IT BUSINESS INTELLIGENCE

ACHIEVING COST SAVINGS BY
RIGHTSIZING
SERVERS WITH ITBI™

SMT Data
Specialists in IT Business Intelligence

Contents

Executive Summary

According to a recent international survey[1], 30 percent of all servers – or 10 million worldwide – are completely idle or severely underutilized. Some of the servers have much more capacity (CPU, memory, disk) than they need to run their workload. Some of them are not doing any useful work at all, but have simply been forgotten and never decommissioned. Identifying the low hanging fruit – the expensive servers with low utilization – and rightsizing these servers typically results in savings of 10-30% - equating to millions of euro for a large IT installation.

Monitoring tools and unhappy users tend to ensure that the under-configured servers are dealt with, but usually no one is looking at the over-configured servers. Virtualization has led to the perception that over-allocation of capacity is free because the hypervisor and thin provisioning should ensure that the virtual server doesn't actually get more capacity than it needs. But the reality is more complex and not very transparent. Software costs, for example, are often driven by allocated virtual capacity. Installations that have outsourced their operations or moved to the cloud are usually paying for allocated virtual capacity, and the outsourcer or cloud provider is harvesting the benefits of virtualization. Even for installations that own the hardware and license software based on the physical installation, rightsizing virtual servers has benefits.

Large IT installations have a wealth of data about capacity and performance but struggle to create value from this data. Successful rightsizing requires tools that create transparency - combined with people and processes focused on cost-hunting. A good data warehouse to manage the data and good reporting and analysis tools are a must. It is also important to enrich the technical data with cost and organizational information in order to understand 'who is using what for how much' (see figure 1, below). SMT Data's IT Business Intelligence (ITBI[tm]) solution is built for this and the examples in this paper are based on SMT Data's experience using ITBI at large customer installations.
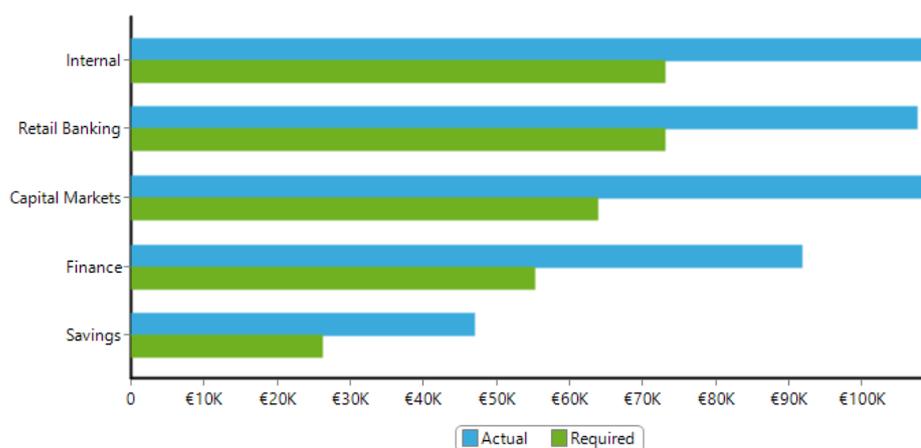

Figure 1: Technical data can be enriched with business data to understand "who is using what and for how much?" This ITBI report shows the actual server costs per month per department as well as the estimated costs if the servers were rightsized.

Rightsizing is an iterative process, getting you closer and closer to an optimal configuration. A concentrated one-off effort can result in significant savings, but ensuring that rightsizing is on ongoing discipline is even more beneficial and ensures sustainability of savings. Ongoing rightsizing can create large savings in connection with hardware refresh, DevOps, infrastructure integration, outsourcing, software license management and cloud. SMT Data, and SMT Data's partners, can provide both the tools and the consulting assistance required to ensure that these efforts are successful.

With the right tools, organization and processes, and with a relatively small amount of time and effort, rightsizing can save a large IT organization millions of euro a year. The rightsizing opportunities in most installations are big and clear cut. The low hanging fruit are easily identified with ITBI even without knowing all the technical details or understanding the full complexity of the cost model.

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[1] Research published in June, 2015 by Jonathan Koomey, Research Fellow, Steyer-Taylor Center for Energy Policy and Finance, Stanford University and Jon Taylor, Anthesis. www.koomey.com / www.anthesisgroup.com

How to Rightsize

Rightsizing starts out with gathering data about what to rightsize. A good data warehouse to manage the data and good reporting and analysis tools are a must. SMT Data's IT Business Intelligence (ITBI) solution is built for this and the examples in this paper are based on SMT Data's experience using ITBI at large customer installations.

Once the data and tools are in place, then it is straightforward to identify the most expensive servers with lowest utilization and reduce their allocated capacity to what is actually needed. KPIs, such as the number of over-configured servers, or number of excess cores, etc. can be used to track progress and ensure focus. Enriching the technical data with information about who is using the capacity can be helpful in the dialog with the business users. Adding cost information makes it easier to prioritize rightsizing, quantify trade-offs and document the resulting savings from the rightsizing effort.

