

The top banner features a blue and white abstract background with circular patterns and a computer monitor on the right. The logo on the left consists of three overlapping circles in shades of blue and white.

EdgeTech Development
We are always on the cutting edge!

TCP/IP Packet Descriptor

Detailed Design

Welcome
Mr. Ken Swarner

EdgeTech Members

- | | | |
|-------------------------|---|------------------------|
| Matt DeCrescente | - | Librarian |
| Eric Fish | - | Lead Programmer |
| Jill Foster | - | Team Leader |
| John Mooney | - | Consultant |
| Das Nobel | - | Webmaster |

Detailed Design

Roger Bacon Room 328

March 1, 2005

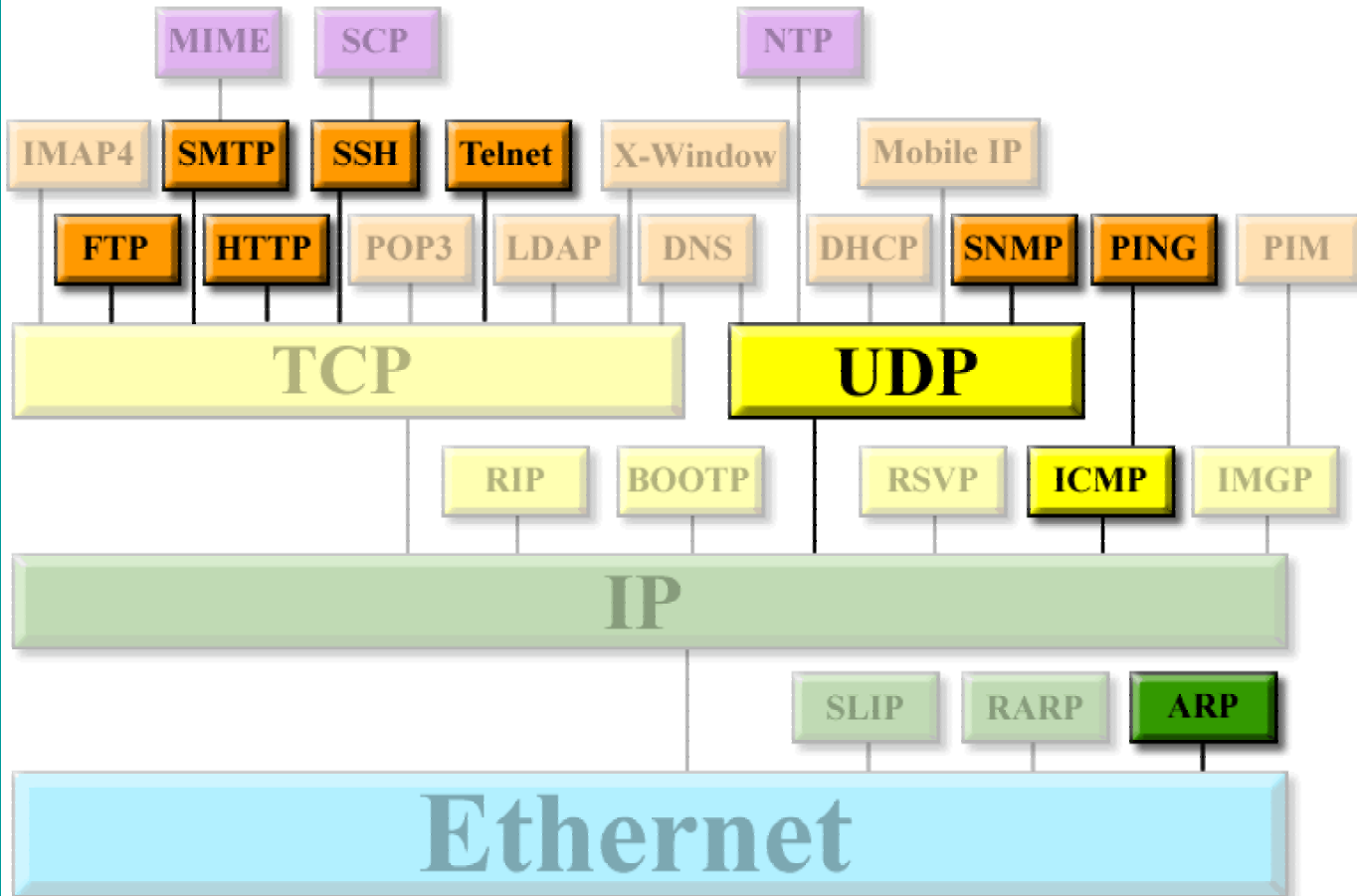
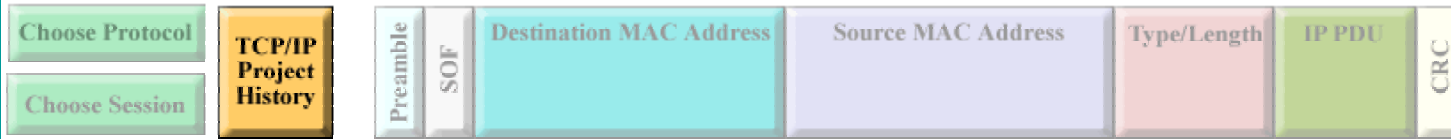
- Jill Foster Introduction & Conclusion
- John Mooney Prototypes
- Matt DeCrescente Testing Plan

