zDynaCap

Dynamic Capping Made Easy

Workload License Charge

Under Sub-capacity *Workload charging* (***AWLC***) the software license charge is easily the highest single monthly invoice in a data center. To control those costs and to maximize the ROI, it is essential for any data center to monitor all pricing relevant thresholds in real time and to react to events automatically.

Until recently, two values, the actual number of MSUs and the 4 hour average MSU, have been the determining factors for the MLC software pricing. The IBM-provided z/OS options, ***DefCap*** (Defined Capacity) and ***GCL*** (Group Capacity Limit), are a way to place a limit on software costs; however they are static and do not take workload and service level requirements into account. They also are not designed for IBM's more recent pricing metrics.

The introduction of *Country Multiplex Pricing*, *Mobile Workload Pricing,* and *IBM Collocated Application Pricing* adds new pricing layers along with evolving rules for implementing these, thus elevating MSU and software cost management to a whole new level of complexity.

In this ever-changing world of z Systems software pricing, how can customers do real-time MSU cost management? The answer is zDynaCap! Now, for some history …

History

zIT Consulting was founded to provide specialized professional services for optimizing software costs on IBM z System and to this day is very active in this business.

Our consulting practice quickly revealed that the default z/OS tools are insufficient for implementing strategic, flexible and automated MSU management solutions. This led to our first product, zPrice Manager (2006), currently in use by some of the largest international financial institutions.

Over the years, zPrice Manager has proven to be a very effective offering, with the flexibility to adapt to IBM's changing pricing metrics, especially in larger or more complex environments. However, smaller companies with less complex environments benefit most from a product that is easy to use, which is why we released zDynaCap in 2013. zDynaCap could be viewed as the younger brother of zPrice Manager – it benefits from all the lessons we learned in working with our zPM customers, and it uses the same basic infrastructure, but it is lighter and simpler to set up and manage.

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Features and Functions

- zDynaCap makes optimized, flexible capping very easy and straightforward.
- A plug and play product with no hooks or interfaces other than the standard z/OS interfaces.
- Automatically balances MSU capacity based on customer-defined policies (LPAR groups) – every 5 minutes, 24 hours per day!
- Automatically adjusts Defined Capacity as soon as the actual usage goes down, while the R4HA still goes up, which could lead to avoidable MLC costs ("DefCap Optimization").
- Flexible enough to control either total software costs or even costs at the individual product level, the latter by defining LPAR groups based on product usage.
- Greater granularity than IBM capacity groups due to ability to have nested LPAR groups
- Provides a complete overview and control of MSU usage.
- Function-rich browser-based reporting feature delivers a cockpit view of current usage information.
- Reports and historical information offer cross-checking of the SCRT reports and associated invoices.

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Ease of use

Within zDynaCap there is just one control table (shown below) that contains all the definitions needed by zDC to manage your environment:

- Categorization of the LPAR priority.
- Minimum and maximum MSU values (ranges) for the CEC, groups (and nested groups), and LPARs.
- Categorization of the workload using the WLM Importance Levels.
- Easy and straightforward, easy to maintain, easy to change: no fussy logic.
- Secure handling: entry and maintenance thru ISPF.

Benefits

zDynaCap offers 4 functions:

- Defined Capacity Optimization,
- Capacity Balancing,
- Capacity Reallocation and
- Very modern and intuitive GUI reporting.

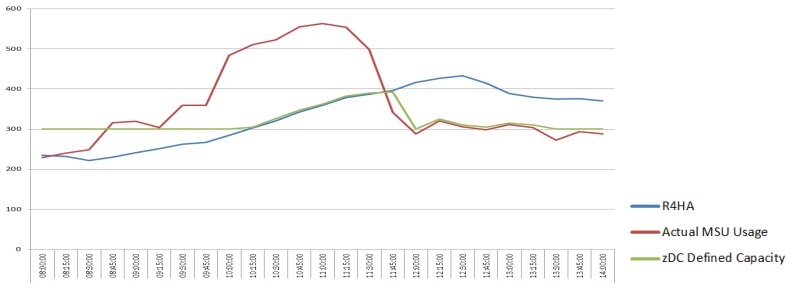
All functions are managed thru one easy control table that is maintained under ISPF.

CEC1				770	850							
	Group	LPAR	LPAR Type	MIN MSU	MAX MSU							
	GR1_IMS			360	550	IMP0	IMP1	IMP2	IMP3	IMP4	IMP5	DISC
		PRD11	Regular	300	550	BC	BC	BC	BC	BC	TC	NTC
		DEV11	Regular	60	150	BC	BC	BC	TC	NTC	NTC	NTC
	GR1_CICS			410	500	IMP0	IMP1	IMP2	IMP3	IMP4	IMP5	DISC
		PRD12	Preferred	340	450	BC	BC	BC	BC	BC	BC	TC
		DEV12	Regular	65	100	BC	BC	BC	BC	BC	BC	TC
		SYP12	Deferred	5	15	BC	BC	BC	BC	BC	BC	TC

BC = Business Critical, TC = Time Critical, NTC = Not Time Critical. All figures represent MSU values.

