Mastering Systems Integration; Course Overview

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Abstract

Course overview of the course Systems Integration.

Distribution

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Nuggets Course Mastering Systems Integration

mandatory		elective		
introduction and context	core	people, process, and organization	technical	
Course introduction	Visualizing Dynamic Behavior	Human Aspects	Budgeting	
Course Overview	Early Validation	Process and Integration	Testing	
Process and Positioning	Integration Strategy	Organization	Readiness Levels	
Hardware, Software, System!	Integration Environments and Configurations		Systems of Systems	
Systems Integration Terminology	Project Management		Architecting for Integration	
Economic Perspective			The Impact of Change	
			Software and Integration	
			Product Families, platforms	



Content per Nugget

mandatory		elective			
introduction and context	core	people, process, and organization	technical		
Course introduction Why is integration difficult and poorly understood	Visualizing Dynamic Behavior	Human Aspects bias <https: <br="" en.wikipedia.org="" wiki="">List_of_cognitive_biases></https:>	Budgeting	Architecting for Integration integration technologies integration patterns	
Course Overview nuggets, face-to-face program	Early Validation V-model and late validation from waterfall to iterative continuous integration from waterfall to agile processes Integration Strategy approach: fail early, reduce risk perspectives dynamic behavior qualities project, product, component robustness of integration cookbook Integration Environments and Configurations test configurations modeling configuration management testware Project Management integration planning test facilities, resource and supplier planning Last Planner	team work motivation approbation mindset versus internal	Testing modeling, simulation prototyping, testing, monitoring (development & field), measuring, reviewing, inspecting ALT, HALT, HASS automation, regression trouble shooting diagnosis design for experiment testware Readiness Levels technology readiness	integration pitfalls The Impact of Change	
Process and Positioning integration in phase gate process fail early, qualification top-down and bottom-up		Process and Integration process capability (of organization) support with procedures, templates, tools Governance Organization roles		Software and Integration	
Hardware, Software, System! from components to system qualities different failure modes and patterns early HW SW integration				Product Families, platforms projects, products	
Systems Integration Terminology validation, verification qualification, certification objective evidence, regulatory agencies site and factory acceptance Economic Perspective knowledge and life-cycle commitment time-to-market cost milestones			Systems of Systems integration interoperability COTS & characterization Outsourcing (component, system, service) data cloud time dimension compatibility		

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System Specification

- determine *KPPs* and their quantified specification
- assess *risk* of KPPs caused by volatility, uncertainty, complexity and ambiguity pick one *high-risk* KPP to elaborate
- describe *typical use* (including circumstances in the *context*) related to KPP

System design

- make system, SW, and HW *block diagrams* (parts, interfaces, connections)
- model *dynamic behavior* resulting in the KPP
- map dynamic behavior on block diagrams and budget: quantify contributions to KPP
- re-assess risks of KPP

Systems Integration Plan

- determine an incremental *integration* sequence to measure the KPP as early as possible
- assess for the parts contributing to the KPP
 - *fitness for purpose* in customer context
 - integration configurations and testware
 - supplier and logistics status
 - technology readiness
 - development and resource status
- Identify tensions with development, logistics status, and availability of testware and transform the sequence in a (PERT) plan with required resources and integration configurations
- assess *robustness* of the plan
- capture results in presentation

Reflection and Evaluation

• identify *tensions* or *gaps* in processes, organization, people, tools, instrumentation, context knowledge, etc. for executing the integration.

