

Avaya Secure Router 4134 vs. Cisco ISR 3845: WAN Router Performance, Power Consumption and TCO

Executive Summary

Hands-on testing of Avaya's Secure Router 4134 shows that the enterprise-class branch router not only delivers throughput that matches or exceeds the widely deployed Cisco ISR 3845, but it does so using less energy, and can reduce costs by 24% over the long-term. With an emphasis on cost cutting in recessionary times, the Secure Router 4134 costs less to deploy, and less to operate over a five-year span than the Cisco ISR 3845.

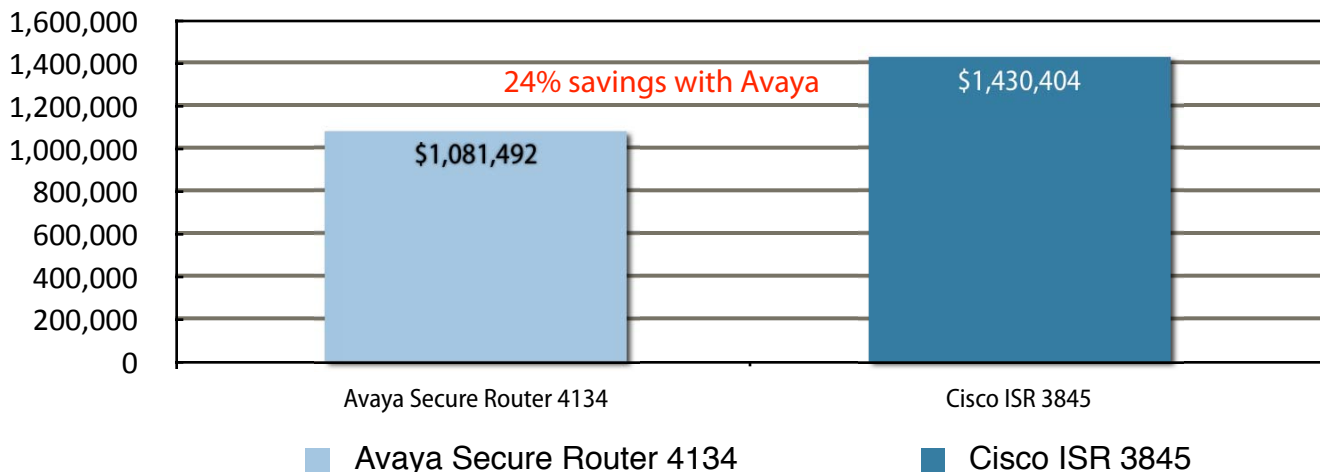
Users seeking to control costs in their enterprise networks need to consider alternatives to branch office networking infrastructures that cost more to deploy and consume more energy on a year-to-year basis, ultimately costing organizations more to operate over a deployed lifecycle.

Tolly engineers examined the Avaya Secure Router 4134, a modular switch that Avaya designed to support a range of advanced network services – including IPv4/IPv6 routing, high-performance WAN, high-density Ethernet switching, Power over Ethernet, Voice over IP (VoIP) and security – in a single integrated platform. The Secure Router 4134 is designed to meet the needs of enterprise branch, regional or even headquarters sites.

The Bottom Line

- 1 Costs 24% less to operate and maintain over a projected five-year period than Cisco ISR 3845
- 2 Uses up to 19% less energy than Cisco ISR 3845 for switch power and cooling
- 3 Matches or exceeds Cisco ISR 3845 WAN throughput over a single T3 or eight aggregated T1 links
- 4 Branch offices can reduce network energy consumption by 25% with Avaya Secure Router versus Cisco ISR

**Five-Year TCO: Deployment & Power/Cooling Costs
Avaya Secure Router 4134 vs. Cisco ISR 3845 (in USD)**



Note: Based on 25 deployed routers; pricing based on U.S. MSRP, January 2009. Totals reported reflect initial hardware cost, annual maintenance, plus projected power/cooling costs over a five-year period. Based on US 2006/2007 power costs.

