

 **Software Process Improvement Network** 

Teaching *New* Dogs *Old* Tricks

Leveraging PM-related Intellectual Capital

December 11, 2007

Carl A. Singer

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Farfel
December 25, 1978 - February 13, 1995



No way!!!

Teaching *Old* Dogs *New* Tricks



Sharing Expertise

A Process Driven Approach

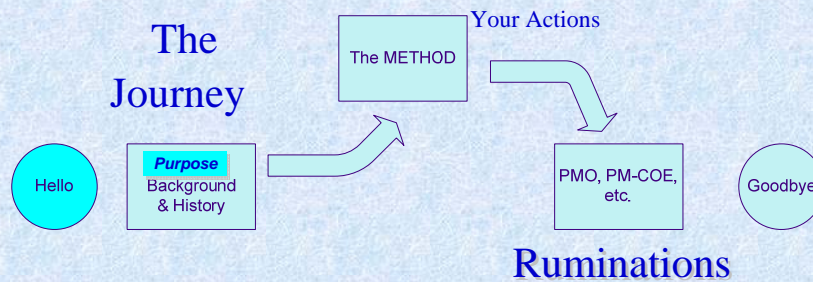
For IT Projects / Management

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Presentation Outline

- Purpose
 - Background
 - History
 - **Solution approaches**
 - **The METHOD** *What YOU can do*
 - PMOs, PM-COEs & friends
- + *some digressions and diversions*

A Destination



Purpose

.... Of the concepts

- To do things better
 - Shared Intellectual Capital (IC)
 - Process related improvements

Specific to the IT domain

Purpose

.... Of this presentation

Jeff Sutherland – Agile – Evangelist

- To engage (*aka*, “tickle”) your curiosity
- To help *you* get motivated / started towards building *your* own solutions

Purpose

.... Of this presentation

Carl Singer – PM Process – Advocate

- To engage (*aka*, “tickle”) your curiosity
- To help *you* get motivated / started towards building *your* own solutions

This isn't Shrinkwrap or Turn Key

Carl's 1st theorem of project teams

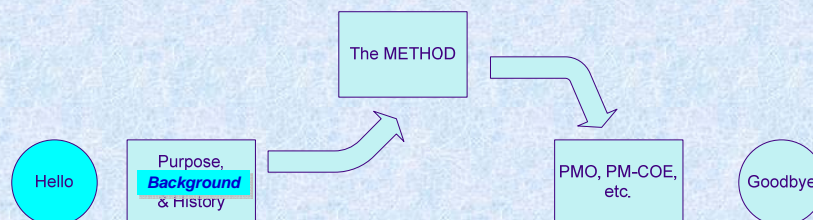
All of us together are smarter than any of us alone

- THIS IS BASIS FOR MAKING PROGRESS
- I hope to share some experience and opinion – feel free to do the same

Digressions & Diversions D²

I think this is the most extraordinary collection of talent, of human knowledge, that has ever been gathered together at the White House, with the possible exception of when Thomas Jefferson dined alone.

- John F. Kennedy Remarks at a Dinner Honoring Nobel Prize Winners of the Western Hemisphere. April 29th, 1962



Background

Background of the Problem / Opportunity

- Lack of Skills
- Lack of appropriate Skills
- Lack of skills that **fit** a specific situation

- The inability to do the right job right

SKILL

skill *noun* [ME *skil*, fr. ON, distinction, knowledge; prob. akin to OE *scylian* to separate, *sciell* shell — more at shell]

- 1 *obs* : cause, reason
- 2 **a** : the ability to use one's knowledge effectively and readily in execution or performance
b : dexterity or coordination esp. in the execution of learned physical tasks
- 3 : a learned power of doing something competently : a developed aptitude or ability <language *skills*> **syn** see art

skill-less or **skil-less** \ˈskil-lɛs\ *adjective*

skill-less-ness or **skil-less-ness** *noun*

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Merriam-Webster on-line Collegiate Dictionary

SKILL

**the ability to use one's knowledge effectively
and readily in execution or performance**

**a learned power of doing something competently:
a developed aptitude or ability**

Merriam-Webster on-line Collegiate Dictionary

**“Skills imply the capacity for action toward
some application.**

As such, much of IC (Intellectual Capital) is prescriptive and attempts to supplement individual skills to achieve a solution or solve a problem.* ”

* Context-specific Intellectual Capital – the next link in the knowledge chain – IBM Systems Journal, 42-3, 2003

IC is the “Bionic Brain” of Skill-Based Endeavors 😊

**“Skills imply the capacity for action toward
some application.**

As such, much of IC (Intellectual Capital) is prescriptive and attempts to supplement individual skills to achieve a solution or solve a problem.* ”

* Context-specific Intellectual Capital – the next link in the knowledge chain – IBM Systems Journal, 42-3, 2003

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Characteristics of ... The Experienced Worker

The Old Dog



Smells Smoke

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Characteristics of ...
The **SKILLED** Worker
The IC-enabled worker

1. Works more quickly
2. Produces better results
3. Makes less mistakes
4. Is more consistent
5. Can do more kinds of work *Broader*
6. Can do more in-depth work *Deeper*
7. Senses deviation more quickly
8. Senses smaller deviations

