Livingston Telephone:
Making the Video Triple-Play

Traditional telephone companies are seeing a dramatic erosion in revenues from fixed-line voice services due to increased competition from new players such as mobile phone operators and cable TV companies. Changing market dynamics have opened up huge growth opportunities for telephone companies. The telecommunication deregulation has changed the competitive landscape by allowing companies to compete freely for new customers and revenues. And advances in technologies and standards have made delivery of many new services over the existing copper loop a viable economic reality. Video-over-DSL solutions can deliver new revenue-generating services such as Digital TV (DTV), Video-on-Demand, Pay-per-View Sports, Interactive DTV, and gaming over the ubiquitous telephone connection that exists in almost every consumer household. Video-over-DSL gives incumbent telephone operators their own "triple-play" to combat fierce competition from the cable TV (CATV) and Direct Broadcast Satellite (DBS) operators.

Livingston Telephone is an excellent example of a forward-thinking company delivering the triple-play of voice, video, and data over the existing copper loop. The company is headquartered in Livingston, Texas and has a customer base of nearly 15,000 subscribers.

> "Our biggest asset is our customers. We needed a way to deliver more services to them over our existing infrastructure."
>
> ***Curt Walzel***
> *CEO, Livingston Telephone*

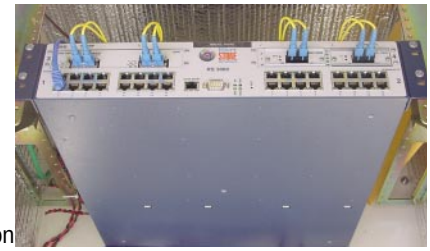
Livingston is a full-service telephone company offering voice and data services such as dial tone voice services, TDM T1/T3, Optical SONET OC-3/12, Internet dial-up, and high-speed DSL. They also provide ISDN, cellular phone service as part of Verizon Wireless, security alarm systems via Livingston Security, and telecom equipment parts, maintenance and service through their Livingston Telecom store.

Livingston Telephone has its own backbone fiber optic network, which forms the underlying basis for the services that the company offers. Livingston also owns the majority of last-mile copper loops in its service area.

Livingston's Challenge

Livingston's challenge was to maximize the profitability of a local phone company, which until now relied solely on traditional voice, traditional private line, Internet, and some cellular. Although cable competition for voice services has not yet been a major issue, it is destined to become one eventually. In addition to direct cable TV, direct satellite broadcast is the other major provider of CATV in the Livingston area.

With their strong foothold as the incumbent phone company, Livingston soon realized that a service such as video TV services delivered over DSL could bring in much needed revenues for them in a very short period. However, Livingston needed a turnkey solution that could be rolled out in a short period of time so that a favorable time-to-revenue could be realized. Livingston turned to industry leaders such as Riverstone, Myrio, Minerva Networks, and AFC for a turnkey Video-over-DSL solution



RS 3000 providing video streaming service

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Riverstone's Solution

Riverstone Networks partnered with best-of-breed video solution providers such as Minerva Networks, Myrio, and AFC to provide a complete end-to-end solution. The overall network is shown in Figure 1.

> "With this solution we can compete head on with CATV and satellite broadcasters. There is no need for digging cables or installing dishes so our customers can get their service fast."
>
> ***Curt Walzel***
> *CEO, Livingston Telephone*

The video head-end at Livingston's central office is the source for all video content. It includes the broadcast feeds either from direct satellite broadcast, local broadcast studios, local advertisement insertion, video-on-demand servers, etc. Once the content has been encoded in data packets, it is assigned a channel identifier and passed as an IP packet to the Riverstone router for broadcast to the channel groups subscribing to each video stream. Each channel group is mapped to an ATM Virtual Circuit (VC) and passed to the Riverstone router for forwarding over the backbone network to the appropriate local exchanges. The backbone network is a fiber ring constructed using long-haul Gigabit Ethernet. This gives Livingston Telephone a capacity of 1 Gbps capacity over links up to 70 kilometers long. At the local exchanges the video channels are distributed (using IGMP multicast) by Riverstone routers to the Digital Subscriber Link Access Multiplexor (DSLAM) for transmission over the copper telephone line to the individual subscriber homes. A subscriber can change and view a channel using the set-top box running Myrio's interactive client software.