Agenda

- **Prototypes**
- Testing Plan
- Conclusion

Protocol Selector Screen

Ethernet Packet



TCP/IP Model	OSI Model
Application	Application
	Presentation
	Session
Transport	Transport
Internet	Network
Network Access	Data Link
Physical	Physical

Packet Selector Screen

Ethernet Packet

Choose Protocol

Choose Session

**TCP/IP
Project
History**

Preamble

SOF

Destination MAC Address
B0 1B 5B C3 85 BC

Source MAC Address
48 FC 92 E8 50 AB

Type/Length
93 B6

IP PDU

CRC

FTP

TCP

IP

Ethernet

FTP
 Select A Packet From The
 Right Or Open A New
 Captured Session Below

Directory:

/usr/local/etherdumps_edge

Name ▲	Date
FTP_Default	02/02/2005
FTP_Bitmap	10/10/2004
FTP_Documents	09/10/2004
FTP_InstallFile	04/01/2004
FTP_JPEG	11/01/2003

No. -	Time	Source	Destination	Protocol	Info
1	0.000000	192.168.0.39	192.168.0.101	TCP	32816 > ftp [SYN] Seq=0 Ack=0 win=!
2	0.000154	192.168.0.101	192.168.0.39	TCP	ftp > 32816 [SYN, ACK] Seq=0 Ack=1
3	0.000401	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=1 Ack=1 win=!
4	0.013027	192.168.0.101	192.168.0.39	FTP	Response: 220 cb118ks.cs.siena.edu
5	0.013375	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=1 Ack=95 win=!
6	6.676401	192.168.0.39	192.168.0.101	FTP	Request: USER fakeuser
7	6.676429	192.168.0.101	192.168.0.39	TCP	ftp > 32816 [ACK] Seq=95 Ack=16 win=!
8	6.677232	192.168.0.101	192.168.0.39	FTP	Response: 331 Password required for
9	6.677417	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=16 Ack=132 win=!
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11	13.827680	192.168.0.101	192.168.0.39	FTP	Response: 230 User fakeuser logged
12	13.827905	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=33 Ack=162 win=!
13	13.828369	192.168.0.39	192.168.0.101	FTP	Request: SYST
14	13.828878	192.168.0.101	192.168.0.39	FTP	Response: 215 UNIX Type: L8
15	13.868033	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=39 Ack=181 win=!
16	15.964049	192.168.0.39	192.168.0.101	FTP	Request: TYPE I
17	15.964227	192.168.0.101	192.168.0.39	FTP	Response: 200 Type set to I.
18	15.964440	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=47 Ack=201 win=!
19	21.044925	192.168.0.39	192.168.0.101	FTP	Request: PASV
20	21.046043	192.168.0.101	192.168.0.39	FTP	Response: 227 Entering Passive Mode
21	21.046293	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=53 Ack=249 win=!
22	21.047403	192.168.0.39	192.168.0.101	FTP	Request: STOR testfile.dat
23	21.060328	192.168.0.101	192.168.0.39	FTP	Response: 150 opening BINARY mode
24	21.099489	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=72 Ack=308 win=!
25	21.099568	192.168.0.101	192.168.0.39	FTP	Response: 226 Transfer complete.
26	21.099738	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=72 Ack=332 win=!
27	23.631322	192.168.0.39	192.168.0.101	FTP	Request: QUIT
28	23.631433	192.168.0.101	192.168.0.39	FTP	Response: 221-You have transferred
29	23.631752	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=78 Ack=379 win=!
30	23.631769	192.168.0.101	192.168.0.39	FTP	Response: 221-Total traffic for this
31	23.631983	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=78 Ack=525 win=!
32	23.632002	192.168.0.101	192.168.0.39	TCP	ftp > 32816 [FIN, ACK] Seq=525 Ack=!
33	23.632348	192.168.0.39	192.168.0.101	TCP	32816 > ftp [FIN, ACK] Seq=78 Ack=!

