

Building a Measurement Information Model in Support of Diverse Organizations

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- About pragma Systems and processMax
- CMMI Measurement requirements & challenges
- ISO 15939 Measurement Information Model
- Implementation Approach
- Summary

- Founded 1990
- One of the first organizations licensed by SEI to perform assessments
- Software Process Improvement consulting and assessments for seven years
- First release of processMax in 1998

Government	Government Contractor	Commercial
U.S. Navy U.S. Army Department of Labor Veterans Benefits Administration National Security Agency National Institutes of Health	Northrop Grumman General Dynamics Mantech Teledyne Brown Dynamics Research L3 Communications	ADP Bosch United Healthcare GTECH Intuit Chicago Mercantile Exchange

More than 50 successful independent assessments or appraisals

Defined Processes

- . . . includes all policies, procedures, guidelines, criteria, templates, and forms in role-based, step-by-step instructions, ready for use.*
- . . . fully compliant with the Capability Maturity Model[®] for Software (SW-CMM) or Capability Maturity Model Integration (CMMI).*

Project Repository

- . . . total document management with version control, change control, and process history.*

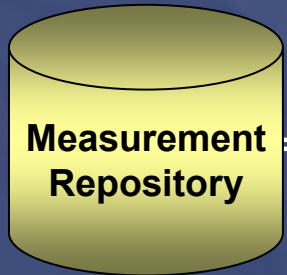
Integrated Workflow

- . . . automatic e-mail notification of tasking and actions*

Organizational Portal

- Organization's Standard Software Project Process**
- ◆ Project Management Roles
 - ◆ Project Technical Roles
 - ◆ Templates
 - ◆ Guidelines
 - ◆ Criteria
 - ◆ Methods
 - ◆ Forms

Organizational Programs Roles
 Templates
 Guidelines
 Criteria, Methods, Forms
 Plans, Reports, Data, Memos
 Organizational Training Materials
 Organizational Training Records
 Organizational Library of Project Examples
 Organizational Library of Project Data
 Organizational Policies



Project 1's personnel use this website

Project N's personnel use this website

Instantiate Organization's Standard Software Project Process for software development or maintenance projects

Formal Feedback Mechanisms

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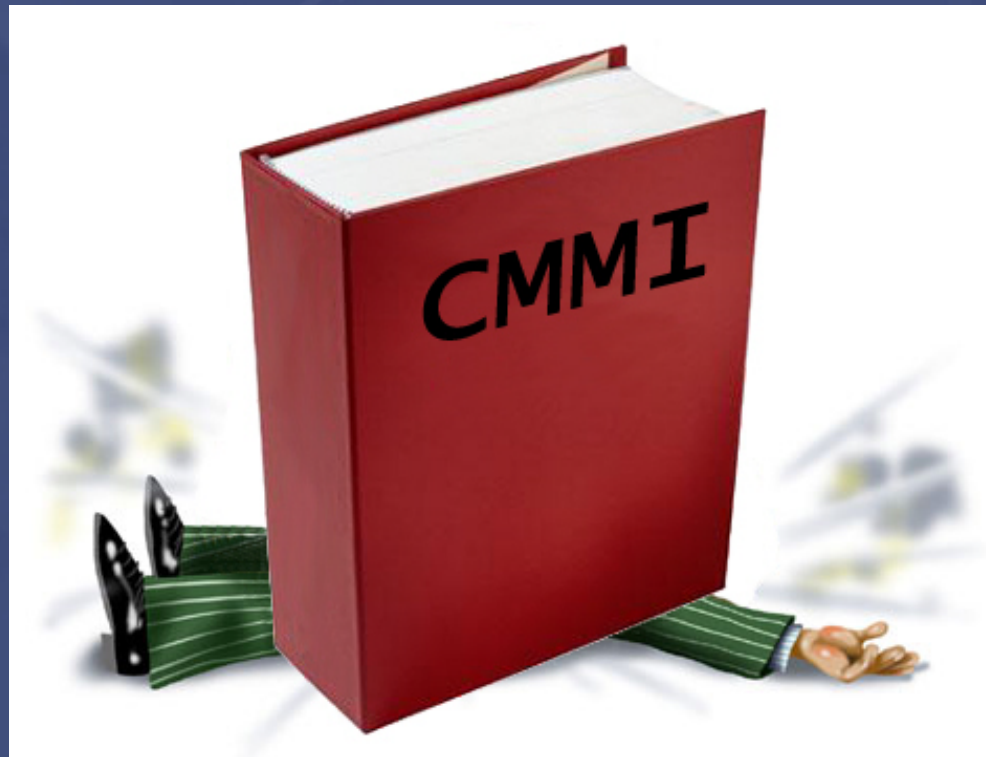
SW-CMM:

