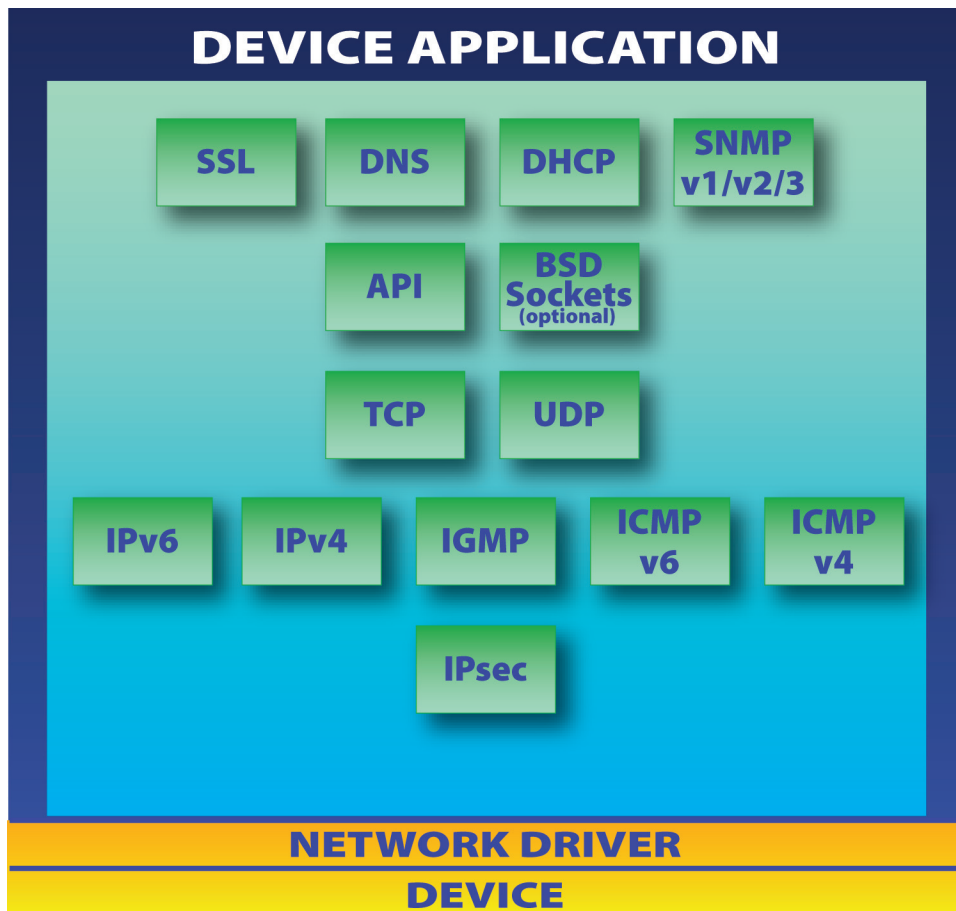# silex technology

TCP/IP Protocol Stack

SX-TCP

IPv6 And IPv4 Software for Embedded Devices

The next generation of TCP/IP networking

Features

- Portable and modular code designed specifically for embedded applications
- Works with most processors, NICs, and operating systems
- Concurrent IPv6 and IPv4 capabilities
- SSL and IPsec security (IPsec available Q1 2007)
- SNMPv1/v2/v3 management
- Supports multiple concurrent network interfaces
- Designed to work in LAN, WAN, and wireless environments
- Proven technology

Why you need IPv6!

With millions of new network devices coming on line every month, the world is rapidly running out of IP addresses. And there's only one long-term solution to this crisis – IPv6. IPv6 uses a 128-bit addressing scheme that allows a virtually unlimited number of uniquely addressed devices on the Internet. The current IPv4 standard, on the other hand, uses a 32-bit addressing that is limited to a few billion devices.

IPv6 also provides more robust and efficient routing capabilities, improved security, and auto configuration. For all of these reasons -- but especially because of the impending IP address shortage -- you need to upgrade your networking product line to support IPv6 as soon as possible. In fact, IPv6 support has already become a significant issue in the Far East, and it will inevitably be critical worldwide in the next few years. The time to act is now so that your next generation of products will support IPv6 in time to meet the demand!

SX-TCP -- the IPv6 Solution for Embedded Systems

To satisfy the requirement for IPv6 compatibility in embedded systems, silex has developed SX-TCP, a comprehensive IPv6 software protocol stack. SX-TCP was coded specifically for resource-limited embedded systems, so it is more efficient and has a smaller memory footprint than general-purpose TCP/IP software. It is also modular, so you only need to include the specific modules required for your application in the run-time code. SX-TCP is based on the same TCP/IP code that has been proven in hundreds of thousands of silex networking products since 1989.

Because the transition from IPv4 to IPv6 will not happen overnight, SX-TCP includes complete IPv4 and IPv6 capabilities. This is an important advantage, because some networks will support both IPv6 and IPv4 for several years, while many others may remain IPv4-only in the near-term. With SX-TCP, your device will automatically work on both types of networks with no operator intervention or special configuration required.

