Enterprise Core Systems Engineering Reference Manual: Step-by-Step Enterprise Router Configuration

PRODUCT IDENTIFICATION

This document serves as the definitive technical reference manual for the deployment and configuration of the TELECOM-HW ENTERPRISE ROUTER SERIES (Model Series: THW-ER-X9). Designed for network engineers and systems architects, this guide provides a hierarchical, step-by-step configuration methodology ensuring secure, high-performance Layer 3 forwarding in campus backbone and edge aggregation topologies.



CORE INTERNAL TOPOLOGY & CONFIGURATION PREREQUISITES

The THW-ER-X9 leverages a non-blocking switching fabric with an integrated

Network Processor Unit (NPU). Prior to initialization, verify the following hardware prerequisites:

- Console Access: RS-232 to USB-C serial cable (115200 baud, 8 data bits, 1 stop bit, no parity).

- Management Ethernet: Dedicated MGMT port with static IPv4/IPv6 assignment for Out-of-Band management.

- Power Redundancy: Dual AC feeds (100-240V ~ 50/60Hz) or -48VDC telco-grade supply.

- Image Verification: Router OS image (THW-IOS-X9 v2.6 or higher) stored on onboard eMMC or external USB flash.

STEP-BY-STEP CONFIGURATION SEQUENCE

PHASE 1: INITIAL ACCESS & BOOTSTRAPPING

1. Connect console cable to the RJ45 CONSOLE port on the front panel.

2. Power on the chassis; observe POST (Power-On Self-Test) LEDs.

3. Upon boot completion, enter the bootloader prompt (THW-ER-X9>).

4. Issue command: `setup` to invoke the interactive bootstrap wizard.

5. Define hostname, enable secret password, and management VLAN (default: 1).

PHASE 2: BASIC LAYER 3 INTERFACE CONFIGURATION

6. Enter global configuration mode: `configure terminal`.

7. Assign IP addressing to physical interfaces:

`interface GigabitEthernet 0/0`

`ip address 203.0.113.1 255.255.255.0`

`no shutdown`

8. Configure loopback for router ID (required for dynamic routing):

`interface loopback 0`

`ip address 192.0.2.1 255.255.255.255`

PHASE 3: STATIC & DYNAMIC ROUTING PROVISIONING

9. Establish default route to upstream gateway:

`ip route 0.0.0.0 0.0.0.0 203.0.113.254`

10. Enable OSPFv2 for internal backbone redundancy:

`router ospf 1`

`router-id 192.0.2.1`

`network 192.0.2.1 0.0.0.0 area 0`

`network 203.0.113.0 0.0.0.255 area 0`

PHASE 4: ACCESS CONTROL LIST (ACL) DEPLOYMENT

11. Create extended ACL to permit management access only from authorized subnets:

`access-list 100 permit tcp 192.0.2.0 0.0.0.255 any eq 22`

`access-list 100 deny ip any any log`

12. Apply ACL to VTY lines (SSH/Telnet):

`line vty 0 4`

`access-class 100 in`

PHASE 5: SECURE MANAGEMENT PLANE HARDENING

13. Generate RSA keypair for SSHv2: `crypto key generate rsa modulus 4096`.

14. Disable Telnet and HTTP services:

`no ip telnet server`

`no ip http server`

15. Enable SSHv2 exclusively: `ip ssh version 2`.

16. Commit configuration to startup memory: `write memory`.

SWITCHING SUBSYSTEM CAPABILITIES (VLAN & INTER-VLAN ROUTING)

The THW-ER-X9 supports 802.1Q trunking and Switch Virtual Interfaces (SVIs) for wire-speed inter-VLAN routing. Configure as follows:

- Create VLAN 10 (Engineering): `vlan 10; name Engineering`

- Assign port GigabitEthernet 0/1 as access VLAN 10: `interface GigabitEthernet 0/1; switchport mode access; switchport access vlan 10`

- Create SVI for VLAN 10: `interface vlan 10; ip address 10.10.10.1 255.255.255.0`



OPERATIONAL ADVANTAGES

- Feature 1: Zero-Touch Provisioning (ZTP) via DHCP Option 43 for bulk deployment.

- Feature 2: Hot-swappable power and fan modules for 99.999% uptime.

- Feature 3: Hardware-accelerated NAT and ACL at 10 GbE line rate.

- Feature 4: Full MPLS/VPLS support for Carrier Ethernet extensions.

- Feature 5: sFlow v5 and NetFlow v9 for real-time telemetry.

SPECIFICATION MATRIX

Parameter	**Specification**
Form Factor	1RU Rack-mountable (19-inch EIA-310 compliant)

Switching Capacity	Non-blocking 120 Gbps (full-duplex)
Forwarding Rate	90 Mpps (IPv4/ IPv6 line rate)
Power Supply	Dual Hot-Swappable Redundant AC/DC (AC: 100-240V, DC: -48V)
Typical Power Consumption	75W (idle) to 120W (full load)
Operating Temperature	0°C to 50°C (32°F to 122°F)
Interfaces	4x 10G SFP+ cages, 8x Gigabit RJ45 PoE+ (802.3at), 1x Console RJ45, 1x MGMT Ethernet
Routing Protocols	OSPFv2/v3, BGP-4, IS-IS, RIP v1/v2, Static routes, PIM-SM for multicast
Security Features	Hardware MACsec (802.1AE), Control Plane Policing, ACL, Zone-based firewall
Jumbo Frame Support	Up to 9216 bytes

REGULATORY COMPLIANCE

- Safety: UL 60950-1, IEC 62368-1, EN 60950-1

- EMC: FCC Part 15 Class A, EN 55032, EN 55024

- Environmental: RoHS 3 (2015/863/EU), WEEE compliant

- Carrier Standards: MEF 9, MEF 14, IETF RFC 2544 (performance testing)

- Energy Efficiency: Energy Star 3.0, CEC Title 20

LIFECYCLE ASSURANCE

Mean Time Between Failures (MTBF): > 350,000 hours @ 40 ° C ambient. Standard hardware warranty: 5 years advanced replacement with 24/7 technical support. Extended support available through THW-SUPPORT-X9 service contract.