

Cisco Integrated Services Router: Reduce Power Consumption through Integrated Services Delivery

The Cisco Integrated Services Router is an integrated high-performance network infrastructure platform designed to replace multiple devices in today's existing networking environments. Businesses can consolidate six disparate devices (router, switch, voice IP private branch exchange (PBX), security appliance, application acceleration device, and wireless access point) into a single platform, reducing the physical space requirements, reducing energy and cooling consumption costs by more than 76 percent and reducing overall management expense.

Local and global green initiatives are gaining serious commercial momentum in the marketplace. More and more, executives are talking about environmental concerns and raising their priority on corporate agendas. Multiple reports from the U.N. Intergovernmental Panel on Climate Change show that there is increasing evidence that human activity, and particularly carbon dioxide output, is the main cause for global climate change. In response, many national governments, especially in Europe, have implemented strict controls, and many more are planned. Correspondingly, there is growing consumer awareness and concern regarding the subject. These consumer and governmental trends are placing growing pressure on corporate policy makers to reduce their carbon footprint.

Depending on the size of the business, network-related factors can provide different challenges. Most small and medium-sized businesses have neither the expertise nor the resources to invest in green IT solutions; they need guidance and support from vendors and partners. On the other hand, large enterprises tend to build up disparate networks because of mergers and acquisitions, resulting in disparate IT departments—and over time network equipment accumulates.

Cisco® understands and appreciates that IT is critical in helping meet green-related challenges. IT-related power demands, worker travel, and e-waste are all critical areas of concern in any organization's green efforts. Cisco is committed to being an industry leader in resource conservation. As a member of the Green Grid, a consortium of information technology companies and professionals seeking to improve energy efficiency in data centers, Cisco is working to improve the green posture of data centers through improved networking systems and services. (Refer to *Cisco Energy Efficient Data Center Solutions and Best Practices* at http://www.cisco.com/en/US/solutions/ns708/networking_solutions_products_genericcontent0900aec806fd32e.pdf.)

Recognizing that branch-office needs—and related branch IT systems—also accelerate resource demands both in the data center and at remote sites, Cisco is working to improve resource usage associated with remote branch offices. Here, the Cisco Integrated Services Router serves as a strong example of Cisco efforts to ensure that branch IT systems are both fully effective and resource-efficient. An obvious way to reduce power consumption and cooling requirements in the branch office is to consolidate features and functions onto fewer branch systems. These

multiservice systems also offer the added benefit of expansion as service needs in the branch heighten. The Cisco Integrated Services Router family of products does exactly that.

The following five-step program takes full advantage of the Cisco Integrated Services Router and helps you reduce the carbon footprint of your branch offices through more efficient power consumption, management, and delivery.

1. Integrate your services into the router to monitor profitability.

Every watt of electricity saved in the branch office equals more than 2 watts removed from the business's carbon footprint and the global warming equation. This savings includes that from the power needs of network equipment as well as corresponding cooling requirements due to dissipation. Although IT does not have to budget for power-consumption costs—this factor being mostly a facilities one—IT can play the role of a powerful influencer toward reducing the carbon footprint of the company's branch offices.

Integration of services and applications into your network results in lower energy bills and power-related costs. The Cisco Integrated Services Router combines routing, switching, wireless, security, IP PBX, wide-area file services, and WAN optimization in a single box.

The Cisco Integrated Services Router helps to directly reduce branch-office network operating expenses (OpEx) with the power of integration. (Refer to "Optimizing Branch Office Network Infrastructure total cost of ownership (TCO) with Cisco Integrated Services Router" at http://www.cisco.com/en/US/products/ps5855/products_white_paper0900aecd805898e5.shtml) Naturally, this benefit also extends to reducing the branch-office carbon footprint as well as recurring costs related to power and cooling requirements.

Using an enterprise-based model with 50 branch offices with an estimated 50 employees each, with a yearly growth rate of 8.9 percent as a result of headcount increases as well as the rollout of multiple advanced services over an IP network in the next 3 years, the comparisons reveal that the power of integration can bring enormous benefits to your organization. All comparisons are made on the basis of published power-consumption and power-dissipation data as provided on vendor data sheets. Cisco compared an integrated solution from Cisco to six diverse competitor appliances that serve the same purposes—combining routing, switching, wireless, security, IP PBX, wide-area file services, and WAN optimization.

Cisco Integrated Services Routers clearly offer an extremely compelling green return on investment (ROI) for the network. Table 1 summarizes the benefits amortized over a 3-year lifecycle of the equipment.

