Sysplex Migration Analysis Using zCP3000

New Features in zCP3000 November 2014

Abstract

November 2014 new support for modelling configuration changes, including Thin Interrupt.

Gretchen Frye

frye@us.ibm.com

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Sysplex Migration Analysis using zCP3000

zCP3000 is a tool available to IBMers and entitled Business Partners to do performance analysis and capacity planning. This document describes changes made in the November 2014 version of zCP3000, and how they can help the modeler evaluate the effect of configuration changes on sysplex performance.

There are several ways to evaluate the effect of configuration changes in zCP3000:

- In PA (Performance Analysis, yellow background), you can define alternate processors for each CPC and see the difference from the current configuration, but you cannot move partitions or change any sysplex features (ie, linktype).

- In QM (Quick Migration, pink background), you can define alternate machine types, define a new CPC, move partitions around, move CF structures, and you can change several sysplex features, but you cannot specify growth over time, and you cannot move/split a z/OS workload to a different partition.

- In CP (Capacity Planning, green background), you can define new CPCs and alternates, grow workload over time, move partitions and move/split workloads, change the coupling link type, and move structures, however you cannot change the CF dispatch mode, and the accuracy of the structure service time model decreases with each change made, because it is no longer based on the original SMF metrics.

For that reason, if the primary purpose of the study is to look at CF link migration or CF Thin Interrupt dispatch mode, you should use QM (Quick Migration) mode (Figure 1. Go To QM Mode from the main zCP3000 window.).

Two key reports in QM mode that you will want to look at are the CFQ100 CF Migration Summary report, available from the CF window, and the CFQL001 CF Link Migration Summary, available from the CF Link window. The CFQ100 report has sections on the CF partition detail:

Sysplex ISPLEXP Coupling Facility PRODCF2		
	Configuration Before Migration	Configuration After Migration
CF Machine Type:	2097-710	2827-701
Lpar Utilization	16.5%	9.7%
Engines	(1.0) ICF	(1.0) ICF
Dynamic Dispatch	Off (Polling)	Thin Interrupt
Relative Share	Dedicated Engines	90.0%
Effective #engines:	1.0	0.9
CFCC Busy	16.5%	10.7%

As well as partition information for all coupling facilities and members of the sysplex:

Sysplex ISPLEXP Configuration After Migration							
	CECID	Model	Partition	SCP Level	Logical Engines	Relative Weight	Engine Type
PRODCF2	newCec	2827-701	PRODCF2	16	1	90.0%	ICF
PRODCF1	CPC7C8B5	2097-714	PRODCF1	16	1	Dedicated Engines	ICF
SYSA	CPC7C8B5	2097-714	PROD1	ZV011100	10	61.0%	GCP
SYSB	CPC7C8C5	2097-710	PROD2	ZV011100	6	39.1%	GCP

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SYSY	CPC7C8B5	2097-714	PROD3	ZV011100	5	33.9%	GCP
SYSZ	CPC7C8C5	2097-710	PROD4	ZV011100	4	38.1%	GCP

Along with before and after information about the coupling links:

Sysplex ISPLEXP Configuration After Migration						
SYSID	Reqs/sec	CHPIDs	SubChannels:	Link Type:	KM	Link Utilization
SYSA	20,465.4	2	14	IFB-12x	0.0	3.6%
SYSB	10,318.4	2	14	IFB-12x	0.0	1.3%
SYSY	1,941.3	2	14	IFB-12x	0.0	0.3%
SYSZ	2,207.5	2	14	IFB-12x	0.0	0.3%

And information about the effect of the migration on key structures on the CF:

Structures	Type	Duplexed?	Reqs/sec	Configuration Before Migration		Configuration After Migration	
				%Sync	Service Time	%Sync	Service Time
IMSP_VSAM	CACH	No	25,974.6	100.0%	7.5	100.0%	17.6
DSNPR0B_GBP2	CACH	Yes	2,528.7	98.3%	10.1	98.3%	22.3
IXCSTR4	LIST	No	2,250.0	0.0%	28.8	0.0%	61.5
IXCSTR2	LIST	No	1,488.0	0.0%	29.6	0.0%	61.7
DSNPR0B_GBP8K0	CACH	Yes	907.7	96.4%	13.9	96.4%	23.0

The CFQL001 CF Link Migration Summary has similar, link-related information, but with service time information specific to that link, not weighted over all links as in the CFQ100 report.

