

Measuring new z/OS functions

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Agenda

- Virtual Flash Memory
- CF structures encryption
- Asynchronous CF lock duplexing
- zHyperLink Express
- Container pricing
- Summary

Virtual Flash Memory

- SCM has been replaced by Virtual Flash Memory (VFM) in z14; possible size is from 1,5TB to 6TB (1-4 drawers)
- Changing to VFM is transparent to applications and offers the same functionalities (paging, 1MB pages support, MQ shared queue) but VFM uses real memory so we expect performance to be better
- Paging to SCM or VFM reduces the applications performance penalty but not the CPU overhead due to page processing
- Metrics available in SMF 74-10

Virtual Flash Memory

- R7410FLG, SCM flag; if bit 0 set, Virtual Flash Memory is used
- R7410CWU, card (SCM) or SAP processor (VFM) time used for SCM processing at LPAR level; it is the sum of the average utilization per second in percent multiplied by the number of seconds of this interval
- R7410CWUC, card (SCM) or SAP processor (VFM) time used for SCM processing at CEC level; it is the sum of the average utilization per second in percent multiplied by the number of seconds of this interval

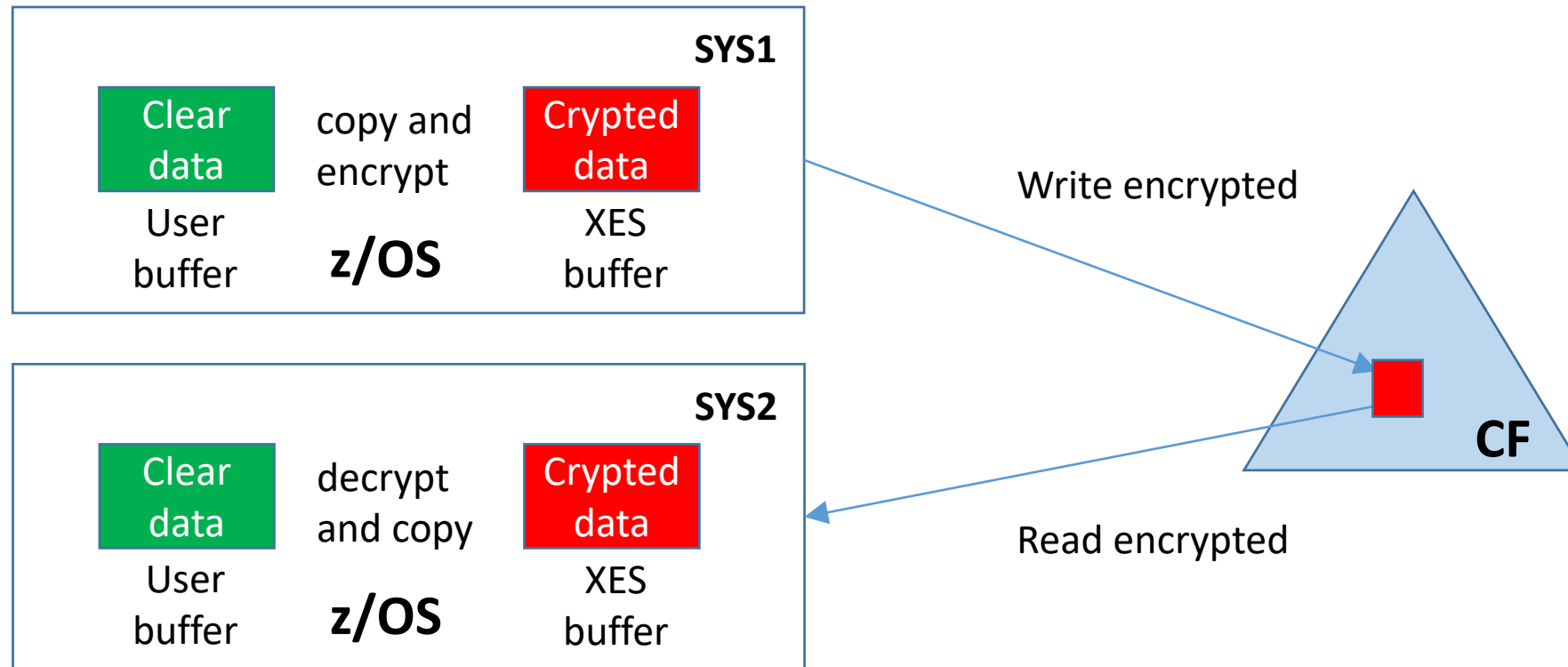
CF structure encryption

- On 25th May 2018 GDPR came into effect
- All organisation handling personal data of EU citizens, regardless of where the company is located were affected
- At the moment, customer data flowing through the CF are vulnerable to exposure because the data are not encrypted
- Cache and list structure may contain personal data; in this case they should be encrypted

CF structure encryption

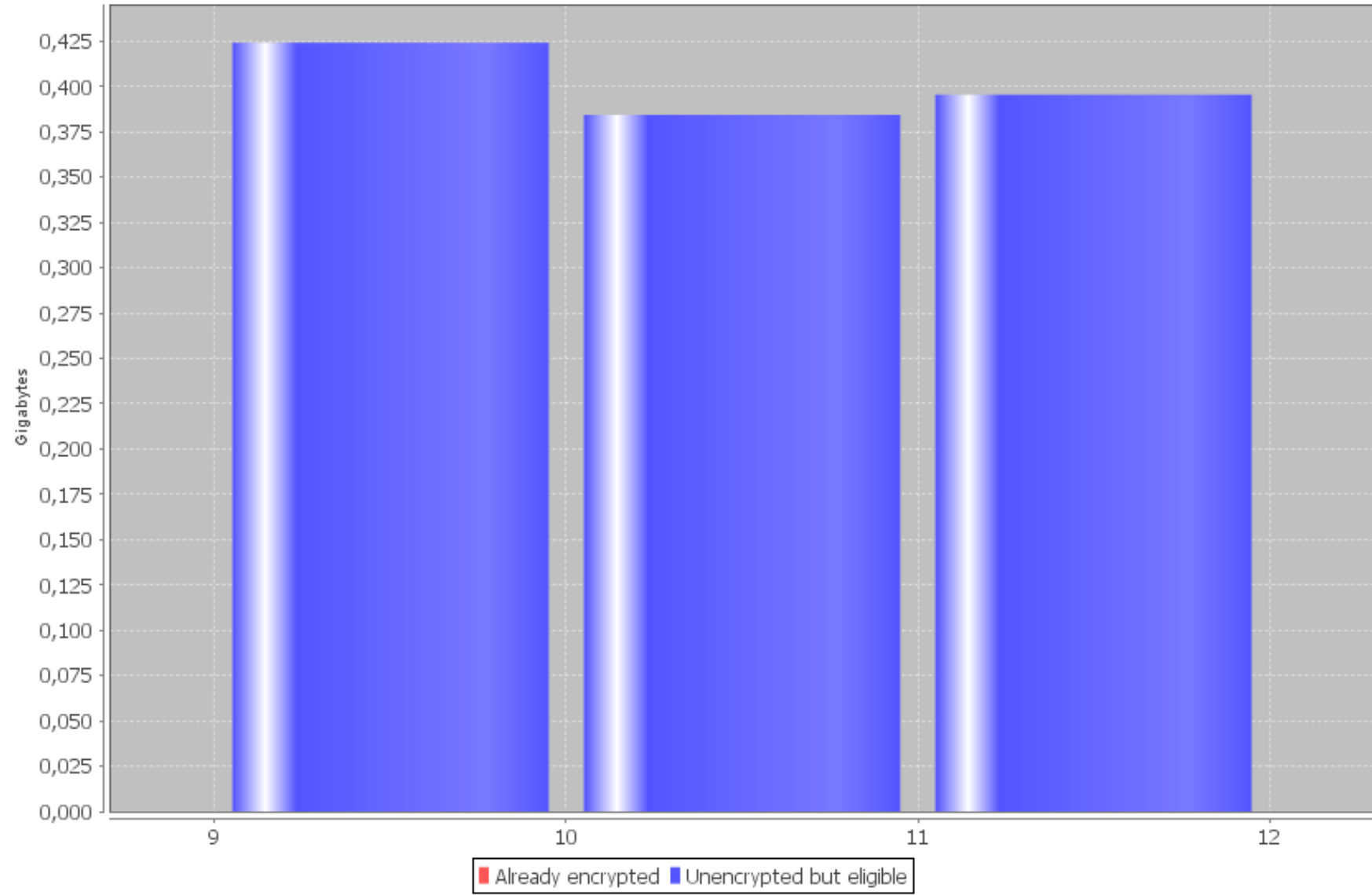
- Required OS level: z/OS 2.3 on all systems
- Minimum z/OS HW: zEC12 and Crypto Express3
- Crypto Express cards are used for handshake and key negotiation
- CPACF is used for encryption/decryption; CPU cycles are needed
- Recommended CF HW: z14

