Enterprise Wi-Fi Analysis & Troubleshooting

Durée: 4 Jours   Réf de cours: CWAP

Résumé:

The CWAP Wireless LAN Analysis course consists of hands-on learning using the latest enterprise wireless LAN analysis and troubleshooting tools. This course takes an in-depth look at the functionality of WLANs, intended operation of the 802.11 protocol and Wi-Fi Alliance specifications, WLAN frame formatting and structure, troubleshooting methodology, and protocol analysis. It also includes extensive training in modern spectrum analysis with a focus on advanced RF behavior analysis, data collection methods, interpreting spectrum plots and charts, and understanding advanced features of WLAN spectrum analyzers.

Students who complete the course will acquire the necessary skills for analyzing, assessing, and troubleshooting wireless operation in the enterprise, utilizing hardware and software solutions from the industry's leading manufacturers.

For those who are skilled at analyzing and troubleshooting today's wireless LANs, the Certified Wireless Analysis Professional (CWAP) certification offers an opportunity to leap forward in your career.
Do you have a mastery of operation and frame exchanges? Can you perform protocol and spectrum analyses? Are MAC layer frame formats right in your wheelhouse?
Measure your skills and knowledge with this professional-level certification and get on track toward ultimately earning your Certified Wireless Network Expert (CWNE) certification. Those that pass the CWAP exam earn credit towards a CWNE certification.

Public visé:

All staff who need to be able to Support and Troubleshoot Wi-Fi networks with authority. Wi-Fi network professionals preparing for the (CWNP) CWAP industry certification exam. Wi-Fi network professionals progressing towards the Internationally-recognised CWNE (Certified Wireless Network Expert) Certification.

Objectifs pédagogiques:

- On completing this course, you will be able to:

- Analyse, assess and troubleshoot Enterprise Wi-Fi networks in depth.

- Use advanced Wi-Fi network analysis tools from the industry's leading manufacturers.

- Gain confidence and familiarity with Wi-Fi RF spectrum analysers, using plots and charts to display and interpret spectrum data.

- Use Wi-Fi network analysis tools to capture and visualise 802.11 frame types, formats and 802.11 protocol exchanges.

- Gain hands-on troubleshooting skills by diagnosing common problems in Wi-Fi networks.

- Prepare for the Certitrek (CWNP) CWAP-403 Certified Wireless Analysis Professional exam.

- Progress towards application for the Internationally-recognised CWNE (Certified Wireless Network Expert) Certification.

Pré-requis:

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Test et certification

- **Associated Certifications**: CWAP

Contenu:

The following list contains the materials covered in the lecture portion of the course.

Principles of WLAN Communication

- 802.11 Working Group
- OSI reference model and the 802.11 PHY and MAC
- Communication sublayers and data units
- WLAN architecture components
- Organization of station forwarding
- Addressing and internetworking operation
- Modern WLAN product architectures

Physical (PHY) and MAC Layer Formats and Technologies

- Physical layer functions
- Preamble function and format
- Header purpose and structure
- Analysis of PHY problems
- Physical PPDU formats
- 802.11b
- 802.11a
- 802.11g
- 802.11n
- MAC frame components
- MAC encapsulation
- Fields and subfields of the MAC header
- Frame Control
- Frame types and subtypes and their uses
- Addressing
- Frame body
- Data frame format
- Control frame format
- Management frame format
- Information elements and fields

Protocol Operation

- Beaconing and synchronization
- Scanning
- Client state machine
- 802.11 contention
- QoS
- Admission control
- Band steering and airtime fairness mechanisms
- Fragmentation
- Acknowledgments and Block acknowledgments
- Protection mechanisms and backward compatibility
- Power management
- Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC)
- Security components, methods, and exchanges
- Roaming procedures exchanges
- Future protocol enhancements

802.11n

Protocol Analyzer Setup, Use, and In-Depth Analysis

Using a WLAN protocol analyzer is a fundamental piece of network troubleshooting. In this course, protocol analysis is the foundation for hands-on learning, as students will use these tools to gain familiarity with and exposure to analyzer features and use, frame formats, and protocol operation.

This lab set (10 labs) is focused on gaining familiarity with analysis tools, using them to capture traffic, and interpreting the frame traces:

- Basic installation and familiarity with capabilities, configuration, and data display
- Opening, collecting, saving, and modifying capture files
- Exploring common features like device naming and prioritization, filtering traffic, and using coloring rules as analysis aides
- Configuration of the tool to perform live captures based on a set of desired collection criteria
- Identifying significant network behaviors, metrics, and statistics used to identify and isolate network problems
- Using expert features of the analyzer, such as conversation analysis
- Remote packet capture with an AP
- Understanding the MAC header
- Comparing the three major frame types and their subtypes
- Analyzing frame formats of individual frame types
- Analyzing 802.11n frame components
- Identifying what additional information is reported by protocol analyzers
- Understanding what information is not visible in protocol analyzers
- Connectivity exchanges and sequences
- Legacy and modern security exchanges
- ERP and HT protection mechanisms
- Power save behavior
- Acknowledgments, block acknowledgments, and supporting action frames
- Dynamic rate switching
- Band steering
- And more
- Troubleshooting connectivity exchanges
- Troubleshooting 802.1X and EAP exchanges
- Troubleshooting roaming
- Installing the analyzer and becoming

