Integrated Project and Process Management – A Cornerstone for the CMMI

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Objective

- **To discuss what integrated process and project management means**
- **To describe some ways to achieve it**

Opening Thought

"In preparing for battle I have always found that plans are useless, but planning is indispensable."

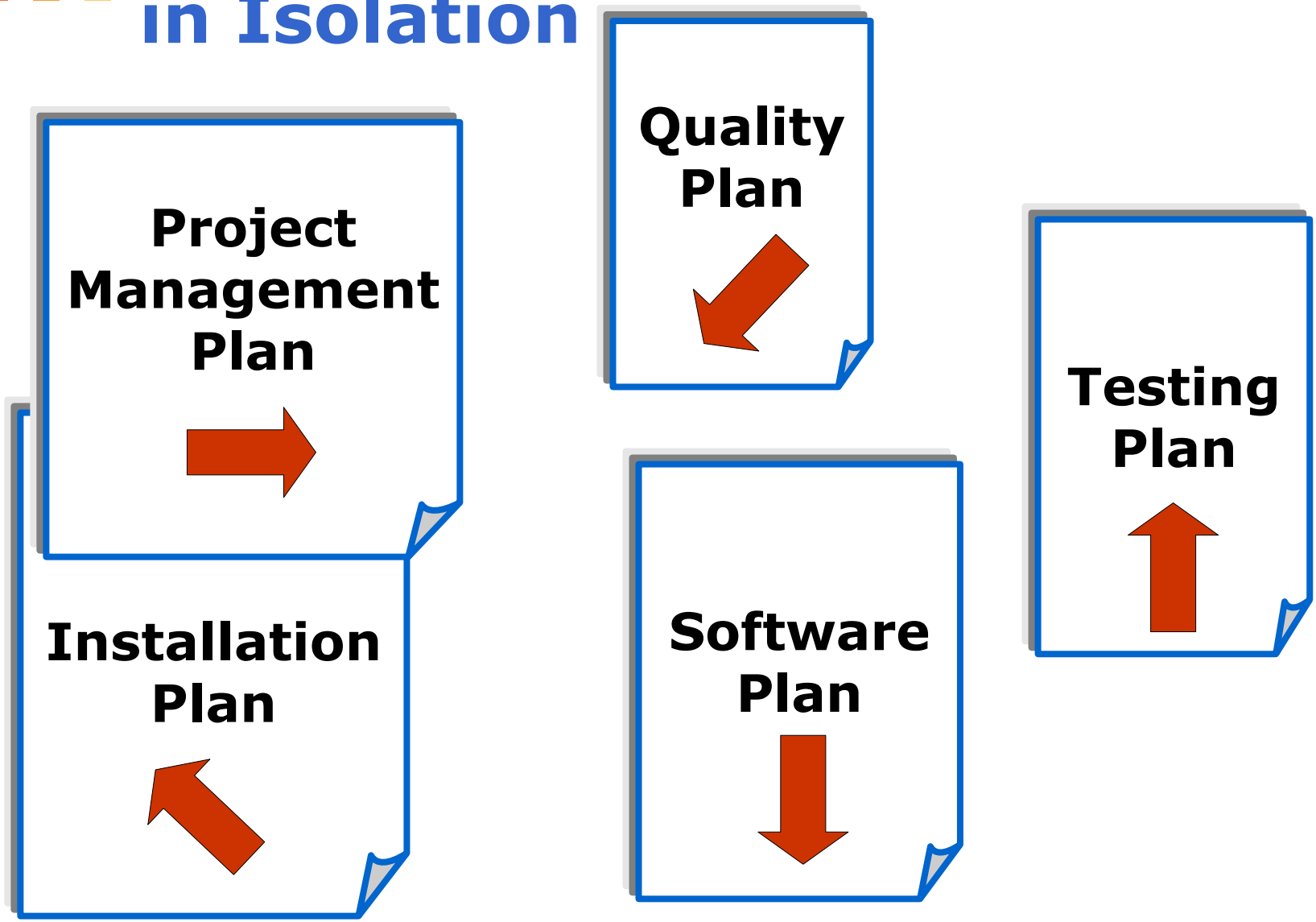
Dwight D. Eisenhower (1890–1969)

What the CMMI Says

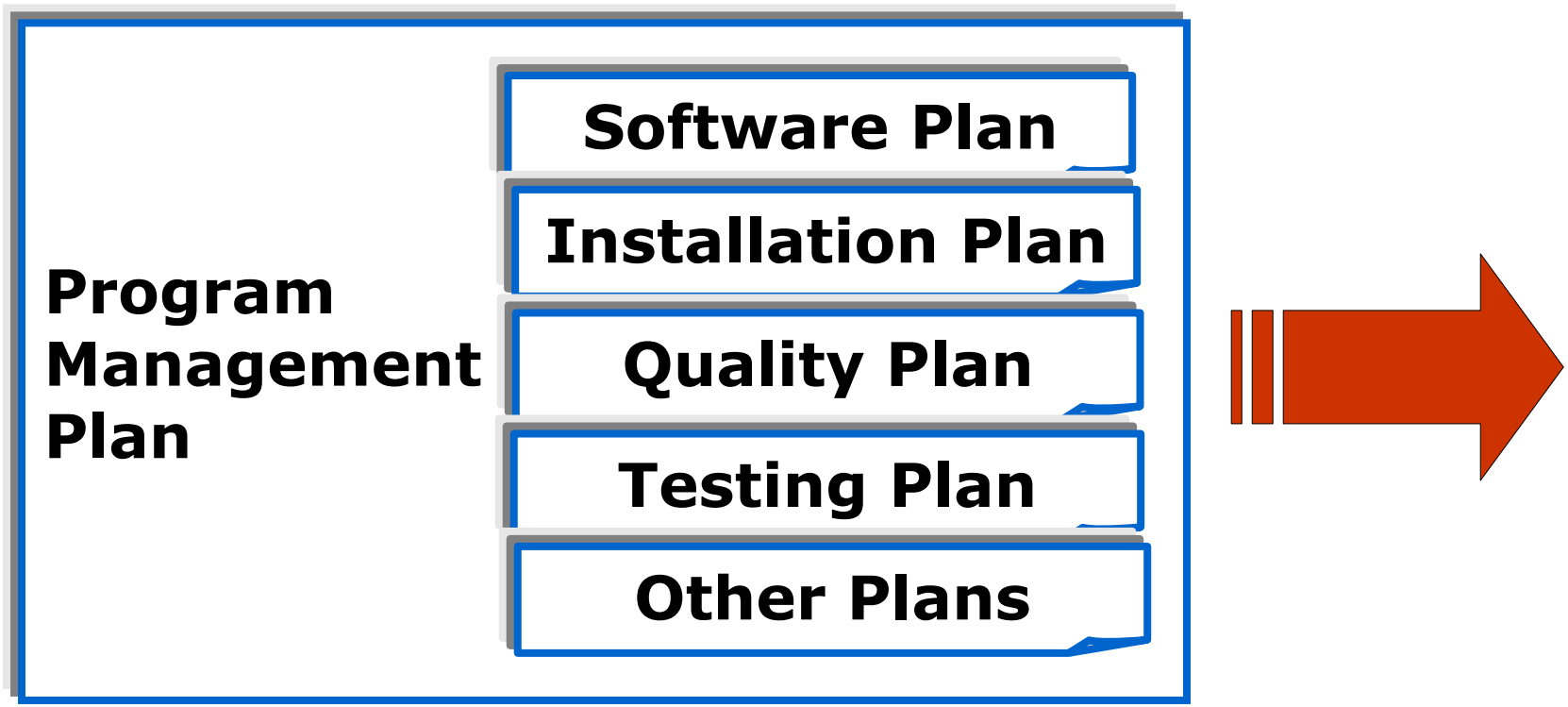
Integrate the project plan and the other plans that affect the project to describe the project's defined process.