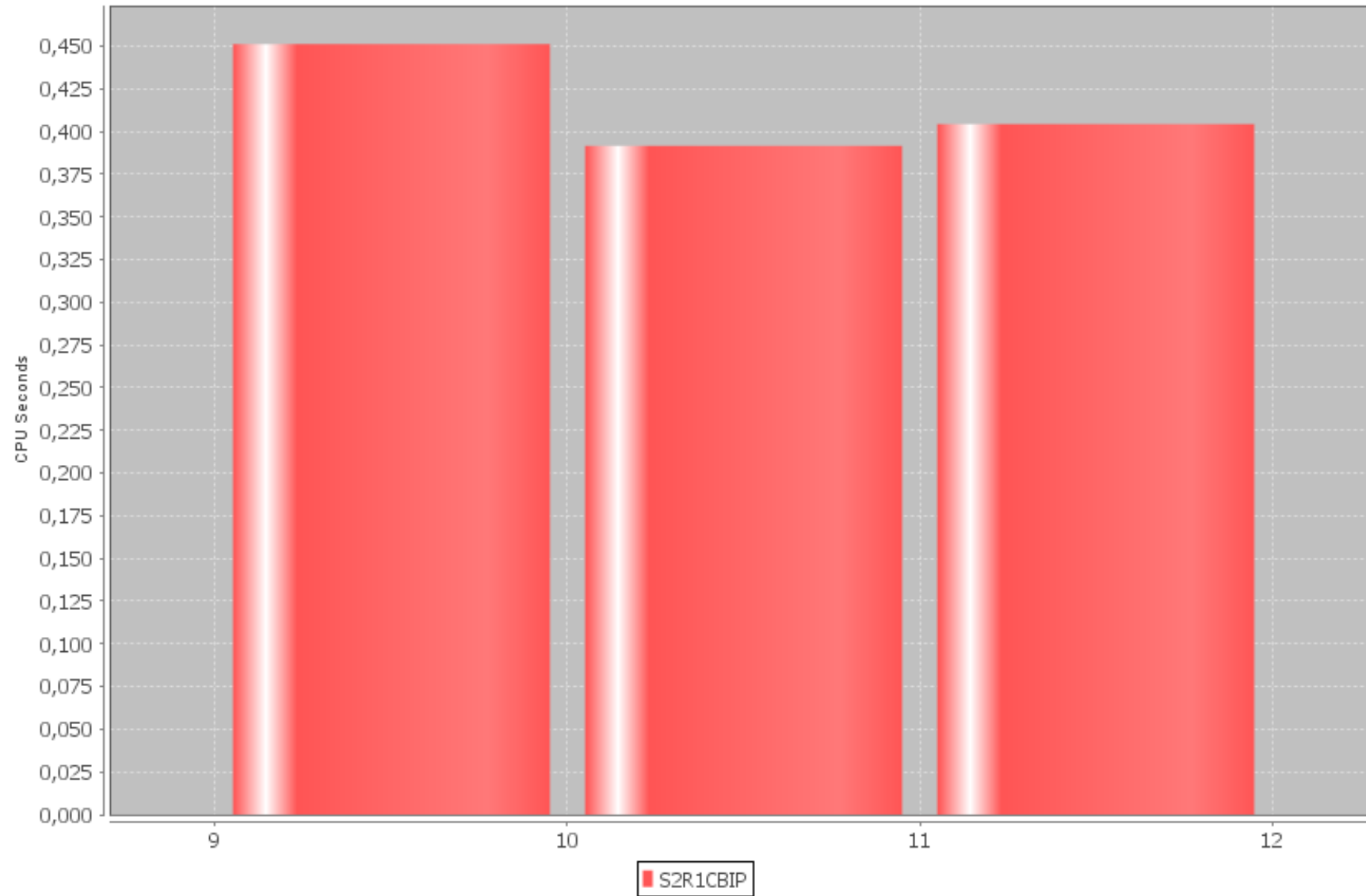
CF structure encryption



CF structure encryption

- New metrics available in SMF 74-4:
 - ✓ R744SFLG, structure status flag; structure encrypted if bit 6 is set
 - ✓ Many other metrics introduced (see next slides); used by zBNA tool to estimate the cost of encrypting/decrypting structures; not clear which algorithm is used
- About 1 CPU millisecond per MB ?

S2R1 - Estimated CF GB/Hr (All Structures)

S2R1 - Estimated CF Encryption CPU Time (All Structures)

CF structure encryption

- R744SWDR Number of requests to write data to the CF structure
- R744SWAC Number of adjunct areas written to the CF structure
- R744SRDR Number of requests to read data from the CF structure
- R744SRAC Number of adjunct areas read from the CF structure
- R744SWEC Number of data entries with data elements that have been written to the CF structure. Includes both single and multi entry write requests
- R744SREC Number of data entries with data elements that have been read from the CF structure. Includes both single and multi entry read requests

