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

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David Chase, WW IBM System z Software
scrt@us.ibm.com
http://ibm.com/systems/z/swprice

business on demand software

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Chart 3

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

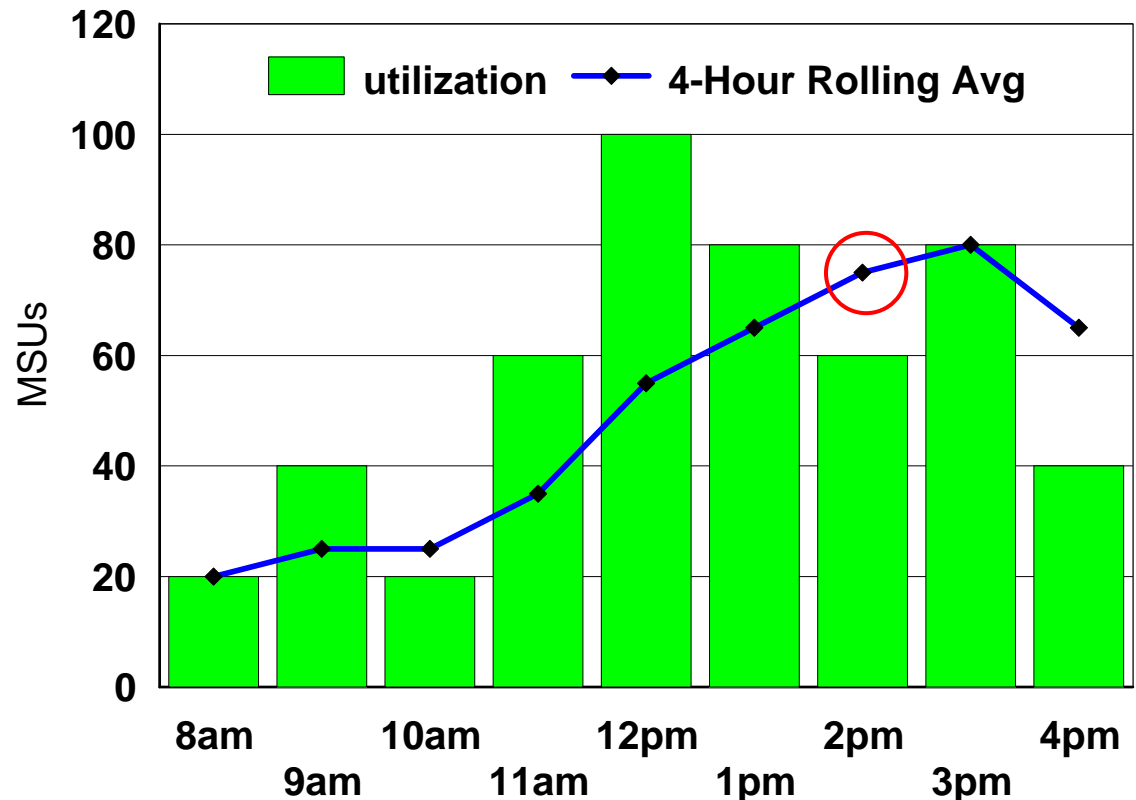**4-Hour Rolling Average**
11 am (8,9,10,11):   35 MSUs
12 pm (9,10,11,12): 55 MSUs
1 pm   (10,11,12,1): 65 MSUs
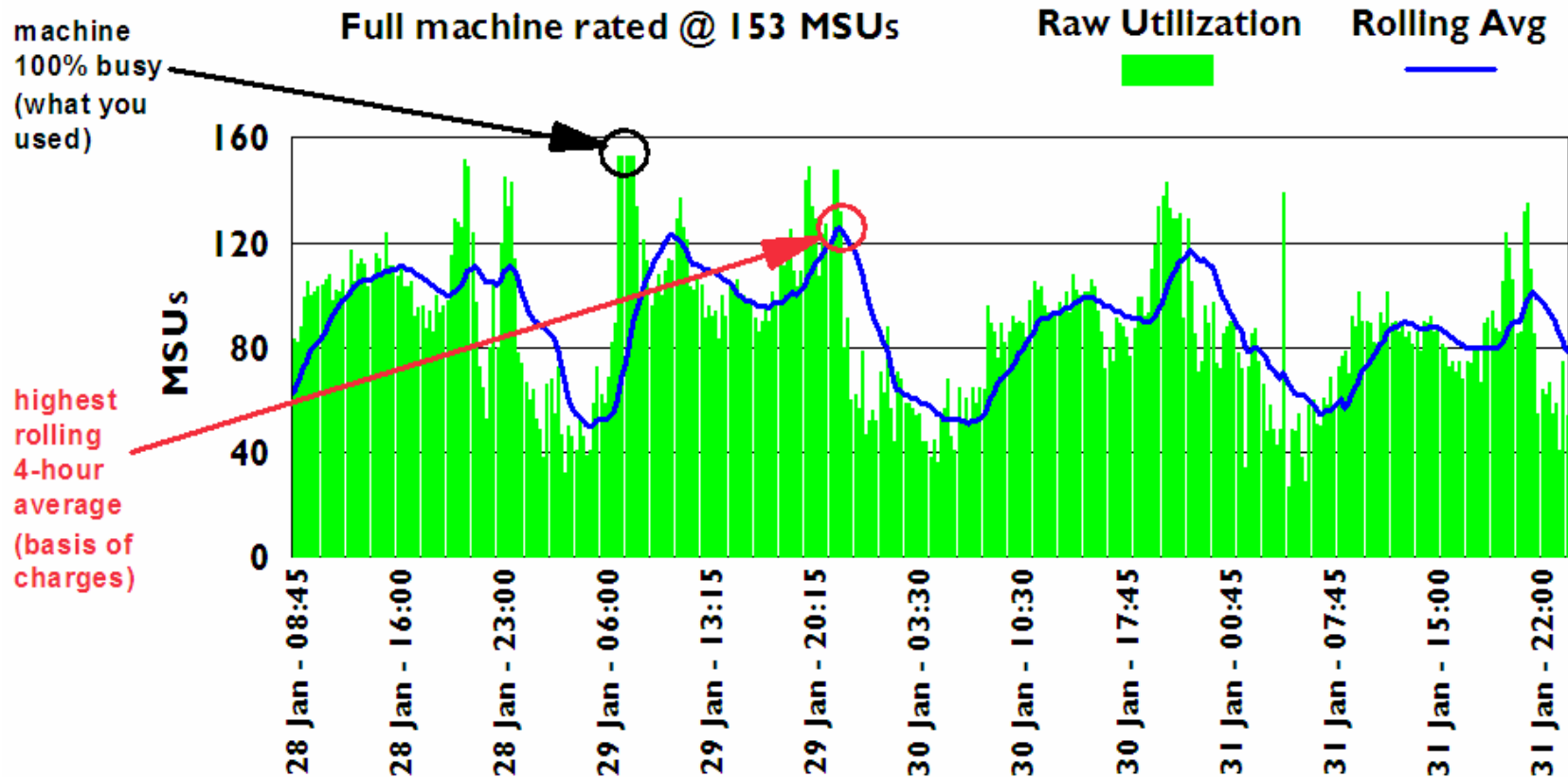**2 pm   (11,12,1,2):   75 MSUs**
3 pm   (12, 1, 2, 3): 80 MSUs
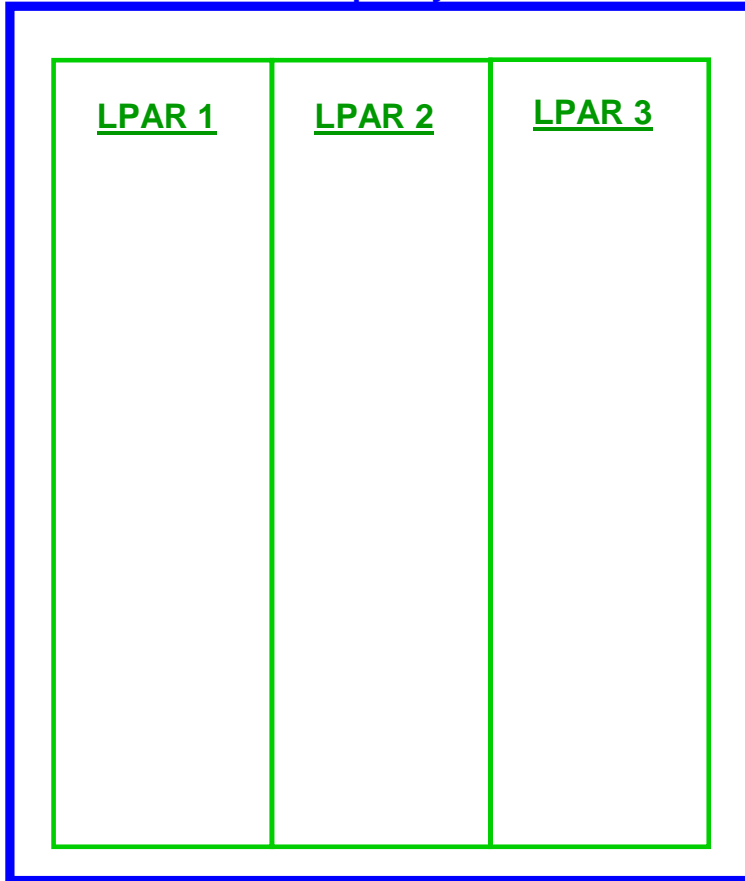**4 pm   (1, 2, 3, 4):   65 MSUs**