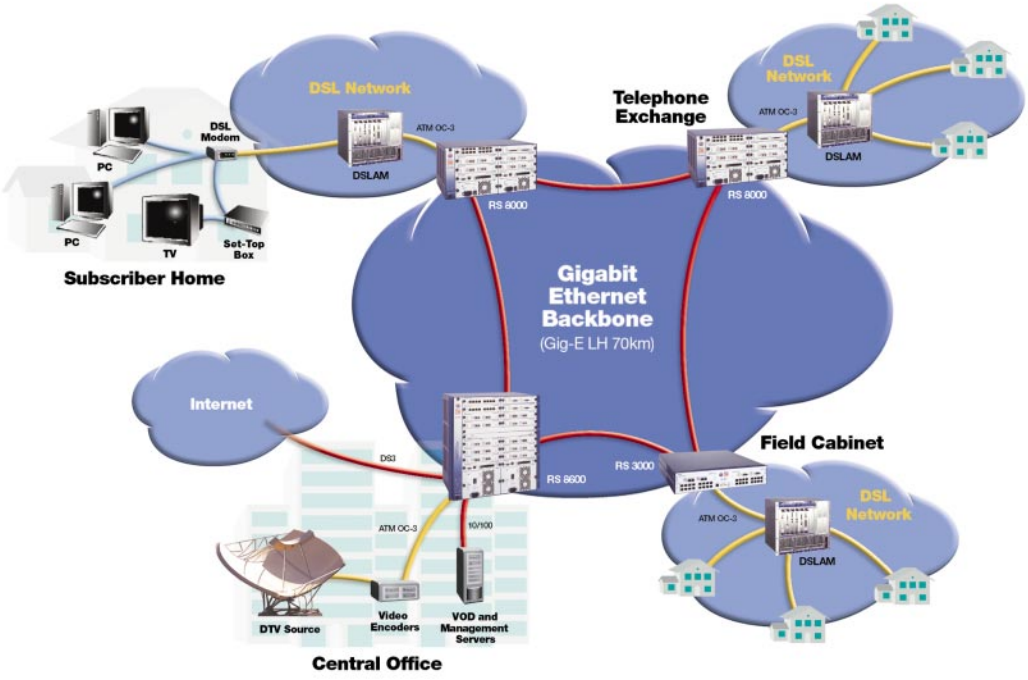

Figure 1. Network Architecture

River STONE NETWORKS™

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The Benefits of the Riverstone Solution

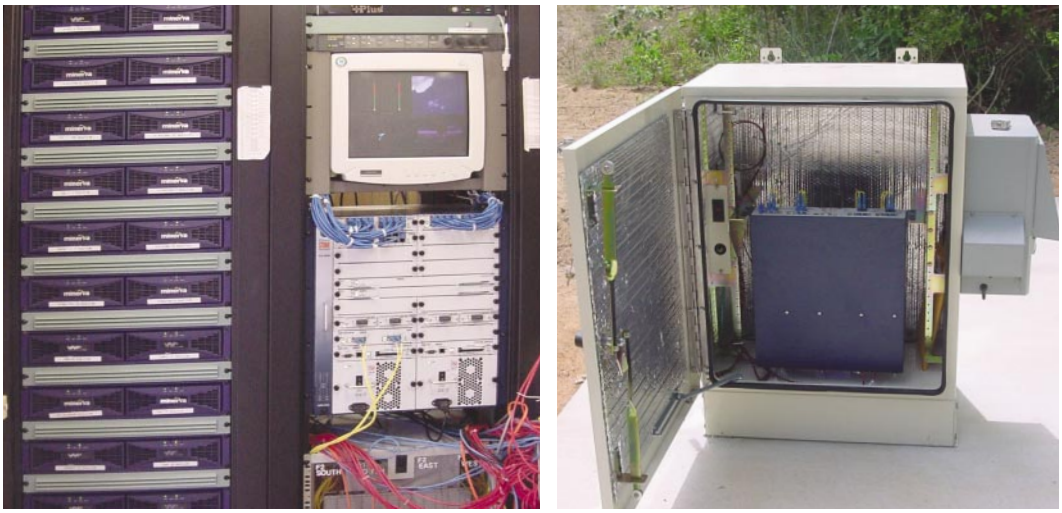
Livingston's analysis of its fiber backbone revealed that most of the capacity was already used up providing ATM and SONET links for Livingston's telephone and data services. The company had two options – either bury more fiber in the ground, or increase the existing capacity of the fiber network. By implementing Riverstone's Gigabit Ethernet backbone, Livingston was able to use existing fiber pairs to increase the capacity nearly tenfold. And by moving the bandwidth-intensive Internet and video broadcast to this Gigabit backbone, extra capacity was released in the existing ATM/SONET backbone. In fact, there is so much capacity available in the network today that Livingston is able to offer other local telephone operators high-speed access to its customers over its backbone network.

