

Requirements Engineering and the Enterprise: The Ultimate Complex Concurrent System

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Tuesday, 26 June 2007

10:00 – 12:00 AM

(Session 4, Track 1)

Software vs. Systems Viewpoints

- Converging viewpoints
- UML / SysML is driving some convergence or at least discussion
- Driving attitudes that need to change
 - Systems – “Software is just a component”
 - Software – “Avoid the messiness of systems in the real world, such as deployment, aging, poor physical environments, and chaos”

- What is software and what is hardware in the enterprise?
– Bricks, desks, and machines?
– People, decisions, information systems?

Programs







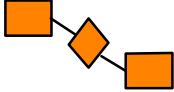
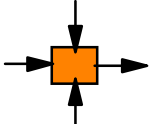
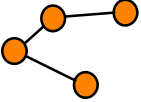
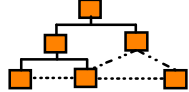
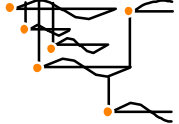
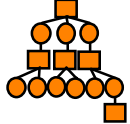
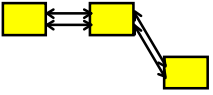
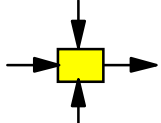
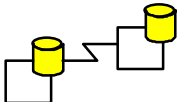
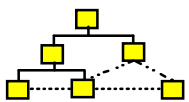
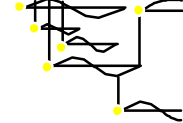
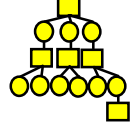
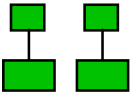
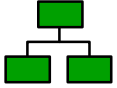
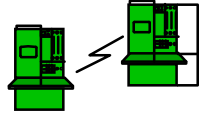
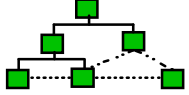
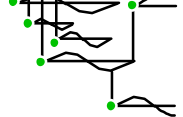
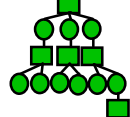






