

Automating Process Enactment Using IBM® Rational Team Concert™

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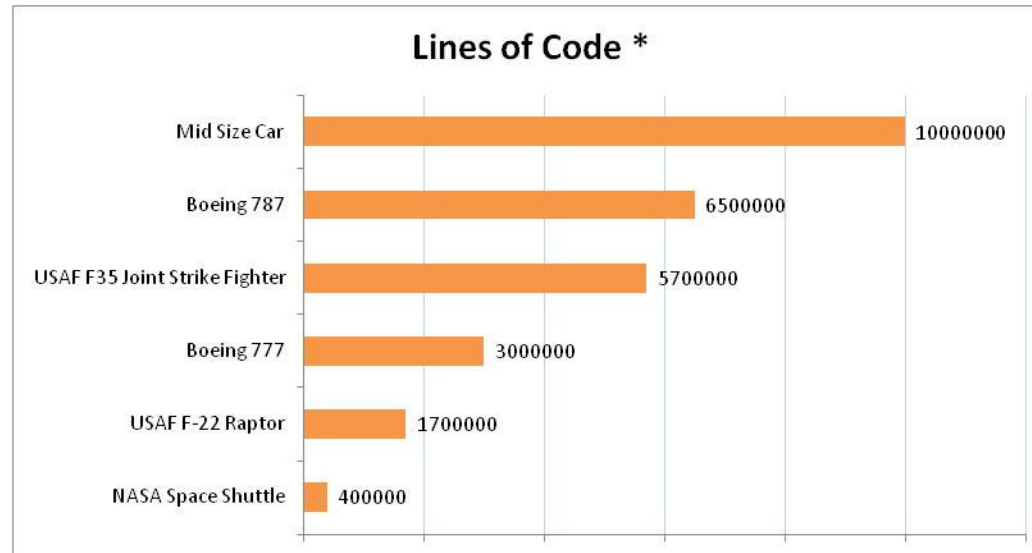
August 9-11, Bangalore | August 11, Delhi



Agenda

- Background
- The Challenge
- Goals and Principles
- Solution
- Benefits
- Lessons Learned
- Future Plans

Background



* IEEE Spectrum February 2009

The average Mid Size vehicle has

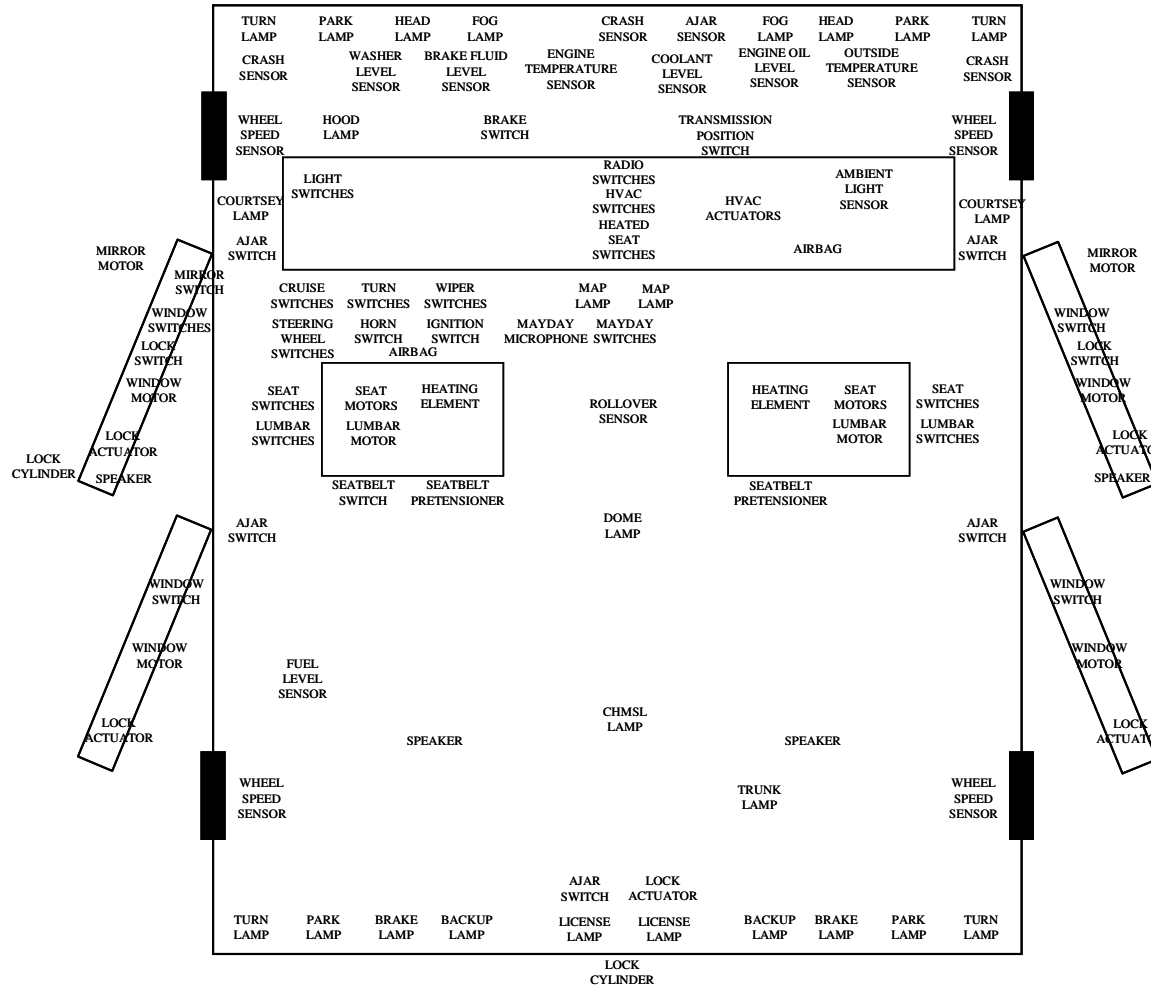
- Between 40 and 60 Electronic Control Units (ECUs) on board
- Over 8 MBytes of Software
- Over 10 Million Lines of Code (LOC)
- Over 5000 Vehicle variants
- Over 15000 calibrated vehicle variants