Rightsizing is an iterative and ongoing process. A concentrated one-off effort can result in significant savings, but ensuring that rightsizing is an ongoing discipline is even more beneficial and ensures sustainability of savings.

1.   Gathering the data

Capacity and utilization data is fundamental to rightsizing. Typically, this means gathering months of historical CPU, memory, disk and network allocation and utilization for all of the servers of interest. The data should be granular (for example in 10 minute intervals) - and detailed (down to the individual processes and services running on each server).

Ideally, the data should be collected in a 'low touch' fashion. This means minimal footprint and minimal performance impact on the servers being measured. ITBI uses the Windows Management Instrumentation (WMI) interface to remotely gather capacity and performance data from each server. Similarly, standard Unix commands are executed through a secure shell connection to gather data from Linux and Unix servers. This means that no agents need to be installed on the servers being measured and the additional load on the servers and network is negligible.

The data should be stored in a well-structured data warehouse with good analysis and reporting tool support. ITBI is based on standard data warehouse and BI technologies and includes a rich set of standard reports to ensure a simple implementation and fast time-to-value.

2.   Enriching the data

The technical capacity and performance data described in the previous section is standard data provided by the operating system. While standard data can be used 'out of the box' for a rightsizing effort, it can be extremely useful to enrich this technical data with business information to better understand who is using what capacity and what it costs. ITBI has rich support for this kind of mapping.

The technical dimensions such as server name can be mapped to a business dimension such as the organizational unit owning the server or the application running on the server or preferably both. This mapping can often be extracted from a CMDB, asset management system or naming convention. A complete mapping of all servers is not needed. Like in everything else in rightsizing, the focus is on understanding the big servers with low utilization.

The technical measurements can also be enriched with cost information such as a cost per server, cost per core, cost per GB of RAM or disk. Remember to include the key software products, especially SQL Server, Oracle and SAS that are often more expensive than the underlying server and often licensed based on capacity. Exact costing can be quite complicated, but approximate costs are good enough for the purpose of rightsizing. The objective is to identify the most expensive servers in order to know what to focus on.

Special attention should be paid to choosing the right measurements during cost mapping. If your software is licensed based on a cost per core, is that per socket, per chip, per CPU, per virtual CPU? What about hyperthreading?

3.   KPIs

Key Performance Indicators can be useful in planning and managing a rightsizing effort. They help understand the rightsizing potential, track the progress of the effort and document the results. They are particularly useful in getting a management overview when dealing with an installation with thousands of servers.

ITBI supports both technical KPIs (e.g. number of cores installed across all servers versus the number actually needed, allocated disk space versus free space, GB of memory allocated versus in use) and financial KPIs (e.g. cost of excess cores, memory or disk). The business mapping above allows the KPIs to be measured by application, by business area, by sourcing provider etc. This can be useful in benchmarking business units or suppliers against each other.

Figure 2, below, shows an example of an ITBI dashboard showing the measured 'actual' values and the estimated 'required' values for a number of KPIs across a business area with 700 servers. The dashboard gives a quick overview of the overall rightsizing potential both in financial and technical terms. Here we see the KPIs calculated in April, before the rightsizing effort, and again in October, after the initial rightsizing effort. Rightsizing has reduced the monthly cost for this business area by €103.000 per month, a 15% savings, but there is still an additional rightsizing potential estimated to be a further €191.000 per month.
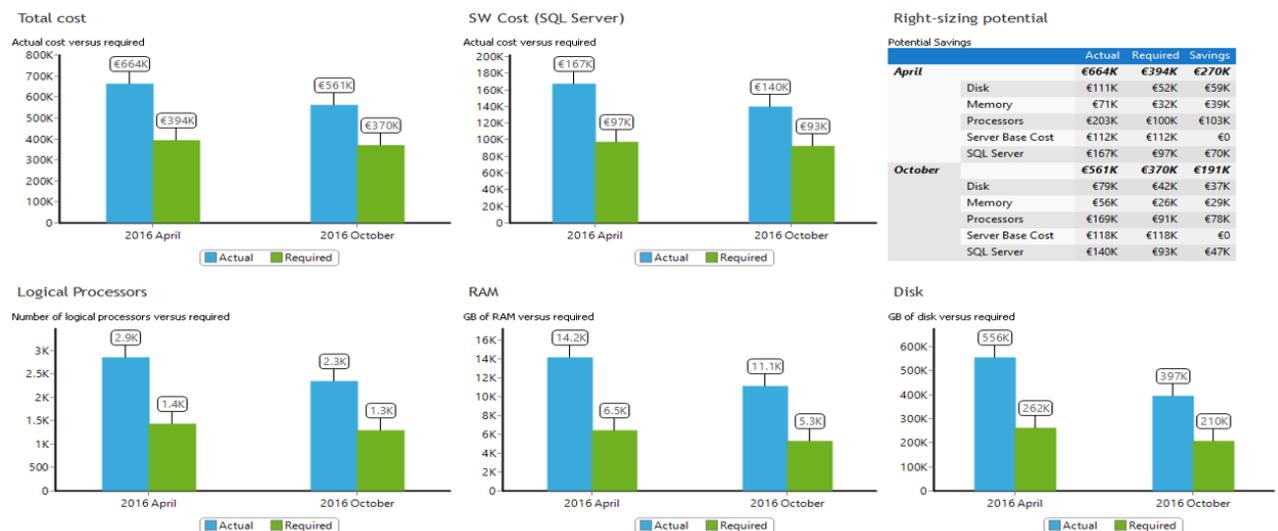

