IBM solutions for embedded agile software development
**Highlights**

- A solution built around collaboration to support the agile development lifecycle for embedded software
- Spans the entire embedded software development lifecycle including agile planning and task management from requirements through design, test and quality management to delivery of the working product
- Built-in support for repeatable agile processes helps keep development teams on the same page from the outset
- Provides interoperability across the lifecycle and extensibility through open standards

**An embedded world**

Embedded technology is practically everywhere today: in cars, airplanes, consumer electronics, household appliances, medical devices, and more. In many cases, it is already a key point of competitive differentiation for products and systems. The importance and value of embedded technology will only increase as the Internet of Things becomes a reality, bringing with it a huge number of ever more instrumented, interconnected and intelligent products.

Agile methods are today the default approach in enterprise and IT software development. With the right attention to the needs of embedded development, agile can offer the same benefits in this field, too:

- Better collaboration to align project outcomes with customer and user needs
- Incremental delivery to cut risk and improve the predictability of delivery
- Early detection of errors through rapid feedback to improve quality and avoid late derailment of projects
- Improved efficiency through the elimination of unnecessary work – to deliver more, faster.

To fully exploit the benefits of an agile approach, organizations need a development and delivery environment that meets the specific requirements of embedded development while also being able to scale to the needs of projects and the market. Correctly implemented, agile embedded development can become an essential part of delivering the continuous engineering capability that is key to creating tomorrow’s sophisticated and highly connected products and services.
Agile collaboration for the whole development team

The IBM® solution for systems and software engineering is an open, flexible, standards-based collaboration environment for the agile delivery of complex real-time and embedded software. It is built on the widely-used IBM Jazz™ platform, which provides integration and interoperability across the full lifecycle, and it offers extensibility through the Open Services for Lifecycle Collaboration integration standard and via additional capabilities from both IBM and third-party vendors.

Combining tools, best practices and flexible deployment options to deliver flexible solutions that can grow with each organization’s needs, the IBM solution for systems and software engineering supports:

- Agile planning and management
- Requirements management and traceability
- Model-based architecture and design
- Quality management and testing
- Change and configuration management
- Reporting and analytics.

The IBM Systems Solution Library provides proven best-practice support, drawing on a core of agile best practices specifically tuned to the needs of embedded development. It includes industry-specific practice variants to support development teams working with industry standards, and it can be customized using process authoring tools to meet specific organizational or project requirements.

Figure 1. The IBM solution for systems and software engineering

Key capabilities for successful agile embedded delivery

Agile planning and management

In an agile world, planning and management must be adaptive and flexible, and it is vital to keep teams focused on the goal by allowing all members to work with relevant, up-to-date information at the right time. The IBM solution provides web-based,
task-specific information to developers, tightly linked to other development tools and the information they contain, to help them to do the right job faster. Tasks, changes, backlogs and other essential information are available in real time. Equally, project managers can access an up-to-the-minute view of metrics such as task statuses, test results, burn-down, and more.

Agile requirements and traceability
Rapid and effective response to change is one of the cornerstones of agile. In embedded development, where there are typically many dependencies on hardware and other potentially time-critical software functions, this is hard to achieve. Traceability is the key to understanding the impact of change. In the IBM solution, traceability can be created between work products as they are built or modified—with powerful tools to analyze, visualize and understand the linked information — making change easier to manage.

Agile modeling and simulation
Agile can deliver higher quality results and lower delivery risk through the early detection and correction of errors. The IBM solution’s modeling capabilities enable visual collaboration on architecture and design, helping teams quickly gain a shared understanding of the embedded software being built. Furthermore, the solution’s simulation and code generation capabilities provide a mechanism to prove at the earliest opportunity the correctness of the architecture and the detailed design.

Test and quality management
Test-driven approaches help ensure that agile development will deliver the right output. The IBM solution’s ability to automatically generate and execute tests from architecture and design models enables testing to be conducted efficiently and accurately. Its quality management capabilities enable the efficient reuse of tests and test suites throughout the development lifecycle, and allow the integration of defect resolution and change management processes.

Reporting and analytics
While agile de-emphasizes unnecessary documentation activities, reporting is still necessary in many embedded agile projects—for example, to provide evidence for standards compliance. The IBM solution provides automated reporting capabilities that capture information and automatically generate the required documentation—boosting efficiency and cutting errors. Meanwhile, its analytics capabilities can dynamically access lifecycle information to answer questions on subjects such as change impact, status and progress reporting.

Change and configuration management
Change and configuration management processes are vital to the successful delivery of complex embedded software, but they must not be an overhead that detracts from the agile focus. The IBM solution provides change and configuration management capabilities that are integrated with the agile development environment, enabling developers to maintain full control of development artifacts as an integral part of the agile process.
Agile process support
One of the keys to successful agile development is having a ‘just
enough’, repeatable process that is tuned to the needs of the
development team. Here, the IBM solution provides integrated,
customizable, role-based support for agile processes. These are
enacted through templates, tool mentors, web-based documenta-
tion and a comprehensive process library. The IBM solution
supports industry standards including ISO 26262 (automotive),
DO178B/C (aerospace), IEC 62304 (medical devices)
EN 50128 (rail), and is customizable via process authoring tools.

Deploying the IBM solution
The IBM solution can be adapted to the size and specific
requirements of any organization, and is fully scalable across
the embedded software development lifecycle. Organizations
can start with a complete solution—or choose one or more
components to solve particular problems, and then scale the
deployment as their needs evolve.

Organizations can deploy the solution to an individual
co-located team, or to a large, complex and distributed
development organization—on-premise or on the cloud,
with a choice of service levels including full managed service.
Optional IBM deployment services bring IBM’s deep industry
experience through the deployment of proven, customizable
practices and methods to ensure efficient, repeatable and
error-free workflows and rapid time-to-value.

Why IBM?
IBM offers the broadest range of agile development capabilities
integrated on a standards-based collaboration platform, backed
by process and deployment support designed to improve
embedded software delivery.

The IBM solution for systems and software engineering is built
on the Jazz collaboration platform, and includes flexible deploy-
ment options to help simplify the vendor landscape and integrate
distributed environments for real-time and embedded software
development. The fully comprehensive IBM solution helps
organizations deliver higher quality embedded software faster,
with greater predictability—while ensuring industry-specific
standards are supported.

For more information
To learn more about the IBM solution for systems and software
engineering, please contact your IBM sales representative
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