DWDM: It's Not Just For Carriers Anymore

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A quick search of the telecom trade press suggests that dense wave division multiplexing (DWDM) is old hat. However, while DWDM in the carrier backbone may be passé, DWDM in a "private" network is hot. Here's a peek at what large enterprise customers are doing with it and what you should consider if DWDM is a possibility for your enterprise.

DWDM allows data transmissions to be multiplexed across a single optical fiber in native LAN protocols (e.g., Ethernet, Fibre Channel, ESCON, OC-x) over different wavelengths or "*lambdas*." For years, carriers have used DWDM in their backbone to increase bandwidth on existing facilities.

You may ask why enterprise user interest in DWDM has exploded over the past few years—particularly since 9/11. The reasons are many, but here are the two most often cited:

First, DWDM provides tremendous bandwidth capacities—an essential ingredient for data-intensive applications. Unlike big OC-x pipes for which the customer pays a fixed fee regardless of how much capacity is used, carriers typically don't require the customer to pay for "unlit" wavelengths on a DWDM ring until the enterprise needs them. And carriers can light wavelengths to add capacity much more quickly than they provision additional OC-x pipes.

Second, in the wake of 9/11, business continuity has become essential. Business continuity planning is necessary for the enterprise to avoid losses associated with downtime and, perhaps more immediately, to comply with recent governmental "suggestions" for certain industries, like the financial services industry, to locate primary and back-up datacenters 100 or more miles apart and to recover operations within several hours of a disaster.

If your company is preparing to walk the DWDM runway, here are half a dozen pointers that are intended to prevent you from tripping.

1.) Recognize that DWDM deals are different. DWDM rings are custom-designed for your company's particular needs. In many cases, this means a carrier will have to construct at least some facilities to reach a particular company location. These facilities may not exist prior to the deal and may or may not have been part of the carrier's business growth plans, especially if the location is not in a pre-existing business district.

DWDM rings are customized—not commodity—products

In virtually all cases, it means a carrier will purchase equipment (such as optical amplifiers, optical multiplexers and customer interface cards) to light wavelengths on your particular DWDM ring. In contrast, carriers don't need special equipment at your site to drop OC-x circuits in your telco closet or switched voice services into your PBX. In short, DWDM rings are specialized—not commodity—products.

2.) Get competitive bids, and get them well before your desired cut-over date. Construction takes time and can be costly. With a DWDM ring, the carrier is your general contractor, and you will want to compare bids in order to get the best quality and price. The general contractor must hire subcontractors and get their assurances of timely delivery, but may hesitate to hire these subs without a signed contract in hand.

Why do you care? The carrier will build time for contingencies into its promised delivery date. In my experience, it can take a carrier six or more months to install and test a DWDM ring—even one between existing business districts—if a customer has special design requirements (e.g., a minimum required separation of the eastern and western routes).

If you start the process early, this "cushion" shouldn't be too much of a burden. If you don't, carriers may be unwilling to meet your desired cut-over date or unwilling to back up their promises with things like financial penalties or workarounds (e.g., delivering half of the ring for testing while the other half is completed, or running two unprotected channels on the same route instead of one protected channel across both routes).

3.) Know the performance you need, test that the services perform, and demand assurances of ongoing performance. The high-capacity circuits on DWDM rings are most often used by enterprises to interface with key applications or databases. Find out how much tolerance each of those applications has for latency, bit errors and the like, and make sure the vendor can meet them. Test performance for yourself or monitor vendors' tests to ensure these requirements are met before you accept and start to pay for the ring and circuits. If there are performance problems, get a credit and, ultimately, a right to terminate the service without paying termination charges if the problems persist.

4.) Consider how you want to pay for capacity on the DWDM ring, and understand the consequences of your decision. Because of the specialized nature of the DWDM product and the upfront costs, carriers seek assurances that the sale will be profitable or, at least, break even. (Don't worry on their behalf; it will.) They tend to amortize the upfront costs over a fixed term (often five or more years) and then push customers to commit to purchase the ring capacity and some minimum set of "lit" wavelengths for a similar period. The enterprise will need to make this commitment while

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preserving flexibility to add or delete lit wavelengths over the term, or to substitute one protocol for another as their business needs change.

