# ENGINEER TECHNICAL SUPPORT
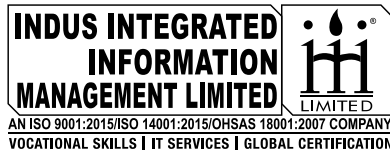
**SSC/Q0101**

# ENGINEER TECHNICAL SUPPORT

**INDUS INTEGRATED
INFORMATION
MANAGEMENT LIMITED**

AN ISO 9001:2015/ISO 14001:2015/OHSAS 18001:2007 COMPANY
VOCATIONAL SKILLS | IT SERVICES | GLOBAL CERTIFICATION

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# INDEX

## CHAPTER 1

# Introduction
# TECHNICAL SUPPORT ENGINEERS

Support engineers, or more specifically technical support engineers, address customer questions and concerns regarding their company's products. These professionals answer incoming phone calls from customers and troubleshoot technical problems. The educational requirements for this career vary, although an associate's or bachelor's degree in a technical field is commonly required. Individuals may also find positions with significant professional experience.

## Job Description

In addition to addressing customer inquiries, concerns and suggestions, support engineers may focus on issues brought up by other departments within their company, such as sales, manufacturing and operations. They may work in a variety of industries, from healthcare to telecommunications. Support engineers serve as experts in the products that their company manufactures and develops. They find solutions to problems with the products and help customers work through technical difficulties. Job duties may include:

- ↪ Filing reports regarding product problems
- ↪ Researching technical issues
- ↪ Managing and processing customer orders
- ↪ Walking customers through solutions
- ↪ Reviewing product change requests
- ↪ Learning about product updates and new technologies

Support engineers also report defects or offer suggestions for product improvement. Through their investigations, support engineers contribute to product knowledge and help make future technical support easier. Additional responsibilities may include taking action to resolve problems, troubleshooting, answering phones calls, and responding to e-mails.

## Job Requirements

The educational requirements for support engineers can vary greatly by employer. For example, companies who manufacture computer software may prefer a bachelor's degree in computer science or computer engineering. Other employers may not be so specific regarding a major and may require a bachelor's degree in engineering or a technical discipline. Few employers may accept an associate's degree or no degree at all for job applicants with extensive experience.

Because support engineers must communicate with other departments within their company and customers on a regular basis, both oral and written communication skills are very important. Individuals also need to have excellent troubleshooting, problem-solving and analytical skills. Support engineers must be technically knowledgeable when

it comes to their company's products and able to learn about new technologies quickly.

# TECHNICAL SUPPORT AND HELPDESK

As a technical support/helpdesk employee, you'll be monitoring and maintaining the computer systems and networks within an organisation in a technical support role. If there are any issues or changes required, such as forgotten passwords, viruses or email issues, you'll be the first person employees will come to.Tasks can include installing and configuring computer systems, diagnosing hardware/software faults and solving technical problems, either over the phone or face to face.Most importantly, as businesses cannot afford to be without the whole system, or individual workstations, for more than the minimum time taken to repair or replace them, your technical support is vital to the ongoing operational efficiency of the company.As technical support, you may also be known as a helpdesk operator, technician or maintenance engineer. You could work for software or equipment suppliers providing after-sales support or companies that specialise in providing IT maintenance and support. Alternatively you may work in house, supporting the rest of the business with their ongoing IT requirements.Some tasks you may be involved in include:

- ↦ Working with customers/employees to identify computer problems and advising on the solution
- ↦ Logging and keeping records of customer/employee queries
- ↦ Analysing call logs so you can spot common trends and underlying problems
- ↦ Updating self-help documents so customers/employees can try to fix problems themselves
- ↦ Working with field engineers to visit customers/employees if the problem is more serious
- ↦ Testing and fixing faulty equipment

## Opportunities

In many companies, you may find there's a natural career progression within technical support. As an example, this would see you being promoted to a more senior technical support role and from there to a team, section or department leader. Alternatively, a role in technical support is a good stepping stone if you wish to move towards various other areas in IT, such as programming, IT training, technical sales or systems administration.

## Required skills

As well as a strong technical background, many employers would want you to be able to explain complex information in simple, clear terms to a non-IT personnel. Additionally, they will be looking for:

- ↦ An ability to assess each customer/employee's IT knowledge levels
- ↦ Ability to deal with difficult callers
- ↦ Logical thinker

- ↦ Good analytical and problem solving skills
- ↦ Up-to-date technical knowledge
- ↦ An in depth understanding of the software and equipment your customers/ employees are using
- ↦ Good interpersonal and customer care skills
- ↦ Good accurate records keeping

## Entry requirements

You can start training to work in a technical support role straight from school if you have good GCSE grades in English, Maths and IT or Science.An additional computing course would also help you stand out among employers. Popular courses include: BTEC (Edexcel) National Certificate and Diploma IT Practitioners, City & Guilds (E-Quals) IT Practitioners Certificate and Advanced Diploma and OCR (iPRO) Certificate for IT Practitioners.If you have a degree in a related computing subject, you could enter a suitable graduate trainee scheme; you'll receive a high standard of on the job training, helping you to progress quickly with working knowledge of your chosen field.

## Training

Many employers in the IT industry understand that ongoing training is important for technical positions, particularly with the speed of new developments in IT. Because of this, many employers may put you on a structured training scheme or send you on relevant courses to stay up to date.There are some specialist courses, run by the Helpdesk Institute, which may be suitable in this role. These include: Customer Support Specialist (CSS) for new entrants; Help Desk Analyst (HDA) for professionals with 9-18 months of experience; and a Help Desk Manager's qualification for those with 3-5 years of experience.You can add to your existing qualifications by taking work-based awards such as: NVQ Practitioner Levels 1 to 4, City & Guilds Higher Professional Diploma for IT Practitioners and the OCR Higher Level Award for IT Professionals.

