Migrating from z10 ICBs to z196 Infiniband- a Detailed Performance Study and User Experience

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Garanti Technology

10 August 2011 9743

Agenda

- Who is GT ?
- GT-Parallel Sysplex Configuration
- General Information About PSIFB
- General Information About CF Request
  - Life Cycle Of CF Requests
  - How Does Sync/Async Heuristic Algorithm Work ?
- Effect Of Upgrade To Performance Items
- RMF Mon III,I panels That Are Used and Key Fields
- More Information & Backup Slides

Who is GT ?

GARANTI TECHNOLOGY

- A wholly-owned subsidiary of Garanti Bank, the second largest private bank in Turkey owned by Doğuş Group and BBVA.
- One of the largest private internal IT service providers in Turkey
- Most up-to-date IT infrastructure
- Tightly integrated and fully in-house developed, custom-fit IT solutions
- Uninterrupted transaction capability and infrastructure security
- Well-reputed as a company of “firsts”
- Visionary and continuous investment in technology since 90’s

Garanti

- Fast decision making and strong communication from top to down
- Centralized management reporting systems, enable management to take timely actions
- Advanced CRM applications
- Paperless banking

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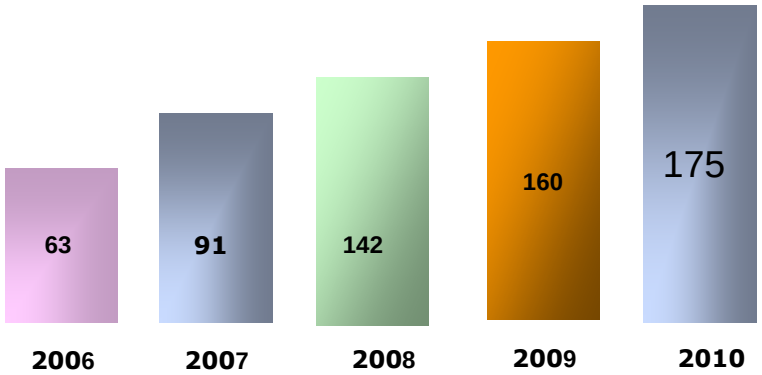
Our Customers

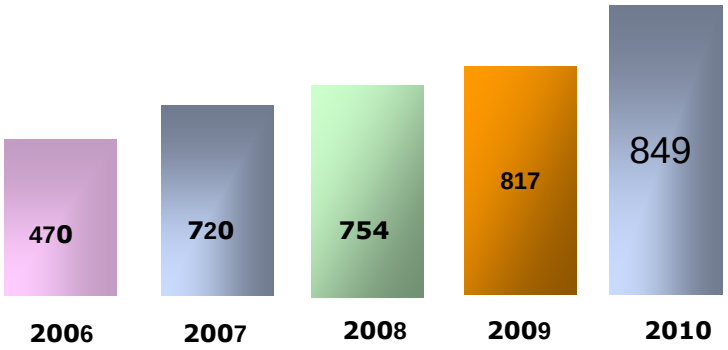
Who is GT ?

Number of Transactions / Day (mio.)



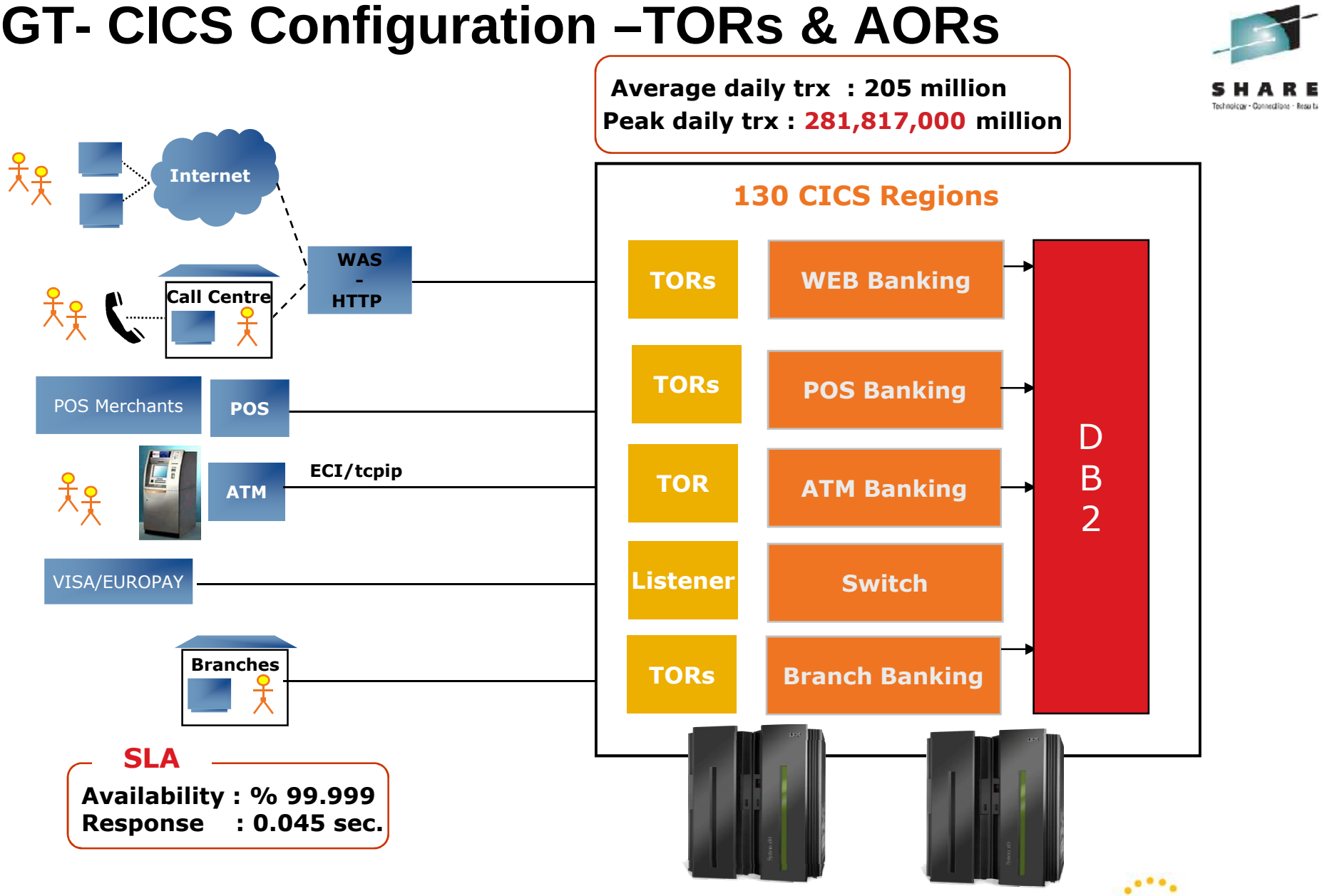
Average daily txs. : 205 million
Peak daily txs. : 281 million
Average response time: 0.045 sec.

Average Login / Day (`000)



Internet Average logins /day : 849,000
Internet Logins/day on peak days :1,209,000
Internet Average response time : 22 msec.

GT- CICS Configuration –TORs & AORs

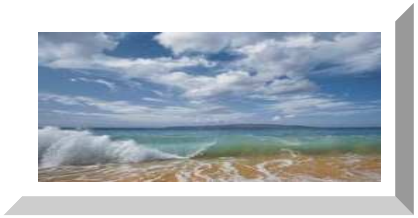


GT Is A Member Of …

- SHARE

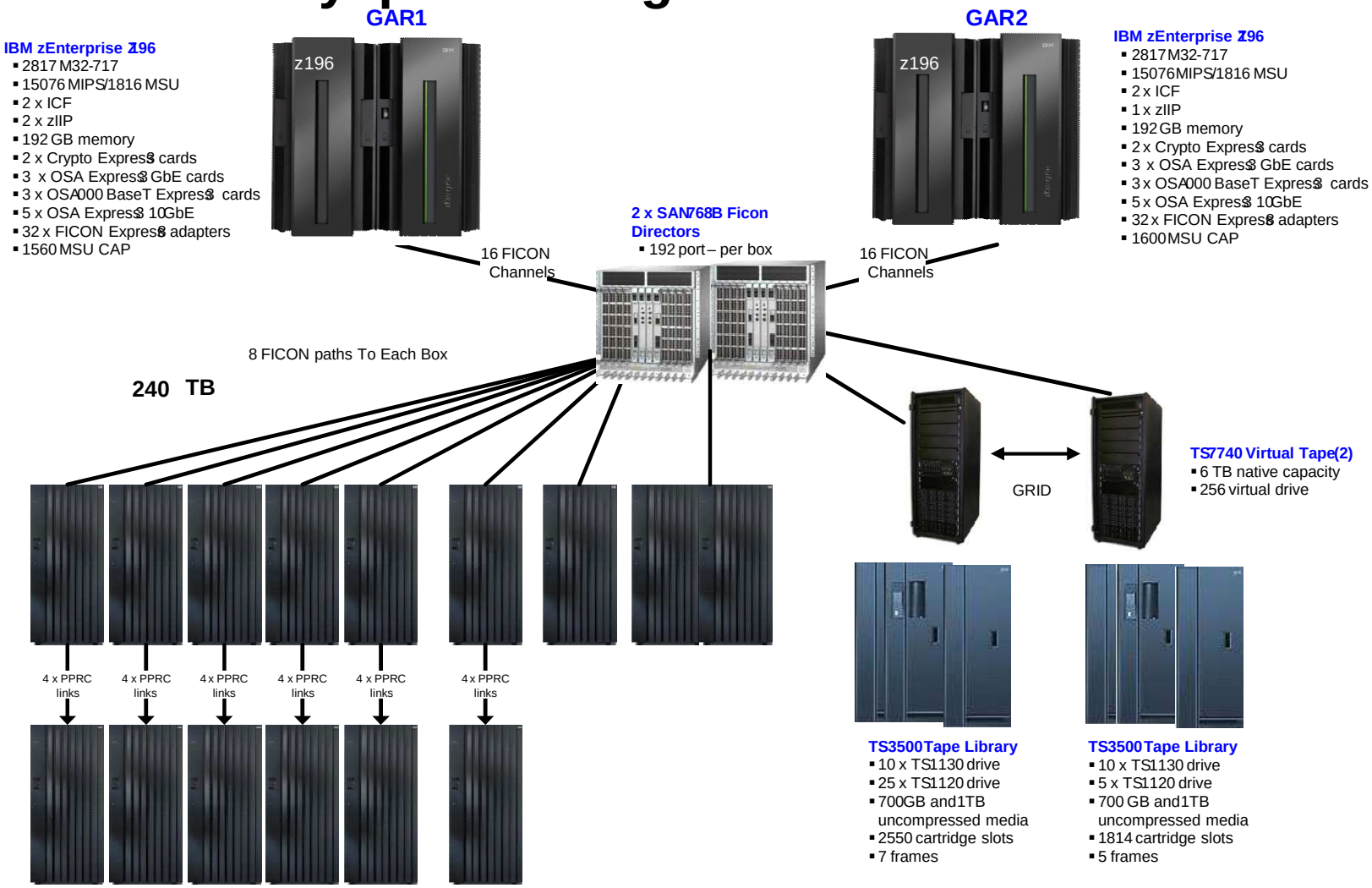
- CMG

- GDPS Design Council
- zBLC



GT Parallel Sysplex Configuration

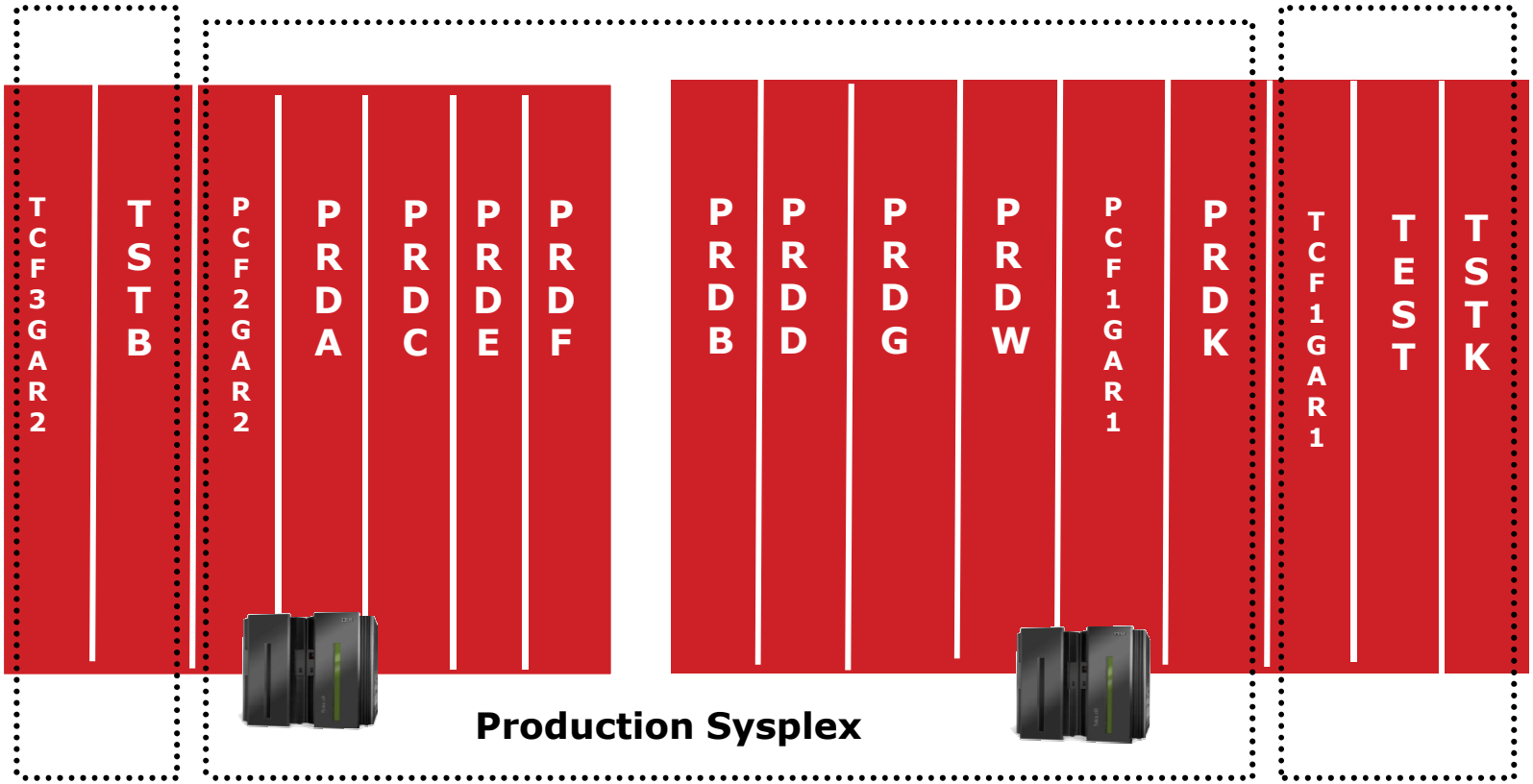
GT Parallel Sysplex Configuration - Hardware



Production Disk Subsystems
- 4 x DS8700, 12,8 TB per box
- 4 x DS8300 Turbo, 12,8 TB per box
- 2 x DS8300 Turbo, 6,4 TB per box
- GDPS/PPRC, GDPS/XRC, HyperPAV, zHPF
- 128GB (4), 256GB (6) cache per box
- 24 (6) and 32 (4) FICON adapters per box

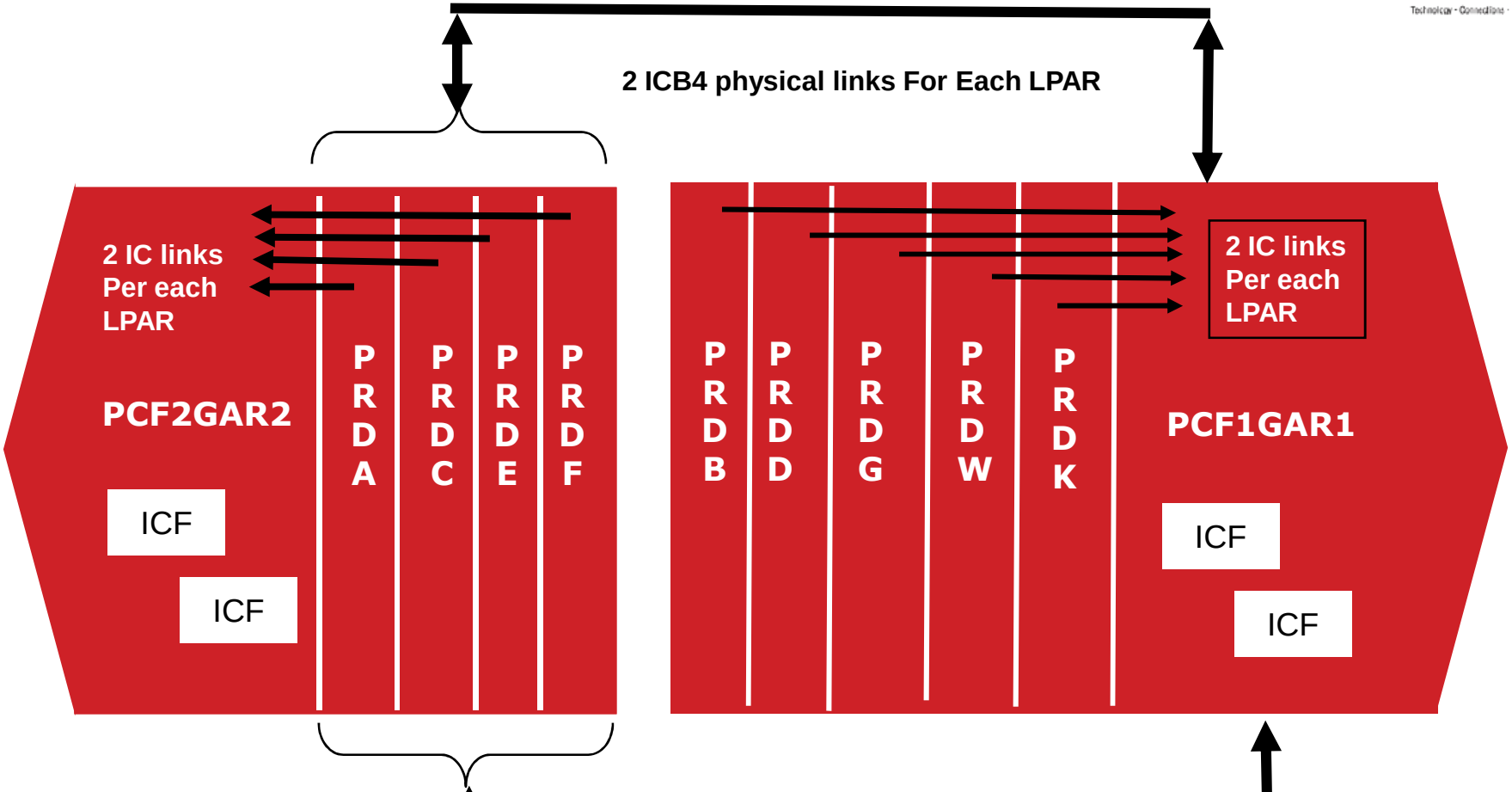
Archive and TEST Disk Subsystems
- 3 x DS8300, 6,4 TB per box
- 1 x DS8700, 85 TB
- GDPS/PPRC, GDPS/XRC, PAV
- 256GB(1), 128GB(2), 64GB(1) cache per box
- 24 FICON adapters per box

