Scope the Improvement

- Establish plan ownership
- State the major goals and problems
- Group the problems related to each goal
- Ensure that the goals and problems are crystal clear and compelling
- Set goal priorities
- Derive metrics for the goals

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Develop an Action Plan

- Enumerate actions using brainstorming and a process framework
- Organize the action plan based on the goals and problems
- Add placeholders for checking progress and taking corrective action

⇩

Determine Risks and Plan to Mitigate

- Determine the scope of the risk session
- Select the team and moderator
- Identify risks
- Analyze risks
- Plan to mitigate
- Plan for periodic risk review

Figure 1-2 Tthe goal-problem approach for planning an improvement program.

Goals

1. Create predictable schedules
2. Successfully deliver product X
3. Reduce rework
4. Improve the performance of our core software product
5. Keep customers happy
6. Keep making a profit

Problems

1. Need better requirements. Requirements tracking not in place. Changes to requirements are not tracked; code does not match specification at test time.
2. Management direction unclear for product version 2.3. Goals change often.
3. Quality department does not have training in product and test skills
4. Unclear status of software changes
5. Lack of resources and skills allocated to software desing
6. Changes to specification and test groups
7. Finding time to do critical activities (product development) is difficult. Time is spent on crisis activities
8. Test plan does not necessarily encompass things that matter to the customer
9. Defect repairs break essential product features
10. Wrong files (for example, dynamic link libraries) are put on CD Unsure of the correct ones.
11. Revising the project plan is difficult. Items drop off, new things are added, plan is out of date
12. We don´t understand our capacity and do not have one list of all the work we have to do
13. Schedule tracking and communication of changes to affected groups is poor
14. Testers do not have tools to manage their test activities
15. Customers are unhappy. There are approximately 300 outstanding defects that have not been addressed.

Figure 1-4 The goals and problems of one organization.

Table 1-1 Problems and Goals Grouped According to Which Problems Prevent Each Goal.

Goal	Problem	Problems Description
1. Create Predictable schedules	Problem 7	Finding time to do critical activities (product development) is difficult. Time is spent on crisis activities. Revising the project plan is difficult.
	Problem 11	Items drop off, new things are added, plan is out of date.
	Problem 12	We don´t understand our capacity and do not have one list of all the work we have to do. Schedule tracking and communication of changes to affected groups is poor.
	Problem 13	Testers do not have tools to manage their test activities.
	Problem 14	
2. Successfully Deliver Product X	Problem 1	Need better requirements. Requirements tracking not in place. Changes to requirements are not tracked; code does not match specification at test time
	Problem 2	Management direction unclear for product version 2.3. Goals change often.

3.	Reduce rework	Problem 3 Problem 4 Problem 5 Problem 6 Problem 8 Problem 9 Problem 10	Quality department does not have training in product and test skills. Unclear status of software changes. Lack of resources and skills allocated to software design. Changes to specifications and documentation are not communicated effectively to documentation and test groups. Test plan does not necessarily encompass things that matter to the customer. Defect repairs break essential product features. Wrong files (for example, dynamic link libraries) are put con CD. Unsure of the correct ones.
4.	Improve the performance of our core software product		
5.	Keep customers happy	Problem 15	Customers are unhappy. There are approximately 300 outstanding defects that have not been addressed.
6.	Keep making a profit		

Table 1-2 Goals Reworded for Clarity

Goal	Problem	Problems Description
1. ~~Create predictable schedules~~ Meet all our difficult cost and Schedule commitments	Problem 7	Finding time to do critical activities (product development) is difficult.
	Problem 11	Time is spent on crisis activities. Revising the project plan is items drop off, new things are added, plan is out of date. We don't understand our capacity and do not have one list of all the work we have to do.
	Problem 12	Schedule tracking and communication of changes to affected groups is poor.
	Problem 13	Testers do not have tools to manage their test activities.
	Problem 14	
2. ~~Succosafully dcliver produet x~~ Deliver product X by Mm/dd/yy	Problem 1	Need better requirements. Requirements tracking not in place. Changes to requirements are not tracked; code does not match specification at test time.
	Problem 2	Management direction unclear for product versión 2.3. Goals change often.
3. Reduce rework Reduce rework to less than 20 percent of total project effort.	Problem 3	Quality department does not have training in product and test skills

	Problem 4 Problem 5 Problem 6 Problem 8 Problem 9 Problem 10	Unclear status of software changes. Lack of resources and skills allocated to software design Changes to specifications and documentation are not communicated effectively to documentation and test groups Test plan does not necessarily encompass things that matter to the Customer Defect repairs break essential product features. Wrong files (for example, data link libraries) are put on CD. Unsure of the correct ones.
4. Improve the performance of our core software product. (Target to be defined.)		
5. ~~Kocp custo mera happy.~~ Achieve customer rating of 9/10 on product evaluation form.	Problem 15	Customers are unhappy. There are approximately 300 outstanding defects that have not been addressed.
6. ~~Kocp making a profit~~ Keep profits at 15 percent (and cots at the same level as last Year)		

