Data Sheet

Cisco IP VSAT Satellite WAN Network Module for the Cisco Integrated Services Routers

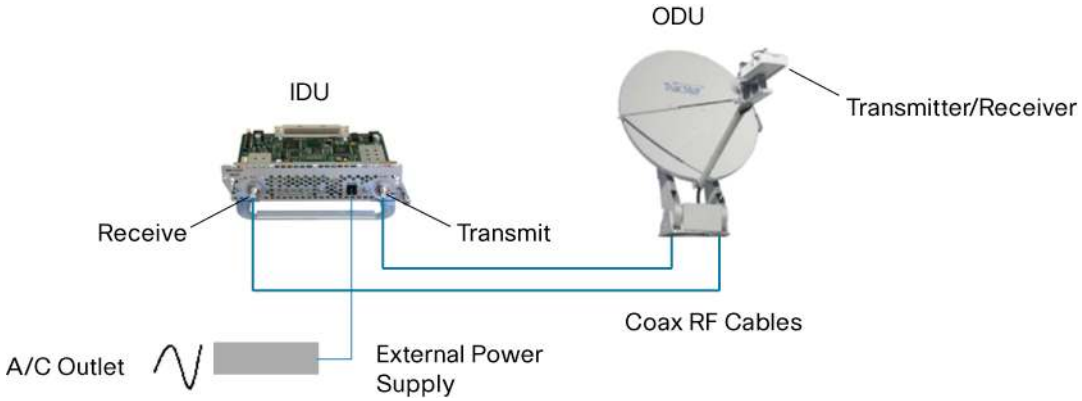
The IP VSAT Satellite WAN Network Module for the Cisco Integrated Services Routers provides two-way broadband satellite connectivity for non-terrestrial WAN Backup, IP multicast, and broadband internet access.

The Cisco® IP VSAT Satellite WAN Network Module (Figure 1) provides two-way broadband satellite connectivity for remote sites and branch offices on the Cisco 2800 and 3800 Series Integrated Services Routers as well as the Cisco 2600XM, 2691, and 3700 Series Access Routers. Using the highly reliable and available-everywhere satellite network, the Cisco IP VSAT module can provide resilient WAN backup for enterprise branch offices in case of primary connectivity failure, thus enhancing network reliability. When combined with the advanced services available on integrated services routers, such as voice and wireless, a highly portable and self-contained emergency response communications kit can be created to provide instant and mobile communication at a disaster site. Satellite multicast provides an efficient and cost-effective way to deliver bandwidth-rich content such as video, audio, and software upgrades to multiple sites. Using the Cisco IP VSAT module in conjunction with the Cisco Enterprise CDN (Content Delivery Network) solution, enterprise customers can create a highly reliable and scalable content delivery system for their branch offices worldwide.

Figure 1. Cisco IP VSAT Satellite WAN Network Module

Completely IP-based, the Cisco IP VSAT Module supports the latest in satellite technology with respect to access scheme, modulation, and coding to provide maximum efficiency and performance from the satellite network. The module is compatible with satellite services that use Gilat SkyEdge hub systems. The module is the indoor unit (IDU) built into a network module form factor, and it connects to the outdoor unit (ODU), which consists of the dish antenna and the transmitter/receiver using coaxial RF cables (Figure 2).

