SPEC-2 Homelab (ISR4331 Isolated Router + Catalyst 3560/2960)

Background

This spec configures a homelab where ISR4331 connects to Spectrum and to the Core 3560. VLANs: 10 management, 20 workstations. Static IP plan used.

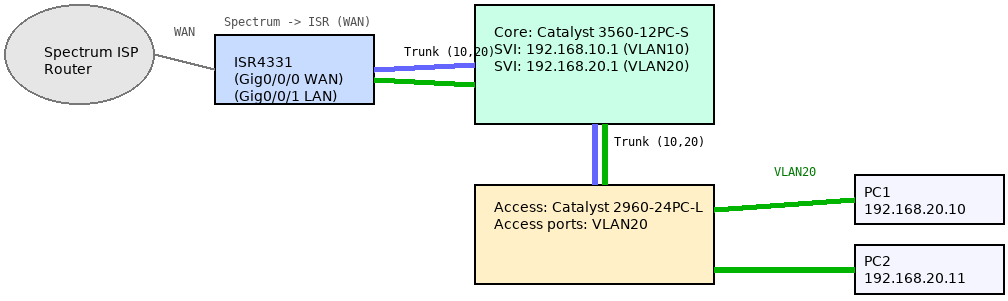
Method

1. Connect Spectrum ISP router to Cisco ISR4331 WAN interface (Gig0/0/0).
2. Connect ISR4331 LAN interface (Gig0/0/1) to Catalyst 3560 core switch (Gi0/1).
3. Connect Catalyst 3560 to Catalyst 2960 access switch with trunk link (Gi0/2 -> Gi0/1).
4. Create VLANs (10, 20) on both switches; configure SVIs on the 3560 core switch.
5. Assign static management IPs to switches; assign static IPs to PCs (192.168.20.10, .11).
6. Validate connectivity and confirm isolation from the home network.

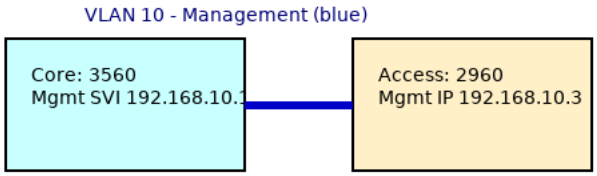
VLAN Plan

VLAN ID	Name	Purpose
10	Management	Switches, core mgmt
20	Workstations	PCs, laptops

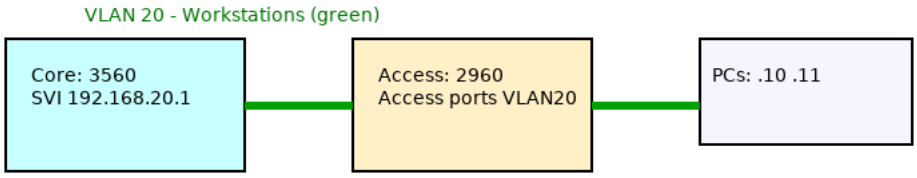
Topology Diagrams (Master + per-VLAN)



VLAN 10 (Management)



VLAN 20 (Workstations)



Configuration Input (Step-by-Step)

Core Switch (3560) — Basic Device Configuration (Paste-ready)

```
CORE-SW> enable
  ! Enter privileged EXEC mode
CORE-SW# configure terminal
  ! Enter global configuration mode
CORE-SW(config)# hostname CORE-SW
  ! Set device hostname for identification
CORE-SW(config)# enable secret class
  ! Set encrypted enable password
CORE-SW(config)# ip domain-name homelab.local
  ! Required for generating SSH keys
CORE-SW(config)# username admin privilege 15 secret cisco123
  ! Create local admin user
CORE-SW(config)# crypto key generate rsa
  ! Generate RSA keypair for SSH
How many bits in the modulus [512]: 1024
  ! Select 1024-bit modulus
CORE-SW(config)# ip ssh version 2
  ! Enable SSH v2
CORE-SW(config)# line vty 0 4
  ! Configure VTY lines
CORE-SW(config-line)# login local
  ! Use local login
CORE-SW(config-line)# transport input ssh
  ! Restrict access to SSH
```

```
CORE-SW(config-line)# exit
 ! Exit VTY line config
CORE-SW(config)# line console 0
 ! Configure console line
CORE-SW(config-line)# logging synchronous
 ! Prevent log interruption
CORE-SW(config-line)# exec-timeout 10 0
 ! Set idle timeout
CORE-SW(config-line)# password consolepass
 ! Set console password
CORE-SW(config-line)# login
 ! Enable console login
CORE-SW(config-line)# exit
 ! Exit console line config
CORE-SW(config)# exit
 ! Exit global config
```