The most significant competitive advantage of this design is that it allows Livingston to operate as a cable TV provider without having to bury coaxial cable to all of the homes. They can now compete very effectively with cable TV companies operating in the area.

> "We looked at various broadcast routers and found Riverstone's solution was four times more cost-effective than the other solutions."
>
> ***Ted Summers***
> *CTO, Livingston Telephone*

For Livingston's telephone subscribers, the new DTV service is very attractive. Picture quality is excellent and they find channel changes are equivalent to CATV or DBS systems. More importantly, they are able to receive these services in remote rural areas without cable access. The video-on-demand services provide access to hundreds of movies held on the video servers at the Livingston headquarters. And best of all, they now have high-speed instant Internet access either through their TVs or PCs.

Overall, the service is a win-win for both Livingston and their subscribers. Livingston has unleashed the potential of its existing network and has added a much-needed revenue stream. And its subscribers now enjoy the benefits of a modern digital TV service plus Internet access in areas that previously had been digital deserts.



RS 8600 in the central office video head-end and RS 3000 in field cabinet installations

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Why Riverstone?

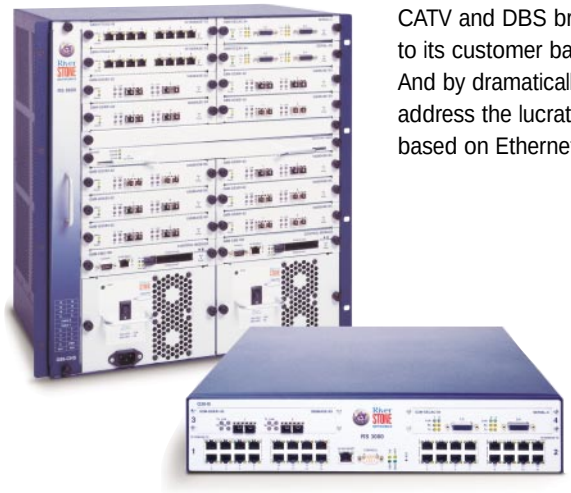
The overall project was designed and delivered by Myrio. Myrio is a leading provider of software and services that allow network operators to deliver next-generation, TV-based services and media over secure broadband networks. The project team evaluated several router vendors for the IP multicast portion of the network and found that Riverstone was at least four times more cost effective than other vendor solutions. In addition the flexibility of Riverstone's switching and routing architecture make the solution very scalable.

By making the backbone a flat Gigabit Ethernet network, the performance and manageability of the network is greatly enhanced. Traffic is segregated into Virtual LANs (VLANs) that can be mapped to any number of physical or logical interfaces on the edge of the network. This significantly reduces the overall number of pieces of equipment to manage and greatly increases the performance of the network.

On the performance side, Myrio evaluated different vendor solutions and found that with Riverstone's implementation of all the required multicast and forwarding features in hardware, the overall performance was much greater at a much lower cost. Other vendors implemented the multicast features in their software creating the potential for severe performance bottlenecks in the network.

What the Future Holds

Livingston has unleashed many possibilities for future revenue-generating services. By opening up a high-speed link to their subscribers through their telephone line, they can not only offer their own services but can also resell this capability to other local service providers in the area. They have provided a modern attractive service to delight their customers and have restricted the competition from CATV and DBS broadcasters. This has helped Livingston offer high-margin services to its customer base and at the same time successfully reduced customer attrition. And by dramatically increasing the bandwidth in their backbone, they will be able to address the lucrative business market and offer more scalable and flexible bandwidth based on Ethernet rather than traditional TDM services such as ISDN and T1.



RS 8600 and RS 3000

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