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Achieving Sustainable IT with Application Resource Management

PeerSpot

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Introduction

As the climate crisis worsens, organizations across the globe are making a major push toward greater sustainability. IT teams have an important role to play in advancing their broader organizations' sustainability initiatives. Drivers of these sustainability initiatives include regulatory pressure and voluntary efforts based on a desire to reduce the environmental impact of IT operations. In some cases, sustainability is an explicit, defined goal. Other times, it arises from indirect, but no less consequential actions, e.g., reducing infrastructure resource use, which translates into less carbon creation from power and cooling processes. In this paper, users of IBM Turbonomic application resource management software discuss how the solution has enabled them to "right-size" their infrastructure and shrink their environmental footprint—while assuring application performance.

Except where noted, the companies mentioned in this paper have between 1,000 and 5,000 employees.

How IT Resource Use Affects Sustainability

IT operations affect the natural environment in a variety of ways. Computer hardware uses a great deal of electricity, as do data center cooling systems. The IT sector has a significant carbon footprint as a result. Data centers consume substantial volumes of water, too. They're built structures, comprising hundreds of millions of square feet worldwide.

For these reasons, any increase in IT resource efficiency promises to reduce the environmental impact of IT operations and further the achievements of an organization's sustainability initiatives. This issue is growing more relevant and serious over time. IT must do its part to contribute to a sustainable future. And, with energy prices on the rise, it certainly makes economic sense to improve IT resource utilization. By doing its part for sustainability, the IT department can become a key contributor, or even a leader in sustainability within the organization.
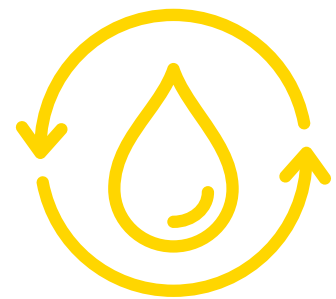
Sustainability

How Application Resource Management Leads to Better Sustainability Outcomes

To improve sustainability outcomes, it's necessary to start with the applications themselves. It is applications that drive the CPU cycles, storage functions and network processes that consume energy. Application resource management has the potential to reduce power and cooling requirements for IT operations. It does this by "right-sizing" infrastructure and optimizing application workloads. Figure 1 provides a simple look at the relationship between CPU use, power and cooling.

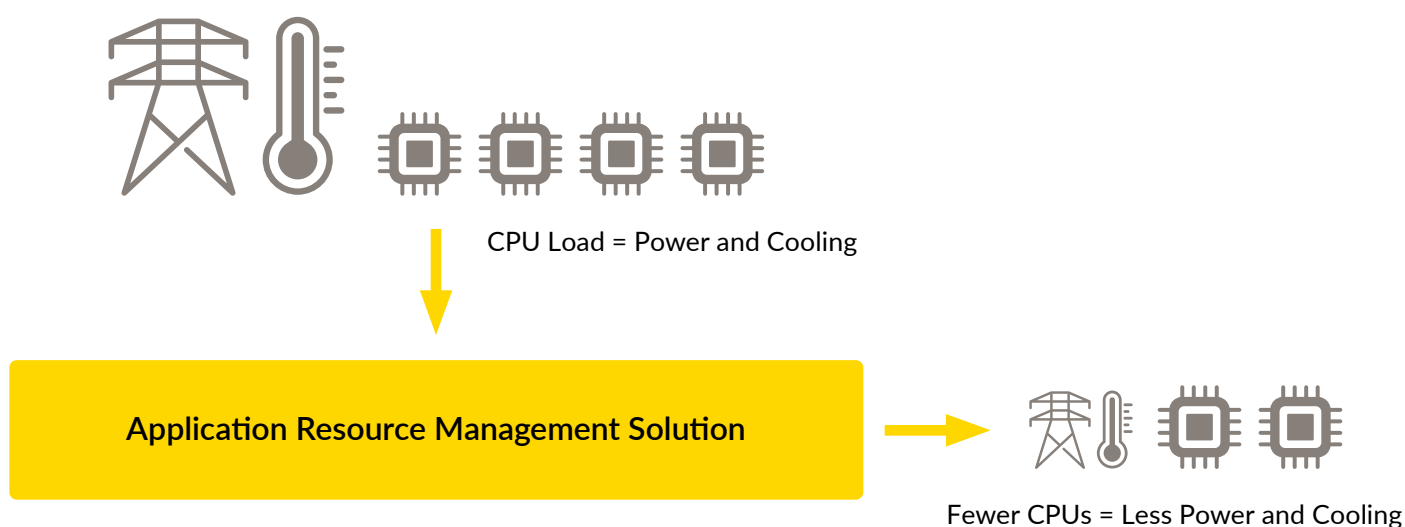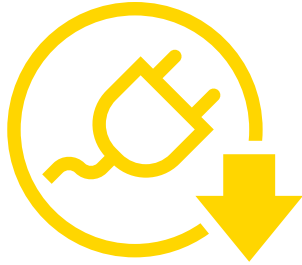CPU Load = Power and Cooling

