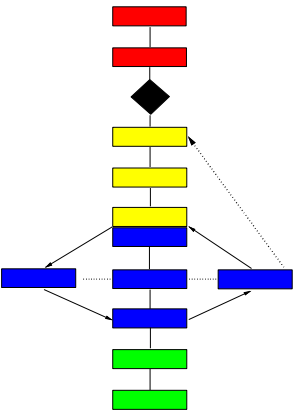


Inventory Management Guide

MITP
v5.1



Edition Notice

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This edition applies to Version C5.0 of Managing the Implementation of the Total Project (MITP), and to all subsequent releases and modifications until otherwise indicated in new editions.

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PREFACE About This Document

This document describes how to manage project inventory through all life cycle phases.

For information about the MITP life cycle, the key techniques, and the support techniques, see the MITP Handbook. A glossary of terms may be found at the back of the MITP Handbook

Who Should Read This Document

The 'you' in this document is the project manager, but other people can read and extract useful information from it.

How to Use This Document

The table of contents provides a clear roadmap to the main topics outlined in this document.

ISO9000 Control Information

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1. Introduction to Inventory Management

Webster's Ninth New Collegiate Dictionary defines inventory as:

- An itemized list of current assets
- A list of goods on hand
- A list of traits, preferences, attitudes, interests, or abilities used to evaluate personal characteristics or skills
- The quantity of goods or materials on hand, for example, stock
- The act or process of taking an inventory.

So you can speak about inventorying a project, where an itemized list of current project assets would be:

- Skills
- Client systems documentation
- Project documentation
- Previous project work
- Established client relationships
- Project review documentation
- Computers, software, and so on
- Other project information.

Or, as a list of traits, preferences, attitudes, interests, or abilities used to evaluate personal characteristics or skills:

- Project personnel personality characteristics
- Project personnel technical skills
- Project personnel services skills
- Client satisfaction.

It is impossible to know what a project's inventory is before initially establishing that inventory, and consistently maintaining it. The following addresses those components of a project that should be inventoried, and the processes that will be helpful in establishing and maintaining that inventory in all phases of a project.

All phases of a project must have an inventory. Of course, the inventory increases as a project progresses. This means that additional inventory tracking is required as a project progresses. That is one reason why good project management requires:

- The establishment of solid project plans
- Assurance that all required inventory is acquired
- Assurance that all acquired inventory is adequately maintained.

It is important to consider every piece of information, every skill, and every physical asset as part of the project inventory. This even includes the relationships established with the client, teams organized to work on the project, and the skills of each individual on the project. Many of these relationship inventories will be more fully addressed in subsequent topics. However, it is important that you value these as inventory just as you would value other assets of the project.

Current education emphasis is on the construction of a project plan. Project plans are made up of units of work and one of the more common problems in projects is overlooking units of work or not knowing or understanding the entire project inventory. However, to develop a plan or manage work, you must know what your inventory components are. This plan inventory includes:

- What was done in past project phases
- The known extent of work
- Associated deliverables for this project.

You cannot develop a work plan unless you know the complete inventory. Inventory, in this case, is the entire universe for the project. In the most detailed level of the project, roll-up of these work plans is the basis of the schedule. If there are elements left out of the work plans, there can be no schedule integrity and the project will be filled with unplanned events.

Management of work revolves around managing these individual inventory components. These components will differ between a systems integration (SI) project, an application or software development project, or a reengineering or conversion project. However, many work components or tasks are standard. Emphasis on the common process and the review of tasks provides the best management consistency between technologies and brings steady results from project to project.

This document describes:

- The first steps in inventory management
- Common work breakdown methods for gathering inventory components used to develop a work plan
- Common project process and tasks (also inventory) for implementation
- Some of the deliverables or work products, definitely project inventory.

2 Assessing Inventory

When you inherit a project, the first task is to examine the project inventory. Questions need to be answered before starting any work or staffing the project. This up front work pays dividends by insuring that all information is accurate and the assumptions, scope, and plan for the project are correct.

Typically, you become involved in a project in one of following situations:

1. A proposal has not been completed, and you must manage the proposal effort and follow-on efforts
2. A proposal has been signed by the client and requirements and design for the deliverables must take place
3. A Contract has been signed and the project is based on a design and/or a requirements study with broad statements of work and tasks. The detail work breakdown and schedule and staffing plan must be done before work begins
4. A Contract has been signed, the project plan has defined tasks and work and pricing has been done with the assumption that the only work required is to manage the project.