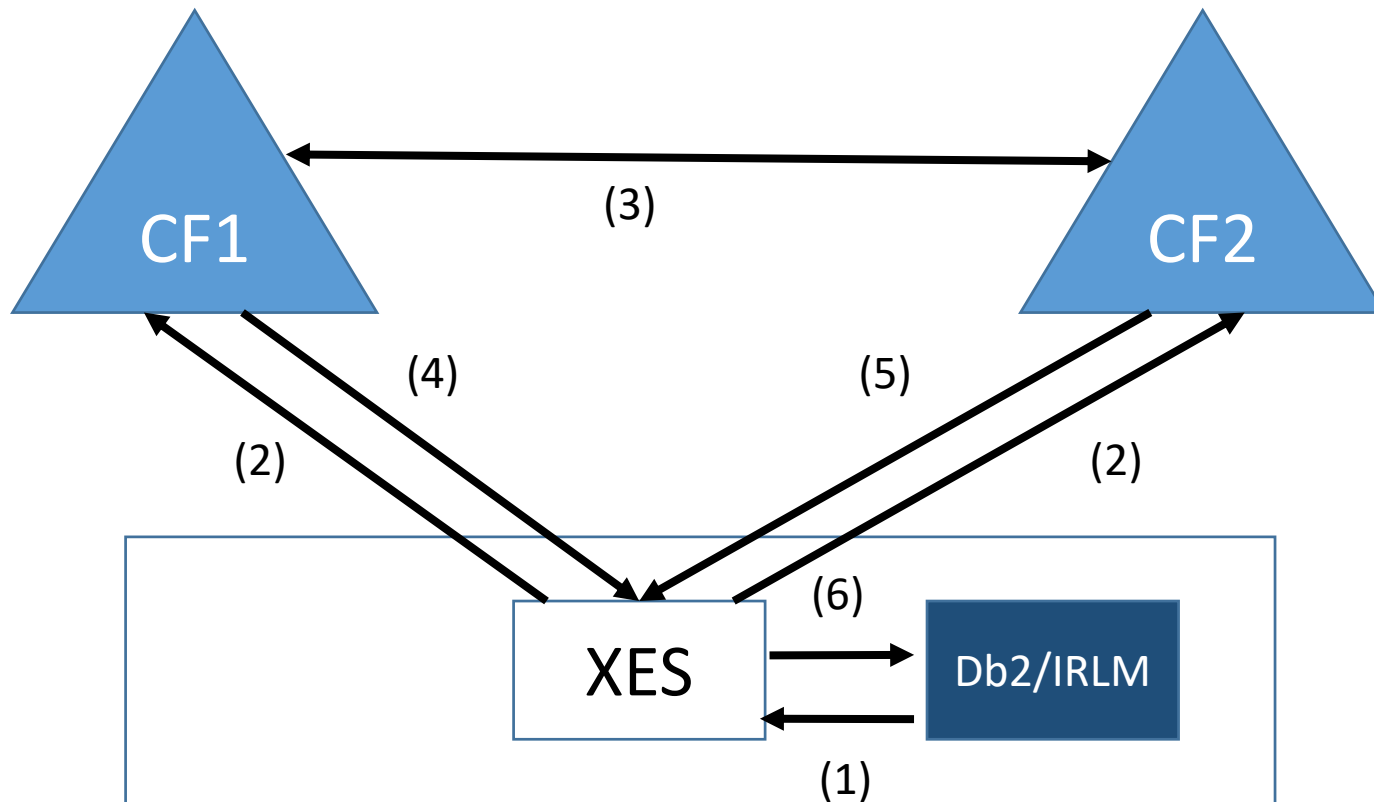
CF structure encryption

- R744SWED Sum of 256-byte increments accumulated for entry data with data elements written to the CF structure
- R744SWES Square of summed number of 256-byte increments accumulated for entry data with data elements written to the CF structure
- R744SRED Sum of 256-byte increments accumulated for entry data with data elements read from the CF structure
- R744SRES Square of summed number of 256-byte increments accumulated for entry data with data elements read from the CF structure

Synchronous CF lock duplexing

- Duplexing of the CF lock and SCA structures eliminates the need for a failure-isolated CF
- A failure isolated CF means that it is isolated from all the Db2 members of the data sharing group
- When the CF lock and SCA structures are duplexed, two CECs are enough to provide a highly available solution. Each CEC can have an ICF and one or more Db2 members of the data sharing group
- However, the performance overhead is high with synchronous system managed duplexing of the lock structure, especially as the distance between the primary and secondary structures grows

Synchronous CF lock duplexing



- 1 Lock request
- 2 Write to CF1 and CF2
- 3 Communication between CF
- 4 CF1 completes
- 5 CF2 completes
- 6 Response

Asynchronous CF lock duplexing

- Minimum requirements:
 - ✓ CF on z13 GA2
 - ✓ CFCC Level 21
 - ✓ z/OS 2.2
 - ✓ Db2 V12
- New flag in SMF 74-4 to identify structures duplexed asynchronously

Asynchronous CF lock duplexing

- Asynchronous duplexing of the lock structure is turned OFF by default. That means, users installing the PTFs for PI68378 will need to configure the environment to setup asynchronous duplexing. It requires changing CFRM policy to add DUPLEX 'mode' option along with the lock structure duplexing enabled/allowed option.
- e.g. `DUPLEX(ENABLED,ASYNC|ASYNCONLY)` or
- `DUPLEX(ALLOWED,ASYNC|ASYNCONLY)`
- Please refer to XES APAR OA47796 for details on configuring the asynchronous duplexing environment.

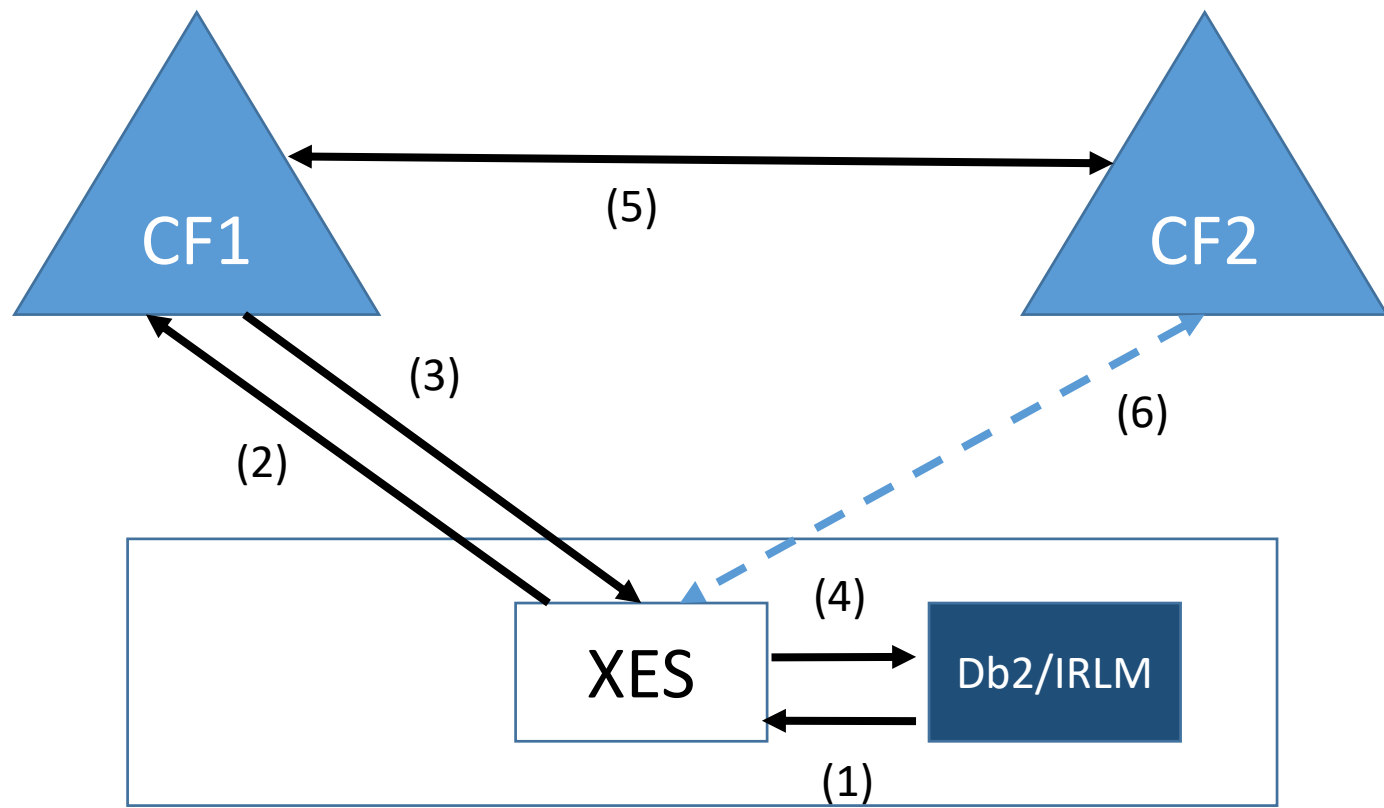
Asynchronous CF lock duplexing

- The new Asynchronous CF Lock Duplexing feature has been designed to be a viable alternative to synchronous system managed duplexing
- Secondary structure updates are performed asynchronously with respect to primary updates
- Db2 (or any other exploiter) considers the command complete after the primary lock structure has been updated.
- However, before Db2 commits a transaction, it checks that the necessary requests have been successfully written to the secondary structure

