

# Chapter 8: Commercial Items

Commercial items (CIs) consist of automated software tools for management of IT projects. CI tools consist of commercial–off–the–shelf (COTS) and nondevelopment items (NDIs) that are already developed in an organization. The CI tool encompasses a collection of automated software tools that assist IT project managers in the various phases of system management. The CI tool is not a replacement for any method of the system management; it is a supplement for the methods and enhancement for generation of quality products.

Various CI tools are available for project management, system engineering, system architecture, system requirements analysis, system design, software requirements analysis and design, rapid prototyping, configuration management (CM), software quality assurance (SQA), software complexity measurement, testing, and documentation preparation. This chapter discusses only project management–related CI tools.

## Definition of CI Tools

Vendors develop CI tools at their own expense for the industry and sell them in substantial quantities on a competitive basis to multiple organizations. CI tools also consist of NDIs that have been developed in an organization and are available for reuse. CI tools apply rigorous discipline in the management of an IT project. The manager must find the right CI tools for the right management applications and environments. The practitioners who use the tools must be properly trained. This approach saves time and cost of project management and achieves efficiency and quality in the final product. The following are benefits for use of CI tools:

1. Save costs
2. Reduce schedules
3. Allow for faster project development
4. Allow for reuse of state–of–the–art practices
5. Enhance quality
6. Improve testing

CI tools are only devices that aid the work of project management; the tools by themselves have little value. The effectiveness of CI tools depends on the managers who are using them and the quality of the tools. Thus a CI tool can be defined as a computer program that aids in the management, development, analysis, testing, or maintenance of another computer program or its documentation.

## CI Selection Criteria

CI selection criteria depend on a particular requirement, environment, and ideas about how the tools should work. The project manager selects a CI tool suitable for the magnitude and complexity of the project that he or she manages and for the number of resources involved in the project. The selection depends on the project schedule, budget, and complexity of interdepartmental interfaces. No industry standard exists for evaluation of a CI tool.

The selection of a CI tool depends on the project manager's experience with project management CI tools. The following are six guidelines for evaluation of a CI tool:

1. Ease of use
2. Capability
3. Robustness

## Ease of Use

4. Functionality
5. Ease of insertion
6. Quality of support

### **Ease of Use**

Ease of use is a measure of a CI tool's effectiveness for interaction by a user. The functionality or completeness of a tool does not matter. If the user spends most of his or her time thinking about how the tool works, then the tool is a hindrance and not helping with the task.

A CI tool should be user friendly and not user hostile. The tool should be easy to use and capable of tailoring to the needs of a particular user. The tool should be helpful to the user and perform particular functions. The more intelligent a tool is, the more functions it will perform without direct specification by the user. The tool should anticipate user interaction and provide a simple and efficient means for execution of functions.

Unpredicted responses from the CI tool usually lead to unhappy users and unwanted output. Command names should have a function. The user should rarely be surprised by a tool's response. The tool should check the user's errors and check and correct these errors whenever possible. A good tool will accommodate interaction with many users or other tools.

### **Capability**

The capability of a CI tool depends on how well it understands the product that it is manipulating and that simple commands can cause major effects. The tool also demonstrates its capability by reasonable performance, which is achieved with efficient use of management resources. A good tool can give the impression of greater power capability, which keeps more knowledge about its internal state.

The performance of a CI tool greatly affects the ease with which it is used and can ultimately determine the success of a tool within an organization.

### **Robustness**

The robustness of a CI tool is a combination of the following factors:

- Reliability of the tool
- Performance of the tool under failure conditions
- Criticality of the consequences of tool failures
- How the tool is integrated into the environment

The consistency of the tool's operation confirms its degree of robustness. Consistency relates to well-defined syntax and semantics. A CI tool evolves over time and accommodates the changing requirements, changing environment, correction of detected flaws, and performance environment. A good tool should be built, evolve, and retain compatibility between versions. A CI tool is a piece of software that performs a function and may not be free of bugs. A tool should be self-instrumented and assist in determining the cause of a problem. The tool should contain a self-test mechanism that ensures that it is working properly.

