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# Program-Project Management Skills

## On business skills

### My skills in business methodologies

- **Business evaluation:** I performed the evaluation of business proposals based on financial metrics (ROI, NPV, etc.), alignment with organization mission and strategy, prioritized based on forecasted value, risks, impact on the organization and dependency to other initiatives - Used at HOOPP, 2010 to rank 300+ initiatives, Used at CIBC, 2009 to develop business case for Risk Initiatives
- **Business process methodology:** I am experienced in [Six Sigma](#) and Lean management. I am trained in many of the tools including: SIPOC, Voice of Customer, Voice of Process, Process Map, ANOVA, Cause-Effect, Cost of poor quality CoPQ
- **PPM Tool Kit**

## On Project Management

### Management Topics

AGILE, 18 AGILE Questions, 18 Business requirements, **Error! Bookmark not defined.** Change, **Error! Bookmark not defined.** Data skills Checklist for Project Management, 7 CIBC PLANVIEW PPM, 14 Financials, 8 Gating, 2 Governance, 3 Leading and mentoring, 2 Meetings, **Error! Bookmark not defined.** MS Project, schedules, 14 Project estimation, 8 Quality Management, **Error! Bookmark not defined.** Questions to ask, 7 SDLC, 2 Stakeholders, **Error! Bookmark not defined.** Status, 3 Technical reviews, **Error! Bookmark not defined.** Timelines, **Error! Bookmark not defined.** Vendors, 3 Work Breakdown structure, 2

### Management Best Practices

Category	Best Practice
Strategy Development	<ul style="list-style-type: none"><li>• Consider more than cost-reduction</li><li>• Global collaboration strategies should be aligned with business strategy</li><li>• Global collaboration strategies should be organization-wide and multi-year</li><li>• Ensure senior management support</li><li>• Involve partners in the strategy process</li><li>• Align contract terms with the global collaboration strategy</li></ul>
Project Organization	<ul style="list-style-type: none"><li>• Improve collaboration skill sets</li><li>• Have an on-site project management liaison</li><li>• Focus on resource continuity &amp; skills</li></ul>
Product Development Process	<ul style="list-style-type: none"><li>• Extend development methodologies with multi-site and collaboration processes</li><li>• Decide whether to use one methodology or two</li><li>• Employ a continuous-improvement process</li><li>• Consider the partner team as part of the company organization.</li></ul>
Program and Project Management	<ul style="list-style-type: none"><li>• Create a robust status reporting system</li><li>• Build effective lines of communication</li><li>• Provide product, methodology and domain expertise training</li><li>• Update product and system documentation</li><li>• Build a "buddy system"</li></ul>
Platform Best Practices	<ul style="list-style-type: none"><li>• Have the company and partners use the same versions of the same tools</li><li>• Determine data synchronization needs</li><li>• Assume throughput requirements will grow over time</li><li>• Test the use of video conferencing</li></ul>
Intellectual Property	<ul style="list-style-type: none"><li>• Use partner intellectual property when available</li><li>• Manage access to your own intellectual property</li></ul>

### My skills in leading and mentoring

① [Team Management](#) ② [Principles for leading](#) ③ [Coaching](#) ④ [Emotional Intelligence](#)

### On Work Breakdown structure

Product-oriented, 100% rule, documentation, WBS and EVM and Risk management

Table 8: Common Elements in Work Breakdown Structures

Common element	Description
Integration, assembly, test, and checkout	All effort of technical and functional activities associated with the design, development, and production of mating surfaces, structures, equipment, parts, materials, and software required to assemble level 3 equipment (hardware and software) elements into level 2 mission equipment (hardware and software)
System engineering	The technical and management efforts of directing and controlling a totally integrated engineering effort of a system or program
Program management	The business and administrative planning, organizing, directing, coordinating, controlling, and approval actions designated to accomplish overall program objectives not associated with specific hardware elements and not included in systems engineering
Training	Deliverable training services, devices, accessories, aids, equipment, and parts used to facilitate instruction in which personnel will learn to operate and maintain the system with maximum efficiency
Data	The deliverable data that must be on a contract data requirements list, including technical publications, engineering data, support data, and management data needed to configure management, cost, schedule, contractual data management, and program management

System test and evaluation	The use of prototype, production, or specifically fabricated hardware and software to obtain or validate engineering data on the performance of the system in developing program (in DOD, normally funded from research, development, test, and evaluation appropriations); also includes all effort associated with design and production of models, specimens, fixtures, and instrumentation in support of the system-level test program
Peculiar support equipment	Equipment uniquely needed to support the program: vehicles, equipment, tools, and the like to fuel, service, transport, hoist, repair, overhaul, assemble and disassemble, test, inspect, or otherwise maintain mission equipment, as well as equipment or software required to maintain or modify the software portions of the system
Common support equipment	Equipment not unique to the program and available in inventory for use by many programs
Operational and site activation	Installation of mission and support equipment in the operations or support facilities and complete system checkout or shakedown to ensure operational status; may include real estate, construction, conversion, utilities, and equipment to provide all facilities needed to house, service, and launch prime mission equipment
Facilities	Includes construction, conversion, or expansion of existing industrial facilities for production, inventory, and contractor depot maintenance required as a result of the specific system
Initial spares and repair parts	Includes the deliverable spare components, assemblies, and subassemblies used for initial replacement purposes in the materiel system equipment end item

### WBS Example

Level 2 element	Level 3 element
1.1 Primary vehicle	1.1.1 Hull/frame
	1.1.2 Suspension/steering
	1.1.3 Power package/drive train
1.2 Secondary vehicle	1.1.1-18 (Same as primary vehicle)
1.3 Systems engineering/program management	1.3.1 System test and evaluation
	1.3.2 Development test and evaluation
	1.3.3 Operational test and evaluation
	1.3.4 Mock-ups/system integration lab
	1.3.5 Test and evaluation support
	1.3.6 Test facilities
1.4 Training	1.4.1 Equipment
	1.4.2 Services
	1.4.3 Facilities
1.5 Data	1.5.1 Technical publications
	1.5.2 Engineering data
	1.5.3 Management data
	1.5.4 Support data
	1.5.5 Data depository

### My system development skills

#### Planning Methodology

Project Initiation	Assess Change Management Implications
Application Architecture	Business Requirements Develop Architecture
Analysis & Design	Functional Specification Technical Design Data Mapping and Conversion
Development	Build Unit Test
Testing	Setup Test Environment Systems Integration Testing Regression Testing Stress Testing UAT
User Documentation and Training	
Deployment	Setup Production Environment Deploy Application

#### Development projects

● **RSI OLSM Accenture 1.2M Optimized Least Squares Monte Carlo (OLSM)** to reduce the computational burden of pricing instruments (using FO models require too much resource) plus non-vendor risk system - **Payout Module** to push out P/L vectors

Contract 1: July 220K Initial market risk / counterparty risk OLSM design

Contract 2: Aug 220K Additional: CVA design & prototype interface code

Contract 3: Sep 108K Prototype analytics code and demo

● **OSFI a) IRC work stream b) MRA Stressed VaR c) MRA Enhanced VaR** (IR basis risk, correlation risk, dividend risk, etc., volatility scaling)

● **HOOPP SIMCORP** team of 5 business analysts and vendors and a pool of 10 developers in the transition to production of SCD; converted a **backlog** of over 300 business requirements in collateral management, investment accounting, and treasury operations into a coherent goal for 3 iterations of **20,000 man-hour**, each with an **iteration plan** made of **sprints** of 3 weeks each ending with a testable deliverable based on a well-developed **user story**, itself part of an **epic** or **feature** – **End product**: integration of portfolio management, trading, risk management and performance attribution

#### Experiences with OPS gating

**Gate 0**-Project Feasibility **Gate 1**-Review & Approval Dependant on Value/Risk **Gate 2**-Definition Phase, Project **Gate 3**-Planning Phase, Integrated Project Plan **Gate 4**-Implementation Phase, User Acceptance Documents **Gate 5**-Close out Phase

♦ Gate 0 and 1: CMA, MBA and Masters of Research, Consulting training ♦ Gate 2, 3 and 4: PMP, Consulting training, Commercial IT development background, CISA IT auditing ♦ Gate 5: [ITIL](#), CISA IT auditing ♦ Selected projects with gates **HOOPP (2012) Accounting Analytics** Gate 0 ⇒ 5 **CIBC (2009) Risk Initiatives** Gate 0 ⇒ 3 **MANULIFE Derivatives Accounting (2009)** Gate 2 ⇒ 5 **CIBC-Secure End User Computing SEUC (2008)** Gate 0 ⇒ 3 **CIBC-Mellon (2007) Financial System Renewal Project FSRP** Gate 0 ⇒ 3 **CIBC Internal Control Repository ICR (2003)**: Gate 2 ⇒ 5

#### Project governance

♦ **Main activities** (1 program direction 2 ownership and sponsorship 3 ensure effectiveness 4 reporting and disclosure, consulting with stakeholders) ♦ **Compelling business case** (project objects, in-/ out-of-scope) ♦ **Assess compliance** against original objectives ♦ **Identify stakeholders** with interest in project ♦ **Defined method of communication** to each stakeholder ♦ **Agreed business-level requirements** by all stakeholders ♦ **Agreed project deliverables** ♦ **Appointment of project manager** ♦ **Clear project roles/ responsibilities** ♦ **Current, published project plan** spanning all stages ♦ **Accurate status/ progress-report** with time records ♦ **Central document repository** for project ♦ **Central glossary** of project terms ♦ **Process for management and resolution of issues** ♦ **Process to record/ communicate risks** ♦ **Standard for quality review** of key governance documents and of the project deliverables

#### Project governance tools

♦ **Dashboard weekly** (Minutes & Action Items from Steering, Discussion Points, Green/ Yellow/ Red Status by Work Stream, 90-Day Plan, Critical Milestones) ♦ **PMO Handbook** (Scope Summary, Program Approach, Program Management Control Process, High Level Integrated Program Plan, Project Critical Milestones, RSI Governance, **Appendices** Roles & Responsibilities, Weekly Status Report Process, Change Control Purpose & Responsibilities, RSI SharePoint, Project Control Mechanism, Centralized Issues Log)

♦ **Tools & Techniques for Management, Change – DMAIC Tools Map, Constraint Analysis, Cause and Effect, Check list, Fault Tree Analysis, Root Cause Analysis, Risk Breakdown Structure, Probability and Impact Matrix, Probability and Impact, Risk Heat Map.**

#### Documents that I generated to report

♦ **Management Summary:** achievements since last report, is the project on target to meet the delivery date and the budget? If not, discuss the reasons and risks; and approaches/ requirements to get the project back on track ♦ **Key milestones:** Planned completion date (baseline), Currently projected completion date, Actual projection date ♦ **Risk register:** risk description, current mitigation plan, contingency plan, likelihood of occurring, potential impact (\$ / schedule / quality etc) ♦ **Change request history:** estimated cost in \$, estimated effort (man-days), schedule change (if any), status (in review, agreed, withdrawn) ♦ **Key project metrics:** application features (planned, developed, tested, accepted), change requests (new, approved, closed), project staff (current-planned, turnover rate) ♦ **Financials:** on labor, expenses, material, contingency per to-date, planned (baseline), currently projected

#### Knowledge of Technical Architecture

[UML](#), certified SUN Java Enterprise Architect, Open Group [TOGAF](#), [dot-NET](#) architecture

#### Strategic project management

- Resources (people, equipment, and material)
- Time (task durations, dependencies, and critical path)
- Money (costs, contingencies, profit)
- Scope (project size, goals, and requirements)

	CONVENTIONAL PROJECT MANAGEMENT	STRATEGIC PROJECT MANAGEMENT
Link with business strategy	Vague and distant	Direct and explicit
Project definition	Usually portrayed as a 'given'	Highly flexible, creative, depending on options
Project planning	Follows on directly from project definition	Only done once a project strategy is set
Attitude to detail	Absolutely central – it is all about control	Important but only in context – try always to see the Big ("Helicopter") Picture
The importance of stakeholders	Emphasis on formal structures – project manager, team sponsor	Far-reaching stakeholder analysis; requires continual scanning
The importance of uncertainty	Coped with through critical path analysis (after activity planning)	Do uncertainty analysis first, then plan activities

#### Vendor Management

♦ **Spiel (COBIT)** ♦ **Review RFIs + RFPs** (♦ requirements definition ♦ procedure to clarify requirements ♦ sufficient time for vendors to prepare proposals ♦ award criteria + decision process definition) ♦ **Evaluate RFIs+ RFPs+ contractor performance** per approved evaluation process/criteria to identify opportunities/ need to replace ♦ **Maintain documentary evidence** of evaluations ♦ **Produce reports to monitor** problem resolution against business requirements and SLAs ♦ **Ensure escalation of problems per agreed criteria** (to

higher management level, external vendors, change advisory board to increase priority of urgent request for change (RFC) for temporary workaround) ♦ **Regularly review & evaluate information on new potential threats** (e.g., reviewing vendors' products and services security) ♦ **Off shoring** Chennai: 1,000 Indian IT Tata Consulting Service ♦ **Factors** **Project** **Client Maturity** (♦ Interaction process ♦ Development process ♦ Requirements/ specifications ♦ Platforms/ technologies ♦ Tools) **System Complexity** (♦ Data model ♦ Functionality ♦ Types, # interfaces) **Lessons** 1 Follow/ respect methodology & working process 2 Define handover points, entry/exit criteria, deliverables 3 Plan technical connectivity early 4 Plan well ahead, involve off-shore team 5 One Team, not "us and them" 6 For larger, more complex engagements, embed onshore solution skills/ management strength into offshore location 7 **Aware Off shore culture, public holidays, religious practices** ♦ **Communication layer** ♦ Communication Protocols ♦ Communication Infrastructure ♦ Email and IM ♦ Skype ♦ Face-to-Face Meetings ♦ Optimizing Time Differences ♦ Big Challenge ♦ Schedule Meetings at Overlapping Times ♦ **Vendor intelligence** 1 Client references 2 Technology architecture (SW, HW, communications, storage, security) 3 Current/future roadmap 4 Documentation 5 Development 6 Management/ support ♦ **ASP Concerns** (Data Security, Application Availability/ Performance, Application Integration, Vendor's Stability/ Longevity, Customization, Loss of Control, Bound by Contract) ASP Certification and Insurance

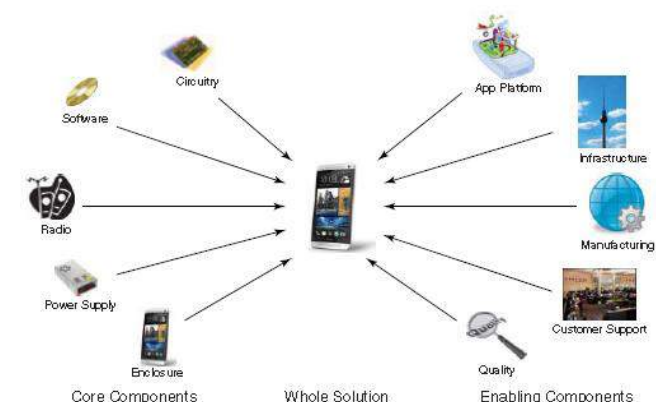
#### Specific skills

♦ Build, maintain constructive relationships with internal business partners, suppliers & service providers ♦ Manage & administer supplier and service provider contracts in accordance with **Bank's Outsourcing Model** ♦ Ensure supplier & service provider **policies and procedures (P&Ps)** meet Bank legal, control, audit, compliance, risk/privacy mandates and security requirements, comply with regulatory and Bank requirements ♦ Provide day-to-day oversight of supplier/service provider services, ensuring adherence to all contracted service levels ♦ Evaluate overall **merits of contracts** ♦ Participate in contract renewal negotiations, provide **Service level agreement SLA, Technology service agreement TSA, Business Partnership agreement BPA** ♦ Prepare quarterly **management interpretation documents** ♦ Complete & submit **annual outsourcing attestation** ♦ Act as escalation point for internal business

♦ [Contract Baseline \(8 elements\)](#) ♦ [Vendor Selection](#) ♦ [ITIL](#)

#### Portfolio Management

#### Program Complexities - Whole Solution



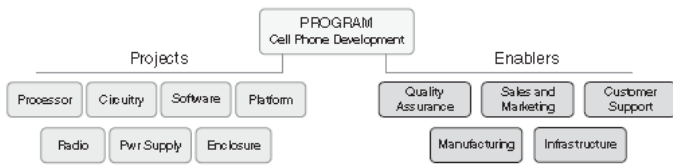


Figure 4.7 Example of cell phone program architecture.

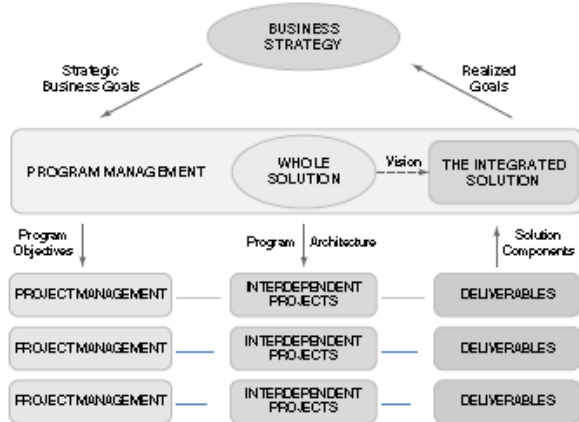
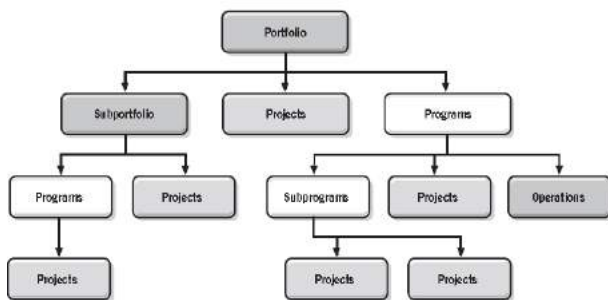


Figure 4.6 The whole solution guides program vision and architecture.

### Components of Project Portfolio Management PPM

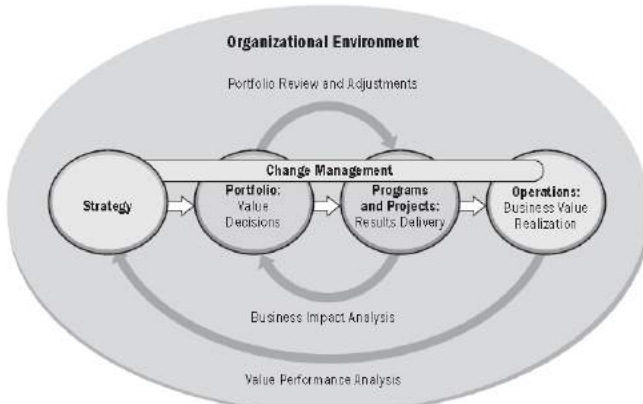


### Portfolio, Program, Project

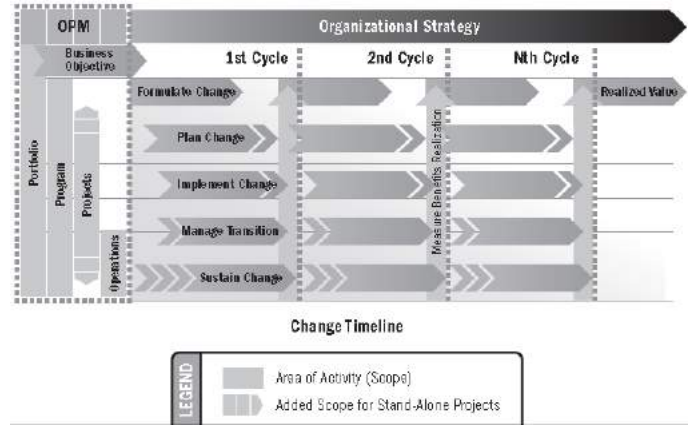


### Organizational Project Management OPM

#### OPM and Change



### OPM and Change Timeline



### Program Management Process (Ricardo Vargas)

#### Portfolio Management principles & practices (10)

1 Strategic focus 2 Strategic initiatives 3 Portfolio Components 4 Quantifiable Components 5 Time Horizon 6 Portfolio snapshot 7 Portfolio Management Activities 8 Alignment to Organization Strategy 9 Governance 10 Balancing of conflicting demands

1. Strategic focus	Portfolio management is the coordinated management of one or more portfolios to achieve the strategies and objectives of the organization. It includes related organizational processes and change initiatives by which an organization evaluates, selects, prioritizes, and allocates its limited internal resources to best accomplish organizational strategies consistent with its vision, mission, and values.
2. Strategic Initiatives	Organizations execute their strategies through the creation of strategic initiatives, comprising portfolios of programs and projects to achieve a future state. The portfolio components may not necessarily be interdependent or have related objectives. An organization may have more than one portfolio, each addressing unique organizational strategies and objectives. Proposed initiatives are structured as portfolios and components are identified, evaluated, selected, and authorized. Managing the necessary changes should be an integral part of planning initiatives.
3. Portfolio Components	As shown in Figure 4-1, a portfolio is a component collection of related programs, projects, or operations managed as a group to achieve strategic objectives. A portfolio exists to achieve one or more organizational strategies and objectives and may consist of a set of past, current, and planned or future portfolio components.
4. Quantifiable Components	The portfolio components are quantifiable, that is, they can be measured, ranked, and prioritized.
5. Time Horizon	Portfolios and programs have the potential to be longer term with new projects rotating into the portfolios unlike projects, which have a defined beginning and end.
6. Portfolio Snapshot	At any given moment, a portfolio represents a snapshot of its selected portfolio components and reflects the organizational strategy and objectives—even when specific programs or projects within the portfolio are not interdependent or do not have related objectives.
7. Portfolio Management Activities	By reflecting upon the investments made or planned by an organization, portfolio management includes activities for identifying and aligning the organizational priorities; determining governance and performance management framework; measuring value/benefit; making investment decisions; and managing risk, communications, and resources.
8. Alignment to Organization Strategy	When elements of the portfolio are not aligned to organizational strategy, the organization should question why the work is being undertaken. A portfolio should be representative of an organization's intent, direction, and progress. It is possible to undertake essential projects that do not strictly align with the strategic portfolio. However, when these projects cannot be justified as essential, the portfolio manager should remove them from the portfolio of activities for reconsideration at a later date.
9. Governance	Portfolio management requires a governing body to make decisions that control or influence the direction of a group of portfolio components as they work to achieve specific outcomes. This governing body needs to be particularly sensitive to the degree of change required to achieve the portfolio initiatives.
10. Balancing of Conflicting Demands	Portfolio management balances conflicting demands between programs and projects, allocates resources (e.g., people and funding) based on organizational priorities and capacity, and manages resources in order to achieve the benefits identified.

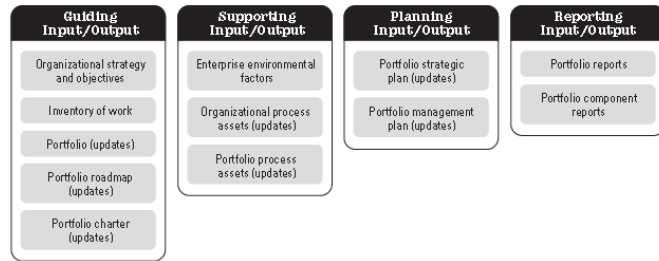
#### Portfolio Management Process Groups (5)

1 Strategic 2 Governance 3 Performance 4 Communication 5 Risk

Knowledge Areas	Process Groups		
	Defining Process Group	Aligning Process Group	Authorizing and Controlling Process Group
Portfolio Strategic Management	4.1 Develop Portfolio Strategic Plan 4.2 Develop Portfolio Charter 4.3 Define Portfolio Roadmap	4.4 Manage Strategic Change	
Portfolio Governance Management	5.1 Develop Portfolio Management Plan 5.2 Define Portfolio	5.3 Optimize Portfolio	5.4 Authorize Portfolio 5.5 Provide Portfolio Oversight
Portfolio Performance Management	6.1 Develop Portfolio Performance Management Plan	6.2 Manage Supply and Demand 6.3 Manage Portfolio Value	
Portfolio Communication Management	7.1 Develop Portfolio Communication Management Plan	7.2 Manage Portfolio Information	
Portfolio Risk Management	8.1 Develop Portfolio Risk Management Plan	8.2 Manage Portfolio Risks	



## Portfolio Management Input & Output



### Portfolio Management Tools & Techniques

1 Analysis 2 Selection 3 Meeting 4 Communication

### Analysis Tools & Techniques (15)

1 Strategic alignment 2 Prioritization 3 Scenario 4 Capability & Capacity 5 Interdependency 6 Cost/benefit 7 Stakeholder 8 Readiness 9 Portfolio Organizational Structure 10 Graphical Analytical Tools 11 Quantitative & Qualitative 12 Value Scoring & Measurement 13 Benefits Realization 14 Communication Requirements 15 Gap

### Selection Tools & Techniques (4)

1 Portfolio component inventory 2 Portfolio component categorization 3 Weighted ranking & scoring 4 Portfolio authorization

### Meeting Tools & Techniques (1)

1 Portfolio review meetings

### Communication Tools & Techniques (4)

1 Communication methods 2 Elicitation techniques 3 Portfolio Management information system 4 Integration of Portfolio Management

### Portfolio Management Organizational Context



### Portfolio 5 Tiers of Work

1 Operations 2 Lights on 3 Regulatory Mandated 4 Partner Requests/Deamand 5 Grow and Transform (>\$10K, 200 hours)



### Portfolio Processes

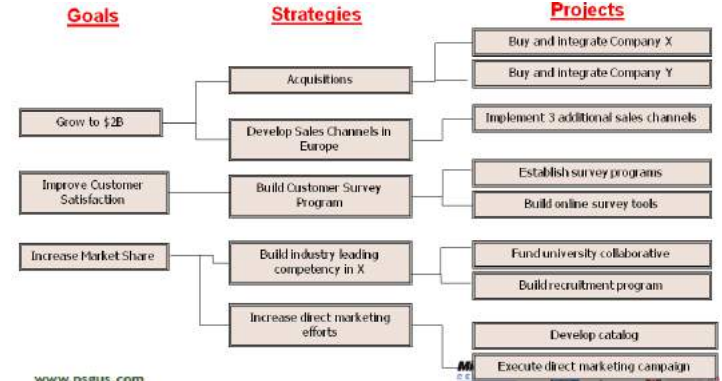
#### Proposal > Project > Benefits

1 **Proposals** • Business drivers prioritization • Business case (strategic & financial benefits) • Portfolio analysis/ optimization • Resource/ Capacity Planning/ What-If Analysis • Portfolio balancing schedules-skills • Portfolio Selection 2 **Project** • Planning/ scheduling • Resource assignment • Project tracking • Time reporting • Resource Management • Status Reporting 3 **Benefit** • Portfolio investment tracking • Performance tracking • Benefits realization tracking • Risk analysis • Project lifecycle cost tracking

### Governance

Group initiatives into portfolio in order to 1 **Support business segment, product, product line** 2 **Manage investments** continuing oversight/ decision-making about which initiatives to undertake, continue, reject or discontinue

## Goals > Strategies > Projects



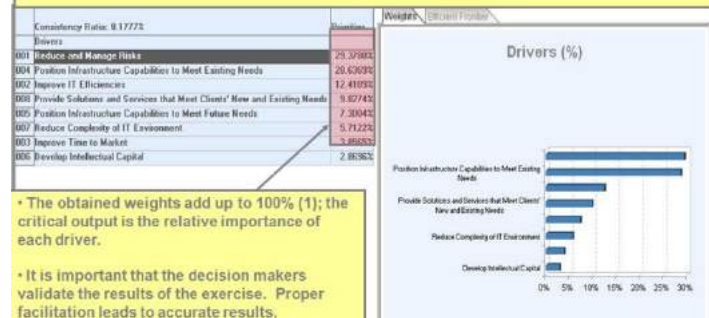
### Pairwise Comparison

The Pairwise comparison is a method for obtaining ratio scale priorities or weights for Business Drivers or objectives through performing one-to-one comparisons.