The Challenge

- Increasing number of Software Intensive Features
 - ▶ More than 80% of new features are Software enabled
- Increasing number of Distributed Features
 - ▶ More than 70% of new features are distributed

The Challenge (continued)

The Vehicle is Distributed by Design



The Challenge (continued)

Distribution across the vehicle

<u>DOMAINS</u>	Front End	Under Hood	Instrument Panel	Doors	Interior Cabin	Rear Deck	Trunk	Rear End
Body/Comfort	X	X	X	X	X	X	X	X
Safety	X		X	X	X			X
Chassis	X	X	X				X	
Powertrain	X	X	X				X	
Infotainment	X	X	X	X	X	X	X	X

The Challenge (continued)

Domains

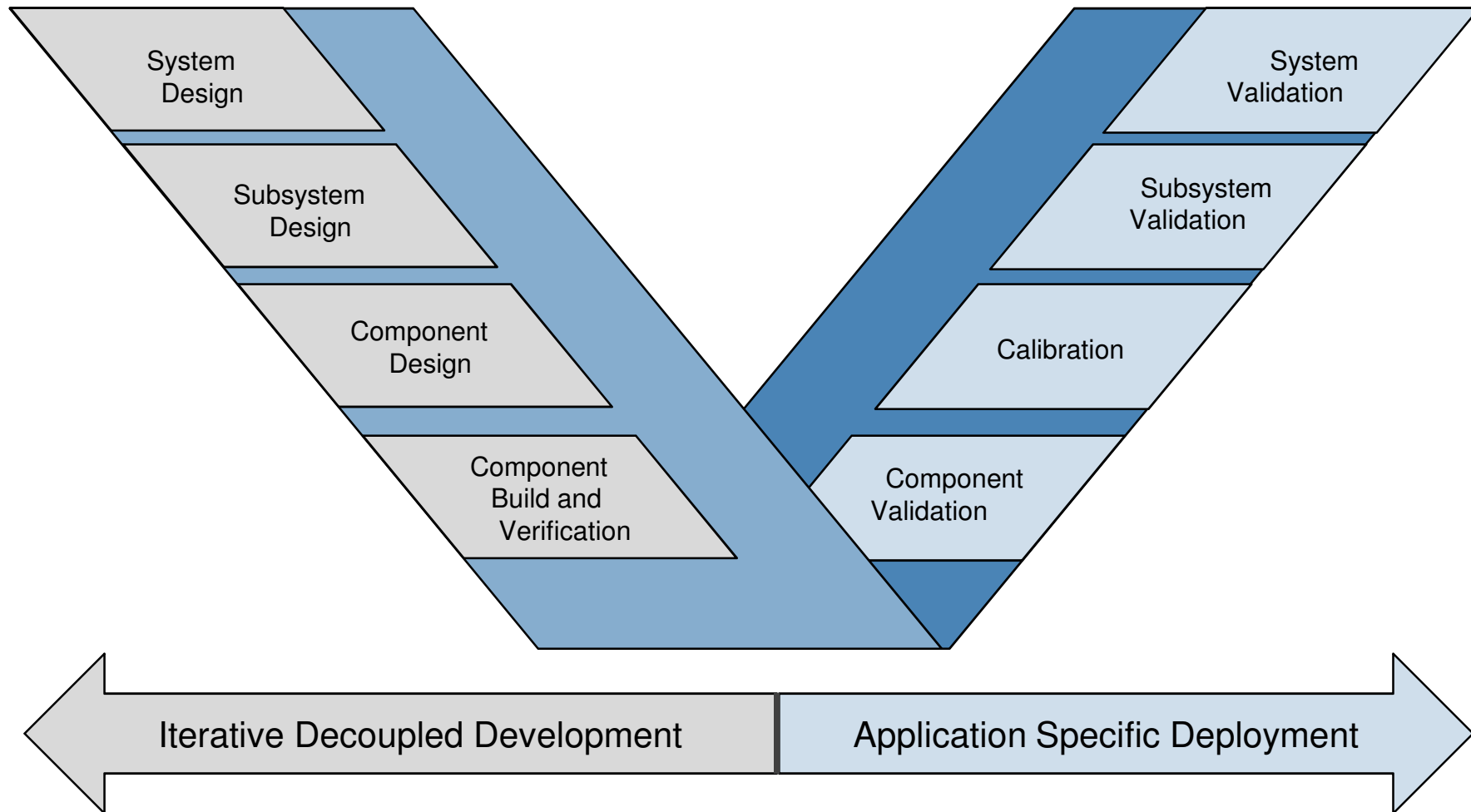
- Body/Comfort
 - Power windows, locks, heating, cooling, etc.
- Safety
 - Airbags, lane detection, etc.
- Chassis
 - Anti-lock brakes, traction control, etc.
- Powertrain
 - Engine (gas, diesel, hybrid), transmission (automatic, manual), etc.
- Infotainment
 - Radio, navigation, speed, fuel, warnings, etc.