Asynchronous CF lock duplexing

- The expectation is that most of the time this will be the case
- If it isn't then the Db2 log write process will be suspended until the updates to the secondary structure are complete.
- This “sync-up” protocol ensures that the secondary structure contains all the necessary updates (even though at any given moment the updates to the secondary structure are lagging behind those to the primary structure by some amount)

Asynchronous CF lock duplexing



- 1 Lock request
- 2 Write to CF1
- 3 CF1 completes
- 4 Response with seq#
- 5 Asynch write to CF2
- 6 Db2/IRLM query seq# at commit

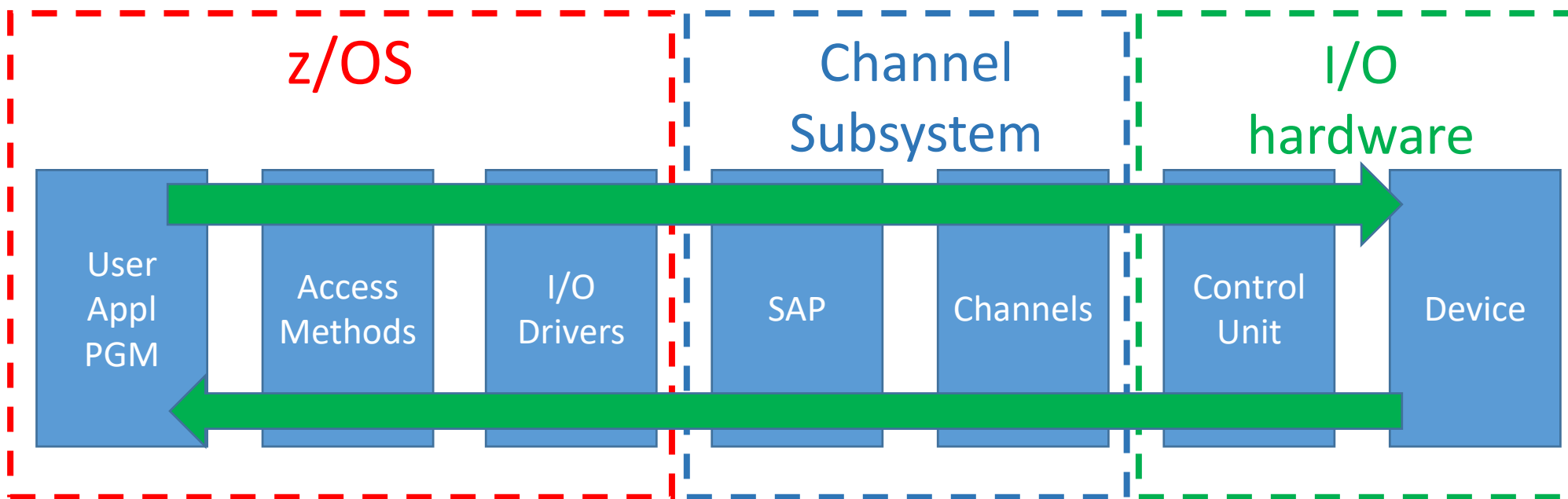
Asynchronous CF lock duplexing

- R744SIXC, number of asynchronous duplex requests that requested sync up with the primary
- R744SXSC, number of asynchronous duplex requests that were suspended waiting for the operations to complete in the secondary structure of the current duplexing instance
- R744SXST, summed suspend time, in microseconds, for suspended requests that were waiting for asynchronous duplex operations to complete in the secondary structure of the current duplexing instance

Asynchronous CF lock duplexing

- R744SADO, number of asynchronous duplex operations that were delayed because the primary structure was unable to accept new requests either because it could not forward requests to the secondary CF or because the secondary CF could not process incoming requests
- R744SADR, number of asynchronous duplex requests that experienced a delayed operation because the primary CF was unable to accept new requests
- R744SQCH, asynchronous duplex operation queue characteristic. The number of queue entries is: $4096 * 2 ** R744SQCH$

zHyperLink Express

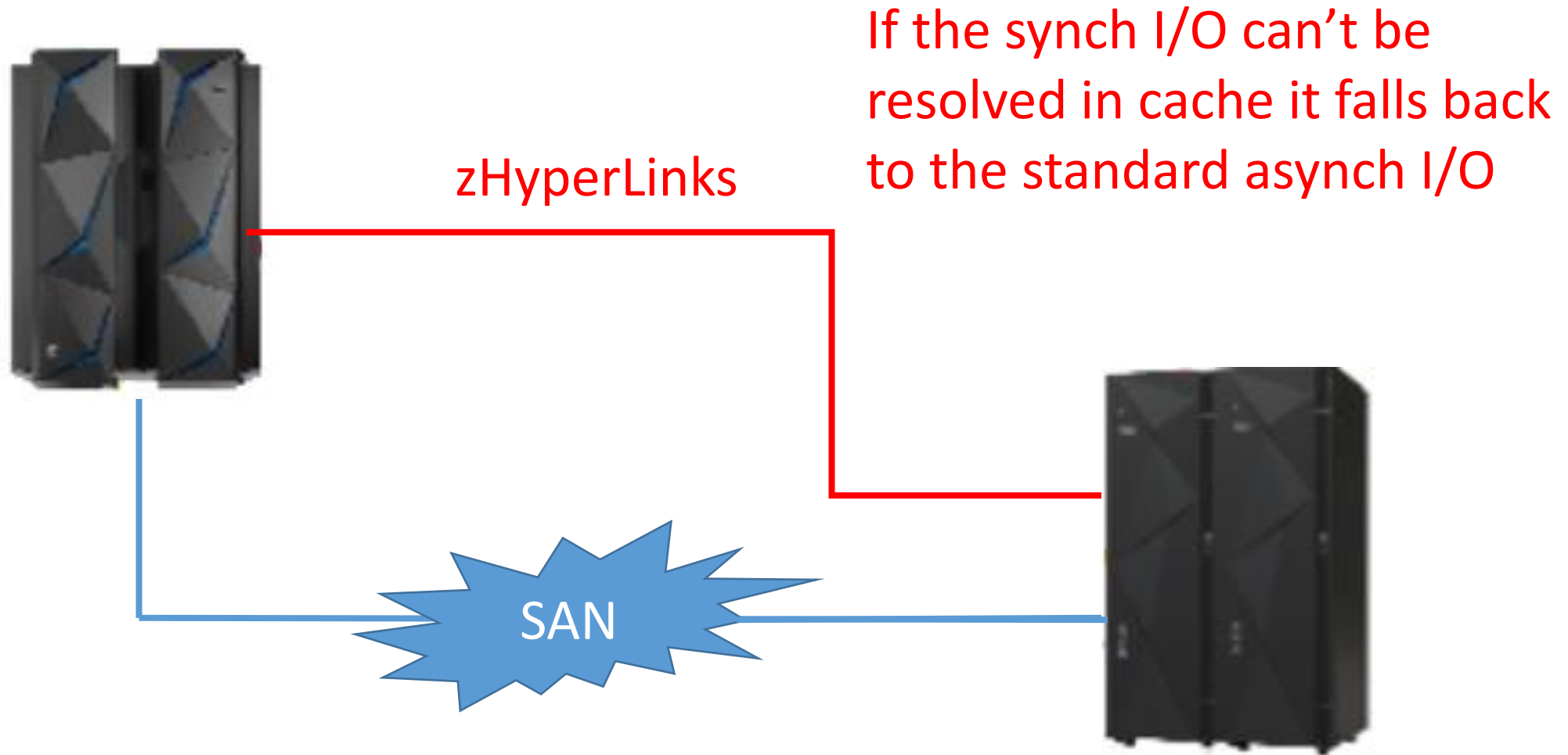


- Long elapsed time with many possible bottlenecks
- Many CPU cycles are used in z/OS to manage I/Os