In addition to understanding the frame types and formats in WLANs, it is essential to know how and when each frame is used in interactive communication. Understanding frame exchange rules and behaviors is critical to identifying expected and unexpected. It is also necessary to understand what is normal so that aberrations can be properly troubleshot. This lab is focused on observing and explaining WLAN behavior using a protocol analyzer. The following will be covered in this lab exercise:

- Basic installation and familiarity with capabilities, configuration, and data display
- Opening, collecting, saving, and modifying capture files
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- Troubleshooting connectivity exchanges
- Troubleshooting 802.1X and EAP exchanges
- Troubleshooting roaming
- Installing the analyzer and becoming familiar with display and navigation
- Understanding the "RF perspective" provided by each plot and chart
- Using built-in features like markers and traces as well as automated device identification

- Transmit beamforming
- Spatial multiplexing
- Maximal Ratio Combining (MRC)
- Space-Time Block Coding
- 40 MHz channels
- Frame aggregation
- HT-OFDM format
- Modulation and Coding Schemes (MCS)
- HT frame formatting
- And More

Protocol Analysis Tools and Methodology

- Troubleshooting methodology
- Protocol analyzer types
- Analysis NIC/adapter selection and constraints
- Interpreting results based on location
- Analyzer settings and features
- Filtering and channel scanning
- Interpreting decodes
- Using advanced analysis features
- Assessing WLAN health and behavior factors
- Evaluating network statistics
- Troubleshooting common problems
- Wired analysis to support wireless network issues

Spectrum Analysis Tools and Methodology

- Radio frequency behavior review
- Visualizing RF domains using spectrum measurement tools
- Spectrum analyzer types and operation
- Analyzer specifications and characteristics
- Understanding spectrum data presentation
- Interpreting plots and charts
- Common WLAN spectrum analyzer features
- Identifying transmit patterns
- Device classification and network impact
- Recognizing transmit signatures

Hands-on Lab Exercises

- familiar with display and navigation
- Understanding the "RF perspective" provided by each plot and chart
- Using built-in features like markers and traces as well as automated device identification
- Characterizing the behaviors of an interference source
- Assessing the impact of an interference source
- Determining the impact of transmitter proximity on interference and spectrum displays
- Identifying signatures of common transmitters
- Remote spectrum analysis with an AP

Understanding Frame Components

This lab set (9 labs) is focused on using analysis tools to capture and visualize the 802.11 frame types, uses, and formats first hand. Familiarity with the frame structure and contents is essential in real-world troubleshooting efforts, and this lab is designed to provide that familiarity so that both normal behavior and problematic behavior can be identified. Areas of focus include:

- Basic installation and familiarity with capabilities, configuration, and data display
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Troubleshooting Common Problems

This lab exposes students to hands-on troubleshooting skills by setting up common problems in WLANs and allowing students to attempt to solve them.

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Frame Exchanges

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Spectrum Analyzer Setup, Use, and In-Depth Analysis

This lab section is focused on gaining confidence and familiarity with spectrum analyzers. Specifically, it will explore the plots and charts used to display spectrum data and how to interpret this data to define a transmitter's impact on the network. The following steps will be covered in this lab exercise.

- Basic installation and familiarity with capabilities, configuration, and data display
- Opening, collecting, saving, and modifying capture files
- Exploring common features like device naming and prioritization, filtering traffic, and using coloring rules as analysis aides
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Méthodes pédagogiques :

The official CWAP courseware will be used during the course.
Global Knowledge is a CWNP Authorized Learning Center.

Autres moyens pédagogiques et de suivi:

• Compétence du formateur : Les experts qui animent la formation sont des spécialistes des matières abordées et ont au minimum cinq ans d'expérience d'animation. Nos équipes ont validé à la fois leurs connaissances techniques (certifications le cas échéant) ainsi que leur compétence pédagogique.
• Suivi d'exécution : Une feuille d'émargement par demi-journée de présence est signée par tous les participants et le formateur.
• En fin de formation, le participant est invité à s'auto-évaluer sur l'atteinte des objectifs énoncés, et à répondre à un questionnaire de satisfaction qui sera ensuite étudié par nos équipes pédagogiques en vue de maintenir et d'améliorer la qualité de nos prestations.

Délais d'inscription :

• Vous pouvez vous inscrire sur l'une de nos sessions planifiées en inter-entreprises jusqu'à 5 jours ouvrés avant le début de la formation sous réserve de disponibilité de places et de labs le cas échéant.
• Votre place sera confirmée à la réception d'un devis ou """"booking form"""" signé. Vous recevrez ensuite la convocation et les modalités d'accès en présentiel ou distanciel.
• Attention, si cette formation est éligible au Compte Personnel de Formation, vous devrez respecter un délai minimum et non négociable fixé à 11 jours ouvrés avant le début de la session pour vous inscrire via moncompteformation.gouv.fr.

Accueil des bénéficiaires :

• En cas de handicap : plus d'info sur globalknowledge.fr/handicap
• Le Règlement intérieur est disponible sur globalknowledge.fr/reglement