Smells Smoke

Characteristics of ...
The **SKILLED** Worker

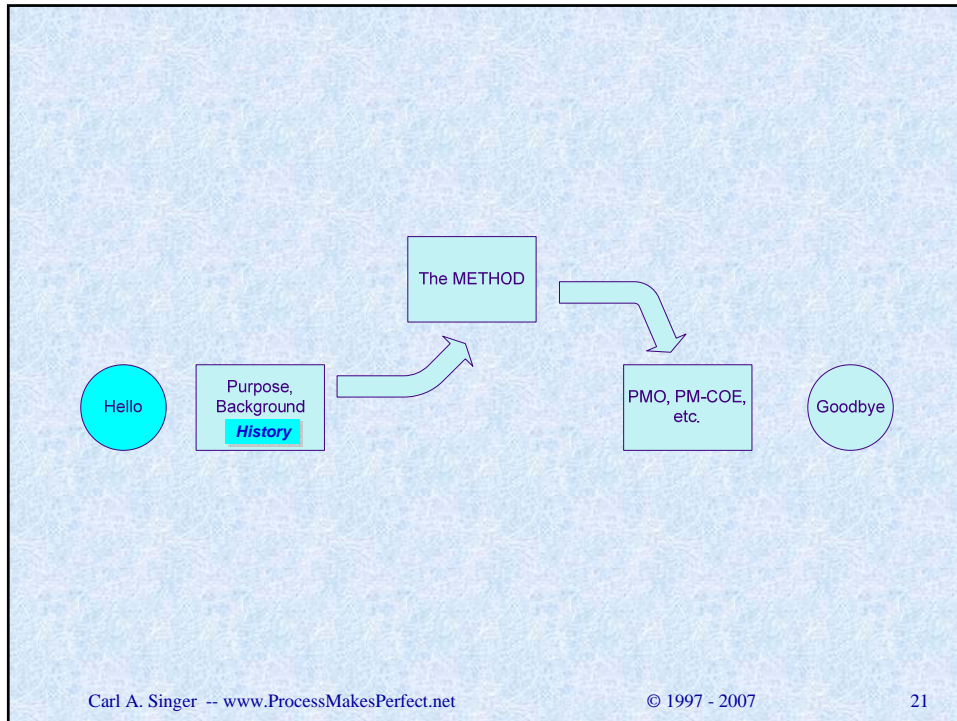
Communicates Well

WORKS SMARTER NOT HARDER

Has a "can do" attitude *Adheres to Process*

YOUR TURN
(Audience Participation)

Smells Smoke



History

History of Solution Approaches

- **IC-related Tools**
- Guilds / Trade Schools / Apprenticeships
- OJT – On the Job Training
- Mentoring
- Teaming

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“Recent” History

History of Solution Approaches

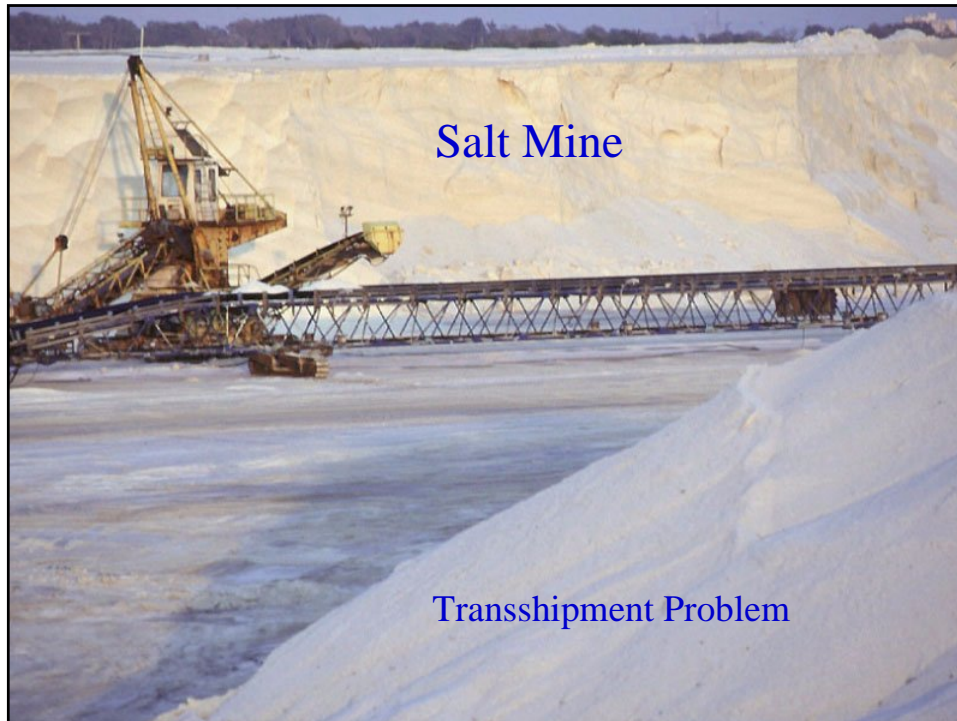
- **ISDOS** – Information System Design & Optimization System
- Boot Camp / *Stay in Step*
- Requirements Guidelines & Templates

The Method

PMOs

ISDOS 1965

- Information System Design & Optimization System
-- Case Tech / University of Michigan
- Dan Teichroew
- **IF** Fully Describe the System and SDLC Process –
THEN Generate Systems Design (SODA)
- **PSL / PSA** – 1965 → Requirements Statement
Language / Requirements Statement Analyzer
- Real Business Problems: Transshipment Problem



Problem:
Cutting Costs in Production and Shipping at the Salt Co.

