



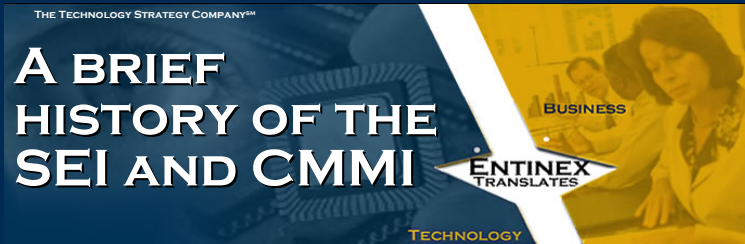
What the SEI Won't Teach You*

*Nothing to hide, just not their style.

TOPICS



- ▲ A brief history of the SEI and CMMI
- ▲ What the CMMI is and isn't
- ▲ What the appraisal is and isn't
- ▲ How the appraisal works
- ▲ How you need to qualify and prepare
- ▲ Typical SPI Plan
- ▲ Different macro-level ways to get everything set-up

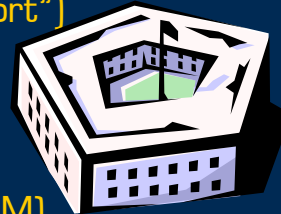


Well... it sounded like a good idea.

SEI



- ▲ Software Engineering Institute
- ▲ DOD Funded
- ▲ Standish Group Study ["Chaos Report"]
- ▲ Carnegie Mellon University
- ▲ Beat U of MD in a Competition [GQM]



SEI's PURPOSE

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▲ STOP THIS:

- ▼ ~80% software projects fail
- ▼ ½ cancelled
- ▼ ½ are over budget and schedule by 2x and deliver < 60% expected functionality
- ▼ ~20% succeed:
 - <20% over budget and schedule and deliver >75% of expected functionality



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BRASS TACKS

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STRATEGY COMPANY™

- ▲ Software customers
 - ▼ Paid **twice** as much
 - ▼ Waited **twice** as long
 - ▼ And Got **half** of what they expected
- ▲ And the DoD was **TIRED** of it!

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CMMI

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▲ Started out as CMM

- ▼ Capability
- ▼ Maturity
- ▼ Model



▲ Became SW-CMM when SEI introduced

- ▼ SE
- ▼ SA
- ▼ IPD
- ▼ P
- ▼ Security

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CMMI

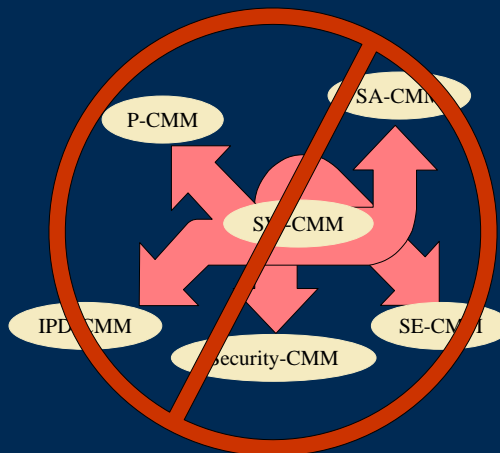
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▲ Capability

▲ Maturity

▲ Model

▲ Integration



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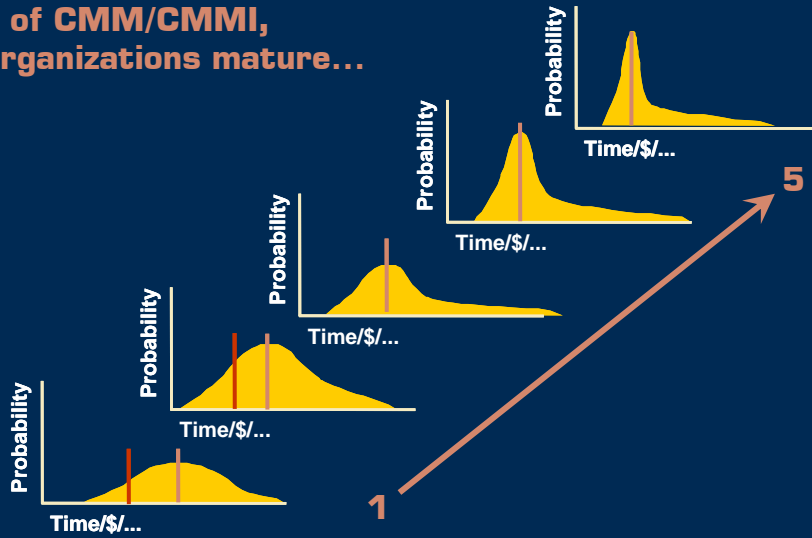
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NAME(S) NOTWITHSTANDING

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Goal of CMM/CMMI,
As organizations mature...



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WHAT THE CMMI IS AND ISN'T

ENTINEX
TRANSLATES

TECHNOLOGY

BUSINESS

Definitions and Misconceptions

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CMMI IS A FRAMEWORK

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- ▲ Not a standard
- ▲ Not a prescription
- ▲ IS a description
- ▲ CANNOT be cookie cutter [and still work well]
- ▲ Does not require purchase of software or tools
- ▲ Meant for process **improvement**,
not process **compliance**.



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IMPROVEMENT VS. COMPLIANCE

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- ▲ Process Compliance =
Do the process this way.
- ▲ Process Improvement =
Do things that will make a difference to your company.