Core Switch - Real Console Session Example

```
Switch> enable
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# hostname CORE-SW
CORE-SW(config)# enable secret class
CORE-SW(config)# ip domain-name homelab.local
CORE-SW(config)# username admin privilege 15 secret cisco123
CORE-SW(config)# crypto key generate rsa
The name for the keys will be: CORE-SW.homelab.local
Choose the size of the key modulus in the range of 360 to 2048 for your General Purpose Keys.
How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK]
CORE-SW(config)# ip ssh version 2
CORE-SW(config)# line vty 0 4
CORE-SW(config-line)# login local
CORE-SW(config-line)# transport input ssh
CORE-SW(config-line)# exit
CORE-SW(config)# line console 0
CORE-SW(config-line)# logging synchronous
CORE-SW(config-line)# exec-timeout 10 0
CORE-SW(config-line)# password consolepass
CORE-SW(config-line)# login
CORE-SW(config-line)# exit
CORE-SW(config)# exit
CORE-SW#
```

Access Switch (2960) — Basic Device Configuration (Paste-ready)

```
ACCESS-SW> enable
 ! Enter privileged EXEC mode
ACCESS-SW# configure terminal
 ! Enter global configuration mode
ACCESS-SW(config)# hostname ACCESS-SW
 ! Set device hostname for identification
ACCESS-SW(config)# enable secret class
```

```
 ! Set encrypted enable password
ACCESS-SW(config)# ip domain-name homelab.local
 ! Required for generating SSH keys
ACCESS-SW(config)# username admin privilege 15 secret cisco123
 ! Create local admin user
ACCESS-SW(config)# crypto key generate rsa
 ! Generate RSA keypair for SSH
How many bits in the modulus [512]: 1024
 ! Select 1024-bit modulus
ACCESS-SW(config)# ip ssh version 2
 ! Enable SSH v2
ACCESS-SW(config)# line vty 0 4
 ! Configure VTY lines
ACCESS-SW(config-line)# login local
 ! Use local login
ACCESS-SW(config-line)# transport input ssh
 ! Restrict access to SSH
ACCESS-SW(config-line)# exit
 ! Exit VTY line config
ACCESS-SW(config)# line console 0
 ! Configure console line
ACCESS-SW(config-line)# logging synchronous
 ! Prevent log interruption
ACCESS-SW(config-line)# exec-timeout 10 0
 ! Set idle timeout
ACCESS-SW(config-line)# password consolepass
 ! Set console password
ACCESS-SW(config-line)# login
 ! Enable console login
ACCESS-SW(config-line)# exit
 ! Exit console line config
ACCESS-SW(config)# exit
 ! Exit global config
```

Access Switch - Real Console Session Example

```
Switch> enable
Switch# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)# hostname ACCESS-SW
ACCESS-SW(config)# enable secret class
ACCESS-SW(config)# ip domain-name homelab.local
ACCESS-SW(config)# username admin privilege 15 secret cisco123
ACCESS-SW(config)# crypto key generate rsa
The name for the keys will be: ACCESS-SW.homelab.local
Choose the size of the key modulus in the range of 360 to 2048 for your General Purpose Keys.
How many bits in the modulus [512]: 1024
% Generating 1024 bit RSA keys, keys will be non-exportable...
[OK]
ACCESS-SW(config)# ip ssh version 2
ACCESS-SW(config)# line vty 0 4
```

```
ACCESS-SW(config-line)# login local
ACCESS-SW(config-line)# transport input ssh
ACCESS-SW(config-line)# exit
ACCESS-SW(config)# line console 0
ACCESS-SW(config-line)# logging synchronous
ACCESS-SW(config-line)# exec-timeout 10 0
ACCESS-SW(config-line)# password consolepass
ACCESS-SW(config-line)# login
ACCESS-SW(config-line)# exit
ACCESS-SW(config)# exit
ACCESS-SW#
```

VLAN Creation (Core & Access)

```
CORE-SW(config)# vlan 10
  ! Create VLAN 10 for management
CORE-SW(config-vlan)# name Management
  ! Name VLAN 10
CORE-SW(config)# vlan 20
  ! Create VLAN 20 for workstations
CORE-SW(config-vlan)# name Workstations
  ! Name VLAN 20
```

Access switch repeat VLAN creation (if desired)

