INTUITION

GLOBAL BANDWIDTH MANAGEMENT

iDIRECT

TODAY'S LEADING SATELLITE NETWORK OPERATORS TRUST GLOBAL BANDWIDTH MANAGEMENT

Satellite capacity is a valuable, limited resource, and expanding it is both challenging and costly. Optimizing network performance and bandwidth is essential for delivering high-quality service while controlling costs. Recent trends show significant growth in capacity, highlighting the need for innovative, automated solutions to allocate resources. To meet this need, leading satellite operators and service providers rely on Global Bandwidth Management (GBWM) from iDirect to maximize bandwidth efficiency, revenue, and profitability.

Optimizing capacity involves balancing the cost of deploying it with the return on the satellite network operator's investment. Both the operator and their customer use two complementary methods to define and measure service: service level agreements (SLAs) and quality of service (QoS). SLAs specify the expected service, while QoS encompasses the bandwidth allocation, traffic shaping and enforcement, and performance metrics that measure how well the network meets the SLAs. Together, SLAs and QoS determine whether the operator has fulfilled its commitment to the customer, whether the service provider or the end user.

Network performance is crucial in satellite communications, especially with the growth of 5G and the pivotal role satellites play today in shaping the future of global connectivity.Today, service providers can reliably offer committed information rates and maximum information rates, defined in Mbps, which has significantly expanded the use cases for satellite communications.

With the launch of our new satellite ground system, Intuition, we introduce Global Bandwidth Management for all.

What once was reserved for the largest operators and service providers, is now part of Intuition, our next-generation, cloud-native, software-defined ground system designed for multi-orbit environments. Intuition will offer additional impact by combing GBWM with other features of this system, such as the awarding winning return waveform, Mx-DMA MRC, the new Intuition cloud-native network management system (NMS), and resource orchestration capabilities to support software-defined satellites.

Global Bandwidth Management from ST Engineering iDirect offers satellite network operators of NGSOs and software-defined satellites exceptional control of their dynamic space segment plus maximum flexibility to deliver highly differentiated services with strict SLAs while achieving unparalleled operational and revenue efficiency.

GBWM users rely on these capabilities:

Universal configuration of bandwidth

Real-time, ***network-wide bandwidth allocation of dynamic,*** multi-orbit capacity

Global congestion management

Continuous ***optimization and load balancing*** for mobility

Worry-free SLAs with ***precise service areas and enforcement***

Freedom to engage in ***numerous paths to market***

MOBILITY AND MULTI-ORBIT ENVIRONMENTS REQUIRE GLOBAL BANDWIDTH MANAGEMENT

Mobility and multi-orbit satellite environments will require advanced GBWM from ST Engineering iDirect to ensure seamless, reliable service across diverse and rapidly changing conditions.

Continuous *Optimization and Load Balancing* for Mobility

In mobility sectors such as maritime, aviation, and land-based transport, users require continuous, high-quality connectivity while moving across multiple satellite beams and regions. Continuous optimization allows operators to efficiently manage capacity without the need for complex external intervention. This eliminates the need to over-allocate capacity for a fleet of terminals in every beam or risk falling short of the fleet SLAs. Hence, operators can accommodate more terminals in their networks and generate more revenue while maximizing SLA fulfillment. By dynamically adapting to real-time terminal demand across iNets, operators can maximize both Maximum Information Rate (MIR) and Committed Information Rate (CIR).

GBWM supports real-time, network-wide bandwidth allocation and load balancing across an entire satellite fleet, including geostationary (GEO) and non-geostationary (NGSO) constellations. GBWM's dynamic approach is even more essential for multi-orbit constellations, where bandwidth resources and demand become very dynamic with NGSO satellites and complex satellite switching algorithms.

Real-Time, *Network-Wide Bandwidth Allocation* of Dynamic, Multi-Orbit Capacity

GBWM will play a critical role managing dynamic satellites and multi-orbit constellations. New, software-defined satellites (SDS) will need GBWM not only to manage bandwidth effectively but also to provide insights that fully leverage their inherent flexibility and meet the evolving demands of modern connectivity. GBWM service delivery configuration is independent of the underlying carriers. Its real-time, network-wide bandwidth allocation accounts for all available carriers at any instance. Additionally, GBWM's advanced statistics enable service-driven satellite resource orchestration.

Software-Defined Satellites & Global Bandwidth Management

Unlike traditional satellites, SDS can dynamically adjust their coverage, power, and frequency allocations. This adaptability enables SDS to optimize performance, respond to changing user needs, and efficiently allocate resources across various regions, users, and services. By coupling SDS with GBWM, satellite operators can expect these benefits:

- Maximize assets and resources while ensuring SLA compliance and customer satisfaction
- Meet diverse service needs across markets despite broad variation in bandwidth requirements
- Provide consistent service quality as users move between coverage areas
- Balance traffic and service quality in complex, multi-orbit environments
- Ensure continuous scalability as software-defined architecture, automation, and 5G interoperability expose new opportunities and enhance operational efficiencies (time-to-configure)

Universal Configuration of Bandwidth

The hallmark of GBWM is its ability to manage an entire satellite fleet as a single pool of bandwidth, enabling seamless scalability across multiple satellites and a dynamic space segment. GBWM simplifies service configuration across networks—whether global, regional, or non-contiguous—by allowing dozens of satellites and hundreds of beams to be included in a single plan. Other systems in the market require individual configurations for each beam, but GBWM streamlines the process, allowing for additional increased or decreased capacity and traffic without redundant steps. GBWM leverages automation to eliminate the necessity for repetitive manual configuration in traditional QoS in order to scale. It surpasses traditional QoS, which typically requires repetitive manual configurations for new capacity or users. Universal configuration means that GBWM is ready to adapt to software-defined satellite resources instantly.

