Optical LAN Advantage (OLA)

Cost Savings When Deploying Multiple Networks

Noovis, LLC

Converge – Connect – Conserve

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VOLUME I

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Introduction

Noovis's Optical LAN Advantage (OLA) is a fiber-to-the-desktop network that provides secure layer 2 transport capabilities via a single fiber delivering voice, data and video services at gigabit speeds for a fraction of the cost of traditional LAN architectures.

Assuming that every customer may dictate different standards for their switched Ethernet architectures, Noovis is providing this cost study for implementing turn-key Optical LAN Solutions of various sizes so that each customer may conduct an objective internal cost analysis.

Technical Approach

Noovis's OLA is based on the ITU Standard for Gigabit Passive Optical Networks (GPON) and uses proven Joint Interoperability Test Command (JITC) certified equipment to provide carrier grade performance, all without the need for the expensive copper cabling, access switches, power and cooling typically required in a conventional network.

The typical OLA network as depicted in figure 1 places an Optical Line Terminal (OLT) in the customer's data center with connectivity to the user desktops being provided via passive singlemode fiber. The optical signal is then converted back to an electrical interface via an Optical Network Terminal (ONT) placed at the user station. Note that the typical ONT provides at least (4) GigE ports, effectively allowing two users to share ONTs where applicable.

Assumptions:

- (4) GigE ports per ONT
- Each user requires Power over Ethernet (PoE)
- Each user has a dedicated Optical Network Terminal (ONT)
- Infrastructure is installed under a raised floor in a new building

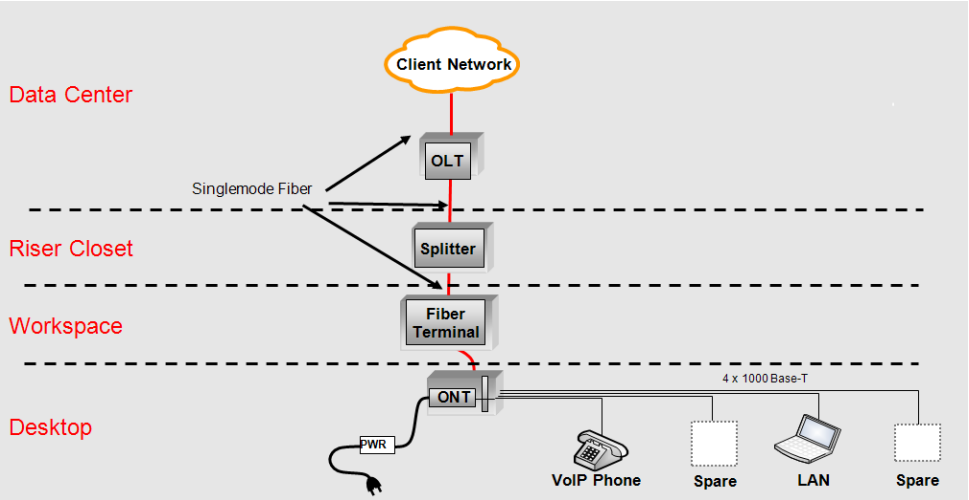

Figure 1: OLA Architecture

By assuming each user requires Power over Ethernet service and must have a dedicated ONT, the employed cost model provides a conservative "worst case" total cost scenario in terms of infrastructure requirements and desktop components. As one would expect, the cost per user drops significantly as the total size of the network grows as depicted in figure 2.

CLIN	500 Users	1,000 Users	2,000 Users	3,000 Users	3,800 Users
Eng, Design and Inst. Fiberplant	$ 120,000	$ 240,000	$ 360,000	$ 550,000	$ 690,000
Eng, Design and Inst. Electronics	$ 140,000	$ 175,000	$ 190,000	$ 240,000	$ 255,000
Material - Fiber Plant	$ 165,000	$ 310,000	$ 490,000	$ 670,000	$ 835,000
Material - Electronics	$ 355,000	$ 590,000	$ 1,100,000	$ 1,500,000	$ 1,870,000
Total	$ 780,000	$ 1,315,000	$ 2,140,000	$ 2,960,000	$ 3,650,000
Cost Per User	$ 1,560	$ 1,315	$ 1,070	$ 987	$ 961

