

Continuous Delivery with IMS: IMS Function Level Overview

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IMS Continuous Delivery

- Why?
 - 2+ years wait for new IMS enhancements that sometimes did not deliver exactly what customers wanted
 - Risk of new enhancement SPEs destabilizing customer IMS systems
 - Having to restart or sometimes cold start IMS to enable a new function
- Our response
 - Move towards continuous delivery of small, usable pieces of function
 - Introduce IMS Function Level as the first step in the journey

IMS Function level Activation Control

- IMS 15 with APAR/PTF PI83839/UI52153, introduced the ability to dynamically enable or disable new IMS functions that are delivered as PTFs under the IMS continuous delivery model without an IMS system outage.
- After a new IMS function is installed, you control when to enable and disable the function by using the UPDATE IMSFUNC command.
- Some IMS functions, due to either technical or strategic requirements or because it has no impact until you choose to use it, are enabled by default after you install the PTF.
- For functions that are enabled by default, you do not need to issue any command to start using the enhancement.

IMS Function level Activation Control

- Use the QUERY IMSFUNC command to display one, more or all of the IMS functions that are defined in the IMS function table and information about the functions.
- Also use the QUERY IMSFUNC command to see the current IMS function level
- Alternatively, you can enable the new function statically by defining the parameter for the function in the DFSDFxxx member of the IMS PROCLIB data set and cold starting IMS.

IMS Continuous Delivery mechanics

- Continuous delivery of IMS enhancements consists of a:
 - Process
 - IMS Function Level
 - IMS Function Table
 - IMS Functions Enabled Bitmap
 - Potentially a function enabling / disabling command

The Process

- The Process follows a set of structured decisions
 - Every new function evaluated to determine whether it can be enabled with a command
 - Every new function evaluated to determine whether it can be disabled with a command
 - New function is delivered in smaller, usable pieces in a PTF when ready
 - Pre-conditioning PTF(s) are only when necessary (migration/coexistence)
 - New function PTF can be applied to systems in a rolling migration
 - macro changes, non-OCO code changes and specifications are delivered to vendors & sponsor user early in the development cycle

IMS Function Level

- Put simply, is a number that identifies the PTF that contains the new function delivered
 - format is LLLLLLLL in hexadecimal (4 bytes)
 - shown in enabled function bitmap, log records and dumps as hexadecimal and in messages and command output as decimal
 - First function level is x'00000001'
 - Maximum function level is x'7FFFFFFF' = 2,147,483,647
 - Increments by 1
 - Increments by x'100' for new IMS version or release, to allow new functions to be added at the previous version or release level
- A function that pre-requisites a function at a previous function level pre-requisites the function itself, not the function level

IMS Function Level

- IMS Function Level is incremented by 1 by a PTF containing one or more of the following types of IMS enhancements:
 - Significant new or changed function
 - Infrastructure changes
 - Optional function is changed to be enabled by default
 - Function that is no longer supported
 - Large or complex fix

IMS Function Table (DFSFNCT0)

- Defines current IMS function level and significant IMS functions delivered by IMS henceforth
- Defined in the IMS RESLIB as OCO module DFSFNCT0 mapped by macro DFSFNCT
- Contains the following information about significant new or changed IMS functions delivered by IMS
 - Function name (up to 16 characters)
 - IMS function level where function was introduced
 - Bits that indicates whether function can be dynamically enabled or disabled
 - Bit that indicates that function must be enabled on all IMSs at the same time
 - Bits that indicate function not supported for DBCTL or DCCTL

IMS Functions Enabled Bitmap (DFSFNCE)

- Defines enabled IMS functions delivered by IMS disabled by default
 - Includes bitmap length
 - Includes current IMS function level
 - Has a bit for each function delivered disabled by default
 - Set if function is enabled
 - Reset if function is disabled
 - Defines function name associated with each bit
- Built when IMS initializes from IMS function table and PROCLIB member parameter definitions
- Bits in bitmap are checkpointed
- Bitmap can be passed to user exits

IMS Function Levels – conceptually

IMS Function level	APAR/P TF	Function Name	Can Enable	Can Disable	Enabled by default	Global	DBCTL	DCCTL	Batch	Description
00000001	PI83839/ U1zzzzz	FUNCTIONLEVEL	N	N	Y	N	Y	Y	Y	Introduce IMS function level, IMS function table, and DFS4878I restart message that indicates current function level
00000002	Plyyyyy/ U1zzzzz	NEWFUNCTION2								To Be Done
00000003	Plyyyyy/ U1zzzzz	NEWFUNCTION3								To Be Done
00000004	Plyyyyy/ U1zzzzz	NEWFUNCTION4								To Be Done

IMS Function Levels – deployed

IMS function level	APAR/PTF	Function name	Can be enabled	Can be disabled	Enabled by default	Must be applied globally	DBCTL	DCCTL	Batch	Activation bits	New function description
00000001	PI83839/ UI52153	FUNCTIONLEVEL	N	N	Y	N	Y	Y	Y	Not applicable because function is enabled by default	Function level activation control enhancement
Not applicable	PI75575/UI54239	Not applicable	Y	N	N	N	Y	Y	N	Not applicable	Data set support for zHyperWrite
	PI82325/UI54815										
Not applicable	PI85328/UI57463 /UI57462	Not applicable	Y	Y	N	N	N	Y	N	Not applicable	Displaying RACF sign-on messages
Not applicable	PI95173/ UI55199/ UI55198	Not applicable	Y	Y	N	N	N	Y	N	Not applicable	Generic return code enhancement for RACF verifications (IMS - SGNGENRC OPTION)