### Functionality

The functionality of a CI tool is driven by the task for which it is designed and by the methods used in the accomplishment of that task. Many tools are available in the IT industry. The accuracy and efficiency with which the tool supports a method can directly affect the understandability and performance of the tool and determine the quality and usefulness of tool outputs.

The tool should provide an adequate scheme for storage, organization, and manipulation of the products of the project's application. The tool should also provide guidance and ensure that the user follows the concepts of the methodology.

During the CI tool selection process, the manager should establish and observe guidelines so that the tool operates correctly and produces the correct output. The tool should generate output that is consistent with what is dictated by the methodology.

### Ease of Insertion

Ease of insertion is the ease with which a tool can be incorporated into the target environment. Managers and users need to be aware of how well the tool fits within the existing environment, and they must accept changes that the tool may inflict on their environment. When selecting a tool, the project manager should know how much effort is necessary to effectively learn the tool and put it into practice. The tool's command set should be consistent and understandable. The tool interacts with the user and helps the user learn proper use of the tool. The tool should have templates or other aids that guide interaction.

A good CI tool should run on the existing system and be easy to install and learn. A good tool should use file structures and databases that are similar to what is currently used. The data should be able to interchange between the tool and other tools that the organization currently employs.

### Quality of Support

Quality of support refers to the ranges from cost–maintenance agreements to the level of required training provided. When selecting a tool, the project manager should consider the past performance of the vendor and the product. The tool should be sound and mature, and the product should be from a well–reputed vendor. The purchase or rental agreement should answer the following questions:

- What is or is not being required?
- Is there a cost reduction for the purchase of multiple copies?
- Is a corporate site license available?
- Can the tool be leased?
- Are there warranty periods in which a CI tool can be returned for a full refund?
- Can a customer acquire full rights and access the source code?
- Is the user free of all vendors' obligations?
- Is a maintenance agreement available?
- Can the user receive future updates free of charge?
- Are the future updates compatible with the existing version?
- Does the vendor provide a responsive helpful hotline service, and what is the turn–around time for problem reports?
- What is the delivery time of the tool?
- Does the vendor have an effective training program available? Are examples and exercises available for self–study courses? How much free training is included with the purchase of the CI tool?

## Microsoft Project 98

- Are vendor representatives knowledgeable and well trained?

The CI tool vendor should support it with ample documentation manuals for installation, use, maintenance, and interfacing. Documentation provides a big picture of the tool and what it does. The documentation should be simple to read, understandable, complete, accurate, and affordable.

Project management tools relate best to the IT project manager's work. They are software packages that center on a database engine, a place where the project data are stored and manipulated. Many CI tools are available for project management, some of which are described as follows:

- Microsoft Project 98
- Kidasa Software's Milestones Etc. 5.0
- AEC Software's FastTrack Schedule 6.0
- Digital Tools, Inc., AutoPlan
- Computer Associates International, CA-SuperProject for PC
- COSMIC, COMPASS
- Quality Software Products Co., MasterPlan
- Cambridge Management Systems, Project Outlook

### Microsoft Project 98

Microsoft Project 98 is easy to install but requires a reboot to finish installation. Project 98's initial data entry is in the timeline format known as a Gantt chart, which calls for assignment of start and finish dates and calculation of the time allotted to each task. New lines are inserted above the task. Project 98 indents tasks to denote hierarchy. Dragging a task's timeline bar and connecting it to another can link subtasks. Editing the project data is not comfortable. As each task and subtask is added or edited, associated time lines disappear and the task reverts back to the default—the current day's date. The user must enter all previously scheduled information.

Project 98 reclassifies the subtasks as a main task when a main task is deleted. When the user moves the end point of an independent task, the start points for dependent tasks cascade to correspond with the new end point. Spell check is available.

A project manager needs to excel in presentation, diagramming the entire project in an understandable way. Project 98 helps the project manager make more comprehensive views, including Gantt and resource graphs, variations on resource usage tracking graphs with Gantt formats, and a calendar view.

Project 98 can easily publish to the Web. The user can save a file as a hypertext markup language (HTML) document and save schedules in a graphic format.