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CMMI STRUCTURE

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▲ “Super-Structure”

- ▼ Representations
 - Staged / Continuous
- ▼ Constellations
 - **DEV** / *ACQ* / *SVC* / ...
- ▼ Additions



▲ Categories

- ▼ Process Areas related to each other
 - Engineering / Proj Mgmt / Proc Mgmt / Support

▲ Process Areas

- ▼ Specific Goals
 - Specific Practices
- ▼ Generic Goals
 - **Generic Practices**

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CMMI “REPRESENTATIONS”

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▲ Staged

- ▼ Familiar levels...
- ▼ Do these cumulative m processes for level x ,
Do these cumulative n processes for level y ...
- ▼ Results in ***Maturity Level Rating***

▲ Continuous

- ▼ New level structure
- ▼ Do *your pick* of processes to *this extent* for level p ,
Do *your pick* of processes to *this extent* for level q ...
- ▼ Results in a ***Capability Level Rating***

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“ADDITIONS” & CONSTELLATIONS

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▲ Additions

- ▼ Currently, the only “additions” are for IPPD.
- ▼ Implementing IPPD was once done by including 2 PAs and some goals.
- ▼ PAs denoted by “+”s
- ▼ In the future there may be other additions.

▲ Constellations

- ▼ Core PAs [16]
- ▼ Development [← Currently the only one out.]
- ▼ Acquisition
- ▼ Services
- ▼ May be others in the future.

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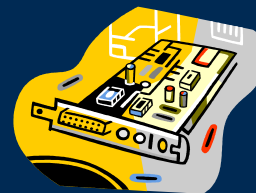
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CMMI COMPONENTS

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- ▲ Process Areas [PA]
- ▲ Specific Goals [SG]
- ▲ Specific Practices [SP]
- ▲ Generic Goals [GG]
- ▲ Generic Practices [GP]



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PROCESS AREAS (PAs)



- ▲ There are 22 Process Areas in the entire CMMI.
- ▲ Each PA describes:
 - ▼ One set of goals and practices that make up the process area: **Specific Goals** and **Specific Practices**
 - ▼ And one set of practices that are shared across all process areas: **Generic Goals** and **Generic Practices**

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SPECIFIC GOALS (SG)



- ▲ Each Process Area has at least 1 Specific Goal
- ▲ All the Specific Practices are organized by which Specific Goal they help organizations achieve.
- ▲ The Goals are what organizations are required to pursue.
- ▲ The Practices are what organizations are expected to perform, but can be swapped with alternative practices.

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SPECIFIC PRACTICES (SP)



- ▲ What organizations are expected to actually *do* in order to achieve a Goal is described in some number of Specific Practices.
- ▲ Most Goals have several practices.
- ▲ The straightest line to achieving a goal is to perform the practices.
- ▲ The “straightest line” may a matter of perspective. Do not assume every practice is right for you.

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GENERIC GOALS (GG)



- ▲ Every Process Area has the same Generic Goals with “fill-in-the-blank” differences for each PA.
- ▲ Choice of “Staged” or “Continuous” representation determines which Generic Goals are required for a level rating.
- ▲ “Capability Level N” implies that you are performing all the SG/SPs in a PA + all the GPs in through GG N
- ▲ GGs imply how “deeply institutionalized” your practices are...

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GENERIC PRACTICES (GP)



- ▲ GPs in each GG describe what you're doing to "institutionalize" the SGs and SPs.
- ▲ @ GG 1 you are barely executing the PA's SPs from project to project.
- ▲ @ GG2 you are making a conscious effort to plan, track, and ensure the success of each PA's SPs. It may look different from project to project, but you're doing enough work each time to get it right.

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GP STUFF CONTINUED



- ▲ @ GG3 you have a single set of defined processes that each project uses and tailors to their specific instantiation. With a single set, you can now start to collect and feed-back improvement data on the processes.
- ▲ @ GG 4 you will be using the data in GG 3 to manage the processes using numbers, not just management oversight. "Quantitatively Managed"
- ▲ @ GG 5 you're able to use computational methods to predict process performance, to anticipate process issues, and to create an environment in which you can really get creative with what you improve, how you improve, and when.

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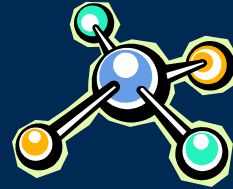
RATINGS INGREDIENTS



▲ Maturity Levels [Staged]

▼ Level X =

- All PAs in the LEVEL
- All SGs in the PA
 - All SPs in the SG
- All GGs in the PA
 - All the GPs in the GG



▲ Capability Levels [Continuous]

▼ Level X =

- All GG-Xs in the PAs you've chosen
 - All the GPs in the GG
- All the SP-Xs in the PAs you've chosen
 - SPs still do add up to SGs

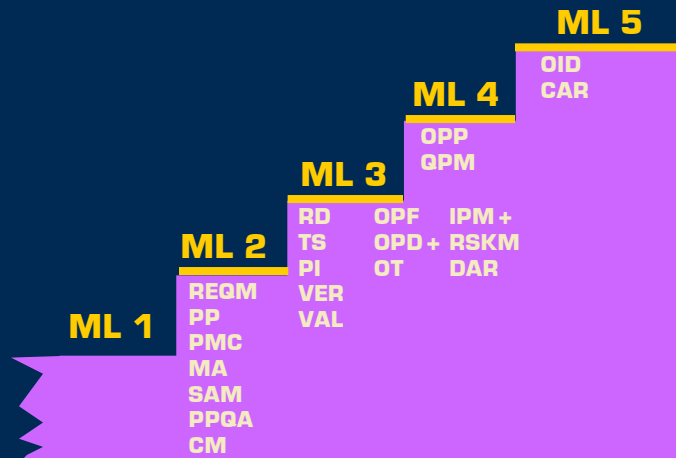
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CONFUSING? AN EXAMPLE: (PART 1)



