



IBM Software Group

IBM System z™ Software Pricing: Sub-Capacity and the Rolling 4-Hour Average

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<http://ibm.com/systems/z/swprice>



@business on demand software

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**Sub-Capacity Concepts
apply to both MLC and IPLA software**

SubCap Concept: Rolling 4-Hour Average Utilization

z/OS captures the 4-hour rolling average LPAR utilization for each interval in the month

4-Hour Rolling Average

11 am (8,9,10,11): 35 MSUs

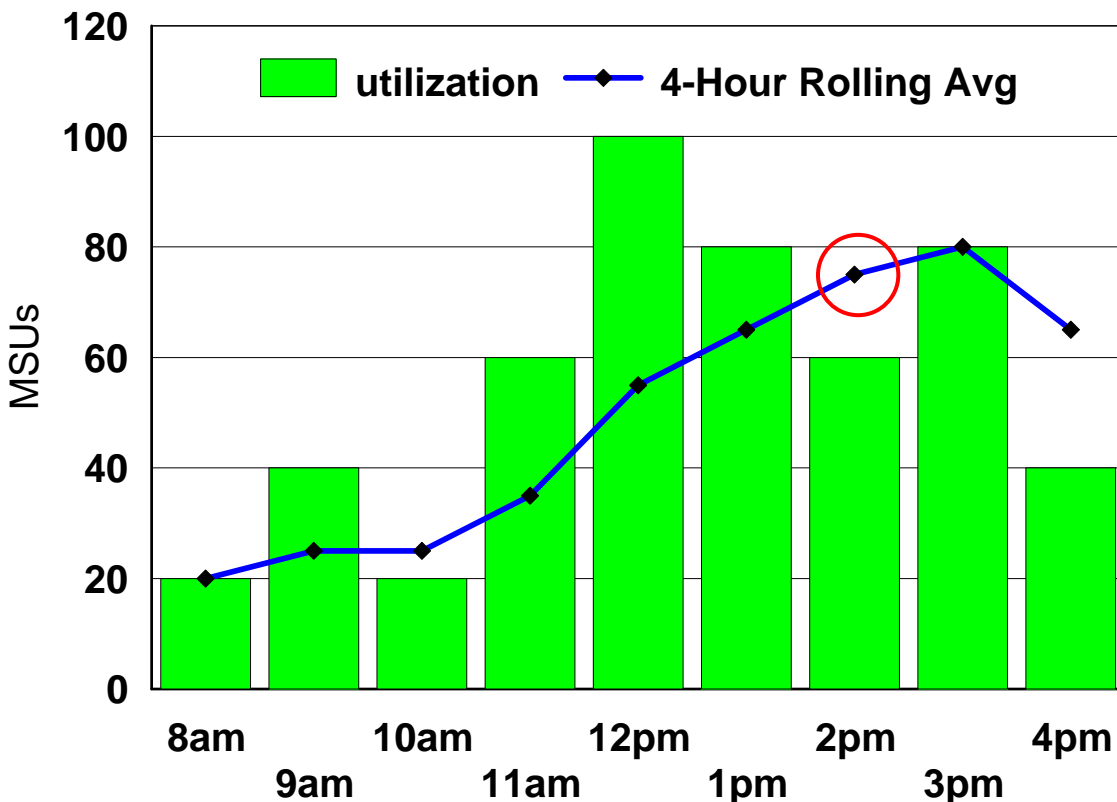
12 pm (9,10,11,12): 55 MSUs

1 pm (10,11,12,1): 65 MSUs

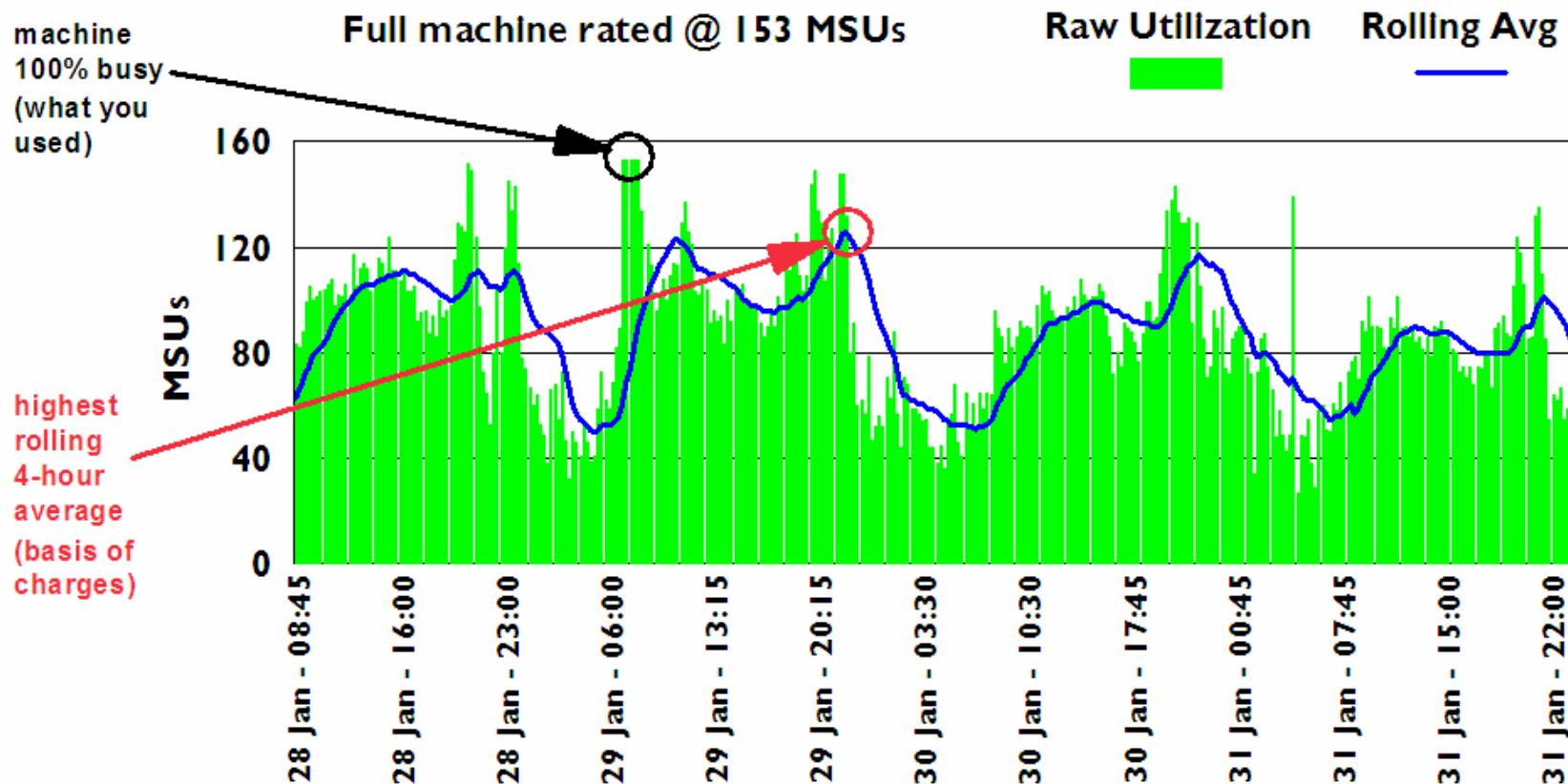
2 pm (11,12,1,2): 75 MSUs

3 pm (12, 1, 2, 3): 80 MSUs

4 pm (1, 2, 3, 4): 65 MSUs



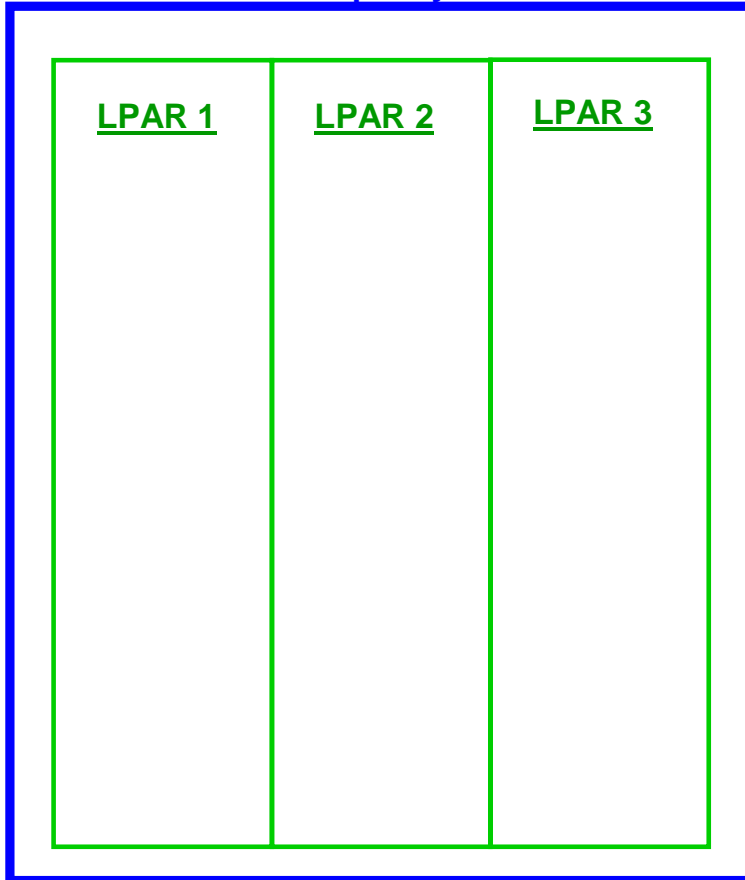
Example: Rolling 4-Hour Average



