



## Ensuring Business Continuity with Last-Mile Diversity and Redundancy

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In support of their business continuity plans, many mid-sized companies endeavor—as the proverb advises—to avoid putting all their eggs in one basket.

Understanding the critical role of last-mile connectivity and always-available Internet access for their operations, savvy firms utilize redundant wide area network (WAN) and Internet connections from multiple service providers to ensure network availability. Despite the good intentions, their Internet connectivity risks may still be in a single basket. That is because internet service providers (ISPs) and competitive local exchange carriers (CLECs) may operate using leased network infrastructure from the same incumbent local exchange carrier (ILEC).

### The Cost of Failure

Enterprise planning for business continuity and disaster recovery are closely linked. As the names imply, the goal of business continuity is to prevent interruptions to operations, while disaster recovery is aimed at restoring operations following an ordinary or catastrophic disruption. Redundant facilities-based Internet connections are an essential support for both.

Businesses in Silicon Valley were reminded about the importance of network redundancy during an unexpected regional infrastructure disruption. Early on a Thursday morning, vandals cut ten fiber-optic cables in San Jose, Calif. While most of the fiber lines were owned by AT&T, numerous service providers were impacted, including Verizon and Sprint. More than 50,000 business and residential customers lost service, and mobile services from multiple carriers were disrupted as connections to cell phone towers failed. Following the network failure, doctors could not access electronic medical records, 911 calling was interrupted for first responders, ATMs were unavailable for banking services and businesses could not process customer credit card orders or payments.<sup>1</sup>

When Hurricane Sandy roared ashore on an October day in New Jersey, landline and mobile communications services throughout the Northeastern U.S. were severely disrupted. Even those carriers that were “too big to fail” did. As a result, many customers on Wall Street and other Big Apple business districts lost Internet connectivity.<sup>2</sup>

Research finds that network failures are surprisingly common and costly. In a 2015 survey more than one in three businesses reported experiencing at least one outage severe enough to require disaster recovery. Of those who suffered an outage, more than four in ten had multiple incidents in the past five years. Companies reported the leading causes of incidents to be hardware failure, environmental disasters, power outages, human error and software failure.<sup>3</sup>

In addition to catastrophic outages, network availability can be compromised by congestion, degraded performance and security breaches. With these types of impediments factored in, more than eight in ten companies report that business-critical applications are adversely impacted either occasionally or frequently by WAN availability challenges.<sup>4</sup> Not surprisingly, when asked about their biggest WAN concern, nearly half of IT professionals cited availability in a 2014 *InformationWeek* survey.<sup>5</sup>

Whatever the cause, when the flow of data is interrupted, so is business. In a survey of IT professionals, 82 percent said their companies lose revenue when

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“CLECs and ISPs are the new middlemen between the customer and the local exchange carrier.”

their network goes down—an average of \$140,000 per incident. Outages can have a high career cost too, as an IT employee is fired by one in five companies following a network downtime incident.<sup>6</sup>

### CLEC Reality Check

In larger U.S. cities businesses may have a choice among several Internet access and network service providers. The menu typically includes the ILEC, CLECs, ISPs and cable company. CLECs can often afford to build facilities to reach business customers in densely populated commercial districts and office parks. In other cases, CLECs and ILECs utilize the same local and regional physical network infrastructure. A brief history lesson will help explain why.

The original Bell telephone system operated by AT&T enjoyed a monopoly on local and long-distance telecommunications services in the U.S. for more than a century. In 1984 a groundbreaking court ruling split AT&T into separate local and long-distance companies, creating a gap for alternative providers to enter the telecom marketplace. However, the high cost of constructing local access networks separate from the ILEC proved to be a major obstacle for many upstart competitors. CLECs could typically only justify constructing their own facilities in highly concentrated business districts.

