



Welcome

Mr. Ken Swarner



Detailed Design Presentation

March 9, 2004

Mirage Incorporated

Presented By:

Jayme Gresen, Introduction and Conclusion

Lauren Englisbe, Eye Candy

Rich Connell, Testing Overview and Testing Cases

Paul Aiuto, Testing Sheets



Mirage Incorporated

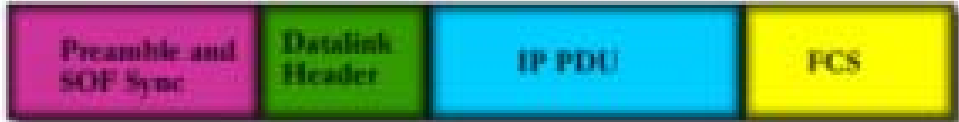
- Paul Aiuto, The AdministratROAR
- Richard Connell, Webmasta Double-R C
- Lauren Englisbe, Fireworks Goddess
- Jayme Gresen, Fearless Leader
- Jeffrey Habiniak, Pee-Wee Webmaster



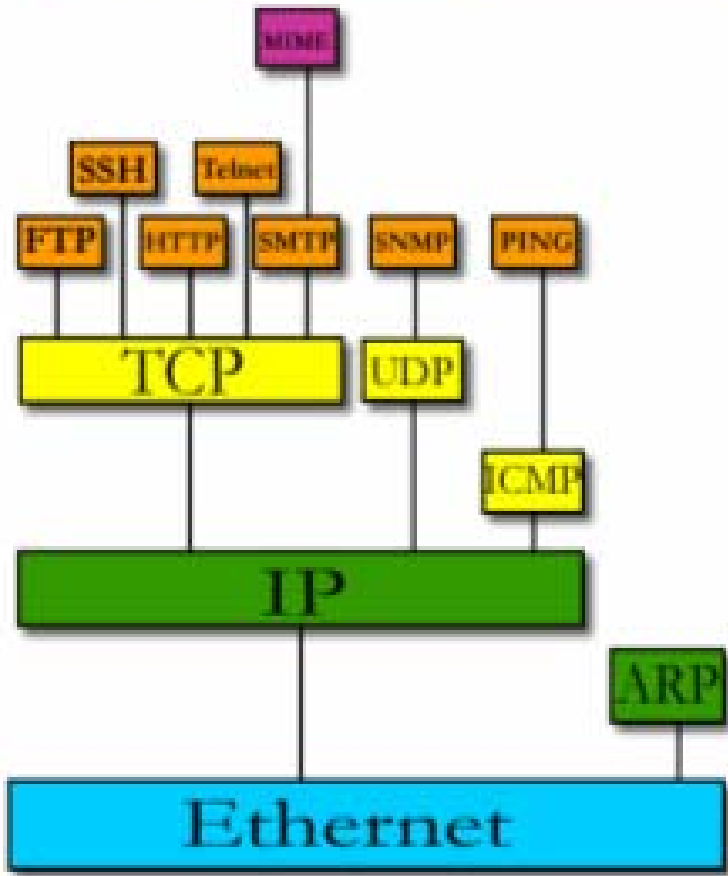
Eye Candy

Ethernet Packet

Choose A Protocol



IPv4
IPv6



	Application
Application	Presentation
	Session
Transport	Transport
Internet	Network
Network Access	Data Link
Physical	Physical