Table 1: Network Cost

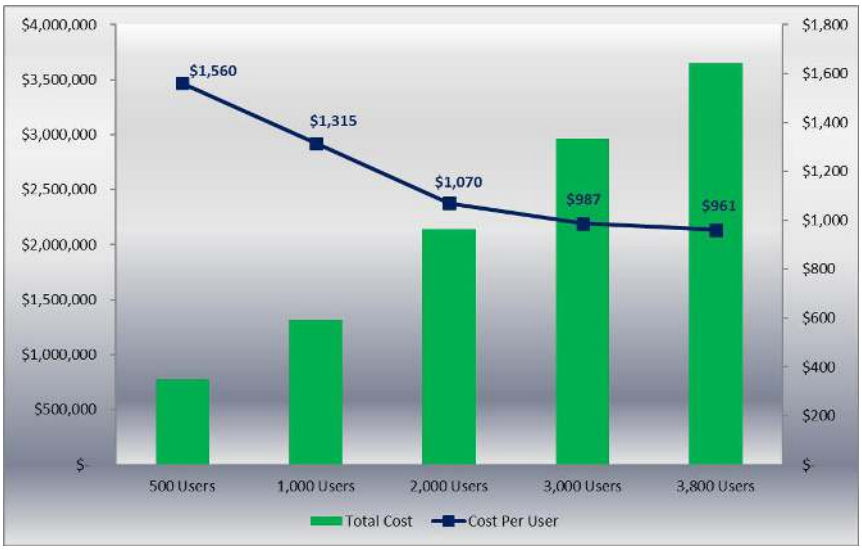

Figure 2: Total Cost and Cost per User

Adding Parallel Networks

Just as larger user counts offer the ability for per user cost savings, so too can economies of scale be leveraged when placing multiple networks during a single installation effort. When doing so, customers can realize close to 20% savings for the third network being installed as depicted in figure 3 for a 3,800 user implementation.

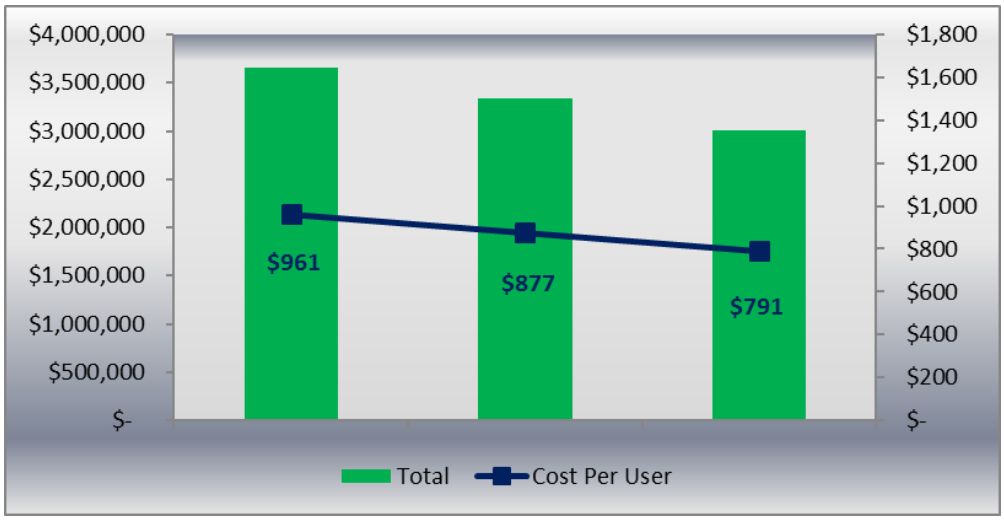

Figure 3: Cost Savings for Additional Networks

Sharing ONTS

While placing additional networks concurrently provides true savings, even better cost reductions can be had when users are allowed to share ONTs. In this model, two users working in a typical cubicle environment would both receive voice, data and video service from a single ONT. For those that would see this as a perceived security risk we should consider that in the conventional switched Ethernet model up to 48 users are already sharing access switches for these same services.

