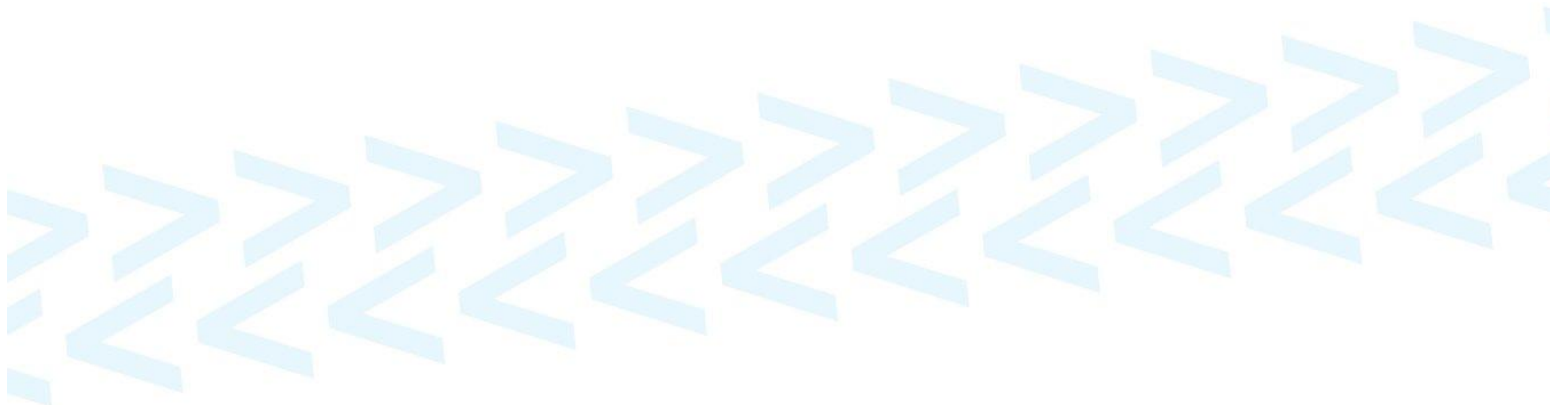




BridgeWave
COMMUNICATIONS

Leased-Line Replacement

Utilising gigabit wireless links to provide fibre-like performance at significant savings compared to leased lines.



Introduction

When considering high-bandwidth connections between locations, the thinking used to be that the only way to get service was to pick up the phone, call the service provider and order a circuit. As long as the start-up costs and monthly recurring charges were within the IT budget, and the IT manager and business administrators were content with the level of service provided, writing a monthly cheque to the service provider was not a problem. If troubles were encountered with the service, a phone call to the provider was all that was necessary to resolve the problem.

Businesses relying on leased lines find a wide range of performance options tailored to suit their needs, from E1 (2 Mbps), multiple E1s, 10Mb Ethernet, up to E3 (34 Mbps), STM-1 (155 Mbps), and even gigabit and multi-gigabit data rates. A review of BT's standard business pricing reveals that, depending on the length of contract, these services run on the order of over £500 per month for a single E1 connection, up to over £2,000 per month for gigabit fibre service. Establishing leased line service often entails start-up fees, in addition to the monthly OPEX charges, that can range from a few hundred pounds to hundreds of thousands of pounds when new fibre circuits must be constructed. If the installation requires special considerations, additional cost and time to provision the circuits are usually added to the above pricing. In most cases, the commitment to utilise leased circuits requires contract terms of anywhere between three and five years, further adding to the expenditure.



Due to competitive market pressures, businesses are increasingly looking to IT departments to improve productivity and control costs. This paper examines the benefits of replacing leased line circuits with affordable gigabit Ethernet wireless links.

The Economics of Leased Line Services

In this section we'll consider three scenarios that involve interconnecting buildings located within a few miles of each other.

In the first scenario, a growing small business needs room to house its expanding workforce and finds a suitable building one mile away from the main office. The IT manager is tasked to connect the two buildings with voice and data being the primary applications. Since a 2 Mbps connection does not offer enough capacity to handle the need, a 10 Mbps Ethernet service is ordered from the service provider at a monthly rate of £520. It also requires an initial connection fee of £3,500. In order to secure the best rate, a thirty-six month commitment is required. This amounts to £22,130 for the three year lease to provide a 10 Mbps connection between the company headquarters and the satellite office.

