

## Introduction

The CWAP™ certification, covering the current CWAP-402 exam objectives, will certify that the successful candidate understands the frame structures and exchange processes for each of the 802.11 series of standards and how to use the tools that are available for analyzing and troubleshooting today's wireless LANs. This certification exam will cover the details of these topics and will have a strong inclination towards real-world applicability of this knowledge. The CWAP candidate must have obtained the CWNA certification prior to earning the CWAP certification. When you pass the CWAP-402 exam, you earn credit towards the CWNE certification.

The skills and knowledge measured by this examination are derived from a survey of wireless networking professionals and analyzer product manufacturers from around the world. The results of this survey were used in weighing the subject areas and ensuring that the weighting is representative of the relative importance of the content.

The following chart provides the breakdown of the CWAP exam as to the weight of each section of the exam.

Wireless LAN Analysis Subject Area	% Of Exam
Troubleshooting Processes	5%
802.11 Communications	25%
WLAN Hardware	15%
Protocol and Spectrum Analysis	35%
Troubleshooting Common Problems	20%
<b>Total</b>	<b>100%</b>

## CWNP Authorized Materials Use Policy

CWNP does not condone the use of unauthorized 'training materials', aka 'brain dumps'. Individuals who utilize such materials to pass CWNP exams will have their certifications revoked. In an effort to more clearly communicate CWNP's policy on use of unauthorized study materials, CWNP directs all certification candidates to the CWNP Candidate Conduct Policy at:

<http://www.cwnp.com/exams/CWNPCandidateConductPolicy.pdf>

Please review this policy before beginning the study process for any CWNP exam. Candidates will be required to state that they understand and have abided by this policy at the time of exam delivery. If a candidate has a question as to whether study materials are considered "brain dumps", he/she should perform a search using CertGuard's engine, found here: <http://www.certguard.com/search.asp>

## 1.0 Troubleshooting Processes – 5%

- 1.1 Understand industry and vendor recommended troubleshooting processes and implement the same to resolve common 802.11 wireless networking problems.
- 1.2 Apply the OSI Model to the troubleshooting processes and problem resolution methods used in 802.11 wireless networks.
- 1.3 Use the appropriate tools (network analysis tools and operating system tools) to troubleshoot specific problems including no network connectivity, slow network performance, unavailable resources, and unavailable services.

## 2.0 802.11 Communications – 25%

- 2.1 Explain the 802.11 communications processes including authentication, association, security negotiation, frame transmission and factors impacting data rates.
- 2.2 Understand the different WLAN architectures in use and their impact on performance and operations.
- 2.3 Understand and explain the 802.11 frames including general frame format, management frames, control frames and data frames and how they apply to WLAN analysis.
- 2.4 Understand and explain the 802.11 PHY header and preamble and the indications for WLAN performance and operations.

## 3.0 WLAN Hardware – 15%

- 3.1 Understand client devices and operations including radios, drivers, supplicants and implementations.
- 3.2 Describe and discover access point (AP) options, configurations and behaviors, including internal and external antennas, Ethernet connections, power options and management options.
- 3.3 Explain the functionality of WLAN controllers and managers including protocols used, installation locations and supported data communication options.
- 3.4 Describe and implement WLAN analysis hardware for protocol analysis and spectrum analysis.
- 3.5 Describe and analyze wired infrastructure hardware including routers and switches as well as servers and services.

## 4.0 Protocol and Spectrum Analysis – 35%

- 4.1 Describe the common functionality and features of protocol analyzers.
- 4.2 Demonstrate the ability to install, configure and use a protocol analyzer to capture and analyze WLAN traffic.
- 4.3 Demonstrate the ability to use a protocol analyzer to capture the appropriate wired traffic related to WLAN operations.

- 4.4 Define terminology related to spectrum analysis including SNR, duty cycle, sweep cycles, signal strength, resolution bandwidth and utilization.
- 4.5 Understand the common functions and features of a protocol analyzer as it relates to WLAN analysis.
- 4.6 Demonstrate the ability to install, configure and use a PC-based spectrum analyzer to analyze RF activity in an area.
- 4.7 Recognize RF patterns of common devices including 802.11 devices, Bluetooth devices, microwave ovens, wireless video devices and cordless phones.

## 5.0 Troubleshooting Common Problems – 20%

- 5.1 Understand and explain common wired problems that impact the WLAN including DNS, DHCP, switch configuration, WLAN controller access and PoE.
- 5.2 Demonstrate the ability to troubleshoot wired issues using protocol analyzers, operating system commands and hardware troubleshooting.
- 5.3 Select the appropriate location for placement of a protocol analyzer on the wired network and use it to troubleshoot common issues including DHCP, DNS and data communications issues.
- 5.3 Analyze and repair Quality of Service issues on the wired side of the network.
- 5.4 Recognize and repair common WLAN issues including insufficient capacity, lack of connectivity, interference and QoS problems.
- 5.5 Diagnose and repair roaming problems including dropped VoIP calls, broken connections and lack of reconnect.
- 5.6 Understand and repair issues related to WLAN security including authentication, encryption and mobile device management (MDM).
- 5.7 Recognize and repair common client-side problems including unstable drivers, configuration errors, incompatible supplicants and operating system bugs and vulnerabilities.

## CWAP Terms

The following terms should be understood for the CWAP-402 exam:

2.4 GHz  
4-way Handshake  
5 GHz  
802.11a  
802.11ac  
802.11b  
802.11e  
802.11g  
802.11i  
802.11n  
802.11w  
802.1p  
802.1X  
Access Category (AC)

AES  
AIFS  
Analysis  
AP  
APSD  
Association  
Authentication  
Beacon  
CCA  
CCMP  
Channels  
Coding  
Contention Window  
Control Frame  
Controller  
CoS  
CSMA/CA  
Data Frame  
DCF  
Deauthentication  
Decode  
Delay  
DFS  
DHCP  
DIFS  
Disassociation  
DNS  
DSCP  
DSSS  
DTIM  
Duty Cycle  
EAP  
EDCA  
Energy Detect  
ERP  
Frame  
Header  
HR/DSSS  
HT  
Jitter  
Latency  
MAC  
Management Frame  
Management Frame Protection (MFP)  
MCA  
MCS



MIMO  
Modulation  
MPDU  
MSDU  
NTP  
OFDM  
OKC  
PHY  
PLCP  
PMD  
PMK Caching  
Power Save  
PPDU  
Preamble  
Preauthentication  
Probe Request  
Probe Response  
Protected Management Frame (PMF)  
Protocol  
PSDU  
PSMP  
QoS  
RBW  
Real Time FFT  
RSSI  
RTS/CTS  
S-APSD  
SCA  
SIFS  
SISO  
Slot Time  
SMPS  
SNR  
Spatial Multiplexing  
Spectrum  
Sweep Cycle  
Swept Spectrograph  
ToS  
TPC  
U-APSD  
Utilization  
VHT  
VoIP  
WIPS  
WMM  
WPA



WPA2

