INCOSE Agile SE Life Cycle Model Fundamentals Project Host Workshop-Process Information

Last Updated 5-Dec-2016

Latest version updated from time-to-time can be found at
www.parshift.com/s/AgileSELifeCycleModelProject-HostPrepAndParticipantAnalysisDetail.pdf
also see:
www.parshift.com/s/AgileSELifeCycleModelProject-HostInformationPreparationBrief.pdf
and Project Overview with separate audio at:
www.parshift.com/s/150127IW-TownHallASELCM.pdf
www.parshift.com/s/150127IW-TownHallASELCM-AudioOnly.mp4

This intent of this document is to outline the nature of workshop objectives and the nature of the non-proprietary and non-security-sensitive information to be discussed, captured, analyzed, and subsequently reported.

ACRONYMS

	Acronym	
Unique to Workshop	AAP	• Agile Architecture Pattern (see Chart 14)
	CURVE	• Capriciousness, Uncertainty, Risk, Variation, Evolution (see Chart 7)
	RSA	• Response Situation Analysis (see Chart 8)
	RF	• Reality Factors (see Chart 9)
Common Usage	SE	• Systems Engineering
	Q&A	• Questions and Answers
	COTS	• Commercial Off-The-Shelf
	POC	• Point of Contact

Planned (Roughly) Workshop Agenda

---------- Day 1 – 8 hours of structured work starting at 8:00am, room open at 7:30.

2:00 – Introductions, objectives, workshop agenda structure, tools and processes.
2:00 – Host process presentation/discussion of SE CURVE situation and SE process.

Lunch (one hour lunch allows informal conversation)

2:00 – Breakout: analysis of SE-process RSA/RF (two teams doing identical analysis).
2:00 – Brief-out: Analysis results, discussion, and refinement.
Dinner (host-funded for all participants) at time TBD.

---------- Day 2 – 8 hours of structured work starting at 8:00am, room open at 7:30.

1:00 – Break out: refinement of yesterday's salient learning.
3:00 – Host presentation and Q&A of 20 processes.

Lunch (one hour lunch allows informal conversation).

2:00 – Break out: Identifies observed process-guidance principles.
2:00 – Brief out: observed process-guidance principles with discussion.

---------- Day 3 – 8 hours of structured work starting at 8:00am, room open at 7:30.

0:30 – Review Agile Architecture Pattern (AAP) concepts.
1:00 – Breakout: Develop AAP process representation, and refine principles as time permits.
0:30 – Brief-out AAP process representation
1:00 – Host presentation/discussion and Q&A of process challenge (in any form wished).
1:00 – Breakout: identify RSA issues for challenge area.

Lunch (one hour lunch allows informal conversation).

1:00 – Breakout cont.: describe the application of principles to address the RSA issues.
1:30 – Brief-out and wrap up.
0:30 – General reflection on the workshop process, tools, learning, and results.
1:00 – Private reflection among Host personnel, what might be applied?

Pre-Workshop Host Preparation

- Get budget approved: estimated at $20k, to cover facilitation, synopsis reports, materials, estimated participant travel costs, workshop lunches, and one dinner.
- Identify principal point of contact, phone(s), and email address.
- Reach agreement on process to be analyzed, process to be synthesized, and date of workshop.
- Request standard proposal for 3-day discovery workshop.
- Identify in advance any special sign-in/registration needs for participants including nationality constraints, if any.
- Recommend hotel(s) for traveling participants, means to travel from hotel to workshop facility, and provide map of facility location.
- Identify at least two host participants that will attend at least two additional workshops, with email addresses.
- Identify others that will present/participate in host workshop, with email addresses. Number is negotiable to accommodate non-host participants.
- Identify who will review post workshop results synopsis, phone and email address.
- Schedule workshop facilities for full group (20 people max) and 1-2 additional break out team rooms that could accommodate two sub-groups.
- Arrange suitable place for Day 1 evening dinner, one large (U preferred) table or smaller tables in proximity accommodating 4-8 people, and provide map.
- Arrange morning and 2 break refreshments including coffee/soft drinks.
- Arrange box lunch for three days served at workshop facility (preferred).
- Prepare Days 1-2-3 presentations with advance guidance & review by Rick Dove.

