

Via Satellite's

Tech Focus REPORT

Capturing New Gains in Bandwidth Efficiency



Space segment is a critical resource that is expensive and often in scarce supply, making it difficult for network operators to provide competitively priced services and expand their networks. Developing effective strategies to deal with these issues is more essential than ever. Two recent industry innovations, DVB-S2 with Adaptive Coding and Modulation and Group Quality of Service, can help network operators increase bandwidth efficiency and strengthen their service offerings.



DVB-S2 With Adaptive Coding & Modulation

The DVB standards committee formally approved the DVB-S2 standard in 2005. Although the broadcast video market was the main driver of this second generation, the committee took the opportunity to incorporate an “interactive data” element of the DVB-S2 Digital Broadcast standard developed specifically for VSAT applications. This implementation of the outbound or forward link channel represents the most efficient data delivery physical layer solution in terms of link efficiency (Bits/Hz) available anywhere today.

One of the advancements within the standard includes a new forward error correction technique known as Low Density Parity Code (LDPC), which has been shown to provide a 30 percent increase over the DVB-S standard and a 15 percent improvement over Turbo FEC coding. A second major enhancement in the DVB-S2 standard is the provision of higher order modulation schemes. In addition to QPSK, the standard includes 8 PSK, 16 APSK and 32 APSK.

But perhaps the most significant advancement related to DVB-S2 is the provision of Adaptive Coding and Modulation (ACM) within the standard. With the return-channel capability of an interactive data system,

direct feedback from the remote or terminal end of every link in the system can provide real-time information to the hub on how well the outbound link data is being received by the terminal.

With DVB-S2/ACM, the carrier to each remote can be operated at the most efficient coding and modulation combination possible for that terminal at any particular moment in time. No longer are network operators constrained by the worst-case terminal in their network. ACM automatically monitors the condition of the data link to each remote and adjusts the modulation and coding scheme for the outbound carrier continually in real time.

Network operators can exploit this ACM advantage in a variety of ways: by reducing satellite capacity requirements (costs) for data service delivery, increasing their customer’s service levels (availability and/or throughput rate), or a combination of these two factors depending on the service level commitments and business plans for their customers.

Increased Data Throughput

Without any increase in symbol rate, DVB-S2/ACM will allow higher absolute data throughput speeds. For example, a 45Ms/s carrier filling a 54MHz transponder will yield a “user”

data rate around 140Mbps when running 16 APSK, far above anything seen with DVB-S.

Network operators should understand that ACM carries a slight additional overhead. The threshold where ACM pulls ahead of DVB-S2 (with no ACM) is typically reached at around 5Ms/s, so service providers with smaller carriers may find it more cost effective to stay with a TDM configuration until their network grows to a higher capacity requirement on the outbound channel.

Overcoming Rain Fade

One benefit of ACM will be particularly noticeable for network operators serving tropical zones in which torrential rain challenges satellite links. Until now, network operators have been forced to balance the commercial imperative of making services economically viable for customers against engineering constraints required to maintain links during adverse weather conditions.

ACM automatically optimizes link performance, balancing efficiency and availability as rain belts pass across a satellite footprint. Link margins previously required to survive tropical downpours can now be used within the link design for additional paying customers or increased data throughput, typical during the better conditions in the network that prevail most of the time. Given that rain fade is often quite localized across a footprint, more customers can effectively be served within the same capacity.

