

Cisco Mobile Ready Net: Enabling True Mobility in the Field



Challenge

Defense personnel and first responders need dynamic information that is ready to go, including biometrics, location telemetry, and real-time video to enhance situational awareness. Field workers must be able to collaborate and share information with each other and headquarters while on the move. This growing demand for increased collaboration in these communities now drives the need to network everything that walks, flies, drives, or sails.

The delivery of IP-based data, voice, and video to highly mobile users is complicated by size, weight, and power constraints, by radio bandwidth inefficiencies, and by the dynamic nature of emerging mobile operations. Most mobile vehicles have limited space for equipment, insufficient available power, and severe operating environments. These limitations pose a challenge for developing solutions that provide the requisite mission performance and availability. Mobile networking requires solutions that are optimized for their operating environments.

When merging IP routers and radio networks, fluctuations in radio link quality can significantly affect throughput. The highly variable nature of radio links means that the best route through the network can change rapidly. Topologies also can change quickly in mobile environments, as nodes enter or leave the network. Network visibility into radio events is critical to ensure performance, especially for delay-sensitive traffic.

Many mobile users operate beyond the reach of fixed infrastructure, but still need the ability to share information at the local level. They need ad hoc networks: self-forming, self-healing clusters of mobile routers, or nodes, communicating over wireless links. A node can be anything that moves, such as ground vehicles, aircraft, watercraft, even humans on foot. Ad hoc network nodes move unpredictably and form arbitrary topologies that can change rapidly. Traditional networking techniques generate unacceptable overhead in these environments that can limit the number of users supported in a given ad hoc cluster.

Solution

The Cisco Mobile Ready Net solution is the platform for extending information sharing and collaboration to highly mobile users, even those operating in the most severe and remote locations. The solution's architecture targets the critical challenges of mobile networking environments, including size, weight, power (SWaP), router-radio integration, and ad hoc networking.

Cisco Embedded Services Routers (ESRs) are designed to meet the size, weight, power, and environmental constraints of mobile platforms. They are card-based routers that can be embedded in a wide range of devices, making anything that moves a full-featured network node. Cisco ESRs run industry-leading Cisco IOS® Software and provide full compatibility with existing Cisco equipment.

To ensure effective integration of router and radio networks, Cisco Radio Aware Routing (RAR) enables routers and radios to share link-quality metrics and neighbor status. Cisco's current RAR support is based on the industry's first router implementation of RFC 4938bis, which defines a cross-layer signaling mechanism between routers and radios. Cisco IOS Software has been enhanced to take full advantage of the metric and status information offered by RFC 4938-compliant radios, allowing network-based applications and information to be transported quickly and reliably over directional radio links. The goal is to enable mobile networking over various radio types and in diverse government and commercial environments. Fast convergence and optimal route selection help ensure delivery of mission-critical, delay-sensitive traffic.

With RAR, Cisco routers can use link metrics from the radios, such as maximum data rate, current data rate, and resources, in addition to the standard metrics used when calculating route costs or shortest paths. RAR also enables routers to recognize and adapt immediately to changes in network neighbor status based on radio feedback, delivering delay-sensitive traffic quickly and efficiently to those who need it most.

Cisco Mobile Ready Net includes standards-based enhancements to Open Shortest Path First Protocol version 3 (OSPFv3) that can improve performance and scalability in mobile ad hoc networks (MANETs). Cisco OSPFv3 enhancements for MANETs reduce routing protocol overhead and ensure that network changes are propagated more efficiently. Cisco also has enhanced its OSPFv3 functionality to support Address Families, which facilitates the integration of IPv4 and IPv6 networks.

Collaborate and share, wherever you are

Users demand the ability to access and share information in any format, from anywhere, at any time, yet are limited by current networking capabilities. Partnering with integrators to offer compatible solutions to government and enterprise customers, Cisco is expanding its mobile networking capabilities with new hardware and software features, enabling defense, public safety, and homeland security agencies to network everything that drives, walks, flies, or sails.

Innovative Global Government Solutions

Cisco has the breadth and depth needed to address all the requirements of truly mobile networking in rugged environments. Cisco supports governments and defense agencies around the world by delivering innovative, integrated mission capabilities through thought leadership, advanced technologies, and innovative services. Cisco's team includes top experts from the space, military, homeland security, public safety, and intelligence communities from all levels of government around the world. They not only understand the unique challenges of government, but also bring years of personal experience to help you meet mission requirements.

For More Information

Learn more about the Cisco Mobile Ready Net solution and other global government solutions and services for defense at: www.cisco.com/web/strategy/government/defense_adhocompatibility.html.



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

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