TCP/IP Model OSI Model



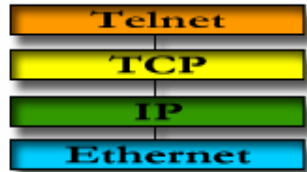
IP PDU

Ethernet Packet

Choose A Protocol



IPv4
IPv6



Bits																																							
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31								
Version				IHL				Type of Service								Total Length																							
0 1 0 0				0 1 0 1				0 0 0 0 0 0 0 0								0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 0																							
0				1				2								3																							
Identification																Flags		Fragment Offset																					
1 1 0 0 0 1 1 1 0 1 0 1 0 1 1 1																0 0 1		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0																					
4				5				6								7																							
Time to Live								Protocol								Header Checksum																							
0 1 0 0 0 0 0 0								0 0 0 0 0 1 1 0								1 1 1 1 0 0 0 1 1 0 0 0 0 1 0 1																							
8								9								10																11							
Source IP Address																																							
1 1 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 1 1 0 0 1 0 1																																							
12								13								14																							
Destination IP Address																																							
1 1 0 0 0 0 0 0 1 0 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 1 1 1																																							
16								17								18								19															
Options (if any, variable length, padded with 0's, 40 bytes maximum length)																																							
20								21								22								23															
Data (TCP PDU)																																							
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31																																							

IP PDU > IP Version for the selected TELNET PDU

Field Name: IP Version

Purpose and Definition: Version is a 4-bit field that indicates the format of the internet header.

Field Key: 4 = IPv4
6 = IPv6

Data value (decimal): 4

Data values in other bases:

Hexadecimal 4
Binary 0100
Decimal 4

IP



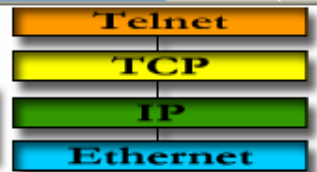
TCP PDU

Ethernet Packet

Choose A Protocol



IPv4
IPv6



Bits 0 1 2 3 4 5 6					Bits 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31																									
Version		IHL				Source Port Number										Destination Port Number														
0 1 0 0		0 1 0				0 0 0 0 0 0 0 0 0 0 1 0 1 1 1										1 0 0 0 0 0 0 0 0 0 1 0 0 1 0 1														
0		0				0										1														
Ide					Sequence Number																									
1 1 0 0 0 1 1					1 0 0 1 1 1 0 1 0 0 0 1 0 0 1 1 1 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0																									
4					4					5					6					7										
Time to Live					Acknowledgement Number																									
0 1 0 0 0 0					1 0 0 1 0 1 1 0 1 0 0 1 0 0 0 1 0 0 1 1 1 1 1 1 0 0 0 0 0 1 0 1																									
8					8					9					10					11										
Length		Reserved			URG	ACK	PSH	RST	SYN	FIN	Window Size																			
1 1 0 0 0 0		0 0 0 0 0 0			0	1	1	0	0	0	0 1 1 1 1 1 0 1 0 1 1 1 1 0 0 0																			
12		12			13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31							
Checksum					Urgent Pointer																									
1 1 0 0 0 0					0 1 0 1 1 0 0 1 1 0 0 0 1 0 0 1										0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1															
16					16					17					18					19										
Options (if any)					Options																									
20					20																				21		22		23	
Data (TELNET PDU)																														
0 1 2 3 4 5 6					0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31																									

IP > TCP PDU > Source Port for the selected TELNET PDU

Field Name: Source Port
 Purpose and Definition: This 16-bit number represents the name of the application that sent the data in the IP packet.
 Field Key: Not applicable
 Data value: telnet(23)

Data values in other bases:

Hexadecimal	0	0	1	7
Binary	0000	0000	0001	0111
Decimal	0		23	
ASCII		©		©

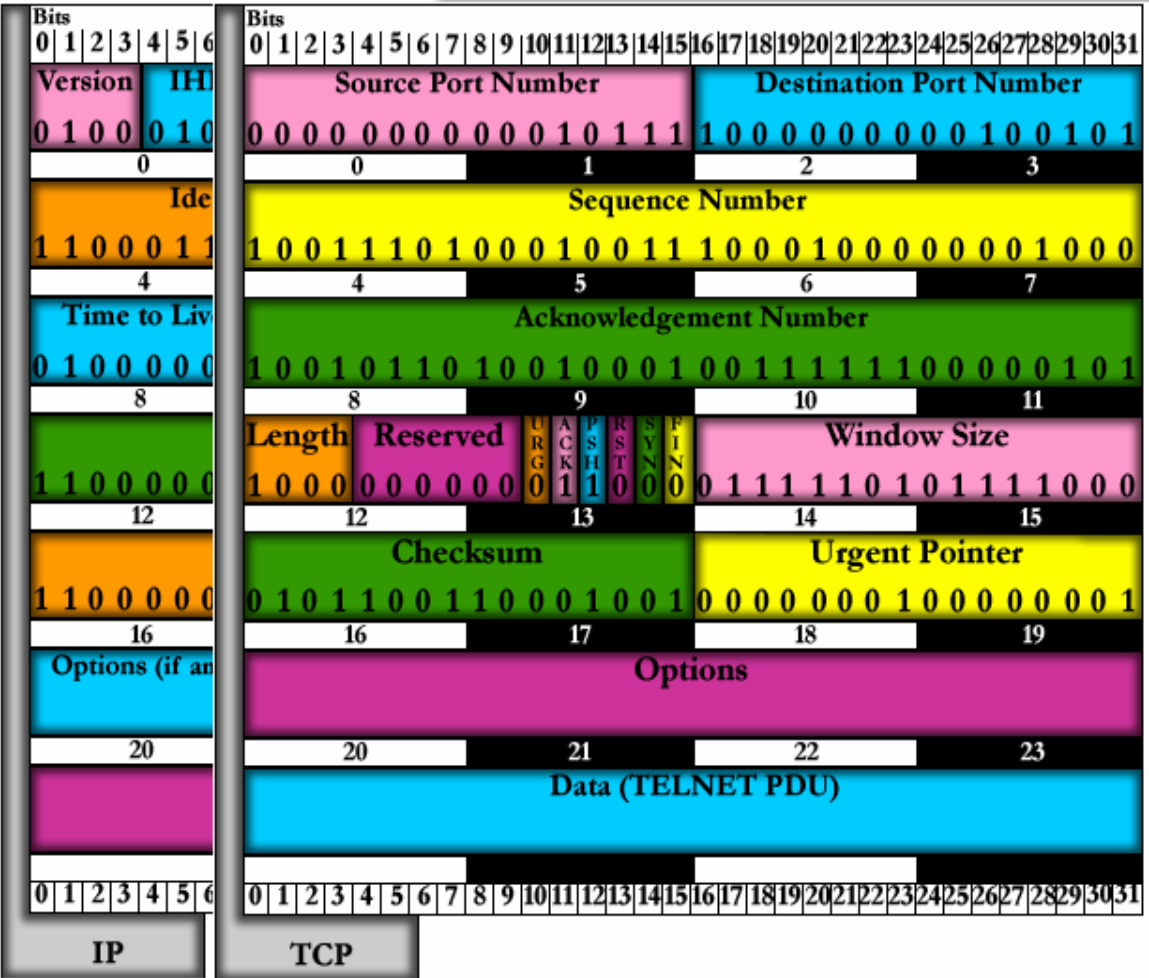
IP TCP



TELNET PDU

Ethernet Packet

Choose A Protocol



IP > TCP > TELNET PDU for the TELNET Packet

RFC Link: <http://www.ietf.org/rfc/rfc0959.txt?number=959>

PASS (Password)
 The argument field is a Telnet string specifying the user's password. This command must be immediately preceded by the user name command, and, for some sites, completes the user's identification for access control.

