

with Kevin Daines

World Wide Packets: Soul of a First Mile Innovator

By Steven S. Ross ■ *Editor-in-Chief*

Kevin Daines, Chief Technical Officer at FTTH pioneer World Wide Packets, looks ahead to 2006 with optimism. But in an interview in early November, he admitted that WWP's revenue from business services will outpace revenue from FTTH deployments. Here's why, and here's why he's wildly optimistic overall.



BP: Can you describe WWP's business direction these days? The broadband systems continue, of course, but so does a major deal with Sprint and technology for metro Ethernet in general.

Daines: World Wide Packets continues to be a leader in the Ethernet access triple-play market, domestically and internationally. The residential, or triple-play, market continues to grow as more developers realize the value of providing the infrastructure as a differentiator for their properties. Municipalities also aid in this growth as the early municipal deployments prosper and federal rulings continue in their favor.

We are also seeing substantial demand for our technology in business services in addition to our strong municipal customer base. Over the next 18-24 months we anticipate more revenues from business services than from residential triple-play networks.

Carrier Ethernet is now synonymous with next-generation business services and is also key in delivering multiple residential services cost-effectively. More and more service providers are following British Telecom's lead by declaring definitive plans to move to more profitable packet-based networks. This bodes well for us and for the industry in general. World Wide Packets is well positioned with a proven solution to address Carrier Ethernet access and metro edge networks.

BP: When WWP got into the fiber systems business, there were no real competitors and only rudimentary standards.

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WWP built successful systems and helped grow the business for everyone. What are your strengths now in contrast to competitors?

Daines: World Wide Packets has definitely helped the overall market by helping our early adopter customers deploy, manage and operate successful triple-play Ethernet networks. This, in turn, has spurred significant business development and competitive activity both domestically and internationally.

World Wide Packets' leadership from voice and video experts complement our in-house switch/router expertise. This, along with more than five years of customer deployments, helps us stay ahead.

BP: Is there anything missing from IEEE standards that you'd like to add?

Daines: In general, the link-level building blocks are in place for access and metro Ethernet networks. World Wide Packets was instrumental in forming the IEEE 802.3ah Ethernet in the First Mile standards project. Through this effort, the industry now has interoperable Operations, Ad-

ministration and Maintenance (OAM) mechanisms. In addition, World Wide Packets championed single-strand point-to-point 100 Mbps and 1 Gbps optical interfaces, lowering the cost of plant installation. We have also helped push for extended temperature optics for those links that terminate in non-controlled environments.

Our attention has turned to OAM on virtual links or paths. A current project called IEEE 802.1ag Connectivity Fault Management is tackling that problem now. This effort will produce MAC ping and traceroute functionality along with the ability to perform much needed performance monitoring capabilities.

BP: Some of your early systems are expanding, and WWP is handling the expansions. What new technologies are you bringing in for that?

Daines: We are pleased at the success of these early systems. We have several customer networks with more than 1,000 installed devices, some with over 10,000, which is an impressive base for one vendor to configure and manage remotely. As these customers continue to grow they are realizing the benefits of deploying a purpose-built solution. Many of our features gain importance as the systems grow. One example is our multicast implementation, which allows the available bandwidth to be used in the most cost effective manner.

Also, as more customers use our systems they begin to see the future of unlimited IP services delivered over to their homes, which leads to customization of services over our high-bandwidth network.

BP: Would you comment on GePON vs GPON, active versus PON?

Daines: GePON and GPON are both TDM-PONs. They are based on the first passive optical network concept, conceived in the late 80s. They are both shared bandwidth point to multi-point optical systems. There were several drivers for this architecture in the late 80s, such as the cost of fiber and active opto-electronics, which have largely lost their relevance today.

The basic purpose of TDM PON protocols is to manage traffic on a point to multi-point optical system. Both GePON and GPON provide this function but the encapsulations and features are different. They are not interoperable. GePON (Gigabit Ethernet PON), which uses Ethernet

encapsulation, is actually not interoperable with standard Ethernet devices because of the extra layer of processing required for the point to multi-point operation.

The term "Active" Ethernet is somewhat of a misnomer as Ethernet can be deployed in both passive and active topologies. At the current cost of fiber, Ethernet can be economically deployed without intervening "active" remote terminals (RT) for fairly long distances.

In addition, the cost trends of WDM (Wavelength Division Multiplexing) devices are making it possible to economically deploy shared fiber approaches (that are similar to a TDM-PON physical layer but preserving the benefits of Ethernet) if there is a preference for passive remote terminals.

