



Intel® QuickAssist Technology Compression API Reference

Automatically generated from sources, June 09, 2020.

Based on API version 2.4

(See Release Notes to map API version to software package version.)

By using this document, in addition to any agreements you have with Intel, you accept the terms set forth below. You may not use or facilitate the use of this document in connection with any infringement or other legal analysis concerning Intel products described herein. You agree to grant Intel a non-exclusive, royalty-free license to any patent claim thereafter drafted which includes subject matter disclosed herein.

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

A "Mission Critical Application" is any application in which failure of the Intel Product could result, directly or indirectly, in personal injury or death. SHOULD YOU PURCHASE OR USE INTEL'S PRODUCTS FOR ANY SUCH MISSION CRITICAL APPLICATION, YOU SHALL INDEMNIFY AND HOLD INTEL AND ITS SUBSIDIARIES, SUBCONTRACTORS AND AFFILIATES, AND THE DIRECTORS, OFFICERS, AND EMPLOYEES OF EACH, HARMLESS AGAINST ALL CLAIMS COSTS, DAMAGES, AND EXPENSES AND REASONABLE ATTORNEYS' FEES ARISING OUT OF, DIRECTLY OR INDIRECTLY, ANY CLAIM OF PRODUCT LIABILITY, PERSONAL INJURY, OR DEATH ARISING IN ANY WAY OUT OF SUCH MISSION CRITICAL APPLICATION, WHETHER OR NOT INTEL OR ITS SUBCONTRACTOR WAS NEGLIGENT IN THE DESIGN, MANUFACTURE, OR WARNING OF THE INTEL PRODUCT OR ANY OF ITS PARTS.

Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined". Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information.

The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order.

Copies of documents which have an order number and are referenced in this document, or other Intel literature, may be obtained by calling 1-800-548-4725, or go to: <http://www.intel.com/design/literature.htm>.

Any software source code reprinted in this document is furnished for informational purposes only and may only be used or copied and no license, express or implied, by estoppel or otherwise, to any of the reprinted source code is granted by this document.

This document contains information on products in the design phase of development.

Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. Go to: http://www.intel.com/products/processor_number/.

Code Names are only for use by Intel to identify products, platforms, programs, services, etc. (â productsâ) in development by Intel that have not been made commercially available to the public, i.e., announced, launched or shipped. They are never to be used as â commercialâ names for products. Also, they are not intended to function as trademarks.

Intel and the Intel logo are trademarks of Intel Corporation in the U.S. and/or other countries.

*Other names and brands may be claimed as the property of others.

Copyright © Intel Corporation 2020. All Rights Reserved.

Revision History

Date	Revision	Description
June 2020	010	Adding cpaDcUpdateSession() Changed version of the compression API to v2.4
January 2019	009	Adding chaining support. Changed version of the compression API to v2.3
April 2018	008	Adding support for compressAndVerifyAndRecover.
February 2018	007	Adding support for Compress and Verify strict mode.
June 2016	006	Adding support for: - Compress and Verify - Batch and Pack Compression
October 2015	005	Changed version of the compression API to v2.0. Added new error codes to CpaDcReqStatus in cpa_dc.h.
September 2015	004	Incrementing DC API version number to v1.6. Adding CPA_STATUS_UNSUPPORTED as a return status for each function and callback Deprecating use of fileType and deflateWindowSize fields from CpaDcSessionSetupData in cpa_dc.h. Clarifying documentation for srcBufferLen, bufferLenToCompress, destBufferLen and bufferLenForData fields in CpaDcDpOpData in cpa_dc_dp.h
August 2015	003	IXA00391973: Adding reportParityError to the DC instance capabilities. Incrementing the DC API version number of 1.5
October 2014	002	Adding cpaDcResetSession API
June 2014	001	First public version of the document. Based on Intel Confidential document number 410926-1.3 with the revision history of that document retained for reference purposes.
February 2013	1.3	- Supports supplying multiple intermediate buffer lists when starting a compression instance. Also provides a utility function to determine the number of intermediate buffer lists required by an implementation. - API extensions to support endOfLastBlock detection within a deflate stream.
January 2013	1.2	Resolves the following work requests: - TECG00000185: Changing use of flush flags for stateless compression. Adding support for passing an initial checksum into a stateless compression request. Adding a constraint that cpaDcGenerateFooter() is not supported for stateless operations.
November 2012	1.1	Resolves the following work requests: - TECG00000189: Add a unique instance identifier to CpaInstanceInfo2 - TECG00000193: Enhanced auto select best
October 2012	1.0	Resolves the following work requests:

		<ul style="list-style-type: none"> TECG00000186: Add instance notification support for RESTARTING & RESTARTED events and CPA_STATUS_RESTARTING return codes.
June 2012	0.93	<p>Resolved review comments against previous version which resulted in minor updates to the API comments.</p> <p>Resolved the following work requests:</p> <ul style="list-style-type: none"> TECG00000179: Adding version number to compression API
May 2012	0.92	<p>Resolved the following work requests:</p> <ul style="list-style-type: none"> TECG00000172: Remove references to cpaDcSessionCreate in cpa_dc.h TECG00000170: cpaCySymDpSessionCtxGetSize() returns a fixed value TECG00000173 and TECG00000174 updates/cleanup of api comments TECG00000174: Updated checksum processing rules.
March 2012	0.92RC6	Added -12 and -13 error codes
March 2012	0.92RC7	<p>Resolved the following work requests:</p> <ul style="list-style-type: none"> TECG00000166: Added ability to query bus address information for a CpaInstance.
November 2011	0.92RC5	Added internal memory store to capabilities reporting
September 2011	0.92RC4	Addressed review comments
July 2011	0.92RC3	<p>Completed data plane API</p> <ul style="list-style-type: none"> Moved results structure to 1st 64 byte section Added buffer sizes for use by driver
May 2011	0.92RC2	Addressed comments in data plane API
March 2011	0.92RC1	Added data plane API
October 2010	0.91RC2	Minor typo fixes
September 2010	0.91RC1	<p>Based on feedback, incorporated the following:</p> <ul style="list-style-type: none"> Converted statistics counters to 64 bit Improved the results structure Updated memory configuration for consistency with other services
March 2010	0.9RC5	<p>Based on review and feedback, incorporated the following:</p> <ul style="list-style-type: none"> Added a results structure to the compress and decompress interfaces, and to the callback API <ol style="list-style-type: none"> added enums to define the potential failures of the accelerators Intermediate buffer is now a buffer list.
January 2010	0.9RC4-2	Added size of context field to cpaDcGetSessionSize
December 2009	0.90RC4	<p>Based on feedback, incorporated the following:</p> <ul style="list-style-type: none"> Separated checksum algorithms in capabilities Added return code CPA_DC_BAD_DATA return code Bundled return information to include bytes consumed, bytes produced and checksum

		<ul style="list-style-type: none"> • Clean up of some documentation
Sept 21 2009	0.90RC3	<p>Updated as a result of review, incorporate the following changes;</p> <ul style="list-style-type: none"> • Compression window capabilities now split for compress and decompress. • Update statistic to be more consistent with other APIs. • Added pHistoryBuffer to support state-ful deflate. • Removed reference to having different instances able to process the same session.
July 2009	0.90RC2	<p>Added distinction in capabilities for stateful and stateless, compression and decompression</p> <p>Replaced cpaPmGetInstanceInfo with cpaPmGetInstanceInfo2 that gets a new info structure, CpaInstanceInfo2, which supersedes the previous version. Additional info includes physical id, core affinity, and NUMA relevant node.</p>
June 2009	0.90RC1	<p>Added capabilities</p> <p>Add distinction between stateful and stateless.</p> <p>Updated with cpaDcGet/SetMemoryConfiguration</p> <p>Changed from buffer lists to u32 pointers for responses.</p>
February 2009	0.74	<ol style="list-style-type: none"> 1. Addition of response Arguments - APIs can use source and destination buffers in an easier fashion 2. Change from flat buffers to buffer lists to align with QA conventions 3. Major re-write of description of buffer rules 4. Addition of dynamic Huffman trees 5. Removal of file based functions. It was deemed that this functionality could be built using other buffer based APIs 6. Clean up of session parameters and various typos
December 2008	0.73	<p>First released version of this document with new generation process.</p>

Table of Contents

1	Deprecated List.....	1
2	CPA API.....	2
2.1	Detailed Description.....	2
2.2	Modules.....	2
3	Base Data Types [CPA API].....	3
3.1	Detailed Description.....	3
3.2	Data Structures.....	3
3.3	Defines.....	3
3.4	Typedefs.....	4
3.5	Enumerations.....	4
3.6	Data Structure Documentation.....	4
3.6.1	_CpaFlatBuffer Struct Reference.....	5
3.6.2	_CpaBufferList Struct Reference.....	5
3.6.3	_CpaPhysFlatBuffer Struct Reference.....	6
3.6.4	_CpaPhysBufferList Struct Reference.....	7
3.6.5	_CpaInstanceInfo Struct Reference.....	8
3.6.6	_CpaPhysicalInstanceId Struct Reference.....	9
3.6.7	_CpaInstanceInfo2 Struct Reference.....	10
3.7	Define Documentation.....	12
3.8	Typedef Documentation.....	14
3.9	Enumeration Type Documentation.....	18
4	CPA Type Definition [CPA API].....	20
4.1	Detailed Description.....	20
4.2	Defines.....	20
4.3	Typedefs.....	20
4.4	Enumerations.....	20
4.5	Define Documentation.....	20
4.6	Typedef Documentation.....	21
4.7	Enumeration Type Documentation.....	22
5	Data Compression API [CPA API].....	24
5.1	Detailed Description.....	24
5.2	Modules.....	24
5.3	Data Structures.....	24
5.4	Defines.....	24
5.5	Typedefs.....	24
5.6	Enumerations.....	25
5.7	Functions.....	26
5.8	Data Structure Documentation.....	28
5.8.1	_CpaDcInstanceCapabilities Struct Reference.....	28
5.8.2	_CpaDcSessionSetupData Struct Reference.....	31
5.8.3	_CpaDcSessionUpdateData Struct Reference.....	32
5.8.4	_CpaDcStats Struct Reference.....	32
5.8.5	_CpaDcRqResults Struct Reference.....	34
5.8.6	_CpaDcSkipData Struct Reference.....	34
5.8.7	_CpaDcOpData Struct Reference.....	35
5.9	Define Documentation.....	36
5.10	Typedef Documentation.....	37
5.11	Enumeration Type Documentation.....	41
5.12	Function Documentation.....	45

Table of Contents

6 Data Compression Batch and Pack API [Data Compression API]	77
6.1 Detailed Description.....	77
6.2 Data Structures.....	77
6.3 Typedefs.....	77
6.4 Functions.....	77
6.5 Data Structure Documentation.....	77
6.5.1 _CpaDcBatchOpData Struct Reference.....	77
6.6 Typedef Documentation.....	79
6.7 Function Documentation.....	79
7 Data Compression Chaining API [Data Compression API]	83
7.1 Detailed Description.....	83
7.2 Data Structures.....	83
7.3 Typedefs.....	83
7.4 Enumerations.....	83
7.5 Functions.....	84
7.6 Data Structure Documentation.....	84
7.6.1 _CpaDcChainSessionSetupData Struct Reference.....	84
7.6.2 _CpaDcChainOpData Struct Reference.....	85
7.6.3 _CpaDcChainRqResults Struct Reference.....	86
7.7 Typedef Documentation.....	87
7.8 Enumeration Type Documentation.....	87
7.9 Function Documentation.....	90
8 Data Compression Data Plane API [Data Compression API]	98
8.1 Detailed Description.....	98
8.2 Data Structures.....	98
8.3 Typedefs.....	98
8.4 Functions.....	98
8.5 Data Structure Documentation.....	99
8.5.1 _CpaDcDpOpData Struct Reference.....	99
8.6 Typedef Documentation.....	102
8.7 Function Documentation.....	103

1 Deprecated List

Class **_CpaDcSessionSetupData**

As of v1.6 of the Compression API, the fileType and deflateWindowSize fields in this structure have been deprecated and should not be used.

Class **_CpaInstanceInfo**

As of v1.3 of the Crypto API, this structure has been deprecated, replaced by CpaInstanceInfo2.

Global **CPA_DEPRECATED**

As of v1.3 of the Crypto API, this enum has been deprecated, replaced by **CpaAccelerationServiceType**.

Global **CPA_DEPRECATED**

As of v1.3 of the Crypto API, this enum has been deprecated, replaced by **CpaOperationalState**.