The Salt Company had :

- 4 salt mines ("street salt" for winter roads)
 - f* 12 month operation
 - f* 3 shifts
 - f* Different costs and capacities at each mine

- 84 warehouses
 - f* Seasonal demand, municipal contracts, etc.
 - f* Multiple shipping modes (barge, rail, truck)
 - f* Different availabilities, costs, and capacities



Analysis:

- 4 Mines x 12 Months = 48 "sources"

- 84 Warehouses x 12 Months = 1008 "sinks"

- f Constraints include -- you can't ship backwards in time

- Yields a 48 (4 x 12) x 1008 (84 x 12) shipping tableau

- Three key accomplishments

- f We "tackled" the *data* -- gathered & understood the numbers

- f We solved the *mathematics*, in theory, then in practice (operations research issues)

- f We solved the *computing* issues - "Interactive computing"



Results:

We were fired!!!

- Previous year's shipping costs **\$26 Million**

- "Optimized" Shipping Cost **\$14 Million**

- f We saved the client

\$12 Million = 46% cost reduction

History

History of Solution Systems

- ISDOS – Information System Design & Optimization System
- **Boot Camp** / *Stay in Step*
- Requirements Guidelines & Templates

The Method

PMOs

BOOT CAMP 1990

- Bellcore
 - Growth - large influx of new employees
 - Specialized SDLC model
 - CMM – level 5
 - 4 week intense, off-site class
 - Technical Content, Leadership Message & Motivation
 - Focus on *our* SDLC
 - “Stay in step” program for “old dogs”



History

History of Solution Systems

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The Method

PMOs

Requirements Guidelines & Templates

- Bellcore SR-NWT-002159, December 1992
 - A Requirements Tutorial – Quality Systems & Software Requirements
- Elements of a Single Requirement
- Requirements Tools
- Structure – labeling / hierarchy / links
- Attributes
- Requirements Categories: Explicit / Conditional / Phased

Elements of a Single Requirement

Technical Content

- Requirements Statement (Text or Language)
 - Requirement (explicit)
 - Recommended Practice
 - Conditional Requirement
 - Constraining Requirement
- Graphics (as Appropriate)
- Attributes Importance / Certainty / Volatility
- Verification Data Validation, Test Plan
- Structure Decomposition, Trace, Link
- Metrics Function Points / Complexity
- Comments

CHANGE CONTROL

Administrative Content

- Unique Identifier
- Change / Configuration Data
 - Configuration Data
 - History narrative
 - Board Approval(s)
- Version / Phase Data
 - Audience
 - Level of abstraction
- Working Notes
 - Meeting Notes
 - Analysis
 - Decision Memoranda
 - Discarded Requirements
- Current Status

- ILITies

- Availability
- Reliability
- Certainty
- Volatility
-
- Ease of use
- Performance
- Security
-

Sins of Commission
Sins of Omission

Faster, Cheaper, Better Better Faster Cheaper

- On **Time**
- Within **Budget**
- Achieving **Quality** Goals

Quality?

- Conformance to Requirements

Better Faster Cheaper

- Project **I**ntegration Management
- Project **S**cope Management
- Project **T**ime Management
- Project **C**ost Management
- Project **Q**uality Management
- Project **H**uman Resource Management
- Project **C**ommunications Management
- Project **R**isk Management
- Project **P**rocurement Management

PMBOK

PM is a “soft science”

Quantum Mechanics

- Own Language
- Own Views
- Observations
- Theorems & Proofs

Teach / Learn T & Ps

Project Management

- Own Language
- Own Views
- Observations
- RoTs & HW
(Rules of Thumb &
Hand Waving)

Share Expertise

Carl's 1st LEMMA *Carl's 1st Lament*

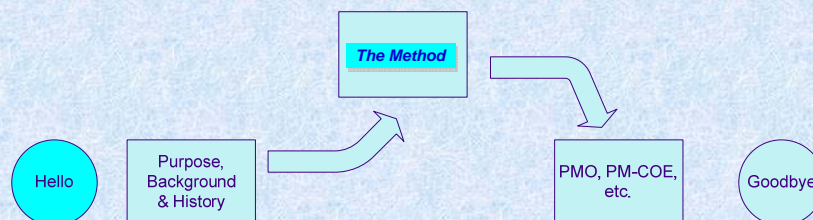
- The laws of physics are *not* determined by a management committee and are *not* subject to annual budget review

The “laws” of Project Management *are*

Projects exist in a business context

Sharing Expertise

- Book Learning / Formal Instruction
- Leadership / Mentoring
- OJT – On the Job Training / Simulation
- **Knowledge Management / Intellectual Capital Management**



Knowledge Management

To be useful

- **Relevant** knowledge **readily available**
- **Tailored** to the task at hand
- **Tuned** to the user's training & experience
- **Enhanced** by selectable levels of detail
- **Context Specific** / Context Aware
- **Enabled** with supporting templates & guidelines
- **Supported** by effective navigation tools

PM - Intellectual Capital

Definitions

Principle: A fundamental truth, rule of conduct or law upon which others is based.

Guideline: A guideline is is: (1) actionable (i.e. it recommends, or recommends against, an action to be taken) and (2) authorized by consensus. Guidelines are not set in stone and should be treated with common sense and the occasional exception.

