Coupling facility level (CFLEVEL) considerations

To support migration from one coupling facility level to the next, you can run different levels of the coupling facility concurrently as long as the coupling facility LPs are running on different CPCs. CF LPs running on the same CPC share the same coupling facility control code EC level.

When migrating CF levels, lock, list, and cache structure sizes might need to be increased to support new function. The amount of space needed for the current CFCC levels must be determined by visiting the CFSizer tool.

CPC support for coupling facility code levels

The following table summarizes CPC support for the different coupling facility code levels.

CPC models	Coupling facility code level					
	Level 24	**Level 23**	**Level 22**	**Level 21**	**Level 20**	**Level 19**
8561 - z15™ T01 8562 - z15 T02	D41c ec P46603 mcl 006					
3907 z14®-ZR1		D36c ec P41419 mcl 008				
3906 z14		D36c ec P41419 mcl 008	D27i ec P08416 mcl 009	N/A	N/A	N/A
2965 z13s®			N/A	EC P08416 MCL 005	EC N98780 MCL 007	N/A
2964 z13®			N/A	EC P08416 MCL 005	EC N98780 MCL 007	N/A
2828- zBC12™			N/A	N/A	N/A	EC H49559 MCL 015

Notes:

1. Previous machine types that support the coupling facility are included for completeness and sysplex connectivity purposes.
2. The (Ver n.n.n) refers to the version of code installed in the Support Element. You can verify what version code you have by looking at the title bar on the Workplace window of your Support Element.
3. All MCLs cited in the table are current as of the publication date of this edition and can be superseded by later MCLs. The MCLs cited in the table are the latest service levels as of the current publication date of this edition. They do not necessarily reflect the minimum service level required for a particular CFLEVEL but rather the recommended service level. For the latest EC and MCL information, use the service support link to view the appropriate PSP bucket subset ID for hardware and software maintenance information.

Level 24 coupling facility

A level 24 coupling facility (CFLEVEL=24) provides the following enhancements:

- CFCC Fair Latch Manager2 improvements
- Message Path SYID Resiliency Enhancement
- Shared-Engine CF Default is changed to “DYNDISP=THIN"
- CF Monopolization Avoidance
- 384 Coupling CHPIDs per CPC

Level 23 coupling facility

A level 23 coupling facility (CFLEVEL=23) provides the following enhancements:

- Asynchronous cross-invalidate (XI) of CF cache structures
- Coupling Facility hang detect enhancements
- Coupling Facility ECR granular latching

Level 22 coupling facility

A level 22 coupling facility (CFLEVEL=22) provides the following enhancements:

- Notification Delay and Round Robin Support for List and Key-Range Monitoring
- CFCC Encryption Support
- CLTE Performance Enhancements
- Control/Release duplexing enhancements for Cache Structures
- CFCC dispatcher enhancements
- The ability to utilize specialized processors for bringing in new work and dispatching new work.

Level 21 coupling facility

A level 21 coupling facility (CFLEVEL=21) provides the following enhancements:

- Asynchronous CF duplexing for lock structures when CFLEVEL 21 is at service level 02.16 or higher.
- A CF Dump Reason Code added to the dump header when a CF non-disruptive dump is taken. This allows for a quick evaluation of why the dump was taken.
- The coupling facility will provide identifying information to the service processor similar to what other operating systems running in other logical partitions currently provide.

CPC Support: See Table 10 for a listing of the CPCs that support a level 21 coupling facility.
Software Corequisites: For a list of the software levels that use the function and levels that can coexist with CFLEVEL=21, see the “Summary of CFLEVEL Functions” section of the *z/OS® MVS™ Setting Up a Sysplex* document.

Level 20 coupling facility

A level 20 coupling facility (CFLEVEL=20) provides the following enhancements:

- ICA SR coupling link support
- CFCC processing scalability support
- 256 coupling CHPIDs per CPC support
- Support for up to 141 ICF processors per z Systems server
  - The maximum number of logical processors in a Coupling Facility Partition remains at 16.
- Large Memory Support
  - Improve availability/scalability for larger CF cache structures and data sharing performance with larger Db2® Group Buffer Pools (GBP).

  - This support removes inhibitors to using large CF structures, enabling use of Large Memory to appropriately scale to larger Db2 Local Buffer Pools (LBP) and Group Buffer Pools (GBP) in data sharing environments.
  - CF structure size remains at a maximum of 1 TB

CPC Support: See Table 10 for a listing of the CPCs that support a level 20 coupling facility.
Software Corequisites: For a list of the software levels that use the function and levels that can coexist with CFLEVEL=20, see the "Summary of CFLEVEL Functions" section of the *z/OS MVS Setting Up a Sysplex* document.