- Measurement is decentralized and focused on satisfying individual KPAs

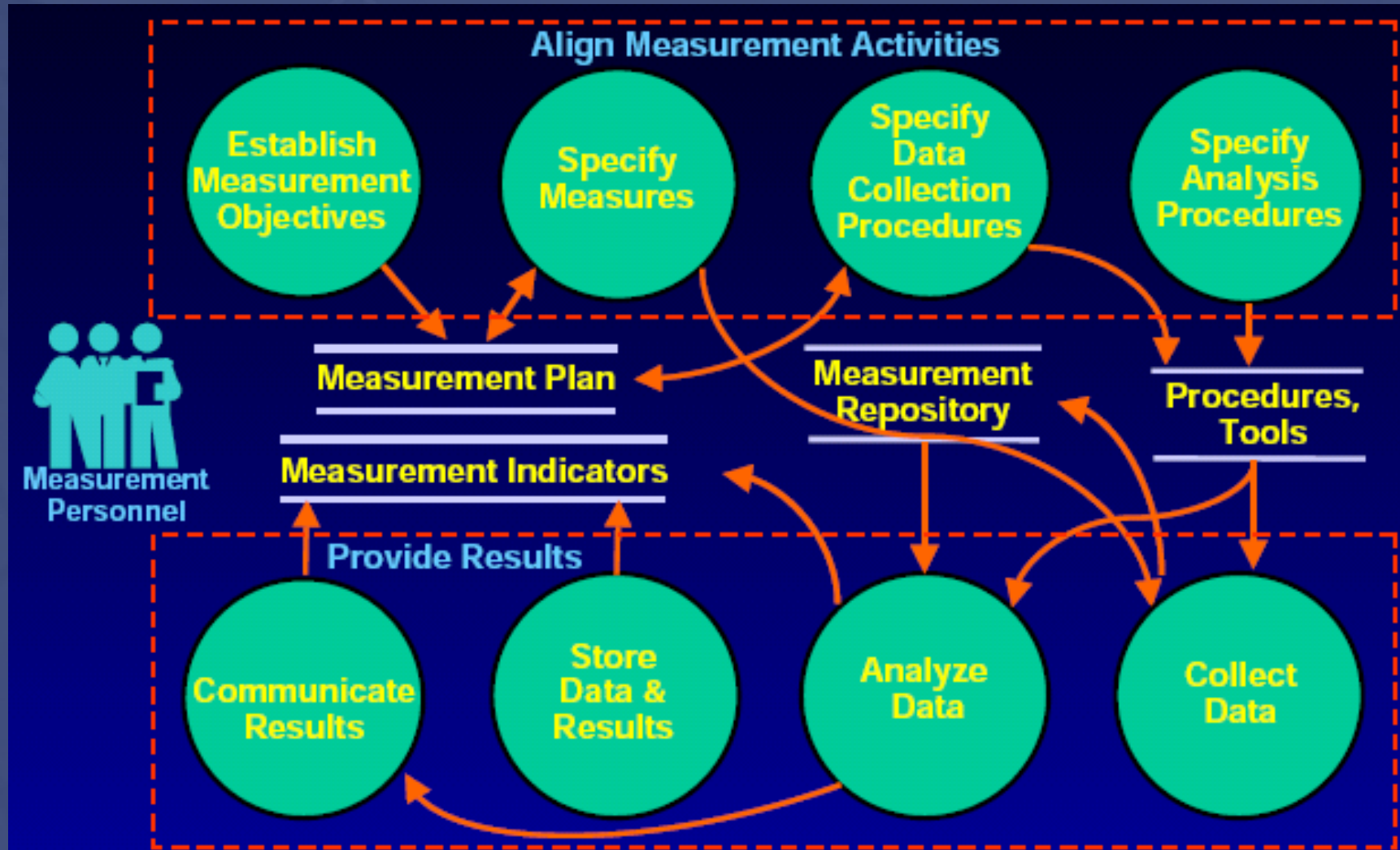
CMMI:

- Focus on measurement – “no longer in the fine print”
- Early emphasis at Maturity level 2 – M&A Process Area
- Other process areas (OPD, OPP, OPM, CAR, OID) have significant measurement content
- Also Generic Practices 2.8, 3.2, 4.1, 4.2, 5.1, 5.2

CMMI: ponderous and complex for appraisers, engineers, and managers

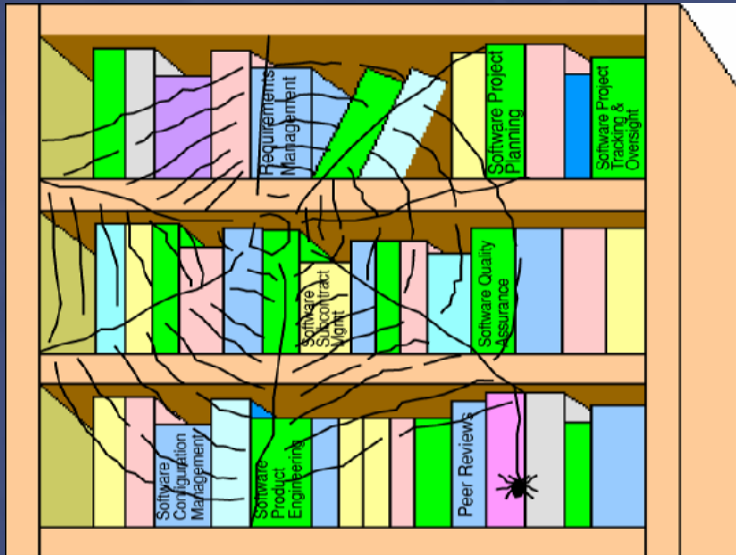


There are approximately 200 detailed measure-related requirements for Maturity Level 3 and another 60 for Maturity Levels 4 & 5.

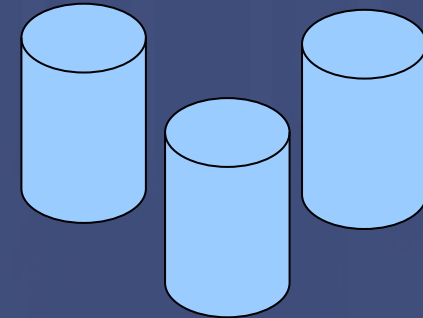


- Collecting data is very onerous and error prone
- CMMI more explicitly requires measurements, especially of process-oriented activities
- How to support large number of measures implied by the CMMI in a consistent way
- Diversity of target organizations – project types and size
- Need for customizability
- Measurement collection must be integrated with day-to-day work

