

Silicon Xpresso and Internet Reconfigurable Logic



Here's how Xilinx is using the Web to provide 21st century tools and applications.

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Last September, we announced our Silicon Xpresso initiative to create interactive Web-based tools and services that leverage the power of the Web for speedier design development. Then, in October, we announced our award winning Internet Reconfigurable Logic (IRL) applications, which enable you to upgrade digital products over any network. This article provides a summary and status of both Silicon Xpresso and IRL.

Silicon Xpresso

Silicon Xpresso is a suite of Internet-enabled tools that leverage the Internet and the Web to make you more productive. These tools include WebFitter, all the Internet-enabled software releases since 1.5i (which connect to support.xilinx.com), and Internet Team Design.

WebFITTER

WebFITTER is a free, Web-based CPLD fitter that runs on Xilinx in-house secure servers. It includes all of the features contained in the latest Xilinx development software, currently version 1.5i of our Alliance Series[®] and Foundation Series[®] tools. By simply submitting your CPLD designs via the Internet, Xilinx can quickly and efficiently “fit” your design into any XC9000 series CPLD device.

WebFITTER is fast, it's easy to use, it requires almost no learning curve, and it is always up to date with our latest enhancements. Therefore, it allows you to evaluate your CPLD designs in Xilinx XC9000 series devices with very little effort. You can easily make informed decisions and choose the best CPLD for your particular needs. With WebFITTER you can focus your creativity where it produces the best results — on your front-end design — leaving the back-end fitting and software management to us. It costs you nothing to use WebFITTER, the reports, or the device programming files that we create for you.

support.xilinx.com

Starting with release 1.5i in October 1998, Xilinx software releases are “Internet-enabled.” Simply by clicking on the help menu of the Alliance Series Design Manager or the Foundation Series Project Manager you have immediate access to support.xilinx.com, our designer-centric website.

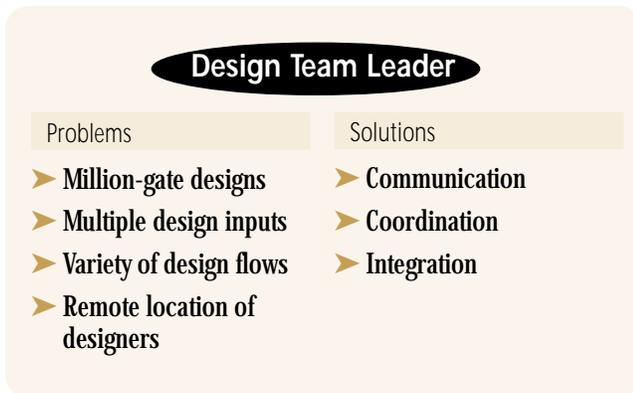
On support.xilinx.com you can quickly find the answers you need from our Answers[™] database containing over 3000 records. You can easily construct online searches of this database or search all available application notes, expert journals, data sheets, on-line manuals, and articles from our Xcell Journal. To help you quickly finish your design, support.xilinx.com also provides:

- **Troubleshooting Tools** – powerful search engines updated daily.
- **Software Updates** – the latest files and service packs, for your convenience.
- **Searchable Library** – volumes of reference materials harnessed through advanced search engines.
- **Education Services** – just-in-time training, when you need it.
- **On-line documentation** – software documentation for your convenience.
- **A “what's new” section** – so that you can make sure you have the latest information.

Be sure to visit support.xilinx.com frequently and keep your design on track.

The solution to these challenges lies in efficient and asynchronous communication, an infrastructure for coordinating multiple inputs, and the ability to integrate a variety of design files.