Maturity Levels



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CONFUSING? AN EXAMPLE: (PART 2)



Capability Levels

	PA1	PA2	PAr
	SG1	SG1	SG1
	SP1.1	SP1.1	SP1.1
	SP1.2	SP1.2	SP1.2
	SP1.m	SP1.m	SP1.m
	SGq	SGq	SGq
	SPq.1	SPq.1	SPq.1
	SPq.2	SPq.2	SPq.2
	SPq.n	SPq.n	SPq.n
CL1	GG1	GG1	GG1
	GP1.1	GP1.1	GP1.1
CL2	GG2	GG2	GG2
	GP2.1 - 2.10	GP2.1 - 2.10	GP2.1 - 2.10
CL3	GG3	GG3	GG3
	GP3.1 - 3.2	GP3.1 - 3.2	GP3.1 - 3.2
CL4	GG4	GG4	GG4
	GP4.1 - 4.2	GP4.1 - 4.2	GP4.1 - 4.2
CL5	GG5	GG5	GG5
	GP5.1 - 5.2	GP5.1 - 5.2	GP5.1 - 5.2

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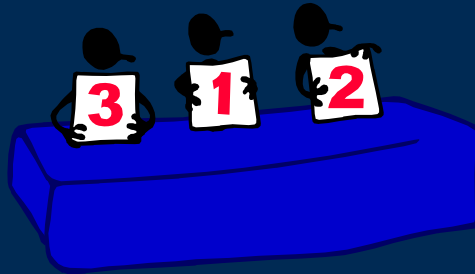
Certification?

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RATINGS?

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- ▲ You perform an APPRAISAL
- ▲ You get a RATING
- ▲ You do not get CERTIFIED



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NOT ONE MORE SEAFOOD JOKE!

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- ▲ SCAMPI
- ▲ S tandard
- ▲ C MMI
- ▲ A ppraisal
- ▲ M ethod
- ▲ P rocess
- ▲ I mprovement



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EVEN THIS HAS A HIERARCHY

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- ▲ ANSI/ISO 15504 [“SPICE”]
- ▲ Appraisal Requirements for CMMI
- ▲ SCAMPI Method Definition Document
- ▲ Appraisal Plan
- ▲ Appraisal Results



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MORE ON WHAT IT IS AND IS NOT

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- ▲ Not a Test
- ▲ Is a benchmark
 - ▼ for where you are for yourselves,
 - ▼ not relative to others
- ▲ Can be used for many purposes, not just ratings
- ▲ DOES NOT require special documentation
- ▲ DOES NOT intrinsically impose any tools or work(!)



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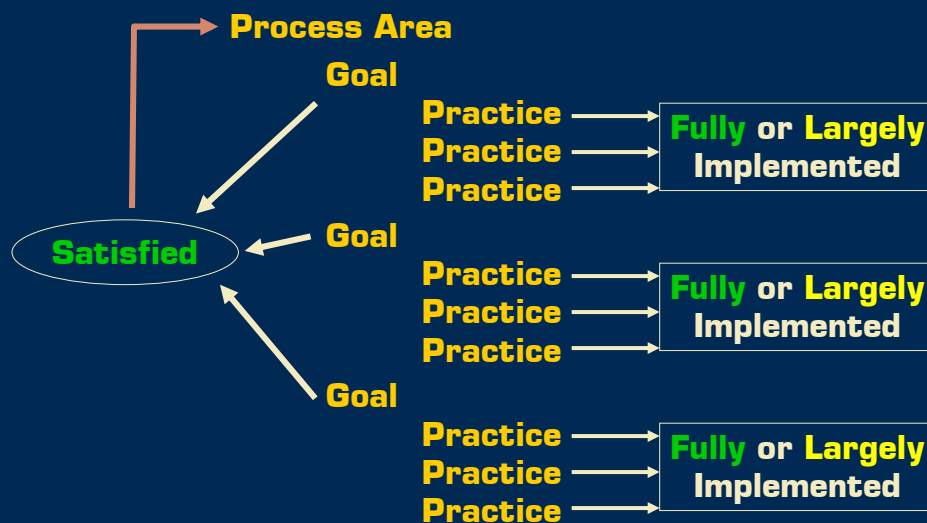
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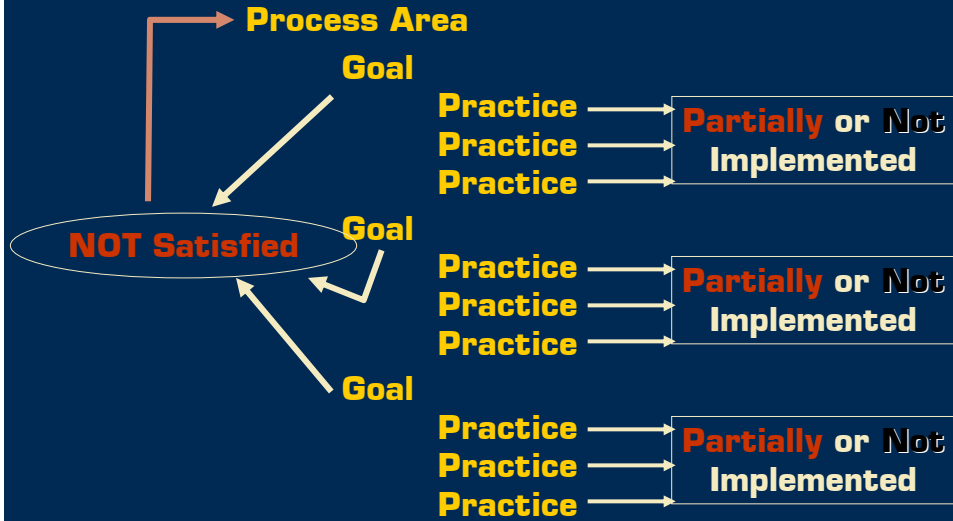
Appraisal Mechanics You Must Know

