

Complexity Management from a Systems Engineering Perspective

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FELLOW



FELLOW and LIFE MEMBER



FELLOW and SYSTEMS ENGINEERING PIONEER

Cyber-Physical Systems: Life Cycle Framework



Thanks to Dinesh Verma of Stevens Institute for Providing this Plain Language Framework

Complexity, Systems, and Software

Complexity Characteristics

Objective

Subjective

Tight Coupling

Costly

Uncertain

Large Size

Multiple Scales

Risky

Difficult to Understand

Decentralized

Adaptive

Difficult to Predict

Non-Mechanical

Frustrating

Emergent

Uncontrollable

Self-Organizing

Obsolete when built

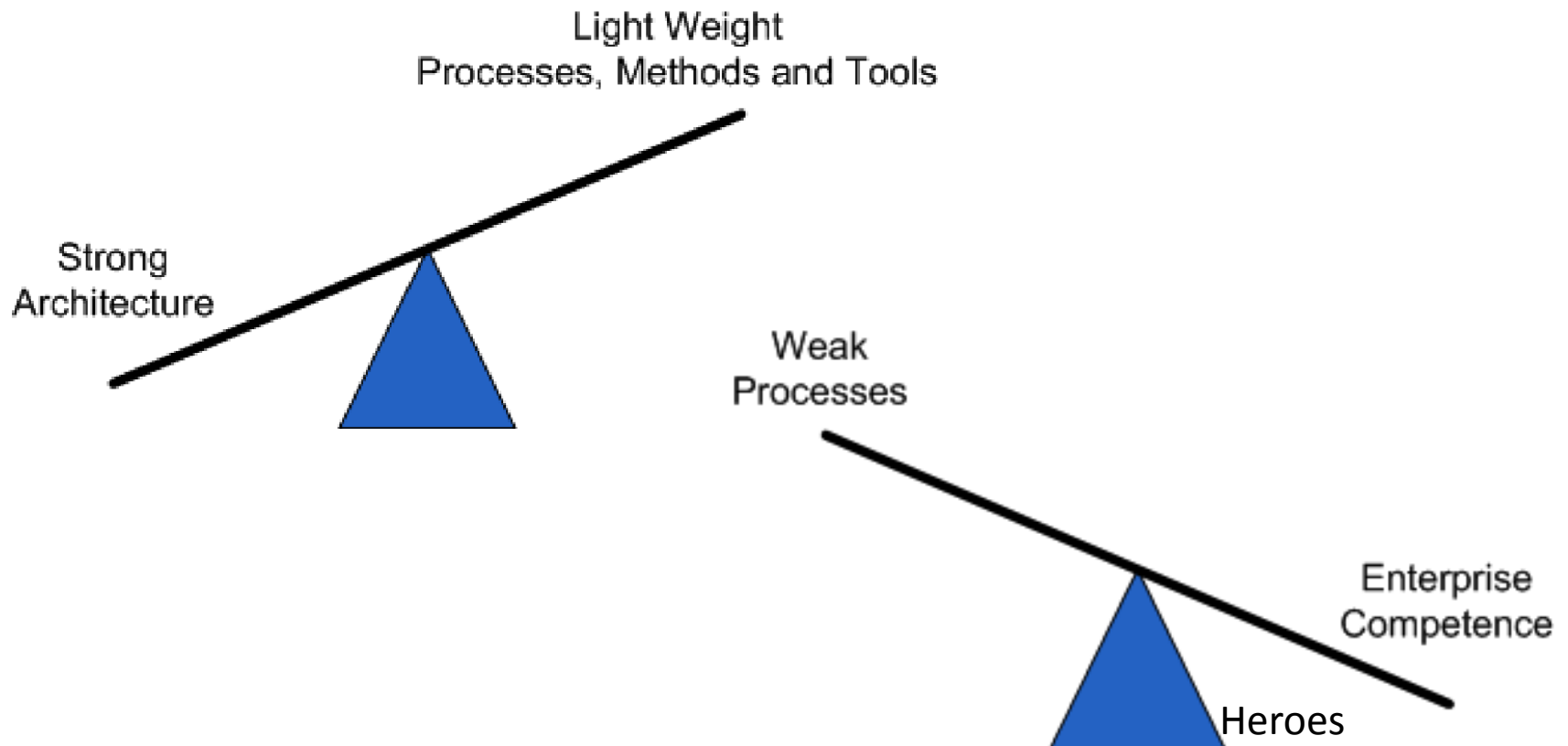
Chaotic

Unclear causality

Nonlinear

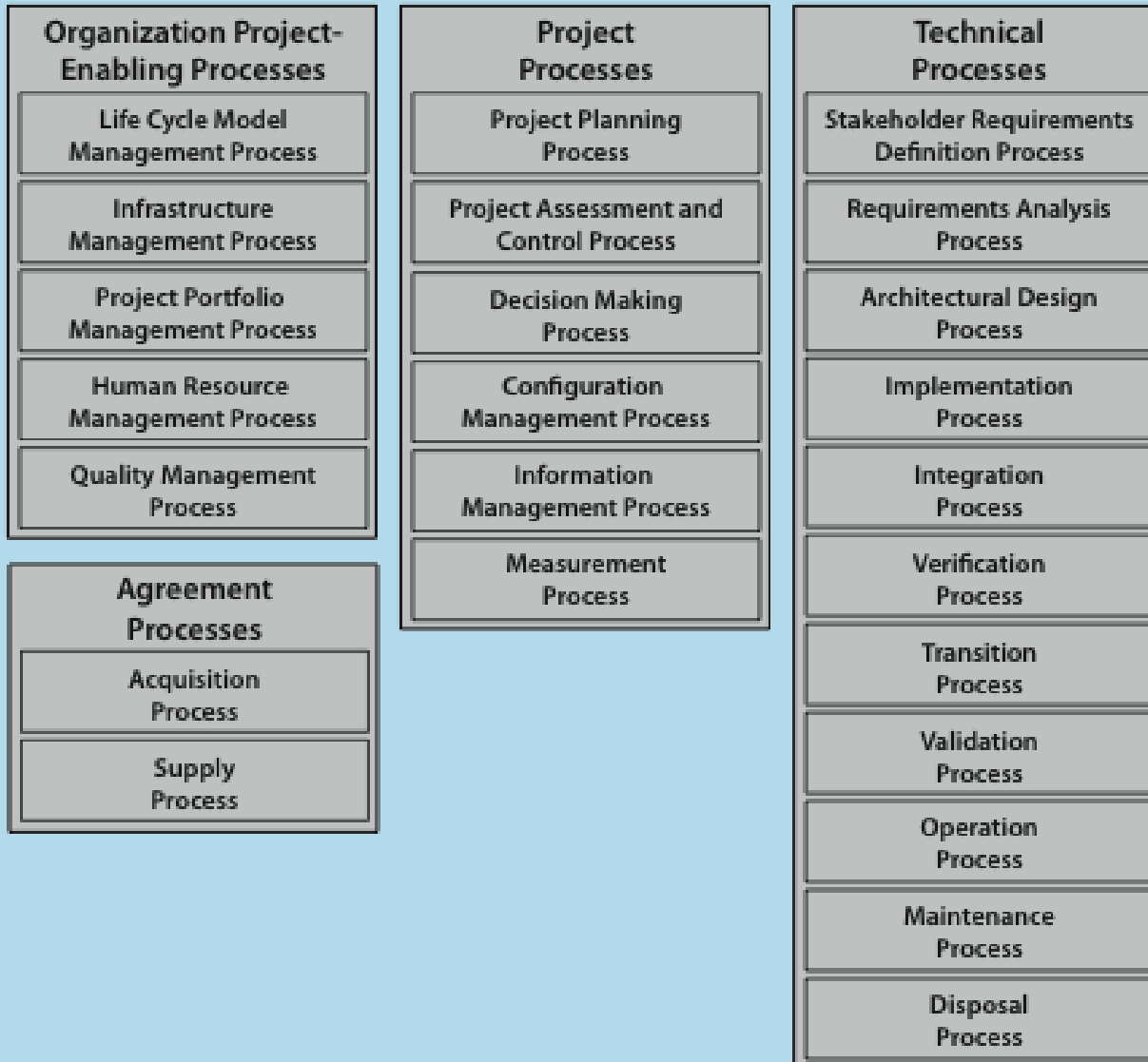
**Presented by Sarah Sheard in Chapter 5
of Software Engineering in the Systems Context**