Application Resource Management Solution

Fewer CPUs = Less Power and Cooling

Figure 1 – By reducing application demand on CPUs, application resource management solutions can cut down on energy and cooling needs.

Power and Cooling Impacts

Reduce Power and Cooling Needs

Application resource management has the ability to reduce power and cooling needs in the data center. As a Senior Systems Engineer at a university explained, before adopting Turbonomic, his system management tools were putting a heavy load on what he called his "little boxes," while only allocating a light computing load to the "big boxes." This approach to load balancing led to unnecessary power use. Turbonomic, he said, "made the hardware more cost-effective because I didn't have little guys sleeping in a corner someplace <u>sucking up hardware, power, and cooling</u> while not doing any work all day." Figure 2 depicts this process.

Underused In Use

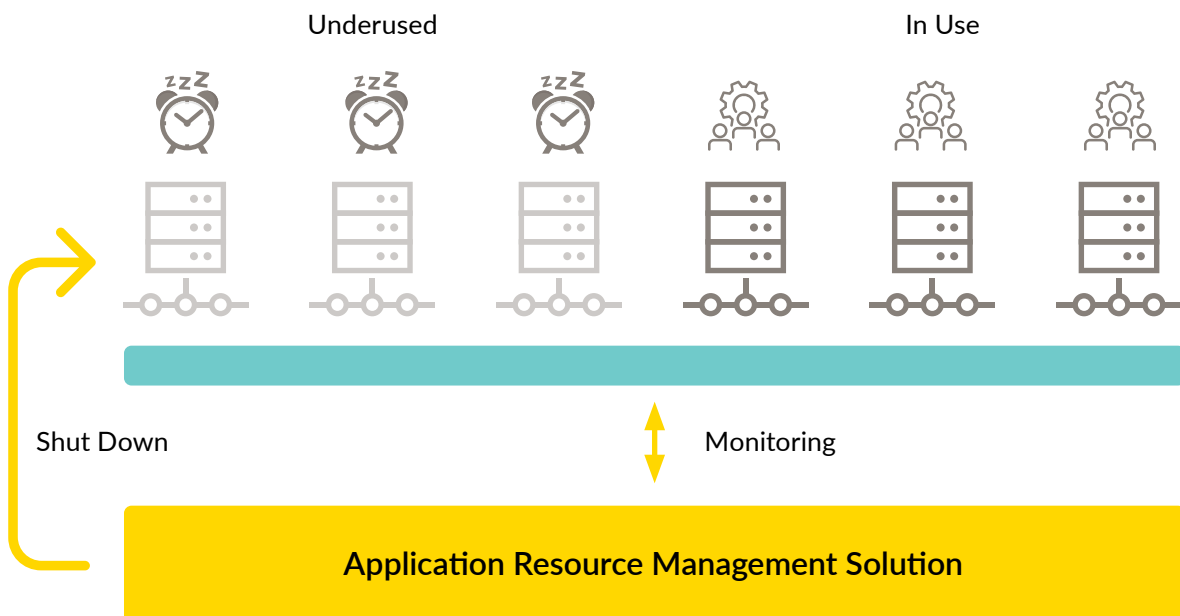Shut Down Monitoring

Application Resource Management Solution

Figure 2 - Application resource management solutions can find underused servers and shut them down.