Project 98 has many advanced features, such as open database connectivity support for transferring files to various databases. The tool also tracks resource allocation, workload, and labor costs as an integrated function. Project 98 gives standard telephone support with a charge for after-hours calls, and it has a Web interface for posting questions online. Project 98 includes the standard help topics, three tutorials, and a series of links to Microsoft web sites. Project 98 has links to frequently asked questions (FAQ) lists and an online support form. The major characteristics of Project 98 are as follows (Microsoft Corp., Redmond, Washington, 425-882-8080, [www.microsoft.com/project](http://www.microsoft.com/project)):

- Hardware requirements include Windows 9x or NT, 32 Mb RAM, 40 Mb storage, and 133 MHz Pentium.
- Ease of installation is good.

## Kidasa Software's Milestones Etc. 5.0

- Data entry is excellent.
  - ◆ Intuitive data entry format: Yes
  - ◆ Data hierarchy: Yes
  - ◆ Dependent tasks connected to independent ones: Yes
- Data editing is fair.
  - ◆ Easy to go back and edit: No
  - ◆ Dependent data remain after removing data with a dependent task: Yes
  - ◆ Cascading time lines: Yes
  - ◆ Spell check: Yes
- Presentation is excellent.
  - ◆ Charts easy to make: Yes
  - ◆ Gantt timeline: Yes
  - ◆ Calendar: Yes
  - ◆ Program evaluation and review technique (PERT) charting: Yes
  - ◆ Resource allocation: Yes
  - ◆ HTML file creating: Yes
  - ◆ Color publishing: Yes
  - ◆ Graphics creation from scheduling: Limited
  - ◆ JPEG: No
  - ◆ Bitmap: No
  - ◆ GIF: Yes
  - ◆ TIFF: No
- Advanced features are excellent.
  - ◆ Object linking and embedding (OLE) available: Yes
  - ◆ Workload tracking: Yes
  - ◆ Cost and hour tracking: Yes
- Help information is fair.
  - ◆ Telephone support: Limited, some charges apply
  - ◆ Online help: Extensive, tutorials and help
  - ◆ Web site: Form to submit questions
  - ◆ Hardcopy manual: Yes

## Kidasa Software's Milestones Etc. 5.0

Milestones Etc. focuses on drawing time lines and entering explanatory text. The tools have visual cues to show progress and status. The tool is easy to install. Milestones asks only one installation question: standard or custom? Milestones sets up a separate text box for subactivities that the user can drag and drop onto the timeline. Symbols and connectors make the timeline bars represent similar tasks. The user can insert new tasks by right-clicking on a task to create a new line below.

Milestones lists subtasks under a task but does not indent them. The user can edit Milestones text by clicking on the task's date to open a new window for data. A mouse click on the time makes another data point instead of editing one. The user cannot edit the connecting bar colors, so the user must delete and recreate the timeline bar in the new color and format. The user can assign task dependencies by right-clicking on the menu over the main task.

## Kidasa Software's Milestones Etc. 5.0

Milestones reclassifies the subtasks as a main task when a main task is deleted. When the user moves the end point of an independent task, the start points for dependent tasks cascade to correspond with the new end point. Spell check is available.

Milestones has two presentation views: calendar and Gantt. Milestones can easily publish to the Web. The user can save a file as an HTML document and save schedules in a graphic format. Milestones can include numeric data as a part of its charting, but analysis of the data is not present. The tool has telephone and e-mail support. Milestones provides a question and answer page for installation and a top 10 support-question list. The major characteristics of Milestones Etc. 5.0 are as follows (Milestones Etc. 5.0, Kidasa Software Inc., Austin, Texas, 512-328-0167, [www.kidasa.com](http://www.kidasa.com)):

