



CONFIGURABLE EMBEDDED
ENGINEERING ECOSYSTEM

Embedded DevOps & AI Software Factory

From Physical Lab to Intelligent Software Factory

A modular engineering ecosystem configured around your hardware, software lifecycle, security policies and validation needs.

CONNECT • AUTOMATE • VIRTUALISE • VALIDATE • SCALE INTELLIGENTLY

Embedded Development Is Still Constrained by the Physical World

Complex hardware, distributed teams and demanding validation requirements expose the limits of manually operated laboratories and disconnected engineering workflows.



Physical dependency

Direct access to target boards and test equipment limits flexibility.

Limited capacity

Scarce hardware must be shared across teams, projects and locations.

Manual operations

Deployment, reset, interface setup and log collection consume engineering time.

Fragmented workflows

Build, analysis, testing and reporting often operate as separate processes.

Late defect discovery

Integration and runtime defects may remain hidden until physical testing.

Distributed knowledge

Defects, behaviour and evidence remain scattered across tools and teams.

The challenge is not simply remote access. It is an integrated engineering lifecycle.

One Ecosystem. Configured Around Your Engineering Environment.

Bytecraft designs modular engineering ecosystems around each customer's existing hardware, processes, tools, network architecture and security requirements.



TOOLCHAIN-INDEPENDENT BY DESIGN

Compatible components are selected and integrated according to technical objectives, operational constraints and the long-term engineering roadmap.

Hardware

Targets, processors, interfaces, instrumentation and test equipment.

Toolchain

Repositories, build systems, analysis, testing and reporting.

Lifecycle

Reviews, validation gates, release workflows and evidence.

Security

On-premises, isolated networks and controlled access.

Start with the capabilities you need today. Extend as your environment evolves.

A Modular Ecosystem from Engineering Data to Real Hardware

Each capability can be deployed independently or combined into an end-to-end engineering environment.



01 Engineering Data & Lifecycle

02 AI Engineering & Security

03 Virtual Platforms & Digital Twins

04 DevOps & Validation Automation

05 Connected Physical Lab

06 Evidence, Knowledge & Feedback

Value comes from orchestration across the layers, not dependence on a single technology.

Connected Lab Infrastructure

Transform distributed hardware resources into a secure and centrally managed engineering environment.



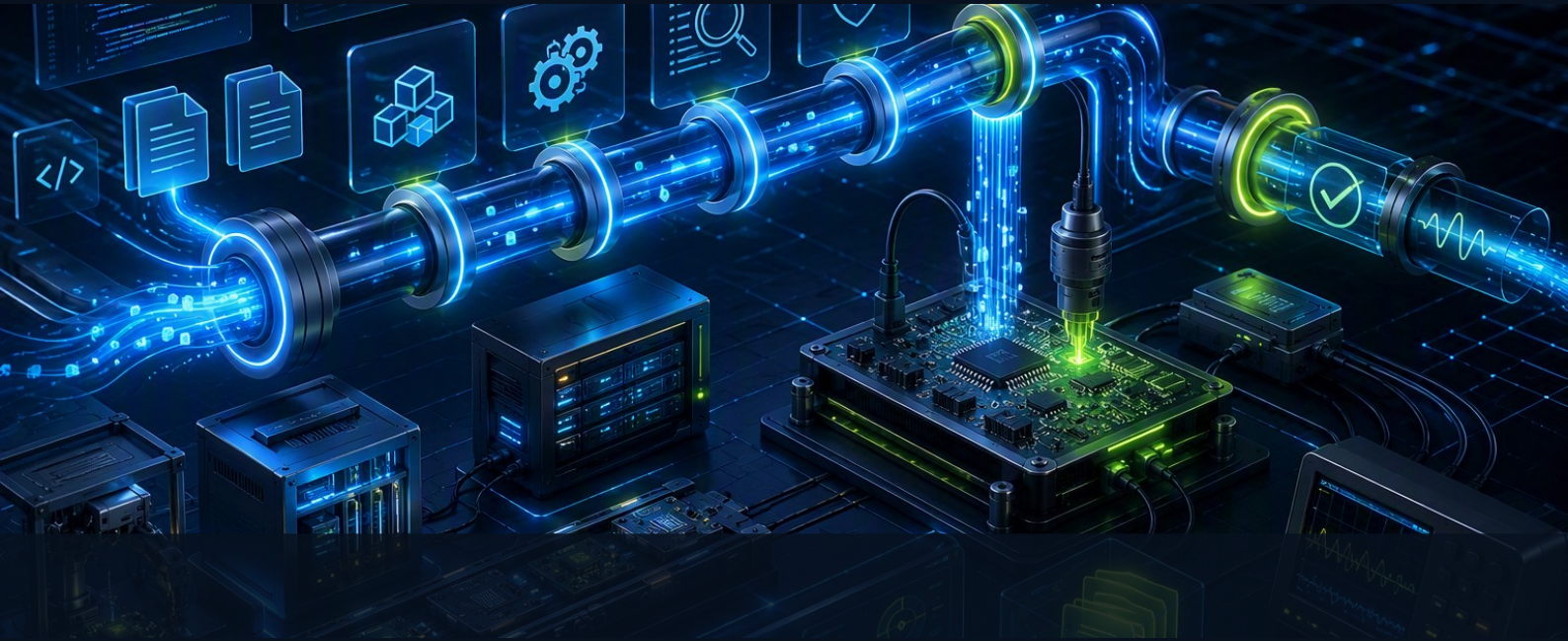
Connected Lab Infrastructure provides controlled access to target hardware, debug interfaces, communication channels and laboratory resources without continuous physical presence at the test bench.