Day 1 Host SE-Process Presentation/Discussion Guide

Points to cover in 2 hours:

- **Present general context of process to be analyzed and its application.**
- **Present CURVE (Capriciousness, Uncertainty, Risk, Variation, Evolution) high-level points of concern – as a mission analysis relative to the SE process needs.**
- **Present salient points of SE process agility: general life cycle model in whatever form is employed, what is done and why, in whatever process guidance is employed.**
- **Q&A throughout and following the above.**

Host presents SE process context

General Info

- Type of process: Scrum-like, Wave-like, SAFe-like, ICSM-like, LVC-like, uniquely home-grown, etc
- Type of project domain: Defense, commercial, social, etc
- Type of project intent: feasibility demonstration, proof of concept development, prototype development, short-run rapid fielding, multiple-unit production product, single-unit system, etc
- Type of product: satellite, unmanned vehicle, integration process, command & control system, bio-medical device, etc
- Important: To what extent and capability does the system architecture that is under development facilitate change when the agile SE process discovers a need for rework, augmentation, or replacement of prior work. For instance, agile software development processes are generally implemented on an object-oriented development platform (or in linked web-pages) that facilitates relatively-easy reconfiguration and rework. If your agile SE process also addresses hardware or other non-software development, how is in-process change facilitated? Is there a modular concept employed and structured for relative-ease of change? Or not?

Host presentation should replace sub-bullet items below with as many items as relevant in the process to be analyzed

Example: CURVE High-Level SE-Process Environment

Consider both reactive needs & proactive opportunities to seize, within mission

Agile systems have effective situational response under, e.g.:

- **Capriciousness: unknowable situations**
  - **Un-availability of key personnel and/or subcontractor**
  - **Compelling new approach is revealed**
- **Uncertainty: randomness with unknowable probabilities**
  - **Feasibility of solution design**
  - **Contracting issues, funding gaps, and budget shortfalls**
- **Risk: randomness with knowable probabilities**
  - **Performance of sub-contractor**
  - **Meeting necessary schedules and/or performance measures**
- **Variation: knowable variables and variance range**
  - **Availability of critical test/demo facility/personnel**
  - **Performance differences in multiple COTS-sources**
- **Evolution: gradual (relatively) successive developments**
  - **Change in targeted operating environment**
  - **Availability of superior technology matures**

Participants will construct RSA from Host discussion

Example: Scrum Response Situation Analysis (RSA)

Details in www.parshift.com/s/140630IS14-AgileSystemsEngineering-Part1&2.pdf

Change Domain		Pro forma only – not expected to survive the project analysis work
Proactive	Creation (and Elimination)	• requirements • experiments • next sprint activity • shared team knowledge • customer satisfaction
Proactive	Improvement	• process effectiveness • risk/uncertainty reduction • effort estimating • completion to schedule
Proactive	Migration	• new technology/tools that will impact infrastructure • lean SE process principles
Proactive	Modification (of Capability)	• new team member unfamiliar/uncomfortable with agile SE • new environmental situation
Reactive	Correction	• wrong requirement • wrong design • inadequate implementation • non-compliant supplier • inadequate developer
Reactive	Variation	• expertise and skill levels among team members • allowable deliverable performance range • customer availability, interaction, involvement expertise
Reactive	Expansion (of Capacity)	• 2x (or half x) project scope change • x to y engineers distributed across n to m locations
Reactive	Reconfiguration	• unanticipated expertise requirement • development activity-sequence priority change • system/sub-system design change

Participants will construct Reality Factors from Host discussion

Example: Scrum Environmental Reality Factors (RF)

RSA exercises often assume a reasonably behaved and supportive environment, and tend to focus on the system's internal functional response situations. This framework tool moves the analysis into the external environment.