Table 1. Benefits of Cisco Solution

	Cisco 3845 Integrated Services Router	Six Competitor Appliances
Power Consumption (Million W-hr)	10.32	42.34
Cooling Requirements (Million BTU)	35.21	143.54
Carbon Generated (T)	594	2,431

As the table indicates the following possibilities:

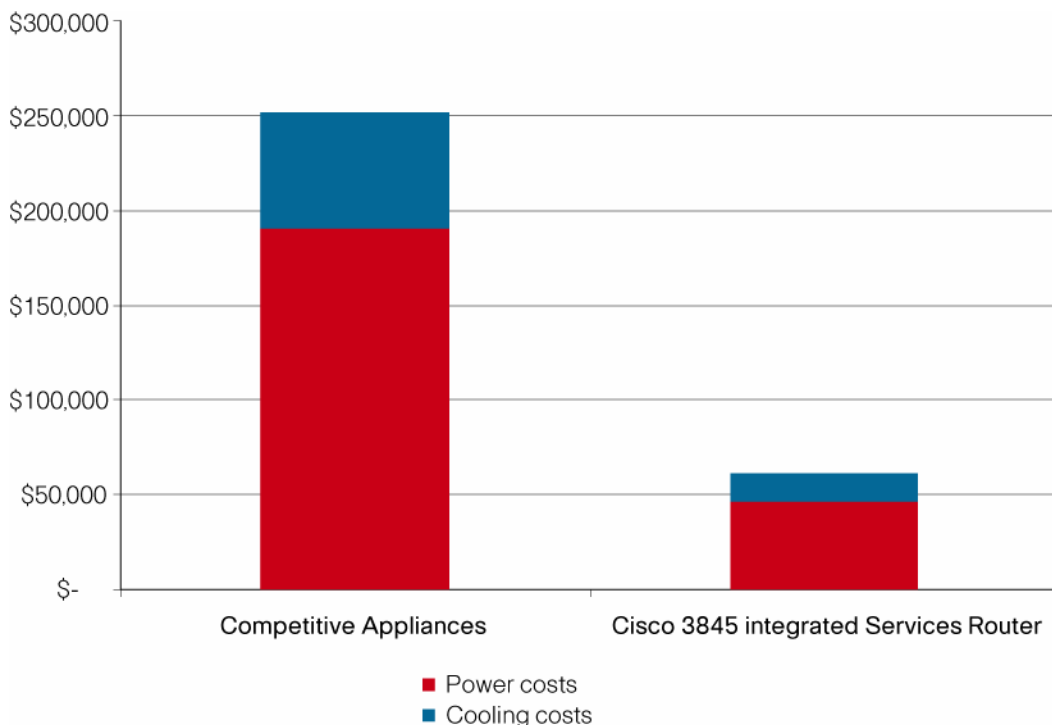
- 1,900 round-trip flights across the US (from New York to San Francisco)
- 850 round-trip flights from San Francisco to Heathrow or to Tokyo

- 850 round-trip flights from Heathrow to Bangalore
- 250 employees commuting everyday to work for approximately 25 miles a day per employee for 3 years!

The integrated approach of the Cisco Integrated Services Router also helps decrease TCO based on power and cooling costs. To calculate this cost component of TCO, Cisco studied a comprehensive model consisting of OpEx related to powering and cooling branch-office network infrastructure. Using current cost metrics from the U.S. Department of Energy, power and cooling costs were calculated for a model enterprise in this case study over a 3-year period.

As displayed in Figure 1, owning a Cisco Integrated Services Router over a 3-year lifecycle, in comparison to overlay appliances, constitutes a saving of more than 76 percent per year. In other words, an enterprise network with 50 branch offices will spend almost \$200,000 more on power and cooling when using a collection of specialized, standalone products in their branch-office network. And this extra expense is further heightened if you consider the multiple layers of complexity related to ongoing operations, support, and troubleshooting.

Figure 1. Green Integrated Services Router TCO



2. Manage your power usage.

Because the integrated services router is a single box, it results in structured cabling requirement—instead of the mass of wires and adapters. The router has an industry-standards-based, energy-efficient power supply adapter. It has a fully validated power and cooling system—a scenario that is not possible in a multiple-appliances and multivendor environment. Extensive testing and validation has been carried out for each of the multitude of configurations on the integrated services router.

It also has highly valuable features such as:

- Variable fan speeds reduce sound pollution: The integrated services router consumes lower power than normal when fan speeds are varied depending on load and utilization.
- During module-based sleep mode, if a certain module is idling, it neither charges nor dissipates: Power delivery is automatically assigned to network modules, and modules shut down if they are not configured or not being used.
- Fewer cooling requirements result from lower power dissipation when compared to a multiple-appliance scenario.