Since there can be variations and combinations of the above, you must assess the project inventory before staffing and completing the plan or schedule unless you have managed the previous phases.

The reasons for the project assessment and inventory are to ensure:

- Agreement on the scope, approach, and objectives of the project
- Agreement on deliverables and time-frames
- Understanding of all of the work involved by the client and the team
- Management commitment to the project
- Revalidation of the previous work in regard to assumptions:
 - Technology
 - Workloads and time-frames
 - Workloads and cost of staffing
 - Availability of skills
 - User acceptance
 - Understanding of the business value or justification.

By definition, inventory means all related project inputs, including:

- User specifications
- Data flows
- System inventory
- Work flows
- Project documentation including:
 - Scope definitions
 - Objectives
 - Requirements definitions
 - Business value of deliverables
 - Design documents
 - Specifications

- Proposal
- All completed.

The need to ensure that common project deliverable specifications are complete is somewhat obvious but many projects are begun and staffed with an incomplete understanding of the work to be done or the breadth of the tasks.

Subtopics

- 2.1 Importance of Project Inventory
- 2.2 Inventory Process
- 2.3 Inventory Information Gathering
- 2.4 Work Breakdown

2.1 Importance of Project Inventory

No business runs without a good inventory, and a project is a business. You must "get your hands around the project" before being able to 'handle' it. The project inventory effort provides a means to accomplish this.

Inventory is especially key when either converting or integrating systems. Failure to include a key component or system in the inventory will result in it being overlooked during early phase work (requirements and design) and later implementation failure.

In the past, when application development was new, inventory was not considered important until the maintenance phase after production cutover. Development projects were much smaller, and the deliverables provided less function. Maintenance of inventory during development was fairly simple due to the lack of complexity.

Today, the implications of distributed systems with distributed data, and disparate geography and time zones, demand accurate inventory mapping to show system components, data flow and components, and accompanying business process. Additionally, many of today's development projects involve the integration of functionally complex systems in a comparatively short period of time. Maintaining the project inventory is extremely complex.

It is impossible to assess test or change ramifications during implementation if the inventory is not known. In order to prioritize work or assess change to work, it is also important to know the business value of inventory components. All of this information is essential to constructing a schedule, a resource plan, and a work or project plan that will meet the project financial plan or budget.

2.2 Inventory Process

The purpose of assessing the project inventory is to have a thorough understanding of the project, and its current status. To achieve this, the entire project must be inventoried. The entire project includes a complete inventory of the client and its needs, the project work to-date, work to be performed, and the skills and other assets of the project. Many project managers, when assuming a project that is already in progress, will have a project review performed as part of their inventory analysis. The project review will assist in gathering pieces of the inventory, specifically, the project documentation, tracking and reporting, and portions of the client inventory.

Table 1 contains a partial list of the major areas that you should have in the inventory:

Table 1. Inventory Checklist	
Inventory Item	Y/N
Project scope:	
User organizational involvement	
Business function to be included	
Systems to be included or interfaced	
Client management agreement on scope	
Client involvement and agreement	
Executive sponsor support	
IS involvement and support	
User department management support and participation	
End User participation	
Client organization and business documentation:	
Contract and related documentation	
Organization chart	
Contact lists	
Laws and regulations	
Audit requirements	
Standards	
Procedures	
IS inventory	
Client's deliverable service or goods	
Project documentation and deliverables:	
Proposal and statement of work	
Methodology documentation	
All requirements, designs, specifications	
Standards	
Procedures	
Guidelines	
Completed project intermediate deliverables	
Completed project deliverables	
Work plans	
Resource plans	
Schedule plans	
Organization plans	
Financial plans	

Orientation plans	
Quality plans	
Testing plans	
Training plans	
Inventory tracking plans	
Previous project reviews	
Project status reviews	
Project technical reviews	
Project design reviews	
All project tracking reports	
All project status reports	
Project resources:	
Skills assessments	
Individual skill profiles	
Supplier profiles and contracts (including deliverables)	
Hard and soft inventory	
Staffing plans	
Training plans	
Nonhuman resource inventory	
Tracking of resources	

Much of this information (if not all) should be present in the Project Control Book for the project. However, if any of the information is missing or is incomplete, then you must ensure that it is completed.

2.3 Inventory Information Gathering

Regardless of the previous inventory work performed, or the phase of the project, it is most likely that some required project inventory will be missing. A plan should be put in place to assist in gathering that needed inventory. The following points may assist in gathering the additional information required to complete the project inventory.