Table 1-3 Setting Goal Priorities

Goal	*Relative Benefit Of Goal, 1-10 pts*	*Relative Cost of Goal, 1-10 pts*	*Priority (benefit/ cost*	*Phase*
2. Deliver product *X* by mm/dd/yy. Problem 1: Need better requirements. Requirements tracking not in place. Changes to requirements are not tracked; code does not match specification at test time. Problem *2:* Management direction unclear for product versión 2.3. Goals change often	***10***	***4***	***2.5***	***1***
1. Meet all our cost and schedule commitments. Problem 7: Finding time to do critical activities product development) is difficult. Time is spent on crisis activities. Problem 11: Revising the project plan is difficult items drop off, new things are added, plan is out of date. Problem 12: We don't understand our capacity and do not have one list of all the work we have to do. Problem 13: Schedule tracking and communication of changes to affected groups is poor. Problem 14: Testers do not have tools to rnanage their test activities.	***9***	***5***	***1.8***	***1***
5. Achieve customer rating of 9/10 on product evaluation form. Problem 15: Customers are unhappy. There are approximately 300 out-standing defects that have not been addressed.	***6***	***6***	***1***	***1***
2. Reduce rework to less than 20 percent of total project effort. Problem 3: Quality department does not have training in product and test skills.	***7***	***5***	***1.4***	***2***

Problem 4: Unclear status of software changes. Problem 5: Lack of resources and skills allocated to software design. Problem 6: Changes to specifications and documentation are not communicated effectively to documentation and test groups. Problem 8: Test plan does not necessarily encompass things that matter to the customer. Problem 9: Defect repairs break essential product features. Problem 10: Wrong files (for example, dynamic link libraries) are put on CD. Unsure of the correct ones.				
6. Keep profits at 15 percent (and costs at the same level as last year).				
4. Improve the performance of our core software product. (Target to be defined).				

What *is your goal?*

Reduce product development cycle to six to nine months for product X.

What is preventing you from achieving the goal (¡n other words, problems)?

1. Changing requirements
2. Loss of resources; difficult to replace people with specialized skills who leave the project
3. Too many features for the six- to nine-month development cycle
4. Poor quality of ¡ncoming code from other groups
5. Inadequate availability of test equipment

What other problems do you have related to this goal?

6. Lack of visibility within each Ufe cycle phase. It is difficult to know whether we are ahead or behind schedule.
7. Don't always have the resources available to complete the planned work.
8. Difficult to find defects early.

Figure 1 – 5 Project – level improvement scope.

Table 1-4 The GQM Approach to Defining Metrics

Goal	Questions	Metrics
Meet all our cost and Schedule commitments.	Are we spending the planned number of hours on the project to complete it? Are we hitting our milestones?	Planned versus actual effort for each project. The number of days each milestone is early or late.
Deliver product X by mm/dd/yy.	Are we spending the planned number of hours on the project to complete it? Are we hitting our milestones?	Planned vs. actual effort for each project milestone. The number of days each milestone is early or late
Reduce rework to less trian 20 percent of total project effort.	How much time do we spend on rework now? How does this compare with our development time and are we improving? How many defects do we have in the product during design and coding?	Percentage of project time spent on rework
	How many defects do we have in the product during design and coding?	Defect density: number of defects found per unit size of work product (for example, number of pages of design, number of lines of code)
Improve the performance of our core software product. (Target to be defined.)	What is our current performance?	Average screen response time during peak system usage
Achieve customer rating of 9/10 on product evaluation form	How satisfied are they now? Are we improving?	Annual customer satisfaction survey2
Keep profits at 15 percent (and costs at the same level as last year).	What is our profit? Is ¡t getting better or worse?	Annual net profit

Business Goal	Assessment Finding
1. Deliver on product development date estimates and costs.	Merged projects from outside the organization use different processes, making communication cumbersome (for example, software configuration management, estimation, schedules), leading to un-planned consumption of resources.
2. Deliver on product development functionality.	Inadequate collaboration with the marketing department in developing business case and market analysis. Requests and product planning are short term and reactive.
3. Maintain product quality.	Lack of focus on design/architecture issues • Necessary design practices have not been identified. • Inadequate time allocated for current design activities. • Coding starts before related design complete. Risk of losing control over software configuration management as organization grows, and as multiple products are built off the same platform.

Figure 1 – 6 Mapping assessment findings to business goals.