Right-Sizing Infrastructure

PeerSpot members found that Turbonomic's application resource management capabilities enabled them to work smarter regarding adding resources. For example, according to a Server Administrator at a logistics company, "<u>The right-sizing is the most valuable feature</u>. It constantly lets you know if a machine is being over-utilized or under-utilized, so that you can make it the appropriate size for what you need it for."

A Principal Engineer at a software company found that Turbonomic's right sizing feature "<u>makes sure that our virtual machines are sized properly</u> so we don't have a lot of wasted resources, either too large or too small."

This user then elaborated, saying, "For my maintenance weekend, I can schedule it to right-size a subset of VMs [virtual machines] every month. That works perfectly for me. It goes out on its own and tells me which machines need to be changed. Then, it will perform that function. I don't have to do any manual intervention. It runs its own report in the background." In this way, the solution prevents what he calls "resource starvation." He can also use the solution to simulate load and plan accordingly.
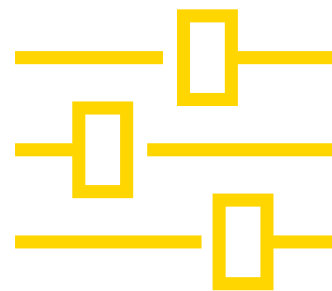
Right-Sizing Workloads

"It identifies areas where we can <u>delete storage that is not being used</u>," said an ICT Infrastructure Team Cloud Engineer at a mining and metals company with over 10,000 employees. Turbonomic lets his team address right-sizing workloads that are overprovisioned in the public cloud.

Right-sizing VMs in AWS is one of several ways that a Senior Cloud Engineer at O.C. Tanner Co., a manufacturing company, uses Turbonomic. He said, "We're using it to improve performance efficiency in our Kubernetes containers and make sure the requests are in line with what they should be. If an application has way more memory allocated than it needs, Turbonomic helps us decide to scale that back."

For a Director of Infrastructure at a tech services company with more than 200 employees, the application resource management workload is the <u>right-sizing of virtual servers</u>. As he said, "This is relevant for both hot-add, and during an improvement-maintenance window where resource reclamation of the virtual servers takes place."

Optimizing Application Workloads

Achieving sustainability goals involves optimizing application workloads. This way, they minimize power consumption while ensuring applications perform optimally. Ideally, the optimization process should be continuous and automatic. As an Advisory System Engineer at an insurance company explained, "Performance is something that should constantly be monitored and constantly be worked on. Turbonomic is doing that in the background, without me having to manually do it."

He elaborated, saying, "It's monitoring something that I just physically couldn't do all by myself because the environment is too large. It's looking at the resources in any environment and taking snapshots of where things are. At the right time, it's adding or taking away resources, and that's helping make the environment more efficient. We have too many machines for one person to do that. The automation helps me in that it is done in a really efficient way and a balanced way because of the policies. It really helps."
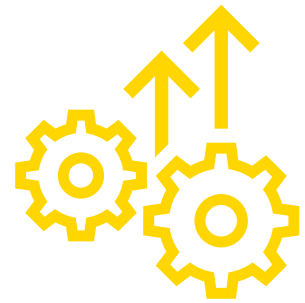
Optimization

Advisory System Engineer
at a insurance company with
1,001-5,000 employees

★★★★☆

"Performance is something that should constantly be monitored and constantly be worked on. Turbonomic is doing that in the background, without me having to manually do it."

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For the logistics company Server Administrator, what mattered was the ability to <u>optimize application performance</u> on a continuous process. His perspective is that this task "is beyond the scope of a human to be able to do on a consistent basis." For example, he said, "If you have 20 virtual machines, it's reasonable that a human could watch the utilization and determine size changes as needed, but if you're getting into hundreds of virtual machines, it becomes a task that's beyond the ability of a person to do by himself. It's a question of scale. As you get into hundreds of VMs, it becomes too tedious to keep track of and it becomes very time-consuming as well."