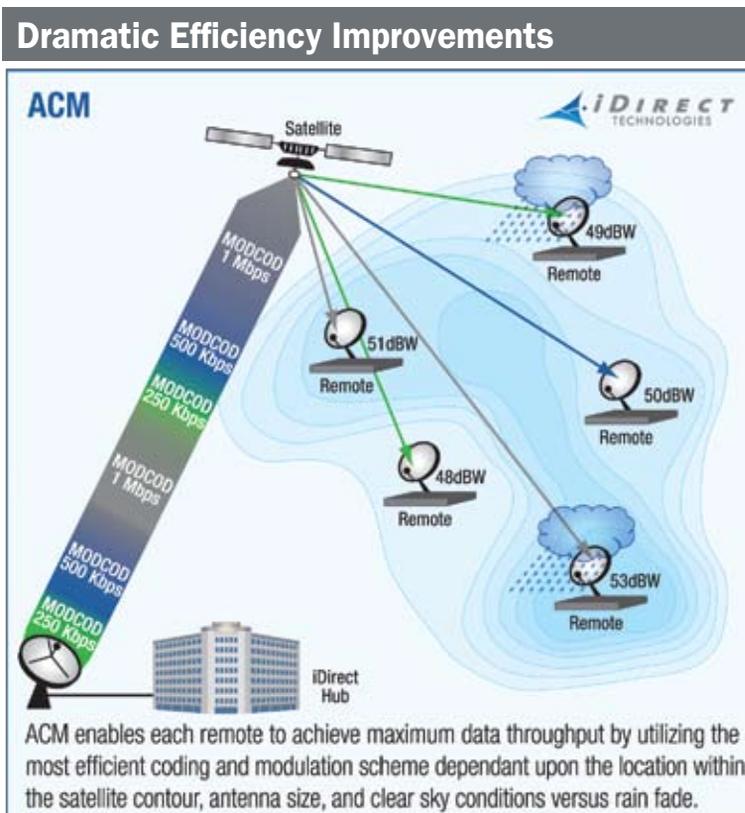
Advancing Quality of Service

Today, network operators face new, complex challenges assuring Service Level Agreements (SLAs) to their customers. They need the flexibility to take a specified amount of bandwidth and allocate it logically to different tasks. They also need the ability to make service level guarantees for each logical partition. And compounding the challenge, network operators must ensure SLAs on upstream and downstream circuits.

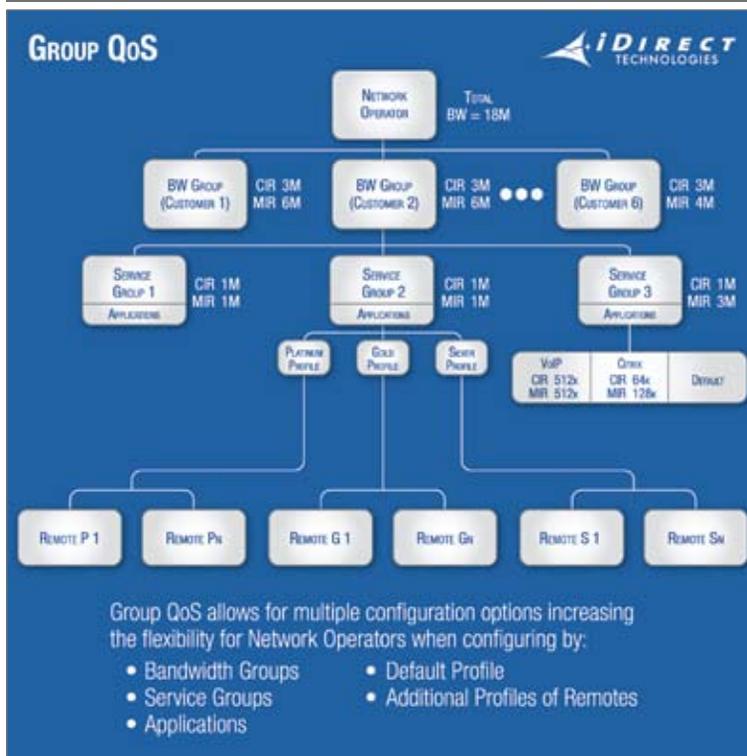
For example, as more applications run over an IP satellite network, multiple applications must peacefully coexist on the same space segment – with critical applications such as VOIP given priority. This becomes further complicated when traffic from different companies share a satellite network.

Smarter Bandwidth Allocation

An innovation called Group Quality of Service (QoS) helps network operators solve



Flexible Bandwidth Management



this challenge. Group QoS allows operators to utilize bandwidth more effectively by providing logical partitions on the same physical circuit. Since traffic can be logically segregated on a satellite circuit, network operators can aggregate small satellite circuits into larger ones, thereby reducing bandwidth and lowering costs.

In addition to saving bandwidth through aggregation, Group QoS allows network operators a tremendous amount of flexibility to serve a range of clients with disparate needs. Operators can partition their networks based on application priority, committed information rate (CIR), maximum information rate (MIR) or cost. For instance, a network operator can prioritize VOIP traffic over file transfers while allowing some clients, but not all, to burst over their CIR, while at the same time supporting a handful of virtual network operators (VNOs).

