SAMPLE
5-DAY COURSE OUTLINE

Troubleshooting and Network Forensics with Wireshark®

CHAPPELLUNIVERSITY

Chappell University™ Sample 5-Day Course:
Troubleshooting and Network Forensics with Wireshark®

ISBN13: N/A

Part No: Custom 5-Day Sample Outline

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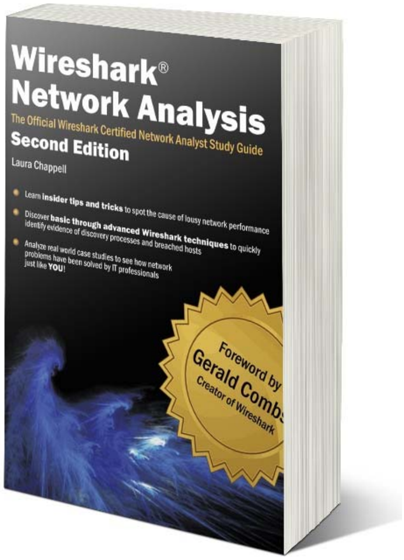
Wireshark Network Analysis: The Official Wireshark Certified Network Analyst Study Guide – Second Edition

This book focuses on practical use of the Wireshark Certified Network Analyst Exam objectives. For more information, visit www.wiresharkbook.com.

Author:	Laura Chappell, Founder of Wireshark University
Foreword:	Gerald Combs, Creator of Wireshark
Contributors:	Numerous
Paperback:	986 pages
Publisher:	Protocol Analysis Institute
Website:	www.wiresharkbook.com
Language:	English
ISBN-10:	1-893939-94-4
ISBN-13:	978-1-893939-94-3
Dimensions:	7.44 x 9.69 inches
Weight:	4 pounds
Contact:	info@wiresharkbook.com
Exam Info:	www.wiresharktraining.com/certification


Wireshark®
Network Analysis
The Official Wireshark Certified Network Analyst Study Guide
Second Edition
Laura Chappell
Learn insider tips and tricks to spot the cause of lousy network performance
Discover basic through advanced Wireshark techniques to quickly identify evidence of discovery processes and breached hosts
Analyze real world case studies to see how network problems have been solved by IT professionals just like YOU!
Foreword by
Gerald Combs
Creator of Wireshark

Wireshark Certified Network Analyst Exam

The Wireshark Certified Network Analyst program is designed to validate a professional's abilities to analyze, troubleshoot, secure and optimize networks using Wireshark.

For more information on the Wireshark Certified Network Analyst Exam, visit www.wiresharktraining.com/certification.

About the Course Author
Wireshark University/Chappell University Founder

Ms. Chappell is the Founder of Wireshark University and Chappell University, and the Senior Protocol/Security Analyst for the Protocol Analysis Institute, Inc., three US-based companies that research, document and present information on network and host forensics, security breaches and cutting-edge exploit tools.

Ms. Chappell is often called in to troubleshoot more complex network problems that require visibility into the communications system. Her clients include the U.S. Navy, IBM Corporation, Apple, Cisco Systems, U.S. Court of Appeals, United Bank of Switzerland, Dell Corporation, Australian High Tech Crime Centre, Capital One Financial Services, U.S. Armory, Hong Kong Police Department, Symantec Corporation, McAfee Corporation, Microsoft, Bank of San Francisco, Beth Israel Medical Center (Harvard), U.S. Joint Warfare Analysis Center and Pharmerica Corporation. With her skills as both a network analyst and Instructor, Ms. Chappell mixes onsite analysis services with live analysis training to develop self-sufficient IT teams within her client organizations.

As a member of the High Technology Crime Investigation Association (HTCIA) and the FBI's Infragard, Ms. Chappell has trained local, regional, national, and international law enforcement officers, as well as corporate security professionals on the methods and tools used to attack and defend networks. Ms. Chappell is also a voting member of Institute for Electrical and Electronics Engineers (IEEE) (member since 1990).

Ms. Chappell's enthusiasm for her topics, sense of humor and preference for working "live" during sessions has consistently ranked her as a top-presenter at numerous conferences including Microsoft TechEd North America, Microsoft TechEd Europe, HP Technical Forum, HTCIA International Conference, InterOp, Altiris ManageFusion and Novell BrainShare.

