

IT Service Optimization

As Part of a Green Initiative

This paper explores how ITSO can help implement a part of your green initiative. This can help you successfully launch your initial green effort with an early “quick win,” or it can serve as just one piece of a much more involved overall green plan for your organization. But it is important that you not limit your green efforts to the techniques described here. More and more, consumers are looking to their vendors to lead the way in green initiatives. Claiming to be green by consolidating servers while continuing to dump dangerous chemicals into a public waterway could make you a target of criticism. Therefore, we recommend that you embrace the green movement holistically rather than looking at just one or two aspects that could be construed as lip service rather than thoughtful intent.

About the Authors

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“Going green” is about pursuing environmental initiatives that reduce the impact of human civilization on the earth, the goal being to take actions that alleviate global warming and sustain the earth’s limited resources. It seems like doing this should be a no brainer, but going green can be a huge undertaking. There are so many ways to become more environmentally friendly. Where does one start? Even focusing more specifically on “green computing” as a small part of an overall green initiative can be overwhelming. But using the right Capacity Management techniques, you can make your green computing initiative seem a lot less daunting.

ITSO can help you get a quick green win.

TeamQuest has Capacity Management software products that can help you with key parts of your green computing initiative. TeamQuest Capacity Management software is designed to make data centers run more efficiently, helping with IT Service Optimization (ITSO).

ITSO often means meeting service levels while minimizing costs such as those associated with equipment, operations staff, software licenses, and maintenance agreements. But IT or service delivery can be optimized as much for environmental factors as for cost. The same tools that can help you use less money can help you use less heating, cooling, power, space, and other environmentally significant resources.

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tion. But it is important that you not limit your green efforts to the techniques described here. More and more, consumers are looking to their vendors to lead the way in green initiatives. Claiming to be green by consolidating servers while continuing to dump dangerous chemicals into a public waterway could make you a target of criticism. Therefore, we recommend that you embrace the green movement holistically rather than looking at just one or two aspects that could be construed as lip service rather than thoughtful intent.

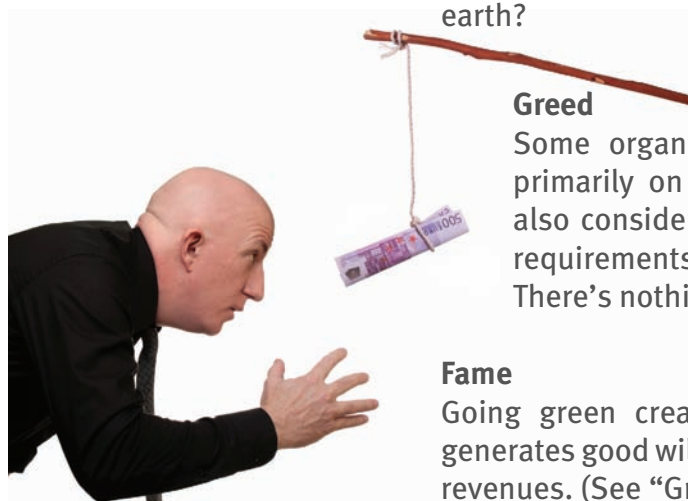
For a more comprehensive introduction to a broader range of green computing strategies, we recommend you read, “Shades of Green: Which One Will Your Organization Choose?”



Why implement green computing?

We already mentioned that green is about reducing the impact of human civilization on the earth. For some managers, that is reason enough to go green, but others require more than that for motivation. Some believe that global warming is just a conspiracy dreamed up by people who want clean air. They are more concerned with financial results.

So what are some reasons for going green other than saving planet earth?



Greed

Some organizations, if they use capacity planning, focus primarily on minimizing the number or cost of servers. By also considering factors such as heating, cooling, and space requirements, organizations stand to save a lot of money. There's nothing wrong with that!

Fame

Going green creates favorable publicity. It proves you care. It generates good will. Good will means more customers and increased revenues. (See "Greed," above.)

Fear

Some organizations are going green now, because they are afraid that if they don't, their competition might beat them to it. And future governmental regulations will require more and more environmental conservation. If you wait until tougher laws go into effect, you may be at a disadvantage if your competition has already taken proactive measures.