zHyperLink Express

- A new direct (point to point) short distance link between z14 and DS8880 control unit
- The goal is to dramatically reduce I/O response time by running synchronous I/O (5-7 times faster)
- When running synch I/Os:
 - ✓ CPU is spinning waiting for the I/O to complete (CPU↑)
 - ✓ no un-dispatch of the running task (CPU↓)
 - ✓ no CPU queueing Delays to resume it (CPU↓)
 - ✓ no host CPU cache disruption (CPU↓)

zHyperLink Express



zHyperLink Express

- z14 and DS8880 required
- z/OS, DFSMS and exploiter software needs to be updated
- Db2 V12 synchronous reads will be the initial exploiter of zHyperLinks
- Db2 active log write support could be announced soon
- Following SMF records have been enhanced:
 - ✓ SMF 74 subtype 1, device activity
 - ✓ SMF 74 subtype 9, PCI Express Based Function Activity
 - ✓ SMF 42 subtype 6, DASD data set I/O statistics

zHyperLink Express

- PI82575: DB2 12 FOR Z/OS NEW FUNCTION

<http://www-01.ibm.com/support/docview.wss?uid=swg1PI82575>

- A new zParm - zHYPERLINK is available to enable this support in Db2
- By default zHYPERLINK is disabled
- Users can set zHYPERLINK to ENABLE or DATABASE, to perform synchronous data base read I/Os

zHyperLink Express (good)

- SMF74SQR, number of successfully completed synch I/O reads
- SMF74SQW, number of successfully completed synch I/O writes
- SMF74SBR, number of synch I/O read bytes transferred
- SMF74SBW, number of synch I/O write bytes transferred
- SMF74SPR, processing time for synch I/O reads
- SMF74SPW, processing time for synch I/O writes

zHyperLink Express (bad)

- SMF74SFTR, elapsed time for unsuccessful synch I/O reads
- SMF74SFTW, elapsed time for unsuccessful synchronous I/O writes
- SMF74SLBR, number of synchronous I/O read link busy conditions
- SMF74SLBW, number of synchronous I/O write link busy conditions
- SMF74SCMR, number of cache miss conditions for synchronous I/O reads
- SMF74SNIS, number of synchronous I/O writes where the write data could not be immediately stored

zHyperLink Express (bad)

- SMF74STOR, number of synchronous I/O read timeout conditions
- SMF74STOW, number of synchronous I/O write timeout conditions
- SMF74SOR, number of synchronous I/O read requests rejected for reasons other than link busy, read cache miss or timeout conditions
- SMF74SOW, number of synchronous I/O write requests rejected for reasons other than link busy, timeout or deferred write conditions

Container Pricing

- IBM is introducing Container Pricing for IBM z13 and z14
- Three solutions will initially be enabled with Container Pricing:
 - ✓ Application Development and Test Solution – aggressive pricing
 - ✓ New Application Solution – highly competitive pricing for new z/OS applications
 - ✓ Payments Pricing Solution – business metric tied directly to payment volumes

Most information about Container Pricing available on:
'Container Pricing for IBM Z' – Version 2 Release 3

Container Pricing

- Container Pricing enables the following possibility:
 - ✓ A new solution may be defined as being collocated with other solutions **in existing z/OS images (LPARs)**, in separate LPARs or multiple LPARs
 - ✓ The collocated solution has no **direct** impact to the rolling four-hour average. Therefore introduction of a new workload in the same production system has minimal or no impact on the pricing of existing workloads
 - ✓ The collocated solution can be measured and its MSU utilization optionally capped, independent of other workloads
 - ✓ The system records data about the collocated solution for accounting (SCRT reporting) purposes. SCRT analyzes the recorded data and produces a report for consumption by fulfillment systems, removing the workload's MSU utilization from the rolling four-hour average

Container Pricing

STEP1

- Once a solution is agreed upon with the client, with an agreed price, IBM Sales initiates a sales order, which triggers the creation of a solution ID
- The **IBM-provided solution ID** is a 64-character string representing an approved workload with an entitled MSU capacity in the form of a full-cap pricing container used for billing purposes

Container Pricing

STEP 2

- **Tenant resource groups** have to be created in the WLM service definition to identify the WLM classified workloads that constitute the approved solution workload
- The tenant resource group also supports metering and optional capping of the workload's MSU utilization
- When defining the tenant resource group the 64-character solution ID that was obtained in the prior step has to be provided
- That is the link between the approved workload and SCRT's evaluation, and exclusion from the R4HA

Container Pricing

STEP 3

- When the WLM service definition is activated with tenant resource group definitions and the solution executes, WLM records data related to the workload
- RMF then writes each tenant resource group's consumption data to SMF Type 70, Subtype 1 records (and SMF 72)
- SMF 89 records are also written

Container Pricing

STEP 4

- When SCRT is invoked later by the client, it reads the tenant resource group data in SMF 70 and 89 records and reports MSU utilization for each Container in the SCRT report, which includes the solution ID for all defined solutions
- The solution ID is used by IBM's billing process to correlate the workload with the entitled Container Pricing(s) for that client and to handle software billing based on the report
- CPU resource that is reported for the **address spaces** and **independent enclaves** that are defined to Container Pricing are subtracted by SCRT from the LPAR rolling four-hour average

Container Pricing – WLM definitions

- Two new logical structures are needed in WLM to identify, measure and eventually cap a container:
 - ✓ Tenant Report Classes
 - ✓ Tenant Resource Groups
- New entries are provided in the WLM application from LEVEL032

Container Pricing - WLM definitions

```
File Utilities Notes Options Help
-----
Functionality LEVEL031          Definition Menu          WLM Appl LEVEL035
Command ==> _____

Definition data set . . . : none

Definition name . . . . . EPVDEF00 (Required)
Description . . . . . EPV Service Definition

Select one of the following options.
=
1. Policies
2. Workloads
3. Resource Groups
4. Service Classes
5. Classification Groups
6. Classification Rules
7. Report Classes
8. Service Coefficients/Options
9. Application Environments
10. Scheduling Environments
11. Guest Platform Mgmt Provider
12. Tenant Resource Groups
13. Tenant Report Classes
```

Container Pricing – WLM definitions

- Tenant Resource Groups have to be created in WLM to identify the workloads that constitute the co-located container workload
- Before defining the Tenant Resource Group, a 64-character solution ID has to be obtained from IBM
- The solution id is the link between the approved qualified workload and the SCRT's evaluation; it will allow SCRT to avoid a direct impact of the container activity on other software costs and set the right price for the container workload