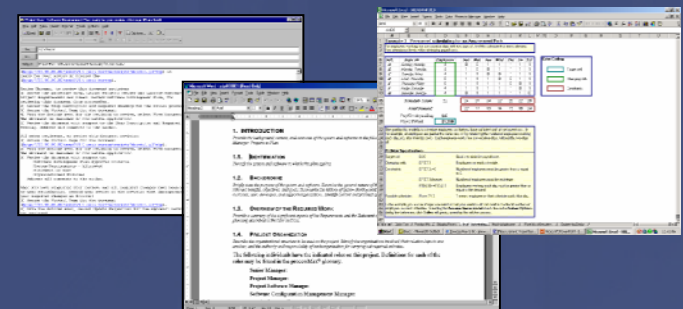
Process



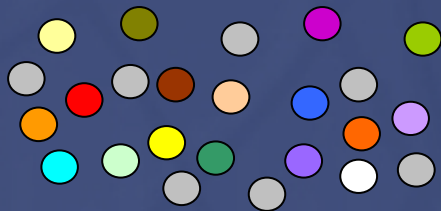
Data



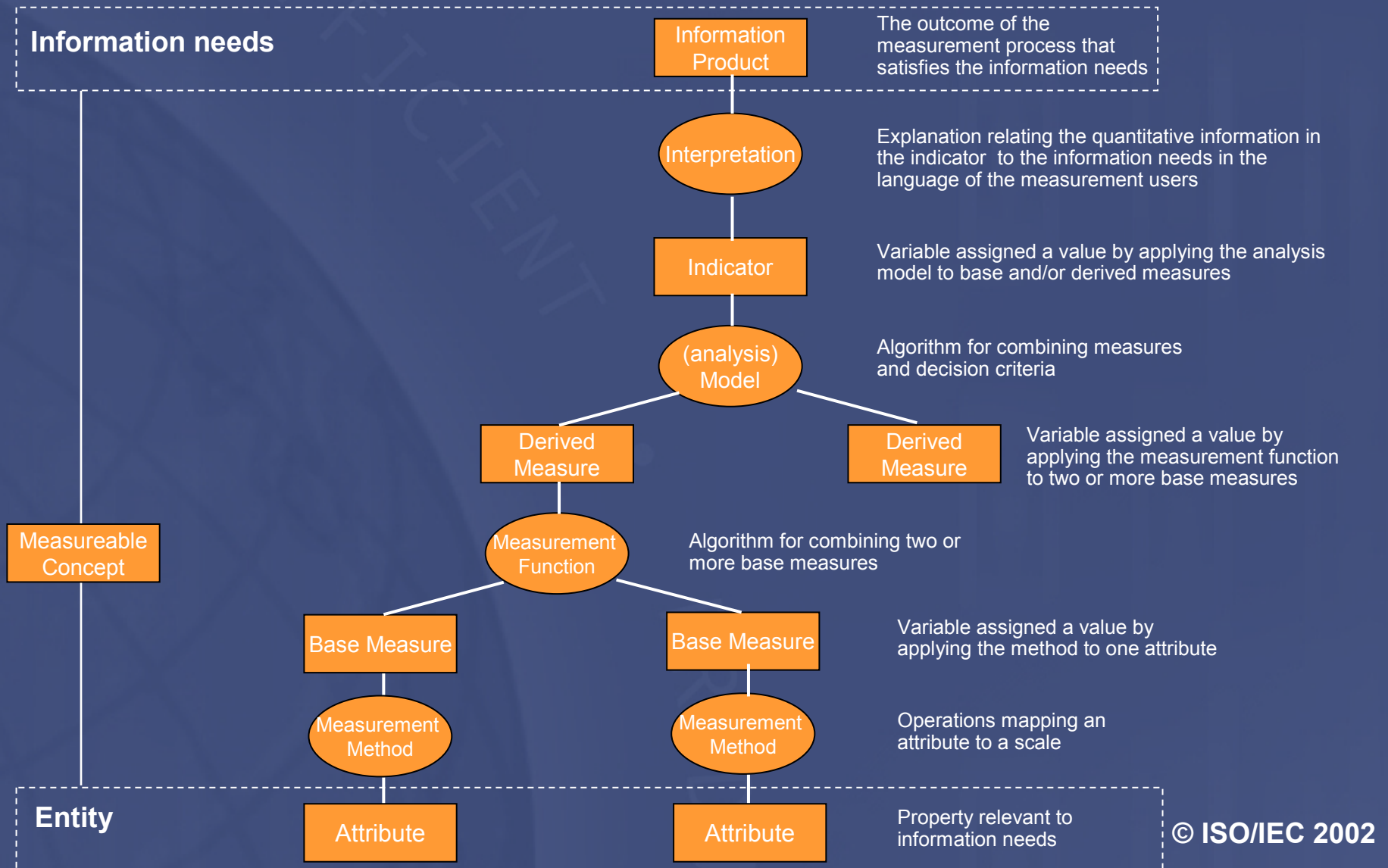
Tools



Measures



- Robust ISO model meets CMMI requirements and ensures consistency across Process Areas.
- ISO Measurement Information Model (MIM) provides “structure linking information needs to the relevant entities and attributes of concern”
- Base Measures are mapped to processMax data entities
- Derived Measures are calculated from Base Measures
- Indicators are created from Base or Derived Measures to support Information Needs.



