

HelloDevice Network Protocol

2000 12

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Protocol(OSI)



- Protocol ?
 -
- OSI (Open System Interconnect)
 - ISO(International Standards Organization)
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OSI



Layer	
Application	Consists of application programs that use the network
Presentation	Standardizes data presentation to the applications
Session	Manages session between applications
Transport	Provides end-to-end error detection and correction
Network	Manages connections across the network for the upper layers
Data Link	Provides reliable data delivery across the physical link
Physical	Defines the physical characteristics of the network media

TCP/IP



layer	
Application	Consists of applications and processes that use the network
Host-to-Host Transport	Provides end-to-end data delivery services
Internet	Defines the datagram and handles the routing of data
Network Access	Consists of routines for accessing physical network

TCP/IP Encapsulation



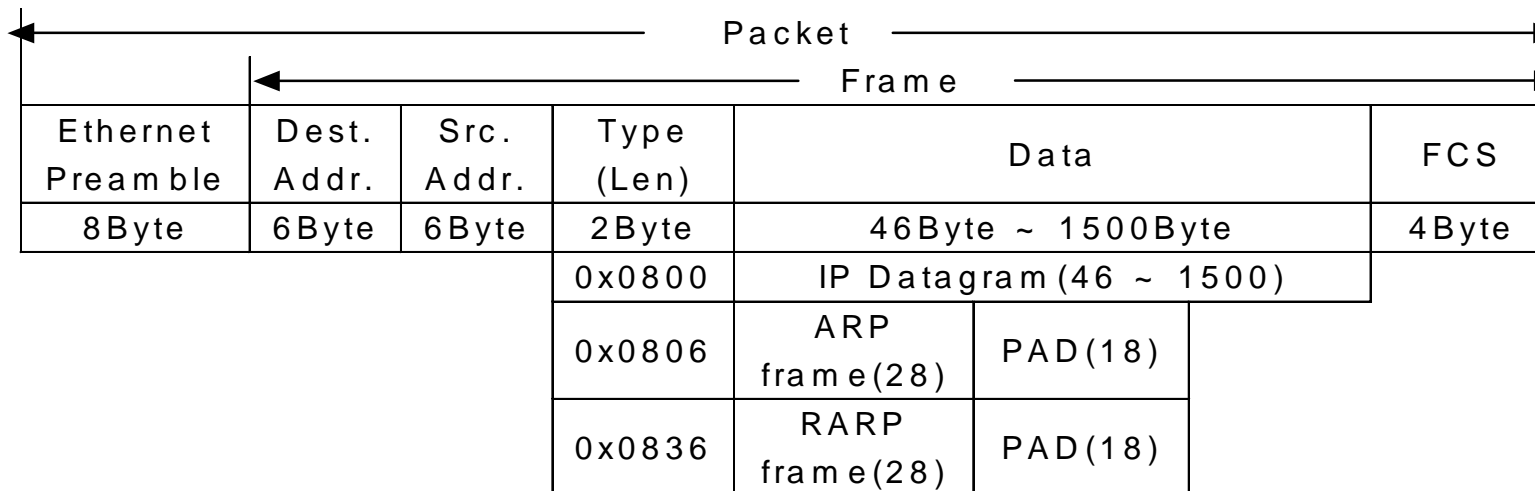
Layer	Encapsulation				TCP	UDP
Application				Data	Stream	Message
				↑		
Transport			Header	Data	Segment	Packet
				↓ ↑		
Internet		Header	Header	Data	Datagram	Datagram
				↓ ↑		
Network Access	Header	Header	Header	Data	Frame	Frame

	OSI	TCP/IP	HelloDevice				
7	Application	Application	HTTP	DIO,DPRAM,Serial		BOOTP	DHCP
6	Presentation						
5	Session						
4	Transport	Transport	TCP		UDP		
3	Network	Internet	IP	ICMP		ARP	
2	Data link	Network Access	Ethernet(IEEE802.3)		PPP		
1	Physical layer						

Network Access Layer



- Ethernet(IEEE 802.3)
 - CSMA/CD : Carrier Sense Multiple Access With Collision Detection)
 - 10 Base-T : 10Mbps, RJ-45 Jack, UDP Cable