In the second scenario, a 100 Mbps leased line is used to connect a school's LAN to the regional office backbone two miles away. Services such as voice, data, Internet access, and classroom video are transported over the circuit. There is a start-up connection fee of £6,600 and the recurring monthly charges of £635 for this connection are based on a thirty-six

month contract. When one adds up the start-up and recurring costs for this circuit, the school will pay just under £30,000 for this three year commitment.

In the third scenario, a gigabit leased line is used to provide a high speed connection from an outpatient clinic to a hospital three miles away, and transport medical image files, patient records, pharmacy information, as well as providing Internet/intranet access and VoIP. As it is unlikely the hospital will move in the next five years, the administrator signs a long term contract with the service provider to get the best possible per-month price on the leased line. For a gigabit fibre-based circuit, the rates are around £1,700 per month, and do not include start-up connection costs of £12,480. The hospital will pay £113,000 over the life of the contract for this high-speed connection.

Replacing Wired Services with High Capacity Wireless Links

Microwave radio systems have been used for decades to provide highly reliable, trouble-free transmission of voice, data, and video, for service providers who depend on them to generate revenues, or for businesses who need backhaul for essential company network services. Because of their limited bandwidth, transmission rates top out at a few hundred megabits per second. With the opening of millimetre wave spectrum in the 80 GHz bands, full gigabit (GigE) wireless transmission has become an affordable alternative to high capacity leased circuits.

For businesses, there are many advantages of utilising high-capacity gigabit wireless links to replace fibre or aging copper based circuits, both in terms of cost and of network performance. On the cost side, GigE wireless links provide a rapid return-on-investment, relative to the costs of leasing high-speed circuits. In the third scenario described above, leased line OPEX costs for a 1000Mbps fibre service were shown in the order of £1,683 per month; a rate of £20,200 per year. By comparison, a GigE wireless link can provide equivalent fibre-like speeds for a one-time expenditure comparable to the annual cost of leasing fibre-based service. In many cases when new fibre runs must be constructed, the initial installation costs for fibre services actually exceed the cost of installing a GigE wireless system.



As the life cycle costs are charted, it is evident that the financial advantage of the small initial CAPEX investment in GigE wireless systems can be realised in a relatively short period of time compared to the recurring OPEX charges for leased lines. In many cases, the breakeven point is measured in months, not years.

Chart 1 - Leased Line vs. GigE Wireless Life Cycle Costs

The Economics of Replacing Leased Lines with High Capacity Wireless Links

Consider the three earlier scenarios. Let's examine each one and show how high-capacity wireless links provide significant savings. It should be noted that the leased line prices shown herein are based on British Telecom's standard business pricing for Ethernet Extension Services, and utilising BT as the Internet Service Provider. These prices reflect a three year commitment.

Scenario #1: It was shown that 10 Mbps service would cost the business a total of £22,130 for the three year commitment. Replacing this leased circuit with a 100 Mbps 80 GHz link would not only save 7% over the leased costs, but also yield 10x faster speeds between locations. The 80 GHz, 100 Mbps link provides a future-proof solution that can be upgraded to a full gigabit as capacity needs grow.



	80 GHz FE Wireless	Leased 10 Mbps
Monthly Leased Circuit Fee	£ 0	£ 517.50
Number of Months	N/A	36
Connection Charge	£ 0	£3,500
80 GHz FE80U radios	£ 17,933	£ 0
Installation Services	£ 2,500	£ 0
80 GHz Licence	£150	£ 0
Total	£ 20,583	£ 22,130
Throughput	100 Mbps	10 Mbps

Table 1- Cost Benefits of Wireless Link in Scenario #1



Scenario #2: The school is poised to pay almost £30,000 over the three year term of the contract; however an alternative would be to connect the school to the regional office using a gigabit Ethernet 80 GHz wireless link. Replacing this 100 Mbps leased circuit would save almost 20% over the life-cycle cost of leasing the line, with the added benefit of a ten times improvement in connection speed with this full-rate gigabit wireless link.

