A rough cut of the movie

The team will complete initial production of the movie, including on-location filming, in-studio filming, and initial editing. The producer and the director will both approve the rough cut.

3. A production-ready cut of the movie

The team will finalize the movie for production. This will include re-shooting scenes as needed, sound editing, color correction, and testing with audiences. The producer and the director will both approve the final cut.

4. Limited launch of the movie

The team will conduct a limited launch of the movie into select movie theaters. The launch will include production of 5,000 copies, placement of advertisements in key publications, and scheduling of the stars on television "talk" shows. Depending on initial audience response, a more complete launch may follow.

Major Deliverables—Target Dates

The following are the target dates for major deliverables. They will not be confirmed until the detailed project plan is completed, optimized, and validated by the producer, director, and studio.

Major Deliverable	Target Date
Comprehensive pre-production arrangements	10/1/96
A rough cut of the movie	4/30/97
A production-ready cut of the movie	7/31/97
Limited launch of the movie	10/31/97

Project Team Roster

Project Team

Clark Kent	Project Manager
Bruce Wayne	Director
Selena Kyle	Pre-production manager
Dick Tracy	Production manager

Sponsors

Erica Kane	Producer

Major Risks

A preliminary risk analysis identified the following "high" risks to the success of the engagement:

- Inability to "sign" a big-name talent could reduce box office success.
- Location shooting could be slowed by wet weather.
- The script will not be complete on time.
- The script will have to be rewritten during the "shooting."
- The special-effects lab will not be ready on time.

Key Framework Processes

Project File

The project file will be maintained by Clark Kent on location. The file will be backed up every two weeks, with an archived copy kept at Vue Studios' headquarters.

Issues/Action Item/Change Tracking

The standard issues/action item/change log will be used. All issues/action items/changes will be recorded on the log and reviewed weekly.

Meetings

Meetings will be held every Monday morning to review the status reports and identify new action items.

Appendix A—*Is* and *Is Not* Lists for Movie Project

Deliverable #1. Comprehensive pre-production arrangements

Is	Is Not
♦ Signing major talent	♦ Signing extras
♦ Completing second draft of script	♦ Final script
♦ Arranging for locations, including travel plans to location	♦ Shipping of equipment to locations
♦ Signing production crew	♦ Starting production
♦ Approved by producer and director	
♦ Written production plan	

Deliverable #2. A rough cut of the movie

Is	Is Not
♦ Complete filming of movie	♦ Shooting of additional scenes
♦ Initial editing	♦ Color correction
♦ Screening by production crew	♦ Final edit
♦ Final script	♦ Audience tested
♦ Approved by producer and director	

Deliverable #3. A production-ready cut of the movie

Is	Is Not
♦ Final edit	♦ Launched
♦ Color corrected	
♦ Sound corrected	
♦ Approved by producer, director, studio	
♦ Audience tested	

Deliverable #4. Limited launch of the movie

Is	Is Not
♦ Released to limited numbers of theaters	♦ General release
♦ Advertising in select publications	♦ General advertising
♦ Stars interviewing on talk shows	♦ European release
♦ Screenings for reviewers	
♦ 5,000 copies produced	