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Beyond the Checklist: Rethinking Quality for an Agile Era

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We pioneer motion

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20 years in automotive and software quality

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AGENDA

Opening Session	Introduction: Beyond the Checklist	The Changing Automotive Landscape	The Limitations of Traditional Quality Models	Agile Principles in Automotive
Rethinking Quality: A Holistic Approach	Continuous Integration/Continuous Delivery (CI/CD)	The Role of Automation and AI in Quality	Traditional vs. Modern Testing Approaches	Data-driven Quality: The Power of Telemetry
The Role of ASPICE in an Agile World	Case Study: SDV Cybersecurity Transformation	The Future of Automotive Quality	Conclusion: Beyond the Checklist	Q&A

The Changing Automotive Landscape

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The "China Speed" Challenge:

Rapid innovation and intense competition

Software-Defined Vehicles (SDVs):

Vehicles are becoming complex software platforms

Shifting Customer Expectations:

Consumers demand seamless, connected, and personalized in-car experiences

From Hardware-centric to Software-centric:

The focus is shifting from mechanical components to software and electronics

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The Limitations of Traditional Quality Models

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Checklist-driven Compliance:

Over-reliance on rigid, document-heavy processes slow down development.

Siloed Development and Testing:

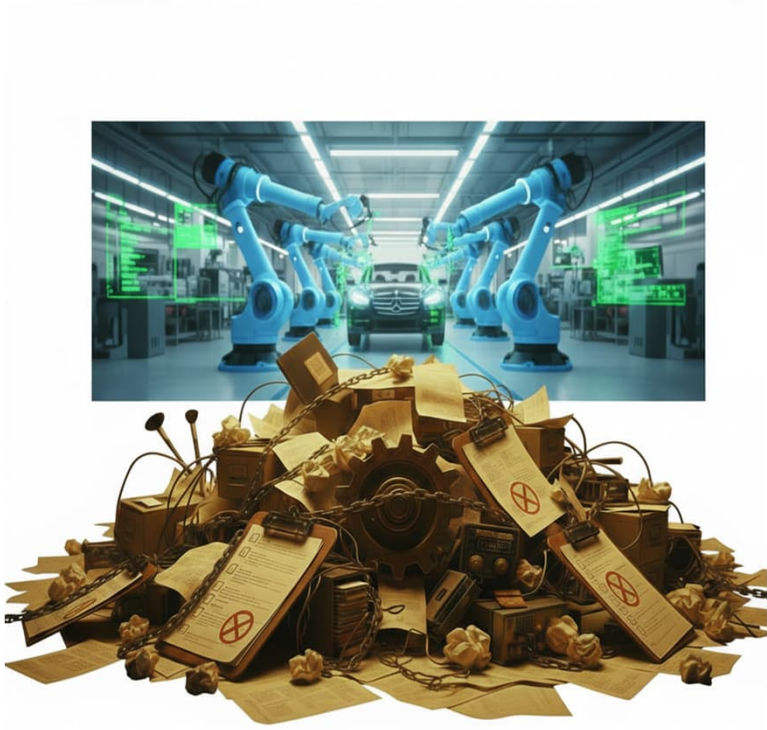
Traditional V-model approaches create silos between development, testing, and quality assurance teams, leading to late feedback and integration issues.

Slow Feedback Loops:

Long development cycles and late-stage testing mean that feedback from customers and real-world usage is often delayed.

Inadequate for Agile:

These models are not well-suited for the iterative and incremental nature of agile development, where requirements and priorities can change rapidly.



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Agile Principles in Automotive

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Individuals and interactions over processes and tools

Proven solution over comprehensive documentation

Customer collaboration over contract negotiation

Responding to change over following a plan

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Rethinking Quality: A Holistic Approach

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Beyond Defect Detection:

Quality is not just about finding and fixing bugs. It's about delivering value to the customer and creating a positive user experience.

"Built-in" Quality:

Quality must be embedded into every stage of the development process, from initial design to final delivery.

Customer-centricity:

The ultimate measure of quality is customer satisfaction. We must focus on understanding and meeting their needs and expectations.

Continuous Improvement:

Quality is a journey, not a destination. We must constantly seek to improve our processes, tools, and practices.

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Continuous Integration/Continuous Delivery (CI/CD)

Automated Build and Integration:

Code changes from multiple developers are automatically built and integrated into a shared repository several times a day.

Automated Testing:

A comprehensive suite of automated tests (unit, integration, regression) is run on every build to provide rapid feedback on code quality.

Faster Time to Market:

CI/CD enables a rapid and reliable release process, allowing new features and bug fixes to be delivered to customers more frequently.