Global **CpaDcFileType**

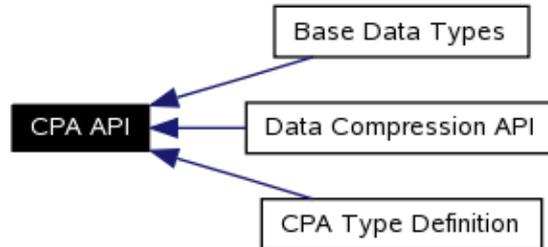
As of v1.6 of the Compression API, this enum has been deprecated.

Global **CpaDcCompType**

As of v1.6 of the Compression API, CPA_DC_LZS, CPA_DC_ELZS and CPA_DC_LZSS have been deprecated and should not be used.

2 CPA API

Collaboration diagram for CPA API:



2.1 Detailed Description

File: cpa.h

This is the top level API definition for Intel(R) QuickAssist Technology. It contains structures, data types and definitions that are common across the interface.

2.2 Modules

- **Base Data Types**
- **CPA Type Definition**
- **Data Compression API**

3 Base Data Types

[CPA API]

Collaboration diagram for Base Data Types:



3.1 Detailed Description

File: cpa.h

The base data types for the Intel CPA API.

3.2 Data Structures

- struct **_CpaFlatBuffer**
- struct **_CpaBufferList**
- struct **_CpaPhysFlatBuffer**
- struct **_CpaPhysBufferList**
- struct **_CpaInstanceInfo**
- struct **_CpaPhysicalInstanceId**
- struct **_CpaInstanceInfo2**

3.3 Defines

- #define **CPA_INSTANCE_HANDLE_SINGLE**
- #define **CPA_DP_BUFLIST**
- #define **CPA_STATUS_SUCCESS**
- #define **CPA_STATUS_FAIL**
- #define **CPA_STATUS_RETRY**
- #define **CPA_STATUS_RESOURCE**
- #define **CPA_STATUS_INVALID_PARAM**
- #define **CPA_STATUS_FATAL**
- #define **CPA_STATUS_UNSUPPORTED**
- #define **CPA_STATUS_RESTARTING**
- #define **CPA_STATUS_MAX_STR_LENGTH_IN_BYTES**
- #define **CPA_STATUS_STR_SUCCESS**
- #define **CPA_STATUS_STR_FAIL**
- #define **CPA_STATUS_STR_RETRY**
- #define **CPA_STATUS_STR_RESOURCE**
- #define **CPA_STATUS_STR_INVALID_PARAM**
- #define **CPA_STATUS_STR_FATAL**
- #define **CPA_STATUS_STR_UNSUPPORTED**
- #define **CPA_INSTANCE_MAX_NAME_SIZE_IN_BYTES**
- #define **CPA_INSTANCE_MAX_ID_SIZE_IN_BYTES**
- #define **CPA_INSTANCE_MAX_VERSION_SIZE_IN_BYTES**

3.4 Typedefs

- typedef void * CpaInstanceHandle
- typedef Cpa64U CpaPhysicalAddr
- typedef CpaPhysicalAddr(* CpaVirtualToPhysical)(void *pVirtualAddr)
- typedef _CpaFlatBuffer CpaFlatBuffer
- typedef _CpaBufferList CpaBufferList
- typedef _CpaPhysFlatBuffer CpaPhysFlatBuffer
- typedef _CpaPhysBufferList CpaPhysBufferList
- typedef Cpa32S CpaStatus
- typedef enum _CpaInstanceType CPA_DEPRECATED
- typedef enum _CpaAccelerationServiceType CpaAccelerationServiceType
- typedef enum _CpaInstanceState CPA_DEPRECATED
- typedef enum _CpaOperationalState CpaOperationalState
- typedef _CpaInstanceInfo CPA_DEPRECATED
- typedef _CpaPhysicalInstanceId CpaPhysicalInstanceId
- typedef _CpaInstanceInfo2 CpaInstanceInfo2
- typedef enum _CpaInstanceEvent CpaInstanceEvent

3.5 Enumerations

- enum _CpaInstanceType {
 - CPA_INSTANCE_TYPE_CRYPTO,
 - CPA_INSTANCE_TYPE_DATA_COMPRESSION,
 - CPA_INSTANCE_TYPE_RAID,
 - CPA_INSTANCE_TYPE_XML,
 - CPA_INSTANCE_TYPE_REGEX
- enum _CpaAccelerationServiceType {
 - CPA_ACC_SVC_TYPE_CRYPTO,
 - CPA_ACC_SVC_TYPE_DATA_COMPRESSION,
 - CPA_ACC_SVC_TYPE_PATTERN_MATCH,
 - CPA_ACC_SVC_TYPE_RAID,
 - CPA_ACC_SVC_TYPE_XML,
 - CPA_ACC_SVC_TYPE_VIDEO_ANALYTICS
- enum _CpaInstanceState {
 - CPA_INSTANCE_STATE_INITIALISED,
 - CPA_INSTANCE_STATE_SHUTDOWN
- enum _CpaOperationalState {
 - CPA_OPER_STATE_DOWN,
 - CPA_OPER_STATE_UP
- enum _CpaInstanceEvent {
 - CPA_INSTANCE_EVENT_RESTARTING,
 - CPA_INSTANCE_EVENT_RESTARTED,
 - CPA_INSTANCE_EVENT_FATAL_ERROR

3.6 Data Structure Documentation

3.6.1 _CpaFlatBuffer Struct Reference

3.6.1 _CpaFlatBuffer Struct Reference

3.6.1.1 Detailed Description

File: cpa.h

Flat buffer structure containing a pointer and length member.

A flat buffer structure. The data pointer, pData, is a virtual address. An API instance may require the actual data to be in contiguous physical memory as determined by **CpaInstanceInfo2**.

3.6.1.2 Data Fields

- Cpa32U dataLenInBytes
- Cpa8U * pData

3.6.1.3 Field Documentation

Cpa32U _CpaFlatBuffer::dataLenInBytes

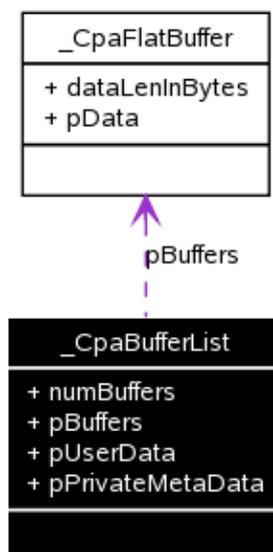
Data length specified in bytes. When used as an input parameter to a function, the length specifies the current length of the buffer. When used as an output parameter to a function, the length passed in specifies the maximum length of the buffer on return (i.e. the allocated length). The implementation will not write past this length. On return, the length is always unchanged.

Cpa8U* _CpaFlatBuffer::pData

The data pointer is a virtual address, however the actual data pointed to is required to be in contiguous physical memory unless the field requiresPhysicallyContiguousMemory in CpaInstanceInfo2 is false.

3.6.2 _CpaBufferList Struct Reference

Collaboration diagram for _CpaBufferList:



3.6.2 _CpaBufferList Struct Reference

3.6.2.1 Detailed Description

File: cpa.h

Scatter/Gather buffer list containing an array of flat buffers.

A scatter/gather buffer list structure. This buffer structure is typically used to represent a region of memory which is not physically contiguous, by describing it as a collection of buffers, each of which is physically contiguous.

Note:

The memory for the pPrivateMetaData member must be allocated by the client as physically contiguous memory. When allocating memory for pPrivateMetaData, a call to the corresponding BufferListGetMetaSize function (e.g. cpaCyBufferListGetMetaSize) MUST be made to determine the size of the Meta Data Buffer. The returned size (in bytes) may then be passed in a memory allocation routine to allocate the pPrivateMetaData memory.

3.6.2.2 Data Fields

- **Cpa32U numBuffers**
- **CpaFlatBuffer * pBuffers**
- **void * pUserData**
- **void * pPrivateMetaData**

3.6.2.3 Field Documentation

Cpa32U _CpaBufferList::numBuffers

Number of buffers in the list

CpaFlatBuffer* _CpaBufferList::pBuffers

Pointer to an unbounded array containing the number of CpaFlatBuffers defined by numBuffers

void* _CpaBufferList::pUserData

This is an opaque field that is not read or modified internally.

void* _CpaBufferList::pPrivateMetaData

Private representation of this buffer list. The memory for this buffer needs to be allocated by the client as contiguous data. The amount of memory required is returned with a call to the corresponding BufferListGetMetaSize function. If that function returns a size of zero then no memory needs to be allocated, and this parameter can be NULL.

3.6.3 _CpaPhysFlatBuffer Struct Reference

3.6.3.1 Detailed Description

File: cpa.h

Flat buffer structure with physical address.

Functions taking this structure do not need to do any virtual to physical address translation before writing the buffer to hardware.

3.6.3 _CpaPhysFlatBuffer Struct Reference

3.6.3.2 Data Fields

- **Cpa32U dataLenInBytes**
- **Cpa32U reserved**
- **CpaPhysicalAddr bufferPhysAddr**

3.6.3.3 Field Documentation

Cpa32U _CpaPhysFlatBuffer::dataLenInBytes

Data length specified in bytes. When used as an input parameter to a function, the length specifies the current length of the buffer. When used as an output parameter to a function, the length passed in specifies the maximum length of the buffer on return (i.e. the allocated length). The implementation will not write past this length. On return, the length is always unchanged.

Cpa32U _CpaPhysFlatBuffer::reserved

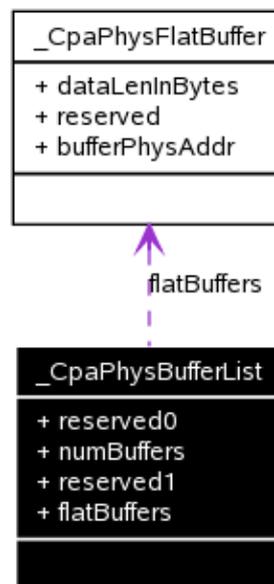
Reserved for alignment

CpaPhysicalAddr _CpaPhysFlatBuffer::bufferPhysAddr

The physical address at which the data resides. The data pointed to is required to be in contiguous physical memory.

3.6.4 _CpaPhysBufferList Struct Reference

Collaboration diagram for _CpaPhysBufferList:



3.6.4.1 Detailed Description

File: cpa.h

Scatter/gather list containing an array of flat buffers with physical addresses.

Similar to **CpaBufferList**, this buffer structure is typically used to represent a region of memory which is not physically contiguous, by describing it as a collection of buffers, each of which is physically contiguous. The

3.6.4 _CpaPhysBufferList Struct Reference

difference is that, in this case, the individual "flat" buffers are represented using physical, rather than virtual, addresses.

3.6.4.2 Data Fields

- **Cpa64U reserved0**
- **Cpa32U numBuffers**
- **Cpa32U reserved1**
- **CpaPhysFlatBuffer flatBuffers []**

3.6.4.3 Field Documentation

Cpa64U _CpaPhysBufferList::reserved0

Reserved for internal usage

Cpa32U _CpaPhysBufferList::numBuffers

Number of buffers in the list

Cpa32U _CpaPhysBufferList::reserved1

Reserved for alignment

CpaPhysFlatBuffer _CpaPhysBufferList::flatBuffers[]

Array of flat buffer structures, of size numBuffers

3.6.5 _CpaInstanceInfo Struct Reference

3.6.5.1 Detailed Description

File: cpa.h

Instance Info Structure

Deprecated:

As of v1.3 of the Crypto API, this structure has been deprecated, replaced by CpaInstanceInfo2.

Structure that contains the information to describe the instance.

3.6.5.2 Data Fields

- enum **_CpaInstanceType type**
- enum **_CpaInstanceState state**
- **Cpa8U name** [CPA_INSTANCE_MAX_NAME_SIZE_IN_BYTES]
- **Cpa8U version** [CPA_INSTANCE_MAX_VERSION_SIZE_IN_BYTES]

3.6.5.3 Field Documentation

enum _CpaInstanceType _CpaInstanceInfo::type

Type definition for this instance.

enum _CpaInstanceState _CpaInstanceInfo::state

Operational state of the instance.

3.6.5 _CpaInstanceInfo Struct Reference

Cpa8U _CpaInstanceInfo::name[CPA_INSTANCE_MAX_NAME_SIZE_IN_BYTES]

Simple text string identifier for the instance.

Cpa8U _CpaInstanceInfo::version[CPA_INSTANCE_MAX_VERSION_SIZE_IN_BYTES]

Version string. There may be multiple versions of the same type of instance accessible through a particular library.

3.6.6 _CpaPhysicalInstanceId Struct Reference

3.6.6.1 Detailed Description

File: cpa.h

Physical Instance ID

Identifies the physical instance of an accelerator execution engine.

Accelerators grouped into "packages". Each accelerator can in turn contain one or more execution engines. Implementations of this API will define the `packageld`, `acceleratorId`, `executionEngineId` and `busAddress` as appropriate for the implementation. For example, for hardware-based accelerators, the `packageld` might identify the chip, which might contain multiple accelerators, each of which might contain multiple execution engines. The combination of `packageld`, `acceleratorId` and `executionEngineId` uniquely identifies the instance.