Modular integrated services routers offer AC and DC options. It can be realistically expected that a fully loaded system with high-voltage DC power is more efficient when compared to an AC system. The effect of these power savings in branch offices multiplies rapidly as the number of branch offices rises into the hundreds. However, DC installations may result in higher capital expenditures (CapEx) and specialized installation.

Another important factor to consider is the fact that the quiescent power consumption of a single box versus six separate appliances is significant and in turn significantly affects power management.

3. Use the Power over Ethernet (PoE) advantage.

The integrated services router is designed to capably power end devices using PoE. This extremely efficient power-distribution model minimizes power dissipation in the network and eliminates the use of rather inefficient adapters—the so-called “power bricks”—and the need for electrical wiring and outlets required by individual networked devices. PoE can be used to power IP phones, wireless LAN access points, webcams, Ethernet hubs, embedded computers, and other Ethernet-connected appliances. The Cisco Integrated Services Router, through its PoE-enabled switching module, supports a wide variety of PoE wattage levels and uses intelligent power distribution methods, so only the power that is needed by an end device is delivered, reducing standby losses and enabling right-sizing power supplies that offer the best and most efficient match to branch requirements.

4. Exploit technology innovation to enable power savings.

As carbon accounting gets progressively integrated into the list of business priorities, a good starting point would be to examine all aspects of your business to find ways of reducing its overall carbon footprint. This process is accomplished by focusing on all modes of energy usage by the business, from ground transport and aviation to buildings, logistics, home working, and IT. Because the network touches every part of the business, it can create a multiplier effect extending carbon frugality measures across business functions.

The integrated services router can exceed expectations for carbon-footprint reduction through the multitude of services it delivers, such as:

- Use of WAN optimization to facilitate video-on-demand training in remote sites
- Unified communication technology over completely secure network access for optimal collaboration, resulting in reduced business travel
- Secure wireless LAN and WAN capabilities to reduce physical wiring in offices as mobile workforce users come and go

5. Use Cisco green programs to your benefit.

You can easily introduce new networking technologies and services into your integrated services router-based branch office. The integrated services router network modules are completely backward-compatible, so you can take advantage of existing integrated services router investment to reduce both your carbon footprint and your operations costs by avoiding or minimizing equipment shipments and onsite technician visits.

Reducing your electronic waste is another green effect of this modular upgrade approach. Here, you and Cisco avoid or minimize the disposal of existing equipment when scaling to meet new business and networking requirements.

When equipment is displaced in the customer's network, Cisco backs up its technology with a host of programs committed to sustainable business practices as well as innovation in operations, products, and architecture. Cisco has technology migration programs (TMPs) to create incentives for customers to return IT equipment by allowing them to trade in old machinery against the purchase of new. The program is specifically designed to reduce the accumulation of scrap equipment in landfill sites.

Cisco also works with recycling companies to promote extraction of valuable metals from old equipment for reuse in new products. Government directives on the disposal of electronic waste—called Waste Electrical and Electronic Equipment (WEEE), and the use of hazardous substances in manufacturing (RoHS) pose new challenges to vendors and users of network equipment. Cisco is fully compliant with both, offering partners a “take back and recycle” program for equipment at the end of its life to help ensure proper treatment, recovery, recycling, and environmentally sound disposal, and it works only with RoHS-compliant suppliers.

The the single-box approach of the Cisco Integrated Services Router automatically reduces the amount of packaging used for the product, conserving paper. Cisco works further toward document reduction for manuals by making the manuals downloadable from its website as well as available on CDs. The integrated services router is manufactured at multiple worldwide hubs to rationalize product delivery—thereby reducing transit time to destination and the associated carbon footprint.

Summary

Cisco Integrated Services Routers work to improve your “green” standing on multiple fronts:

- Through service integration, Cisco Integrated Services Routers provide for excellent energy efficiency while at the same time delivering a comprehensive set of networking services to organizations of all sizes.
- These routers reduce your company's effect on the environment with regard to contamination, pollution, emissions, and e-waste.
- Effective in chassis power management and efficient power-delivery capabilities, the Cisco Integrated Services Routers facilitate power conservation by integrating devices.
- The integrated services router has second-order effects in enhancing your abilities to change and improve your business processes, through travel substitution and e-business and therefore control of overall energy use.
- With a strong history of corporate stewardship and responsibility, and the Cisco commitment to innovation toward green IT, Cisco helps its customers stay up-to-date with regard to green initiatives.

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