



## Position Paper

# IT networks: How to make an immediate impact on your bottom line and the environment

Reducing energy consumption is an objective on business managers' agendas around the globe. But what is the best way to start? In this paper, we aim to give decision-makers an understanding of possible methods for reducing energy consumption and greenhouse gas emissions along with costs.

Let's begin with a simple example that has been validated in a third-party lab<sup>1</sup> that gives substance to the claim Nortel has made — that achieving energy efficiency with Nortel is as easy as changing a light bulb. In Table 1, we compare two edge switches: Nortel's 4550T 48-port PoE and the Cisco 3750G 48PS, comparably configured.

The Nortel 4550T switch consumes 45 watts compared to 89 watts for Cisco 3750G, plugged in and idling with factory settings. This amounts to a 44 Watt savings *before any devices are connected!* If we assume a three-year replacement cycle for this example, then implementing the Nortel switch in place of the Cisco equivalent saves a million Watts of electricity over its life.

### Nortel Ethernet Routing Switch 4500

In the Tolly Group's recently released comparative study of equipment cost per throughput, the Nortel 4548GT-PWR came out a clear winner at

\$70 per Gigabit throughput — a fraction of the cost of the Cisco C3750G-48PS and the C3560G-48PS (\$250 and \$153 respectively). Another Tolly report on the 4500 series gives Nortel's equipment 'straight A's' for reliability, throughput and quality, stating that, "The Nortel Ethernet Routing Switch 4500 switches achieved zero-loss throughput with low latency and jitter, along with delivering stack resiliency." See Table 2.

Scientific independent testing from Tolly Labs confirms Nortel switches featured significantly greater energy efficiency, resulting in lower operational (power and cooling) costs.<sup>2</sup>

**Table 1. Tolly Labs test results: Switches running with factory settings**

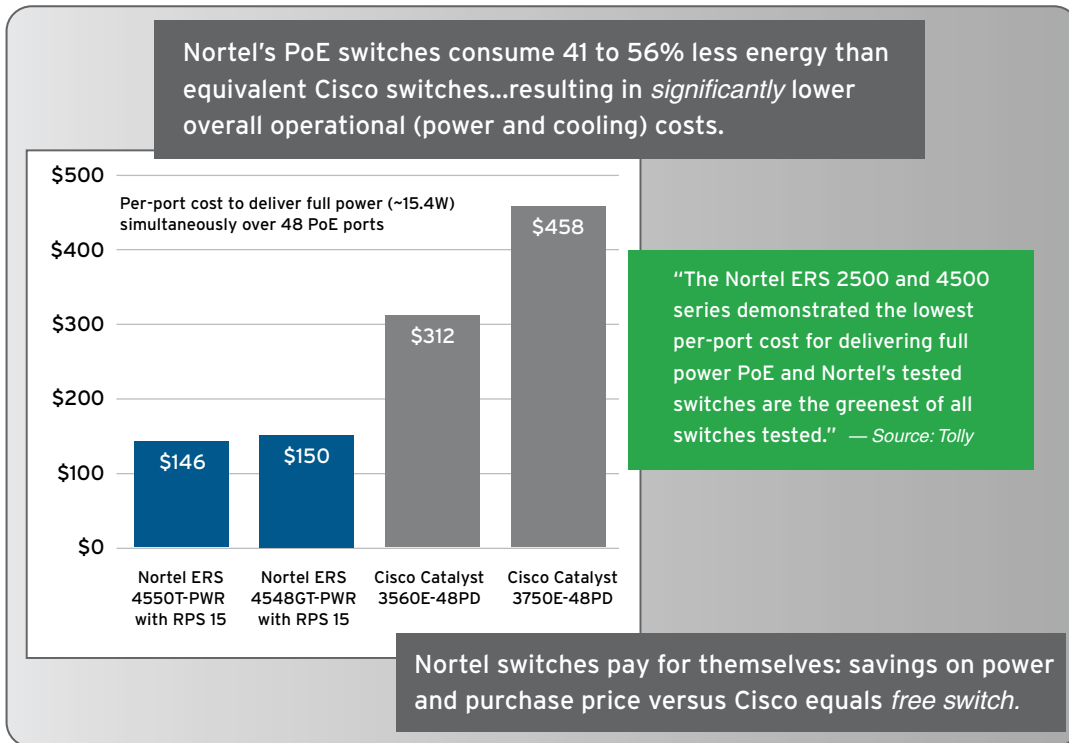
Edge Switch comparison		Watts		Nortel energy savings
Nortel	Cisco	Nortel	Cisco	
Nortel 4548T PWR	Cisco Catalyst 3750G-48PS	39	89	<b>56%</b>
<b>Three year's savings:</b>				<b>1,314,750 Watts!</b>