Hardware based accelerators implementing this API may also provide information on the location of the accelerator in the `busAddress` field. This field will be defined as appropriate for the implementation. For example, for PCIe attached accelerators, the `busAddress` may contain the PCIe bus, device and function number of the accelerators.

3.6.6.2 Data Fields

- **Cpa16U packageld**
- **Cpa16U acceleratorId**
- **Cpa16U executionEngineId**
- **Cpa16U busAddress**
- **Cpa32U kptAcHandle**

3.6.6.3 Field Documentation

Cpa16U _CpaPhysicalInstanceId::packageld

Identifies the package within which the accelerator is contained.

Cpa16U _CpaPhysicalInstanceId::acceleratorId

Identifies the specific accelerator within the package.

Cpa16U _CpaPhysicalInstanceId::executionEngineId

Identifies the specific execution engine within the accelerator.

Cpa16U _CpaPhysicalInstanceId::busAddress

Identifies the bus address associated with the accelerator execution engine.

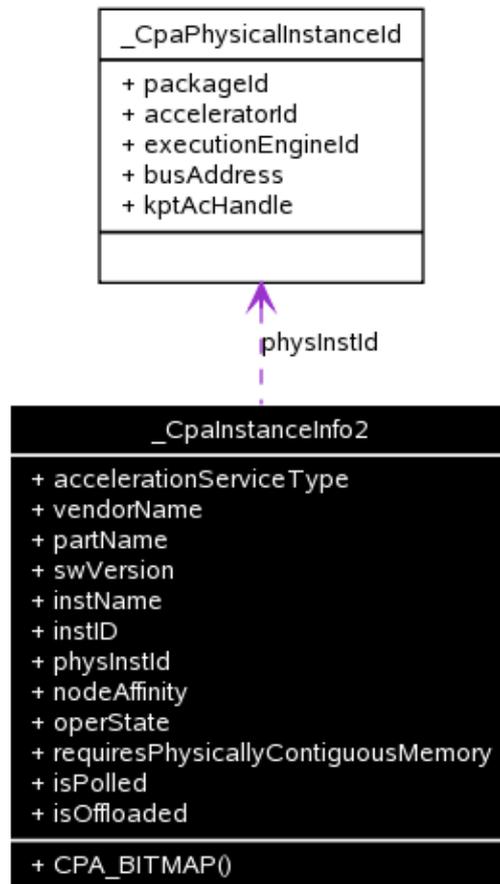
Cpa32U _CpaPhysicalInstanceId::kptAcHandle

3.6.6 _CpaPhysicalInstanceId Struct Reference

Identifies the ahandle of the accelerator.

3.6.7 _CpaInstanceInfo2 Struct Reference

Collaboration diagram for _CpaInstanceInfo2:



3.6.7.1 Detailed Description

File: cpa.h

Instance Info Structure, version 2

Structure that contains the information to describe the instance.

3.6.7.2 Public Member Functions

- **CPA_BITMAP** (coreAffinity, CPA_MAX_CORES)

3.6.7.3 Data Fields

- **CpaAccelerationServiceType** accelerationServiceType
- **Cpa8U** vendorName [CPA_INST_VENDOR_NAME_SIZE]
- **Cpa8U** partName [CPA_INST_PART_NAME_SIZE]
- **Cpa8U** swVersion [CPA_INST_SW_VERSION_SIZE]
- **Cpa8U** instName [CPA_INST_NAME_SIZE]

3.6.7 _CpaInstanceInfo2 Struct Reference

- **Cpa8U instID** [CPA_INST_ID_SIZE]
- **CpaPhysicalInstanceId physInstId**
- **Cpa32U nodeAffinity**
- **CpaOperationalState operState**
- **CpaBoolean requiresPhysicallyContiguousMemory**
- **CpaBoolean isPolled**
- **CpaBoolean isOffloaded**

3.6.7.4 Member Function Documentation

```
_CpaInstanceInfo2::CPA_BITMAP( coreAffinity ,  
                                CPA_MAX_CORES  
                                )
```

A bitmap identifying the core or cores to which the instance is affinitized in an SMP operating system.

The term core here is used to mean a "logical" core - for example, in a dual-processor, quad-core system with hyperthreading (two threads per core), there would be 16 such cores (2 processors x 4 cores/processor x 2 threads/core). The numbering of these cores and the corresponding bit positions is OS-specific. Note that Linux refers to this as "processor affinity" or "CPU affinity", and refers to the bitmap as a "cpumask".

The term "affinity" is used to mean that this is the core on which the callback function will be invoked when using the asynchronous mode of the API. In a hardware-based implementation of the API, this might be the core to which the interrupt is affinitized. In a software-based implementation, this might be the core to which the process running the algorithm is affinitized. Where there is no affinity, the bitmap can be set to all zeroes.

This bitmap should be manipulated using the macros **CPA_BITMAP_BIT_SET**, **CPA_BITMAP_BIT_CLEAR** and **CPA_BITMAP_BIT_TEST**.

3.6.7.5 Field Documentation

CpaAccelerationServiceType _CpaInstanceInfo2::accelerationServiceType

Type of service provided by this instance.

Cpa8U _CpaInstanceInfo2::vendorName[CPA_INST_VENDOR_NAME_SIZE]

String identifying the vendor of the accelerator.

Cpa8U _CpaInstanceInfo2::partName[CPA_INST_PART_NAME_SIZE]

String identifying the part (name and/or number).

Cpa8U _CpaInstanceInfo2::swVersion[CPA_INST_SW_VERSION_SIZE]

String identifying the version of the software associated with the instance. For hardware-based implementations of the API, this should be the driver version. For software-based implementations of the API, this should be the version of the library.

Note that this should NOT be used to store the version of the API, nor should it be used to report the hardware revision (which can be captured as part of the **partName**, if required).

Cpa8U _CpaInstanceInfo2::instName[CPA_INST_NAME_SIZE]

String identifying the name of the instance.

Cpa8U _CpaInstanceInfo2::instID[CPA_INST_ID_SIZE]

3.7 Define Documentation

String containing a unique identifier for the instance

CpaPhysicalInstanceld _CpaInstanceInfo2::physInstId

Identifies the "physical instance" of the accelerator.

Cpa32U _CpaInstanceInfo2::nodeAffinity

Identifies the processor complex, or node, to which the accelerator is physically connected, to help identify locality in NUMA systems.

The values taken by this attribute will typically be in the range 0..n-1, where n is the number of nodes (processor complexes) in the system. For example, in a dual-processor configuration, n=2. The precise values and their interpretation are OS-specific.

CpaOperationalState _CpaInstanceInfo2::operState

Operational state of the instance.

CpaBoolean _CpaInstanceInfo2::requiresPhysicallyContiguousMemory

Specifies whether the data pointed to by flat buffers (**CpaFlatBuffer::pData**) supplied to this instance must be in physically contiguous memory.

CpaBoolean _CpaInstanceInfo2::isPolled

Specifies whether the instance must be polled, or is event driven. For hardware accelerators, the alternative to polling would be interrupts.

CpaBoolean _CpaInstanceInfo2::isOffloaded

Identifies whether the instance uses hardware offload, or is a software-only implementation.

3.7 Define Documentation

```
#define CPA_INSTANCE_HANDLE_SINGLE
```

File: cpa.h

Default instantiation handle value where there is only a single instance

Used as an instance handle value where only one instance exists.

```
#define CPA_DP_BUFLIST
```

File: cpa.h

Special value which can be taken by length fields on some of the "data plane" APIs to indicate that the buffer in question is of type CpaPhysBufferList, rather than simply an array of bytes.

```
#define CPA_STATUS_SUCCESS
```

Success status value.

```
#define CPA_STATUS_FAIL
```

Fail status value.

```
#define CPA_STATUS_RETRY
```

3.7 Define Documentation

Retry status value.

```
#define CPA_STATUS_RESOURCE
```

The resource that has been requested is unavailable. Refer to relevant sections of the API for specifics on what the suggested course of action is.

```
#define CPA_STATUS_INVALID_PARAM
```

Invalid parameter has been passed in.

```
#define CPA_STATUS_FATAL
```

A serious error has occurred. Recommended course of action is to shutdown and restart the component.

```
#define CPA_STATUS_UNSUPPORTED
```

The function is not supported, at least not with the specific parameters supplied. This may be because a particular capability is not supported by the current implementation.

```
#define CPA_STATUS_RESTARTING
```

The API implementation is restarting. This may be reported if, for example, a hardware implementation is undergoing a reset. Recommended course of action is to retry the request.

```
#define CPA_STATUS_MAX_STR_LENGTH_IN_BYTES
```

File: cpa.h

API status string type definition

This type definition is used for the generic status text strings provided by `cpaXxGetStatusText` API functions. Common values are defined, for example see **CPA_STATUS_STR_SUCCESS**, **CPA_STATUS_FAIL**, etc., as well as the maximum size **CPA_STATUS_MAX_STR_LENGTH_IN_BYTES**.

Maximum length of the Overall Status String (including generic and specific strings returned by calls to `cpaXxGetStatusText`)

```
#define CPA_STATUS_STR_SUCCESS
```

Status string for **CPA_STATUS_SUCCESS**.

```
#define CPA_STATUS_STR_FAIL
```

Status string for **CPA_STATUS_FAIL**.

```
#define CPA_STATUS_STR_RETRY
```

Status string for **CPA_STATUS_RETRY**.

```
#define CPA_STATUS_STR_RESOURCE
```

Status string for **CPA_STATUS_RESOURCE**.

```
#define CPA_STATUS_STR_INVALID_PARAM
```

Status string for **CPA_STATUS_INVALID_PARAM**.

```
#define CPA_STATUS_STR_FATAL
```

Status string for **CPA_STATUS_FATAL**.

```
#define CPA_STATUS_STR_UNSUPPORTED
```

3.8 Typedef Documentation

Status string for **CPA_STATUS_UNSUPPORTED**.

```
#define CPA_INSTANCE_MAX_NAME_SIZE_IN_BYTES  
Maximum instance info name string length in bytes
```

```
#define CPA_INSTANCE_MAX_ID_SIZE_IN_BYTES  
Maximum instance info id string length in bytes
```

```
#define CPA_INSTANCE_MAX_VERSION_SIZE_IN_BYTES  
Maximum instance info version string length in bytes
```

3.8 Typedef Documentation

```
typedef void* CpaInstanceHandle
```

File: cpa.h

Instance handle type.

Handle used to uniquely identify an instance.

Note:

Where only a single instantiation exists this field may be set to **CPA_INSTANCE_HANDLE_SINGLE**.

```
typedef Cpa64U CpaPhysicalAddr
```

File: cpa.h

Physical memory address.

Type for physical memory addresses.

```
typedef CpaPhysicalAddr(* CpaVirtualToPhysical)(void *pVirtualAddr)
```

File: cpa.h

Virtual to physical address conversion routine.

This function is used to convert virtual addresses to physical addresses.

Context:

The function shall not be called in an interrupt context.

Assumptions:

None

Side-Effects:

None

Blocking:

This function is synchronous and blocking.

3.8 Typedef Documentation

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *pVirtualAddr* Virtual address to be converted.

Returns:

Returns the corresponding physical address. On error, the value NULL is returned.

Postcondition:

None

See also:

None

```
typedef struct _CpaFlatBuffer CpaFlatBuffer
```

File: `cpa.h`

Flat buffer structure containing a pointer and length member.

A flat buffer structure. The data pointer, `pData`, is a virtual address. An API instance may require the actual data to be in contiguous physical memory as determined by **CpaInstanceInfo2**.

```
typedef struct _CpaBufferList CpaBufferList
```

File: `cpa.h`

Scatter/Gather buffer list containing an array of flat buffers.

A scatter/gather buffer list structure. This buffer structure is typically used to represent a region of memory which is not physically contiguous, by describing it as a collection of buffers, each of which is physically contiguous.

Note:

The memory for the `pPrivateMetaData` member must be allocated by the client as physically contiguous memory. When allocating memory for `pPrivateMetaData`, a call to the corresponding `BufferListGetMetaSize` function (e.g. `cpaCyBufferListGetMetaSize`) MUST be made to determine the size of the Meta Data Buffer. The returned size (in bytes) may then be passed in a memory allocation routine to allocate the `pPrivateMetaData` memory.

```
typedef struct _CpaPhysFlatBuffer CpaPhysFlatBuffer
```

File: `cpa.h`

Flat buffer structure with physical address.

Functions taking this structure do not need to do any virtual to physical address translation before writing the buffer to hardware.

```
typedef struct _CpaPhysBufferList CpaPhysBufferList
```

3.8 Typedef Documentation

File: `cpa.h`

Scatter/gather list containing an array of flat buffers with physical addresses.