LEVEL RATINGS, 1



LEVEL RATINGS, 2

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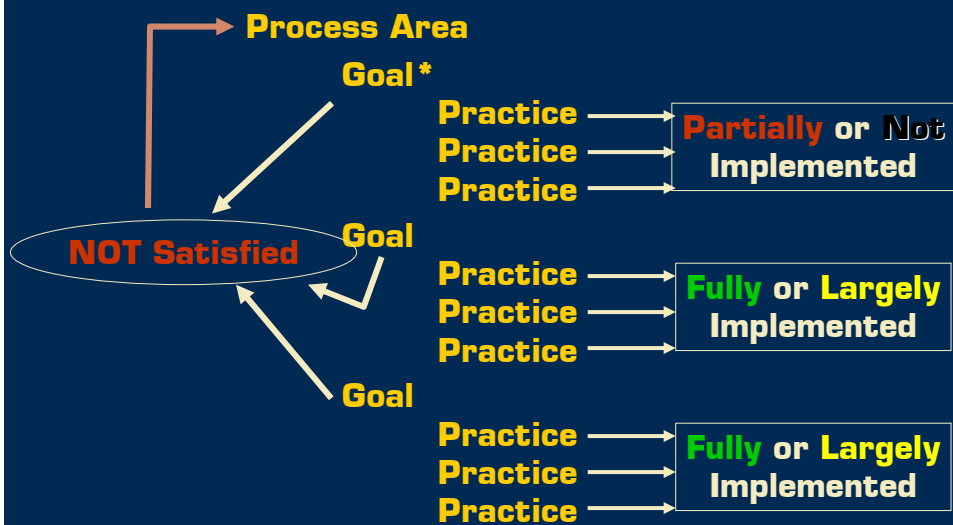
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LEVEL RATINGS, 3

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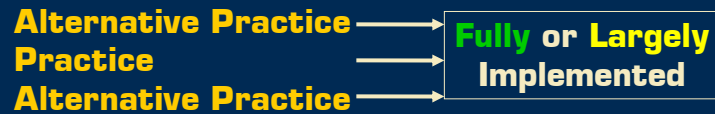
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*NOT ALL SHE WROTE



Goal



Alternative practices must be qualified, and supported by Objective Evidence

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HOW WE DETERMINE FI, LI, PI AND NI



▲ Objective Evidence

▼ Direct Artifact

- Direct output of a process/practice, e.g., the process says "write a plan" and the DE is the plan

▼ Indirect Artifact

- Some item that clearly shows a process was being followed e.g., meeting minutes in which a process/practice was addressed

▼ Affirmations

- Verbal [written or oral] communication to the appraisal team that provides positive corroboration of a process.

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FI, LI, PI AND NI



Goal			
Practice	Project 1		
	Project 2		
	Project 3		
Practice	Project 1		
	Project 2		
	Project 3		
Practice	Project 1		
	Project 2		
	Project 3		

Goals are just



or

Can only be LI

Can't be FI
Could be PI

Can only be LI

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MINIMUM OBJECTIVE EVIDENCE



1 Direct Evidence

+

1 Indirect Evidence or 1 Affirmation



[with a calculated minimum # of affirmations]

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DEFINITIONS OF FI, LI, PI (NI AND NR)



▲ Fully Implemented =

All required OE and no weaknesses

▲ Largely Implemented =

All required OE and qualified weaknesses, or consistency among weaknesses.

▲ Partially Implemented =

Missing OE and/or weaknesses that prevent the practice from being implemented.

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WHAT'S A WEAKNESS?*



▲ Practices that are *not*, or are only *partially*, performed.

▲ Evidence that must be massaged to fit the expected practice, or, that you did it looks like a coincidence.

▲ Evidence that is out of synch with practices definitions.

▲ Evidence that looks like it was created for the appraisal.

***not a complete list**

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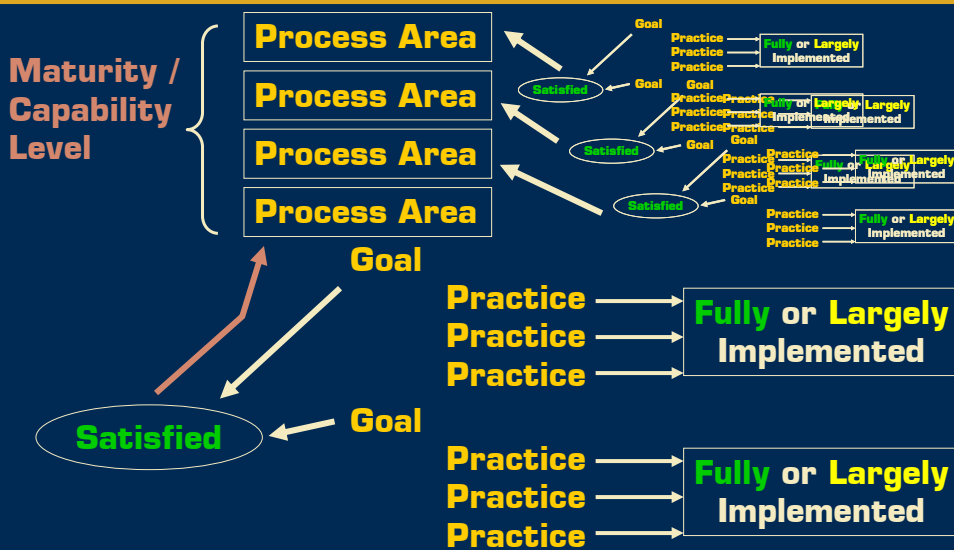
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PUTTING IT ALL TOGETHER

- ▲ Objective Evidence [2 types] provide indicators of practice implementation.
- ▲ Goals are met when all projects are found to be performing (in aggregate) all practices
- ▲ Process Areas are met when all goals are met.
- ▲ Level Ratings are “awarded” when all level requirements are met [i.e., PAs for MLs and SGs/GGs for CLs].