Initiatives

Infrastructure

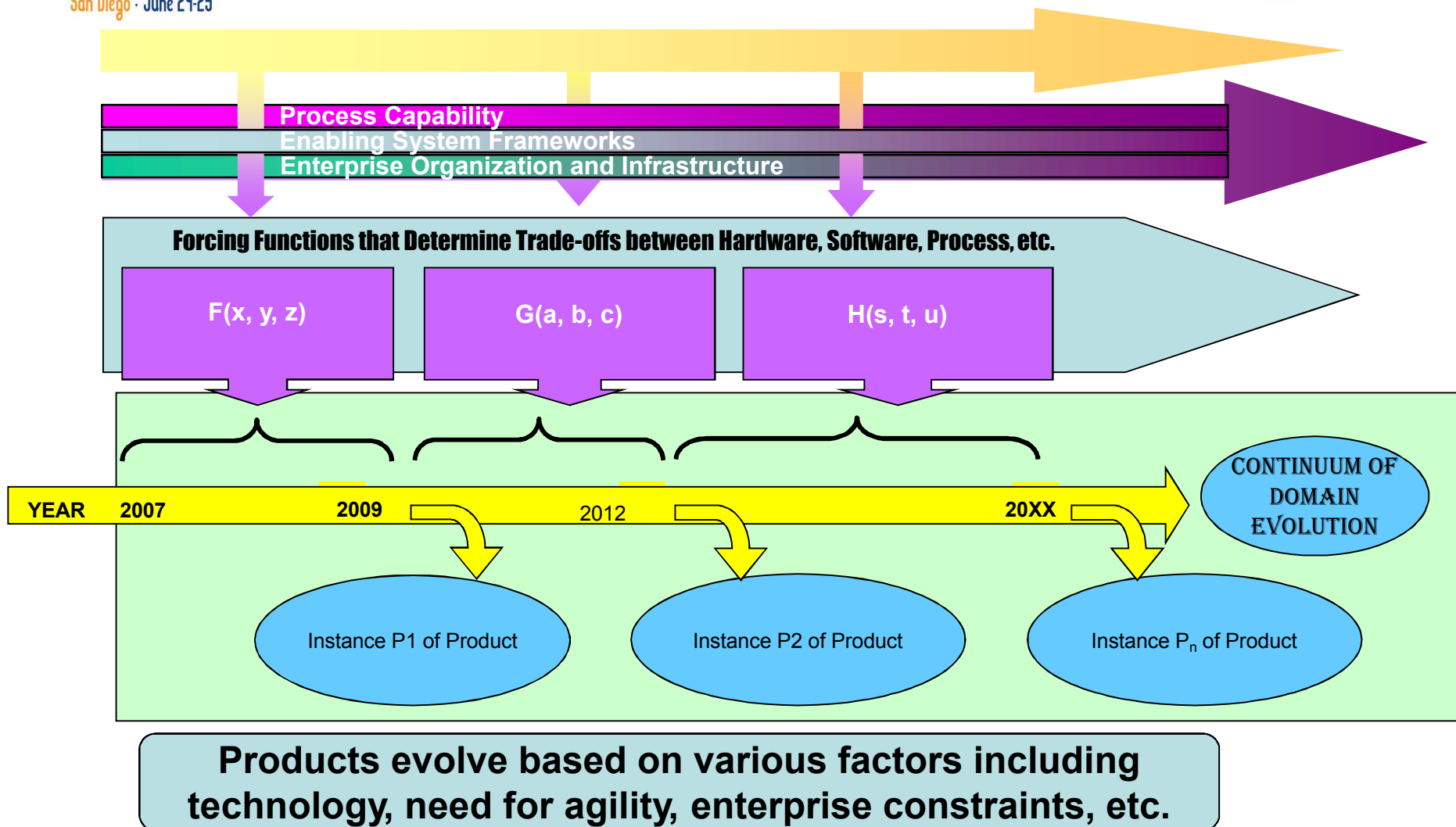
Campaigns

Applying Systems Engineering to the Enterprise May Drive Complete Convergence

ENTERPRISE ARCHITECTURE - A FRAMEWORK™

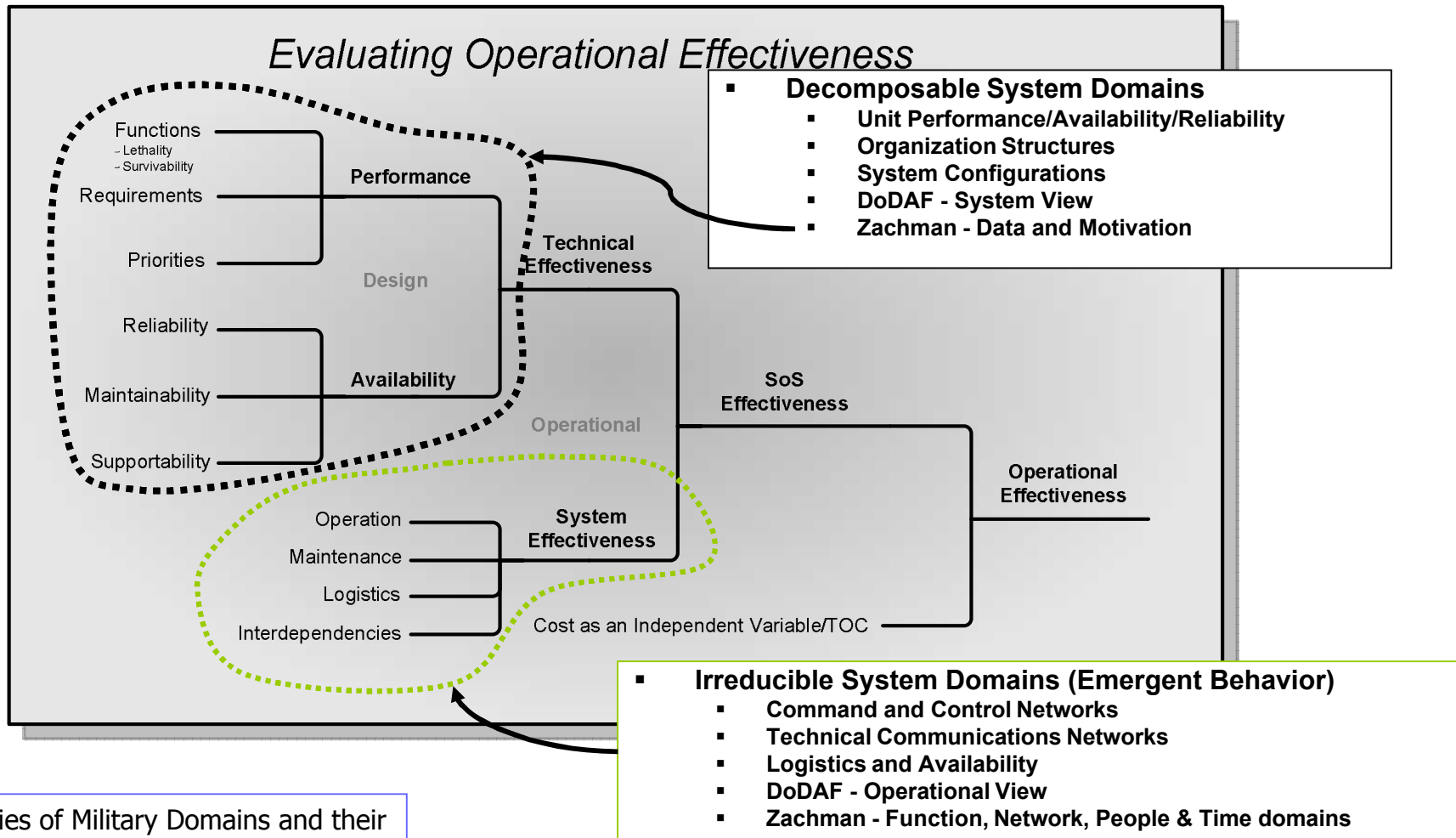
	DATA <i>What</i>	FUNCTION <i>How</i>	NETWORK <i>Where</i>	PEOPLE <i>Who</i>	TIME <i>When</i>	MOTIVATION <i>Why</i>	
SCOPE (CONTEXTUAL)	List of Things Important to the Business 	List of Processes the Business Performs 	List of Locations in which the Business Operates 	List of Organizations Important to the Business 	List of Events Significant to the Business 	List of Business Goals/Strat 	SCOPE (CONTEXTUAL)
<i>Planner</i>	ENTITY = Class of Business Thing	Function = Class of Business Process	Node = Major Business Location	People = Major Organizations	Time = Major Business Event	Ends/Means=Major Bus. Goal/Critical Success Factor	<i>Planner</i>
ENTERPRISE MODEL (CONCEPTUAL)	e.g. Semantic Model 	e.g. Business Process Model 	e.g. Logistics Network 	e.g. Work Flow Model 	e.g. Master Schedule 	e.g. Business Plan 	ENTERPRISE MODEL (CONCEPTUAL)
<i>Owner</i>	Ent = Business Entity ReIn = Business Relationship	Proc. = Business Process I/O = Business Resources	Node = Business Location Link = Business Linkage	People = Organization Unit Work = Work Product	Time = Business Event Cycle = Business Cycle	End = Business Objective Means = Business Strategy	<i>Owner</i>
SYSTEM MODEL (LOGICAL)	e.g. Logical Data Model 	e.g. "Application Architecture" 	e.g. "Distributed System Architecture" 	e.g. Human Interface Architecture 	e.g. Processing Structure 	e.g., Business Rule Model 	SYSTEM MODEL (LOGICAL)
