

Technology Brief

Data Center Interconnect (DCI): Whether to Lease or Own?



The massive expansion of over-the-top applications, streaming devices, and cloud services in recent years is driving more and more traffic into data centers, resulting in a demand for increased capacity to meet this rapid growth. This demand also drives an increased need for data center interconnect (DCI), typically occurring between data centers and access to the Internet at what is commonly known as an Internet Exchange Point (IXP). For the purposes of this brief, both of these demands will be considered together as DCI.

Many service providers utilize leased services (multiple 10G and 100G) to meet their DCI needs, largely due to a lack of trained optical personnel in their organization, or because leasing is their traditional way of enhancing or expanding a network. But there are other options that should be considered relative to cost, as these leased services can become expensive to scale, and are typically inflexible, with extended wait times when changes are required. As an alternative to leasing, the service provider, ICP or DCO can also purchase dark fiber and deploy their own optical equipment in order to meet specific requirements.

In many cases, data centers are rethinking their needs to allow them to better take advantage of economies of scale. In addition, they are moving towards virtualizing their data center and implementing SDN in order to ramp up the efficiency of their storage, servers and transport systems and to provide a greater degree of flexibility for future upgrades and changes. But is leasing or owning the best option for these new centers?

Benefits of Leasing vs. Owning

The decision to lease or to own facilities for DCI has strategic and financial implications to data center operators. Here are a few factors to consider when deciding which path to take:

Leasing:

- Very few upfront costs. Costs that do exist are treated as OPEX, not CAPEX.
- Associated costs are largely predictable, and grow consistently over time.
- Capacity can be increased as needed with few, if any, complications.
- The lease typically comes with experienced help, so efficiency and availability are maximized from the very beginning.
- This can be a more expensive option over time, depending on the number of 100G services provisioned.
- Lease fees are treated as expenses for accounting and financial activities.

Buying/Building:

- The center can be customized to individual needs.
- Losing the lease is rarely a problem.
- Unused bandwidth can be rented out to others, creating a profit center.
- For organizations with more than three or four 100G services, this can be the most economical option over time.
- Owning can also come with consultancy services, so those without dedicated optical personnel have guidance in setting up and operating new equipment.
- Equipment costs are treated as capital with depreciation for accounting and financial activities.