Business Drivers	Comparison	Weight
0001 Employer of Choice	St Less Imp	
0002 Expand Our Reach to New Markets	Mod Less Imp	
0003 Reduce the effect of Cyclical Risks	St More Imp	
0004 Grow Market Share in our Established Markets	Mod More Imp	
0005 Reduce the Impact on Our Environment	St Less Imp	
0006 Exploit Synergies Through our Common Filter Base	St More Imp	

The Pairwise comparison exercise is a facilitated group session to capture the business priority of each driver relationship as defined by the key stakeholders.

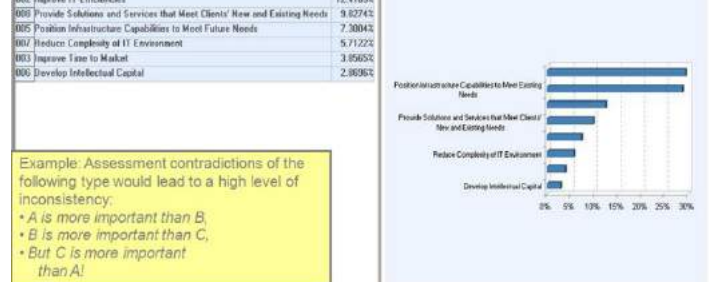
As a result of the Pairwise comparison, we obtain the absolute priority of each of the Drivers.



The obtained weights add up to 100% (1); the critical output is the relative importance of each driver.

It is important that the decision makers validate the results of the exercise. Proper facilitation leads to accurate results.

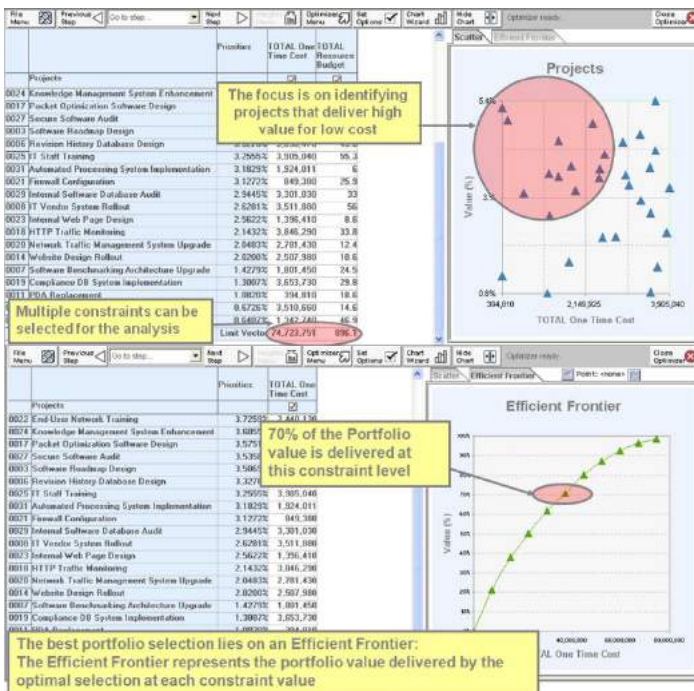
The consistency ratio helps uncover inconsistencies in the Pairwise comparison process.



Example: Assessment contradictions of the following type would lead to a high level of inconsistency:

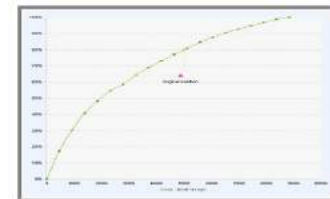
- A is more important than B,
- B is more important than C,
- But C is more important than A!

### Scenario analysis



### Input to Efficient Frontier Analysis

- Strategic Value
- NPV
- ROI
- CAGR
- Savings
- Risk
- Market Share
- Customer Satisfaction

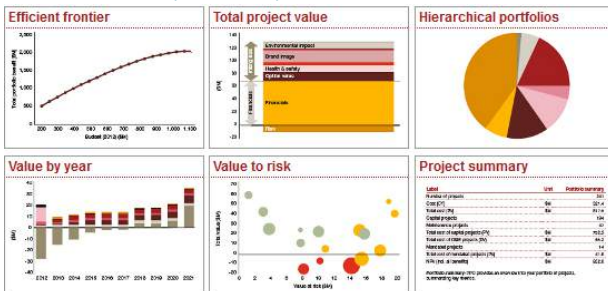


Can be single criteria per axis or multiple weighted criteria

- Cost
- Capital/Non-capital Expense
- Human Resources (FTE)
- Material
- Equipment
- Facilities
- Time (Duration, Time to Market, etc.)

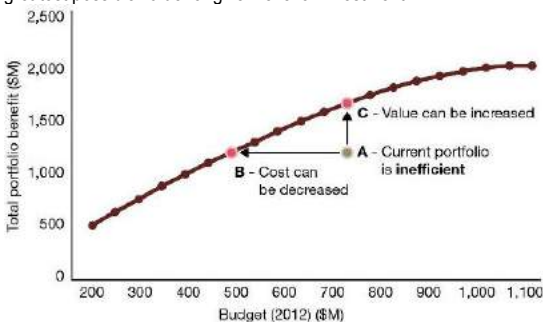
### Project Portfolio Optimization (PPO)

#### PPO Dashboard (from PwC)

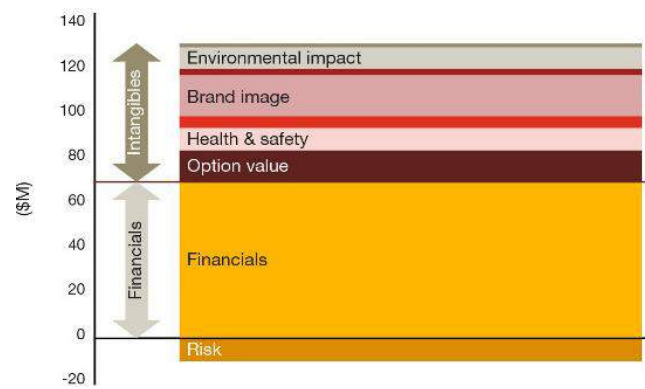


#### Efficient frontier

- Efficient frontier illustrated results of funding different combinations of projects that deliver greatest possible value for given level of investment



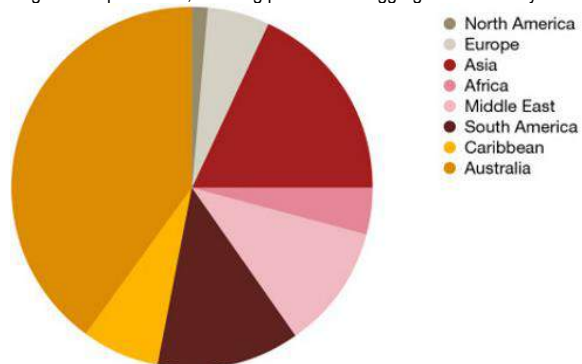
#### Total Project Value



- Value creation = incremental revenue + cost savings + indirect benefits (brand value, health and safety improvements, environmental impact, sustainability, stakeholder perception) + "Real Option Value" (management's ability to change course with project)

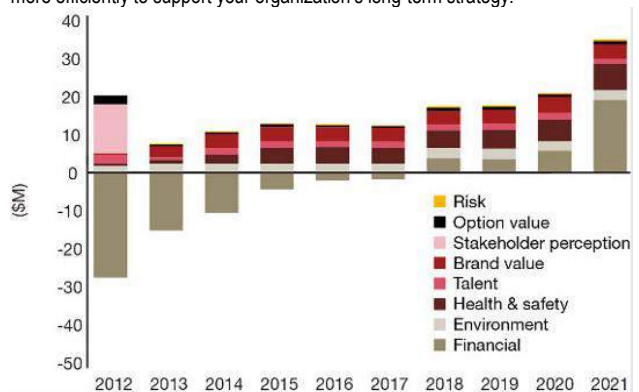
#### Hierarchical portfolios

- Prioritize funding regardless of where decisions are made (centralized at corporate level or decentralized at business unit level)
- Centralized optimization  $\Rightarrow$  resources redeployed across business units as needs arise (final resources allocated to each business unit = output of value, not a constraint set up front)
- Decentralized organizations  $\Rightarrow$  resources, budget divided among business units; funding based on historical precedent, strategic importance or growth expectations; resulting portfolios be aggregated and analyzed



#### Value by year

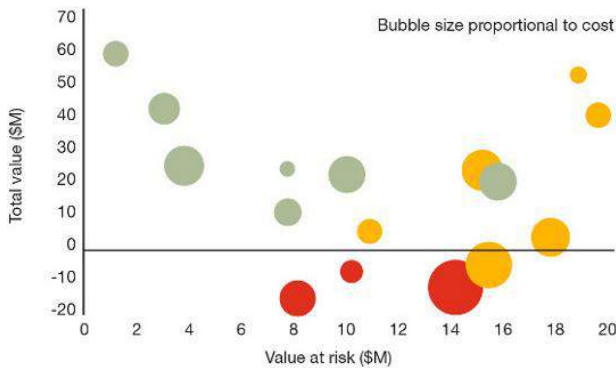
- Project's value components change over time
- Value equation includes number of dynamic variables that can change over time
- Initial investment usually front-loaded while benefits take time to develop
- PPO lets you project and compare the value of projects by year or the time interval you choose
- You can see total value as well as the components of value and how each changes over time
- With a more complete view into value, you can deploy capital more efficiently to support your organization's long-term strategy



#### Value to risk

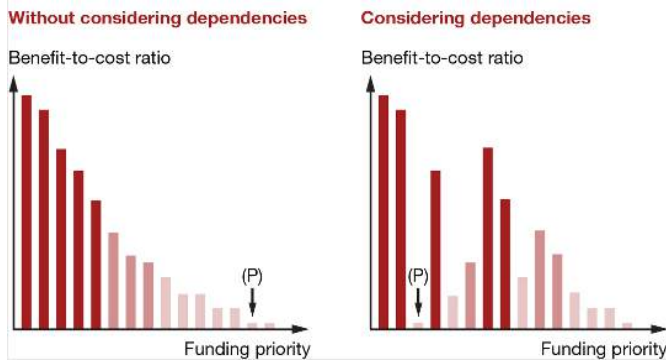
- Which projects are worth the risk? Quantify risks so you can prioritize projects based on their value to risk
- You can compare – on a level playing field – the risks assumed
- You'll have a basis for considering – and defending – which projects are worth the risk





### Project dependencies

•How to prioritize foundational projects •Which projects to take priority •Highest benefit-to-cost ratio/ *foundational projects* •Make project portfolio funding decisions based on cumulative impact on organization's goals •Graphs illustrate how Project P overlooked for funding because low cost-benefit ratio. But when dependencies are considered, Project P takes a much higher priority because it enables other, more beneficial projects



### Roadmap to PPM Maturity



### Portfolio Metrics

Category	Key Question	Sample Metrics
Portfolio Mix	Is our funding aligned to strategic objectives	% portfolio spend in "run the business," "grow the business," and "innovate the business" [could use other <a href="#">portfolio models, like the one from MIT CISR</a> ]; % of Portfolio in Short/Medium/Long-term Projects; % of Portfolio in Large and Extra Large Projects
Demand & Capacity	Do we have the right prioritization and sequencing of projects given capacity?	% growth in project intake, % growth in initiatives, IT resource utilization, business resource utilization, recruiting pipeline
Value	For our portfolio, to what extent did we achieve our objectives?	% on time, % on budget, Portfolio and Sub-portfolio IRR, # function points delivered vs plan, \$ saved for consolidation efforts
Portfolio Health	For projects in-flight, how is our execution progressing?	counts and amounts for projects in Red/Amber/Green status; #issues by severity: opened, closed, on-hold
Financial Management	How effectively are we managing project budgets and what are financial trends?	% variance to plan, % funding in-flight; \$ committed but not spent; earned value

### Monte Carlo

**What For?** ❶ Critical Path / Time to Market Analysis ❷ Project Cost Estimation ❸ Workforce Planning with Queuing ❹ Schedule Risk Analysis **Input Distributions** ❶ Normal ❷ Exponential for inter-arrival times ❸ WEIBULL for component life/failure times ❹ Lognormal for cycle times ❺ Poisson for the number of events in a given time interval ❻ Triangular distribution

## Project Management

### Overview

#### Responsibilities

**Tasks** •Project estimation, quality, planning, risk, issues management, reporting and stakeholder management **Services/activities** •Deliver project plans/ integration, issues/ risk management, financial management •Manage project scope, quality, schedule/ change control processes •Manage development of project plan deliverables •Manage critical processes (requirement gathering/ solution design) •Responsible for chairing status, issues/ risk meetings •Day-to-day management •Lead project procurement/ contract management •Ensure knowledge transfer **Deliverables** •Integrated project plan •Project issues •Project change management status •Project risks •Weekly Status Reports •PMO Status Reports •Integrated plan •Project issues •Project change management status

#### Questions at Project Start

#### Why-Who-What-When-How

**Why?** Why are we doing this project? What are the goals? How do these goals align with institutional, school, or department strategic goals? Why are we initiating this project now?

**Who?** Who is the client for the project? Who is the project sponsor? Who will the customers and stakeholders be? Who is the team that will be supporting the project after launch? Which operations will this project impact? Who is providing the resources for planning, managing, and supporting this project? Who will be responsible for communicating with stakeholders about the project? Who do we need to communicate with during the planning, running and evaluation of the project?

**What?** What are the resources being devoted to the project? How many FTEs? How many dollars? Which team members will be assigned? For how long? What is it okay not to do (opportunity cost) due to this project? What do we expect to learn? What are we not doing by starting this project? What would be the costs and benefits of not starting this project? What are the risks? What other questions about this project should I be asking?

**When?** When will the project go live? When will we start communicating about the project? When will the resources that are needed be secured? When will we have a window to initiate this new project given current operational needs? When can we manage any scheduled downtime that this new product or service may cause?

**How?** How do we plan to recoup the costs (direct, indirect, and opportunity) for the project? How will this project be evaluated? How will we prioritize this project within our portfolio of other projects? How will we manage any changes that will result from this project? How will we recognize, communicate, and mitigate the risks?

#### My Boss

•What is the current status of the project? •Is there a statement of work and project plan I can review? •Where are the contracted deliverables and timelines? •What does success look like for my role? •Who are the main clients and how do you see me interacting with them? •Who are the firm executives on the account and what are their roles? •What politics should I be aware of? •What documents should I review first? •Who should I meet with to get up to speed quickly? •What do I need to tackle first this week?

#### Practical

•Where is project team located? •How do we set up meeting? (Outlook invitation, meeting room set up, conferencing, Etc) •Is there a shared workspace or SharePoint for the account/project team? •Are there specific templates that should be used for deliverables?

#### Stakeholders

•Why are you doing this? •What are your assumptions? •Who is your audience and what do they want? •What is the follow-up plan? •How do you define success? •What are the perceived risks? •Who is the main stakeholder? •Who is responsible for ensuring appropriate resources (time, people and money)? •Who will be responsible for deciding whether the project goes ahead or not?

#### Planning

•What are the major deliverables for this project? •What are the major steps in my project plan? •How detailed should the plan be to put deliverables in perspectives? •How experienced/mature is the organization in its project management approach? •What is the project delivery methodology? •Which tool is used for planning? •How rigorous is the time reporting? •Are there templates for management reporting?

#### Checklist for Project Management

•Clear, concise **statement defining the program** prepared & reviewed by knowledge parties for consensus •**Performance objectives** follow guidelines with actual calendar dates for completion •**Work Breakdown Structure** developed to a level sufficient to prepare accurate estimates of cost, resources and working times for all program activities •Statement of **program scope** that clearly defines the limits of what will and what will not be done or delivered as a result of the program •**Specifications** identified and "owners" of these specifications concur with the outcomes •**Tangible deliverables** identified for milestones for performance measurement •**Responsibility Assignment Matrix (RAM)** showing involvement of key contributors •**Working schedule** with allocated resources showing how these resources will be applied over time to produce the project or service from the program •**Critical Path & Program Evaluation Review Technique** basis for all performance reporting, working schedules, and known dependencies •**Spend plan** that shows cash flow throughout the program's duration •Strengths, Weaknesses + Opportunity and Threats (SWOT) analysis on program risk •Where risks have been identified, **contingency plans**

have been started to deal with them as well as a risk register to tract the potentials for the risk becoming a problem •If capital equipment is needed in the program, appropriate **requisitions** have been prepared, with cost justifications attached •**Program plan** prepared with participation & input from the deliverables owners •**Control system** established using variance analysis to assess performance •All components of program measurement system are as defined in **Earned Value Management System** or an appropriate measure of physical percent complete •Individuals have been selected for assignment to the program whose individual needs will be met through participation, where possible •The program is planned to a manageable level of detail at no less than level 3 of the **work breakdown structure (WBS)** •Work has been broken down into reasonable durations tasks (work packages) which are assigned with a budget and to a responsible **Control Account Manager** •A post-mortem has been done at each **milestone** in the program and a final one has been done for the overall program and placed in the program •Team instructed to **record their working times** on the program daily •**Chart of control accounts** (level three of the WBS) has been developed to track earned value against the plan and the contract deliverables of the program •All members of the team are clear on the **expectations** of them in terms of authority, responsibility and accountability •Standard **operating procedures for empowering** people has been applied to every member of the team •**Limits** established to determine when the program plan will be revised, such as plus or minus 10% total authorized budget variation, etc •**Needs of customers** carefully considered and documented in preparing the program plan •**Qualitative guides** developed for non-quantifiable program objectives, such as program performance •Checklists prepared for major segments of the program avoiding overlook

### Project Metrics

#### JP Morgan 5 Project Metrics

①Effort level by phase ②Project variances ③Productivity rate (Phase effort/Project size in functional points) ④Defect counts ⑤Functional point counts

#### Core Metrics and Additional Metrics

TABLE 5-8 The Core Metrics

MEASURE	INDICATOR
Time	Schedule Performance Index
Cost	Cost Performance Index
Resources	Quality and Number of Actual versus Planned Staff
Scope	Number of Change Requests
Quality	Number of Defects against User Acceptance Criteria
Action Items	Number of Action Items behind Schedule

- Deliverables (schedule): late versus on time
- Deliverables (quality): accepted versus rejected
- Management reserve: amount available versus amount used
- Risks: number of risks in each core metric category
- Action items: action items in each core category
- Action items aging: how many action item not completed are over 1 month, 2 months, 3 or more months

#### Converting Metrics to KPI

TABLE 4-2 Converting a Metric to a KPI

METRIC	PREDICTIVE	QUANTIFIABLE	ACTIONABLE	RELEVANT	AUTOMATED
Number of unstaffed hours	Yes	Yes	Yes	Yes	Yes
Number or % of milestones missed		Yes		Yes	Yes
Management support his as % of total labor	Yes	Yes			Yes
% of work packages on budget		Yes		Yes	Yes
# of scope changes		Yes		Yes	Yes
Changes in the risk profile	Yes	Yes	Yes	Yes	Yes
# or % of assumptions that have changed		Yes		Yes	
Customer loyalty	Yes	Yes	Yes	Yes	Yes
Turnover of key personnel, # or %		Yes		Yes	
% of labor hrs on overtime		Yes	Yes		Yes
SV		Yes			Yes
CV		Yes			Yes
SPI	Yes	Yes	Yes	Yes	Yes
CPI	Yes	Yes	Yes	Yes	Yes

### Project estimation techniques

#### Estimation during 4 phases

①Initiation ⇒ **Order-of-Magnitude** (project-level analogous estimates based on similar projects) ②High-level planning ⇒ **analogous estimates** or **percentage techniques**

project-level & major deliverable ③Final project plan ⇒ **parametric estimates** or **bottom-up estimates/ 3-point estimates** (O-optimistic, P-pessimistic, L-likely  $(O+4L+P/6)$ ) @ confidence level (⇒ **reserve analysis**) ④Weekly status ⇒ weekly **rolling estimates** until completion See **Estimating Effort in WBS context**

#### Parametric estimates

•Based on average known (historical) rates: **source lines of code (SLOC)**, **function points**, **function-based sizing (FBS)** •ISBSG International Software Benchmarking Standards Group

#### MONTE CARLO

•Environmental specifics (UoM Estimations) ①Project Management

②Requirements/Analysis ③Design & Development Batch (COBOL, SQR, C, etc.), PeopleSoft Objects, App Engine, Integration Broker, Business Interlinks, Component Interface (excl. calling programs), DMS, Message Agent (excl. subscriber or publisher programs, Oracle Triggers, SQL/Script, Workflow, REPORTING, Security -PeopleSoft Objects, XML Publisher ④System Testing ⑤Performance Support ⑥Data Delivery (New Data Set, Enhancements, Definitions) ⑦Data Administration ⑧Practice Moves ⑨Infrastructure ⑩Security Activities 11 Third Party Products & Interfaces

#### Monitoring and Measuring Effort

Measurement Methods	Key Points to Consider on Determining the Method
Discrete Effort (7.3.1)	<b>Fixed Formula</b>
	50/50, 25/75, etc. – Using the 50/50 and 25/75 methods, work is credited for EV as soon as it starts. However, the real progress is invisible and can give a false sense of accomplishment. This measurement method should only be used for work that spans less than two reporting periods.
	0/100 – The 0/100 method does not incrementally credit EV for partial work. Therefore the start of the work is not explicitly reported. This measurement method should only be used for work that is scheduled to start and complete within one reporting period.
	<b>Weighted Milestone</b>
	<b>Percent Complete</b>
	The weighted milestone method has one or more milestones in the measurement period. Each milestone has an objective, verifiable accomplishment that is associated with it. The milestones are weighted to reflect the relative accomplishment of the milestones against the whole.
	<b>Physical Measurement</b>
	The evaluation of work progress in the project work packages is related to the physical nature. Whereas testing, measurement procedures, and/or its specifications should be explicit and be agreed upon in advance.
<b>Apportioned Effort (7.3.2)</b>	
To use apportioned effort, the project manager must have pragmatic knowledge and validated performance records to create the percent of apportioned effort pertaining to the discrete work package.	
<b>Level of Effort (7.3.3)</b>	
Level of effort (LOE) can be misused and distort the real progress of project, because PV of the LOE determines EV for each reporting period (there is never a schedule variance) no matter how much of the work is actually performed.	

#### Estimating Effort in WBS context

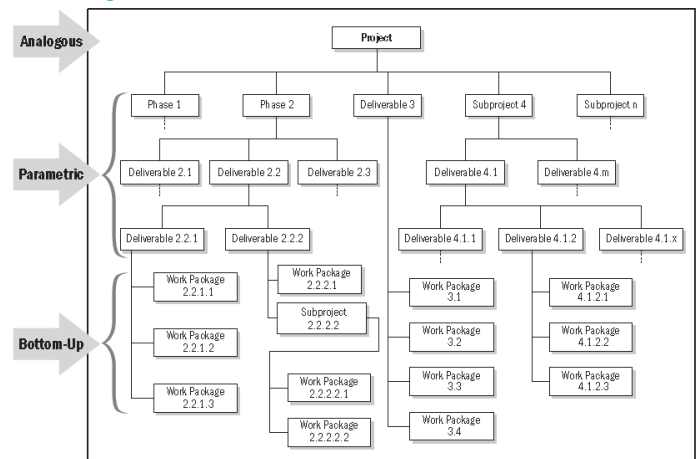


Figure 4-2. Types of Estimating Techniques in the Context of Decomposing a WBS

#### 5 groupings for Size scoring

①Base score (finance, customer, system) ②Project size ③Technical complexity ④Project complexity ⑤Project impact

<p><b>①Base Score</b></p> <p><b>A Financial</b> Total dollar value of customer account balances on system? Worst-case if erroneous financial results? System rating in comparison to others? (Occasional use, high volumes) Average value of each transaction? <b>B Customer</b> Customer response if system was? Sensitivity of the data in the system? Importance of the customer base of this system to the bank? Customers interface to this system? <b>C System</b> category by Senior Management and Business Owners? Who is the primary user of the</p>	<p><b>③Technical complexity</b></p> <p>How close does the development (not QA) environment resemble production? How many new interfaces? What is the nature of the new technological infrastructure to be used? What is the nature of the new functionality being delivered?</p> <p><b>④Project complexity</b></p> <p>Where will development take place? How much do we know about vendor(s)? How are requirements being developed? What level of expertise of the project team?</p>
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system? What is the required system availability? If this system becomes inoperable, how is bank staff affected? System size in relation to other bank systems (Lines of Code/Function Points)? <b>2 Project size</b> What size is the project team? How big is this deliverable (either in terms of LOC or new functionality)? How will deliverable affect business areas?	What type of change management/version control is being used? <b>3 Project impact</b> How would a delay in implementing this project affect other projects? How will this system be implemented? What fallback plans are in place in the event of system failure?
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## Estimation Refinement (NASA)

TABLE 7-1

**EFFORT ESTIMATE REFINEMENT  
THROUGHOUT A PROJECT**

Estimation Point	Upper Limit	Lower Limit
End of requirements definition and specification	x2.0	x0.50
End of requirements analysis	x1.75	x0.57
End of preliminary design	x1.4	x0.71
End of detailed design	x1.25	x0.80
End of implementation	x1.10	x0.91
End of system testing	x1.05	x0.95

## Percentages of effort by Software Class

TABLE 6.4 Percentages of Development Effort by Software Class  
(Assumes application of 1000 function points or 100,000 source code statements)

Activity	End-user projects	MIS projects	Systems projects	Commercial projects	Military projects
Requirements definition	0	7	8	4	10
Design	10	12	15	10	15
Coding	60	25	18	25	18
Testing	30	30	30	36	22
Change management	0	6	10	5	12
Documentation	0	8	7	10	10
Project management	0	12	12	10	13
Total	100	100	100	100	100

## Dimensions of Project Complexity

Dimensions	Technical	Organizational	Strategic
Characteristics	<ul style="list-style-type: none"> <li>number and type of interfaces</li> <li>technology development requirements</li> <li>interdependencies among technologies (tight coupling vs. loose)</li> </ul>	<ul style="list-style-type: none"> <li>number and variety of partners (industry, international, academic/research)</li> <li>distributed/virtual team; decentralized authority</li> <li>horizontal project organization</li> <li>intensive learning needs</li> </ul>	<ul style="list-style-type: none"> <li>number and diversity of stakeholders</li> <li>socio-political context</li> <li>funding source(s) and process(es)</li> <li>geopolitical interests (international partnerships)</li> </ul>

Figure 2.1. Project complexity can be described in terms of three fundamental dimensions.

