

Next-generation, high-throughput platform for satellite broadband networks

The JUPITER System from Hughes is a next-generation, high-throughput platform for VSAT satellite broadband networks, designed to support a wide range of applications across all market sectors, from consumer to government to enterprise. Powering the world's largest satellite broadband service—HughesNet®—in North America, the JUPITER System has now been deployed by leading operators in South America and Russia, making it the preferred technology choice for delivering advanced broadband services.

Innovative Architecture

Building on its heritage as a pioneer and leading provider of broadband satellite technology and services globally—with more than 4 million terminals shipped to customers in over 100 countries—Hughes has designed the JUPITER Gateway with a unique, high-density processing architecture incorporating numerous innovations. At the waveform level, wideband modulators/demodulators pack a massive amount of bandwidth processing into a very small form factor. Advanced modulator and demodulator technology enables a significant amount of capacity in a very small footprint. All IP processing and Web acceleration subsystems are run using virtual processing technology, which allows tremendous flexibility in managing and scaling these subsystems. For large capacity configurations, the use of JUPITER technology enables the equivalent of 2 Gbps of IP processing per rack, inclusive of all modulation, demodulation, IP processing, Web acceleration, and network management. The following summarizes JUPITER's key technology advantages.

Wideband, High-Capacity Waveform

- Scalable from 1 to 225 Msps/32APSK
- Higher orders of modulation and wideband carriers that enable higher efficiencies and throughputs
- More usable capacity, more service flexibility
- Industry-leading spectral efficiency

Advanced Gateway Architecture

- Very high density, up to 2 Gbps capacity per rack (inclusive of all radio functionality and IP processing)
- Small footprint with flexible capacity per rack
- Low power, low OPEX, autonomous design and “lights out” operation
- High availability

Integrated End-to-End Link Management

- Efficiency optimized at multiple layers (layer 1 and up)
- Integrated PEP/Compression/Acceleration/Session Flow Control

Comprehensive Network Management

- Sophisticated interactive OSS for Configuration/Operation/Monitoring
- Easy integration with BSS
- Readily scalable from 100 to 100,000s of sites

Dual Stack IPv4/IPv6

- Essential for Internet evolution
- Native IPV6: Universal Access Devices

Next Generation Web Acceleration

- Content pre-fetch, caching brings super-fast user experience

High-Throughput Terminals

- Next-generation VSAT system leveraging powerful new chipsets that enable very high data throughputs capable of supporting many devices simultaneously

Highly Secure

- Hardware implemented 256 AES encryption ensures secure communications without any sacrifice of performance

Powerful Value-Added Features

- Cost-effective Virtual Network Operator (VNO) capabilities, sharing of spot beam systems
- Advanced QoS capabilities to differentiate various service levels including video

JUPITER Gateway Configurations

For traditional Fixed Satellite Service (FSS) applications, where the satellite capacity is offered over 36/54/72 MHz transponders, or for smaller HTS deployments, the JUPITER Gateway is configured in a single rack configuration, which supports up to six networks. An integrated 4 IF distribution system enables multitransponder and multisatellite capability. The base gateway comes fully equipped with an integrated IF distribution, timing system, Network Management System (NMS) with firewall, LAN switch, and intelligent power distribution. All components are 1:N redundant with automatic fault detection and switchover.

For multi-Gateway, multi-beam HTS applications, a high-density JUPITER Gateway is deployed with the capability to support more than 2 Gbps of capacity per rack. The high-density JUPITER Gateway can be configured to support a virtually limitless amount of capacity. Typically included with the high-density gateway are deep packet inspection and traffic shaping devices.

Gateway stations are autonomous as they can be operated independent of any other system element and do not require any central processing station for operation.



JUPITER Gateway configuration for FSS applications



JUPITER Gateway configuration for HTS applications

JUPITER Network Management System (NMS)

The JUPITER Gateway is integrated with the powerful and full-featured JUPITER NMS. The JUPITER NMS can be collocated to a gateway as is typical for FSS applications or via a central location elsewhere as in the case where multiple gateways are managed. The JUPITER NMS provides a graphical, Web-based user interface through which operators can manage and monitor both gateway and remote terminals.