PICTURE IS WORTH...



A HIDDEN REALITY*



Compare:

Goal	Practice	Project 1	Yellow	To this		
		Project 2	Green			
		Project 3	Yellow			
	Practice	Project 1	Red		To this	
		Project 2	Green			
		Project 3	Yellow			
	Practice	Project 1	Yellow			To this
		Project 2	Yellow			
		Project 3	Green			

This → What does that *tell* you?

***WARNING: don't make this your goal!
NOT SEI-Condoned!**

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HOW YOU NEED TO QUALIFY AND PREPARE

**Are you ready?
When are you ready?
Should you bother?**

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BASICS

- ▲ Have policies and processes.
- ▲ Follow them.
- ▲ Can show [objectively] that you follow them.



PREPARATION BASICS

- ▲ Any company staff on the Appraisal Team **must** have completed an SEI-Licensed course of *Introduction to CMMI*
 - ▼ [Team consists of a leader + 3 people]
 - ▼ [Can include internal and external members]
- ▲ Team members [and leaders] must have certain minimum experience
 - ▼ In Engineering, Management and Life Cycle
 - ▼ Sticking junior staff on the team is not a good plan

MORE PREP



- ▲ Lead-in to the Appraisal includes:
 - ▼ Readiness Review(s)
 - ▼ Appraisal Team Training [not the same as “Intro...”]
- ▲ Lead Appraiser writes an Appraisal Plan
 - ▼ Registers the appraisal with SEI
- ▲ These two slides outline what’s required by the SEI, not what may needed for YOU.

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Getting Started to Getting Done

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TYPICAL ROAD MAP

▲ Gap Analysis

- ▼ Where are you relative to the CMMI?

▲ Training

▲ Process Improvement

- ▼ Assuming you "ain't all *that*"
- ▼ Process creation and deployment



▲ Process Institutionalization and Normalization

▲ Appraisal Prep

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FACTORS THAT AFFECT TIME AND COST

▲ Where you are w.r.t. CMMI? (i.e., Gap Analysis Results)

▲ How "process-oriented" is your company?

▲ How much work will your company do on its own?

▲ How much work will your company need help doing?

▲ How much progress do you think you'll be able to make?

▲ How quickly?



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STOP!



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▲ You really must answer some questions of yourself before you even embark upon the SCAMPI journey.

- ▼ Why do you want one?
- ▼ Can your reason be justified in business goals?
- ▼ Can your business goals be qualified in ROI?
- ▼ If you're not the one who calls the shots, who is and will that person give you the resources to get through this successfully?



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DIFFERENT MACRO-
LEVEL WAYS TO GET
EVERYTHING SET-UP

BUSINESS

ENTINEX
TRANSLATES

TECHNOLOGY

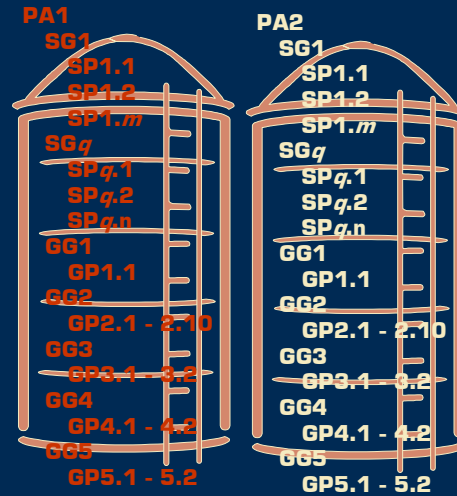
Opinion: The most common way is the worst way. The “path of least resistance” usually means you hit the wall faster.

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PROCESS SILOS

- ▲ PAs in a vacuum.
- ▲ Each PA is self-contained in it's own silo.
- ▲ For each PA instance, practices are planned, performed to its plan.
- ▲ Can be implemented w/out affecting 'real' work.
- ▲ Adds layers of process overhead & paperwork.
- ▲ Makes appraisers' jobs easier.
- ▲ Makes developers' jobs harder.
- ▲ Least "Institutionalization"



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A WORD ABOUT THE GPs

- ▲ **Generic Practices:**
 - ▼ Establish an Organizational Policy & a Defined Process
 - ▼ Plan the Process
 - ▼ Provide Resources
 - ▼ Assign Responsibilities
 - ▼ Train People
 - ▼ Manage Configurations
 - ▼ Involve Stakeholders
 - ▼ Monitor & Control the Process
 - ▼ Objectively Evaluate Adherence & Collect Improvement Information
 - ▼ Review Status w/Higher Level Mgmt

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GP DISCUSSION

- ▲ **Generic Practices**
 - ▼ Same in every PA
 - ▼ Refer to the SPs of the respective PAs
- ▲ **The Silo'd Approach:**
 - ▼ Is mechanical and simple (minded)
 - ▼ Good for companies with lots of overhead
 - ▼ Requires these be done for every project
 - ▼ Often unrelated to:
 - what the actual work is
 - when the actual work is done
 - when practices are used
 - ▼ Most often, very disruptive
 - ▼ Too easy to “get wrong”