Reality Factors	Pro forma only – not expected to survive the project analysis work
Human Behavior: Non-team behavior, error, expediency, uncommitted customer rep, …	
Organizational Behavior: Change in stakeholders, organizational priorities, resource access, ...	
Technology Pace: Evolving technology, testing trade-offs, ...	
Complexity: Large project with many involved simultaneously, emergent interaction affects, ...	
Globalization: Partners/teams with different ethics, cultures, infrastructures, …	
Partially-Agile Enterprise Concepts: Outsourcing, COTS affects, COTS supply/supplier affects, agile software-practice-thinking dominance on HW/SW project...	
Agile Customers/Competitors/Adversaries: Continuous external-knowledge evolution, continuous external innovation, …	

Day 2 Host 15288 Life Cycle Processes Discussion Guide

3 hour presentation/discussion of 20 ISO/IEC/IEEE 15288-2008 processes.

Average of ~10 minutes for each of the 20 processes, including Q&A.

Present/discuss each process and its inputs, control, constraints, enabling mechanisms, and outputs to the extent reasonable and discussion instigating.

Re: 15288 version 2008 vs 2015. We are doing only 20 of the 15288 processes. These 20 have (virtually) 1:1 representation in each version. The 2015 version refined the 2008 Architectural Design process into two separate processes.

2008	2015
Stakeholder Requirements Definition →	Stakeholder Needs & Requirements Definition
Requirements Analysis →	System Requirements Evaluation
Architectural Design →	Architecture Definition
	Design Definition

Detail differences across the 20/21 processes to be analyzed is not expected to affect results – as we are looking for generic fundamental principles that should exhibit stable pattern integrity regardless of original source.

Feel free to use either 2008 or 2015 version for your presentation guidance.

Host presents/discusses 20 processes

Day 2 Host 15288 Life Cycle Processes for Discussion

with respect to unpredictable/uncertain/evolving SE environment accommodation

Text from ISO/IEC/IEEE 15288 (2008)

Organizational Project-Enabling Process

- Life Cycle Model Management Process

Project Processes

- Project Planning Process
- Project Assessment and Control Process
- Decision Management Process
- Risk Management Process
- Configuration Management Process
- Information Management Process
- Measurement Process

Technical Processes

- Stakeholder Requirements Definition Process
- Requirements Analysis Process
- Architectural Design Process
- Implementation Process
- Integration Process
- Verification Process
- Transition Process
- Validation Process
- Operation Process
- Maintenance Process
- Disposal Process

Special Process

- Tailoring

The Project Processes are used to establish and evolve project plans, to execute the project plans, to assess actual achievement and progress against the plans and to control execution of the project through to fulfilment. Individual Project Processes may be invoked at any time in the life cycle and at any level in a hierarchy of projects, as required by project plans or unforeseen events. The Project Processes are applied with a level of rigour and formality that depends on the risk and complexity of the project.

The Technical Processes are used to define the requirements for a system, to transform the requirements into an effective product, to permit consistent reproduction of the product where necessary, to use the product to provide the required services, to sustain the provision of those services and to dispose of the product when it is retired from service. The Technical Processes define the activities that enable organization and project functions to optimize the benefits and reduce the risks that arise from technical decisions and actions.

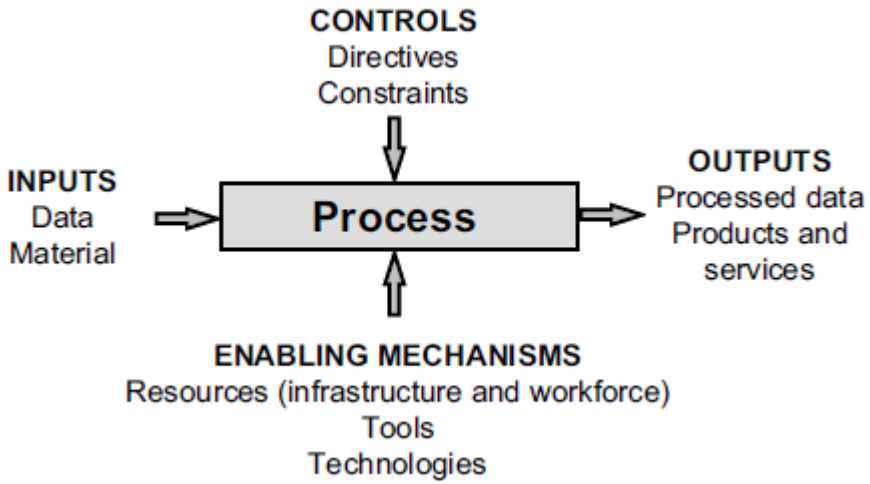
The Tailoring Process is to adapt the processes of this International Standard to satisfy particular circumstances or factors that: a) Surround an organization that is employing this International Standard in an agreement; b) Influence a project that is required to meet an agreement in which this International Standard is referenced; c) Reflect the needs of an organization in order to supply products or services.