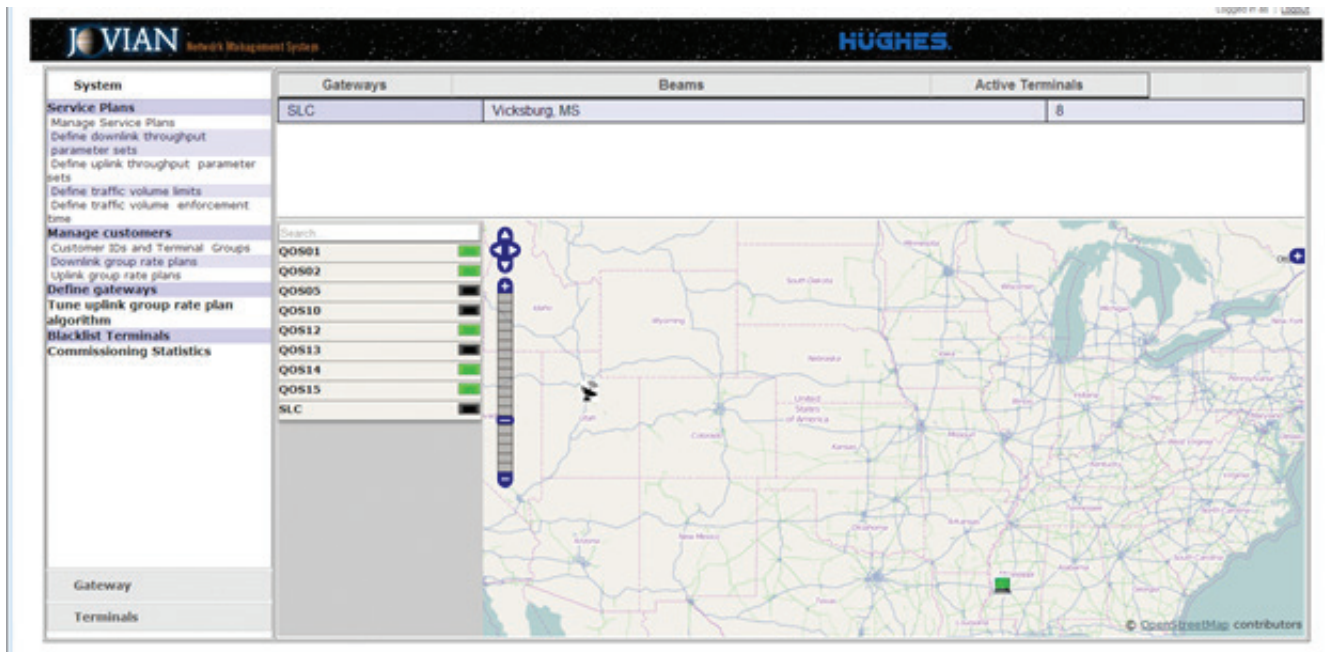


Figure 1. Map-based NMS

- Map shows location of terminals and gateways.
- Easy navigation between system-level configuration, gateway management, and terminal management.
- Terminal dashboard uses context-sensitive search to allow search on ANY field in the dashboard.
- Spreadsheet upload allows you to bulk enter a set of terminals from any client PC.