## Hours and environment

As technical support, your typical hours will be 37 to 40 hours a week, but the days and times might vary if you work for a company that runs shifts to make sure the helpdesk is open for business 24/7.It's a desk-based job and you'll spend most of your day on the phone or emailing customers and/or employees. Thanks to advances in technology enabling remote access, more and more of your work can be completed from your workstation.

## Salary

The average pay for a Technical Support Engineer is Rs 267,478 per year. Most people with this job move on to other positions after 10 years in this career. Experience has a moderate effect on salary for this job. The skills that increase pay for this job the most are UNIX and Microsoft SQL Server.

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CHAPTER 2

# CO-ORDINATE THE DEPLOYMENT OF SOFTWARE PRODUCTS/APPLICATIONS

## Scope

### 2.1 Prepare for the Project

**Roles:** Project Manager
Executive Sponsor
Project Sponsor and/or Project Director
Project Team Members
Stakeholders

**Purpose:** After formal approval of the Project Charter during the Initiation process, a Project Manager is assigned along with the initial project team. Their first responsibility is to Prepare for the Project. The Project Manager must work to ensure that the Sponsor and/or Project Director and their performing organizations expectations and all available project information are effectively conveyed to the Project Team. This can be done collaboratively with the organizations management team.

### Tasks associated with Preparing for the Project

2.1.1 Assign the Project Manager
2.1.2 Identify Initial Project Team
2.1.3 Review Historical Information
2.1.4 Conduct Project Kick-Off Meeting
2.1.5 Establish Project Repository

### 2.1.1 Assign the Project Manager:

The Project originator (generally the Project Sponsor) will assign the Project Manager to the project. The Project Executive Sponsor and Project Sponsor and/or Director(s) are also confirmed. Because the Project Sponsors will champion the project within the organization, secure spending authority and resources, and provide support to the Project Manager, it is imperative that he/she be identified as early in the project management lifecycle as possible. Building the relationship between the Project Manager, the Project Sponsor and/or Project Director and the Executive Sponsor is critical to project success.

### 2.1.2 Identify Initial Project Team:

The extent to which the Project Team has been defined at this point may vary. At a minimum the manager for the project and certain individuals who can provide support in preparing for the project should be identified.

During Project Initiation, a Project Charter was created and should include the governance model and resources for the Project Planning (High Level). The Charter is

reviewed to confirm the roles required. With the help of appropriate Stakeholders, the Project Sponsor and/or Project Director should take the lead in identifying the names of individuals within the performing organization who could fill the roles and become Project Team members. In selecting the Project Team, definition both of the skills required to perform current tasks and of the skills required for future project tasks is needed. Immediate project needs should be met first. Various areas of the Organization may be required to provide resources to the project in order to complete Project Planning (High Level). The Project Sponsor and/or Project Director must communicate with the affected areas of the performing organization, proactively gaining agreement and securing the necessary resources. After Project Team members have been identified, the Project Manager should provide them with a project orientation and review with individual team members their current and future roles in the project. This establishes a baseline understanding of team members project responsibilities, which will be useful for conducting performance reviews later in the project.

Some organizations hold a planning meeting at the beginning of Project Planning (High Level), where all Key Stakeholders come together to review the Project Charter, discuss required roles for the next steps of developing the High Level Plan (Project Initiation Plan), and assign the Project Team members. In other organizations, establishing a Project Team is a less formal process. You should choose and use the method to identify your Initial Project Team that will work best for your project and within your organization.

Take the opportunity, from the outset, to establish the concept of a Project Team that comprises not only the folks reporting directly to you, but also your Project Sponsor, Customer Representatives, Customer Decision-makers, and all other players participating in the Project Schedule.

## 2.1.3 Review Historical Information

Development of the Project Initiation Plan will require review of documentation compiled or presented during development of the Project Charter. Materials and information reviewed may include:

The strategic plan and/or business plan, a formal document produced by the organization that outlines the business goals and direction over a designated number of years.

The Project Charter, including the initial Business Case, which describes the project objectives and how they support the organizations strategic business direction.

Project selection criteria, defining the parameters used in determining whether or not to undertake a project and identifying its business justification.

Information from a previous project similar in size, scope and objectives whose results may help in producing the project definition.

Project knowledge and experience of the individuals on the Project Team.

## 2.1.4 Conduct Project Kick-off Meeting

When the Project Team has been identified, the Project Kick-off Meeting is conducted. The Project Kick-off Meeting is the event that formally marks the beginning of the project. It is most likely the first opportunity for the Project Sponsor and/or Project Director to assemble the entire Project Team to discuss his/her vision of the project, demonstrate support, and advocate project success. Project Team members are introduced to each

other and given the opportunity to discuss their areas of expertise and how they will contribute to the project. The Project Charter is presented by the Project Manager and discussed in an open forum, to foster a mutual understanding of and enthusiasm for the project. At the conclusion of the meeting, Project Team members will understand their next steps, and will leave the meeting ready and excited to begin work.

The Project Manager can review the next Process of the Project and distribute the Project Initiation Plan Template and describe the approach that will be taken to complete the Process of developing the High Level Project Initiation Plan.

Prior to the meeting, an agenda and presentation highlighting the contents of the Charter should be prepared by the Project Manager. The Project Manager should designate one of the Project Team members as the scribe for the session, to capture decisions, issues and action items. The Project Charter and any applicable supporting materials are distributed to attendees for their review. The review of the Project Charter contents ensures that expectations for the project and its results are in agreement.

Following the session, the decisions, issues and action items should be compiled into meeting minutes and distributed to all attendees.

## 2.1.5 Establish Project Repository

Maintaining information about the project in an organized fashion facilitates new team member transitions and creates a central point of reference for those developing project definition documents. Most importantly, it provides an audit trail documenting the history and evolution of the project.