- Rolling 4-Hour Average Utilization Smooths Out Peaks in Raw Utilization
- Allows for Varied Peaks, Bases Software Charges on More Moderate Measure

Sub-Capacity Overview

100 MSU Rated Capacity

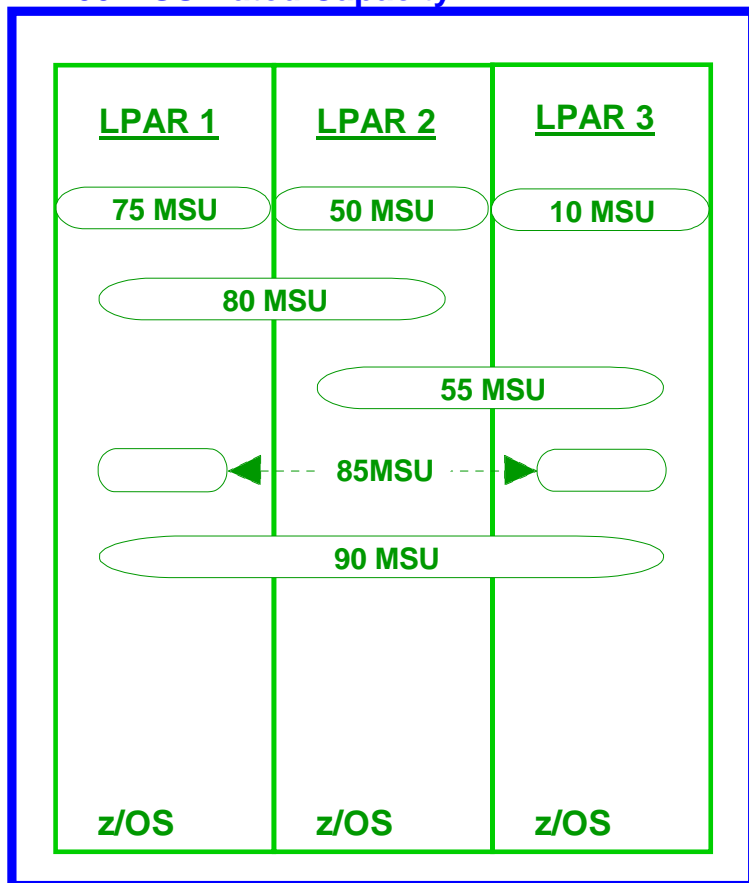


- **Full Capacity Pricing**

- ▶ Charges based on Machine Capacity of machines where product runs
- ▶ Each SW product on the machine charged 100 MSUs

