Quokka Robotics

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Quokka FPGA Toolkit

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Overview

Quokka FPGA Toolkit is a set of tools and utilities for hardware engineers, who use FPGA chips in their products. Quokka project is aiming to bring software and hardware people together to create amazing integration products. Working with low-level hardware is a pain due to tooling, timing, synchronization, protocol implementations etc. There are IPs available for different tasks, but bringing it all together is a challenge, which is costly and time consuming process. Quokka FPGA Toolkit is focused on solving this last mile problem, it allows quickly shuffle your hardware configuration, coordinate components and does all the heavy lifting of VHDL programming

Resources

Source code for test cases, functional capabilities and some examples of complex designs is available for evaluation on GitHub

https://github.com/EvgenyMuryshkin/QuokkaEvaluation

Toolkit itself is not open sourced and available as NuGet package, which runs locally and does not require any license or internet connection to run.

Philosophy

Rise in demand for IoT and robotics applications in coming years will require large amount of hardware to be developed.

Entry level knowledge is very high comparing to the software world. There is not enough skilled engineers around to fulfill that demand.

Hardware development was traditionally associated with complex processes, practices and tools.

Major FPGA vendors provide sophisticated tools for developers which lacks usability comparing to most popular software development tools.

Debugging and diagnostics is a pain point, associated with hardware. Available simulation practices are complex and time consuming, regression is a major problem.

Solution

Quokka FPGA Toolkit is aiming to solve some of the described problems by utilizing popular development tools and easy and familiar C# language.

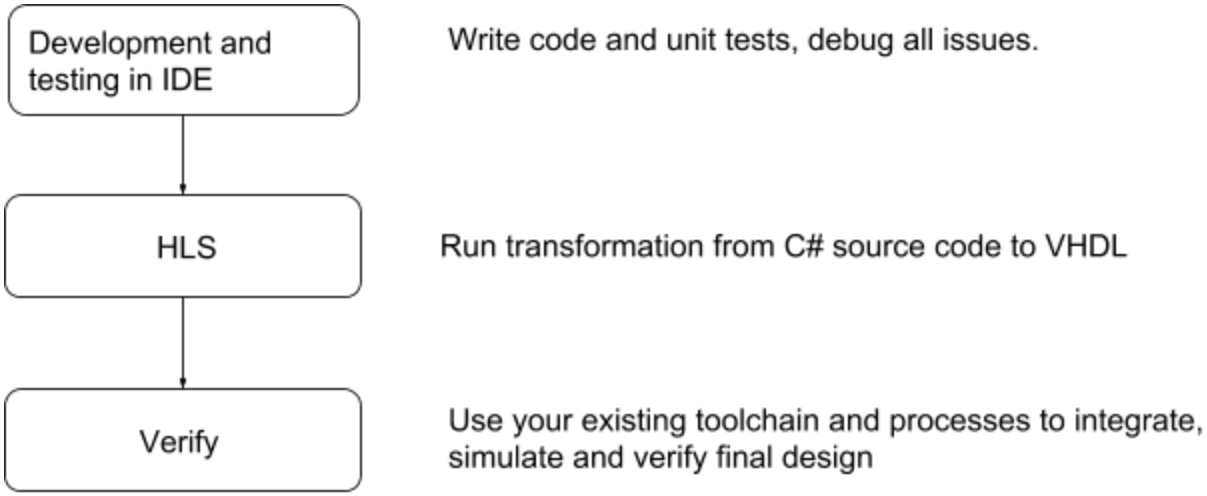
Hardware development can be done in Visual Studio, Visual Studio Code or any other advanced IDE with rich capabilities like syntax highlighting, code lens, refactoring, code analysis, debugging and testing tools, that are already available in software development.

There is no intention to completely replace existing toolchains and HDLs. Quokka is targeting specific set of hardware problems, that traditionally solved either by FPGAs, PLCs or microcontrollers. Quokka output can be integrated into existing designs, and existing IP can be integrated inside Quokka.

Toolkit provides set of high-level concepts, that limits the scope of functionality in hardware. All code, based on this concepts, can be unit tested inside IDE without real hardware or simulation.

These concepts will make it possible for wider range of developers to create hardware products within certain functional scope in a fraction of a time and cost.

All requirements, that are not covered by high-level concept should be developed as usual and then integrated in final design



Milestones

Feedback collection phase is commencing after MVP Release. During that time, early adopters will receive support in product evaluation, and will help to shape the roadmap for the future development.

Crystal ball

Here is a list of potential features that may be scheduled for upcoming development.

- Verilog output
- Human-readable output
- Debugger integration with Visual Studio
- Neural nets
- Explicit FSM definition of states, transitions and effects
- Resource optimization
- MQTT
- Integration with soft CPU