All relevant project-related material, documents produced, decisions made, issues raised and correspondence exchanged must be captured for future reference and historical tracking. The project repository can be kept as hard copy in a binder or notebook, or as electronic files and email folders, or both, at the discretion of the Project Manager, in accordance with organizational records management policies. Within the primary hard copy repository, information should be organized in indexed volume(s) to enable easy access. An index should provide reference to all material maintained electronically (for example, a file directory or e-mail folder by drive, directory, and filename). The most current hard copy of documentation should be kept in the primary hard copy repository, with earlier versions in the electronic file.

### By the end of the project, a project repository may include the following materials:
- ↪ Project Charter and supporting documentation, including the Business Case
- ↪ The Project Initiation Plan (PIP)
- ↪ Any working documents or informal documents defining Budget, Scope, Schedule (The Triple Constraints) of the project
- ↪ Project Plan (Detail) which includes the Project Schedules (baseline and current)
- ↪ Project financials
- ↪ Project Scope changes and requests log
- ↪ Project status reports
- ↪ Team member progress reports and timesheets (if applicable)
- ↪ Issues log and details (open and resolved)
- ↪ Project acceptance log by deliverable

- ↪ Products
- ↪ Risk Plan if separate from the Project Initiation Plan
- ↪ Audit results if encountered
- ↪ Correspondence, including any pivotal or decision-making memos, letters, email, etc.

## Meeting minutes

The project repository should be available to everyone involved in the project and must, therefore, be considered public information.  It is not advisable to keep sensitive information concerning individuals on the project, such as salaries or evaluations, in the project repository. Some project-related documents may also be regarded as confidential. A confidential project repository should be established in a separate location to secure sensitive information.

The organization of an electronic file system is at the discretion and preference of the Project Manager in accordance with organizational records management policies. All files related to the project should be grouped by categories within project-specific folders.  The structure should be intuitive so that anyone browsing the directory can easily locate needed information.

2.2.1 Refine the Business Case
2.2.2 Define Goals and Objectives
2.2.3 Define Project Scope
2.2.4 Develop High-Level Schedule
2.2.5 Identify Stakeholder Involvement
2.2.6 Develop Communications Plan
2.2.7 Establish Benefits and Budget
2.2.8 Define Governance and Resourcing
2.2.9 Define Management Approaches
2.2.10 Develop High Level Risk Plan
2.2.11 Produce Project Initiation Plan

## 2.2.1 Refine the Business Case

The Project Initiation Plan starts with an Executive summary that introduces the project by giving an overview of the project with a brief background as to how it came about.  This should include a further refinement of the Business Case (Business Need) that was originally defined in the Project Charter. It would include the business drivers (that is, market demand, business need, customer request, technological advance, legal requirement, or social need) that created the problem, opportunity, or business requirement.

The executive summary should also include a Project Description of the project that includes the opportunity, purpose of the project, what the project will deliver and any other high level expectations of the project.  It should identify if this is part of a larger project or if it has follow on projects. Finally, it should identify the customers and anticipated consumers of the project and why they will benefit from the project.

As you complete all the tasks for Project Planning (High Level) and develop the Project Initiation Plan, you may revisit and continually refine the business case as the project unfolds.

## 2.2.2 Define Goals and Objectives

The purpose of developing the Overall Goal and Specific Objectives is to provide a clear picture of what the project is trying to accomplish. It is also the basis for documenting the Success Criteria that will explain how you will know the overall project was a success. The input for this task is the Project Charter and the Executive Summary that you just completed. To write an effective, comprehensive list of Specific Objectives and Success Criteria, the Project Manager must work with the Project Sponsor and/or Project Director and any appropriate subject matter experts and Key Stakeholders.

If issues or conflicting project expectations are uncovered while developing the Specific Objectives and Success Criteria, the Project Manager must communicate with Key Stakeholders to resolve the discrepancies, elevate the issues when appropriate, and obtain consensus. Decisions that impact project expectations significantly should be thoroughly documented.

## 2.2.3 Define Project Scope

The purpose of defining Scope is to clearly identify what will actually be included in the project and what is beyond the range of activities and results to be included. By clarifying this at the inception of the project, people can be fully aware when the project has scope creep, the tendency to add activities and outcomes to a project without fully recognizing the impact.

This is where we will introduce one of the major concepts that is incorporated throughout this Guidebook: Triple Constraints. The Triple Constraints concept is derived from a project's constraints: Budget, Scope, and Schedule, which determine the resulting Quality. Because the constraints are interdependent, they are defined and managed together. You cannot change one with out affecting the others. The work products that define the project and its desired outcome are called the Triple Constraints and are first created during Project Planning (High Level).

## 2.2.4 Develop High-Level Schedule

A Project Schedule is a calendar-based representation of work that will be accomplished during a project. Developing a schedule means determining the start and end dates for all tasks required to produce the projects product. The High Level Schedule should include key deliverables and milestones.

At this early stage in the project management lifecycle, information required to complete a Project Schedule is known only at an overview level, often based solely upon the expert judgment of the Project Manager or other individuals with experience managing projects with similar lifecycles. Even at a high level, this information still provides insight into preparing the first draft of a Project Schedule. The activities documented in the schedule at this early stage will be further broken down during Project Planning (Detail Level), when the schedule will be refined to include the specific individuals assigned and the amount of time required to complete the work.