Similar to **CpaBufferList**, this buffer structure is typically used to represent a region of memory which is not physically contiguous, by describing it as a collection of buffers, each of which is physically contiguous. The difference is that, in this case, the individual "flat" buffers are represented using physical, rather than virtual, addresses.

```
typedef Cpa32S CpaStatus
```

File: `cpa.h`

API status value type definition

This type definition is used for the return values used in all the API functions. Common values are defined, for example see **CPA_STATUS_SUCCESS**, **CPA_STATUS_FAIL**, etc.

```
typedef enum _CpaInstanceType CPA_DEPRECATED
```

File: `cpa.h`

Instance Types

Deprecated:

As of v1.3 of the Crypto API, this enum has been deprecated, replaced by **CpaAccelerationServiceType**.

Enumeration of the different instance types.

```
typedef enum _CpaAccelerationServiceType CpaAccelerationServiceType
```

File: `cpa.h`

Service Type

Enumeration of the different service types.

```
typedef enum _CpaInstanceState CPA_DEPRECATED
```

File: `cpa.h`

Instance State

Deprecated:

As of v1.3 of the Crypto API, this enum has been deprecated, replaced by **CpaOperationalState**.

Enumeration of the different instance states that are possible.

```
typedef enum _CpaOperationalState CpaOperationalState
```

File: `cpa.h`

3.8 Typedef Documentation

Instance operational state

Enumeration of the different operational states that are possible.

```
typedef struct _CpaInstanceInfo CPA_DEPRECATED
```

File: cpa.h

Instance Info Structure

Deprecated:

As of v1.3 of the Crypto API, this structure has been deprecated, replaced by CpaInstanceInfo2.

Structure that contains the information to describe the instance.

```
typedef struct _CpaPhysicalInstanceId CpaPhysicalInstanceId
```

File: cpa.h

Physical Instance ID

Identifies the physical instance of an accelerator execution engine.

Accelerators grouped into "packages". Each accelerator can in turn contain one or more execution engines. Implementations of this API will define the packageId, acceleratorId, executionEngineId and busAddress as appropriate for the implementation. For example, for hardware-based accelerators, the packageId might identify the chip, which might contain multiple accelerators, each of which might contain multiple execution engines. The combination of packageId, acceleratorId and executionEngineId uniquely identifies the instance.

Hardware based accelerators implementing this API may also provide information on the location of the accelerator in the busAddress field. This field will be defined as appropriate for the implementation. For example, for PCIe attached accelerators, the busAddress may contain the PCIe bus, device and function number of the accelerators.

```
typedef struct _CpaInstanceInfo2 CpaInstanceInfo2
```

File: cpa.h

Instance Info Structure, version 2

Structure that contains the information to describe the instance.

```
typedef enum _CpaInstanceEvent CpaInstanceEvent
```

File: cpa.h

Instance Events

Enumeration of the different events that will cause the registered Instance notification callback function to be invoked.

3.9 Enumeration Type Documentation

enum `_CpaInstanceType`

File: `cpa.h`

Instance Types

Deprecated:

As of v1.3 of the Crypto API, this enum has been deprecated, replaced by **CpaAccelerationServiceType**.

Enumeration of the different instance types.

Enumerator:

<code>CPA_INSTANCE_TYPE_CRYPTO</code>	Cryptographic instance type
<code>CPA_INSTANCE_TYPE_DATA_COMPRESSION</code>	Data compression instance type
<code>CPA_INSTANCE_TYPE_RAID</code>	RAID instance type
<code>CPA_INSTANCE_TYPE_XML</code>	XML instance type
<code>CPA_INSTANCE_TYPE_REGEX</code>	Regular Expression instance type

enum `_CpaAccelerationServiceType`

File: `cpa.h`

Service Type

Enumeration of the different service types.

Enumerator:

<code>CPA_ACC_SVC_TYPE_CRYPTO</code>	Cryptography
<code>CPA_ACC_SVC_TYPE_DATA_COMPRESSION</code>	Data Compression
<code>CPA_ACC_SVC_TYPE_PATTERN_MATCH</code>	Pattern Match
<code>CPA_ACC_SVC_TYPE_RAID</code>	RAID
<code>CPA_ACC_SVC_TYPE_XML</code>	XML
<code>CPA_ACC_SVC_TYPE_VIDEO_ANALYTICS</code>	Video Analytics

enum `_CpaInstanceState`

File: `cpa.h`

Instance State

Deprecated:

As of v1.3 of the Crypto API, this enum has been deprecated, replaced by **CpaOperationalState**.

Enumeration of the different instance states that are possible.

Enumerator:

<code>CPA_INSTANCE_STATE_INITIALISED</code>	Instance is in the initialized state and ready for use.
---	---

3.9 Enumeration Type Documentation

CPA_INSTANCE_STATE_SHUTDOWN Instance is in the shutdown state and not available for use.

enum **_CpaOperationalState**

File: *cpa.h*

Instance operational state

Enumeration of the different operational states that are possible.

Enumerator:

CPA_OPER_STATE_DOWN Instance is not available for use. May not yet be initialized, or stopped.

CPA_OPER_STATE_UP Instance is available for use. Has been initialized and started.

enum **_CpaInstanceEvent**

File: *cpa.h*

Instance Events

Enumeration of the different events that will cause the registered Instance notification callback function to be invoked.

Enumerator:

CPA_INSTANCE_EVENT_RESTARTING Event type that triggers the registered instance notification callback function when an instance is restarting. The reason why an instance is restarting is implementation specific. For example a hardware implementation may send this event if the hardware device is about to be reset.

CPA_INSTANCE_EVENT_RESTARTED Event type that triggers the registered instance notification callback function when an instance has restarted. The reason why an instance has restarted is implementation specific. For example a hardware implementation may send this event after the hardware device has been reset.

CPA_INSTANCE_EVENT_FATAL_ERROR Event type that triggers the registered instance notification callback function when an error has been detected that requires the device to be reset. This event will be sent by all instances using the device, both on the host and guests.

4 CPA Type Definition

[CPA API]

Collaboration diagram for CPA Type Definition:



4.1 Detailed Description

File: `cpa_types.h`

This is the CPA Type Definitions.

4.2 Defines

- `#define NULL`
- `#define CPA_BITMAP(name, sizeInBits)`
- `#define CPA_BITMAP_BIT_TEST(bitmask, bit)`
- `#define CPA_BITMAP_BIT_SET(bitmask, bit)`
- `#define CPA_BITMAP_BIT_CLEAR(bitmask, bit)`
- `#define CPA_DEPRECATED`

4.3 Typedefs

- `typedef uint8_t Cpa8U`
- `typedef int8_t Cpa8S`
- `typedef uint16_t Cpa16U`
- `typedef int16_t Cpa16S`
- `typedef uint32_t Cpa32U`
- `typedef int32_t Cpa32S`
- `typedef uint64_t Cpa64U`
- `typedef int64_t Cpa64S`
- `typedef enum _CpaBoolean CpaBoolean`

4.4 Enumerations

- `enum _CpaBoolean {`
 `CPA_FALSE,`
 `CPA_TRUE`
}

4.5 Define Documentation

```
#define NULL
```

File: `cpa_types.h`

4.5 Define Documentation

NULL definition.

```
#define CPA_BITMAP ( name,  
                    sizeInBits )
```

File: `cpa_types.h`

Declare a bitmap of specified size (in bits).

This macro is used to declare a bitmap of arbitrary size.

To test whether a bit in the bitmap is set, use **CPA_BITMAP_BIT_TEST**.

While most uses of bitmaps on the API are read-only, macros are also provided to set (see **CPA_BITMAP_BIT_SET**) and clear (see **CPA_BITMAP_BIT_CLEAR**) bits in the bitmap.

```
#define CPA_BITMAP_BIT_TEST ( bitmask,  
                             bit      )
```

Test a specified bit in the specified bitmap. The bitmap may have been declared using **CPA_BITMAP**. Returns a Boolean (true if the bit is set, false otherwise).

```
#define CPA_BITMAP_BIT_SET ( bitmask,  
                           bit      )
```

File: `cpa_types.h`

Set a specified bit in the specified bitmap. The bitmap may have been declared using **CPA_BITMAP**.

```
#define CPA_BITMAP_BIT_CLEAR ( bitmask,  
                              bit      )
```

Clear a specified bit in the specified bitmap. The bitmap may have been declared using **CPA_BITMAP**.

```
#define CPA_DEPRECATED
```

Declare a function or type and mark it as deprecated so that usages get flagged with a warning.

4.6 Typedef Documentation

```
typedef uint8_t Cpa8U
```

File: `cpa_types.h`

Unsigned byte base type.

```
typedef int8_t Cpa8S
```

File: `cpa_types.h`

Signed byte base type.

```
typedef uint16_t Cpa16U
```

File: `cpa_types.h`

4.6 Typedef Documentation

Unsigned double-byte base type.

```
typedef int16_t Cpa16S
```

File: `cpa_types.h`

Signed double-byte base type.

```
typedef uint32_t Cpa32U
```

File: `cpa_types.h`

Unsigned quad-byte base type.

```
typedef int32_t Cpa32S
```

File: `cpa_types.h`

Signed quad-byte base type.

```
typedef uint64_t Cpa64U
```

File: `cpa_types.h`

Unsigned double-quad-byte base type.

```
typedef int64_t Cpa64S
```

File: `cpa_types.h`

Signed double-quad-byte base type.

```
typedef enum _CpaBoolean CpaBoolean
```

File: `cpa_types.h`

Boolean type.

Functions in this API use this type for Boolean variables that take true or false values.

4.7 Enumeration Type Documentation

```
enum _CpaBoolean
```

File: `cpa_types.h`

Boolean type.

Functions in this API use this type for Boolean variables that take true or false values.

Enumerator:

`CPA_FALSE` False value

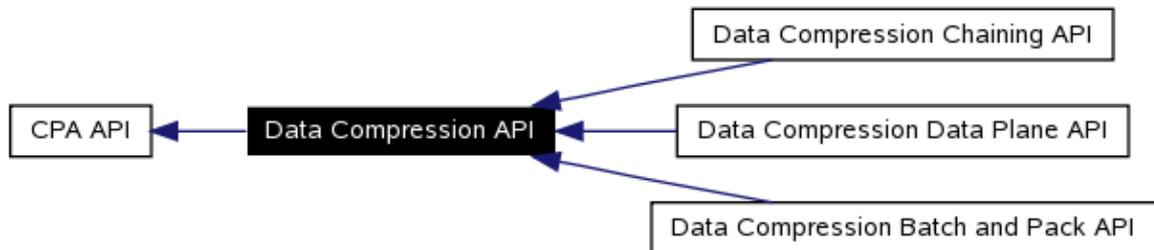
4.7 Enumeration Type Documentation

CPA_TRUE True value

5 Data Compression API

[CPA API]

Collaboration diagram for Data Compression API:



5.1 Detailed Description

File: `cpa_dc.h`

These functions specify the API for Data Compression operations.