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Cookbook Steps for Sysplex Migration Analysis

So let's get started: to get to QM mode from the main zCP3000 window, after loading EDF files or a 3PA input file, select View->Go To Quick Migration.
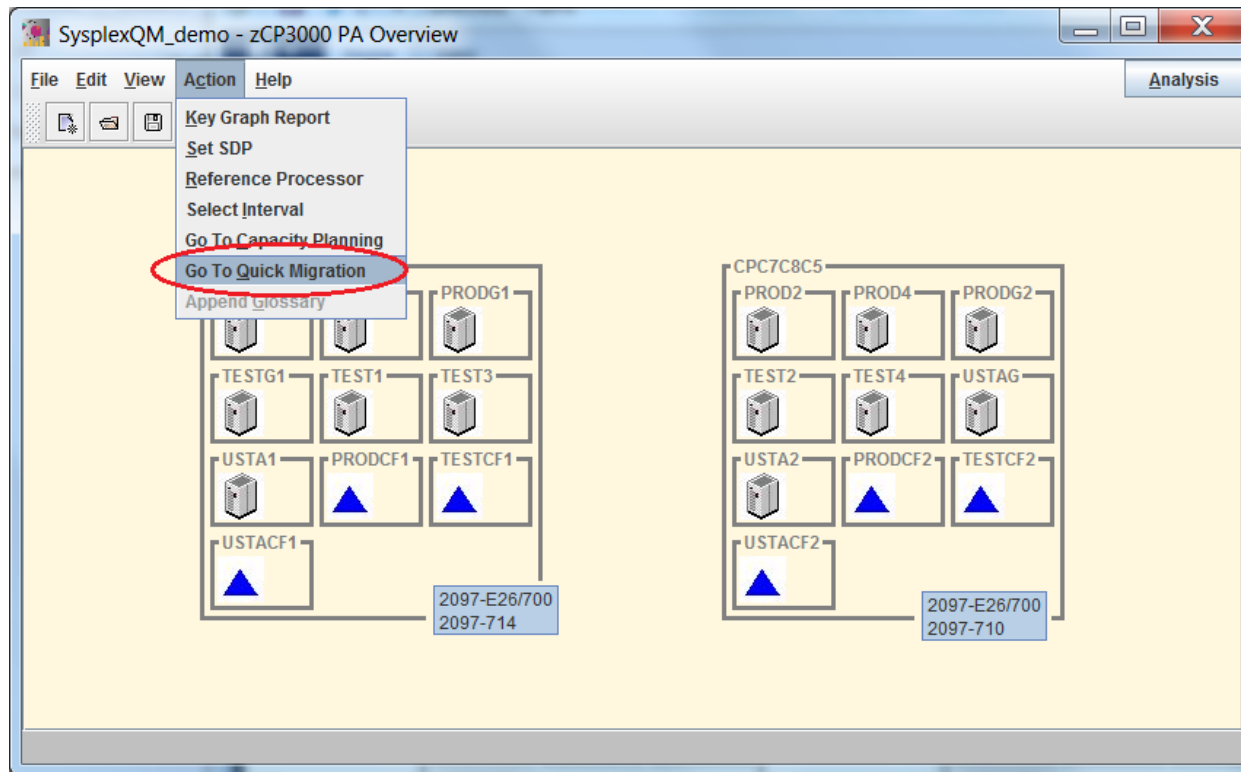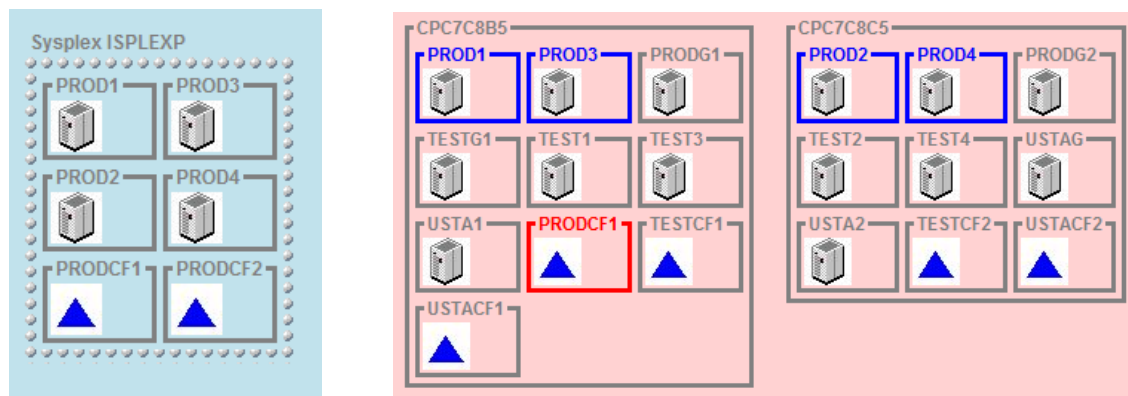

Figure 1. Go To QM Mode from the main zCP3000 window.