**Table 2. A comparison of Nortel's Edge gear with comparable Cisco devices**

Edge Switch comparison		Watts		Nortel energy savings	Cisco energy premium
Nortel	Cisco	Nortel	Cisco		
Nortel 4548GT	Cisco Catalyst 3560G-48PS	39	84	<b>54%</b>	115%
Nortel 4548GT	Cisco Catalyst 3750G-48PS	39	89	<b>56%</b>	128%
Nortel 4548GT	Cisco Catalyst 3750E-48PD	39	102	<b>62%</b>	162%
Nortel 4548GT	Cisco Catalyst 3560E-48PD	39	104	<b>63%</b>	167%

**Figure 1. Nortel's PoE initial costs compared with Cisco's**



Per-port cost is based on U.S. national average commercial electric costs over three years of continuous operation.

**Office IT: Nortel phones vs. Cisco phones**

Forty percent to sixty percent of capital expense for new VoIP deployment costs is linked to acquiring the phones. Many evaluations are focused on user-friendly features and how the phones look. What is seldom taken into account is the energy draw the IP phones require.

This becomes a significant ongoing operational expense. For example, using the NY State commercial kWh rate average of 16.13 cents and modeling 2500 Nortel 1140E 10/100 vs. Cisco 7960 IP phones, we find Nortel consumes over five years 668,000 watts and Cisco 904,220. This equals \$80,946.06 in saving with Nortel IP Phones. See Table 3.

**WAN Access Routers**

An obvious way to reduce power consumption and cooling requirements in the branch office is to compare the power requirements each vendor lists in their published documents. Saving energy in the branch with Nortel power-efficient routers is as easy as changing a light bulb. See Table 4.

**Table 3. A comparison of telephone power and cooling requirements**

Office Clients: Digital Phone power consumptions		Watts		Nortel energy savings	Cisco energy premium
Nortel	Cisco	Nortel	Cisco		
IP Phone 1230	IP Phone 7960	3.20	7.88	59%	146%
IP Phone 2004 10/100	IP Phone 7960	3.20	7.88	59%	146%
IP Phone 1140E 10/100	IP Phone 7960	6.00	7.88	24%	31%
IP Phone 2007 Color	7970 GIG E	8.50	10.25	17%	21%

**Table 4. A comparison of power requirements for Access Routers<sup>3</sup>**

Input power requirements: Nortel versus Cisco access routers		Maximum system power dissipation (W)		Nortel energy savings	Cisco energy premium
Nortel	Cisco	Nortel	Cisco		
Secure Router 1001	ISR1841	8	50	84%	525%
Secure Router 1002/4	ISR2801	12	150	92%	1150%
Secure Router 3120	ISR3825	80	300	73%	275%
Secure Router 4134	ISR3845	250	435	43%	74%

## Data Center Nortel Ethernet Routing Switch 8600 vs. Cisco Catalyst 6500

Nortel Ethernet Routing Switch 8600 delivers a reliable, secure and intelligent network routing solution for today's convergence and web-based applications. Like the other enterprise switches in Nortel's line, the Ethernet Routing Switch 8600 saves 60 percent of energy

consumed over the Cisco 6500 series switch, and offers proportionately lowered cooling requirements and CO<sub>2</sub> emissions. See Table 5.

### Immediate ROI of power-efficient hardware

Tables 6 and 7 demonstrates an initial example analysis Nortel has developed with its Energy Efficiency Calculator.

We modeled a 2500-port data center's energy consumption in New York State. Clearly, Nortel equipment provides immediate business benefits and a positive physical impact to the environment by lower carbon emissions. And as IT demands keep rising, Nortel can provide both performance and energy efficiency using industry-standard technology.