Info Display Screen

Ethernet Packet



IP Frame																RFC - 0791															
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 Version		Hdr Length		Type of Service				Total Length																							
1	1	0	1	1	0	1	1	1	0	0	1	0	1	1	0	1	1	0	0	1	0	0	1	0	0	1	0	1	1	0	1
0		1				2				3																					
Identification												R	D	M	Fragment Offset																
1	0	0	1	0	1	1	0	0	1	0	1	1	0	1	0	1	1	0	1	0	0	1	0	1	0	1	0	0	1	1	1
4		5				6				7																					
Time to Live				Protocol				Header Checksum																							
1	1	1	0	1	0	0	0	1	1	0	0	1	0	0	1	1	1	0	0	1	0	0	0	1	0	0	0	0	1	1	1
8		9				10				11																					
Source IP Address																															
1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
12		13				14				15																					
Destination IP Address																															
0	0	1	1	0	0	1	1	0	0	1	1	0	1	1	0	1	1	0	1	1	0	1	1	0	0	1	1	0	0	1	1
16		17				18				19																					
Options																															
20		21				22				23																					
TCP PDU																															
24		25				26				27																					

FTP PDU

Ethernet > IP PDU > *Total Length*

Field Name: Total Length of Ethernet Frame

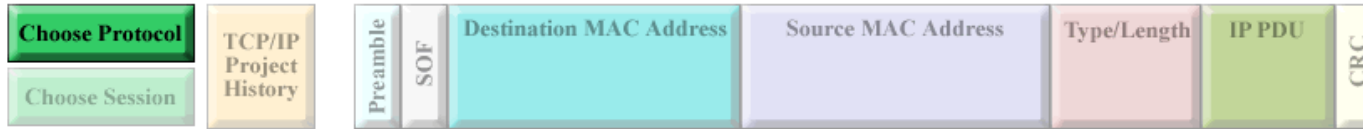
Purpose & Definition: Total Length is 16-bit field that indicates the length of the frame, measured in octets, including internet header and data. The maximum size is 2^{16} or 65,536 octets; however, the recommended maximum size is 576 octets.

Field Key: Not applicable

Data				
Hexadecimal	C	9	2	D
Binary	1100	1001	0010	1101
Decimal	51501			

History Screen

Ethernet Packet



History of TCP/IP Packet Descriptor

Two teams from the Class of 2004's Software Engineering class developed TCP/IP Packet Descriptors. Both gave graphical expressions and informative knowledge about different Internet Protocols. However, the packet information was hard-coded into the program, allowing the user to see the protocol data units of one packet for each different protocol.

For the Class of 2005's Software Engineering class, our team, EdgeTech Development, was asked to enhance the program. The enhancements were to combine the best design points of both programs and combine them into one. Another enhancement was to allow the user to take an Ethernet dump file from an external program and open it up in our TCP/IP Packet Descriptor, and allowing the user to pick any packet from the dump file and have the program break it up into its different data units.

The links below will take you to last years team websites and programs from Blue Technologies and Mirage Inc.