-CMMI,
Integrated Project Management Process Area,
Specific Practice 1.3

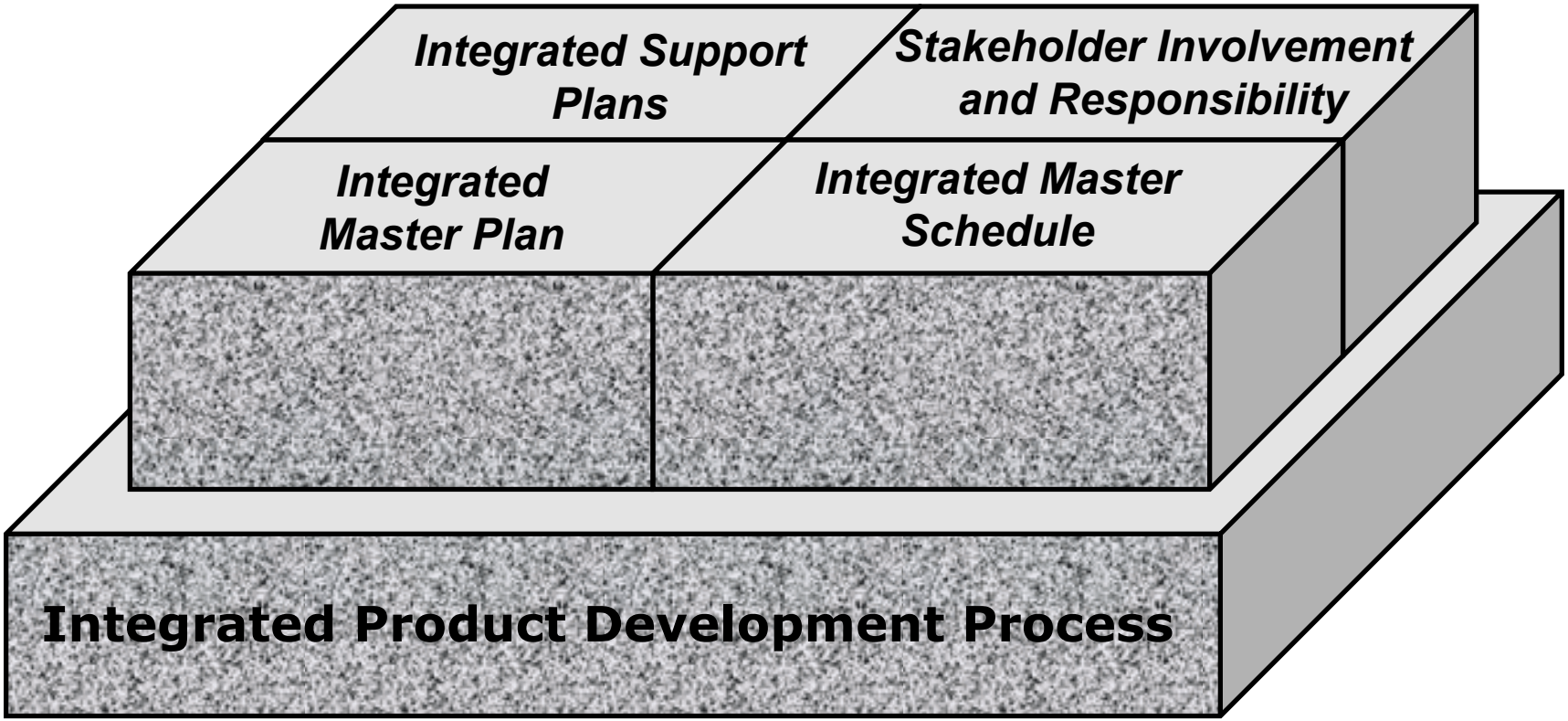
Plans Must Not be Developed in Isolation



Plans Must be Aligned and Consistent



Key Elements of Integrated Planning



Integrated Planning is the foundation for program success.

What is an Integrated Product Development Process

- **A readily accessible collection of common processes, tools and enablers**
  - The processes and sub-processes used throughout the organization to design, test, build, deliver and support products
- **A support infrastructure necessary to deploy, maintain, measure and improve these processes and tools**
- **When tailored to satisfy specific program objectives, this defines the way the organization plans, captures, executes and measures product development programs**

The Integrated Product Development Process is the common language of the organization

IPDP Vision

- **A process oriented culture with a focus on:**
  - Common processes, standard tools & shared libraries
  - Seamless integration of business development, program management, engineering, manufacturing & supply chain mgmt
  - Active management commitment