## Characteristics of Credible estimates

Table 1: GAO's 1972 Version of the Basic Characteristics of Credible Cost Estimates

Characteristic	Description
Clear identification of task	Estimator must be provided with the system description, ground rules and assumptions, and technical and performance characteristics. Estimate's constraints and conditions must be clearly identified to ensure the preparation of a well-documented estimate.
Broad participation in preparing estimates	All stakeholders should be involved in deciding mission need and requirements and in defining system parameters and other characteristics. Data should be independently verified for accuracy, completeness, and reliability.
Availability of valid data	Numerous sources of suitable, relevant, and available data should be used. Relevant, historical data should be used from similar systems to project costs of new systems; these data should be directly related to the system's performance characteristics.
Standardized structure for the estimate	A standard work breakdown structure, as detailed as possible, should be used, refining it as the cost estimate matures and the system becomes more defined. The work breakdown structure ensures that no portions of the estimate are omitted and makes it easier to make comparisons to similar systems and programs.
Provision for program uncertainties	Uncertainties should be identified and allowance developed to cover the cost effect. Known costs should be included and unknown costs should be allowed for.
Recognition of inflation	The estimator should ensure that economic changes, such as inflation, are properly and realistically reflected in the life-cycle cost estimate.
Recognition of excluded costs	All costs associated with a system should be included; any excluded costs should be disclosed and given a rationale.
Independent review of estimates	Conducting an independent review of an estimate is crucial to establishing confidence in the estimate; the independent reviewer should verify, modify, and correct an estimate to ensure realism, completeness, and consistency.

## My expertise in tracking and reporting project financials

CIBC RSI (2009-10): created budget of \$80 million, weekly coordinated the report of 100+ contractors, IT Infrastructure and vendors, weekly reconciled against Accounting, monthly reported financial spending against project progress and milestones achievement

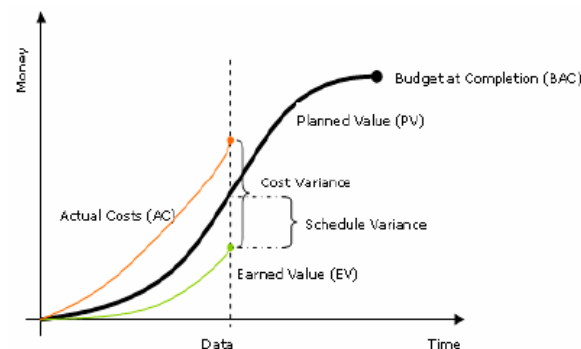
## Project accounting Time accounting categories

**Major time accounting categories** ♦ Management (plan, manage stakeholder, manage change) ♦ Administration ♦ Process development ♦ Requirements development ♦ Detailed analysis ♦ Prototyping ♦ Architecture ♦ Detailed Design ♦ Unit Testing ♦ System Testing ♦ User acceptance testing ♦ Deployment

## How I mapped the project financials against the project deliverables

Regularly discussed with managers of project streams on achievement during reporting period with focus on whether those achievements are accurately reflected in project spending (allowed managers flexibility to sometimes early start low-hanging fruits)

## Earned Value



## Variance

- Cost Variance (CV) = EV - AC
- Schedule Variance (SV) = EV - PV

## EVM in summary

## EVM Performance Measures

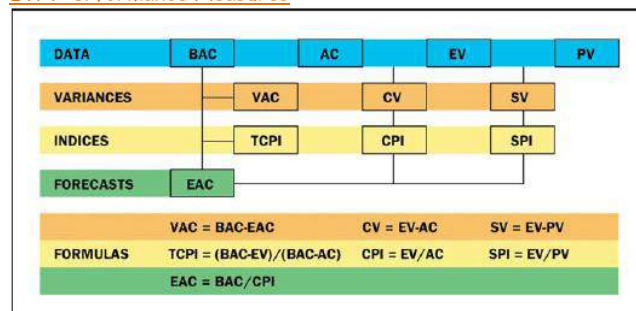


Figure 3-1. EVM Performance Measures

## EVM and basic PM questions

Project Management Question	EVM Performance Measures
<b>How are we doing time-wise?</b>	<b>Schedule Analysis &amp; Forecasting</b>
- Are we ahead or behind schedule?	- Schedule Variance (SV)
- How efficiently are we using time?	- Schedule Performance Index (SPI)
- When are we likely to finish work?	- Time Estimate at Completion (EAC)
<b>How are we doing cost-wise?</b>	<b>Cost Analysis &amp; Forecasting</b>
- Are we under or over our budget?	- Cost Variance (CV)
- How efficiently are we using our resources?	- Cost Performance Index (CPI)
- How efficiently must we use our remaining resources?	- To-Complete Performance Index (TCPI)
- What is the project likely to cost?	- Estimate at Completion (EAC)
- Will we be under or over budget?	- Variance at Completion (VAC)
- What will the remaining work cost?	- Estimate to Complete (ETC)

Figure 3-2. EVM and Basic Project Management Questions

## EVM performance measures interpretation

Performance Measures		Schedule		
		SV > 0 & SPI > 1.0	SV = 0 & SPI = 1.0	SV < 0 & SPI < 1.0
Cost	CV > 0 & CPI > 1.0	Ahead of Schedule Under Budget	On Schedule Under Budget	Behind Schedule Under Budget
	CV = 0 & CPI = 1.0	Ahead of Schedule On Budget	On Schedule On Budget	Behind Schedule On Budget
	CV < 0 & CPI < 1.0	Ahead of Schedule Over Budget	On Schedule Over Budget	Behind Schedule Over Budget

Figure 3-3. Interpretations of Basic EVM Performance Measures

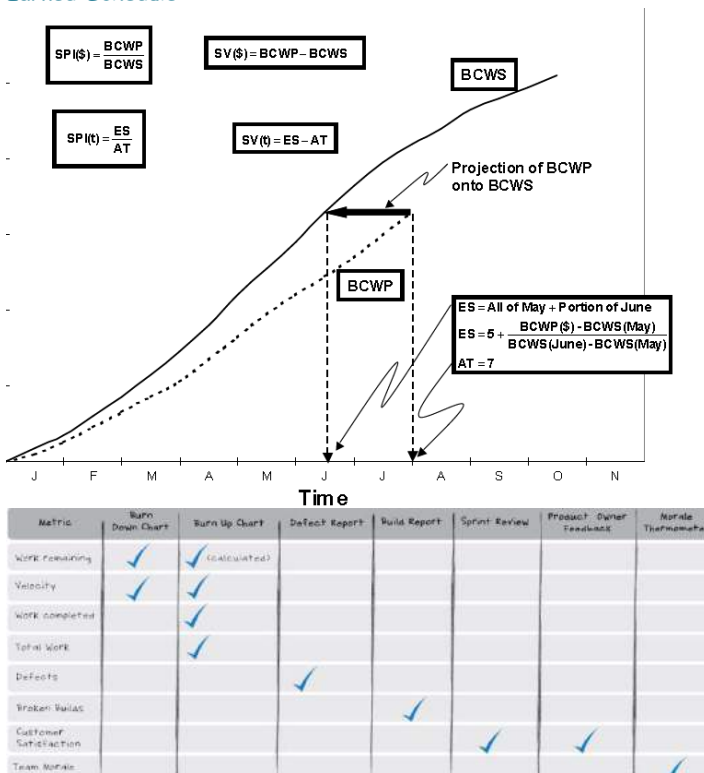
## Normalized performance indices

- Cost Performance Index (CPI)** =  $EV / AC$  (value < 1.0 indicates a cost overrun compared to the budget estimates; interpreted as "I am getting x cents out of every \$". This indicator can be used to forecast project costs at completion.
- Schedule Performance Index (SPI)** =  $EV / PV$  - Interpreted as "I am progressing at y% of the rate originally planned". This index is not a reflection of the schedule on its own, and should be reviewed in conjunction with the project plan to determine true project position

## Forecast cost and/or schedule completion

- Estimate at Completion (EAC)** =  $AC + ((BAC - EV) / CPI)$ , BAC = total PV @ completion
- Estimate to Completion (ETC)** =  $(BAC - EV) / CPI$  - revised work schedule completion

## Earned Schedule



## Variance Analysis Report

Variance Analysis Report						
Project	Bicycle			Report Period	Period-6	
Date	February 8, 2010			WBS Element	1.4.1 Braking System	
				Cost Variance		Schedule Variance
	PV	EV	AC	CV	CV%	SV
Current Period	\$3,920	\$1,176	\$2,000	(\$224)	-70%	(\$2,744)
Cumulative	\$3,920	\$1,176	\$2,000	(\$224)	-70%	(\$2,744)
At Completion	BAC	EAC	VAC			
	\$11,440	\$12,000	(\$560)			

### SCHEDULE VARIANCE

#### Problem Analysis - Cause

Several delivered components from one vendor have failed receipt inspection, resulting in approximately \$3,000 of parts associated with the handle lever that were returned to the vendor for modifications. These parts were planned to be delivered by February 26, however they are anticipated to be returned on March 11. It is anticipated that the schedule variance will go to zero at that time.

#### Program/Task Impact

The braking system is on the critical path of the program. Delays in these deliveries may impact all downstream activity including the shifting system, integration, assembly, and test. The anticipated impact to the braking system is a 2-week delay in completion.

#### Corrective Action Plan (Include Expected Recovery Date)

The braking system team is working with the project manager and other component teams on a mitigation plan to recover some of the 2-week delay. Specifically, some component tests and product tests may begin without the braking system. In addition, we are working with the shifting system team to assess if activities can be performed simultaneously rather than serially as planned. Anticipate completion of the braking system by March 11, and program impact is still being managed and assessed.

### COST VARIANCE

#### Problem Analysis - Cause

\$560 of the cost variance is due to a higher than anticipated cost associated with the brake calipers and pads. The remaining \$264 is labor associated with managing early receipt of wiring components.

#### Program/Task Impact

The \$560 pad and caliper overrun cannot be mitigated and is included in the braking system EAC. No impact projected for the labor variance.

#### Corrective Action Plan (Include Expected Recovery Date)

The \$264 of labor variance is level of effort activity performed earlier than anticipated. Since the associated wiring components have arrived early, these LOE activities will not have to be performed when anticipated in late February, and the \$264 variance will go to zero at that time.

#### Impact to Estimate At Completion (EAC)

Purchase orders released to vendors for braking system parts, primarily the pads and calipers, were negotiated \$560 higher than budgeted. Cost impacts associated with part inspection failures are still being evaluated, but a potential \$1,500 - \$2,000 EAC impact is possible.

## AGILE Planning, Budgeting, Charting

## Project Processes and Tools

## Recourse planning and Cost Management

	Recourse Planning	Cost Estimating	Cost Budgeting	Cost Control
Information needed	<ul style="list-style-type: none"> <li>Work breakdown structure</li> <li>Historical info</li> <li>Scope statement</li> <li>Recourse pool description</li> <li>Organizational policies</li> </ul>	<ul style="list-style-type: none"> <li>Work breakdown structure</li> <li>Recourse reqmts</li> <li>Recourse rates</li> <li>Activity duration estimates</li> <li>Historical info</li> <li>Chart of accounts</li> </ul>	<ul style="list-style-type: none"> <li>Cost estimates</li> <li>Work breakdown structure</li> <li>Project schedule</li> </ul>	<ul style="list-style-type: none"> <li>Cost baseline</li> <li>Performance rpts</li> <li>Change requests</li> <li>Cost management plan</li> </ul>
Tools and Techniques	<ul style="list-style-type: none"> <li>Expert judgment</li> <li>Alternatives identification</li> </ul>	<ul style="list-style-type: none"> <li>Analogous estimating</li> <li>Parametric modeling</li> <li>Bottom-up estimating</li> <li>Comp. tools</li> </ul>	<ul style="list-style-type: none"> <li>Cost estimating tools and techniques</li> </ul>	<ul style="list-style-type: none"> <li>Cost change Control system</li> <li>Performance measurement</li> <li>Additional planning</li> <li>Computerized tools</li> </ul>
Results - Profits	<ul style="list-style-type: none"> <li>Recourse requirement</li> </ul>	<ul style="list-style-type: none"> <li>Cost estimates</li> <li>Supporting detail</li> <li>Cost management plan</li> </ul>	<ul style="list-style-type: none"> <li>Cost baseline</li> </ul>	<ul style="list-style-type: none"> <li>Revised cost estimates</li> <li>Budget updates</li> <li>Corrective action</li> <li>Estimate at completion</li> <li>Lessons learned</li> </ul>

## Activities and Scheduling

	Activity Definition	Activity Sequencing	Activity Duration Estimating	Schedule Development	Schedule Control
Information needed	<ul style="list-style-type: none"> <li>Work breakdown structure</li> <li>Scope statement</li> <li>Historical information</li> <li>Constraints</li> <li>Assumptions</li> </ul>	<ul style="list-style-type: none"> <li>Activity list</li> <li>Product Desc</li> <li>Mandatory dependencies</li> <li>Discretionary dependencies</li> <li>External dependencies</li> <li>Constraints</li> <li>Assumptions</li> </ul>	<ul style="list-style-type: none"> <li>Activity list</li> <li>Constraints</li> <li>Assumptions</li> <li>Recourse requirements</li> <li>Recourse capabilities</li> <li>Historical information</li> </ul>	<ul style="list-style-type: none"> <li>Project network diagram</li> <li>Activity duration estimates</li> <li>Recourse requirements</li> <li>Recourse</li> <li>Pool description</li> <li>Calendars</li> <li>Constraints</li> <li>Assumptions</li> <li>Leads and Lags</li> </ul>	<ul style="list-style-type: none"> <li>Project schedule</li> <li>Performance Reports</li> <li>Change requests</li> <li>Schedule management plan</li> </ul>
Tools and Technique	<ul style="list-style-type: none"> <li>Decomposition</li> <li>Templates</li> </ul>	<ul style="list-style-type: none"> <li>Precedence diagramming method (PDM)</li> <li>Arrow Diagramming method (ADM)</li> <li>Conditional diagramming methods</li> <li>Network templates</li> </ul>	<ul style="list-style-type: none"> <li>Expert judgment</li> <li>Analogous estimating</li> <li>Simulation</li> </ul>	<ul style="list-style-type: none"> <li>Mathematical analysis</li> <li>Duration compression</li> <li>Simulation</li> <li>Recourse leveling heuristics</li> <li>Project management software</li> </ul>	<ul style="list-style-type: none"> <li>Schedule Change control system</li> <li>Performance measurement</li> <li>Additional planning</li> <li>Project management software</li> </ul>
Results - Profits	<ul style="list-style-type: none"> <li>Activity list</li> <li>Supporting detail</li> <li>Work breakdown Structure updates</li> </ul>	<ul style="list-style-type: none"> <li>Project network diagram</li> <li>Activity list updates</li> </ul>	<ul style="list-style-type: none"> <li>Activity duration estimates</li> <li>Basis of estimates</li> <li>Activity list</li> </ul>	<ul style="list-style-type: none"> <li>Project schedule</li> <li>Supporting detail</li> <li>Schedule management</li> </ul>	<ul style="list-style-type: none"> <li>Schedule updates</li> <li>Corrective action</li> <li>Lessons learned</li> </ul>

updates	plan •Recourse requirement updates
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## CIBC Enterprise Delivery framework EDF

### Gating processes

#### Gate reviews (for application projects)

**Gate 1:** Design Complete, Ready for Construction/Build

**Gate 2:** Application Code Complete, Ready for UAT Testing

**Gate 3P:** UAT Testing Complete, Application Ready for Production Testing

**Gate 3 Final:** Ready for Production

#### Infrastructure Gate

**Gate i1:** Design Complete, Ready for Infrastructure Build

**Gate i2:** Infrastructure Build Complete, Ready for Testing

**Gate i3:** Testing Complete, Ready to Receive Application

#### Gate review meeting

(1.5 hour, 6 weeks notice) - Gate Review Meeting's attendees

①Project Team Representatives (Project Manager, Project Team Subject Matter Experts - application development resources, application architect, database, user interface, testing/quality assurance) ②Gate Chair(s) ③Technology Infrastructure & Technology Solutions ④Enterprise Internet Security (EIS) who reviewed **Threat/Risk Assessment (TRA)** ⑤Operations - For HP HA: HP Architecture, HP Operations, HP Project Manager. For **Shared Infrastructure**, this includes appropriate GCO/GCC/PAS representation

#### 11 Control groups

①**Action Items Tracking** •Action Items Log ②**Application Retirement Tracking** •Application Retirement Checklist ③**Change Control** •Change Control Log •Change Request Form ④**Document Review & Approval** •Walkthrough approval •Walkthrough notice ⑤**EPM Update** EPM Project Schedule ⑥**Health Check Update** •Health Check Status Report ⑦**Issue Tracking** •Issue Log ⑧**Project Reporting Facility PRF Update** ⑨**PCM Risk Mitigation** •Stakeholder Role Map •Organization Readiness Assessment •Change Planning Worksheet •Polarity Analysis & Mapping Templates ⑩**Progress Reporting** •Progress Report •Risk Tracking •Risk Log

#### EDF Phases and Responsibilities (v6)

##### Phase 0 - Pending (Business Initiation)

•Business Processes •Business Proposal •High-level requirements	BA/Project sponsor
•TO Intake Request Form •Unified Triage/ PPM create opportunity	Project lead

##### Phase 1.1 - Planning Initiation & Requirements

•Business Current/Future state <b>FMEA</b> •Voice of the customer •Gap Analysis	BA
•Business Case – Request for Seed	Project sponsor
•Project charter •Kick-off document •Work package Template	Project lead
•Team List •Development Plan •Timeline •Risk Assessment •Communication Plan •Status Meeting Minutes •Issue Log	
•Benefits Realization Plan (start)	Project sponsor, Project lead
•Detailed requirements	BA/Project lead
•GSSP Goods & Services Sourcing Req.	Project lead
•Candidate architecture •TO Intake •Unified Triage (A)	TO lead

##### Phase 1.2 - Planning Design

•Business Planning (Communication, Training, Pilot)	Project lead/Business lead
•GOI Business Gating	
•Business Case approval •GSSP Contract approval	Project lead/Business lead
•NIAP – NIRA •Project reporting facility PRF setup	
•Application Design •CETM Test Planning, TEP (Test Execution Plan) •Change Request Log	Project Lead, Development Lead, QA Lead

##### Phase 2.1 - Execution Construction

•Business Planning (Implementation) •CETM DIT, Unit Testing •Service Continuity ADRP/ ACRP	Project lead/Business lead
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##### Phase 2.2 - Execution Testing

•CETM DIT, Unit Testing <b>Gate 2, Gate 3P</b>	
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##### Phase 2.3 - Execution Implementation

•GOI Business Gating •NIAP - NILA <b>Gate 3F</b>	
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##### Phase 3 - Closing

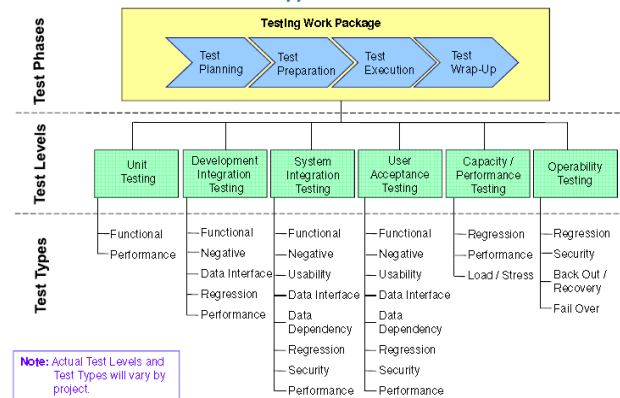
•Project Closure Report •Post Implementation Review (PIR) •PSAT •Benefits Realization Plan (execute)	
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RSI and EDF Mapping PPM and Triage Application testing AGILE Testing

## D4 SDLC PLANVIEW

### EDF Mandatory Test Processes

#### Test Phases, Levels and Types



#### Considerations for mandatory test processes

Mandatory Test Process	Considerations
Determine Test Environment Requirements	If test and production environment differ •Identify risks & mitigation strategies •Document in Test Plan
Establish Entry and Exit Criteria	•MUST document exit criteria for DIT •MUST document entry and exit criteria for all other test levels (except Unit)
Create a Traceability matrix	•Demonstrates test coverage •MUST be created for UAT
Construct Test Cases	•MUST be documented for UAT •MUST be documented for SIT
Perform Test Execution	•Results MUST be documented (except for Unit test level) •Test Level Completion Report MUST be created for UAT and signed off •Test Level Completion Report MUST be created for SIT and Capacity & Performance testing
Perform Variance Management	•All variances found in all Test Levels (except Unit) MUST be logged •Severity levels MUST be consistent across all test levels that will be conducted for a planned change
Obtain Management Approvals	•At minimum, business & technology management sign off MUST be obtained for the UAT Plan and UAT Test Level Completion Report •Open variances at completion of UAT MUST be documented in UAT Test Level Completion Report •Number of tests executed •Number of tests planned not executed & reasons why •Recommendation to proceed or not to next level
Wrap Up Test Work Package	•MUST create a paper and/or electronic testing project file for all test documentation •All sign-offs (including e-Mail sign-offs) MUST be filed with the rest of the test documentation

**CEMLI** = Configuration/ customization, Extension, Modification, Localization, Internationalization

#### Test Processes

♦Assess Risks ♦Perform Test Planning ♦Determine Test Levels ♦Determine Test Types ♦Determine Test Data Requirements ♦Determine Test Environment Requirements ♦Establish Entry & Exit Criteria ♦Create Traceability matrix ♦Construct Test Specifications ♦Perform Test Execution ♦Perform Variance Management ♦Capture Test Metrics ♦Obtain Management Approvals ♦Wrap Up Test Work Package

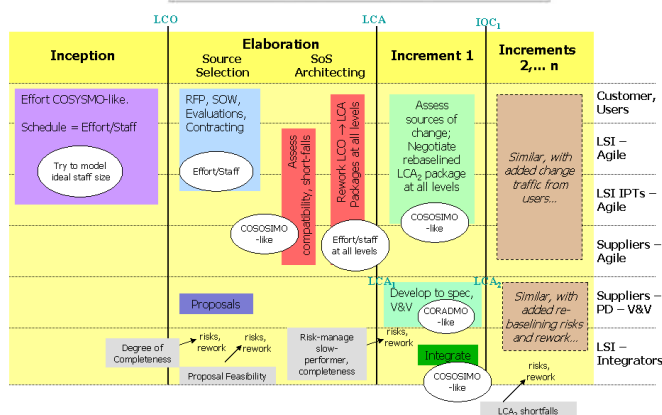
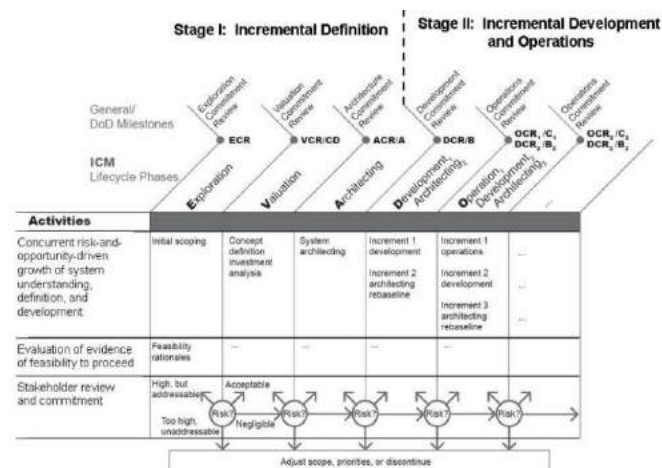
#### Testing Risk Assessment

Business Process/Function	Business Complexity			Technical Complexity		Testing Complexity		Risk Exposure (Value)	Priority (Overall Risk Exposure)
	Business Criticality	Frequency of use	Number of impacted users	Probability of Failure	Size of change	Functional Complexity	Data Complexity		
BRD - Activity 1 Sales Officer Process a Loan application - reCapp application creation by using Branch/CAU channel	3	3	3	2	2	1	1	108	H

<sup>1</sup> FMEA = Failure Modes & Effects Analysis



## Incremental Commitment Methodology



## Microsoft Dynamics SURE STEP Methodology

Phase	Tasks during phase
Diagnostic	<ul style="list-style-type: none"> <li>• Evaluate client business processes and infrastructure</li> <li>• Due diligence: ascertain requirements and fit with solution, assess resources</li> </ul>
Analysis	<ul style="list-style-type: none"> <li>• Prepare project plan, proposal and <b>Statement of Work</b></li> <li>• Analyze current business model and finalize <b>Functional Requirements</b></li> <li>• Finalize <b>fit-gap analysis</b></li> <li>• Develop <b>Environment Specification</b></li> </ul>
Design	<ul style="list-style-type: none"> <li>• Develop <b>Functional Design, Technical Design, Solution Design</b></li> <li>• Finalize data migration design</li> <li>• Establish test criteria</li> </ul>
Development	<ul style="list-style-type: none"> <li>• Finalize configurations, set up standard solution</li> <li>• Develop, finalize custom code</li> <li>• Conduct functional and feature test</li> <li>• Create <b>User Training</b></li> </ul>
Deployment	<ul style="list-style-type: none"> <li>• Set up production environment</li> <li>• Migrate data to production</li> <li>• Conduct user acceptance</li> <li>• Train users and finalize user documentation</li> <li>• Conduct go-live check and promote system to production</li> </ul>
Operation	<ul style="list-style-type: none"> <li>• Resolve pending issue</li> <li>• Finalize user documentation and knowledge transfer</li> <li>• Conduct project post-mortem</li> <li>• Provide on-going support</li> </ul>
Optimization	<ul style="list-style-type: none"> <li>• Leverage Review Offerings to determine whether the solution has been optimized</li> <li>• Analyze the system to determine how it can be optimized</li> </ul>
Upgrade	<ul style="list-style-type: none"> <li>• Assess customer's current business processes and solution</li> <li>• Document the requirements for new functionality</li> <li>• Upgrade to the new release, add new functionality, promote existing customizations. eliminate codes no longer required</li> </ul>

Microsoft Dynamics SURE STEP Analysis

## Activities

Standard, Agile, Rapid and Upgrade	Enterprise – Additional
<ul style="list-style-type: none"> <li>Finalization and approval of the project charter.</li> <li>Finalization and approval of the project plan.</li> <li>Execution of the project Kickoff meeting.</li> <li>Documentation and approval of functional requirements.</li> <li>Execution and documentation of Fit Gap Analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Execution of executive kick off meeting.</li> <li>Development of the organization change management strategy, communications strategy and training strategy</li> <li>Documentation and approval of functional and non-functional requirements</li> <li>Development of the future state business process models</li> <li>Definition of the master data taxonomy and management process</li> <li>Assessment of the architecture and infrastructure</li> </ul>