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IN OUR OPINION



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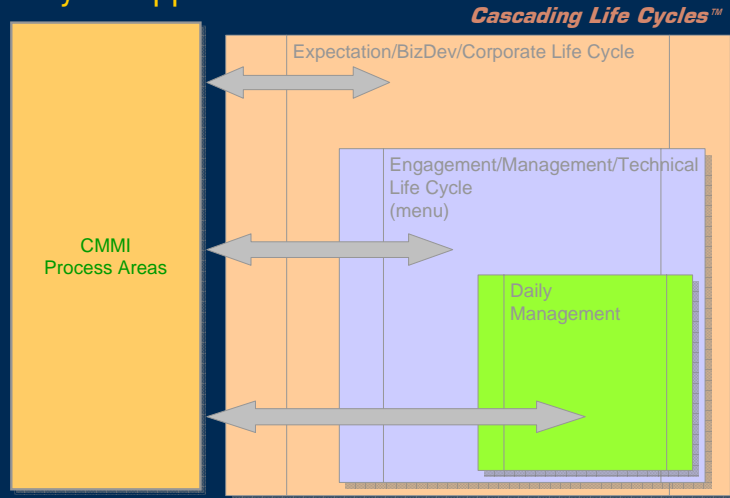
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INSTEAD...



▲ Life Cycle Approach



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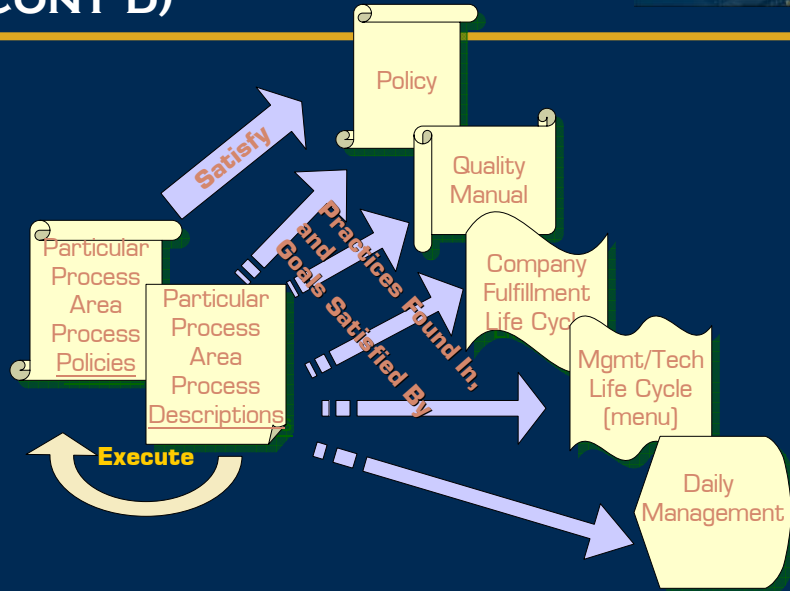
PROCESS FLOW-DOWN



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PROCESS FLOW-DOWN (CONT'D)



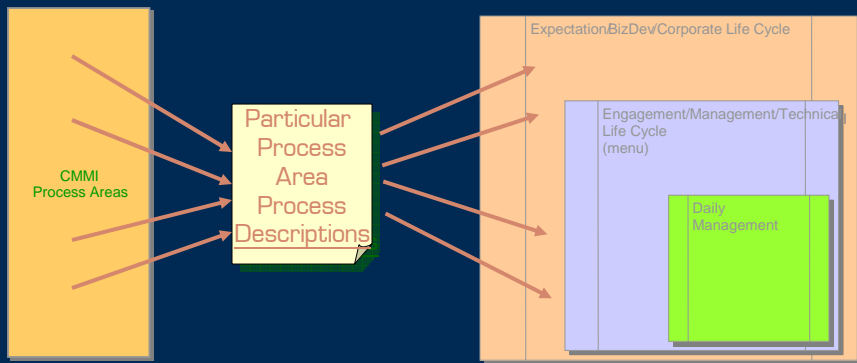
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KEY FEATURE



▲ Process definition/description documents define where in YOUR reality practices take place.



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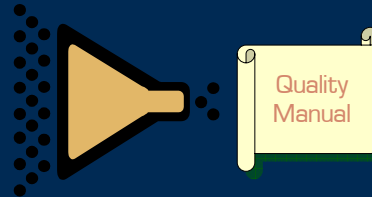
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WHAT'S IN THE QUALITY MANUAL?



▲ Explains how on each project, all company Processes:

- ▼ are planned-out and tailored from a single set of company processes
- ▼ are assigned as someone's responsibility
- ▼ are provided resources to be done
- ▼ are assured of having people trained in them
- ▼ have their work products configuration controlled
- ▼ involve relevant stakeholders
- ▼ are monitored & controlled
- ▼ are objectively evaluated against applicable standards,
- ▼ have performance reviewed with higher management, and
- ▼ incorporate lessons learned for improvement