- Hardware requirements include Windows 9x or NT, 32 Mb RAM, 40 Mb storage, and 133 MHz Pentium.
- Ease of installation is excellent.
- Data entry is fair.
  - ◆ Intuitive data entry format: Yes
  - ◆ Data hierarchy: No
  - ◆ Dependent tasks connected to independent ones: Yes
- Data editing is excellent.
  - ◆ Easy to go back and edit: Yes
  - ◆ Dependent data remain after removing data with a dependent task: Yes
  - ◆ Cascading time lines: Yes
  - ◆ Spell check: Yes
- Presentation is fair.
  - ◆ Charts easy to make: Limited
  - ◆ Gantt timeline: Yes
  - ◆ Calendar: Yes
  - ◆ PERT charting: No
  - ◆ Resource allocation: Yes
  - ◆ HTML file creating: Yes
  - ◆ Color publishing: Yes
  - ◆ Graphics creation from scheduling: Limited
  - ◆ JPEG: No
  - ◆ Bitmap: No
  - ◆ GIF: No
  - ◆ TIFF: No
- Advanced features are fair.
  - ◆ OLE available: Yes
  - ◆ Workload tracking: No
  - ◆ Cost and hour tracking: No
- Help information is good.
  - ◆ Telephone support: Yes
  - ◆ Online help: Yes
  - ◆ Web site: Yes
  - ◆ Hardcopy manual: Yes

## AEC Software's FastTrack Schedule 6.0

FastTrack focuses on activity listing and does timeline editing. FastTrack lacks color options and table options.

The tool is easy to install. FastTrack puts an icon on the Start menu, on the desktop, and under the program file information. FastTrack also uses the Gantt format. The user can insert new lines to the task. The tool indents tasks to denote hierarchy. Dragging a task's timeline bar and connecting it to another can link subtasks. Editing the project data is not comfortable. As each task and subtask is added or edited, associated time lines disappear and the task reverts back to the default—the current day's date. The user must reenter all previously scheduled information.

The user can retype an activity's information and change start and end dates without changing data for other tasks. The time lines bars also can shift the time.

FastTrack reclassifies the subtasks as a main task when a main task is deleted. When the user moves the end point of an independent task, the start points for dependent tasks cascade to correspond with the new end point. Spell check is available. In presentation, FastTrack gives a Gantt view with total–day allocation below.

FastTrack can easily publish to the Web. The user can save a file as an HTML document and save schedules in a graphic format. FastTrack does workload tracking as a part of the standard schedule, but labor costs are not present, nor is there a way to allocate resources. The tool has telephone and e–mail support. FastTrack provides a tutorial, help topics, and an online FAQ list (the tool maintains an FAQ page). The major characteristics of FastTrack are as follows (FastTrack Schedule 6.0, AEC Software Inc., Sterling, Va., 703–450–1980, [www.aecsoft.com](http://www.aecsoft.com); Jackson, 1999):

- Hardware requirements include Windows 9x or NT, 32 Mb RAM, 20 Mb storage, 133 MHz Pentium.
- Ease of installation is good.
- Data entry is excellent.
  - ◆ Intuitive data entry format: Yes
  - ◆ Data hierarchy: Yes
  - ◆ Dependent tasks connected to independent ones: Yes
- Data editing is excellent.
  - ◆ Easy to go back and edit: Yes
  - ◆ Dependent data remain after removing data with a dependent task: Yes
  - ◆ Cascading time lines: Yes
  - ◆ Spell check: Yes
- Presentation is good.
  - ◆ Charts easy to make: No
  - ◆ Gantt timeline: Yes
  - ◆ Calendar: Yes
  - ◆ PERT charting: No
  - ◆ Resource allocation: Yes
  - ◆ HTML file creating: Yes
  - ◆ Color publishing: Limited
  - ◆ Graphics creation from scheduling: Limited
  - ◆ JPEG: Yes
  - ◆ Bitmap: Yes

- ◆ GIF: Yes
- ◆ TIFF: Yes
- Advanced features are good.
  - ◆ OLE available: Yes
  - ◆ Workload tracking: Yes
  - ◆ Cost and hour tracking: No
- Help information is good.
  - ◆ Telephone support: Yes
  - ◆ Online help: Yes
  - ◆ Web site: Yes
  - ◆ Hardcopy manual: Yes

## Digital Tools, Inc., AutoPlan

AutoPlan is a graphic project management system for open systems. With this tool the project team members exchange information across multiple platforms. The planners and engineers use the same platforms for scheduling projects that they use for design and engineering and rolling up project data for summary level reports. This allows the user to manage projects effectively by providing a powerful graphic user interface that supports multiple overlapping windows and a mouse. Time analysis, resource and cost analysis, work breakdown structure (WBS), and progress monitoring are easy.