	80 GHz GE Wireless	Leased 100Mbps
Monthly Leased Circuit Fee	£ 0	£ 632.50
Number of Months	N/A	36
Connection Charge	£ 0	£6,600
80 GHz GE80 radios	£ 21267	£ 0
Installation Services	£ 2,500	£ 0
80 GHz Licence	£ 150	£ 0
Total	£ 23,917	£ 29,370
Throughput	1000 Mbps	100 Mbps

Table 2 - Cost Benefits of Wireless Link in Scenario #2

Scenario #3: Leasing a gigabit fibre service between the hospital and medical office building will cost £113,000 over the five year term of the contract. Replacing this leased circuit with an 80 GHz gigabit wireless link would save 74% over the life-cycle cost of leasing the line with an equivalent gigabit speed and with improved latency between the buildings.



	80 GHz AR Wireless	Leased GigE
Monthly Leased Circuit Fee	£ 0	£1,683
Number of Months	N/A	60
Connection Charge	£ 0	£ 12,480
80 GHz AR80X radios	£ 26,600	£ 0
Installation Services	£ 2,500	£ 0
80 GHz Licence	£ 250	£ 0
Total	£ 29,350	£ 113,480
Throughput	1000 Mbps	1000 Mbps

Table 3 - Cost Benefits of Wireless Links in Scenario #3

Server Centralisation Utilizing Gigabit Wireless Links

Often the greatest savings realized by deploying gigabit wireless links are not in the direct savings from eliminating monthly leased-line charges, but in the indirect savings resulting from centralising IT facilities and staff. Rather than tying together remote-site server facilities using lower-speed leased lines, gigabit wireless links provide the performance needed to centralise servers, whilst providing remote users with server access performance equal to those of local users. This consolidation eliminates duplicated server hardware, software licenses, backup systems and server room costs at multiple locations, which can result in significant savings. Also, centralising server gear greatly simplifies network administration and server management, improving service reliability and reducing the costs of deploying new applications and server capacity.

Other Tangible Benefits to Replacing Leased Line Services with High Capacity Wireless Links

In addition to the significant savings realised by utilising high capacity gigabit wireless links, businesses can future-proof their networks, and provide ample capacity as new applications need to be transported over the link or the workforce continues to expand. Transmission rates provided by these gigabit wireless links mean that the backbone will remain free of bottlenecks as application capacity needs grow.

In regards to performance, these millimetre wave GigE wireless links provide full-rate non-blocked gigabit throughput speeds with latency comparable to that of an Ethernet switch, yielding a fibre-equivalent backbone link that is perfect for transporting real-time applications such as video and VoIP. With GigE wireless links, there are no protocol conversions to make (e.g. SDH/ATM-to-IP), no expensive edge devices to purchase, configure and maintain; GigE wireless links provide the simplicity of native IP interfaces, matching the interfaces used by server and user systems.

Even when the costs of leased line services are deemed to be acceptable, often the time to provision these services can be prohibitive. High-speed wireless links can be commissioned in days, allowing the organisation to react quickly to changes in the business environment, whilst new fibre installations are often burdened with construction delays of up to nine months.

Whilst it can be comforting to simply call someone else (e.g. a service provider) to address network issues or outages, many IT organisations prefer to have local control over their own network to ensure that any network issue troubleshooting or resolution actions can be undertaken without being dependent on outside parties. Gigabit wireless links include extensive management facilities that are consistent with those found on other Ethernet switching equipment. This allows network administrators to easily integrate the links into their existing network management systems without the complexity of dealing with proprietary management solutions. This gives IT managers' complete visibility into their network, with the tools necessary to quickly diagnose issues without waiting for a service provider to respond to a trouble ticket.

Summary

Gigabit wireless links provide a direct substitution for leased services, with the performance, reliability and security of fibre. These links allow IT departments to simultaneously improve user services whilst reducing communications expenses. The direct savings over recurring leased-line costs are compounded by the indirect savings realised through IT facility centralisation and simplified network management, as well as providing the peace-of-mind of complete network visibility and control.

About BridgeWave Communications

Founded in 1999, BridgeWave Communications is the leading supplier of outdoor Gigabit wireless connectivity solutions. The company's exclusive AdaptRate™ and AdaptPath™ technologies combined with its advanced Forward Error Correction capability deliver the highest availability at the longest distances for full-rate gigabit links. BridgeWave's point-to-point, wireless solutions are widely deployed in mainstream enterprise and service provider network applications and are poised to play a key role in the migration to 4G mobile network backhaul. With the largest installed base of GigE radios worldwide, BridgeWave delivers the highest levels of product quality and reliability. For more information, visit www.bridgewave.com.



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