Figure 2: ITBI Right-Sizing KPI Dashboard showing various technical and financial Key Performance Indicators before and after a rightsizing effort.

4.   Finding the low hanging fruit

While KPIs give a good management overview of the potential and progress, more detailed information is needed to actually carry out the rightsizing. The next step is to generate lists of servers and sort them based on rightsizing potential.

Rightsizing potential requires knowing the actual configuration and then determining how much capacity is required to run the workload running on that server. The actual configuration is easy to measure, but determining what is required can be more difficult. There are several approaches to this, and ITBI's rightsizing algorithms are highly configurable.

Out of the box, ITBI uses a 99th percentile approach to rightsizing. For example, if a server has 16 cores, but runs at less than 50% utilization more than 99% of the time, then the 'required' number of cores is estimated to be 8 (50% of 16). If it runs at less than 25% utilization more than 99% of the time, then the 'required' number of cores is estimated to be 4 (25% of 16). Similar calculations can be done for memory. Disk is less forgiving than CPU or memory, so here a 30% buffer is added onto the maximum utilization for a period to determine the required allocation.

Such rules of thumb are obviously only indicative. They should be validated and adjusted based on experience and an understanding of the underlying applications. See more on this in the next section. Obviously the longer the period of observation, the more reliable the estimates. Normally you will want at least one month's worth of data, but ideally more, especially for servers that have a seasonal workload or are part of a cluster.

Figure 3, below, shows an example of a rightsizing list from ITBI. On the left, we see the 'actual' cost in € of each server broken down by components (disk, memory, cores, base cost, software). For the sake of simplicity, only SQL Server cost is included in the software and is assumed to be a fixed cost per core. On the right, we see an estimated 'required' cost based on the rightsizing rules of thumb discussed above. Finally, a

'difference' is shown. This difference reflects the potential monthly savings by rightsizing this server. The list can easily be sorted to find the low hanging fruit.

	Actual						Required						Difference
		+ Disk	+ Memory	+ Processors	+ Server Base Cost	+ SQL Server		+ Disk	+ Memory	+ Processors	+ Server Base Cost	+ SQL Server	
Total	€269,297	€32,160	€32,612	€94,725	€49,800	€60,000	€167,188	€16,363	€12,975	€52,650	€49,800	€35,400	€102,109
SMT000618	€6,520	€50	€480	€1,040	€150	€4,800	€949	€39	€30	€130	€150	€600	€5,571
SMT000625	€7,228	€758	€480	€1,040	€150	€4,800	€2,314	€394	€375	€195	€150	€1,200	€4,914
SMT000511	€5,063	€633	€320	€1,560	€150	€2,400	€1,064	€154	€30	€130	€150	€600	€4,000
SMT000004	€7,252	€942	€320	€1,040	€150	€4,800	€3,978	€633	€275	€520	€150	€2,400	€3,274
SMT000638	€5,063	€633	€320	€1,560	€150	€2,400	€1,944	€154	€245	€195	€150	€1,200	€3,119
SMT000273	€4,949	€1,133	€81	€585	€150	€3,000	€2,247	€627	€75	€195	€150	€1,200	€2,702
SMT000088	€3,341	€111	€160	€520	€150	€2,400	€1,022	€52	€90	€130	€150	€600	€2,319
SMT000444	€3,387	€157	€160	€520	€150	€2,400	€1,118	€98	€140	€130	€150	€600	€2,269
SMT000484	€2,183	€160	€313	€1,560	€150		€482	€22	€180	€130	€150		€1,701
SMT000119	€3,408	€178	€160	€520	€150	€2,400	€1,797	€117	€135	€195	€150	€1,200	€1,610
SMT000650	€2,405	€625	€60	€320	€200	€1,200	€1,016	€11	€45	€160	€200	€600	€1,389
SMT000649	€2,386	€625	€40	€320	€200	€1,200	€1,061	€31	€70	€160	€200	€600	€1,325
SMT000715	€2,357	€587	€160	€260	€150	€1,200	€1,145	€130	€135	€130	€150	€600	€1,212
SMT000260	€4,331	€1,101	€160	€520	€150	€2,400	€3,255	€775	€140	€390	€150	€1,800	€1,076
SMT000031	€4,517	€1,127	€320	€520	€150	€2,400	€3,460	€845	€275	€390	€150	€1,800	€1,056

Figure 3: A list of servers from ITBI, showing the actual costs and the estimated required cost after rightsizing. The list is sorted based on potential savings in order to easily identify the low hanging fruit.

