

B E E T L E B O X

BeetleboxCI: The new automation  
platform for FPGA design





# **The speed of software innovation is outpacing silicon chips. FPGA Accelerators are the solutions.**

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Here at Beetlebox, we envision a future where reconfigurable hardware is used to optimally process newly emerged workloads in weeks not years.

# FPGA accelerator design is still hampered by an un-optimised development process

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Our own development of FPGA accelerators was plagued by development issues.



Slow builds locking local computers.



Limited compute time for simulations.



Losing data between runs.

# The reason that software innovation occurs so quickly is because of the evolution of development.

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Modern software companies use the practise of Continuous Integration (CI) to rapidly deliver solutions to their clients.

CI is the practise of developers committing their code changes to a central code base, several times a day. This code is routinely built, tested and deployed into production through automation software.

# Current CI platforms are designed for software, but not for the FPGA development process.

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No support for FPGA design tools.



Constant crashing caused by lack of computing resources.



Timeouts for builds and tests that need to run for days.

# FPGA design needs to be simple, scalable and cost-efficient

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## Simple

Engineers need to be focused on design space exploration, not on trying to get builds and tests to remain stable on machines.

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## Scalable

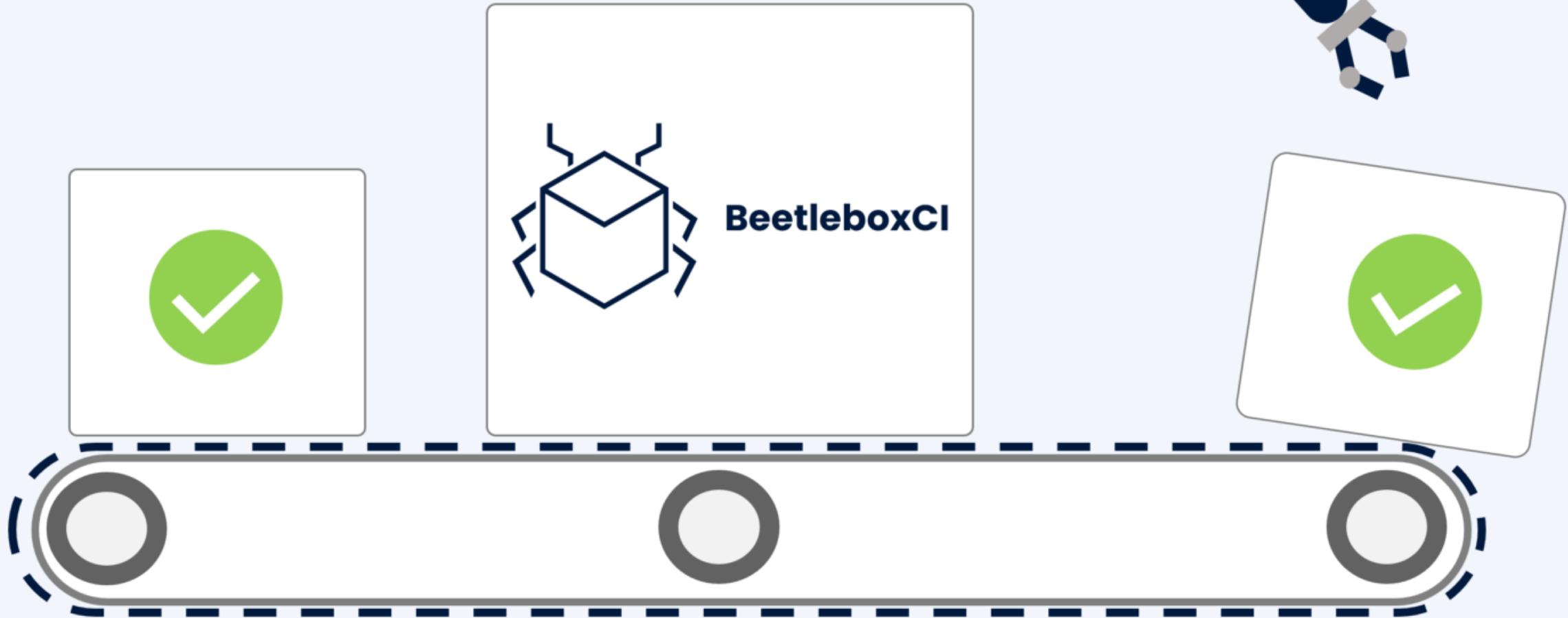
Design is a complex process that can involve running tens of iterations before meeting the perfect one. Servers need to scale with demand, whether running one test or a thousand.

