

Stratecast Perspectives and Insight for Executives

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Satellite Services: From Business Continuity Plans to High Availability Networks

Introduction¹

In 2010, network managers have no excuses. Employees, customers and partners expect 24-hour access to the corporate network and the critical applications it delivers. Anything less and businesses risk lost revenue, increased costs, and damaged reputations.

But where connectivity options are limited, it can be difficult and expensive to keep the network available at all times. This is especially true in a distributed network environment, with hundreds or thousands of branch locations, each served by a different blend of carriers and access technologies. The challenge for such enterprises is formidable: How do they ensure always-available network connectivity, to run applications with consistent levels of performance and security, at a reasonable cost and with minimal management oversight?

For an increasing number of businesses, the answer is to incorporate satellite services into the network mix. Long a staple of disaster recovery planning for emergency responders, satellite technology also enjoys a role as a business continuity solution for many businesses, thanks to its scalability and ubiquitous presence in the U.S.

More recently, enterprises looking to get the best price-performance from their network investments are using satellite links for more than backup at their remote locations. To support them, vendors are rolling out products and services that provide improvements in network performance, support for Class of Service prioritization, and sophisticated management tools, all of which have made satellite worthy of consideration as a viable part of a high availability enterprise IP network.

In this SPIE, Stratecast looks at how satellite services have evolved to meet the needs of multi-location enterprises. We look at products and services offered by three providers that go beyond support for business continuity planning, and address demand for high availability network solutions.

¹ In preparing this report, Stratecast conducted interviews with representatives of the following companies:

- Hughes Networks – Sampath Ramaswami, Senior Director, Strategic Development
- iDirect – Toni Lee Rudnicki, CMO; Dave Bettinger, CTO
- Spacenet – Jon Douglas, Director of Marketing; Alasdair Calder, Director, Strategic Product Management

Please note that the insights and opinions expressed in this assessment are those of Stratecast and have been developed through the Stratecast research and analysis process. These expressed insights and opinions do not necessarily reflect the views of the company executives interviewed.

Definitions: High Availability and Business Continuity

A high availability network is, as its name suggests, one that is “always on”. Communication Services Providers (CSPs) and their enterprise clients often combine discussions of high availability networks with business continuity solutions. Stratecast defines the terms as follows:²

Business Continuity is the means by which an enterprise averts or overcomes system disruptions, so that critical business functions continue unimpeded. Cable cuts, equipment failure, even routine maintenance activities may trigger business continuity processes.

High Availability describes a type of business continuity solution that bakes resiliency into the network. Rather than triggering a “plan” – which implies manual or human intervention – high availability networks include more self-healing and automatic failover functionality.

In a high availability network, the enterprise generally does not install backup capacity that remains idle until needed. Instead, all network links are utilized to carry traffic. Each link serves as a backup to others from the site, with critical traffic given priority via class of service or other routing rules.

CSPs have long built their core networks for high availability, including multiple routes and complex routing algorithms that ensure packets are delivered quickly regardless of equipment or circuit hiccups. The high availability WAN extends those same principles to the last-mile, with the access links managed either by the provider or the enterprise.

A high availability network does not absolve the enterprise of the need to build a business continuity plan; for example, the enterprise may still need to establish processes to notify employees or customers of a building closing. However, the high availability network automates many network-related functions to ensure continued connectivity.

Building Resiliency into the Network

As with all business continuity solutions, high availability networks rely on redundancy and diversity. Redundancy ensures that a second access link is available for each location, in the event that the primary link fails. Diversity provides a degree of assurance that the secondary route is different enough to escape the fate that befell the primary route.

Diversity comes in three types:

Carrier diversity: By selecting more than one provider (generally a primary provider that carries most of the traffic and a secondary provider that handles selected sites or applications), enterprises can protect themselves against carrier-related disruptions, to some degree. Tier 1 carriers are quick to point out that carrier diversity doesn't necessarily have the intended effect: most carriers share wireline conduit and right-of-ways, and often their nodes are co-located in the same physical facilities, which means that a cable cut or flood will effect many carriers equally. Nonetheless, establishing relationships with multiple carriers provides enterprises with flexibility to move traffic as needed, provided shared facilities are not out-of-order.