5. Validating the opportunities

As discussed above, the rightsizing recommendations are only indicative and should be subject to further analysis before any action is taken.

In many cases, the conclusions appear clear cut. For example, the server has 64 cores and has never been over 2% utilization during the last 3 months. Still, each server needs to be looked at more closely before carrying out the rightsizing. This usually involves a discussion with the server owner. Maybe the application on the server isn't in full production yet, or maybe it is only used once a year. There can be valid business reasons for running with over-capacity.

But more often than not, the background is simply that capacity needs were not clearly known when the server was created, so it was given a lot of extra capacity 'to be on the safe side'. Once the system is running and not causing anyone problems, no one bothers to go back and reduce the capacity to what is actually needed.

This section outlines some further analysis that can be done to validate the rightsizing recommendations in cooperation with the application or business owner for the server.

The first step is to see the rightsizing recommendation in technical terms. Figure 4, below, shows an example of an ITBI report similar to the rightsizing list above, but shown in number of cores, GB of RAM and GB of disk rather than in €. The rules for determining the 'required' configuration are outlined in the previous section.

	Actual			Required			Excess Disk	Excess Memory	Excess Processors
	+ Disk	+ Memory	+ Processors	+ Disk	+ Memory	+ Processors			
Total	160798	6522	1443	81816	2595	801	78982	3927	642
SMT000484	800	63	24	111	36	2	689	27	22
SMT000511	3167	64	24	768	6	2	2399	58	22
SMT000638	3167	64	24	772	49	3	2395	15	21
SMT000485	136	32	16	72	28	2	64	4	14
SMT000618	250	96	16	197	6	2	53	90	14
SMT000286	157	32	16	117	7	3	40	25	13
SMT000448	137	24	16	108	6	3	29	18	13
SMT000625	3792	96	16	1970	75	3	1822	21	13
SMT000487	660	32	16	252	15	5	408	17	11
SMT000338	360	32	12	175	11	2	185	21	10

Figure 4: A technical rightsizing list from ITBI showing the actual current configuration of each serer, the estimated required configuration and rightsizing potential in technical terms. The list is sorted base on 'excess' logical processors in order to easily identify the servers with significant rightsizing potential.

From this list, we can drill down to an individual server and see its utilization over time. Figure 5, below, is an ITBI report showing CPU utilization and configuration for a selected server (SMT000511 from the list above) during a 10-month period. The server starts out in January with 24 cores and a CPU utilization around 5%. At the end of January, the server is reconfigured, reducing the number of cores from 24 to 8. The CPU utilization increases somewhat, but is still under 20%. A further reduction to 4 cores is carried out in May, resulting in a utilization around 40% with occasional peaks up to 80%.
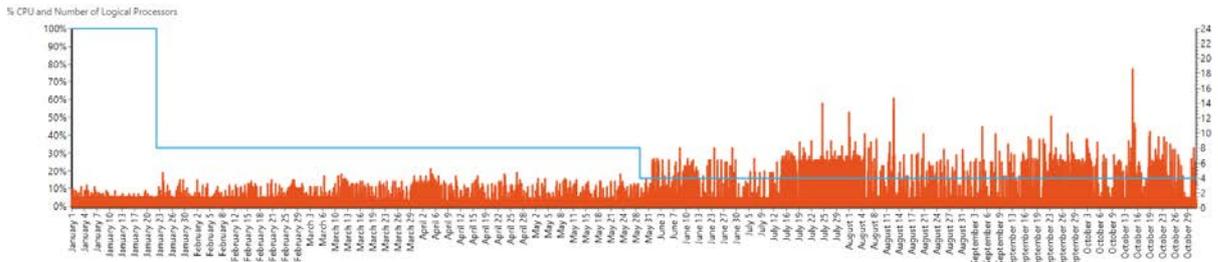

Figure 5: A graph from ITBI showing the number of logical processors over time in blue, and the percent CPU utilization in red. Here we clearly see both the rightsizing potential and the impact of the rightsizing actions over time.

Sometimes it can be useful to drill even further down and look at the capacity requirements for the individual process or services running on the server. Figure 6, below, is an ITBI report showing the CPU utilization by process for this server at the end of January, when the initial rightsizing step took place.