Reduced Risk:

By testing small, incremental changes, CI/CD reduces the risk of introducing major issues into the codebase.

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The Role of Automation and AI in Quality

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AI-Powered Test Case Generation:

- Automatically create more effective test cases.
- Cover edge cases that human testers might overlook.

Predictive Defect Analysis:

- Use machine learning to identify code areas prone to defects.
- Focus testing efforts on high-risk components.

Automated Anomaly & Failure Analysis:

- Analyse vast amounts of vehicle telemetry data to detect anomalies.
- Automate root cause analysis of failures, significantly reducing diagnostic time.

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Traditional vs. Modern Testing Approaches

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Traditional "Shift Left" Testing

Focus: Find bugs *before* release.

Environment: Staging, QA, or testing labs.

Activities: Unit tests, integration tests, user acceptance testing (UAT).

Goal: Ensure the software works as designed.

"Shift Right" Approach

Focus: Understand real-world performance and user behavior *after* release.

Environment: The live production environment (the vehicle on the road).

Activities: Telemetry, A/B Testing, Analytics, feature flagging, canary releases.

Goal: Ensure the software delivers real value and works as intended in the wild.

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Data-driven Quality: The Power of Telemetry

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Real-world Usage Data: Collecting and analyzing telemetry data from vehicles in the field provides invaluable insights into how customers are using the product.

Identifying "Unknown Unknowns": Telemetry can help to uncover unexpected issues and usage patterns that were not anticipated during development and testing.

Proactive Maintenance and Support: By monitoring vehicle health and performance in real-time, we can proactively identify and address potential issues before they become major problems.

Continuous Product Improvement: Telemetry data provides a continuous feedback loop that can be used to inform future product development and improve the overall user experience.

The Role of ASPICE in an Agile World

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ASPICE as a Framework, not a Dogma:

Automotive SPICE (ASPICE) should be seen as a framework for process improvement, not a rigid set of rules to be blindly followed.

Tailoring ASPICE for Agility:

The key is to adapt ASPICE processes to fit the iterative and incremental nature of agile development.

Focus on Outcomes, not just Artifacts:

The goal is to achieve the desired outcomes of the ASPICE processes, not just to produce a mountain of documentation.

Lean and Agile Process Implementation:

Implement lean and agile principles to streamline ASPICE compliance and reduce overhead.

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Case Study: SDV Cybersecurity Transformation

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The Challenge (The "Before"): Reactive & Fragmented

A Vehicle Full of Vulnerabilities

• Massive Attack Surface from 100+ siloed ECUs.• Months-long patch delays requiring dealership visits.• No real-time threat monitoring on the road.

The Solution (The "How"): Proactive & Centralized

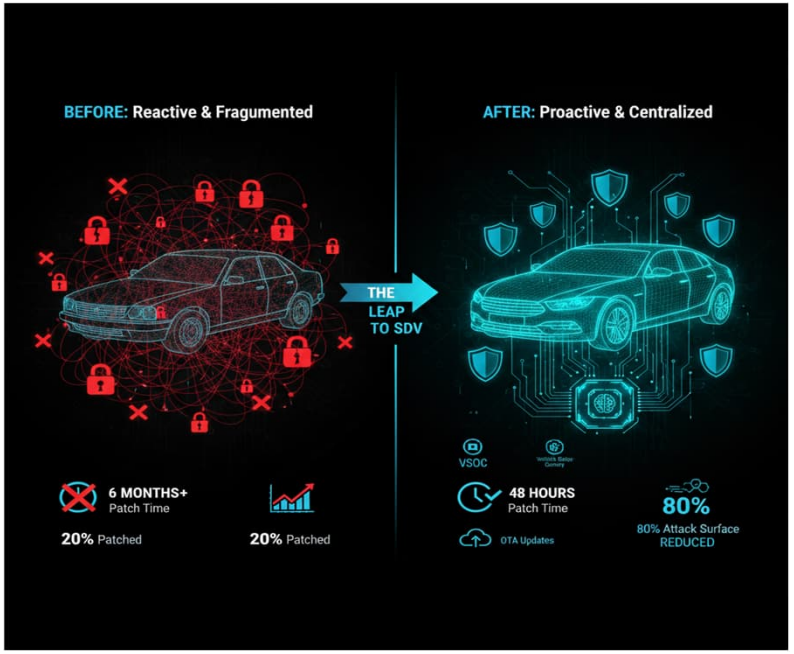
Security-by-Design with SDV

• DevSecOps: Embedded automated security scanning into the CI/CD pipeline.• Centralized Monitoring (VSOC): Enabled real-time intrusion detection across the fleet.• Rapid OTA Patching: Ability to deploy critical security fixes to all vehicles at once.