² For additional discussion of business continuity and disaster recovery solutions, see BCS 3-8, *Marketing Business Continuity and Disaster Recovery Solutions to Enterprises* (November 2009).

Route diversity: Regardless of whether facilities are owned by one or multiple carriers, it's smart to build route diversity into the network, so that traffic can be rerouted in the case of a circuit or PoP outage. This is especially true for remote branch locations that may be served only by a single Local Exchange Carrier.

Access technology diversity: It's not uncommon for a significant incident, such as a cable cut, to affect all wireline services to a geographical location. Therefore, a non-wired technology, such as satellite or wireless, can offer needed diversity.

Why Satellite?

Satellite technology is increasingly being incorporated into enterprise high availability, resilient networks because it can satisfy some or all of the diversity criteria. In addition, satellite offers the following benefits:

- **Ubiquitous coverage:** U.S. based satellite providers are able to offer coverage that encompasses the entire footprint of the continental U.S., as well as southern Canada, northern Mexico and the Caribbean. For businesses with hundreds and thousands of locations, this negates the need to contract with multiple local service providers.
- **High speed, high performance:** Increasingly, satellite networks offer enterprise-grade performance that rivals terrestrial VPN networks. Bandwidth can be configured at rates up to 5 Mbps, exceeding T1 capacity. While latency remains an issue – the physics of satellite transmission means additional delay of up to ½ second on a round-trip transmission – many enterprise applications can tolerate the delay without noticeable degradation. With the introduction of next-gen traffic shaping equipment, certain latency-sensitive applications, such as VoIP, can be transported over satellite with acceptable results.
- **Scalability:** New locations can be easily set up with the installation of premises-based equipment. No need to schedule an appointment with the LEC to run cable to the demarcation point.
- **Affordability:** Satellite can be a very affordable solution, especially when bandwidth is shared and allocated among enterprise locations

How it Works: A Satellite Primer

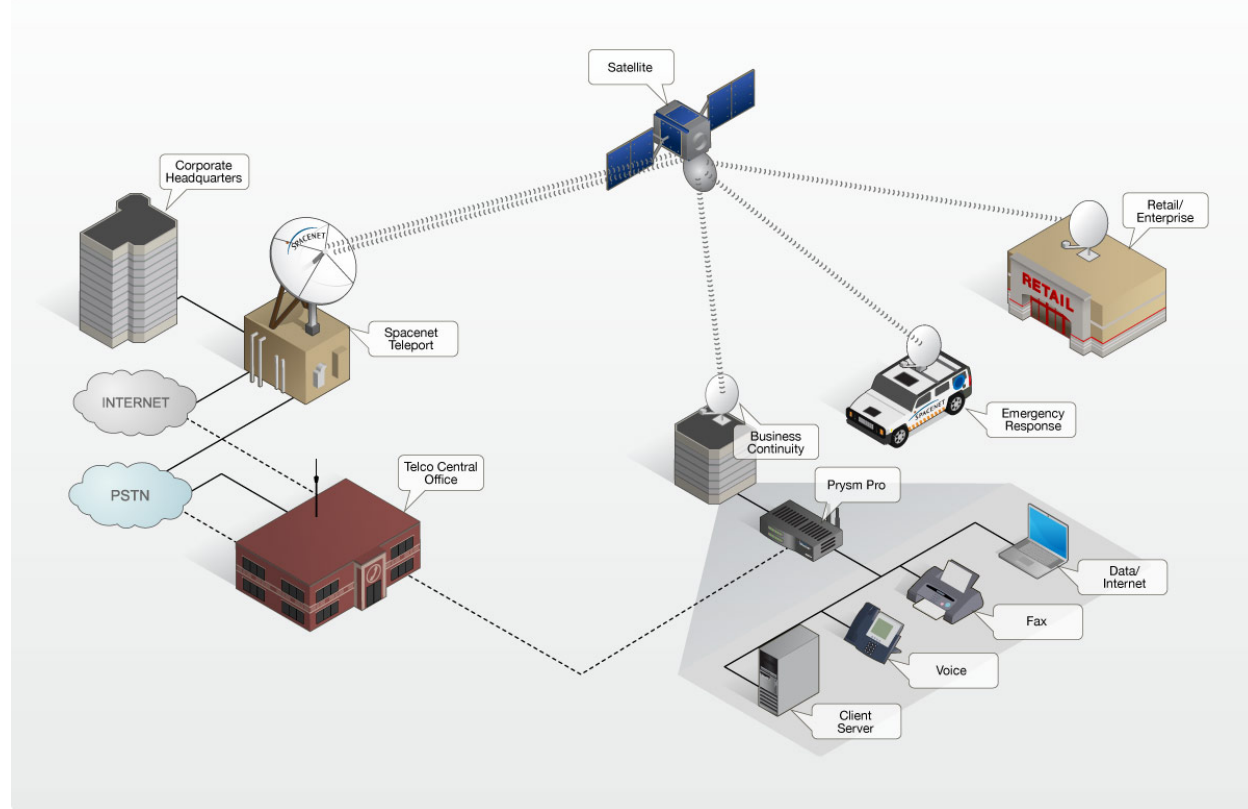
A satellite link requires several pieces to work:

- At the branch location: a VSAT (Very Small Aperture Terminal), which consists of a dish within line of sight to the satellite is connected to a location-based transceiver, an appliance that interconnects to the location's data servers and other networking equipment.
- In the sky: A transponder, which is housed in the fixed-orbit satellite.
- At the hub location (e.g., enterprise data center): A larger VSAT dish and hub controller to accommodate one-to-many communication streams, that is, a hub-and-spoke network configuration.

Figure 1 shows a sample configuration that combines satellite links with other network technologies in a hybrid network from Spacenet.

Figure 1

Spacenet Sample Hybrid Network Configuration



Source: Spacenet

Satellite networks can be configured as needed by the application. One-way broadcast applications, like digital signage, require a simple hub-and-spoke configuration with high-speed downloads from the hub to the branch locations and limited capacity uploads. But satellite networks can also be configured in a meshed architecture, enabling communication between branches – for example, for a multi-cast media application or a collaboration app. The networks are flexible and easy to reconfigure from a centralized management terminal; an on-site visit and additional equipment may not be necessary.

The technology is especially well-suited to the unique needs of highly distributed network environments, for example, retail outlets, convenience stores, and gas stations. These businesses operate with thousands of branch locations, many in remote areas. Each location relies on the network to process credit card payments, maintain point-of-sale data, support inventory tracking, and comply with regulatory requirements. Therefore, they require always-on network connectivity.

Using Satellite in a High Availability Network

It takes more than a satellite link to turn a connectivity solution into an always-on, high availability network. Providers must offer simple, efficient and cost-effective routing and management platforms that allow the most effective use of the satellite technology – not just during a service disruption, but at all times. Furthermore, they must minimize staffing burden and automate, where possible, the flow of traffic across the multiple links.

Several providers of equipment and services have stepped up to help enterprises build high-availability networks using satellite technology.

HughesNet High Availability VPN

Long known as a provider of satellite services, Hughes Networks has evolved to offer a full portfolio of managed WAN services. As a virtual network operator that manages a network comprised of its own and leased facilities, the company offers network solutions that combine satellite, terrestrial and wireless broadband access.

For enterprises interested in maintaining always-on network access from all locations through a single provider, Hughes offers its HughesNet High Availability VPN service. The company configures each customer's network so that each location has two diverse access paths – landline (T1 or broadband DSL, depending on need and local availability) and satellite. Broadband wireless may also be incorporated. As a result of the access diversity, Hughes offers customers up to 99.99% availability across its network.

