The Best of Both Worlds – Field Programmable Gate Arrays

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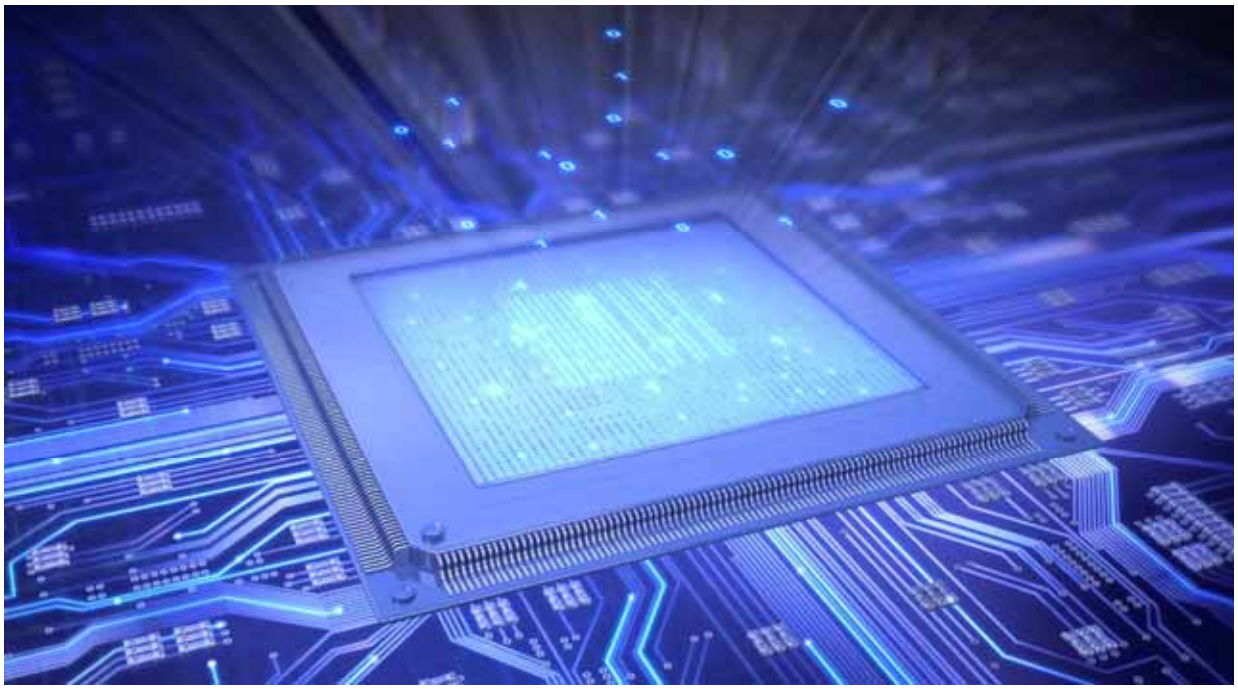


WHAT IF I TOLD YOU THERE EXISTS TODAY A TECHNOLOGY that allows you to create a hardware circuit implementation of a software application. The Field Programmable Gate Array or FPGA is a reprogrammable silicon chip that provides the reliability of dedicated hardware without the drawback of sharing software resources—possibly the best of both worlds.

