

An Integrated Framework for Managing Scientific Data Stewardship Activities

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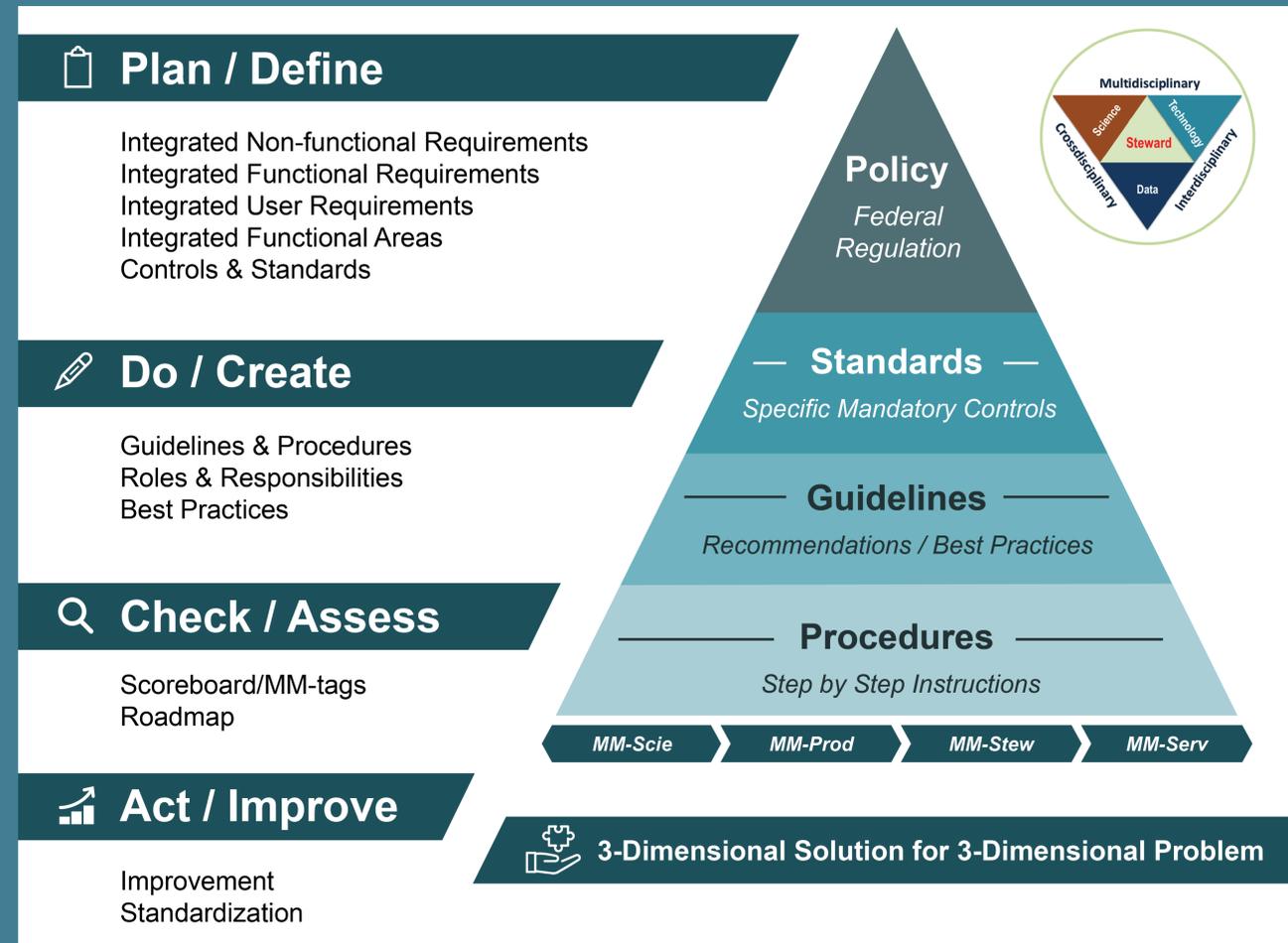
BACKGROUND

- Scientific data stewardship management is a three-dimensional and interdisciplinary problem.
- U.S. government directives and scientific guidelines require a formal approach to stewardship activities supporting compliance verification and reporting.
- Many science data centers lack an integrated and holistic framework to support such efforts.
- The business- and process-oriented data stewardship frameworks tend to be costly and lengthy to implement.
- We present here a data-centric enterprise framework for managing scientific data stewardship activities.

THIS FRAMEWORK

- is based on the Plan-Do-Check-Act (PDCA) cycle, a proven industrial concept,
- provides a tool for addressing all stewardship functions as a consistent, integrated system,
- includes the application of maturity assessment models,
- allows for quantitative evaluation of how organizations manage their stewardship activities, and
- supports informed decision-making and continual improvement towards compliance with federal, agency, and user requirements.

Need to Improve Data Stewardship? Need to Know Where to Start?

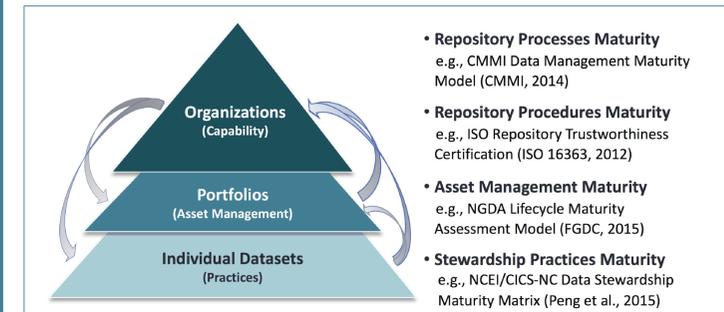


(Adapted from Peng et al. 2018)

Why do We Need an Integrated Framework?

- Managing scientific data stewardship is multi-perspective (Peng et al. 2018).
- Data and information quality are multi-dimensional (Ramapriyan et al. 2017).

Multi-Perspectives of Data Stewardship and Existing Maturity Assessment Models



(From Peng et al. 2018)

Multi-Dimensions of Data Products Quality and Existing Maturity Assessment Models

Define/Develop/Validate Science	Produce/Assess/Deliver Product	Maintain/Preserve/Disseminate Stewardship	Use/User Service Service
Science Maturity Matrix	Product Maturity Matrix	Stewardship Maturity Matrix	Service Maturity Matrix
Zhao et al. (2016) Thorne et al. (2015)	Bates and Privette (2012)	Peng et al. (2015)	NCEI MM-Serv WG (under-development)
EUMETSAT (2013)			

(From Peng 2018)

REFERENCES

Peng, G., 2018: The state of assessing data stewardship maturity – An overview. *Data Science Journal*, **17**, doi: 10.5334/dsj-2018-007.

Peng, G., J.L. Privette, C. Tilmes, S. Bristol, T. Maycock, J.J. Bates, S. Hausman, O. Brown, and E. J. Kearns, 2018: A Conceptual Enterprise Framework for Managing Scientific Data Stewardship. *Data Science Journal*, **17**, doi:10.5334/dsj-2018-015.

Ramapriyan, H., G. Peng, D. Moroni, C.-L. Shie, 2017: Ensuring and Improving Information Quality for Earth Science Data and Products. *D-Lib Magazine*, **23**, doi: 10.1045/july2017-ramapriyan.



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