Table 1-5 Actions for Two of the Projects Problems

Problem	**What Actions Are Needed to Address the Problems and Achieve the Goals?**
1. Changing requirements	• *Baseline the requirements before design commence.* • *Only allow changes to the application interface, not to the kernel routines.* • *Improve the library control system to minimize version control errors.* • *Investigate requirements management tools.*
3. Too many features for the six- to nine-month development cycle	• Establish a review process with clients to negotiate features for a six- to nine-month development cycle. • Rate each feature based on value to the customer (1-10 points) and cost to develop (1-10 points) • Establish an incremental delivery plan to phase in lower priority features.

Table 1-6 Examples of Using Elements from CMM 1.1 for Two of the project Problems

Problem	*If a Process Improvement Framework Is Being Used, Which Elements Will Help the Problems Listed? (examples from CMM 1.1)*
1. Changing requirements	• Review the initial requirements and changes before they are incorporated into the project plan (based on CMM Requirements Management activity 1). • Establish a group with the authority for managing the project's software baselines (based on CMM Software Configuration Management ability 1). • Record and track change requests and problem reports for all configuration items (based on CMM Software Configuration Management activity 5).
2. Too many features for The six – to nine – month Development cycle	• Review project commitments with senior managers, software engineers, and the customer to obtain agreement (based on CMM Software Project Planning activity 4). • Perform risk management related to The schedule, resource, and technical Aspects of the project (based on CMM Software Project Planning activity 13).

Figure 1 – 7 Action plan format

Action Plan Owner:_____					
Prelimary Goal and Intermediate Goals (The result you want)	**Purpose of Goal (Why do you want to achieve this goal?)**	**Actions**	**Priority (*essential)**	**Time Estimate**	**Who**
PRIMARY GOAL 1	**PURPOSE OF PRIMARY GOAL 1**				
Small intermediate goal (based on problem statement)	*Purpose of small intermediate goal*	*Action*	1*		
Small intermediate goal (based on problem statement)		*Action*	2*		
		Action	3		
		Action	4		
Next intermediate goal	*Purpose of next intermediate goal*	*Action*	1*		

Table 1-7 Problems Rewritten as Intermediate Goals

Original Problem	***Problems Rewritten as an Intermediate Goals***
1. Changing requirements	Manage changing requirements
2. Loss of resources; difficult to replace people with specialized skills who leave the project	Replace people with specialized skills who lea ve the project
3. Too many features for the six- to nine-month development cycle	Set feature priorities for a six- to nine-month development cycle
4. Poor quality of incoming code from other groups	Improve quality of incoming code from other groups
5. Inadequate availability of test equipment	Ensure adequate availability of test equipment
6. Lack of visibility within each life cycle phase. It is difficult to know whether we are ahead or behind schedule	Improve visibility within all Ufe cycle phases
7. Don't always have the re- sources available to complete the planned work	Ensure resources are available to complete the planned work
8. Difficult to find defects early	Find defects earlier

Figure 1 – 8 Action plan example

***Action Plan Owner**: Jane*					
Primary Goal and Intermedíate Goals (The results you want)	***Purpose of Goal (Why do you want to achieve the goal?)***	***Actions***	***Priority (*essential)***	*Time Estímate*	*Who*
Reduce product development cycle to six to nine months for product X.	*Deliver earlier than competltion.*				
Manage changing requirements (based on problem 1).	*Prevent schedule slips resulting from expensive scope changes.*	*Only allow changes to the application interface, not to the kernel routines.*	*1**	*4hrs*	*Jane*
		Establish a group with the authority for managing the project's software baselines.	*2**	*4 hrs*	*Pradeep*
		Check *progress a and take corrective action.*[6]	—	*2hrs*	*Jane*
		Improve the library control system to minimize version control errors. Investígate requirements management tools.	*3*	*80 hrs*	*Fred*

Primary Goal and Intermediate Goals (The results you want)	**Purpose of Goal (Why do you want to achieve the goal?)**	**Actions**	**Priority (*essential)**	**Time Estímate**	**Who**
		Record and track change requests and problem reports for all configura-tion Items.	4	2 hrs/week	Jane
		Review the initial requirements and changes before they are incorporated ¡nto the project plan.	5	2 hrs/week	Mike
		Baseline the requirements before design commences.	6	20hrs	Jane
Set feature priorities for a six- to nine-month development cycle (based on problem 3).	Ensure commitments are achievable.	Establish a review process with clients to negotiate features for a 6- to 9-month development cycle.	1*	16hrs	Jane
		Rate each feature based on valué to the customer (1-10 points) and cost to develop (1-10 points)	2*	4 hrs	Jim
		Check progress and take corrective action.[7]	---	2hrs	Jim