A Work Breakdown Structure (WBS) is a very useful work product that a Project Manager should create to facilitate development of a Project Schedule. A WBS is a graphical representation of the hierarchy of project deliverables and their associated tasks. As opposed to a Project Schedule that is calendar-based, a WBS is deliverable-based, and written in business terms. All tasks depicted are those focused on completion

of deliverables. There are no dates or effort estimates in a WBS. Using a WBS, Project Team members are better equipped to estimate the level of effort required to complete tasks, and are able to quickly understand how their work fits into the overall project structure.
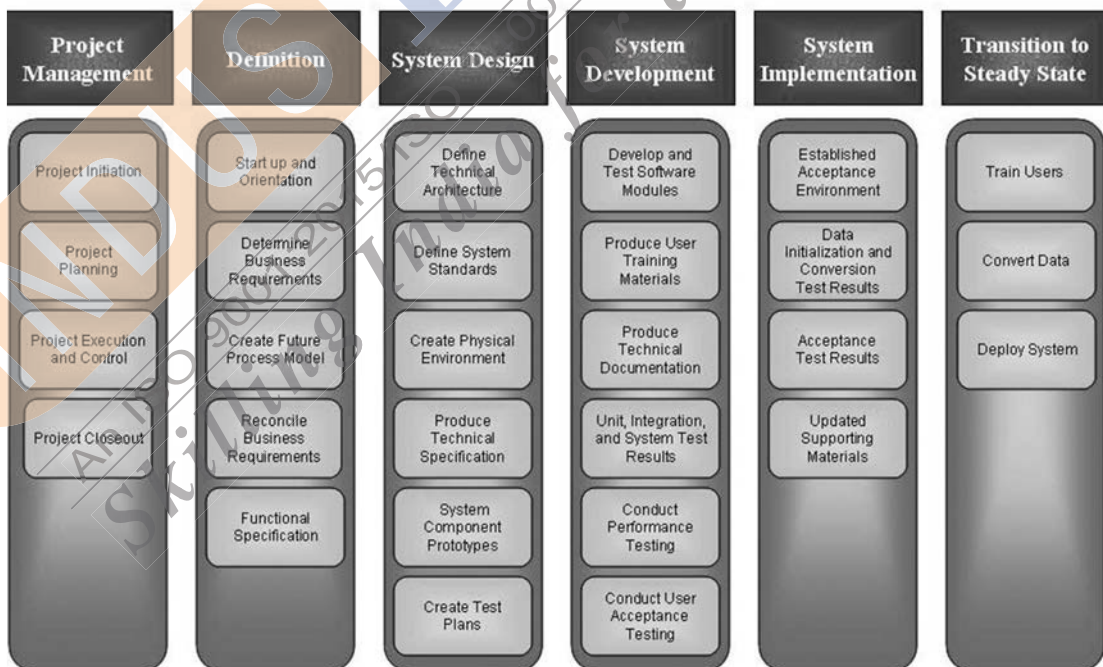
The first hierarchical level of a WBS usually contains the phases that are specific to both the Project Management Lifecycle and the Product Lifecycle of the project being performed. For example, the first level of the WBS for a software development project might look something like this: Project Management, Definition, System Design, System Development, System Implementation, and Transition to Steady State.

For this reason, a WBS may be reused for other projects with the same lifecycle. Once the first level has been completed, it is broken down into more detailed sub-levels, until eventually all deliverables and tasks are depicted at the level you intend to manage the project. When defined to the appropriate level of detail, a WBS is very useful as input to both creating and refining a Project Schedule, including estimating the required resources, the level of effort, and the cost.

In Project Planning (High Level), the information required to produce a complete WBS representing the entire project will not be known in sufficient detail. There will be enough information, however, to enumerate the tasks required to produce the High-Level Schedule. The WBS is not static - the Project Manager should work with the Project Team throughout the project lifecycle to refine the WBS and use it as input to refining the Project Schedule.

The following figure is a sample High-Level Work Breakdown Structure organized by Project Management and System Development Lifecycle for a software development project.

## Project Management Lifecycle and System Development Lifecycle Work Breakdown Structure

| Project Management | Definition | System Design | System Development | System Implementation | Transition to Steady State |
|---|---|---|---|---|---|
| Project Initiation | Start up and Orientation | Define Technical Architecture | Develop and Test Software Modules | Established Acceptance Environment | Train Users |
| Project Planning | Determine Business Requirements | Define System Standards | Produce User Training Materials | Data Initialization and Conversion Test Results | Convert Data |
| Project Execution and Control | Create Future Process Model | Create Physical Environment | Produce Technical Documentation | Acceptance Test Results | Deploy System |
| Project Closeout | Reconcile Business Requirements | Produce Technical Specification | Unit, Integration, and System Test Results | Updated Supporting Materials | |
| | Functional Specification | System Component Prototypes | Conduct Performance Testing | | |
| | | Create Test Plans | Conduct User Acceptance Testing | | |

## 2.2.5 Identify and Document Stakeholders Involvement

Stakeholder Analysis and Management is a critical part of every project. Stakeholders include all individuals, groups, and entities internal or external to your organization that contribute to the project or are impacted by, or can impact, the outcomes of the project. Stakeholders can come from many areas: Project Governance (Executive Sponsors, Sponsors, Directors, Steering Committees, Consultants, and Project Teams), Technology Groups, Customers, Subject Matter Experts, Suppliers, Support Groups, Training Groups, Special Interest Groups, other Interdependent Project Teams, Auditors, Legal, Purchasing, etc.

Normally, major or key stakeholders are identified during the Project Planning (High Level) and documented in the Project Initiation Plan and is reviewed again during Project Planning (Detail Level). You will complete Table 9 in the Project Initiation Plan with the Project Role, Name of Stakeholders, University Role, Project Responsibilities/Accountabilities, and their commitment of time to the project. This is where you set expectations for the Stakeholders, define their roles, establish individual accountabilities, and gain agreement on those accountabilities. This activity is critical to the successfully initiation and implementation of the project.

Failure to address stakeholder issues is a major cause of project failures.

