

Static to OSPF WAN Migration & Convergence Validation

Type: Static Routing Migration | OSPF Area 0 | ECMP Validation

Platform: Cisco 2900 Router | Packet Tracer

Objective

Migrate a three-router WAN topology from static routing to OSPF (Area 0) while validating dynamic route advertisement, equal-cost multi-path (ECMP) behavior, and deterministic convergence under link failure.

Network Design

Topology

- Three-router triangular WAN core
- /30 point-to-point WAN links
- One /24 LAN per site
- Single OSPF area (Area 0)

Addressing

WAN Subnets

- 10.1.12.0/30 (R1–R2)
- 10.1.23.0/30 (R2–R3)
- 10.1.13.0/30 (R1–R3)

LAN Subnets

- 172.16.10.0/24 (Site A)
- 172.16.20.0/24 (Site B)
- 172.16.30.0/24 (Site C)

Control-Plane Design

- OSPF Process 1
- Manual Router IDs (1.1.1.1 / 2.2.2.2 / 3.3.3.3)
- LAN interfaces configured as passive

Implementation

Static Baseline

- Configured full static routing across all routers
 - Verified end-to-end LAN connectivity
 - Validated routing tables and next-hop accuracy
- Simulated WAN failure to observe static routing limitations

OSPF Deployment

- Advertised WAN and LAN networks into Area 0
- Verified neighbor adjacency (FULL state)
- Confirmed route installation (AD 110)
- Removed all static routes

Convergence Testing

- Validated ECMP under normal operation (dual next-hops present)
- Introduced controlled WAN interface shutdown
- Observed SPF recalculation and path collapse to single next-hop
- Restored link and verified adjacency reformation

Validation

- All remote LANs learned dynamically via OSPF
- No static routes remaining in routing tables
- ECMP behavior confirmed
- Deterministic failover observed
- Routing table stability verified post-recovery