



Cisco OSPFv3 Manet Enhancements

Cisco® OSPFv3 enhancements for Mobile Ad Hoc Networks (MANETs) help optimize the performance and scalability of Open Shortest Path First Version 3 (OSPFv3) in highly dynamic, wireless mobile environments. These enhancements, for select models of the Cisco integrated services routers, enable:

- More efficient flooding of routing updates when the network topology changes
- Reduced overhead traffic associated with periodic Hello packets
- Implementation of a new MANET interface type designed specifically for wireless networks

What Problems Need to be Solved?

- OSPF is deployed in mission-critical networks throughout the world. To enable increased information sharing and collaboration, many agencies are extending their networks to support highly mobile users.
- Unlike existing wire-line networks, which tend to be predictable and stable, MANET topologies can change rapidly. MANET nodes also can be subject to power and bandwidth constraints, so conserving these resources is essential.
- Traditional routing protocols such as OSPF lack efficient mechanisms for processing and propagating updates in a highly dynamic environment. Periodic routine timer traffic and the flooding of topology updates generate high overhead that consumes resources and limits scalability.
- A wide range of specialized ad hoc routing protocols has been proposed, but these are unproven and often unfamiliar to many organizations. Users have expressed a strong desire for a standards-based, evolutionary solution that enhances and improves OSPF in ad hoc environments.

Cisco OSPFv3 Manet Capabilities

Cisco OSPFv3 MANET enhancements represent the industry's first field-deployable implementation of the capabilities described in draft-chandra-ospf-manet-ext-02. This IETF experimental draft, authored by Cisco, defines the critical optimizations needed to effectively use OSPFv3 in MANETs. The enhancements are available on a limited basis to select customers and partners.

- **Flooding reduction:** The enhancements reduce overhead by eliminating redundant flooding traffic when network topologies change. Each MANET router identifies overlapping relays based on knowledge of its two-hop neighbors. This capability enables updates to be flooded selectively, so that a given node does not receive the same update from multiple sources. Without this feature, all OSPFv3 routers will flood all updates, resulting in a high number of unnecessary packets. This feature also supports intelligent, selective acknowledgement of updates for improved efficiency.
- **Incremental Hello messages:** As OSPFv3 networks scale to support more users, the overhead associated with periodic Hello messages increases due to the number of advertised neighbors included in each message. To help ensure that ad hoc networks can scale as needed, Cisco has implemented incremental Hello timers, which only advertise changes to the neighbor list.
- **OSPFv3 MANET interface:** The IETF draft implementation creates an OSPFv3 interface specifically for MANET neighbors connected through wireless links. The interface treats each neighbor connection as a point-to-point link, and link metrics can be set for each neighbor. Every MANET node has at least one MANET interface and communicates with other MANET nodes through this interface. MANET nodes can communicate with non-MANET nodes using standard interfaces such as Ethernet or ATM.

What are the Benefits of OSPFv3 Manet Enhancements?

- **Scalability:** OSPFv3 MANET enhancements improve routing efficiency and reduce overhead traffic in mobile ad hoc environments, so that network clusters can scale to support more users.
- **Fast convergence:** Boosts performance for delay-sensitive, mission-critical voice, video, and data traffic.
- **Easy migration:** Enables OSPFv3 to be extended into ad hoc environments; reduces complexity by eliminating the need to implement another protocol; facilitates the integration of wireless MANETs with existing wire-line networks.
- **Investment protection:** Organizations benefit from their staff's knowledge of this well-understood, industry-standard routing protocol.

Why Cisco?

OSPFv3 MANET enhancements are an important element of the Cisco Mobile Ready Net, a comprehensive solution for extending the benefits of IP networking to users beyond the reach of traditional networks. Mobile Ready Net uses Cisco's innovative Radio Aware Routing technology, plus a wide range of platforms and services, to enable communications at any time from anywhere.

As the global leader in mission-critical IP networking, Cisco is uniquely positioned to deliver reliable and efficient converged voice, video, and data solutions to fixed and mobile users worldwide. Cisco solutions are backed by award-winning technical support and advanced services.