- Measurement Objectives – 18
 - Approximately equivalent to the Purpose section of each Process Area. They answer ‘Why are we measuring these particular items?’ A Measurement Objective is associated with one or more Information Needs.
- Information Needs – 23
 - Correspond approximately to PMC SP 1.1 and GP 2.8 of each Process Area. An Information Need is associated with one or more Indicators, Derived Measures, and/or Base Measures.
- Indicators – 75
 - Trend or snapshots relying on Derived Measures and/or Base Measures
- Derived Measures – 35
 - Algorithms, programmed inside a report, relying on one or more Base Measures or other Derived Measures.
- Base Measures – 102
 - Defines what is to be measured, its source, when it is to be measured, how (i.e., count or record) it is to be measured, and data constraints, such as default values.

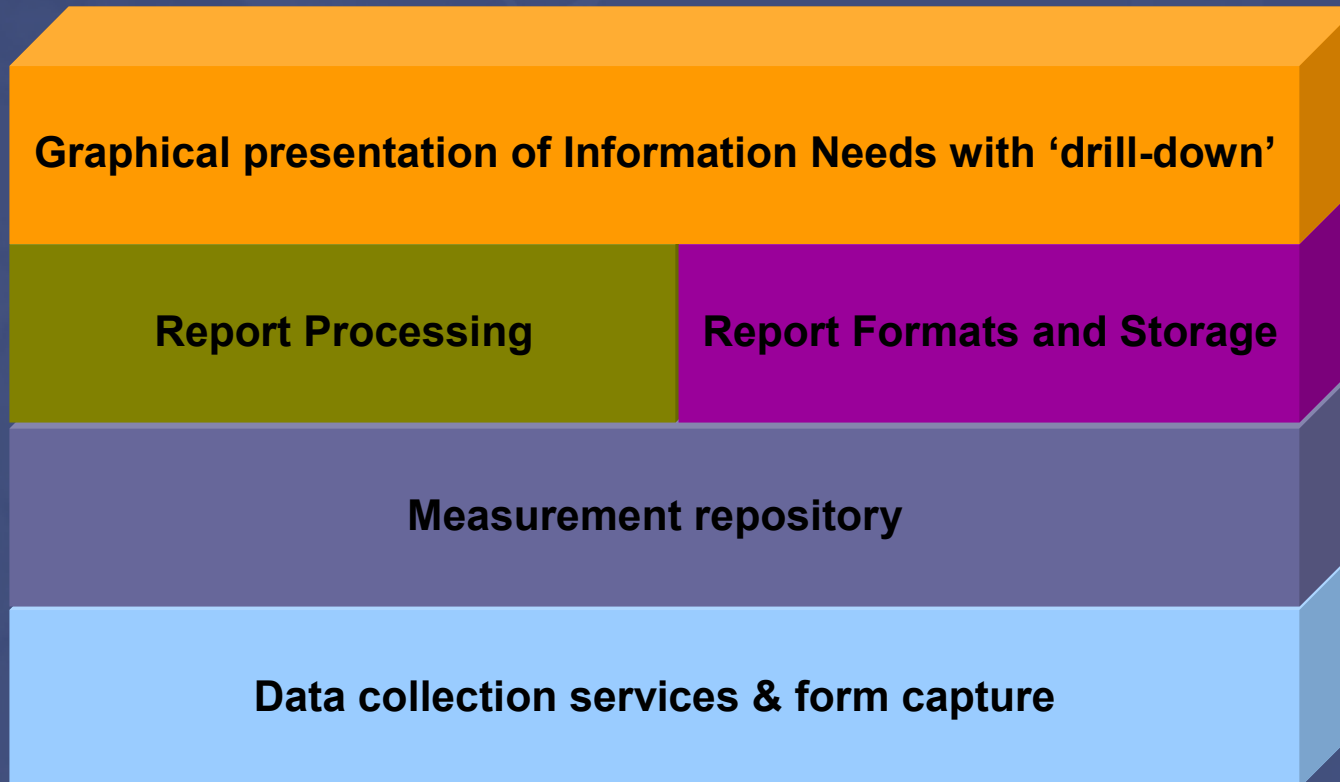
- **Information Need #4 Monitor project planning parameters**
 - Supported by ten indicators
 - Example Indicator: Trend of planned versus actual schedule for tracked tasks and milestones
 - Derived Measure 44 Total date variance to track slippage per Milestone
 - Derived Measure 97 Variance of original planned date versus actual date per Milestone
 - Base Measure 64 Planned milestone date and name per Milestone
 - Base Measure 65 Actual milestone completion date per Milestone
 - Base Measure 76 Planned Start Date, Task Name, Task Type, and Task Category per Tracked Task
 - Base Measure 77 Planned end date per Tracked Task
 - Base Measure 78 Actual end date per Tracked Task
 - Base Measure 79 Actual Start Date, Task Name, Task Type, and Task Category per Tracked Task