Remember, you can use menu option View->Sysplex Logical to view just the sysplex members and coupling facilities, or you can see the connections highlighted by clicking on any CF or z/OS member of the sysplex (PROD1-4).

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Double click on a CF to see more detail. If SMF data was collected for that CF, you will see the CF Summary window. Click on column headers to sort. Double click on a link or structure to see more detail about that. Click the Analysis button for a list of graphs.

	PRODCF2: Coupling Facility QM Summary						— ☐ ✕

View Action   **Analysis**

CF Name: PRODCF2
Sysplex Name: ISPLEXP   Peer Name: PRODCF1
CF Machine Type: 2097-710   CF Machine Type: 2097-714
CF Level: 16   CF Level: 16
Lpar Utilization 16.5%   Storage Defined: 11,937 mb
Engines (1) ICF   Dump Storage: 4 mb
                                                        Storage Available: 5,930 mb
Dynamic Dispatch Off (Polling) ▼
Relative Share Dedicated Engines

EDF data missing for at least one sysplex member.

Partition	SYSID:	Reqs/sec	SubChann...	CF Links:	Link Type:	Km	Link Utiliza...
CPC7C8B...	SYSA	20,465.4	14	2	ICB-4	0.0	1.7%
CPC7C8C...	SYSB	10,318.4	14	2	IC	0.0	0.6%
CPC7C8B...	SYSY	1,941.2	14	2	ICB-4	0.0	0.5%
CPC7C8C...	SYSZ	2,207.5	14	2	IC	0.0	0.2%

CF Study Interval 4/2/13 11:00 ▼

Structure	Type	Size	Reqs/sec ▼	Duplexed?
IMSP_VSAM	CACH	125	25,974.6	☐
DSNPR0B_GBP2	CACH	98	2,528.7	✔
IXCSTR4	LIST	9	2,250.0	☐
IXCSTR2	LIST	9	1,488.0	☐
DSNPR0B_GBP8K0	CACH	55	907.7	✔
more structures not shown				
IMSP_V_KOR00T0...	CACH	912	0.5	☐
RRS_RESTART_1	LIST	17	0.4	☐
DSNPR0B_GBP16	CACH	25	0.4	✔
43 Structures	Totals		34,932.6	6 duplexed

                                                              Cancel   Apply

WARNING: EDF data missing for at least one sysplex member.

Figure 2. CF Summary Window.

Change the machine type and coupling link type

When you move a coupling facility to a new machine, the service times to structures on that CF will be re-calculated, because the engine speed of a zEC12 is faster than the old z10 machine type, and the request can be expected to complete more quickly. **Step one**, add the new machine.
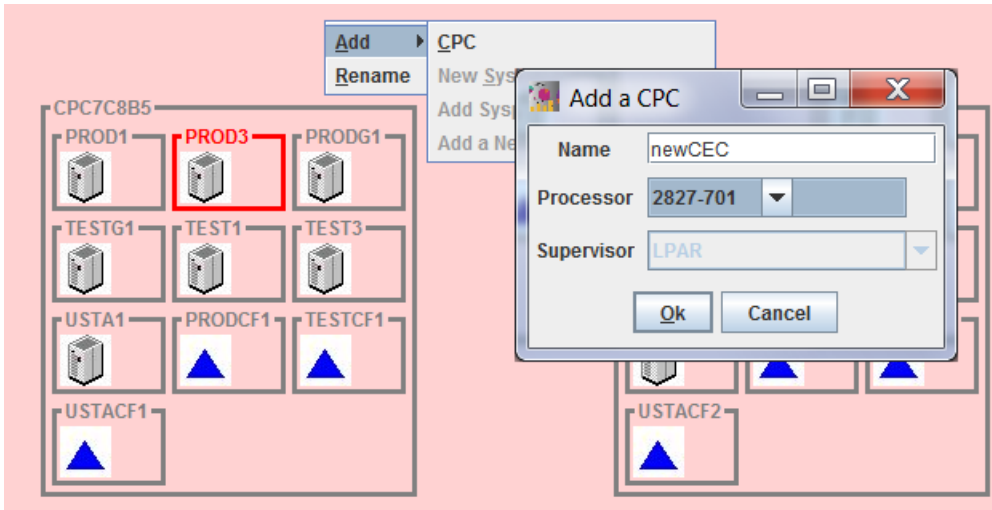
The new CPC will have an error flag on it, since it is empty. **Step 2**, click and hold PRODCF2 then drag and drop it onto the new CPC, then do the same for TESTCF2. The process of moving will recalculate CF service times, so if you need to undo this, use the Edit->Undo button, don't just move it back (which would recalculate service times again, instead of restoring them to what they were).
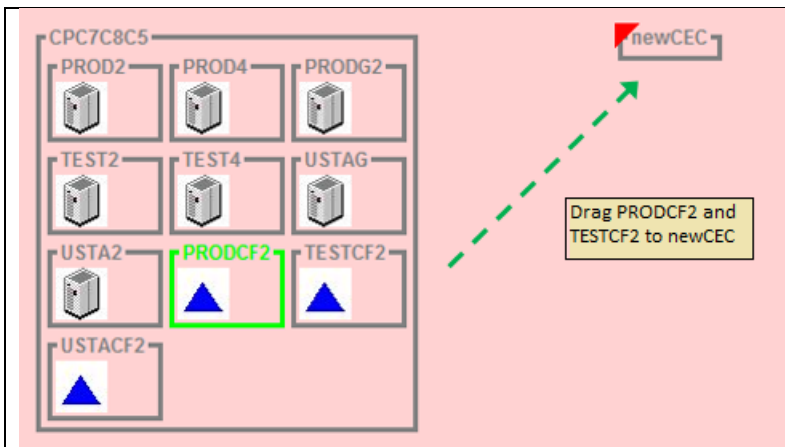