Standard Process Representation

IEEE Guide – Adoption of ISO/IEC TR 24748-2:2011

This shows one way to organize the process discussions, but is not necessary.

Principle purpose of the 15288 task discussions is to focus individually on each general task purpose and their methods of accomplishment, in whatever way the purpose and method for each task is explicitly recognized and/or accomplished as a part of your SE process ConOps.



4.4.2 Process principles

4.4.2.1 Introduction

ISO/IEC 15288:2008 establishes a top-level architecture of the life cycle of systems from conception through retirement. The architecture is constructed with a set of processes and interrelationships among these processes. The processes are based on two primary principles: modularity and responsibility.

4.4.2.2 Modularity

The processes are modular, in that they are:

a) Strongly cohesive: All the parts of a process are strongly related. This reduces the dependency of one process on others, which in turn increases the efficiency with which the process can be executed;

b) Loosely coupled: The number of interfaces among the processes is kept to a minimum, which reduces the amount of communication required for each process to successfully complete.

In principle, each process is dedicated to a unique function at each usage in a given stage of the life cycle and may employ another process for a specialized function. The following presents the rules for identifying, scoping, and structuring processes:

a) A process must be modular i.e. one process should perform one and only one function within the life cycle and the interfaces between any two processes should be minimal;

b) Each process is invoked in the architecture;

c) If a process A is invoked by a process B and only process B, then A belongs to B;

d) If a function is invoked by more than one process, then the function becomes a process in itself;

e) It must be possible to verify any function within the life cycle model;

f) Each process should have an internal structure defined sufficiently to be executable.

Participants will construct principles-observed analysis

~10 Principle *Candidates* Will Be Provided at Each Workshop

Principle 01 – where was this observed?

Principle 02 – where was this observed?

Principle 03 – where was this observed?

Principle 04 – where was this observed?

Principle 05 – where was this observed?

Principle 06 – where was this observed?

Principle 07 – where was this observed?

Principle 08 – where was this observed?

Principle 09 – where was this observed?

Principle 10 – where was this observed?

Principle (Others) – where were these observed?

2015 workshops revealed initial *candidate* principles that might be necessary and sufficient to cope with a CURVE SE environment.

These will evolve through each subsequent workshop as they are confirmed/denied/augmented in what is observed in each subsequent workshop.

Each workshop will use the latest evolution of candidate principles for analysis.

Keep in mind that the principles being sought are context-independent – i.e., they should be applicable in any-and-all Agile SE processes.