Senior
Mgmt

SEPG
Staff

Project
Mgmt

SQA



- Data is captured close to source and in a timely way.
 - As user follows process steps, measurement data is automatically gathered by system
 - ... or via meaningful query ... Rather than ask “Is your risk exposure high?”, ask “What would be the cost if this risk were to occur?” and relate this to management reserve.
- As required or on a scheduled basis, a reporting user or the system selects from template reports and generates report(s) to support Information Need(s).
- Report template accesses Measurement Repository and retrieves relevant base measure data and stores output in repository.
- Any other user can browse stored report(s) and drill-down to satisfy Information Need(s)

processMax 6.0 - Test_Project_SATD_65 - Microsoft Internet Explorer provided by Dell

File Edit View Favorites Tools Help

Address: http://10.10.10.157/orgweb_satd_65/pmaxengine/scripts/pmax.pl?web=1.p.1.1

Google Search 18683 blocked

My Work | **Glossary** | Utilities | Folder | Data

Measurement Reports

- Process
- PR
- Compliance
- Help

- Additional Work Products
- All Work Products
- Configuration Management
- Corrective Actions
- Criteria
- Independent Standards Compliance
- Measurement
 - Measurement Reports
- Meeting Memoranda
- Memoranda
- Personal Workspace
- Planning and Tracking
- Process Improvement Program Process_Configuration Management
- Process Improvement Program Process_Corrective Actions
- Process Improvement Program Process_Instatiation and Upgrade
- Process Improvement Program Process_ISO Measurement Information M
- Process Improvement Program Process_Measurement Reports
- Process Improvement Program Process_Organizational Policies
- Process Improvement Program Process_Organizational Process Definiti
- Process Improvement Program Process_Organizational Process Focus
- Process Improvement Program Process_Planning and Tracking
- Process Improvement Program Process_Process Asset Library
- Process Improvement Program Process_Projects
- Process Improvement Program Process_Skills Reports
- Process Improvement Program Process_Support Data
- Process Improvement Program Process_Training
- Requirements
- Risks
- Standards Compliance
- Supplier Management
- Support Data
- Verification
- White Papers and Research

Control Page

Control Number

- 230 Actions
- 228 Actions
- 226 Actions
- 225 Actions
- 224 Actions
- 223 Actions
- 222 Actions
- 221 Actions
- 218 Actions
- 217 Actions
- 213 Actions
- 212 Actions
- 211 Actions
- 210 Actions
- 209 Actions

Control Page

pragma SYSTEMS CORPORATION Progress And Performance Indicator - Microsoft Internet Explorer

in Report 1 / 1 100% powered by crystal

Trend of Planned versus Actual Number of Reviews per Review Type

Project Name: InterGalactic Computer Corporation (1.p.1.1)

Display Date: 10/14/2005

Page 1 of 1

Trend of Planned versus Actual Number of Reviews

Month	Planned	Actual
1/2005	2	2
2/2005	2	1
3/2005	1	0
4/2005	2	1
5/2005	2	1
6/2005	1	9
7/2005	2	0
8/2005	2	0
9/2005	1	0

Review Type

[Milestone Review](#)

[Progress Review](#)

- CMMI measurement is organized and centralized.
- Standard set of measures instantiated for each project, with customization and tailoring
- Data gathering is automated and interactive reporting is provided
- Consistent set of measures is used across the organization – process integrated with tools
- Transformation of measurement process from an onerous task typically performed by a small specialist team to an integrated approach where data is captured at source and often without any user effort
- Management insight through ‘best of breed’ graphical reporting

Thank you for your attention.

Questions?