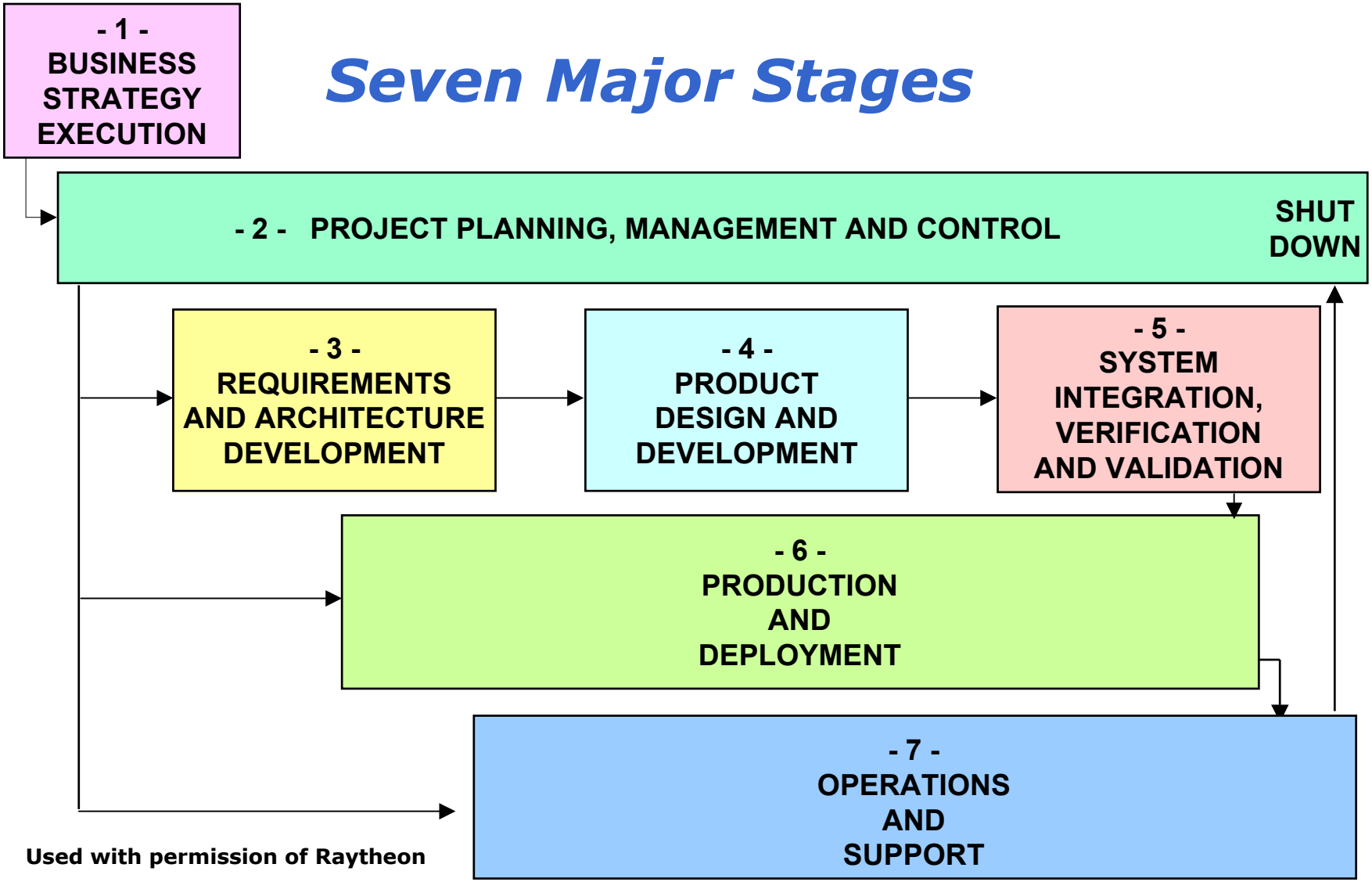
Manage by Process

- **Rationale / business perspective:**
  - Reduces the cost of conducting business
  - Facilitates the movement and management of work
  - Provides support/enablers process and tool improvement
  - Enables knowledge sharing and design reuse

Improve Overall Business Competitive Advantage

An Example of an IPDP Architecture

Seven Major Stages



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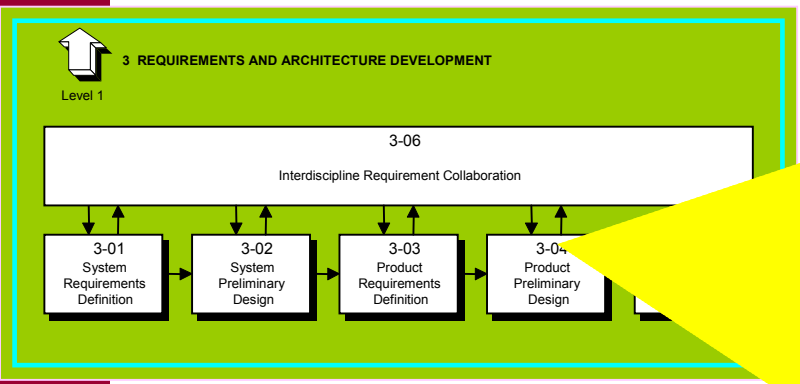
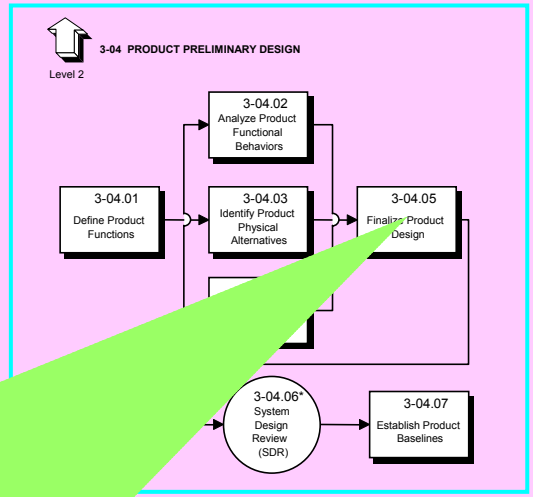
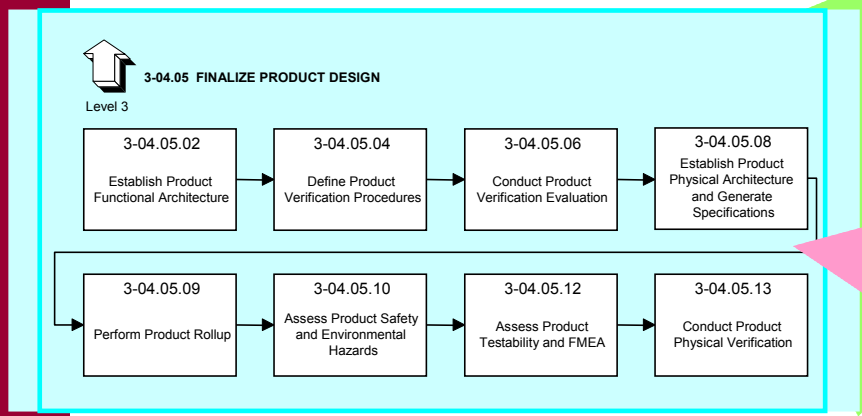
Sample IPDP Documentation Hierarchy



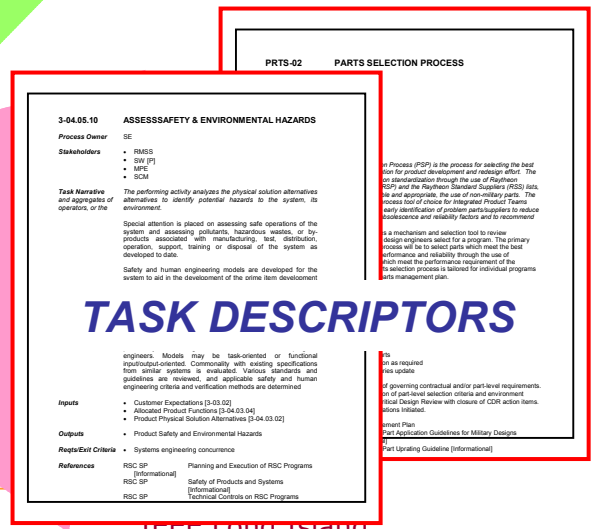
TOP LEVEL FLOWCHART

INTERMEDIATE LEVEL





DETAILED LEVEL



TASK DESCRIPTORS

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Task Descriptor Provides Details

4-05-06.10 **Evaluate software test strategy**

Process Owner SW Engineering

Stakeholders

- Software Testing Manager
- Software Quality Manager
- Software Development Manager

Participants

- Software Engineering
- Quality Assurance
- Systems Engineering
- Test Manager

Task Narrative *The performing activity evaluates the software test strategy to assure that it satisfies organizational and program test effectiveness criteria*
This includes assuring that the tests address all original and derived software requirements, are comprehensive and complete in coverage, and place due priority on the more frequently executed portions of the software.

It is also critical that the end user patterns of use be evaluated and accounted for in the testing strategy.