In my experience, carriers are willing to structure charges to accommodate a customer's wishes, but will do so in a way that recaptures the upfront costs. Carriers will provide different monthly recurring charges for circuits with different time commitments, with the charges for shorter time commitments being higher to reflect the shorter amortization schedule. If you take this path, make sure you get a range of choices for circuit term commitments (e.g., 12, 24, 36, 48 and 60 months) and insist that once the committed term is over and upfront costs are recovered, the ongoing monthly recurring charges for that circuit fall and no "early" termination charges apply.

5.) Set reasonable expectations on termination charges. With commodity telecom services, termination charges can be as low as 25 percent of the monthly charges (where there are separate contract terms for individual circuits) or of the total committed amount (where there are overall dollar commitments) regardless of when you terminate. Don't expect such terms in a DWDM deal.

Carriers will seek 100 percent of the monthly charges for all remaining months of the "committed" term of a DWDM contract. Customers with leverage (like those who have carriers competing head-to-head for the business) should be able to negotiate a termination charge that declines over the life of the contract, say from 100 percent to 35 percent, depending upon when termination occurs.

Even if the termination charges are reasonable, demand strong rights to terminate without paying them. For example, you should not pay if you terminate because the carrier fails to install the services in a timely fashion, if the ring is not properly configured and routed, or the services fail to perform.

6.) Understand the software and hardware issues arising from DWDM services. DWDM services require hardware and software in order to light the fiber on the ring. Unlike commodity telecom products, this hardware and software is typically dedicated to a particular customer—not shared by many—and much of the necessary gear is located on the customer's premises.

This raises a variety of issues, one of which we touched on above—the upfront costs involved in a DWDM deal. There are several others:

- Who will own the equipment, and who will bear the risk of loss;
- Who will have and who needs a software license to use the equipment and related software;
- Will equipment and software upgrades be provided and in what circumstances? and
- Who will bear the risk of intellectual property claims related to use of the hardware and software individually or in combination with your LAN interface equipment.

Be careful when determining which sites to include on a DWDM ring

Conclusion

With these issues in mind, keep a flow chart of strategies. For example, if the carrier will own the equipment, make sure its software license with the equipment manufacturer allows your company to use the equipment and software in the way intended—e.g., to connect to or between your LANs at the LAN interface port. Also, if the carrier owns the equipment on your premises, make sure that your insurance policies will cover losses of gear that you don't own.

If your company will own the equipment, make sure the software license is broad enough to allow the carrier to manage and maintain the equipment and software on your behalf as part of the DWDM services, and that the carrier provides you with clear title to the equipment you purchase.

Regardless of who owns the equipment, make the carrier bear responsibility for third-party intellectual property claims related to your use of the DWDM service or any part thereof (such as the equipment or software), and for claims related to the connection between the DWDM service and your LAN. The carrier designed your solution and should stand behind it.

One final note to keep in mind. When moving forward with a DWDM ring, understand the implications of which sites are on the ring. You are likely to have to pay for services to those sites for the length of the deal—typically five years. If you are using the ring to connect your datacenters or campuses, which you are unlikely to leave in the next five years, there is little risk that you'll wind up paying for services that you no longer need halfway through the contract (unless, of course, you suffer a business downturn and close a site).

On the other hand, using the ring to connect to a carrier's point of presence (POP) is a nice way to reduce some local access charges, but one that comes with serious disadvantages. The value—but not the cost—of the ring to the enterprise will drop dramatically if you switch vendors and no longer run services through a POP on the ring. This pressures the enterprise—as the incumbent is well aware—to continue to purchase WAN services accessed via the DWDM ring from the incumbent. Your talk of moving services offered through those POPs is no longer viewed as a threat, more a hollow cry. And the rate reductions the vendor used to offer in response to that threat no longer flow.

If you heed the above pointers, you will perform beautifully. When the curtain falls on the DWDM negotiations, your boss will tip his/her hat in your direction. If you don't, s/he may instead hurl it toward the ground. You decide□