What is Contained in the Packet
 Request: PASS

Data Values (hexadecimal): 50 61 73 73 77 6F 72 64 3A 20

Data Values in Other Bases

Hexadecimal	5	0	6	1	7	3	7	7
Binary	0101	0000	0110	0001	0111	0011	0111	0111
Decimal	80	97	115	119				
ASCII	P	a	s	w				

Hexadecimal	6	F	7	2	6	4	3	A
Binary	0110	1111	0111	0010	0110	0100	0011	1010
Decimal	111	114	100	58				
ASCII	o	r	d	:				

Hexadecimal	2	0
Binary	0010	0000
Decimal	32	
ASCII	@	



ARP PDU



FTP PDU

Ethernet Packet

Choose A Protocol



0	1	2	3	4	5	6
Version		IHL				
0	1	0	0	0	1	0
0						
Iden						
1	0	1	0	1	0	1
4						
Time to Live						
0	1	0	0	0	0	0
8						
Length						
1	1	0	0	0	0	0
12						
Options (if any)						
20						
Data (TELNET PDU)						
0						

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Source Port Number										Destination Port Number																					
1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1
0				1				2				3																			
Sequence Number																															
1	0	0	0	0	0	1	1	0	1	0	0	1	0	1	0	0	0	1	0	1	1	0	0	1	1	0	1	1	0	0	0
4				5				6				7																			
Acknowledgement Number																															
1	0	0	0	1	1	1	0	1	0	0	0	1	1	0	1	0	1	0	0	1	1	0	1	0	1	1	1	0	1	0	1
8								9								10								11							
Length		Reserved				URG	ACK	PSH	RST	SYN	FIN	Window Size																			
1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	1	0	1	1	0	0	0	0	0	
12				13				14				15																			
Checksum																															
0	0	0	1	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16				17				18				19																			
Options																															
Data (TELNET PDU)																															
0																															

IP > TCP > FTP PDU for the FTP Packet

RFC Link:
<http://www.ietf.org/rfc/rfc0959.txt?number=959>

PASS (Password)
 The argument field is a Telnet string specifying the user's password. This command must be immediately preceded by the user name command, and, for some sites, completes the user's identification for access control.