[EdgeTech Development](#)

[TCP Descriptor](#)



[Mirage Inc.](#)

["The Descriptor"](#)



[Blue Technologies Inc.](#)

[TCP Descriptor](#)

Client: Mr. Ken Swarner

Teacher/Silent Partner: Dr. Timothy Lederman

Class: [Software Engineering](#)

School: [Siena College](#)

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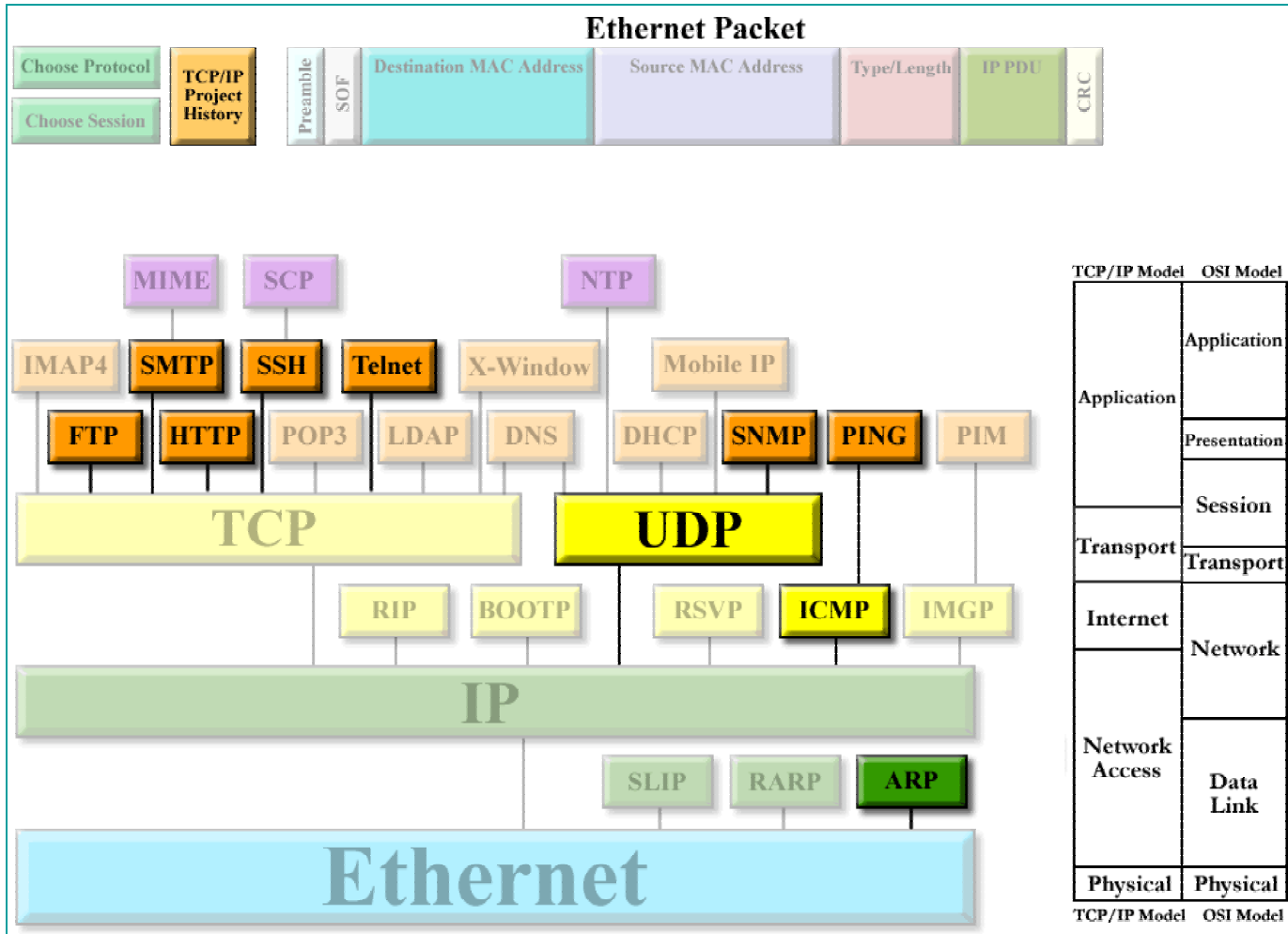
Agenda

- Introduction
- **Testing Plan**
- Conclusion

- 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 Examples:
 - Do the buttons bring you to correct/next logical screen/PDU?
 - Is the hierarchical tree dynamic?
 - Is the “Choose a Protocol” hierarchical tree displayed when the user clicks “Choose a Protocol?”
 - Are the inactive buttons dimmed and easily distinguishable from the active links?