In defining the High-Level Schedule for the Triple Constraints (Budget, Scope, and Schedule), a preliminary list of roles and skills required for the project will be produced. This list may be useful when creating the list of stakeholder roles needed to perform the tasks leading to the desired project outcome and the responsibilities for each role. Even if the information is known only at a preliminary level, it is helpful to the Project Manager. When documenting roles and responsibilities, the Project Manager should evaluate whether the individuals being assigned are in appropriate roles, if this information is known. If it is decided that assigned individuals may be weak in certain areas, or there are no individuals to fill certain roles, the Project Manager documents this information.

One of the greatest challenges in project management is getting the work done by individuals and business units that do not report to the Project Manager, or even to the Project Managers entire chain of command. The earlier you can identify whom you need cooperation from, and the more detail you can provide as to the extent and outcome of that cooperation, the better your chances of actually influencing the work done. Make your case early and convincingly (emphasizing how the folks that DO have influence will benefit), and you may actually get them to do what your project requires.

## 2.2.6 Develop a Communications Plan

The Communications Plan (Table 10 in the Project Initiation Plan) describes the means by which project communications will occur. The communication process must be bi-directional. The Project Manager must receive input from Project Team members and Stakeholders about their information and communications requirements, determine the best and most cost effective way in which the requirements can be met, and record the information in a formal, approved document. Similarly, the Project Manager must provide details to the team and the internal and external Stakeholders regarding the communications he/she expects to receive, and document his/her requirements in the plan.

## 2.2.7 Establish Benefits and Budget

Benefits (Table 11 in the Project Initiation Plan): By documenting the benefits of the project in the Project Initiation Plan you will gain support and buy in from all the stakeholders and continue to justify the project and obtain approval to proceed. Benefits can be classified in either quantitative or qualitative terms and should be assigned a benefit class: Increase in revenue, avoid revenue loss, reduce costs, avoid cost increases, improved service, legislative/regulatory mandates, meet competition/protect or increase market share, etc.

Budgets (Table 12 in the Project Initiation Plan): Using available tools, the Project Manager calculates the preliminary budget that will be required to complete project activities. All aspects of the project, including the cost of human resources, equipment, travel, materials, consultants, and supplies, should be incorporated. At this point information will be presented at a summary level; to be refined during Project Planning (Detail Level), as more detailed information becomes known. However, the budget should be more detailed and more accurate now than it was during Project Initiation (Project Charter). The Project Manager should use manual or automated tools to generate a Preliminary Budget Estimate. The budgeting tools may be simple spreadsheets or complex mathematical modeling tools. (See Figure

2 -9 for the Preliminary Budget Estimate.) For historical purposes, and to enable the budget to be refined, the Project Manager should always maintain notes on how this preliminary budget was derived. Cost estimating checklists help to ensure that all preliminary budgeting information is known and all bases are covered.

The Project Manager must also have a general understanding of the cost of both the human resources and the equipment and materials required to perform the work. The method by which staff and products will be acquired for the project will directly affect the budgeting process.

In coming up with the projects budget, many Project Managers fall into one of two extremes, depending on their temperaments and prior experience:

Those who are risk-averse or have been burned in the past tend to "aim high," inflating the Project Budget to protect against all eventualities.

Those who are "green," optimistic, or afraid of rejection often "aim low,"underestimating the risks and realities.

Neither approach, of course, is optimal; both put the whole project at risk, the former by either disqualifying the project in view of limited funds or inviting uninformed wholesale cuts, the latter by setting unrealistic expectations and guaranteeing multiple additional requests for more money. The best approach is to use organizational experience, your own expertise, and the best advice you can muster to predict with the greatest possible accuracy what the project will actually cost, and then set up a separate change budget.

Above all, document the basis of your estimates!

## 2.2.8 Define Governance and Resourcing

Governance (See Figure 4 in the Project Initiation Plan): The Governance of a project should describe the manner in which it will function.  It is the accountability framework and may be quite different from the organizations normal management structure. The

depiction of the projects governance structure is usually put in a graphical chart showing accountable relationships and includes the Project Role the person has and their name. It also includes the groups they belong to (Steering Committee, Technical Team, Functional Team, Campus Readiness Team, etc.). Agreeing on the project governance structure is a critical step for the project. It brings clarity to the project team on accountabilities and it is used later when we define the management approaches on how issues are escalated and the change control processes.

Resourcing (See Table 14 in the Project Initiation Plan): A number of constraints, financial, political, and organizational, may dictate the methods by which required individuals, equipment, and materials are acquired. The Project Manager needs to be aware of existing resource acquisition policies, guidelines, and procedures. In addition, the preferences of the performing Organizations management team and/or the Customer Representatives may influence acquisition decisions. In any case, the strategies defined should satisfy the needs of project Stakeholders. Information from similar past projects can be used to gain an understanding of acquisition strategies; those that were successful and applicable may be considered for implementation on the current project.

Once the Project Manager assesses the needs of the project, financial considerations, time constraints, and individual skills and availability, a method is defined for acquiring project staff. Depending on the way different organizations relate to one another, strategies used to acquire staff may vary. It is important for the Project Manager to understand the reporting relationships, both formal and informal, among different organizations, technical disciplines, and individuals. Staff may be allocated from within an organization or from an outside source using an established staff procurement procedure. The Project Manager should work with the Project Sponsor and/or Project Director to determine staffing options.

The skills required for the project, influence the means by which staff members are acquired. If there are limited qualified in-house resources available to staff a project or if a Project Manager has had positive experiences with contract staff, for example, he/she may elect to retain contractors to fill the positions rather than allocating resources from within.

As is the case with human resources, a method is defined by which equipment, materials, and other non-human resources will be obtained. The Project Manager, in conjunction with the Project Sponsor, should determine the method to be used to acquire these resources.