## Deliverables



## Milestones



## Microsoft Dynamics SURE STEP Design

## Activities

Implementation Approach	Configuration	Design for Customization	Integration Points
<ul style="list-style-type: none"> <li>The goal of the Design phase is to define how the business requirements will be implemented.</li> </ul>	<ul style="list-style-type: none"> <li>It includes configuration of the overall Microsoft Dynamics solution and the design of specific customizations needed to satisfy business requirements identified during the Analysis phase.</li> </ul>	<ul style="list-style-type: none"> <li>The customizations can range from simple user interface or report modifications to moderate-to-complex functionality additions or modifications.</li> </ul>	<ul style="list-style-type: none"> <li>Customizations may also include the integrations and interfaces and data migration elements required to support the requirements.</li> </ul>

## Deliverables



## Milestones



Microsoft Dynamics SURE STEP Development

## Activities

Customization Development	Major Deliverables	Key Objectives to be accomplished
<ul style="list-style-type: none"> <li>Development phase is to build and test the system components defined and approved in the design specifications, including developing the customizations, integrations and interfaces, and data migration processes.</li> </ul>	<ul style="list-style-type: none"> <li>The major deliverables include the complete system configuration, completion and freezing of code for customizations, integrations and interfaces, and data migration.</li> </ul>	<ul style="list-style-type: none"> <li>Other Key Objectives to be accomplished include finalization of the design specifications and the completion of Solution Testing. For an Enterprise project, this may also include Data Acceptance, Process and Integration Testing.</li> </ul>

## Deliverables

Final Business Process Models	Final System Configuration	Final Custom Code Development	Solution Testing (Process, Integration, and Data Acceptance) completed
User Acceptance Test Scripts	Final Production Environment Specification	Final Integration and Interface Code Development	Final Data Migration Code Development

## Milestones

Core Microsoft Dynamics application Upgrade complete	ISV Solution Upgrade complete (if applicable)	Customization Code Upgrade complete	Integration and Interfaces Upgrade complete (if applicable)
Upgrade Testing complete	Data verification via benchmarks complete	User Acceptance Test (UAT) Test Scripts development/confirmation complete	Customer sign-off for Production environment technical architecture

## Microsoft Dynamics SURE STEP Deployment

- The Deployment phase is where all the efforts of the project team come together for a successful transition to the new Microsoft Dynamics™ solution

## Deliverables

End User Training	User Acceptance Test Results	<b>Additional Deliverables for Enterprise Projects</b> <ul style="list-style-type: none"> <li>Deployment Plan</li> <li>Train-the-Trainer (TTT) Training</li> <li>Production Operations Guide</li> </ul>
Final Data Migration (excluding Upgrade Projects)	Final System Readiness & Go-Live Checklist	
Production Environment	Cutover to Production	

## Milestones

End User Training complete	User Acceptance Testing complete	Production Environment ready	<b>Additional Milestones for Enterprise Projects</b> <ul style="list-style-type: none"> <li>Training of Trainers</li> <li>Performance Testing</li> </ul>
Final Data Migration complete (excluding Upgrade Projects)	System Go-Live		

## SURE STEP Operations

- Close the project
- Provide post-production support
- Transition the solution and knowledge to the customer

## Deliverables

Project Closure Report	Final Delivery of all Project Deliverables to the customer
Documented Lessons Learned	

## Milestones

Post-Go-Live Support complete	Transition of solution to Support complete	Formal Project Closure
System Acceptance and Sign-off		

## Microsoft Dynamics SURE STEP AGILE

### PERT, CPM, GERT

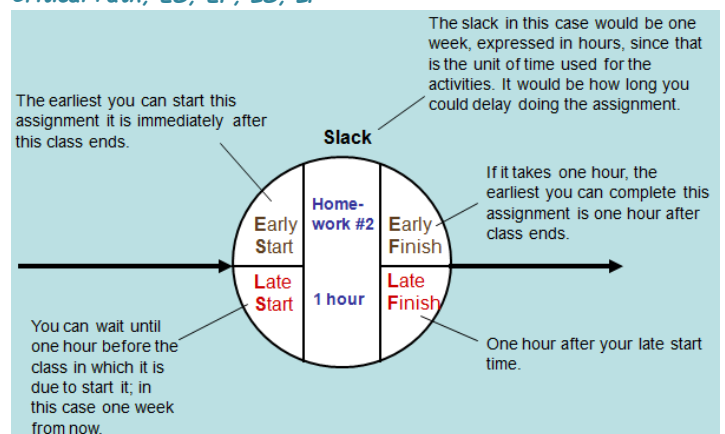
#### Definition

**PERT (Program Evaluation and Review Technique)** – when *uncertain* activity times - 3 time-estimates  $\text{Expected Time} = (\text{Best} + 4 \text{ Most likely} + \text{Pessimistic})/6$  - Activity slack max length of time that activity can be delayed without delaying project

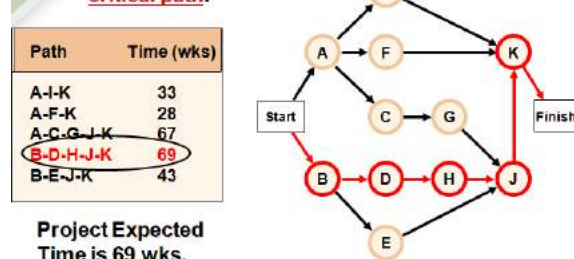
**CPM (Critical Path Method)** - when *certain* activity times

**GERT (Graphic Evaluation and Review Technique)** Used only in complex projects • Overcomes PERT & CPM limitations (complex to set up relationships, biased time estimates, overlooked near critical paths) • Allows completed/not completed (succeed/ fail) individual activity • Allows looping back (redoing activity) or skipping

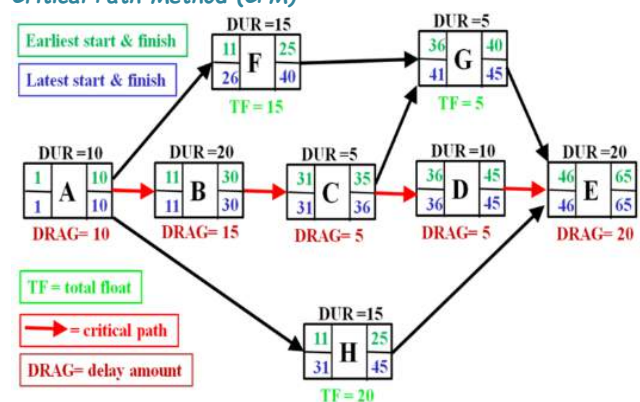
#### Critical Path, ES, EF, LS, LF



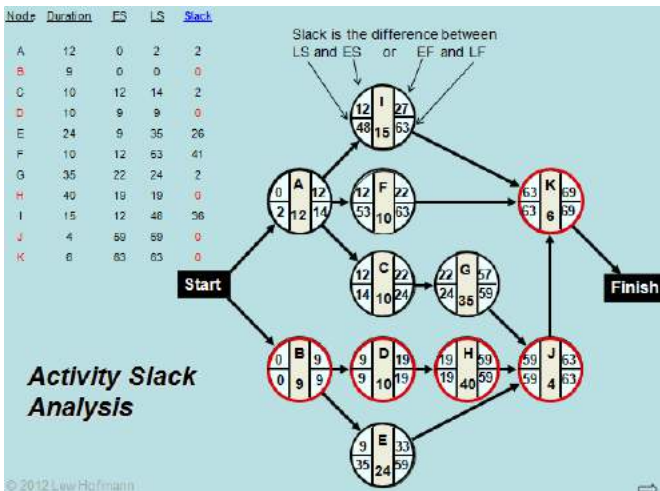
The longest path is the **critical path!**



#### Critical Path Method (CPM)







## MS Project

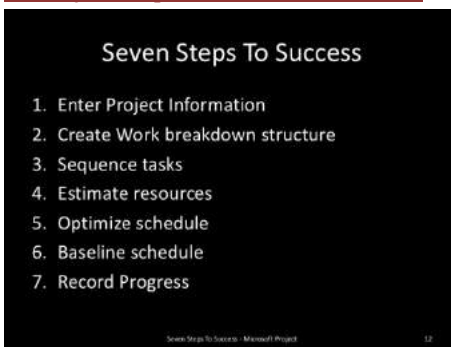
Acronyms	Earned Value Fields
BCWS	Budgeted Cost of Work Scheduled
BCWP	Budgeted Cost of Work Performed
ACWP	Actual Cost of Work Performed
SV	Schedule Variance
CV	Cost Variance
BAC	Budgeted at Completion
EAC	Estimate at Completion
VAC	Variance at Completion

## MS Project

### MS Project schedules

•Plan ahead the key phases before creating the project plan in MS Project •Use PMI-compliant templates for a quick start •Define "Phases", "Tasks" and "Milestones" by alternatively using manual and automatic scheduling •**Progressive elaboration, rolling-wave planning** •Use the **WBS Coding tool** to track changes •Conduct What-if Scenarios with Multilevel Undo •Set project baseline to track variances •**EVM**. Set baseline, preconfigured **Earned-Value-Over-Time-Report**. Planned Value PV (Budgeted cost of Work scheduled-BCWS), Earned Value EV (Budgeted cost of Work performed-BCWP), Actual Cost AC (Actual Cost of Work performed-ACWP), Schedule Variance SV=EV-PV, Cost Variance CV=EV-AC, EAC, BAC, VAC – Earned Value Cost Indicators CV%, Cost Performance Index CPI=EV/AC, TCIP – Earned Value Schedule Indicators SV%, Schedule Performance Index SPI=EV/PV

### MS Project 7 steps to Build Realistic Schedule



### Step 1 Enter project information

- ✓ Set the project start date
  - Don't: Type project start date in Gantt Chart view.
  - Do: Set Project Information in Project ribbon
- ✓ Set working time, holidays
  - Don't: Change Calendar settings in Options dialog
  - Do: Use Change Working time in Project ribbon

### Step 2 Create WBS

- ✓ Display project objective and estimates
  - Don't: Insert summary task in Gantt Chart
  - Do: Show Project Summary task using Format ribbon
- ✓ Add deliverables and detail tasks
  - Don't: Auto schedule tasks, combine tasks into one
  - Do: Manually schedule tasks, insert tasks using Task ribbon
- ✓ Check WBS granularity
  - Don't: Expand/collapse the summary tasks
  - Do: Use Outline button in View ribbon

### Step 3 Sequence tasks

- ✓ Set dependencies
  - Don't: Enter the task dates, drag the task bar
  - Do: Set dependencies using Task forms
- ✓ Validate network
  - Don't: Use Gantt Chart view
  - Do: Use Task forms, Network diagram in Task ribbon
- ✓ Compare top-down and bottom-up estimates
  - Don't: Set constraints on low-level tasks
  - Do: Manually schedule summary tasks, auto schedule detail tasks

### Step 4 Estimate resources

- ✓ Add resource details
  - Don't: Type resource name in Gantt Chart
  - Do: Use Resource Sheet in Resource ribbon
- ✓ Assign resources
  - Don't: Select resource name in Gantt Chart
  - Do: Use Assign Resources, Team planner in Resource ribbon
- ✓ Fix task duration or work or resource assignment
  - Don't: Change the work or duration
  - Do: Use the task type to control the behavior

### Step 5 Optimize schedule

- ✓ Identify critical path
  - Don't: Have broken critical path
  - Do: Check slack, critical path using Format ribbon
- ✓ Level resources
  - Don't: Use Gantt chart view
  - Do: Use Resource Usage, Team planner in Resource ribbon

### Step 6 Baseline schedule

- ✓ Set baseline
  - Don't: Copy the file (or) fields to custom fields
  - Do: Set Baseline using Project ribbon
- ✓ View baseline
  - Don't: Insert columns in view
  - Do: Use Baseline table, Show baseline bar using Format ribbon

### Step 7 Record progress

- ✓ Record actual
  - Don't: Use the Entry table for recording actual
  - Do: Use the Tracking table with % complete in Task ribbon
- ✓ Slippage
  - Don't: Write formula to calculate variance
  - Do: Use Slippage of Format ribbon, Variance table
- ✓ Report progress
  - Don't: Use the standard reports, copy picture
  - Do: Print views, copy timeline view

### MS Project Schedule Checklist

Notes: **summary task** = task with indented subtasks @ lower level in WBS - **detail task** = task without indented subtasks listed beneath it. Checklist categories:

Work Breakdown Structure (WBS), 15  
 Estimates, 15  
 Dependencies, 15  
 Scheduling Constraints, 16  
 Resources, 16  
 Assignments, 16  
 Optimizing, 16  
 Reporting, 17



## General

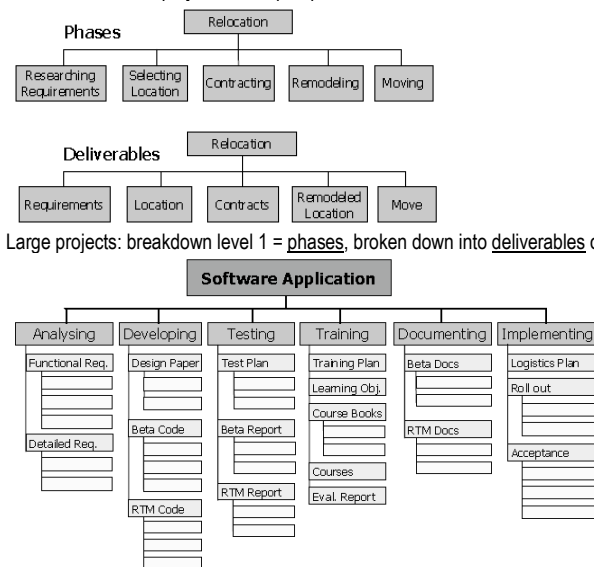
- **Objective** of final product of project (if not described in File, Properties, Comments)?
- **Deadline date** of project (if not shown as a deadline date in the schedule)?
- **Cost budget?** If yes, how much?
- **Person hour budget (effort)?** (person hours/ days/ weeks/ months/ years)?
- Work time estimates pure or gross?
- **Rolling Wave approach** in planning? Duration of detail planning window?
- Will you do **task updates (durations)** or **assignment updates (time sheets)** or both?

## Setup

- Does **File, Properties, tab General, Comments** field describe the objective or final product of the project? Description is visible as **Note** on project summary task.
- Do the working hours on the **Tools, Change Working Time, Standard** (Project Calendar) correspond to the **Tools, Options, Schedule, Hours per day** setting? Are working times 8AM-12PM and 1PM-5PM consistent with 8 hours/day and 40 hours/week. Quickest way to check consistency: choose **Tools, Change Working Time** to take directly to the **Tools, Options, Calendar** dialog.

## WBS

- Is WBS a **deliverable-oriented** breakdown structure? Are there deliverables in the WBS? Deliverables captured using **nouns** (perhaps with adjectives, but without verbs). Verbs change deliverable into activity. If no nouns in WBS, there are no deliverables. Alternatives for a deliverable-oriented breakdown: **phase-oriented** breakdown or an **organizational** breakdown. From a project control perspective, these are less effective.



### Is the list of deliverables complete?

- Are all expected deliverables explicitly included in the WBS? This should include the significant reporting items (e.g. monthly reports, test reports).
- Are out-of-scope deliverables explicitly excluded from the WBS? We recommend you capture exclusions in **File, Properties, tab General, Comments** field.
- There are no unnecessary deliverables in the WBS.
- Include the project management deliverables and activities in the WBS. Enter **overhead tasks** (ongoing tasks during entire project, e.g. project management, technical support and quality control) as **long-duration tasks**.

### Does the WBS have a logical hierarchy?

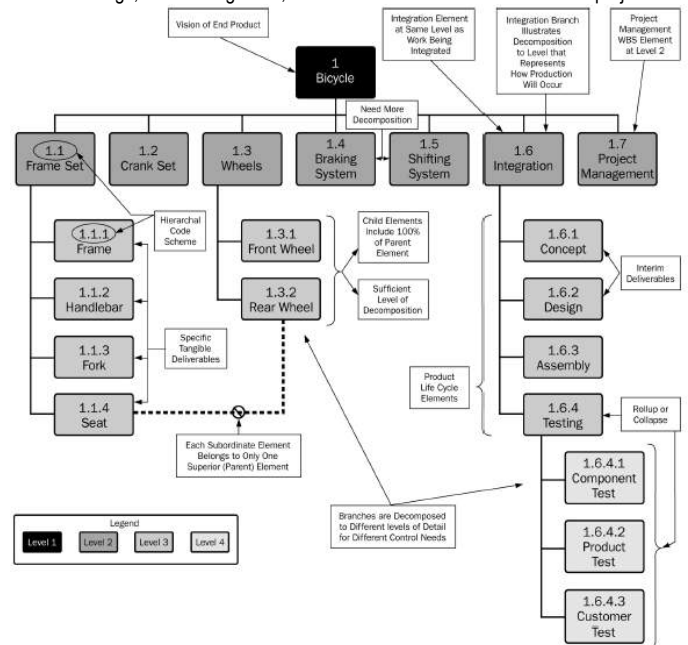
- If you don't have a logical hierarchy, you may report the wrong cost and duration by phase or by deliverable. You can check if the WBS is a logical hierarchy by expanding the outline structure level by level by clicking **SHOW** on the **Formatting** toolbar.
- Is the WBS an indented list with multiple, hierarchical levels instead of one long list?
- Are the phases, if present, on a higher level than the deliverables?
- Are the tasks, if present, on a lower level than the deliverables?
- Does each element logically relate to its summary tasks?
- Do the subtasks comprise all the work of their summary task?
- Does each summary task have at least two detail tasks? There should be no duplication of deliverables or overlap between the deliverables.
- Is the feature **Tools, Options, View, Project Summary Task** used instead of a physical project summary task? MS Project's **project summary task** has ID number 0 (zero).
- Are WBS elements properly formulated? **Phases** use imperfect tense (-ing). **Deliverables** use noun (perhaps with an adjective but without verb). **Detail tasks** use present tense verb.
- **Milestones** use noun of deliverable and verb in past or perfect tense - or words: 'ready', 'complete' or 'sign-off'
- Are deliverables name, tasks and milestones used consistently in the entire WBS?
- Are there enough milestones? (roughly 1 milestone for each deliverable). Milestone events center on deliverables when deliverable is completed, approved, sent, signed off, published, or shipped. Check this by applying the standard filter **Milestones** and checking if most deliverables (summary tasks) have a milestone.

### Does the WBS have the right level of detail?

- Can you estimate the duration or work on the detail tasks?
- Do you have difficulties finding the dependencies between the detail tasks?
- Do you often assign more than one resource per task?
- Are there detail tasks that are longer than a reporting period?
- Detail tasks with durations longer than 10% of the project duration (**1%-10% Rule**)? Check by applying filter 1 IIL Level of Detail > 10% of Proj Dur.

### There may be too many detail levels in the WBS:

- Do you think there are too many levels, or the task list too long?
- Checklist items or reminders into the task list? Transfer these to the Notes field.
- Can you update all detail tasks in the schedule during project execution?
- Tasks with durations shorter than 1% of project duration (1%-10% Rule)?
- Is the WBS clear to all project stakeholders (customers, suppliers, upper management, team members, and support staff)?
- Do the overhead tasks (like "project management") extend over the entire project? Do the status meetings, as recurring tasks, continue over the entire duration of the project?



## Estimates

### Are estimates reasonable given work that needs to be performed?

- This may be hard to evaluate if you are not a subject matter expert. However, we all know that writing documents takes a long time, particularly if they are formal or contractual documents – See **estimation techniques**

### Are estimates consistent with working hours on Standard (Project Calendar)?

- Gross working time estimates should be entered in a schedule with gross working hours (typically 8AM-5PM).
- Pure working time estimates should be entered in a schedule with pure working hours. 100% productive working hours correspond to a shorter working day, for example, 8AM-3PM. You should change the working times to shorter **Non-default** working times on the Standard (Project Calendar) in **Tools, Change Working Time**. If you do this, you should also revise the Hours per day and Hours per week conversion factors in **Tools, Options, Calendar** accordingly. This is to keep your schedule consistent.

## Dependencies

### Dependency type

- **Finish-to-Start (FS)** – default • **Finish-to-Finish (FF)** – simultaneous end • **Start-to-Start (SS)** – simultaneous start • **Start-to-Finish (SF)** – rare

### Does the logic of the network make sense?

You can check this by showing the highest outline levels only and checking whether the timing of the deliverables (or phases) makes sense on this high level.

### Is the network of dependencies complete?

The network is complete if the task bars of all detail tasks are tied up at both ends. However, the network can have multiple starting points, but only one ending point. Only then will the **Critical Path calculation** be correct. The following questions will help determine if the network is complete:

- Is the logic as much as possible set on detail tasks only? If dependencies run over summary tasks, it takes time to check if the network is complete. It is also too hard to trace the Critical Path and understand it. Only with a complete network will the schedule be a fully dynamic model of the project. You can check if there are dependencies on summary tasks by applying filter 2 IIL Summary Tasks with Dependencies.
- Are all the starts of the detail tasks and milestones linked to at least one other detail task or milestone? Exceptions: all tasks that can start when the project starts, external delivery

milestones (should have a **Start-No-Earlier-Than** date), recurring tasks, and overhead tasks. Verify if all starts are linked by applying filter **3 IIL Detail Tasks without Predecessors**. Note that if the project manager used **SS-** or **FF-**dependencies, the filter is not conclusive. You can check if there are tasks with **SS-** or **FF-**dependencies by applying filter **3 IIL Detail Tasks with SS or FF**.

- Are all ends of the detail tasks and milestones linked to at least one other detail task or milestone? Exceptions: project end milestone, recurring tasks and overhead tasks. You can verify if all finish dates are linked up by applying the filter **3 IIL Detail Tasks without Successors**. Note that if the project manager used **SS-** or **FF-**dependencies, the filter is not conclusive. Check whether there are tasks with **SS-** or **FF-**dependencies by applying the filter **3 IIL Detail Tasks with SS or FF**.

- Are there tasks with an unreasonably large amount of Total Slack? Check by descending sort on **Total Slack** and checking whether the tasks with the largest positive slack were expected to have a lot of slack. If not, you have found missing logic.

When a change is entered into the schedule, does it update the rest of the schedule automatically through dependencies? Is the entire schedule still valid? Where the schedule is not valid, a dependency might be missing. If you have to check the entire schedule on every change, you don't have a dynamic schedule.

### Are there redundant dependencies making network difficult to understand?

- Are there dependencies that leapfrog each other?
- Are there dependencies that run in parallel on detail and summary tasks? If that is the case, keep the detail task dependencies and remove the summary task dependencies.
- Does the network have circular logic? Circular logic does not make sense because it is not clear which task should be scheduled first. MS Project warns you not to set circular logic within a single schedule.

## Deadlines and Constraints

### Is the project deadline modeled in the schedule?

Set as a **deadline date** or as a **hard constraint date** on the project finish milestone

- Does the schedule have the fewest possible schedule constraints? Constraints make the schedule rigid. However, *constraints are allowed on:*

External dependencies, such as delivery of supplies or arrival of materials  
Activities that have to take place on a certain agreed-upon date, like presentations and training. In general, these are activities in which a group of people is involved.

Recurring detail tasks, like status meetings.

Do-or-drop-dead deadlines, like the Dec.31, 1999 deadline for Y2K projects.

Activities affected by (winter) weather conditions i.e., task asphalt streets **starts-no-earlier-than** April 1st.] Display tasks with constraints with filter **4 IIL Constraints other than ASAP** to display recurring detail tasks.

## Resources

Resources and assignments are important in projects in which it can be expected that limited resource availability or huge workloads will influence the project end date. They are also important if there is a budget and the cost needs to be managed.

### Are all resources identified in the Resource Sheet?

This is the case if all resources are entered into the Resource Sheet that could have a potential impact on the quality, duration or cost of the project.

**Consolidated Resources** = group of pooled individuals. The maximum units are set to the number of full-time equivalent individuals who are part of the consolidated resource. Full-time equivalency is defined in the **Tools, Options**, tab **Calendar**, **Hours per Day** setting. If you have 2 full-timers and 2 half-timers on a team, the maximum units for that consolidated resource should be set to  $2 \times 1 + 2 \times 0.5 = 3$  resources

### Are there no overlaps between resources or duplication of resources?

If there are overlaps or duplications, the project manager cannot check the workloads of the resources properly. Workloads of one person will be aggregated on two different resource names in the project.

### Is the availability of the resources appropriately modeled?

This can be assessed by checking:

- Does availability of individuals not exceed 120% (captured in resource field **Max. Units** and availability profile in **Resource Information**, tab **General**)? This threshold was chosen for **schedule certification** purposes. It is unreasonable to ask resources for more than 120% availability for periods longer than one week. If the **Max. Units** are less than 100%, is there a valid reason for this? Valid reasons are that the project manager works with pure work time estimates or that the resources have other ongoing work or other projects.

- Are the vacations of individual resources captured on their resource calendars? Vacations are little effort to enter, but their omission can throw projects off track in a major way. You

can check this by choosing the report **View, Reports, Assignments...**, **Who does what**, click **EDIT**, click tab **Details**, select **Calendar**, click **OK**. In print preview, you will now see individual vacations listed under **Exceptions**. You can copy this changed report back into your GLOBAL.MPT using the organizer (**Tools, Organizer**). In this way you have it ready to go for future schedule analysis.

- Are the costs of the resources appropriately modeled?

If the project manager has a cost budget, the costs of the project should be modeled in the schedule. The following guidelines will help determine this:

- Are human resources entered as **Work** resources in the resource field **Type**? Are facilities, machines and materials entered as **Material** resources?

- Do **Material** resources have an appropriate **Material Label** to indicate their unit of measurement?

- Are the rates entered in the appropriate fields?

Time-related costs for **Work** resources in the **Std. Rate** field. Unit-related cost for **Material** resources in the **Std. Rate** field. Time-related cost for facilities and machines as **Material** resources using a combination of the **Std. Rate** field (where you enter the per-unit cost) and the assignment-related **Units** field (where you indicate the number of units used per time unit, for example 1000/day). Use-related costs in the **Cost/use** field. Overtime costs in the **Ovt. Rate** field, but only if the overtime is paid for and at a higher rate than the standard rate; rates that vary over time in the **Cost Rate Tables**; multiple rates in the **Cost Rate Tables** and the appropriate cost rate table should be selected for each assignment. Fixed costs in the task-related **Fixed Cost** field.

- Is the cost scheduled appropriately?

- Does the resource-related **Accrue At** field reflect when the cost occurs: at the **Start** or at the **End**, or **Prorated** with the **% Complete**?

- Does task-related **Fixed Cost Accrual** field reflect when the fixed cost will be incurred?

## Assignments

- Is the **Type** of task appropriate? (**Fixed Duration**, **Fixed Units** or **Fixed Work**)

- Does each detail task have at least one human resource assigned?