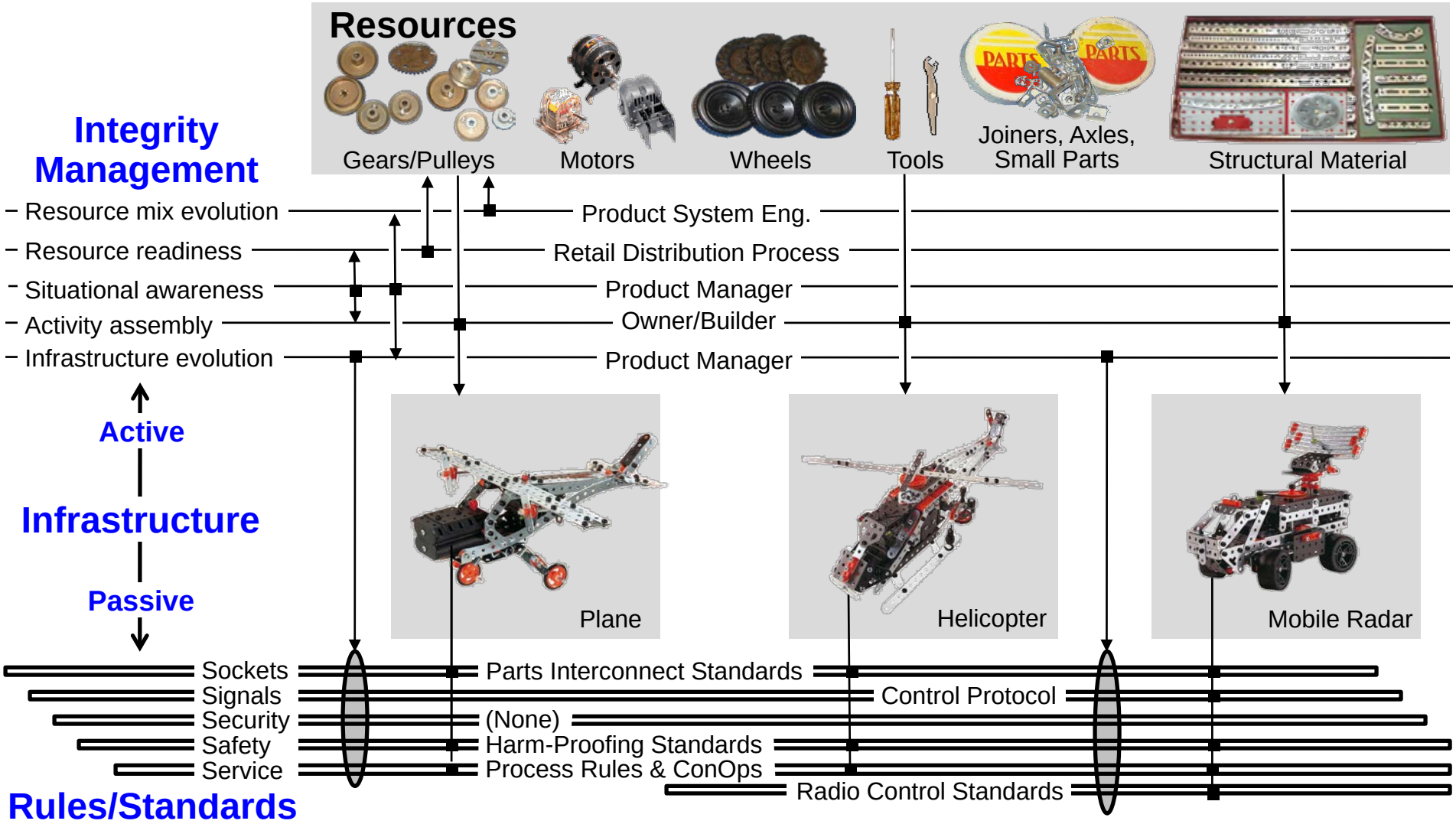
This necessitates stating the principles as high level concepts – with generic intent.

Each workshop will provide examples of how these generic principles are exhibited in context-specific application.

Day 3 – Iconic Agile Architecture Pattern (AAP)