- Secure remote laboratory access
- Centralised target-board and device pools
- Remote serial, debug and communication access
- Resource allocation, reservation and usage coordination
- Remote power control and clean-state preparation
- Isolated test networks
- Centralised operational monitoring
- Multi-location laboratory integration
- Customer-specific client and agent configurations
- Integration with validation workflows

Make physical hardware securely accessible, shareable and ready for automation.

DevOps & HIL Automation

Automate the path from source change to evidence from real hardware.



01 Change & Build

02 Artifact Preparation

03 Resource Allocation

04 Target Preparation

05 Deployment & HIL

06 Data Collection

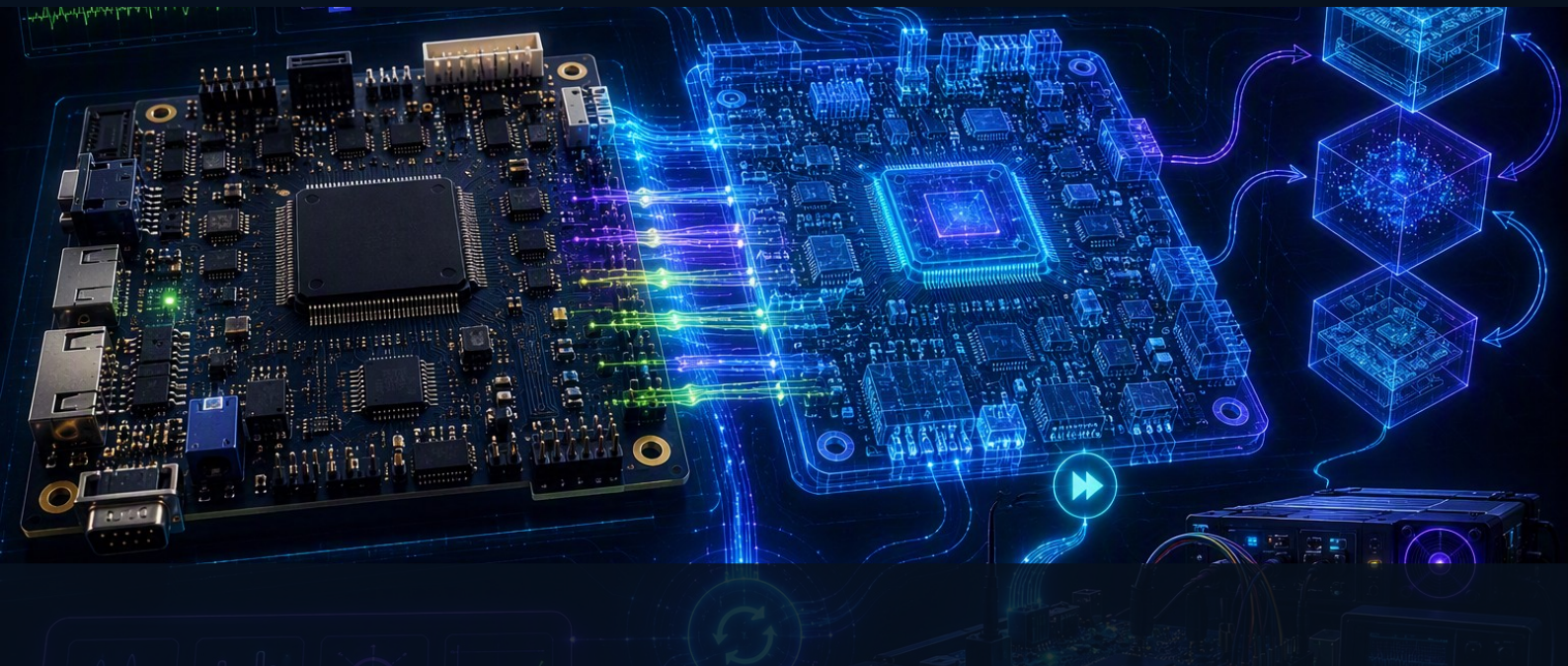
07 Evaluation & Reporting

08 Quality Decision

Repeatable automation turns laboratory activities into an engineering process.

Virtual Platforms & Digital Twins

Validate earlier, reproduce failures consistently and preserve scarce hardware capacity.



Virtual target environments complement physical testing by enabling earlier software execution, repeatable scenarios and controlled analysis before limited laboratory capacity is consumed.

- Virtual target and board environments
- Processor, memory and peripheral behaviour modelling
- Deterministic execution, snapshot and replay
- Automated virtual validation
- Fault injection and boundary testing
- Pre-HIL validation gates
- Virtual and physical test correlation
- Earlier feedback and repeatable defect reproduction
- Parallel development and validation
- Improved diagnostic visibility

Virtual validation complements real hardware - it does not replace it.

AI Engineering & Security Intelligence

Transform engineering data into contextual insight, focused validation and reusable knowledge.



Review support

Analyse software changes and engineering context to identify potential risk areas.

Test intelligence

Recommend test scenarios using architecture, interfaces, objectives and prior defects.

Diagnostic intelligence

Correlate builds, logs, traces, measurements and test results.

Validation prioritisation

Support test selection, prioritisation and rerun decisions.

Knowledge reuse

Turn resolved defects, target behaviour and decisions into reusable knowledge.

Security intelligence

Integrate source, configuration, firmware and runtime security assessment.

AI becomes an intelligence layer across the engineering lifecycle.

Designed Around Your Organisation, Not the Other Way Around

Bytecraft begins with the current environment and designs around what should be retained, connected and improved.



Preserve valuable infrastructure

Continue using compatible tools, equipment and technical assets.

Integrate before replacing

Connect fragmented capabilities before major infrastructure change.

Select by requirement

Choose technologies according to fit, maintainability and security.

Isolate dependencies

Use modular interfaces and replaceable components.

Configure for the lifecycle

Align with development, verification, release and support.