Primary Goal and Intermediate Goals (The results you want)	**Purpose of Goal (Why do you want to achieve the goal?)**	**Actions**	**Priority (*essentials)**	Time Estímate	Who
		Review project commitments with senior managers, engineers, and the customer to obtain agreement.	3	2hrs	Kim
		Perform risk management related to the schedule, resource, and technical aspects of the project.	4	2 hrs	B.J.
		Establish an incremental delivery plan to phase ¡n lower priority features.	5	3hrs	Jim

Table 1-8 Inappropriate and Unnecessarily Complex Solutions

Problem	Inappropriate and Overly Complex Solution
Unable to get requirements from customers	Adopt quality function deployment— a highly systematic technique for relating product features and attributes to customer value.
No time allocated for design	Adopt a detailed object-oriented design process.
Inaccurate estimates	Create a new historical database, built from scratch, and available on four platforms.
Poor-quality software products	Define a detailed software life cycle, containing numerous software engineering methods.

Table 1-9 Simple Solutions Focused on the Problems

Problem	*Simpler Solution*
Unable to get requirements from customers	• *Establish a primary customer liaison.* • *Interview the customers.* • *Develop a prototype of the product showing customers what features are possible.*
No time allocated for design	• *Clarify what "design" means in our environment.* • *Estimate the time needed for the design phase.* • *Learn negotiation techniques for obtaining time in the schedule for design.* • *Allocate time for designing the highest risk product components.*
Inaccurate estimates	• *Learn an estimation process that addresses some of the root causes of the inaccurate estimates (for example, the Wideband Delphi method).* • *Start collecting actual data for current projects so that they can compare their estimates with actual effort expended.*
Poor-quality software products	• *Inspect (peer review) all critical documents and code.* • *Improve estimation of test time needed.* • *Train test engineers in test skills.* • *Send test engineers to a customer site to understand how the customer uses the product. Factor this knowledge into the test strategy.*

Table 1-10 Examples of Risks for an Improvement Project

Risk Items (Potential future problems derived from the brainstorming session)	***Consequence if Risk item Does Occur***	***Likelihood of Risk item Occurring***	***Impact to Project if Risk Item Does Occur***	***Priority (Likelihood X Impact***
Management buy-in for improvement diminishes	Improvement program fails.	9	10	90
Management changes priorities before we complete any milestone.	Improvement program loses credibility	9	9	81
New requirements management tool has long learning curve.	Developers give up in frustration	9	8	72
Library control person might leave.	Wasted time training a new person.	7	8	56
New group to manage baseline changes is not accepted by project managers.	Duplication of effort or baseline changes are not managed.	6	9	54
Creation of specialized training materials for new staff takes too long.	Pass up the opportunity To try the tool.	5	7	35
Requirements management tool is delivered to us late.		4	3	12

Table 1-11 Risk Management Plan to Mitigate the Top Three Risks

Risk items (Potential future problems derived from the brainstorm-ing session)	**Consequ-ence if Risk item Does Occur**	**Likeli-Hood Of Risk Item Occu r-ring**	**Impa ct To Proje ct If Risk Item Does Occu r**	**Pri ori ty (Li ke li Ho od x Im pa ct)**	**Action to Re-Duce Likelihood Of Risk Occurring**	**Action to Reduce Impact If Risk Does Occur**	**Who is Responsib le For These Actions?**	**When Actions Should be Complet e**	**Status of Action**
Management buy- in for improvement diminishes	Improve-ment program fails.	9	10	90	. 1. Ensure that the improvement program addresses the management team´s problems and goals. 2. Establish a steering committee to oversee the improvement effort. Meet bimonthly 3. Provide four funding options for the improvement program: full-time, part time, short bursts, and	4. Determine Improvement s that can be made at a project level with out major funding. 5. Explain the problems and goals that will not be addressed because of reduced funding. 6. Determine a time when the improvement program can be revisited.	Action 1: Joe Action 2: Jill	3/3/YY 4/3/YY	Comple -te

					investment spread over two years.				
Management changes priorities before we complete any milestone	Improve-ment program loses credibilit y	9	9	81	1. Present the action plan to management and obtain agreement that priorities remain unchanged between major improvement milestones. 2. Explain the problems and goals that will nor be addressed if changes in priority occur.	3. Determine improvement s that can be made regardless of which project is active.	Action 1: Cathy	5/6/YY	In-progres s
New require-ments management tool has long learning curve	Develope rs give up in frustratio n	9	8	72	1. Start a pilot project to test the tool. 2. Select a subset of the tool´s features to use. 3. Have vendor come on-site to help transition to the tool.	4. Establish a cutoff date when we will give up on the tool and use manual methods in-stead. The tool can be used on the next release.	Action 1: Lois	4/6/YY	In Progres s