Different processes and tools used across the different domains

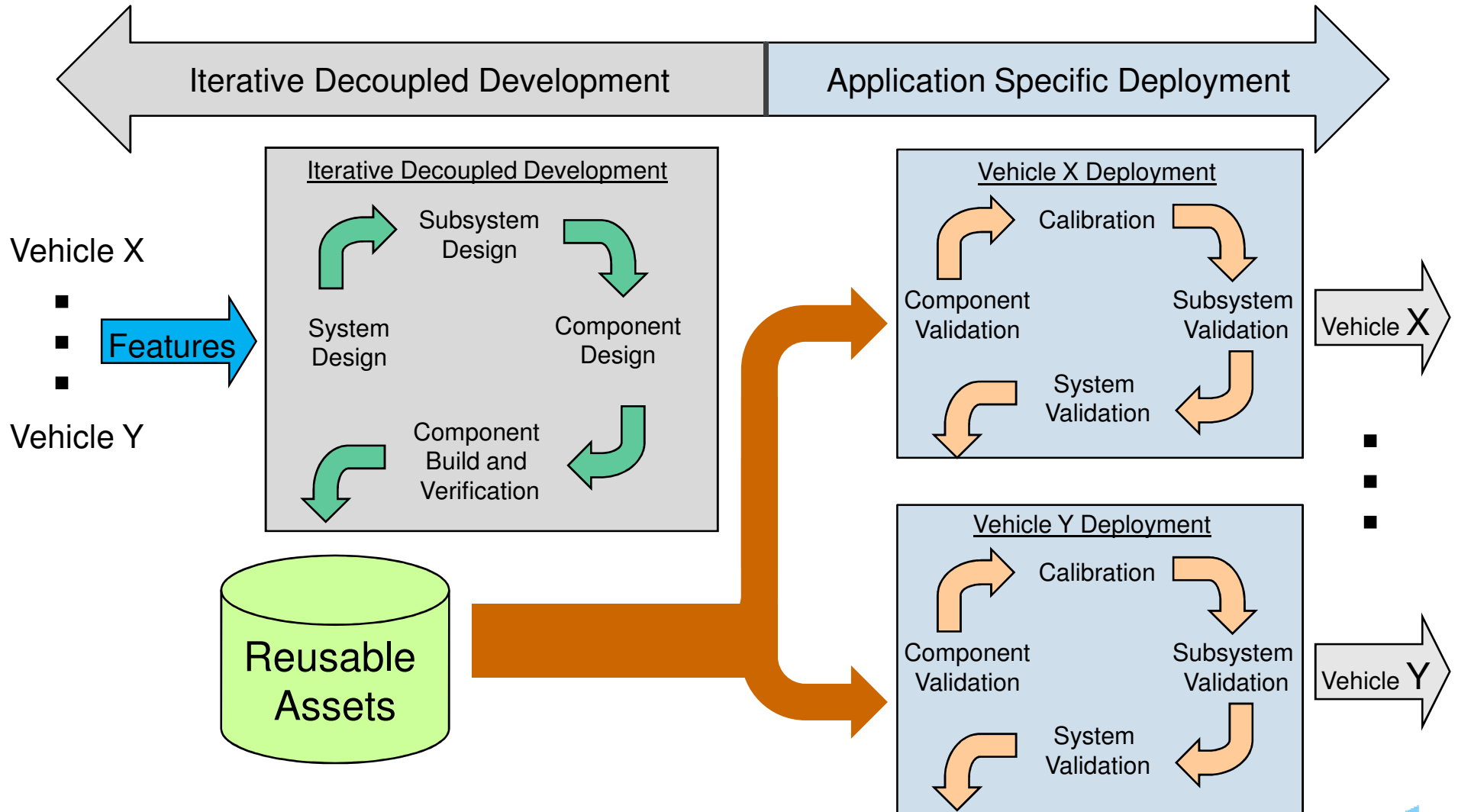
Goals and Principles

- Goals:
 - ▶ Enhance process fidelity: bridge the gap between theory (documented process) and practice (executed process)
 - ▶ Ease process adherence for the practitioners
 - ▶ Enable process compliance to CMMI and ISO standards
- Principles:
 - ▶ Guidance and support for practitioners instead of strict governance
 - ▶ Integration of industry standard tools instead of implementing unique solutions

High Level Process



Application Specific Deployment



Problem Statement

- Lack of tools to integrate to ensure execution of work according to defined processes, thereby, leading to rigorous human effort to ensure process adherence to produce a high quality product

Process Enactment Automation Solution

What and When? Process Modeling Tool (Stages)

Process Definition (Phases, Activities, Roles, Work Products, ...)
Process Compliance (Mapping to CMMI-DEV, ISO 26262, ISO 9001)