Since no two clients are the same, network operators need the flexibility to subdivide their bandwidth and have the freedom to adapt SLAs for each individual client. As operators grow, they need the ability to further subdivide their bandwidth and assign different rules to each new segment. This capability is particularly important to an operator that serves virtual network operators.

Enabling Multipurpose Networks

Over the last decade, enterprise clients have escalated their disaster planning and preparedness. Spurred by recent natural disasters, corporate IT staff are looking to add backup capability to their networks to minimize costly downtime. VSAT communications always has been a good fit for disaster recovery applications, but provi-

sioning full-time bandwidth on a standby basis has been cost prohibitive.

Group QoS also allows the “repurposing” of bandwidth, providing network operators a pool of bandwidth that can be sold to support disaster recovery services. Consider the situation where a network operator sells VSAT services to enterprise customers based on a CIR with the ability to burst to higher speeds if bandwidth is available. If one disaster recovery terminal or a group needs service, Group QoS will prevent the CIR-based VSATs from bursting and will automatically reassign the requisite bandwidth to the disaster recovery VSATs.

Group QoS also allows logical partitioning of a single remote, in essence creating logically separate remotes. A good example is found on many offshore drilling rigs. Multiple companies participate in the drilling of an offshore oil well and each requires a secure connection back to its corporate network. Group QoS allows a network operator to support each company with its own bandwidth request and bill them separately. The principle of logical remotes could be extended to gasoline retailers and fast food restaurants sharing a building.

Conclusion

Satellite bandwidth is the largest cost of doing business for network operators and effective strategies are needed to deal with bandwidth efficiency and utilization. DVB-S2/ACM and Group QoS dramatically help network operators maximize their investment in this resource and will have significant effects on both their top and bottom lines.

The Next eVolution in Performance from iDirect

ACM and Group QoS are landmark innovations that can deliver major advances in bandwidth efficiency and allocation. iDirect pioneered the development of Group QoS and has made this exclusive technology available to network operators. iDirect has now unveiled its next generation platform – eVolution – delivering the industry’s most advanced DVB-S2/ACM system.

Combining DVB-S2/ACM and Group QoS with iDirect’s other powerful technology advances, the eVolution platform delivers significant benefits that enable network operators to run more efficient systems and expand their network offerings:

- **Bandwidth efficiency** – iDirect’s DVB-S2/ACM platform provides an additional bandwidth efficiency of greater than 50 percent when compared to other non-ACM DVB-S2 solutions.
- **Simplified network design** – To configure ACM, a network operator simply chooses the worst-case link budget within the network that would be used in a CCM system. iDirect’s ACM system then automatically exploits the clear-channel margin for each individual remote in the network.
- **Service flexibility** – Group QoS allows network operators to logically segregate applications on common bandwidth. Operators can design SLAs that meet the growing need for IP satellite communications among a diverse base of businesses, organizations and governments worldwide.
- **Real-time monitoring** – iDirect’s network management system measures ACM gains in real time. This enables network operators to track the benefits of ACM throughout their network and use this critical information to manage satellite capacity to best fit their business needs.

WHAT'S STANDING BETWEEN YOUR SERVICE AND MILLIONS OF NEW CUSTOMERS?

ABSOLUTELY NOTHING.

**Toll Quality
Voice, Video
And Data**

**Network
Scalability**

**Optimal
Performance with
DVB-S2/ACM**

**Full
Encryption
And Security**

**Support Any
IP Centric
Application**

**Lowest
Cost Of
Ownership**

**Superior
Traffic
Management**

**Simple
Centrally Managed
Solution**

The global marketplace demands global connectivity—with no limits. The iDirect IP-based satellite networking platform delivers all the power of broadband connectivity with none of the constraints. Offer your customers the best service and support for voice, data, video and other applications anywhere in the world. The iDirect platform is an easy-to-deploy, extremely efficient, fully encrypted solution that can support all of your end users' communications requirements with high network availability. And with a single, scalable platform capable of supporting multiple technologies, iDirect provides the flexibility you need as your enterprise grows. To learn more, call iDirect at 1-888-362-5475. **The leader in broadband IP satellite communications.**

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