# Practical CCNA Home Lab Setup: Internet Access via Cisco Devices

This document details the step-by-step configuration of a home lab using Cisco devices, connecting a Cisco 819 router directly to a home modem for internet access, a Catalyst 3650 switch, and a Cisco AIR-CAP1702I-B-K9 access point. It includes the configurations, common errors encountered, and the solutions applied.

## Objective

Set up a working home network using Cisco equipment, demonstrating practical CCNA knowledge. Provide internet access to wireless clients through VLAN segmentation, DHCP, and NAT, while troubleshooting real-world issues.

## 1. **Topology Overview**

[Home Modem]  
 |  
[Router: Cisco 819] - Fa1 (switchport) ↔ G1/0/5 [Switch: Catalyst 3650] ↔ G1/0/3 [Access Point: AIR-CAP1702I-B-K9]

* VLAN 30 is used for wireless clients.
* The AP broadcasts SSID WeWorshipThor.
* The router provides DHCP and NAT for internet access.

## 2. **Router (Cisco 819) Configuration**

### Internet Connection

interface GigabitEthernet0  
 description Connected to Modem  
 ip address dhcp  
 ip nat outside  
 no shutdown

### Internal LAN Setup (VLAN 30)

interface Vlan30  
 ip address 192.168.30.1 255.255.255.0  
 ip nat inside  
 no shutdown  
  
ip dhcp pool VLAN30-POOL  
 network 192.168.30.0 255.255.255.0  
 default-router 192.168.30.1  
 dns-server 8.8.8.8

### NAT Configuration

ip access-list standard NAT-LAN  
 permit 192.168.30.0 0.0.0.255  
  
ip nat inside source list NAT-LAN interface GigabitEthernet0 overload

### Fa1 as Trunk Port (Switchport)

interface FastEthernet1  
 switchport mode trunk  
 switchport trunk allowed vlan 1,30,1002-1005

**Issue Encountered:** Command rejected: Bad VLAN allowed list. Required all default VLANs. **Fix:** Included 1,30,1002-1005 in trunk allowed VLANs.

## 3. **Switch (Catalyst 3650) Configuration**

### VLAN Creation

vlan 30  
 name WiFi

### Interface Configurations

interface GigabitEthernet1/0/5  
 description Uplink to Router  
 switchport mode trunk  
 switchport trunk allowed vlan 1,30,1002-1005  
  
interface GigabitEthernet1/0/3  
 description Access Point  
 switchport access vlan 30  
 switchport mode access  
 spanning-tree portfast

## 4. **Access Point (AIR-CAP1702I-B-K9) Configuration**

Note: This AP runs autonomous IOS (k9w7 image)

### Interface and SSID Setup

interface Dot11Radio0  
 encryption mode ciphers aes-ccm  
 encryption vlan 30 mode ciphers aes-ccm  
 ssid WeWorshipThor  
 no shutdown  
 station-role root  
  
interface GigabitEthernet0.30  
 encapsulation dot1Q 30  
 ip address dhcp  
 bridge-group 30  
 bridge-group 30 spanning-disabled  
 no bridge-group 30 source-learning  
  
interface Dot11Radio0.30  
 encapsulation dot1Q 30  
 bridge-group 30  
  
interface BVI30  
 ip address dhcp

### SSID Configuration

dot11 ssid WeWorshipThor  
 vlan 30  
 authentication open  
 authentication key-management wpa  
 wpa-psk ascii SuperSecure123  
 guest-mode

**Issue Encountered:** SSID WeWorshipThor not visible **Fixes Applied:**

* Confirmed radio was up with no shutdown
* Configured encryption for vlan 30
* Ensured mbssid and guest-mode enabled

**Issue Encountered:** Clients stuck on connecting **Fix:** Set encryption to aes-ccm on Dot11Radio0 and vlan 30 explicitly

**Issue Encountered:** No IP assigned to interface BVI30 **Fix:** Verified DHCP was working and switchport was correctly assigned to vlan 30

## 5. **Final Verifications**

* show ip interface brief on AP showed BVI30 with DHCP-acquired IP.
* Router could ping AP and vice versa.
* Mobile device could associate to WeWorshipThor and get IP address.
* Internet access confirmed.

## 6. **Lessons Learned and Practical CCNA Applications**

* VLAN trunking with switchports and subinterfaces
* Interfacing router-on-a-stick model using non-routable switchports
* DHCP and NAT configuration
* Troubleshooting VLAN and SSID issues
* Use of BVI interfaces in autonomous APs
* Understanding dot1Q tagging and subinterfaces

This project is a full application of CCNA fundamentals in a real-world home lab scenario.

## 7. **Suggestions for GitHub Repo**

* Add this document as README.md
* Include device configs as separate .txt files:
  + router\_config.txt
  + switch\_config.txt
  + ap\_config.txt
* Use diagrams (ASCII or Visio) to illustrate the topology
* Include troubleshooting logs or show command outputs

## 8. **Conclusion**

This guide provides a solid foundation for using CCNA knowledge in a home environment. By manually configuring devices and troubleshooting through trial and error, you build real confidence and understanding of networking concepts.