satellite vs. terrestrial:
which network is right for you?

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introduction

There is a lot of misunderstanding when it comes to satellite communications. Most people still have some prejudices. They perceive satellite as an unreliable communications medium. They think that terrestrial services are superior in quality. Some people even think that a satellite can fall out of the sky. Others think that satellite cannot support TCP/IP or mission-critical applications like SAP or even real-time applications like voice and video. None of these notions are correct.

Many enterprises, when choosing a new IP infrastructure, choose satellite technology because of its lower cost, scalability, enterprise-wide consistency and ease and speed of deployment. The purpose of this document is not to prove that satellite is better than terrestrial options. That will vary on a case-by-case basis depending on the criteria of each situation. The purpose of this document is to demystify satellite communications and position it as a reliable alternative or ideal complement to the terrestrial infrastructure.

myth	truth
satellite services are only viable beyond terrestrial networks	satellites offer wide, ubiquitous, instant coverage, complementary to terrestrial networks
satellite services are expensive	the cost effectiveness relative to terrestrial services varies
satellite services are unreliable	reliability and availability ratios of satellite services are often higher than 99.9%
terrestrial services are of superior quality	satellites offer a unifying technology solution
satellite cannot support TCP/IP	satellite TCP/IP performance is comparable to that of terrestrial lines given proven technology that has been available for a long time
satellites can fall out of the sky	satellites do not fall out of the sky; satellite is a fully managed, reliable, single-point-of-contact network technology
voice communications are not possible using satellite	real-time voice and video are definitely possible over satellite; many Orange customers have enabled voice and video over their satellite links

positioning: terrestrial vs. satellite

ubiquitous availability

Satellite is the only broadband wide-area network technology that is available everywhere – in urban and rural areas around the world. All that is required for a location to receive connectivity from the satellite is a clear view of the sky unobstructed by trees, tall buildings or other objects. In contrast, terrestrial technologies are limited in their coverage area.

In order to appropriately position satellite access against terrestrial alternatives, you need to be aware of the availability of terrestrial connection technologies. In fact terrestrial connectivity is rarely available in remote locations, leaving no other alternative than satellite communications. But even if available, terrestrial connectivity still might not be the preferred option due to price competitiveness or SLA commitments that can be lower compared to satellite.

network reliability

Lines can be cut by construction projects; falling trees can take down utility poles; and equipment can fail at local telephone central offices – terrestrial networks have multiple potential points of failure where outages can occur. On the other hand, satellite has just three potential points of failure: the satellite, the hub and the satellite terminal, each of which has built-in redundancy in case of failure.

Satellite outages are exceedingly rare but, should one occur, traffic to failed transponders is automatically rerouted to back-up transponders transparently to end users with no impact to the service. At the hub, online redundant equipment is used to provide immediate switching, again in a matter completely transparent to the end user, for uninterrupted service in the event of equipment failure. Finally, satellite equipment has the longest mean-time-between-failure in the industry, and Orange provides its customers with extensive after-sales support via field engineers all over the globe.

network availability

Satellite communications are often said to suffer from rain fades and, therefore, presumably exhibit lower availability rates than terrestrial-based communications. This myth has been dispelled by properly engineering satellite links and provisioning enough margins so that rain fades have close to zero impact on link availability. This has allowed satellite links to feature availability ratios higher than 99.9% even in equatorial areas. More recently, new adaptive satellite waveforms (such as the DVB-S2 standard) have been able to exploit those power margins in order to provide higher throughputs while consuming the same satellite bandwidth.

DVB-S2 combined with ACM (automatic code modulation) is mitigating the issue of rain fade. Even under extreme rain conditions, the satellite link can still transmit and receive by lowering the bandwidth of the impacted site using the appropriate modulation scheme. And even while a site that's impacted by rain fade is transmitting at a lower bandwidth, this will not impact the other sites in the same network.

single service provider

With satellite, the "long haul" and "last mile" are one and the same – a virtual circuit in the space between the hub, the satellite and the individual satellite terminal. Not only does this eliminate all possibility of failure – since construction crews digging up the street can't sever a virtual circuit traveling over satellite – it also means that satellite network users have a single end-to-end network provider that owns, operates and controls every portion of the network and can diagnose and fix problems immediately and unilaterally.

uniform service levels

Orange satellite customers are assured of consistent, uniform service levels at every remote location: the same bandwidth, the same equipment, the same customer service and the same field support. Of course, consistency across all services, whether they be satellite or terrestrial, would be ideal. However, that is not always possible. For example, with DSL technology, the further the user is from the local telephone exchange, the less bandwidth he'll have available. And in certain cases, the user might be out of reach and by consequence not eligible for DSL. These are just a couple of the factors that add complexity when managing the various service levels on a terrestrial network.

economics

The economics of a satellite network are simple. The one-time charges for the antenna and associated net modem can be expensive; however, the hub and satellite space segment can be shared by many customer sites or even shared by different customers. This makes the ROI calculation attractive and, in certain cases, less expensive than terrestrial networks.

timely deployment and installation

With a terrestrial network, deployment and installation of new locations typically involves multiple vendors. With a satellite network, installation and deployment are quick and simple. First, because satellite technology is completely free of terrestrial infrastructure, there is no need for coordination with the local exchange carrier or any other third party. An installation team can complete a site install in a matter of hours, no matter where the site is located. For this reason, satellite deployments are ideal in the case of emergency deployments. Satellite deployments are subject to authorized licensing and in-country shipping regulations, which could, however, introduce deployment delays in some countries.

multicast content distribution capability

Satellite networks have a key strength in the distribution of bandwidth-intensive information to large numbers of remote locations. The advantage comes from satellite's inherent capability as a broadcast medium.