Sub-Capacity Overview

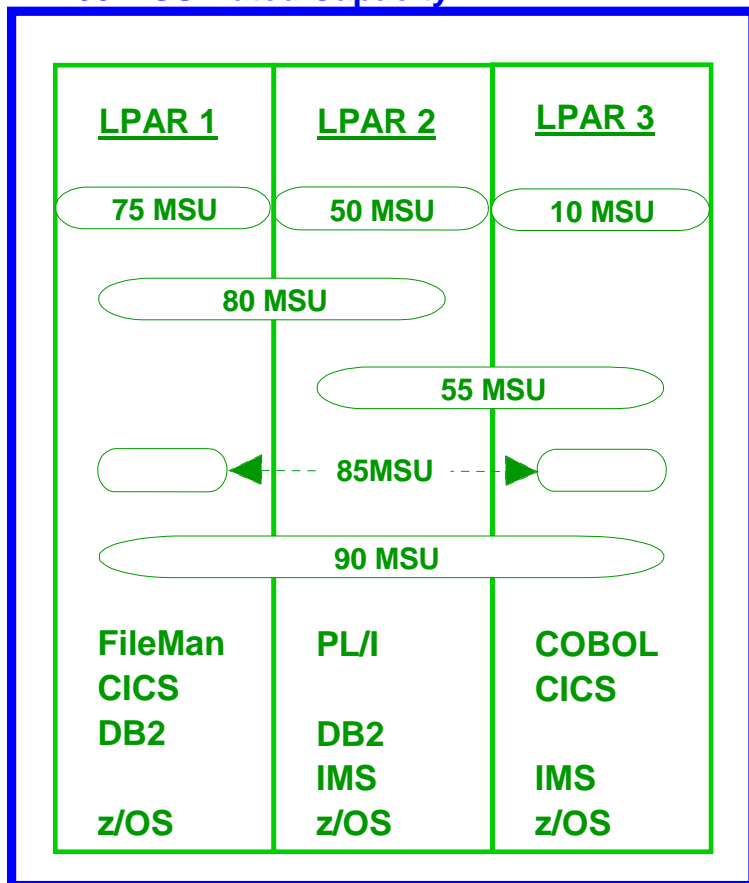
100 MSU Rated Capacity



- **Full Capacity Pricing**
 - ▶ Charges based on Machine Capacity of machines where product runs
- **Sub-Capacity Pricing**
 - ▶ Charges based on Hardware Utilization of LPARs where product runs
 - ▶ Hourly intervals measured
 - ▶ Rolling 4-Hour Average calculated for each combination of LPARs
 - ▶ Charges based on Monthly Peak R4HA of appropriate LPAR combination