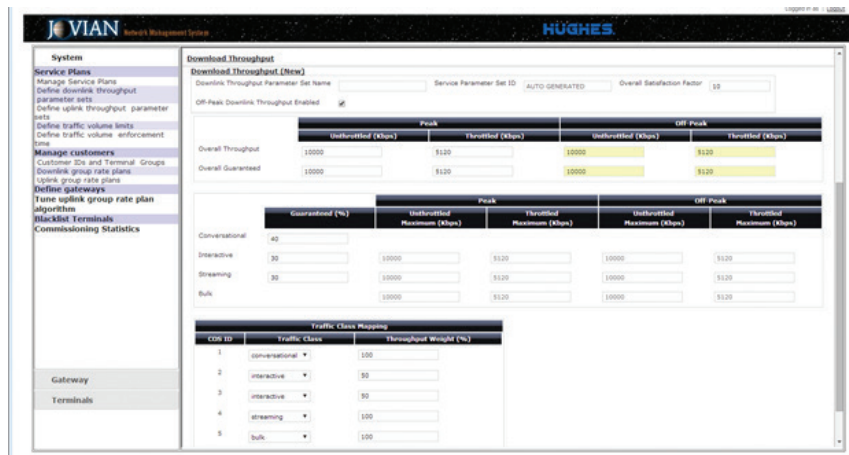


Figure 2. Customizable Quality of Service Plans

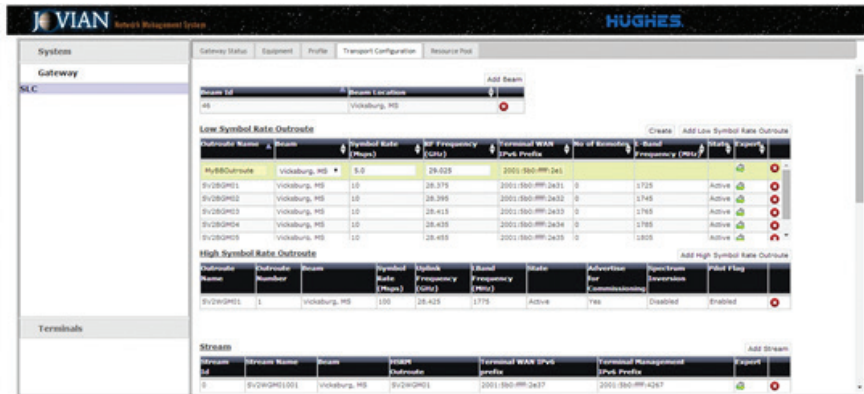


Figure 3. Easy Transport and Component Configuration

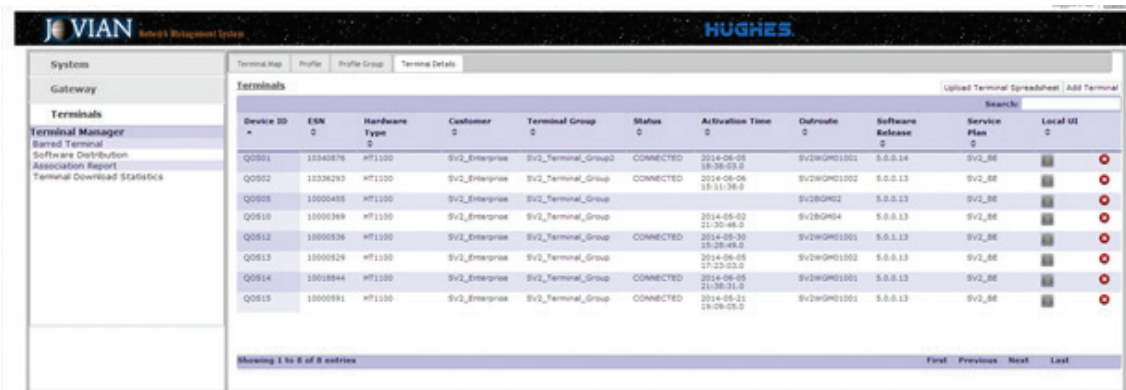


Figure 4. Powerful Terminal Management Capabilities

Lights-Out Autonomous Operation

The JUPITER Gateway is designed for lights-out operation featuring:

- Efficient remote management and visibility
- Proactive embedded monitoring agents
- SNMP-based fault reporting
- Remote software upgrades
- Equipment control extended even to the level of remotely controllable power strips for blade racks

HT Family of Broadband Satellite Terminals

The JUPITER Gateway operates with the entire family of JUPITER HT broadband satellite terminals, including the powerful HT1100, HT1200, and HT1300 terminals. The advanced JUPITER System on a Chip (SoC), a powerful multi-core ASIC, powers the JUPITER HT remote terminals and enables wideband forward channel demodulation of up to 1 Gbps per carrier.

Features

JUPITER Gateway Features

- Scalable from 50 Mbps to more than 10 Gbps per gateway station
- Designed to support multi-satellite, multi-beam gateway
- Local or centrally managed, integrated NMS controlling multiple gateways
- Native IPv6 transport with dual stack IPv4/IPv6 capability
- High-density, flexible packaging minimizing rack space
- Unique network security with integrated outbound encryption/conditional access using hardware implemented 256 AES encryption
- Comprehensive network management with intelligent fault detection
- Active redundancy for all critical components

Services Supported

- Broadband Internet access
- Multimedia streaming
- VoIP telephony
- Enterprise networking
- Cellular backhaul
- MPLS extension
- Videoconferencing

Hughes Acceleration Techniques

- Integrated advanced Web acceleration (HTTP object prefetch) enables fast Internet downloads
- Advanced techniques including TCP spoofing, ACK reduction, and flow control accelerate TCP traffic using Hughes proprietary Performance Enhancement Proxy (PEP)
- Advanced grammar-based compression algorithm improves compression ratios and resulting throughput
- DNS caching eliminates satellite latency introduced by DNS lookup queries

Traffic Management and QoS

- Intelligent, protocol-sensitive bandwidth assignment for optimum performance
 - Committed Information Rate (CIR)
 - On-demand Committed Bit Rate (CBR)
 - Adaptive CBR (outbound and Inbound)
- Inbound and outbound terminal groups
- Inbound and outbound terminal service parameters
- Voice over IP (VoIP)

Routing Protocols

- BGP IPv4, BGP IPv6
- RIP v2
- VLAN and DSCP-based prioritization
- Firewall access control
- Policy-based routing

Technical Specifications

Forward Channel

Frequency: C-band, Ku-band, and Ka-band
Modulation: QPSK, 8PSK, 16APSK, 32APSK
Code blocks: Normal and short frames
Encapsulation: GSE
Symbol rates: 1 to 60 Msps (optional 60 to 225 Msps)
Adaptive coding and modulation

Return Channel

Modulation: OQPSK and 8PSK
Symbol rates: 256 kbps to 6 Msps
Encoding: LDPC
Access Scheme: FDMA/TDMA with dynamic load balancing

Gateway Architecture

Hardware platform: Multi-core server utilizing virtual machine implementation
Redundancy: Fully redundant with 1:N for most subsystems
Software platform: Linux

Environmental

Temperature: +10° C to + 35° C
Relative humidity: 10% to 80% noncondensing
Altitude: -100 ft to 10,000 ft

Gateway Interface

RFT input/output: L-band or 70 MHz
WAN Interface: 10/100/1000 Ethernet, optical interface optional

Optional WAN Interface Module

Deep packet inspection
Traffic shaping
WAN router

Power Supply

120/240 VAC, 50/60 Hz

Security

Hardware-based 256 bit AES encryption (bidirectional)

Remote Terminals Supported

HT1100
HT1200
HT1300

For more information, please visit www.hughes.com or email globalsales@hughes.com.