Solutions for Satellite Internet Providers
Connecting the World

Satellite communications networks deliver vital Internet services to a wide range of audiences: from household and business broadband in rural or remote areas, to specific verticals including airlines, maritime operators (e.g., cruise ships, offshore oil and gas operators, fishing, shipping), and connected cars, to industrial/remote sensing, and more.

Recent advances, including high-throughput satellites (HTS) and a growing number of satellites in service, dramatically increased the capacity and extended the coverage for satellite providers, creating new opportunities for customers and providers alike.

Like all IP communications networks, satellite networks can benefit from policy control solutions that make the network more efficient, make it easier to manage, help it deliver valuable services, help it defend itself against attacks, etc.

However, the satellite Internet ecosystem is complex and multi-layered, and the networks themselves have some unique characteristics: bandwidth on beams is at an absolute premium, because upgrades depend on getting new satellites in the sky; round-trip time latency can approach 500ms, which can wreak havoc with platforms that can't accommodate this delay; and TCP timestamps—which are often used by policy control solutions to enable particular capabilities—are often obscured by end-to-end acceleration systems.

Sandvine's universal policy control platform is well-suited to overcome these challenges, and has been proven in a diverse range of real-world satellite Internet deployments.
Solutions for Satellite Operators

While our customers rely on us to satisfy a wide range of use cases across a number of solution areas, our satellite customers often focus on our Traffic Optimization, Business Intelligence, and Subscriber Services capabilities.

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<td>Beam bandwidth is at a premium, and managing this scarce resource is fundamental to any successful satellite communications business.</td>
<td>Understanding your customers is a foundation of every business, and understanding how your network is performing lets you make informed decisions.</td>
<td>Satellite providers deliver services to a diverse array of customers, from individual households to fleets of aircraft, and many things in-between.</td>
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These solutions are explored in greater depth in the following pages.

Of course, many of our satellite customers also implement our Cyber Security, Subscriber Engagement, and Business Services solutions—taking advantage of the full range of solutions available on our network policy control platform. For information about those solutions, please visit our website.

Xplornet

Xplornet is Canada's leading rural broadband provider. Despite the challenges posed by Canada's vast geography and large number of rural residents, Xplornet deployed the country's first national 4G network by leveraging both fixed-wireless towers on the ground and next-generation satellites in space.

"With Sandvine's Network Analytics product, we will have intelligent, real-time visibility into how our network is performing with respect to the activities that are increasingly critical for our customers." - David Miles, Chief Network Officer, Xplornet Communications
Traffic Optimization

Precisely manage beam throughput to maximize value and quality of experience

Despite an increase in the number of satellites in the sky and the introduction of high-throughput satellites, the number one challenge for most satellite operators is managing the limited beam bandwidth.

Sandvine has unique expertise in traffic optimization: from aggregate traffic management, to precise congestion management, to acceleration solutions (where applicable), our capabilities empower satellite operators in all parts of the ecosystem (e.g., Satellite owners, wholesale providers, consumer providers, etc.) to extract the maximum value from their beam bandwidth.

Our virtualized solutions have even allowed some providers to implement management policies right at the subscriber/access edge, by installing some of our platform components on vCPE devices.

Plus, we can apply management policies in our Policy Traffic Switch (our PCEF, in 3GPP architectures) directly, and we also support using our standards-compliant Service Delivery Engine (our PCRF) to signal to third-party gateways.
Aggregate Traffic Management

Many satellite operators have an ideal traffic profile in mind, and our solutions let you create that profile with a wide array of conditions (e.g., user, plan, type of traffic, recent usage, time of day, etc.) and actions.

Plus, unlike alternatives that run out of rules or 'virtual pipes', or that can't layer management policies on top of one another, Sandvine lets you programmatically define rich policies that cascade multiple rules six layers deep. For instance, a Satellite operator can apply separate levels of QoS to a network of beams, a beam, an airline, a terminal, a subscriber, and—finally—an application.