Inputs

- Preliminary requirements specification
- Preliminary design description
- Test strategy (unapproved)

Outputs

- Test strategy evaluation report
- Test strategy (approved)

Requirements/Evaluation Criteria/Exit Criteria

- Organizational test effectiveness standard

References

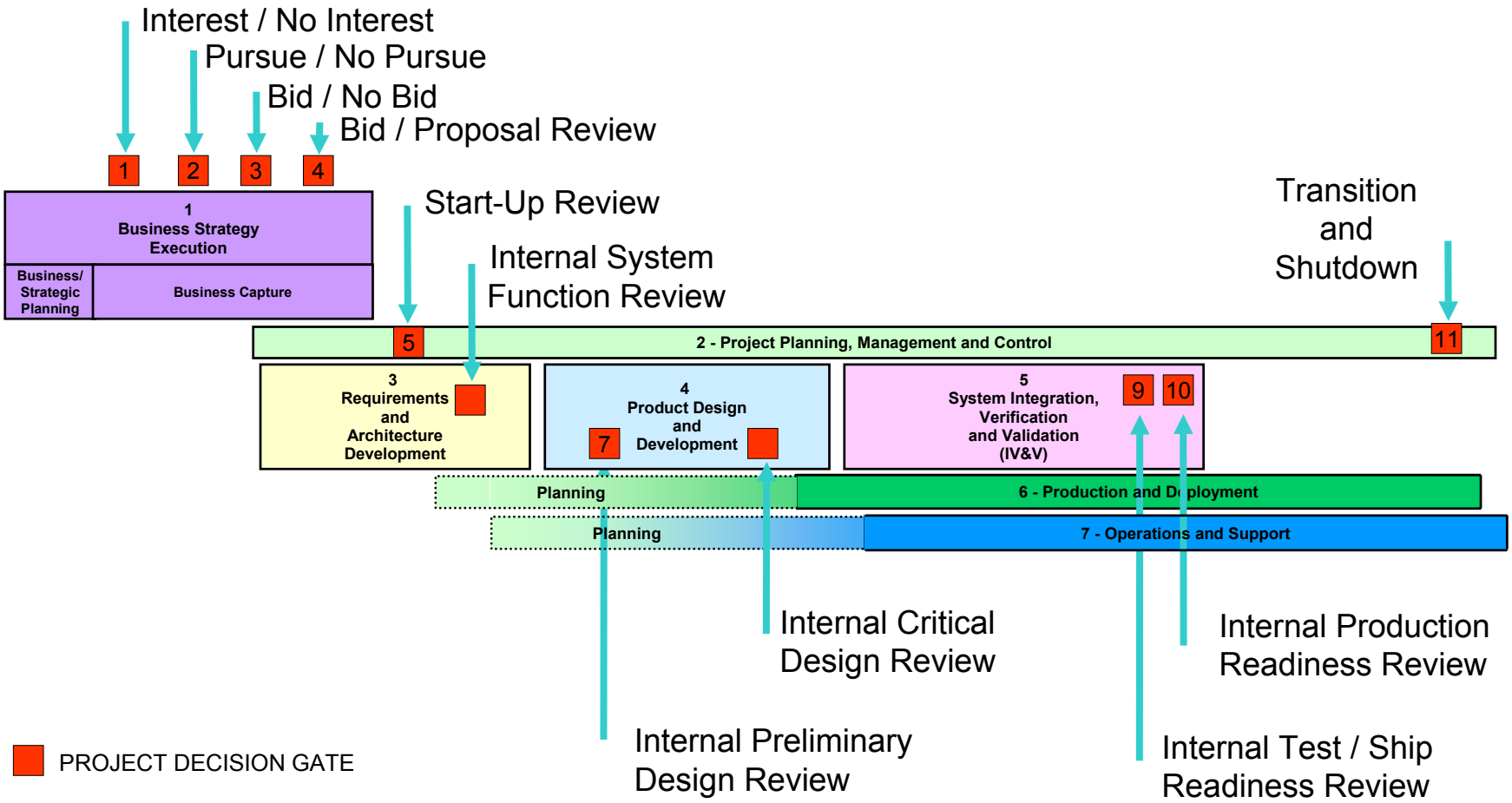
Organizational test policy

Related Processes Predecessor: Develop software test strategy (4-05-06.09)
Successor: Develop software test procedures (4-06-03.21)

CMMI Mapping

- RD SP 3.4-3

Gates are Essential to the Process



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Three Steps to Successful Implementation of IPDP

1. **Develop the Integrated Process Model**
   - Must be done by practitioners, not just by "process experts"

2. ***Deploy*** **the Integrated Process**
   - The most common source of failure
   - Requires genuine management commitment

3. **Improve the Integrated Process**
   - Because it will be far from perfect when first deployed

Management Commitment, Teamwork, Tailoring and Effective Training are Essential to Success

Elements of Successful Deployment

- A *deployment process* is established and followed
- All stakeholders are involved
- Allocation of sufficient time / resources / budget for deployment, including effective communication, *tailoring* and training
- Cohesive links / consistency between the tailored process and the various program plans
- *Follow-up* to make sure the plan is being followed
- *No backing down* by management when the going gets tough

Tailoring is Especially Important for Effective Deployment

- **The process should be a tool to facilitate effective project execution**
  - Not a straitjacket to impose inappropriate bureaucracy
- **Tailoring of the process is an essential step to make this effective**
- **Tailoring must be taken seriously**
  - The process must include a process for tailoring itself
- **Tailoring must be approved by a responsible executive-level manager**
  - Who will be responsible for the consequences

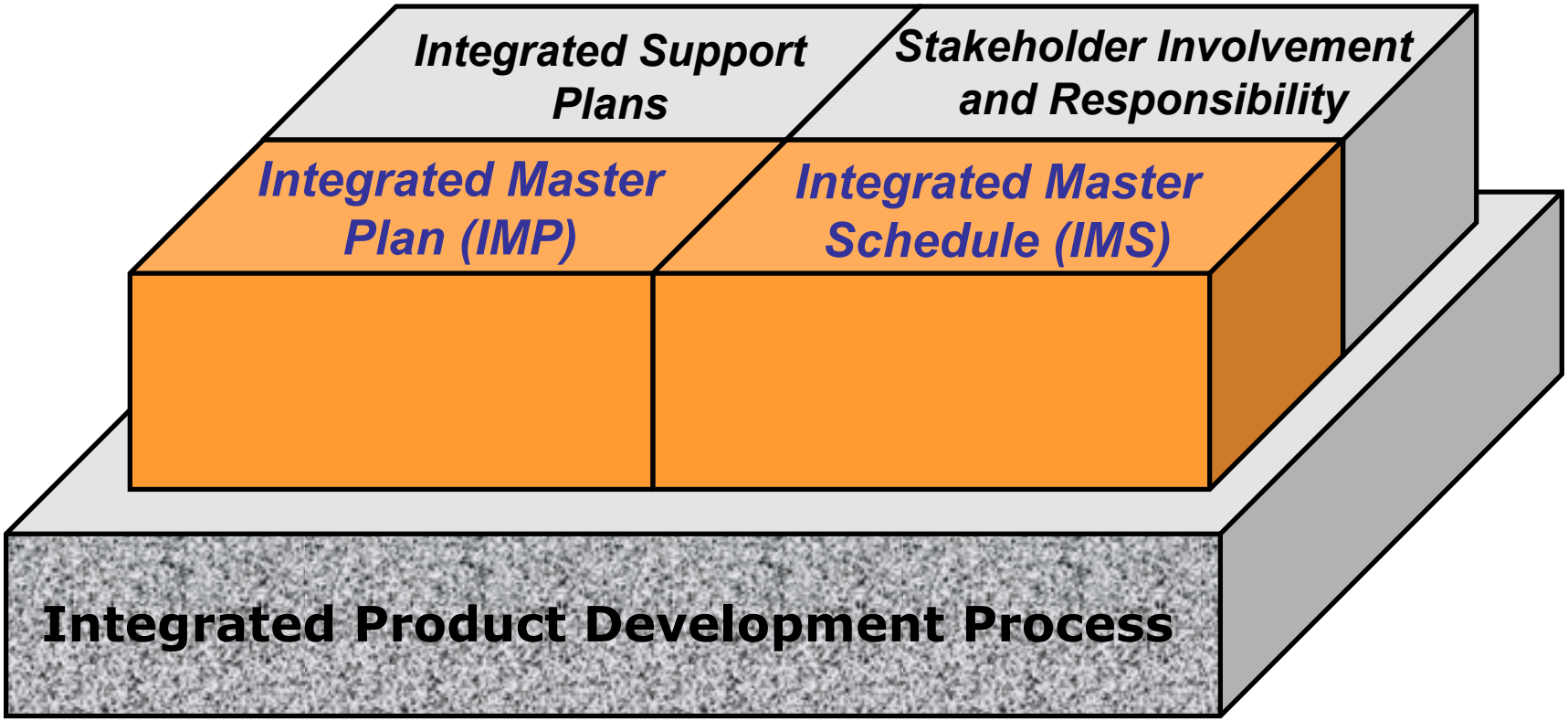
The Program Manager's Perspective

- **IPDP is the foundation upon which the program plans are built**
- **The tailoring process gives the program manager his/her first *holistic view of the program*, including height, breadth, depth and assumptions**