Finding the Balance Between Architecture vs. Processes, Methods and Tools



When to use Synchronous (Deterministic) vs. Asynchronous (Non-Deterministic)

Life Cycle Process Approach a la ISO/IEC/IEEE 15288



Architecture is
Based on a Few Concepts

INCOSE Handbook

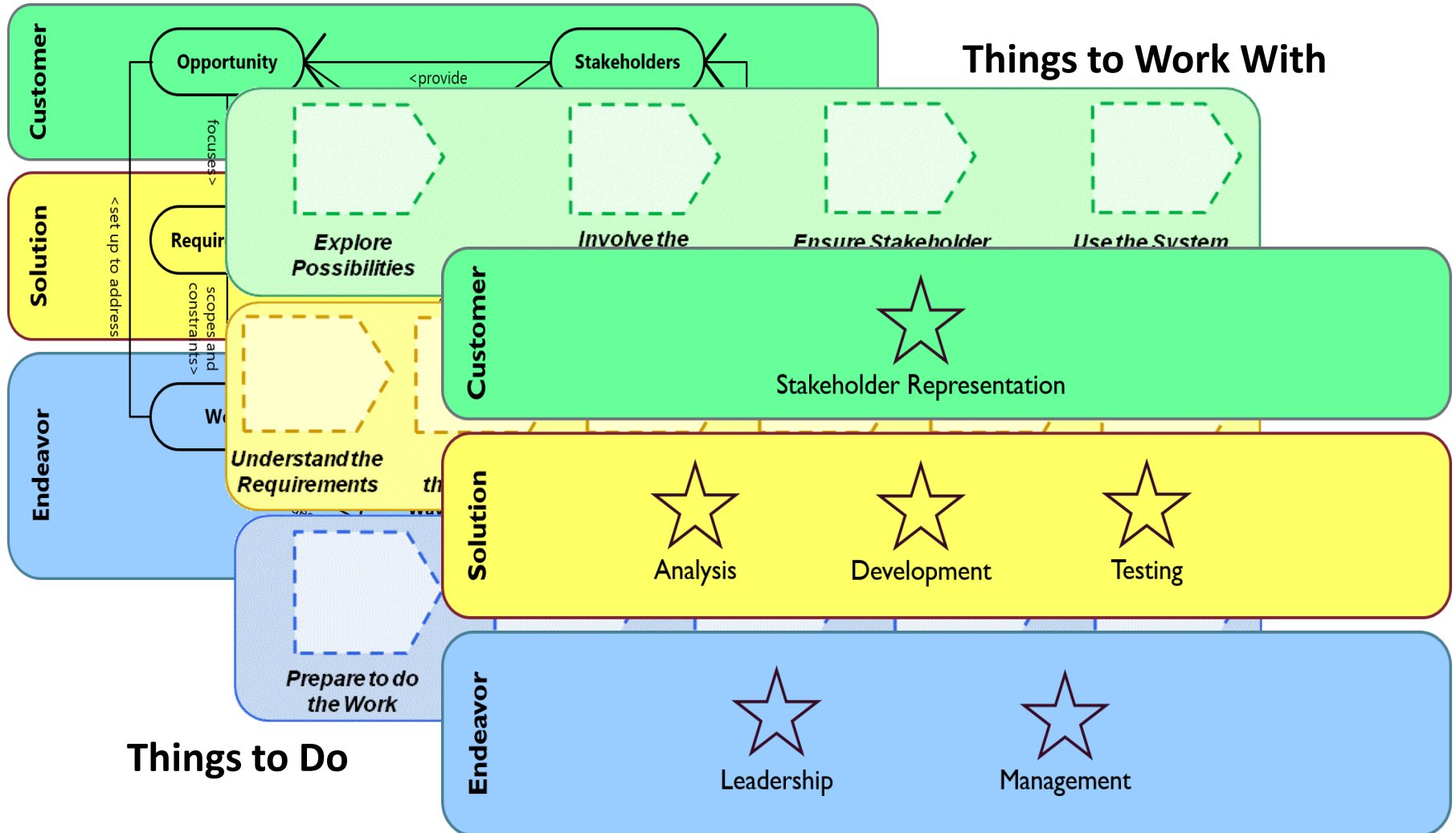
BKCASE Project

Systems Eng. Certification

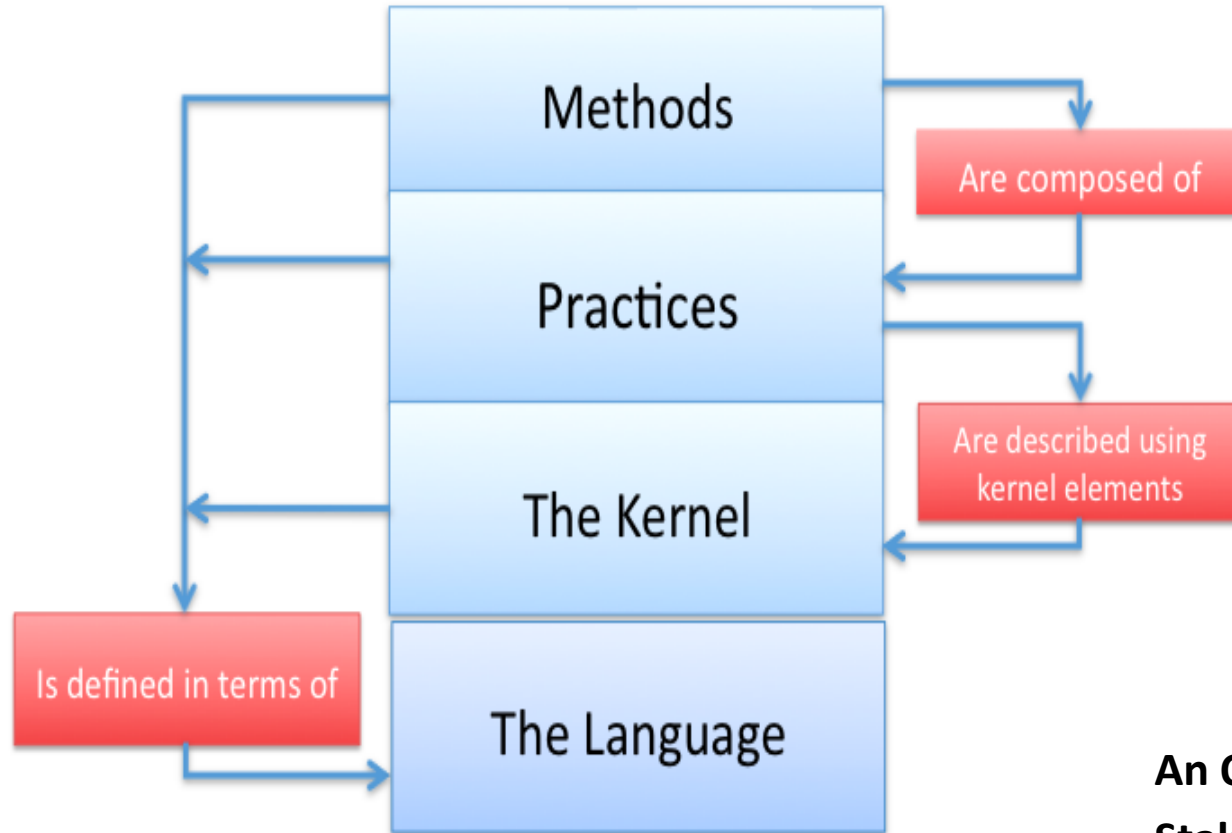
NIST Special Publication
800-160

Systems Security Engineering
Considerations for a
Multidisciplinary Approach
in the Engineering of
Trustworthy Secure Systems