Sub-Capacity Overview

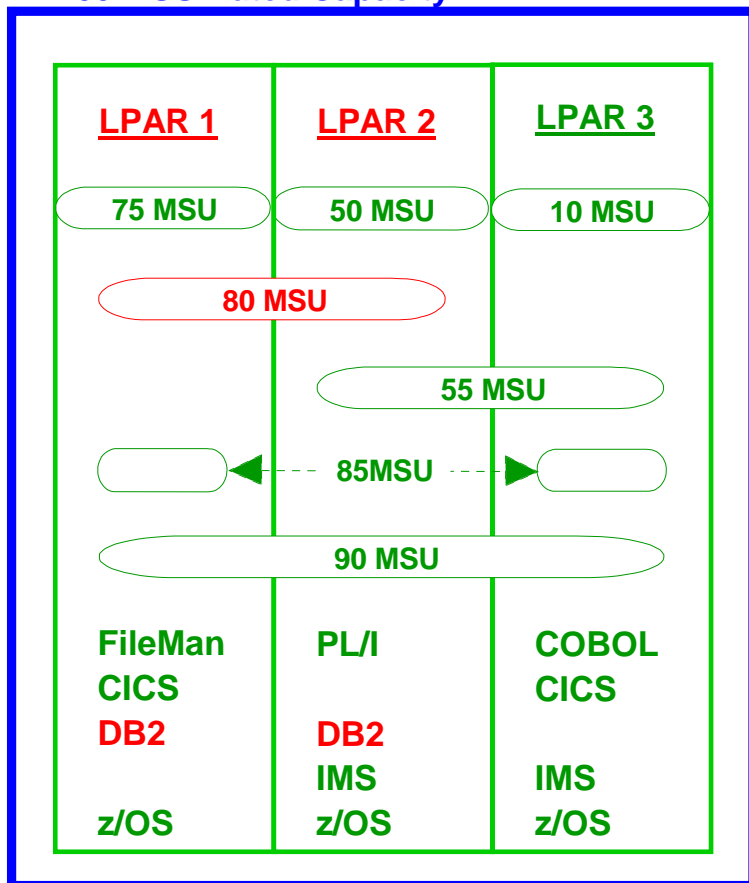
100 MSU Rated Capacity



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 - ▶ ***Not based on individual Product measurement***

Sub-Capacity Overview

100 MSU Rated Capacity



Full Capacity Pricing

- Charges based on Machine Capacity of machines where product runs

Sub-Capacity Pricing

- Charges based on Hardware Utilization of LPARs where product runs
- Hourly intervals measured
- Rolling 4-Hour Average calculated for each combination of LPARs
- Charges based on Monthly Peak R4HA of appropriate LPAR combination
- Not based on individual Product measurement**
 - e.g. DB2 is charged 80 MSUs because LPARs 1&2 had a peak R4HA utilization of 80 MSUs and DB2 ran in LPARs 1&2, **not** because DB2 “used” 80 MSUs

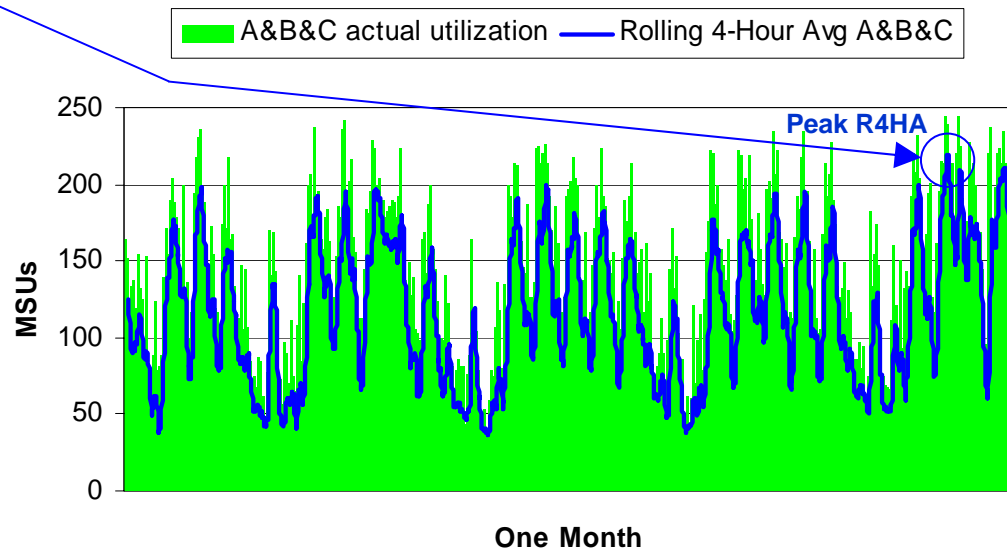
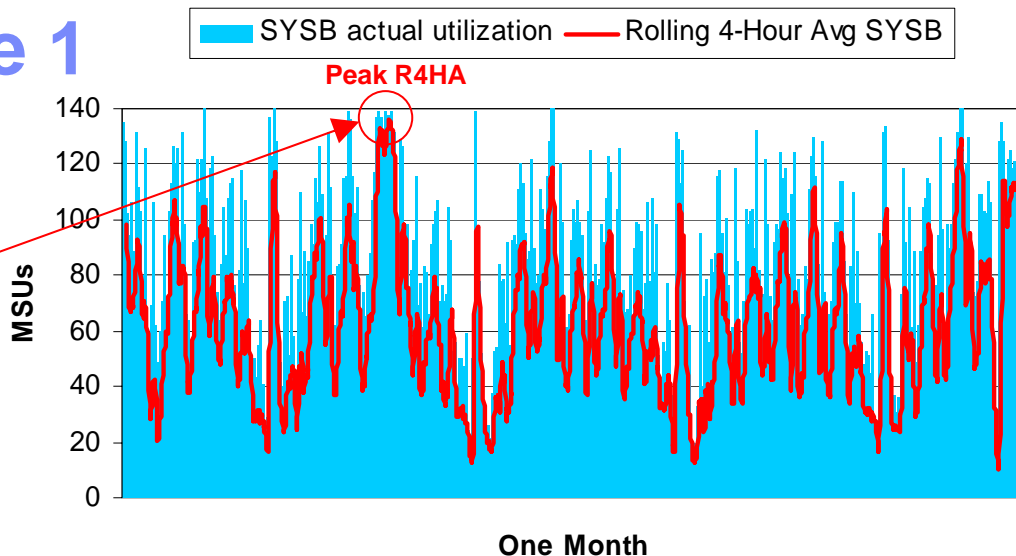
Sub-Capacity Example 1