Remarks:

5.2 Modules

- Data Compression Batch and Pack API
- Data Compression Chaining API
- Data Compression Data Plane API

5.3 Data Structures

- struct `_CpaDcInstanceCapabilities`
- struct `_CpaDcSessionSetupData`
- struct `_CpaDcSessionUpdateData`
- struct `_CpaDcStats`
- struct `_CpaDcRqResults`
- struct `_CpaDcSkipData`
- struct `_CpaDcOpData`

5.4 Defines

- `#define CPA_DC_API_VERSION_NUM_MAJOR`
- `#define CPA_DC_API_VERSION_NUM_MINOR`
- `#define CPA_DC_CHAIN_CAP_BITMAP_SIZE`
- `#define CPA_DC_BAD_DATA`

5.5 Typedefs

- typedef void * `CpaDcSessionHandle`
- typedef enum `_CpaDcFileType` `CpaDcFileType`
- typedef enum `_CpaDcFlush` `CpaDcFlush`

5.5 Typedefs

- typedef enum **_CpaDcHuffType** **CpaDcHuffType**
- typedef enum **_CpaDcCompType** **CpaDcCompType**
- typedef enum **_CpaDcChecksum** **CpaDcChecksum**
- typedef enum **_CpaDcSessionDir** **CpaDcSessionDir**
- typedef enum **_CpaDcSessionState** **CpaDcSessionState**
- typedef enum **_CpaDcCompLvl** **CpaDcCompLvl**
- typedef enum **_CpaDcReqStatus** **CpaDcReqStatus**
- typedef enum **_CpaDcAutoSelectBest** **CpaDcAutoSelectBest**
- typedef enum **_CpaDcSkipMode** **CpaDcSkipMode**
- typedef void(* **CpaDcCallbackFn**)(void *callbackTag, **CpaStatus** status)
- typedef **_CpaDcInstanceCapabilities** **CpaDcInstanceCapabilities**
- typedef **_CpaDcSessionSetupData** **CpaDcSessionSetupData**
- typedef **_CpaDcSessionUpdateData** **CpaDcSessionUpdateData**
- typedef **_CpaDcStats** **CpaDcStats**
- typedef **_CpaDcRqResults** **CpaDcRqResults**
- typedef **_CpaDcSkipData** **CpaDcSkipData**
- typedef **_CpaDcOpData** **CpaDcOpData**
- typedef void(* **CpaDcInstanceNotificationCbFunc**)(const **CpaInstanceHandle** instanceHandle, void *pCallbackTag, const **CpaInstanceEvent** instanceEvent)

5.6 Enumerations

- enum **_CpaDcFileType** {
 CPA_DC_FT_ASCII,
 CPA_DC_FT_CSS,
 CPA_DC_FT_HTML,
 CPA_DC_FT_JAVA,
 CPA_DC_FT_OTHER
}
- enum **_CpaDcFlush** {
 CPA_DC_FLUSH_NONE,
 CPA_DC_FLUSH_FINAL,
 CPA_DC_FLUSH_SYNC,
 CPA_DC_FLUSH_FULL
}
- enum **_CpaDcHuffType** {
 CPA_DC_HT_STATIC,
 CPA_DC_HT_PRECOMP,
 CPA_DC_HT_FULL_DYNAMIC
}
- enum **_CpaDcCompType** {
 CPA_DC_LZS,
 CPA_DC_ELZS,
 CPA_DC_LZSS,
 CPA_DC_DEFLATE
}
- enum **_CpaDcChecksum** {
 CPA_DC_NONE,
 CPA_DC_CRC32,
 CPA_DC_ADLER32,
 CPA_DC_CRC32_ADLER32
}
- enum **_CpaDcSessionDir** {
 CPA_DC_DIR_COMPRESS,
 CPA_DC_DIR_DECOMPRESS,
 CPA_DC_DIR_COMBINED
}

5.6 Enumerations

```
    }
    • enum _CpaDcSessionState {
        CPA_DC_STATEFUL,
        CPA_DC_STATELESS
    }
    • enum _CpaDcCompLvl {
        CPA_DC_L1,
        CPA_DC_L2,
        CPA_DC_L3,
        CPA_DC_L4,
        CPA_DC_L5,
        CPA_DC_L6,
        CPA_DC_L7,
        CPA_DC_L8,
        CPA_DC_L9
    }
    • enum _CpaDcReqStatus {
        CPA_DC_OK,
        CPA_DC_INVALID_BLOCK_TYPE,
        CPA_DC_BAD_STORED_BLOCK_LEN,
        CPA_DC_TOO_MANY_CODES,
        CPA_DC_INCOMPLETE_CODE_LENS,
        CPA_DC_REPEATED_LENS,
        CPA_DC_MORE_REPEAT,
        CPA_DC_BAD_LITLEN_CODES,
        CPA_DC_BAD_DIST_CODES,
        CPA_DC_INVALID_CODE,
        CPA_DC_INVALID_DIST,
        CPA_DC_OVERFLOW,
        CPA_DC_SOFTERR,
        CPA_DC_FATALERR,
        CPA_DC_MAX_RESUBITERR,
        CPA_DC_INCOMPLETE_FILE_ERR,
        CPA_DC_WDOG_TIMER_ERR,
        CPA_DC_EP_HARDWARE_ERR,
        CPA_DC_VERIFY_ERROR,
        CPA_DC_EMPTY_DYM_BLK
    }
    • enum _CpaDcAutoSelectBest {
        CPA_DC_ASB_DISABLED,
        CPA_DC_ASB_STATIC_DYNAMIC,
        CPA_DC_ASB_UNCOMP_STATIC_DYNAMIC_WITH_STORED_HDRS,
        CPA_DC_ASB_UNCOMP_STATIC_DYNAMIC_WITH_NO_HDRS
    }
    • enum _CpaDcSkipMode {
        CPA_DC_SKIP_DISABLED,
        CPA_DC_SKIP_AT_START,
        CPA_DC_SKIP_AT_END,
        CPA_DC_SKIP_STRIDE
    }
}
```

5.7 Functions

- **CpaStatus** **cpaDcQueryCapabilities** (**CpaInstanceHandle** dcInstance, **CpaDcInstanceCapabilities** *pInstanceCapabilities)

5.7 Functions

- **CpaStatus cpaDcInitSession** (**CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle, **CpaDcSessionSetupData** *pSessionData, **CpaBufferList** *pContextBuffer, **CpaDcCallbackFn** callbackFn)
 - **CpaStatus cpaDcResetSession** (const **CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle)
 - **CpaStatus cpaDcUpdateSession** (const **CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle, **CpaDcSessionUpdateData** *pSessionUpdateData)
 - **CpaStatus cpaDcRemoveSession** (const **CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle)
 - **CpaStatus cpaDcDeflateCompressBound** (const **CpalInstanceHandle** dclInstance, **CpaDcHuffType** huffType, **Cpa32U** inputSize, **Cpa32U** *outputSize)
 - **CpaStatus cpaDcCompressData** (**CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle, **CpaBufferList** *pSrcBuff, **CpaBufferList** *pDestBuff, **CpaDcRqResults** *pResults, **CpaDcFlush** flushFlag, void *callbackTag)
 - **CpaStatus cpaDcCompressData2** (**CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle, **CpaBufferList** *pSrcBuff, **CpaBufferList** *pDestBuff, **CpaDcOpData** *pOpData, **CpaDcRqResults** *pResults, void *callbackTag)
 - **CpaStatus cpaDcDecompressData** (**CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle, **CpaBufferList** *pSrcBuff, **CpaBufferList** *pDestBuff, **CpaDcRqResults** *pResults, **CpaDcFlush** flushFlag, void *callbackTag)
 - **CpaStatus cpaDcDecompressData2** (**CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle, **CpaBufferList** *pSrcBuff, **CpaBufferList** *pDestBuff, **CpaDcOpData** *pOpData, **CpaDcRqResults** *pResults, void *callbackTag)
 - **CpaStatus cpaDcGenerateHeader** (**CpaDcSessionHandle** pSessionHandle, **CpaFlatBuffer** *pDestBuff, **Cpa32U** *count)
 - **CpaStatus cpaDcGenerateFooter** (**CpaDcSessionHandle** pSessionHandle, **CpaFlatBuffer** *pDestBuff, **CpaDcRqResults** *pResults)
 - **CpaStatus cpaDcGetStats** (**CpalInstanceHandle** dclInstance, **CpaDcStats** *pStatistics)
 - **CpaStatus cpaDcGetNumInstances** (**Cpa16U** *pNumInstances)
 - **CpaStatus cpaDcGetInstances** (**Cpa16U** numInstances, **CpalInstanceHandle** *dclInstances)
 - **CpaStatus cpaDcGetNumIntermediateBuffers** (**CpalInstanceHandle** instanceHandle, **Cpa16U** *pNumBuffers)
 - **CpaStatus cpaDcStartInstance** (**CpalInstanceHandle** instanceHandle, **Cpa16U** numBuffers, **CpaBufferList** **pIntermediateBuffers)
 - **CpaStatus cpaDcStopInstance** (**CpalInstanceHandle** instanceHandle)
 - **CpaStatus cpaDcInstanceGetInfo2** (const **CpalInstanceHandle** instanceHandle, **CpalInstanceInfo2** *pInstanceInfo2)
 - **CpaStatus cpaDcInstanceSetNotificationCb** (const **CpalInstanceHandle** instanceHandle, const **CpaDcInstanceNotificationCbFunc** pInstanceNotificationCb, void *pCallbackTag)
 - **CpaStatus cpaDcGetSessionSize** (**CpalInstanceHandle** dclInstance, **CpaDcSessionSetupData** *pSessionData, **Cpa32U** *pSessionSize, **Cpa32U** *pContextSize)
 - **CpaStatus cpaDcBufferListGetMetaSize** (const **CpalInstanceHandle** instanceHandle, **Cpa32U** numBuffers, **Cpa32U** *pSizeInBytes)
 - **CpaStatus cpaDcGetStatusText** (const **CpalInstanceHandle** dclInstance, const **CpaStatus** errStatus, **Cpa8S** *pStatusText)
 - **CpaStatus cpaDcSetAddressTranslation** (const **CpalInstanceHandle** instanceHandle, **CpaVirtualToPhysical** virtual2Physical)
 - **CpaStatus cpaDcDpGetSessionSize** (**CpalInstanceHandle** dclInstance, **CpaDcSessionSetupData** *pSessionData, **Cpa32U** *pSessionSize)
 - **CpaStatus cpaDcDpUpdateSession** (const **CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle, **CpaDcSessionUpdateData** *pSessionUpdateData)
 - **CpaStatus cpaDcDpRemoveSession** (const **CpalInstanceHandle** dclInstance, **CpaDcSessionHandle** pSessionHandle)
-

5.8 Data Structure Documentation

5.8.1 `_CpaDcInstanceCapabilities` Struct Reference

5.8.1.1 Detailed Description

Implementation Capabilities Structure

This structure contains data relating to the capabilities of an implementation. The capabilities include supported compression algorithms, RFC 1951 options and whether the implementation supports both stateful and stateless compress and decompress sessions.

5.8.1.2 Public Member Functions

- **CPA_BITMAP** (dcChainCapInfo, CPA_DC_CHAIN_CAP_BITMAP_SIZE)

5.8.1.3 Data Fields

- **CpaBoolean** statefulLZSCompression
- **CpaBoolean** statefulLZSDecompression
- **CpaBoolean** statelessLZSCompression
- **CpaBoolean** statelessLZSDecompression
- **CpaBoolean** statefulLZSSCompression
- **CpaBoolean** statefulLZSSDecompression
- **CpaBoolean** statelessLZSSCompression
- **CpaBoolean** statelessLZSSDecompression
- **CpaBoolean** statefulELZSCompression
- **CpaBoolean** statefulELZSDecompression
- **CpaBoolean** statelessELZSCompression
- **CpaBoolean** statelessELZSDecompression
- **CpaBoolean** statefulDeflateCompression
- **CpaBoolean** statefulDeflateDecompression
- **CpaBoolean** statelessDeflateCompression
- **CpaBoolean** statelessDeflateDecompression
- **CpaBoolean** checksumCRC32
- **CpaBoolean** checksumAdler32
- **CpaBoolean** dynamicHuffman
- **CpaBoolean** dynamicHuffmanBufferReq
- **CpaBoolean** precompiledHuffman
- **CpaBoolean** autoSelectBestHuffmanTree
- **Cpa8U** validWindowSizeMaskCompression
- **Cpa8U** validWindowSizeMaskDecompression
- **Cpa32U** internalHuffmanMem
- **CpaBoolean** endOfLastBlock
- **CpaBoolean** reportParityError
- **CpaBoolean** batchAndPack
- **CpaBoolean** compressAndVerify
- **CpaBoolean** compressAndVerifyStrict
- **CpaBoolean** compressAndVerifyAndRecover

5.8.1.4 Member Function Documentation

5.8.1 _CpaDcInstanceCapabilities Struct Reference

```
_CpaDcInstanceCapabilities::CPA_BITMAP( dcChainCapInfo  
                                         CPA_DC_CHAIN_CAP_BITMAP_SIZE  
                                         )
```

Bitmap representing which chaining capabilities are supported by the instance. Bits can be tested using the macro **CPA_BITMAP_BIT_TEST**. The bit positions are those specified in the enumerated type `CpaDcChainCapabilities` in `cpa_dc_chain.h`.