Regardless of how staff and products are acquired for the project, the Project Manager must add the estimated cost of all resources to the Preliminary Budget Estimate. (See 2.2.4 Develop High-Level Schedule and 2.2.7 Establish Budget)

Table 14 in the Project Initiation Plan is a summary of all the resources needed including those already identified and those that are yet To Be Determined (TBD). This table provides a clear picture of the number of resources, the percentage of time needed, and the time frames they will be needed, along with the name of their manager (if applicable).

Don't forget to document in the Project Initiation Plan any important resourcing comments, constraints, and/or issues that are important to understanding the High Level Schedule and Budget.

Any manager providing resources of any significance to the project should be identified as a stakeholder and usually needs to sign off on the Project Initiation Plan.

### 2.2.9 Define Management Approaches

It is important to define early in the project the approaches used to manage the project. In general, the Cornell Project Management Methodology (CPMM) will be applied as the project management approach to implementing your project, specifically, planning, controlling, and closing out the project. If there is a Product Lifecycle approach being used, it should be identified. These approaches will be documented in the Project Initiation Plan. (See the Management Approaches section of the Project Initiation Plan)

### 2.2.9.1 Mode of Accomplishment

The mode of accomplishment is an overall statement on how the project will be accomplished. Will it be totally done by Cornell resources, or will outside partners be involved? Who is the Customer and how will their participation be needed? How will the project be organized? Are all the stakeholders and their responsibilities clear or are some yet to be defined? Will the project team need any training to develop individual or group skills to enhance project performance? How many end users will be impacted by this project? Will it require a Campus Readiness activity? Will a transition team be required? Is training a significant part of the project? How will you ensure the project will satisfy the needs for which it was undertaken? Are their quality standards that need to be met? How will the quality of the project be assured?

### 2.2.9.2 Issues Management

Critical to the success of a project is to manage issues that surface from the very beginning of a project. It is important that all key stakeholders participate in resolution of issues that might affect the Triple Constraints (Scope, Time, and Cost) and resulting quality.

### Here is a sample of a standard issues management procedure:

An issue is registered in the Issues Log.

When the issue has been registered, the issue owner initiates a planning process to develop an action plan to resolve the issue. The action plan identifies the expected resolution date.

The project manager and the project team will review issues regularly (you may specify a period of time, such as weekly) to ensure that action is being taken. The steering committee or other key stakeholders will review open issues monthly or as needed.

On the Project Status Report, the project manager will analyze the issues in the log and include statistical analysis (such as the resolution trend of issues). Any critical unresolved issues that are impacting the scope, time, cost, or quality of the project will be highlighted in the status report. Any escalation procedures for issues should be identified.

When an issue is resolved, merged with another issue, or withdrawn, the issue log is updated.

When an issue is closed the resolution is logged and it is moved to a closed status.

### 2.2.9.3 Change Management

Change is expected to occur during the life of any project, but that change must be managed if the project is to succeed. The Project Manager and the Sponsor need to determine how change will be controlled during the project and make sure all team members are aware of the process. Normally the Change Process begins when the Baseline Project Schedule completed during Planning (Detail Level) is approved. The change management procedure and required approvals should be documented in the Project Initiation Plan.

### Here is a sample of a standard change management procedure:

Complete a CPMM Change Order (Internal) and log the change requests in the CPMM Request for Change Log. Complete the Impact Analysis Statement of the change.

Submit the CPMM Change Order (Internal) to the appropriate people for authorization.

The Project Manager will track the CPMM Change Order (Internal) and log the status in the CPMM Request for Change Log: (Proposed, Authorized, Denied, Deferred)

The project manager reports on the status of the Change Orders in the CPMM Project Status Report (Template: CPMM Project Status Report).

The above change management process covers managing changes that are internal to Cornell. If the project you are managing will involve changes to Purchase Orders or contracts with outside Vendors, then please follow standard University Policy.

### 2.2.9.4 Risk Management

Risk planning is the process of deciding how to approach and plan the risk management activities for a project.

Risks will be managed as follows:

During Initiation, stakeholders will be informed of the risk management process and its benefits and will agree to follow the process. Broad risk areas will be defined in this Project Initiation plan.

In Project Planning (Detail Level), a detailed risk plan will be developed, including the identification and assessment of risks and the planning of strategies to minimize or avoid the risks. Throughout the project, the risk plan will be monitored on a regular basis, reported on at regular intervals in the CPMM Status Report, and updated as required.

When the project is complete, the risks and strategies will be analyzed to evaluate the success of the risk management plan.

### 2.2.9.5 Procurement Plan

If your project will involve procuring products or services outside of Cornell University, this section should outline the scope of the product or service, any assumptions or constraints, and any other activities that will be required for the procurement or contract. The project team should identify the specialists within Cornell for Procurement and/or Contracting and involve them early in the planning process as a member of the project team.

### The following should be considered:

↪ What type of Contract or Purchase Order will be used?

↪ Will Cornell Preferred Suppliers be used or will a formal bid solicitation be

needed? Who will prepare the bid documents? Will it be a single/sole source and how will it be justified?

↪ How will you plan to involve the Cornell procurement/contracting specialists in the project?

↪ How will the procurement be coordinated with other project aspects, such as scheduling and reporting?

↪ How will multiple providers be managed?

### 2.2.9.6 Transition Management Plan (Campus Readiness)

Identify the approach that will be required to move the project from development to production or from project completion to steady state. When will this planning start? Will it be managed by the project manager of this project, or will there be a Transition (Campus Readiness) Team Lead or will there be a completely separate Campus Readiness Team that includes members of this project team integrated with the transition (Campus Readiness) team?

### 2.2.9.7 Gathering Customer Requirements Approach

A key component to delivering projects on-time and on-budget is doing a great job of defining the requirements and understanding the approach. Requirements can be gathered in many ways. Some projects cannot start before all requirements are known, while other projects will have a more iterative approach to gathering requirements.