Transform to

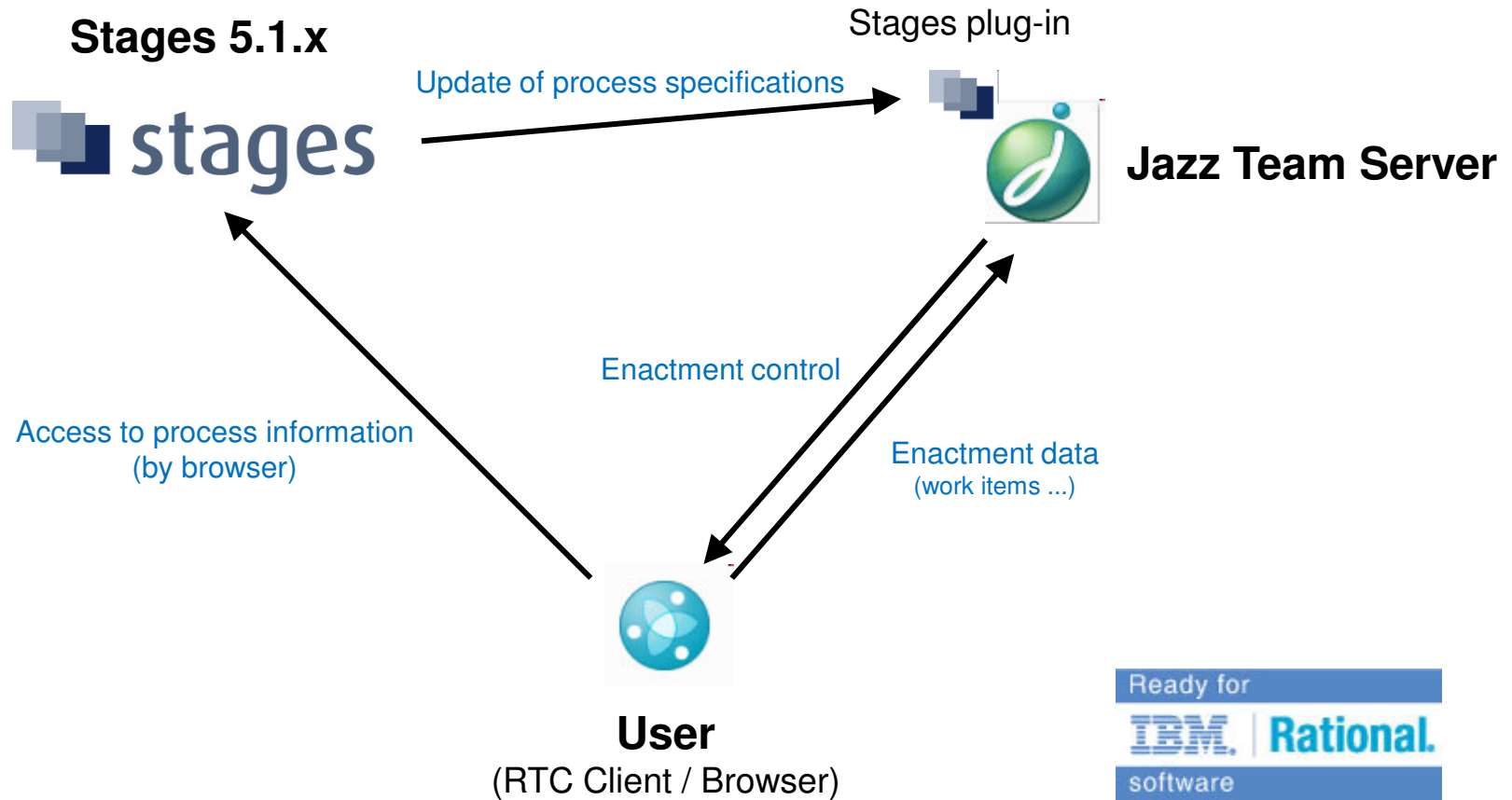
Process Enactment
(Change Requests, Work Tickets, Assigned Persons, Work Assets,...)