Ms. Chappell can be reached via email at laura@chappellu.com.

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Course Estimator and Quote Request Form

Ready to train your team on Wireshark, TCP/IP analysis, troubleshooting and network forensics? Complete Part 1 of this Cost Estimator and Quote Request Form to determine the cost of training.

Training is available in three formats:

- *Onsite*: instructor-led, lab-based at your location - customize with your own traffic files
- *Online Live*: instructor-led, lab-based connected via the Internet - customize with your own traffic files
- *On-Demand*: online recorded, available 24x7, transcripts, one-year All Access Pass subscriptions

Please contact us at info@chappellU.com if you have any questions.

Email completed forms to Brenda Cardinal (brenda@chappellU.com).

Part 1: Training Project Information (Required for Formal Quotes)

Use this form for group pricing for onsite, online or on-demand training.

Project Title

Contact Name

Company

Phone Number

Your Email Address

Company Billing Address for Quote?

Desired Course Format
□ Onsite Live
□ Online Live
□ On-Demand (All Access Pass Subscriptions)
□ Other

Course Delivery Timeline
○ Within 3 months
○ 3-6 months
○ 6+ months
○ I have specific dates in mind (see next item)

Desired Training Dates

Course Location (if known)

Number of Students
○ Up to 20 students
○ 21-30 students
○ 31-40 students
○ 41-50 students
○ Over 50 students (estimated student count:)

Course Length
○ Less than 2 days (online training option only)
○ 2 days
○ 3 days
○ 4 days
○ 5 days
○ 6 or more days (estimated course length in days:)

Course Objectives

Objective #1	
Objective #2	
Objective #3	

Additional Elements to include in your training quote (optional)

- □ Pre- and post-course quizzes
- □ Discounted All Access Pass Group Subscriptions (online 1-year training subscription)
- □ *Wireshark Network Analysis* book (1 per student)
- □ *Wireshark 101: Essential Skills for Network Analysts* book (1 per student)
- □ *Troubleshooting with Wireshark* book (1 per student)
- □ *Wireshark Certified Network Analyst Exam Prep Guide* (1 per student)
- □ Follow-up Live Online Webinar
- □ *Wireshark Certified Network Analyst Exam* Vouchers
- □ Other

Will you provide trace files for further customization of the training material?

- ○ Yes
- ○ No
- ○ Unknown

Other Requests or Comments

Please email completed forms to Brenda Cardinal (brenda@chappellU.com).

Part 2: Design Your Course Content

Please let us know what topics you would like covered in your custom course. Visit www.chappellu.com/onsite.html for sample course outlines. You may choose to use a sample outline with modifications if desired.

Section 1
Network Analysis Overview

□ All items in this section
□ Troubleshooting Tasks for the Network Analyst
□ Security Tasks for the Network Analyst
□ Application Analysis Tasks for the Network Analyst
□ Security Issues Related to Network Analysis
□ Legal Issues Related to Listening to Network Traffic
□ Overcome the "Needle in a Haystack" Issue
□ Example of a Network Analysis Session from Symptoms to Resolution
□ Other

Section 2
Wireshark Functionality Overview

□ All items in this section
□ Capturing Packets on Wired or Wireless Networks
□ Working with Trace Files from Other Capture Devices - Wiretap Library
□ How Wireshark Processes Packets – Drivers, Dissectors, Filters, Plugins
□ Wireshark Installation Options, Executable Files and Configuration Files
□ Accessing the Wireshark Code and Updates
□ Other

Section 3
Capture Techniques: Wired/Wireless

□ All items in this section
□ Where to Tap into the Network–Wired/WLAN, Duplex Issues, Switches
□ Infrastructure Effects – NAT/PAT, QoS Routing, VLANs, APs
□ Options for Remote Capture
□ Using File Sets and Optimizing for Large Capture Quantity
□ Conserve Memory with Command-line Capture (tshark, dumpcap)
□ Using Default and Custom Capture Filters
□ Filter by a Protocol, Address or Host Name
□ Advanced Capture Filters (Operators and Byte Offset Filtering)
□ Work with Multi-Adapter Capture
□ Other