Policy: Governing principles that apply to the management of the business. A policy is similar to a guideline, only more official and less likely to have exceptions. One should not generally edit policy without seeking consensus first.

Rule: An authoritative regulation, law or established practice by which conduct, methods and procedures are controlled in alignment with stated policies and/or principles.

Process: A central and organized way of doing things, generally following certain policies or guidelines (e.g. the "deletion policy" tells us how the "deletion process" works).

Doctrine: the body of principles in a branch of knowledge or system of belief

Methodology: A disciplined accumulation of the above.

Sharing Smarts at IBM The Method

- 35,000 Consultants – lots & lots of projects
- Lots of development types
 - Web based
 - Legacy + Web front end
 - Rapid Custom Development
- Lots of domains
 - Insurance
 - Banking
 - Manufacturing – Supply Chain

Not much commonality
Not much communication

WRONG!

COMMONALITY

- ✓ Planning
- ✓ Requirements
- ✓ Design
- ✓ Testing
- ✓ Staffing

COMMONALITY

One size does NOT fit ALL

*BUT 100 projects do not require 100
clean sheets of paper*

Some things CAN be shared

For example,

*100 projects may be serviced by
perhaps 5 different approaches to
gathering requirements 5 << 100*

COMMONALITY

Some things CAN be shared

For example,

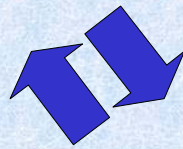
*or ALL projects of a certain type might
share a single approach to gathering
requirements*

The Method 50,000 Foot View

- Engagement models
 - **Piece-parts** – Intellectual Capital for reuse
- Uploading & storing Intellectual Capital
- Locating & downloading Intellectual Capital
- Build Engagement Model Instances (planning)
 - **MAW** (Methodology Adoption Workshop)
- Project Execution support

Project Lifecycle

PLAN the work



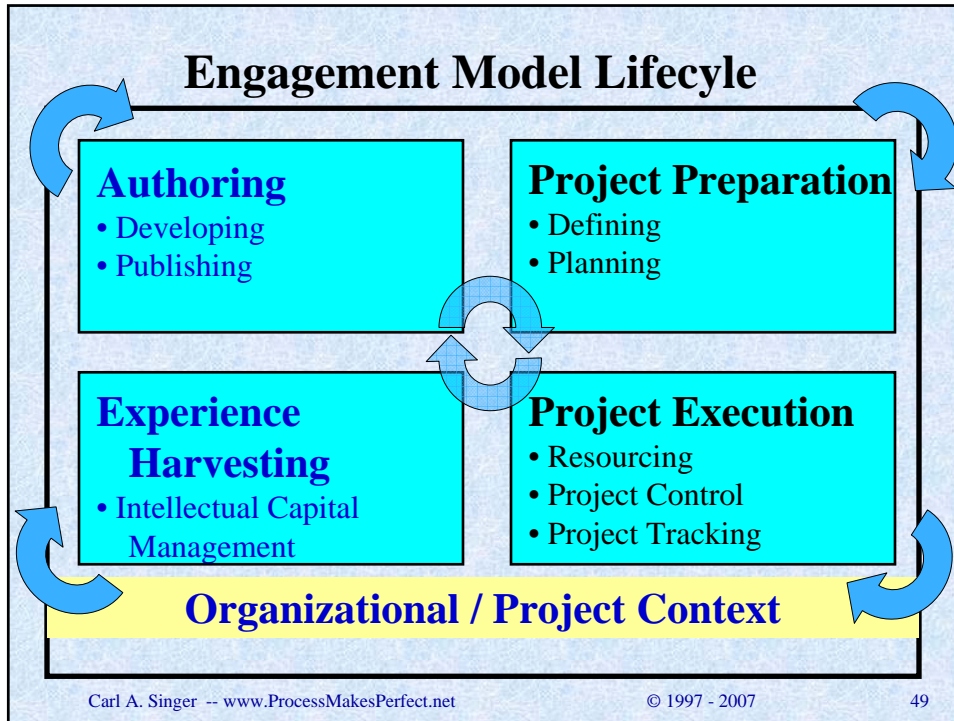
WORK the plan

Project Preparation

- Defining
- Planning

Project Execution

- Resourcing
- Project Control
- Project Tracking



HOW TO

Action Steps


- **Identify domains**
- **Find experts / leaders**
- **Identify best practices**
- **Capture the goodness**
- **Break components down**
 - Work Products
 - Work Breakdown Structure
- **Build Supporting Artifacts**
- **Continuous updating**

Project

- Realistic Boundaries
- Approach Framework
- Plans / Resources

Scaffolding

- Information Structure
- Toolset
- Support Structure



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Two Approaches to PM IC

- Task-oriented approach
- Output-oriented approach

TASK

Breaking components down

Work Breakdown Structure

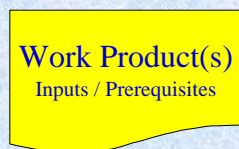
- Project

– Phase

- Activity

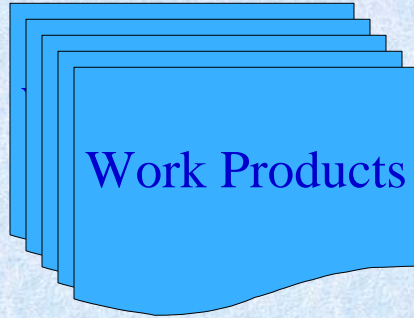
– Task

» Subtask



OUTPUT

Work Products



Work Breakdown Structure

- Project
 - Phase
 - Activity
 - Task
 - » Subtask

WPD: Name of Work Product & Version v.1.1 Classification

Work Product Description (WPD)