Signs of Poor Deployment

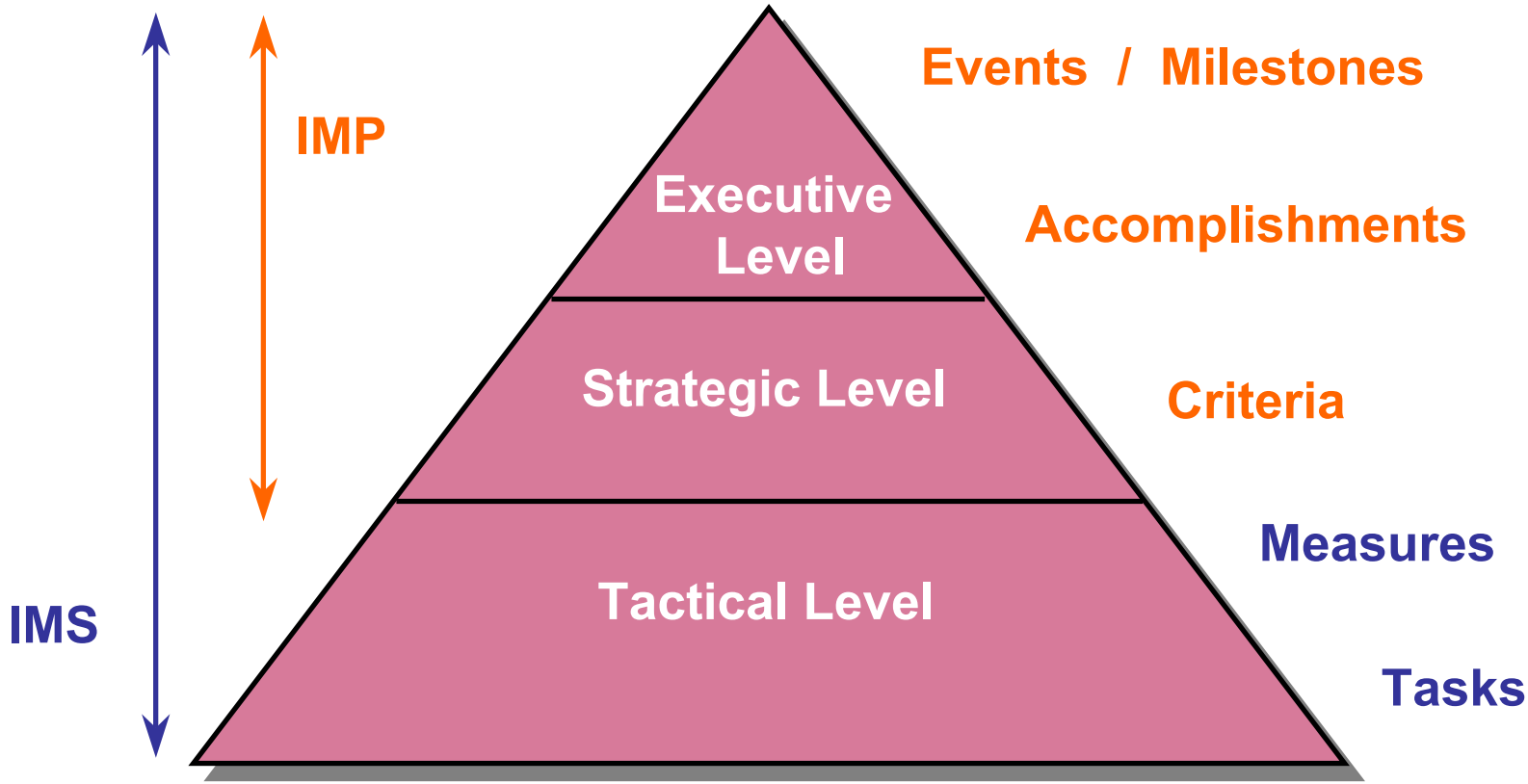
- The program manager and key stakeholders are not present for the tailoring activity or do not participate actively
- Tailoring is cursory, with little basis for decisions made
- Undocumented decisions and assumptions
- Management does not review or approve the tailoring
- Tailored process becomes “shelfware”

Key Elements of Integrated Planning



Integrated Planning is the foundation for program success.

The Role of IMP and IMS



The IMP Is the Blueprint,
The IMS Is the Build Schedule...

What is the IMP?

- **A list of the key tasks to be performed, their goals/objectives/desired accomplishments and their completion or evaluation criteria**
- **An event-driven, top-level Plan**
  - Documents significant accomplishments necessary to achieve the program's key objectives
  - The work effort defined in the IMP is based on the ***tailored*** Integrated Product Development Process
  - Each IMP element has objective criteria to define its start and completion
  - The IMP is not time-oriented
- **The IMP defines what is included in the scope of the program**

The IMP Defines the *Work to be Performed*

Elements of the IMP

IMP Elements	IMP Narrative	IMP Process Information
WHAT is the project? • Tasks and maturity assessment points (**Events**) • The work definition (**Accomplishments**) • Completion indicators (**Criteria**)	**WHO** does it ? • Project team membership • Roles and responsibilities • Interfaces / work flow • Terms, definitions, how to use, etc.	**HOW** is work done? • Applicable processes, policies and procedures • For unique processes, the specific process information • Metrics

Key Definitions

Events are "project-unique value-added measurement points" that provide opportunities to assess progress in achieving project objectives. Events relate to project and product maturity. Events may be customer and/or contractor defined.

Accomplishments are significant, natural, time-phased, product-oriented activity groupings that must be completed to satisfy project and Event objectives. Accomplishments encompass activities to define, design, develop, verify, produce, and/or deploy project outcomes (products).