System z @ 240 MSUs

SYSA	SYSB	SYSC
	136 MSUs	
219 MSUs		
	COBOL DB2	
z/OS	z/OS	z/OS

SCRT Report:

Product	Sub-Cap MSUs
COBOL	136 MSUs
DB2	136 MSUs
z/OS	219 MSUs



SCRT and SMF data

▪ SMF 70 Records

- ▶ Created by RMF (priced, optional feature of z/OS)
 - *Alternatively customers may use CMF product from BMC*
- ▶ These records contain the processor LPAR utilization information
- ▶ Governed by SMF parameters in ParmLib

▪ SMF 89 Records

- ▶ Created by z/OS
- ▶ These records contain Product execution data including LPAR name
 - *Not all products are instrumented for the creation of SMF 89 records*
- ▶ Governed by SMF parameters in ParmLib

▪ NO89 statement in SCRT JCL

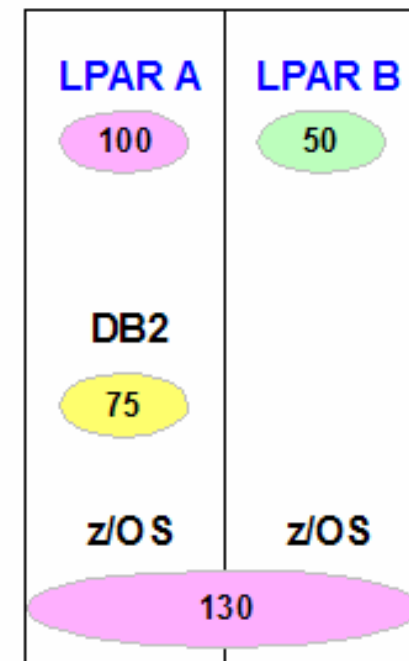
- ▶ Products not instrumented for SMF 89 record creation do not generate SMF 89 records for SCRT to use
- ▶ Customers must identify the LPAR name(s) for any LPAR where the program ran at any time of the month in the SCRT JCL
- ▶ These products are referred to as “NO89 products”



SCRT Algorithm

Hour	1	1	2	2	3	3	...	719	719	720	720
LPAR	A	B	A	B	A	B		A	B	A	B
r4hr avg*	70	30	75	30	50	50		100	30	100	10
r4hr A/B	100		105		100			130		110	
z/OS	yes 100	yes	yes 105	yes	yes 100	yes		yes 130	yes	yes 110	yes
DB2	yes 70		yes 75		yes 50						

* Respective r4ha for each LPAR



- **True:** Peak interval for A&B where z/OS ran = hour 719, so z/OS is 130
- **False:** z/OS Runs in LPAR A and B, add A (100) + B (50), so z/OS is 150
- **True:** Peak interval for A where DB2 ran = hour 2, so DB2 is 75
- **False:** DB2 Runs in LPAR A, LPAR A peaks at 100, so DB2 is 100