- 1 Determine the type of information needed:
 - Project documentation
 - Client scope definition
 - Client system documentation or information
 - Project work products.
- 2 Locate the sources of information:
 - Where is it located
 - Best source within the group.
- 3 Determine the way to extract the information:
 - Interviews
 - Documentation
 - Survey
 - Other methods as appropriate.
4. Lay out how the information from all sources fits together
5. Develop the best format to present the information and document the inventory
6. If the project is a conversion or migration project, Inventory is even more key and you must know:
 - The number work units available and to be produced
 - All interrelationships between systems and applications.
7. Set a realistic schedule and deadline for acquiring the required information.

If you are comfortable with the known project inventory, then you may proceed to the next step.

2.4 Work Breakdown

At this point, project tasks must be validated. The work breakdown takes the statement of work and all previous project requirements and design documents (if available) including deliverables, and breaks them into work units using tasks. Tasks should tie back to inventory when there is work associated with the system, data, work flow, or process inventory.

If a work breakdown already exists, you should validate it against existing documentation. This validation must include all task estimates. If working with an existing plan, ensure that valid new estimates are incorporated into the plan as well as the net additional tasks

resulting from inventory assessment. Figure 1 compares outstanding task estimates with completed task estimates against actuals. This may provide a confidence measure for future work.

$$\text{Confidence Measure} = \frac{\text{Actuals of Completed Tasks}}{\text{Estimate of Completed Tasks}}$$

$$\text{Outstanding Estimate} = (\text{Confidence Measure} * \text{Estimate of Outstanding Work})$$

Simplified Example:

Task 100 original estimate = 16 hours

Task 100 actual = 17.5 hours

Task 200 original estimate = 21 hours

Only task 100 complete

$$\text{Confidence Measure} = \frac{17.5 \text{ hours}}{16.0 \text{ hours}} = 1.09$$

$$\text{New Outstanding Estimate for Task 200} = 21 \text{ hours} * 1.09$$

$$\text{Hours to complete} = \frac{\text{-----}}{\text{-----}} = 22.9 \text{ hours}$$

Figure 1. Confidence Measure

Use of a technique such as this must be judiciously applied. You can apply it, for example:

- Against the work being performed by an individual
- Against a similar set of tasks (similar with task difficulty)
- Against supplier estimates
- Against the entire project if all estimates and actuals appear to be off by the same amount.

2.4.1 Breaking Work into Manageable Units

Most projects involve the application development of systems to be developed or reengineered. The steps that follow will therefore be geared to such projects. However, a similar procedure would be applicable to other projects including SI, conversions, migrations, roll-out, and operational services projects.

1. A logical approach is to group units of work according to data, users, and systems. The inventory must be assessed to develop factors which place the tasks into a schedule precedence or order.
2. Some estimating technique must be used to determine how long the work will take to complete for each task or unit of work.

To do this assessment, task difficulty and resource availability must be assessed (but only at this inventory level - a more detailed assessment will be done at the schedule level). Just consider factors affecting the amount of time a task will take given the proper resource was applied and one person working on it (hours to complete).

To do this effectively, inventory characteristics must be known relating to difficulty, complexity, and interlinkage (testing and matrix factors).

3. Once tasks are known, it is possible to assess which must come first relative to:

- Precedence
- Priority
- Dependencies

and which can be done in parallel.

It is helpful to use a project planning tool to move tasks around.

4. Once you have the inventory tasks defined, add the communication, planning and assessment tasks such as:

- Test planning
- Test file building
- Walkthroughs
- Project reviews
- Problem solving sessions.

Note: For a more complete description of work breakdown, see the Work Breakdown Structure Guide. Inventory Management Guide Inventory Checklists

3 Inventory Checklists

While not complete the following information is included as an aid to performing the project inventory for a typical software development project.

Subtopics

- 3.1 Project Readiness Checklist
- 3.2 Inventory Checklist of Key Project Documents
- 3.3 Inventory Checklists for Major Project Work Components

3.1 **Project Readiness Checklist**

You can use the following checklist as an aid to in determining if the project is ready to move into implementation. Its primary purpose is to assess the completeness of the requirements and design phases of the project.

Table 2. Project Readiness Checklist		
Is the Following Complete?	Yes	No
Have you reviewed documentation from the requirements and design phases?		
Does the design match requirements?		
Has an expert technical review been performed on the design?		
Do you understand the methodology used and the implication to implementation tasks (see managing requirements/design projects for methodology overviews)?		
Are user performance, compliance, and acceptance criteria documented and does the design appear to deliver to them?		
If the project tasks for implementation are laid out and estimated, have you validated these tasks by assessment of the inventory?		
If this is a rapid prototyping project, have you ensured that the design does not have ramifications to other systems or work units?		
Is the work flow documented?		
Are the data flows documented?		
Do you have documentation that ties system inventories to functional work and applications as they relate to planned deliverables?		