5.8.1.5 Field Documentation

CpaBoolean _CpaDcInstanceCapabilities::statefulLZSCompression

True if the Instance supports Stateful LZS compression

CpaBoolean _CpaDcInstanceCapabilities::statefulLZSDecompression

True if the Instance supports Stateful LZS decompression

CpaBoolean _CpaDcInstanceCapabilities::statelessLZSCompression

True if the Instance supports Stateless LZS compression

CpaBoolean _CpaDcInstanceCapabilities::statelessLZSDecompression

True if the Instance supports Stateless LZS decompression

CpaBoolean _CpaDcInstanceCapabilities::statefulLZSSCompression

True if the Instance supports Stateful LZSS compression

CpaBoolean _CpaDcInstanceCapabilities::statefulLZSSDecompression

True if the Instance supports Stateful LZSS decompression

CpaBoolean _CpaDcInstanceCapabilities::statelessLZSSCompression

True if the Instance supports Stateless LZSS compression

CpaBoolean _CpaDcInstanceCapabilities::statelessLZSSDecompression

True if the Instance supports Stateless LZSS decompression

CpaBoolean _CpaDcInstanceCapabilities::statefulELZSCompression

True if the Instance supports Stateful Extended LZS compression

CpaBoolean _CpaDcInstanceCapabilities::statefulELZSDecompression

True if the Instance supports Stateful Extended LZS decompression

CpaBoolean _CpaDcInstanceCapabilities::statelessELZSCompression

True if the Instance supports Stateless Extended LZS compression

CpaBoolean _CpaDcInstanceCapabilities::statelessELZSDecompression

True if the Instance supports Stateless Extended LZS decompression

CpaBoolean _CpaDcInstanceCapabilities::statefulDeflateCompression

True if the Instance supports Stateful Deflate compression

CpaBoolean _CpaDcInstanceCapabilities::statefulDeflateDecompression

True if the Instance supports Stateful Deflate decompression

5.8.1 _CpaDcInstanceCapabilities Struct Reference

CpaBoolean _CpaDcInstanceCapabilities::statelessDeflateCompression

True if the Instance supports Stateless Deflate compression

CpaBoolean _CpaDcInstanceCapabilities::statelessDeflateDecompression

True if the Instance supports Stateless Deflate decompression

CpaBoolean _CpaDcInstanceCapabilities::checksumCRC32

True if the Instance can calculate a CRC32 checksum over the uncompressed data

CpaBoolean _CpaDcInstanceCapabilities::checksumAdler32

True if the Instance can calculate an Adler-32 checksum over the uncompressed data

CpaBoolean _CpaDcInstanceCapabilities::dynamicHuffman

True if the Instance supports dynamic Huffman trees in deflate blocks

CpaBoolean _CpaDcInstanceCapabilities::dynamicHuffmanBufferReq

True if an Instance specific buffer is required to perform a dynamic Huffman tree deflate request

CpaBoolean _CpaDcInstanceCapabilities::precompiledHuffman

True if the Instance supports precompiled Huffman trees in deflate blocks

CpaBoolean _CpaDcInstanceCapabilities::autoSelectBestHuffmanTree

True if the Instance has the ability to automatically select between different Huffman encoding schemes for better compression ratios

Cpa8U _CpaDcInstanceCapabilities::validWindowSizeMaskCompression

Bits set to '1' for each valid window size supported by the compression implementation

Cpa8U _CpaDcInstanceCapabilities::validWindowSizeMaskDecompression

Bits set to '1' for each valid window size supported by the decompression implementation

Cpa32U _CpaDcInstanceCapabilities::internalHuffmanMem

Number of bytes internally available to be used when constructing dynamic Huffman trees.

CpaBoolean _CpaDcInstanceCapabilities::endOfLastBlock

True if the Instance supports stopping at the end of the last block in a deflate stream during a decompression operation and reporting that the end of the last block has been reached as part of the CpaDcReqStatus data.

CpaBoolean _CpaDcInstanceCapabilities::reportParityError

True if the instance supports parity error reporting.

CpaBoolean _CpaDcInstanceCapabilities::batchAndPack

True if the instance supports 'batch and pack' compression

CpaBoolean _CpaDcInstanceCapabilities::compressAndVerify

True if the instance supports checking that compressed data, generated as part of a compression operation, can be successfully decompressed.

CpaBoolean _CpaDcInstanceCapabilities::compressAndVerifyStrict

5.8.2 _CpaDcSessionSetupData Struct Reference

True if compressAndVerify is 'strictly' enabled for the instance. If strictly enabled, compressAndVerify will be enabled by default for compression operations and cannot be disabled by setting opData.compressAndVerify=0 with **cpaDcCompressData2()**. Compression operations with opData.compressAndVerify=0 will return a CPA_STATUS_INVALID_PARAM error status when in compressAndVerify strict mode.

CpaBoolean _CpaDcInstanceCapabilities::compressAndVerifyAndRecover

True if the instance supports recovering from errors detected by compressAndVerify by generating a stored block in the compressed output data buffer. This stored block replaces any compressed content that resulted in a compressAndVerify error.

5.8.2 _CpaDcSessionSetupData Struct Reference

5.8.2.1 Detailed Description

Session Setup Data.

This structure contains data relating to setting up a session. The client needs to complete the information in this structure in order to setup a session.

Deprecated:

As of v1.6 of the Compression API, the fileType and deflateWindowSize fields in this structure have been deprecated and should not be used.

5.8.2.2 Data Fields

- **CpaDcCompLvl compLevel**
- **CpaDcCompType compType**
- **CpaDcHuffType huffType**
- **CpaDcAutoSelectBest autoSelectBestHuffmanTree**
- **CpaDcFileType fileType**
- **CpaDcSessionDir sessDirection**
- **CpaDcSessionState sessState**
- **Cpa32U deflateWindowSize**
- **CpaDcChecksum checksum**

5.8.2.3 Field Documentation

CpaDcCompLvl _CpaDcSessionSetupData::compLevel

Compression Level from CpaDcCompLvl

CpaDcCompType _CpaDcSessionSetupData::compType

Compression type from CpaDcCompType

CpaDcHuffType _CpaDcSessionSetupData::huffType

Huffman type from CpaDcHuffType

CpaDcAutoSelectBest _CpaDcSessionSetupData::autoSelectBestHuffmanTree

Indicates if and how the implementation should select the best Huffman encoding.

CpaDcFileType _CpaDcSessionSetupData::fileType

5.8.3 _CpaDcSessionUpdateData Struct Reference

File type for the purpose of determining Huffman Codes from CpaDcFileType. As of v1.6 of the Compression API, this field has been deprecated and should not be used.

CpaDcSessionDir _CpaDcSessionSetupData::sessDirection

Session direction indicating whether session is used for compression, decompression or both

CpaDcSessionState _CpaDcSessionSetupData::sessState

Session state indicating whether the session should be configured as stateless or stateful

Cpa32U _CpaDcSessionSetupData::deflateWindowSize

Base 2 logarithm of maximum window size minus 8 (a value of 7 for a 32K window size). Permitted values are 0 to 7. cpaDcDecompressData may return an error if an attempt is made to decompress a stream that has a larger window size. As of v1.6 of the Compression API, this field has been deprecated and should not be used.

CpaDcChecksum _CpaDcSessionSetupData::checksum

Desired checksum required for the session

5.8.3 _CpaDcSessionUpdateData Struct Reference

5.8.3.1 Detailed Description

Session Update Data.

This structure contains data relating to updating up a session. The client needs to complete the information in this structure in order to update a session.

5.8.3.2 Data Fields

- **CpaDcCompLvl compLevel**
- **CpaDcHuffType huffType**
- **CpaBoolean enableDmm**

5.8.3.3 Field Documentation

CpaDcCompLvl _CpaDcSessionUpdateData::compLevel

Compression Level from CpaDcCompLvl

CpaDcHuffType _CpaDcSessionUpdateData::huffType

Huffman type from CpaDcHuffType

CpaBoolean _CpaDcSessionUpdateData::enableDmm

Desired DMM required for the session

5.8.4 _CpaDcStats Struct Reference

5.8.4 _CpaDcStats Struct Reference

5.8.4.1 Detailed Description

Compression Statistics Data.

This structure contains data elements corresponding to statistics. Statistics are collected on a per instance basis and include: jobs submitted and completed for both compression and decompression.

5.8.4.2 Data Fields

- **Cpa64U numCompRequests**
- **Cpa64U numCompRequestsErrors**
- **Cpa64U numCompCompleted**
- **Cpa64U numCompCompletedErrors**
- **Cpa64U numCompCnvErrorsRecovered**
- **Cpa64U numDecompRequests**
- **Cpa64U numDecompRequestsErrors**
- **Cpa64U numDecompCompleted**
- **Cpa64U numDecompCompletedErrors**

5.8.4.3 Field Documentation

Cpa64U _CpaDcStats::numCompRequests

Number of successful compression requests

Cpa64U _CpaDcStats::numCompRequestsErrors

Number of compression requests that had errors and could not be processed

Cpa64U _CpaDcStats::numCompCompleted

Compression requests completed

Cpa64U _CpaDcStats::numCompCompletedErrors

Compression requests not completed due to errors

Cpa64U _CpaDcStats::numCompCnvErrorsRecovered

Compression CNV errors that have been recovered

Cpa64U _CpaDcStats::numDecompRequests

Number of successful decompression requests

Cpa64U _CpaDcStats::numDecompRequestsErrors

Number of decompression requests that had errors and could not be processed

Cpa64U _CpaDcStats::numDecompCompleted

Decompression requests completed

Cpa64U _CpaDcStats::numDecompCompletedErrors

Decompression requests not completed due to errors

5.8.5 _CpaDcRqResults Struct Reference

5.8.5.1 Detailed Description

Request results data

This structure contains the request results.

For stateful sessions the status, produced, consumed and endOfLastBlock results are per request values while the checksum value is cumulative across all requests on the session so far. In this case the checksum value is not guaranteed to be correct until the final compressed data has been processed.

For stateless sessions, an initial checksum value is passed into the stateless operation. Once the stateless operation completes, the checksum value will contain checksum produced by the operation.

5.8.5.2 Data Fields

- **CpaDcReqStatus** status
- **Cpa32U** produced
- **Cpa32U** consumed
- **Cpa32U** checksum
- **CpaBoolean** endOfLastBlock

5.8.5.3 Field Documentation

CpaDcReqStatus _CpaDcRqResults::status

Additional status details from accelerator

Cpa32U _CpaDcRqResults::produced

Octets produced by the operation

Cpa32U _CpaDcRqResults::consumed

Octets consumed by the operation

Cpa32U _CpaDcRqResults::checksum

Initial checksum passed into stateless operations. Will also be updated to the checksum produced by the operation

CpaBoolean _CpaDcRqResults::endOfLastBlock

Decompression operation has stopped at the end of the last block in a deflate stream.

5.8.6 _CpaDcSkipData Struct Reference

5.8.6.1 Detailed Description

Skip Region Data.

This structure contains data relating to configuring skip region behaviour. A skip region is a region of an input buffer that should be omitted from processing or a region that should be inserted into the output buffer.

5.8.6 _CpaDcSkipData Struct Reference

5.8.6.2 Data Fields

- **CpaDcSkipMode skipMode**
- **Cpa32U skipLength**
- **Cpa32U strideLength**
- **Cpa32U firstSkipOffset**

5.8.6.3 Field Documentation

CpaDcSkipMode _CpaDcSkipData::skipMode

Skip mode from CpaDcSkipMode for buffer processing

Cpa32U _CpaDcSkipData::skipLength

Number of bytes to skip when skip mode is enabled

Cpa32U _CpaDcSkipData::strideLength

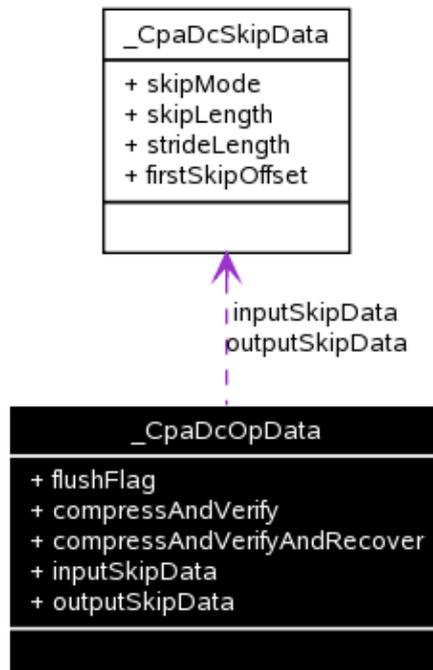
Size of the stride between skip regions when skip mode is set to CPA_DC_SKIP_STRIDE.

Cpa32U _CpaDcSkipData::firstSkipOffset

Number of bytes to skip in a buffer before reading/writing the input/output data.

5.8.7 _CpaDcOpData Struct Reference

Collaboration diagram for _CpaDcOpData:



5.8.7.1 Detailed Description

(De)Compression request input parameters.

This structure contains the request information for use with compression operations.

5.8.7 _CpaDcOpData Struct Reference

5.8.7.2 Data Fields

- **CpaDcFlush flushFlag**
- **CpaBoolean compressAndVerify**
- **CpaBoolean compressAndVerifyAndRecover**
- **CpaDcSkipData inputSkipData**
- **CpaDcSkipData outputSkipData**

5.8.7.3 Field Documentation

CpaDcFlush _CpaDcOpData::flushFlag

Indicates the type of flush to be performed.

CpaBoolean _CpaDcOpData::compressAndVerify

If set to true, for compression operations, the implementation will verify that compressed data, generated by the compression operation, can be successfully decompressed. This behavior is only supported for stateless compression. This behavior is only supported on instances that support the compressAndVerify capability.