Optimized Defined Capacity or "DefCap Optimization"

zDynaCap automates the setting of capacity limits. The actual usage is much more volatile than the R4HA: while the actual usage often drops dramatically (e.g. during lunch time), the R4HA can continue to increase.



For each LPAR zDynaCap will automatically set the capacity limit at the optimal value indicated by the policy. This often leads to substantial savings without limitations: the capacity definitions initiated by zDynaCap follow the actual usage and as soon as the actual usage goes up again, the caps are adjusted accordingly.
The SCRT will take the lower of the two values R4HA or Defined Capacity, so in the example show above, the SCRT will take the max DefCap value of 392 MSU instead of the max R4HA value of 428 MSU.
Reducing the DefCap below 392 MSU (in the example to 300 MSU, following the actual MSU usage) enables other LPARs to use that capacity at no extra charge: this optimizes the usage of 'white capacity space'.

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Capacity Reallocation and/or Capacity Balancing

zDynaCap automates the optimization of capacity allocation within CECs, Capacity Groups, or user-defined Groups of LPARs and offers two different capacity allocation techniques:

Capacity Balancing

zDynaCap's capacity balancing is shown in GR1_IMS in the policy above. The LPARs in the group have the same relative priority: prioritization of the workload is done solely thru the definitions of the MSU ranges and of the workloads within each LPAR, allocating a level of time criticality (priority) to each WLM importance level of each LPAR within a group. The objective is to protect the service levels of critical workloads without having to increase the overall amount of available capacity. Within a group, capacity is first allocated to BC workloads, then to TC workloads and – if there is excess capacity – to NTC workloads

Capacity Reallocation

zDynaCap's capacity reallocation is shown in GR1_CICS in the policy above. All LPARs in the group are categorized in 'Preferred', 'Regular' or 'Deferred' with 'Preferred' being the highest level and 'Deferred' being the lowest level. All WLM importance levels are all defined as time critical: in this example they are not important for the capacity reallocation process. Capacity reallocation is done on the same level or upward, never downward. Referring to the example above, if DEV12 needs more than 65 MSUs LPAR SYP12 will have first be reduced to its defined minimum of 5 MSUs before more capacity is added to the group. Likewise, if PRD12 needs more than 340 MSU, DEV12 will first be reduced to 65 MSUs and only if that does not suffice, more capacity is added to the group.

Please note

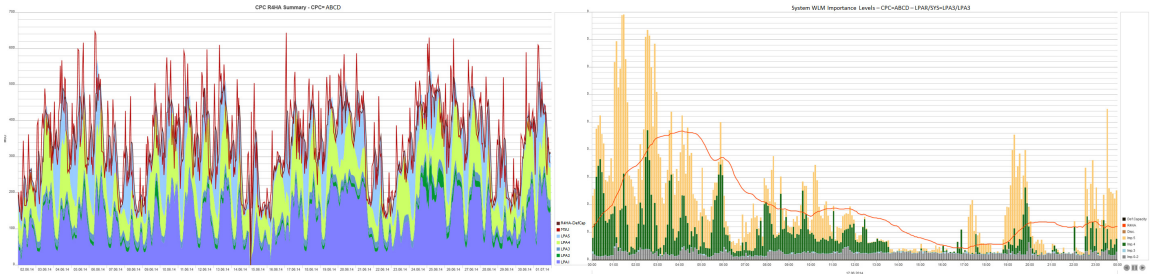
- The disadvantage of Capacity Reallocation is that there might very well be a situation in which PRD12 will still run workload that is not time critical (NTC), while at the same time more capacity (and cost) is added so that DEV12 can execute its workload.
- A combination of Capacity Reallocation and Capacity Balancing is possible, but leads to higher complexity.
- Results at customer sites have shown that the straight forward Capacity Balancing leads to the highest savings.

Simplified MSU Usage & Policy Reporting for z/OS Professional

All too often there is too much data and not enough information. zDynaCap provides an efficient GUI interface that displays the information required by the z/OS technician who manages MSU capacity usage.

zDynaCap® GUI - Examples

The zDynaCap GUI offers real time insight into the capping situation in the cockpit overview, showing all details about the current usage and the active policy.
Furthermore it offers a detailed reporting focused on MSU reduction. Below are just some examples.



The CPC R4HA Summary on the left shows all the LPARs and their MSU and R4HA MSU values of a period, with a zoom-in capability down to 5 minute intervals.
This System WLM Importance Levels report on the right shows the breakdown of the workload per WLM importance level on one LPAR in 5 minute intervals.

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Conclusion

zDynaCap is a unique MSU capacity monitoring and balancing software that combines the best of three ideas:

- Balancing Capacity based upon workload categorizations
- Reallocating Capacity based upon LPAR categorizations
- DefCap Optimization: Use the invoicing rules for MLC software to reduce the usage without limiting the service.

zDynaCap gives you peace of mind: its method of pushing back workloads and reassigning MSU capacity based upon priorities given to WLM importance levels is patent protected (US patent No. 8,904,405).

zDynaCap is an easy to use, yet powerful tool that has been designed and continuously enhanced by experienced pricing and capacity planning consultants. It actively controls the MSU usage within IBM z Systems data center environments while protecting your critical service levels. It's here where active, well-designed MSU management most often leads to very substantial savings!

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