Container Pricing – WLM definitions

- To define a Tenant Resource Group you have to set:
 - ✓ Tenant Resource Group Name, a mandatory and unique 8 bytes name;
 - ✓ Description, an optional description;
 - ✓ Tenant ID, an optional Tenant unique identifier
 - ✓ Tenant Name, an optional Tenant description;
 - ✓ Solution ID, the 64 character Solution ID as provided by IBM; this is the anchor point for SCRT to discard containers consumptions when calculating the MSU used by the other workloads and the MSU used by each container; more than one Tenant Resource Group can be associated to the same solution id to compose a unique container;

Container Pricing – WLM definitions

- ✓ Tenant Resource Group Type, an optional number from 1 to 4 depending on the limit that has to be applied:
 - SU/sec, sysplex scope;
 - % LPAR share of general purpose processors, system scope;
 - Fraction of general purpose processors, system scope;
 - MSU/h, sysplex scope; these are not 4-hour rolling average MSUs;
- ✓ Maximum Capacity, an optional maximum amount of processor capacity that work associated with the tenant resource group type chosen;
- ✓ Include Specialty Processor Consumption, to apply the Maximum Capacity to both general purpose and specialty processors; default is NO.

Container Pricing - WLM definitions

```

Tenant-Resource-Group  Xref  Notes  Options  Help
-----
                          Modify a Tenant Resource Group
Command ==> _____

Enter or change the following information:

Tenant Resource Group Name  EPVTEST
Description . . . . . EPV test for Container Pricing
Tenant ID . . . . . EPVCONT1
Tenant Name . . . . . _____
Solution ID . . . . . _____

Define Capacity:  __  1.  In Service Units (Sysplex Scope)
                   2.  As Percentage of the LPAR share (System Scope)
                   3.  As a Number of CPs times 100 (System Scope)
                   4.  In accounted workload MSU (Sysplex Scope)

Maximum Capacity . . . . . _____
Include Specialty Processor Consumption NO      (YES or NO)

```

Container Pricing – WLM definitions

- The Solution ID field is not mandatory; if you omit to specify it, the Tenant Resource Group is accepted; it can be useful to estimate possible benefits but a bit “dangerous” if you forget it after adopting Container Pricing
- Of course, this means that SCRT will not be able to manage the container consumptions appropriately
- On the other hand, if you specify an incomplete or not valid Solution ID you will get the error messages in the next slides

Container Pricing - WLM definitions

```
Tenant-Resource-Group  Xref  Notes  Options  Help
-----
                          Modify a Tenant Resource Group

Command ==> _____

Enter or change the following information:

Tenant Resource Group Name  EPVTEST
Description . . . . . EPV test for Container Pricing
Tenant ID . . . . . EPVCONT1
Tenant Name . . . . . _____
Solution ID . . . . .
1111

Define Capacity:  ___  1. In Service Units (Sysplex Scope)
                   2. As Percentage of the LPAR share (System Scope)
                   3. As a Number of CPs times 100 (System Scope)
                   4. In accounted workload MSU (Sysplex Scope)

Maximum Capacity . . . . . _____
Include Specialty Processor Consumption NO (YES or NO)

A Solution ID, if specified, must be 64 characters long. (IWMAM542)
```

Container Pricing - WLM definitions

```

Tenant-Resource-Group  Xref  Notes  Options  Help
-----
                          Modify a Tenant Resource Group

Command ==> _____

Enter or change the following information:

Tenant Resource Group Name  EPVTEST
Description . . . . . EPV test for Container Pricing
Tenant ID . . . . . EPVCONT1
Tenant Name . . . . . _____
Solution ID . . . . .
1111_SDJA FALA Fhaf ALHA Hahl FHHA Haha AFHA FLAF ALHS 233L DLAH

Define Capacity: ___  1.  In Service Units (Sysplex Scope)
                     2.  As Percentage of the LPAR share (System Scope)
                     3.  As a Number of CPs times 100 (System Scope)
                     4.  In accounted workload MSU (Sysplex Scope)

Maximum Capacity . . . . . _____

A Solution ID can contain only alphanumeric characters (A-Z, 0-9), and
dashes ("-"). (IWMAM541)

```

Container Pricing - WLM definitions

```
Tenant-Resource-Group  Notes  Options  Help
-----
                          Create a Tenant Resource Group

Command ==> _____

Enter or change the following information:

Tenant Resource Group Name  EPVTEST  (required)
Description . . . . . EPV test for Container Pricing
Tenant ID . . . . . EPVCONT1
Tenant Name . . . . . _____
Solution ID . . . . .
123ABCD-ABCD123-FGH178G890-A1A2A3A4-W345-P98U-ZA09-12FG45-67YUT8

Define Capacity:  ___  1.  In Service Units (Sysplex Scope)
                   2.  As Percentage of the LPAR share (System Scope)
                   3.  As a Number of CPs times 100 (System Scope)
                   4.  In accounted workload MSU (Sysplex Scope)

Maximum Capacity . . . . . _____

Invalid Solution ID. Make sure that you paste the value as provided by IBM
without any modification. (IWMAM554)
```

Container Pricing – WLM definitions

- Tenant Report Classes are the basic elements feeding Tenant Resource Groups
- They have many characteristics similar to Report Classes
- The major difference is that Tenant Report Classes **have** to be associated to a Tenant Resource Group while in the “traditional” WLM definitions only **Service Classes (not Report Classes) may be** associated to a Resource Group

Container Pricing – WLM definitions

- To define a Tenant Report Class you have to set:
 - ✓ Tenant Report Class Name, a mandatory and unique 8 bytes name
 - ✓ Description, an optional description
 - ✓ Tenant Resource Group Name, a mandatory Tenant Resource Group

Container Pricing - WLM definitions

```
Tenant-Report-Class  Notes  Options  Help
-----
                Create a Tenant Report Class

Command ==> _____

Enter or change the following information:

Tenant Report Class Name . . . TRCCONT1  (Required)
Description . . . . . Tenant Report Class for EPV test

Tenant Resource Group Name . . EPVTEST  (Required; name or ?)
```


Container Pricing – WLM definitions

- The final step is assigning address spaces or enclaves to Tenant Report Classes by setting appropriate WLM classification rules

Container Pricing - WLM definitions

```

Subsystem-Type  Xref  Notes  Options  Help
-----
                Modify Rules for the Subsystem Type                Row 1 to 3 of 3
Command ==> _____ Scroll ==> PAGE

Subsystem Type . : JES          Fold qualifier names?  Y  (Y or N)
Description . . . EPV test for Container Pricing

Action codes:   A=After      C=Copy      M=Move      I=Insert rule
                B=Before     D=Delete row R=Repeat    IS=Insert Sub-rule
                                           More ==>

          -----Qualifier-----          -----Class-----
Action   Type      Name      Start              Service      Report
                                           DEFAULTS: RJOBLOW  RRBATCH
_____  1  TN      EPV0001% _____  RJOBTEST    TRCCONT1
  
```

Container Pricing - Issues

1. A solution id can be omitted (already discussed)
2. A tenant report class cannot be specified on a classification rule with a Reporting Attribute of MOBILE, CATEGORYA, or CATEGORYB
3. A classification rule cannot categorize work into a tenant report class and a service class which is associated with a resource group
4. As you add capacity for your tenant resource groups, there is no legacy capability to prevent existing workloads from using that new capacity
5. ISV acceptance (not discussed here)