Figure 2. VSAT Components



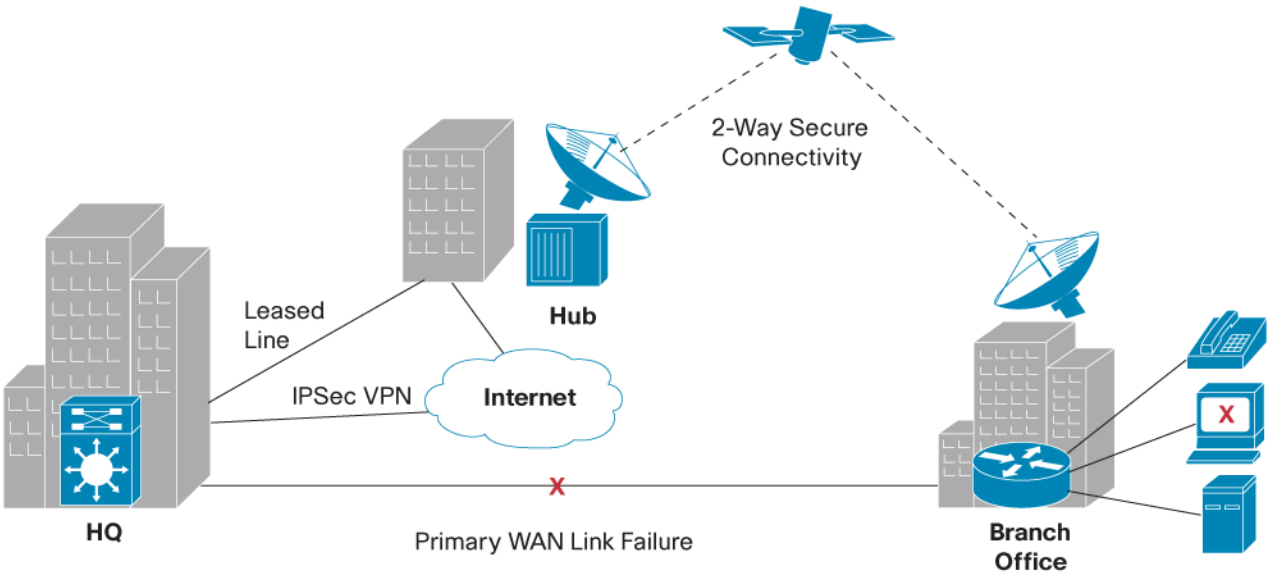
APPLICATIONS

The Cisco IP VSAT module provides for IP-based data, voice, and video communications over satellite, thus allowing enterprise, commercial, and government customers to enhance their business continuity solution, stream rich-media content using multicast, and set up instant and mobile communication kits for disaster preparedness.

Business Continuity and Network Reliability Through Integrated Terrestrial and Satellite WAN Diversity

Satellite WAN backup (Figure 3) provides an economical, high-speed (more than 1 Mbps) connectivity to branch offices, retail stores, and remote sites, helping customers maintain business continuity in the event of a terrestrial network failure (for example, cable cut, central-office outage, fiber ring outage, and other failures in the WAN). WAN connectivity over satellite protects against most local and regional network outages caused by natural and human events, resulting in a higher level of network reliability for data, voice, and video transactions. Integrating the satellite WAN with the terrestrial WAN using dynamic routing protocols with policy-based routing helps customers optimize the efficiency and reliability of their network through policy-based load balancing and automated rerouting of traffic based on policies and failure conditions.

Figure 3. Branch Office WAN Backup Using Satellite

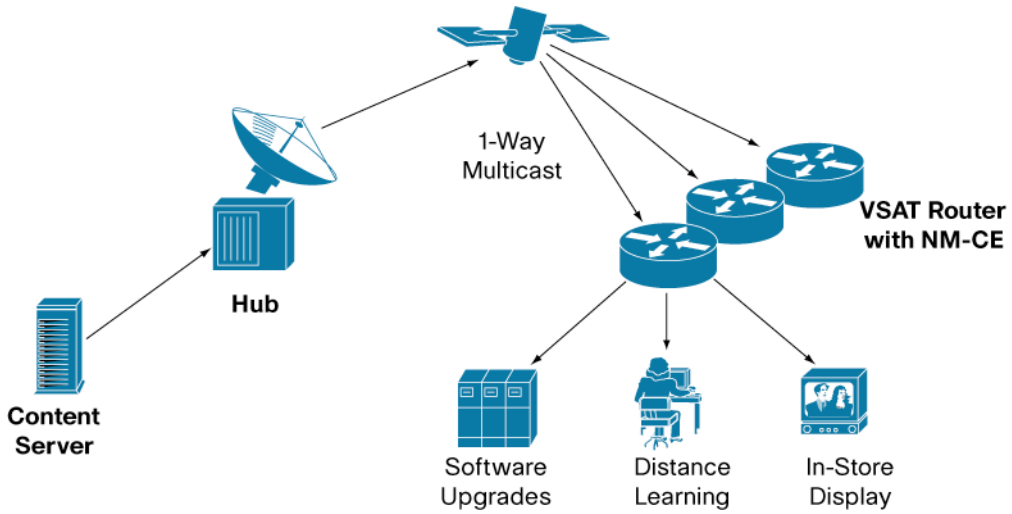


Video, Audio, and Content Distribution Through IP Multicast

Satellite IP Multicast (Figure 4) is a cost-effective, high-speed (more than 8 Mbps) method for delivering content to a large number of sites without upgrading the entire terrestrial infrastructure for high-speed multicast services:

- **Live video**—Live multicast streaming video of company meetings, events, sales training, employee training, advertising, etc.
- **Video on demand (VoD)**—Multicast distribution of VoD sessions for employee training, advertising, digital signage, etc.
- **Audio**—Live multicast streaming of audio for large audio broadcasts, analyst conference calls, etc.
- **Other multicast content distribution**—High-speed distribution of large files or documents, software updates, etc.

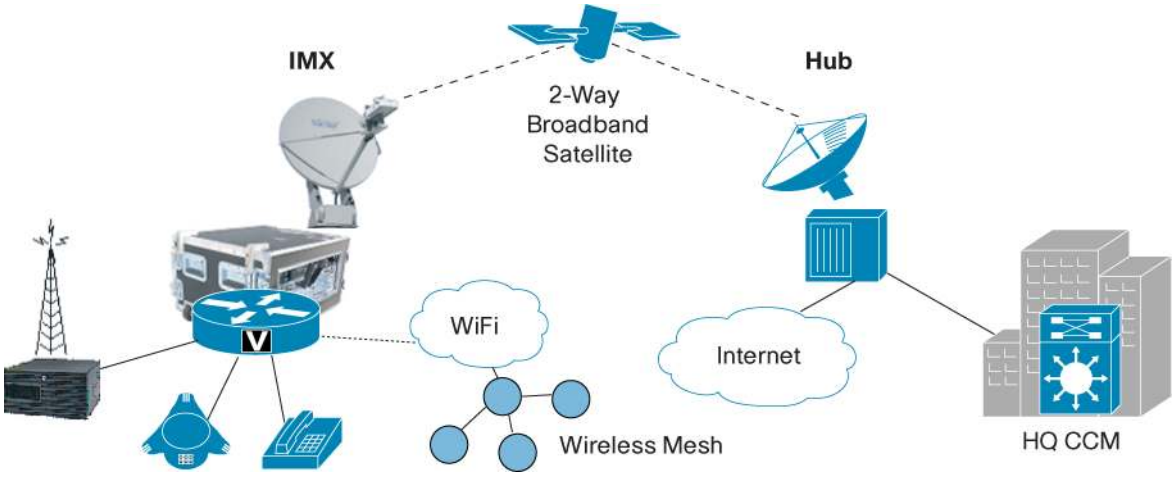
Figure 4. Multicast Content Distribution over Satellite



Mobile Communications Kit for Disaster Recovery and Temporary Sites

Cisco integrated services routers provide a single-box communications solution with data, voice, and wireless capabilities in a highly portable form factor (Figure 5). With the Cisco IP VSAT Module providing backhaul to the Internet using an auto-pointing portable VSAT antenna, this communications kit is completely autonomous, highly portable, easy to deploy, and cost-effective.

Figure 5. IMICS System Architecture



The Instant and Mobile Integrated Communications Solution (IMICS) is the result of best-of-breed routing technology in an integrated services router and the high availability and reliability provided by VSAT technology. The IMICS solution uses existing off-the-shelf Cisco Systems® technologies and products to build a highly effective communications solution with IP Communications at the core. When disaster of any kind strikes and the local communication infrastructure is either rendered inoperative or overloaded, the Cisco IMICS solution helps relief agencies and affected people stay connected and access to essential information. It provides secure voice over IP (VoIP), optimized Web connectivity, wireless hotspot and WLAN management capability, and land mobile radio (LMR) interoperability.

Broadband Connectivity for Remote Sites and Telemetry Stations

Satellite offers a large coverage area to allow customers to get broadband service at sites where DSL or cable service may not available, resulting in a cost-effective solution for rural, remote, offshore, and international sites.

Single Nationwide or Multinational Service

Satellite service is an attractive option for customers seeking a single service provider for national or multinational WAN backup, content distribution, and remote-site WAN connectivity.