System Response-Construction Kit

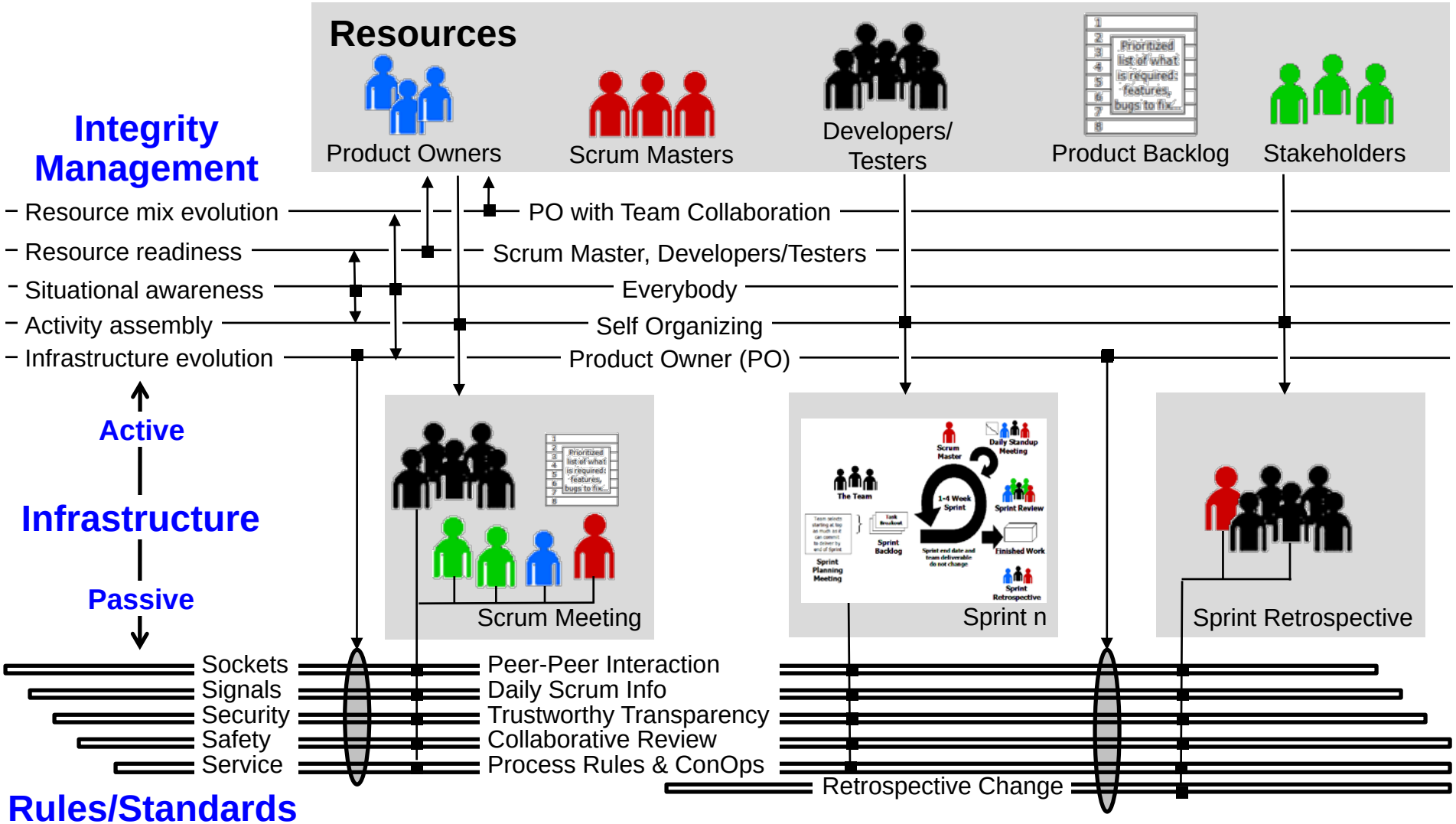
Details in www.parshift.com/s/140630IS14-AgileSystemsEngineering-Part1&2.pdf



Workshop Leadership prepares participants for AAP breakout development

Example: Scrum Agile Architecture Pattern (AAP)

Details in www.parshift.com/s/140630IS14-AgileSystemsEngineering-Part1&2.pdf



Pro forma only – not comprehensive

Workshop Leadership prepares participants for AAP breakout development

Example: Scrum SE Process AAP – Text Version

SE Process Drag and Drop Resource Pools

- Product Owners (PO), Scrum Masters (SM)
- Developers/Testers, Stakeholders
- Product Backlog

SE Process Active Infrastructure Responsibilities

- Module Mix Evolution: PO with team collaboration
- Module Readiness: SM, Developers/Testers
- Situational Awareness: Everybody
- Process Assembly: Self Organizing
- Infrastructure Evolution: PO

SE Process Plug and Play Passive Infrastructure

- Sockets: peer-peer personnel-interaction interface understandings
- Signals: what I did yesterday, will do today, need from others
- Security: trustworthy disclosure and transparency rules
- Safety: non-threatening and encouraging collaborative environment rules
- Service: Scrum-classic SE process ConOps

Pro forma only – not comprehensive

Participants will construct AAP from Host discussion

SE Process Architecture Elements

Objective: Which of These Elements are Process-Present, in what form?