What is Contained in the Packet
 Request: PASS
 Request Arg: fla2k3user

Data Values (hexadecimal): 50 41 53 53 20 66 31 61 32 6B 33 75 73 65 72 0D 0A

IP TCP



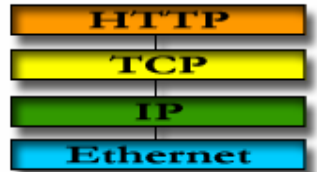
HTTP PDU

Ethernet Packet

Choose A Protocol

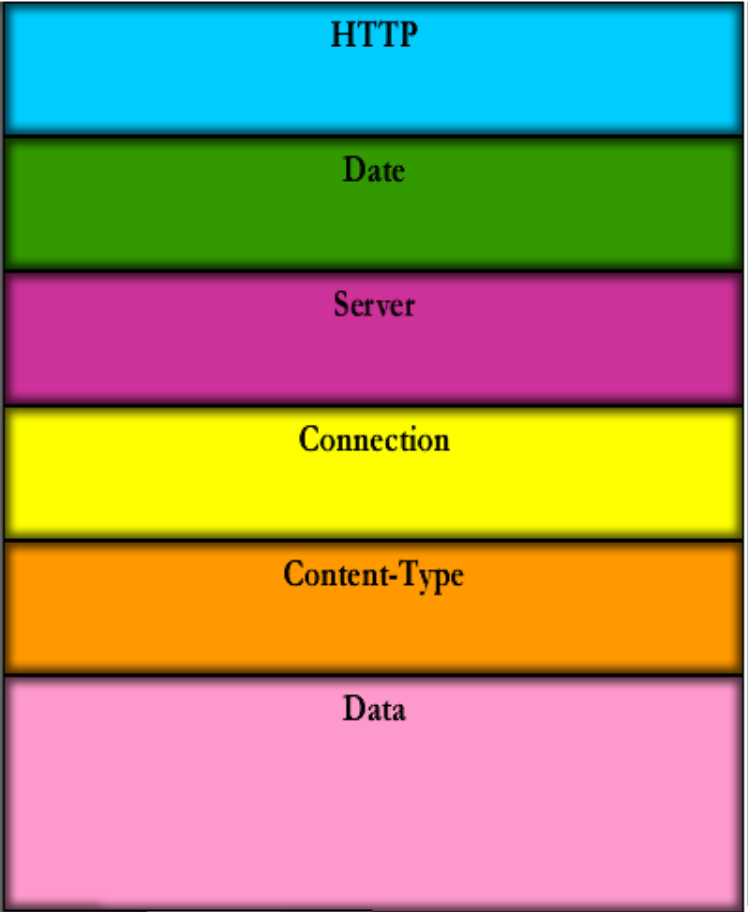


IPv4
IPv6



0	1	2	3	4	5	6
Version			IHL			
0	1	0	0	0	1	0
0						
Iden						
0	0	1	1	1	1	0
4						
Time to Live						
0	1	0	0	0	0	0
8						
Length						
1	1	0	0	0	0	0
12						
Options (if any)						
1	1	0	0	0	0	0
16						
Options (if any)						
0	1	2	3	4	5	6

0	1	2	3	4	5	6
Source						
0	0	0	0	0	0	0
0						
Date						
0	0	1	1	1	0	1
4						
Server						
0	1	0	1	0	0	1
8						
Length		Res				
1	0	0	0	0	0	0
12						
Ch		Ch				
1	1	1	1	0	0	0
16						
Options (if any)						
0	1	2	3	4	5	6



IP > TCP > HTTP PDU > Content Type for the selected HTTP PDU

Field Name: Content Type

Purpose and Definition: The Content-Type entity-header field indicates the media type of the Entity-Body sent to the recipient.

Field Key: Not applicable

Data value (ASCII): text/html; charset=iso-8859-1\r\n

Data Values in Other Bases

IP

TCP

HTTP



PING PDU

Ethernet Packet

Choose A Protocol



IPv4
IPv6



0	1	2	3	4	5	6
Version		IHL				
0 1 0 0		0 1 0				
0						
Identifier						
0 0 0 0 0 0 0						
4						
Time to Live						
0 1 0 0 0 0 0						
8						
1 1 0 0 0 0 0						
12						
1 1 0 0 0 0 0						
16						
Options (if any)						
20						
0 1 2 3 4 5 6						

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Type				Code				Checksum																							
0 0 0 0 1 0 0 0				0 0 0 0 0 0 0 0				1 1 0 0 1 0 0 1 0 0 0 1 0 1 0 1																							
0				1				2				3																			
Identifier								Sequence Number																							
0 1 1 1 0 0 0 0 0 1 1 0 0 0 0 0								0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0																							
4				5				6				7																			
Data (TCP PDU)																															
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31																															

IP > ICMP Header > Checksum for the selected PING PDU

Field Name: Checksum

Purpose and Definition: The checksum is the 16-bit one's complement of the one's complement sum of the ICMP message, starting with the ICMP type. For computing the checksum, the checksum field should initially be zero.

Field Key: Not applicable

Data value (hexadecimal): C9 15

Data values in other bases:

Hexadecimal	C	9	1	5
Binary	1100	1001	0001	0101
Decimal	201		21	
ASCII				©

IP

PING



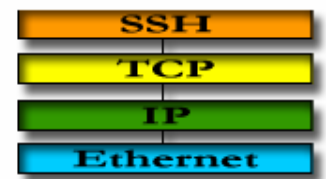
SSH PDU

Ethernet Packet

Choose A Protocol



IPv4
IPv6



Bits 0 1 2 3 4 5 6	Bits 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Version IHL 0 1 0 0 0 1 0	Source Port Number Destination Port Number 0 0 0 0 0 1 0 0 1 1 0 1 1 0 1 1 0 0 0 0 0 1 0 0 1 1 0 1 1 0 1 1
0	0 1 2 3
Iden 0 0 1 1 0 0 0	Sequence Number 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 0 1 1 0 1
4	4 5 6 7
Time to Live 0 1 0 0 0 0 0	Acknowledgement Number 1 1 1 0 0 0 1 0 0 1 1 0 1 1 0 0 1 0 1 1 0 1 1 1 0 1 0 0 0 0 0 0
8	8 9 10 11
Length Reserved 1 1 0 0 0 0 0	Window Size 1 0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 1 1 1 1 1 0 1 0 1 1 1 1 0 0 0
12	12 13 14 15
Checksum 1 1 0 0 0 0 0	Urgent Pointer 0 1 1 1 1 1 0 1 0 1 1 1 1 0 0 0 1 0 0 0 1 0 1 1 1 1 0 0 1 0 1 0
16	16 17 18 19
Options (if any)	Options
20	20 21 22 23
	Data (TELNET PDU)
0 1 2 3 4 5 6	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
IP	TCP

IP > TCP > SSH PDU for the SSH Packet

RFC Link: <http://www.ietf.org/rfc/rfc0959.txt?number=959>

PASS (Password)
 The argument field is a SSH string specifying the user's password. This command must be immediately preceded by the user name command, and, for some sites, completes the user's identification for access control. All information below is encrypted.

What is Contained in the Packet
 Request: PASS

Data Values (hexadecimal):
 03 B6 51 11 6A 46 12 36 4F 46 C9 63 B1 A4 B5 48 A2 BA 68 1C 42
 17 AB D2 CE 8E 6D 3F 49 7E EB 36 A0 1B 16 62 E4
 0F D7 55 DD 5F EB 52 64 B9 A7 62



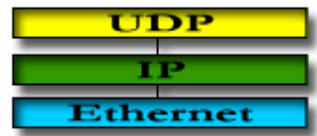
UDP PDU

Ethernet Packet

Choose A Protocol



IPv4
IPv6



Bits 0 1 2 3 4 5 6	Bits 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Version IHL	Source Port Destination Port
0 1 0 0 0 1 0	0 0 0 0 0 0 1 0 0 0 0 0 1 1 0 1 0 0 0 0 0 0 1 0 0 0 0 0 0 1 1 0 1
0	0 1 2 3
Ident	Length Checksum
1 1 0 0 0 1 1	0 0 0 0 0 0 0 1 0 0 0 1 0 1 0 0 1 1 1 0 1 0 0 1 1 1 0 1 1 0 1 1
4	4 5 6 7
Time to Live	Data
0 0 1 0 0 0 0	
8	
	Bits 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
1 1 0 0 0 0 0	
12	
1 1 0 0 0 0 0	
16	
Options (if any)	
20	
0 1 2 3 4 5 6	
IP	UDP

IP PDU > UDP > Checksum for the selected UDP PDU

Field Name: Checksum

Purpose and Definition: Checksum is the 16-bit one's complement of the one's complement sum of a pseudo header of information from the IP header, the UDP header, and the data, padded with zero octets at the end (if necessary) to make a multiple of two octets.

Data value (decimal): E9 DB

Data values in other bases:

Hexadecimal	E	9	D	B
Binary	1110	1001	1101	1011




Testing...1...2...3....

Testing Overview

- To test, we will use testers from outside of our company
- Implementing gray box testing
 - Gray box testing is a testing procedure done with some knowledge of how the internals work.
- Attributes Tested:
 - Individual fields of the packets
 - Hierarchical tree
 - Options

Test Cases

- Did the computer connect to the web-based client?
 - Does each screen load up promptly when navigating through the client?
 - Is scrolling to a minimum?

- 
- At the main menu:
 - Do the buttons bring you to correct/next logical screen/PDU?
 - Does changing the radians show affect on all PDU's?
 - Is the hierarchical tree dynamic?
 - Is the “Choose a Protocol” hierarchical tree displayed when the user clicks “Choose a Protocol?”
 - Does a message box appear when user selects “IPv6” stating that it is not currently available?