The capabilities of AutoPlan are as follows (Digital Tools, Inc., 408–366–6920):

- Project management functional areas
  - ◆ Project scheduling
  - ◆ Resource management
  - ◆ Project tracking
  - ◆ Project reporting
- Project scheduling functionality
  - ◆ Critical path method (CPM)
  - ◆ Precedence analysis
  - ◆ Multiple project scheduling
  - ◆ Task priority
  - ◆ WBS modeling
- Resource management functionality
  - ◆ Conflict analysis
  - ◆ Profile definition
  - ◆ Resource leveling
  - ◆ Pool definition
- Project tracking functionality
  - ◆ Planned versus actual
  - ◆ Cost/schedule variance
  - ◆ Man–hour accounting
  - ◆ Contingency planning
  - ◆ Earned value (EV) analysis

## Computer Associates International, CA–SuperProject for PC

- Project reporting functionality
  - ◆ Gantt chart
  - ◆ Resource histogram
  - ◆ Cost line graph
  - ◆ Network diagram

The platform requirements for AutoPlan are as follows:

- Sun Sparc; Sun OS: OpenLook, Motif
- HP 9000/400, 700; HP–UX: Motif; Motorola: MPC, UNIX, Motif
- IBM: RS6000; AIX; Intel: all, SCO, ODT/Motif
- DEC: 3100, 5000, ULTRIX, Motif; Data General: Motif
- Silicon Graphics: IRIS Indigo, IRIX 4.0, Motif

The minimum configuration for AutoPlan is as follows:

- Selected server with 16 Mb RAM
- Selected workstations with 8 Mb RAM

## Computer Associates International, CA–SuperProject for PC

CA–SuperProject for PC is a project planning, tracking, and reporting tool that implements the Microsoft Windows graphic user interface. The tool incorporates multiple views for editing and display of project information. The tool provides dynamic data exchange (DDE) connectivity to external spreadsheets and other CA–SuperProject files. CA–SuperProject is packaged with CA–Realizer, a superset of the BASIC high–level programming language that enables the creation of external applications that can interface directly with CA–SuperProject. Standard report templates are provided with user customization capabilities included. CA–SuperProject generates Gantt, PERT, and resource histogram charts as well as cost line graph and spreadsheet EV data.

The capabilities of CA–SuperProject are as follows (Computer Associates International, Inc., 1–800–CALL–CAD):

- Project management functional areas
  - ◆ Project scheduling
  - ◆ Resource management
  - ◆ Project tracking
  - ◆ Project reporting
- Project scheduling functionality
  - ◆ CPM
  - ◆ Precedence analysis
  - ◆ Multiple project scheduling
  - ◆ Task priority
  - ◆ WBS modeling
- Resource management functionality
  - ◆ Conflict analysis
  - ◆ Profile definition

## COSMIC, COMPASS

- ◆ Resource leveling
- ◆ Pool definition
- Project tracking functionality
  - ◆ Planned versus actual
  - ◆ Cost/schedule variance
  - ◆ Man-hour accounting
  - ◆ Contingency planning
  - ◆ EV analysis
- Project reporting functionality
  - ◆ Gantt chart
  - ◆ Resource histogram
  - ◆ Cost line graph
  - ◆ Network diagram

The platform requirement for CA-SuperProject is 80386 SX (16 MHz), MS-DOS 3.0, and Windows 3.0 or higher.

The minimum configuration for CA-SuperProject is 80386 SX (16 MHz), 4 Mb RAM, 10 Mb hard disk space, VGA monitor, Mouse or Track ball, MS DOS 3.0 or higher, and Windows 3.0 or higher.

## COSMIC, COMPASS

COMPASS is suitable for a wide range of projects, including activity scheduling. The tool has the capabilities necessary for the user to plan creation in advance of execution time, plan revision before execution time, and plan revision at execution time in response to failure and delays. The tool can be used to manage activities that are subject to timing constraints, ordering constraints, and availability of resources. The tool can also be used to manage a variety of resources, including other tools, equipment, crews, electricity, and water. The resources may be used and then returned by an activity, consumed by an activity, or even produced or supplied by an activity.