Uses

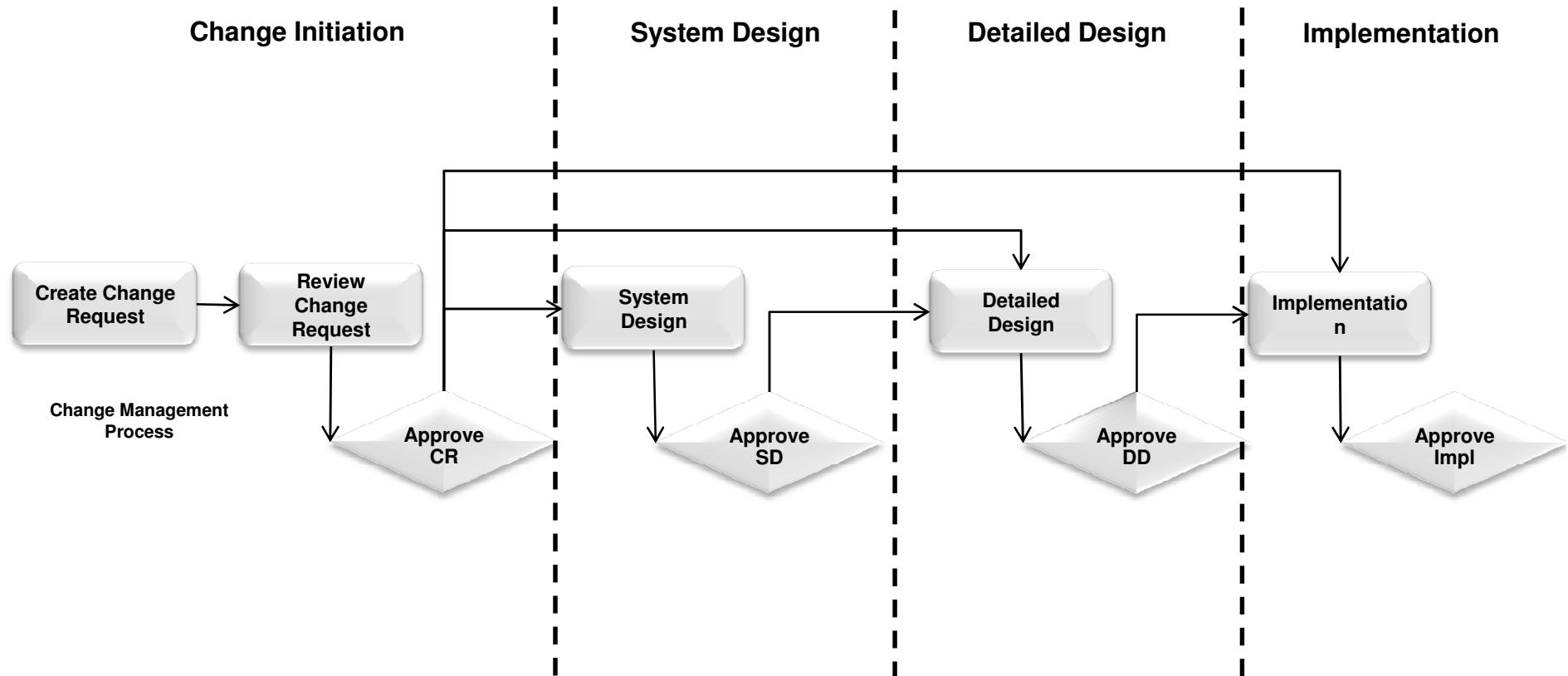
Process Enactment Rules

How? Change & Configuration Management Tool (RTC)