Testing Plan



Functional Buttons

- Choose Protocol
- Choose Session
- TCP/IP Project History
- FTP
- SMTP
- HTTP
- SSH
- Telnet
- SNMP
- PING
- UDP
- ICMP
- ARP

Choose Session Screen

- Functional Buttons
 - Choose Protocol
 - Choose Session
 - TCP/IP Project History
 - Name (To sort)
 - Date (To sort)
 - Any File
 - Any Packet
 - Preamble
 - SOF
 - Destination MAC Address
 - Source MAC Address
 - Type/Length
 - IP PDU
 - Cyclic Redundancy Check
 - Ethernet
 - IP
 - TCP
 - FTP

Ethernet Packet

Choose Protocol

Choose Session

TCP/IP
Project
History

Preamble	SOF	Destination MAC Address	Source MAC Address	Type/Length	IP PDU	CRC
		B0 1B 5B C3 85 BC	48 FC 92 E8 50 AB	93 B6		

FTP
TCP
IP
Ethernet

FTP

Select A Packet From The Right Or Open A New Captured Session Below

Directory:

/usr/local/etherdumps_edge

Name ▲	Date
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31	23.631983	192.168.0.39	192.168.0.101	TCP	32816 > ftp [ACK] Seq=78 Ack=525 w
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33	23.632348	192.168.0.39	192.168.0.101	TCP	32816 > ftp [FIN, ACK] Seq=78 Ack=!

Detailed Design

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Info Display Screen - TCP

- Functional Buttons
 - Choose Protocol
 - Choose Session
 - TCP/IP Project History
 - Ethernet
 - IP
 - TCP
 - FTP
 - Preamble
 - SOF
 - Destination MAC Address
 - Source MAC Address
 - Type/Length
 - IP PDU
 - CRC
 - RFC Link
 - Source Port Number
 - Destination Port Number
 - Acknowledgment Number
 - Length
 - Reserved
 - U, A, P, R, S, F
 - Window Size
 - TCP Checksum
 - Urgent Pointer
 - Options
 - FTP PDU

Ethernet Packet

Choose Protocol

TCP/IP Project History

Choose Session

Preamble

SOF

Destination MAC Address

Source MAC Address

Type/Length

IP PDU

CRC

Ethernet

IP Frame [RFC - 0791](#)

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 Version		Hdr Length		Type of Service				Total Length																							
1 1 0 1		1 0 1 1		1 0 0 1 0 1 1 0				1 1 0 0 1 0 0 1 0 0 1 0 1 1 0 1																							
0		1		2				3																							
Identification																R	D	M	Fragment Offset												
1 0 0 1 0 1 1 0 0 1 0 1 1 0 1 0																1	1	0	1 0 0 1 0 1 0 0 1 0 0 1 1 1												
4		5		6				7																							
Time to Live				Protocol				Header Checksum																							
1 1 1 0 1 0 0 0				1 1 0 0 1 0 0 1				1 1 0 0 1 0 0 0 1 0 0 0 0 0 1 1 1																							
8		9		10				11																							
Source IP Address																															
1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1																															
12		13		14				15																							
Destination IP Address																															
0 0 1 1 0 0 1 1 0 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 0 0 1 1 0 0 1 1																															
16		17		18				19																							
Options																															
20		21		22				23																							
TCP PDU																															
24		25		26				27																							

FTP PDU

Ethernet > IP PDU > *Total Length*

Field Name: Total Length of Ethernet Frame

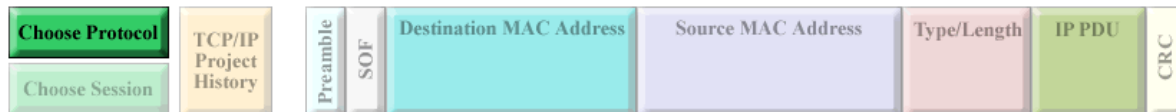
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Field Key: Not applicable

Data	Hexadecimal	C	9	2	D
Binary	1100	1001	0010	1101	
Decimal	51501				

History Page

Ethernet Packet



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Client: Mr. Ken Swarner
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Class: [Software Engineering](#)
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[Back](#)