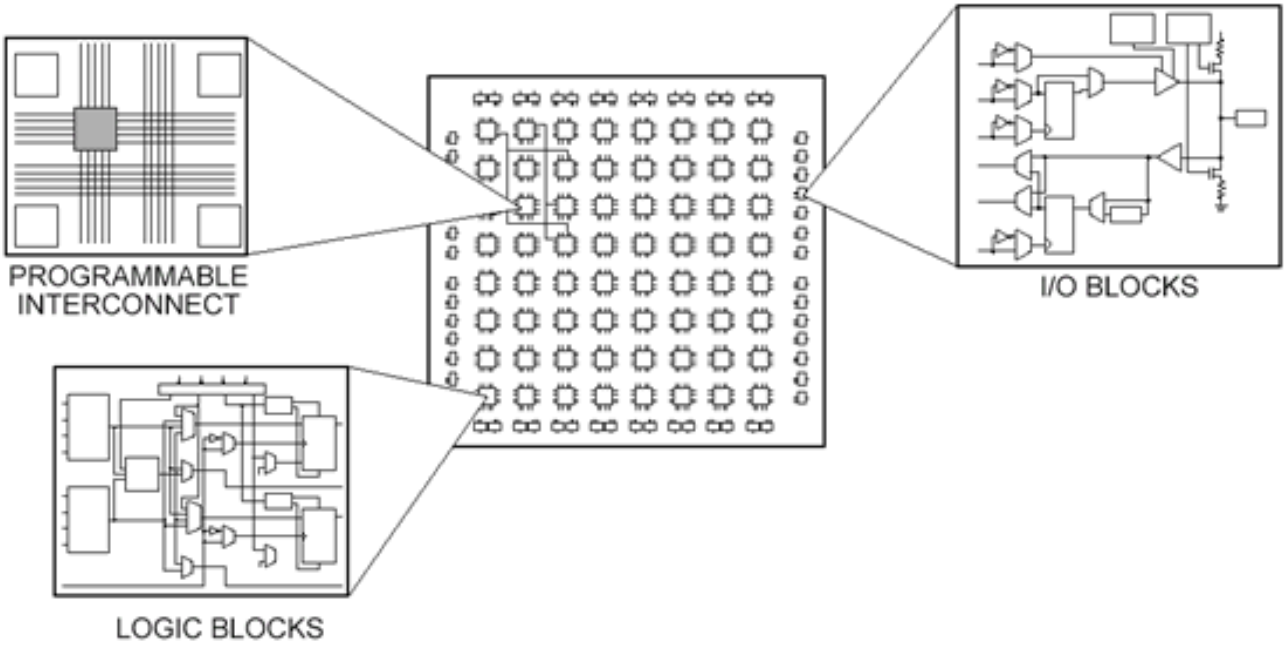
Unlike processors, FPGAs use dedicated hardware for processing logic and do not have an operating system. FPGAs are in fact parallel in nature so different processing operations do not have to compete for the same resources. As a result, the performance of one part of the application is not affected when additional processing is added.

But wait there's more! Over the years we have become accustomed to the constant series of software updates, upgrades and revisions to our computer operating systems, applications and product firmware. What if we could upgrade or rewire the internal circuitry of our hardware through the application of a software program. An FPGA not only allows us to correct for existing hardware deficiencies in the field, but permits the addition of circuitry to improve or enhance system performance while the devise is operating in the field.

The manufacturers of FPGAs can provide the tools so that circuits can be implemented in a short amount of time with no physical layout process, no mask making, no IC manufacturing, just a software defined circuit. In the past, FPGA technology was only available to engineers with a deep understanding of digital hardware design. The recent rise of high-level design tools, however, is changing the rules of FPGA programming with new technologies that convert graphical block diagrams into digital hardware circuitry.

RF Neulink has recently completed the design of a revolutionary new radio data transceiver, the **NL900S**, incorporating an FPGA and Software Defined Radio technology. The combination of these two leading technologies has given our product designers the freedom to break through conventional design limitations of wireless data communications products. Because FPGAs are software programmable, you can use tools to change the functionality of the product by simply downloading a new application to the FPGA without changing any hardware. The benefit to the product owner is the capacity to defer the obsolescence of your investment through the ability to update both your hardware and your software.

Just one FPGA can replace thousands of discrete components by incorporating millions of logic gates in a single integrated circuit chip. The internal resources of an FPGA chip consist of a matrix of configurable **logic blocks**, as shown below. The logic blocks are surrounded by a boundary of **I/O blocks**. Signals are routed within the FPGA by **programmable interconnect** switches and wire routes.



Summary

Reprogrammable silicon also has the same flexibility of software running on a processor-based system, but it is not limited by the number of processing cores available. Unlike processors, FPGAs are truly parallel in nature so different processing operations do not have to compete for the same resources. Each separate processing task is assigned to a dedicated section of the chip and can function separately without any effect from other logic blocks. As a result, the performance of one part of the application is not affected when additional processing is added.

Top Five Benefits of FPGA Technology

1. **Performance**
2. **Time to Market**
3. **Cost**
4. **Reliability**
5. **Long-Term Maintenance**