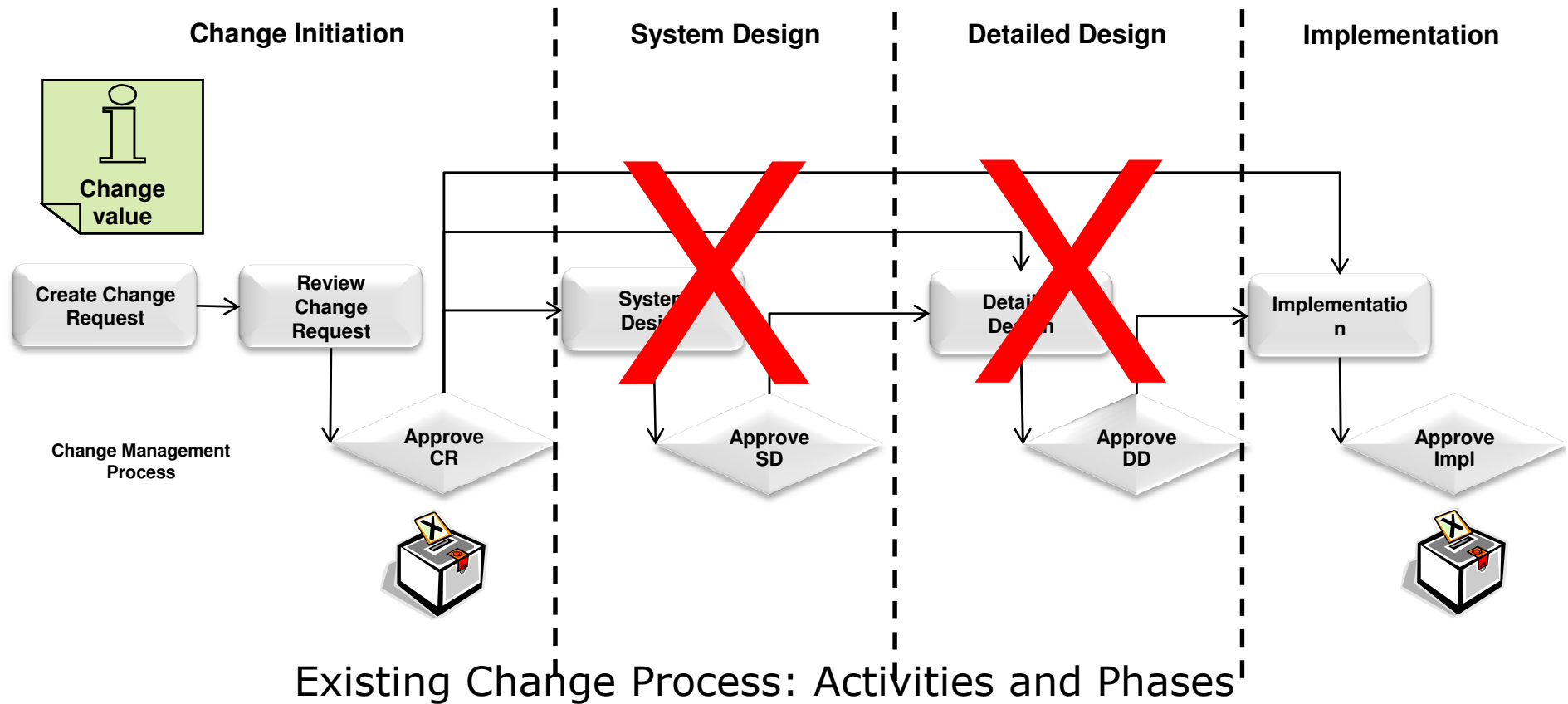
Process Enactment Components



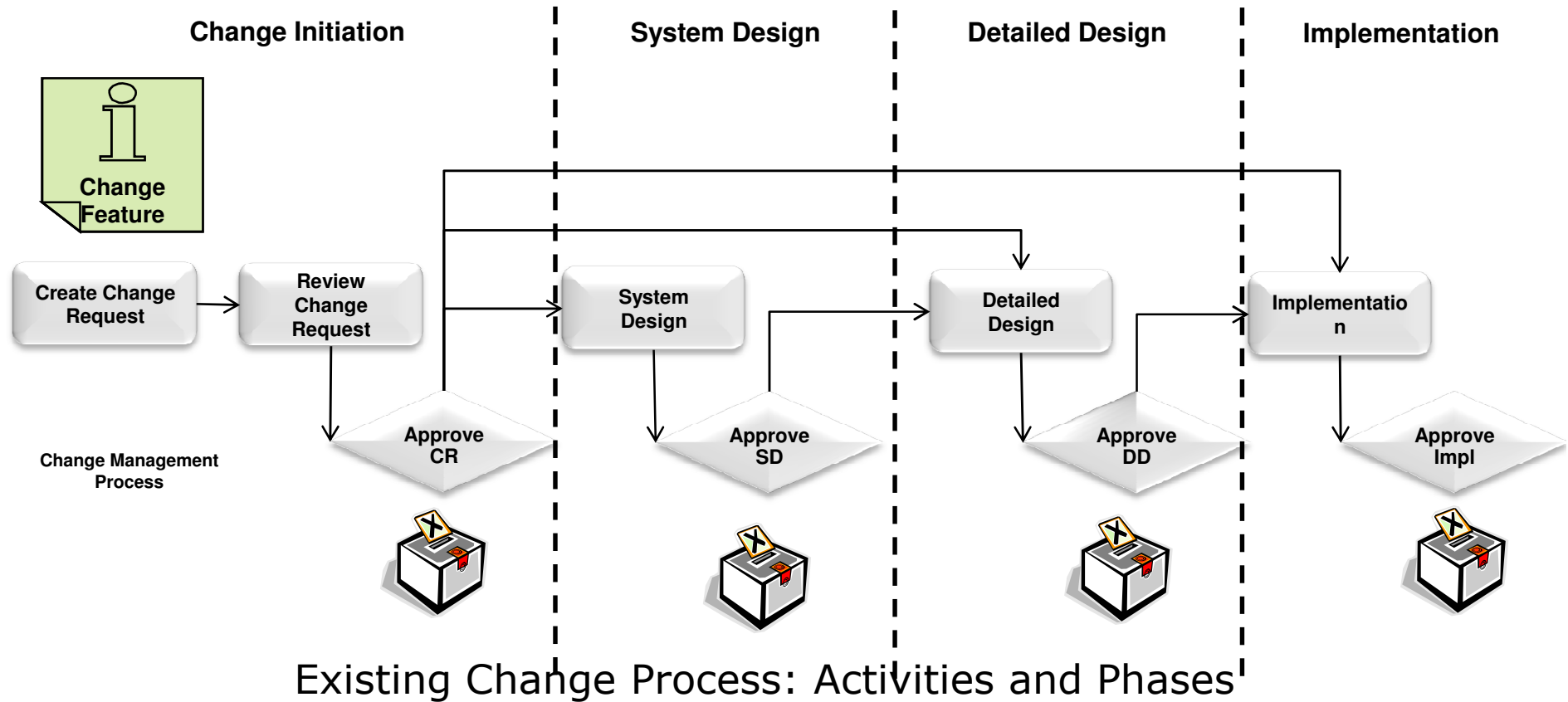
Process Flow Example: Change Process