Section 4
Customize Wireshark: Preferences and Profiles

□ All items in this section
□ Create a Custom Profile and Share Profile Elements
□ Set Global and Personal Configurations
□ Customize Your User Interface Settings
□ Define Your Capture Preferences
□ Define IP and MAC Name Resolution
□ Options for Network Name Resolution
□ Define ARP, TCP, HTTP/HTTPS and Other Protocol Settings
□ Use Colors to Distinguish Traffic
□ Mark Packets of Interest
□ Annotations and Report Generation
□ Working with Columns for Efficient Analysis
□ Dealing with Applications Running Over Non-Standard Port Numbers
□ Using Right-Click Functionality
□ Other

Section 5
Troubleshoot with Time Values and Summary Information

□ All items in this section
□ Alter the Default Time Column
□ Measure Roundtrip Time and Path Latency
□ Create Additional Time Columns
□ Analyze Application Response Times
□ Other

Section 6
Interpret Basic Trace File Statistics to Identify Trends

□ All items in this section
□ Identify Protocols and Applications in Use
□ Identify the Most Active Conversations/Endpoints
□ List Endpoints and Map Them on the Earth (GeoIP Mapping)
□ List Conversations or Endpoints for Specific Traffic Types
□ List All UDP and TCP Ports Used
□ Graph the Flow of Traffic
□ Analyze HTTP Statistics
□ Analyze WLAN Statistics
□ Other

Section 7
Create and Apply Display Filters for Efficient Analysis

□ All items in this section
□ Create Display Filters Using Auto Complete
□ Create and Apply Saved Display Filters
□ Filter on a Conversation, Endpoint or Protocol
□ Use Expressions for Filters of Lesser-Known Applications
□ Combine Display Filters with Comparison Operators
□ Alter Display Filter Meaning with Parentheses
□ Filter on Specific Bytes in a Packet
□ Avoid Common Display Filter Mistakes
□ Manually Edit the *dfilters* File
□ Add Filter Expression Buttons
□ Share Display Filters with Other Wireshark Systems
□ Other

Section 8
Follow Streams and Reassemble Data

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□ Follow and Reassemble UDP Conversations
□ Follow and Reassemble TCP Conversations
□ Use Reassembly to Identify Undissected Traffic
□ Use Reassembly to Extract Files Transferred Across a Network
□ Identify Common File Types Based on File Identifiers
□ Follow and Reassemble SSL Conversations
□ Other

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□ Define the Multistep Resolution Process
□ Define Port Number Resolution
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□ Define Route Resolution for a Local Target
□ Define Local MAC Address Resolution for a Target
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□ Define Local MAC Address Resolution for a Gateway
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Analyze Domain Name System (DNS) Traffic

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☐ Analyze Unusual DNS Queries/Responses
☐ Dissect the DNS Packet Structure
☐ Identifying DNS Faults with Filter Expression Buttons
☐ Use DNS Packets in the Trace File for Wireshark Name Resolution
☐ Other

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Analyze Address Resolution Protocol (ARP) Traffic

☐ All items in this section
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☐ Analyze Unusual ARP Requests/Responses
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☐ Dissect the ARP Packet Structure
☐ Other

Section 12
Analyze Internet Protocol (IPv4) Traffic

☐ All items in this section
☐ Analyze Normal IPv4 Traffic
☐ Analyze Normal IPv4 Traffic
☐ Dissect the IPv4 Header Structure
☐ Set Your IP Protocol Preferences
☐ Identify Issues Related to Fragmentation and Reassembly
☐ Identify Black Hole Detection Blocking Issues
☐ Analyze the Use of Differentiated Services Code Point (DSCP)
☐ IPv6 Overview and Comparison with IPv4
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☐ Black Hole Detection
☐ ICMP Types and Codes to Catch
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☐ Dissect the UDP Header Structure
☐ Analyze UDP-based Multicast Video Streams
☐ Other

