

NICHELITE™ • PORTABLE TCP/IP PROTOCOL STACK

TECHNOLOGY OVERVIEW

Now you can have your choice between two compatible TCP/IP stacks, one of which is sure to meet your requirements. NicheLite™ TCP/IP stack is a full featured subset of our NicheStack™ TCP/IP. The table below illustrates the differences between NicheStack and NicheLite

NicheLite is the only fully featured TCP/IP stack, written completely in C, that is under 12 KB. It is a highly portable and RFC compliant implementation of the TCP/IP protocol suite. It includes ANSI C sources for the TCP/IP family of protocols listed below, a "Mini" Sockets API, and full technical documentation.

The NicheLite IP layer can support one hardware interface. NicheLite provides compatibility with InterNiche's PPP, FTP, Telnet Server, Web Server, Web Browser, DHCP Server, Email, and SNMP.

Protocols and Services Provided

- Address Resolution Protocol (ARP)
- Internet Protocol (IP)
- Internet Control Message Protocol (ICMP)
- User Datagram Protocol (UDP)
- Transmission Control Protocol (TCP)
- Trivial File Transfer Protocol (TFTP)
- DHCP Client (DHCP)
- Mini Sockets
- Zero Copy

KEY FEATURES

Small Memory Requirement

NicheLite requires only 12 KB of ROM.

Modular

NicheLite modules are compatible with NicheStack modules. If a device needs a small footprint, but has to have routing, the IP module from NicheStack can be substituted for the NicheLite IP module. The same is true for the TCP modules. Either combination provides a smaller footprint than NicheStack.

Two Way Tasking

No special multitasking features are required. All code is implemented as an event-driven

state machine, which means you can either run the stack by polling from a central loop or take advantage of an RTOS suspend/resume feature.

Versatile Memory Management

Memory is allocated and freed by macros. Systems which support the alloc()/free() functions can map the macros to these functions. RTOS systems (which typically use partitions) can define the macros to allocate the next larger partition.

RTOS Independence

InterNiche provides a tasking API that interfaces to InterNiche's NicheTask™ or other RTOS environments. With this feature, developers can use NicheLite for deeply embedded applications and easily port the same code for execution by virtually any RTOS.

The API also provides portability among other Real Time Operating Systems so that the developer can easily migrate among a variety of third-party RTOS environments. The API introduces no additional overhead, so there is no performance penalty when migrating from RTOS to RTOS.

Network Interfaces

NicheLite was designed for small memory targets that only require one network interface. Connections are limited only by available memory.

Blocking and Non-Blocking

Supports both blocking and non-blocking modes of all socket operations, including connect().

NicheTool - Debugger/Optimizer

NicheLite includes NicheTool™ the most comprehensive debugging and optimizing tools available in any commercially available TCP/IP stack.

Debugging is totally menu driven, can be customized by development engineers for any applications added to the stack, and allows NicheLite to be optimized for memory usage and performance.

TCP Layer

NicheLite's portable TCP layer is fast, small, and optimized for embedded systems. It is based on BSD 4.4 TCP and a subset of Sockets.

Packet data, including headers, is in contiguous buffers to simplify memory management and avoid data copies.

Macros to protect critical sections of code are used sparingly to improve throughput and reduce memory requirements.

Tunable parameters such as MSS (Maximum Segment Size) and the TCP window can be left to the runtime logic or be customized for your application.

TECHNICAL SUMMARY

- Zero data copy for ultra fast performance
- Subset of Standard Sockets Interface
- Non-blocking versions of all functions
- Versatile MSS and window options
- Connections limited only by memory availability
- Optimized assembly language checksum routines (or C language if you prefer)
- "Predictive" header processing for speed
- Nagle Algorithm (Slow Start)
- VJ Smoothed Round Trip Timing
- Delayed ACKs
- BSD style "Keepalive" option
- Complete debugging and optimization module

IP Features

- Support for Zero Copy
- Loop back test driver included
- Optimized checksum routines

IP	NicheLite	NicheStack
Size	4 KB	15 KB
UDP	Yes	Yes
IP	Yes	Yes

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Routing	No	Yes
ICMP	Yes	Yes
ARP	Yes	Yes
Zero Copy	Yes	Yes
Network	One hardware device	Unlimited
Multicast	No	Yes

TCP	NicheLite	NicheStack
Size	6 KB	31 KB
TCP	Yes	Yes
Sockets	Mini	Full
Zero Copy	Yes	Yes

RFC Compliance (partial list)

- RFC0768 -User Datagram Protocol
- RFC0791 -Internet Protocol
- RFC0792 -Internet Control Message Protocol
- RFC0793 -Transmission Control Protocol
- RFC0826 -Ethernet Address Resolution Protocol
- RFC0862 -Echo Protocol
- RFC0919 -IP Broadcast Datagrams
- RFC0950 -IP Subnet Extension
- RFC0951 -Bootstrap Protocol
- RFC1034 -Domain Names - Concepts and Facilities
- RFC1035 -Domain Names - Implementation and Specification
- RFC1055 -Nonstandard for Transmission of IP Datagrams Over Serial Lines
- RFC1213 -Management Information Base-II (MIB II)
- RFC1350 - The TFTP Protocol (Revision 2)
- RFC3046 - DHCP Relay Agent Information Option

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