Unique ID: APP-1234

Version 1.1, May 2007

1 Description

2 Purpose

2.1 The primary purpose of the XXX is to provide

2.2 Reasons for Not Needing This Work Product

3 Notation

4 Example

5 Development Approach

6 Validation and Verification

7 Advice and Guidance

8 References

9 Estimating Considerations

10 Revision History

Date of this release:		Date of next revision:	
Revision Number	Revision Date	Summary of Changes	Changes Marked?
Version 1.0	01/01/2007	Base Version. Updated template and style, spelling and grammar review.	
Version 1.1	05/03/2007	Revised to include	Yes

Work Product

Work Product
TEMPLATE

Technique
Papers

Work Product
Instance

Guidelines

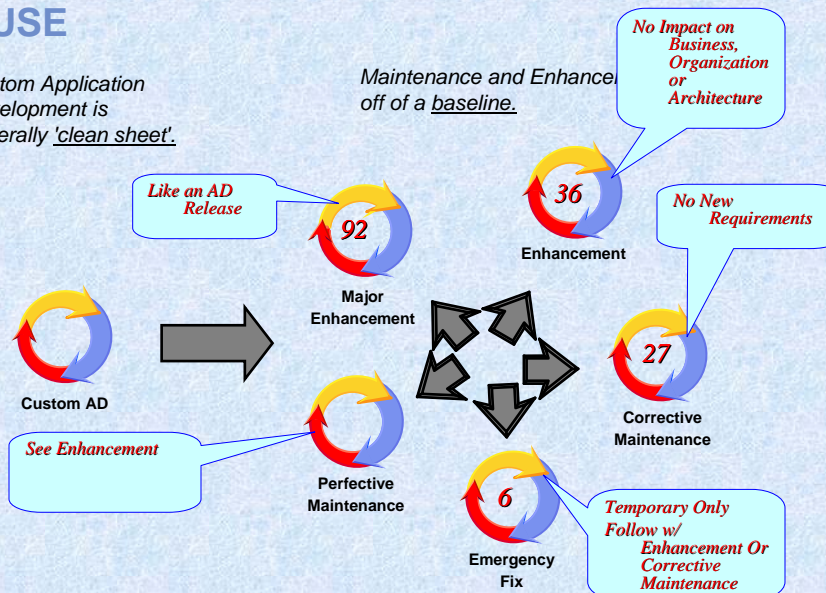
Leveraging the Method The Software Maintenance Example

- Many Software Maintenance Engagements
 - Some real experts, but much uncertainty
 - I located and gathered the experts
 - Scotland, England, Australia & USA
- See Leveraging a Worldwide Project Team
PM Network Magazine, PMI, April, 2001.
- Key was reuse – *How different is SW Maintenance from Software Development?*

REUSE

Custom Application Development is generally 'clean sheet'.

Maintenance and Enhancement off of a baseline.



Four AMO Engagement Models

Major Enhancement

(max ~92 work products)

Same as Custom AD Multiple Release

Enhancement

(max ~36 work products)

No impact on business, organisation and architecture domains

Corrective Maintenance

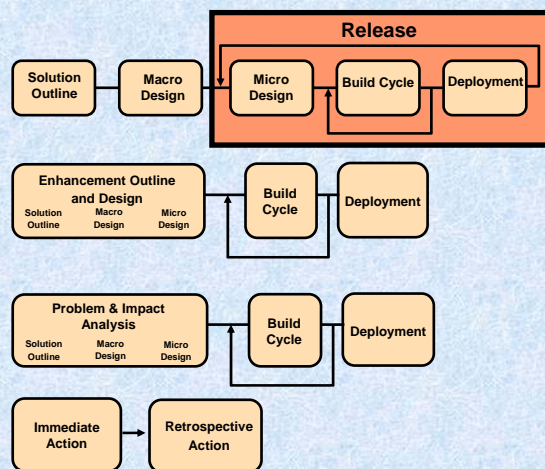
(max ~27 work products)

No new requirements

Emergency Fix

(max ~6 work products)

Leads to Corrective Maintenance or Enhancement



Some features

- New engagement family
- Consistent with existing work product based architecture
- New work products identified:
 - *Baseline Analysis*
 - *Impact Analysis*
 - *Impact Analysis (Emergency Fix)*
 - *Emergency Fix Design*
 - *Problem Resolution Report*
- New supporting technique papers identified:
 - *Working with Use Cases in an Application Development / Maintenance Environment*
 - *Tailoring Engagement Models in an Application Development / Maintenance Environment*
 - *Integration Testing Planning*
 - *Construction and Testing*
 - *Progression from Emergency Fix to Enhancements or Corrective Maintenance*

Only 5 WPs to maintain, to learn

The Method Adoption Workshop (MAW)