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☐ All items in this section
☐ Access Expert Info
☐ Analyze Normal TCP Communications
☐ Analyze Unusual TCP Communications (Packet Loss, Congestion, etc.)
☐ Define the Establishment of TCP Connections (3-Way and 2-Way Handshakes)
☐ Define How TCP-based Services Are Refused
☐ TCP Sequential Packet Tracking
☐ TCP Selective ACK (SACK) Analysis
☐ TCP Window Scaling Analysis
☐ TCP Timestamp Analysis (Including PAWS)
☐ Define TCP Flow Control (Receiver Congestion, Congestion Window)
☐ Analyze the Most Common TCP Problems (See Section 16)
☐ Set TCP Protocol Parameters
☐ Work with TCP Stream Index Values
☐ Graph TCP Streams (Stevens/tcptrace)
☐ Other

Section 16
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☐ All items in this section
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☐ Expert Info: tcp_analysis_retransmission
☐ Expert Info: tcp_analysis_fast_retransmission
☐ Expert Info: tcp_analysis_spurious_retransmission
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☐ Graph HTTP Traffic Flows
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□ Analyze Unusual FTP Communications
□ Reassemble FTP Data Transfers
□ Colorize FTP Commands
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Section 20
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□ Analyze Normal Email Communications
□ Analyze Unusual Email Communications
□ Analyze POP Traffic
□ Analyze SMTP Traffic
□ Other

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□ Graph Host and Application Traffic
□ Use Calc Functions to Graph Field Sums, Averages, Maximums, Minimums, etc.
□ Graph Roundtrip Time and Throughput Rates
□ Graph TCP Window Size Issues
□ Interpret Packet Loss, Duplicate ACKs and Retransmissions in Graphs
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□ Filter on All WLAN Traffic
□ Analyze Frame Control Types and Subtypes
□ Analyze Signal Strength and Interference
□ Capture WLAN Traffic - Compare Monitor Mode and Promiscuous Mode
□ Set up WLAN Decryption
□ Prepend a Radiotap or PPI Header
□ Compare Signal Strength and Signal-to-Noise Ratios
□ Describe 802.11 Traffic Basics
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□ Examine RTP Call Traffic
□ Detect if DSCP is Affecting Directional Traffic Flows
□ Analyze VoIP Problems and Error Response Codes
□ Playback Unencrypted VoIP Calls
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□ The “Good Traffic” Rule
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□ Capture Location and Methods
□ Methods for Avoiding Capture Detection
□ Essential Capture Filters
□ Offset Capture Filters
□ String-Matching Capture Filters
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□ Detect Active Applications and Hosts
□ Right-Click Features Used for Network Forensics
□ Using the Expert to Detect Anomalies

Network Forensics Fundamentals (continued)

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□ Data Carving and Object Reassembly
□ Annotating for a Network Forensics Report
□ Display Filter Essentials for Network Forensics
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□ Building and Applying Compound Filters
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Detect Scanning and Discovery Processes

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□ Detect ICMP Ping Sweeps
□ Detect Various Types of TCP Port Scans
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□ Define Idle Scans
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□ Detect Dynamic Router Discovery
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□ Identify Unacceptable Traffic
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□ Find Maliciously Malformed Packets
□ Identify Invalid or Dark Destination Addresses
□ Differentiate between Flooding or Standard Denial of Service Traffic
□ Find Clear Text Passwords and Data
□ Identify Phone-Home Behavior
□ Catch Unusual Protocols and Applications
□ Detect Applications Using Non-Standard Port Numbers
□ Force Dissections on Non-Standard Port Number Traffic
□ Locate Route Redirection that Uses ICMP
□ Catch ARP Poisoning
□ Catch IP Fragmentation and Overwriting
□ Spot TCP Splicing
□ Watch Other Unusual TCP Traffic
□ Identify Password Cracking Attempts
□ Other

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Use Command-Line Tools

□ All items in this section
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□ Capture Traffic with tshark
□ Capture Traffic with dumpcap
□ List Trace File Details with Capinfos
□ Edit Trace Files with Editcap
□ Merge Trace Files with Mergecap
□ Other

Additional Course Requests

Click **Save** when you have completed this form. Email your form to Brenda Cardinal (brenda@chappellU.com) to receive a formal quote after we review your request.

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