In most cases the sharing of ONT's does not effectively halve the number of ONT's deployed as it would not be practical to do so in all instances such as when users reside in individual offices. Previous experience has shown that an 80% sharing provides a fair model for a cost study. Shown in Table 2, we see that when ONT sharing is implemented over 30% savings can be realized when user counts exceed 1,000 work stations. A Cost per User comparison is also provided in figure 5.

Dedicated	500 Users	1,000 Users	2,000 Users	3,000 Users	3,800 Users
Eng, Design and Inst. Fiberplant	$ 120,000	$ 240,000	$ 360,000	$ 550,000	$ 690,000
Eng, Design and Inst. Electronics	$ 140,000	$ 175,000	$ 190,000	$ 240,000	$ 255,000
Material - Fiber Plant	$ 165,000	$ 310,000	$ 490,000	$ 670,000	$ 835,000
Material - Electronics	$ 355,000	$ 590,000	$ 1,100,000	$1,500,000	$ 1,870,000
Dedicated ONTs Total Cost	$ 780,000	$ 1,315,000	$ 2,140,000	$2,960,000	$ 3,650,000

Shared	500 Users	1,000 Users	2,000 Users	3,000 Users	3,800 Users
Eng, Design and Inst. Fiberplant	$ 120,000	$ 190,000	$ 265,000	$ 375,000	$ 435,000
Eng, Design and Inst. Electronics	$ 130,000	$ 160,000	$ 160,000	$ 195,000	$ 195,000
Material - Fiber Plant	$ 130,000	$ 195,000	$ 330,000	$ 490,000	$ 615,000
Material - Electronics	$ 280,000	$ 385,000	$ 655,000	$ 990,000	$ 1,200,000
Shared ONTs Total Cost	$ 660,000	$ 930,000	$ 1,410,000	$2,050,000	$ 2,445,000

Total Cost	500 Users	1,000 Users	2,000 Users	3,000 Users	3,800 Users
Dedicated ONTs Total Cost	$ 780,000	$ 1,315,000	$ 2,140,000	$2,960,000	$ 3,650,000
Shared ONTs Total Cost	$ 660,000	$ 930,000	$ 1,410,000	$2,050,000	$ 2,445,000
% Savings	15%	29%	34%	31%	33%