If there are detail tasks without human resources assigned, you have not captured all the workloads in your project. If workloads are missing, the schedule may not forecast finish dates that are feasible. In the **Resource Usage** view there should be no detail tasks listed under the first category **Unassigned**. You can also apply the filter **5 IIL Detail tasks without Resources Assigned**. The filter allows you to easily copy the tasks including their ID-numbers to provide detailed feedback to the project manager. Note that there could still be detail tasks with only material resources assigned if you check the **Unassigned** category or apply the filter. An exception to this rule is that recurring detail tasks do not need resources assigned to them.

## Optimizing Workloads

- Is the total work within the **person-hour** budget of the project (if a person-hour or person-day budget is available)?

- Are the workloads for the resources reasonable? The workload for individuals **should not exceed 150%** of their regular availability on a day-by-day basis. The workload **should not exceed 120%** on a week-by-week basis. These upper bounds may be too high for your own organization. We have arbitrarily set them at these levels to prevent burnout, attrition, and dramatic loss of productivity. These levels are hard cut-off points for most organizations; many will use lower thresholds. The workload of consolidated resources (groups) should not exceed their availability. The workloads should be fairly smooth since there are hidden costs involved with erratic workloads. Note that it is not enough to just check whether there is any red in the **Resource Usage** view. MS Project often highlights more resources red than are truly over-allocated. If there is an over-allocation during only one business hour, the resource will already be colored red. Also, assignments that are already completed are never colored red. Use the **Go To Next Over allocation** on the **Resource Management** to check over-allocations.

## Optimizing Costs

- Is the total cost within the budget of the project (if a cost budget is available)?

## Optimizing Time

### Are the deadline dates and other constraints met in the schedule?

Check this by applying the filter **6 IIL Deadlines or Constraints not met**. The filter displays tasks with a deadline or constraint that have negative slack. When deadline or constraint dates are not met, the schedule may forecast a project end date that is too optimistic.

### Does the schedule have a Critical Path or a Resource Critical Path?

Check the **Critical Path** by applying the **Tracking Gantt** view. This view has the Critical Path highlighted in red by default. If a schedule has extended when the workloads were leveled, a **Resource Critical Path** needs to be identified. Resource critical tasks need to be marked manually in the field **Marked**. Resource Critical Path can only consist of detail tasks and milestones and not *level-of-effort* tasks (overhead tasks or recurring tasks) or summary tasks (logic should be kept on the detail tasks).

- Does the (Resource) Critical Path provide a complete explanation for the project duration? You can check the completeness by displaying the (Resource) Critical Path and then looking for gaps in it. Normally, there is at least one critical task on every business day (unless there are lags on critical dependencies). If you find gaps, the (Resource) Critical Path is fragmented and the missing (resource) critical tasks need to be identified.

- Are there as many parallel paths as logically possible in the network of dependencies? Novice schedulers tend to schedule all tasks in one long sequential chain. In that situation there are many soft dependencies that make the duration of the project unnecessary long.



When optimizing for time it is important to schedule in parallel what logically can be scheduled to happen simultaneously.

## Reporting

- Is there a one-page status report available as a View object in your project file that displays the major milestones?
  - Are the major milestones filtered in this view instead of grouped together? Many project managers put the major milestones at the top of their schedule to create a one-page overview of the project. This makes the network of dependencies complex in Gantt Chart
  - Are the appropriate milestones chosen to represent the status of the project and to forecast the project?
  - Does the 1-page view report give an appropriate impression of the project health?
- If your schedule has a Resource Critical Path, is there a separate view object that displays the Resource Critical Path?

## Updating

The following guidelines are mandatory if the project is supposed to be started. A project is supposed to be started if today's date is later than the project start date.

### What is the quality of the baseline in the schedule?

- Is a baseline present? A baseline has to be present at project start.
  - Is the baseline complete? You can verify the presence and completeness by applying the filter 7 ILL Tasks with missing baseline info. The filter displays any tasks without entries in **Baseline Start**, **Baseline Finish**, **Baseline Duration** or **Baseline Work**. When assignments are created after the baseline is set, often the **Baseline Work** field is empty. The filter does not check the field **Baseline Cost**.
  - Is the baseline original? The baseline cannot be reset without formal approval of the appropriate project stakeholders.
  - Is the baseline relevant? If the project deviated too far from the baseline, a new baseline needs to be negotiated. The baseline should provide a meaningful standard of comparison for the current schedule. You can check this by looking at how far the current schedule bars are removed from the baseline bars.
  - Are the appropriate options selected in **Tools, Options, Calculation** for the chosen updating strategy?
- For task updating (revising the **Actual Duration** & **Remaining Duration** fields), the options are: Updating task status updates resource status / Split in-progress tasks
- For assignment updating (entering numbers from the time sheets into the assignment-related **Actual Work** and **Remaining Work** fields), the options are: **Updating task status updates resource status**. If you keep this option selected, you should not enter % Complete on tasks because this will override time sheet data / Split in-progress tasks
- For updating both tasks and assignments, the options are: **Updating task status updates resource status**. Entering a % Complete on tasks will override the time sheet information. You cannot enter both types of information unless you de-select this option / Split in-progress tasks

- Is the **Status Date** set to an appropriate date?
- The appropriate date is the regular reporting date that is closest to the date of submitting the schedule. Don't forget to set the **Current date** to the same date as the **Status date** in **Project, Project Information** before updating the schedule.
- Is the schedule up to date as per the **Status date** (or **Current date**)?
  - Are all actual durations (actual work / actual hours worked) scheduled in the past? The actuals are scheduled in the past if they are earlier than the status date. Otherwise, the schedule does not reflect up-to-date forecasts. When you bring actual durations to the past, all their dependent tasks may be rescheduled earlier as well, thus updating the forecasts. This is why rescheduling is important.
  - Are all remaining durations (remaining work) scheduled in the future? The remaining estimates are scheduled in the future if they are later than the status date. If you leave unfinished work before the status date, you are scheduling work to be done in the past. The work should be moved to the future to update the forecast dates. Otherwise, the schedule does not reflect up-to-date forecasts. If you don't do this you have created a status report, not a forecast report.
  - Are the remaining durations (remaining work) revised? Otherwise, the schedule may not reflect up-to-date forecasts. If the project manager has been revising the durations of detail tasks, these will be displayed. This filter is different from the other filters in the sense that if it displays tasks, it is good. If the filter does not display any tasks, it is an indication that the project manager is not revising (remaining) durations while updating. If remaining durations are not revised, the forecasts are not very accurate, and may not even be reliable

## MS Project Earned Value

### Earned Value

**BAC**=Budget at Completion, **BCWS**=Budgeted Cost Work Scheduled, **ACWP**=Actual Cost Work Performed, **BCWP**=Budgeted Cost Work Performed

Task Name	BAC	BCWS	ACWP	BCWP
0 Manual Project	19,400.00	14,530.00	14,037.50	13,700.96
1 Weekly meetings	0.00	0.00	0.00	0.00
10 Content	10,450.00	8,900.00	8,047.50	6,750.96
11 Design structure	2,750.00	2,750.00	2,750.00	2,750.00
12 Write body text	6,150.00	6,150.00	5,297.50	4,000.96
13 Set page layouts	1,550.00	0.00	0.00	0.00
14 Exercises	8,950.00	5,630.00	5,990.00	6,950.00
15 Create exercises	5,300.00	5,300.00	4,660.00	5,300.00
16 Test exercises	1,650.00	330.00	1,330.00	1,650.00
17 Create contents & index	2,000.00	0.00	0.00	0.00
18 Manual completed	0.00	0.00	0.00	0.00

## MS Project 3 preconfigured views

- 1 Earned Value PV (BCWS), EV (BCWP), AC (ACWP), SV, CV, EAC, BAC, VAC
- 2 Earned Value Cost Indicators CV%, CPI, TCIP
- 3 Earned Value Schedule Indicators SV%, SPI

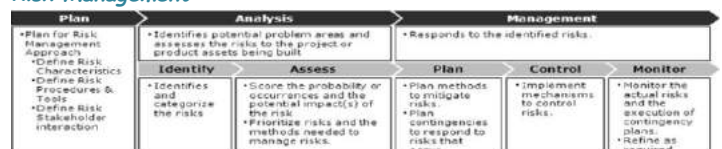
The screenshot shows the 'Visual Reports - Create Report' dialog box in MS Project. The 'Task Summary' tab is active, displaying a list of reports. The 'Earned Value Over Time Report' is highlighted. A preview of the report is shown on the right, featuring a Gantt chart and a table of earned value data. Below the dialog, a screenshot of the 'Earned Value Over Time Report' is displayed, showing a Gantt chart and a table of earned value data.

## CIBC PLANVIEW PPM

### PLANVIEW and EDF

- 1 Project Initiation Completing the Process Steps for Initiating a Delivery Component, Create a Portfolio, Project Planning (Manager-Portfolio View, Manager-Project View), Review the Work Breakdown Structure (WBS), How to Upload the Project Charter and Key Documents
- 2 Project Planning Refining the Work Breakdown Structure, Determine Durations, Determine Resource Requirements, Reserve Resources to Tasks, Project Funding, Baseline the Project
- 3 Project Execution, Monitoring and Control Overview Monitor Work Completion, Monitor on Target, Update Project Schedule, Update Project Financials, Request Resources, Reporting Project Status, Assign Resources to Work, Risk Management (Enter and Classify a Risk, Monitor Risk Status, Close a Risk) Issue Management (Enter & Classify an Issue, Monitor Issue Status, Reclassify an Issue, Close an Issue) Monitor Changes (Enter/ Classify a Change, Estimate Impact of Change, Update Project Plan, Monitor Change & Review Change Status, Close a Change Request)
- 4 Close Project Overview (Close Project, Change Project's Status to Completed)

## Risk Management



## Progress report

- 1 Overall status
- 2 Finance
- 3 Schedule
- 4 Scope
- 5 Staffing
- 6 Governance (define and implement processes)
- 7 QA
- 8 Sponsor relationship
- 9 Benefits



## Status Commentary

❶ Overall and commentary on PRF status ❷ Upcoming key project activities ❸ Latest key achievements

Figure B: Project Status

## CA-CLARITY

Features	Benefits
<b>Project Management</b>	
Basic project planning	Provides simple project planning and collaboration when capturing effort is more important than detailed tracking of costs and schedules, such as for new initiatives, pre-funded projects and new opportunities.
Detailed project planning	Provides full project management functionality for complex projects where your users need to capture and control costs, perform detailed resource scheduling, manage tasks against a timeline and track and complete deliverables.
Best practices methodologies	Automatically builds project plans including key tasks, milestones, role assignments and forms based on your project managers' answers to project profile questions. This allows you to build best practice plans for consistent use throughout your organization.
Project templates	Allows you to easily create best practice project libraries, ensuring all of your employees follow the appropriate procedures and use the correct templates. A process template can contain a phased WBS with tasks and activities, a project schedule, a budget and forecast, resources and roles, assignments and documents. When a new project is created, or when a gate is passed into a new phase, the appropriate project data is immediately made available to everyone on the team.
WBS creation and resource assignments in the browser	Allows your project managers to build simple project plans, manage complex project tasks and make task assignments, all within the CA Clarity Project Manager browser-based environment. This eliminates the need to launch separate desktop project management applications such as Microsoft Project.
Multiple project baselines	Gives your project managers the ability to compare forecasted tasks and effort with current requirements and original budgets. They can then modify their approach to the project midstream, making the strategic decisions necessary to come in on time and on budget.
Custom fields and pages creation	Allows you to configure the system so that it captures and reflects information and processes unique to your business needs. CA Clarity™ Studio makes it easy for your users to create custom fields and pages within CA Clarity Project Manager, and to arrange and label both standard and custom fields in the way that makes sense to your organization.
Task guidelines	Makes best practices information about how to complete a task available to those actually doing the work, ensuring that your organization's know-how is accessible and timely.
Integration with Open Workbench and Microsoft Project	Allows you to manage complex projects online or offline using either Open Workbench, the open source desktop scheduler, or Microsoft Project. The CA Clarity Schedule Connect module provides the link.
Scheduling in the Browser	Via the browser, your users can also create schedules, make changes and publish the schedule to the plan of record, without having to download or maintain client software.
<b>Time Tracking</b>	
Timesheets	Provides your managers with complete access to all of the work your people are doing and all the costs associated with that work. Users create timesheets that are automatically linked to their assignments where they not only record the time spent working on tasks and incidents but also designate billing charges and attach explanatory notes.
No client software or downloads	Reduces your deployment and maintenance costs by eliminating the need to maintain software on user desktops. For your team members, all time tracking and project management features are accessed through a web browser, without the need to install plug-ins, ActiveX controls or applets.
Auto-populating timesheets	Employees entering daily time can automatically populate their timesheets based on information submitted in the previous week. When people are assigned new work, these tasks and incidents automatically appear on the timesheet for tracking.
Timesheet approval	Provides oversight to ensure timesheets are accurate and complete before being submitted to billing. Timesheets are fully enabled for workflows in the process engine, allowing your organization to set up simple or complex approval routing plans, including split approvals.
Offline timesheets	Allows your mobile knowledge workers to track and review their time while disconnected from the network. Offline timesheets, managed in Microsoft Excel, are synchronized and submitted when the user reconnects to CA Clarity. Offline timesheets are available in all languages supported by CA Clarity.

<b>Risk, Issue and Change Management</b>	
PMBOK compliant risk scoring	Automatically calculates risk scores based on probability, impact and category weighting, ensuring that risk scoring is consistent across all of your initiatives.
Risk sorting, filtering and thresholds	Allows your users to quickly identify high impact risks that need immediate attention, ensuring that team members focus risk mitigation strategies in the most important areas.
Risk, issue, task and action item associations	Provides context and patterns for identifying the root causes of risks and issues by maintaining associations and links between related items.
Audit trail	Ensures that the complete history of risks, issues and changes is captured for review and future learning.
Portfolio risk assessment	Improves decision making around current and future projects by rolling risk scores up to the project portfolio in the CA Clarity Project Portfolio Manager module.
Risk issue change progression	Improves your company's efficiency and reduces manual effort by automatically converting risks into issues at the command of your project managers. Similarly, issues can be converted into change requests, preserving the history of analysis and action.

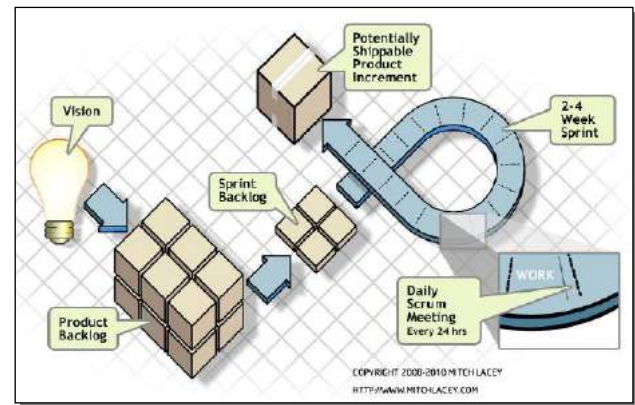
<b>Budgeting and Forecasting</b>	
Project budgets and forecasts	Facilitates the prudent financial management of your initiatives by linking labor, expense, material and equipment costs directly to the projects in which they are incurred.
Budget and forecast revisions	Allows multiple revisions over the project life cycle to be baselined, tracked and compared. This not only provides you with control of the project financial metrics, but also ensures that pitfalls and overruns that happened in the past can be avoided in the future.
Budget and forecast approvals	Enforces review and approval processes in project accounting by requiring that budget adjustments be approved by the appropriate financial managers.
Automatic financial plan creation	Reduces your project administration efforts by enabling your project managers to easily create and update financial plans from their detailed project plans. Based on task resources, their rates and their estimates to complete, you can create an accurate time-phased financial plan with minimal effort.

<b>Program Management</b>	
Project roll up into programs	Provides top-down planning and bottom-up aggregation by enabling projects to be grouped into programs.
Program and project level planning	Allows your users to budget costs and benefits at the program level without completing detailed project plans. As projects are executed, high level estimates are replaced with project level specifics.
Program dashboard	Enables your executives to see at a glance whether the overall project portfolio is on track in terms of budget, issues, schedule, milestones and risk profile and to drill down into any initiative that is having problems.
Program drill down	Allows you to easily assess risk and ROI, actual spending versus budget, forecast cost expenditure and expected benefit delivery through a simple drill-down from the program level to subproject details.
Benefit realization graph	Lets you compare top-down program benefit estimates with bottom-up project accruals to ensure that your deliverables match expectations and to improve future planning.

<b>Reporting</b>	
Numerous standard portlets	Allows your project managers to personalize their project dashboards with pre-defined portlets, such as Project Risks, Project Team, Labor Effort and Project Issues.
Numerous standard reports	Includes readily accessible reports for every user to answer key questions about their work and business. A sampling of standard reports includes: <ul style="list-style-type: none"> <li>Budget/Forecast Analysis</li> <li>Key Tasks and Milestone Status</li> <li>Project Analysis and Profitability</li> <li>Resource Assignments</li> <li>Resource Bench</li> <li>Timesheet Detail</li> </ul>
Stoplights	Connects business data to graphical stoplights, providing users with a visual alert based on a project or program's risk, status, issues, budget or other user-configurable benchmarks.
Role-based reporting	Provides your users with one-click access to every report relevant to them. While the volume of information about a project may be large, users view only a percentage of the content.
Export to Microsoft Excel or PDF	Provides you with additional analysis and easy distribution of reports by enabling report downloads to Microsoft Excel and PDF files.

## AGILE

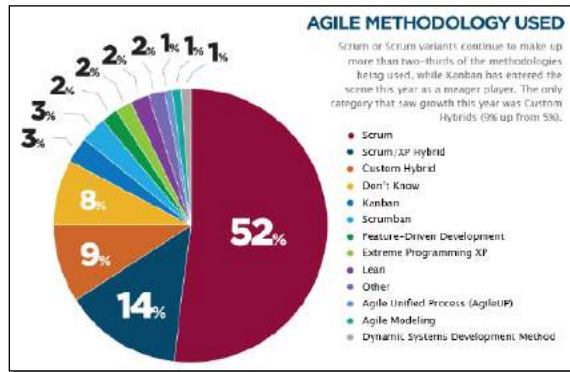
### Scrum schematics



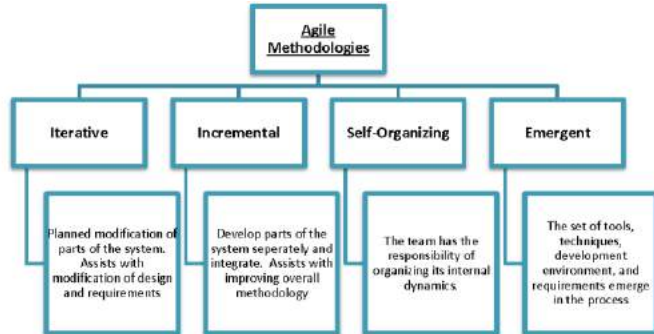
### Agile Questions

**A-Biggest challenges starting with Scrum & how can Scrum Master help?** Un-empowerment because of a) Organizational command and control behavior b) Specific Scrum Master failings → Scrum Master ❶ Eliminate "command and control"; teams run own sprint planning sessions (task estimates/sequencing/assignments, sprint reviews and retrospectives) ❷ Control dysfunctional meeting ❸ Remove barriers between team members ❹ Protect team from stressful outside influences and unnecessary meetings **B-Most important aspects of Scrum?** ❶ Product back log with stories ❷ Product back log listed by priority ❸ Stories estimated in points ❹ Sprint created with stories selected for feasibility in sprint time frame ❺ Daily scrums **C-Is a Project Manager different from a Scrum Master?** Scrum Master facilitate, coach, provide support/ manager: manage, lead, take responsibility **D-When is Scrum not a good choice?** ❶ Companies against Scrum ❷ Companies expecting lot of benefits from Scrum but cannot commit ❸ Companies that matrix numerous people into numerous projects ❹ Teams cannot commit to a week of fairly fixed ❺ Not software development **E-4 values in AGILE manifesto?** ❶ Individuals & interactions - processes & tools ❷ Working software, comprehensive documentation ❸ Customer collaboration - contract negotiation ❹ Responding to change - following a plan

## Agile methodologies

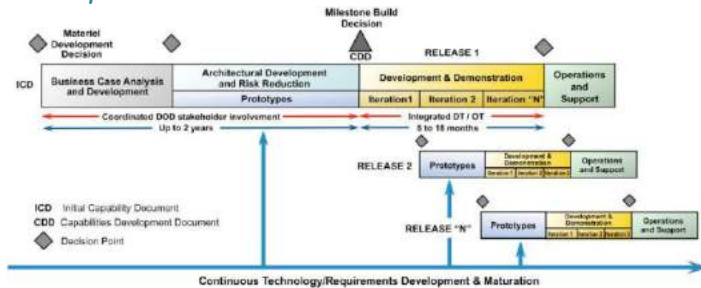


## Agile Iterative, Incremental, Self Organizing, Emergent



## Agile at DoD

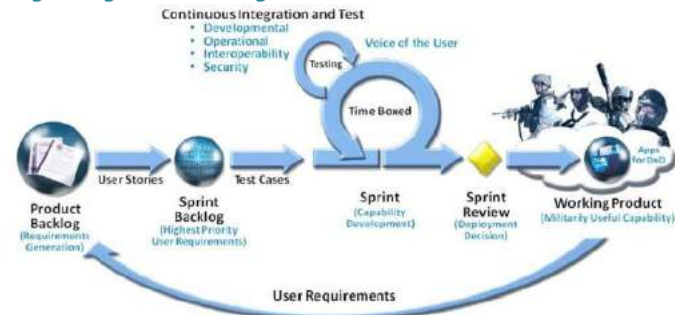
### DoD Acquisition Process



## Adapted Agile

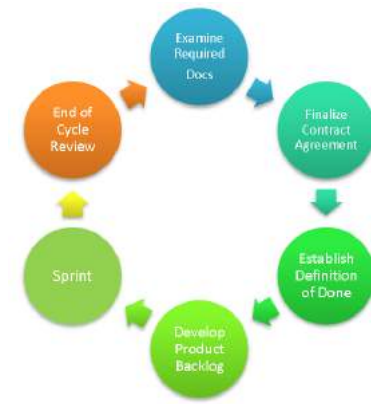
1 Split project in way that's closer to spiral development effort than pure Scrum Agile 2 Spiral = 6 months of work (requirement analysis, critical design, development, contractor testing, government testing and information assurance) 3 Partially completed products sent back to customer for review every 3 months to ensure effort aligned with expectations 4 Complete documentation for new capabilities developed per spiral

## Aligned Agile Document generation



1 Systems Engineering Documents generated during sprint 2 Requirements from capabilities documents and user stories 3 Requirements after sprint 4 Continual integration and testing

## Scrum Agile Document Development Framework



## Agile PMI-ACP

### Agile elements

**XP core values** 1 Simplicity 2 Communication 3 Feedback **XP core practices** 1 Whole team 2 Planning games 3 Small releases **Scrum pillars** 1 Transparency 2 Inspection 3 Adaptation **Scrum backlogs** 1 Product backlog 2 Sprint backlog

### Scrum inspection & adaptation

1 Sprint retrospective 2 Daily scrum meeting 3 Sprint review meeting

### Lean principles

1 Eliminate waste 2 Empower team 3 In-build quality 4 Defer decisions 5 Amplify learning

### Kanban principles

1 Visualize flow 2 Manage flow 3 Make process policies explicit 4 Improve collaboratively

### Manifesto

1 Individuals & interactions over processes and tools 2 Working software over comprehensive documentation 3 Customer collaboration over contract negotiation 4 Responding to change over following a plan

### Value stream mapping

1 Identify product/service 2 Create value stream map (steps, queues, delays, information flow) 3 Review to find delays, waste, constraints 4 Create new map of desired future state, optimized to remove delays, waste, constraints 5 Develop roadmap for creating optimized state 6 Plan to revisit in future to continually tune/optimize

**Total cycle time** = Value-add + Non value-add time

**Process cycle efficiency** = Total value-add time / Total cycle time

**WIP Limits** • WIP consumes capital / only delivers return when converted to product • WIP hides bottlenecks that slow workflow • WIP represents risk (potential rework)

**Little's law**: Cycle time (delay to earn benefits) ~ Queue size (WIP)

### Customer-valued prioritization schemes

1 Simple schemes "Priority 1", "Priority 2", "Priority 3" 2 MoSCoW "Must have", "Should have", "Could have", "Would like to have" 3 Monopoly Money 4 100-point method 5 Requirements prioritization model benefit, penalty, cost, risk on scale 1 (low) to 9 (high); customers rate benefit (have feature)/penalty (not have feature); developers rate cost/risk 6 Kano analysis excitors, satisfiers, dissatisfiers, indifferent

**Personas** to understand stakeholder demographics and needs

**Wire frame** for to confirm design (not detailed enough to test design)

## User story

**User story** = role, function, benefit **Org** Feature > Epic > User story > Task

**User story** to capture high-level objectives of requirements

**User story INVEST** = Independent, Negotiable, Valuable, Estimatable, Small, Testable

### User Story versus Use Case

• **User Stories** leave out important details. **Principles**: Develop small increments, get feedback and iterating, rather than up-front detailed documentation • **Use Case** = "an end to end sequence of interactions between actor and system that yields a result of observable value to an actor, usually the instigating actor" **Format**: Actor does something, System does something, Actor does something else, System does something else; Use Case is made up of one main flow + alternate and/or exception flows some of which can branch back to the main flow. Use Cases are by nature fairly detailed BDUF - Big Design Up Front

### Definition of "Done"

1 **User story level**: developed, documented, UAT 2 **Release level**: release X done when system Y replaced 3 **Project deliverable level**: all high + medium-priority features implemented, 2 months of trouble-free operation, satisfaction score > 70% 4 **Software level (James Shore)** • **Tested** all unit, integration, customer tests finished • **Coded** all code written • **Designed** all code refactored to team's satisfaction • **Integrated** user story working from end-to-end (user interface to database) fit into rest of SW • **Builds**: build scripts including all new modules • **Installs**: build scripts including user story in automated installer • **Migrated**: build script updating database schema + installer migrating data • **Reviewed**: customers reviewing user story confirm expectations met • **Fixed**: known bugs fixed/ scheduled as own stories • **Accepted**: customers agree user story finished

### Velocity

**Velocity** measures of work done= the team's capacity for work per iteration in hours, days, points or jelly beans – net of all interruptions, accounting for meetings, part-time resources



and scope changes **Velocity** can be used to predict the project completion when tracked over multiple iterations **Velocity** increases with experiences but plateau with more maintenance and refactoring

## Facilitation

**Active listening** ① Internal listening ② Focus listening ③ Global listening

**Facilitation methods** ① Goals ② Rules (use of cell phones, start time) ③ Timing (fixed duration, breaks) ④ Assisting (juniors to speak up)

## Team Management

**Globalization, culture and team diversity:** F2F kickoff before split up, F2F release and planning, rotating secondment (temporary assignment), pairing (XP practice)

**Team decision-making tools** ① Simple voting ② Thumbs up/ down/ sideways ③ Decision spectrum (Jim Highsmith fully in favor, OK but with reservations, mixed feelings, not in favor but commit, veto) ④ Fist-of-five voting (similar to decision spectrum method)

**Servant leadership duties** ① Shield team from interruptions ② Remove impediments to progress ③ (Re)-communicate project vision ④ Carry food and water

**Modeling desired behavior** ① Honesty-transparency, follow through, admit mistakes, add contingency ② Forward-looking ③ Competent-not needing be specialist ④ Inspiring-explain vision and journey with

## Principles for leading

① Learn team's needs ② Learn project's requirements ③ Act for simultaneous welfare of team and project ④ Create environment of functional accountability ⑤ Have vision of completed project - Use project vision to drive own behavior ⑥ Be central figure in successful team development ⑦ Recognize team conflict as positive step ⑧ Manage with ethics - not afterthought but integral to thinking ⑨ Take time to reflect ⑩ Think backwards

**Guidelines for managers** ① Shared vision ② Realistic goals ③ Limit team size <= 12 ④ Build team identity ⑤ Strong leadership

**High-performance teams** ① Self-organizing not role- or title-based ② Empowered to make decisions ③ Believe that as a team, can solve any problems ④ Committed to team success ⑤ Team own decisions and commitments ⑥ Trust (not fear, anger) motivates them ⑦ Consensus-driven (full-divergence then convergence) ⑧ Constant constructive disagreement to generate buy-in decision

## Coaching

**Five team dysfunctions** ① Absence of trust ② Fear of conflict ③ Lack of commitment ④ Avoidance of accountability ⑤ Inattention to results

**Levels of conflict** ① Problem to solve ② Disagreement ③ Contest ④ Crusade ⑤ World war

**One-on-one coaching** ① Meet half-step ahead, don't push to end point ② Guarantee safety ③ Partner with managers ④ Create positive regard

## Emotional Intelligence

**Tuckman's 4 stages** ① Forming ② Storming ③ Norming ④ Performing

**Blanchard & Hersey** ① Directing ② Coaching ③ Supporting ④ Delegating

Emotional Intelligence pairing

Self	Others	
Self-management	Social skills	Regulate
Self-control	Influence	
Self-awareness	Social awareness	Recognize
Self-confidence	Empathy	

Start with "self-awareness" then learn "self-management" then develop "social awareness" and finally hone "social skills"

## Planning

### Brainstorming

① Quiet writing ② Round robin ③ Free-for-all

### Prioritization techniques

① **MoSCoW** (Must, Should, Could, Won't) for hierarchical prioritization or "1, 2, 3" or "High, Medium, Low" ② Dot Voting or Multi Voting

### Managing distributed teams

① Maintain a metaphor - e.g. 'build Great wall of China' ② Frequent communications - 2 stand-ups a day + one-on-one call ③ Intensify facilitation

### Planning concepts

① Plan at multiple levels (Strategy, Portfolio, Product Vision, Product Roadmap, Release plan, Iteration plan, Daily commitment, Continuous) ② Team and customer plan iterations ③ Manage expectations by frequently demonstrating progress and extrapolating velocity ④ Tailor processes to project's characteristics ⑤ Update plan based on project's priorities ⑥ Include estimates for risks, distractions, team availability ⑦ Use estimate ranges to reflect level of uncertainty in the estimate ⑧ Base projections on completion rates ⑨ Factor in diversions and outside work

**Project plan** many releases each many iterations

**Release Planning** - date driven or functionality driven (What proportion of the user story backlog can be delivered in the release?)