### It is important that for every project you:

↪ Define the approach that will be used to gather customer requirements.

↪ Identify the mechanism to make changes to requirements and add new requirements.

↪ Identify any tools that are used to gather customer requirements. These may vary depending on the product or service.

### 2.2.9.8 Reporting

Each team will determine who should receive their status reports and attend status review meetings, based on the stakeholder table. Status reports will be distributed on a regular schedule determined by the project team. Status review meetings will be held on a regular schedule determined by the project team.

All of the above Management Approaches should be documented during Project Planning (High Level) in the Project Initiation Plan. These are continually refined during Project Planning (Detail Level) and the course of the project as needs change.

### 2.2.10 Develop High Level Risk Plan

Developing a High Level Risk Plan with broad Risk Areas is important early in the project. This provides the executive sponsor, sponsors and/or project director and funding sources an understanding of what can go wrong and if they need to have a contingency strategy and possibly contingency funds.

### 2.2.10.1 Identify Risks

Risks are events that can potentially affect the cost, schedule, and/or efforts of a

project. Project risk identification begins during Project Planning (High Level) with the documentation of known project risks so that early planning can mitigate their effects.

Throughout the duration of the project, risks must continue to be identified, tracked and analyzed to assess the probability of their occurrence, and to minimize their potential impacts on the project.

The Project Manager solicits input from the Project Team, Project Sponsor, and from Customer Representatives, who try to anticipate any possible events, obstacles, or issues that may produce unplanned outcomes during the course of the project. Risks to both internal and external aspects of the project should be assessed. Internal risks are events the Project Team can directly control, while external risks happen outside the direct influence of the Project Team (for example, legislative action).

A list of risks is documented in the Project Initiation Plan, and as the scope, schedule, budget, and resource plan are refined during Project Planning (Detail Level), it is updated to reflect further risks identified.

## The project should be analyzed for risk in areas such as:

culture of the performing organization anticipated impact on the performing organization of the resulting product or service the level to which the end result is defined (the more complete the definition, the lower the possibility of risk) technology used on the project (proven vs. new) relationships among team members impact on work units and number of people affected.

Documentation associated with Project Planning (High Level) can also be used to help identify risks. Some examples are:

The scope definition may uncover previously unidentified areas of concern (again, the more complete the scope definition, the lower the possibility of risk) project constraints indicate likely risk sources the high-level Project Schedule may produce extremely aggressive or unrealistic scheduling preliminary staffing requirements may be problematic if required resources have limited availability or unique skills that would be hard to fund and/or replace should they leave the project.

Refer to the parts of this document concerning the Triple Constraints (Scope, Budget, and Schedule) and other information in the Project Initiation Plan to review for possible areas of risk.

Historical information can be extremely helpful in determining potential project risks. Data and documentation from previous projects, or interviews with team members or other subject matter experts from past projects provide excellent insight into potential risk areas and ways to avoid or mitigate them.

### 2.2.10.2 Quantify and Document Risk

The Project Manager documents the identified broad level risks. (See Table 15 in the Project Initiation Plan) The table should include the broad risk areas that have been identified and their impact on the project. A risk rating is assigned. The rating should include a probability of the risk occurring and the severity of the impact of the risk to the project should it occur. This will provide an overall Risk rating. (You can use a "High / Medium / Low" scale or a numerical rating if you prefer).

Since each risk may have more than one impact, the Risk Management Plan must describe the actions to be taken to avoid, mitigate or accept each risk impact, including

contingency plans. It should also specify the individuals responsible for the mitigation actions or contingency plan execution. Most attention should be directed to those risks most likely to occur, with the greatest impact on the outcome of the project. On the other hand, a conscious decision can also be made by the Project Team to accept or ignore certain risks. These decisions must be documented as part of the Risk Management Plan for subsequent re-evaluations.

## Some commonly employed risk mitigation strategies may include:

**Procurement**– some risks can be mitigated through procurement. For example, if the project requires staff with particular skills it may be advisable to retain resources through an outside organization. Unfortunately, this may introduce other risk factors such as the resources unfamiliarity with the organization.

**Performance Bond or Penalties**– some organizations may opt to introduce insurance to the project in order to address some of the risk. This holds true especially for those project services being supplied by external vendors through a contract.

**Resource Management**– it may be beneficial to leverage a lead resource that has already worked on a project with similar characteristics by assigning that resource as a mentor to more junior team members. This will mitigate delays in the schedule due to the learning curve of more junior resources.

**Use of Best Practices / Lessons Learned** – some organizations already have repositories of project specific or business function best practices, which may help you to prepare for unanticipated risks. Taking advantage of other project best practices, whether they are process or tool based, will help to mitigate risk. Implementing processes that have worked successfully on other projects will save time.

In addition to quantifying risk probability and impact and formulating risk responses, the risk assessment process facilitates establishment of an agreement for the Project Team, Project Sponsor and/or Project Director, and Customer Representatives to collaborate in managing risks as they arise during the project.

Last, and most important, risk management plans must specify the individuals responsible for the mitigation actions, the timing of the actions to be implemented, and the expected results of the actions.

There are a number of tools available to quantify risks. The Risk Management Worksheet presented here has been selected for its simplicity and ease of use. More sophisticated tools may be necessary for large-scale high-risk projects.

A factor to be considered when quantifying risks is stakeholder risk tolerance, the threshold to which the organization will assume risk, which is dependent on its attitude toward and motivation for the project. For example, an organization may view a 15☐ chance of a project overrun as acceptable since the cost benefit for the organization to do the project far outweighs this factor. The Project Managers understanding of the organizations strategic direction and the motivation of both the Project Sponsor and/or Project Director and the Customer will help determine the level of risk tolerance for the project.