The pie chart on the left shows the CPU usage by the top 20 processes during this period. The graph on the right shows each process' CPU utilization in 10 minute intervals. Here we can clearly see the increase in CPU utilization after the rightsizing.
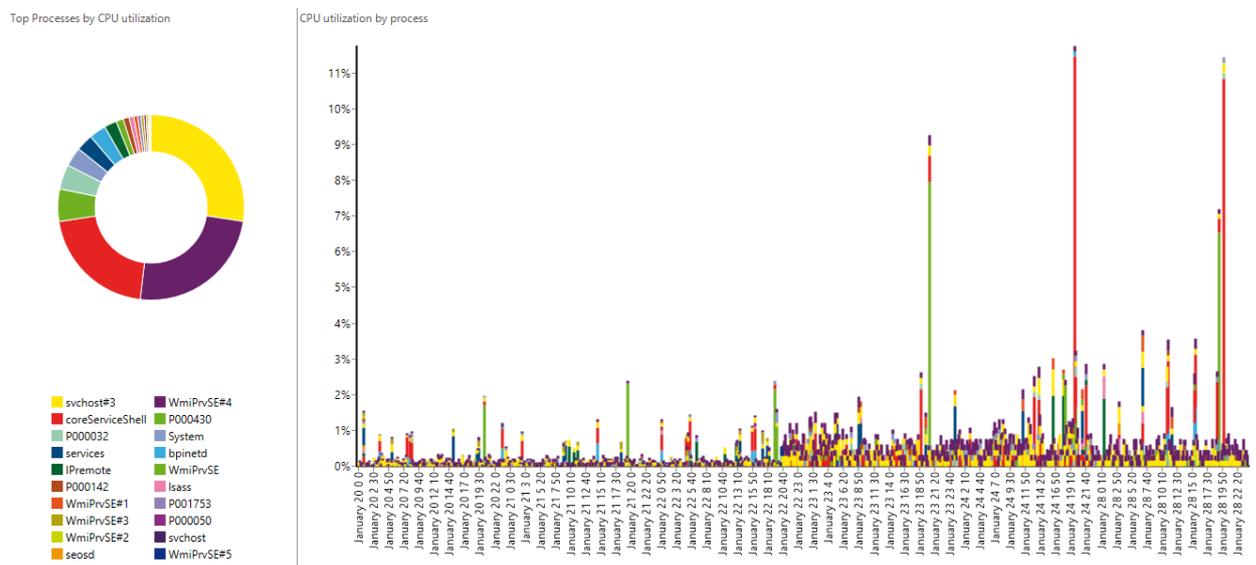

Figure 6: Detail process measurements from ITBI showing the top 20 CPU consuming processes on the server, and the cpu usage by process over a period of time in 10 minute intervals.

Note that although SQL Server is installed on this machine (as we saw in the Cost Overview above) the SQL Server process doesn't appear to be actually running. Can we simply uninstall SQL Server from the server and thereby achieve even bigger savings? Is the server even in use? From the process list, it doesn't look like it is doing much useful work. Maybe the server can just be decommissioned.

By creating transparency into this data, we can have a fruitful dialog with the application or business owner of the server and make fact-based decisions.

6. Tracking progress

Figure 7, below, shows an example of an ITBI report that can be used to track the progress of the rightsizing effort.
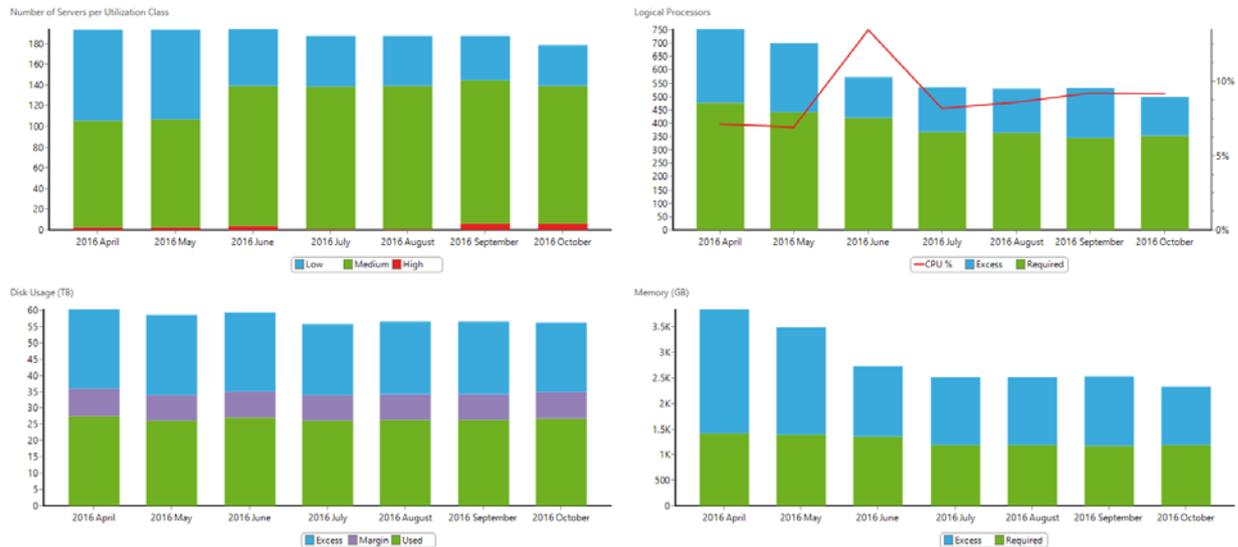

