

Mastering Systems Integration; Assignments

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Abstract

All assignments of the course Mastering Systems Integration.

Distribution

This article or presentation is written as part of the Gaudí project. The Gaudí project philosophy is to improve by obtaining frequent feedback. Frequent feedback is pursued by an open creation process. This document is published as intermediate or nearly mature version to get feedback. Further distribution is allowed as long as the document remains complete and unchanged.

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logo
TBD

Pre-assignment

Make an initial project overview for your own project

Project Title

meta information, e.g. version, date, author, owner

Project Goals

- 3 to 5 specific and quantified objectives

system context

- sketch the next generation system context, e.g. a drawing, block diagram, 3D model, photo of the system context
- indicate changes in the context compared to the current generation system

system of interest

- sketch your next generation system, e.g. drawing, block diagram, 3D model, photo
- indicate changes compared to the current generation system

Key Performance Parameters

- 5 to 10 specific and quantified requirements

project master plan with timeline

- time line with 5 to 10 milestones, especially deliverables. specific and quantified
- first light, prototype shipment, 1st SAT @OEM, 1st SAT @OEM's customer, start volume production

other relevant project information

- enabling systems
- stakeholders
- external or internal interfaces
- constraints, e.g. applicable legislation

Sketch the system-of-interest

What are the most relevant project goals?

Sketch the project master plan (the main milestones and their timing)

Determine KPPs

Determine 5 to 10 **Key Performance Parameters** (KPP) of the System

Quantify these KPPs

Define the KPPs roughly, using a **Use Case**

VUCA Causes Risks

VUCA =

Volatility

Uncertainty

Complexity

Ambiguity

Assess the risk for each KPP

Explain why this KPP may suffer from this risk

Select one KPP to work on in the remainder of the Face-to-Face workshop

this KPP should be “hot” (lot of organizational buzz)

you may also select two “conflicting” KPPs

Define the typical use (by customer stakeholders) of the system in relation to the selected KPP.

This use case helps to define the KPP further

This use case will guide the verification and validation

Make Block Diagrams

Make block diagrams of the system, the software, and the hardware.

Block diagrams show parts, and interfaces or connections.

These block diagrams need tens of blocks.

Model the Dynamic Behavior of the System.

Focus on the Dynamic Behavior that relates to the KPP.

Visualize the Dynamic Behavior with various sketches, diagrams, or graphs (see Visualizing Dynamic Behavior for inspiration).

Map the Dynamic Behavior on the block diagrams.

Transform this into a budget:

Quantify contributions of parts and functions to the KPP.

Re-assess the risks for the chosen KPP

using the insights gained so far

These risks are leading when defining the integration sequence

Determine an Incremental Integration Sequence

Determine an incremental ***integration sequence*** to build confidence in the KPP ASAP.

Strive for about 6 main increments.

Reason starting at the end result and then backward in time.

For each increment determine its prerequisites in terms of parts, interfaces, functions, and performance levels.

assess the planning from the perspectives:

- ***fitness for purpose*** in customer context
- ***integration configurations*** and ***testware***
- ***supplier*** and ***logistics*** status
- ***technology readiness***
- ***development*** and ***resource*** status

Transform the integration sequence and the planning from the other perspectives into a ***PERT-plan***.

A PERT-plan focuses on ***activities*** and their mutual ***relations***; the logic of the plan. Time and resources are secondary information.

Assess how well the PERT plan addresses the original risks in the KPPs.

Assess the robustness of the PERT-plan for changes.

All assumptions in the integration plan will probably change. A good integration PERT-plan shouldn't change much.

Prepare Final Presentation

Prepare a presentation for the management

- to communicate the systems integration approach
- its rationale
- and its impact on the project, the test configurations, the schedule, the organization, and the suppliers

Add a slide on the course learnings and reflections

Content for Final Presentation

- Goal of this presentation, main message, desired outcome
- Mission/goal of end customer
- Master plan, milestones and dates
- Key performance parameters of the system
- Block diagrams (20..30 blocks), dynamic behavior (20..30 blocks), some supporting visualizations, budget
- Integration strategy and sequence
- PERT plan (proposal)
- Summary and specific actions, and recommendations (e.g. allocate these resources, order ..., etc.)

Add a slide on the course learnings and reflections

Homework Project

A4 Project/System Overview

A4 Master plan with time lines

Project description

- Architecture overview (enabling systems, context, SOI, partitioning, interfaces, dynamic behavior, KPP's, MOEs, critical Design and Technology choices) + Rationale
- Risk Analysis + Rationale
- Ideal integration sequence PERT plan + Rationale
- Project plan inputs (resources, suppliers, customers, technologies, test mgmt...) + Rationale
- Project plan + Rationale

Evaluation of the project description (how mature, how accurate, where are gaps?)

Reflection report