

CCNP BCMSN Notes - Wireless Architecture and Design

Legacy Authentication Types **Open Authentication** No authentication is used; any client can associate to an AP. **Pre-Shared Key (PSK)** A pre-shared static Wired Equivalence Protocol (WEP) key authenticates the client to the AP. **Extensible Authentication Protocol (EAP)** Types EAP is an authentication framework originally developed for PPP authentication (RFC 3748). The wireless variants of EAP are defined in RFC 4017. **Lightweight EAP (LEAP)** LEAP (also known as Cisco EAP) is a Cisco-proprietary extension to EAP. Client and AP authentication is performed through a RADIUS server. Each authenticated client is assigned a unique WEP key. **EAP-TLS** EAP-TLS (defined in RFC 2716) uses Transport Layer Security (TLS) and relies on digital certificates for authentication. Every client and AP must have a valid digital certificate to be authenticated. Each authenticated client is assigned a unique WEP key. **Protected EAP (PEAP)** PEAP is similar to EAP-TLS (it also relied on TLS), but only the authentication server is required to have a digital certificate; this certificate is used to authenticate the server to clients. Clients are authenticated using MS-CHAPv2. **EAP Flexible Authentication via Secure Tunneling (EAP-FAST)** EAP-FAST establishes a secure tunnel between the client and the authentication server using a Protected Access Credential (PAC). The PAC can be assigned from a PAC server or generated dynamically. **Wi-Fi Protected Access (WPA)** Types **WPA** First-generation WPA was based on draft 802.11i. WPA utilizes Temporal Key Integrity Protocol (TKIP); WEP keys are incremented per-packet, and regenerated on reauthentication. Some form of EAP or a preshared key is used for the initial authentication exchange. Message Integrity Check (MIC) is used to provide message integrity (hashing). **WPA2** WPA2 was developed from the finalized 802.11i standard. WPA2 relies on Advanced Encryption Standard (AES) for encryption, which requires a hardware upgrade from WEP/WPA. TKIP is supported for backward-compatibility with WPA. Proactive Key Caching (PKC) can be used to allow a client to roam between APs without reauthenticating to each. **Cisco Compatible Extensions (CCX)** Cisco developed CCX as a certification process for ensuring compatibility between devices:

CCXv3 - WPA2, 802.1X for EAP-TLS, 802.11 Multimedia QoS (802.11e)
= CCXv4 - Cisco NAC, VOIP call admission control, VOIP metrics, enhanced roaming, RFID functionality
Roaming APs with overlapping coverage areas should be configured to operate on non-overlapping channels (1, 6, and 11 for 802.11b/g). Vendor-specific roaming algorithms determine when a wireless client will decide to roam. Clients can scan channels for other APs in two ways:

Passive scanning - A client only listens for beacon frames
 Active scanning - A client actively transmits probe requests
A client must disassociate with the current AP before it can associate with another. **WLAN Design** **AP Cell Size** A larger cell has the potential to support more clients than is desired. Effective transmitter power determines the cell size. Antenna type determines the cell shape. **Channel Layout** Cells should be laid out in a honeycomb fashion, preventing dead space and overlapping channels; this can be accomplished with only three non-overlapping channels.