■ Graphical User Interface (GUI):

- Is the GUI clearly visible on 1024x768 projectors?
 - Is it visible from the farthest corners in the room?
- Are all colors easily distinguishable?
- Are information boxes placed so that the current PDU is not covered?
- When a field is clicked, is the information box the same color as the field?
- Does each protocol have a link to its RFC?



Testing Sheets

Screen: IP PDU

Date: _____

Tester: _____

Screen: Pass Fail

Field Name: *Version*

Attempted	Expected Result	Comments	Pass	Fail
1. Right Click	Nothing pops up			
2. Left Click	Version information field pops up in a pink box			

Field Name: *Internet Header Length*

Attempted	Expected Result	Comments	Pass	Fail
1. Right Click	Nothing pops up			
2. Left Click	Internet Header Length information field pops up in a cyan box			

Field Name: *Type of Service*

Attempted	Expected Result	Comments	Pass	Fail
1. Right Click	Nothing pops up			
2. Left Click	Type of Service information field pops up in a yellow box			

Screen: ICMP PDU

Date: _____

Tester: _____

Screen: Pass Fail

Field Name: *Type*

Attempted	Expected Result	Comments	Pass	Fail
1. Right Click	Nothing pops up			
2. Left Click	Type information field pops up in an appropriately colored box			

Field Name: *Code*

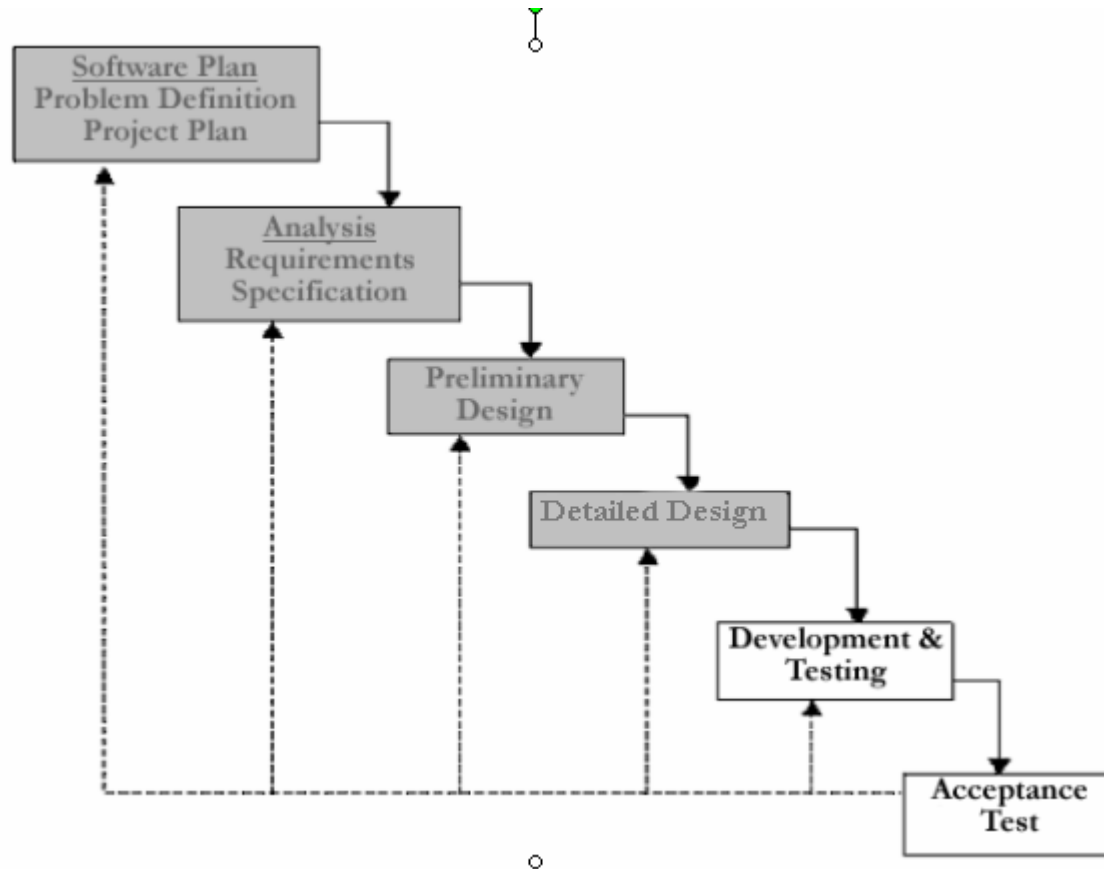
Attempted	Expected Result	Comments	Pass	Fail
1. Right Click	Nothing pops up			
2. Left Click	Code information field pops up in an appropriately colored box			