The Results (The "After"): A Cyber-Resilient Fleet

From Months of Risk to Hours of Response

• Patch Time: 6 Months → 48 Hours.• Attack Surface: Reduced by 80%.• Thwarted a live zero-day attack in under 72 hours via an OTA update.• Achieved UN R155 compliance ahead of schedule.



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The Future of Automotive Quality

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AI and Machine Learning:

AI will play an increasingly important role in all aspects of quality, from test automation to predictive maintenance.

DevSecOps:

Integrating security into the DevOps pipeline to ensure that vehicles are secure by design.

Over-the-Air (OTA) Updates:

OTA updates will become the primary mechanism for delivering new features, bug fixes, and security patches to vehicles.

The Digital Twin:

Creating a virtual representation of the vehicle that can be used for simulation, testing, and diagnostics.

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Conclusion: Beyond the Checklist

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A New Mindset:

Rethinking quality in the agile era requires a fundamental shift in mindset, from a focus on compliance to a focus on customer value.

Embrace Change:

The automotive industry is in a state of rapid transformation. We must be willing to embrace change and adapt our processes and practices accordingly.

Collaboration is Key:

Breaking down silos and fostering a culture of collaboration is essential for success in the agile era.

Continuous Learning and Improvement:

The journey to agile quality is a continuous process of learning, experimentation, and improvement.

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Q&A

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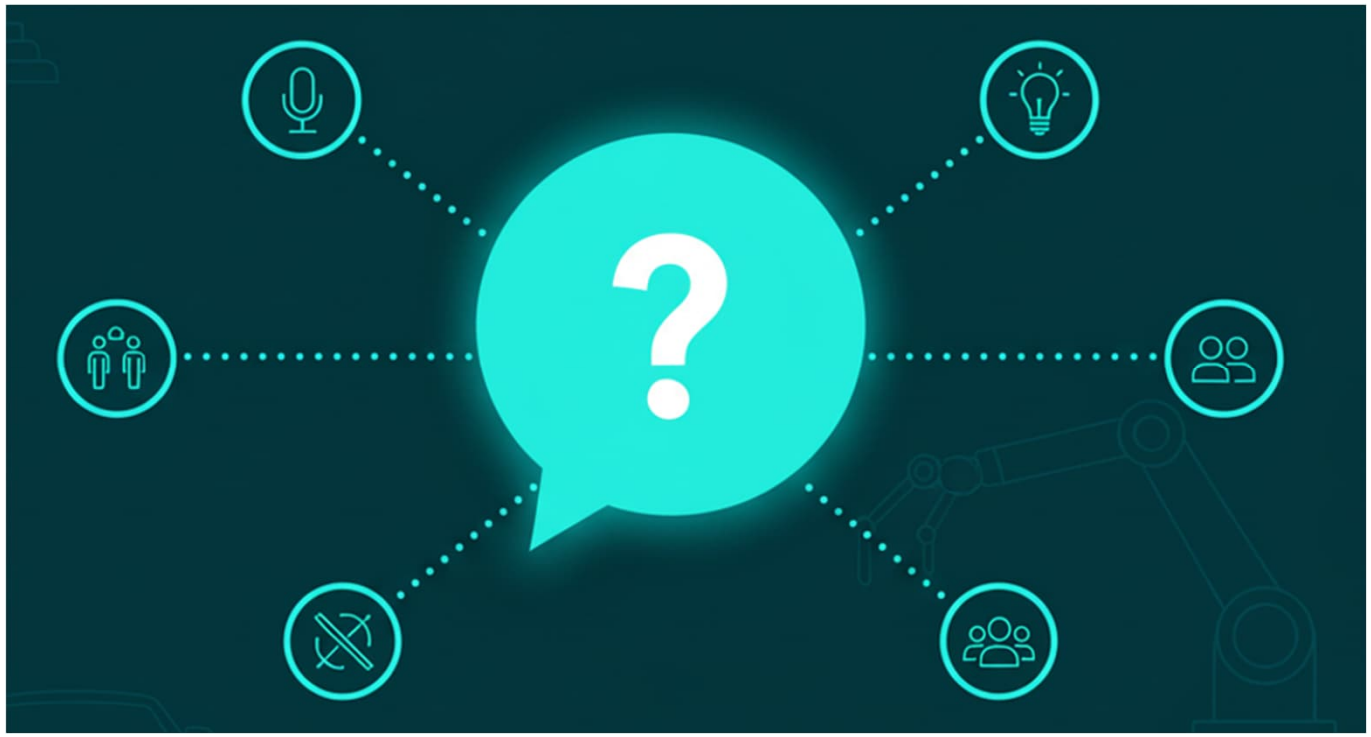

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