Precise Congestion Management

Any shared resource experiences periods of congestion, and satellite beams are no different.

Some of our satellite customers rely on our congestion detection and management algorithms, while others have developed in-house congestion detection expertise and prefer to take advantage of our dynamic shaping feature, in which bandwidth limits are configured in real-time via an API.

TCP Acceleration

Most satellite operators have TCP acceleration solutions in place already, but for those who don't we have a powerful solution. The Sandvine TCP Accelerator transparently optimizes TCP traffic, delivering rapid return on investment by increasing network efficiency and subscriber quality of experience.
Business Intelligence

Running a business means making decisions, and Sandvine’s solutions provide you with the information you need to make the right decisions for your business.

Understand What’s Happening on Your Network

At the most fundamental level, our solutions help you understand what’s happening on your network. You will learn what applications and services your subscribers are using, how busy different parts of the network are, what trends are emerging, and much more.

Armed with this information, you can spot new opportunities and replace assumptions with knowledge to make truly informed decisions.

What You Want, How You Want

You can examine subscriber and network usage at a high level, or dive down into precise detail; you can view historical trends, or investigate usage in real-time; you can explore your data using Sandvine’s graphical interfaces, or stream data records to your existing systems – whatever works for you!

Monitor Subscriber Quality of Experience

Beyond simply telling you what’s happening on the network, Sandvine’s solutions also provide metrics that measure Network Health and Subscriber Quality of Experience. These metrics help you measure the effectiveness of different traffic optimization policies, and let you identify and respond to potential quality issues before subscribers even notice.

A report from Sandvine’s Network Demographics reporting interface showing the top 25 protocols, by bandwidth, over time for in-flight Internet services. The top three subscriber activities are Facebook, browsing the web, and Apple’s iMessage service.
A FlexPanels dashboard from Sandvine’s Network Analytics that shows Netflix bitrates, both as a daily summary and by resolution and device. The FlexPanels feature lets anyone – even non-specialists – explore your network data to extract meaningful insights.
Subscriber Services

The Satellite Internet ecosystem is uniquely capable of providing a diverse range of services, from household Internet in rural locations, to connecting cars outside of mobile coverage ranges, to even reaching ships and aircraft.

Grow your revenue with rich subscriber services

Household subscriber services are a big piece of the revenue pie for many satellite providers. Sandvine's platform gives you all the tools you need to create and deliver desirable subscriber services.

Most of these services are constructed from a handful of building blocks, including speed tiers and fair use quotas (with hard or soft caps). Some services are enriched with other features, like zero-rated periods (e.g., overnight) or parental controls. By combining these building blocks in different ways, Satellite providers can create rich services that precisely target the needs of distinct market verticals.

Deliver a safe, secure, and optimized service experience for connected cars

Today's drivers expect rich Internet capabilities within their automobiles, and manufacturers are building connected car capabilities into practically every new model that rolls off the line.

These Internet services are ultimately enabled by terrestrial mobile networks or—when travel is outside mobile coverage range—by Satellite Internet services.

Connected car services often impose technical requirements upon the delivery networks; in fact, many automobile manufacturers are requiring that CSPs demonstrate a robust policy control and charging infrastructure in order to win the lucrative connected car business.

A common requirement is to support complex charging structures, like multiple charging groups to accurately count and distinguish traffic associated with in-car Internet services for passengers, sponsored data services for passengers, and automobile manufacturer needs (e.g., diagnostics, telemetry, etc.) for the vehicle itself.

Additionally, protecting the quality of experience (QoE) of infotainment services is often a priority.