Source: The Tolly Group, September 2008

Figure 1



Tolly engineers compared the performance and power consumption of the Secure Router 4134 against a commonly deployed Cisco ISR 3845, an integrated service router. While engineers measured throughput and power consumption, they also used the hands-on data to calculate initial deployment costs and operational costs over a five-year lifespan to demonstrate how the Avaya switch can provide an effective and cost-efficient option to the Cisco ISR 3845. Tests were conducted in September 2008.

Results: WAN Throughput

Tolly engineers measured the zero-loss (>0.001%) throughput of both the Avaya Secure Router 4134 and the Cisco ISR 3845 for frame sizes of 64, 128, 256, 512, 1,024 and 1,500 bytes.

Engineers first measured the bidirectional zero-loss throughput over a simulated T3 line. For taxing 64-byte frames, the Avaya Secure Router 4134 delivered 86 Mbps of zero-loss, bidirectional throughput, matching the Cisco ISR 3845. For 512-byte and 1,500-byte frames, both devices delivered 88 Mbps of throughput. Engineers went on to measure throughput over eight simulated T1 lines. For 64-byte frames, both devices delivered 21 Mbps (out of a bidirectional maximum of 24.7 Mbps), though Avaya did so with zero loss while the Cisco switch experienced 0.09% loss.

For 512-byte frames, both devices achieved 19 Mbps of throughput though neither met the full zero-loss criteria and at 1,500-byte frames, the Avaya Secure Router 4134 offered 20 Mbps of throughput while the Cisco ISR 3845 reached only 19 Mbps of throughput. At the largest frame size, the Avaya switch experienced 0.01% to 0.02% loss, while the Cisco switch experienced 2.4% frame loss.

In a test over 24 Fast Ethernet ports, both devices achieved 100% of the theoretical maximum throughput, delivering an aggregate throughput of 2.4 Gbps.

Power Consumption


Tolly engineers measured the power consumption of the DUTs and found that the Avaya Secure Router 4134 consumed just 145 Watts at 100% throughput across all 24 Fast Ethernet ports, while the Cisco 3845 drew 179 Watts (or 19% more power) in the same scenario.

Sitting idle, with no cables connected, the Cisco ISR 3845 drew 29% more power than Avaya, with 146 Watts to 104 Watts for Avaya.

Total Cost of Ownership

Tolly engineers used the power consumption results to calculate a five-year total cost-of-ownership for the Avaya Secure Router 4134 versus the Cisco ISR 3845.

Avaya Inc.
Secure Router 4134
Performance, Power Consumption & TCO



Tested September 2008

Engineers assumed a remote user base of 2,500 users spread across 25 branch locations.


Engineers developed a "hardware deployment price," consisting of the purchase price of the equipment plus an annual maintenance contract. The support contract included in the pricing is an on-site standard business hour policy (8x5) with same day replacement of equipment in the event of a failure.

Using U.S. MSRP pricing as of January 2009, the Secure Router 4134 hardware deployment cost was 24% less than its Cisco counterpart. Each Secure Router 4134 had equipment costs of \$31,230 and a five-year support contract cost of \$11,230 for a total MSRP price of \$42,460. In a network with 25 routers, that represents a hardware cost of \$1,061,500.

The Cisco ISR 3845, by contrast, came with a hardware deployment price of \$56,230 (\$37,725 for equipment and \$18,505 for maintenance), or a total deployment cost for 25 routers of \$1,405,750.

Based on MSRP pricing, users lay out more than a quarter million dollars more (\$344,250) for the Cisco gear. Prices were obtained from public on-line price lists collected during the month of January 2009 and verified by a third-party partner. As can be seen, initial hardware costs are just a portion of the TCO picture. Users need to

Power Consumption in Various Scenarios
Total Watts (Power Consumption and Heat Dissipation)



Test Scenario	Avaya Secure Router 4134	Cisco ISR 3845
100% traffic across 24 Fast Ethernet ports	192.9	238.1
Idle state with Fast Ethernet ports active	190.2	236.7
Idle state with no cables attached	138.3	194.2

Source: The Tolly Group, September 2008 Figure 2



factor in the support plus five-year operational costs for operating and cooling to obtain a more complete picture for TCO.