- f* **The MAW is the keystone of method deployment, and requires preparation, education, leadership and follow-on mentoring**
- f* **The MAW is undertaken during Solution Design to position the Proposal and SOW utilizing the Method**
- f* **MAWs are undertaken at major engagement checkpoints to accomplish a re-orientation**

f Objectives

- Understand the project
- Tailor the method to project estimation, selecting techniques, tasks and tools
- Define team organization and roles
- Assess risks
- Assess team skills

f Results

- Tailored Method
- Project Plan
- Risk Assessment
- Resource Plan for the Team
- Log of method exclusions and extensions
- Identified project work products and deliverables

The MAW is the primary deployment activity to the field practitioners

f A Method Adoption Workshop (MAW) is used to bring the project and the method together

f A MAW is usually facilitated by a trained Methods Exponent

f The length and content of a MAW are adapted to the needs of the project

- They are discussed and agreed beforehand.
- (Typical length 2-4 days, it may be spread over >1 workshop)

f A MAW is

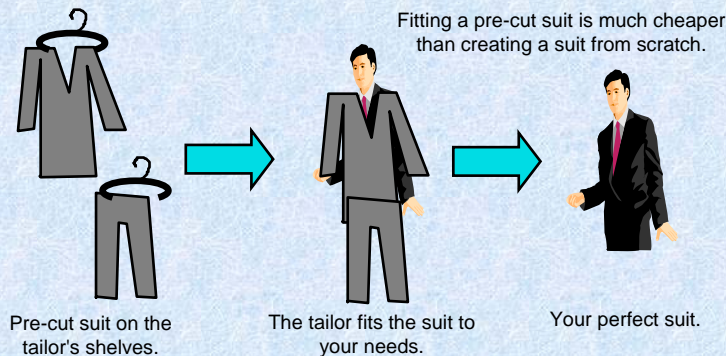
- Part consulting assignment,
- Part education, and
- Part project workshop

f A MAW is NOT a standard course



During tailoring the general engagement model is fitted to the needs of an individual project.

- No method can fit everything
- A specific, ready-to-use method can only be applied to very specific uses
- Therefore we use a general engagement model which is tailored to the needs of the individual project



Individual projects tailor the Engagement Models to fit their specific engagement

- f The different Engagement Models are starting points for tailoring the method for a specific engagement
- f Choose the closest Engagement Model and tailor from there
- f Some engagements may also require components from *other* Engagement Models



Knowledge Management

- **Relevant** knowledge **readily available**
- **Tailored** to the task at hand
- **Tuned** to the user's training & experience
- **Context Specific** / Context Aware
- **Enhanced** by selectable levels of detail
- **Enabled** with supporting templates & guidelines
- **Supported** by effective navigation tools

Navigation Tools

- Secure
- Easy to use
- Provides selection assistance and caveats
- Provides links to related material
- Assembles good starting point

What Can You Do In This Domain?

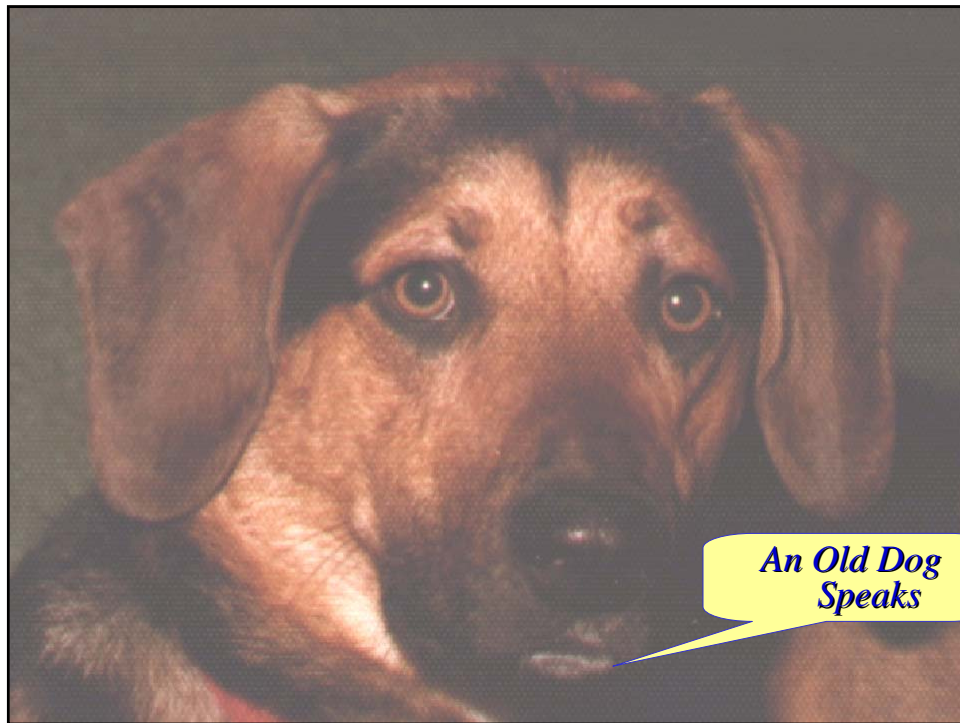
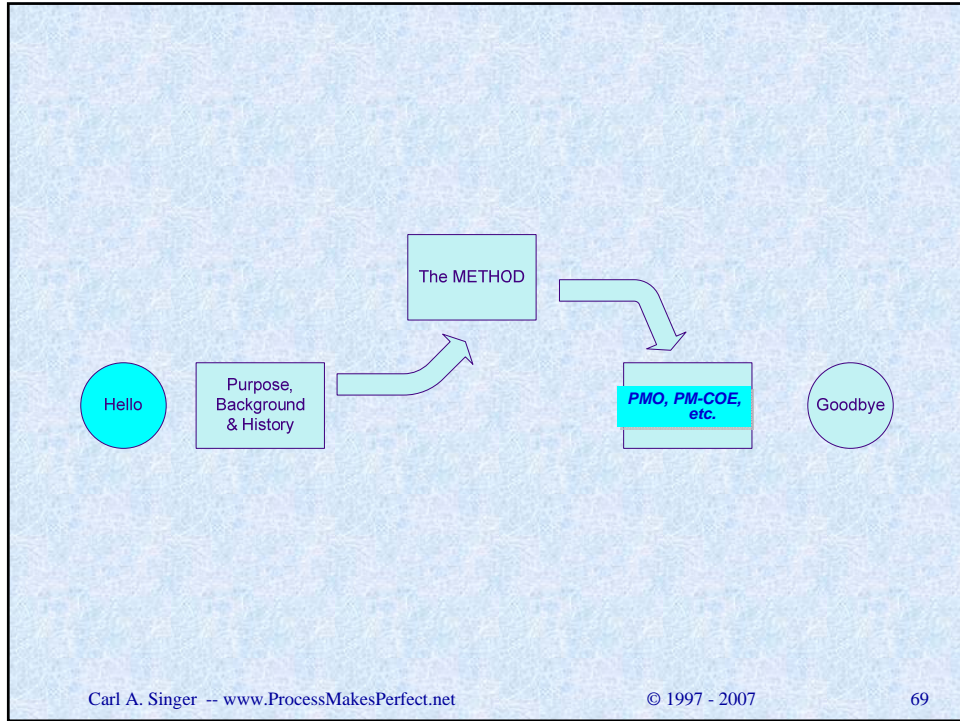
- Spend lots and lots of money
- Study your projects – identify useful artifacts
- Are they different because they need to be?
Or did they just wind up that way?
- Choose some “best of breed” *and*
decide where they may or may not apply
- Create an orderly “filing” system