GT Parallel Sysplex Configuration - LPARS

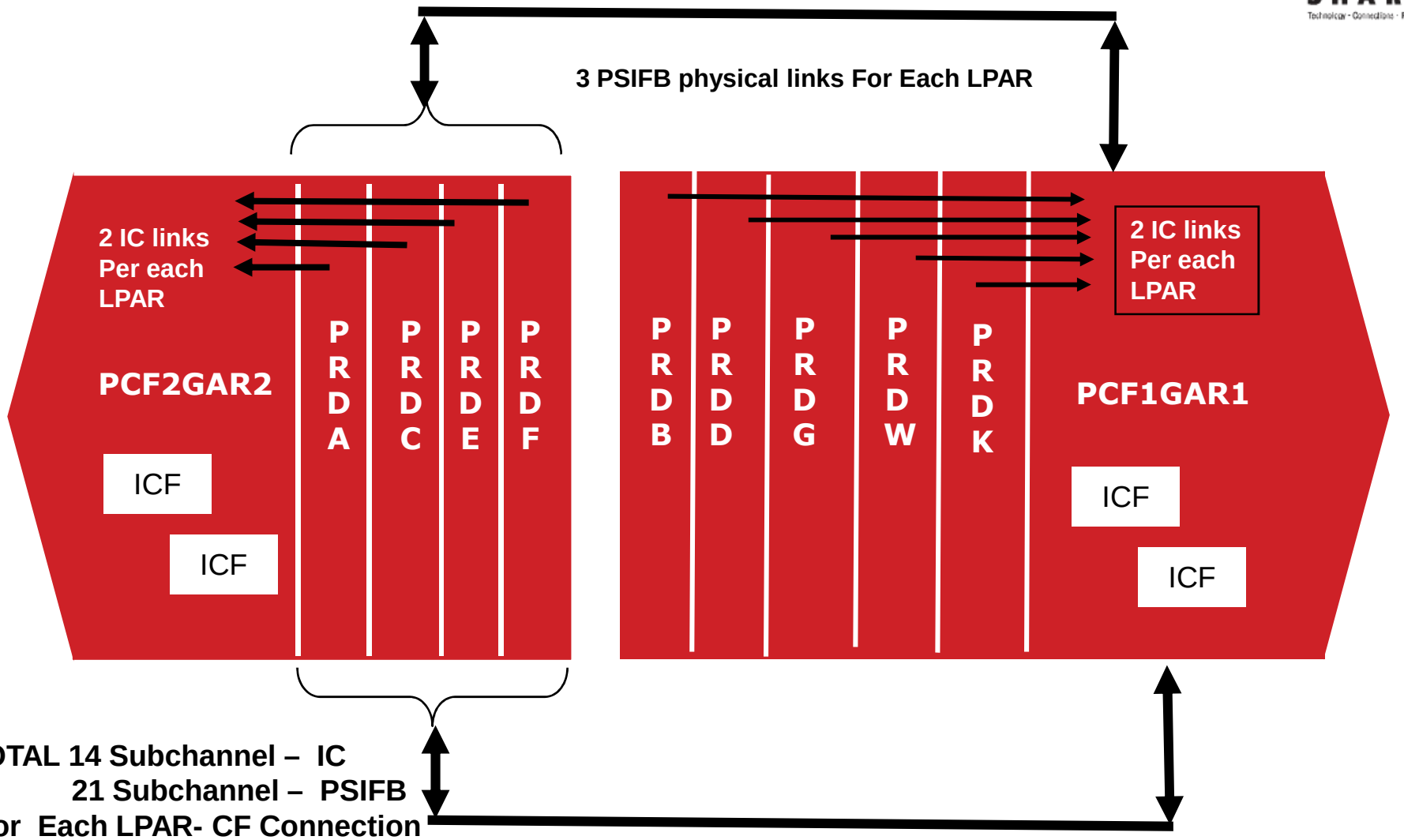


z/OS 1.12
DB2 V9
CICS TS 3.2

GT Parallel Sysplex Configuration - ICFs & CF Links z10



GT Parallel Sysplex Configuration - ICFs & CF Links z196



z196 Infiniband Adapters & Chpids

GAR1

6 Infiniband Adapters
12 Physical Ports/Links

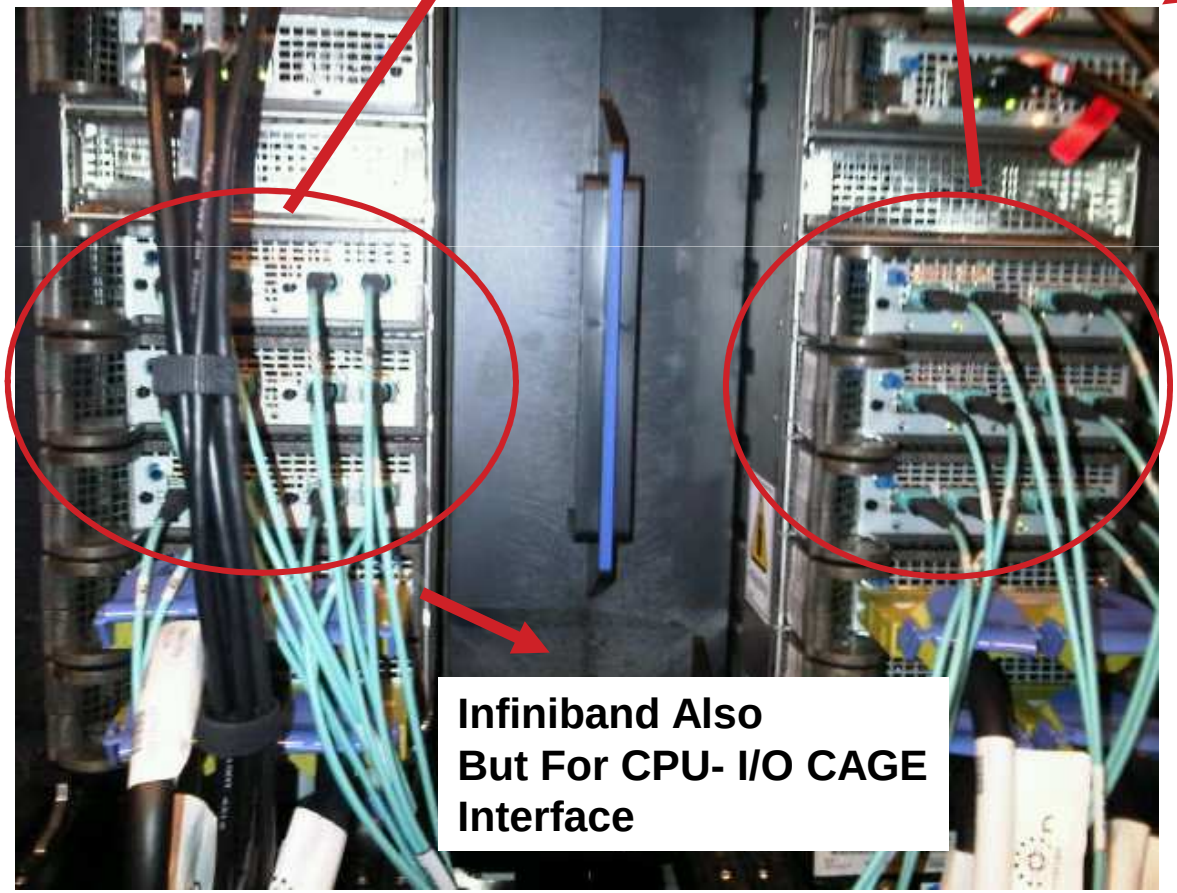
GAR2

6 Infiniband Adapters
12 Physical Ports/Links

z196 Infiniband Adapters & Chpids

3 PSFIB Adapters + 3 PSFIB Adapters

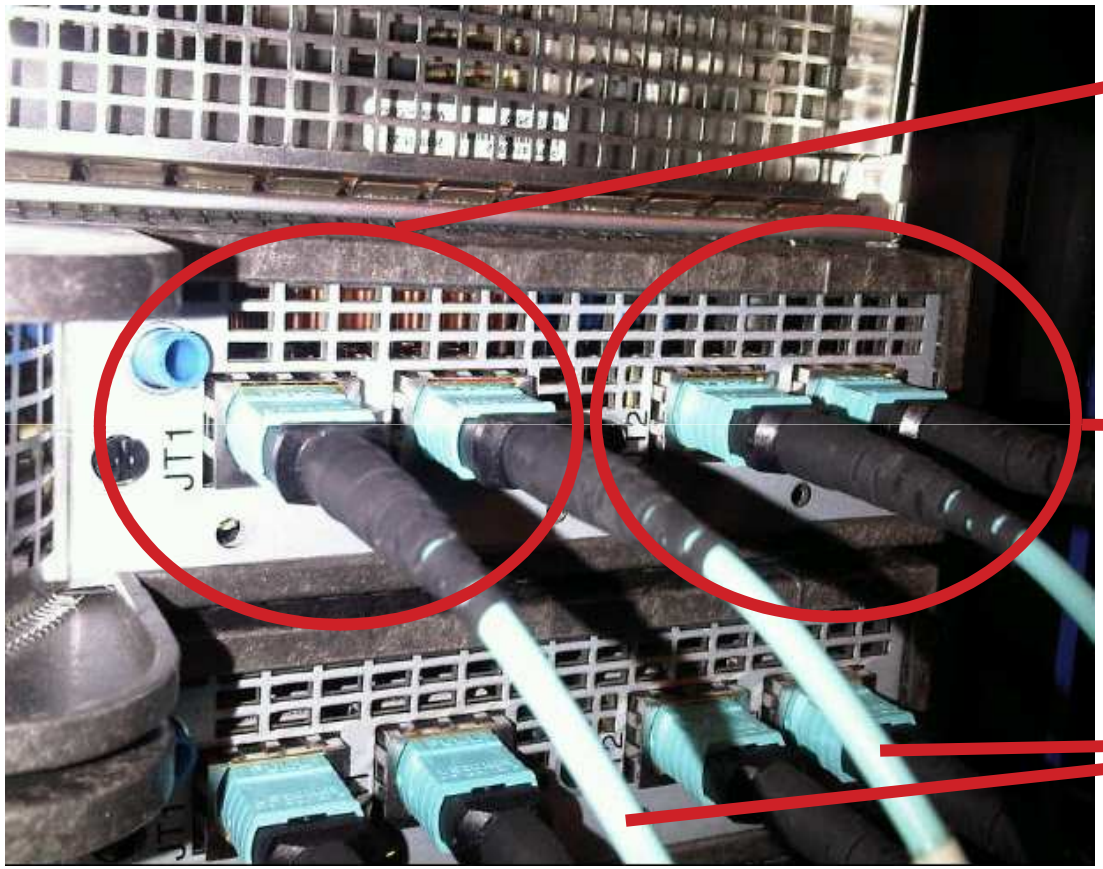
Book 1 Book 3



Infiniband Also
But For CPU- I/O CAGE
Interface

z196 Infiniband Links- CHPIDs

IN ONE INFINIBAND ADAPTER CARD ,THERE ARE 2 PORTS



PORT1
ONE PHYSICAL CONNECTION(LINK)
ONE CABLE (Transmit/Receive)

PORT2
ONE PHYSICAL CONNECTION(LINK)
ONE CABLE (Transmit/Receive)

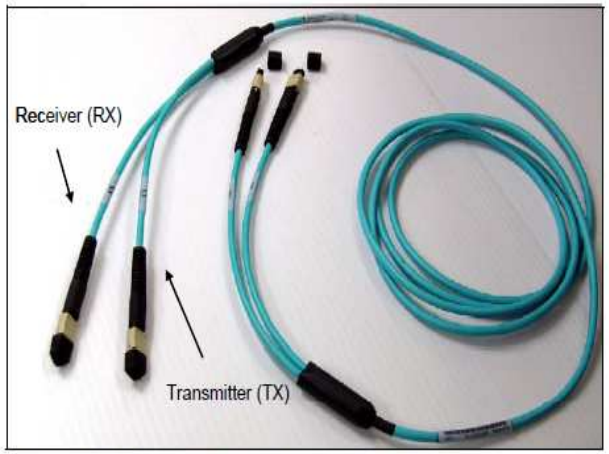
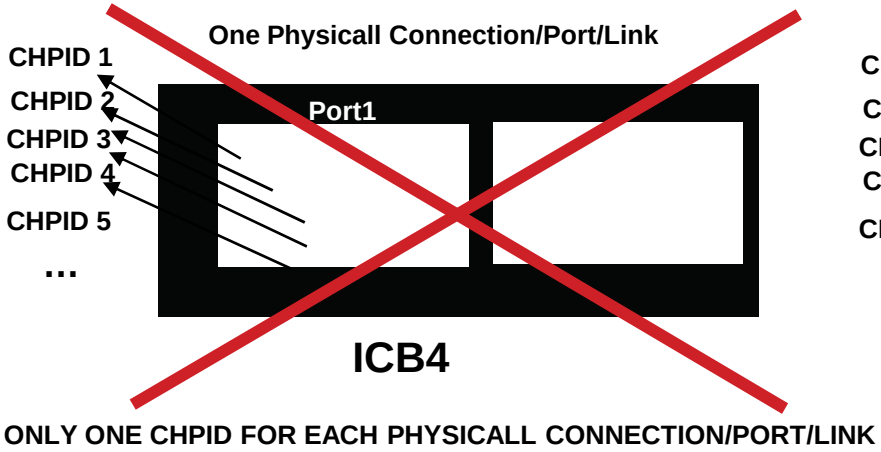
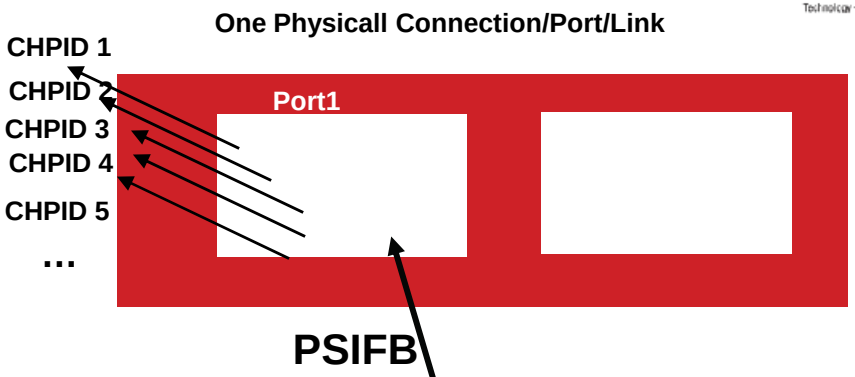


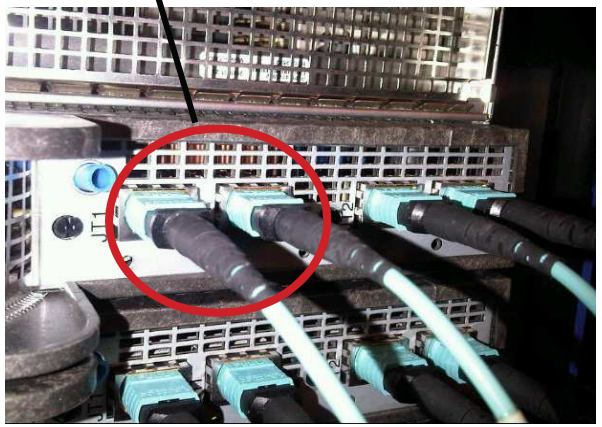
Figure 2-10 Optical InfiniBand cable, including TX and RX labels

z10 ICB4 & z196 Infiniband Links- CHPIDs Relationship





- More subchannels per physical link BY HAVING A CHANCE TO DEFINE MORE THAN ONE CHPID FOR SAME PHYSICALL CONNECTION!
- Subchannel Limit For One CHPID Is Still 7
- Up To 16 CHPIDs Across The Two Ports Of Single InfiniBand Coupling HCA (Adapter)



z196 Infiniband Cables & CHPIDs

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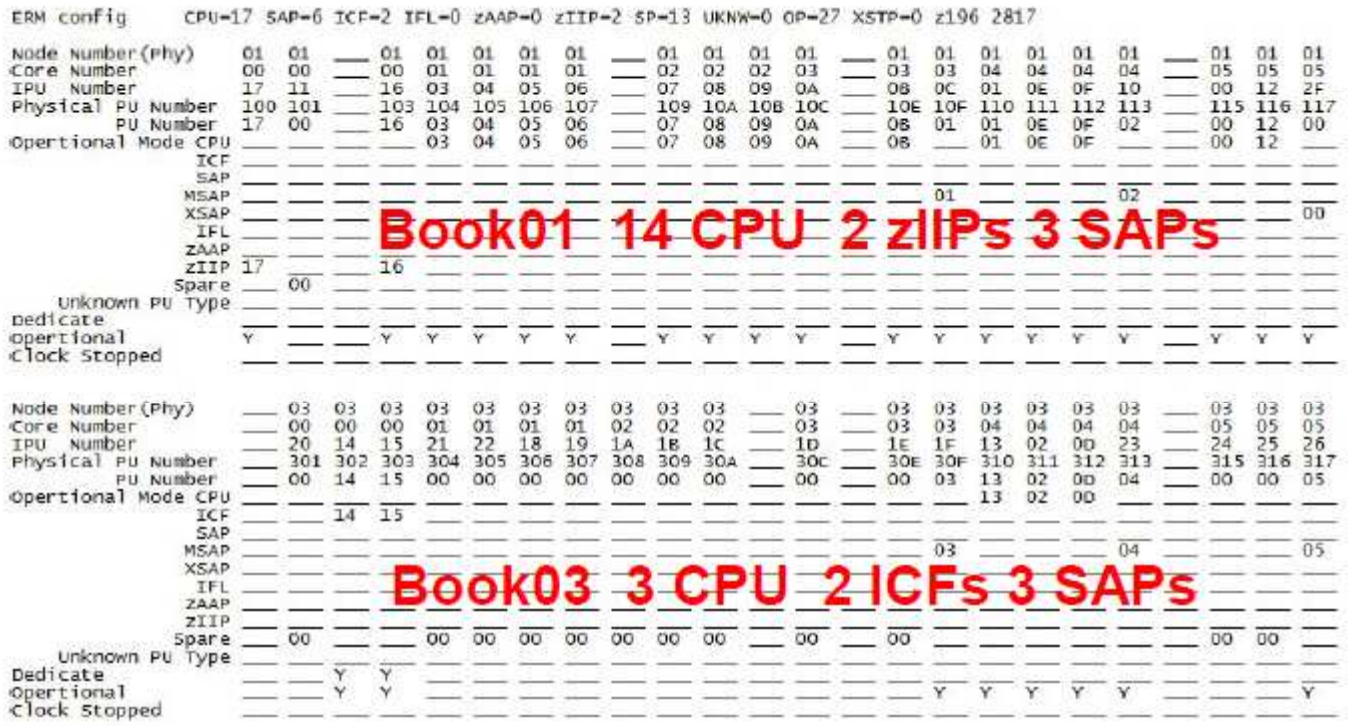
z196 Where Are My ICFs ?

GAR1



z196 Where Are My ICFs ?

GAR2

```
ERM config      CPU=17 SAP=6 ICF=2 IFL=0 ZAAP=0 zIIP=1 SP=14 UKNW=0 OP=26 XSTP=0 z196 2817

Node Number(Phy)      ___ 01 01 01 01 01 01 01 01 ___ 01 01 01 ___ 01 01 01 01 01 01 01 ___ 01 01
Core Number           ___ 00 00 00 01 01 01 01 02 ___ 02 02 03 ___ 03 03 04 04 04 04 05 ___ 05 05
IPU  Number           ___ 0A 16 11 01 04 05 06 07 ___ 08 09 02 ___ 0B 0C 0D 0E 0F 10 00 ___ 12 2F
Physical PU Number    ___ 101 102 103 104 105 106 107 108 ___ 10A 10B 10C ___ 10E 10F 110 111 112 113 114 ___ 116 117
        PU Number     ___ 0A 16 00 01 04 05 06 07 ___ 08 09 02 ___ 0B 01 0D 0E 0F 02 00 ___ 12 00
Opertional Mode CPU   ___ 0A ___ ___ 01 04 05 06 07 ___ 08 09 02 ___ 0B ___ 0D 0E 0F ___ 00 ___ 12 ___
                ICF   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
                SAP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
               MSAP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ 01 ___ ___ ___ 02 ___ ___ ___
               XSAP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ 00
                IFL   ___ ___ ___ Book01 15 CPU 1 zIIP 3 SAPs ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
               zAAP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
               zIIP   ___ ___ 16 ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
              Spare   ___ ___ ___ 00 ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
    Unknown PU Type   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Dedicate              ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Opertional            ___ Y Y ___ Y Y Y Y Y ___ Y Y Y ___ Y Y Y Y Y Y Y ___ Y Y
Clock Stopped         ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Node Number(Phy)      03 03 03 ___ 03 03 03 03 ___ 03 03 03 03 ___ 03 03 03 03 03 03 03 ___ 03 03
Core Number           00 00 00 ___ 01 01 01 01 ___ 02 02 02 03 ___ 03 03 04 04 04 04 05 ___ 05 05
IPU  Number           24 14 15 ___ 25 17 18 19 ___ 1A 1B 1C 1D ___ 1E 1F 20 21 22 23 13 ___ 03 26
Physical PU Number    300 301 302 ___ 304 305 306 307 ___ 309 30A 30B 30C ___ 30E 30F 310 311 312 313 314 ___ 316 317
        PU Number     00 14 15 ___ 00 00 00 00 ___ 00 00 00 00 ___ 00 03 00 00 00 04 13 ___ 03 05
Opertional Mode CPU   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ 13 ___ 03 ___
                ICF   ___ 14 15 ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
                SAP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
               MSAP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ 03 ___ ___ ___ 04 ___ ___ ___ 05
               XSAP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
                IFL   ___ ___ ___ Book03 2 CPU 2 ICFs 3 SAPs ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
               zAAP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
               zIIP   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
              Spare   00 ___ ___ ___ 00 00 00 00 ___ 00 00 00 00 ___ 00 ___ 00 00 00 ___ ___ ___ ___ ___ ___
    Unknown PU Type   ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Dedicate              ___ Y Y ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
Opertional            ___ Y Y ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ Y ___ ___ ___ Y Y ___ Y Y
Clock Stopped         ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
```

GT Parallel Sysplex Configuration - Structures

DSNPD01_GBP0
DSNPD01_GBP1
DSNPD01_GBP16K0
DSNPD01_GBP16K1
DSNPD01_GBP2
DSNPD01_GBP21
DSNPD01_GBP22
DSNPD01_GBP23
DSNPD01_GBP24
DSNPD01_GBP31
DSNPD01_GBP32
DSNPD01_GBP32K
DSNPD01_GBP33
DSNPD01_GBP34
DSNPD01_GBP5
DSNPD01_GBP6
DSNPD01_GBP7
DSNPD01_GBP8K0
DSNPD01_LOCK1
DSNPD01_SCA

DSNPDRM_GBP0
DSNPDRM_GBP1
DSNPDRM_GBP2
DSNPDRM_GBP8K0
DSNPDRM_LOCK1
DSNPDRM_SCA

PQS1APPLSTR
PQS1CSQ_ADMIN
PQS1FFMCSTR
PQS1FFMDSTR
PQS1LOGOSTR
PQS1OLASTR
PQS1OTPSTR
PQS1SMSSTR
PQS1SYSPSTR
PQS1UTLSTR

EZBEPORT
EZBEPORT0111
EZBEPORT0113
ISTGENERIC

DFHNCLS_PRODNC1
DFHXQLS_PRODTSQ1
LOG_DFHLOG_WUI
LOG_DFHSHUNT_WUI

IXCSIG1
IXCSIG11
IXCSIG2
IXCSIG21
IXCSIG3
IXCSIG31
IXCSIG4
IXCSIG5
IXCSIG6
IXCSIG7

CKPT1
RLS_APL1
RLS_APL2
RRSSTR1
SYSARC_HSMPP_RCL
SYSIGGCAS_ECS
SYSTEM_OPERLOG
SYSZWLM_0E162817
SYSZWLM_0E262817
HSA_LOG
HZS_HEALTHCHKLOG
IBMBDG
IGWLOCK00
ISGLOCK

TOPSTR1

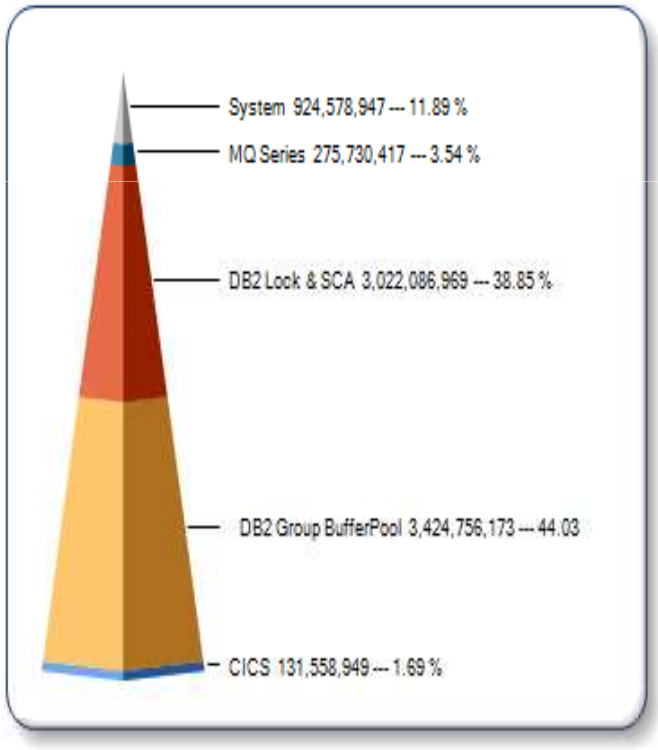
GT-CF Configuration – z196

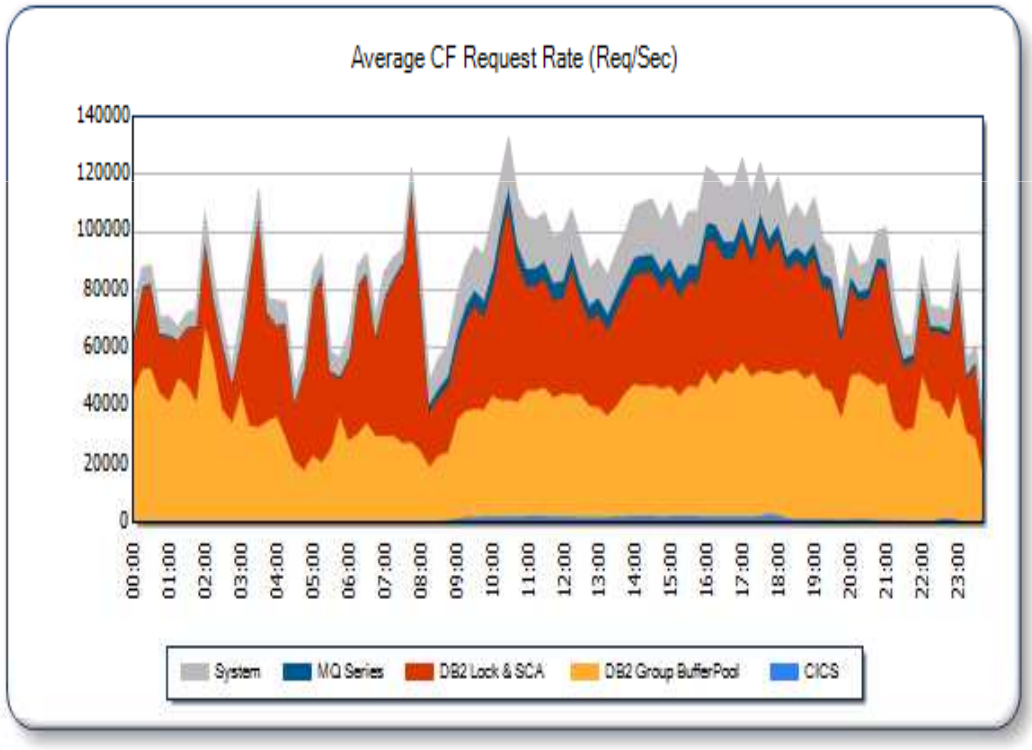
- 179 Structures Defined In CFRM Policy
- 27205 MB Storage In Each CF

RMF MON I

AVERAGE CF REQUEST RATE / WORKLOAD

20-06-2011





General Information About PSIFB

Infiniband Technology - Drivings Of Innovation (WHY?)

Problem

Efficient Systems Must Provide Balance Between

- **CPU Performance**
- **Memory Bandwidth**
- **I/O Capabilities**

Semiconductor Technology Evolves Much Faster Than I/O Interconnect Speed.

New Technology is needed to keep up with the speed of processors

Solution

In 1999 Two Competing I/O Standards called

- **Future I/O (Developed By Compaq.IBM,HP)**
- **NextGeneration I/O (Developed By Intel,Microsoft,Sun)**

Merged Into Unified I/O Standard Called INFINIBAND

InfiniBand offers a powerful interconnect architecture that by its nature is better able to scale with increasing processor speeds. Up to 120 Gbps

http://www.infinibandta.org/itinfo/IL

Infiniband Technology - Advantages

- ✓ Superior Performance – Up To 120 Gbps
- ✓ Reduced Complexity
- ✓ Highest Interconnect Efficiency
- ✓ Reliable & Stable Connection

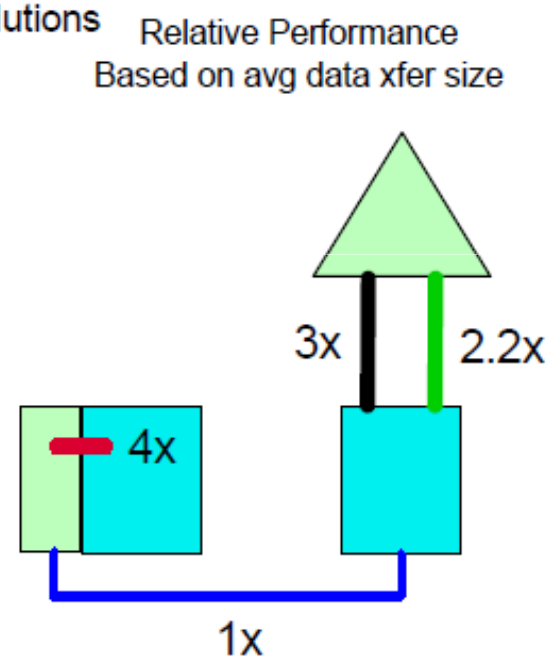
- ❑ First Used As Connection Between Books & I/O Cage,starting with z10.
- ❑ With z10 and supported by z9 also, it started to be used as CF link.

BUT !

Infiniband As Coupling Link Choice - PSIFB

Coupling Link Choices - Overview

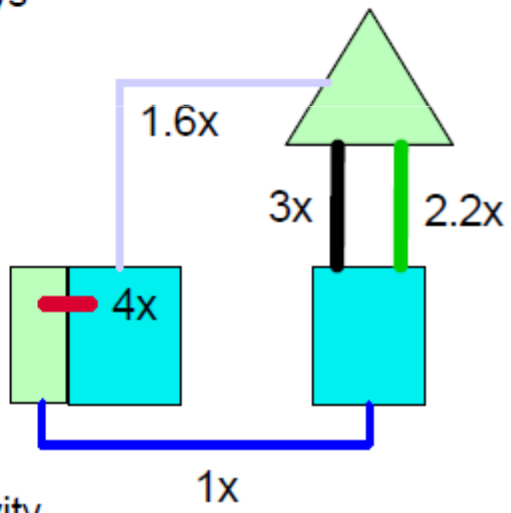
- ISC (Inter-System Channel)
  - Fiber optics
  - I/O Adapter card
  - 10km and longer distances with qualified WDM solutions
- ICB (Integrated Cluster Bus)
  - Copper cable plugs close to memory bus
  - 10 meter max length
  - Not available on z196
- IC (Internal Coupling Channel)
  - Microcode - no external connection
  - Only between partitions on same processor
- PSIFB (12x IB)
  - 150 meter max distance optical cabling
  - Supports multiple CHPIDs per physical link
  - Multiple CF partitions can share physical link



PSIFB Configuration Advantages

PSIFB Configuration Advantages

- Pure Capacity
  - 1 12x PSIFB replaces 1 ICB4
  - 1 12x PSIFB replaces 4 ISC3s
- Eliminating subchannel and path delays
  - Often >2 ICB4s configured not for capacity but for extra subchannels/paths to eliminate delays
  - 2 12x PSIFB links with multiple CHPIDs can replace >2 ICB4s in this case
- Multiple sysplexes sharing hardware
  - Production, development, test sysplexes may share hardware – each needs own ICB4 or ISC3 links
  - 2 PSIFB links with multiple CHPIDs can replace >2 ICB4s or ISC3s in this case
- Multiple CHPID recommendations
  - Max 16 per HCA (2 ports per HCA)
    - Use up to all 16 for lightly loaded connectivity
    - Limit to use up to 8 per HCA for heavy loads



PSIFB Configuration Disadvantages

In Every Document –There Is One NOTE

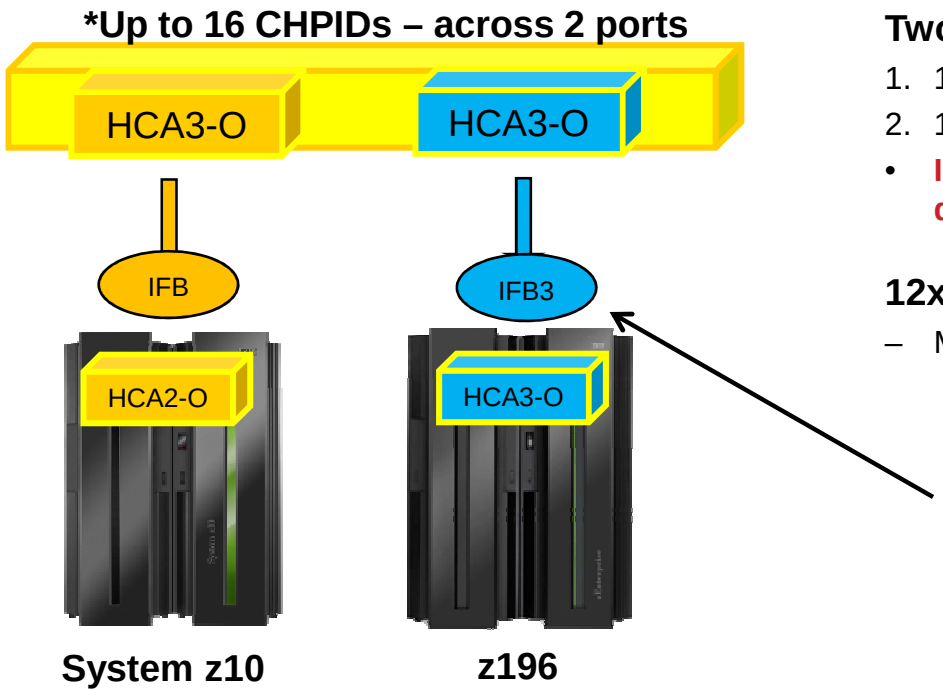
Note: **The InfiniBand link data rates of 6 GBps, 3 GBps, 2.5 Gbps, or 5 Gbps do not represent the performance of the link. The actual performance is dependent upon many factors including latency through the adapters, cable lengths, and the type of workload. With InfiniBand coupling links, while the link data rate may be higher than that of ICB (12x IB-SDR or 12x IB-DDR) or ISC-3 (1x IB-SDR or 1x IB-DDR), the service times of coupling operations are greater, and the actual throughput may be less than with ICB links or ISC-3 links.**

Note: The InfiniBand link data rate of 6 GBps or 3 GBps does not represent the performance of the link. The actual performance depends on many factors, such as latency through the adapters, cable lengths, and the type of workload. With InfiniBand coupling links, while the link data rate might be higher than that of ICB links, the service times of coupling operations are greater.