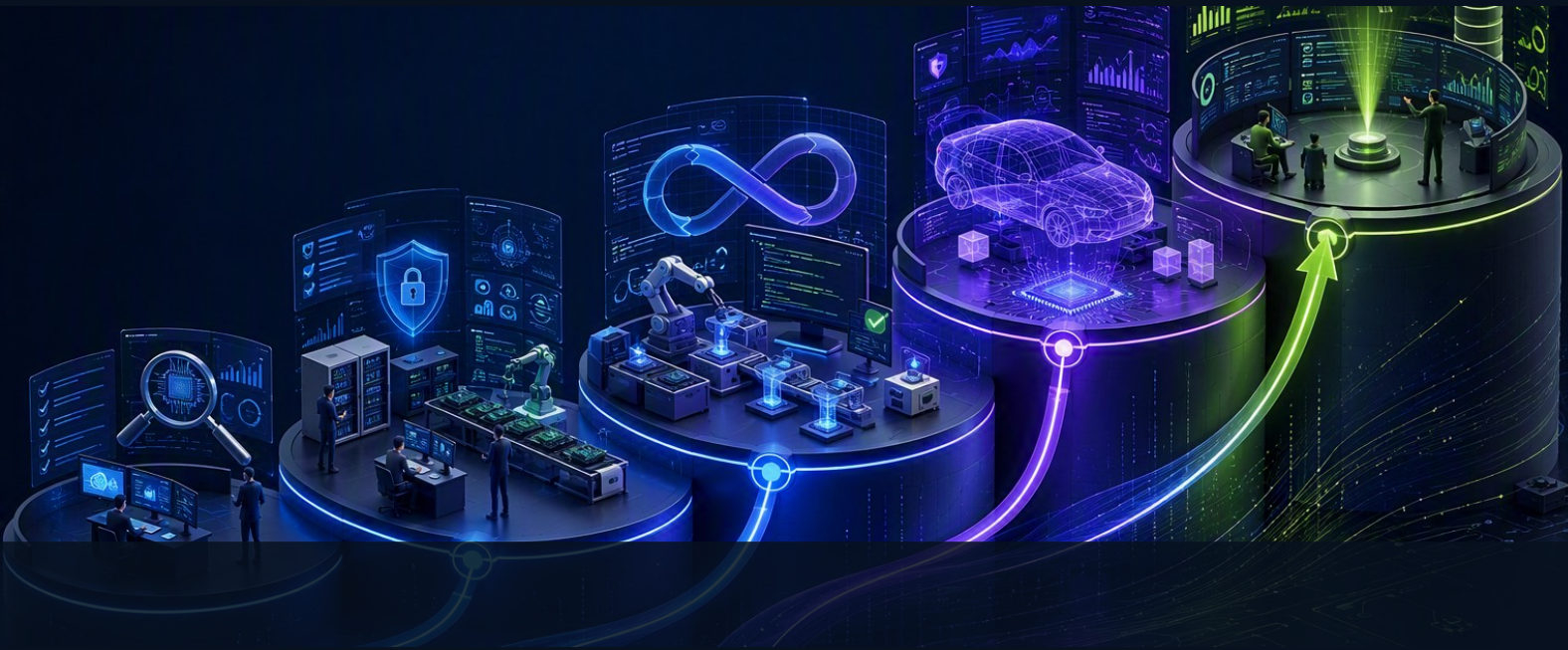
Build for controlled growth

Add boards, projects, labs and capabilities progressively.

No fixed toolchain. No one-size-fits-all architecture.

Start Where You Are. Expand When You Need.

The ecosystem can be introduced in focused phases based on priorities, maturity and operational constraints.



01 ASSESS

Understand the current laboratory, workflow, tools, bottlenecks and constraints.

02 CONNECT

Make hardware resources accessible, manageable and visible.

03 AUTOMATE

Establish repeatable build, deployment, HIL and reporting workflows.

04 VIRTUALISE

Introduce virtual targets, repeatable testing and pre-HIL validation.

05 SCALE INTELLIGENTLY

Apply risk analysis, diagnostics, security intelligence and knowledge reuse.

Each phase delivers value while preparing the environment for the next level.

Built for Complex Embedded Engineering Environments

For organisations where hardware access, repeatability, traceability and engineering evidence are critical.



Aerospace & Defence

Controlled labs, target integration and verification evidence.

Railway Systems

Repeatable validation and long-lifecycle engineering knowledge.

Automotive

ECU development, target validation and scalable test operations.

Industrial Systems

Controllers, connected devices and multi-configuration products.

Semiconductor & FPGA

Processor, programmable logic and board-level development.

Advanced R&D Labs

Shared infrastructure and multi-project resource management.

A common framework, adapted to each industry, system and organisation.



Build Your Embedded Software Factory with Bytecraft

Modernise the laboratory, automate hardware-in-the-loop validation, introduce virtual target environments and establish AI-assisted engineering capabilities - without forcing a fixed product stack.

Solution Architecture

Define the target ecosystem and engineering roadmap.

Engineering Integration

Connect hardware, software, automation and analysis.

Customer-Specific Development

Build the interfaces, agents and applications required.

Deployment & Commissioning

Deploy within approved infrastructure and security.

Lifecycle Support

Evolve the ecosystem as projects and tools change.

LET US DESIGN THE RIGHT ENGINEERING ECOSYSTEM FOR YOUR ORGANISATION.

Connect your laboratory. Automate validation. Extend with virtual and intelligent engineering capabilities.

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