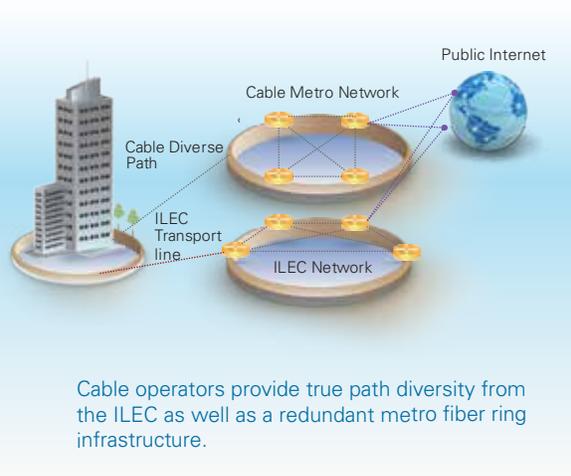
Congress and the FCC worked to address the problem through the Telecommunications Act of 1996, which required ILECs to sell unbundled network elements (UNEs) to competitors on a wholesale basis. This legislation enabled competitors to enter a market without having to construct their own facilities. The breakthrough offered more businesses a choice for their communications needs, applying pressure on the ILECs for better pricing and service.

The downside is that, when it comes to local network infrastructure, some CLECs and ISPs started to serve merely as an intermediary between the customer and the ILEC. In this situation, the competitor’s ability to innovate on pricing is limited by the network fees charged by the ILEC. Additionally, the ability of CLECs and ISPs to provision, monitor and repair services may be dependent on ILEC assistance. When the ILEC network fails, so can the services of alternative providers utilizing the same physical infrastructure. Through network unbundling and resale arrangements, not only do these CLECs and ISPs use ILEC lines to offer service, they may also use ILEC central-office equipment to deliver broadband Internet access over local copper loops. Where else can businesses look for facilities-based redundancy?

### Calling on Cable

Cable’s infrastructure is physically separate from the telephone company networks at the local, last mile, metro and regional levels, enabling genuine network redundancy and diversity, as illustrated in Figure 1. Cable operators have built extensive hybrid fiber and coax networks to deliver video, Internet and telephone services. By leveraging this vast infrastructure footprint, cable operators are able to provide communications services to business of all sizes. Highlighting the widespread adoption of cable provider solutions, researchers estimate annual business service revenue for U.S. cable operators now exceeds \$10 billion.<sup>7</sup> Their networks include high-capacity metro fiber rings, plus fiber access networks with deep reach into commercial areas, retail districts and residential neighborhoods.

Figure 1  
Last-Mile Diversity with Cable



Cable operators provide true path diversity from the ILEC as well as a redundant metro fiber ring infrastructure.

Source: Spectrum Enterprise

Depending on the location and business needs, fiber or coax connections are available to the customer premise.

Additionally, by owning and operating their networks and construction teams, cable operators may more quickly provision and better monitor services than CLECs or ISPs that merely resell ILEC capacity. Through the broad reach of their networks, cable operators can also serve a wide range of locations, from office parks and business centers to small office, branch office, retail, medical and municipal buildings. By comparison, reseller ISPs and CLECs are dependent on a competitor to install and provision services. This means they operate on ILEC schedules, rather than their own, and their network footprint is limited to the ILEC's.

Network availability is essential for Dallas-based Stealth Monitoring. This family-owned business provides remote video surveillance services to prevent and deter crime for hundreds of business customers. Real-time video streams flow into Stealth Monitoring's operations center from more than 6,000 security cameras across North America. Having a "very reliable Internet connection is critical to our success," explains company president David Charney. "It's mission critical for us to be able to keep that uptime and provide information in real time." Stealth Monitoring has partnered with Time Warner Cable Business Class (TWCBC is now Spectrum Enterprise) since 2011, and today relies on a 1-Gbps Internet connection with diverse uplinks and fiber connections into their data center. If a catastrophic event takes one path down, real-time video surveillance can continue through the other fiber link.

## Can You Say SLA?

To enhance the resiliency and redundancy of their network connections—and to hedge against the cost of losses from connectivity interruptions—many businesses enter into a service level agreement (SLA) with their network and ISPs. These agreements set performance benchmarks for service reliability and, should an unplanned outage occur, responsiveness for repair and restoration.