So As Expected IBM, Recently Created A New Adapter & Protocol

New PSIFB Protocol & Infiniband Fanout Cards

New 12x InfiniBand fanout cards, exclusive to z196 and z114



Attachment to System z9 HCA1 not supported

Two protocols (IFB & IFB3)

1. 12x IFB = HCA3-O to HCA2-O
2. 12x IFB3 = HCA3-O to HCA3-O (see below)

- **Improved service times, 12x IFB3 service times are designed to be 40% faster than 12x IFB**

12x IFB3 protocol activation requirements

– Maximum of **four** CHPIDs per HCA3-O port

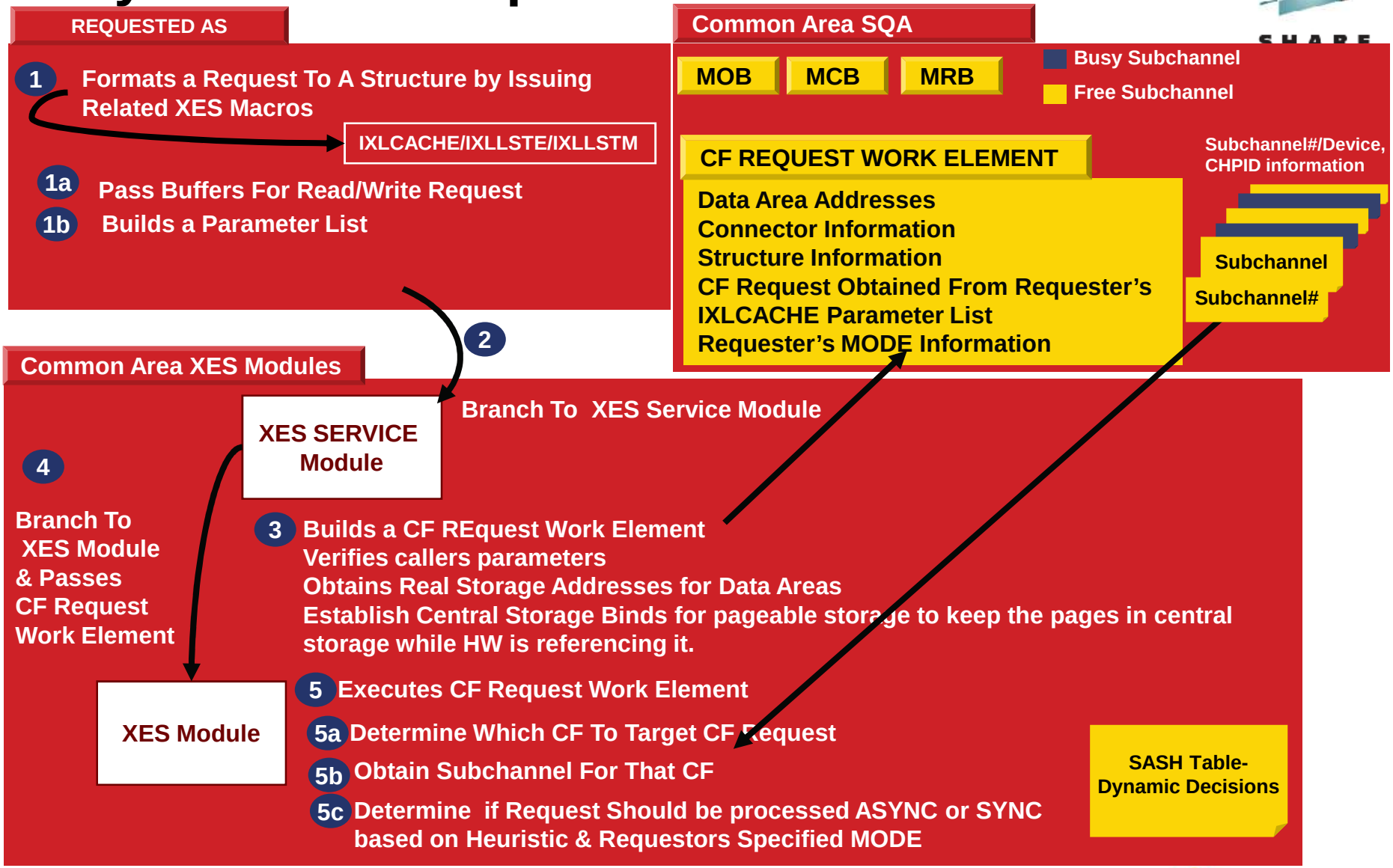
- **If more than four CHIPDs are defined per port, links will run at normal 12x IFB service times**
- **IFB3 protocol activated as long as 4 CHPIDs or less are defined. No configuration settings required.**
- Performance considerations may reduce the number of CHPIDs per port

Note: The InfiniBand link data rates of 6 GBps, 3 GBps, 2.5 Gbps, or 5 Gbps do not represent the performance of the link. The actual performance is dependent upon many factors including latency through the adapters, cable lengths, and the type of workload.

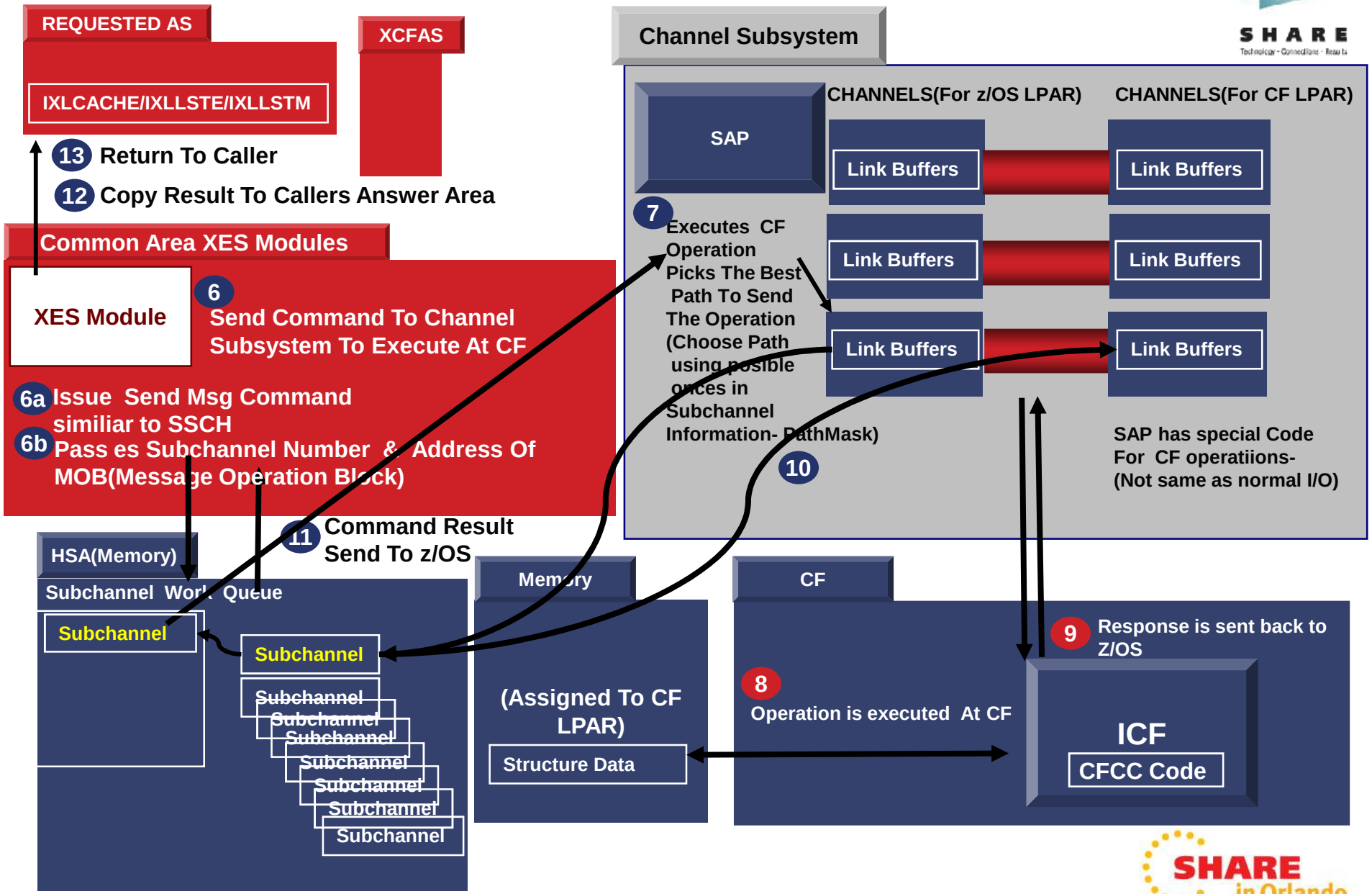
Thanks To Riaz Ahmad For This Slide

Life Of A CF Request

CF Syncronous Request Flow-1



CF Syncronous Request Flow-2



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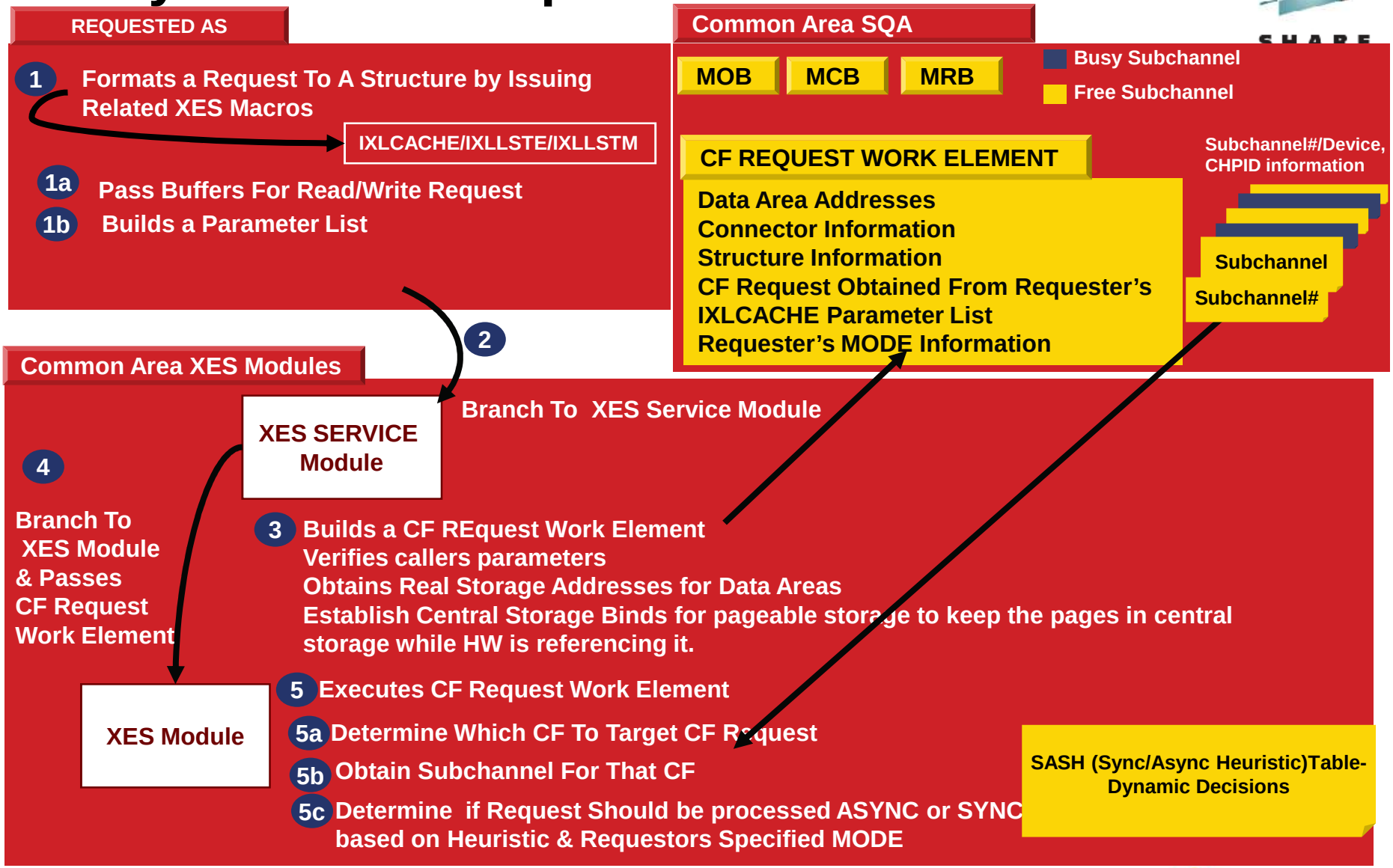
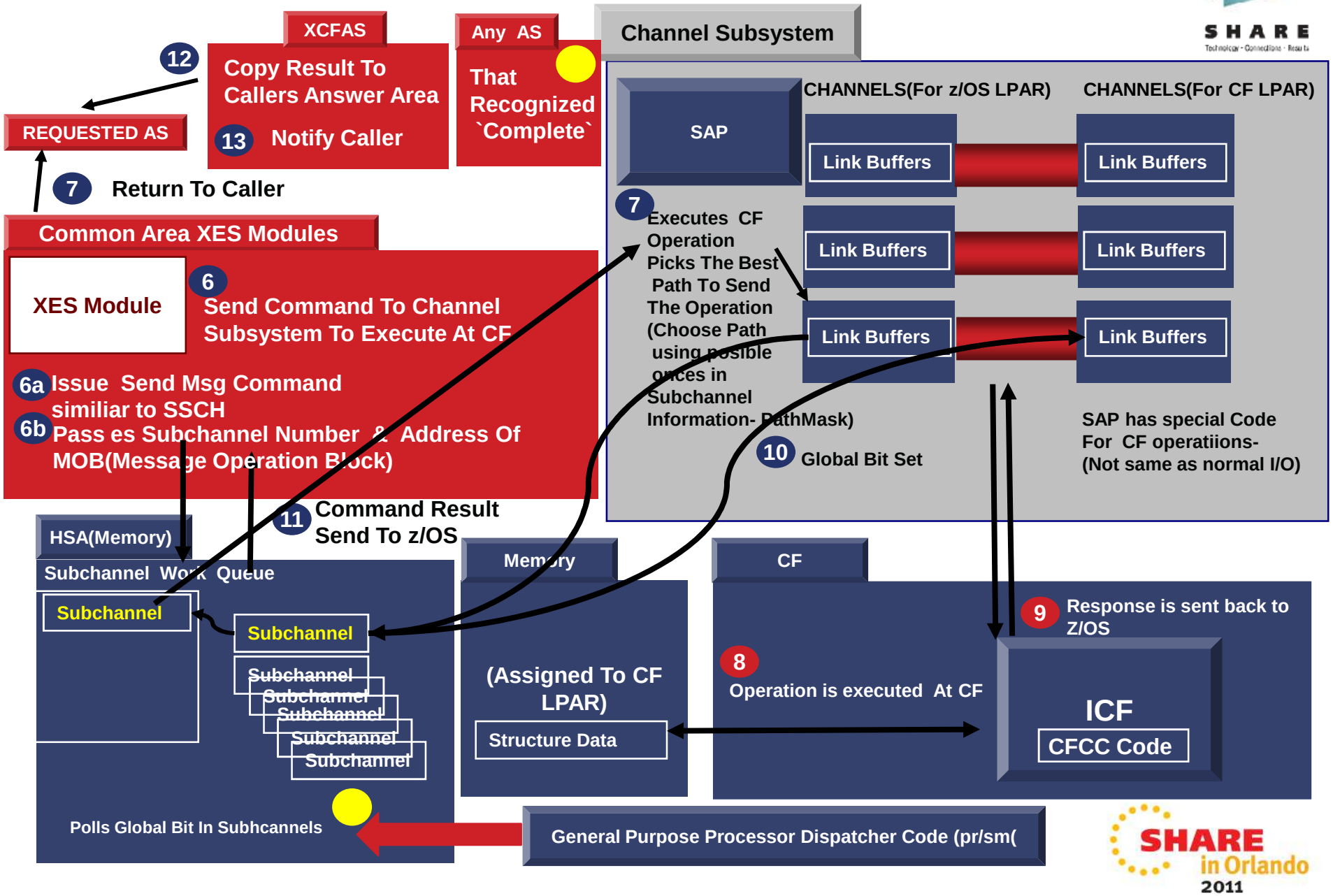
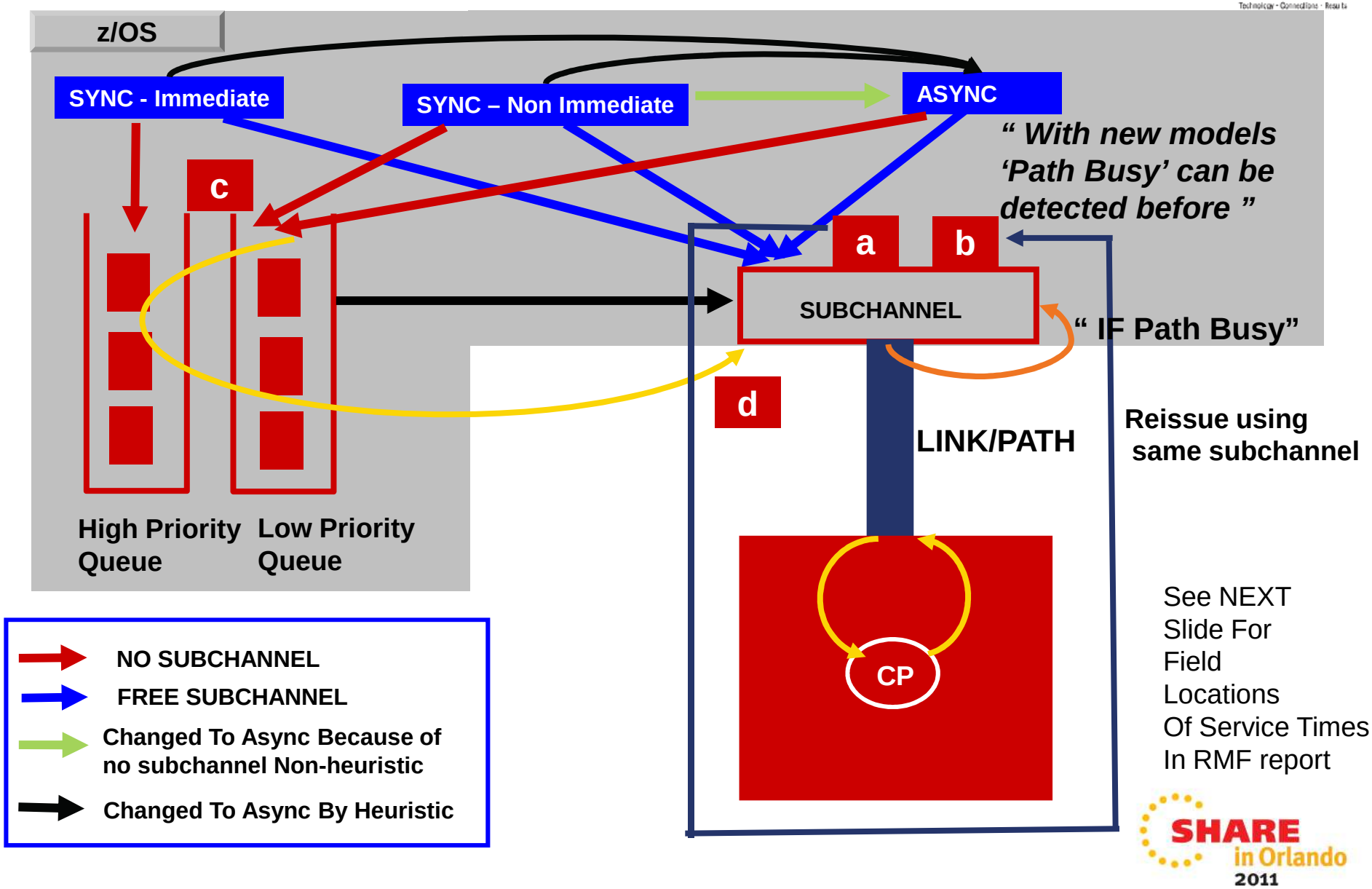
CF Asyncronous Request Flow -1



CF Asyncronous Request Flow -2



CF Request Types & Cases



CF Request Types & Cases – RMF Report

b — a

d — c

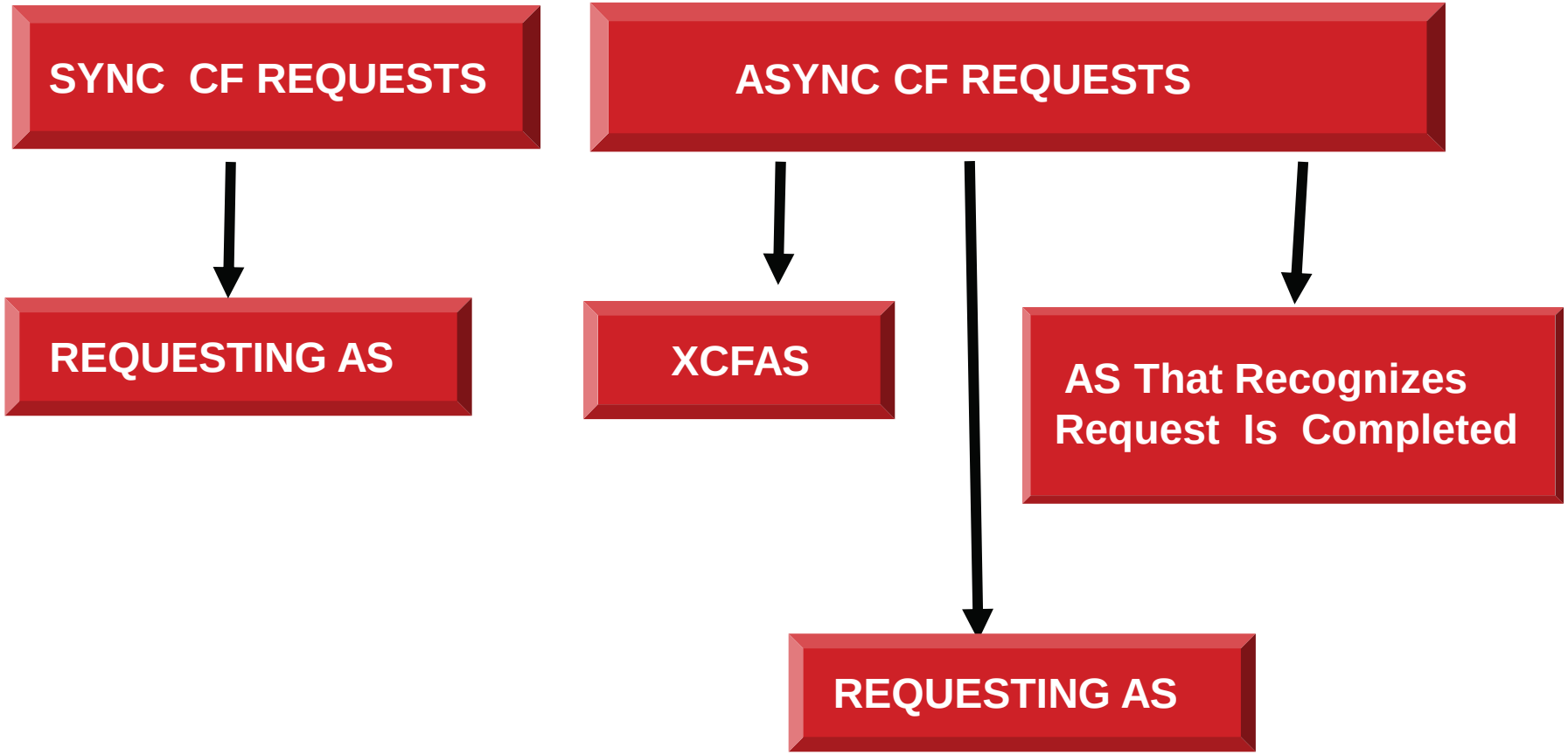
Service Time is calculated as

Delayed Time is calculated as

SUBCHANNEL ACTIVITY

SYSTEM NAME	Ö REQ TOTAL AVG/SEC	CF TYPE	LINKS GEN	LINKS USE	PTH BUSY	REQUESTS	Ö REQ	SERVICE TIME(MIC) AVG	SERVICE TIME(MIC) STD_DEV	DELAYED REQUESTS	Ö REQ	% OF REQ	AVG TIME(MIC) /DEL	AVG TIME(MIC) STD_DEV	AVG TIME(MIC) /ALL
PRDA	2391K	CIB	3	3	0	SYNC	1579K	13.0	4.7	LIST/CACHE	358	0.0	42.5	33.6	0.0
	2656.3	SUBCH	42	21		ASYNC	788047	111.8	161.0	LOCK	0	0.0	0.0	0.0	0.0
						CHANGED	0	INCLUDED IN ASYNC		TOTAL	358	0.0			
						UNSUCC	0	0.0	0.0						
PRDB	5869K	ICP	4	4	1935	SYNC	4234K	3.9	34.9	LIST/CACHE	415	0.0	789.0	601.7	0.1
	6521.0	SUBCH	56	28		ASYNC	1589K	41.7	395.3	LOCK	13	0.0	207.0	159.9	0.0
						CHANGED	413	INCLUDED IN ASYNC		TOTAL	428	0.0			
						UNSUCC	0	0.0	0.0						
PRDC	6364K	CIB	3	3	0	SYNC	4671K	12.9	4.0	LIST/CACHE	3052	0.1	707.5	573.0	0.8
	7071.1	SUBCH	42	21		ASYNC	1645K	72.8	88.7	LOCK	60	0.0	115.5	125.4	0.0
						CHANGED	2492	INCLUDED IN ASYNC		TOTAL	3112	0.0			
						UNSUCC	0	0.0	0.0						
PRDD	11892K	ICP	4	4	2718	SYNC	9162K	4.1	31.9	LIST/CACHE	582	0.0	961.6	1544	0.1
	13213	SUBCH	56	28		ASYNC	2757K	36.0	475.6	LOCK	86	0.0	393.3	1096	0.0
						CHANGED	627	INCLUDED IN ASYNC		TOTAL	668	0.0			

CPU COST OF CF REQUESTS



Sync/Async Conversion

Sync/Async Conversion

NON-HEURISTIC

- Subchannel Busy Condition
- Path Busy Condition
- Serialized List or Lock Contention

HEURISTIC

Introduced with z/OS v1r2...