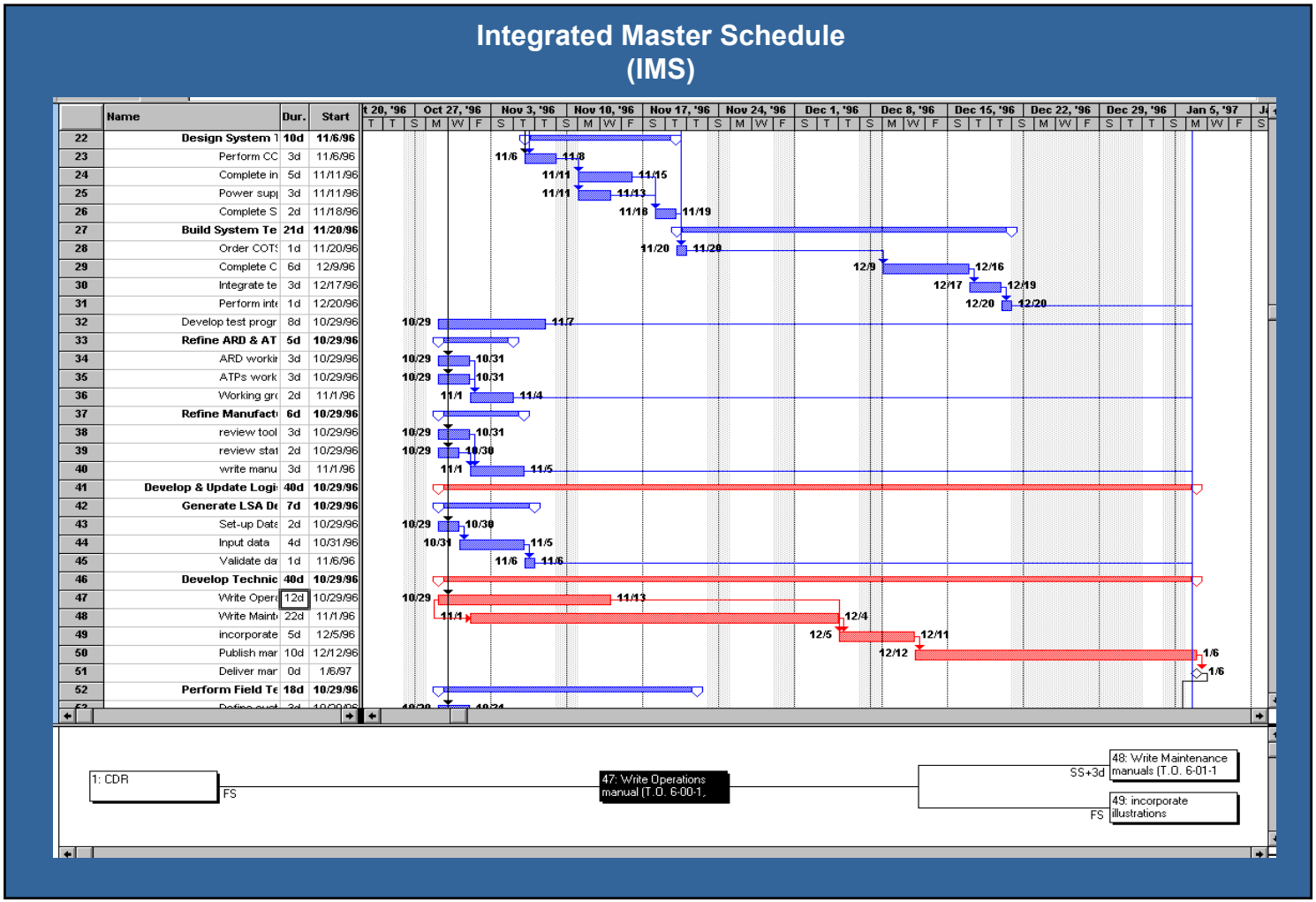
Criteria are the evidentiary standards (progress indicators) that define what must be done to confirm completion of Accomplishments, e.g., measurable, descriptive, demonstrable, product identifiers.

What is the IMS?

- **A detailed, time-dependent, task-oriented, multidisciplinary schedule**
- **Includes all tasks & events in the IMP**
  - Time-phases and interlinks the tasks and activities required to complete each milestone
- **All tasks in the IMS should be directly traceable to IMP tasks and related to IMP accomplishments**
- **The IMS is the schedule baseline against which performance is measured**

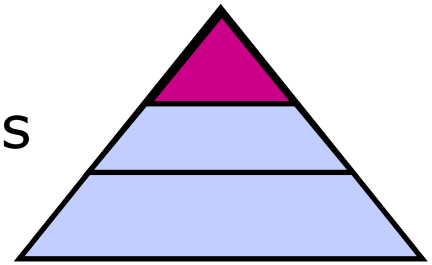
The IMS Defines *When* the Work will be Performed

Sample IMS (portion)



Characteristics Of an Effective IMS

- **Executive Level**
  - Tracks top level program objectives
  - Provides insight by exception
  - Typically shows entire program on one page
  - Captures events and key accomplishment time spans
  - Identifies major threads of work
  - Shows top level critical path
  - Rolled up from strategic level



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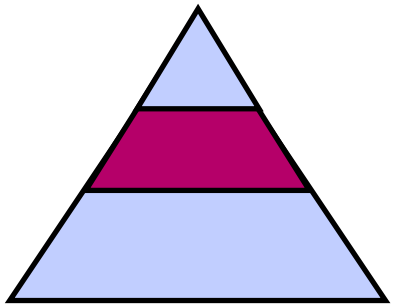
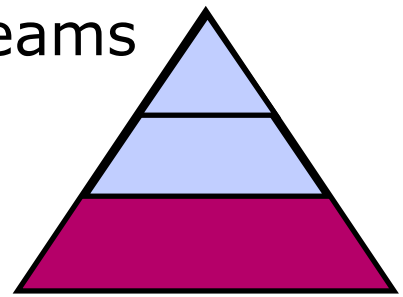


- **Strategic Level**
  - Provides program summary metrics
  - Enables predictive course correction
  - Enables program simulation - “What ifs”
  - Basis for schedule and cost risk assessment
  - Typically one to two pages for each 1st Tier Program Task
  - Roll up of tactical level data

Characteristics Of an Effective IMS

- **Tactical Level**
  - Integrated with Measurement System
  - Work and Team Structure
  - Compatible with risk management tools
  - Clearly defined tasks and realistic time spans lower level tasks
  - Defines interfaces within and between work teams
  - Developed and owned by the work teams

There should be vertical integration – it should be clear how each work task supports higher level program objectives