Options for Service Providers

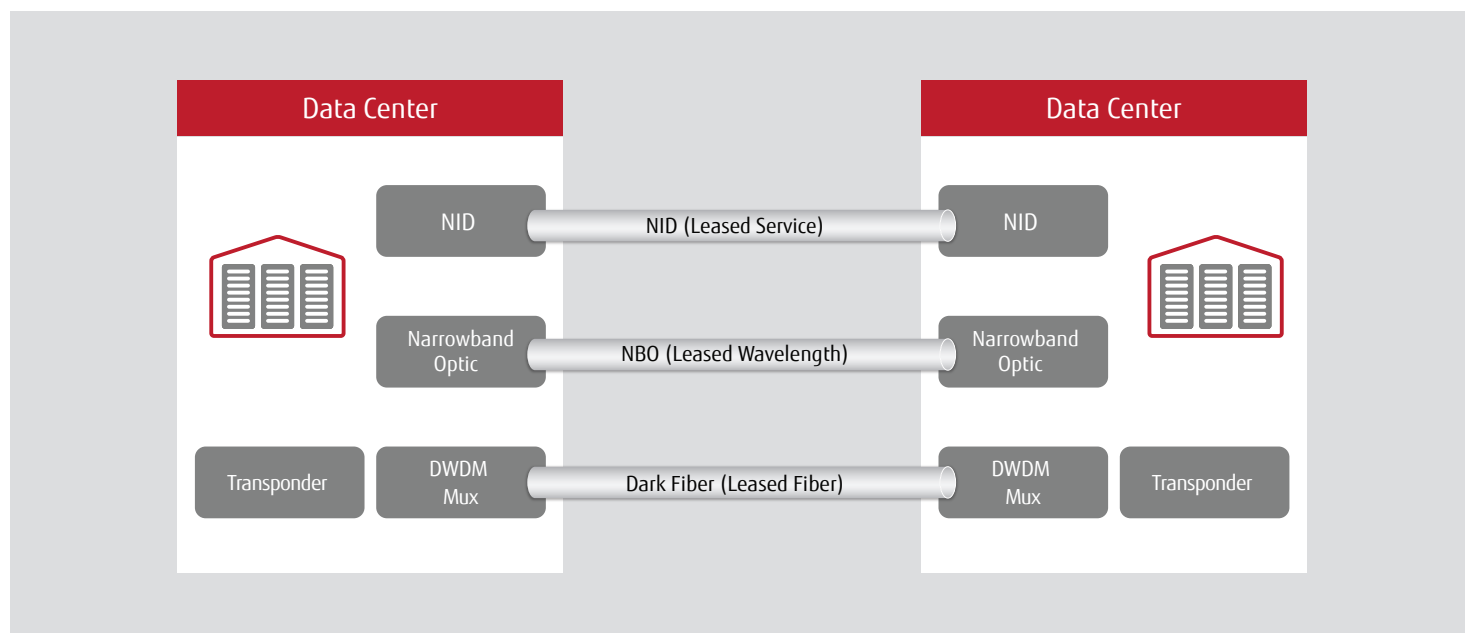


Figure 1: DCI lease vs. own options and cost items

DCI Options

There are several scenarios that address DCI bandwidth:

1. Lease service from a service provider (Leased Service), in which the service provider supplies a Network Interface Device (NID) at a data center and delivers traffic to another data center or IXP, charging a monthly fee for its use.
2. Lease a wavelength from a service provider (Leased Wavelength), where a specific wavelength in a fiber is leased from a service provider, the leased wavelength utilizing a narrow band optic (NBO) in the switch or router. In this case, the service provider supplies a transponder or narrowband optic, and utilizes their DWDM transport to deliver the traffic to the other data center or IXP.
3. Private DWDM from a fiber provider (Leased Fiber) and deploy a self-owned optical network (Private WDM), in which dark fiber is leased from a fiber provider, incurring a monthly dark fiber fee. Transport equipment, comprised of transponders and a Dense Wavelength Division Multiplexer (DWDM), is purchased and owned to provide efficient use of the leased dark fiber and is then used to deliver optical services across that fiber.

Comparison of Options

Looking at a four year cost of ownership versus leasing study allows for the comparison of the three DCI options in terms of building an optical network of the same capacity. Figure 1 shows the four-year Total Cost of Ownership (TCO) for each of the above scenarios, using typical values for the various lease rates and optical equipment. The horizontal axis shows the number of 100G services needed, while the vertical axis represents the relative cost of services over the four years.

- In option #1, Leased Service, there is simply a monthly service fee for each 100G service needed.
- In option #2, Leased Wavelength, there is a smaller monthly service fee for each lambda used, as well as the purchase of a 100G narrowband optic to work with existing switches and routers for each 100G service needed.
- In option #3, Private WDM, there is a monthly fee for dark fiber and the purchase of DWDM equipment, including a transponder at each end of the fiber for each 100G service. Also, the cost associated with increasing the capacity of the transponder as service demands increase is relatively low, and has been included in this analysis.

Figure 2 shows that leasing is the better option for data center operators that have one or two 100G services, since their cost is either below or at the entry cost of actually buying equipment. But larger operators, using three or more 100G services, actually see significant cost increases when leasing, as service per 100G is increasingly more expensive than adding optics and transport electronics to a transponder using leased dark fiber.