Figure 7: An ITBI dashboard showing trend over time for capacity utilization for servers, processors, disk and memory. The effect of rightsizing is clearly visible in the reduction in number of processors and amount of memory. This results in a corresponding decrease in the number of servers identified as having low utilization.

Here we have selected a single business area and can follow up on:

- The number of servers in this area month by month. The number of servers with a low utilization (potential for rightsizing) are shown in blue. Medium utilization is shown in green. High utilization (potentially needing more capacity) is shown in red. During this period, the number of servers decreases slightly reflecting that some unused servers were decommissioned. The number of servers that have the correct configuration (green) increases during the period

- The total number of logical CPUs and the average CPU utilization in percent across the servers. Green shows the estimated required number of cores, and the blue indicates excess cores that probably can be removed. Note how the number of cores is reduced over time results in a slight increase in the average CPU utilization

- The total GB of logical disk seen by the servers. Green shows the maximum GB that are used during the month. Purple shows a 30% margin on top of the used amount. Blue indicates excess allocation that can potentially be released

- The total GB of memory these servers are configured with. Green shows memory required and blue indicates excess memory that probably can be removed.

7. Quantifying the results

It is important to quantify the results in financial terms. Figure 8, below, is an ITBI report showing the trend over time for server cost broken down by cost type (base cost, CPUs, Memory, Disk, Software) across the organization.
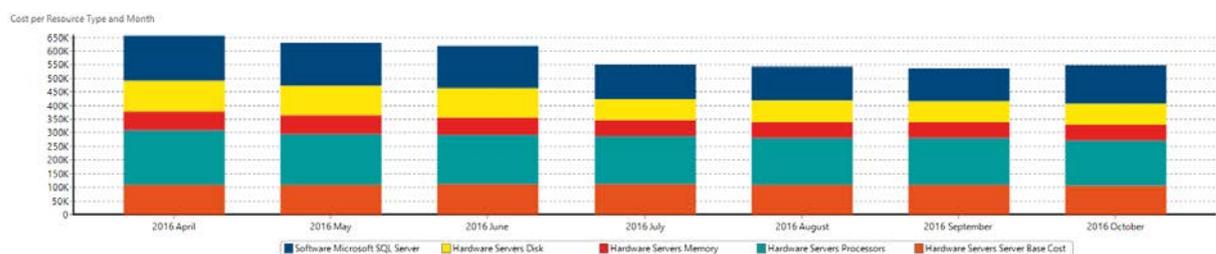

Figure 8: An ITBI financial report, showing the cost over time by cost type.

Because ITBI supports enriching the data with business dimensions, we can select data from a single business unit, as seen in figure 9, below.
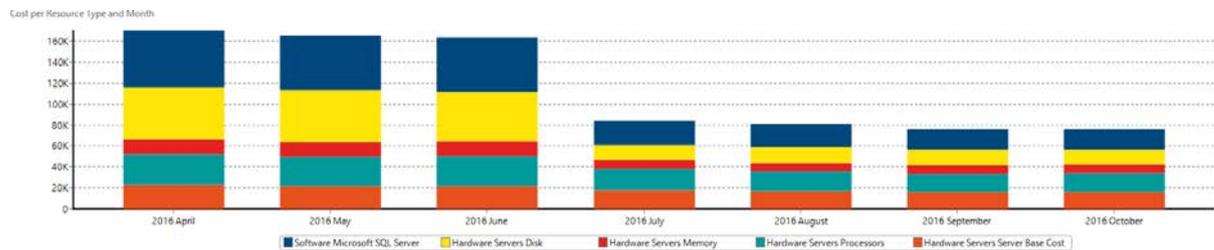

Figure 9: The same ITBI report as above, but sliced to just show the servers from a selected business area.

Here we see that this business unit has especially saved on disk and software. The software license cost is based on the number of cores. Reducing these shows an aligned cost reduction. The financial impact of rightsizing on software costs is often much larger than on hardware costs.

8.   Ongoing management

As we can see from the examples above, rightsizing is an iterative process, getting you closer and closer to an optimal configuration. A concentrated one-off effort can result in significant savings, but ensuring that rightsizing is an ongoing discipline is even more beneficial and ensures sustainability of savings.