Example: Rolling 4-Hour Average

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

Sub-Capacity Overview

100 MSU Rated Capacity
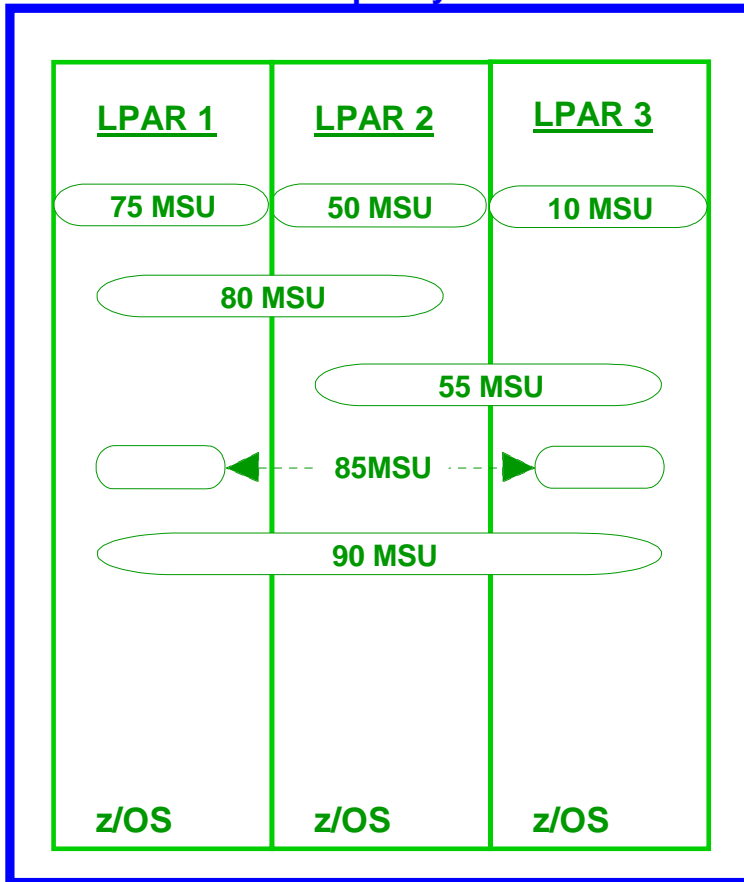
| LPAR 1 | LPAR 2 | LPAR 3 |

- **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

LPAR 1	LPAR 2	LPAR 3
75 MSU	50 MSU	10 MSU

80 MSU

55 MSU

85MSU