Field Name: *Checksum*

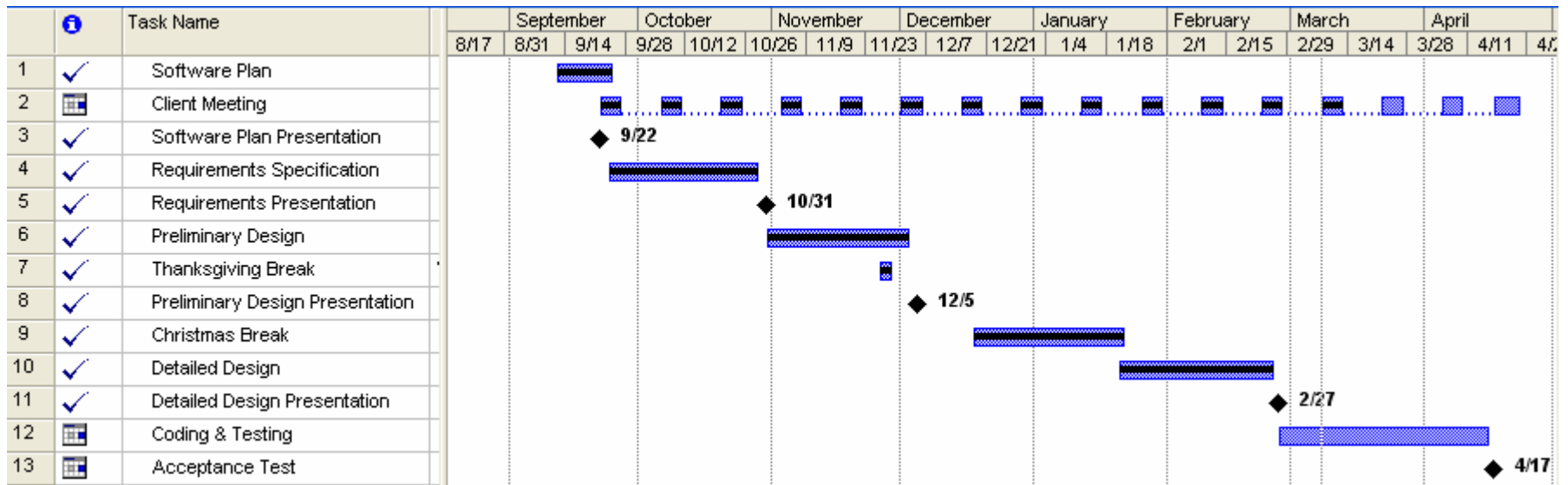
Attempted	Expected Result	Comments	Pass	Fail
1. Right Click	Nothing pops up			
2. Left Click	Checksum information field pops up in an appropriately colored box			

The Next Phase

Linear Sequential Model (Classic Waterfall)



Year-Long Schedule



Our Last Document...tear

- Acceptance Test
 - Documents – April 22, 2004
 - Presentation – April 27, 2004

Questions?





Thank You