There are a number of areas, where an ongoing fact-based approach to rightsizing is extremely valuable:

- **Hardware refresh**. Do the new servers really need the same capacity as the existing ones?
- **DevOps Transparency**. How do new software releases affect capacity costs and performance?
- **Mergers and acquisition**. Can the infrastructure being acquired be rightsized as part of an integration project? How big are the cost savings opportunities?
- **Outsourcing**. How will new billing models affect my costs? How good is my outsourcer at ensuring an optimal server infrastructure? Who gets the benefit of virtualization?
- **Cloud**. What are the potential benefits of being able to dynamically adjust capacity to better reflect the actual usage? Which servers have usage patterns that make them ideal for a cloud solution?
- **Software License Management**. How will rightsizing affect my current license situation, and what are the potential benefits of other licensing models?

Understanding cost drivers

As mentioned above, the actual cost drivers in a large server environment can be extremely complex. A detailed and completely correct understanding may require reading hundreds of contracts from multiple suppliers. Fortunately, a rightsizing effort does not require knowledge of exact amounts. The important questions to answer are 'which are my most expensive servers that are under-utilized', and 'will I save money if I reconfigure them with less capacity?'

There are many ways of paying for capacity, but they can be roughly divided in to four general approaches. Obviously, a large installation may combine all of these approaches.

1.   Hardware and software costs based on virtual capacity

This is a typical model in an outsourced environment. The outsourcer manages the underlying hardware and creates virtual servers for the customer on request. The cost of these servers is typically based on configuration, e.g. a fixed base price per server, plus a price for each core, GB RAM, GB Disk, etc. There may be multiple prices depending on the component type (e.g. mirrored disk, SSD) or service level included (e.g. 24x7 monitoring). The price typically includes some software (e.g. Windows). The customer may then install other software packages, such as SQL Server. These software packages are often licensed based on number of virtual cores.

This is an optimal model for rightsizing efforts. Adjusting the capacity of a server results in direct, immediate and measurable cost savings.

Cloud is a special case of this model, but with the added flexibility of easily adding new servers or adjusting capacity to actual needs on an ongoing basis. It is worth noting that this flexibility can also be dangerous from a cost perspective. It is very easy to create new servers and give them extra capacity in a cloud environment, so ongoing rightsizing and de-commissioning of servers is absolutely critical.

2.   Own hardware, but software costs based on virtual capacity

This is a typical model for many installations who own and manage their own infrastructure. In this model the installation buys the hardware and then creates a number of virtual servers on that hardware. The software is still licensed based on the capacity of the virtual servers.

This model can lead to the perception that over-allocation of capacity is free because the hypervisor and thin provisioning should ensure that the virtual server doesn't actually get more capacity than it needs. But reality is more complex and not very transparent.

Both the hypervisor and the virtual server perform best when the allocated virtual capacity is close to the required capacity. A virtual server with 32 cores may not perform as well as one with 4 cores, if 4 is all that is needed to run the workload. The density and efficiency of the hypervisor are generally also improved through rightsizing of the virtual servers.

Software is often much more expensive than hardware these days. If the software is licensed based on virtual capacity, then there can be huge software savings from rightsizing the virtual servers, even if the hardware savings are less evident. It is important to work with subject matter experts for Software Licensing to ensure a common understanding of the license basis and where and how benefits can be realised.

3.   Own hardware, and software licensed based on physical capacity

In this case, the customer owns the hardware and licenses the software based on the total physical capacity of the hypervisor. In other words, there is no direct incremental cost for creating an additional virtual server on the hypervisor and therefor no direct savings from rightsizing or removing virtual servers from the hypervisor.

Many installations choose this model (or a site license, which is a variation on this theme) because it gives them a fixed and predictable software cost. License management and compliance are also easier to deal with.

There are two disadvantages to this model. First, it is often more expensive than only licensing the real, rightsized, virtual capacity. Second, this model leads to the perception that the software is 'free' and the installation gets sloppy about where it is installed, decreasing transparency into the real usage and real cost of the software.

Some installations have been surprised by this model. They install a software product on a single virtual server on a hypervisor and suddenly have to pay for a software license based on the total capacity of the hypervisor.

Many of the rightsizing methods and tools are still extremely valuable in this environment, even if the rightsizing benefits are less immediate. Transparency into allocated and used capacity helps make good fact-based decisions. For example, would a license model based on virtual capacity be cheaper? The installation may have purchased licenses based on the physical capacity of the hypervisor, but how many of the virtual servers running on that hypervisor are actively using the software? Can the some of the virtual servers be decommissioned, rightsized, or moved, allowing for a reduced the capacity of the hypervisor and thereby save software costs? It is also important in this model to work with subject matter experts for Software Licensing to ensure a common understanding of the license basis and where and how benefits can be realised.