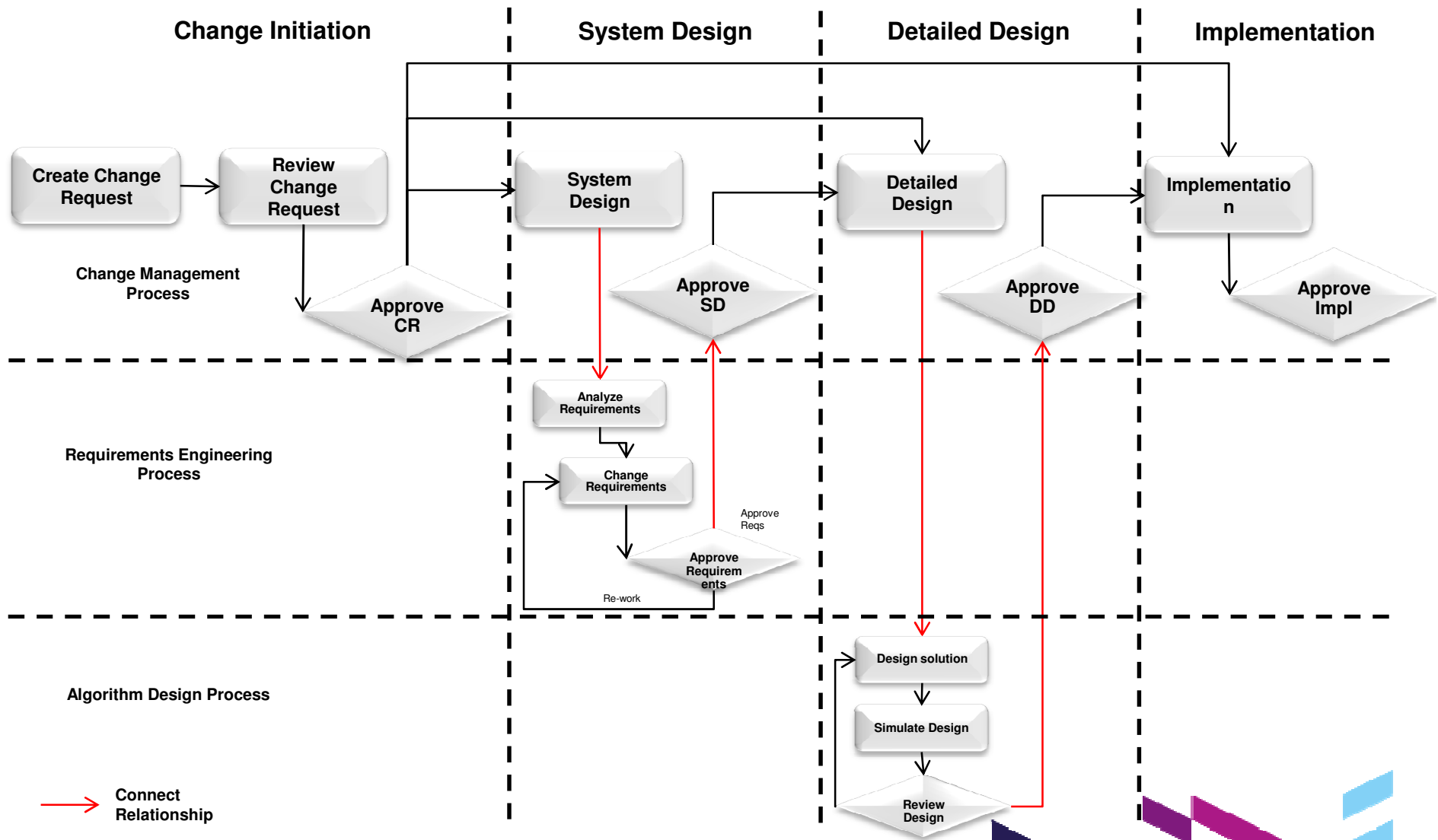
Process Execution Example: Simple Change Request



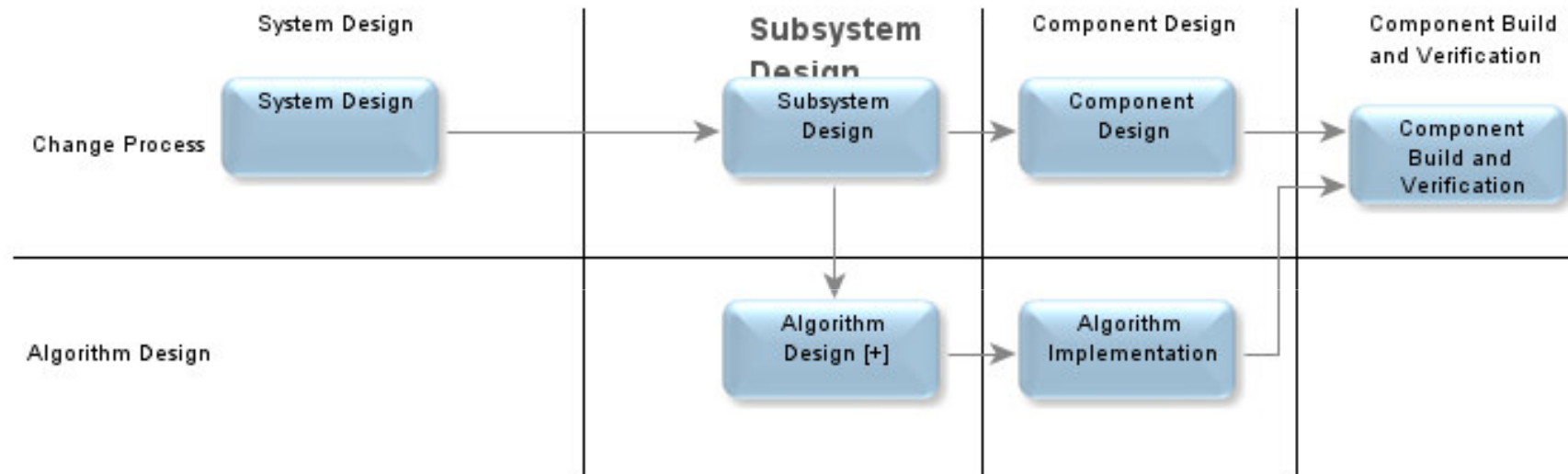
Process Execution Example: Complex Change Request