Functional Buttons

- [Choose A Protocol](#)
- [Choose Session](#)
- [TCP/IP Project History](#)
- [Ethernet Packet](#)
- [Hierarchy Tree](#)
- [EdgeTech Links](#)
- [Mirage Links](#)
- [Blue Technologies Links](#)
- [Software Link](#)
- [Siena College Link](#)
- [Back Button](#)

Sample Test Sheet

<u>Screen: TCP PDU</u>		
Date:	_____	
Tester:	_____	
Screen:	Pass	Fail

Field Name: *RFC Link*

Attempted	Expected Result	Pass	Fail	Comments
1. Right Click	Nothing pops up			
2. Left Click	Takes the user to the RFC website for the chosen protocol			

Field Name: *Source Port*

Attempted	Expected Result	Pass	Fail	Comments
1. Right Click	Nothing pops up			
2. Left Click	Source Port information field pops up in the appropriate colored box			

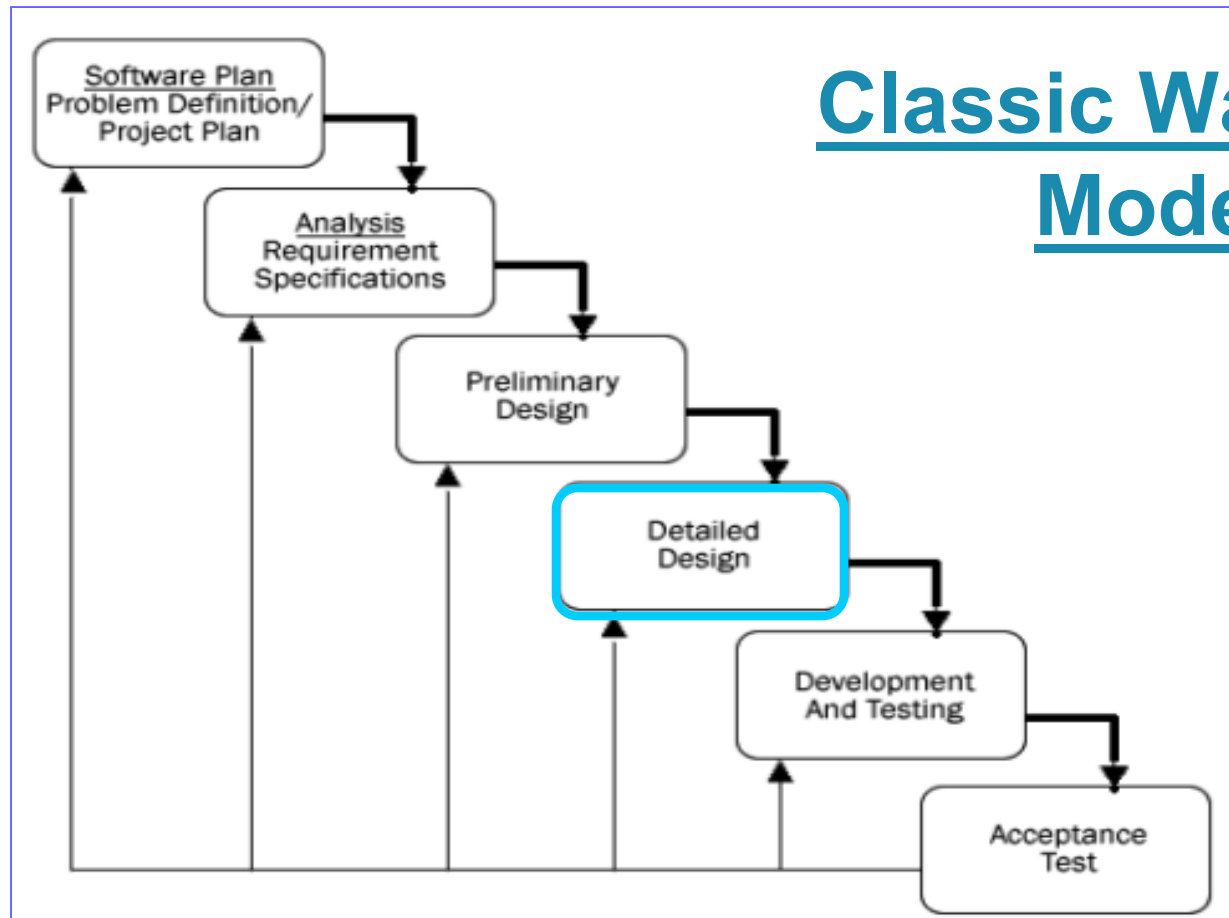
Field Name: *Destination Port*

Attempted	Expected Result	Pass	Fail	Comments
1. Right Click	Nothing pops up			
2. Left Click	Destination Port information field pops up in the appropriate colored box			

Overview

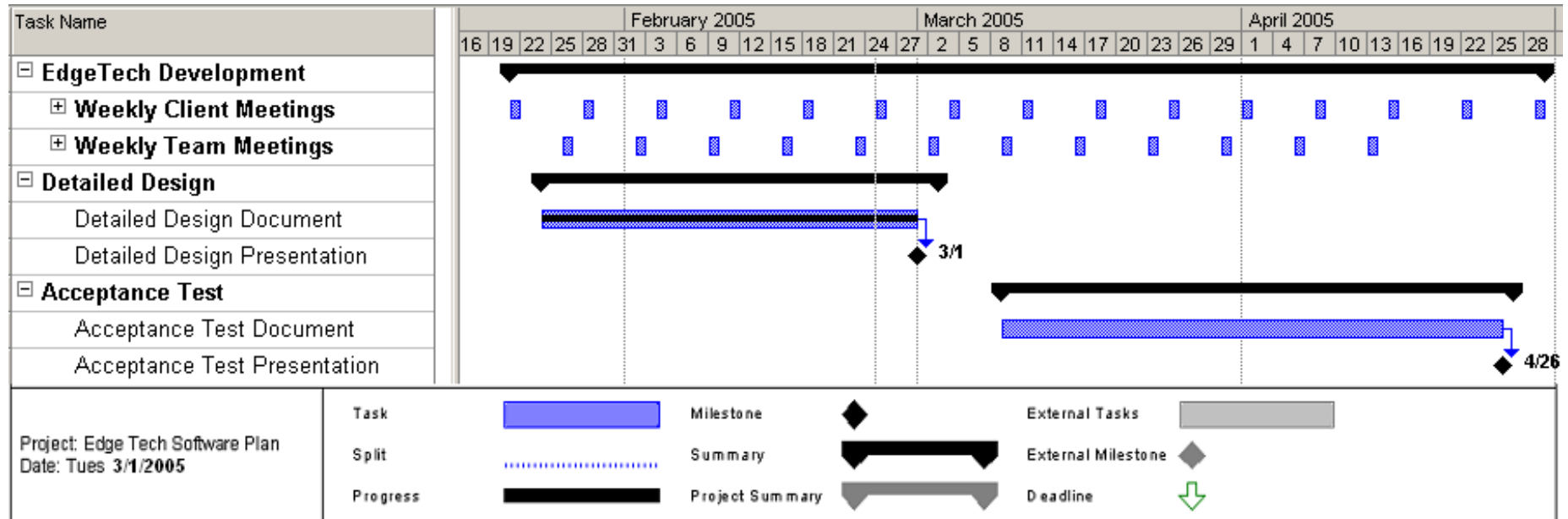
- Interface Design
- Testing
- **Conclusion**

Classic Waterfall Model



Detailed Design

Gantt Chart



- **Important Dates**

- April 25th – Acceptance Test Document
- April 26st – Acceptance Test Presentation
- April 29th – Academic Celebration
- May 3rd – CS Party in Boland Room

The top banner features a blue and white abstract background with circular patterns and a computer monitor on the right. The logo on the left consists of three overlapping circles in shades of blue and white.

EdgeTech Development

We are always on the cutting edge!

Any Questions?

The top banner features a blue and white abstract background with circular patterns and a computer monitor on the right. On the left, there is a circular logo containing three smaller circles. The text 'EdgeTech Development' is prominently displayed in a bold, dark blue font, with the tagline 'We are always on the cutting edge!' underneath in a smaller, lighter blue font.

EdgeTech Development

We are always on the cutting edge!

Thank You!