<i>Designer</i>	Ent = Data Entity ReIn = Data Relationship	Proc. = Application Function I/O = User Views	Node = I/S Function (Processor, Storage, etc.) Link = Line Characteristics	People = Role Work = Deliverable	Time = System Event Cycle = Processing Cycle	End = Structural Assertion Means = Action Assertion	<i>Designer</i>
TECHNOLOGY MODEL (PHYSICAL)	e.g. Physical Data Model 	e.g. "System Design" 	e.g. "System Architecture" 	e.g. Presentation Architecture 	e.g. Control Structure 	e.g. Rule Design 	TECHNOLOGY CONSTRAINED MODEL (PHYSICAL)
<i>Builder</i>	Ent = Segment/Table/etc. ReIn = Pointer/Key/etc.	Proc. = Computer Function I/O = Screen/Device Formats	Node = Hardware/System Software Link = Line Specifications	People = User Work = Screen Format	Time = Execute Cycle = Component Cycle	End = Condition Means = Action	<i>Builder</i>
DETAILED REPRESENTATIONS (OUT-OF-CONTEXT)	e.g. Data Definition 	e.g. "Program" 	e.g. "Network Architecture" 	e.g. Security Architecture 	e.g. Timing Definition 	e.g. Rule Specification 	DETAILED REPRESENTATIONS (OUT-OF-CONTEXT)
<i>Sub-Contractor</i>	Ent = Field ReIn = Address	Proc. = Language Stmt I/O = Control Block	Node = Addresses Link = Protocols	People = Identity Work = Job	Time = Interrupt Cycle = Interrupt Cycle	End = Sub-condition Means = Step	<i>Sub-Contractor</i>
FUNCTIONING ENTERPRISE	e.g. DATA	e.g. FUNCTION	e.g. NETWORK	e.g. ORGANIZATION	e.g. SCHEDULE	e.g. STRATEGY	FUNCTIONING ENTERPRISE