Finally, there are safety and security considerations, for instance:

- Parental controls to filter browsing activity
- Access restrictions to ensure that the telematics client can only reach designated destinations
- Botnet and malware filtering to prevent subscribers and automobile components from communicating with malicious destinations
- Protecting the vehicle and its occupants from being scanned and potentially compromised by attackers

Sandvine's solutions are ideally suited to all of these requirements, and we've been working for several years with CSPs to make the connected car vision a reality.
Deliver valuable connectivity to the world’s planes, trains, boats, and automobiles

Today’s travellers expect—and value—Internet services as they move about, whether they’re flying, traveling by rail, driving, or moving from port-to-port.

In some cases, the Internet service powers a WiFi hotspot for a single connected car, bus, or recreational vehicle (RV), providing an Internet experience for a few, or a few dozen users; in other cases, the Satellite connection powers a WiFi hotspot that delivers connectivity to hundreds or even many thousands of passengers in a plane, train, or boat (e.g., a cruise ship), complete with self-service portals. Behind the scenes, though, these services are ultimately carried over satellite beams.

But delivering these services is challenging:

- it’s a technical challenge to deliver a mobile Internet connection that can fairly accommodate many users who might move many thousands of kilometers
- it’s an operational challenge to manage the network to ensure fairness between users and a high quality of experience for sensitive applications
- it’s a business challenge to design services that meet the individual tastes and needs of a diverse range of users
- it’s an ongoing battle to prevent fraud that takes advantage of zero-rating (e.g., by masquerading as the satellite operator’s website or by using techniques like DNS tunneling)

Ultimately, the network’s users typically want to behave the same on the WiFi connection as they would on a household’s fixed Internet connection—to the user, the fact that the connection depends upon a Satellite link isn’t even considered.

For years, Sandvine has helped satellite providers overcome these challenges to deliver high-quality Internet services, and we are proud to be a crucial part of satellite networks that deliver one-off and recurring services to air travellers, rail commuters, and nautical/maritime operators.

With our real-world experience and proven platform—a platform that can accommodate the unique nuances of satellite networks—you can trust that Sandvine knows how to help your satellite Internet business to succeed.
When it comes to Internet connectivity, the sky’s no longer the limit for SITAONAIR

Bringing Quality Internet Experiences to 30,000 Feet

SITAONAIR provides satellite Internet services to a number of airlines, allowing passengers to use their wireless devices en route. Passengers enjoy the convenience of connecting with friends and family and keeping up with events while cruising at thirty thousand feet.

But to ensure everyone has a good experience, the satellite bandwidth must be carefully shared between all the service’s users – and that’s where Sandvine comes in.

At the 2016 Policy Control Awards, Informa Telecoms & Media’s recognized this implementation with the award for Most Innovative Policy-Enabled Project or Application.
Deploying the Sandvine Solution

Despite their common elements, satellite networks vary enormously. However, there are some common functions that must be introduced in order to implement policy control use cases.

Gaining Subscriber Awareness

Implementing per-user policies requires an up-to-date mapping of sessions to subscribers, and that can be a challenge in satellite networks.

Fortunately, the Sandvine platform is versatile enough to enable subscriber awareness in a wide variety of ways: by direct provisioning from a third-party system, by inspecting authentication traffic (if it exists), through a sign-up portal when a subscriber joins the network, and more.

Enforcing Management Policies

Our platform provides satellite operators with a range of policy enforcement options. You can enforce policy directly on our Policy Traffic Switch (our PCEF, in a 3GPP architecture), or take advantage of the universal policy control capabilities of our Service Delivery Engine (our PCRF) to signal for enforcement on another device (e.g., an SMTS).

For some deployments, it might even be possible to place an enforcement component on-premises (e.g., in a building, or on an aircraft or vessel) so that policies are enforced directly on the access edge.

An extremely simplified deployment diagram: the Sandvine platform is typically deployed ‘north’ of the satellite gateway; in some deployments, platform components may be deployed on-premises as part of a virtual CPE

Smart Scalability with Virtualization

In addition to high-scale hardware elements, Sandvine’s platform is available in a completely virtualized format that is perfect for lower bandwidth Satellite environments and even on-premises deployments.