The capabilities of COMPASS are as follows (COSMIC, 706-542-3265):

- Project management functional areas
  - ◆ Project scheduling
  - ◆ Project reporting
- Project scheduling functionality
  - ◆ Multiple project scheduling
- Resource management functionality
  - ◆ Conflict analysis
- Project tracking functionality
  - ◆ Planned versus actual
  - ◆ Man-hour accounting
  - ◆ Contingency planning
- Project reporting functionality

- ◆ Gantt chart
- ◆ Resource histogram
- ◆ The platform requirement for COMPASS is Sun Sparc; Sun 3.
- ◆ The minimum configuration for COMPASS is as follows:
  - 4 Mb RAM; 2 Mb hard disk space
  - Sun Workstation with Sun OS 4.0
  - X–Windows release 11.3 or higher, VERDEX Ada compiler

## Quality Software Products Co., MasterPlan

MasterPlan 1.1X is a graphically oriented project management system for UNIX–based systems running the X–Windows system. This tool can be used for planning projects of varying sizes. This provides project management features such as CPM, Gantt charts, PERT charts, resource allocation and leveling, and a variety of resource costing procedures.

The capabilities of MasterPlan are as follows (Quality Software Products Co., 1–800–288–6981):

- Project management functional areas
  - ◆ Project scheduling
  - ◆ Resource management
  - ◆ Project tracking
  - ◆ Project reporting
- Project scheduling functionality
  - ◆ CPM
  - ◆ Precedence analysis
  - ◆ Multiple project scheduling
  - ◆ WBS modeling
- Resource management functionality
  - ◆ Conflict analysis
  - ◆ Resource leveling
  - ◆ Pool definition
- Project tracking functionality
  - ◆ Planned versus actual
  - ◆ Cost/schedule variance
  - ◆ Contingency planning
  - ◆ EV analysis
- Project reporting functionality
  - ◆ Gantt chart
  - ◆ Resource histogram
  - ◆ Cost line graph
  - ◆ Network diagram

The platform requirements for MasterPlan are as follows:

- Sun Sparc; Sun OS: OpenLook, Motif
- HP 9000/400, 700; HP–UX: Motif; Motorola: MPC, UNIX, Motif

## Cambridge Management Systems, Project Outlook

- IBM: RS6000; AIX; Intel: all, SCO, ODT/Motif
- DEC: 3100, 5000, ULTRIX, Motif; Data General: Motif
- Silicon Graphics: IRIS Indigo, IRIX 4.0, Motif

The minimum configuration of MasterPlan is 8 Mb RAM, 150 Mb hard disk space, and X–Windows 11.3 or higher.

## Cambridge Management Systems, Project Outlook

Project Outlook is a project management scheduling design and control tool that uses the Microsoft Windows graphic user interface.

The capabilities of Project Outlook are as follows:

- Project management functional areas
  - ◆ Project scheduling
  - ◆ Project tracking
  - ◆ Project reporting
- Project scheduling functionality
  - ◆ CPM
  - ◆ WBS modeling
- Project tracking functionality
  - ◆ Planned versus actual
  - ◆ Project reporting functionality
  - ◆ Gantt chart

The platform requirement for Project Outlook is an IBM–compatible PC and Windows.

The minimum configuration for Project Outlook is Windows 3.0 standards.

## Risk Radar

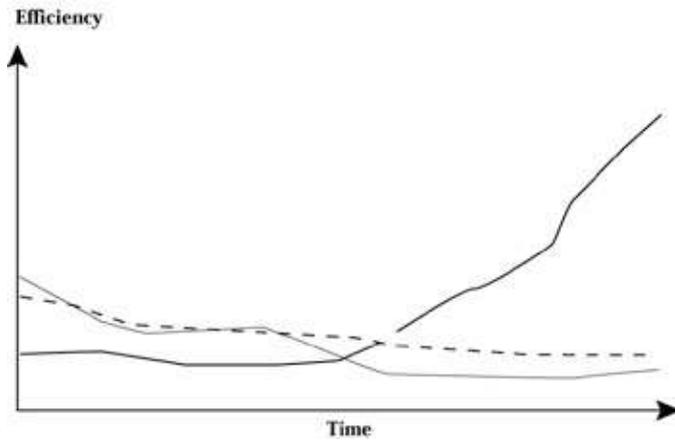
Risk Radar is a risk management application by the Software Program Management Network (SPMN) that identifies, organizes, prioritizes, tracks, and displays project risks. Project managers who use this tool can easily characterize, rank, and communicate project risk with the entire project team. Risk Radar keeps risks in view so that the manager can preempt risks before they become disasters. The control panel improves project management and avoids unwanted surprises by enabling software managers to monitor and control key drivers of project cost, schedule, and performance.