- CF Link Technology
- Types Of Workload – Variable Workload Amount
- Range Of CF Utilization,Shared CP or not,...
- Actual Observed Sync Request Service Time
- Amount Of Data That Needs To Be Transfered
- Other items that effect CF response ex:Distance
- Moving Weighted Averages Of Actual CF Requests
- Every 1 of N Request not converted and send as Sync

How To Display sync/async Conversion Threshold Value

With z/OS V1R11 (APAR OA28603 for z/OS v1r8 and above)

```
PRDA D XCF,C
IXC357I  15.21.03  DISPLAY XCF 494
SYSTEM PRDA DATA
   INTERVAL    OPNOTIFY     MAXMSG    CLEANUP       RETRY    CLASSLEN
        165         165       2000         15          10         956

   SSUM ACTION  SSUM INTERVAL  SSUM LIMIT     WEIGHT  MEMSTALLTIME
       ISOLATE              0          60        100            NO

   CFSTRHANGTIME
              NO

   PARMLIB USER INTERVAL:      85
   DERIVED SPIN INTERVAL:     165
   PARMLIB USER OPNOTIFY:      87

   MAX SUPPORTED CFLEVEL: 17

   MAX SUPPORTED SYSTEM-MANAGED PROCESS LEVEL: 17

   SIMPLEX SYNC/ASYNC THRESHOLD:                26
   DUPLEX SYNC/ASYNC THRESHOLD:                 26
   SIMPLEX LOCK SYNC/ASYNC THRESHOLD:           26
   DUPLEX LOCK SYNC/ASYNC THRESHOLD:            26

   CF REQUEST TIME ORDERING FUNCTION: INSTALLED

   SYSTEM STATUS DETECTION PARTITIONING PROTOCOL ELIGIBILITY:
     SYSTEM CANNOT TARGET OTHER SYSTEMS.
       REASON: SYSPLEX COUPLE DATA SET NOT FORMATTED FOR THE PROTOCOL
     SYSTEM IS NOT ELIGIBLE TO BE TARGETED BY OTHER SYSTEMS.
       REASON: SYSPLEX COUPLE DATA SET NOT FORMATTED FOR THE PROTOCOL
```

Related To Heuristic Decision

How To Display sync/async Conversion Threshold Value

```
PRDE D XCF,C
IXC357I  15.22.57  DISPLAY XCF 859
SYSTEM PRDE DATA
   INTERVAL    OPNOTIFY     MAXMSG    CLEANUP       RETRY    CLASSLEN
        165         165       2000         15          10         956

   SSUM ACTION  SSUM INTERVAL  SSUM LIMIT     WEIGHT  MEMSTALLTIME
       ISOLATE              0          60          1            NO

   CFSTRHANGTIME
              NO

   PARMLIB USER INTERVAL:      85
   DERIVED SPIN INTERVAL:     165
   PARMLIB USER OPNOTIFY:      87

   MAX SUPPORTED CFLEVEL: 17

   MAX SUPPORTED SYSTEM-MANAGED PROCESS LEVEL: 17

   SIMPLEX SYNC/ASYNC THRESHOLD:                26
   DUPLEX SYNC/ASYNC THRESHOLD:                 26
   SIMPLEX LOCK SYNC/ASYNC THRESHOLD:           26
   DUPLEX LOCK SYNC/ASYNC THRESHOLD:            27

   CF REQUEST TIME ORDERING FUNCTION: INSTALLED

   SYSTEM STATUS DETECTION PARTITIONING PROTOCOL ELIGIBILITY:
     SYSTEM CANNOT TARGET OTHER SYSTEMS.
       REASON: SYSPLEX COUPLE DATA SET NOT FORMATTED FOR THE PROTOCOL
     SYSTEM IS NOT ELIGIBLE TO BE TARGETED BY OTHER SYSTEMS.
       REASON: SYSPLEX COUPLE DATA SET NOT FORMATTED FOR THE PROTOCOL
```

Related To Heuristic Decision

Performance Differences

IBM - Sync Service Times For Different CF Link Types

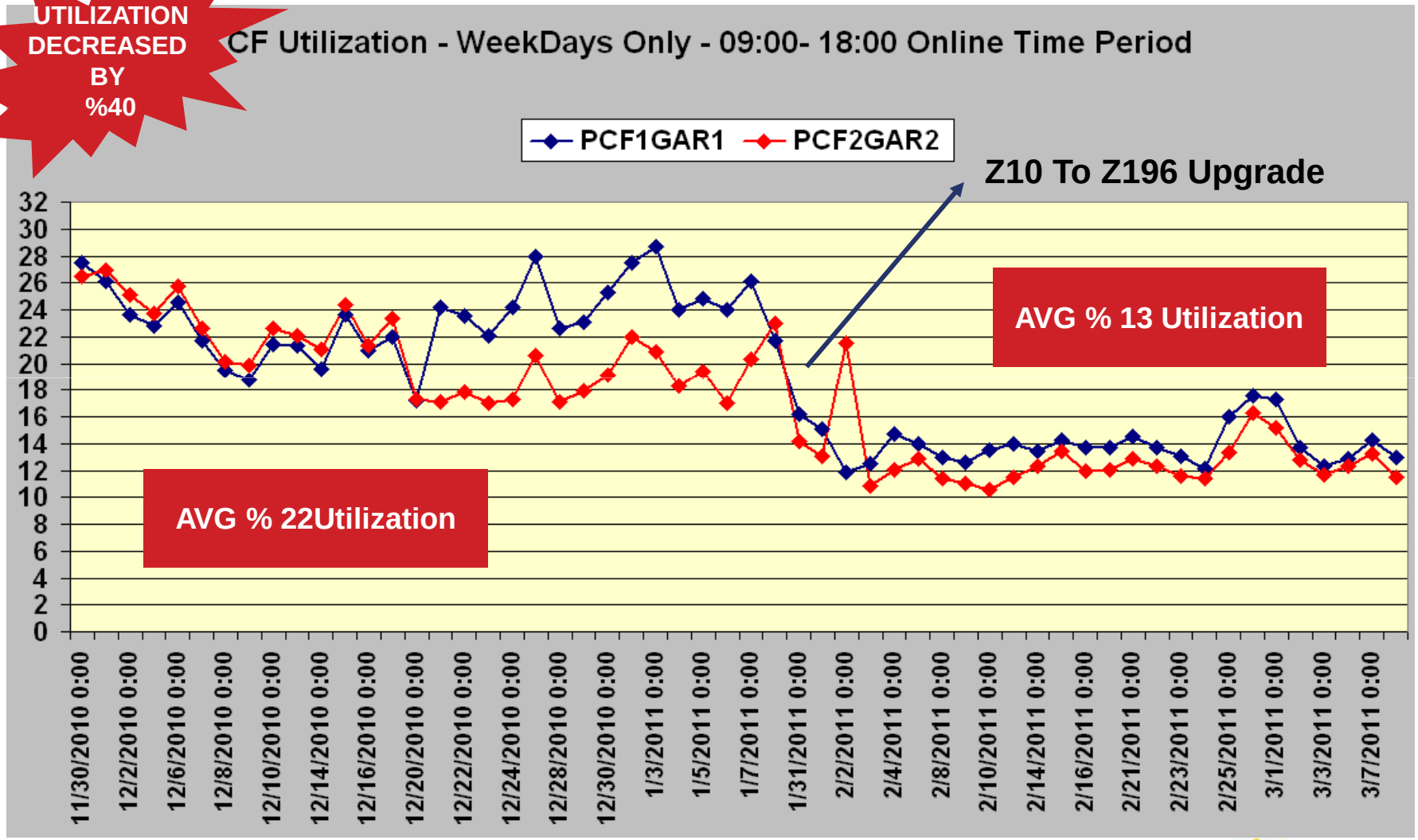
	ISC3	1x IB	12x IFB	ICB4	IC
z10					
Lock	20-30	14-18	11-15	8-12	3-8
List/Cache (4k)	25-40	18-25	15-20	10-16	6-10
z196					
Lock	20-30	14-17	10-14	NA	2-8
List/Cache (4k)	25-40	16-25	14-18	NA	4-9

IBM POK CF Performance Group

IBM POK CF Performance Group Have Not Published Values For New 12XIFB3 Protocol Yet.

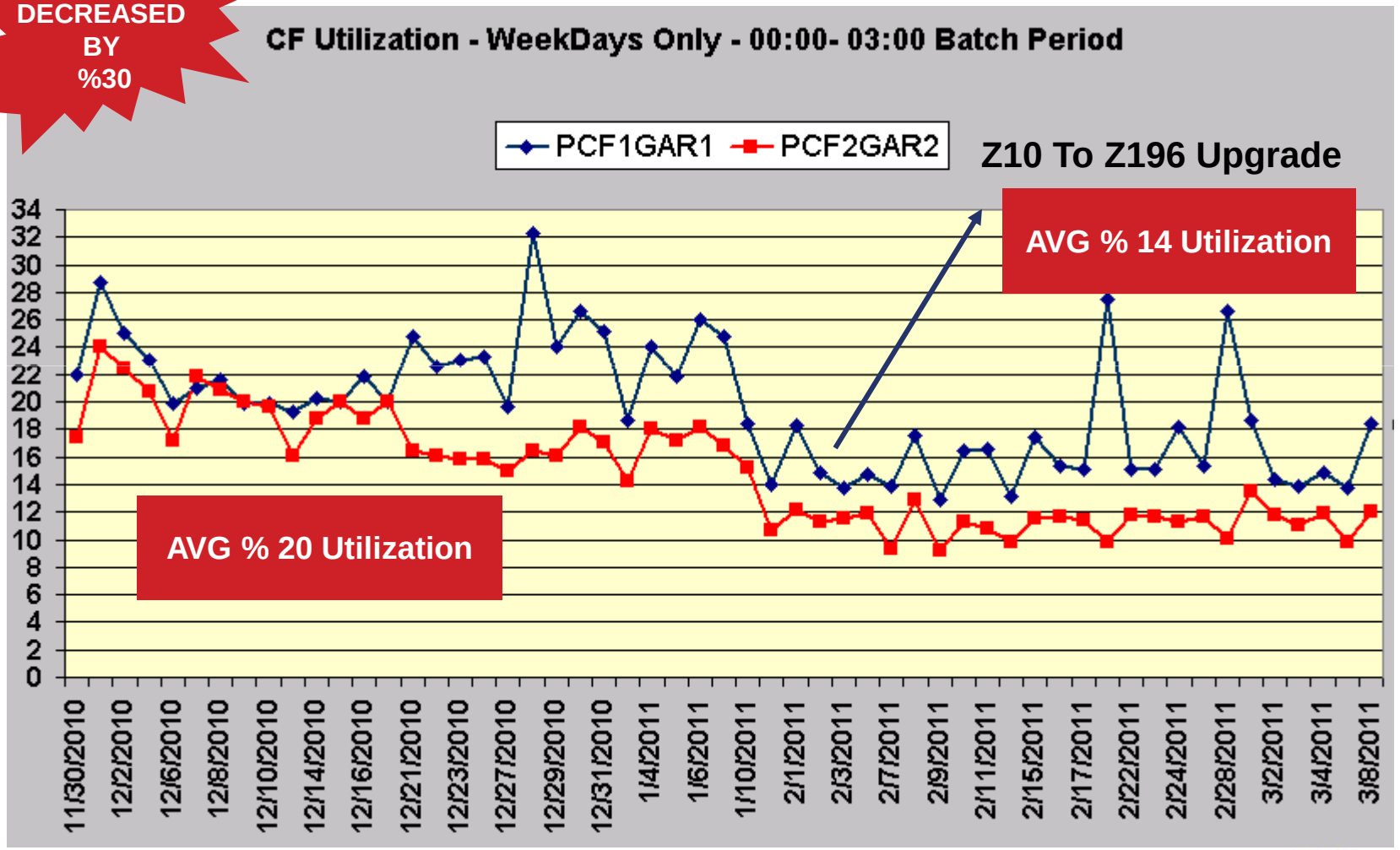
Z10 ICFs To z196 ICFs Utilization Change

UTILIZATION DECREASED BY %40



Z10 ICFs To z196 ICFs Utilization Change

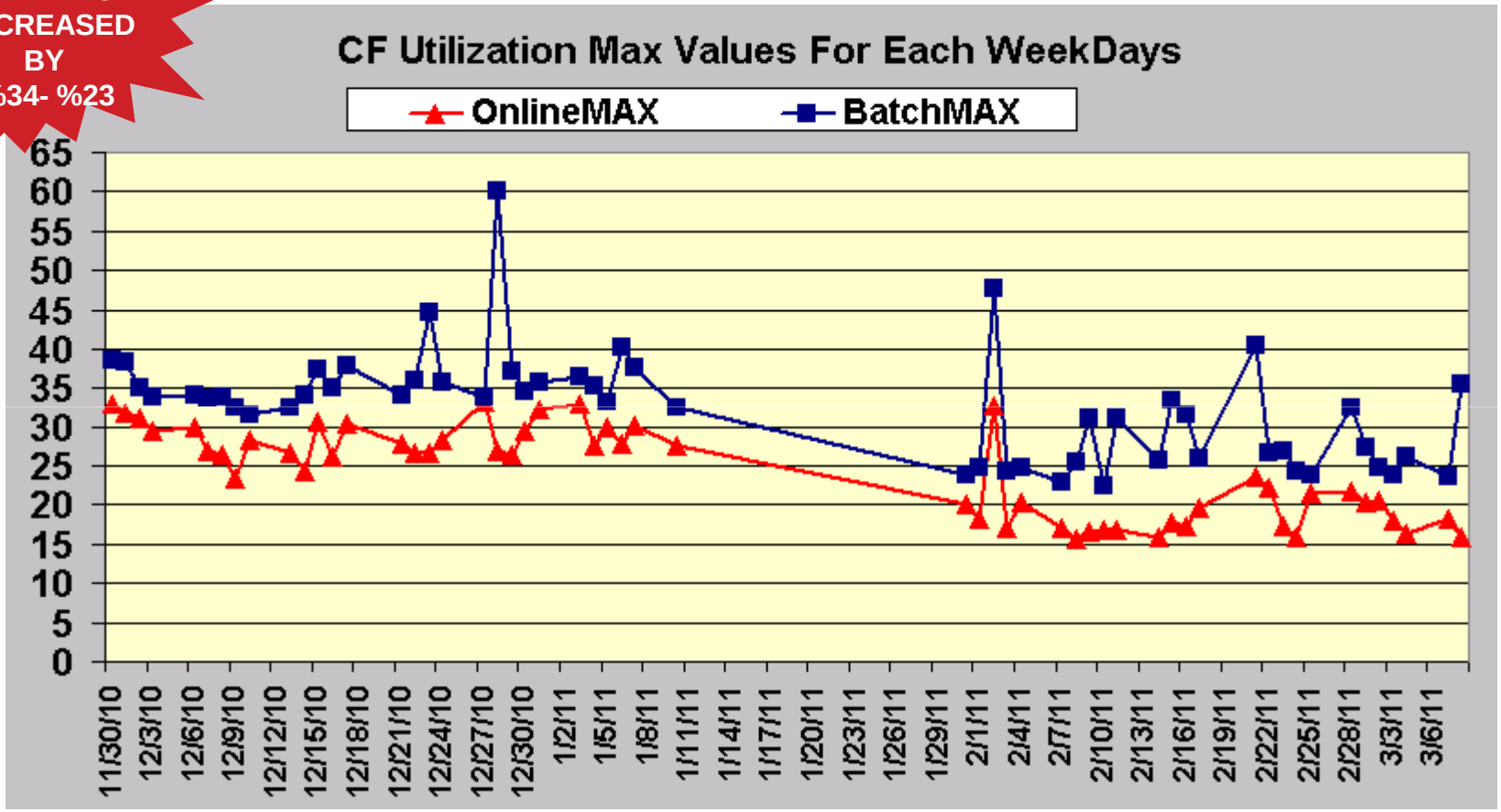
UTILIZATION DECREASED BY %30



Z10 ICFs To z196 ICFs MAX Utilization Change

Av[illegible]es May Not Be Our Concern –It is needed to check the max usages

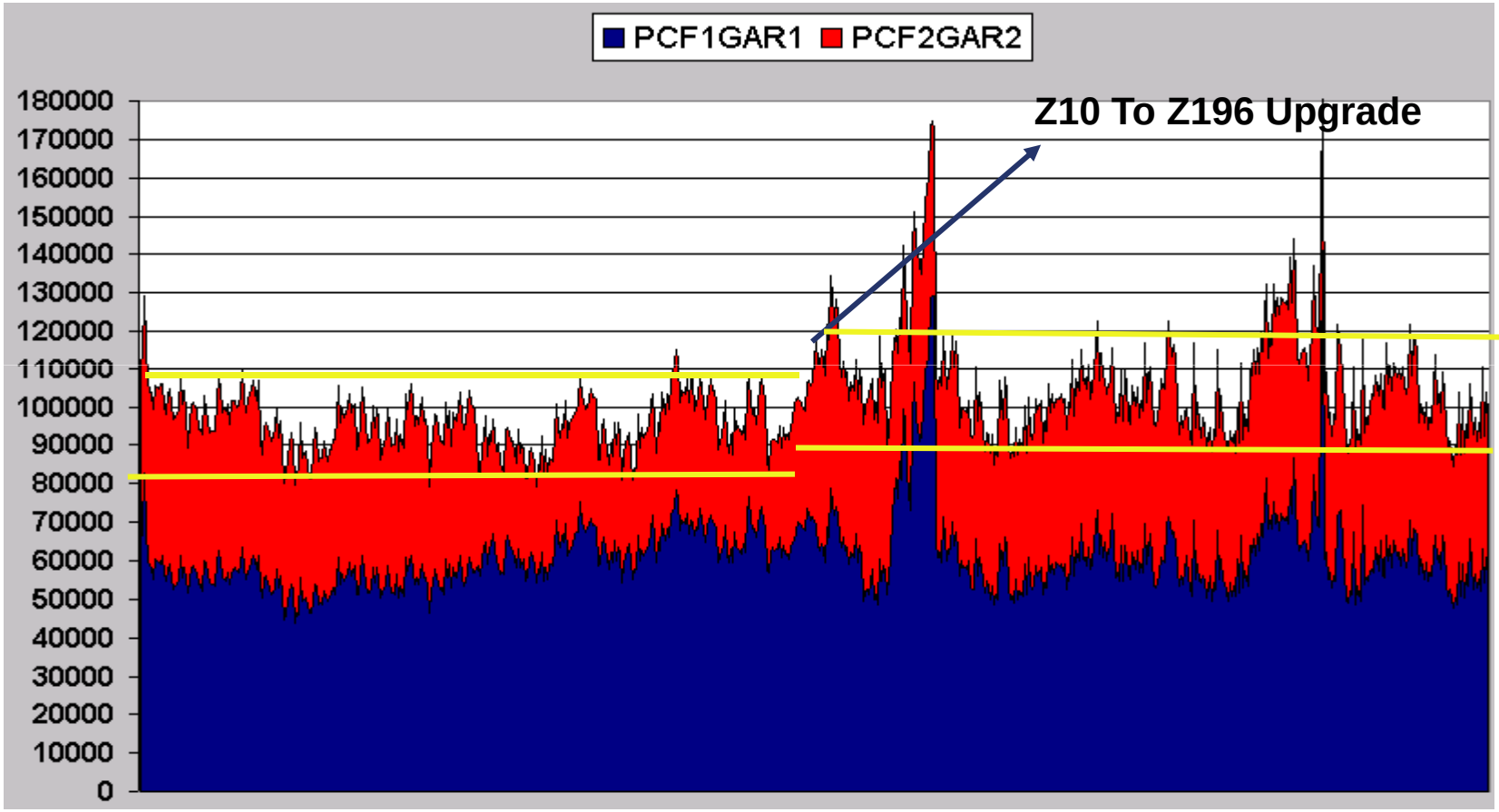
UTILIZATION DECREASED BY %34- %23



Online Time 8 -12 14-18 29 To 19
Batch Period 0-8 & 18-24 36 To 28

Z10 & z196 CF Request Rates Online

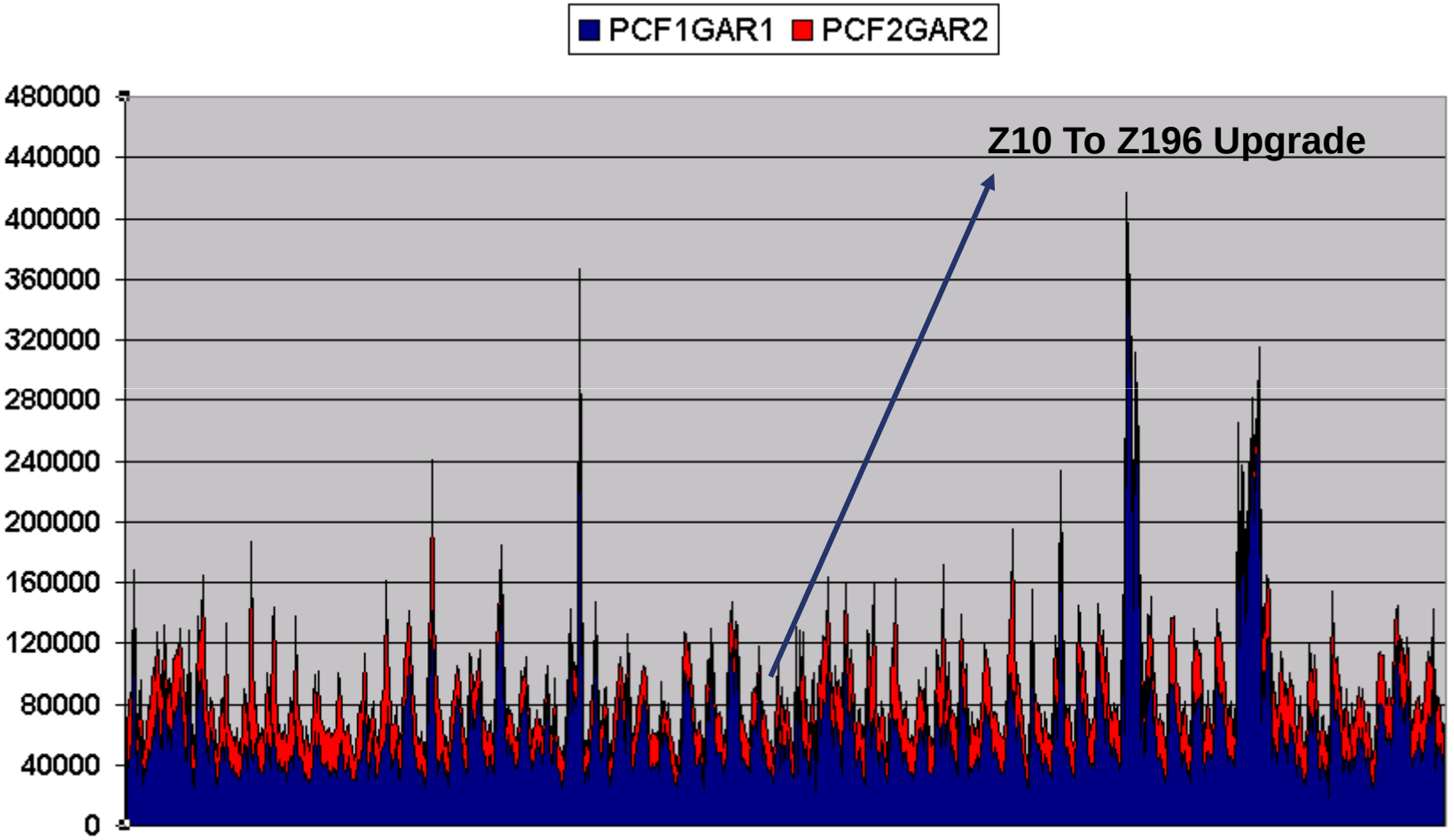
Between 90.000 – 110.000 During 14:00 – 17:00 For Each Week-Day