Figure 3. Error due to empty CPC

The new CPC will still be marked in error because the definition needs to change to accommodate the partitions that just moved there.
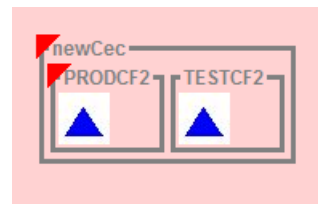

Figure 4. CEC Definition needs to be fixed on new CPC.

Figure 5. Service times are recalculated when you move the CF.

Step 3, right click on an empty area of newCEC and select the "Definition" option to fix the CPC definition (Figure 6. Partition definition for the new CPC). We need to change several things here:

- Define 1 physical ICF engine in the top half of the screen, then right click and apply that change to all intervals ("All Field").
- For PRODCF2, keep the one ICF engine, as it was on the 2097, but define the weight as 90. Right click and apply that change to all intervals ("All Field").
- For TESTCF2, keep the one ICF engine but define the weight as 10. Right click, "All Field".
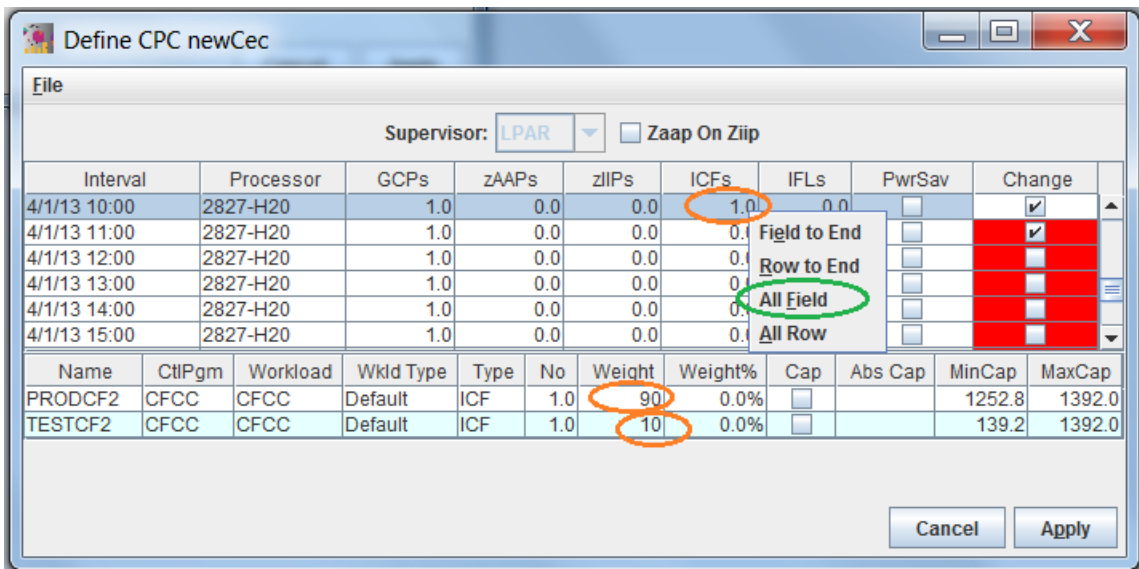- Apply.

