Metrics Package White Paper

OMG ADM Task Force
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White Paper Overview

- This white paper is geared at creating a dialog and encouraging collaboration that will ultimately determine the need, approach and structure of an RFP calling for an Architecture-Driven Modernization (ADM) Metrics Package

Background

- ADM Task Force created a Roadmap [1] of standards.
- Two standards serve as foundation for remaining standards
  - Knowledge Discovery Meta-Model (KDM) Package
  - Abstract Syntax Tree Meta-Model (ASTM) Package
- Metrics Package supports these packages by providing quantifiable and specific indicators, in the form of counts, measures and computational results, about existing systems and the relationship of those systems to target architecture

•[1] See http://adm.omg.org/ADMTF%20Roadmap.pdf

Gaps in Software Metric Maturity

- Software metrics have historically been surprisingly myopic, focused almost exclusively on program-level metrics
- For example, McCabe and other commonly used metrics do not address or describe:
  - environmental counts such as job steps,
  - system-wide data definition replication,
  - program-to-program nesting levels,
  - percentage of batch versus online interfaces,
  - number and percentage of functions in a current system that map to a target architecture, or
  - mapping of data usage between the current system and target architecture
- These are just some examples of significant gaps in current metrics

As a Result of this Gap in Metric Security

ADM Task Force should take an active leadership role in not only enabling the interchange of metric meta-data, but in helping define useful metrics to be represented as meta-data or attributes of meta-data within various models.

Goal of the Metrics Package

- Support other ADM packages and ADM scenarios by providing a meta-model or enhancements to other meta-models that enable the interchange of quantifiable metrics derived from meta-data defined by other ADM packages or alternative sources

Metrics Package Objectives

- Identify metrics that support and complement other ADM packages
- Allow Metrics Package meta-models to evolve as other ADM packages emerge and evolve
- Ensure that Metrics Package clearly supports various ADM scenarios

Metrics Package Premises

- Certain ADM metric categories and metrics should be identified or established
- Metric categories should be clearly mapped to ADM packages
- Metrics Package should incorporate other metric standards to avoid reinventing the wheel
- Metrics should include cross-section of modernization metrics that already exist [1]

[1] http://www.comsysprojects.com/SystemTransformation/tmmetricguide.htm

Potential Metric Categories

- Environmental Metrics
- Data Definition Metrics
- Program Process Metrics
- Architecture Metrics
- Functional Metrics
- Quality / Reliability Metrics
- Performance Metrics
- Security / Vulnerability

Two Metrics Package Examples

- Metrics that expose total number of data groupings (i.e. records, segments or tables) within system or across systems
  - Metrics would be easily derived from KDM meta-data for a system or collection of systems
- Metrics that reflect (1) the number of unique entities across a set of systems and (2) the number of redundant entities across a set of systems to expose data definition redundancy

Metric Examples*

- Environmental Metrics
  - Total executable batch job steps
  - Total executable batch load modules
  - Total number of data base definition artifacts
  - Total number on-line artifacts
  - Total number unique Called subroutines
  - Number unreferenced source program artifacts
- Data Definition Metrics
  - Number of logical I/O data group definitions
  - Number of physical I/O data group definitions
  - Number of total data elements
  - Number of logical literal definitions
  - Programs impacted by field expansion

*Source: http://www.comsysprojects.com/SystemTransformation/tmmetricguide.htm

Metric Examples*

- Quality Metrics
  - Mean time to failure
- Functional Metrics
  - Number of primary entities identified in current system
  - Percentage of current primary entities defined in target
  - Number of functions identified in the target application
  - Number of target system functions not defined in current system
  - Number
- Architectural Metrics
  - Total number of interface systems
  - Presentation layer isolation factor
  - Data redundancy factor

*Source: http://www.comsysprojects.com/SystemTransformation/tmmetricguide.htm

Conceptual Mapping of ADM Metric Categories to Remaining Six ADM Packages

ADM Package / Metric Category	KDM	ASTM	Analysis	Visualization	Refactoring	Transformation
Environmental						
Data Definition						
Program Process						
Data Architecture						
Interface Architecture						
Structural Architecture						
Functional - Data						
Functional - Action						
Quality / Reliability						
Performance						
Security / Vulneribilty						

This mapping should be addressed during RFP development.

Metric Mapping Implications

- Mapping approach
- Facilitates process of identifying various metrics as they pertain to a given ADM scenario
- Requires clear and concise mapping of how each ADM package supports each scenario
- Suggests more detailed Scenario Whitepaper needed to fully understand metrics relationships among ADM packages

Requirements

- Ensure that Metrics Package is synchronized with other ADM packages
- Ensure that Package is flexible enough to adapt to useful metrics a given vendor may incorporate later
- Consider existing or emerging industry metrics and standards
- Reflect scope of systems from which metrics were derived

Practical Applications of the Metrics Package

- Metrics gathered from KDM and ASTM meta-data provide quantifiable numbers that can be plugged into ADM scenario estimating models
- Estimating models can utilize ADM metrics for various ADM scenarios
- Should reflect or consider history or trend metrics

Relationship to Other ADM Roadmap Standards

- Metrics Package should initially support the KDM and ASTM via meta-model extensions or additions
- Metrics Package will need to evolve with additional ADM packages
- Should reflect metric associations between KDM and ASTM

Potential Next Steps

- Identify ADM metric categories based on ADM Packages and Scenarios
- Define metrics to be plugged into each metric category
- Identify how metrics would be represented within specific ADM meta-models
- Establish meta-models or extensions to existing meta-models to support various ADM Packages

In Summary

- Due to relationship between Metrics Package and other ADM packages, creation of this package will require a unique approach
- Metrics Package could be absorbed as enhancements to other ADM packages
- Should minimally be common thread to ensure that all metric meta-data is consistently deployed across various ADM packages

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