What IT managers know, but cannot always detect, is that some VMs are not being used much at all. This is a waste of assets as well as carbon-polluting electricity. To remediate this problem, PeerSpot members like a Sr. Cloud Architect at a software company with over 10,000 employees are <u>optimizing unused VMs</u> with Turbonomic. In his experience, Turbonomic "enables us to say, 'If you combine these, or if you decide to go with a reserve instance, you will save this much.'" The solution provides an estimate using, for example, a Microsoft cost model, to show how much can be saved. This technique saves energy as well as money.

The primary use case for a Head of Enterprise Wide Technical Architecture at a healthcare company with more than 5,000 employees is to <u>optimize their environment</u>. Specifically, as he shared, "We will take our OpenShift environment and use Turbonomic to monitor the size of the [Kubernetes] pods, then determine where to place the pods as well. We will make recommendations from that perspective."

For him, "Turbonomic is an excellent product as far as we are concerned for managing the pod sizes and determining the best sizing for those pods." He needs this capability because his development staff prefers to maximize the size of their pods and requests in terms of memory and CPU, a process that leads them to potentially run out of resources.

Turbonomic can also help with the optimization of cloud workloads, as O.C. Tanner's Senior Cloud Engineer explained. He said, "Turbonomic can show us if we're not using some of our storage volumes efficiently in AWS. For example, if we've over-provisioned one of our virtual machines to have dedicated IOPs [inputs/outputs per second] that it doesn't need, <u>Turbonomic will detect that and tell us</u>. You can save like a thousand bucks a month by switching the storage class. With a click of a button, it automatically makes the changes for you, and you can go in and save a ton of money on AWS with it."

Reducing IT Footprint

The more that an app's computing can be compressed into smaller form factors, the more sustainable it will be. For instance, if a single server core can power an app that used to require two cores, that represents a reduction in electrical power use and cooling requirements. Processor cores are like toasters, in electrical terms, so the more an app "lights them up," the hotter they get, and the more power-consuming air conditioning is needed.

A Sr. System Engineer at Liquidity Services, a logistics company, spoke to this issue when he said that Turbonomic helps reduce their IT footprint and cost. "It handled that perfectly," he remarked. The solution also helped with sustainability for this user by automating shutdowns and startups. "We can turn machines off when they are not being used," he said.

IT Footprint Reduction

Cost Savings

Sustainability is not just good for the environment. It's good for the bottom line. Energy costs money. Data center space costs money—a lot in some cases. Solutions that shrink IT footprints and power use also cut expenses. Conversely, cost savings should correlate with energy savings. This is not always the case, but given the relationship between costs and energy use, this tends to be true.

To this point, PeerSpot members highlighted the cost savings benefits of Turbonomic in their reviews. The insurance company Advisory System Engineer, for instance, shared, "It helps optimize cloud operations and reduce our cloud costs. We're putting things on a certain type of storage and moving things to best fit our environment and give us the best cost for our environment. It will also give us an idea, before we put it there, of what the cost will be before we move it to [Microsoft] Azure."

Chris B.
Sr System Engineer at
Liquidity Services

★ ★ ★ ★ ★

"Turbonomic has helped optimize cloud operations and reduced our cloud costs significantly."

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Turbonomic helps optimize an organization's Azure footprint, which can make cloud migration part of a sustainability strategy. This was the story for Liquidity Services Sr. System Engineer. By moving from on-premises to Azure, they went from having three data centers at approximately 18 offices, with VMware servers in all of them, to three offices and a total of five complete servers. He said, "We budget three million a year. If I can shave 30 to 40 percent off of that, then we can build 30 to 40 percent bigger in Azure."

Liquidity Services Sr. System Engineer said, "Turbonomic has helped optimize cloud operations and reduced our cloud costs significantly. Overall, we are at about 40 percent savings, and we spend about three million a year just in Azure. It reduces the size of the VMs, putting them into the right template for usage."

For additional context, this user commented, "People don't realize that you don't have to future-proof a virtual machine in Azure. You just need to build it for today. As the business or service grows, you can scale up or out. About 90 percent of all the costs that we've reduced has been from sizing machines appropriately."