**Table 5. Core switches compared (two each) for power consumption, cooling requirements, carbon emissions (NY State example)<sup>3</sup>**

Nortel		Cisco		Nortel energy savings	Cisco energy premium
10 Slot Core Switch annual power consumption		Watts			
8600 10 Slot	6500 equivalent	32,735	82,617	60%	152%
HVAC/Cooling		Total MBTU to cool			
8600 10 Slot	6500 equivalent	75	191	61%	155%
CO <sub>2</sub> analysis (NY State)		CO <sub>2</sub> emissions			
8600 10 Slot	6500 equivalent	13.5	34.0	60%	152%

**Table 6. Nortel energy example for a 2,500-user network in NY State, commercial rate.<sup>3</sup>**

	Number of systems	Kilowatts consumed		Energy savings (Kilowatts)		Operational expense savings (USD)	
		Nortel	Cisco	First year	Over 5 years	First year	Over 5 years
6 Slot	0	0.0	0.0	0.0	0.0	0.00	0.00
10 Slot	4	72,912.7	186,029.6	113,116.8	565,584.2	34,057.19	170,285.94
8300 6 Slot	0	0.0	0.0	0.0	0.0	0.00	0.00
8300 10 Slot	4	60,256.2	117,590.1	57,333.9	286,669.7	17,245.95	86,229.73
Non-PoE Stackables	50	61,758.0	93,732.0	31,974.0	159,870.0	9,621.16	48,105.82
PoE Stackables	200	376,680.0	897,024.0	520,344.0	2,601,720.0	156,574.56	782,872.78
WAN Routers	40	9,811.2	56,940.0	47,128.8	235,644.0	14,181.33	70,906.66
IP Phones	2,500	138,700.0	200,020.0	61,320.0	306,600.0	18,451.78	92,258.89
<b>TOTAL</b>		<b>720,118.1</b>	<b>1,551,335.7</b>	<b>831,217.6</b>	<b>4,156,087.9</b>	<b>250,131.96</b>	<b>1,250,659.82</b>

**Table 7. Nortel carbon emissions analysis for NY State<sup>3</sup>**

	Number of systems	CO <sub>2</sub> emissions		CO <sub>2</sub> saved (Metric Ton)		Operational expense savings (USD)	
		Nortel	Cisco	First year	Over 5 years	First year	Over 5 years
6 Slot	0	0.0	0.0	0.0	0.0	0.00	0.00
10 Slot	4	30.0	76.5	46.5	232.7	34,057.19	170,285.94
8300 6 Slot	0	0.0	0.0	0.0	0.0	0.00	0.00
8300 10 Slot	4	24.8	48.4	23.6	118.0	17,245.95	86,229.73
Non-PoE Stackables	50	25.4	38.6	13.2	65.8	9,621.16	48,105.82
PoE Stackables	200	155.0	369.1	214.1	1,070.6	156,574.56	782,872.78
WAN Routers	40	4.0	23.4	19.4	97.0	14,181.33	70,906.66
IP Phones	2,500	57.1	82.3	25.2	126.2	18,451.78	92,258.89
<b>TOTAL</b>		<b>296.3</b>	<b>638.4</b>	<b>342.0</b>	<b>1,710.2</b>	<b>250,131.96</b>	<b>1,250,659.82</b>

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**Footnotes:**

- <sup>1</sup> "Nortel Ethernet Routing Switch 4548GT-PWR Competitive Layer 2 Performance Evaluation vs. Cisco Catalyst 3560G-48 PS and 3750G-48PS", The Tolly Group Report number 201237, September 2007.  
[http://www.nortel.com/products/01/passport/4500/collateral/tolly\\_ers4500\\_vs\\_cisco\\_catalyst\\_09\\_2007.pdf](http://www.nortel.com/products/01/passport/4500/collateral/tolly_ers4500_vs_cisco_catalyst_09_2007.pdf)
- <sup>2</sup> The full Tolly test result can be downloaded with comparisons at: <http://www.tolly.com/DocDetail.aspx?DocNumber=208269>
- <sup>3</sup> Unless noted, all product comparisons are based on vendor published maximum power ratings.

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