NEXT GENERATION OF REQUIREMENTS ENGINEERING

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The total cost of poor automotive software quality (CPSQ) in United States in 2020 was...

$2.08 trillion

Source: Consortium for Information & Software Quality (CISQ)
Imagining the **day** that the cost of poor automotive software quality is **zero**.
Key message

Show how key focused areas can be addressed using solutions that have been developed by solving problems working on real challenges rather than conceptual patterns.
How can we reduce complexity?

Variant Reduction

Off-Cycle / On-Cycle Development

Complexity reduction has been an area of interest for many years with little progress made so far.
Complexity Reduction
Variant Management

Variant Reduction

- Systems & features integration
- Single hardware variant
- Configuration via software only

Complexity Reduction

Variant reduction reduces interdependencies hence reducing design and validation efforts
COMPLEXITY REDUCTION
OFF-CYCLE vs ON-CYCLE DEVELOPMENT

Off-Cycle / On-Cycle Development

- Off-cycle development agnostic of architecture
- On-cycle development agnostic of programme but not architecture
- On-cycle development gnostic of programme

Use of mainline

Leveraging mainline and off-cycle development to speed up design re-use and reduce complexity
DELIVERING SOFTWARE QUALITY
CONTINUOUS DEPLOYMENT

How can we achieve continuous deployment?

Full MBSE & MBD using Agile
End2End Automated Pipelines

Continuous Deployment

Better coverage, faster releases, scalability and team empowerment to retain and attract talent
CONTINUOUS DEPLOYMENT
FULL MBSE/MBD & AUTOMATED PIPELINES

- System Definition & Design (incl. Stakeholder and Sub-System levels)
- Software Development & Implementation
- Hardware Development & Implementation
- System Integration & Test
- Software Integration & Test
- Hardware Integration & Test

Planning, Compliance & Governance
- Iterative Approvals
- Iterative Compliance
- Strategy & Planning
- Alignment & Prioritisation

- Small Batches
- Iterative Development
- Fast Feedback
- Minimum Viable Product
- Continuum

Requirements engineering in the context of the End2End product delivery and continuous measurement
CONTINUOUS DEPLOYMENT
FULL MBSE/MBD & AUTOMATED PIPELINES

System Definition & Design
Virtual System Model

Software Development

Hardware Development

It is recognised that:

Requirements engineering in the context of the End2End product delivery operationalised by agile

- Small Batches
- Iterative Development
- Fast Feedback
- Minimum Viable Product
- Continuum
CONTINUOUS DEPLOYMENT
FROM GATED DELIVERY TO PRIORITISED ENGINEERING

Requirements engineering operationalised by agile and delivery focused on business value
DEVELOERING SOFTWARE QUALITY
CONNECTED TOOLSET

What do we need from a connected toolset?

- Traceable Toolset
- Integrated with Data Lake

Removing duplication of data, increasing throughput and quality of product definition
CONNECTED TOOLSET
TRACEABILITY AND LINK TO DATA LAKE

Integrated and traceable engineering data enabling iterative development through fast change impact analysis
REQUIREMENTS ENGINEERING FOR SOFTWARE QUALITY

CONCLUDING REMARKS & NEXT STEPS

Real solutions presented for focused areas can be used to improve software quality.

Software complexity will continue to increase together with new regulations coupled with shorter development times.

Need to leverage artificial intelligence, data science and accelerate full digital transformation.

Nothing of what has been said can be achieved without talented people and empowered teams.
THANK YOU

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