Love

Suspending cynicism for a moment, there really are a lot of genuinely altruistic and moral reasons to go green. It's hard to argue against preserving the planet for our grandchildren and our grandchildren's grandchildren.

Different ways to go green

Choosing a green strategy is difficult. Green computing has many aspects. Depending upon the goals and needs of your organization, some green computing solutions may fit; others may not. Let's quickly look at a sampling of the different methods for optimizing your data center for green computing. (If you aren't interested in the big green picture and are reading this only to find out what TeamQuest can do for your green initiative, skip this section.)

TeamQuest Performance Software is going to be of assistance primarily for optimizing the equipment used by your IT operation.

Equipment Optimizations

IT infrastructure such as servers, routers, printers, PCs, etc. can be tuned and/or configured to use less power, cooling, and floor space. You might attempt to use fewer servers, perhaps by way of server consolidation, in order to reduce the number of power- and cooling-hungry devices in your data center. Another strategy might be to employ PC hibernation or even set up procedures or policies for powering down devices when they are not in use.

Another way to greenify your IT infrastructure is to institute recycling policies for equipment that is being retired. Or you can attempt to purchase as much locally as possible, in order to reduce shipping, which inevitably requires the use of transportation that adds to your organization's total carbon footprint. Another technique to go green is to purchase equipment that will last longer, perhaps because it is designed to facilitate repair rather than replacement.

Facilities Optimizations

Tuning your IT equipment isn't the only way to go green. You should also take a look at your buildings, grounds, and vehicles. You can optimize buildings by using renewable power sources, automating lighting controls, switching to fluorescent bulbs, including skylights, building with naturally sustainable materials such as bamboo, and by keeping live plants indoors to help purify inside air.

To make your landscaping more efficient, you can plant trees to create shade for buildings, reducing cooling requirements. You can plant green buffer zones rather than concrete in order to reduce surrounding temperatures, and use rainwater for irrigation. You can use greener corporate vehicles, switching to electric, hybrid, or other more environmentally friendly transportation. You actually reduce your company's use of buildings and transportation by facilitating and encouraging telecommuting, making it possible for employees to work without coming to the office.

A green computing initiative can have many aspects. Your green strategy should include material actions that lead to tangible, credible results.

Consumables Optimization

There are a large number of consumable items that are used every day in a typical IT operation. Reducing the amount of consumables, and thereby reducing the amount of materials destined to become waste, is a necessary part of any comprehensive plan to go green.

You can greatly reduce paper use by not printing reports, for example. Store them electronically and view them on display screens when needed, thus saving paper, toner, ink, wear and tear on equipment, and reducing power requirements. Distribute reports electronically to save on the use of shipping or couriers. When you do have a need to print a stored report, print only the portion that is needed rather than the entire report.

Use reusable recording media such as diskettes or memory sticks rather than CDs or DVDs that can introduce more plastic to the landfill. When it is time to ship or request a shipment, select options that utilize less packaging materials and that use renewable packing materials.

Encouraging Behavioral Changes

All the technology in the world will not help if the people using it do not understand or choose to observe a green computing mindset. Here are some ideas on how to energize employees on green.



- Subsidize/finance employee use of hybrid or high-efficiency vehicles
- Offer incentives for the use of carpools for getting to work
- Provide in-house recycling receptacles
- Provide brown bag seminars to help educate employees on how to be more green at work and at home

Community-based Initiatives

Medium and large organizations can expand the scope of their green computing strategy to deploy solutions that benefit the community as well. For example, a manufacturing company that uses large quantities of water in its manufacturing process could clean the water and return it to the aquifer afterward. An organization might also elect to use environmentally-friendly methods for private trash and sewer disposal. A more generally-applicable suggestion might be to provide public access to grounds that are not needed yet for facilities, making them available as green areas for picnics or wildlife refuges.

As you can see, a green computing initiative can have many aspects. It may seem quite daunting to have to consider all the possibilities. An easier method for going green would be to go out and buy carbon credits; however that does not do much for building a credible corporate image (fame). We see and hear “green” messages every day in a variety of media. You need to be able to espouse your social responsibility to stay even with your competition. But simply saying you are green isn’t enough. Care must be taken to avoid a strategy with little tangible content as those are soon uncovered, attracting public criticism followed by corresponding drops in revenues. Your green strategy should include material actions that lead to tangible, credible results.