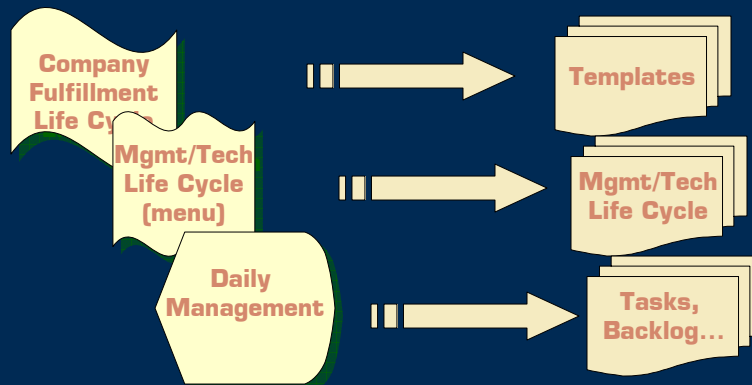


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WORK-PRODUCT GENERATION

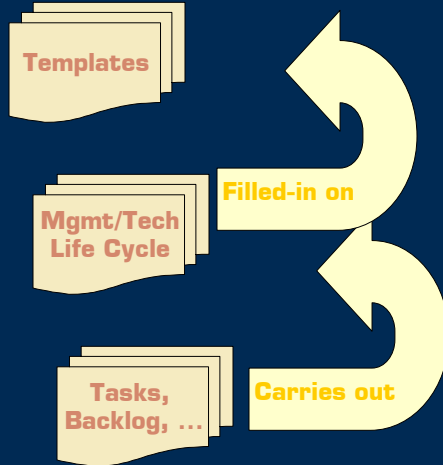


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WORK-PRODUCT INTERACTIONS

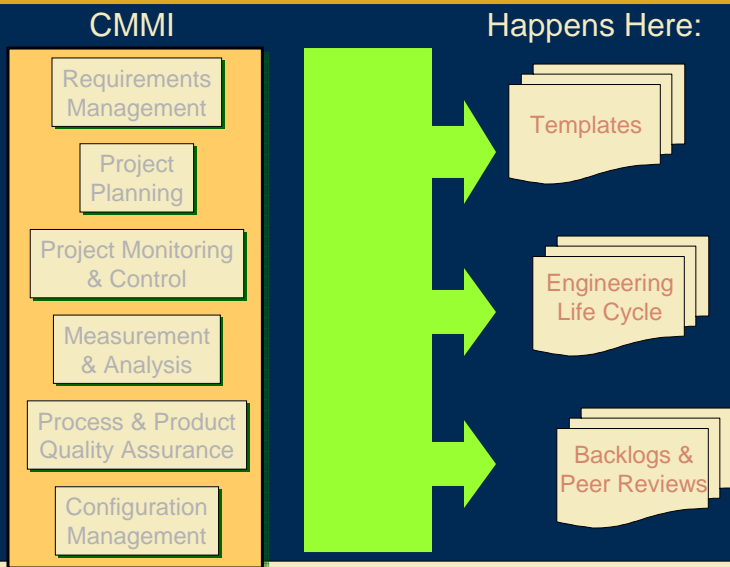


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SUMMARY 2



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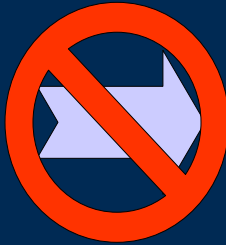
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WHAT'S NOT HERE



Particular
Process
Area
Process
Descriptions



Templates

Engineering
Life Cycle

Backlogs &
Peer Reviews

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AT THE APPRAISAL



Templates

Engineering
Life Cycle

Backlogs &
Peer Reviews

**Process
Implementation
Indicator
Descriptions
come from here:**

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... AND WITH

THE TECHNOLOGY
STRATEGY COMPANY™

- ▲ Keeping an eye on profit when designing processes.
- ▲ Ensures processes are not over-designed.
- ▲ Ensures processes are tied to business needs.
- ▲ Ensures processes affecting profit are included.

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BENEFITS

THE TECHNOLOGY
STRATEGY COMPANY™

- ▲ Uses realistic life cycles.
- ▲ Puts recurring practices in one place.
- ▲ Distributes practices into life cycles.
- ▲ Invokes relevant practices at their point of use.
- ▲ Causes $\lim_{\Delta \delta} [\text{productivity}] \rightarrow 0$
- ▲ Most likely to still be in-place after a time = long-term ROI

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SILVER LINING?



- ▲ **Less Disruption and More Productivity Requires:**
 - ▼ More up-front process design.
 - ▼ Deep understanding of Company Context:
 - Technology
 - Processes/Practices
 - Culture
 - Project types and style
 - Customers
 - ▼ Deep understanding of CMMI.
 - ▼ Deep understanding of SCAMPI process.
 - ▼ More work by the appraiser.
- ▲ **Lasting results and *real*/ROI require *real*/investment and *real*/discipline.**

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APPROACH SUMMARY



- ▲ **Process Silos =**
Overlaying a process onto work you're doing, thus adding overhead and disruption to productive/billable work. Increased production without necessarily increasing productivity.
- ▲ **Cascading Life Cycles™ =**
Using the underlying processes you're already doing and tweaking them [only as needed] to map them to CMMI. Where practices or alternatives aren't done, they are not added as overhead, they're added in line with productive work.

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DESIGNED PROCESS VS. APPRAISAL PREP



▲ Designed Processes

- ▼ Lasting Benefits and ROI.
- ▼ Can be appraised repeatedly without re-inventing evidence.
- ▼ Requires up-front process engineering.
- ▼ Requires expertise in CMMI and company's operations.
- ▼ Can cost more up-front.
- ▼ Establishes foundation of improvement.
- ▼ Appraisal simply looks at ordinary output of processes.