Essence Kernel: A Generic Framework



Defining Practices and Methods and Unifying Software and Systems Engineering



Use 15288 Process Activities and Tasks in Defining Practices that build on a Kernel and that is suitable for both Software Engineering and Systems Engineering

An Opportunity waiting for Stakeholders to DO it resulting in an OMG Standard

THE CAST

Ilia Bider Barry Boehm Lindsey Brodie

Francois Coallier Tom Gilb

Rich Hilliard Ivar Jacobson

Harold “Bud” Lawson Anatoly Levenchuk

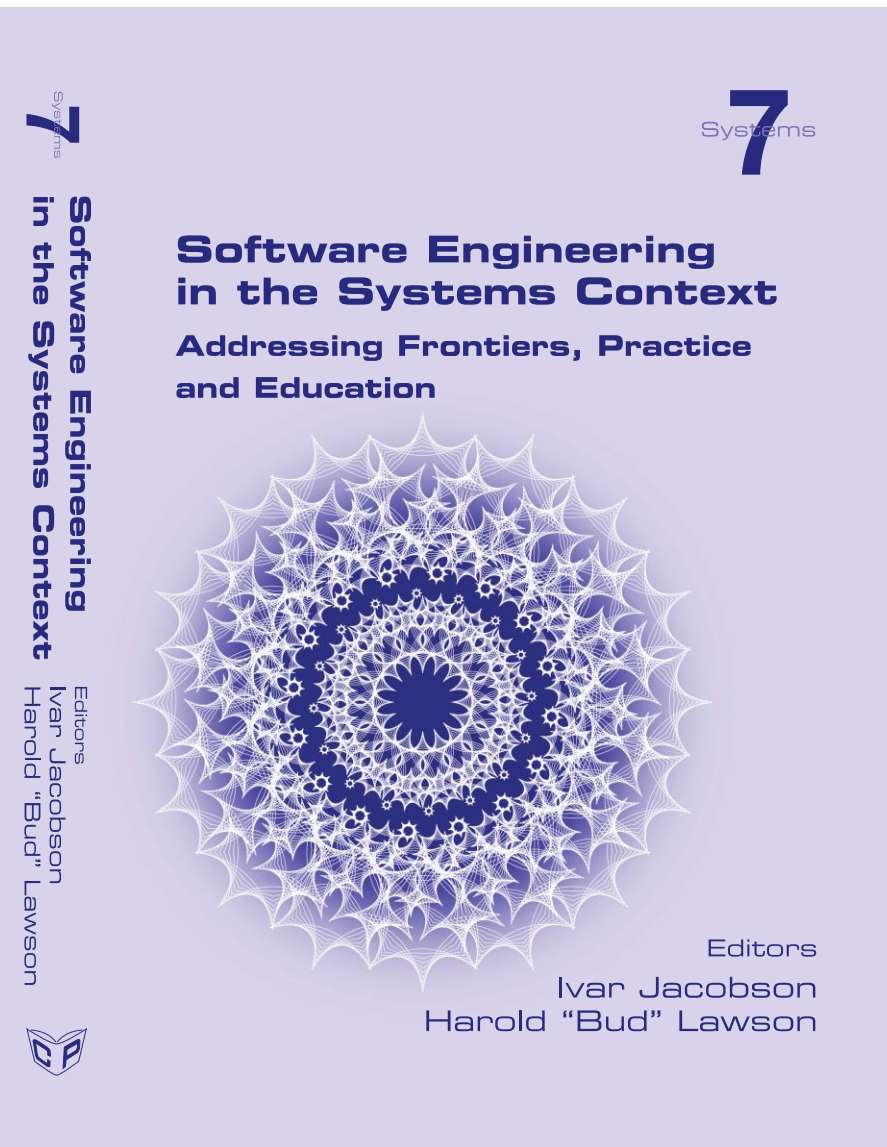
Svante Lidman Paul E. McMahon

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A MUST READ FOR ALL SOFTWARE AND SYSTEMS ENGINEERS!!!

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