**Iteration Planning** - Which user stories that are high-priority items and that can be developed, tested and delivered within the iteration?

**Tailoring project processes** through cycles of regular inspection, reflection, adaptation (what is well? Where to improve? What to do differently?)

### Agile Games (Collaborative/ Innovation Games)

① Remember the future (vision-setting, requirements-elicitation) ② Prune Product tree (gather and shape requirements) ③ Speedboat (identify threats and opportunities) ④ Buy a future (prioritization) ⑤ Bang-for-the-buck (value versus cost rankings)

## Budgeting

**Final project cost** = (Time x rate) + other costs

### Time, Budget & Cost estimation

(Size, effort, cost) ① Determine project size in story points or ideal days (e.g. Size = 500 days) ② Calculate effort in hours or person days, weeks or months (e.g. 3 developers avg availability 75% → Effort= 500/0.75 = 603 days) ③ Convert to schedule (e.g. assume INVEST, 603 days/3 = 201 days or 9.6 months) ④ Calculate cost

**Minimally Marketable Feature MMF** = package of functionality complete enough to be valuable but not big enough to represent the entire project

## Estimation

**Agile estimation** team-based, collaborative, iterative

**Estimation questions:** •Why do we estimate? (For sizing & approving projects, ROI and IRR, what can be done within release/iteration?) •How are estimates created? (progress through stages of determining project's size, effort, schedule, and costs - including development, rollout, sustainment) •How should estimates be stated? ("estimates" not "predictions" because of uncertainty - provided in ranges to manage expectations (16 to 18 months)) •When do we estimate? Continuously and factoring actual costs and duration to date •Who estimates? (Project team)

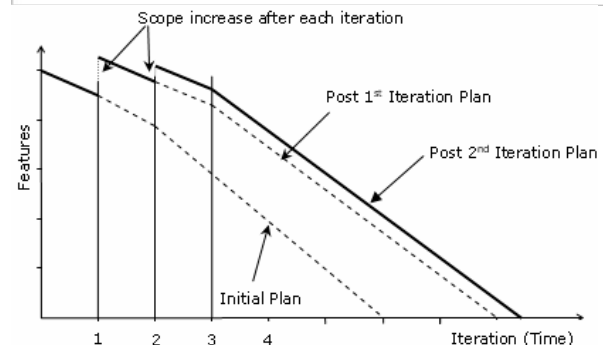
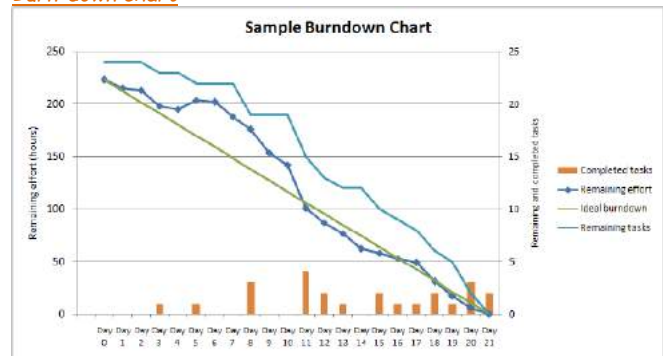
**Project estimation** ① Wideband Delphi<sup>2</sup> ② Planning poker<sup>3</sup> (numbers based on Fibonacci sequence) ③ Ideal time ④ Relative sizing/story points ⑤ T-shirt (Small, Medium, Large)

**Ideal Time** = assume no interruptions, i.e. all 8 hours available for work || Not realistic but more accurate sense of the effort involved

**Relative Sizing / Story Points:** •Allow change upon new information about a story •Good for epics and small stories •Not time consuming •Useful information about progress and work remaining •Tolerant of imprecision in estimates •Useful to plan releases In addition, •Team owns story point (sizing) definition •Story point estimates are inclusive of all known activities (testing, etc.) •When disaggregating, totals do not need to match •Sizes are relative (2-point story is twice 1-point story) •Complexity, work effort, risk are accounted for

## AGILE charting

### Burn-down chart

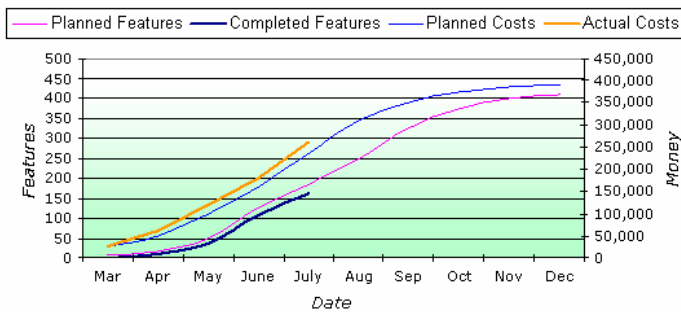


<sup>2</sup> **Wideband Delphi Steps:** ① Break a problem into manageable chunks ② Define problem specification, assumptions, constraints ③ Outline process for next rounds of estimation

<sup>3</sup> **Planning Poker:** card showing the Fibonacci sequence, representing sizing units (to reflect the inherent uncertainty in estimating larger items) including a zero: 0, 1, 2, 3, 5, 8, 13, 21,

34, 55, 89; other decks use similar progressions or the sequence: 0, 1/2, 1, 2, 3, 5, 8, 13, 20, 40, 100, and? (unsure)





## More AGILE Charts

### Value-Based Analysis

Consider business value of work items to act; understand value, consider: •Development+delivery cost - early high-level estimate of backlog items to compare benefit-cost then determine priority •Payback frequency= value generated once or frequently

**Value-based Decomposition and Prioritization** •Elicit stakeholders' requirements •Rank requirements •Prioritize requirements (development) **Tricks of the trade** •Refine requirements from backlog into iteration goal •Refine iteration goal requirements into iteration plan & user stories •Refine user stories requirements with discussions, stand-up

**Value-based Decomposition and Prioritization steps** ①Design Product Box (High-level vision, align stakeholders behind common mission, goals, success criteria) ②Feature workshops (break down vision into potential features) ③Candidate feature list ④Iterative development cycle for prioritized feature list **Parkinson's Law** - Work tends to expand to fill the time available **Student Syndrome** - Given deadline, people tend to start at near deadline

**Progressive elaboration** - refine plans as more details emerge

**Agile Plans** ①Trial & demonstration uncover true requirements requiring planning ②Agile planning less an upfront effort, more throughout project ③Midcourt adjustments = norm

**Built-in feedbacks in planning** ①Backlog reprioritization affects iteration/ release plans ②Iteration feedbacks generate change request+ new requirements ③Retrospective generate changes to processes+ techniques

**Agile Charters** ①Project's goal, purpose, composition, approach ②Authorization from sponsor ③Recognize scope change by characterizing the goals envisioned for the project ④Describe processes and approaches for iterating toward the final product ⑤Acceptance criteria to verify the project outcomes [What is this project about? (High-level vision, mission, goals, objectives) Why is it being undertaken? (Business rationale) When will it start and end? Who will be engaged? (project participants + stakeholders) Where will it occur? (work sites, deployment requirements) How will it be undertaken? (approach, changes from traditional)]

**Business Case** •Project overview •Anticipated costs/ benefits •Business models/ indexes (ROI, IRR, NPV) •ROI assumptions/ risks associated •SWOT/PEST (Political, Economic, Social, Technical) •Sponsor's recommendation (mandatory, critical, nice-to-have)

### On Quality

**Reduce problem's position on cost of change curve:** pair programming, test-driven development, acceptance test-driven development

**Escaped defects** are not discovered during testing & validation; are top of "Cost of change" graph

"Fitness for purpose" = Implied warranty

**Monitor/assess quality of project processes** with tools: •Defect metrics •Variance and trend analysis •Root cause analysis •Corrective actions

**Quality standard practices** ①Measure product quality by tests passes and customer acceptance ②Automate tests if possible ③Test during each iteration ④Fix minimum 90% defects in next iteration ⑤Quality control & assurance side-by-side with developers and business ⑥Testers collaborate with developers on finding defects & reproducing error ⑦Only business can declare defect as fixed

### Failure and Success

**Failure modes** ①Make mistakes human nature ②Prefer to fail conservatively-revert to what they know ③Invent rather than research ④Creatures of habit ⑤Be inconsistent

**Success modes** ①Good @ looking around ②Can learn ③Be malleable ④Pride in work

**Strategy** ①Counter with discipline & tolerance ②Start with concrete & tangible ③Copy & alter ④Watch & listen ⑤Support concentration & communication ⑥Personality-matched work assignment ⑦Talent ⑧Rewards for long-term, self-esteem based motivators: pride-in-work, pride-in-accomplishment ⑨Combine reward ⑩Feedback

### Deming and Testing

**Deming's mistakes** ①React to common-cause-variation outcome as if special cause ②Treat special-cause variations as if common cause **Solution** •Accept common-cause variations, intervene on special-cause •Avoid micromanagement, remove bottlenecks & impediments •Avoid tracking conformance, look to external indicators & daily stand-ups

**Test-driven development** red, green, refactor // write test, write code, refactor **Benefits** ①Focus on outcome and customer ②Good test coverage enhances quality ③Early defect catching ④Small tested units ⇨ Modular, flexible, extendable **Costs** ①Tests written by coder suffer same misinterpretations ②Functionality types e.g. user interfaces difficult/time consuming to test ③Test maintenance is costly ④False sense of security with more tests

### Acceptance Test-Driven Development (ATDD)

Testing focus from code to business requirements 4 stages: ①Discuss requirements ②Distill tests in framework-friendly format ③Develop code and hook-up tests ④Demo

**Investigation steps:** gather data, generate insights - decide what to do

**Control limits** = visual controls **Continuous integration** = software integrating new & changed code **Components** ①Source code control system ②Build tools ③Test tools ④Scheduler/trigger ⑤Notifications **Benefits** ①Early warning of conflicts ②Problems fixed at integration not on release ③Immediate feedback on system-wide impacts ④Frequent unit test ⑤Easy reversion if problems

**Cycle time** = time for work from start to finish = WIP/Throughput

**Risk-based spike** = short period of Proof of Concept

**SMART goals** specific, measurable, attainable, relevant, timely

**Fast failure** finding fatal design flaws early

**Gather data** use timeline (timeline with good, problematic, significant)

**Decide about problems** short subjects, smart goals, retrospective planning games

### Retrospectives

**Stages of executing retrospectives** set stage, gather data, generate insights, decide what to do, close retrospective

①Set the Stage (Check-in, Focus on/Focus off, ESVP = Explorer-Shopper- Vacationer- Prisoner, Working agreements) ②Gather Data (Timeline, Triple nickels, Color code dots, Mad-sad-glad, Locate strengths, Satisfaction histogram, Team radar, Like to like) ③Generate Insights (Brainstorm, Five whys, Fishbone, prioritize with dots, Identify themes) ④Decide what to do (Short subjects, SMART Goals, Circle of questions, retrospective planning game) ⑤Close retrospective (plus/delta, helped-hindered-hypothesis, return on time invested, appreciations)

### Success, Anti-Pattern

**Continuous improvement** is core to pair programming, daily stand-ups, demos-reviews-retrospectives

**Process anti-Patterns** (Bad things): ①One size for all project (no optimal methodology) ②Intolerant (people can choose) ③Heavy (too much artifacts and practices divert people from real goals) ④Embellished (get to know what people won't do even when not admitting to) ⑤Untried (better reuse, adjust, tune and create what is needed) ⑥Used once (better than untried but not yet perfect)

**Success process signs** ①Projects get shipped ②Leadership remains intact ③People on the project work the same way

**Successful methodologies** ①Interactive, face-to-face communication is cheapest, fastest communication ②Excess methodology weight is costly ③Larger teams need heavier methodologies (more knowledge needs be committed to documentation with larger projects) ④Greater ceremony for projects with greater criticality (more rigor with more critical project) ⑤Increasing feedback & communication reduces the need for intermediate deliverables ⑥Discipline, skills & understanding counter process, formality & documentation ⑦Efficiency expendable in non-bottleneck activities: look for constraints, resolve bottleneck otherwise any improvement worthless

### PMI codes

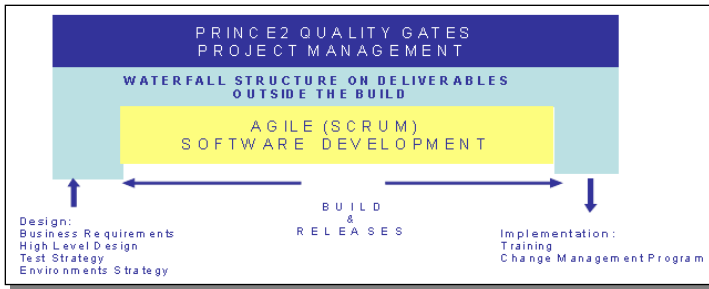
①Responsibility •Make decisions based on company's best interests •Protect proprietary information •Report unethical behavior and violations ②Respect •Maintain an attitude of mutual cooperation •Respect cultural differences •Negotiate in good faith •Deal directly with conflict •Do not use position to influence ③Fairness •Act impartially without bribery •Look for and disclose conflicts of interest •Do not discriminate •Do not use your position for personal/business gain ④Honesty •Understand the truth •Be truthful in all communications

### Traditional versus AGILE

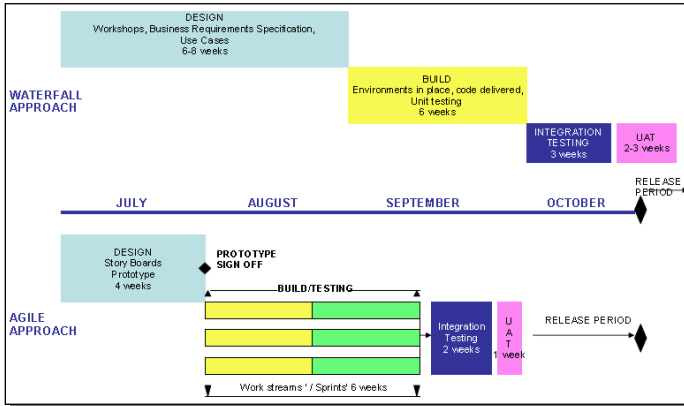
Traditional	Agile	Traditional	Agile
<b>Integration Management</b>		<b>Scope Management</b>	
•Project plan development •Plan execution •Direct, manage, monitor, control •Integrated change control	•Release & iteration planning •Iteration work •Facilitate, serve, lead, collaborate •Constant feedback + ranked backlog	•Scope definition •Create WBS  •Scope verification •Scope change control	•Backlog +planning •Release + Iteration plans (FBS) •Feature acceptance •Constant Feedback and Ranked backlog
<b>Quality Management</b>		<b>Risk Management</b>	
•Quality planning •Quality Assurance  •Quality Control	•Definition of "done" •QA involved from beginning + Review and Retrospectives •Test early/ often; feature acceptance	•Risk identification, qualitative analysis, response planning •Monitoring & Controlling	•Iteration planning, daily stand-ups and retrospectives •Daily stand-ups + visible information radiators

### Agile versus Waterfall

### Integrating AGILE with WATERFALL



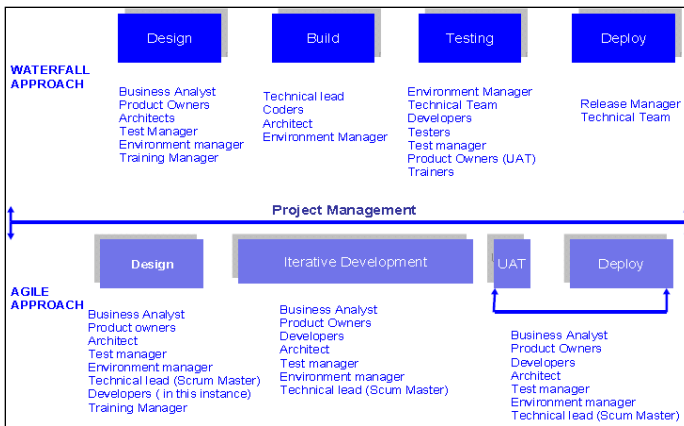
## Planning



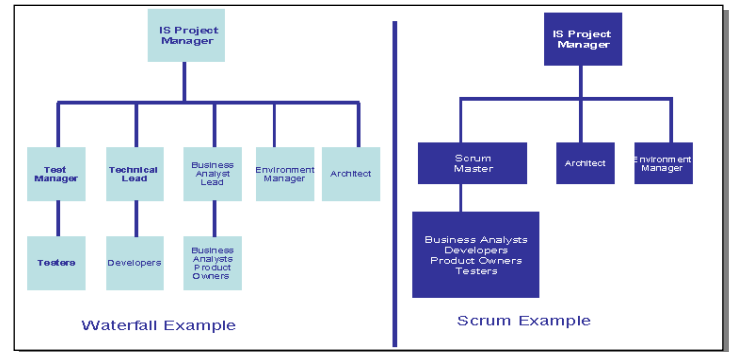
## Deliverables

Phase	Waterfall	Agile (Scrum)
<b>Initiation</b>	•Project charter •Project Initiation Document (PID) •Contracts	•Project charter •Project Initiation Document (PID) •Contracts
<b>Design</b>	•Business Requirements •Specification (BRS) •Functional Specification •Environment Strategy •High-Level Design •Test Strategy •Training Strategy	•Product Catalogue •"Brown Paper" sign-off at end of session •Prototype signoff •Use Cases (not in critical path only for references)
<b>Build</b>	•Detailed Design •Test Plan •Code	•High-level test strategy (reference) •High-level design (parallel with development) •Show-and-tell SW packages at end of Sprint
<b>Implement</b>	•Training Plan •Release Plan	•Training Plan •Release Plan

## Resource allocation



## Organization



## Microsoft DYNAMICS SURESTEP AGILE

### Agile Project Plan

<b>Diagnostic Phase</b> <b>AGILE Preparation</b> 1.1.1-Project Planning 1.2.1 Conduct Solutions Overview 1.2.2 Gather User Training requirements 1.3.1 Conduct detailed Business Process Analysis 1.4.1 Gather Business Requirements 1.4.2 Conduct Fit Gap analysis 1.4.3 Define Solution Backlog 1.7.1 Set up development and other non-production environment 1.8.1 Establish Integration Strategy 1.9.1 Gather Data Migration Requirements <b>AGILE Execution</b> 2.1.1 Define SPRINT Backlog 2.1.2 Conduct SPRINT Planning Meeting	2.1.3 Conduct SPRINT Technical Preview 2.1.4 Conduct SPRINT Post Mortem 3.1.1 Conduct Daily SPRINT Cycle Meeting 3.1.2 Analyze & Design for SPRINT Cycle 3.1.3 Create Scripts for testing 3.1.4 SPRINT configuration & Development 3.1.5 Generate Daily Build 3.1.6 Conduct SPRINT Testing 3.6.1 Conduct Solution Testing 3.7.1 Finalize Production Specification 4.1.1 Project Planning 4.2.2 Conduct User Training 4.4.2 Go Live 4.6.2 Conduct UAT 4.7.1 Build Production Environment 4.9.3 Final data migration to Production
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① **Agile Preparation** project kick-off ⇒ create **Initial Solution Backlog** (initial subset of solution requirements, used to begin development)

② **Agile Execution phase 2 Sprint cycles**:  
 ① **Daily Sprint Cycle** encompassed within  
 ② **30-Day Sprint Cycle** •Development activities on daily basis (planning, analyzing, designing, developing, and testing) performed against **Sprint Backlog** (compiled list of requirements from **Solution Backlog** broken down into smaller increments of product features) •Requirements in Sprint Backlog broken down into manageable tasks during **Sprint Planning Meeting** •**Sprint Technical Preview** activity at end of Sprint Cycle (implementer & customer teams review developed solution wherein requirements are approved, or rejected, and fed back into the Solution Backlog for possible inclusion in a future Sprint Cycle) •**Sprint Post Mortem (Sprint Retrospective)** evaluates team's performance, discusses opportunities for improvement. After final Sprint Cycle, perform **solution testing** and finalize **specification for production**

③ **Deployment and Operation phase** include **User Training, User Acceptance Testing**

### Conditions for Agile project type

•**Fair Degree of Fit**—around 50-75%—with the customer's requirements; customizations medium-to-complex so that development efforts can be encapsulated within Sprint cycles; envisioned solution may include an ISV solution •**Custom code development** may encompass integration or interfaces to 3rd party sources, migration of data from legacy or 3rd-party systems but coding efforts not overly complex •**Business process analysis + OCM activities** may be included and executed in parallel with **development** •**Agile project type** typically applicable to **single site implementations**, but may be extended to smaller multisite engagements with **about three locations** •**Agile project type** requires disciplined **control of scope**, **experienced Scrum Masters** or **Sprint Cycle Managers**, **business and IT users** experienced in deploying / using business solutions to join solution delivery team

### System Integration

#### 14 Integration Best Practices<sup>5</sup>

① **Systems Integration Plan** ② **Matrix (System, subsystems)** defined as **Configuration Items** ⇒ accordingly organize WBS, BOM (Bill of Materials), Schedule ③ **Requirements, Design, Verification specifications** at each system level ④ **Specification trees** (Requirements, Design, Verification) ⑤ **Traceability** (Requirements, Design, Verification specifications) – (Program plans, development, build, release, verification schedules) ⑥ **System integration planning & management methodology** tracks/ documents Configuration Item/ Subsystem progress (min. 1 level of decomposition) ⑦ **Resources** assigned to Subsystem; **budget synergy** (Systems Engineering, Systems Integration, Development, Test) ⑧ **Configuration Management (CM)** owns system configuration; all items submitted to Systems Integration through CM ⑨ **Systems Integration Lab (SIL)** with distinct spaces & equipment for Component Checkout, Subsystem Integration, System Integration ⑩ **System Architecture Skeleton (SAS)** assembled in SIL for continuous

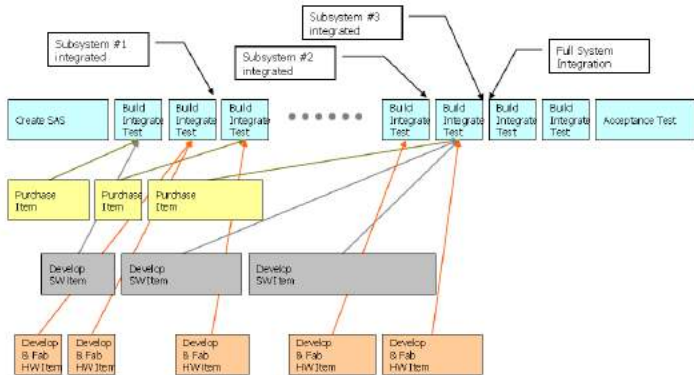
<sup>4</sup> **Sprint cycle** a.k.a. **Scrum** denotes a time period, up to **4 weeks in duration**, in which the team develops the solution on an identified set of backlog items

<sup>5</sup> From Northrop "Best Practices for Systems Integration", 2011

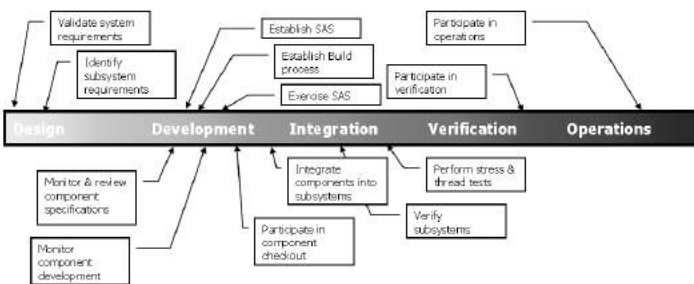
integration activities & incremental alignment ❶ **Continuous integration rhythm** defined in System Architecture Skeleton to include **regular system builds, regression testing, automated test methods for frequent "smoke tests"** ❷ **Component checkout** written procedure prior to Subsystem Integration to verify **component interfaces, compliance with derived requirements, boundary checks, error handling, memory leak testing** ❸ **Subsystem integration** written procedure prior to System Integration to verify **internal interface, end-to-end, system-level capabilities** ❹ **System Integration** written procedure prior to Verification to include **stress testing, long mission thread testing**