Performance characteristics for an SLA may include total uptime for the connection, as well as measured bandwidth and latency between defined IP access points. The availability of essential IP infrastructure, such as domain name servers (DNS) and dynamic host configuration protocol (DHCP) servers, may also be specified. Should a problem arise, response and repair times are defined in the SLA, along with penalties and compensation for noncompliance.

It is important to understand that SLAs supplement, rather than replace, strategies for facilities-based IP access redundancy and resiliency in business continuity plans—particularly since SLAs typically exclude catastrophic interruptions, such as those caused by natural disasters or acts of war.

## Managed Router Services

After installing diverse or redundant connections for IP access, businesses need a method to switch from one network route to the other should a service interruption occur. Multihoming provides this automatic failover function among Internet connections as well as other benefits. A multihoming approach frequently employed is Border Gateway Protocol (BGP). A common Internet routing protocol, BGP supports redundant routes for traffic flows to and from a business location. The challenge is that the effective use of BGP requires close technical collaboration with competing ISPs, as well as internal

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“Managed Internet router services can deliver up to 84 percent lower total cost of ownership.”

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IT staff or consultants with the expertise to handle complex router configurations.

To navigate such challenging terrain, IT teams are increasingly turning to managed router service solutions. The approach enables companies to offload support requirements from limited internal IT staff and gain best-in-class expertise to cost-effectively drive network performance, security and availability. Managed router service providers, including Spectrum Enterprise, can offer turnkey provisioning, configuration, change management, monitoring and security solutions, as well as 24/7/365 support.

An analysis by ACG Research that included two use cases found that, over a three-year period, a managed router service can deliver up to 84 percent lower total cost of ownership (TCO) compared to an internally managed approach. This encompasses both capital and operating expense reductions—including soft or hard dollar savings associated with eliminating IT staff or contractor hours for network setup and day-to-day operations.<sup>8</sup>

### Getting Back Up

Today’s IT departments are tasked with processing, analyzing and providing continuous access to essential business data. Compounding the challenge, IT professionals project that the average amount of data managed within their organization is expected to increase by 76 percent within the next 18 months.<sup>9</sup> Not surprisingly, data storage and backup solutions are at the heart of most business continuity and disaster recovery plans, providing a pathway to get back up to speed following an outage involving data loss.



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Historically, critical enterprise data has been backed up on drives and discs and physically transported to alternate locations for safe storage. Today, however, 94 percent of U.S. businesses report they are backing up at least some data to the cloud.<sup>10</sup> Regularly scheduled backups are performed automatically to remote servers through a company’s secure Internet connection. However, should a data loss occur in a disaster scenario, businesses must be able to connect to the Internet to remotely access and download their backed-up data. Therefore, the availability of IP network access is essential for regular cloud data backup as well as retrieval following a disaster.

Some service providers integrate cloud storage and backup offerings with access solutions. For example, Spectrum Enterprise offers facilities-based Internet access and network services with a diverse path from the ILEC, as well as cloud services for businesses of all sizes in collaboration with NaviSite Inc., a division of Charter Communications.

Companies can take their business continuity and disaster recovery strategies further with remote access solutions. After a disaster, buildings and facilities may be damaged or unavailable, sometimes for extended periods of time. Thus, employees must be able to work remotely for business operations to continue. Since working from home is often the optimal solution, a service provider that can provision facilities-based broadband Internet connections to both business and residential locations is an attractive solution. Many cable operators offer teleworker access with centralized administration, billing and support for residential broadband service.