The Risk Radar tool helps the manager visualize and monitor project progress and status. It displays software development progress measurements that focus on time, money, staff, and defects. Two MS Excel 7.0 spreadsheets supply the data for the control panel: the first provides project data, and the second provides risk data. When these spreadsheets are regularly updated, the control panel supplies the information needed to keep the project on course, allowing every member of the project team to view the project performance. The control panel provides graphic depiction, clarity, concise information, and best practices. The control panel provides the project manager with the status of the following seven critical areas for monitoring purposes:

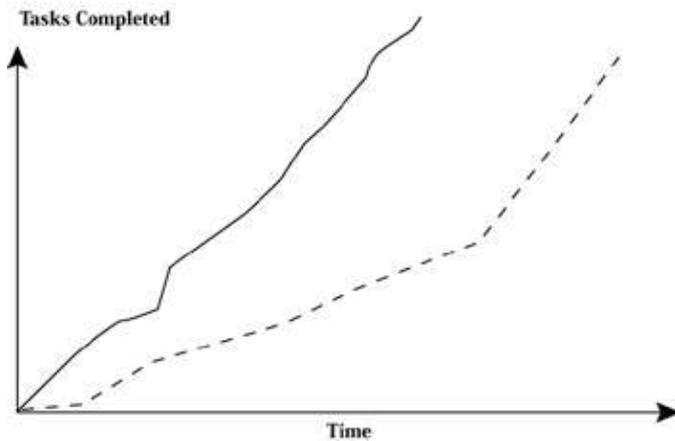
## Cambridge Management Systems, Project Outlook

1. Progress
2. Productivity
3. Completion
4. Change
5. Staff
6. Quality
7. Risk

In addition, Risk Radar uses a standard Microsoft Access database, which contains the data and user interface in a single application file, which is accessible through File Manager in Windows 3.X or directly through MS Access (Versions 2.0 or higher) (Figure 8-1, A-C).

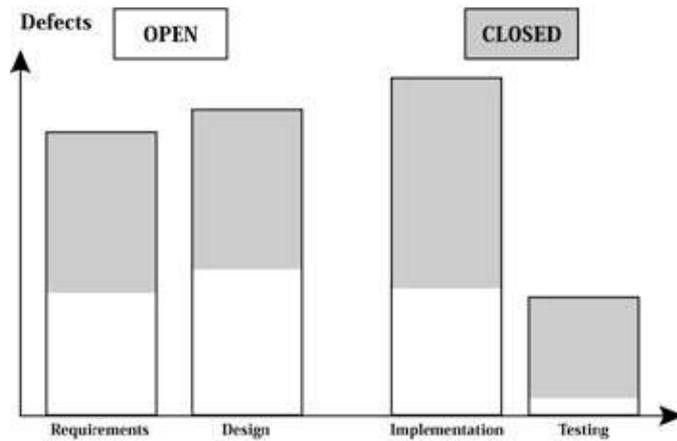


8-1 A: Project performance efficiency



8-1 B: Tasks completed

## Commercial Items Checklist



8-1 C: Defects by phases

### Commercial Items Checklist

- Do extensive market research.
- Select suitable CIs early in the project's development.
- Study product performance.
- Consider quality assurance of the CI (reliability, maintainability, and availability).
- Consider vendors' experience in addition to the product's cost.
- Evaluate market standards and practices.
- Establish flexibility in the operational requirement to allow consideration of a broader range of CIs.
- Document the results of market research.
- Scrutinize vendors' guarantees and warranties for the product.
- Analyze vendors' retention of technical data rights.
- Take advantage of vendors' training and support for the CI.
- Test the usefulness of CIs before making a commitment.