4.   As a Service

In this model, the customer is billed for a service and isn't involved in underlying server costs. The service may be billed based on business volumes or number of users or number of transactions. In this case, it is up to the service provider to carry out rightsizing, and the customer doesn't generally need to worry about over-allocation of capacity.

A service level agreement with the outsourcer should also address the risk of under-allocation of capacity. Still the customer may have a vested interest in looking over the shoulder of the service provider by requesting regular reports showing available and used capacity.

Making it happen

There are three key ingredients to a rightsizing effort: tools, organization and process.

1. Tools

As discussed above under 'Gathering the Data', capacity and utilization data is fundamental to rightsizing. A good data warehouse to manage the data and good reporting and analysis tools are a must. SMT Data's IT Business Intelligence (ITBI) solution is built for this and the examples in this paper are based on SMT Data's experience using ITBI at large customer installations.

Key features of ITBI include: low touch implementation, small footprint, low impact on production systems, high performance on large data, the ability to enrich technical data with business and cost information, good standard reports and the ability to easily create ad hoc reports.

2. Organization

Key organizational ingredients in a successful rightsizing effort include:

- Clear and active management sponsorship and follow-up
- Involvement of key stakeholders: Operations, Capacity Management, Finance, Development, Suppliers
- A 'Cost Hunter' or cost hunting team focused on driving the rightsizing effort as outlined under 'How to Rightsize' above. This often involves coordinating activities across the organization and together with suppliers.

There is a dark side to transparency. The mere implication that there is a lot of expensive over-allocation of capacity may create resistance and finger pointing in the organization. This can be especially true if the responsibility for capacity management has been outsourced, and the outsourcer is actually benefitting financially from the over-allocation.

The application owners of the servers may show resistance. If the servers aren't causing problems, and the owners aren't paying for the over-capacity, they may be reluctant to take perceived risk of rightsizing. What if it impacts performance? Who is to blame?

Senior management attention and a spirit of win-win are important. Rightsizing results should be communicated and celebrated.

SMT Data and SMT Data's partners provide consulting assistance to help customers ensure a successful organization around a rightsizing effort.

3. Process

A concentrated one-off effort can result in significant savings, but regarding rightsizing as an ongoing discipline is even more beneficial and ensures sustainability of savings. Well defined rightsizing processes are required. These include:

- Regular rightsizing meetings to review the progress and identify new areas of opportunity based on the KPIs discussed above
- Life cycle management processes for servers to ensure capacity is adjusted on an ongoing basis and the server is decommissioned when it is no longer needed
- Ongoing validation and maintenance of the business mapping and cost models in the tool
- 'DevOps' use of the rightsizing data and tools when launching new applications or refreshing infrastructure
- End user support for rightsizing tools including developing new reports
- Cost show-back or charge-back to motivate application owners to carry out rightsizing
- Software license management processes that include rightsizing.

SMT Data and SMT Data's partners provide consulting assistance to help customers establish processes that ensure a successful organization around a rightsizing effort.

Conclusion

Many large IT installation are well aware that rightsizing servers can lead to huge cost savings. But they are overwhelmed by the perceived complexity of the task. They don't have good data or tools to create transparency into the jungle of servers or complicated cost models. They comfort themselves by thinking that over-allocation of virtual capacity is free because the hypervisor should take care of it.

But with the right tools, organization and processes, and with a relatively small amount of time and effort, rightsizing can save a large IT organization millions of euro a year. The rightsizing opportunities in most installations are big and clear cut. The low hanging fruit are easily identified with ITBI even without knowing all the technical details or understanding the full complexity of the cost model.

About SMT Data and IT Business Intelligence

SMT Data, a software and services company based in Denmark, has developed a unique software solution that collects, aggregates, and processes enormous amounts of technical data from the company's IT-infrastructure. Conceptually it is Business Intelligence for IT – we call it ITBI.

SMT Data delivers services, knowledge and tools to help you manage your data centre more efficiently, monitor your outsourcing providers and link the use of IT directly to the company's bottom line and development potential. For 25 years, we have supplied fact-based optimization:

- Optimize IT infrastructure utilization and performance.
- Link IT resource consumption and IT costs to business activity
- Control outsourcing providers and optimize outsourcing costs
- Connect application development to IT operations – DevOps
- Consolidate assets and balance load (for M&A, virtualization etc.)
- Reduce time spent on analysing and reporting.

The collection, selection and transformation of the technical data is governed by more than 200.000 rules and policies that embody SMT Data's deep knowledge of how this data can be used and understood. A fully automated process transforms terabytes of unstructured technical data to just gigabytes of information in a well-structured data warehouse running either in the cloud (ITBI as a Service) or at your datacentre.

The data can be easily analysed either using the extensive set of ITBI standard reports/analysis or by developing new reports using the standard end-user BI tool. The technical reporting works 'out of the box' and creates immediate value by identifying capacity, performance and demand optimization potential.

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