Network Access Layer



- PPP(Point to Point Protocol)
 - Serial links Datagram
 - LCP
 - NCP

Flag	Address	Control	Protocol	Data	FCS	Flag
7E	FF	03H	2Byte	0 ~ MTU(1500)	2Byte	7E
			0x0021	Internet Protocol		
			0x8021	IP Control Protocol		
			0xC021	Link Control Protocol		

Internet Layer



- IP(Internet Protocol)

- TCP/IP

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- packet : 65,535 Byte

0	3	7	15	18	23	31
Version	Length	Service Type	Packet Length			
Identification			DF	MF	Fragment Offset	
Time to live		Transport	Header checksum			
Source Address						
Destination Address						
Options					Padding	

Internet Layer



- ICMP(Internet Control Message Protocol)
 - TCP/IP

0	7	15	31
Type	Code	Checksum	
Miscellaneous			
Data(IP protocol Header, 8byte test Data)			

Internet Layer



- ARP(Address Resolution Protocol)
 - IP Address Ethernet Address
- RARP(Reverse Address Resolution Protocol)
 - IP Address

0	8	16	24	31
Hardware Type		Protocol Type		
H/W Addr. Length	Pro. Addr.Length	Operation		
Sender Hardware Address(Byte0 -3)				
Sender Hardware Address(Byte4 -5)		Sender IP Address(Byte0 -1)		
Sender IP Address(Byte2 -3)		Target Hardware Address(Byte0 -1)		
Target Hardware Address(Byte2 -5)				
Target IP Address(Byte0 -3)				

Transport Layer



- TCP(Transmission Control Protocol)
 -
 - (PAR, Positive Acknowledgement with Re-Transmission)

0	8	16	24	31
Source Port		Destination Port		
Sequence Number				
Acknowledgment Number				
offset	Reserved	Flags	Windows Size	
Checksum		Urgent pointer		
Options			Padding	
Data				

Transport Layer



- UDP(User Datagram Protocol)
 -
 - 가
 - Broadcasting
 - Multicasting

16bit Source port Number	16bit Destination Port Number
16bit UDP Length	16bit UDP Checksum
DATA	

Application Layer



- BOOTP(Bootstrap Protocol)

- 가 가 IP
RARP

- DHCP(Dynamic Host Configuration Protocol)

- UDP IP Address

0	8	16	24	31
Op code	H/W Type	H/W Addr. Len.	Hop Count	
Transaction ID				
Number of seconds		Flags		
Client IP Address(4 byte)				
Your IP Address(4 byte)				
Server IP Address(4 byte)				
Gateway IP Address(4 byte)				
Client H/W Address(16 Byte)				
Server Host name(64 Byte)				
Boot File name(128 Byte)				
Vendor Specific info(64 Byte) - BOOTP				
Option - DHCP				

Application Layer



- HTTP(Hyper Text Transfer Protocol)