Figure 6. Partition definition for the new CPC

Step 4, upgrade the coupling links. The current z10 configuration uses ICB4 links, so once PRODCF2 was moved to a zEC12, those ICB4 links became invalid. The IC links are also invalid because the CF no longer resides on the same machine with SYSB and SYSZ. When you upgrade the links, the service time for requests running over those links will be recalculated. Double click an invalid link to see detail. In QM mode, you see both the original configuration, when measurements were taken, as well as the configuration as it currently is in the model. When you click "Upgrade Link", the following things happen:

- The "current" config fields will be enabled for changes to the linktype, chpids, and distance. Only linktypes valid for the current configuration will be listed, so the ICB4 linktype will be dropped from the linktype drop down, and the first valid linktype will be selected.
- A 3rd column, "Estimated" is added to the results area, which will show the estimated service time and request rates for the linktype selected. "Average" service time is a weighted average of sync and async, which will be affected not only by the service time change, but also by the percentage of requests running synchronously (because a request running asynchronously *always* has a longer service time than the same request running synchronously).

Unlike in CP mode, you will need to apply the linktype change before seeing a detail report on the change. The Analysis button on the Edit CF Link Type window is enabled only when the current configuration is valid.

PRODCF2 : SYSA : Edit CF Link Type

Analysis

Sysplex Name	ISPLEXP	Machine Type	
SYSID	SYSA	2097-714	
CF Name	PRODCF2	2827-701	
CF Study Interval	2013-04-02 11:00:0…		

Link Configuration

	Configuratio…	Upgrade
Machine Type	2097-701	2827-701
Link Type	ICB-4	IFB-12x ▼
Minimum ad...	2	2
Chpids	2	2
Subchannels	14	14
Distance(km)	0.0	0.0

Shared Links   ⦿ Chpids ○ Adapters

Shared-L	Chpids	SYSID
✔	2	SYSA

Utilization	Before	Current	Estimated
CF	16.5%	9.7%	9.7%
Sysid	60.3%	87.1%	60.3%
Subchannel	1.7%	2.0%	2.7%

Requests/sec	Before	Current	Estimated
Sync	18,476.76	18,749.36	18,476.52
Async	1,988.67	1,716.07	1,988.91
Total	20,465.43	20,465.43	20,465.43

Service Time (usec)	Before	Current	Estimated
Sync	9.05	10.75	15.2
Async	32.58	47.98	51.93
Average	11.33	13.87	18.77

Cancel   Apply

Step 5, repeat for all other invalid links. Until the new configuration is valid (including all links and the cec definitions), several graphs on the CF window are disabled.

Thin Interrupt Support

There are currently two reports (CF1027 and CF1028) available in CP mode that estimate service time for the current machine and alternates if it were using shared engines and thin interrupt instead of dedicated engine(s). These reports are available now also in QM mode, but additionally, you can actually change the dispatch mode in QM mode and compare the estimated service time to the original configuration (before changing the machine type, link type, and dispatch mode).

To see the effect of multiple changes compared with the original, measured configuration, you must use QM mode (pink background), not CP mode (green background). Once the CF link and CEC definitions are valid, then you can change the dispatch type to Thin Interrupt. To do this,

1. Make sure the CF is on Thin Interrupt capable hardware: zEC12 or zBC12 and above.
2. Make sure the LPAR definition for the CF partition does *not* specify dedicated engines. There does not actually have to be another CF sharing the engines.
3. The coupling links do not have to be valid to change the dispatch mode, but you will not be able to see any relevant reports showing the service time change until the configuration is valid. It does not matter what order you make the changes in.

You must apply the change, and then use the CFQ100 CF Migration Summary report, available from the CF window, and or the CFQL001 CF Link Migration Summary to compare the current configuration, with Thin Interrupt, to the original, measured configuration (from PA mode).

References:

This document can be found, along with other cookbooks and technical documentation, attached to the zCP3000 download webpage at:

IBM Techdocs : http://w3-03.ibm.com/support/techdocs/atsmastr.nsf/WebIndex/PRS1772

IBM PartnerWorld : https://www-304.ibm.com/partnerworld/wps/servlet/ContentHandler/tech_PRS1865

Please join the zCP3000 discussion group at https://groups.google.com/forum/#!forum/zcp3000 for notice of changes to the tool.