📄 **Data Integration** 📄 **LIFE Integration** (system, web services, SOA)

### Integration Model



### System Integration Team & Phases



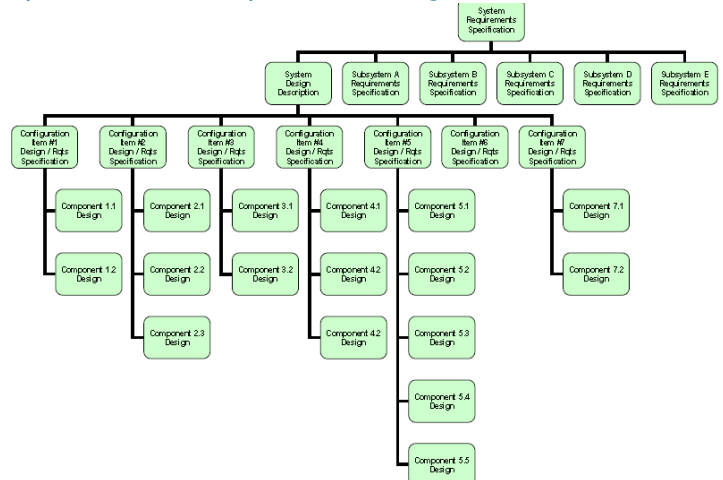
### Configuration Items (HW/SW) and Subsystems

Hardware / Software Configuration Items & Components	Subsystems			
	Subsys A	Subsys B	Subsys C	Subsys D
HWCI 1	X	X	X	X
HWC 1.1	X	X	X	X
HWC 1.2	X	X	X	X
HWCI 2	X		X	X
HWC 2.1	X		X	X
HWC 2.2	X		X	X
HWC 2.3	X		X	X
HWCI 3		X		X
HWC 3.1		X		X
HWC 3.2		X		X
SWCI 4	X	X	X	X
SWC 1.2	X	X	X	X
SWC 1.2	X	X	X	X
SWC 1.3	X	X	X	X
SWCI 5	X			
SWCI 2.1	X			
SWCI 2.2	X			
SWCI 2.3	X			
SWCI 2.4	X			
SWCI 2.5	X			
SWCI 6		X	X	
SWCI 7			X	X
SWCI 4.1			X	X

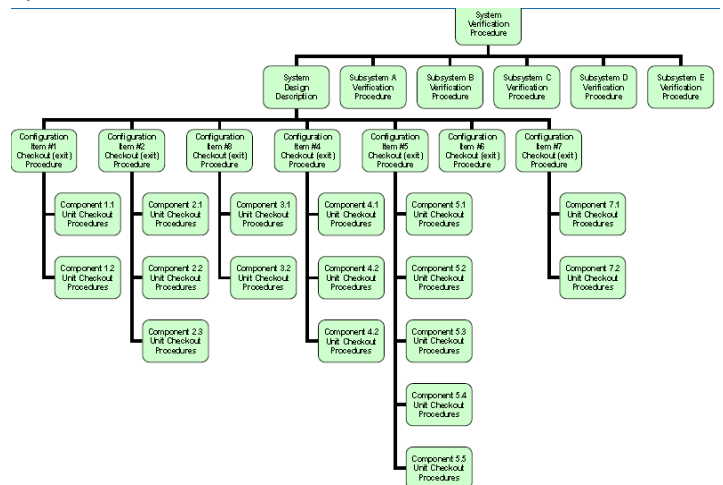
### Integration tracking

Hardware / Software Configuration Items & Components	Subsystems			
	Subsys A	Subsys B	Subsys C	Subsys D
HWCI 1	C	I	C	C
HWC 1.1	C	I	C	C
HWC 1.2	C	I	C	C
HWCI 2	X		X	X
HWC 2.1	X		X	X
HWC 2.2	X		X	X
HWC 2.3	X		X	X
HWCI 3		I		C
HWC 3.1		I		C
HWC 3.2		I		C
SWCI 4	C	I	C	C
SWC 1.2	C	I	C	C
SWC 1.2	C	I	C	C
SWC 1.3	C	I	C	C
SWCI 5	C			
SWCI 2.1	C			
SWCI 2.2	C			
SWCI 2.3	C			
SWCI 2.4	C			
SWCI 2.5	C			
SWCI 6			C	
SWCI 7			X	X
SWCI 4.1			X	X
SWCI 4.2			X	X

### Specification trees Requirements & Design

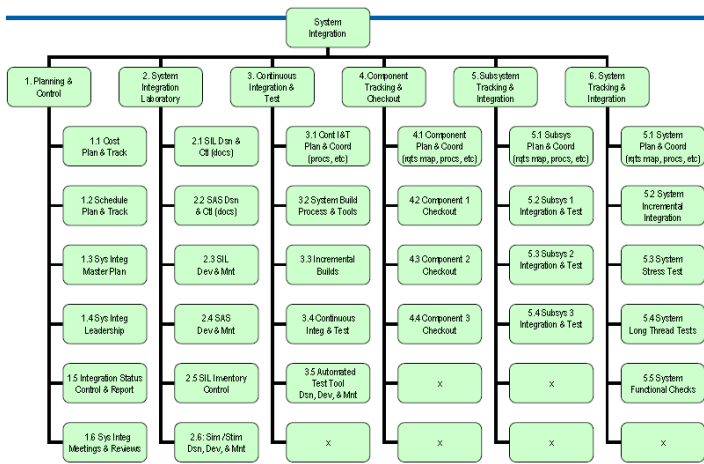


### Specification Tree - Verification



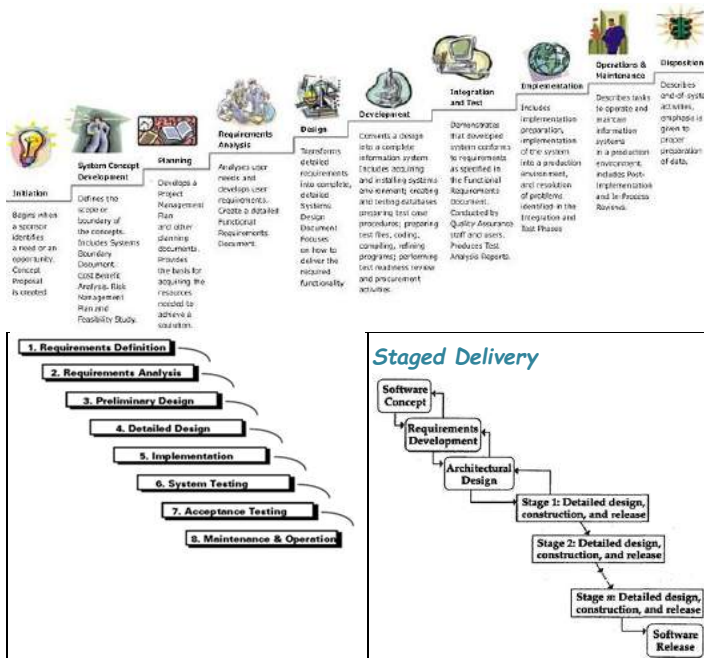
### Integration Work Breakdown Structure



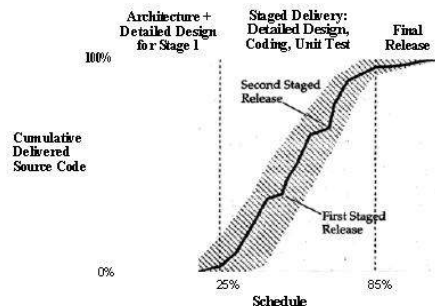


## Software Development Life Cycle (SDLC)

See UML - See Traceability Matrix  
CASE Study HOOPP upgrade  
10 Phases of SDLC



## SDLC Code Growth Pattern



## Application Testing

## Change Management

### Generics

### Keywords

•4P People, process, product, partner •Realign org design to change •Shared understanding of reality of change of issues •Connect market place realities <with> top management aspirations <with> workplace energy & initiatives •Org. capacity to act, reflect, disseminate •Forces for change environment, structure – org, technology, people •Action plan •Actions to deal with change issues •Support for success •Who responsible for what •Timetable for change •Required resources (people, training,

financial) •Criteria for successful change •Monitoring feedback •Anticipated modifications to change •Change manager - Balanced scorecard – Control

### FMEA Failure Modes Effect Analysis

•Pronounced F-M-E-A or FEMA •List key process steps (from highest ranked items of Cause and Effect C&E matrix) •List potential failure mode for each step •List effects of this failure mode; if failure mode occurs, what does this mean to us and customer (what effect) •Rate how severe this effect is (1= not severe, 10= extremely severe) •Identify causes of failure mode/effect & rank it as in the occurrence column (1= highly unlikely to ever occur, 10= happen all the time) •Identify controls in place to detect issue & rank its effectiveness in detection column (1= excellent controls, 10= no controls or extremely weak controls) •Multiply severity, occurrence, detection numbers, store it in RPN (risk priority number) column - used to identify priority (severity= 10 (very severe), occurrence= 10 (happens all the time), detection= 10 (cannot detect it) ⇒ RPN is 1000: all hands on deck, serious issue! •Assign specific actions with responsible persons, include date to be complete •Actions completed ⇒ re-score occurrence & detection; do not change severity score unless customer decides this is not an important issue

### Effective change process

1 Formulate the change 2 Plan the change 3 Implement the change 4 Manage change transition 5 Sustain change

- Formulating the change by identifying and clarifying the need for change, assessing readiness for change, and delineating the scope of change.
- Planning the change by defining the change approach and planning stakeholder engagement as well as transition and integration.
- Implementing the change by preparing the organization for change, mobilizing the stakeholders, and delivering project outputs.
- Managing the change transition by transitioning the outputs into business operations, measuring the adoption rate and the change outcomes and benefits, and adjusting the plan to address discrepancies.
- Sustaining the change on an ongoing basis through communication, consultation, and representation of the stakeholders; conducting sensemaking activities; and measuring benefits realization.

### Kotter's Heart of Change

John Kotter: The Heart of Change



### Change management specialist

•Lead Initiatives & ensure work packages are delivered on time, within budget, and with quality, as agreed to by Project Manager, Client, and / or Sponsor of each initiative •Lead & be responsible for end-to-end management of business work package deliverables within the scope of an overall project, including Business Requirements, Communication and Training strategy (circulars, manual changes, and procedures) •Communicate project objectives, quality control and operational needs of the end users •Lead and Mentor Business Analysts in support of Project work packages deliverables •Process re-engineering support through the use of Lean and Six Sigma tools such as FMEA Failure Modes Effect Analysis and Value Stream Maps relative to the project •Provide estimates of work effort + duration for work package deliverables •Create project plans for assigned work packages with resources, effort, timelines •Lean/Six Sigma

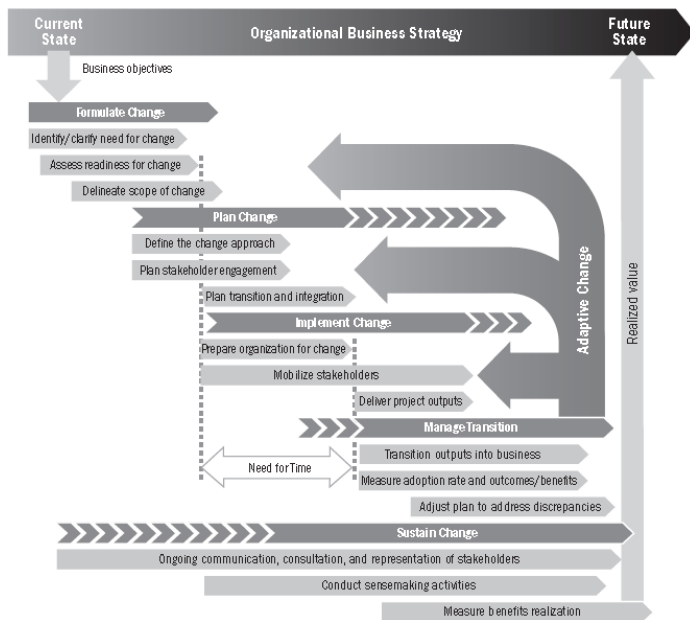
### Change In PMI Context

### Change Management in Portfolio, Program, Project

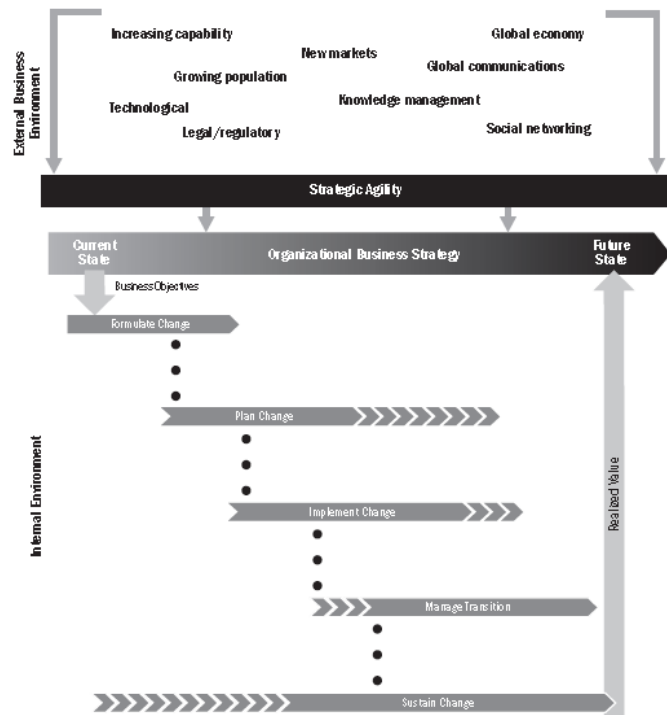
### Change Model Systemic - orders of change

Category of Change	Recipient	Difficulty	Length of Initiative	Reversibility
First-order change	Procedures—modifications in how work is done	minor	short	easily reversed
Second-order change	Policies—doing something significantly different	moderate	medium	irreversible
Third-order change	Values—rethinking the governing values	very	long	irreversible

### Change Management Life Cycle

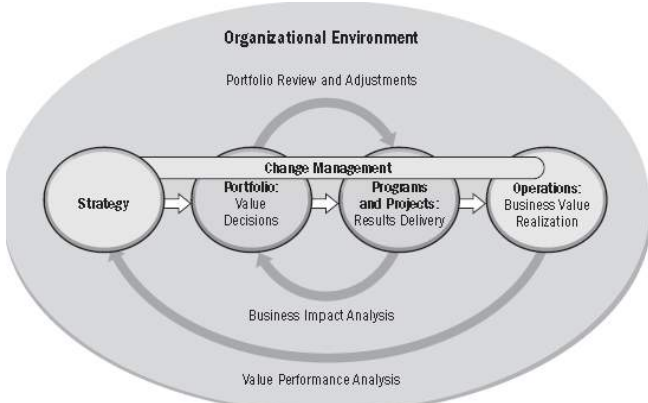


### Strategic agility through Portfolio, Program, Project



### Organizational Project Management (OPM3)

#### Strategy, Portfolio, Program-Project, Operations

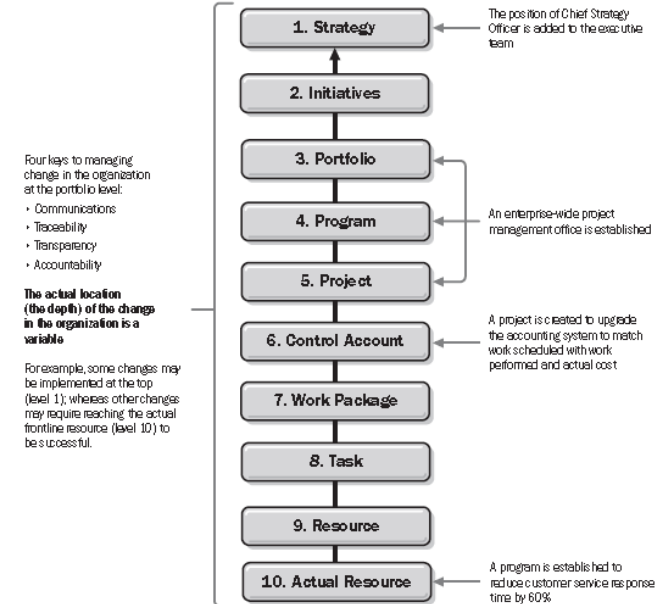


### Change Management at Portfolio Level

#### Two-way Communication between Strategy and Front-line

### 4 legs to manage changes at portfolio level

1 Communication 2 Traceability 3 Transparency 4 Accountability



### Considerations in defining process

Defining Process Group	Change Management Considerations in Defining the Portfolio
Develop Portfolio Strategic Plan	The initial version of this plan will change and evolve before buy-in is received and when approval is sought from the key stakeholders, governing bodies, and portfolio managers.
Develop Portfolio Charter	The portfolio charter needs to account for both the organization's capacity to carry out the strategy and the environmental factors, which may be rapidly changing while the portfolio charter is written.
Define Portfolio Roadmap	The initial issue of this time-phased roadmap may require changes to reflect a growing understanding of the portfolio over time.
Develop Portfolio Management Plan	Incorporation of changes is an iterative process as subsidiary plans are developed.
Define Portfolio	The components of the portfolio may change over time due to factors such as availability, viability, and track record.
Develop Portfolio Performance Management Plan	This plan is essential to the tracking of deviations (changes) in resource capacity, resource utilization, and changing demand.
Develop Portfolio Communication Management Plan	This plan is designed to keep the stakeholders informed of the baseline strategy metrics and any changes that may occur during implementation.
Develop Portfolio Risk Management Plan	This plan establishes the risk strategy, tolerance, and thresholds.

### Considerations in aligning process

Aligning Process Group	Change Management Considerations in Aligning the Portfolio
Manage Strategic Change	Change in the portfolio is a normal occurrence as strategy evolves from the current state to the future state.
Optimize Portfolio	Optimization of the portfolio is an ongoing process as circumstances change. For example, enterprise environmental factors may cause a strategic initiative to be delayed or canceled altogether.
Manage Supply and Demand	The changing of the availability of organizational resources versus the demand varies according to the organizational priorities.
Manage Portfolio Value	Managing portfolio value involves monitoring any changes in the expected value of the strategic components.
Manage Portfolio Information	Portfolio reporting represents a wide variety of inputs from multiple processes. The sources of these inputs are likely to change over the life cycle of the strategic component.
Manage Portfolio Risks	Risk planning is based on the known risks. Change and flexibility are required when a previously unknown risk surfaces.

### Considerations in authorizing and controlling process

Authorizing and Controlling Process Group	Change Management Considerations in Authorizing and Controlling the Portfolio
Authorize Portfolio	Generally, changes to the authorized portfolio are introduced throughout the life cycle of the authorized components.
Provide Portfolio Oversight	Oversight involves monitoring the portfolio performance and recommending changes to the component portfolio mix, which may include the termination of previously approved projects that are no longer viable.

### Change Management at Program Level

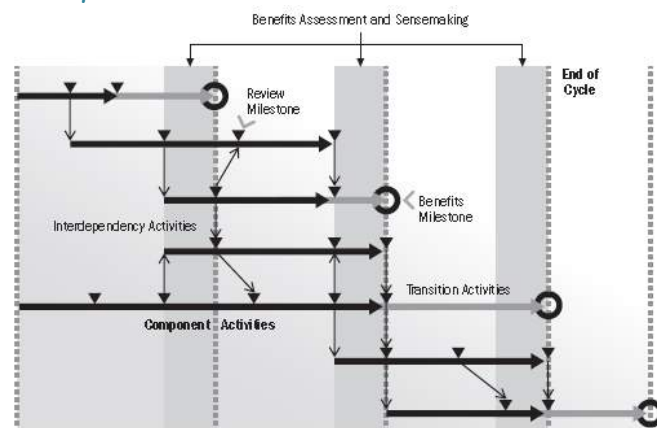
#### Program life cycle vs. Change life cycle

Program Life Cycle Phases (The Standard for Program Management—Third Edition)	Change Life Cycle
<b>Program Definition</b>	<b>Formulate Change</b>
Program Formulation	Identify/clarify need for change
	Assess readiness for change
	Delineate scope of change
Program Preparation	<b>Plan Change</b>
	Define the change approach
	Plan stakeholder engagement
	Plan transition and integration
<b>Program Benefits Delivery</b>	<b>Implement Change</b>
Component Planning and Authorization	Prepare organization for change
Component Oversight and Integration	
(Continuous - Stakeholder Engagement*)	Mobilize stakeholders
Component Transition and Closure	Deliver project outputs
<b>Program Closure</b>	<b>Manage Transition</b>
Program Transition	Transition outputs into business
	Measure adoption rate and outcomes/benefits
Adaptive Change P (at all phases)	Adjust plan to address discrepancies
Program Transition	<b>Sustain Change</b>
	Ongoing communication, consultation, and representation of stakeholders
	Conduct sensemaking activities
	Measure benefits realization
Program Closeout	

### Measuring Program Benefits and Critical Success Factors

Method of Measurement	Program Benefits and Critical Success Factors
Value Management	A structured, multidisciplinary team decision-making process developed to increase the satisfaction of the needs of diverse stakeholders while optimizing the resources used to meet those needs. It is based on the use of functions (expected benefits) and the search for innovative ideas. It can be used for strategic decisions, portfolios, programs, and projects as well as for technical solutions.
Analytic Hierarchical Process (AHP)	A structured, group decision-making technique for organizing and analyzing complex decisions based on stakeholders' goals and their understanding of a situation. The technique consists of breaking down the problem and assigning weights to each component to help make the best decision.
Logical Framework	This technique is popular with international aid agencies and the UN. The logical framework describes four types of events that drive projects: activities, outputs, purpose, and goals. The objective is to create a logical cause-effect relationship between these elements to ensure that activities are linked to goals.
SWOT Analysis	Although the technique is mainly used to analyze the strengths and weaknesses of an organization or department, it is helpful to understand the context of the change and how the program can draw on strengths and mitigate threats and weaknesses to achieve opportunities.
Soft Systems Analysis	This method assumes that each stakeholder has a different view of reality and that these views should be discussed before reaching an agreement. Typically, it asks a group of stakeholders to build a new view that is agreed upon and then this view is compared to reality for identification of desired and feasible changes.
Strategy Maps	The strategy map is a framework based on the balanced scorecard concept. Its purpose is to elicit expected benefits on the basis of four major generic components: financial, customer, internal business processes, and learning and growth. It can be used in conjunction with other, more specific benefits-identification techniques.

### Roadmap elements



- ❶ Component activities    ❷ Interdependencies    ❸ Transition activities    ❹ Review milestone  
❺ Benefits milestone

### Executive-level Benefits Register

Strategic Objective	Benefits	Projects	Business Expectation/ Measure of Success
Respond to new market position (Build new facilities and relocate 1,200 employees)	Change organization while maintaining work culture	Relocate 1,200 employees over 18 months	Reduce resistance and adaptation period
		Hire new employees (included in 1,200)	Minimize culture integration period
		Redesign jobs and reengineer business	Encourage acceptance of new systems
		Introduce new IT and networking systems	Methodology accepted by most personnel
	Deliver fit for purpose buildings in timely manner	Balance facilities delivery with workflow	Pace delivery to BAU requirements
		Deliver facilities to required standards	Delivery according to requirements
		Coordinate construction with operations	Minimize workflow disruption
		Maintain productivity...	