UPDATE IMSFUNC Command

- UPDATE IMSFUNC NAME(newfunc1) SET(ENABLED(Y | N)) is a new type-2 command that can enable or disable some new IMS functions dynamically
 - newfunc1 identifies the IMS function name
 - SET(ENABLED(Y | N)) turns the function on or off
- Most new functions can be enabled/disabled locally on a specific IMS
- Some new IMS functions may need to be enabled globally on all the IMSs at the same time (data sharing systems)

UPDATE IMSFUNC Command

- UPDATE IMSFUNC NAME(newfunc1) SET(ENABLED (Y | N)) for functions that must be enabled globally:
 - Requires SCI, OM and is rarely needed for any new function
 - Rejected if at least 1 IMS does not have new function PTF
 - Global function enablement value stored in resource structure or catalog
 - New managed ACB functions may store global function enablement in catalog
 - Other global functions may store global function enablement in RM resource structure
 - newfunc1 retrieved at IMS cold start from resource structure or catalog
 - New address space automatically takes the global function value when it comes up (overrides PROCLIB member value)
 - Prevents new address spaces from coming up during the UPDATE IMSFUNC command processing
 - Back level address space is not allowed to come up

Query IMSFUNC Command

QUERY IMSFUNC SHOW(ENABLED,LEVEL)

FunctionName	MbrName	CC	LEnabled	LCurrLevel	LAddLevel
FUNCTIONLEVEL	IMS1	0	Y	00000001	00000001

QUERY IMSFUNC SHOW(ALL)

FunctionName	MbrName	CC	LEnabled	LCanEnable	LCanDisable
FUNCTIONLEVEL	IMS1	0	Y	N	

screen 2

FunctionName	MbrName	LVersion	LCurrLevel	LAddLevel
FUNCTIONLEVEL	IMS1	15.1.0	00000001	00000001

Query IMSFUNC Command

QUERY IMSFUNC SHOW(ENABLED,LEVEL,VERSION)

FunctionName	MbrName	CC	LEnabled	LVersion	LCurrLevel	LAddLevel
FUNCTIONLEVEL	IMS1	0	Y	15.1.0	00000003	00000001
FUNCTIONLEVEL	IMS2	0	Y	15.1.0	00000003	00000001
NEWFUNCTION2	IMS1	0	N	15.1.0	00000003	00000002
NEWFUNCTION2	IMS2	0	N	15.1.0	00000003	00000002
NEWFUNCTION3	IMS1	0	Y	15.1.0	00000003	00000003
NEWFUNCTION3	IMS2	0	Y	15.1.0	00000003	00000003

QUERY IMSFUNC ENABLED(N) SHOW(ENABLED,LEVEL)

FunctionName	MbrName	CC	LEnabled	LCurrLevel	LAddLevel
NEWFUNCTION2	IMSB	0	N	00000002	00000002
NEWFUNCTION2	IMS1	0	N	00000002	00000002
NEWFUNCTION2	IMS2	0	N	00000002	00000002

Function Level - FAQs

- Is the resource structure required for global functions?
 - It won't be required for new global functions related to the IMS catalog. The new function enablement will be stored in the IMS catalog
 - For non-IMS catalog global functions, the resource structure is recommended, so that the value can be stored there and made available to IMS at the next cold start
 - If a resource structure is not defined, IMS won't be able to prevent a back level IMS from coming up, or restore the function enablement value at the next IMS cold start

Function Level - FAQs

- Will a new IMS function pre-requisite all the previous function levels?
 - New IMS functions that are added to the IMS function table (DFSFNCT0) will pre-requisite all of the previous function levels added to the IMS function table
 - DFSFNCT0 is an OCO module, so any change to it pre-requisites any previous change to it
- Will the PTFs with new function include hold data that describes the new function?
 - Yes

Function Level - FAQs

- Why would I want to use the QUERY IMSFUNC command?
 - You can use the QUERY IMSFUNC command to display which IMSs do and do not have the new function PTF applied during rolling migration
- So what past new functions in IMS could have been enabled dynamically, had continuous delivery been available then?
 - Functions enabled with PROCLIB member parameters, such as: ACBSHR=Y, CATALOG=YES, FPBP64=Y, GSTSTRAN=Y, MODBLKS=DYN, MSCREPO=Y, STM=YES, WADS=YES
 - Functions enabled with execution parameters, such as FP=Y, MSC=Y, OTMA=Y, PWFI=Y

Function Levels - FAQ

- Will each new IMS function level contain exactly one new function or, can an IMS function level contain multiple new functions?
 - Each new function level can contain one or more new functions
- Will there be another IMS version?
 - Instead of versions, we plan to deliver new IMS enhancements continuously with PTFs, without the wait or the disruption of installing a new version

IMS Continuous Delivery Enhancements so far

- IMS System
 - 9 enhancements including 1 Function Level
- IMS Database Manager
 - 6 enhancements
- IMS Transaction Manager
 - 2 enhancements

https://www.ibm.com/support/knowledgecenter/en/SSEPH2_15.1.0/com.ibm.ims15.doc.rpg/ims_cd_functions.htm

The journey continues . . .

- Keep up-to-date with developments, initiatives and the progress of RFE's by joining the IMS Gold Program
- Influence the future design and delivery of new functions in IMS by joining the IMS Gold Program
- Partner with IMS Development to discover, co-create, incubate, and progress ideas that provide **business value** in the IMS Gold Program
- The IMS Gold Program
 - A Client Feedback Program for IMS
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So finally ,what is the value of this to me?

- You can get IMS functions faster
- You won't need to install a new version of IMS
- You can dynamically enable some IMS functions when you are ready without having to restart IMS
- Through involvement in the IMS Gold program and as a sponsor user you can change IMS in the future, for the future

We want your feedback!

- Please submit your feedback online at
 - <http://conferences.gse.org.uk/2018/feedback/HL>
- Paper feedback forms are also available from the Chair person
- This session is HL