Here, engineers looked at the 193 Watts needed to power and cool the Avaya Secure Router 4134 versus 238 Watts to power and cool the Cisco ISR 3845.

From there, engineers took the average U.S. cost per kilowatt hour of 0.0946 cents and factored out the five-year cost to power and cool both devices. Engineers multiplied: ((number of switches) * (power consumed in Watts) * (hours in a year) * (5 years) * (cost per kilowatt hour)) / (1000).

Calculations show that the Avaya Secure Router costs 19% less to operate and cool over the five-year period – \$19,992 versus \$24,654.

Combining the initial deployment cost with the ongoing power and cooling costs shows that Avaya costs 24% less to deploy, operate and cool over the five-year span versus the Cisco solution. And that is for a 25-unit network, obviously larger deployments will yield even greater savings with Avaya.

Test Bed Setup & Test Methodology

Tolly engineers examined two products: a Avaya Secure Router 4134, running Version 10.1.0.0 software and supporting, eight T1/E1 ports, one T3 port, and 24 Fast Ethernet ports supporting Power over Ethernet (PoE). Engineers also tested a Cisco Systems ISR 3845, running Router Version 12.4(16) software and IOS 12.2(25)SEE3 and having the same hardware configuration. For this test, engineers connected two like DUTs together via different interfaces, such as T3, T1, and RJ-45. Each DUT was configured to use only the specified Tx/Rx module for the current test. A flow of unidirectional traffic was then applied by a SmartBits unit.

TCO Comparison		
Hardware costs and ongoing power/cooling costs		
Category	Avaya Secure Router 4134	Cisco ISR 3845
Deployment expenditure for 25 routers	\$1,061,500	\$1,405,750
Five-year cost for power/cooling	\$19,992	\$24,654
Total cost	\$1,081,492	\$1,430,404
Savings	24% hardware deployment savings with Avaya	19% energy savings with Avaya

Source: The Tolly Group, September 2008 Figure 3

Once each test iteration was completed, engineers recorded the frames per second and frame loss over a 60-second period, from which the throughput was calculated. Engineers then re-ran the test varying the frame size between 64, 512, and 1,500 bytes.

Power Consumption


For this batch of tests, Tolly engineers connected a Kill A Watt commercial-grade power meter between the DUT and the wall power source. To generate the reading for the DUT in the idle state, the switch was turned on and left to sit for five minutes. After the switch had reached a steady state, measurements were taken and recorded. Engineers then attached a SmartBits test tool in a full mesh configuration with the DUT to obtain a “link on” state with no traffic flow. Again, the system was given time to start up and adjust. Measurements were taken at 0% traffic and 100% traffic generated by the SmartBits unit.

TCO Calculation

Using the data collected from the throughput and power measurement tests, engineers compiled a report on the TCO over a five-year term. Engineers first gathered the prices of the components for the switches and produced a price for each of the units.

Using a national average for commercial energy costs, engineers were able to calculate the cost of a five-year deployment of the system (Incorporating HVAC costs).

Pricing data reflects the configuration of the Cisco 3845 originally used in testing. When Tolly personnel rechecked pricing prior to publication date, it was learned that the T1 module originally used in testing was no longer offered by Cisco. Hence, the T1 module pricing used is the original price for the configuration at time of testing.



The test methodology used for this report relies upon test procedures, metrics and documentation practices as defined by Tolly Common Test Plan, #1080 LAN Switch Power Consumption.

To learn more about this and other Tolly Common Test Plans, go to:
<http://CommonTestPlan.org>



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Competitive Interaction



In accordance with Tolly's Fair Testing Charter, Tolly personnel invited representatives from Cisco Systems, Inc. were invited to participate in reviewing the Test Methodology and commenting on the vendor's specific product results. Cisco did not respond to the invitation to participate

For more information on the Tolly Fair Testing Charter, visit:

<http://www.tolly.com/FTC.aspx>

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