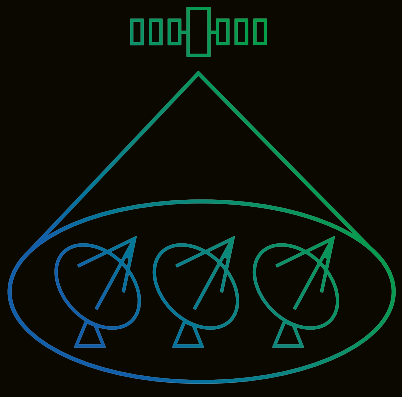
Global Congestion Management

Beam-based QoS silos create inefficiencies that negatively impact SLA fulfillment. GBWM overcomes this by enabling real-time allocation and load-balancing across the entire network footprint. It allows flexible configuration of service modes for each Group Service Plan, supporting various models including VNOs and managed services. This ensures SLA fulfillment without the need to over-allocate valuable bandwidth at service planning and provisioning, empowering operators to confidently offer stringent SLAs while driving higher revenue through efficient bandwidth use.

UNDERSTAND YOUR QOS

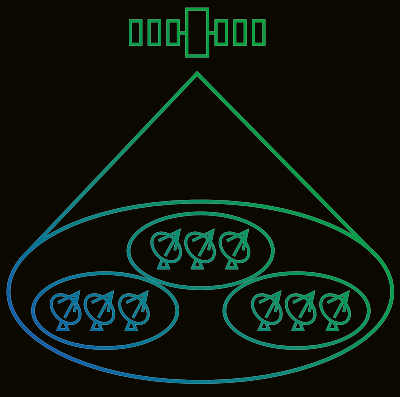
GBWM, an innovation by ST Engineering iDirect, sets the benchmark in service delivery by offering far more than traditional QoS. While sometimes confused with QoS, GBWM is a powerful and multi-dimensional solution that enables comprehensive configuration, precise allocation, and dynamic congestion management.

Unlike standard QoS-based service offerings, GBWM empowers satellite operators to manage capacity seamlessly across the entire network with minimal effort, delivering to customers their desired service levels and reliable coverage. GBWM service area shaping and enforcement ensure full SLA compliance using the least capacity required, optimizing revenue efficiency.



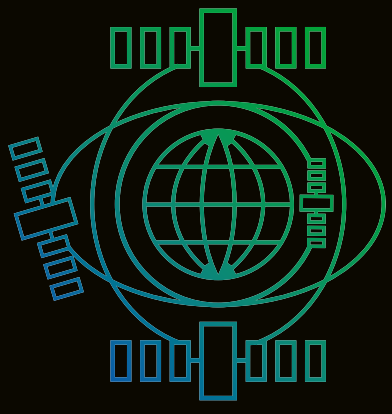
COMMON QOS

Supports configuration of many terminals to one beam.



GROUP QOS

Supports configuration of groups of many terminals to one beam.