KEY FEATURES AND BENEFITS

The Cisco IP VSAT Satellite WAN Network Module is an integrated satellite modem or indoor unit (IDU), which supports Ku-band and C-band frequencies for transmission over the most widely available satellite capacity. It connects to an outdoor unit (ODU)—including a satellite dish antenna, receiver, and transmitter—via coaxial cable.

Supports Existing Satellite Capacity

Ku-band and C-band support allows use of existing satellite capacity to provide coverage around the globe.

'Very Small' Antenna Options, including Portable Auto-Tracking Antennas

Very Small Aperture Terminal (VSAT) antennas starting at 0.55m are supported. Antenna requirements do vary by frequency band, physical location, bandwidth requirements, etc. Auto-tracking antennas are also available for portable applications.

Economical Use of Satellite Bandwidth Shared by Many Sites

Two-way star topology support with FTDMA (Frequency and Time Division Multiple Access) technology allows many sites to share satellite bandwidth (and cost), making VSAT an economical option for broadband connectivity. Compression, TCP acceleration, HTTP acceleration (internet page acceleration), and other features maximize the efficiency of the link.

Enhanced Dynamic Routing and Policy Based Routing

Support for dynamic routing protocols such as OSPF and EIGRP across the satellite network reduces operational costs by allowing customers to integrate the satellite links seamlessly into the organization's wide area network with dynamic routing instead of managing the satellite network as a separate, static overlay. Service providers can configure their hub to transparently pass dynamic routing information. Customers can use policy based routing to route different traffic types over the satellite and terrestrial links while automatically providing a backup mechanism if either route fails.

Extensive QoS

The satellite bandwidth can be statically or dynamically configured to be:

- **Shared Bandwidth**—Random access (RA) bandwidth is shared by all the VSAT units in the satellite network and is ideal for low cost, best effort services. The traffic using the shared bandwidth can be further prioritized into 3 different levels of service, allowing great flexibility and control over the quality for different types of traffic.
- **Dedicated Bandwidth**—Dedicated access (DA) channels are analogous to TDM channels, providing dedicated bandwidth to:
  - **A particular site**: analogous to T1/E1, frame-relay CIR, ATM CBR, SCPC (single channel per carrier) service
  - **A group of sites**: analogous to a TDM switch or PBX trunk connection
  - **A group of services**: analogous to a higher priority level for real-time services which may configured statically, or invoked on-demand (e.g., when a VoIP call is initiated)
- **Partially Dedicated Bandwidth**—For sites that are more active and experiencing more collisions, the network automatically assigns some pseudo-dedicated bandwidth (if available) resulting in fewer collisions and improved performance for the entire network

Always-On and On-Demand Broadband Connectivity

With speeds of up to 10 Mb/s receive (outbound from hub to the remote site with the network module) and over 1 Mb/s transmit performance, the module can provide broadband connectivity for a variety of applications, including always-on and on-demand (e.g., for backup) applications.

IP Multicast and Unicast Support

In addition to static multicast support over satellite, the module can supports dynamic multicast routing with Protocol Independent Multicast (PIM) when used with OSPF or EIGRP.

VoIP and IP Video Support over Satellite

While voice conversations are affected by the delay inherent to satellite communications, the integration with Cisco Call Manager Express (CCME) or Cisco IP-to-IP Gateway on the same router can dramatically enhance the quality of a VoIP call over satellite. The CCME or IP-IP Gateway software can automatically request dedicated access bandwidth over the satellite link whenever a VoIP call is initiated, and can optionally enforce call admission control (CAC), ensuring that VoIP calls receive the highest quality of service.

Secure Satellite Connectivity

Cisco Integrated Services Routers provide extensive data and voice security capabilities including VPN/encryption, firewall, intrusion detection, network access control (NAC), and secure real-time protocol (SRTP). Throughput over the satellite links is enhanced through the use of IOS Rate Based Satellite Control Protocol (RBSCP) or a performance enhancement proxy before encrypting the traffic.

High Availability

For mission-critical deployments, the integrated services routers support high availability capabilities such as hot standby routing protocol (HSRP), gateway load balancing protocol (GLBP), multi-link point to point protocol (MLPPP), automatic backup/failover, dead-peer detection (DPD), stateful switchover (SSO) for IPSec encryption, and stateful network address translation (SNAT). Redundant routers equipped with the network module can support HSRP and share a single satellite dish or use two dishes to deliver a high availability solution over satellite.