Leasing Versus Owning Cost Comparison

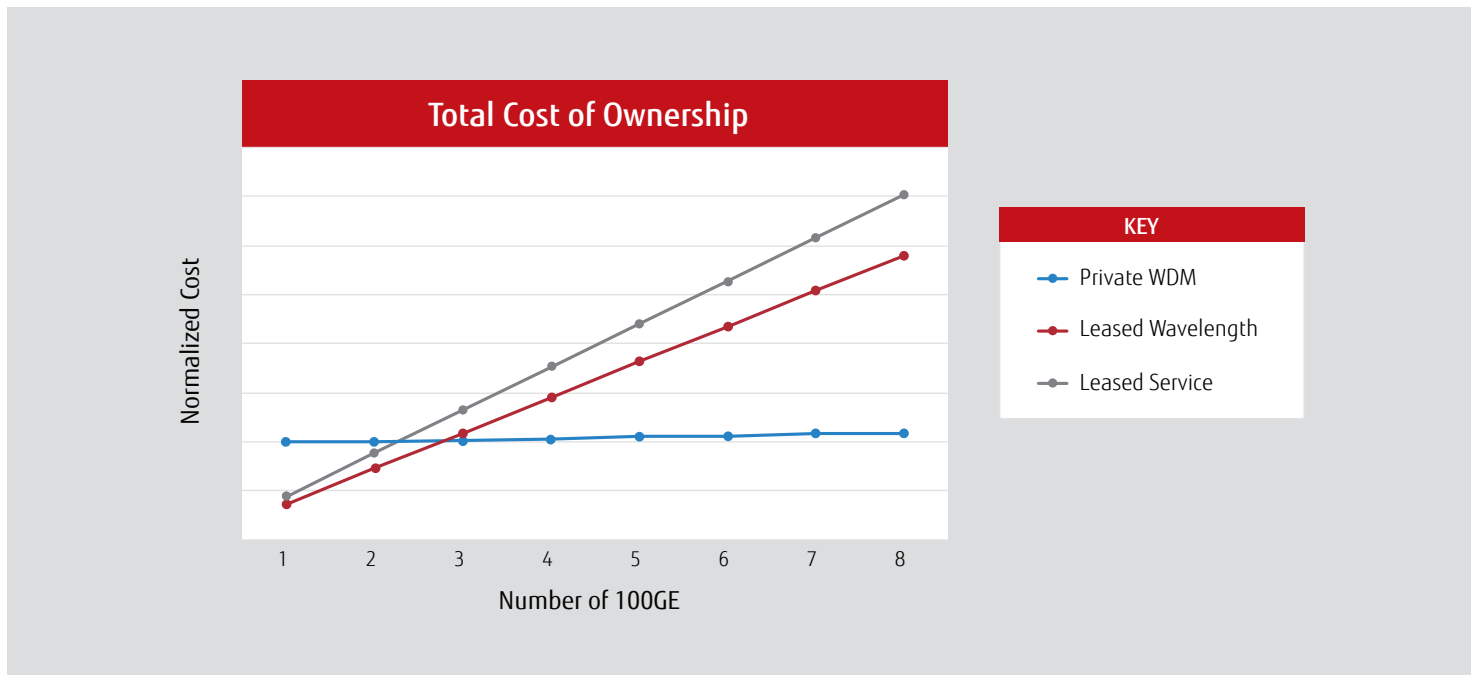


Figure 2: This graph compares the cost of leased services (red and grey lines) versus buying optical equipment and leasing fiber (blue line).

Financial Considerations

Another aspect to consider regarding leasing versus owning is the impact on financial reports. When leasing, the lease fees are considered an operating expense, appearing on the income and cash flow statement accordingly. However, owned property is considered an asset, and thus a capital expense reflected on the balance sheet.

When buying equipment, there is a greater cash outlay at the time of purchase. However, this is recorded as a capital expense that can be depreciated over time, with the income and balance statements showing depreciation accruing as the technology is used. These same benefits are not connected to a leasing plan.

In conjunction with the TCO analysis, these financial concerns should be carefully considered and evaluated during the decision-making process, as they can have a significant effect on a company's bottom line in both the short- and long-term.

Brief Interpretation and Summary

For data center operators transporting small amounts of traffic – perhaps one or two 100G between data centers – or between a data center and an IXP, leasing 100G services is the most economical plan. But, for those whose needs have grown, or are anticipating future growth, beyond two or three 100G services, building and owning the transport network is the better option. There is also a relatively low cost associated with increasing the capacity of the transponder as service demands increase.

There is no “one size fits all” answer to the question of lease vs. own. Each organization must evaluate their current needs and the likelihood of expansion in the future in order to come to the best possible decision. Additionally, different equipment choices and variance in regional lease rates may impact the cross over point between leasing and owning. Consulting with a provider of optical equipment to get an idea of price, lead time, time to operation, etc. is strongly recommended.

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