The tech services Director of Infrastructure provided a quantitative example. He said, "One thing that <u>we are able to assess is savings from an OpEx [operating expense] perspective</u> as a result of right-sizing. We understand how much an administrator would charge back to the company per hour to troubleshoot a particular issue. We have a dashboard to show the value from an OpEx savings perspective with the automation that it's doing. Last year, for example, we had $188K in operational savings due to automation, and we have saved $16K so far this year."

Application resource management can also help save money in other operational areas. "Turbonomic has definitely helped to <u>save human resource time and cost</u> involved in monitoring and optimizing our estate," said a Principal Engineer at an insurance company with over 10,000 employees. "It has automated a lot of things."

"The solution has absolutely helped <u>reduce our IT-related CapEx [capital expense] and OpEx</u>. The money that we have saved by minimizing our costs in the cloud allows us to spend more in the cloud versus buying physical hardware.

Keldric E.
Advisory System Engineer at a insurance company with 1,001-5,000 employees

★★★★★

"Turbonomic has helped to reduce performance degradation in the same way as it's able to see the resources and see what it needs and add them before a problem occurs."

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Other notable comments about cost savings due to application resource management included:

- "We use Turbonomic to help optimize cloud operations, and that has reduced our cloud costs. We have a lot of applications that we run which are very cyclical. Fourth quarter of the year, they get the crap beat out of them. The other three quarters of the year, they are not used a whole lot. It has helped save cloud costs by seven figures." - Director of Enterprise Server Technology at an insurance company with over 10,000 employees

- "When it comes to cloud costs, to VMs, the solution is saving us about $30,000 a month. It has also definitely reduced our IT-related expenditures by about $40,000 per month. And, when it comes to the human resource time involved in monitoring and optimizing our estate, it saves us about 20 hours a week." - Infrastructure Manager at an insurance company with more than 500 employees

- "We use Turbonomic to help optimize our cloud operations, and it has reduced our cloud costs. We have been able to identify unattached premium storage, paying for storage that we weren't using. We have also been able to identify instances that were assigned a larger template than was actually needed. So, we were able to then downsize them. This ended up saving us a significant amount of money by rightsizing those instances." - AVP Global Hosting Operations at an insurance company with over 10,000 employees

Turbonomic is now able to report on energy savings on-premises. Users can estimate their IT data center's carbon impact and see quantitative data showcasing the energy savings they have achieved by implementing IBM Turbonomic automation. The solution further offers recommendations for power reduction.

Avoiding Performance Issues

Application resource management should not negatively affect performance. Indeed, some organizations are reluctant to get involved in energy reduction or data center resource optimization out of concern that these practices will get in the way of delivering great user experiences. This does not have to be a tradeoff. It is possible to get become more sustainable without compromising performance.

As an Advisory System Engineer at an insurance company commented, "Turbonomic has helped to <u>reduce performance degradation</u> in the same way as it's able to see the resources and see what it needs and add them before a problem occurs. It follows the trends. It sees the trends of what's happening and it's able to add or take away those resources." A System Engineer at a financial services firm with more than 200 employees likewise said, "It provides a proactive approach to avoiding performance degradation, absolutely. <u>It always looks at history and looks for patterns.</u>"

"Turbonomic's <u>application-driven prioritization</u> helps us identify where risks are coming from while proactively preventing performance degradation," said O.C. Tanner's Senior Cloud Engineer. "It's nice to be able to avoid problems before they happen. I don't have to wake up in the middle of the night and respond to some alert because one of our applications ran out of memory, and people couldn't use our product. It's helped me get some sleep."

Risk Identification

Conclusion

Sustainability is a serious, long-term issue that all responsible businesses need to address. IT can be part of the solution. Digital infrastructure consumes substantial amounts of energy, so improvements in its efficiency can have a measurable effect on an organization's carbon footprint. This is where IBM Turbonomic can make a lasting impact at your organization. As PeerSpot members discussed in their reviews, Turbonomic application resource management software enables them to "right-size" their infrastructure and cut down on energy and cooling needs while assuring application performance.

About PeerSpot

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About Turbonomic

IBM Turbonomic provides Application Resource Management (ARM) software used by customers to assure application performance and minimize cost by dynamically resourcing applications across hybrid and multicloud environments.

For more information, visit ibm.com/products/turbonomic