Enhanced Management Support

For ease of use, the module can be configured and managed centrally by the satellite service provider while end users (e.g., corporate IT managers) can monitor the status and performance of the module and the satellite connection via the Cisco CLI and CiscoView.

SUMMARY

The NM-VSAT module enables satellite WAN services for remote sites to enhance network reliability through non-terrestrial WAN backup, to distribute multicast video/audio/content efficiently, and to provide broadband connectivity to remote sites where terrestrial broadband services are unavailable. The integrated services routers with satellite connectivity deliver a robust WAN option for enterprise, government, and small/medium business customers.

PRODUCT SPECIFICATIONS

Table 1 summarizes the product specifications.

Table 1. Product Specifications

Specification	Description
Topology	Two-way star topology (transmit and receive between a central hub and remote sites)
Frequency Bands	• Ku-Band: 10.95–11.7 GHz receive, 14.00–14.50 GHz transmit; 11.70–12.20 GHz Rx, 13.75–14.25 GHz Tx; 12.20–12.75 GHz Rx • Extended Ku-Band: 11.45–11.7 GHz. or 10.95–11.2 GHz Rx; 13.75–14.0 GHz Tx • C-Band: 3.62–4.20 GHz Rx, 5.850–6.425 GHz Tx • Extended C-Band: 4.50–4.80 GHz Rx, 7.625–7.925 GHz Tx
Outbound Carrier (Receiver)	• Signal format: DVB-S • Carrier bit rates: 340 Kb/s–66 Mb/s • Modulation: QPSK or 8PSK (optional) • Coding: Viterbi & Reed-Solomon or Turbo (optional) • FEC Rate: 1/2, 2/3, 3/4, 5/6, 7/8
Inbound Carrier (Transmitter)	• Access Scheme: Combined TDMA, FDMA, DAMA • Bit Rate: 60 Kb/s–1.3 Mb/s • Modulation: GMSK & MSK • Coding: Turbo coding FEC ~3/4, ~7/8
Product Compatibility	• Platforms: 3800, 3700, 2800, 2691, 2600XM series (excluding 2801) • Satellite Service: Compatible with services using Gilat SkyEdge hub systems • Outdoor Unit: Compatible with Gilat Satellite Kits and backward compatible with outdoor units for 360E systems
Software Compatibility	• Router: IOS 12.3(14)T (or later) • NM-1VSAT-GILAT: OS 0.15.2; RSP 9.0.1.9; MBC 2.0.1.4; (or later) • Gilat-SkyEdge Hub and NMS: DPS 2.1.3.19; HSP 3.3.6.0; NMS 6.5.2.11; (or later) • CiscoWorks 2000 LAN Management System (LMS) with CiscoView: 5.0 or later with device package versions 24.0 for 2600XM, 2.0 for 2800, 1.0 for 3700, 2.0 for 3800
Protocols	• IP (including VoIP) • Routing: RIPv2, OSPF, EIGRP • Multicast: IGMP, PIM (not compatible with RIPv2)
Components	Network Module (NM-1VSAT-GILAT) requires a satellite kit (outdoor unit/dish antenna, ODU power supply) and associated cables
Cards/Ports/Slots	Single-wide Network Module slots (or larger)