In the event of an outage on one path, the Hughes router on the customer premises automatically re-routes critical traffic to the other path, based on pre-established Class of Service rules. Data acceleration functionality in the router minimizes latency on the satellite link. This fully managed service provides visibility into the network through an Internet-based portal, enabling enterprise IT managers to see real-time status of specific links. Changes to CoS routing priorities can be made via the portal or Hughes services technicians.

Hughes designs its network solutions to maximize the utilization of all circuits. Thus, the secondary satellite link functions not purely as backup, but also carries part of the site's everyday traffic. In the event of a failure to the primary link, pre-designated key applications are prioritized to run over the satellite connection. For an even greater degree of network availability, Hughes can configure high availability networks with a secondary hub.

To enterprises, the value of the High Availability VPN is that it supports network-wide performance parameters and CoS priorities, while enabling each branch location to utilize access types that are most appropriate, based on cost and performance needs. Because the satellite links are configured to support IP traffic, the transition from terrestrial to satellite links is seamless. Furthermore, the single-provider model gives enterprises a single point of responsibility for the entire network.

Spacenet

Enterprises that require a high-availability network are looking for more than connectivity. They need consistent performance, appropriate levels of security, and regulatory compliance – regardless of access type. To address that need, Spacenet offers a range of products and services.

Spacenet is a managed network services operator that offers a range of network services for its enterprise customers. For enterprises looking for a single-source network solution, the company provides managed WAN services that comprise wireline, wireless, and satellite links (its own and leased from other providers). The company's sweet spot for managed network solutions is highly distributed networks, targeting operations such as retail and applications such as content distribution and credit card processing.

For enterprises that manage hybrid networks, Spacenet has recently introduced its powerful IP network management appliance, Prysm Pro. Prysm Pro is a multi-function modular appliance that manages all types of communications access links for the location, including wireless (WiFi and EVDO), terrestrial, VSAT, dial backup, and VoIP and telephony failover. It supports enhanced functionality including data acceleration, security and multimedia content delivery. To serve the retail market, the Prysm Pro can interface directly with point-of-sale equipment, and supports PCI compliance for processing credit card transactions.

To support high availability networking, the Prysm Pro enables automatic rerouting of traffic between satellite, wireline and wireless technologies in the event of an outage on any circuit. The appliance is integrated with the company's Managed Network Services. Customers can establish routing priorities via Class of Service designations or other traffic-based rules, using the company's network management web portal.

As a self-contained, modular appliance, the Prysm Pro offers a number of advantages to Spacenet customers:

- **Reduced footprint:** The self-contained Prysm Pro performs multiple functions that might otherwise be performed by a number of separate appliances, including routers, security devices, WAN optimization and acceleration hardware. This reduces footprint – a boon to distributed environments such as retail in which network closet space is minimal.
- **Lower equipment costs:** Because functionality is combined into a single, modular appliance, the total cost is lower than it would be for installing and maintaining separate hardware devices. For distributed environments that have hundreds or thousands of locations, the cost difference can be significant.
- **Streamlined management:** The Prysm Pro enables remote network management through a centralized management platform called Prysm InSite. This is important for distributed environments, in which it's unlikely that IT personnel are available on site.
- **Scalable:** Because the device is modular, each location can be outfitted with the functionality it needs. And as business needs change, additional functionality can be added without requiring a separate appliance.

iDirect

iDirect is a provider of satellite networking equipment and software that enable enterprises and CSPs to effectively integrate satellite into their IP networks. The company works with CSPs including Verizon Business, Orange, and British Telecom, which deploy the company's products and management system in their own network solutions.

The iDirect Intelligent Platform is a communications system that combines satellite network hardware and network management software to provide an enterprise grade IP satellite service. The platform integrates with terrestrial VPNs to enable enterprises to easily allocate bandwidth among communications circuits. Figure 2 illustrates the components of the iDirect Intelligent Platform in a network configuration.