CpaBoolean _CpaDcOpData::compressAndVerifyAndRecover

If set to true, for compression operations, the implementation will automatically recover from a compressAndVerify error. This behavior is only supported for stateless compression. This behavior is only supported on instances that support the compressAndVerifyAndRecover capability. The compressAndVerify field in CpaDcOpData MUST be set to CPA_TRUE if compressAndVerifyAndRecover is set to CPA_TRUE.

CpaDcSkipData _CpaDcOpData::inputSkipData

Optional skip regions in the input buffers

CpaDcSkipData _CpaDcOpData::outputSkipData

Optional skip regions in the output buffers

5.9 Define Documentation

```
#define CPA_DC_API_VERSION_NUM_MAJOR
```

File: `cpa_dc.h`

CPA Dc Major Version Number

The CPA_DC API major version number. This number will be incremented when significant churn to the API has occurred. The combination of the major and minor number definitions represent the complete version number for this interface.

```
#define CPA_DC_API_VERSION_NUM_MINOR
```

File: `cpa_dc.h`

CPA DC Minor Version Number

5.9 Define Documentation

The CPA_DC API minor version number. This number will be incremented when minor changes to the API has occurred. The combination of the major and minor number definitions represent the complete version number for this interface.

```
#define CPA_DC_CHAIN_CAP_BITMAP_SIZE
```

Size of bitmap needed for compression chaining capabilities.

Defines the number of bits in the bitmap to represent supported chaining capabilities `dcChainCapInfo`. Should be set to at least one greater than the largest value in the enumerated type **CpaDcChainOperations**, so that the value of the enum constant can also be used as the bit position in the bitmap.

A larger value was chosen to allow for extensibility without the need to change the size of the bitmap (to ease backwards compatibility in future versions of the API).

```
#define CPA_DC_BAD_DATA
```

Service specific return codes

Compression specific return codes
Input data in invalid

5.10 Typedef Documentation

```
typedef void* CpaDcSessionHandle
```

Compression API session handle type

Handle used to uniquely identify a Compression API session handle. This handle is established upon registration with the API using **cpaDcInitSession()**.

```
typedef enum _CpaDcFileType CpaDcFileType
```

Supported file types

This enumerated lists identified file types. Used to select Huffman trees. File types are associated with Precompiled Huffman Trees.

Deprecated:

As of v1.6 of the Compression API, this enum has been deprecated.

```
typedef enum _CpaDcFlush CpaDcFlush
```

Supported flush flags

This enumerated list identifies the types of flush that can be specified for stateful and stateless `cpaDcCompressData` and `cpaDcDecompressData` functions.

```
typedef enum _CpaDcHuffType CpaDcHuffType
```

Supported Huffman Tree types

This enumeration lists support for Huffman Tree types. Selecting Static Huffman trees generates compressed blocks with an RFC 1951 header specifying "compressed with fixed Huffman trees".

Selecting Full Dynamic Huffman trees generates compressed blocks with an RFC 1951 header specifying "compressed with dynamic Huffman codes". The headers are calculated on the data being compressed, requiring two passes.

5.10 Typedef Documentation

Selecting Precompiled Huffman Trees generates blocks with RFC 1951 dynamic headers. The headers are pre-calculated and are specified by the file type.

typedef enum _CpaDcCompType CpaDcCompType

Supported compression types

This enumeration lists the supported data compression algorithms. In combination with CpaDcChecksum it is used to decide on the file header and footer format.

Deprecated:

As of v1.6 of the Compression API, CPA_DC_LZS, CPA_DC_ELZS and CPA_DC_LZSS have been deprecated and should not be used.

typedef enum _CpaDcChecksum CpaDcChecksum

Supported checksum algorithms

This enumeration lists the supported checksum algorithms Used to decide on file header and footer specifics.

typedef enum _CpaDcSessionDir CpaDcSessionDir

Supported session directions

This enumerated list identifies the direction of a session. A session can be compress, decompress or both.

typedef enum _CpaDcSessionState CpaDcSessionState

Supported session state settings

This enumerated list identifies the stateful setting of a session. A session can be either stateful or stateless.

Stateful sessions are limited to have only one in-flight message per session. This means a compress or decompress request must be complete before a new request can be started. This applies equally to sessions that are uni-directional in nature and sessions that are combined compress and decompress. Completion occurs when the synchronous function returns, or when the asynchronous callback function has completed.

typedef enum _CpaDcCompLvl CpaDcCompLvl

Supported compression levels

This enumerated lists the supported compressed levels. Lower values will result in less compressibility in less time.

typedef enum _CpaDcReqStatus CpaDcReqStatus

Supported additional details from accelerator

This enumeration lists the supported additional details from the accelerator. These may be useful in determining the best way to recover from a failure.

typedef enum _CpaDcAutoSelectBest CpaDcAutoSelectBest

Supported modes for automatically selecting the best compression type.

This enumeration lists the supported modes for automatically selecting the best Huffman encoding which would lead to the best compression results.

5.10 Typedef Documentation

typedef enum `_CpaDcSkipMode` `CpaDcSkipMode`

Supported modes for skipping regions of input or output buffers.

This enumeration lists the supported modes for skipping regions of input or output buffers.

typedef void(* `CpaDcCallbackFn`)(void *callbackTag, `CpaStatus` status)

Definition of callback function invoked for asynchronous cpaDc requests.

This is the prototype for the cpaDc compression callback functions. The callback function is registered by the application using the `cpaDcInitSession()` function call.

Context:

This callback function can be executed in a context that DOES NOT permit sleeping to occur.

Assumptions:

None

Side-Effects:

None

Reentrant:

No

Thread-safe:

Yes

Parameters:

callbackTag User-supplied value to help identify request.

status Status of the operation. Valid values are CPA_STATUS_SUCCESS, CPA_STATUS_FAIL and CPA_STATUS_UNSUPPORTED.

Return values:

None

Precondition:

Component has been initialized.

Postcondition:

None

Note:

None

See also:

None

typedef struct `_CpaDcInstanceCapabilities` `CpaDcInstanceCapabilities`

Implementation Capabilities Structure

This structure contains data relating to the capabilities of an implementation. The capabilities include supported compression algorithms, RFC 1951 options and whether the implementation supports both stateful and stateless compress and decompress sessions.

typedef struct `_CpaDcSessionSetupData` `CpaDcSessionSetupData`

Session Setup Data.

5.10 Typedef Documentation

This structure contains data relating to setting up a session. The client needs to complete the information in this structure in order to setup a session.

Deprecated:

As of v1.6 of the Compression API, the `fileType` and `deflateWindowSize` fields in this structure have been deprecated and should not be used.

```
typedef struct _CpaDcSessionUpdateData CpaDcSessionUpdateData  
    Session Update Data.
```

This structure contains data relating to updating up a session. The client needs to complete the information in this structure in order to update a session.

```
typedef struct _CpaDcStats CpaDcStats  
    Compression Statistics Data.
```

This structure contains data elements corresponding to statistics. Statistics are collected on a per instance basis and include: jobs submitted and completed for both compression and decompression.

```
typedef struct _CpaDcRqResults CpaDcRqResults  
    Request results data
```

This structure contains the request results.

For stateful sessions the status, produced, consumed and `endOfLastBlock` results are per request values while the checksum value is cumulative across all requests on the session so far. In this case the checksum value is not guaranteed to be correct until the final compressed data has been processed.

For stateless sessions, an initial checksum value is passed into the stateless operation. Once the stateless operation completes, the checksum value will contain checksum produced by the operation.

```
typedef struct _CpaDcSkipData CpaDcSkipData  
    Skip Region Data.
```

This structure contains data relating to configuring skip region behaviour. A skip region is a region of an input buffer that should be omitted from processing or a region that should be inserted into the output buffer.

```
typedef struct _CpaDcOpData CpaDcOpData  
    (De)Compression request input parameters.
```

This structure contains the request information for use with compression operations.

```
typedef void(* CpaDcInstanceNotificationCbFunc)(const CpaInstanceHandle instanceHandle, void  
*pCallbackTag, const CpaInstanceEvent instanceEvent)
```

Callback function for instance notification support.

This is the prototype for the instance notification callback function. The callback function is passed in as a parameter to the `cpaDcInstanceSetNotificationCb` function.

Context:

This function will be executed in a context that requires that sleeping **MUST NOT** be permitted.

Assumptions:

5.11 Enumeration Type Documentation

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

- [in] *instanceHandle* Instance handle.
- [in] *pCallbackTag* Opaque value provided by user while making individual function calls.
- [in] *instanceEvent* The event that will trigger this function to get invoked.

Return values:

None

Precondition:

Component has been initialized and the notification function has been set via the `cpaDcInstanceSetNotificationCb` function.

Postcondition:

None

Note:

None

See also:

`cpaDcInstanceSetNotificationCb()`,

5.11 Enumeration Type Documentation

enum `_CpaDcFileType`

Supported file types

This enumerated lists identified file types. Used to select Huffman trees. File types are associated with Precompiled Huffman Trees.

Deprecated:

As of v1.6 of the Compression API, this enum has been deprecated.

Enumerator:

- `CPA_DC_FT_ASCII` ASCII File Type
- `CPA_DC_FT_CSS` Cascading Style Sheet File Type
- `CPA_DC_FT_HTML` HTML or XML (or similar) file type
- `CPA_DC_FT_JAVA` File Java code or similar
- `CPA_DC_FT_OTHER` Other file types

5.11 Enumeration Type Documentation

enum **_CpaDcFlush**

Supported flush flags

This enumerated list identifies the types of flush that can be specified for stateful and stateless `cpaDcCompressData` and `cpaDcDecompressData` functions.

Enumerator:

- CPA_DC_FLUSH_NONE* No flush request.
- CPA_DC_FLUSH_FINAL* Indicates that the input buffer contains all of the data for the compression session allowing any buffered data to be released. For Deflate, BFINAL is set in the compression header.
- CPA_DC_FLUSH_SYNC* Used for stateful deflate compression to indicate that all pending output is flushed, byte aligned, to the output buffer. The session state is not reset.
- CPA_DC_FLUSH_FULL* Used for deflate compression to indicate that all pending output is flushed to the output buffer and the session state is reset.

enum **_CpaDcHuffType**

Supported Huffman Tree types

This enumeration lists support for Huffman Tree types. Selecting Static Huffman trees generates compressed blocks with an RFC 1951 header specifying "compressed with fixed Huffman trees".

Selecting Full Dynamic Huffman trees generates compressed blocks with an RFC 1951 header specifying "compressed with dynamic Huffman codes". The headers are calculated on the data being compressed, requiring two passes.

Selecting Precompiled Huffman Trees generates blocks with RFC 1951 dynamic headers. The headers are pre-calculated and are specified by the file type.

Enumerator:

- CPA_DC_HT_STATIC* Static Huffman Trees
- CPA_DC_HT_PRECOMP* Precompiled Huffman Trees
- CPA_DC_HT_FULL_DYNAMIC* Full Dynamic Huffman Trees

enum **_CpaDcCompType**

Supported compression types

This enumeration lists the supported data compression algorithms. In combination with `CpaDcChecksum` it is used to decide on the file header and footer format.

Deprecated:

As of v1.6 of the Compression API, `CPA_DC_LZS`, `CPA_DC_ELZS` and `CPA_DC_LZSS` have been deprecated and should not be used.

Enumerator:

- CPA_DC_LZS* LZS Compression
- CPA_DC_ELZS* Extended LZS Compression
- CPA_DC_LZSS* LZSS Compression
- CPA_DC_DEFLATE* Deflate Compression

enum **_CpaDcChecksum**

5.11 Enumeration Type Documentation

Supported checksum algorithms

This enumeration lists the supported checksum algorithms Used to decide on file header and footer specifics.

Enumerator:

<i>CPA_DC_NONE</i>	No checksums required
<i>CPA_DC_CRC32</i>	Application requires a CRC32 checksum
<i>CPA_DC_ADLER32</i>	Application requires Adler-32 checksum
<i>CPA_DC_CRC32_ADLER32</i>	Application requires both CRC32 and Adler-32 checksums

enum **_CpaDcSessionDir**

Supported session directions

This enumerated list identifies the direction of a session. A session can be compress, decompress or both.

Enumerator:

<i>CPA_DC_DIR_COMPRESS</i>	Session will be used for compression
<i>CPA_DC_DIR_DECOMPRESS</i>	Session will be used for decompression
<i>CPA_DC_DIR_COMBINED</i>	Session will be used for both compression and decompression

enum **_CpaDcSessionState**

Supported session state settings

This enumerated list identifies the stateful setting of a session. A session can be either stateful or stateless.

Stateful sessions are limited to have only one in-flight message per session. This means a compress or decompress request must be complete before a new request can be started. This applies equally to sessions that are uni-directional in nature and sessions that are combined compress and decompress. Completion occurs when the synchronous function returns, or when the asynchronous callback function has completed.