What TeamQuest Performance Software will not do for you

TeamQuest Performance Software can be an important part of your overall green strategy, but it can't do everything.

TeamQuest Performance Software can help you with a portion of your overall green initiative, but it can't do it all. TeamQuest software will not:

- Prevent your CEO from using a corporate jet
- Improve the energy efficiency of your trucks
- Provide your facility with a renewable source of electricity
- Recycle your batteries
- Subsidize your employees' use of high-efficiency vehicles
- Add insulation to your attic
- Construct you a new office using renewable bamboo construction materials
- And more!

You get the idea. Although we advise you to pursue these and many additional aspects as part of a credible and effective green initiative, TeamQuest Performance Software is going to be of assistance primarily for optimizing the equipment used by your IT operation. (See "Equipment Optimizations," above.)

TeamQuest measures and monitors green parameters

To manage any process, including optimizing the environmental impact of IT services, you need a method to measure and monitor results. You want to be able to demonstrate progress and have the ability to communicate success. TeamQuest Performance Software is ideally suited for measuring and monitoring IT infrastructure for these purposes.



Your first step in working to optimize your IT infrastructure is to determine what parameters you care about. Are you working to reduce space requirements, cooling, or power consumption? Through the use of a TeamQuest user agent, it is possible to gather just about any kind of data regarding your green effort, including power and temperature data. Most IT operations are likely to have sensors for measuring power and temperature, but if yours does not, those sensors can be readily obtained.

Using data from devices that sense power utilization and temperature is a simple matter of implementing a TeamQuest user agent to obtain necessary information. It can then be stored and analyzed right along with all of the other data that TeamQuest Performance Software gathers for facilitating IT Service Optimization. The only difference is that now we are optimizing for new kinds of parameters.

TeamQuest Performance Software is ideally suited for measuring, monitoring, and reporting the green aspects of IT infrastructure.

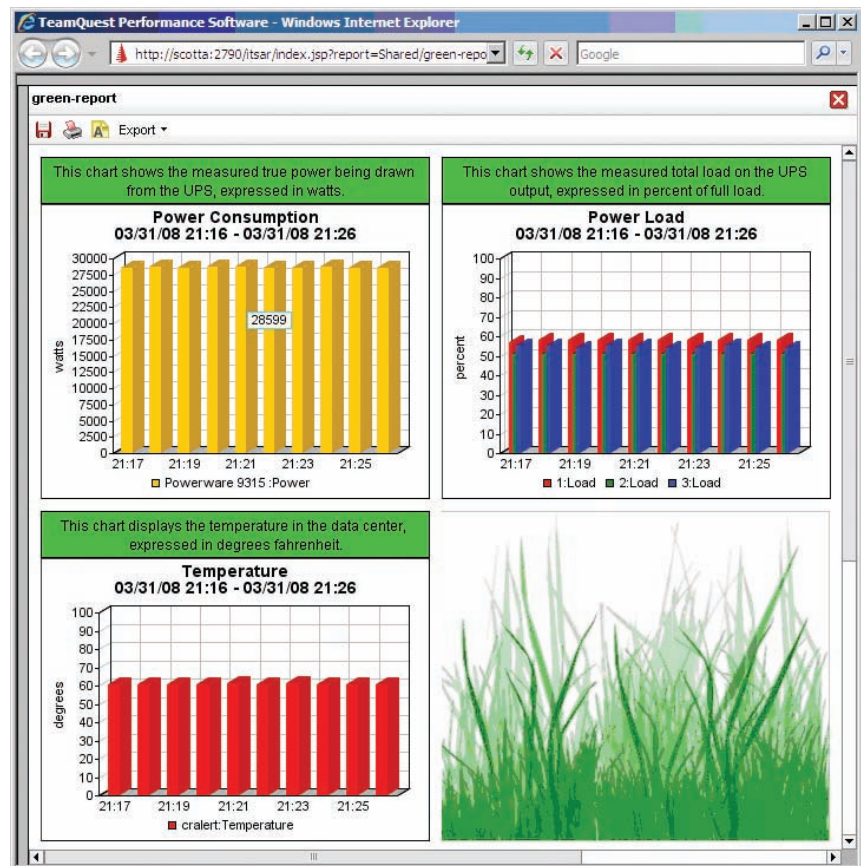


Figure 1
TeamQuest IT Service Reporter
Power and Temperature in TeamQuest's Data Center

Once you have your green parameters instrumented, you can gather data for a representative period of time in order to establish a baseline or starting place for your green project. As the project progresses and after it is complete, you can measure again and compare with your baseline in order to demonstrate success.