Average 96000 To 107300 CF Request Rate increased by %12

Z10 & z196 CF Request Rates Online

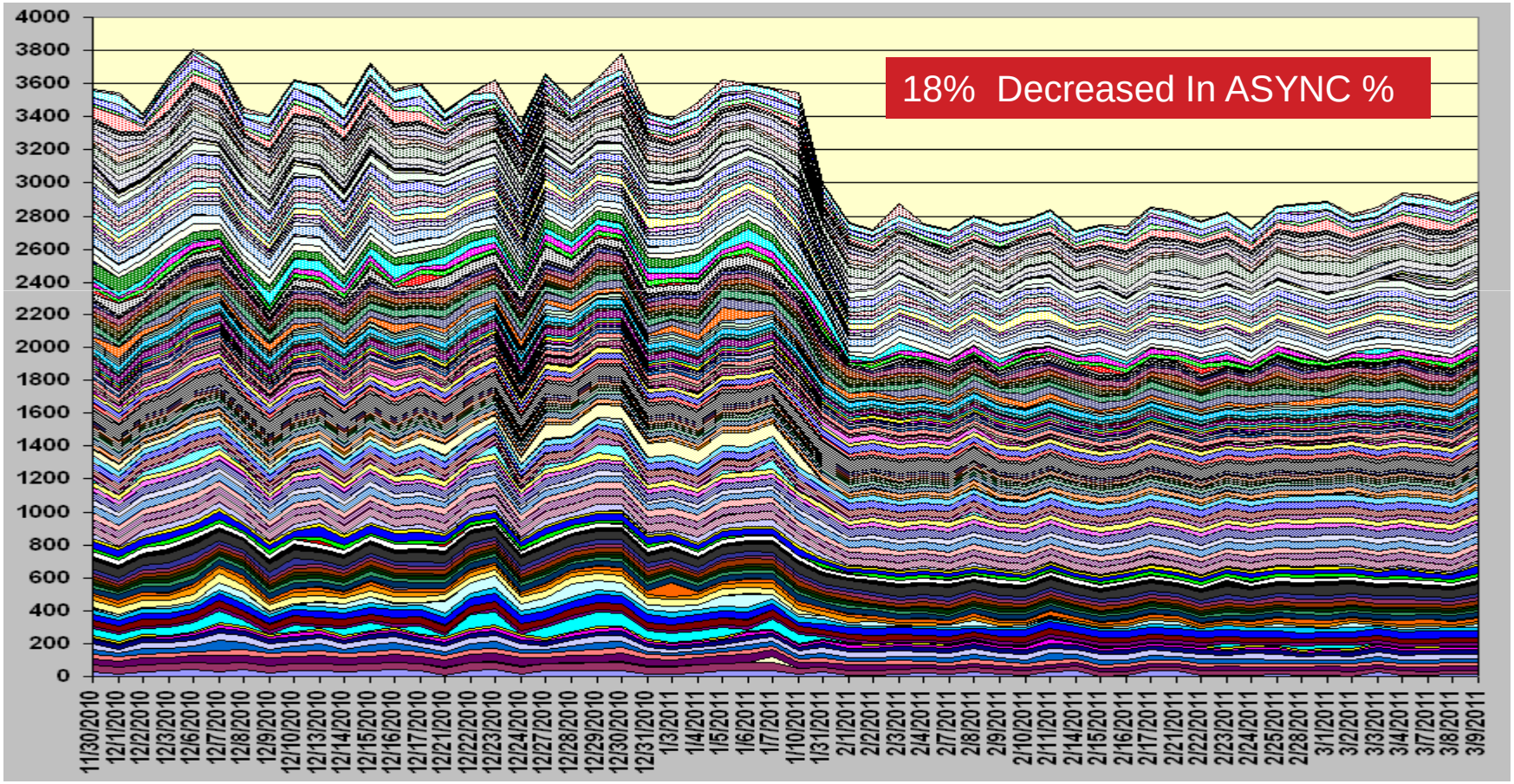
Range is wider than online 80.000 – 120.000 During 00:00 – 03:00 For Each Week-Day



Asyncronous Request %

Async Request Percentage For DB2 GBP Structures 09:00-18:00 – Weekdays Only

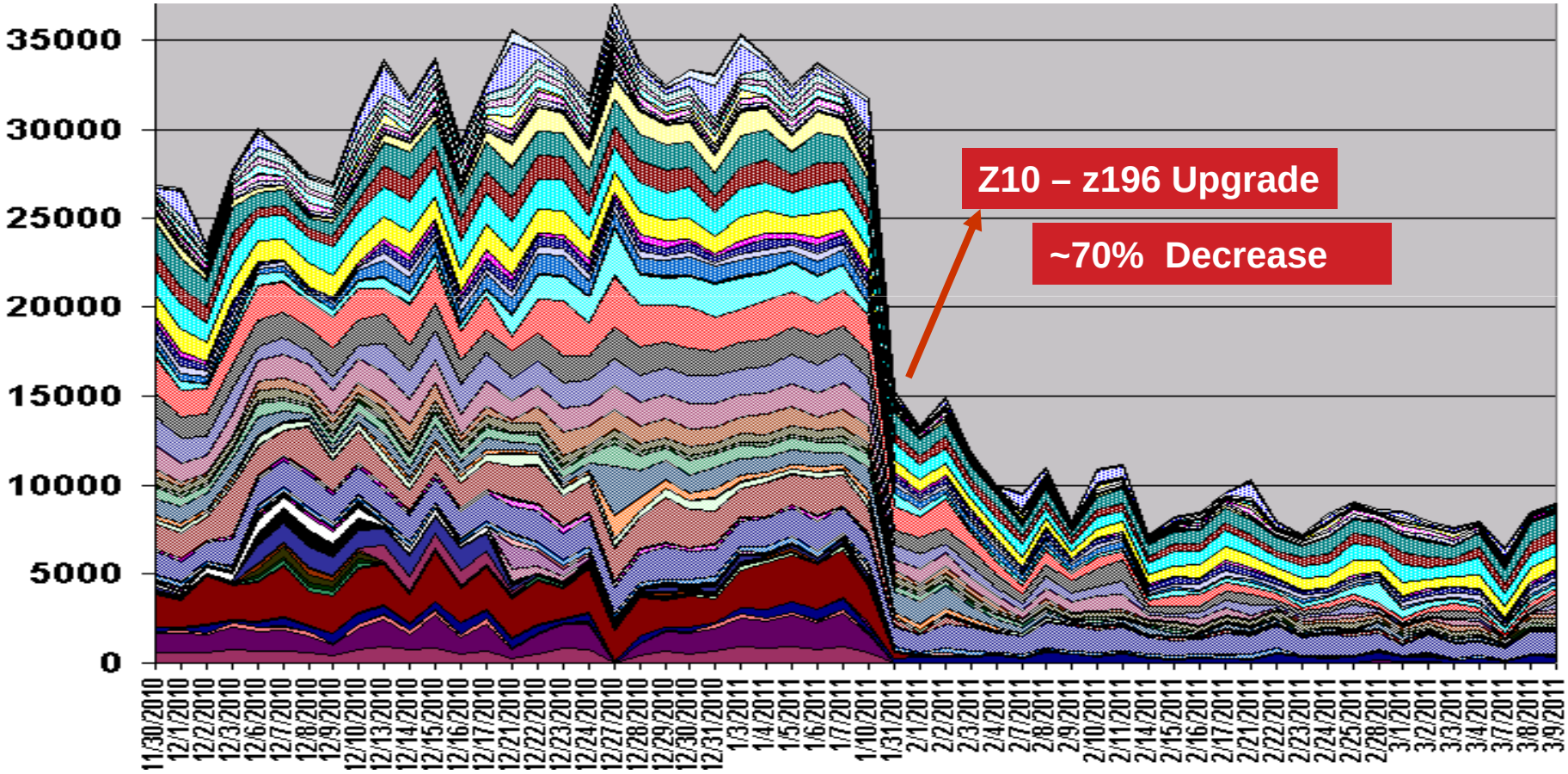
Stacked Area Graph



Number Of Asynchronous Requests Converted by Non-Heuristic

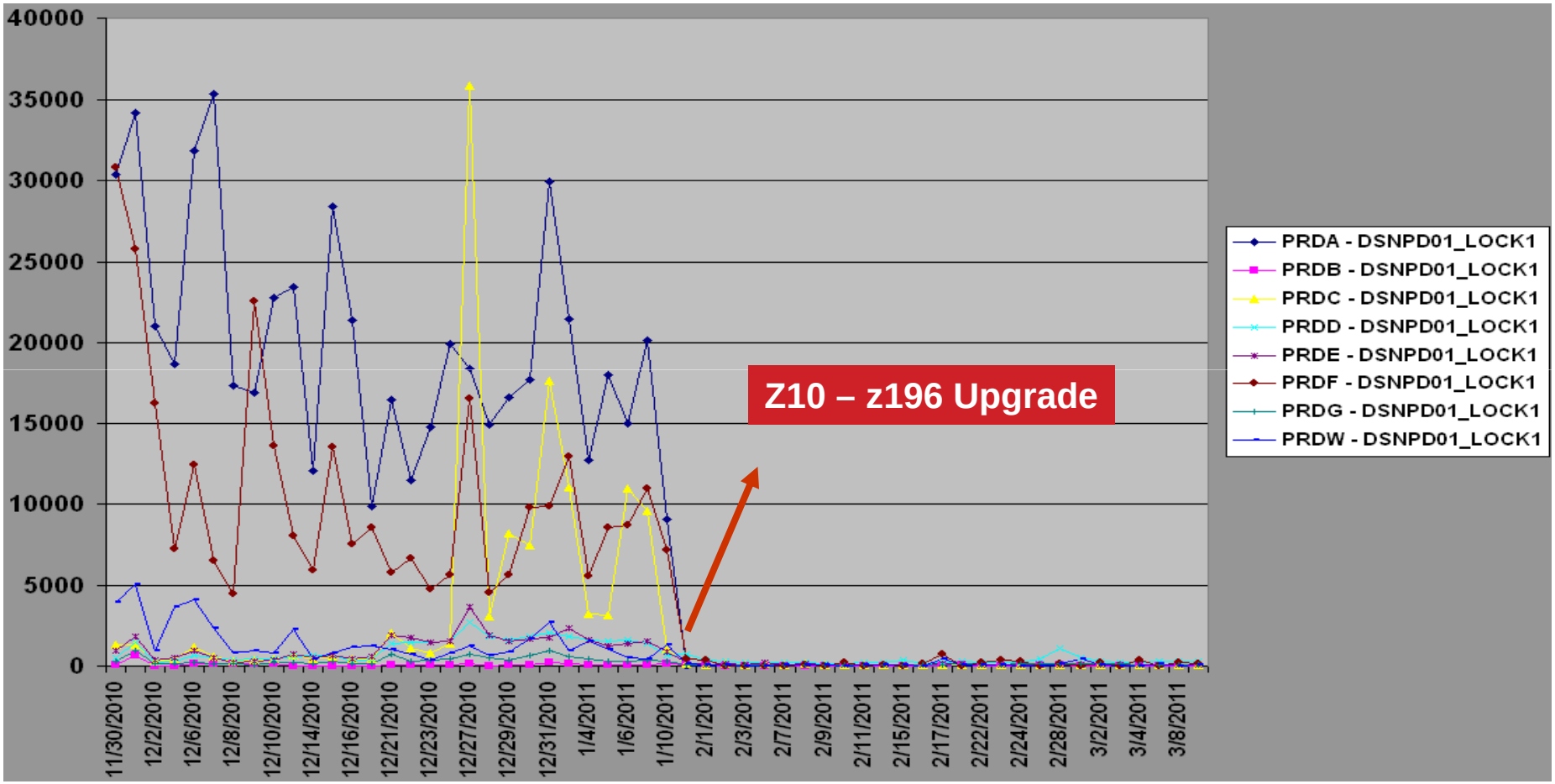
Requests Changed To async by Non-heuristic Method For DB2 GBP Structures
09:00-18:00 – Weekdays Only - Stacked Area Graph

CHANGED Request Fields in RMF Report- `No subchannel ` reason



Configuration Change Effect on # Of Async Requests For DB2 Lock Structure

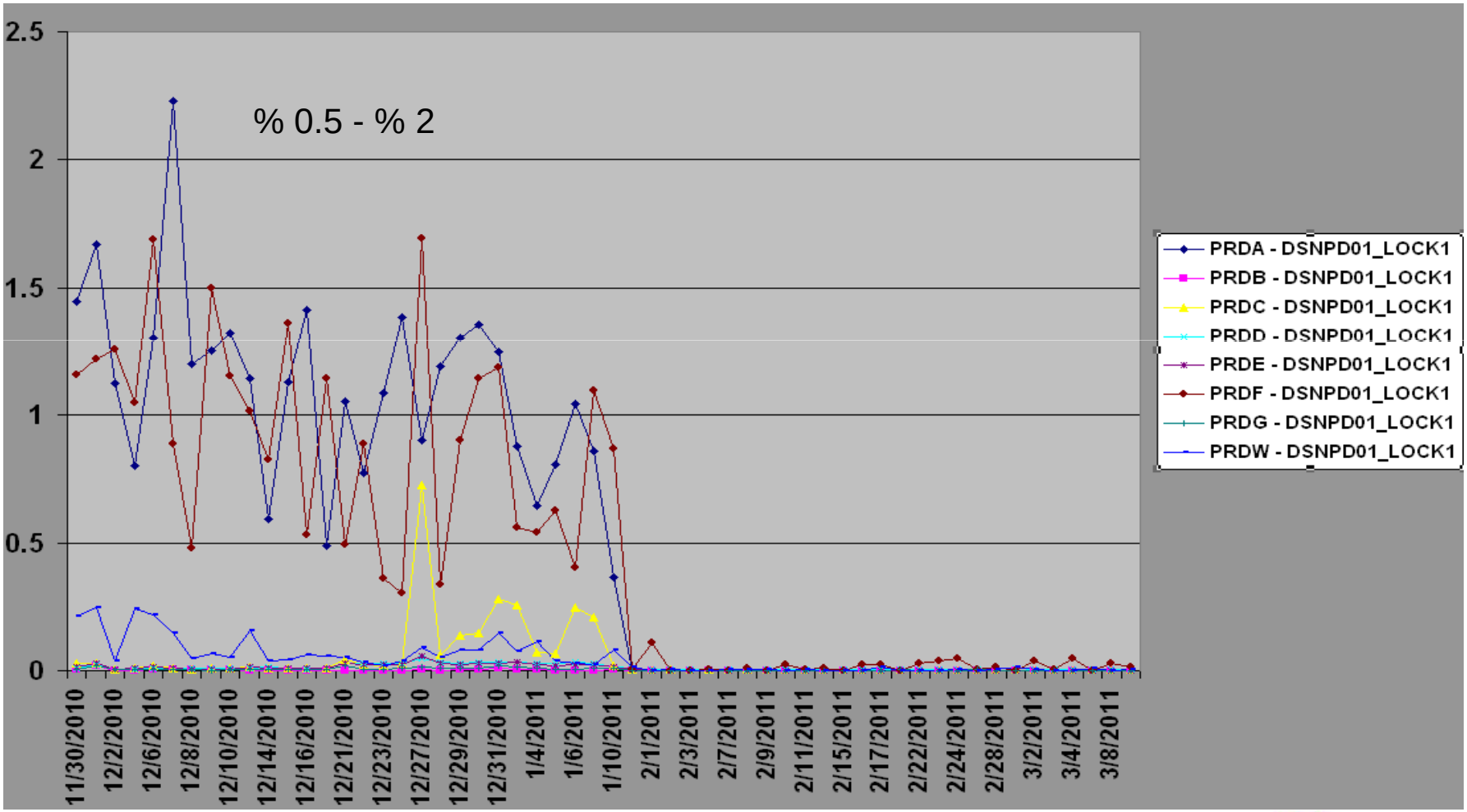
Average # Of Async Requests For DB2 Lock Structure 09:00-18:00 – Weekdays



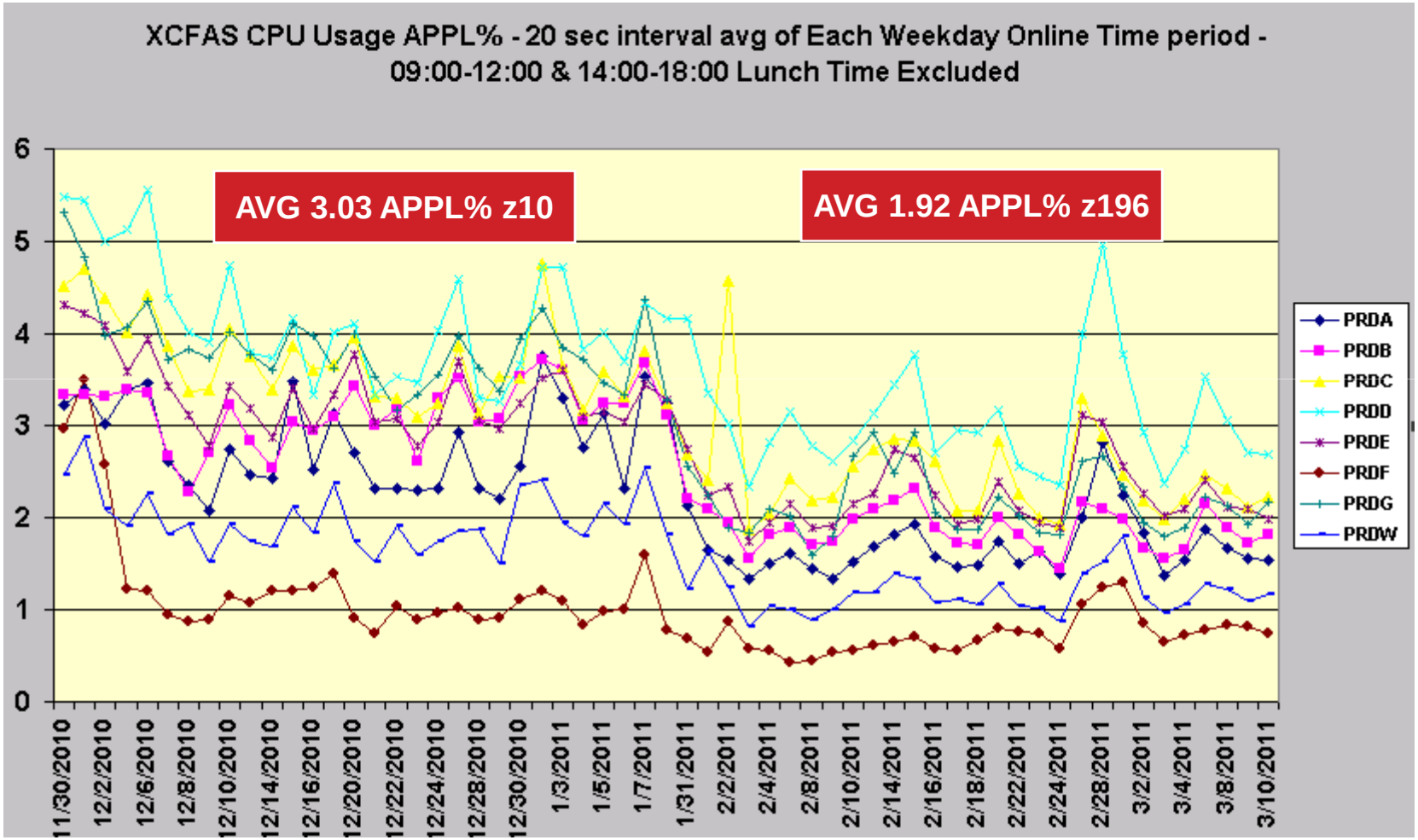
Probability of CF utilization decrease being main reason of this decrease is high