▲ Appraisal Prep

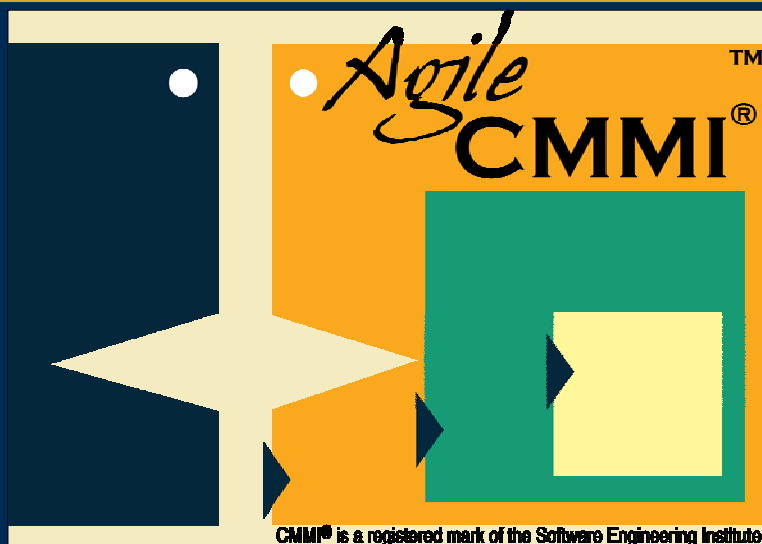
- ▼ Focused on getting through the appraisal [only].
- ▼ Short-term results.
- ▼ Requires less expertise.
- ▼ Can be cheaper [short term].
- ▼ Each appraisal requires renewed preparations.
- ▼ Staff perceives effort as "make work" w/no value added.
- ▼ Difficult to connect appraisal results to actual improvements.
- ▼ Appraisal looks at data created just for the appraisal.

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WE CALL IT



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You always have to ask, don't you?

REMINDER...



- ▲ Where you are w.r.t. CMMI?
(i.e., Gap Analysis Results)
- ▲ How “process-oriented” is your company?
- ▲ How much work will your company do on its own?
- ▲ How much work will your company need help doing?
- ▲ How much progress do you think you'll be able to make?
- ▲ How quickly?

NONETHELESS...

THE TECHNOLOGY
STRATEGY COMPANY™

▲ Most Aggressive Scenario:*

- ▼ Maturity Level 2 in 7 months
- ▼ Maturity Level 3 in 10 months
- ▼ * Assumes
 - Very process-oriented company
 - Minimal gap
 - Tight ship
 - Executive Imperative & Clear Business Need
 - Active Management Role
 - Dedicated Internal Project Leader
 - Persistent Consultant/Expert Involvement, 4-8 hours/week
 - NO DISRUPTIONS
[like actual project work and client needs]

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MORE REASONABLE...

THE TECHNOLOGY
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▲ Aggressive Scenario:**

- ▼ Maturity Level 2 in 9-12 months
- ▼ Maturity Level 3 in 12-18 months
- ▼ ** Assumes
 - Process-oriented company or internal process champions
 - Minimal-to-Moderate gap
 - Tight [enough] ship
 - Executive Sponsorship & Articulate Business Need
 - Active Management Role
 - Strong Part-Time Internal Project Leader
 - Persistent Consultant/Expert Involvement, 8+ hours/week
 - Minimal Disruptions

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MOST REASONABLE...



▲ Most Realistic Scenario:***

- ▼ Maturity Level 2 in 12+ months
- ▼ Maturity Level 3 in 18-24 months
- ▼ *** Assumes
 - Process-orientation is new concept to company culture
 - Typically significant gap and few true processes
 - Ad-hoc ship operations – projects just seem to “get done”
 - Executive Buy-In & Rational Business Need
 - Periodic and Event-driven Management Role
 - Part-Time Internal Project Contact
 - Persistent Consultant/Expert Involvement, 12+ hours/week
 - Ordinary Disruptions

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How we run it &
What we look for

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HOW IT WORKS

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▲ Start w/a Kick-Off

- ▼ Explain what we're up to and why
- ▼ Provide CMMI® *Crash Course*™ (if needed)
- ▼ Describe the Gap Analysis process
- ▼ Describe what the Gap Analysis leads-to
- ▼ On-site 1-4 days

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CONDUCT INTERVIEWS

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- ▲ Not focused as much on:
 - ▼ 'evidence' as much as on existence or absence of practices
 - ▼ Not focused as much on process areas as on practices
- ▲ Looking for your "hidden" processes.
- ▲ Starting the search for your underlying process architecture.

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INTERVIEWS TO FIND

1. Do you have a written process that calls out a practice and is there indication that you follow it?
2. Are you performing a practice even though you don't have it formally defined?
3. Neither 1 nor 2.
4. It's not formal, and it's not exactly "done" but if you talk a lot and we look in enough haystacks it starts looking like you're doing it.

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GAP ANALYSIS OUTPUTS



- ▲ Gap Analysis report
- ▲ Strategy
- ▲ Road Map
- ▲ Action Plan
- ▲ Cost Proposal

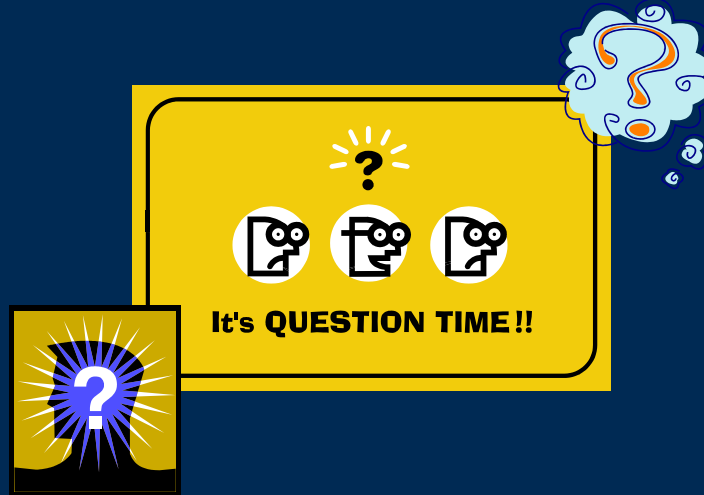
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QUESTIONS?

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DON'T FORGET TO WRITE!

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