Figure 2

iDirect Intelligent Platform Configuration



Source: iDirect

Enterprises can install the iDirect platform as part of their business continuity or disaster recovery solutions, allowing terrestrial links to automatically failover to standby satellite links. But with increasing frequency, businesses are choosing to make iDirect part of their high-availability IP network. This is because **the company has built its technology platform to support the same transport and routing protocols, encryption and security measures, and Quality of Service prioritizations that the enterprise has deployed on their terrestrial VPN.** Applications – whether data, video, or even VoIP – run the same way whether they are on the primary terrestrial link or have been switched over to the satellite link.

For CSPs that integrate the iDirect solution into their customers' managed VPNs, the consistency of network performance means they can offer common Service Level Agreements across the entire network – regardless of access medium. iDirect's platform offers six different MPLS Class of Service prioritizations on the satellite link, the same number of CoS designations that many CSPs offer on their terrestrial VPNs. Thus, the same policy-based rules apply to the satellite traffic, and bandwidth can be more efficiently allocated among applications.

In failover mode, when the iDirect appliance detects that a network link is not working in one direction, the communications protocols "talk" to each other to redirect critical traffic – e.g., a Point of Sale application for a retail establishment, or VoIP – to the satellite link. Less critical traffic, which has a lower priority, will be sidelined until bandwidth is available again.

What about the latency introduced by satellite? While all satellite links are subject to the laws of physics, which necessarily introduce about ½ second of delay for a round-trip satellite transmission, **iDirect's platform optimizes the traffic so that the delay is acceptable even for latency-sensitive applications like VoIP.** The company says it demonstrates live VoIP connections at

industry events, surprising many patrons with the terrestrial-like voice quality. Optimization relies on the numerous traffic processing capabilities – including Quality of Service (QoS), Committed Information Rate (CIR), Segmentation and Reassembly (SAR) – that are built into the real-time traffic management tool kit. These capabilities compensate for and help overcome the satellite delay.

The company's management platforms, iVantage along with SatManage, provide visibility and control over the network. The high-functionality web-based platform monitors network performance, analyzing and reporting performance and SLAs. For enterprises and CSPs, the open platform integrates with existing network management tools, including fault reporting and trouble ticketing. Alternatively, the platform can replace existing network management tools: SatManage is fully capable of doing fault reporting and troubleshooting for the satellite network as well as for the terrestrial network. The simple user interface requires limited training or support.

Enterprises and CSPs that use the iDirect system benefit from a streamlined, simpler network environment. By using the standard IP protocol, but also supporting protocols for security and routing, the satellite link integrates easily into the VPN, and can be managed like any other access link. Furthermore, users benefit from flexibility and network optimization, because traffic can be routed as needed over available bandwidth – during an outage or anytime. Finally, users benefit from an always-on network, in which outages do not mean a service interruption or noticeable degradation in service performance.

Stratecast The Last Word

Satellite technology has proven to be a solid and logical choice for business continuity planning. By augmenting terrestrial links with an alternative that offers diversity in route, access technology, and sometimes even carrier, satellite services provide a ubiquitous and affordable backup solution for remote locations.

For many enterprises, it's no longer enough to provide a back-up solution in the event of a network failure. Driven by a need for consistent, uninterrupted, high-performance access to a range of applications from every location, these enterprises are integrating satellite circuits into their IP-VPNs. These high-availability networks utilize Class of Service prioritizations and traffic shaping techniques to ensure that bandwidth is available to the applications that need them most.

Providers such as Spacenet, Hughes Networks, and iDirect have developed products and services that enable distributed enterprises with hundreds and thousands of branch locations to optimize their networks. Rather than just providing a secondary satellite link to remote locations, they offer tools and functionality that allow the enterprise to dynamically and seamlessly divert traffic among all access circuits. Furthermore, providers are outfitting their products with additional functionality to streamline the appliance footprint and simplify management; enhancements that are especially welcome to distributed enterprises, in which remote locations rarely have on-site technical staff.

Satellite circuits cannot duplicate wireline access performance metrics for latency. Nonetheless, providers have driven performance levels up to the point that for most business applications, the technology delivers acceptable enterprise-grade performance. We applaud providers' efforts to serve the distributed enterprise market with satellite-based tools and services that allow them to conduct business seamlessly, flexibly, and affordably via a high availability network.

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