Configuration Change Effect on % Of Async Requests For DB2 Lock Structure

Async Request % For DB2 Lock Structures 09:00-18:00 – Weekdays

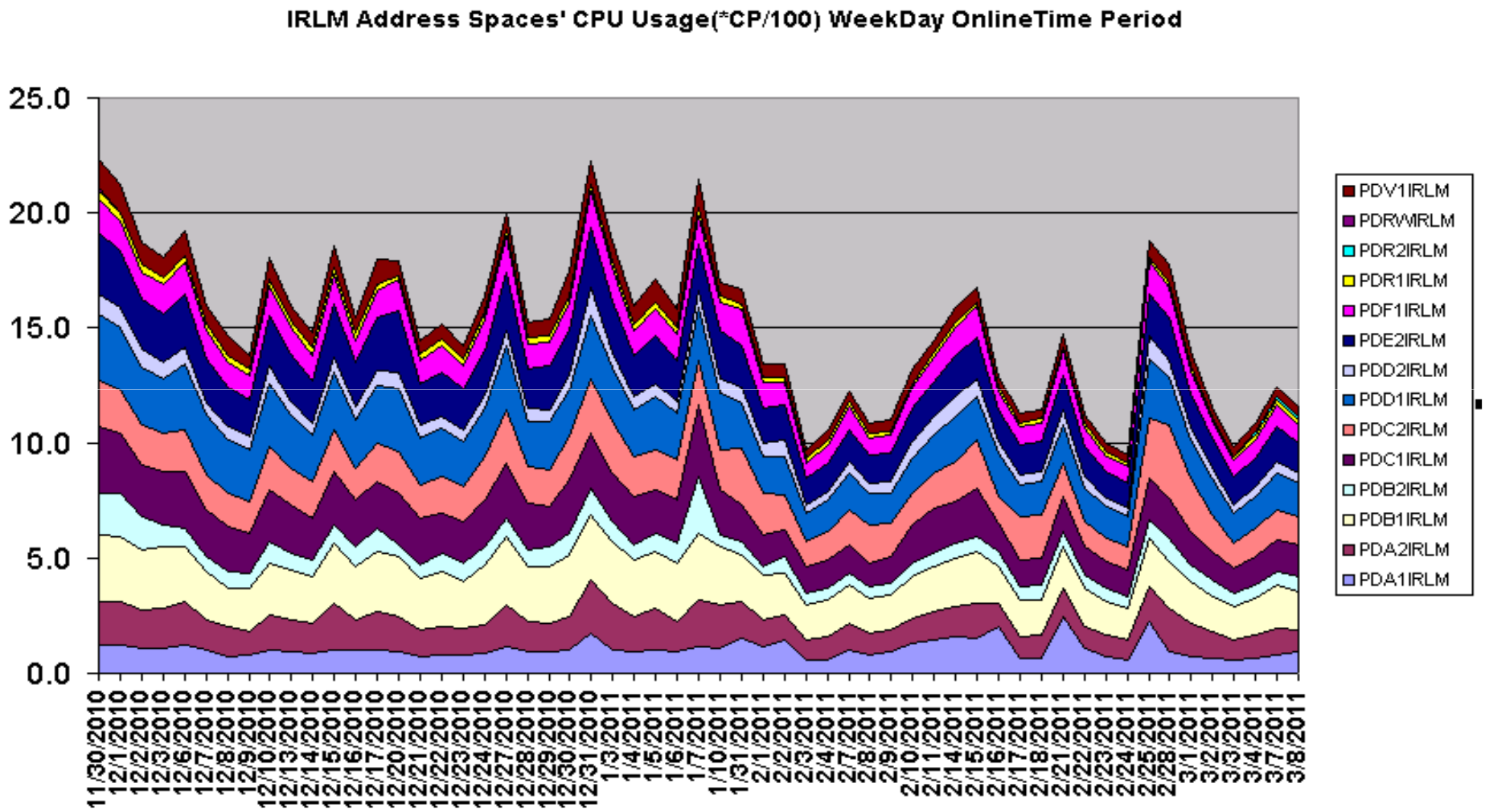


ASYNC Requests CPU USAGE CHARGED TO XCFAS Address Space



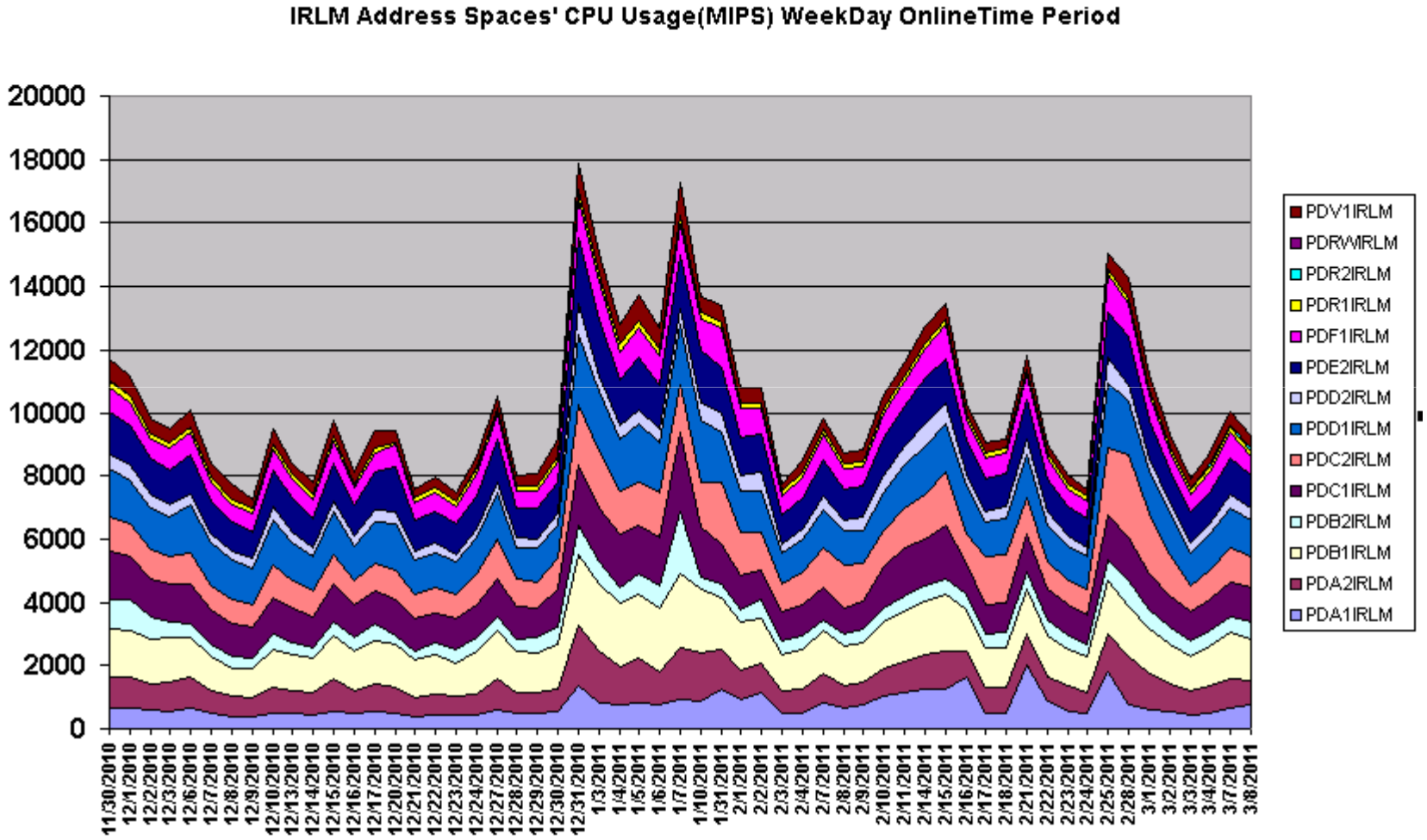
Without Normalization

SYNC Requests CPU USAGE CHARGED TO Requested AS: Sample IRLM

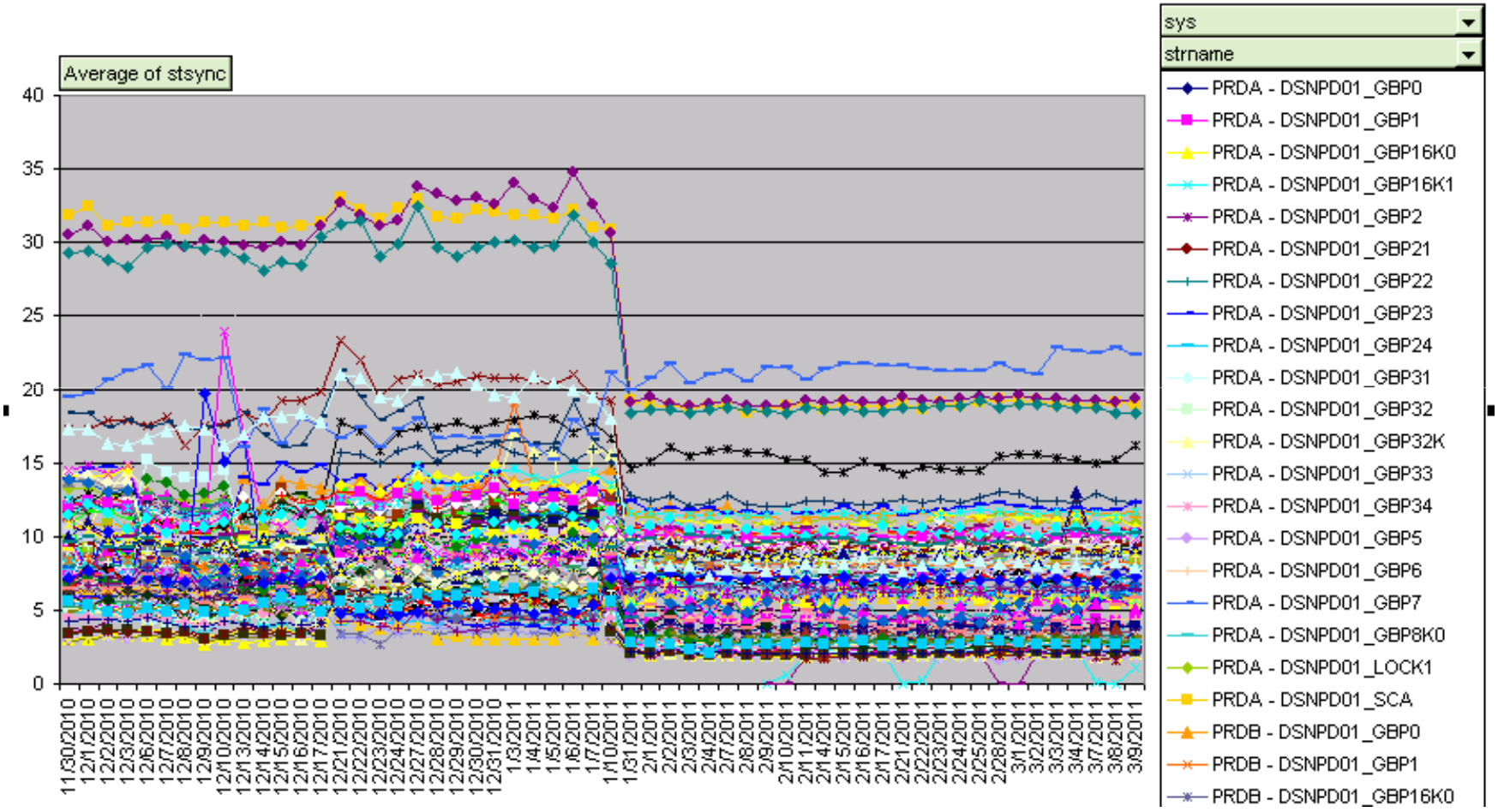


Without Normalization

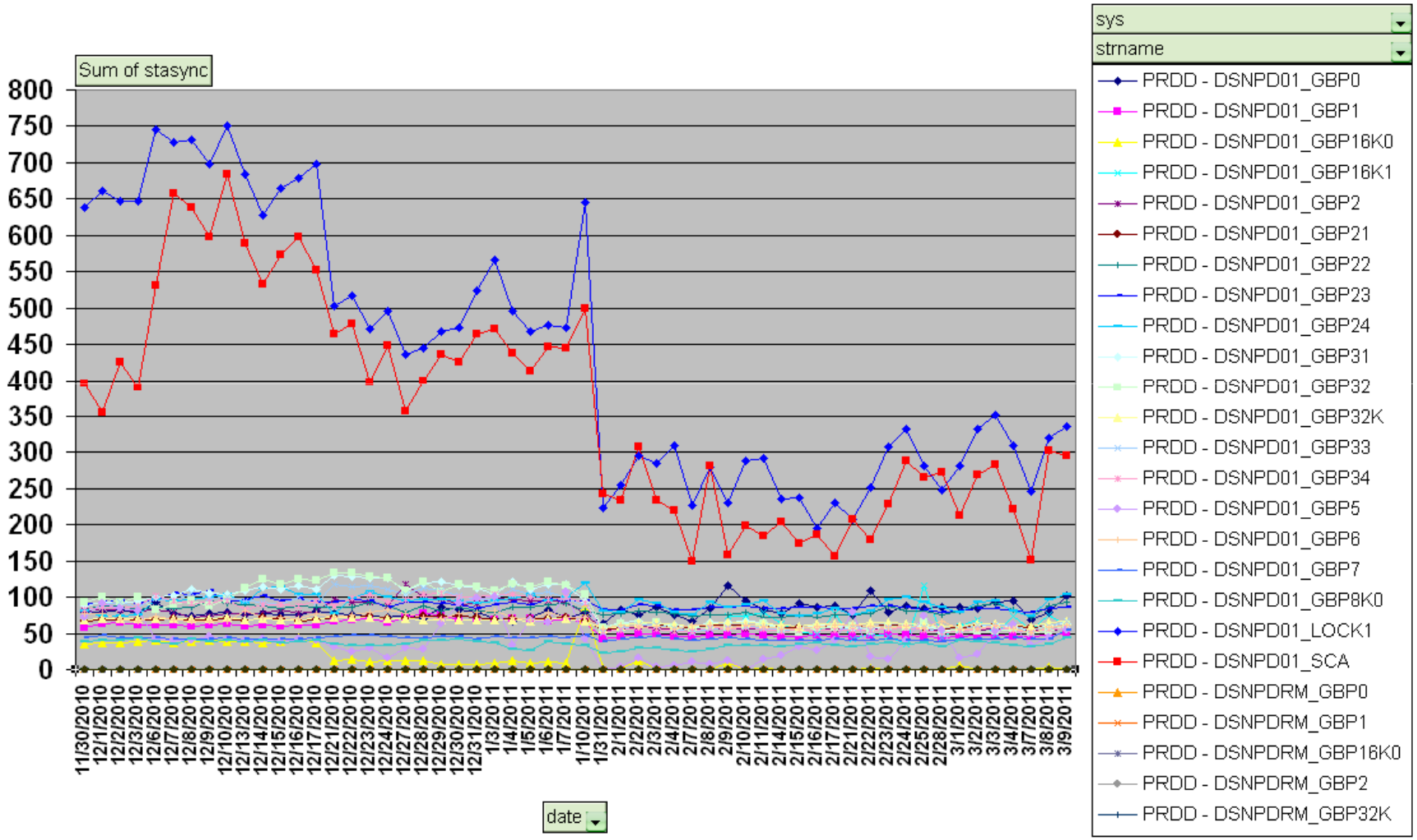
SYNC Requests CPU USAGE CHARGED TO Requested AS: Sample IRLM



Sync Requests Daily Online Period Average Service Times

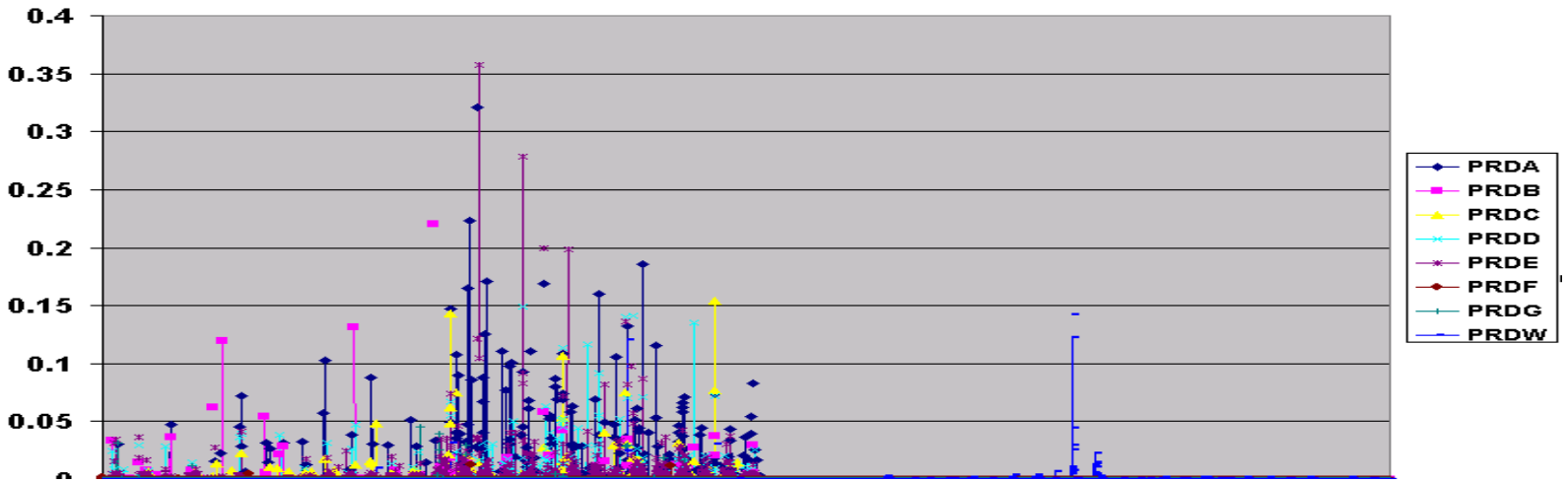


ASync Requests Daily Online Period Average Service Times

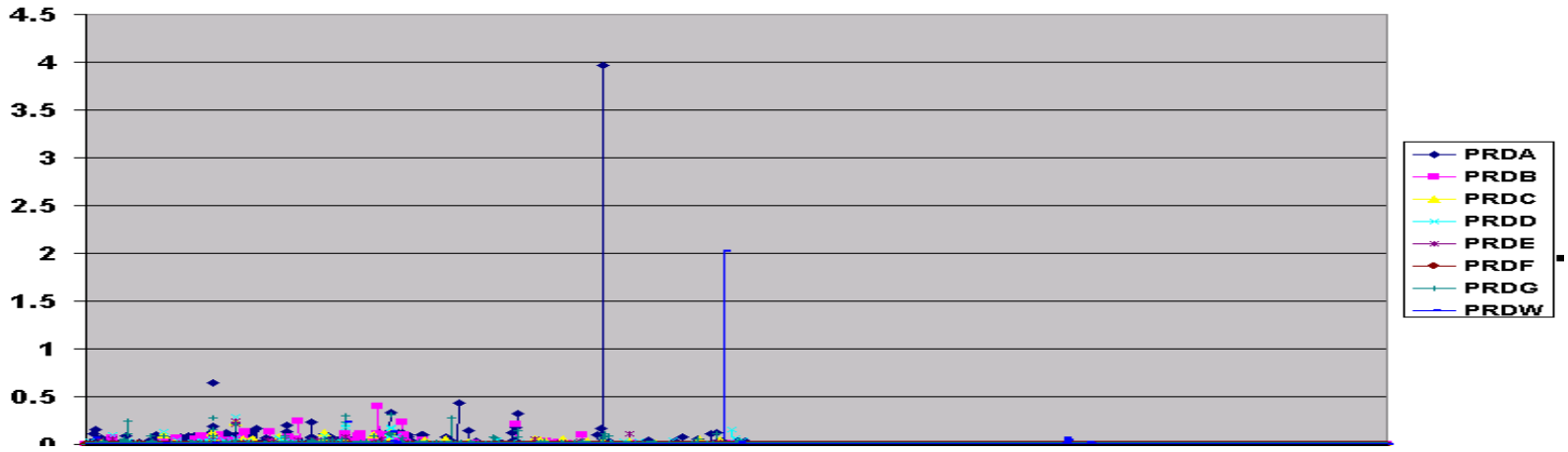


Rule Of Thumb Path Busy < %10 Of Total Req

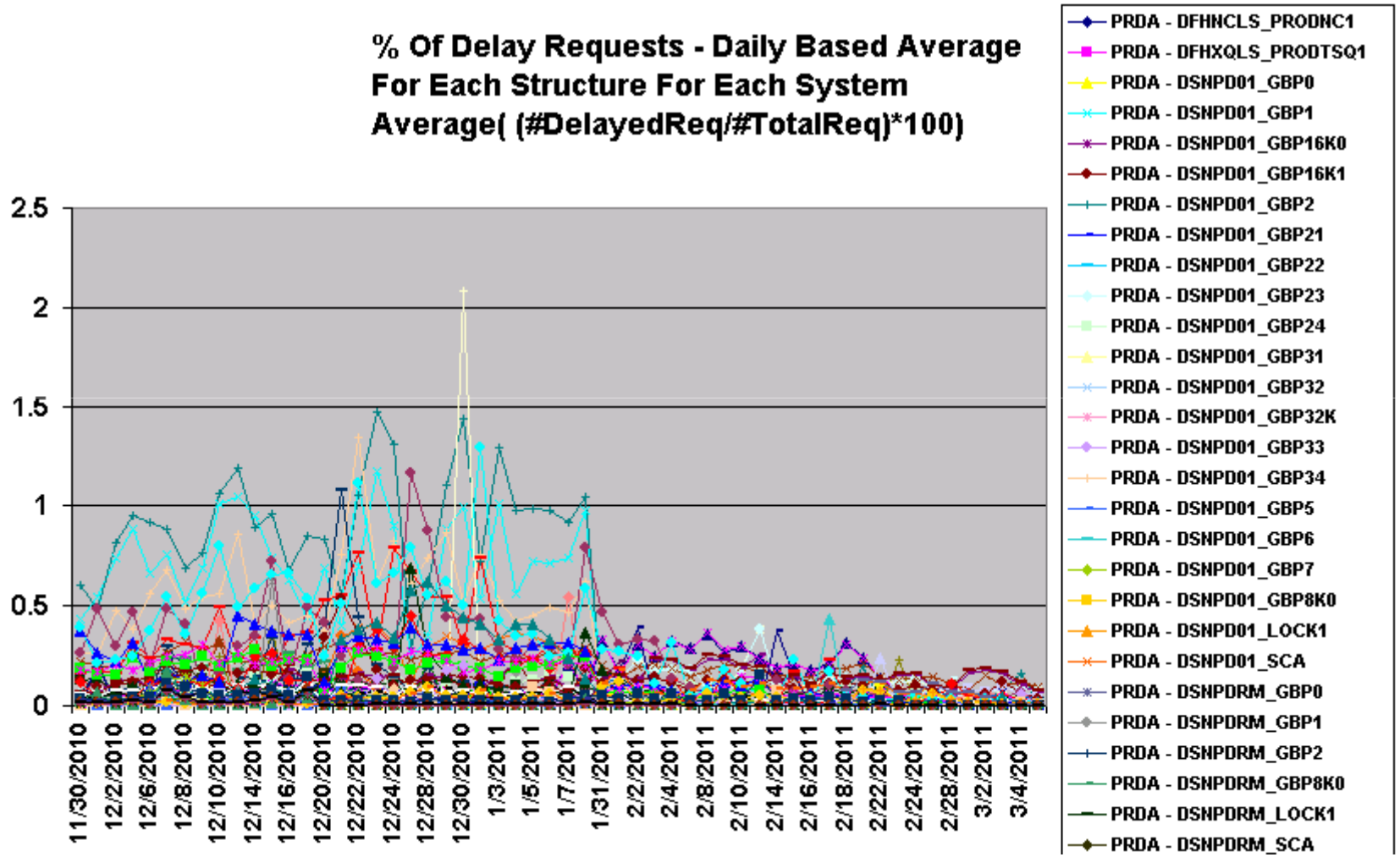
PCF1GAR1 Path Busy %



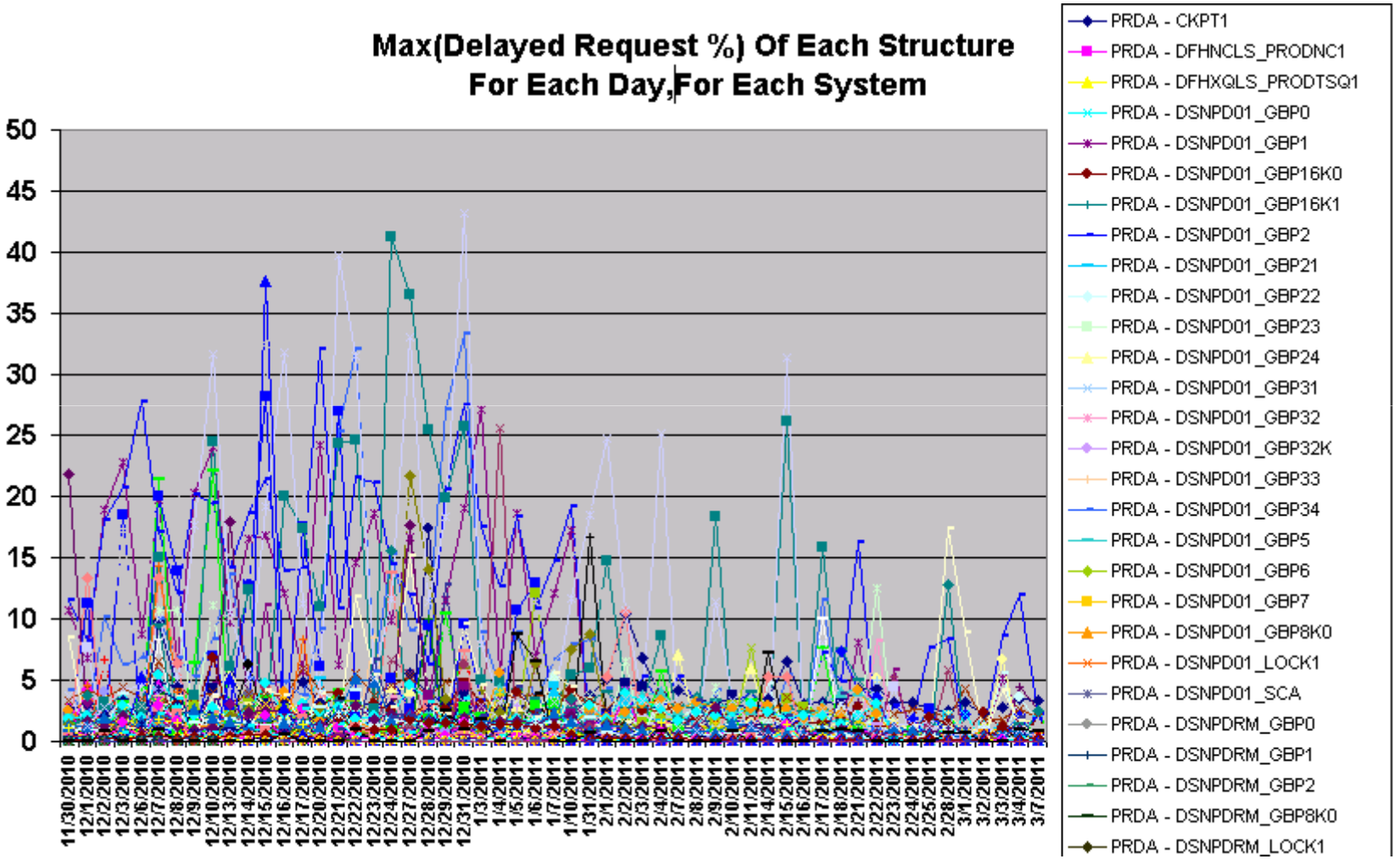
PCF2GAR2 Path Busy %



Rule Of Thump Delayed Request % < %10 Of Total Req



Rule Of Thumb Delayed Request % < %10 Of Total Req



Host Cost (Data Sharing Cost)

Assumes 9 CF requests / MI

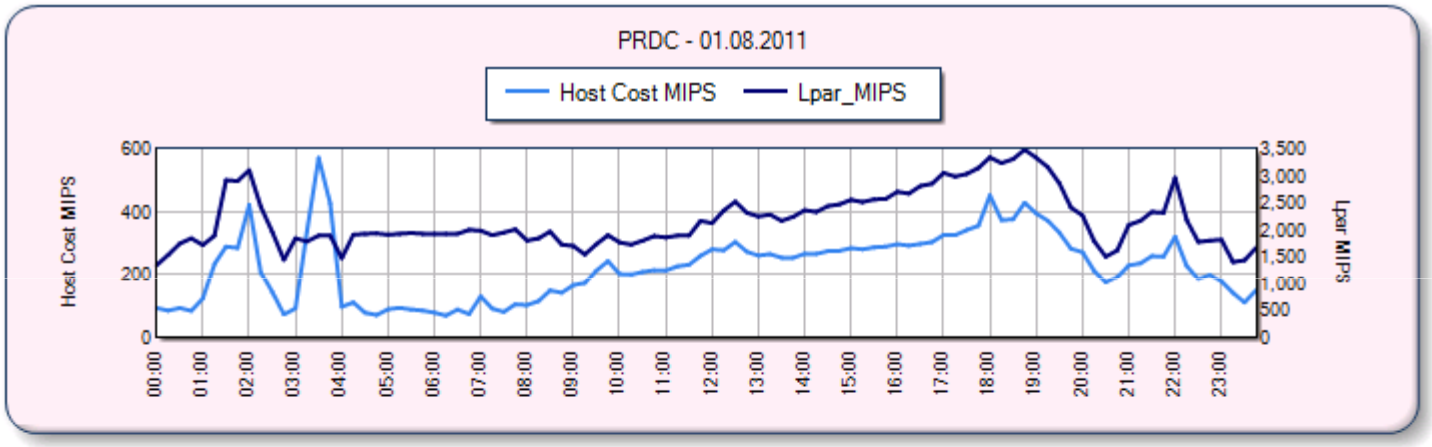
Thanks To Gary King

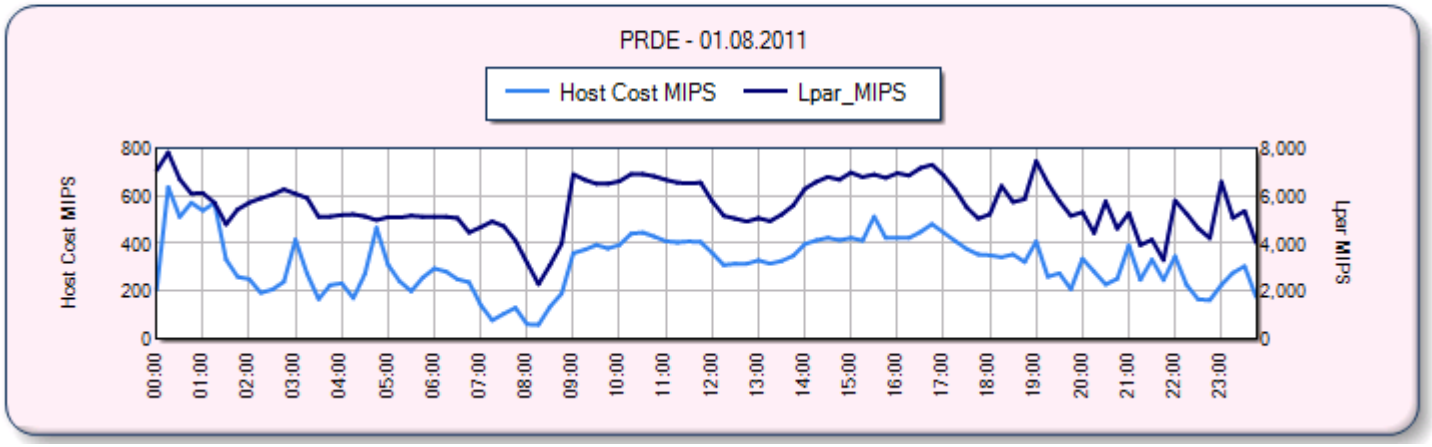
Host	z890	z990	z9 BC	z9 EC	z10 BC	z10 EC	z196
z890 ISC	13%	15%	16%	17%	19%	21%	NA
z890 ICB	9%	10%	10%	11%	12%	13%	NA
z990 ISC	13%	14%	14%	15%	17%	19%	NA
z990 ICB	9%	9%	9%	10%	12%	13%	NA
z9 BC ISC	12%	13%	14%	15%	17%	19%	23%
z9 BC PSIFB 12X	NA	NA	NA	NA	13%	14%	16%
z9 BC ICB	8%	9%	9%	10%	11%	12%	NA
z9 EC ISC	12%	13%	13%	14%	16%	18%	22%
z9 EC PSIFB 12X	NA	NA	NA	NA	13%	14%	16%
z9 EC ICB	8%	8%	8%	9%	10%	11%	NA
z10 BC ISC	12%	13%	13%	14%	16%	18%	22%
z10 BC PSIFB 12X	NA	NA	11%	12%	13%	14%	15%
z10 BC ICB	8%	8%	8%	9%	10%	11%	NA
z10 EC ISC	11%	12%	12%	13%	15%	17%	22%
z10 EC PSIFB 12X	NA	NA	10%	11%	12%	13%	15%
z10 EC ICB	7%	7%	7%	8%	9%	10%	NA
z196 ISC	NA	NA	11%	12%	14%	16%	21%
z196 PSIFB 12X	NA	NA	9%	10%	11%	12%	14%