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## Cost Efficient

CI automation software is expensive. The solution should not need large investment in infrastructure nor spend months configuring a cloud to a team's needs.

# The Solution:



**Design, develop and deploy with the automation platform for FPGA accelerator design**

# BeetleboxCI provides a solution that meets engineers' needs

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## **Simplicity**

Native support for FPGA development tools with no need for any infrastructure setup.

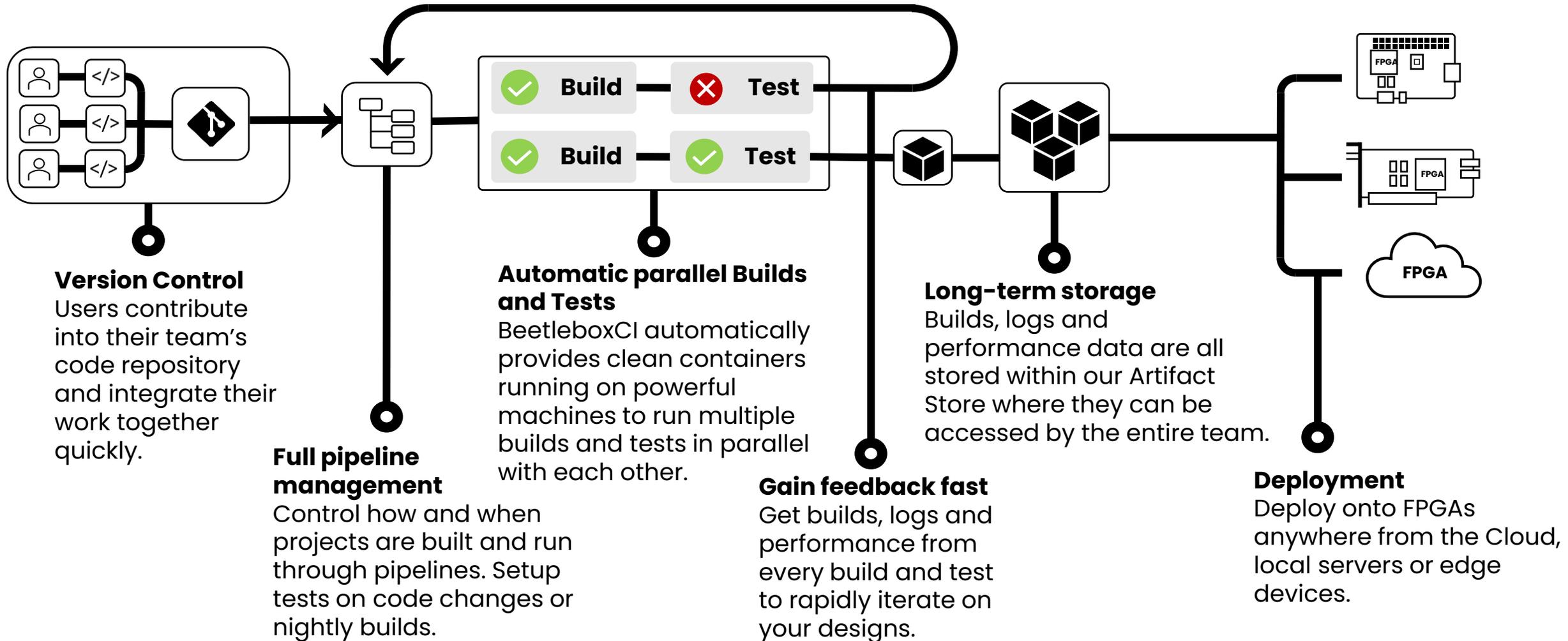
## **Scalability**

BeetleboxCI is designed to handle all stages of development from one or two prototype tests to weeklong simulations.

## **Cost-efficiency**

Developers are only charged for what they use and do not need to invest in costly infrastructure.

# How BeetleboxCI Works



**Version Control**  
Users contribute into their team's code repository and integrate their work together quickly.

**Full pipeline management**  
Control how and when projects are built and run through pipelines. Setup tests on code changes or nightly builds.

