SAVOIR

space avionics open interface architecture

FAIRE working group report (software) – Documentation status

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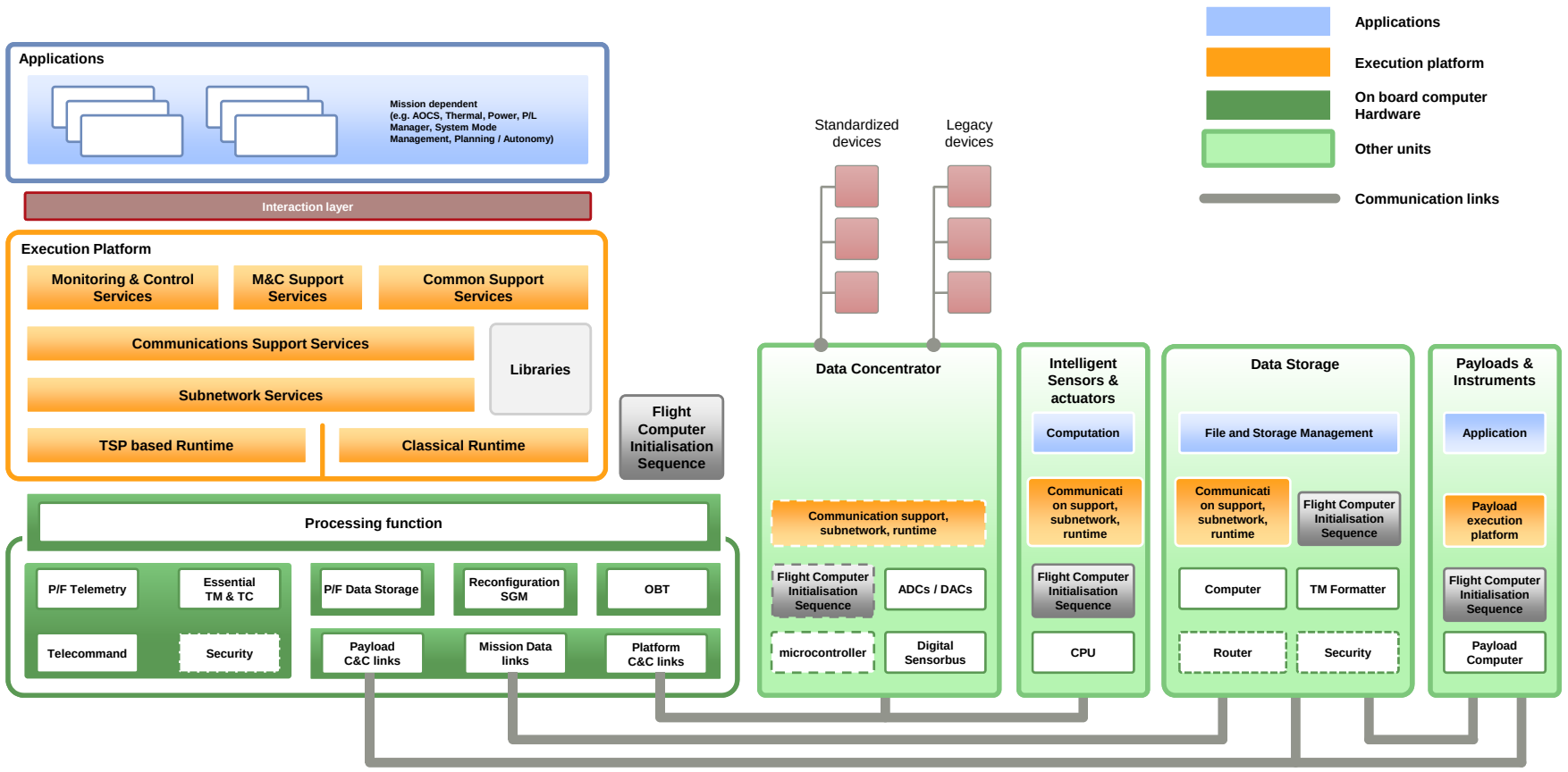
The avionics reference architecture (HW + SW)



The roles of the OSRA layers

- Component Layer
  - This is the “Application Layer”
  - Mission-specific functions
  - Re-use achieved through a component- and model-based approach
- Interaction Layer
  - Provides the “glue” between components and the Execution Platform
  - Implements real-time concerns for components
  - Expected to be tool-generated (no re-use needed)
- Execution Platform
  - Implements all non-mission-specific functions
  - Re-use achieved through reconfiguration

Why standardise the OSRA?

