DESIGN GUIDE / KB1812

Wireless network design and commissioning

Design for both coverage and capacity. Use a predictive plan to estimate placement, then validate it on site with representative clients and applications.

Survey and capacity planning

- Gather floor plans, wall materials, occupancy and client capabilities. Check external interference and neighboring WLANs. Survey critical rooms and adjacent floors. Measure coverage, SNR, channel utilization, retries, client throughput and roaming.
- Plan 2.4, 5 and, where supported and permitted, 6 GHz separately. Channel widths are measured in MHz. Prefer narrower channels in dense environments when reuse is the limiting factor. Select wider channels only when airtime and spectrum allow. Check the regulatory domain and DFS behavior.
- Calculate concurrent clients and airtime per area rather than installing one high-power AP per room. Adjust AP power and placement for the client return path and for the actual antenna pattern. Avoid excessive co-channel overlap.

Backhaul, roaming and security

- Prefer wired AP backhaul where feasible. Mesh and repeaters consume airtime depending on channel use and radios, so measure each hop under load. Check cabling, uplink speed, per-port and total PoE budget and fallback behavior.
- Roaming is client-driven. Controller features and 802.11k/v/r can assist supported clients. Test any fast-roaming or steering policy with the actual devices. Use consistent settings across APs serving the same WLAN.
- Use approved WPA3 where compatible, or a documented WPA2-AES transition design for legacy clients. Protect management access and isolate guests with firewall policy and client isolation where appropriate. Keep firmware current and disable unused networks.

Validate

- Walk test in both directions on each critical route. Verify application throughput, latency, roaming, congestion, and guest isolation. Record channel plan, power settings, failed zones and corrective actions.

References

Cisco, Wireless LAN design for high-density clients

Documentation review. Validate with the exact firmware and endpoints before deployment.