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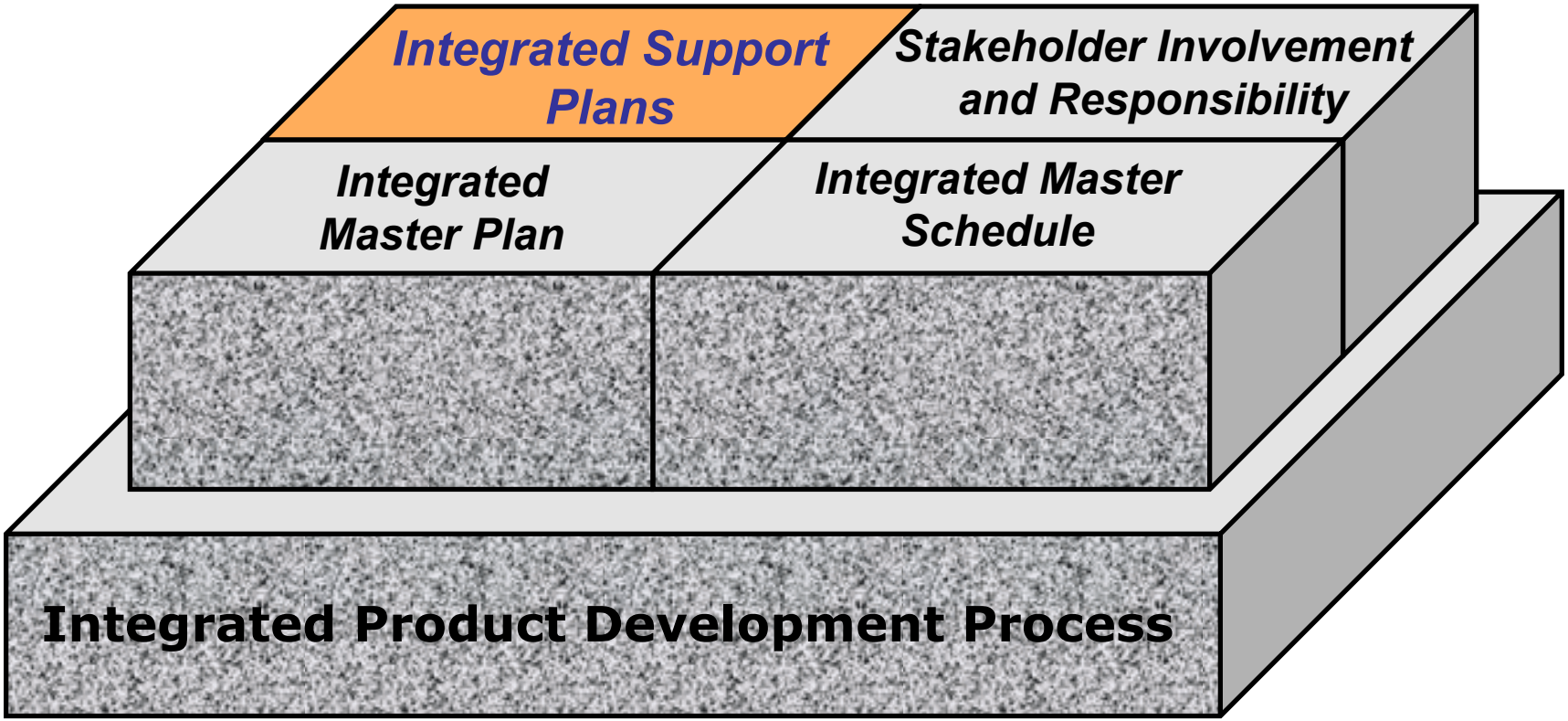

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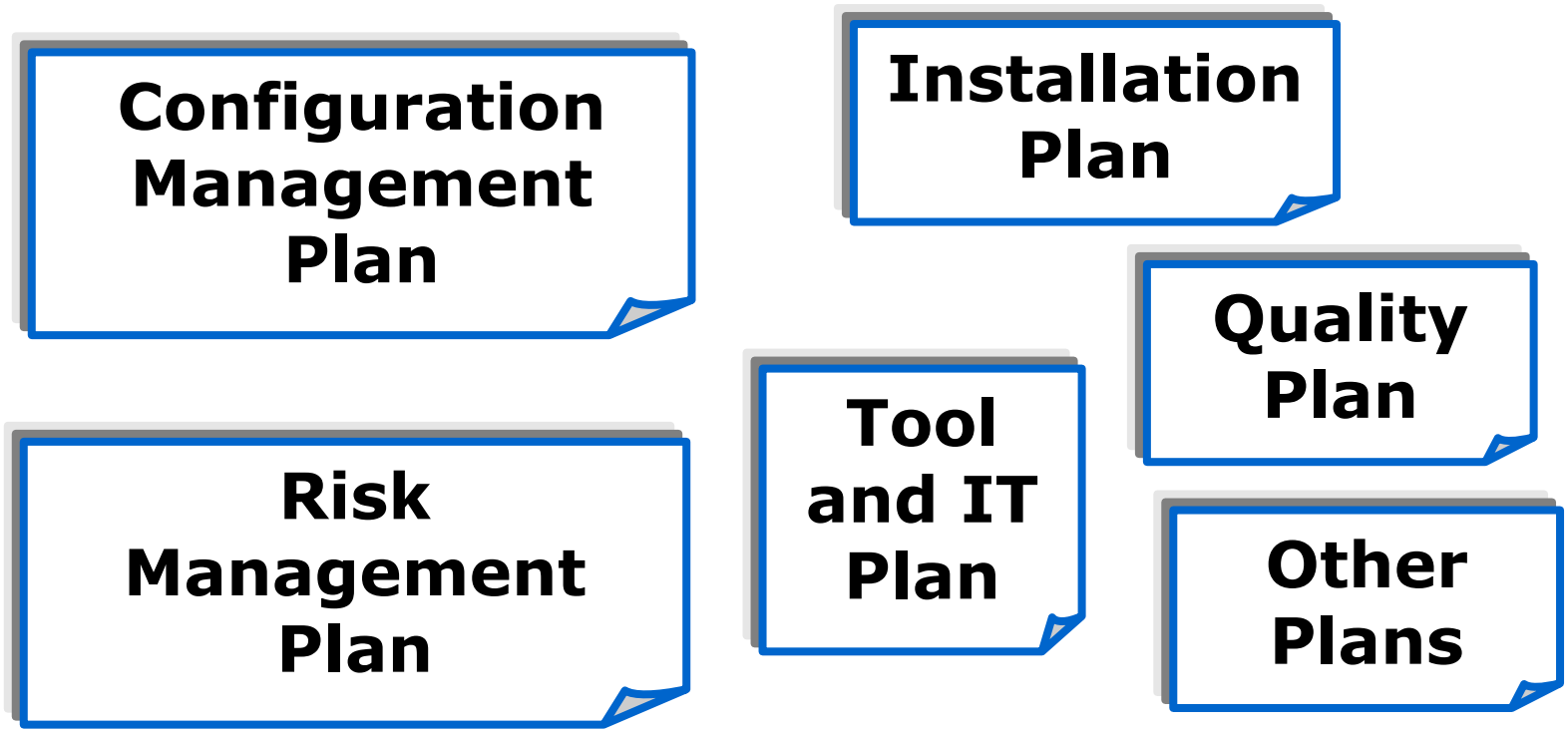
Support Plans Developed Together, Not Independently

- **Peer reviews of plans**
  - Individuals from each team are represented
- **IPDP, IMP and IMS help with coordination**