What Can You Do In This Domain?

If all you do in your first pass is find redundancies – you're already a winner!

What *Can't* You Do?

- Buy a turnkey solution
- There's no "EASY" button, This requires heavy lifting
- Make progress overnight
- Keep managing projects as an AD HOC activity
- **Insanity is defined as doing the *same* thing over and over again and expecting *different* results**



Building an Effective Project Management Office

What's a PMO?

(multiple definitions)

1. a line organization that manages a single (complex) project
2. a line organization that manages or monitors a portfolio of projects and their resources
3. a *staff* organization that builds and maintains processes, standards and other project-related intellectual capital used in planning and executing all projects, yet directly manages no projects.
4. = 2 + 3

PMO

- **Managing Project Operations** – Managing the normal planning, execution and support of (one or many) ongoing projects throughout the entire project lifecycle. These functions will include:
- **Project Execution** – managing the day-to-day project lifecycle from some defined initiation point through to a defined completion or hand-off point.
- **Single Project Selective Support** – Planned participation in various critical project support functions.

PMO

- **Multiple / cross-project support** – (Also called “**Project Portfolio Management**.” or “**Program Management**”)
- Since there may be multiple concurrent projects, there may be a need to perform functions that span or involve trade-offs among multiple projects or a portfolio of projects. Here is a typical list of such functions.
 - **Resource allocation** – allocating resources among the suite of projects.
 - **Status tracking** – tracking status of all active projects. This may include building a Status Reporting Framework.
 - **Parachuting** – (unplanned) providing emergency resources or special.

What's a PMO?

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3 = PM-COE

**Manage Portfolio of Programs:
Form Projects,
Do Projects,
Deploy**

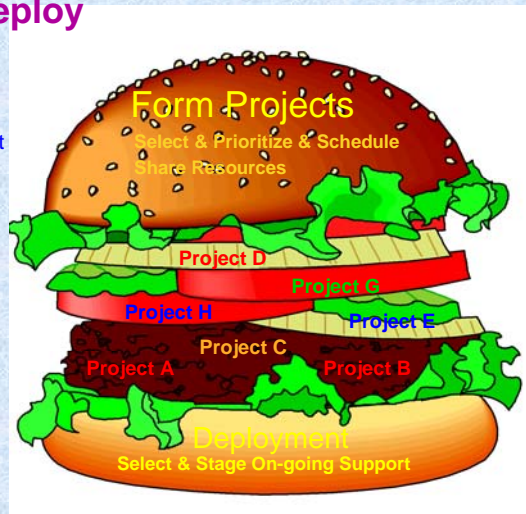


Portfolio Management

Program Management

Project Management

Program Management



Why have a PM-COE?

Motivation: The expected results from having a Project Management Center of Excellence are two-fold:

1. There's the general improvement of project performance and
2. There's the specific avoidance of the *disastrous* project, one where cost, timeliness, quality and / or customer satisfaction are not achieved.