Container Pricing - Issues

2) A tenant report class cannot be specified on a classification rule with a Reporting Attribute of MOBILE, CATEGORYA, or CATEGORYB

```

Subsystem-Type  Xref  Notes  Options  Help
-----
                Modify Rules for the Subsystem Type                Row 1 to 3 of 3
Command ==> _____ Scroll ==> PAGE

Subsystem Type . : JES          Fold qualifier names?  Y  (Y or N)
Description . . . EPV test for Container Pricing

Action codes:   A=After      C=Copy      M=Move      I=Insert rule
                B=Before      D=Delete row R=Repeat   IS=Insert Sub-rule
                <=== More

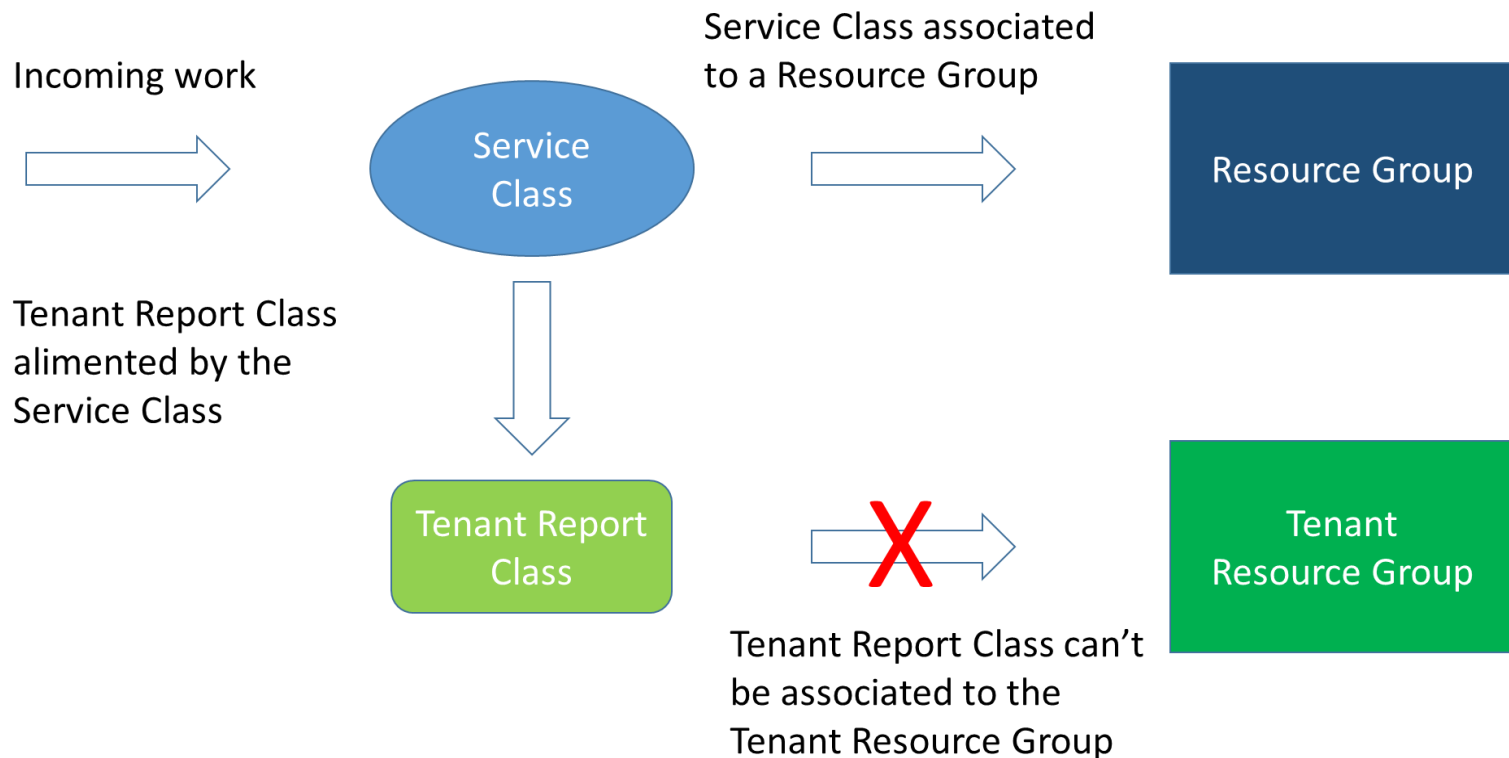
-----Qualifier-----
Action  Type      Name      Start      Storage  Reporting  Manage Region
                Type      Name      Start      Critical Attribute Using Goals Of
_____ 1 TN      EPV0001%  _____ NO      M      TRANSACTION

Non-default Reporting Attribute MOBILE must not be used with Tenant Report
Class EPVRCNT1 in the same classification rule. (IWMAM746)

```

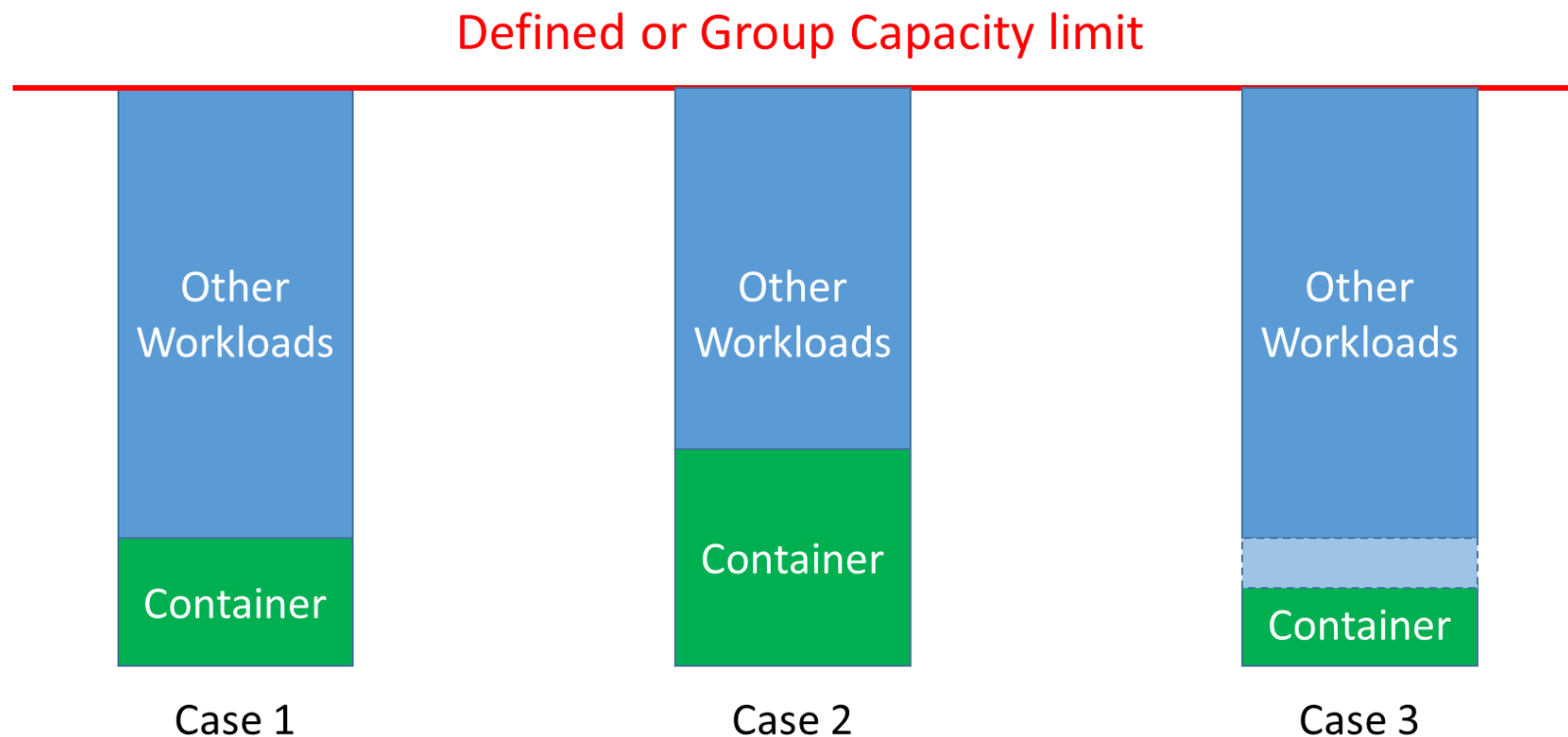
Container Pricing - Issues

3) A classification rule cannot categorize work into a tenant report class and a service class which is associated with a resource group