90 MSU
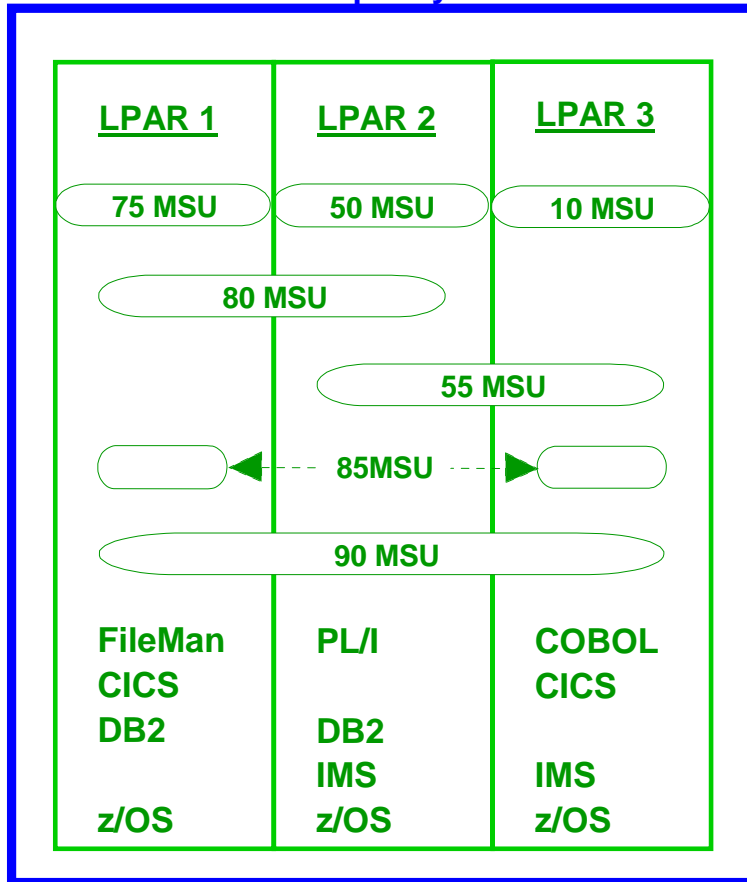
z/OS | z/OS | z/OS

- **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

LPAR 1	LPAR 2	LPAR 3
75 MSU	50 MSU	10 MSU

80 MSU

55 MSU

85MSU

90 MSU

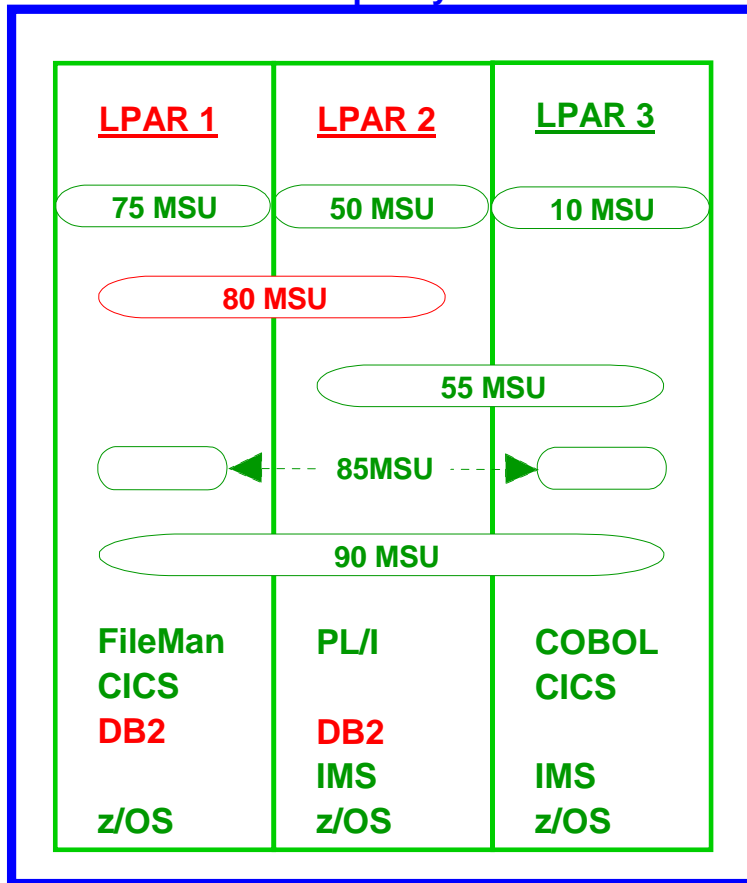| LPAR 1	LPAR 2	LPAR 3
FileMan	PL/I	COBOL
CICS		CICS
DB2	DB2	
	IMS	IMS
z/OS	z/OS	z/OS