- WWW(World Wide Web)
Level

Application

- Request Response

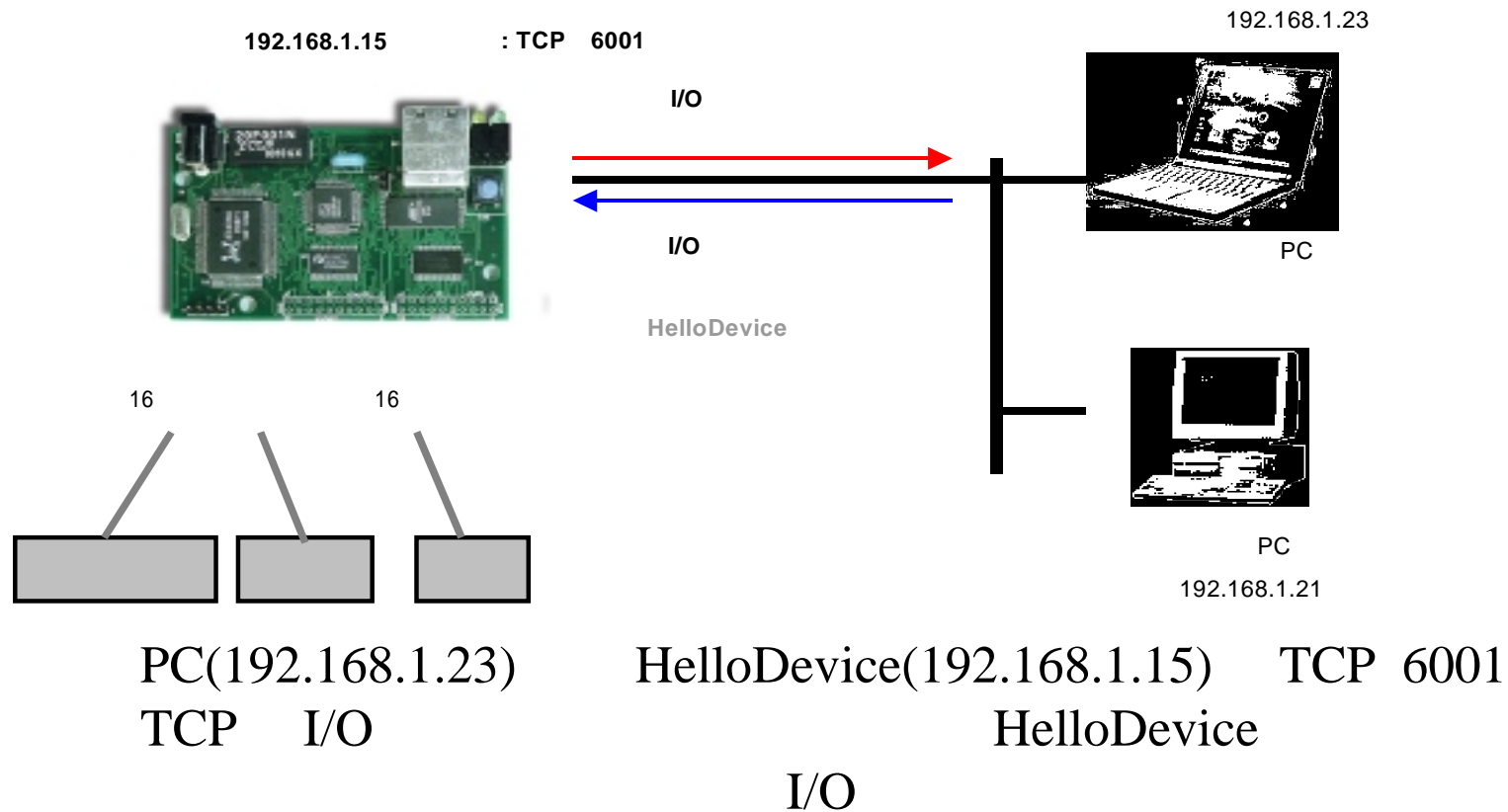
HTTP -message	Simple -Request	Method SP Full -Request -URI CRLF
	Simple -Response	Entity -Body
	Full -Request	Request -Line *(General -Header Request -Header Entity -Header) CRLF [Entyty -Body]
	Full -Response	Status -Line *(General -Header Request -Header Entity -Header) CRLF [Entyty -Body]

Application Layer



- HelloDevice
- HelloDevice

Flow(: HD1100)



Application Layer



- HelloDevice
 - HelloDevice Encapsulation(: HD1100)

Ethernet Preamble	Dest. Addr.	Src. Addr.	Type (Len)	IP Header	TCP Header	HD Protocol	FCS
8Byte	6Byte	6Byte	2Byte	24Byte	24Byte	3Byte	4Byte

- HD 1100 Protocol

	Byte			
	1	2	3	4
	0x75			
	0x76			

* 4 Byte 12Byte Null Data 가

Application Layer



- HD 1200 Protocol

	Byte					
	1	2	3	4	5	...
	0x77	(0x0000 ~ 0x07EF)		(0x001 ~ 0x05AA)		
					(N)	

	Byte						
	1	2	3	4	5	6	7 ~
	0x78	(0x000 ~ 0x7EF)		(0x001 ~ 0x5AA)			1450
							Byte

- HD 1300 Protocol

- HD1300

TCP

Serial

Application Layer



- HelloDevice Utility가 Internet Protocol
 - ARP : HelloDevice Find IP
(Utility : ARP Request, HelloDevice : ARP Response)
 - < UDP Protocol >
 - BOOTP : HelloDevice IP
(HelloDevice : BOOTP Request, Utility : BOOTP Response)
 - System Setting(FlashMemory Upload, Serial Set, IP Clear)
 - < TCP Protocol >
 - HTTP
 - Digital IO , DPRAM , Serial Data