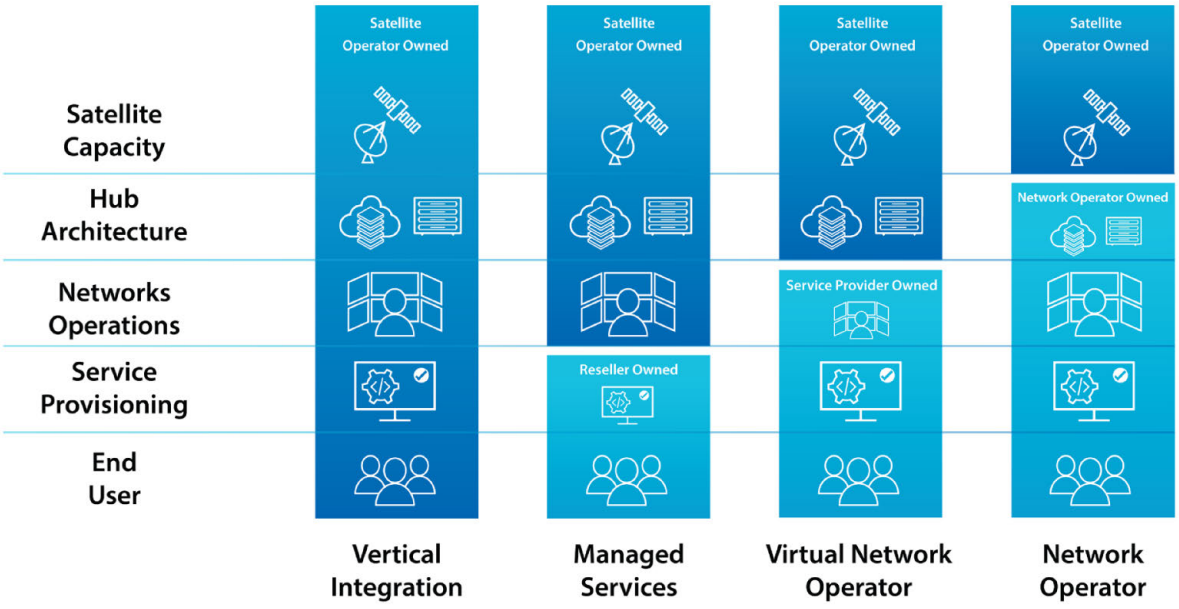


GBWM

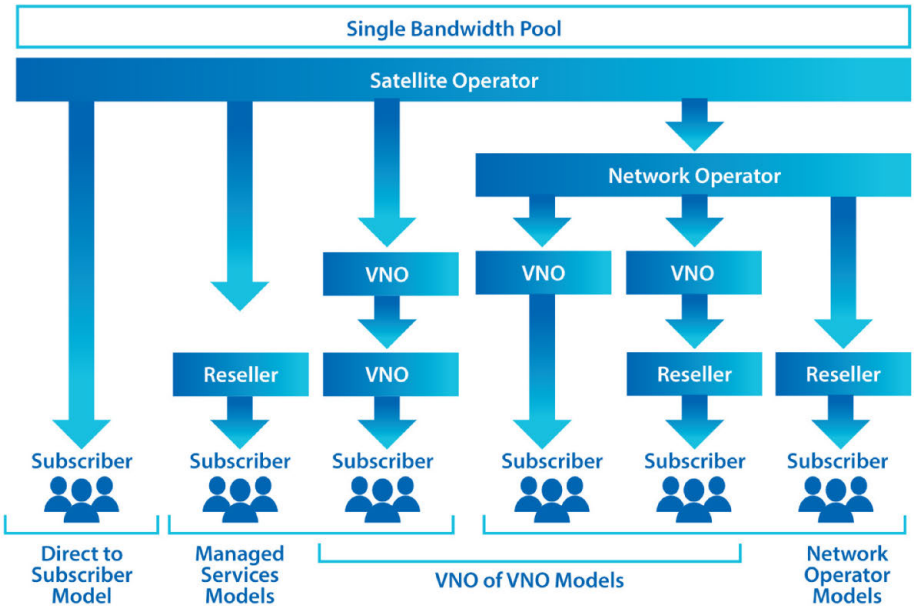
Supports configuration of many numerous groups of terminals across unlimited number of beams, satellites.

ENABLE NUMEROUS GO-TO-MARKET MODELS

GBWM supports satellite operators to generate more revenue through diverse go-to-market configurations. Operators can enable varying degrees of ownership of segments within the satellite solution.



By leveraging all the capabilities and features inherent in GBWM, satellite operators and service providers can configure services for multiple customer types from a single bandwidth pool. GBWM offers flexible options for market entry and additional revenue streams. The new Intuition Network Management System (NMS) provides granular control over network operations and access rights.



FLEXIBLE SERVICE AREA SHAPING & ENFORCEMENT

Maximizing revenue from satellite capacity requires operators to deliver SLAs using the least amount of resources. Instead of relying on common QoS-based networks, GBWM optimizes resource utilization by designing service footprints independent of satellite beam footprints. This allows service areas to be precisely tailored to meet specific needs, such as regulatory requirements, national borders, or offshore coverage. This flexibility also enables differentiated pricing and service offerings, allowing operators to charge premium rates in high-demand regions, optimizing bandwidth allocation and maximizing revenue potential.

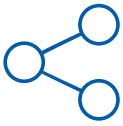
GBWM Creates Unique Service Environments for Each Scenario

Geoscope defines where service commitments are valid based on service areas that can be independent of beam footprints. Different rules can be applied within the Geoscope.

Service scheduling can modify service based on typical or planned periods of high or low usage. Parameters set for automatic or scheduled changes can be configured to certain time zones or geographic regions.

Allocation fairness specifies how to handle equally prioritized subscribers when there is contention for bandwidth.

Load balancing moves eligible terminals to less congested beams to meet service level agreements despite congestion, even increasing IP throughput during expected or unplanned congestion.



Service modes allow for the bandwidth pool to be optimized and allocated based on the type of service, such as direct-to-the-end-user or VNO modes

CONCLUSION

As the satellite communications industry continues to evolve, integrating automation, software-defined architecture, and multi-orbit capacity will be pivotal in driving operational efficiencies, enhancing network performance, and maximizing resource utilization. By leveraging these technologies including GBWM, satellite network operators and service providers can meet the growing demands of global connectivity and unlock potential new revenue streams.