## Management Techniques for Risk Response planning can include four types of responses:

**Avoidance** – Changing the plan to eliminate the risk or condition.

17

**Transference –** Shift the consequence of a risk to a third party together with ownership of the response (shifts, but does not eliminate the risk).

**Mitigation –** Seek to reduce the probability and/or consequences of an adverse risk even to an acceptable threshold. Early action is taken to reduce the probability of occurrence.

**Acceptance –** Deal with the risk and identify a suitable strategy.

Identifying the risk is good, but planning a wise course of action around it is infinitely better.

Be aware that by addressing one risk, you may be introducing another. For example: you identified a risk that your cost estimates may be off by as much as 15%. Your mitigation plan is to request a 20% increase in funds to cover the increased cost. You may have introduced a new risk, because a red flag may be raised, inviting an audit.

## 2.2.11 Produce Project Initiation Plan

The Project Initiation Plan is a collection of information used to describe the environment that will govern the project and set the overall parameters of the project. All of the work products and deliverables produced during Project Planning (High Level) will be compiled to produce The Project Initiation Plan (PIP). At this point in the project management lifecycle, the Project Initiation Plan will consist of the following information:

the refined business case (refined from the Charter), overall goal, specific objectives, success criteria, scope definition, high level schedule, stakeholder accountabilities, a communication plan, benefits and budget, governance and resourcing, the management approaches and a high level risk plan. The Project Initiation Plan is an evolving set of documents; new information will continue to be added and existing information will be revised during Project Planning (Detail Level).

This information will be refined and supplemented in later project work as the Project Manager and team becomes more knowledgeable about the project and its definition. The Project Initiation Plan is not a static document; it requires iterative refinement.

"Don't judge the book by its cover." Hogwash! While we are not advocating style over substance, the format, style, and presentation do mean a lot. During the few minutes that most decision-makers will spend reviewing your written deliverables you want them to be well disposed towards you, and able to abstract the most information in the least amount of time. A professional-looking document will make a good first impression; a well-organized text that clearly and logically builds your case will solidify that impression. So don't just slap it together, snap a rubber band around them, and submit it as the deliverable; treat your Project Plan as a repository of your brightest hopes for the future.

## Deliverables for Task 2.2 (Develop the Project Initiation Plan)

Project Initiation Plan the key deliverable produced during Project Planning (High Level). The initial plan will be refined during Project Planning (Detail Level) and iteratively throughout the entire project management lifecycle and will serve as the main guide to follow during Project Execution and Control. The Project Initiation Plan incorporates the deliverables described in each Task of this section: the refined business case (refined from the Charter), overall goal, specific objectives, success criteria, scope definition,

high level schedule, stakeholder accountabilities, a communication plan, benefits and costs, governance and resourcing, the management approaches and a high level risk plan.

### The Project Initiation Plan is used to:
- ↪ Provide a foundation for the projects with the overall scope and objectives
- ↪ Present a preliminary budget for the Project
- ↪ Gain confidence of the funding source to be able to proceed to Detail Planning
- ↪ Guide Project Planning (Detail Level)
- ↪ Document project planning (High level) assumptions
- ↪ Facilitate communication among internal and external Stakeholders and understand accountabilities
- ↪ Define key management reviews as to content, extent and timing

**See Appendix:** CPMM Project Initiation Plan

### 2.3 Confirm Approval to Proceed to Next Phase
- ↪ Roles
- ↪ Project Manager
- ↪ Executive Sponsor
- ↪ Project Sponsor and/or Director
- ↪ Project Team Members
- ↪ Steering Committee
- ↪ Customer Representatives

### Purpose
The purpose of this process is to formally acknowledge the completion, review and acceptance of all deliverables produced during Project Planning (High Level). Formal acceptance and approval by the Project Sponsor and/or Project Director or an authorized designee also signifies that the project can continue into its next phase, Project Planning (Detail Level).Acceptance and approval are ongoing. The Project Manager should review and gain approval from the Project Sponsor and/or Project Director and Customer Representatives for all interim deliverables with upon their completion. Interim acceptances should streamline final acceptance.

### Tasks associated with Confirming Approval to Proceed
2.3.1 Submit Project Initiation Plan for Approval
2.3.2 Gain Approval to Proceed
2.3.1 Submit Project Initiation Plan for Approval
At the completion of producing the Project Initiation Plan, the Project Manager should submit it to the Steering Committee, Executive Sponsor, Project Sponsor and/or Project Director, Customer Representatives, any funding sources, or anyone whose resources will be affected by the project. Depending on the size of the project the, Project Manager along with the Project team should then schedule one or more meetings to present the Project Initiation Plan for review and discussion. Attendees may also include other members of performing organizations who are able to provide resources that will add value during Project Planning (Detail Level).

Once the review has been completed, the Project Manager should prepare the Final Version of the Project Initiation Plan that will signify the close of Project Planning (High Level) and it should be submitted for signature/approval.

## 2.3.2 Gain Approval to Proceed

One the Project Manager has submitted the deliverable (The Project Initiation Plan) to the Project Sponsor and/or Project Director any other required signers or their authorized designee and obtain their signatures on the Project Initiation Plan, indicating approval to proceed to Project Planning (Detail Level). If the Project Sponsor and/or Project Director do not approve the contents of the acceptance package, he/she should indicate the reason for rejecting it. It is then the responsibility of the Project Manager to resolve any issues regarding the deliverables and to present the updated package to the Project Sponsor and/or Project Director again.

## Deliverables for Task 2.3 (Confirm Approval to Proceed)

Signed Project Initiation Plan – a formal document indicating that Project Planning (Detail Level) resources can be secured and the Project Sponsor and/or Project Director has accepted and approved the project to move to Project Planning (Detail Level).

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