Do's and Don't's

- Do not let your PM-COE get isolated from the day-to-day issues that impact your project managers – encourage candid communications and cross-pollination.
- Do not let your PM-COE get so caught up in the day-to-day turmoil that it loses its vision and becomes simply a Project resource pool. (Measure how much time PM-COE actors are spending (fighting fires?) on specific projects versus other activities.)
- Integrate independent Project Quality Assurance (PQA) into all project plans and all projects.
- Reach out – do not be a passive “service window” but a proactive agent.
- Make sure that your PM-COE attacks issues, not people.
- Do *not* measure your PM-COE based on utilization or other operational metrics – this will lead to bad choices by all. What gets measured gets managed. What gets mismeasured gets mismanaged.
- Constantly seek feedback, both good and bad. Maintain avenues of communication with all project-related organizations.
- Don't be a free resource – The savvy project managers will suck the marrow out of any free resource.
- Rotate a few experienced Project Managers in and out of the PM-COE every few years – the PM-COE should not become a sheltered workshop for tired project managers.
- Avoid NIH (Not Invented Here) at all costs. Together we are all smarter than any of us alone. The “field” has insights and solutions that are waiting to be harvested.

PMO-like things to do

1. Develop, facilitate and provide shared **intellectual capital** to support projects.
2. Build **peer support** network for informal, ad hoc, peer-to-peer communication.
3. Provide generic **project lifecycle reference guides** and **how-to's**.
4. Provide related **training and mentoring**.
5. Provide support for **RFP** response *Estimation & Risk*
6. Provide **project initiation support** – **project kick-off support** *MAW*
7. Provide **project execution support to include tools**

Greatest opportunity / risk when project is leaving the starting gate

PMO-like things to do

8. Provide the **quality assurance / quality audit** function.
(This is *not* testing!)
9. Oversee touch points, gates and other **project decision points**.
10. Build / install **project “dashboard”** facility to monitor project performance against plan.
11. Provide **Program / Portfolio** management capabilities
12. Provide archive / repository for project artifacts
(for completed Projects)
13. *In conjunction with Technology Services provide on-request technical support. (conduit)*
14. *Provide project deployment support – on planned and / or emergency basis. (conduit)*

Carl's Top Ten List **Digressions & Diversions D²**

You know the project is in trouble when:

10. You come in Monday morning and find several wastebaskets filled with empty Pizza Boxes
(or little packets of Soy Sauce are everywhere)
9. You see 4 or more people in a cubicle huddled around a workstation and they're not singing "Happy Birthday"
8. NO one can tell you who's intellectually in charge --- Or there is no one who is in charge, intellectually.
7. Coding is ahead of design, Design is ahead of specs, Testing keeps muttering about requirements
- 6. The customer is distancing himself / herself from the project**
5. Everyone is in catch-up mode.
4. You cannot map function to requirements
3. The Tuesday Wall Street Journal keeps disappearing.
2. There is one indispensable person (maybe two) who seems to hold the key to all knowledge and goodness
-- and you haven't fired him/her.
1. David Letterman has asked you to audition for "stupid pet tricks"

Seven Characteristics of Highly Successful Projects

- 1. A positive relationship with an active, intelligent client**
- 2. Strong project management**
- 3. Clear requirements, well managed**
- 4. Ruthless change management**
- 5. Pervasive process focus**
- 6. Effective controls and communication**
- 7. Technical leadership and excellence**

The critical next step, an honest self analysis of projects.
An analysis based on these seven criteria is something that a PM-COE should consider as part of its continuing process improvement.

1 - A positive relationship with an active, intelligent client

- Stay in your sweet spot
- Win-win contract & realistic project plan
- Effective escalation procedures
- Build / maintain positive relationship
- Seek clients with a history of success
- Client decisionmakers who are actively engaged

2 - Strong Project Management

(roles)

- Project Manager
- Technical Manager
- Schedule Manager
- Resource Manager
- Contract Manager
- Configuration Manager
- Change Manager
- Build Manager
- Data Manager
- Requirements Manager
- Documentation Manager
- Customer Relationship Manager
(Stakeholder Relationship Manager)

Technical leadership should *not* have to make resource / business decisions

3 – Clear Requirements, Well Managed

- Clear, unambiguous, well-documented Requirements in a database
- Requirements review board
- If pre-existing requirements – review to assess their quality

4 – Ruthless Change Management

- Change Manager / Change Review Board
- Baseline
- **Scope creep kills projects!**
- Any / all changes via change control process
- Changes cost money
- **Churn thwarts project success**
- Not all changes reflected in billing

5 – Pervasive Process Focus

- All processes are well documented & in place
- Process steps produce auditable outputs
- No process shortcuts
- Accurate measurement is key
- **Do not abandon process in times of trouble**

6 – Effective Controls & Communications

- Seize the initiative
- **Bad News does not get better with age**
- Build & maintain relationships & communications with all stakeholders
- Stay on message
- Maintain current project status
- Haste makes waste & leads to poor decisions

7 – Technical Leadership & Excellence

- You need a technical lead who is not the PM
- Technical excellence requires stable products
- Technical excellence requires stable platforms
- **There is risk when relying on technology that is not fully in place and stable**
- Internal escalation process for technical issues

Seven Characteristics of Highly Successful Projects

- 1. A positive relationship with an active, intelligent client**
- 2. Strong project management**
- 3. Clear requirements, well managed**
- 4. Ruthless change management**
- 5. Pervasive process focus**
- 6. Effective controls and communication**
- 7. Technical leadership and excellence**

Thank you!

Notes: Cartoons have been removed. To reduce the number of slides, some simple overlays have been placed side by side on a single slide rather than on multiple slides.

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