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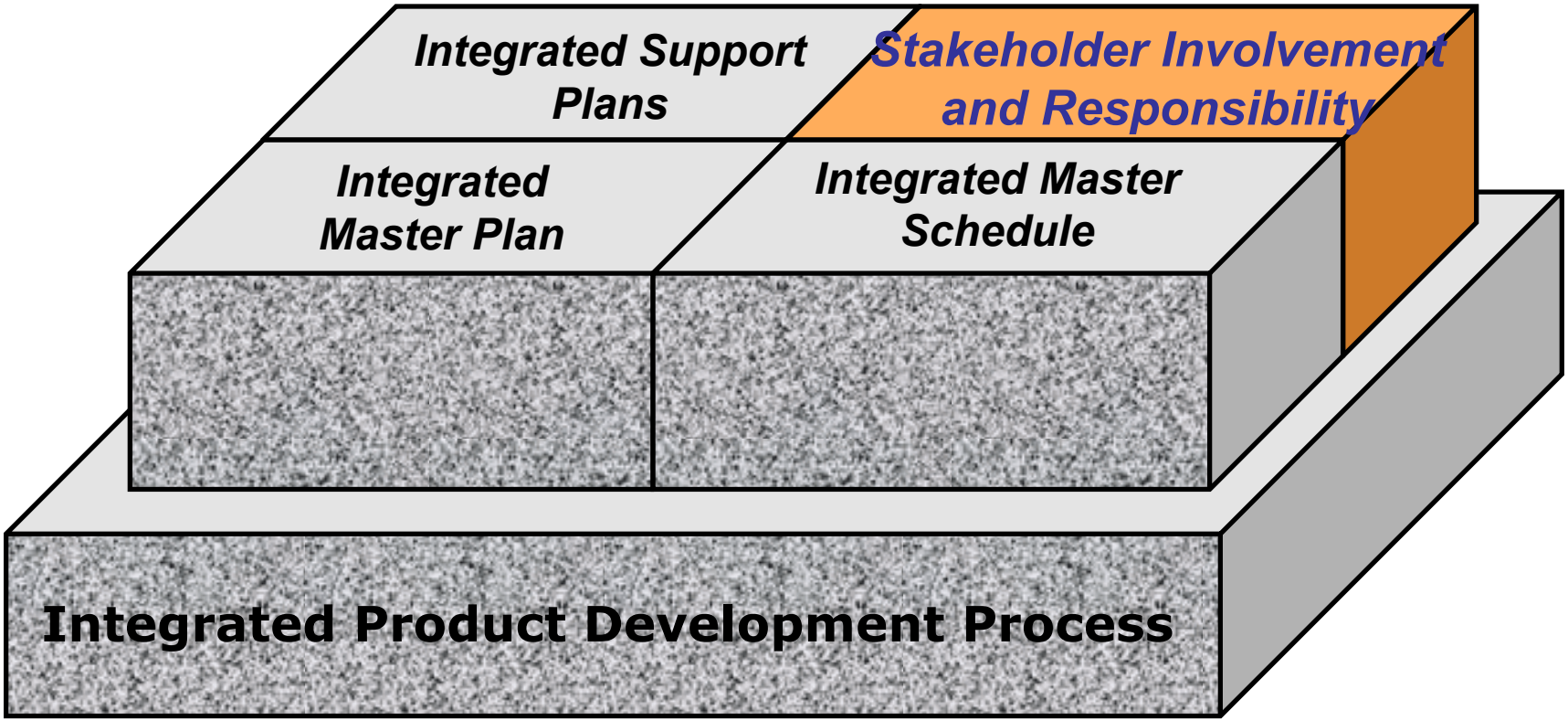

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CMMI on Stakeholders

- **GP 2.7**
  - Identify and Involve Relevant Stakeholders
- **Project Planning SP 2.6**
  - Plan the Involvement of Identified Stakeholders
- **Integrated Project Management SP 2.1**
  - Manage the Involvement of the Relevant Stakeholders in the Project
- **Project Monitoring and Control SP 1.5**
  - Monitor Stakeholder Involvement Against the Plan

STAKEHOLDER

A group or individual that is affected by or is in some way accountable for the outcome of an activity

Why Identify Stakeholders?

- **A major issue on a project is "who is responsible for what". This is important to decide as part of planning so everyone knows how to get things done efficiently**
- **Among the roles people might play:**
  - *Responsible* – the person who does the work
  - *Authority* – the person who approves it
  - *Consultant* – someone who should be consulted due to their expertise or area of responsibility
  - *Informee* – someone who "needs to know" that the task is being done or who cares enough about the outcome that he or she should be kept "in the loop"

Stakeholder Example

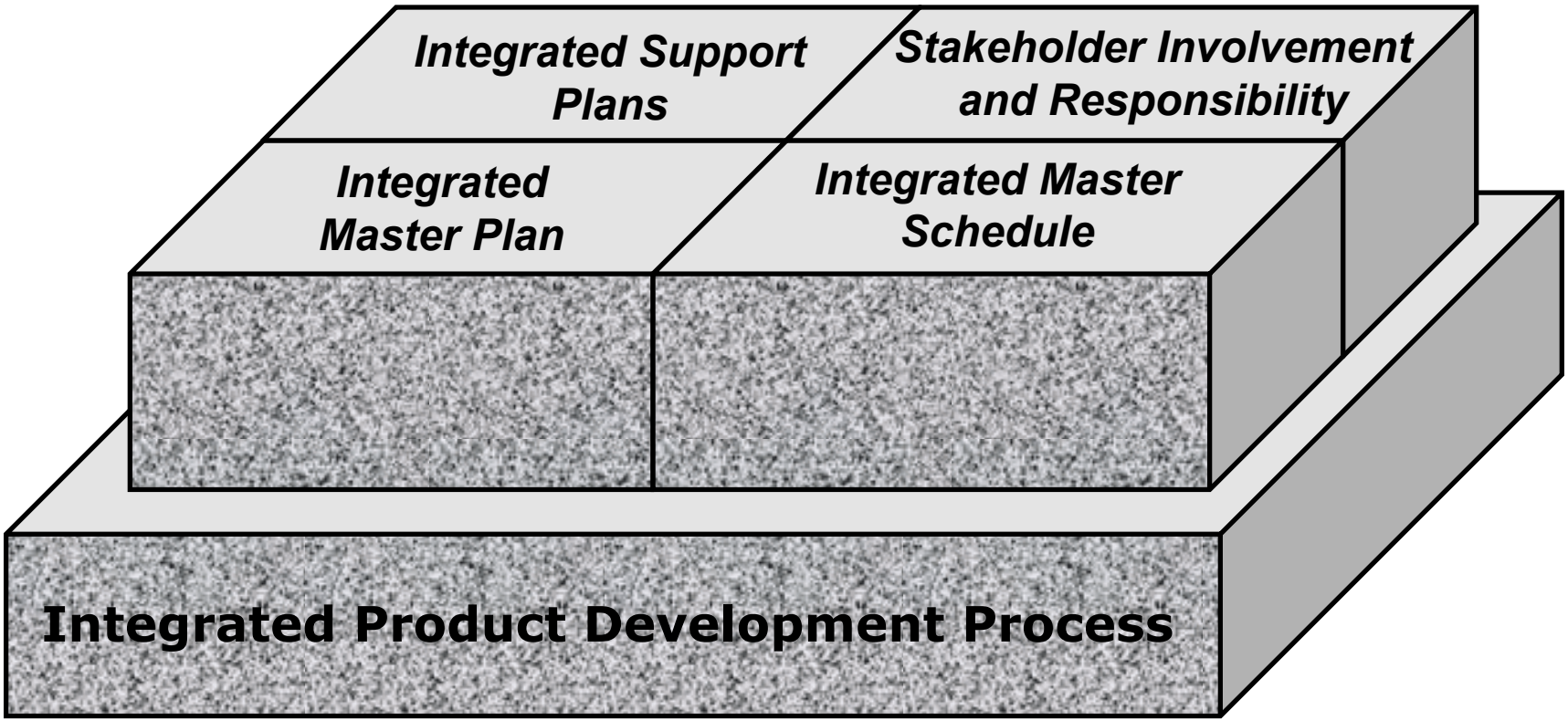
***Issue*: Deciding what to do about a proposed change in requirements**

- ***Responsible*: the person who collects relevant data and makes a change recommendation**
- ***Authority*: the person or group who approves the change**
- ***Consultant*: someone who is an expert on something related to this change**
- ***Informee*: someone who would be affected and "needs to know" that the change is being considered**

"RACI" Chart Identifies Stakeholders and their Roles

Issue	SW Manager	SW Designer	Customer Rep	SW Developer	SW Tester	Etc.
Software Requirements Change	A	R	A	C	I	
Software Design Change	I	R, A		C		
Software Design Process Change	A	R		C		
Software Design Review	A	R	I	C		
Software Design Inspection	I	A		R	I	
Software Test Plan	A	C	C	C	R	

In Summary



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Questions?