Trunk Configuration (Core -> ISR and Core <-> Access)

```
CORE-SW(config)# interface GigabitEthernet0/1
  ! Trunk interface to ISR
CORE-SW(config-if)# description Trunk to ISR4331
  ! Description
CORE-SW(config-if)# switchport mode trunk
  ! Set trunk mode
CORE-SW(config-if)# switchport trunk allowed vlan 10,20
  ! Allow VLANs
CORE-SW(config-if)# spanning-tree portfast trunk
  ! Faster STP for trunk
CORE-SW(config-if)# exit
  ! Exit interface config
ACCESS-SW(config)# interface GigabitEthernet0/1
  ! Trunk interface to CORE-SW
ACCESS-SW(config-if)# description Trunk to CORE-SW
  ! Description
ACCESS-SW(config-if)# switchport mode trunk
  ! Set trunk mode
ACCESS-SW(config-if)# switchport trunk allowed vlan 10,20
  ! Allow VLANs
ACCESS-SW(config-if)# spanning-tree portfast trunk
  ! Faster STP for trunk
ACCESS-SW(config-if)# exit
  ! Exit interface config
```

Access Ports (Access Switch)

```
ACCESS-SW(config)# interface range GigabitEthernet0/2 - 3
 ! Select workstation ports
ACCESS-SW(config-if-range)# switchport mode access
 ! Set ports to access
ACCESS-SW(config-if-range)# switchport access vlan 20
 ! Assign VLAN 20
ACCESS-SW(config-if-range)# spanning-tree portfast
 ! Enable PortFast
ACCESS-SW(config-if-range)# exit
 ! Exit interface range
```

Inter-VLAN Routing (3560 SVIs)

```
CORE-SW(config)# interface Vlan10
 ! Create SVI for VLAN10
CORE-SW(config-if)# ip address 192.168.10.1 255.255.255.0
 ! Assign management IP
CORE-SW(config-if)# no shutdown
 ! Enable SVI
CORE-SW(config)# interface Vlan20
 ! Create SVI for VLAN20
CORE-SW(config-if)# ip address 192.168.20.1 255.255.255.0
 ! Assign workstation gateway
CORE-SW(config-if)# no shutdown
 ! Enable SVI
CORE-SW(config)# ip routing
 ! Enable L3 routing on 3560
```

Optional DHCP (3560)

```
CORE-SW(config)# ip dhcp excluded-address 192.168.20.1 192.168.20.9
 ! Exclude static range
CORE-SW(config)# ip dhcp pool WORKSTATIONS
 ! Create DHCP pool
CORE-SW(dhcp-config)# network 192.168.20.0 255.255.255.0
 ! Network for pool
CORE-SW(dhcp-config)# default-router 192.168.20.1
 ! Default gateway for clients
CORE-SW(dhcp-config)# dns-server 1.1.1.1
 ! DNS server
```

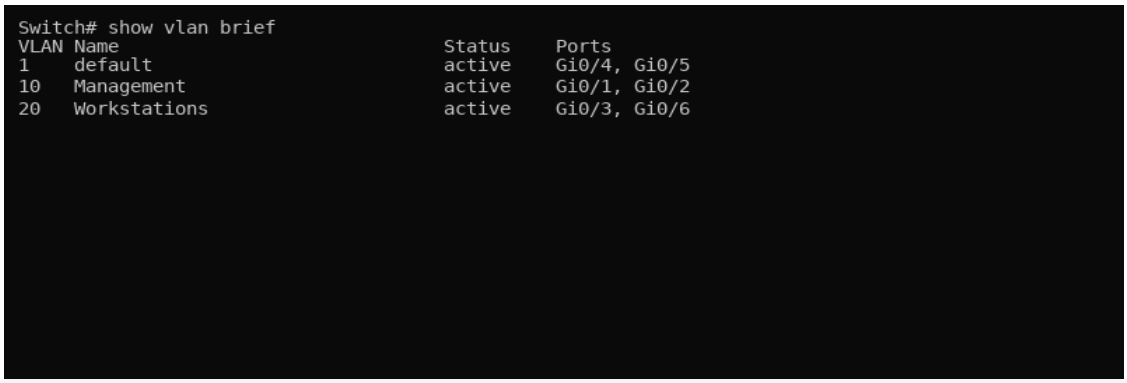
Router (ISR4331) — WAN/LAN and NAT (Paste-ready)

```
ISR4331> enable
 ! Enter privileged EXEC
```