**Automatic parallel Builds and Tests**  
BeetleboxCI automatically provides clean containers running on powerful machines to run multiple builds and tests in parallel with each other.

**Gain feedback fast**  
Get builds, logs and performance from every build and test to rapidly iterate on your designs.

**Long-term storage**  
Builds, logs and performance data are all stored within our Artifact Store where they can be accessed by the entire team.

**Deployment**  
Deploy onto FPGAs anywhere from the Cloud, local servers or edge devices.

# Case Study: The Challenge

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When displaying video back to the user, many robots and drones suffer from shaky camera footage. Sundance looked for a solution to stabilise their footage on their robotics platform.

The proposed solution was building real-time digital image stabilisation on their robotics platform that deployed FPGA technology. To manage the development of the solution, BeetleboxCI was used.



**Company**

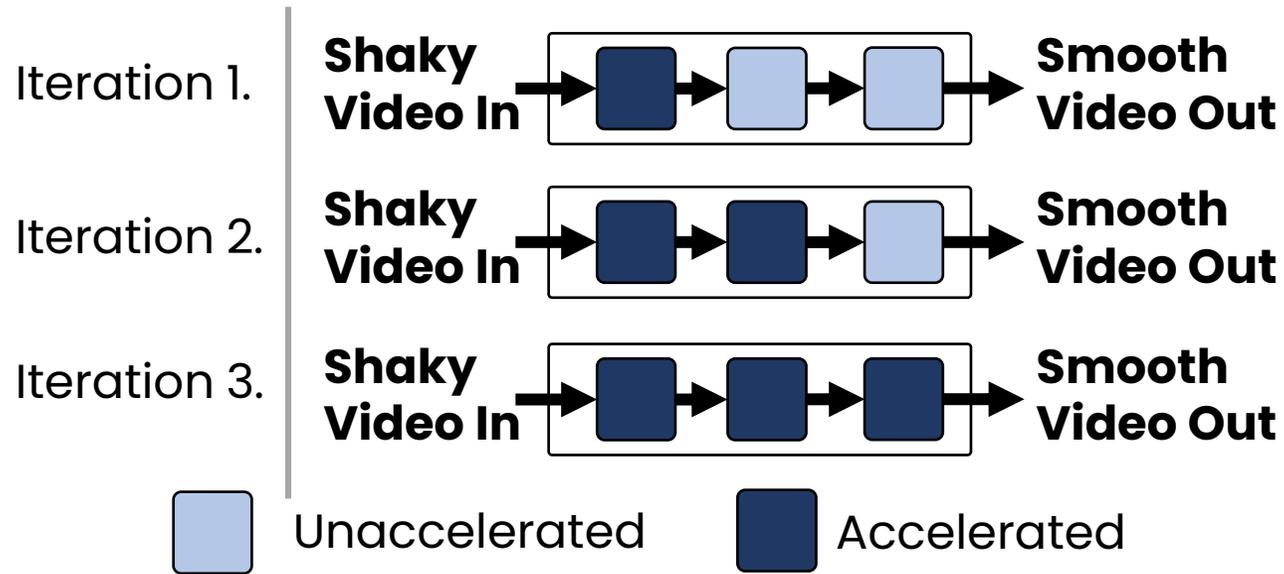
High-performance embedded processing for Robotics, Vision, Motion and Sensor application.

**Technologies**

Zynq, Ultrascale+, Vivado, Vitis

# The Solution

Video stabilisation requires the construction of a high performance pipeline that receives shaky footage as input and smooths it. Using BeetleboxCI allows the setup, build and testing of pipelines to rapidly iterate on design ideas.



The video pipeline consisted of separate modules that could be individually accelerated. Each module was developed by a different team member and immediately integrated into the overall system.

Using BeetleboxCI, each developer could immediately check that their changes didn't impact on system functionality and performance.

# The Result

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Since using BeetleboxCI, systems have been designed to run video stabilisation at 30 FPS on HD video in real time at low power. New features can be added without risking performance issues or introducing new bugs into the system.

“Beetlebox met two critical criteria for the edge. Firstly, it enabled **heavy amounts of computation to run at lower power** than conventional CPUs. It also ran the video stabilisation at a consistent, low latency, something that GPUs have traditionally struggled with.”

**Pedro Machado,**  
**R&D Manager, Sundance Microprocessor Technology**

# Get Developing Now

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