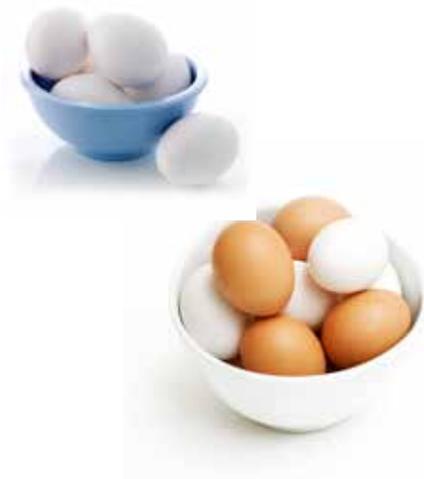
## Taking a SIP

A 2014 survey found that seven out of ten businesses have deployed voice over IP (VoIP) to reduce costs and enhance features.<sup>11</sup> Likewise, 70 percent of businesses currently use or plan to deploy Unified Communications (UC) solutions that integrate VoIP with text messaging, voicemail, fax and email delivery.<sup>12</sup> Both VoIP and UC rely on Session Initiation Protocol (SIP), a signaling communications protocol for IP networks. Not surprisingly, businesses are increasingly choosing SIP Trunking to connect to carrier networks.<sup>13</sup>

In addition to delivering cost-savings, scalability advantages and converged networking opportunities, SIP Trunking offers enhanced business continuity and disaster recovery capabilities. For example, SIP Trunking can be configured to automatically route calls to another telephone number or trunk group during a connection failure and, following restoration, return call traffic to the primary destination. Similarly, SIP Trunking overflow solutions automatically reroute inbound calls to a designated phone number when all provisioned call paths are in use.

## Deploying Different Baskets

Last-mile diversity and Internet access redundancy are essential to ensuring business continuity in today's networked economy. When selecting service providers, choose reliable and diverse network solutions that can be efficiently configured to support your business continuity needs. Carefully investigate the network infrastructure of prospective providers to ensure they use different facilities, reducing risk from a single point of failure. Find out if they can rapidly scale capacity to deliver extra bandwidth when it is needed most. And, consider a provider that can deliver cloud-based backup, storage, alternate site support and SIP Trunking. This way you can be sure your eggs are in different baskets.



## About the Author

Michael Harris is principal consultant at Phoenix, Arizona-based Kinetic Strategies, Inc. Applying more than 15 years of experience as a strategist, research analyst and journalist, Michael consults with select clients in the networking, Internet and telecommunications industries.

## About Spectrum Enterprise

Spectrum Enterprise, a division of Charter Communications, is a national provider of scalable, fiber-based technology solutions serving many of America's largest businesses and communications service providers. The broad Spectrum Enterprise portfolio includes Internet access, Ethernet access and networks, Voice and TV solutions extending to Managed IT solutions, including Application, Cloud Infrastructure and Managed Hosting Services offered by its affiliate, NaviSite. Our industry-leading team of experts works closely with clients to achieve greater business success by providing these right fit solutions designed to meet their evolving needs.

**For more information, visit <http://enterprise.spectrum.com>.**

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<sup>1</sup>"Sabotage attacks knock out phone service," San Francisco Chronicle, April 10, 2009

<sup>2</sup>Hurricane Sandy disrupts Northeast US telecom networks," Reuters, October 30, 2012

<sup>3</sup>Evolve IP 2015 Disaster Recovery & Business Continuity Survey

<sup>4</sup>The 2014 State of the WAN Report, Ashton, Metzler & Associates

<sup>5</sup>InformationWeek 2014 Next-Generation WAN Survey

<sup>6</sup>Avaya Network Downtime Survey, March 2014

<sup>7</sup>"US Cable Nears \$10B in Business Service Revenues," Light Reading, December 2, 2014

<sup>8</sup>"Managed Network Services: The TCO Payoff," ACG Research, 2014

<sup>9</sup>IDG, Enterprise Big Data Study, 2014

<sup>10</sup>IDC Disaster Recovery Survey, May 2014

<sup>11</sup>"Seventh Annual State of the Network Global Study" Network Instruments, May 2014

<sup>12</sup>InformationWeek 2014 Unified Communications Survey

<sup>13</sup>"SIP Trunking and SBC Strategies: North American Enterprise Survey," Infonetix Research, March 2013