Process Flow Example: Multiple Process Enactment

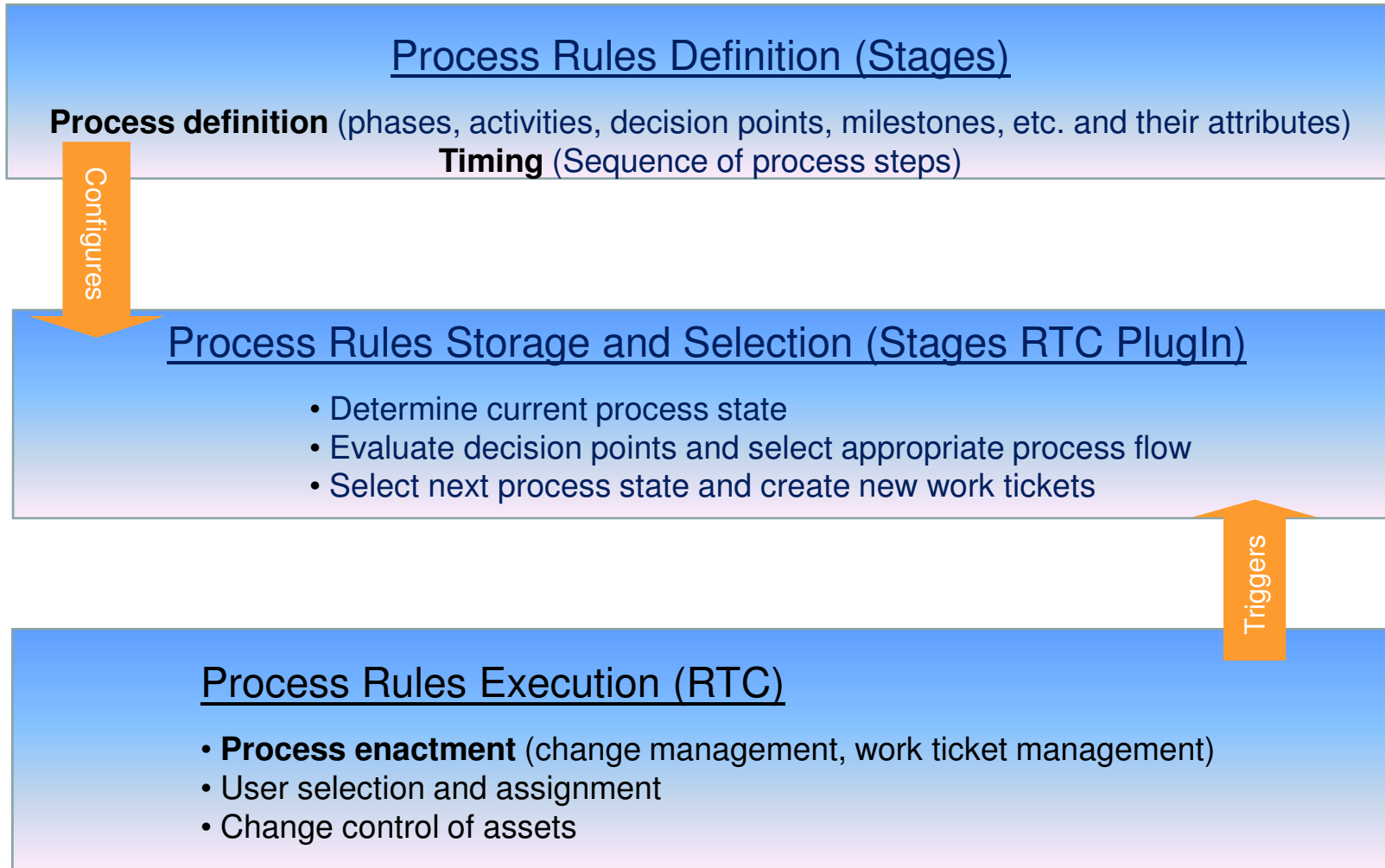


Process Flow Example: Change Process and further Implementation Steps



Enhanced Change Process:
Additional Implementation Activities

Process Enactment Components



Benefits

- Better process adherence, because toolchain supports and guides the process execution (but does not dictate it)
 - ▶ Practitioners cannot skip important process steps
 - ▶ Practitioners can create additional work tickets if required
- No tool reconfiguration required for implementing process changes
- Practitioners do not need to know CMMI or ISO

Lessons Learned

- Perform distributed process design leading to higher acceptance
- Subject Matter Experts (SMEs) should be part of the Process Action Teams (PATs)
- Support people instead of governing them

Future Plans

- Enhance solution to cover entire high level process (iterative decoupled development and application specific deployment)
- Integrate with Measurement & Analysis
 - ▶ Process adoption, usage, and compliance
 - ▶ Product quality improvements
 - ▶ Project status as related to process artifacts
- Integrate with larger vehicle level processes (PLM systems, document management systems, etc.)

QUESTIONS

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