DSock – DOS TCP/IP

by ICOP / DMP Group
What is WinSock?

- The Windows Sockets specification defines a network programming interface for Microsoft Windows which is based on the "socket" paradigm popularized in the Berkeley Software Distribution (BSD) from the University of California at Berkeley.

- Released at 1993 of Windows Sockets 1.1
  - An open interface for network programming under Microsoft Windows version 1.1
  - Application programming interface – API

- WinSock.dll (Windows Sockets)
  - WinSock is a Windows TCP/IP library for users who want to program their network application software under Windows.
Structure of WinSock

User

Application

Windows

WinSock

Ethernet

TCP/IP

Hardware

Application

Windows

WinSock

Ethernet

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What is DSock?

- Based on the platform of DoD Model
  - DoD – Department of Defense

- DSock.lib (DMP DOS Sockets)
  - Issued by DMP group at 1998
  - DSocks is a DOS TCP/IP library for users who want to program their application software through network interface under DOS.
  - It provides C function calls for programmers to create internet applications.
Structure of DSock on DOS Environment

- User
  - Application (NET)
  - DSocks Library
  - Packet Driver
  - DOS
  - Network Interface
  - TCP/IP

Hardware ➔ Network Interface ➔ Packet Driver ➔ DSocks Library ➔ Application (NET) ➔ User

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Conditions to Use DSock?

• Hardware Requirements
  • ICOP Single Board Computers with Ethernet interface only
    • Realtek 8019 10 Base-T
    • Realtek 8139 10/100 Base-T

• Driver Requirements
  • Packet Drivers for RTL8019 and RTL8139 are necessary
    • RTL8019: NE2000 compatible
    • RTL8139: Support by Realtek

• Operating System
  • MS-DOS / Dr-DOS
  • X-DOS
Structure of DSock Library
OSI Reference Model & TCP/IP

7 Layer of Open System Interconnection Model

- Application
- Presentation
- Session
- Transport
- Network
- Data Link
- Physical

5 Layer of TCP/IP Protocol Model

- Telnet
- FTP
- SMTP
- More
- TCP
- UDP
- IP
- ICMP, ARP, OSPF, RIP
- Logical Link Control
- Media Access Control

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OSI Reference Model & DSock

Application
Presentation
Session
Transport
Network
Data Link
Physical

Packet Driver

TCP
UDP
IP
ICMP, ARP

Telnet
FTP
HTTP
SMTP
DNS
BOOTP/DHCP

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Function Call of Dsock Library

DSock.lib

Function Call for C Language

TCP

HTTP

Telnet

FTP

HTTP

SMTP

DNS

DNS

ICMP, ARP

Packet Driver

4 Layer of DoD (Department of Defense) Model

BOOTP/DHCP
Function Call of DSock Library
Function Call of WinSock - 1/3

- **Socket Functions (BSD 4.3-like)**

  - `accept()`
  - `bind()`
  - `closesocket()`
  - `connect()`
  - `getpeername()`
  - `getsockname()`
  - `getsockopt()`
  - `htonl()`
  - `htons()`
  - `inet_addr()`
  - `inet_ntoa()`
  - `ioctlsocket()`
  - `listen()`
  - `ntohl()`
  - `ntohs()`
  - `recv()`*
  - `recvfrom()`*
  - `select()`*
  - `send()`*
  - `sendto()`*
  - `setsockopt()`
  - `shutdown()`
  - `socket()`

- **Note: * The routine can block if acting on a blocking socket.**
Function Call of WinSock - 2/3

- Database Functions (BSD 4.3-like)
  - `gethostbyaddr()`*
  - `gethostname()`
  - `gethostbyname()`*
  - `getprotobynumber()`*
  - `getprotobynumber()`*
  - `getservbyname()`*
  - `getservbyport()`*

- Note: * The routine can block under some circumstances.
Function Call of WinSock - 3/3

- **Microsoft Windows-specific Extensions**

- `WSAAsyncGetHostByAddr()`
  - `WSAAsyncGetHostByName()`
- `WSAAsyncGetProtoByName()`
  - `WSAAsyncGetProtoByNumber()`
- `WSAAsyncGetServByName()`
  - `WSAAsyncGetServByPort()`
- `WSAAsyncSelect()`
  - `WSACancelAsyncRequest()`
- `WSACancelBlockingCall()`
- `WSAGetLastError()`
  - `WSAIIsBlocking()`
- `WSASetBlockingHook()`
  - `WSASetLastError()`
- `WSAStartup()`
  - `WSAUnhookBlockingHook()`
Function Call of DSock - 1/3