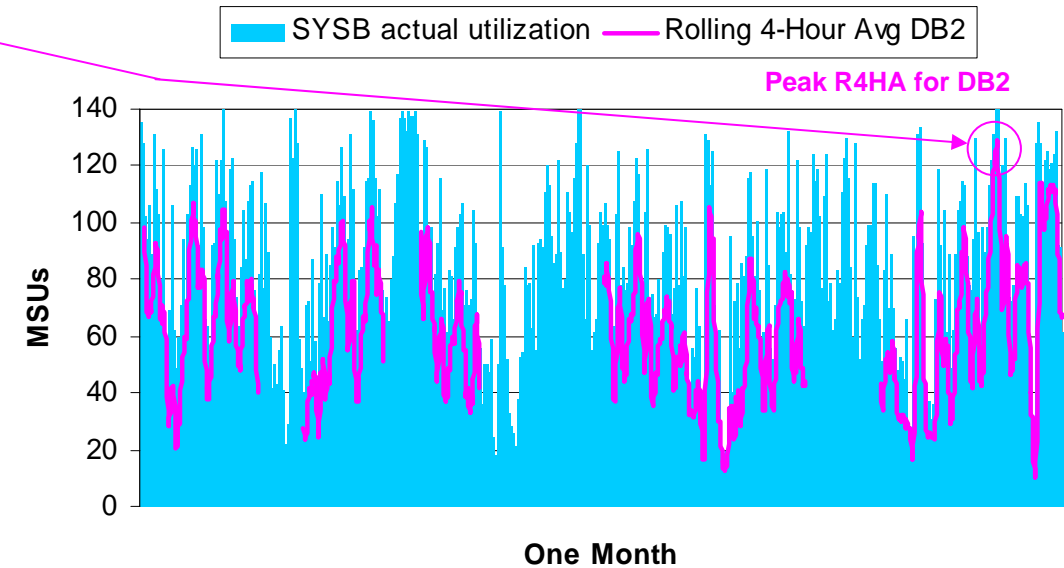
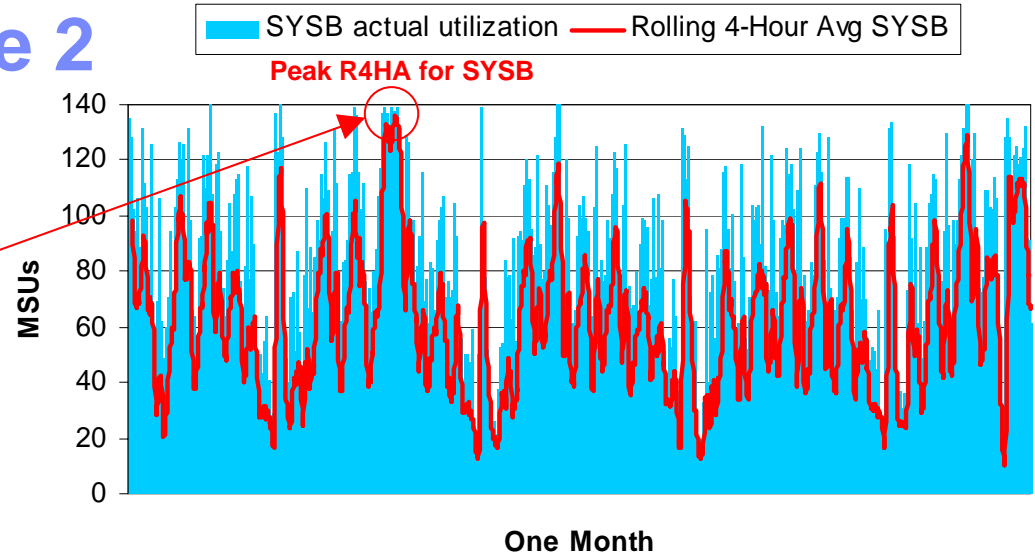
Sub-Capacity Example 2

System z @ 240 MSUs

SYSA	SYSB	SYSC
	136 MSUs NO89	
	129 MSUs SMF89	
z/OS	COBOL DB2 z/OS	z/OS

SCRT Report:

Product	Sub-Cap MSUs
COBOL	136 MSUs
DB2	129 MSUs
z/OS	219 MSUs



The End