The solution that is best (and lowest cost) from among passive and active configurations will depend on customer density, distance from the Central Office, and other parameters. For example, in high customer density applications, such as an MDU or MTU, an active remote in the basement would be the most cost-effective solution.

Ethernet has significant and inherent advantages over TDM-PONs. Its baseline bandwidth is much higher, its ability to scale in order to meet increased customer bandwidth is inconceivable with a TDM-PON, and it has consistently delivered new levels of performance at cost points that no other networking technology has been able to deliver.

BP: What's in store for next year, for WWP and for the industry in terms of cost per home passed, cost per home hooked up, greenfield, and brownfield situations?

Daines: We expect to be part of an international upswing in FTTH. While FTTH continues to gain momentum, customers are becoming more sophisticated, residents are becoming more demanding and new services are being developed that continue to drive bandwidth requirements. In the long run, FTTH is the only technology that can deliver.

As FTTH deployments increase worldwide, the costs are continually decreasing. Fiber is becoming very cost competitive when compared to copper, especially in greenfield applications. In addition, Ethernet continues to be the most widely deployed technology, driving those costs down quickly as well.

BP: Any specific predictions?

Daines: That depends on the customer. Municipalities, carriers, and developers all have their own business models and particular system needs – all of which contribute to cost, timeline, ROI targets, and such.

BP: Is there any particular kind of customer that you crave? The greenfield builds are moving into smaller developments, we notice, and the municipal-wide nets are getting bigger.

Daines: Perhaps it goes without saying, but well-funded customers with solid business plans are ideal! The last five years has been extremely difficult for the market, both component and equipment vendors as well as aspiring service providers. Many have failed.

What seems clear is that emerging from the telecom winter are more rational, reasonable expectations for installing and delivering services to a variety of customers. In addition, technology developments have continued to lower the cost of key components. The state of the industry is healthier in terms of the economics of delivering cost-effective solutions. Since capital isn't "free" anymore, this is a good thing.

BP: Is there any part of the country or the world that's particularly hot in your business plans?

Daines: I wouldn't say one region is necessarily hotter than another. We see substantial activity in greenfield opportunities. Because of the telecom winter there has also been a pent-up demand; carriers and service providers are increasing their network investments. Increasingly, MSO activity is heating up and we have active efforts in that segment of the market. World Wide Packets is poised to benefit as the overall market rises, especially because our product line allows carriers to deploy one network for both residential and business services.

BP: Do you have any new technology partners? We're fascinated at the growth in MSAPs at the edge of the network, for instance, and possibilities for WiMAX, especially in mobile applications. We're also seeing new interest in telemedicine by property developers (looking at the aging population).

Daines: World Wide Packets is working with three tier-one equipment vendors to provide a more comprehensive set of solutions. These partners bring technology that comple-

ments our performance and cost-leading network layer two solution. In addition, their size attracts the larger deals that are beginning to develop at a rapid pace.

As for applications, telemedicine and e-government are driving new bandwidth requirements in several regions of the world. We see this gaining momentum rapidly and currently have several initiatives around these applications.

BP: Do you have any predictions for IPTV? For bandwidth requirements per household?

Daines: I believe video will be more ubiquitous than we can imagine now. It will pervade our homes and portable devices. We're seeing this already in the handheld video players. It will also emerge in premium business services to deliver world news and financial information, as well as video conferencing, growing into HD video conferencing. All of this equates to rapid bandwidth growth in access and metro networks.

Compression techniques will temper some of the bandwidth increases required due to high-definition. However, we're still talking about lots of simultaneous streams, both in real-time broadcast and replay from storage (pay-per-view). The trend these days is to have hard drives incorporated into set-top boxes. Other initiatives include all-in-one media gateway/entertainment devices running newer versions of Microsoft Windows.

Personally, I don't look forward to adding hard drives to media centers to hold more capacity. I believe remote virtual storage is more economical and viable for mass deployment. By registering the pay-per-view movies I order, I can then have near-instantaneous access and full pause, fast-forward and rewind capability if the bandwidth is sufficient.

With the cost of NAND and NOR "bubble" memories falling, I envision very cost-effective, quiet set-top boxes with no moving parts. They will have the capacity for a single full-length movie or sporting event. Thus, with remote virtual digital video recording capability, the overall experience is enhanced. This should translate for better sustainable revenue. I don't think we're too far away from media-less distribution of movies and albums. Robust, resilient high-bandwidth metro solutions will enable new markets and services. **BBP**

About the Author

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