### Specific activities through Change and Program Life Cycle

Program Life Cycle	Change Life Cycle	Specific Change Activities
<b>Program Definition</b>	<b>Formulate Change</b>	
Program Formulation	Identify/clarify need for change	Analyze internal and external pressures Define purpose/vision Identify and classify stakeholders
	Assess readiness for change	Assess impact of change on business Assess business capabilities and staff receptivity Map stakeholders (positive or negative interest and power) Identify potential agents
	Delineate scope of change	Agree on critical success factors and key performance indicators Prepare benefits map and benefits register
Program Preparation	<b>Plan Change</b>	
	Define the change approach	Choose a change process adapted to structures and culture
	Plan stakeholder engagement	Prepare for sensemaking Identify specific activities to mobilize and engage stakeholders
	Plan transition and integration	Identify transition and integration needs in collaboration with integrator Identify transition and integration activities
<b>Program Benefits Delivery</b>	<b>Implement Change Process</b>	
Component Planning and Authorization	Prepare organization for change	Initiate sensemaking activities Identify areas of resistance and support Initiate transition and integration activities Initiate support activities and projects
Component Oversight and Integration		Ensure that project results are fit for purpose and well transitioned
Ongoing Stakeholder Engagement	Mobilize stakeholders	Empower agents and recipients Conduct sensemaking activities
Component Transition and Closure	Deliver project outputs	Assess fit for purpose Assess results integration into business as usual
<b>Program Closure</b>	<b>Manage Transition Process</b>	
Program Transition	Transition outputs into business	Assess delivery of business benefits and value Take corrective or realignment action if necessary
	Measure adoption rate and outcomes/benefits	Assess rate of change integration
Adaptive Change	Adjust plan to address discrepancies	Assess internal and external changes in context Readjust pace of change according to needs Initiate corrective actions if needed
Program Transition	<b>Sustain Change</b>	
	Ongoing communication, consultation, and representation of stakeholders	Identify external and internal influences Define change management approaches Monitor for resistance and/or apathy Respond to resistance and/or apathy
	Conduct sensemaking activities	Implement specific sensemaking activities
	Measure benefits realization	Assess integration of change Identify realized benefits Market the program
Program Closeout		

### Change Management at Project Level

### Coordinating change, program and project



Program Life Cycle Phases (The Standard for Program Management—Third Edition)	Project Management Process Groups (PMBOK® Guide—Fifth Edition)	Change Life Cycle
Program Definition		Formulate Change
Program Formulation		Identify/clarify need for change
		Assess readiness for change
		Delineate scope of change
Program Preparation	Initiating and Planning <sup>a</sup>	Plan Change
		Define change approach
	Planning <sup>a</sup>	Plan stakeholder engagement
	Planning <sup>a</sup>	Plan transition and integration
Program Benefits Delivery		Implement Change
Component Planning and Authorization	Planning	Prepare organization for change
Component Oversight and Integration		
(Ongoing Stakeholder Engagement)	Executing	Mobilize stakeholders
Component Transition and Closure	Executing	Deliver project outputs
Program Closure		Manage Transition
Program Transition	Executing	Transition outputs into business
	Monitoring and Controlling (when explicitly part of project scope)	Measure adoption rate and outcomes/benefits
Adaptive Change (at all phases)	Monitoring and Controlling (when explicitly part of project scope)	Adjust plan to address discrepancies
Program Transition		Sustain Change
		Conduct sense-making activities
		Measure benefits realization
	Monitoring and Controlling	Monitor for resistance and/or apathy

### Change Management activities & PM Process Groups

Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
Identify lead and other resources Identify stakeholders and their vested interest in the change Coordinate change management activities and program management change activities Delineate change management scope Begin change communication	Collect change management requirements and define change management scope Define, sequence, obtain resources and budget change management activities Identify measures of benefit realization Clarify risks to change acceptance and adoption, and plan abatement activities Develop communications management plan, human resource management plan, and quality management plan	Acquire and organize change management team, including procuring outside resources, when applicable Manage change communications	Assess change acceptance Review and modify change management scope, activities, project schedule, and project budget based on acceptance assessment feedback	Measure change acceptance/adoption against established measures Identify, plan, and execute actions needed to transition the change into business operations Close out the project with a plan for sustainability

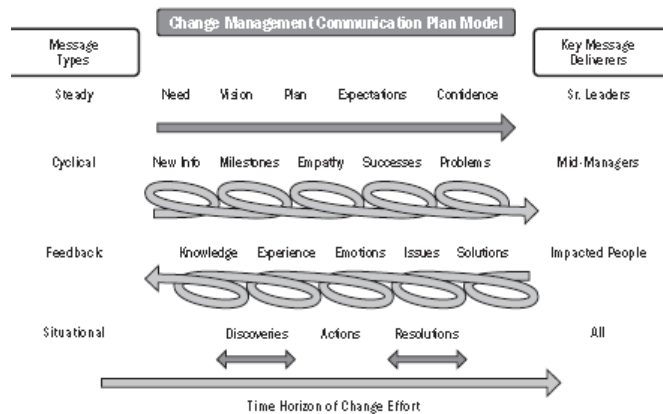
### Change Management & PM Knowledge Areas

Knowledge Area	Project Management Emphasis	Expansion Implied in Change Management
Project Integration Management	Managing interdependencies and unifying project components	<ul style="list-style-type: none"> <li>Managing and unifying interdependencies with change management activities performed in program management</li> <li>Ensuring transition of project deliverables into operations for ultimate achievement of project, program, and strategic benefits</li> </ul>
Project Scope Management	Clarity and limitation of scope	<ul style="list-style-type: none"> <li>Soliciting input into scope before agreeing on limitations</li> <li>Planning scope as new information or challenges develop</li> </ul>
Project Time Management	Completion of a project on a schedule	<ul style="list-style-type: none"> <li>Building adaptive and iterative processes into the schedule</li> </ul>
Project Cost Management	Estimating, funding, and controlling costs	<ul style="list-style-type: none"> <li>Ensuring realization of expected business benefits with project deliverables having reasonable cost structure</li> </ul>
Project Quality Management	Ensuring quality of deliverables	<ul style="list-style-type: none"> <li>Ensuring that quality deliverables result in expected business benefits</li> </ul>
Project Human Resource Management	Organizing, leading, and managing the project team	<ul style="list-style-type: none"> <li>Ensuring and coordinating change management resources and activities for the project</li> </ul>
Project Communications Management	Communicating project information to stakeholders	<ul style="list-style-type: none"> <li>Seeking participation of stakeholders in communication</li> <li>Delivering extensive two-way communications</li> </ul>
Project Risk Management	Planning for and controlling risks to project scope, schedule, and budget	<ul style="list-style-type: none"> <li>Planning for and monitoring risks, particularly those posed by people's actions and reactions</li> <li>Adapting project deliverables and outcomes, as necessary, to ensure realization of expected business benefits</li> </ul>
Project Procurement Management	Planning for, securing, and controlling contracts for products or services necessary to complete the project	<ul style="list-style-type: none"> <li>Planning for, securing, and controlling contracts for services necessary to ensure change adoption and ultimate realization of expected business benefits</li> <li>Obtaining professional expertise in such areas as process design, organization design, and knowledge transfer, when applicable</li> </ul>
Project Stakeholder Management	Engaging stakeholders in defining expectations, analyzing, negotiating, and managing expectations	<ul style="list-style-type: none"> <li>Engaging broad range of stakeholders when defining expectations</li> <li>Seeking stakeholder participation in decision making</li> <li>Testing stakeholder assumptions</li> </ul>

### Risk Mitigation in Change Management

Change Management Area	Risk Abatement Activity
Communication	<ul style="list-style-type: none"> <li>Repetition of messages regarding need for change and vision for future</li> <li>More frequent and/or targeted communication of status, facts, milestones, issues and solutions, changing assumptions or environment</li> </ul>
Feedback	<ul style="list-style-type: none"> <li>More frequent, widespread, or intense requests for input</li> <li>More brainstorming and innovation-seeking techniques</li> <li>More invitations for opposing points of view</li> <li>More delegated decision making</li> </ul>
Development	<ul style="list-style-type: none"> <li>More targeted or intense training</li> <li>More simulation and practice</li> <li>Additional mentors, coaches, and early experts</li> <li>Additional outside expertise</li> <li>Additional methods for learning from each other</li> </ul>
Energy	<ul style="list-style-type: none"> <li>Management modeling of new behaviors</li> <li>Renewed/intensified leadership enthusiasm and support</li> <li>Involvement of early adopters in aiding acceptance</li> <li>Celebrations of early successes</li> <li>Public appreciation for work being done</li> </ul>

### Communication Management Plan



### Engagement/Communication Plan Structure

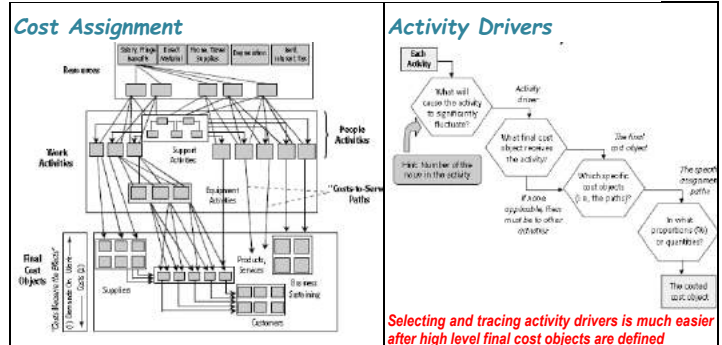
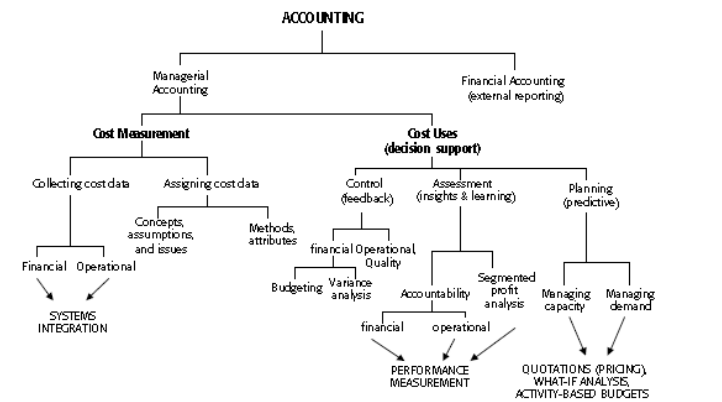
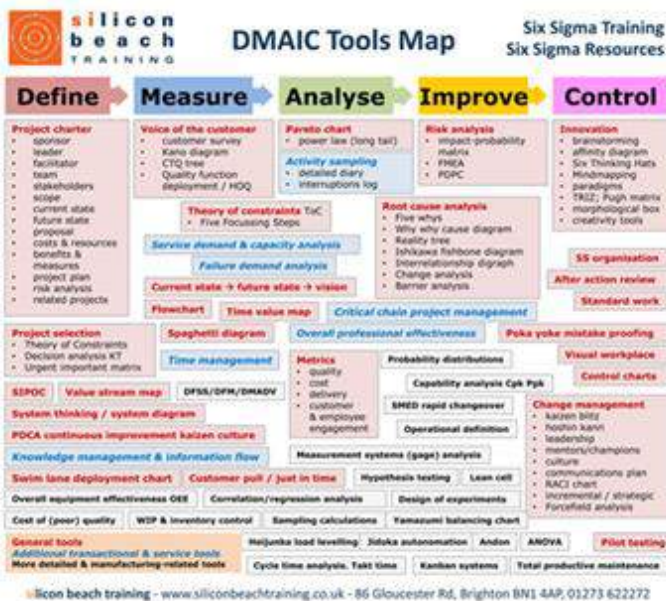
Defining Process Group						
	Information	Ownership	Knowledge	Competence	Issues	Reinforcement
When/who	Action	Action	Action	Action	Action	Action
When/who	Action	Action	Action	Action	Action	Action
When/who	Action	Action	Action	Action	Action	Action
Adaptive Activities						
	Information	Ownership	Knowledge	Competence	Issues	Reinforcement
Trigger/Measure and Timing	Action	Action	Action	Action	Action	Action
Trigger/Measure and Timing	Action	Action	Action	Action	Action	Action
Trigger/Measure and Timing	Action	Action	Action	Action	Action	Action

### Project control

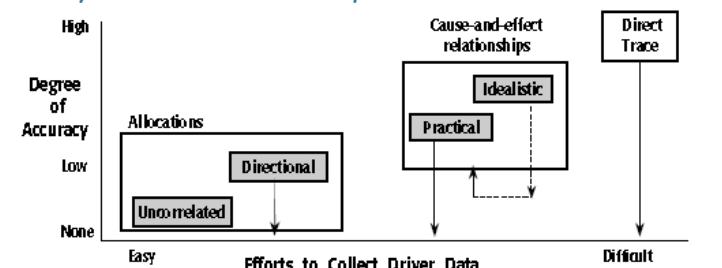
Project Control Options	When is a Change Management Option Important?
Change scope	<ul style="list-style-type: none"> <li>When an assumption that is critical to realizing the benefits of a project is inaccurate, especially when it affects future results in the program</li> <li>When a change in a contextual factor significantly changes the ability to realize the benefits of a project, but still allows the project to contribute to the ultimate outcomes</li> <li>When a deliverable is no longer needed</li> </ul>
Defer scope elements to another project	<ul style="list-style-type: none"> <li>When an assumption that is not critical to realizing the benefits of a project is inaccurate and will not significantly affect future results</li> <li>When a change in a contextual factor can be accommodated at another time without impacting timeliness of the outcomes</li> </ul>
Extend schedule	<ul style="list-style-type: none"> <li>When additional stakeholders are identified whose influence could derail the change effort</li> <li>When additional people are impacted by the project and their capacity to operate in the changed environment is important to realize benefits</li> <li>When transition is more difficult than initially planned</li> </ul>
Add resources/budget	<ul style="list-style-type: none"> <li>When additional people are impacted by the project and their capacity to operate in the changed environment is important to realize benefits</li> </ul>
Stop project	<ul style="list-style-type: none"> <li>When a change in a contextual factor fundamentally changes the ability to achieve the ultimate outcome</li> </ul>

### Lean/Six Sigma

### DMAIC Tool Map



### Activity Cost Assessment Techniques



Useful data collection methods	Any cost assignment technique is arbitrary (suggestion: prorate using cumulative cost assignments of those to the left)	A) Use popular defaults: • Head count • Output/conversion inputs/outputs B) Default to spread evenly among all cost objects	Functional representatives apportion 100%	Imprecise, but suggests surrogates	Volume-based transactions from feeder systems
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Only the "vital" few activity drivers need to be downloaded from feeder databases. The remainder can come from estimates. Stay away from illogical allocations

### Shared Service Model

BASIC MODEL	MARKETPLACE MODEL
<ul style="list-style-type: none"> <li>Economies of scale</li> <li>Reduced operating costs</li> <li>Shared resources</li> <li>Leverage of expertise</li> <li>Charge backs for services</li> <li>Customer and business orientation</li> </ul>	<ul style="list-style-type: none"> <li>Economies of scale</li> <li>Reduced operating costs</li> <li>Shared resources</li> <li>Leverage of expertise</li> <li>Charge backs for services</li> <li>Customer and business orientation</li> </ul>
	+ Customer choice of supplier + Market-based pricing + Separation of governance (policy/audit) role from services

### ABC Cost Assignment Model

### ABC Terminology

• **Resources** Economic elements used to perform activities  
 • **Activity center** cluster of related activities  
 • **Resources Drivers** Factors used to allocate resource or pools of costs to activities  
 • **Activity Cost Pool** Total cost assigned to activity  
 • **Cost Driver** Factor used to assign cost from activity center to other activity cost pools or cost objects  
 • **Cost Elements** amount paid for a resource and assigned to an activity  
 • **Cost Object** ultimate goal for

### Activity-Based Costing

### Booz Allen Cost Transformation

Strategy – Diagnosis & Target Setting	Design	Implementation
1 Determine cost/ performance gap 2 Analyze root causes 3 Assess improvement potential 4 Set target 5 Build leadership commitment	1 Prioritize improvement areas 2 Set up overall program structure 3 Develop baseline & cost driver understanding within each initiatives 4 Design improvement actions & measures	1 Have management lead change 2 Develop implementation plans and roll-out actions 3 Track progress via program office 4 Train staff in new processes 5 Adapt metrics and incentives 6 Launch communications

### Costs versus Strategic Initiatives trade-off

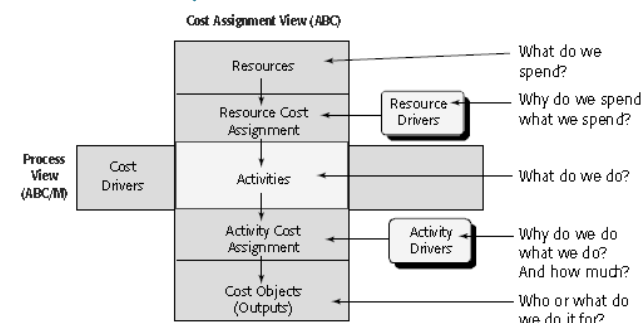
♦ Margin (higher margin market) ♦ Growth ♦ Quality ♦ Service level ♦ Control ♦ Risk assurance ♦ Proprietary Knowledge

### 4 waves of operations technology improvement

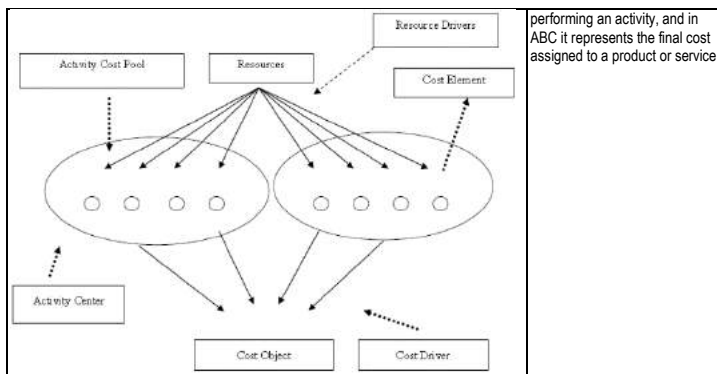
Wave	Eliminate waste "How well we do it"	• Cost transparency (where costs are) • Continuous improvement (Lean manufacturing, Six Sigma)
Wave 2	Streamline processes "How we do it"	• Activity-based costing (managing costs to process) • Process engineering (end-to-end processing, embedded quality, standardization) • Sales & Operations Planning (aligning capacity and demand) • Clarification of decision (operating model, governance, measurement, rewards)
Wave 3	Consolidate activities "Where we do it"	• Cost-driver analysis • Consolidation (footprint and scale) • Off shoring, outsourcing (locations and suppliers) • Tailored business streams (complex versus standard activities)
Wave 4	Attack complexity "What we do"	• Product portfolio rationalization • Product and service architecture (modularization, standardization) • IT architecture (scalability, elimination of legacy)

### ABC Illustrated

### ABC Framework Questions



### Management Accounting Framework



Resource Center: Student Service Department		
Activity Center	Activity	Activity Classification
1) Student Affair Division	- Personal Counseling - Orientation Week - University Social Activity - Career Placement - Graduation	Unit
2) International Student Division	- Visa / Permit	Batch
3) Housing Division	- On campus and Off campus accommodation	Unit
4) Admission and Enrolment Division	- University Enrolment - Update students academic record	Unit Batch
5) Examinations Division	- Academic Result - Examination rules and Procedures - Invigilation Duties - Unit Examination	Unit Batch

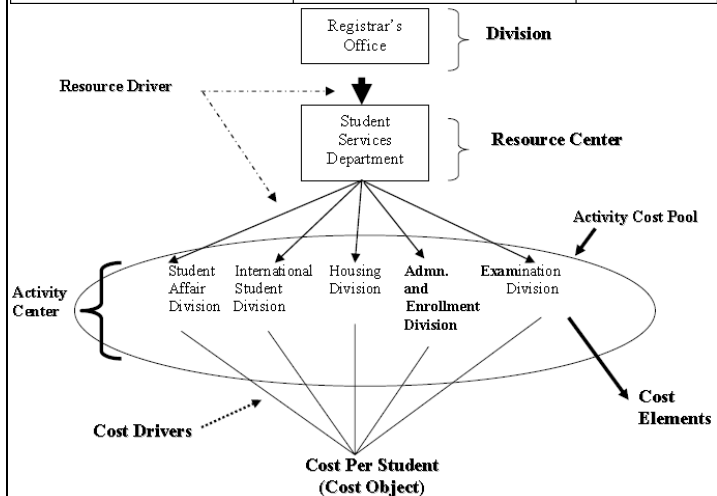


Table 2 Resource Driver

General Ledger Items	Amount (RM)	Allocation Base
Freight and Courier	214,000	Traced
Graduation Expenses	22,300	Traced
Orientation Expenses	6,600	Traced
Printing & Stationery	18,000	Allocated by estimated
Telephone & Faxes	5,000	No Calls and Faxes
Transportation - General	1,000	Allocated
Traveling Expenses	4,600	Allocated
Visa/Permit	3,000	Traced
Salaries & Wages	348,200	Traced
EPF	41,800	Traced
SOCSSO	1,000	Traced
Payroll Taxes	60,000	10% of Wages
Equipment Leasing	30,000	10% of Wages
Depreciation Expenses	40,000	By Floor Space
Utility Expenses	30,000	By Floor Space
Supplies	50,000	Allocated by estimates
<b>Total</b>	<b>875,500</b>	

Table 5 Admission and Enrollment Division's cost pool rate.

Activity Center Cost Pool / Cost Driver = Cost Pool Rate

\$93,667 / 1640 students = \$57.11 per students.

The service cost of Admission and Enrollment division per students is \$57.11.

Table 3 Assignment of Costs from Registrar's office (Division) to Student Service Departments (Resource Center)

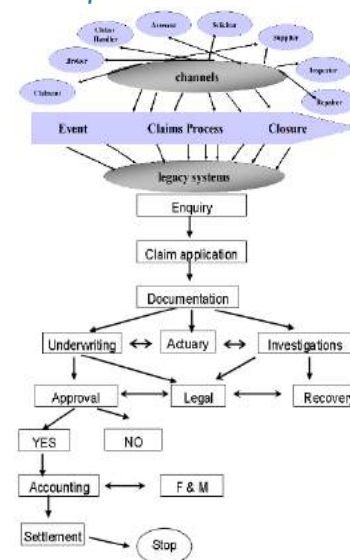
Cost Pool	Amount (RM)	Resource Driver	Student Service Department
Freight and Courier	214,000	Traced	18,000
Graduation Expenses	22,300	Traced	22,300
Orientation Expenses	6,600	Traced	6,600
Printing & Stationery	18,000	Allocated by estimated	12,000
Telephone & Faxes	5,000	No Calls and Faxes	3,000
Transportation - General	1,000	Allocated	800
Traveling Expenses	4,600	Allocated	2,000
Visa/Permit	3,000	Traced	3,000
Salaries & Wages	348,200	Traced (40%)	139,280
EPF	41,800	Traced (40%)	16,720
SOCSSO	1,000	Traced (20%)	200
Payroll Taxes	60,000	20% of Wages	27,856
Equipment Leasing	30,000	10% of Wages	13,928
Depreciation Expenses	40,000	By Floor Space	25,000
Utility Expenses	30,000	By Floor Space	18,750
Supplies	50,000	Traced	20,000
<b>Total</b>	<b>875,500</b>		<b>329,434</b>

Table 4 Assignment of Costs from Student Service Center (Resource Center) to Admission and Enrollment Division (Activity Center)

Cost Pool	Amount (RM)	Resource Driver	Cost Assignment to A & E Division
Freight and Courier	18,000	Traced	12,000
Printing & Stationery	12,000	Allocated by estimated	8,000
Telephone & Faxes	3,000	No Calls and Faxes	2,000
Transportation - General	800	Allocated	200
Traveling Expenses	2,000	Allocated	800
Salaries & Wages	139,280	Traced (15%)	20,892
EPF	16,720	Traced (15%)	2,508
Payroll Taxes	27,856	20% of Wages	4,178
Equipment Leasing	13,928	10% of Wages	2,089
Depreciation Expenses	25,000	By Floor Space	19,500
Utility Expenses	18,750	By Floor Space	13,500
Supplies	20,000	Traced	8,000
<b>Total</b>	<b>297,334</b>		<b>93,667</b>

## ABC in Insurance

### Claims process



### Major Cost Categories

Cost Item	Application processing		Claim processing	
	Average % of total cost	Average Cost per application \$	Average % of total cost	Average Cost per application \$
Front office	22.06	54.24	29.91	71.79
Back office	13.09	23.54	35.30	91.80
Support Functions	64.85	143.50	34.79	90.47
<b>Total</b>	<b>100.00</b>	<b>221.28</b>	<b>100</b>	<b>262.06</b>

### Processing cost - applications

Cost Item	Average % of Total Cost	Average Cost per application \$	% of support function cost	Lowest cost \$
Front Office	36.64	79.75	38.79	88.99
Enquiry/quote	20.65	44.39	87.78	20.80
Policy document	56.19	124.14	56.31	89.79
Back Office				
Actuary	1.09	2.40	0	1.84
Documentation	0.42	0.93	0	0.70
Underwriting	96.37	89.35	52.37	25.37
Accounting	2.40	4.17	0	3.39
<b>Total Back Office</b>	<b>43.50</b>	<b>97.14</b>	<b>78.76</b>	<b>31.30</b>
<b>Total Front and Back Office Cost</b>	<b>100</b>	<b>221.28</b>	<b>64.85</b>	<b>121.09</b>

\*number of applications - 487,883

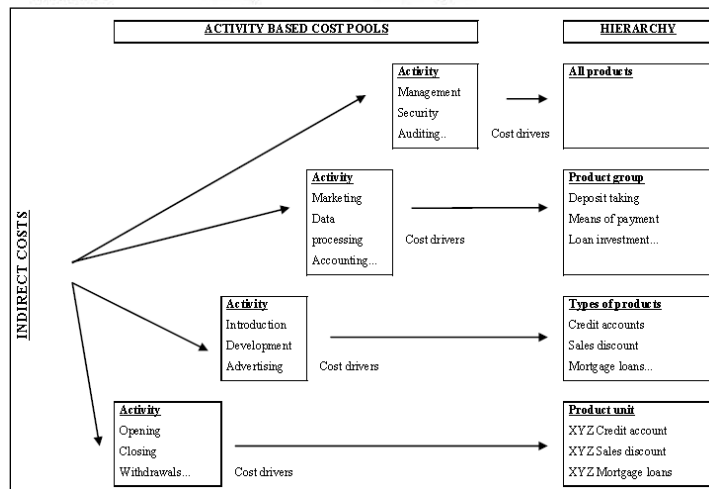
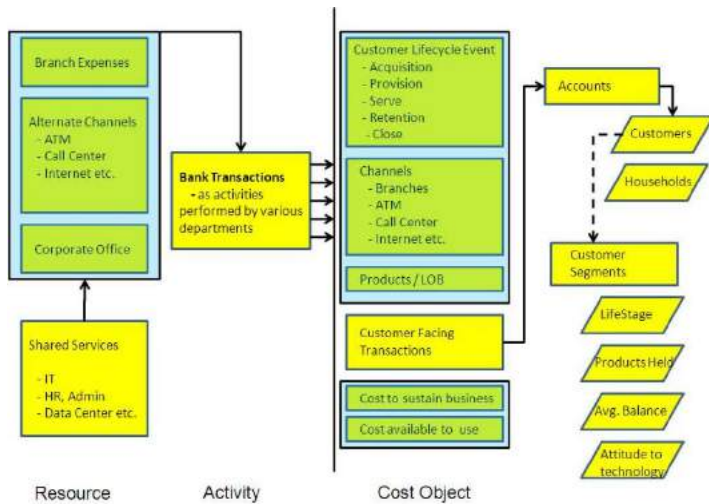
### Processing cost - claims

Cost Item	Average % of Total Cost	Average Cost per application \$	% of support function cost	Lowest cost \$
Front Office	13.39	35.34	55.97	34.85
Enquiry/quote	31.22	79.85	24.12	27.43
Claim application	45.12	117.05	33.71	91.18
Back Office				
Underwriting	18.08	49.34	68.78	21.45
Legal	6.23	16.97	100	8.90
Recovery	15.06	39.17	0	16.89
Accounting	1.431	37.22	0	16.08
<b>Total Back Office</b>	<b>54.88</b>	<b>142.79</b>	<b>35.67</b>	<b>66.28</b>
<b>Total Front and Back Office Cost</b>	<b>100</b>	<b>260.05</b>	<b>34.79</b>	<b>157.76</b>

\*number of claims - 145,997



## ABC in Banking



## PeopleSoft Activity-Based Management PeopleBook

**Questions** (costs of serving clients? most profitable customers, products, channels? opportunities to reduce costs? what products/ services to divest or invest?)

**Features** ♦Setting Up Attributes, Cost of Capital, Resources, Ledger Mapping Rules ♦Setting Up Activities Dimensionality, Consumption Patterns, Sustaining Activities

♦Setting Up Cost Objects ♦Setting Up Drivers attributes, rates, source/target models ♦Real-time vs Batch activity-based management ♦Employee profile, operational warehouse, activity fragmentation ♦Model service-based industries with Bill of Services

**Activity-Based Management Modeling Components** ♦**Resources** (people, facilities, costs associated with people + expenses—economic elements consumed while performing activities) ♦**Activities** consume resources & drive costs to cost objects ♦**Cost objects** cost information grouped by profitability dimensions—products, customers, channels ♦**Ledger mappers** relate expense data from general ledger accounts to resource objects - Map multiple ledger line item amounts to 1/more resource IDs ♦**Actual** amount that represents actual costs of accounting period results ♦**Budgeted** amount to calculate capacity rates as well as budgeted model results ♦**Drivers** (transactional, duration, and intensity) to assign monetary amounts from one object to another throughout the model (calculated by amount, percentage, spread even, and direct) in different ways depending on assignment type and object type ♦**Pointers** specify location of driver quantities in Operational Warehouse - Enriched (OWE) tables Rate options for model types ♦**Actual** ♦**Budgeted** ♦**Capacity** ♦**Frozen** ♦**Combination** ⇒ Create/ run basic, full-absorption models ♦to calculate variances from actual costs such as spending, volume, and capacity variances ♦to attribute monetary amounts to entities that operate at greater than or less than their capacity ♦to maintain a more constant consumption pattern over multiple time periods