Satellite can efficiently multicast content (at speeds up to 40 Mbps) in a single broadcast message to a virtually unlimited number of end-user locations. Through satellite technology, users are connected to the satellite through the same "virtual circuit" or space. By eliminating duplicate transmissions, satellite multicast technology maximizes the efficiency of existing servers and networks, freeing up valuable bandwidth and enabling more efficient use of current infrastructure. An added benefit is that content is delivered to all recipients simultaneously.

The bottom line: satellite technology is a cost-effective choice for businesses that need to deliver large amounts of data, video or audio to a large number of physically dispersed locations.

site relocation and additions

One of the challenges of running a large multi-site network is the fact that remote sites tend to relocate over time and, if enough advance notice is not provided, it can be difficult and expensive to accommodate these moves.

With a satellite network, the time frames required for moves are compressed. In fact, uninstall and reinstall can occur on the same day, in most cases, if the sites are close to one another. In addition, the monthly cost for providing service to a site doesn't change since, from a network perspective, the "virtual circuit" between the site and the satellite continues to serve the new location. When adding new sites, one of the major benefits of satellite technology is that, in most cases, additional sites do not translate to additional monthly bandwidth costs.

The bottom line: relocating and adding network sites is significantly less complicated and less expensive with a satellite network than with most terrestrial technologies.

network capacity expansion

One of the biggest wide-area network challenges faced by many companies is the ever-expanding need for additional bandwidth to support new applications.

With a satellite network, expansion is extremely easy and comparatively inexpensive. First, all bandwidth allocation is controlled at the hub, so increasing network capacity is as simple as increasing the amount of bandwidth allocated to the network.

While it is possible that additional equipment may be required at the hub to support the increased capacity, this hardware can most often be installed in a matter of days. More importantly, no hardware changes or field technician visits are required at remote sites, since satellite equipment is designed out of the box to handle maximum bandwidth requirements.

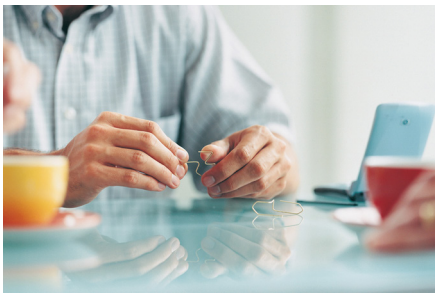
The bottom line: satellite technology provides a uniquely convenient environment for accommodating network and bandwidth expansion.

emerging application support

As a broadcast medium, satellite is a perfect platform for the distribution of bandwidth-intensive content, such as video, software updates and large data files. Using satellite, you will add typically a 560 msec end-to-end delay, but that is not a significant drawback. A lot of improvement has been made by satellite manufacturers, and now satellite can easily support mission-critical applications like SAP and real-time applications like voice and video, providing a similar user experience as that of terrestrial networks.

In addition, a satellite network can simultaneously transport a mix of very different applications for many different customers, while offering advanced quality-of-service mechanisms that enforce end-user SLAs. This ability to mix various streams on the same physical bearer enables large bandwidth gains using statistical multiplexing.

conclusion



Satellite communications have emerged as an integral part of global IP networks. People and organizations need to stay connected to the network whenever they need it and wherever they are. However, terrestrial and wireless networks are inherently limited in their ability to provide this level of connectivity.

Especially when companies are located in remote places, satellite communications can be the only option. Even in low population density zones in Western countries, local PTTs can be disinclined to invest in communications infrastructure. Satellites can provide ubiquitous, instant coverage in these zones as well. Satellite communications can be used as a primary communications platform or as a back-up for a terrestrial infrastructure.

Recognizing the growing demand, Orange Business Services offers satellite services on which IP applications can run reliably and efficiently. Orange provides organizations with immediate global reach – making critical communications possible in challenging and diverse environments.

Orange is the only operator that can propose both alternatives – satellite and terrestrial infrastructure – and help customers decide which is the most appropriate to meet quality, availability and price-point requirements on a case-by-case basis. By integrating satellite technology within converged IP enterprise networks, we are able to serve sites in:

- regions with poor or non-existent communication infrastructure either on land or at sea
- in developed countries as an MPLS back-up

about Orange Business Services

Orange Business Services, the Orange entity for business, is both a telecommunications operator and IT services company dedicated to businesses in France and around the world. Our 20,000 employees support companies, local government bodies and public sector organizations in every aspect of their digital transformation. This means we're at hand to orchestrate, operate and optimize: mobile and collaborative workspaces; IT and cloud infrastructures; connectivity (fixed and mobile networks, private and hybrid systems); applications for Internet of Things, 360° customer experience and big data analytics – as well as cybersecurity, thanks to our expertise in the protection of information systems and critical infrastructures. More than 2 million businesses in France and 3,000 multinationals place their trust in us. See why at: orange-business.com or follow us on Twitter @orangebusiness

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