Security and Management
SX-TCP supports Secure Sockets Layer (SSL) V3.0 security, which is the most popular method of enabling a secure, encrypted and authenticated connection over the Internet. In addition, IPsec capabilities for encryption and authentication (transport and tunneling modes) will be available in the second release (Q1 2007) of SX-TCP.

For more comprehensive security, especially in wireless networks, our optional Network Security Suite (NSS) software provides an extensive range of capabilities, including 802.1x authentication with the most commonly used EAP types, plus WPA and WPA2 encryption.

SX-TCP includes the latest SNMPv3 management capabilities for compatibility with virtually any network management software. It can be configured for SNMPv1/v2/v3 operation, or for SNMPv1/v2 only to reduce memory requirements. SNMP commands include Get, GetN, GetBulk, and Set. Supported MIBs include TCP, UDP, IP, Address Translation, Interfaces, Host Resources, HP JetDirect, and silex proprietary.

SX-TCP Programming Features
SX-TCP is written in ANSI C and works with popular development environments like CYGWIN and the GNU compiler tools. It can be easily ported to virtually any priority-based preemptive real-time embedded operating system using virtually any processor chip and supporting hardware. Because SX-TCP is a fully integrated package with support services, you can significantly reduce your development time and your time to market.

SX-TCP Programming Features include:
- Efficient OS-independent API with Zero-Copy capabilities
- Blocking or non-blocking modes for TCP and UDP data transmission and reception
- Polling or asynchronous notification support for non-blocking mode
- Synchronization of non-blocking callback functions with events like connection, transmission, and reception
- Multiple routing table support both for IPv4 and IPv6
- Multithread support option for simultaneous send/receive operation to a single TCP connection
- Unlimited number of addresses, sockets, routes, and interfaces (limit of 2 IPv4 addresses per interface and 1 IPv4 gateway)On Demand Window function to dynamically change the size of the sending and receiving window to minimize memory utilization
- TCP debugger
- silex SNMP MIB compiler
- MAC Control Block can easily interface to most existing RTOS network drivers
- Optional BSD-compatible socket interface

The silex Advantage
With more than 30 years experience in embedded system design, silex technology, inc. offers the industry's most extensive range of hardware and software solutions for enabling wired and wireless network connectivity on embedded devices. Whether you require fast time-to-market, lowest cost, or maximum functionality, we can meet your needs.

silex network connectivity solutions include:
- External hardware. If you need an immediate solution for enabling wired or wireless network connectivity on your existing devices, we offer a complete range of external device servers. Just plug one of these compact boxes into your device's serial or USB port, and it's ready to communicate on an Ethernet network or an 802.11a/b/g wireless network with no special software required. If your device already has Ethernet capabilities, you can simply plug in our SX-600 wireless bridge to enable transparent 802.11a/b/g wireless capabilities.

- Embedded hardware. When you're ready to redesign your products to provide a more elegant and cost-effect design, you can incorporate our SX-550 Ethernet and 802.11a/b/g module inside your product to provide wireless and wired networking capabilities. The SX-550 has its own dedicated processor and memory that offloads all of the protocol handling for improved performance and faster development times. Or if you prefer to do the protocol handling in your own processor, we offer our SX-10 family of radio modules to provide 802.11a/b/g wireless capabilities without the need for extensive in-house wireless design expertise.

- Embedded software. For the lowest cost solution, our SX-TCP IPv6 software stack enables full networking capabilities using your existing device's processor and operating system. We also offer the Network Security Suite (NSS) software to provide comprehensive security with 802.1x/EAP authentication and WPA/WPA2 encryption.

Because of the high degree of compatibility among all of these solutions, your engineering requirements and development times are minimized, and your end-users don't have to learn new procedures when you introduce new products.

Porting and Support Services
Prospective OEMs can choose to do their own porting of SX-TCP or contract the silex engineering team to do the same. Either way, the silex technical support team will ensure a trouble free integration of SX-TCP with your product.

Want More Information?
To obtain a detailed specification or to get other information regarding the silex SX-TCP protocol stack, please contact us at 801-748-1199 or sales@silexamerica.com.Specifications
Source Code Programming Language: C

Supported Processors: Code is designed to support most types of processors, including RISC, CISC, DSP, big-endian, little-endian, and 80x86 memory segmentation. Tested processors include ARM7, ARM9, MIPS-TX3900, and MIPS-TX4900.

Operating System Requirements: Code is operating system independent (Priority-based preemptive RTOS recommended for easiest implementation).

Supported NIC Hardware: Code is designed to be easily adapted to most types of NIC hardware and RTOS drivers. Specific example code is included for Toshiba TC35815, Micrel KS8695, and Winbond W90C740 as well as various Wireless LAN Hardware.

Included Protocols: TCP, UDP, IPv6, IPv4, ARP, ICMPv4, ICMPv6, IGMPv2/MLDv1, SNMP v1/v2/v3, SSL V3.0, IPsec (SX-TCP release 2), DHCP client, and DNS client.