The table does not take into consideration any extended distance effects or system managed duplexing

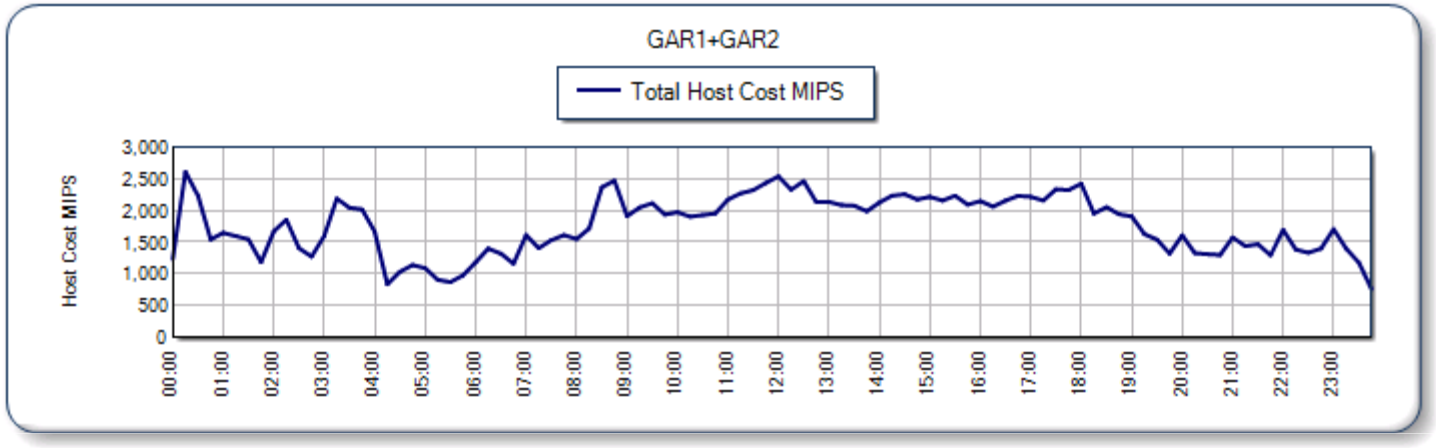
Calculating Host Cost (Data Sharing Cost)

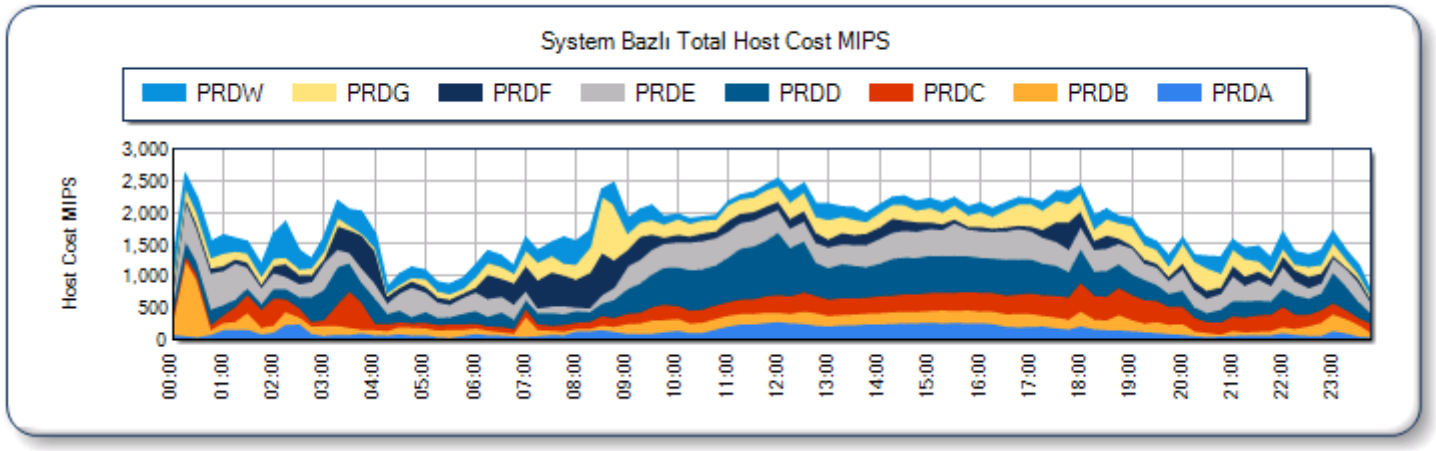
One can calculate the coupling intensity by simply summing the total req/sec of the CFs and dividing by the used MIPS of the attached systems (MIPS rating times CPU busy). Then, the values in the table would be linearly scaled. For example, if the workload was processing 4.5 CF operations per million instructions (or 4.5 CF ops/second/MIPS), then all the values in the table would be cut in half.



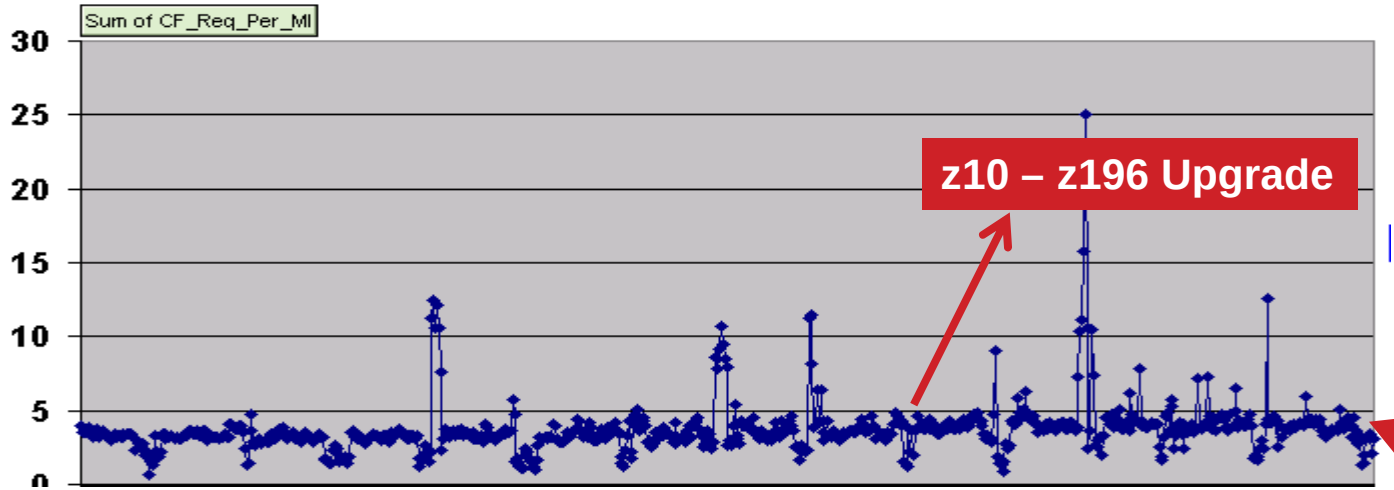


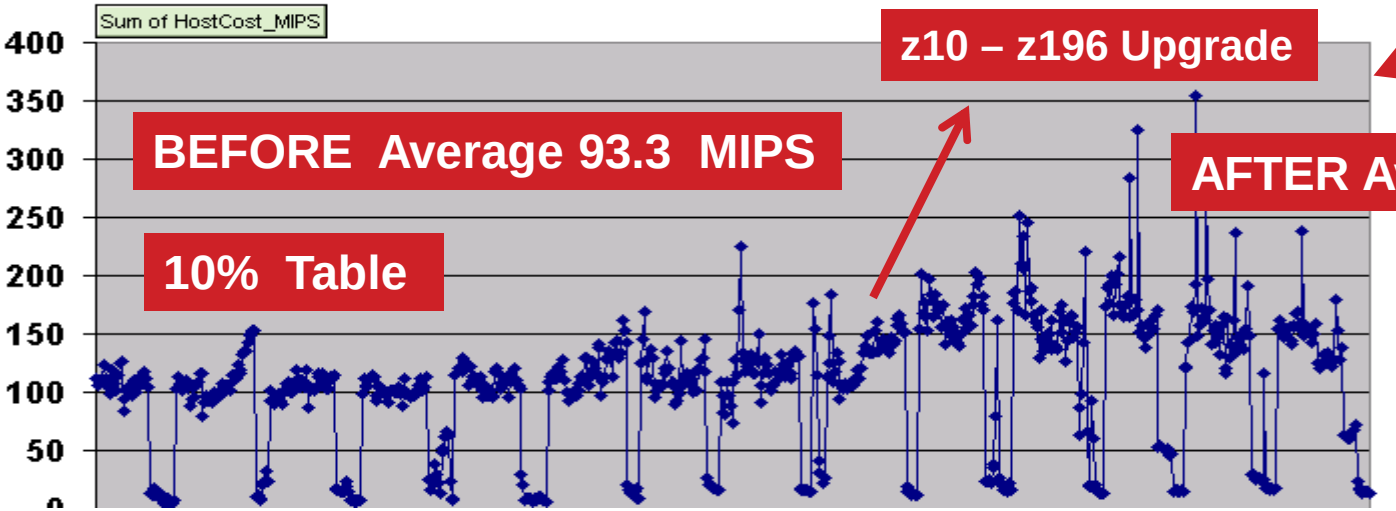
Calculating Host Cost (Data Sharing Cost)





Host Cost Before & After Upgrade – One LPAR





ACTUAL 43 % Increase In Host Cost

AFTER Average 133 MIPS

14% Table

SHARE in Orlando 2011

Host Cost With New IFB3 Protocol

Thanks To Riaz Ahmad For This Information

Host / CF	Z890	Z990	Z9 BC	Z9 EC	Z10 BC	Z10 EC	Z114	Z196
Z890 ISC	13	15	16	17	19	21	-	-
Z890 ICB	9	10	10	11	12	13	-	-
Z990 ISC	13	14	14	15	17	19	-	-
Z990 ICB	9	9	9	10	12	13	-	-
Z9 BC ISC	12	13	14	15	17	19	18	23
Z9 BC 12x IFB	-	-	-	-	13	14	13	16
Z9 BC ICB4	8	9	9	10	11	12	-	-
Z9 EC ISC	12	13	13	14	15	18	17	22
Z9 EC 12x IFB	-	-	-	-	13	14	13	16
Z9 EC ICB	8	8	9	9	10	11	-	-
Z10 BC ISC	12	13	13	14	16	18	17	22
Z10 BC 12x IFB			11	12	13	14	13	15
Z10 BC ICB	8	8	9	9	10	11	-	-
Z10 EC ISC	11	12	12	13	15	17	17	22
Z10 EC 12x IFB			10	11	12	13	12	15
Z10 EC ICB	7	7	7	8	9	10	-	-
Z114 ISC3			14	14	16	18	17	21
Z114 12x IFB			10	10	12	13	12	15
Z114 12x IFB3							10	12
Z196 ISC			11	12	14	16		21
Z196 12x IFB			9	10	11	12	11	14
Z196 12x IFB3							9	11

CF SUBCHANNEL UTILIZATION

Calculate Yourself Using SMF Records

Utilization % = (((Sync #Req * Sync service time) + (Async #Req * Async service time)) / Interval time * #Subchannels in use) * 100

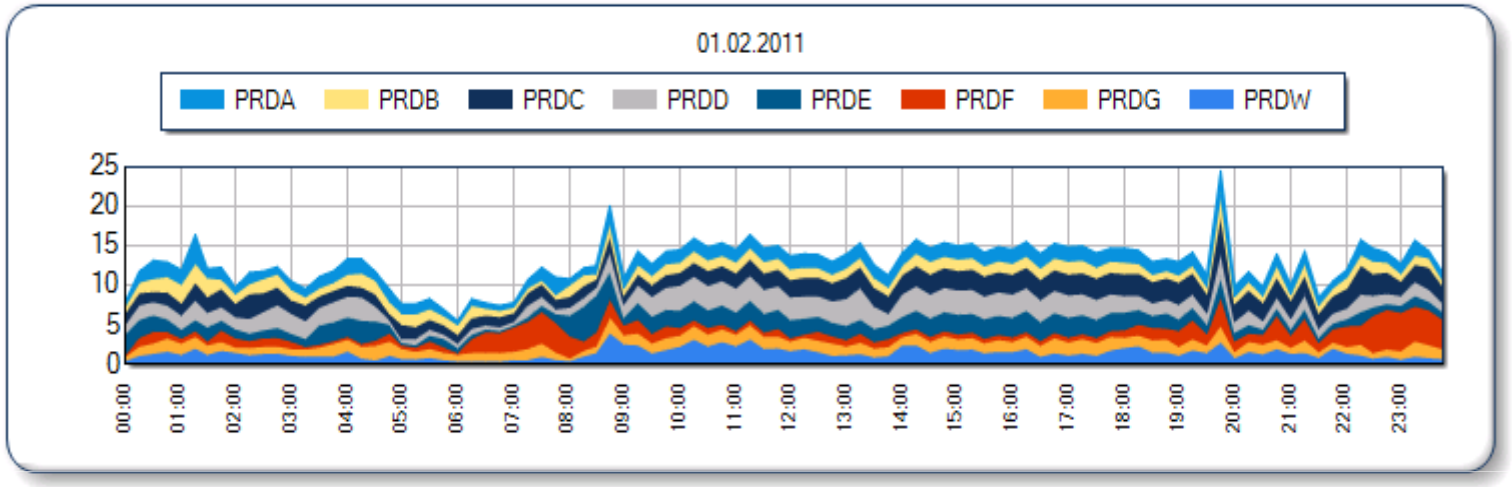
OR

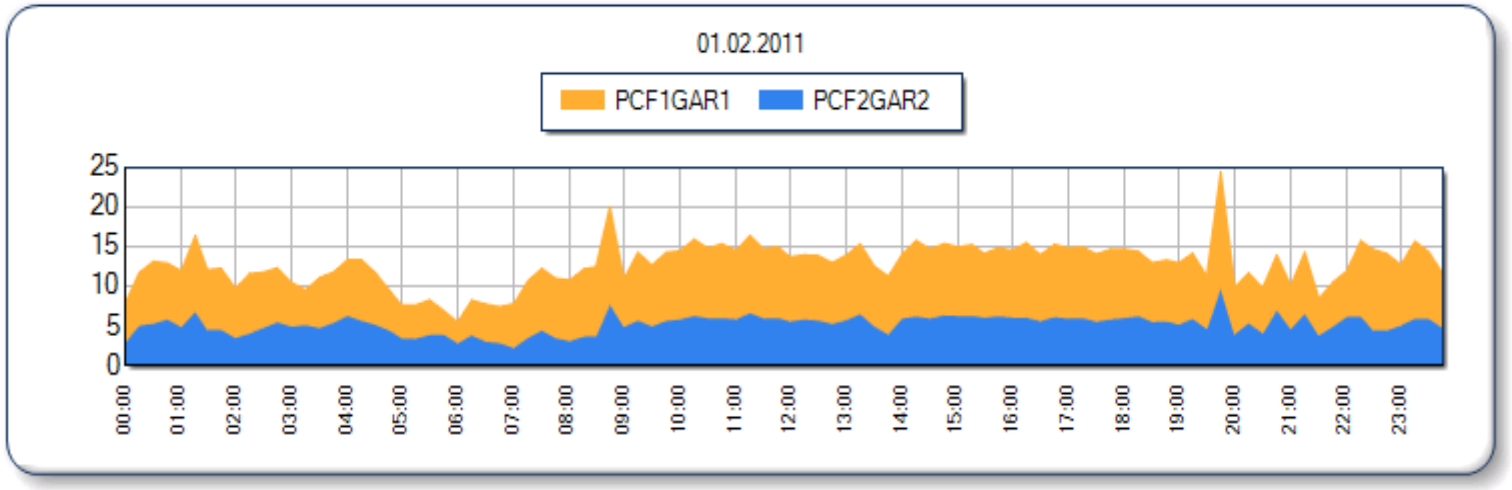
Using RMF Overview Report

OVERVIEW(REPORT)
OVW(CF1P(SUBCHBP(PCF1GAR1)))
OVW(CF2P(SUBCHBP(PCF2GAR2)))

Subchannel busy percentage	SUBCHBP	cfname	R744SSRC R744SSTM R744SARC R744SATM R744FSCU	((R744SSRC * R744SSTM) + (R744SARC * R744SATM)) *100 / Interval * R744FSCU	S

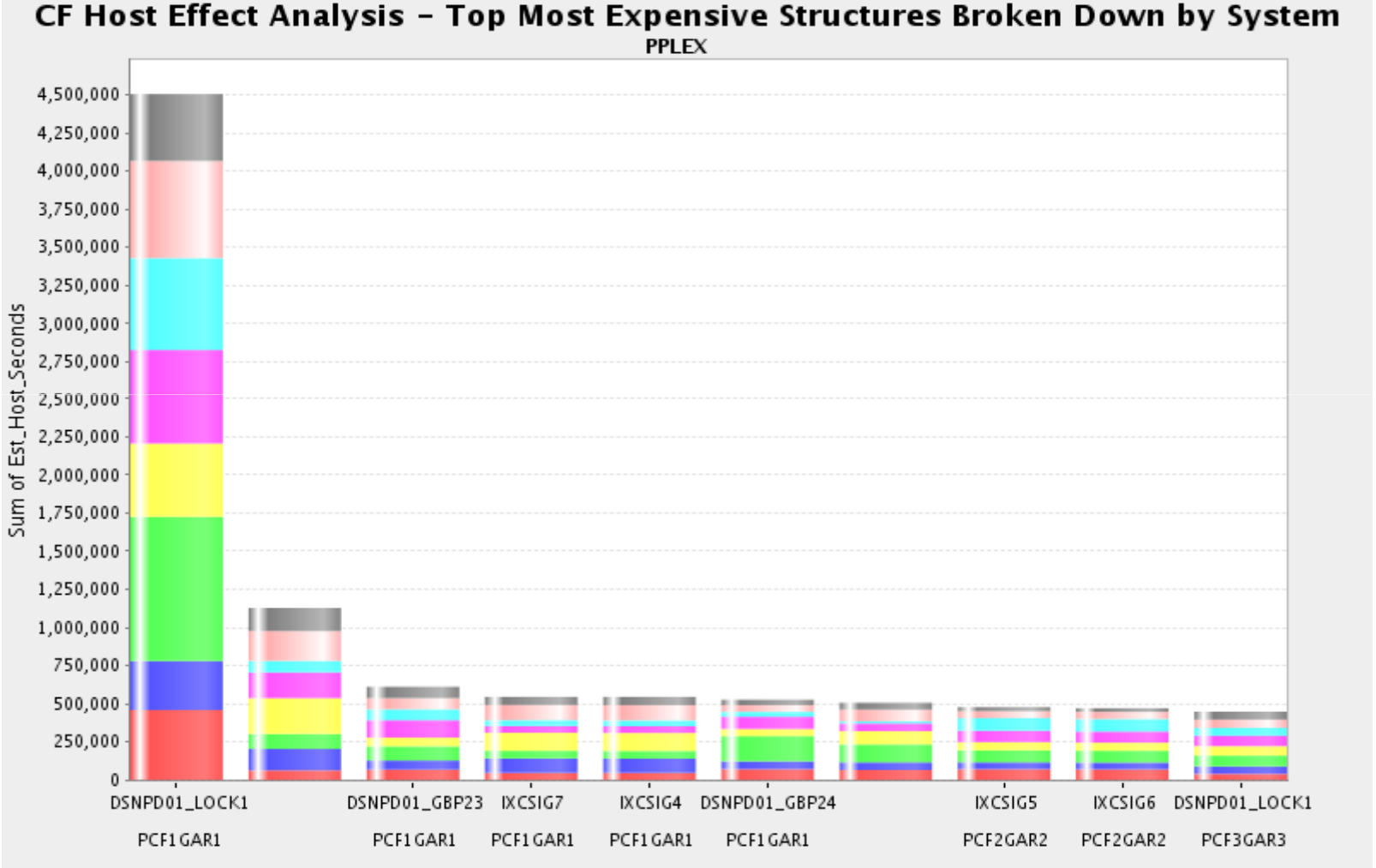
CF SUBCHANNEL UTILIZATION – ONE DAY





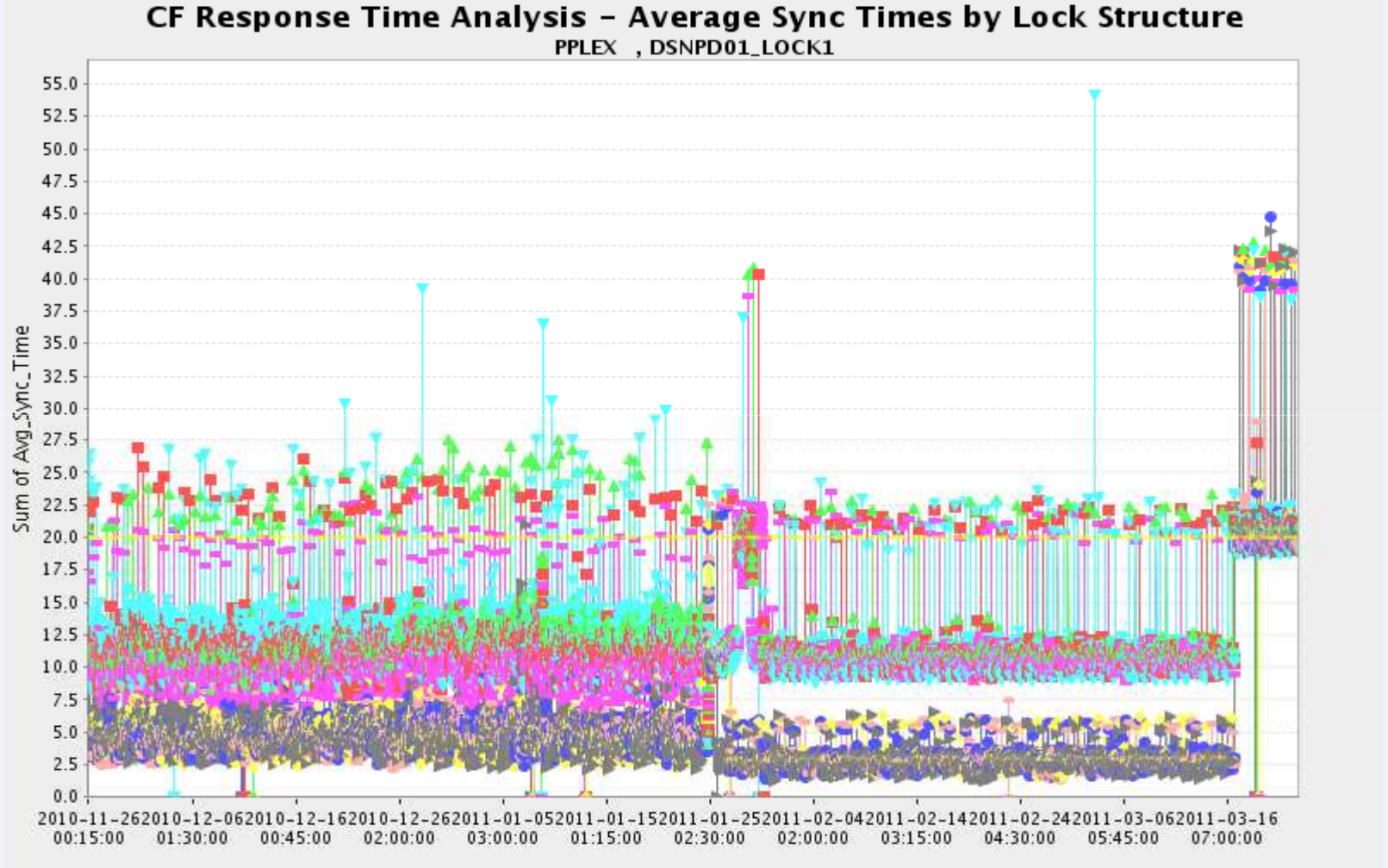
Pivotor Product of Peter Enrico

http://www.epstrategies.com/sitex/index.php



Pivotor Product of Peter Enrico

http://www.epstrategies.com/sitex/index.php



RMF Mon III,I Panels & Key Fields

Understanding Data Types In Reports

- RMF Monitor I Post Processor Report Fields
- RMF Monitor I Overview/Exception Report Fields
- RMF Monitor III Report Fields
- SMF Record Fields (RMF Related Records 70-79)

If explanation in books is not clear,

- Cross Check Related Fields in Other Types Of Data
- Google It – For APARs, Redbooks,WSC Documents
- Ask IBM – Open PMR For Information Request

Sample : Path Busy Condition

SMF Record R744FPBC = 203

Output Of RMF Post Processor Report With Statement "SYSRPTS(CF)"

```
                                                    SUBCHANNEL  ACTIVITY
-------------------------------------------------------------------------------
         Ö REQ                                    ---------- REQUESTS ----------   -----
SYSTEM   TOTAL    -- CF LINKS --   PTH                    Ö   -SERVICE TIME(MIC)-
NAME     AVG/SEC TYPE  GEN  USE   BUSY                   REQ     AVG    STD_DEV

PRDA       2116K ICP     4    4    203   SYNC       1402K     6.7      28.2   LIST/
          2351.3 SUBCH  56   28         ASYNC    691804    80.8     631.1   LOCK
                                         CHANGED     212  INCLUDED IN ASYNC  TOTAL
                                         UNSUCC        0     0.0       0.0
```

Output Of RMF Post Processor Overview/Exception Report With Statements

OVERVIEW(REPORT)
OVW(PTHBUS1(PBSY(PCF1GAR1)))
OVW(PTHBUS2(PBSY(PCF2GAR2)))

R744FBC/Interval = 203/(900 secs) =0.22

```
                                                        R M F   O V E R V I E W
            z/OS   V1R12                        SYSTEM ID PRDA                  START
                                                RPT VERSION V1R12 RMF           END

NUMBER OF INTERVALS 1                      TOTAL LENGTH OF INTERVALS 00.15.00
DATE     TIME      INT          PTHBUS1     PTHBUS2
MM/DD  HH.MM.SS  HH.MM.SS
07/25  09.45.00  00.15.00          0.0          0.2
```

RMF Mon I Post Processor Reports – CF Reports

Postprocessor Statement – SYSRPTS(CF) - See sample JCL in backup slides

- Coupling Facility Usage Summary
- Coupling Facility Structure Activity
- Subchannel Activity