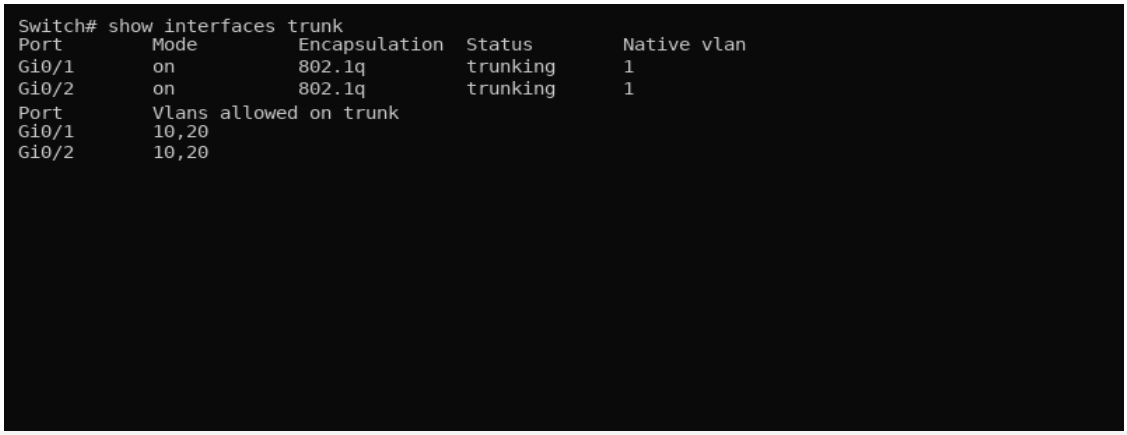
```
ISR4331# configure terminal
 ! Enter global config
ISR4331(config)# interface GigabitEthernet0/0/0
 ! Configure WAN interface
ISR4331(config-if)# description WAN to Spectrum
 ! Description
ISR4331(config-if)# ip address dhcp
 ! Obtain public IP from Spectrum
ISR4331(config-if)# no shutdown
 ! Enable interface
ISR4331(config)# interface GigabitEthernet0/0/1
 ! Configure LAN interface to Core
ISR4331(config-if)# description LAN to CORE-SW
 ! Description
ISR4331(config-if)# no ip address
 ! No IP on physical; using VLANs on switches (trunk)
ISR4331(config-if)# no shutdown
 ! Enable interface
ISR4331(config)# ip nat inside source list 10 interface Gig0/0/0 overload
 ! NAT overload for lab
ISR4331(config)# access-list 10 permit 192.168.20.0 0.0.0.255
 ! Permit internal lab subnet for NAT
ISR4331(config)# exit
 ! Exit config
```

Verification & Sample Outputs

```
ping 192.168.20.10
 ! Ping PC1 from management
ping 192.168.20.11
 ! Ping PC2 from management
show vlan brief
 ! Verify VLANs and ports
```




```
show interfaces trunk
 ! Check trunk status
```




```
show ip interface brief
  ! Check SVI and interface IPs
show ip route
  ! Verify routing table on CORE-SW
show running-config
  ! Review full running config
```

Implementation & Testing Sequence

1. Cable Spectrum -> ISR4331 (Gig0/0/0).
2. Connect ISR4331 (Gig0/0/1) -> CORE-SW Gi0/1 (trunk).
3. Connect CORE-SW Gi0/2 -> ACCESS-SW Gi0/1 (trunk).
4. Power up switches first (CORE then ACCESS), then router, then PCs.
5. Configure management SVIs and verify SSH to switches.
6. Configure access ports, static IPs on PCs, and test connectivity.

Saving & Recovery Tips

- Save config: copy running-config startup-config
- Reset port-security violation: interface Gi0/X / shutdown / no shutdown
- Temporarily negotiate trunk: switchport mode dynamic desirable
- Password recovery: follow Cisco ROMmon procedures

Quick-Start Template (Core Switch)

```
hostname CORE-SW
no ip domain-lookup
enable secret class
ip domain-name homelab.local
username admin privilege 15 secret cisco123
crypto key generate rsa
1024
ip ssh version 2
line vty 0 4
 login local
 transport input ssh
```

```
line console 0
 logging synchronous
 exec-timeout 10 0
 password consolepass
 login
vlan 10
 name Management
vlan 20
 name Workstations
interface GigabitEthernet0/1
 description Trunk to ISR4331
 switchport mode trunk
 switchport trunk allowed vlan 10,20
 interface Vlan10
  ip address 192.168.10.1 255.255.255.0
  no shutdown
 interface Vlan20
  ip address 192.168.20.1 255.255.255.0
  no shutdown
ip routing
```