If too much inventory is missing, a project review and assessment should be conducted to determine the impact of what is missing and what the work effort will be to correct or develop missing deliverables.

In the most drastic situations, the project needs to be halted while requirements are revalidated or determined or a design is constructed or enhanced.

It is better to start with the real situation than to begin work without concrete requirements and a sound design.

There is little chance for success if the building of the system and the deliverables occurs without a sound design.

3.2 **Inventory Checklist of Key Project Documents**

The following inventory checklist is useful in either moving a project from a design into an implementation phase, or as a guide to ensure that adequate project inventory is built during the requirements phases of a project.

Based on the results of this checklist, additional information may need to be gathered, or previous phases work may have to be reworked to bring the project inventory up-to-date before moving into an implementation phase.

Table 3. Key Project Documents Checklist		
Project Document	Yes	No
Is a project objectives document available and complete?		
Is a requirements document available and up-to-date?		
Is a complete design document available and up-to-date?		
Is there an accurate system architecture that encompasses the system design and requirements documents?		
Have internal design specifications been completed (if appropriate for this phase) for all system components?		
Is a project plan available?		
Does the project plan address all deliverables of the chosen methodology?		
Does the project plan allow for the development of all components and subcomponents of the required system?		
Is there a detailed project schedule available?		
Is there a project resource plan?		
Is there a project financial plan?		
Is there an orientation package for new project participants?		

3.3 Inventory Checklists for Major Project Work Components

To validate either requirements or design it is important to review the basic process that should be completed during those phases. It is best to review the design phase management section if it appears that the system will require redesign. If the system requirements are suspect as well, then the requirements phase definition and design phase management sections should be reviewed to assist in the potential system redesign. The following process steps are provided and assume that previous phase validation will be performed as the steps are being completed.

3.3.1 Major Development Process Steps

You should ensure that the following steps are covered through work units, specifications, test criteria, and deliverable definitions before implementation. If any of the steps are missing or incomplete (through an inventory assessment of the work plan) the work plan must be updated or corrected. If the work plan has not been completed, then these steps must be considered when it is created.

Table 4. Major Development Steps - Inventory Checklist		
Step	Activity	Y/N
1	Understand the business and operational needs	
2	Analyze the client or user requirements	
3	Define systems architecture	
4	Define interfaces - user and external	
5	Analyze resource, business, and cost	
6	Develop system and subsystem specifications	
7	Develop system support plans	

8	Develop system, hardware, and software detailed design specifications (This is very iterative if using rapid prototyping)	
9	Complete the development work (build stages)	
10	Integrate and test	
11	Train the new users	
12	Migrate the users to the new system	
13	Maintain and operate the system	

3.3.2 System Development Process - Major Milestones and Documents

This checklist provides a sample of the major deliverable documents and milestone tasks that should be included in any project inventory assessment. In planning or validating the work breakdown for the project, this list is generally inclusive for most methods accepted in the industry.

Table 5. Major Deliverables and Milestones for Development Phases	
Requirements Analysis	
Major Deliverable Documents	Major Milestone
Functional Requirements Specification	Requirements Review
Design	
Major Deliverable Documents	Major Milestone
System Architecture and Configuration data	System Design Review
System Operational Concept	
System Test Plan	
Support Plans	
Hardware and Software Design	Software Specification Review
Software Requirements Specifications	Preliminary Design Reviews
Interface Requirements Specifications	
Operations Concept Document	
Cost Analysis Report	
Detailed Hardware Design/Plan	
Hardware Specifications (New development)	
Software Detail Design Specifications	Design Reviews
Development	
Major Deliverable Documents	Major Milestone
Hardware and software development, work papers, and online products	Code Reviews
Test Plans	
Test Procedures	Unit Tests
Test Plan Review	
SI and Test Plans	System Test Review System Acceptance
Test Reports	Test

Technical Manuals and Training Documents	Functional Review
Fall back and Recovery Plans	Configuration Review
Production Plan (includes Roll-out Plans for Installation)	
Installation Training Materials	Operations Review
Operations and Maintenance Documentation	
Production Cutover	
Major Deliverable Documents	Major Milestone
User Guides	Operations Review
Issue and Problem Logs	
Change Management	
Run Books	
Operations Guides	

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Readers Comments

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