Container Pricing - Issues

4) As you add capacity for your tenant resource groups, there is no legacy capability to prevent existing workloads from using that new capacity



Container Pricing – Issues

- In Case 1 the Tenant Resource Group of the container is capped so it uses the planned amount of MSUs. If you added this amount to the defined and/or group capacity limits the other workloads will be capped as usual.
- In Case 2 the Tenant Resource Group of the container is not capped so it is using more than the planned amount of MSUs. In this case, even if you added this amount to the defined and/or group capacity limits, the other workloads will be capped more than usual. Performance issues could arise.
- In Case 3 the Tenant Resource Group of the container is capped but it is using less than the planned amount of MSUs. In this case, the other workloads will be capped less than usual. Software costs for the other workloads could increase.

Container Pricing – SMF

- New metrics added to the following SMF records:
 - ✓ SMF 70 subtype 1
 - ✓ SMF 72 subtype 3
 - ✓ Record type 79, subtypes 1, 2, and 5 (not discussed here)
 - ✓ SMF 89 subtype 1 and 2 (not discussed here)

Container Pricing – SMF

- SMF70_TRG_NAME, tenant resource group name
- SMF70_TRG_DESC, tenant resource group description (optional)
- SMF70_TRG_TNTID, tenant identifier (optional)
- SMF70_TRG_TNTNAME, tenant name.(optional)
- SMF70_TRG_SBID, solution ID
- SMF70_TRG_SUCP, service units on CPs consumed by TRG
- SMF70_TRG_SUIFA, service units on zAAPs consumed by TRG
- SMF70_TRG_SUSUP, service units on zIIPs consumed by TRG
- SMF70_TRG_LAC, long-term average service on general purpose processors in millions of service units per hour consumed by TRG

Container Pricing – SMF

- Example of SYSTEM WLC USAGE in EPV
- 4 hour rolling average MSU
- One line per TRG

SYSTEM WLC USAGE - Fri, 06 Oct 2017 - SYS1										
METRIC	8	9	10	11	12	13	14	15	16	17
CEC MSU	2.358,00	2.358,00	2.358,00	2.358,00	2.358,00	2.358,00	2.358,00	2.358,00	2.358,00	2.358,00
IMAGE MSU	695	695	695	695	695	695	695	695	695	695
GROUP MSU	695	695	695	695	695	695	695	695	695	695
DEF MSU	0	0	0	0	0	0	0	0	0	0
MIN ENT	491,1	491,1	491,1	491,1	491,1	491,1	491,1	491,1	491,1	491,1
ROLLING 4*HOUR	338,2	341,2	388,8	410,2	400,3	385,2	351	343,2	359	397,7
MAX ENT	695	695	695	695	695	695	695	695	695	695
% ACT SOFTCAPP	0	0	0	0	0	0	0	0	0	0
% WLM SOFTCAPP	0	0	0	0	0	0	0	0	0	0
GROUP MSU AVA	263,8	251,3	192	168,3	175,8	188	225,5	235,7	223	182
ABS MSU CAPP	0	0	0	0	0	0	0	0	0	0
TRGROUP4	30,9	53,7	72,6	91,6	103,2	91,7	82,7	77,4	64,3	76,5

Container Pricing – SMF

- WLC navigation still to be designed
- An exit with customer input will be required if LPAR are used as containers



Container Pricing – SMF

- R723MFLG, tenant report class flag
- R723GGTF, tenant resource group flag
- R723GGTI, tenant identifier
- R723GGTN, tenant name
- R723GGKY, solution ID

Container Pricing – SMF

- Example of Tenant Resource Groups in EPV
- Hourly MSU
- TRG = YES
- ID and solution ID as last columns

SYSTEM RESOURCE GROUP CPU - Fri, 06 Oct 2017 - SYS1 - MSU														
SYSTEM	RESGROUP	TRG	8	9	10	11	12	13	14	15	16	17	ID	SOLUTION ID
SYS1	GROUP1		24,2	9,4	13,1	10	13,1	8,9	17	8,9	126,6	131,3		
SYS1	GROUP2		10,8	24,1	14	19,8	8,6	4,8	6,7	21,8	29,5	16,7		
SYS1	GROUP3		4,6	2,6	4,4	6,6	19,3	3,4	18,6	21,8	5	1,9		
SYS1	TRGROUP4	YES	123,4	91,3	75,7	76	169,9	45	39,9	54,7	117,4	94,1	TENANT1	
SYS1	NORESGRP		237	223,7	279,6	206,1	194,4	168,6	211,8	223,5	214,4	160,2		
	TOTAL		400	351,1	386,9	318,5	405,2	230,6	294	330,7	492,8	404,3		

Container Pricing User experience

- One of our Customers signed a Container Pricing agreement with IBM
- They created a container pricing with all the TEST and DEVELOPMENT Ipars
- I asked for some comments...

Container Pricing User comments

- Container Pricing is principally not a cost saving subject. IBM's aim is to offer more capacity for the "same" money you pay usually for DevTest (3 month measurement, like for CMP)
- I think they want to make z/OS more attractive for application development to get more money in the future when these applications will run in PROD on z/OS
- many shops are going to replace z/OS applications with "new and more modern?" applications running on the distributed world. We do as well or plan to do it. We'll see if it's reasonable.

Container Pricing User comments

- Disadvantages:
- check of the OTC License IBM products concerning the Value Units (max. MSU's). The Container is a Full Box License, regardless if you use the agreed max. MSU average or not
- MIPS based vendor product licenses could also be affected
- additional VU's can have a high discount (up to 95% they said to me) but the higher maintenance charge has no discounts
- you are no longer able to avoid the additional cost for higher PROD - peaks, predictable or not, by reducing the DevTest - capacity

Container Pricing User comments

- Advantages - from my point of view (and experienced during the last 2 month)
- no longer regular capping of DevTest-LPAR's necessary for cost control
- faster providing of test-environments, faster testing, faster delivery of application maintenance and new functions into production

Container Pricing User comments

- Advantages - from my point of view (and experienced during the last 2 month)
- our DevTest people are really satisfied with this "new behaviour". Much easier now to achieve the deadlines for planned application releases.
- more time to find, fix and test the fixes of bugs before the next application release date, better chance to deliver good quality within the given time

Summary

- Many new interesting functions available
- They all require collection of many new metrics
- Reporting systems have to be updated to be able to decide if these new functions should be used and to control their behaviour afterwards

Questions?

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