Specification	Description
Connectivity	• 2 coaxial cable connectors for transmit (inbound to hub) and receive (outbound from hub) signals • 1 power connecter for powering the outdoor unit
QoS	• Random Access: 3 priority levels • Dedicated Access: static or dynamically allocated • Partial Dedicated Access: dynamically allocated
Security	• FTDMA scrambling of all traffic from remote site NM-VSAT to the hub • 128-bit AES encryption of unicast traffic from the hub to the remote site NM-VSAT • Secure distribution of multicast keys from hub to the remote sites via the network management system • End to end encryption (from the remote site NM-VSAT via the SP hub to the HQ data center) with Cisco IOS encryption or a VPN module over satellite requires use of IOS Rate Based Satellite Control Protocol (RBSCP) or an external Performance Enhancement Proxy (PEP) for traffic acceleration before the traffic is encrypted
Bandwidth Efficiency	• TCP acceleration • HTTP acceleration • Efficient packet fragmentation and aggregation
Performance	• Receive (outbound from hub): 340 Kbps to 10 Mbps (8 Mb/s multicast; 2.5 Mb/s TCP; hub transmits up to 66 Mb/s) • Transmit (inbound to hub): 60 Kbps to 1.3 Mbps
Reliability and Availability	• HSRP with single or dual outdoor units (ODUs) • DDR (dial-on-demand routing) for satellite backup of terrestrial WAN and terrestrial backup of satellite WAN
MIBS	• RFC-1213 MIB (MIB II) (Interface MIB) • CISCO-ENTITY-ASSET MIB • ENTITY-MIB
Network Management	• CiscoWorks 2000 LAN Management System (LMS) with CiscoView • Cisco Command Line Interface • Gilat-SkyEdge NMS
LEDs	1. Enable: NM power is on and it was recognized by the Router IOS 2. Rx lock: DVB (outbound) receiver is locked 3. Sync lock: NM is synchronized with the Hub timing 4. On Line: VSAT-HUB connection established 5. Transmit (inbound): NM transmits inbound data to the Hub 6. External power on: External 24V power connected properly (for the outdoor unit)
Dimensions (H x W x D)	1.60 x 7.10 x 7.2 inches (4.1 x 18.0 x 18.3 centimeters)
Weight	0.75 pounds (0.34 kg) maximum
Operating Humidity	5 to 95% non-condensing
Operating Temperature	41 to 104℉ (5 to 40℃)
Non-Operating Temperature	40 to 185℉ (40 to 85℃)
Operating Altitude	0–10,000 feet (0–3000 meters)

Specification	Description
Operating Vibration	5 to 500 Hz, 0.15 g (1 oct/min)
Safety	UL 60950 (former 1950); CSA-C22.2 No. 950; EN 60950; IEC 60950; ACA TS001 (Australia); AS/NZS 3260 (Australia and New Zealand); NOM-019-SCFI-1998 (Mexico)
EMC	• Emissions: EN 55022, 1998, class A (EU); CISPR22, 1997, class A (EU); EN61000-3-2 (EU); EN61000-3-3 (EU); EN300386:2001(EU); CFR47, Part 15, Subpart B, 1995, class A (USA); V-3 (VCCI Japan); AS/NZS 3548 (Australia and New Zealand); ICES003 (Industry Canada) • Immunity: EN300386:2001(EU); CISPR24, 1997 ITE (EU); EN 55024 (EU); EN50082-1 (EU); EN 61000 6-1, including EN 61000-4-2; EN 61000-4-3; EN 61000-4-4; EN 61000-4-5; EN 61000-4-6; EN 61000-4-8; EN 61000-4-11
Power	• The NM is powered by the router power supply • External power supply port on NM for inline Power over Coaxial cable to outdoor unit (external power supply is provided by the satellite service provider with the outdoor unit)

SYSTEM REQUIREMENTS

Table 2 lists the service and satellite kit requirements for the network module.

Table 2. System Requirements

Requirement	Description
Satellite Service or Hub	Service from a Cisco Approved Satellite Service Provider using Gilat-Skyedge hub systems
Outdoor Unit or Satellite Kit	Compatible satellite kit (outdoor unit, provided by the service provider): • Dish Antenna (typical): 0.55m to 1.2m (Ku-band); 1.8m (C-band) • Transmitter: 1W, 2W, 4W (Ku-band); 2W (C-band) • Low Noise Block (LNB) Converter: standard television receive only (TVRO) type • Power supply (typical): 24V DC

ORDERING INFORMATION

To place an order, visit the Cisco Ordering Home Page. Ordering information is in Table 3.

Table 3. Ordering Information

Product Name	Part Number
Cisco IP VSAT Satellite WAN Network Module	NM-1VSAT-GILAT
Cisco IP VSAT Satellite WAN Network Module (spare)	NM-1VSAT-GILAT=

SERVICE AND SUPPORT

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FOR MORE INFORMATION

For more information about the Cisco Integrated Services Routers, visit http://www.cisco.com/go/isr or contact your local account representative.

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