- Encourage a common approach and terminology
- Permit re-use and collaboration at the component layer
  - Exchange of models across and within teams
  - Exchange of component implementations
- Encourage a diversity of tooling
- Encourage a diversity of Execution Platforms

- This requires some standardisation at
  - Component Layer
  - Execution Platform
- Level of standardisation carefully chosen to meet the re-use and collaboration/cooperation needs at that layer

OSRA standardisation (1) – the documents

- An informative guide to the OSRA (TN-002)
  - Complete guide to the OSRA
  - Rationale, User Needs and Requirements
  - Overall architecture and expected process
  - Guide to the component model and of pseudo-components
  - The role of the Interaction Layer
  - An overview of the Execution Platform
  - “Bird’s eye view” of the other OSRA documents

- SCM meta-model specification (TM-001)
  - Complete meta-model description (an ecore example)
  - Standard serialisation/exchange format based on XMI
  - Exchange format compliance based on XML equivalence

OSRA standardisation (2) – the documents

- Pseudo-component specification (TM-002)
  - Complete specification of component layer pseudo-components
  - In terms of the SCM as defined in TM-001

- Component interface specification (TM-003)
  - Specification of interface between a component implementation and the interaction layer
  - In terms of ISO OSI abstract service primitives
  - Example concrete language bindings to C and Ada

- Execution Platform functional specification (GS-005)
  - Specification of the Execution Platform at a functional level

Why Execution Platform standardisation?

- Encourage a common approach to the Execution Platform
  - Use common terminology
  - Locate and bound the Execution Platform within the OSRA
- Encourage diverse designs and implementations
  - Provide guidance on architecture
- Be able to compare alternative implementations
- Encourage re-use, collaboration and competition

Execution Platform – Standardisation approach

- Functional specification of the Execution Platform (GS-005)
  - Identify what functions an Execution Platform should have
  - Identify relationships between functions
  - No specification of how functions should be implemented
- One requirement stating that functional breakdown should be reflected in the architecture
  - Designed to be tailored out if necessary/desirable
- Level of abstraction which permits a range of implementations
  - Capture current state of the art
  - Leave open alternative implementations in future
- Functional breakdown and specifications is new material
  - Draws on SIFSUP and COrDeT-3
- Covers all major Execution Platform functions
  - Designed to be tailored by missions

Execution Platform – Functional breakdown

- Software Execution Environment
  - OS/tasking; libraries; life cycle; context; partitioning
- Hardware Execution Environment
  - Platform management; time access; storage access
- Network and Device Access
  - Subnetwork access; device access
- Protocol Handling
  - M&C, data transfer; onboard communications
- Monitoring and Control
  - Commanding; parameter access, reporting, acquisition, pooling, statistics, monitoring; event distribution; logging
- Access by External Systems
  - Platform access (e.g. memory, storage), device access
- Automation

Execution Platform – Example requirements

- From Parameter Access and Reporting (representative)
  - *The Execution Platform shall be capable of requesting the value of parameters provided by applications in response to requests from within the Execution Platform, external systems or other applications.*
  - *The Execution Platform shall be capable of returning parameter values in response to requests from the Execution Platform to the source of the value request.*
- General architectural requirement
  - *Each functional capability specified in this specification shall be implemented by the Execution Platform as an architecturally distinct software layer or module.*
  - Note that this requirement can be tailored out

Document status and workplan

- An informative guide to the OSRA (TN-002)
  - Draft submitted
- SCM meta-model specification (TM-001)
  - Early draft under revision
  - Next draft due next week
- Pseudo-component specification (TM-002)
  - Draft submitted
- Component interface specification (TM-003)
  - Draft due this week
- Execution Platform functional specification (GS-005)
  - Requirements set completed in draft form for internal review