Table 2: Dedicated VS Shared ONT Costs Model

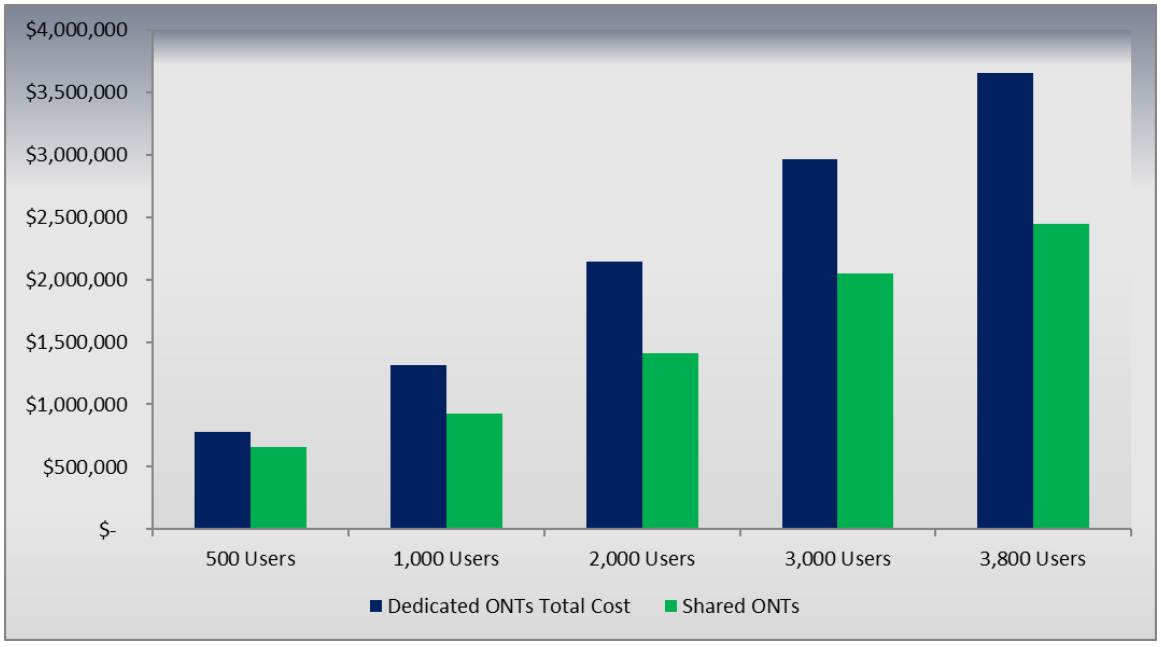

Figure 4: Dedicated vs. Shared ONT Total Costs

Cost Per User	500 Users	1,000 Users	2,000 Users	3,000 Users	3,800 Users
Dedicated ONTs Cost Per User	$ 1,560	$ 1,315	$ 1,070	$ 987	$ 961
Sharing ONTs Cost Per User	$ 1,320	$ 930	$ 705	$ 683	$ 643

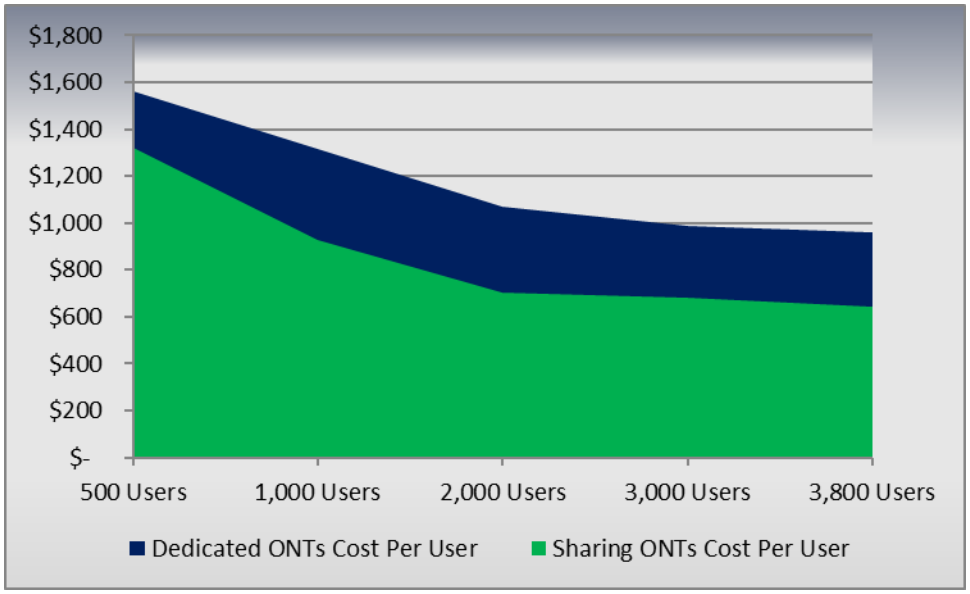

Figure 5: Dedicated vs. Shared Cost per User

Network Expansion

The OLA platform is ideal for use in campus environments as it offers a 12+ mile reach to end users without the need for mid-span electronics or signal regeneration. Should a customer decide to add fifty remote users to an existing network they would only require fiber connectivity to the remote location and desktop electronics as the existing OLT in the datacenter would only require an additional card in the chassis at most.

Operations and Maintenance

When OLA networks are deployed a minimum of 20% sparing is included in the design of the fiber plant. Therefore, increasing connectivity to the existing floor space would cost little more than the time for a network administrator to make a cross-connect at the splitter, place a jumper from the closest terminal to the new workstation and install/provision the ONT. This total time should be less than 4hrs for an experienced technician.

Noovis can customize an O&M plan for customers to include anywhere from full time onsite technicians or simply providing offsite Tier 3 support should the customer's network administrators require assistance.