• Socket Functions (WinSock-like)

- accept()
- bind()
- closesocket()
- connect()
- htonl()
- htons()
- inet_addr()
- inet_ntoa()
- listen()
- ntohl()
- ntohs()

SocketAccept()
SocketBind()
SocketClose()
SocketConnect()
 htonl()
 htons()
 inet_addr()
 inet_ntoa()
 SocketListen()
 ntohl()
 ntohs()
Function Call of DSocket - 2/3

- Socket Functions (WinSock-like)

WinSock
- recv()
- recvfrom()
- send()
- sendto()
- socket()
- WSASStartup()
- WSACleanup()

DSocket
- SocketRecv()
- SocketRecvFrom()
- SocketSend()
- SocketSendTo()
- SocketCreate()
- DSocket_Open()
- DSocket_Close()
Function Call of DSock - 3/3

- DSock-specific Extensions
  - DSock_DoBootp() DSock_LoadConfigFile()
  - DSock_AddGateway() DSock_GetGateway()
  - DSock_Resovle DSock_GetMacAddr()
  - DSock_GetHostIp() DSock_SetHostIp()
  - DSock_GetNetMask() DSock_SetNetMask()
  - SocketDestory() SocketAbort()
  - SocketDataReady() SocketIsConnected()
  - SocketPutChar() SocketGetChar()
  - SocketPutString() SocketGetString()
  - DSock_AddDomainNameServer()
  - DSock_GetDomainNameServer()
Procedure of TCP Server-Client Model

Server

- DSock_Open()
- SocketCreate()
- SocketBind()
- SocketListen()
- SocketAccept()
- SocketSend()
- SocketClose()
- SocketDestory()
- DSock_Close()

Client

- DSock_Open()
- SocketCreate()
- SocketConnect()
- SocketRecv()
- SocketDestory()
- DSock_Close()
Procedure of UDP Server-Client Model

**Server**
- DSock_Open()
- SocketCreate()
- SocketBind()
- SocketRecvFrom()
- SocketClose()
- SocketDestory()
- DSock_Close()

**Client**
- DSock_Open()
- SocketCreate()
- SocketBind()
- SocketSendTo()
- SocketClose()
- SocketDestory()
- DSock_Close()
Demo Program of DSock
## Demo Program of DSock

<table>
<thead>
<tr>
<th>Filename</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOOTP</td>
<td>Demo program of BOOTP/DHCP.</td>
</tr>
<tr>
<td>DNS</td>
<td>To get IP address of domain name.</td>
</tr>
<tr>
<td>EXE</td>
<td>Execute files for all samples.</td>
</tr>
<tr>
<td>FTPD</td>
<td>Demo program of FTP server.</td>
</tr>
<tr>
<td>HTTPD</td>
<td>Demo program of Web server.</td>
</tr>
<tr>
<td>SMTP</td>
<td>A simple program to send mail.</td>
</tr>
<tr>
<td>TALK_TCP</td>
<td>Example of Talk with TCP.</td>
</tr>
<tr>
<td>TALK_UDP</td>
<td>Example of Talk with UDP (broadcast).</td>
</tr>
<tr>
<td>TELNETD</td>
<td>Simple TELNET server example.</td>
</tr>
<tr>
<td>talk_tcp_win</td>
<td>Talk with TCP (Windows version by WinSock).</td>
</tr>
<tr>
<td>talk_udp_win</td>
<td>Talk with UDP (Windows version by WinSock).</td>
</tr>
</tbody>
</table>
Example of DSock to DSock
Example of DSock to WinSock

- TALK_UDP
- DSock Library
- Packet Driver
- Ethernet
- TCP/IP
- talk_udp_win
- Windows
- WinSock
- Ethernet

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Example of DSock Servers

FTPD

HTTPD

TELNETD

DOS

DSock Library

Packet Driver

Ethernet

DOS

DSock Library

Packet Driver

Ethernet

DOS

DSock Library

Packet Driver

Ethernet

TCP/IP

Client

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Why DSock?
Advantages of DOS TCP/IP

• Running under dedicate operating system – DOS
  • 100% dedicate for single tasking
• Complete development tools for x86 and DOS
  • C compiler
  • Debug tools
• Easy to up-to-date
• Fast time-to-market
• Lowest cost of TCP/IP solution
  (Compare with simple work under Windows system)
• Small size and low cost of storage for software
  • Can store in a 512k single chip flash disk