TeamQuest helps reduce power, cooling, and space requirements

Mature IT organizations knowledgeable about IT Service Optimization realize that capacity planning is a crucial, early step in any virtualization and/or server consolidation project. Capacity planning ensures that systems will meet service levels while accommodating future workloads.

Capacity planners nearly always consider equipment costs as a key part of their planning efforts. Capacity planners evaluate multiple alternative configurations in order to find optimal solutions. TeamQuest Model can help them do that much more quickly than competing software tools.

The goal is to find a way to satisfy service levels while handling forecasted future workloads, but to do so without spending more than necessary. You do not want to over-provision, because over-provisioning is a waste of money. That’s probably why you have a capacity planning process in the first place. You also do not want to under-provision such that service levels will be breached within the time period covered by your capacity plan.



Capacity planning then is traditionally a process of searching for configurations that will balance two variables, performance and cost. But cost is just one of many important attributes of the equipment in your data center. Green aspects, such as the power, cooling, and space requirements for your infrastructure, are becoming at least as important as up front cost.

In the charts below you can see a six year forecast of response time for a particular workload after implementation of a server consolidation project. Figure 2 shows the forecasted performance using server configurations that will result in the data center consuming 13.1 gigawatt hours of electrical capacity to power its servers over the course of six years. Figure 3 shows a better-performing configuration, but notice that the power consumption is much higher, 15.7 gigawatt hours over the six year period.

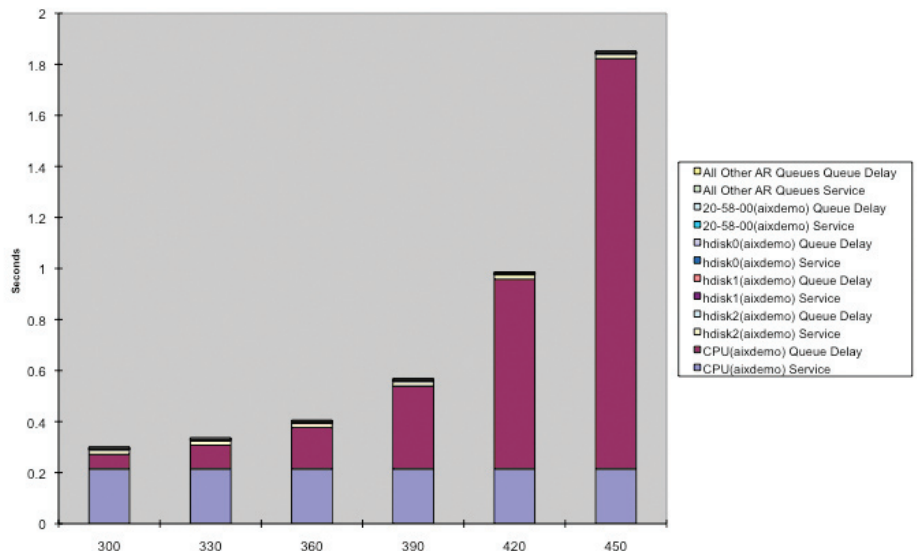


Figure 2
TeamQuest Model Scenario
Components of Response Time
6 Year Power Consumption: 13.1 GW-h