21st Century Design Challenges

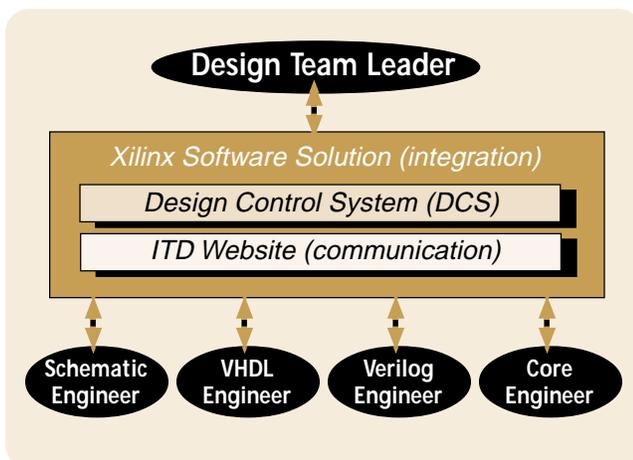


Internet Team Design (ITD)

Coming this summer, with the 2.1i release of our Alliance Series and Foundation Series software, is a development option called Internet Team Design (ITD). ITD is designed to help today's hardware design teams deal with tomorrow's application challenges that include very large and complex designs, where each team member contributes to different aspects of the design and may frequently work from different flows, from a remote location. The solution to these challenges lies in efficient and asynchronous communication, an infrastructure for coordinating multiple inputs, and the ability to integrate a variety of design files.

The Internet, and its cousin a secure *Intranet*, combined with the Xilinx ITD development option, allows your team to work closely together regardless of location or design flow. Combining Java-based technology with powerful Xilinx implementation tools, ITD forms an HTML-based communications layer that allows you to communicate asynchronously and remotely with your project leader. Then, your inputs and project reports are maintained by an automated Design Control System which allows individual team members to

21st Century Design Solution

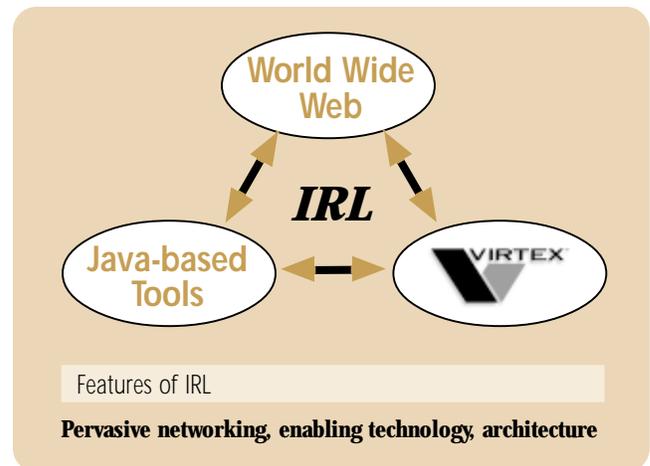


check-in their interactive designs simply by using their Web browser. And then finally, these designs are integrated into the application using the Xilinx Software Solution.

Internet Reconfigurable Logic

Imagine having the ability to remotely upgrade, test, and repair your logic designs anywhere on earth, or above the earth (for a satellite application perhaps). This is not tomorrow's dream; this is today's reality. To facilitate and expand this reality, Xilinx has created a systems approach called Internet Reconfigurable Logic (IRL). IRL is the combination of pervasive networking, our enabling software technology, and our advanced programmable logic architecture to provide programmable logic systems that can be easily modified, upgraded, and tested after your systems have been deployed.

Internet Reconfigurable Logic

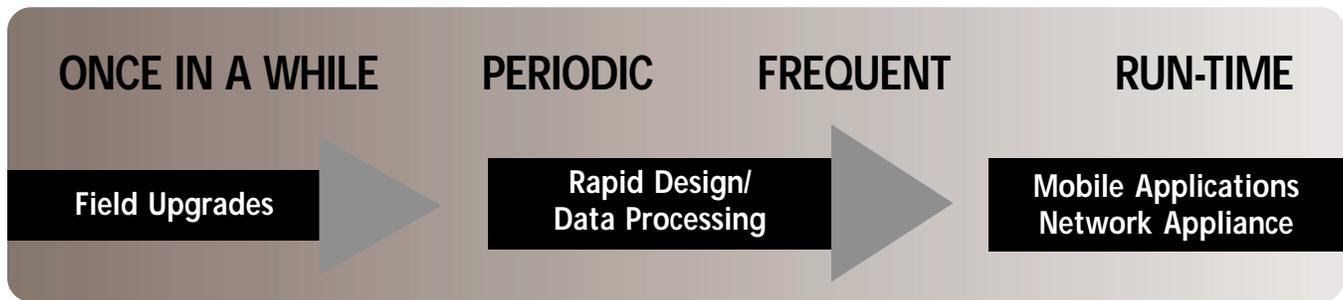


IRL systems bring six key added values to a programmable logic application:

- 1. Shorter Time to Market** – by allowing earlier releases of your systems, that can be upgraded later.
- 2. Extended Time for Revenue** – by allowing modification of your system, after the release.
- 3. Lower costs** – by not requiring the retooling or redeployment of devices, particularly in remote or widespread locations.
- 4. Lower costs** – by eliminating the most expensive stage of manufacturing-in-system test.
- 5. Expanded application opportunities** – by leveraging personalized network applications.
- 6. Increased revenue** – by allowing you to charge for incremental system upgrades. The Internet usage business model is similar to the model used for cellular phones and cable TV.

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Spectrum of Reconfiguration



Reconfiguration Requirements

When creating an IRL system, it's important to analyze your reconfiguration requirements. It may be that you only need to do in-system test before going online. Or, you may need to do incremental or periodic upgrades of the device either for maintenance or for selling added value. You may also want to do network reconfiguration because the system has remote or multiple deployment sites, as used in cellular phone base stations or orbiting satellites. The foremost consideration in all these examples is the frequency of reconfiguration.

The spectrum of reconfiguration spans a wide range of frequency and applications:

- **Field reconfiguration** is generally not time dependent, but it has the most pervasive application. It can be used for updates, bug fixes, and adding new functionality to your digital hardware.
- **Periodic reconfiguration** can be used for those applications where there is a regular change of supporting data, such as environmental monitoring systems, GPS, and so on.
- **Frequent reconfiguration** can be used to accelerate data processing for applications such as image processing.
- **Runtime reconfiguration** can be used where your application relies on changing variables such as detecting network protocols in a mobile application or interrupting operation with new functionality because a security or safety sensor has been triggered.

In many of these examples you need to reconfigure part of the FPGA while the rest of your logic remains the same. This is called “partial reconfigurability” which is provided by the Virtex architecture.

For field upgrades and even partial reconfigurations it is completely feasible to use standard development flows. On our IRL website (<http://www.xilinx.com/products/software/sx/spresso.html>) you can access application notes that describe several methods for field upgrades and partial reconfiguration.

For IRL systems that require either multiple device updates or rapid reconfiguration you might consider using portable Java-based tools such as the “Java API for Boundary Scan” or JBits. Check our IRL website for updates on these technologies.

In addition to the frequency of reconfiguration there are a number of other equally important items to consider such as:

- **System Level Planning** – Your system must be designed to allow in-system programming of the reconfigurable logic devices. The JTAG programming interface (available on all of the latest Xilinx FPGAs and CPLDs) is a good universal choice (see Java API for Boundary Scan), especially if you have multiple reconfigurable logic devices.
You also need to have some way of getting the new bits into your system. The new configuration could be provided manually and loaded through some external interface on the system. If the system is on a network or has other communication capability the new configuration could be loaded remotely.
- **Reconfigurable Logic Planning** – With planning, a circuit design implemented in reconfigurable logic can be changed and still fit in the same part, operate at the same speed, and require the same I/O. However, it does require planning at design time. There are some obvious general guidelines, such as reserving gate and flip-flop capacity for future expansion, and having some timing margin. Understanding and anticipating the kinds of changes that may be required in the future is key.

Conclusion

Xilinx is dedicated to creating 21st Century design tools for 21st Century applications. We are the innovation leader, providing enormous opportunities for you, and helping you provide insanely great applications. *The revolution is brewing, have a cup on us.* ☒

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