RMF Subchannel Activity Section

Service Times Do NOT include Delay Times

Delay Reason Is Related No Subchannel

Path Busy is NOT included
But IBM recognises path busy before
And reissue request using same subchannel

SUBCHANNEL ACTIVITY

SYSTEM NAME	Ö REQ TOTAL AVG/SEC	-- CF TYPE	LINKS -- GEN	USE	PTH BUSY	REQUESTS	Ö REQ	-SERVICE TIME(MIC)- AVG	STD_DEV	DELAYED REQUESTS	Ö REQ	% OF REQ	AVG TIME(MIC) /DEL	STD_DEV	/ALL
PRDA	2391K	CIB	3	3	0	SYNC	1579K	13.0	4.7	LIST/CACHE	358	0.0	42.5	33.6	0.0
	2656.3	SUBCH	42	21		ASYNC	788047	111.8	161.0	LOCK	0	0.0	0.0	0.0	0.0
						CHANGED	0	INCLUDED IN ASYNC		TOTAL	358	0.0			
						UNSUCC	0	0.0	0.0						
PRDB	5869K	ICP	4	4	1935	SYNC	4234K	3.9	34.9	LIST/CACHE	415	0.0	789.0	601.7	0.1
	6521.0	SUBCH	56	28		ASYNC	1589K	41.7	395.3	LOCK	13	0.0	207.0	159.9	0.0
						CHANGED	413	INCLUDED IN ASYNC		TOTAL	428	0.0			
						UNSUCC	0	0.0	0.0						
PRDC	6364K	CIB	3	3	0	SYNC	4671K	12.9	4.0	LIST/CACHE	3052	0.1	707.5	573.0	0.8
	7071.1	SUBCH	42	21		ASYNC	1645K	72.8	88.7	LOCK	60	0.0	115.5	125.4	0.0
						CHANGED	2492	INCLUDED IN ASYNC		TOTAL	3112	0.0			
						UNSUCC	0	0.0	0.0						
PRDD	11892K	ICP	4	4	2718	SYNC	9162K	4.1	31.9	LIST/CACHE	582	0.0	961.6	1544	0.1
	13213	SUBCH	56	28		ASYNC	2757K	36.0	475.6	LOCK	86	0.0	393.3	1096	0.0
						CHANGED	627	INCLUDED IN ASYNC		TOTAL	668	0.0			

RMF CF Usage Summary Section

COUPLING FACILITY USAGE SUMMARY

STRUCTURE SUMMARY

TYPE	STRUCTURE NAME	STATUS	CHG	ALLOC SIZE	% OF CF STOR	Ö REQ	% OF ALL REQ	% OF CF UTIL	AVG REQ/ SEC	LST/DIR ENTRIES TOT/CUR	DATA ELEMENTS TOT/CUR	LOCK ENTRIES TOT/CUR	DIR REC/ DIR REC XI'S
LIST	DSNPDRM_SCA	ACTIVE		11M	0.0	2403	0.0	0.0	2.67	11K	22K	N/A	N/A
										158	458	N/A	N/A
	DSNPD01_SCA	ACTIVE		70M	0.3	36277	0.1	0.1	40.31	80K	159K	N/A	N/A
										1013	2617	N/A	N/A
	HSA_LOG	ACTIVE		14M	0.1	3	0.0	0.0	0.00	2977	9009	N/A	N/A
										153	366	N/A	N/A
	HZS_HEALTHCHKLOG	ACTIVE		15M	0.1	379	0.0	0.0	0.42	3575	32K	N/A	N/A
										2322	22K	N/A	N/A
	IBMBDG	ACTIVE		16M	0.1	971	0.0	0.0	1.08	731	25K	N/A	N/A
										56	2938	N/A	N/A
	IXCSIG1	ACTIVE		15M	0.1	164244	0.3	0.8	182.49	1537	1522	N/A	N/A

RMF CF Usage Summary Section

At the end of this section ,Summary part exists

```
                                    -------  ------  -------   -----  ------  -------
           STRUCTURE TOTALS           13G     47.5    47169K    100     100    52410

 STORAGE SUMMARY
-------------------------------------------------------------------------------------

                                     ALLOC      % OF CF      ------- DUMP SPACE -------
                                     SIZE       STORAGE      % IN USE    MAX % REQUESTED

 TOTAL CF STORAGE USED BY STRUCTURES 12929M       47.5
 TOTAL CF DUMP STORAGE                  49M        0.2          0.0                  0.0
 TOTAL CF STORAGE AVAILABLE          14227M       52.3
                                     -------
 TOTAL CF STORAGE SIZE               27205M

                                     ALLOC      % ALLOCATED
                                     SIZE
TOTAL CONTROL STORAGE DEFINED        27205M       47.7
TOTAL DATA STORAGE DEFINED               0K        0.0

PROCESSOR SUMMARY
-------------------------------------------------------------------------------------

COUPLING FACILITY        2817        MODEL M32      CFLEVEL  17          DYNDISP OFF

AVERAGE CF UTILIZATION  (% BUSY)          14.0      LOGICAL PROCESSORS:  DEFINED   2    EFFECTIVE    2.0
                                                                         SHARED    0    AVG WEIGHT   0.0
```

RMF Structure Activity Section

STRUCTURE NAME = DSNPD01_LOCK1 TYPE = LOCK STATUS = ACTIVE

SYSTEM NAME	Ö REQ TOTAL AVG/SEC		REQUESTS Ö REQ	% OF ALL	-SERV TIME(MIC)- AVG	STD_DEV	DELAYED REQUESTS REASON	Ö REQ	% OF REQ	---- AVG TIME(MIC) ----- /DEL	STD_DEV	/ALL	EXTERNAL REQUEST CONTENTIONS	
PRDA	992K	SYNC	992K	3.8	11.8	3.5	NO SCH	0	0.0	0.0	0.0	0.0	REQ TOTAL	1323K
	1102	ASYNC	0	0.0	0.0	0.0	PR WT	0	0.0	0.0	0.0	0.0	REQ DEFERRED	11K
		CHNGD	0	0.0	INCLUDED IN ASYNC		PR CMP	0	0.0	0.0	0.0	0.0	-CONT	11K
													-FALSE CONT	5615
PRDB	3521K	SYNC	3521K	13.4	3.4	35.0	NO SCH	13	0.0	207.0	159.9	0.0	REQ TOTAL	4412K
	3912	ASYNC	13	0.0	1037.2	506.1	PR WT	0	0.0	0.0	0.0	0.0	REQ DEFERRED	25K
		CHNGD	13	0.0	INCLUDED IN ASYNC		PR CMP	0	0.0	0.0	0.0	0.0	-CONT	25K
													-FALSE CONT	9039
PRDC	3772K	SYNC	3772K	14.4	12.2	3.0	NO SCH	60	0.0	115.5	125.4	0.0	REQ TOTAL	4052K
	4191	ASYNC	53	0.0	541.4	372.3	PR WT	0	0.0	0.0	0.0	0.0	REQ DEFERRED	11K
		CHNGD	53	0.0	INCLUDED IN ASYNC		PR CMP	0	0.0	0.0	0.0	0.0	-CONT	11K
													-FALSE CONT	6088

RMF Structure Activity Section

STRUCTURE NAME = DSNPD01_GBP23 TYPE = CACHE STATUS = ACTIVE PRIMARY

SYSTEM NAME	Ö REQ TOTAL AVG/SEC	REQUESTS	Ö REQ	% OF ALL	-SERV TIME(MIC)- AVG	STD_DEV	DELAYED REQUESTS REASON	Ö REQ	% OF REQ	AVG TIME(MIC) /DEL	STD_DEV	/ALL
PRDA	56964	SYNC	55K	1.6	16.2	7.5	NO SCH	0	0.0	0.0	0.0	0.0
	63.29	ASYNC	2149	0.1	214.4	215.3	PR WT	0	0.0	0.0	0.0	0.0
		CHNGD	0	0.0	INCLUDED IN ASYNC		PR CMP	0	0.0	0.0	0.0	0.0
							DUMP	0	0.0	0.0	0.0	0.0
PRDB	319K	SYNC	309K	9.0	5.4	33.0	NO SCH	138	0.0	407.3	390.7	0.2
	354.4	ASYNC	10K	0.3	109.9	361.5	PR WT	0	0.0	0.0	0.0	0.0
		CHNGD	138	0.0	INCLUDED IN ASYNC		PR CMP	0	0.0	0.0	0.0	0.0
							DUMP	0	0.0	0.0	0.0	0.0
PRDC	128K	SYNC	111K	3.2	14.5	7.9	NO SCH	7	0.0	561.4	696.3	0.0
	141.7	ASYNC	17K	0.5	119.1	164.2	PR WT	0	0.0	0.0	0.0	0.0
		CHNGD	7	0.0	INCLUDED IN ASYNC		PR CMP	0	0.0	0.0	0.0	0.0
							DUMP	0	0.0	0.0	0.0	0.0

Important SMF Fields Analized in SMF 74(4)

ASYNC*REQUESTS	R744SARC
AVERAGE*SERVICE TIME*PER ASYNC	R744SATM
SYNC*REQUESTS	R744SSRC
AVERAGE*SERVICE TIME*PER SYNC	R744SSTM
REQUESTS*CHANGED FROM*SYNC TO ASYNC	R744SSTA
REQUESTS*QUEUED	R744SQRC
REQUESTS*WAITING ON*HI PRTY QUEUE	R744SHTO
REQUESTS*WAITING ON*LO PRTY QUEUE	R744SLTO
TIMES CF*REQUEST FAILED*DUE TO PATH BUSY	R744FPBC
TOTAL REQUESTS*FROM THIS*SYSTEM	R744FTOR

Special THANKS TO .....

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BARBARA WEILER – IBM

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- System z Parallel Sysplex Best Practices
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- z196 PR/SM Guide , z196 Technical Guide
- Previous SHARE prezentations – Parallel Sysplex Update and many more...
- IBM WSC Papers & Flashes
- System 390 Parallel Sysplex Performance
- www.research.ibm.com
- https://www-304.ibm.com/servers/resourcelink/svc03100.nsf?Opendatabase
- IBM XES Related APARs – Really Good Information in APARs.
- www.freepatentsonline.com - For Understanding Alternatives At Least

MORE INFORMATION & BACKUP SLIDES

RMF REPORT SAMPLES

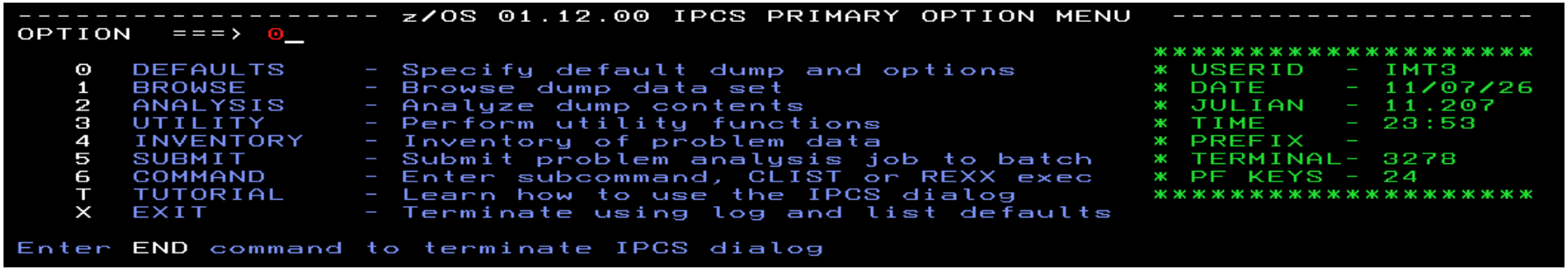
RMF Report Sample JCL * CF report

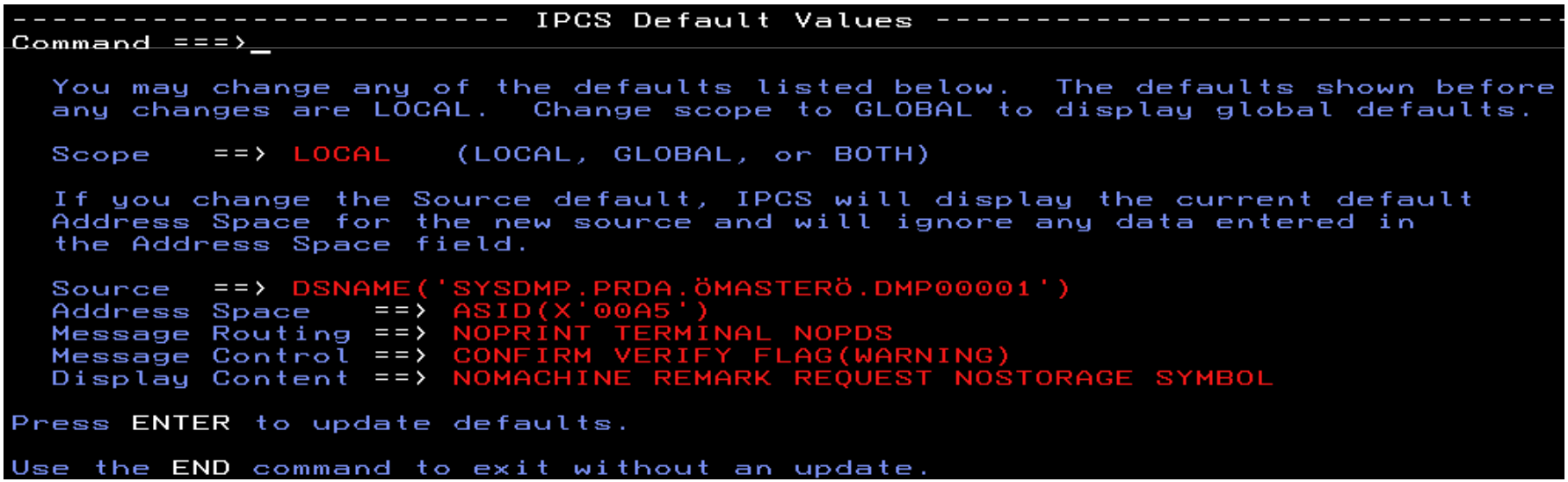
```
//SMT1RMF  JOB  MSGCLASS=X,CLASS=S,NOTIFY=&SYSUID,
//DUMPSMF  EXEC PGM=IFASMFDP,REGION=1M
//DUMPIN   DD  DSN=SYS3.SMF.PRDA.MVSARC2,DISP=SHR
//DUMPOUT  DD  DSN=&&DO,DISP=(NEW,CATLG),
//         SPACE=(CYL,(500,10)),DCB=(LRECL=137,RECFM=VBA,BLKSIZE=1693)
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
  INDD(DUMPIN,OPTIONS(DUMP))
  OUTDD(DUMPOUT,TYPE(70:79))
  START(1000)
  END(1015)
/*
//SORTSMF  EXEC PGM=SORT
//SORTIN   DD  DSN=&&DO,DISP=(OLD,DELETE)
//SYSOUT   DD  SYSOUT=*
//SORTOUT  DD DSN=&&SO,DISP=(,PASS),UNIT=SYSDA,
//         SPACE=(CYL,(5,10))
//SORTWK01 DD   SPACE=(TRK,200),UNIT=SYSDA
//SORTWK02 DD   SPACE=(TRK,200),UNIT=SYSDA
//SORTWK03 DD   SPACE=(TRK,200),UNIT=SYSDA
//EXITLIB  DD  DSN=SYS1.SERBLINK,DISP=SHR
//SYSIN    DD *
  SORT FIELDS=(11,4,CH,A,7,4,CH,A),EQUALS
  MODS E15=(ERBPPE15,36000,,N),E35=(ERBPPE35,3000,,N)
/*
//POSTRMF  EXEC PGM=ERBRMFPP,REGION=32M
//MFPINPUT DD  DSN=&&SO,DISP=(OLD,DELETE)
//MFPMSGDS DD SYSOUT=*
//PPRPTS   DD SYSOUT=*
//SYSIN    DD  DDNAME=SREP
//SREP     DD  *
  SYSRPTS(CF)
  RTOD(0000,2359)
  STOD(0000,2359)
  DINTV(0015)
  SYSOUT(X)
  SUMMARY(INT,TOT)
```

How To Find Out MWASDT Using IPCS

How To Find Out MWASDT Using IPCS

Select 0 ‘Defaults’ To Update Dump Dataset





How To Find Out MWASDT Using IPCS

Select 2 ‘Analysis’ And Then 6 ‘Component’

```
------------------- IPCS MVS ANALYSIS OF DUMP CONTENTS -------------------------

To display information, specify the corresponding option number.

    1   SYMPTOMS     - Symptoms                                  **********************
    2   STATUS       - System environment summary                * USERID   - IMT3
    3   WORKSHEET    - System environment worksheet              * DATE     - 11/07/26
    4   SUMMARY      - Address spaces and tasks                  * JULIAN   - 11.207
    5   CONTENTION   - Resource contention                       * TIME     - 23:54
    6   COMPONENT    - MVS component data                        * PREFIX   -
    7   TRACES       - Trace formatting                          * TERMINAL- 3278
                                                                 * PF KEYS  - 24
                                                                 **********************
Enter END command to terminate MVS dump analysis.
```

```
------------------- IPCS MVS DUMP COMPONENT DATA ANALYSIS ----------------

To display information, specify ÚSÚ option nameÚ or enter S to the left
of the option desired.  Enter ? to the left of an option to display
help regarding the component support.

S Name       Abstract
_ NUCMAP     Nucleus CSECT Map
_ OAMDATA    OAM Control Block Analysis
_ OMVSDATA   OpenMVS analysis
_ RACFDATA   RACF control block analysis
_ RESOLVER   TCP/IP Resolver Analysis
_ RMMDATA    RMM Control Block Analysis
_ RMMPDA     RMM PDA Trace Analysis
_ RSMDATA    Real storage manager summary
_ SADMPMSG   Format SADMP console messages
_ SMSDATA    SMS control block analysis
_ SMSXDATA   SMSX Control Block Formatter
_ SRMDATA    SRM control block analysis
_ SSIDATA    Subsystem Interface analysis
_ STRDATA    Coupling Facility Structure Data
_ SUMDUMP    Format summary dump data
_ SYMDEF     Static Symbol Table Formatter
_ SYMPTOMS   Format symptoms
_ SYSTRACE   Format system trace
_ TCPIP      Tcp/Ip Dump Analysis
_ TCPIPCS    TCP/IP Analysis
_ TSODATA    TSO analysis
_ VLFDATA    Virtual Lookaside Facility data
_ VLFTRACE   Virtual Lookaside Facility trace
_ VSMDATA    VSM control block analysis
_ VTAM       Vtam Dump Analysis
_ VTAMMAP    VTAM control block analysis
_ WLMDATA    Work load manager data
S XESDATA    XES analysis
********************************* END OF LIST *********************************
```

How To Find Out MWASDT Using IPCS

Select ‘Detail’ And Then ‘S’ Command

```
------------------------- IPCS - XESDATA SUBCOMMAND ---------------------
SELECT OPTION ===>

 Select zero or more levels of detail. Default is SUMMARY reporting.
   _  SUMMARY          _  EXCEPTION      *  DETAIL

 Select zero or more report types. Default is ALL report types.
   _  CONNECTION       _  FACILITY       _  CACHE          _  LOCKMGR
   _  XESSTACK         _  LIST           _  LOCKRESOURCE   _  LOCK

 Select zero or more filtering options. Default is NO filtering.
 Filters that do not apply to a given report will be ignored.
 Additional filtering selection menus may be presented:
   _  ASID             _  HASHVALUE      _  SYSNAME        _  REQUESTORCONID
   _  RNAME            _  TARGETNAME     _  STRNAME        _  REQID
   _  SOURCENAME       _  CONNAME        _  CFNAME         _  LISTNUM
   _  JOBNAME          _  LTENTRY        _  LOCKMGRCONID

 XESDATA DETAIL

  S = START XESDATA subcommand.
  R = Reset all panel variables.
  END = Terminate XESDATA subcommand.
```

```
IPCS OUTPUT STREAM ------------------------------------------------- Line 0
 ********************************* TOP OF DATA ***********************
    *****  XESDATA (CROSS-SYSTEM EXTENDED SERVICES) REPORT  *****

 Options list:
     Report(s)..............  CONNECTION
                              XESSTACK
                              LOCKRESOURCE
                              LOCKMGR
                              FACILITY
                              LIST
                              CACHE
                              LOCK
     Level(s) of detail.....  DETAIL
     Filter(s) in use.......  NONE

 Sysplex name...............  PPLEX
 System name................  PRDA

 Facility name..............  PCF1GAR1
     Structure name.........  IXCSIG1
        ASID................  X'0006'
           Connection name..  SIGPATH_06000302
     Structure name.........  IXCSIG11
        ASID................  X'0006'
           Connection name..  SIGPATH_06000302
```

How To Find Out MWASDT Using IPCS

Sample MWASDT 31 microseconds For PCF1GAR1

```
Queued Request Information:

    Facility Name..................... PCF1GAR1
       Low Priority Work Queue
          Number of Queued Requests... 0                    (decimal)
          Total Number of Requests.... 305193               (decimal)
          Time of Last Queued Request. 07/23/2011 22:20:04.270891
       High Priority Work Queue
          Number of Queued Requests... 0                    (decimal)
          Total Number of Requests.... 2429                 (decimal)
          Time of Last Queued Request. 07/23/2011 22:12:04.078669

Moving Weighted Average Subchannel Delay Time (MWASDT) Information:

    Refresh Counter.................. 2                    (decimal)
    Refresh Limit.................... 250                  (decimal)
    Queued Count..................... 2777                 (decimal)
    Total Count...................... 2882                 (decimal)
    MWASDT (in microseconds)......... 31                   (decimal)

Sync/Async Heuristics Data
--------------------------

Simplex Requests:

  OpCode Acronym    Size    ReqCount ConvReqCount  Avg Svc Time
 ------------------------------------------------------------
    0301     ALST    0- 0           0            0           41
    0303     RLSC    0- 0           0            0           18
    0303     RLSC    1- 1           0            0           18
    0304     RLC     1- 1       27036            0           15
    0305     WLC     0- 0        4837            0           13
    0306     ALSU    0- 0           0            0           14
    0307     DLSU    0- 0           0            0           20
    0308     RLM     0- 0     4447777       391000           25
```

How To Find Out MWASDT Using IPCS

Sample MWASDT 6 microseconds For PCF1GAR1

```
Queued Request Information:

    Facility Name..................... PCF1GAR1
        Low Priority Work Queue
            Number of Queued Requests... 0                  (decimal)
            Total Number of Requests.... 0                  (decimal)
        High Priority Work Queue
            Number of Queued Requests... 0                  (decimal)
            Total Number of Requests.... 0                  (decimal)

    Facility Name..................... PCF2GAR2
        Low Priority Work Queue
            Number of Queued Requests... 0                  (decimal)
            Total Number of Requests.... 115497             (decimal)
            Time of Last Queued Request. 07/23/2011 21:41:39.330957
        High Priority Work Queue
            Number of Queued Requests... 0                  (decimal)
            Total Number of Requests.... 21                 (decimal)
            Time of Last Queued Request. 07/22/2011 07:43:06.658744

Moving Weighted Average Subchannel Delay Time (MWASDT) Information:

    Refresh Counter.............. 0                        (decimal)
    Refresh Limit................ 250                      (decimal)
    Queued Count................. 0                        (decimal)
    Total Count.................. 7                        (decimal)
    MWASDT (in microseconds)..... 6                        (decimal)

Sync/Async Heuristics Data
--------------------------

Simplex Requests:

  OpCode Acronym    Size    ReqCount ConvReqCount  Avg Svc Time
 ------------------------------------------------------------
    0301     ALST     0- 0           0             0              30
    0303     RLSC     0- 0           0             0              29
```

GT Structure Distribution – 2 CFs

GT Parallel Sysplex Configuration - CFs & Structures

PCF1GAR1

DSNPD01_LOCK1	DSNPD01_GBP0	RLS_APL2
DSNPD01_SCA	DSNPD01_GBP1	RRSSTR1
DSNPDRM_GBP0	DSNPD01_GBP16K0	SYSTEM_OPERLOG
DSNPDRM_GBP1	DSNPD01_GBP16K1	SYSZWLM_0E162817
DSNPDRM_GBP2	DSNPD01_GBP2	LOG_DFHLOG_WUI
DSNPDRM_GBP8K0	DSNPD01_GBP21	LOG_DFHSHUNT_WUI
DSNPDRM_LOCK1	DSNPD01_GBP22	PQS1CSQ_ADMIN
DSNPDRM_SCA	DSNPD01_GBP23	PQS1OLASTR
EZBEPORT	DSNPD01_GBP24	PQS1SMSSTR
HSA_LOG	DSNPD01_GBP31	PQS1SYSPSTR
HZS_HEALTHCHKLOG	DSNPD01_GBP32	DSNPD01_GBP5
IBMBDG	DSNPD01_GBP32K	DSNPD01_GBP6
IXCSIG1	DSNPD01_GBP33	DSNPD01_GBP7
IXCSIG11	DSNPD01_GBP34	DSNPD01_GBP8K0
IXCSIG2	IXCSIG21	IXCSIG4
IXCSIG7		

GT Parallel Sysplex Configuration - CFs & Structures

PCF2GAR2

DSNPDRM_GBP0	IXCSIG5	SYSZWLM_0E262817
DSNPDRM_GBP1	IXCSIG6	TOPSTR1
DSNPDRM_GBP2	PQS1APPLSTR	CKPT1
DSNPDRM_GBP8K0	PQS1FFMCSTR	DFHNCLS_PRODNC1
EZBEPORT0111	PQS1FFMDSTR	DFHXQLS_PRODTSQ1
EZBEPORT0113	PQS1LOGOSTR	DSNPD01_GBP0
IGWLOCK00	PQS1OTPSTR	DSNPD01_GBP1
ISGLOCK	PQS1UTLSTR	DSNPD01_GBP16K0
ISTGENERIC	RLS_APL1	DSNPD01_GBP16K1
IXCSIG3	SYSARC_HSMPP_RCL	DSNPD01_GBP2
IXCSIG31	SYSIGGCAS_ECS	DSNPD01_GBP21
DSNPD01_GBP33	DSNPD01_GBP31	DSNPD01_GBP22
DSNPD01_GBP34	DSNPD01_GBP32	DSNPD01_GBP23
DSNPD01_GBP5	DSNPD01_GBP32K	DSNPD01_GBP24
DSNPD01_GBP6	DSNPD01_GBP7	DSNPD01_GBP8K0