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

Sub-Capacity Overview

100 MSU Rated Capacity

LPAR 1	LPAR 2	LPAR 3
75 MSU	50 MSU	10 MSU

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90 MSU

FileMan	PL/I	COBOL
CICS		CICS
DB2	DB2	
	IMS	IMS
z/OS	z/OS	z/OS

- **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*
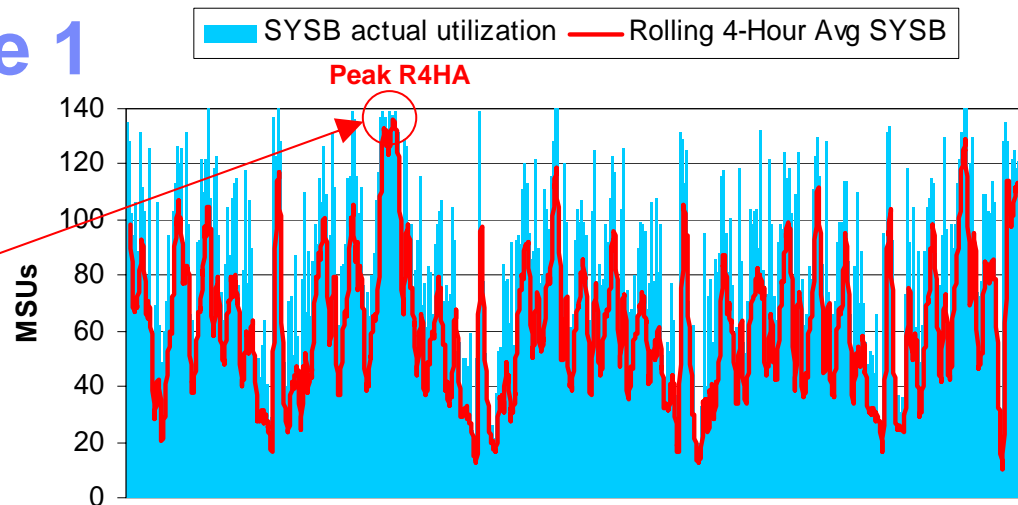
Sub-Capacity Example 1

System z @ 240 MSUs

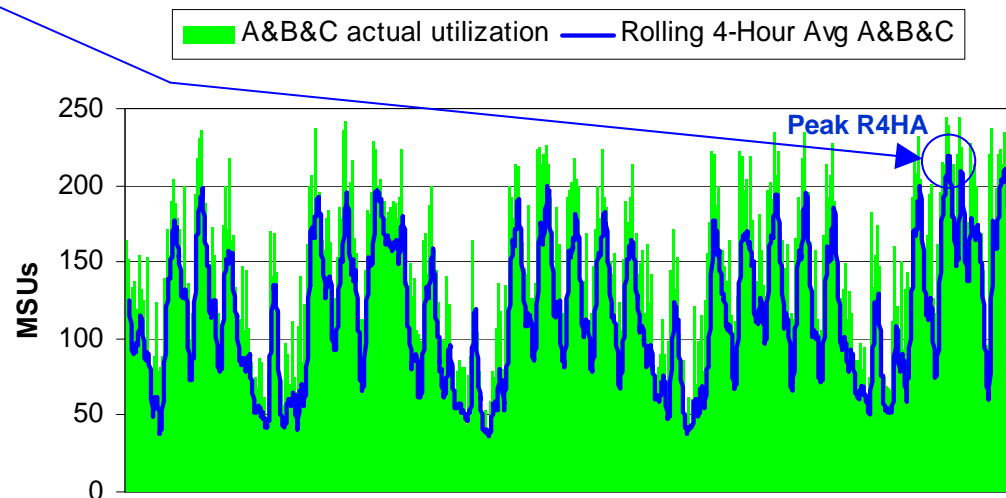| SYSA	SYSB	SYSC
	136 MSUs	
	219 MSUs	
	COBOL	
	DB2	
z/OS	z/OS	z/OS

SCRT Report:

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

Legend: SYSB actual utilization — Rolling 4-Hour Avg SYSB

Peak R4HA

MSUs — One Month

Legend: A&B&C actual utilization — Rolling 4-Hour Avg A&B&C

Peak R4HA

MSUs — One Month

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

LPAR A	LPAR B
100	50
DB2	
75	
z/OS	z/OS
130	

- **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

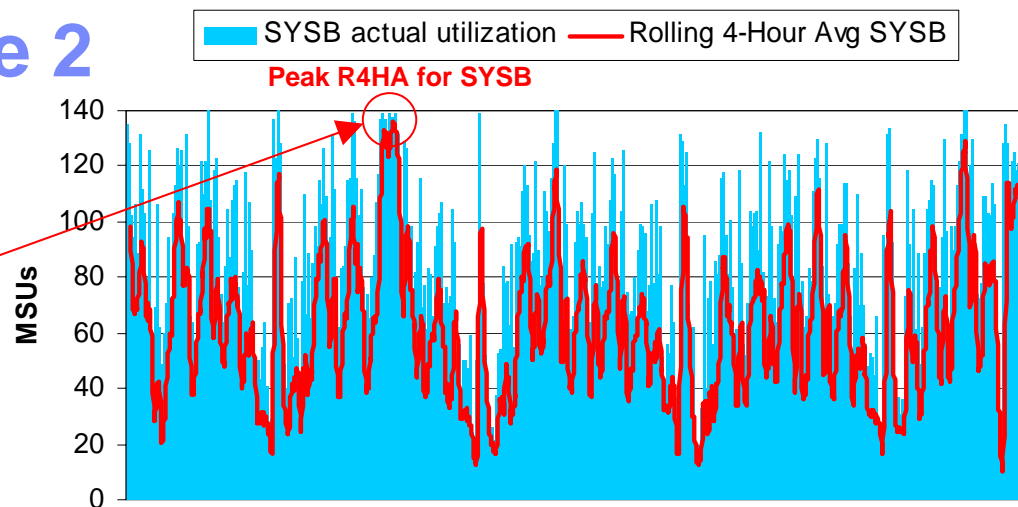- **False**: DB2 Runs in LPAR A, LPAR A peaks at 100, so DB2 is 100
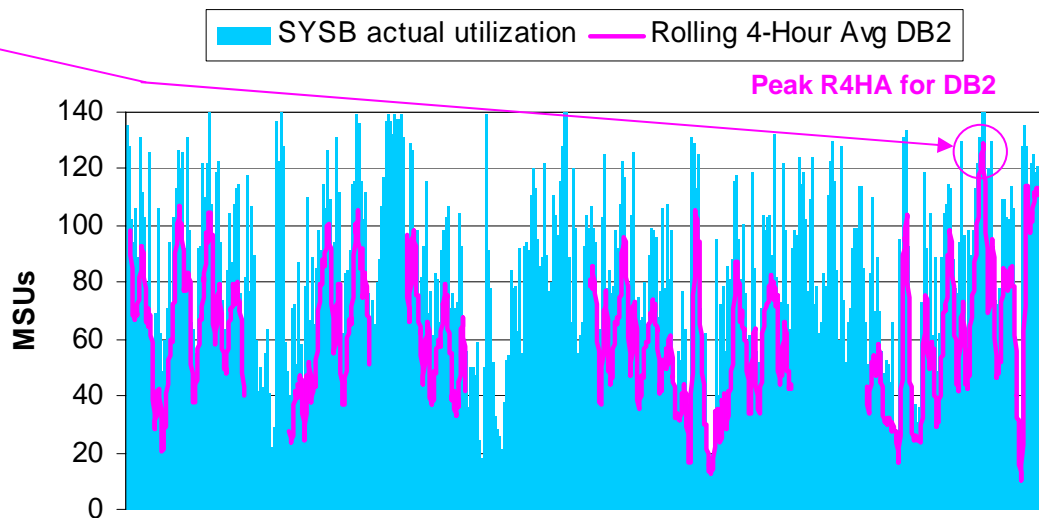
Sub-Capacity Example 2

System z @ 240 MSUs

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

SCRT Report:

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

SYSB actual utilization — **Rolling 4-Hour Avg SYSB**

Peak R4HA for SYSB

One Month

SYSB actual utilization — **Rolling 4-Hour Avg DB2**

Peak R4HA for DB2

One Month

Chart 14

The End