Level 19 coupling facility

A level 19 coupling facility (CFLEVEL=19) provides the following enhancements:

- Coupling Thin Interrupts
  - Improves the efficiency of environments where shared engines are used as Coupling Facilities. While dedicated engines continue to be recommended to obtain the best Coupling Facility performance, Coupling Thin Interrupts may help to facilitate the use of a shared pool of engines, helping to lower your hardware acquisition costs.
  - You may now experience Coupling Facility response time improvements or more consistent response times when using Coupling Facilities with shared engines. This may allow more environments with multiple Coupling Facility images to coexist in a server, and share Coupling Facility engines with reasonably good performance. The response time for asynchronous Coupling Facility requests may also be improved as a result of using Coupling Thin Interrupts on the z/OS host system, regardless of whether the Coupling Facility is using shared or dedicated engines.
- XI Detection
  - Cross-invalidate and list notification error detection Cross-invalidate (XI) and list notification (LN) signals sent by a coupling facility will now receive meaningful replies from the target systems that provide a secondary message exception code and additional diagnostics if the XI or LN experienced an error in its processing. The CF can take additional diagnostic steps like tracing relevant data and/or marking the structure damaged and taking a non-disruptive structure dump.
- Coupling facility flash exploitation
  Coupling facility flash provides a way to get high total storage capacity for a CF structure without needing to define excessively large amounts of structure real memory. Coupling facility flash also provides resiliency and capacity in the event of such backups.
  - Initial coupling facility flash exploitation is targeted for MQ shared queues application structures. It provides standby capacity to handle MQ shared queue buildups during abnormal situations, such as where *putters* are putting to the shared queue, but *getters* are transiently not getting from the shared queue. Flash memory in the CEC is assigned to a CF partition through hardware definition panels, just like it is assigned to the z/OS partitions. The CFRM policy definition permits the desired maximum amount of Flash memory to be used by a particular structure, on a structure-by-structure basis. Structure size requirements for real memory get somewhat larger at initial allocation time to accommodate additional control objects needed to make use of Flash memory. The CFSIZER's structure recommendations take these additional requirements into account, both for sizing the structure's Flash usage itself, and for the related real memory considerations.

Important: CF structures allocated in a CFLEVEL 19 coupling facility might need to be significantly larger than in previous CFLEVELs, in order to be allocated with a similar number of usable structure objects. It is highly recommended to use the CFSizer tool.

CPC Support: See Table 10 for a listing of the CPCs that support a level 19 coupling facility.

Software Corequisites: For a list of the software levels that use the function and levels that can coexist with CFLEVEL=19, see the "Summary of CFLEVEL Functions" section of the *z/OS MVS Setting Up a Sysplex* document.

Level 18 coupling facility

A level 18 coupling facility (CFLEVEL=18) provides the following enhancements:

- CF cache write-around support for performance enhancement. Db2 can use a conditional write
- command during batch update/insert processing to decide which entries should be written to the GBP caches and which entries should be written around the cache to disk.
- CF cache registration attachment validation for error detection.
- CF large structure testing capability.
- CFCC non-disruptive coupling facility dumping support, for improved coupling facility serviceability
- CF structure expansion/contraction/reapportionment performance enhancement for list and cache structures
- Increase in the maximum number of CF structure instances (SIDs) per CF image from 1023 to 2047
- Support for greater than 32 connectors to a CF list/lock structure
- Increase in the number of coupling CHPIDs that can attach to a CF image from 64 to 128

Important: CF structures allocated in a CFLEVEL 18 coupling facility might need to be significantly larger than in previous CFLEVELs, in order to be allocated with a similar number of usable structure objects. It is highly recommended to use the CFSizer tool.

CPC Support: See Table 10 for a listing of the CPCs that support a level 18 coupling facility.
Software Corequisites: For a list of the software levels that use the function and levels that can coexist with CFLEVEL=18, see the "Summary of CFLEVEL Functions" section of the *z/OS MVS Setting Up a Sysplex* document.

Level 17 coupling facility

A level 17 coupling facility (CFLEVEL=17) provides the following enhancements:

- CF cache write-around support for performance enhancement. Db2 can use a conditional write
- command during batch update/insert processing to decide which entries should be written to the GBP
- caches and which entries should be written around the cache to disk.
- CF cache registration attachment validation to protect against lost cross-invalidate signals.
- CFCC non-disruptive coupling facility dumping support, for improved coupling facility serviceability.

Additional capabilities for the CFCC non-disruptive dumping support are provided to allow for capturing and collecting extended diagnostic structure data from CF structures that have encountered an error that are non-disruptive and performed in the background.

- CF structure expansion/contraction/reapportionment performance enhancement for list and cache structures
- Increase in the maximum number of CF structure instances (SIDs) per CF image from 1023 to 2047
- Support for greater than 32 connectors to a CF list/lock structure
- Increase in the number of coupling CHPIDs that can attach to a CF image from 64 to 128

Important: CF structures allocated in a CFLEVEL 17 coupling facility might need to be significantly larger than in previous CFLEVELs, in order to be allocated with a similar number of usable structure objects. It is highly recommended to use the CFSizer tool.

CPC Support: See Table 10 for a listing of the CPCs that support a level 17 coupling facility.
Software Corequisites: For a list of the software levels that use the function and levels that can coexist with CFLEVEL=17, see the "Summary of CFLEVEL Functions" section of the *z/OS MVS Setting Up a Sysplex* document.

For more information about Parallel Sysplex®, visit the website.