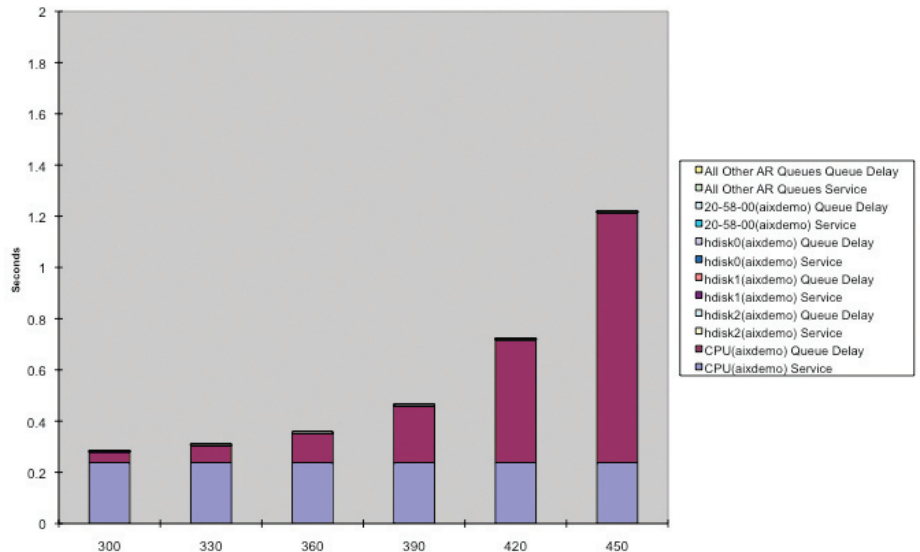


Figure 3
 TeamQuest Model Scenario
 Components of Response Time
 6 Year Power Consumption: 15.7 GW-h

With TeamQuest Model you can take care of profits while at the same time moving your data center toward green.

Using the example provided above and assuming an average utility rate of \$0.20 USD per kilowatt hour, the savings from going with the lower-performing configuration would be \$520,000 over the six year period, just considering power consumption alone. Assuming the cooling costs are similar, the high-performing configuration will cost more than the \$1 million USD more, and will greatly increase the carbon footprint of the data center housing those more powerful servers.

The difference in power and cooling requirements in this case might be enough to justify going with the lower-performing servers, or it may simply provide the motivation for running another what-if analysis using yet another configuration. With a little research and analysis, it may be possible to find a configuration with performance similar to that shown in Figure 3, but with lower power consumption similar to the servers graphed in Figure 2.

As you can see, one way to consider green aspects during capacity planning is to include the cost of power and cooling as part of an overall total cost of ownership calculation for the configurations that you are evaluating. The cost of space can be included as well. By simply including such ongoing operational costs when evaluating solutions with TeamQuest Model, you can take care of profits while at the same time moving your data center toward green.

Advertise your success

Even if fame wasn't your primary motivation for pursuing a green strategy, it makes sense to let the world know about your successful results. Be sure you have the reporting mechanisms in place to communicate your results to your management, to your clients, or quite literally, to the world.



TeamQuest IT Service Reporter is a great tool for periodically communicating the measured progress of your project, whether you are measuring kilowatts, BTUs, or monetary units. You will also want to be certain to summarize the big savings using whatever organizational status reporting mechanism you have in place. And don't forget to communicate major green accomplishments to the public relations folks within your organization, lest you miss out on the good will that environmentalism can bring. Customers like to do business with organizations with an environmental conscience.

Summary

TeamQuest Performance Software can help you optimize IT services for power, cooling, and space utilization.

There are more ways to go green than there are reasons for going green. With so many possibilities, it can be difficult to choose where to start your green initiative. The opportunities are great, so the key is to keep your green strategy broad and ambitious. Focus your attentions too narrowly and you may miss out on the strategies with the greatest payback. And if your efforts seem meager, you could appear less than sincere about your concern for the environment, triggering public cynicism and suspicion. It is possible to touch off negative publicity with a project that was honestly intended to bolster your organization's image.

So "green" should be a major part of your organizational culture. It should be a matter of policy that environmental considerations are to be taken into account for all projects, not just IT projects. And even within IT you should pursue multiple tactics for decreasing the environmental impact of your operation.

One way to get started with your green strategy can be to optimize your IT services for power, cooling, and space utilization. TeamQuest Performance Software can assist by helping you to:

- Take baseline measurements of power and cooling utilization
- Capacity plan for server consolidation, server virtualization, and equipment purchases in general, taking green considerations into account

- Track green factors such as power and cooling in order to evaluate the ongoing progress of your green effort
- Report on results so that you get credit for your efforts to go green

By optimizing power, cooling, and/or space rather than just initial purchase cost, you can modify your IT Service Optimization (ITSO) process to work as an important part of your overall green initiative. ITSO can provide a quick initial win, helping you to successfully begin your bigger overall effort to go green.



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