Some Thoughts on Possible Model

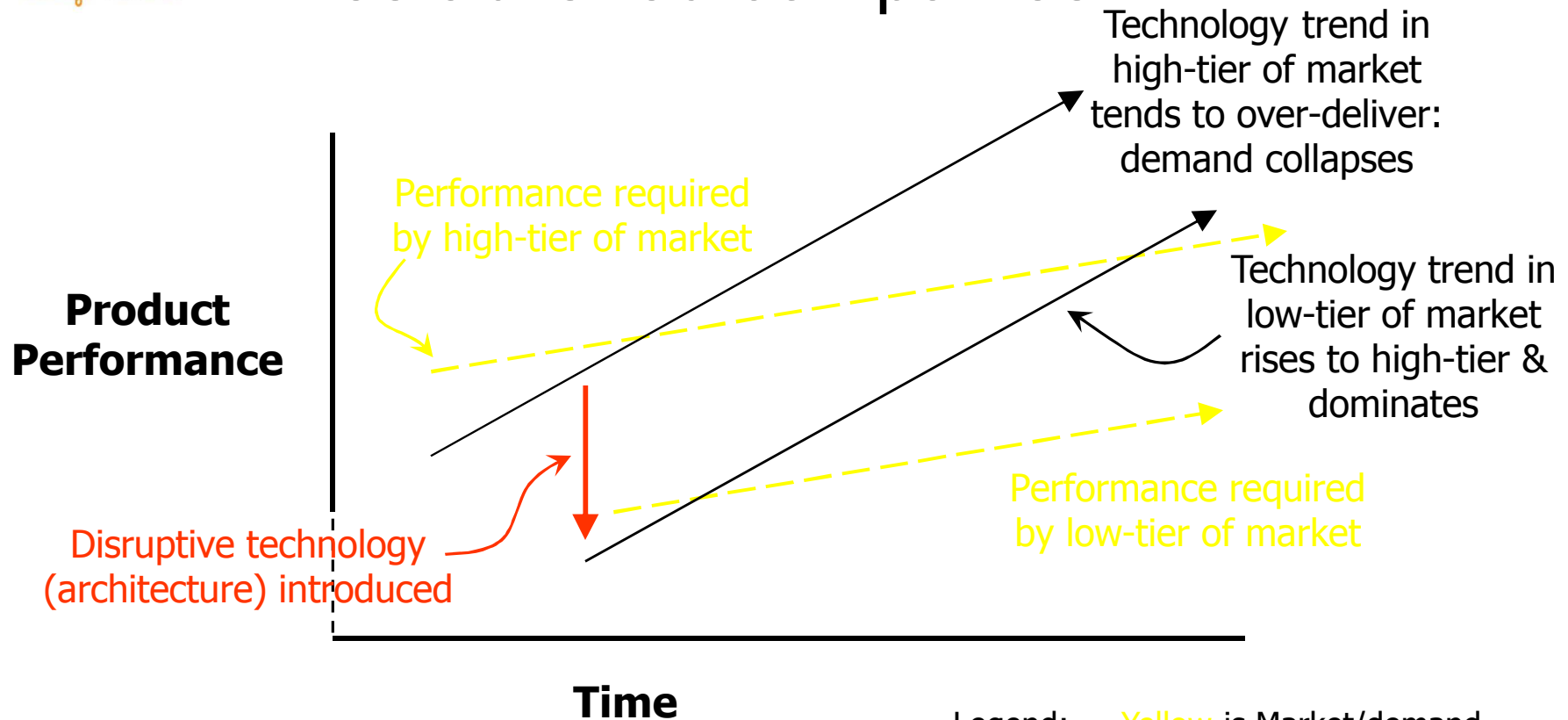


Examples of Reducible and Irreducible Domains

INCOSE
International Council on Systems Engineering



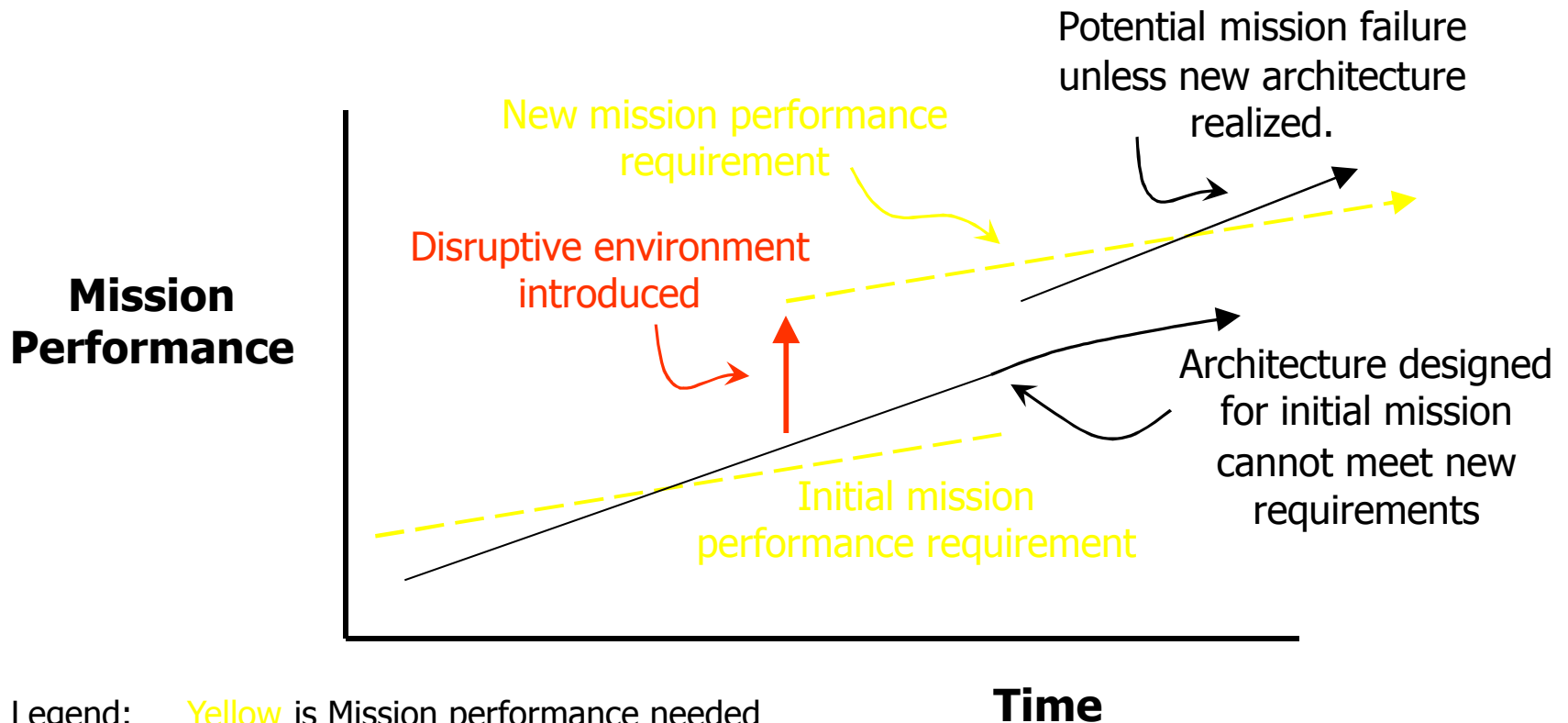
Disruptive technologies (architecture) undermines established companies.



Legend: Yellow is Market/demand
White is Technical capability
Red is Disruptive technology

Based on Fig. I.1 of *Innovator's Dilemma*

Effects of disruptive technologies and environments are similar, but inverted.



Legend: Yellow is Mission performance needed
White is Capability of architecture
Red is Disruptive environment