SE Process Drag and Drop Resource (Module/Asset) Pools

- Resources are self-contained encapsulated units which conform to the plug-and-play passive infrastructure. They can be dragged-and-dropped into the SE process. Resources are encapsulated so that their methods of functionality are not dependent on the functional methods of other resources, except perhaps as the passive infrastructure may dictate.

SE Process Active Infrastructure Sustainment Responsibilities

- Resource Mix Evolution – Who (or what process) is responsible for ensuring that existing resources are upgraded, new resources are added, and inadequate resources are removed, in time to satisfy response needs: ?
- Resource Readiness – Who (or what process) is responsible for ensuring that sufficient resources are ready for deployment at unpredictable times: ?
- Situational Awareness – Who (or what process) is responsible for monitoring, evaluating, and anticipating the operational environment in relationship to situational response capability.
- Activity Assembly – Who (or what process) assembles new system configurations when new situations require something different in capability: ?
- Infrastructure Evolution – Who (or what process) is responsible for evolving the passive and active infrastructures as new rules and standards become appropriate to enable next generation capability: ?

SE Process Plug and Play Passive Infrastructure

The passive infrastructure provides drag-and-drop connectivity between resources. Its value is in isolating the encapsulated resources so that unexpected side effects are minimized and new operational functionality is rapid. At least five categories of standards and rules should be considered:

- Sockets – physical interconnect: ?
- Signals – data interconnect: ?
- Security – trust interconnect: ?
- Safety – of process user, process, and environment: ?
- Service – response assembly and sustainment ConOps: ?

Day 3 Host Challenge Presentation/Discussion Guide

This SE process or need-for-process is something the host would like the group to provide SE-agility guidance for improvement or creation. The intent is for all participants to apply what has been learned to-date in the discovery workshops in a break-out synthesis exercise.

Points to cover in 2 hours for subsequent process synthesis break-out exercise:

- **Present general context of challenge to be synthesized and its application.**
- **Present CURVE high-level points of concern.**
- **Present salient points of SE process and the nature of its need of more agility.**
- **Q&A throughout and following the above.**

Day 3 Synthesis Exercises

Synthesis exercise will cover Host challenge areas, converge on key RSA issues, and suggested application of principles to address challenge issues.

To be generated for full-group review:

- **RSA analysis of prime response issues**
- **Describe the application of principles and AAP to address the RSA issues**

Information Take Away from Workshop

Principle Information take-away:

- **Type of process: Scrum-like, Wave-like, SAFE-like, ICSM-like, LVC-like, uniquely home-grown, etc.**
- **Type of project domain: Defense, commercial, social, etc.**
- **Type of project intent: feasibility demonstration, proof of concept development, short-run rapid fielding, multiple-unit production product, single-unit system, etc.**
- **Type of product: satellite, automobile, unmanned vehicle, integration process, command & control system, bio-medical device, etc.**
- **All host SE-process presentations and consolidated break-out analysis/synthesis exercise reviews. General sessions will be audio recorded for review if needed when developing workshop synopsis.**

Other information take away:

- **To what extent was an agile system developed to enable the agile process?**
- **Nature of permitted/encouraged personnel-activity autonomy.**
- **Distinct process 15288 stages and stage-engagement decision criteria.**
- **To what extent was system security integrated into the SE processes?**
- **Agile SE Metrics.**

Post workshop synopsis and case study:

- **A synopsis of the discovery learning at each workshop will be developed within 30-days.**
- **A case study article will be developed by ASELCM Project leadership in collaboration with Host personnel, and agreed by Host POC that it is accurate and can be published and employed in the project final report to the extent deemed relevant.**