Enumerator:

<i>CPA_DC_STATEFUL</i>	Session will be stateful, implying that state may need to be saved in some situations
<i>CPA_DC_STATELESS</i>	Session will be stateless, implying no state will be stored

enum **_CpaDcCompLvl**

Supported compression levels

This enumerated lists the supported compressed levels. Lower values will result in less compressibility in less time.

Enumerator:

<i>CPA_DC_L1</i>	Compression level 1
<i>CPA_DC_L2</i>	Compression level 2
<i>CPA_DC_L3</i>	Compression level 3
<i>CPA_DC_L4</i>	Compression level 4
<i>CPA_DC_L5</i>	Compression level 5
<i>CPA_DC_L6</i>	Compression level 6
<i>CPA_DC_L7</i>	Compression level 7
<i>CPA_DC_L8</i>	Compression level 8
<i>CPA_DC_L9</i>	Compression level 9

5.11 Enumeration Type Documentation

enum **_CpaDcReqStatus**

Supported additional details from accelerator

This enumeration lists the supported additional details from the accelerator. These may be useful in determining the best way to recover from a failure.

Enumerator:

<i>CPA_DC_OK</i>	No error detected by compression slice
<i>CPA_DC_INVALID_BLOCK_TYPE</i>	Invalid block type (type == 3)
<i>CPA_DC_BAD_STORED_BLOCK_LEN</i>	Stored block length did not match one's complement
<i>CPA_DC_TOO_MANY_CODES</i>	Too many length or distance codes
<i>CPA_DC_INCOMPLETE_CODE_LENS</i>	Code length codes incomplete
<i>CPA_DC_REPEATED_LENS</i>	Repeated lengths with no first length
<i>CPA_DC_MORE_REPEAT</i>	Repeat more than specified lengths
<i>CPA_DC_BAD_LITERAL_CODES</i>	Invalid literal/length code lengths
<i>CPA_DC_BAD_DIST_CODES</i>	Invalid distance code lengths
<i>CPA_DC_INVALID_CODE</i>	Invalid literal/length or distance code in fixed or dynamic block
<i>CPA_DC_INVALID_DIST</i>	Distance is too far back in fixed or dynamic block
<i>CPA_DC_OVERFLOW</i>	Overflow detected. This is an indication that output buffer has overflowed. For stateful sessions, this is a warning (the input can be adjusted and resubmitted). For stateless sessions this is an error condition
<i>CPA_DC_SOFTERR</i>	Other non-fatal detected
<i>CPA_DC_FATALERR</i>	Fatal error detected
<i>CPA_DC_MAX_RESUBITERR</i>	On an error being detected, the firmware attempted to correct and resubmitted the request, however, the maximum resubmit value was exceeded
<i>CPA_DC_INCOMPLETE_FILE_ERR</i>	The input file is incomplete. Note this is an indication that the request was submitted with a <i>CPA_DC_FLUSH_FINAL</i> , however, a <i>BFINAL</i> bit was not found in the request
<i>CPA_DC_WDOG_TIMER_ERR</i>	The request was not completed as a watchdog timer hardware event occurred
<i>CPA_DC_EP_HARDWARE_ERR</i>	Request was not completed as an end point hardware error occurred (for example, a parity error)
<i>CPA_DC_VERIFY_ERROR</i>	Error detected during "compress and verify" operation
<i>CPA_DC_EMPTY_DYM_BLK</i>	Decompression request contained an empty dynamic stored block (not supported)

enum **_CpaDcAutoSelectBest**

Supported modes for automatically selecting the best compression type.

This enumeration lists the supported modes for automatically selecting the best Huffman encoding which would lead to the best compression results.

Enumerator:

<i>CPA_DC_ASB_DISABLED</i>	Auto select best mode is disabled
<i>CPA_DC_ASB_STATIC_DYNAMIC</i>	Auto select between static and dynamic compression
<i>CPA_DC_ASB_UNCOMP_STATIC_DYNAMIC_WITH_STORED_HDRS</i>	

CPA_DC_ASB_UNCOMP_STATIC_DYNAMIC_WITH_NO_HDRS

Auto select between uncompressed, static and dynamic compression, using stored block deflate headers if uncompressed is selected

Auto select between uncompressed, static and dynamic compression, using no deflate headers if uncompressed is selected

enum **_CpaDcSkipMode**

Supported modes for skipping regions of input or output buffers.

This enumeration lists the supported modes for skipping regions of input or output buffers.

Enumerator:

CPA_DC_SKIP_DISABLED Skip mode is disabled

CPA_DC_SKIP_AT_START Skip region is at the start of the buffer.

CPA_DC_SKIP_AT_END Skip region is at the end of the buffer.

CPA_DC_SKIP_STRIDE Skip region occurs at regular intervals within the buffer.

CpaDcSkipData.strideLength specifies the number of bytes between each skip region.

5.12 Function Documentation

```
CpaStatus cpaDcQueryCapabilities ( CpaInstanceHandle dclInstance,
CpaDcInstanceCapabilities * pInstanceCapabilities
)
```

Retrieve Instance Capabilities

This function is used to retrieve the capabilities matrix of an instance.

Context:

This function shall not be called in an interrupt context.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes

Reentrant:

No

Thread-safe:

5.12 Function Documentation

Yes

Parameters:

[in] *dclInstance* Instance handle derived from discovery functions
[in, out] *pInstanceCapabilities* Pointer to a capabilities struct

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_RESOURCE Error related to system resources.
CPA_STATUS_RESTARTING API implementation is restarting. Resubmit the request.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

Note:

Only a synchronous version of this function is provided.

See also:

None

```
CpaStatus cpaDclnitSession ( CpaInstanceHandle dclInstance,  
                           CpaDcSessionHandle pSessionHandle,  
                           CpaDcSessionSetupData * pSessionData,  
                           CpaBufferList * pContextBuffer,  
                           CpaDcCallbackFn callbackFn  
                           )
```

Initialize compression decompression session

This function is used to initialize a compression/decompression session. This function specifies a BufferList for context data. A single session can be used for both compression and decompression requests. Clients MAY register a callback function for the compression service using this function. This function returns a unique session handle each time this function is invoked. If the session has been configured with a callback function, then the order of the callbacks are guaranteed to be in the same order the compression or decompression requests were submitted for each session, so long as a single thread of execution is used for job submission.

Context:

This is a synchronous function and it cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

5.12 Function Documentation

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dclInstance</i>	Instance handle derived from discovery functions.
[in, out]	<i>pSessionHandle</i>	Pointer to a session handle.
[in, out]	<i>pSessionData</i>	Pointer to a user instantiated structure containing session data.
[in]	<i>pContextBuffer</i>	pointer to context buffer. This is not required for stateless operations. The total size of the buffer list must be equal to or larger than the specified contextSize retrieved from the cpaDcGetSessionSize() function.
[in]	<i>callbackFn</i>	For synchronous operation this callback shall be a null pointer.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

dclInstance has been started using cpaDcStartInstance.

Postcondition:

None

Note:

Only a synchronous version of this function is provided.

This initializes opaque data structures in the session handle. Data compressed under this session will be compressed to the level specified in the pSessionData structure. Lower compression level numbers indicate a request for faster compression at the expense of compression ratio. Higher compression level numbers indicate a request for higher compression ratios at the expense of execution time.

The session is opaque to the user application and the session handle contains job specific data.

The pointer to the ContextBuffer will be stored in session specific data if required by the implementation.

It is not permitted to have multiple outstanding asynchronous compression requests for stateful sessions. It is possible to add parallelization to compression by using multiple sessions.

The window size specified in the pSessionData must be match exactly one of the supported window sizes specified in the capabilities structure. If a bi-directional session is being initialized, then the window size must be valid for both compress and decompress.

See also:

None

5.12 Function Documentation

```
CpaStatus cpaDcResetSession ( const CpaInstanceHandle dclInstance,  
                             CpaDcSessionHandle pSessionHandle  
                             )
```

Compression Session Reset Function.

This function will reset a previously initialized session handle. Reset will fail if outstanding calls still exist for the initialized session handle. The client needs to retry the reset function at a later time.

Context:

This is a synchronous function that cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

No.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Instance handle.
[in, out] *pSessionHandle* Session handle.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_RETRY Resubmit the request.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

The component has been initialized via `cpaDcStartInstance` function. The session has been initialized via `cpaDcInitSession` function.

Postcondition:

None

Note:

This is a synchronous function and has no completion callback associated with it.

See also:

`cpaDcInitSession()`

```
CpaStatus cpaDcUpdateSession ( const CpaInstanceHandle dclInstance,  
                              CpaDcSessionHandle pSessionHandle,  
                              CpaDcSessionUpdateData * pSessionUpdateData  
                              )
```

5.12 Function Documentation

Compression Session Update Function.

This function is used to modify some select compression parameters of a previously initialized session handle. The update will fail if resources required for the new session settings are not available. Specifically, this function may fail if no intermediate buffers are associated with the instance, and the intended change would require these buffers. This function can be called at any time after a successful call of **cpaDclInitSession()**. This function does not change the parameters to compression request already in flight.

Context:

This is a synchronous function that cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

No.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dclInstance</i>	Instance handle.
[in, out]	<i>pSessionHandle</i>	Session handle.
[in]	<i>pSessionUpdateData</i>	Session Data.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request

Precondition:

The component has been initialized via `cpaDclStartInstance` function. The session has been initialized via `cpaDclInitSession` function.

Postcondition:

None

Note:

This is a synchronous function and has no completion callback associated with it.

See also:

cpaDclInitSession()

```
CpaStatus cpaDclRemoveSession ( const CpaInstanceHandle dclInstance,  
                                CpaDclSessionHandle pSessionHandle
```

)

Compression Session Remove Function.

This function will remove a previously initialized session handle and the installed callback handler function. Removal will fail if outstanding calls still exist for the initialized session handle. The client needs to retry the remove function at a later time. The memory for the session handle **MUST** not be freed until this call has completed successfully.

Context:

This is a synchronous function that cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

No.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Instance handle.
 [in, out] *pSessionHandle* Session handle.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_RETRY Resubmit the request.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_RESOURCE Error related to system resources.
CPA_STATUS_RESTARTING API implementation is restarting. Resubmit the request.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

The component has been initialized via *cpaDcStartInstance* function.

Postcondition:

None

Note:

This is a synchronous function and has no completion callback associated with it.

See also:

cpaDclInitSession()

5.12 Function Documentation

```
CpaStatus cpaDcDeflateCompressBound ( const CpaInstanceHandle dclInstance,  
                                     CpaDcHuffType huffType,  
                                     Cpa32U inputSize,  
                                     Cpa32U * outputSize  
                                     )
```

Deflate Compression Bound API

This function provides the maximum output buffer size for a Deflate compression operation in the "worst case" (non-compressible) scenario. It's primary purpose is for output buffer memory allocation.

Context:

This is a synchronous function that will not sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

No.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Instance handle.
[in] *huffType* CpaDcHuffType to be used with this operation.
[in] *inputSize* Input Buffer size.
[out] *outputSize* Maximum output buffer size.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

The component has been initialized via `cpaDcStartInstance` function.

Postcondition:

None

Note:

This is a synchronous function and has no completion callback associated with it.

See also:

None

```

CpaStatus cpaDcCompressData ( CpaInstanceHandle   dclInstance,
                               CpaDcSessionHandle pSessionHandle,
                               CpaBufferList *      pSrcBuff,
                               CpaBufferList *      pDestBuff,
                               CpaDcRqResults *     pResults,
                               CpaDcFlush          flushFlag,
                               void *                callbackTag
                               )

```

Submit a request to compress a buffer of data.

This API consumes data from the input buffer and generates compressed data in the output buffer.

Context:

When called as an asynchronous function it cannot sleep. It can be executed in a context that does not permit sleeping. When called as a synchronous function it may sleep. It MUST NOT be executed in a context that DOES NOT permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes when configured to operate in synchronous mode.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dclInstance</i>	Target service instance.
[in, out]	<i>pSessionHandle</i>	Session handle.
[in]	<i>pSrcBuff</i>	Pointer to data buffer for compression.
[in]	<i>pDestBuff</i>	Pointer to buffer space for data after compression.
[in, out]	<i>pResults</i>	Pointer to results structure
[in]	<i>flushFlag</i>	Indicates the type of flush to be performed.
[in]	<i>callbackTag</i>	User supplied value to help correlate the callback with its associated request.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_RETRY</i>	Resubmit the request.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_DC_BAD_DATA</i>	The input data was not properly formed.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

pSessionHandle has been setup using **cpaDclInitSession()**

5.12 Function Documentation

Postcondition:

pSessionHandle has session related state information

Note:

This function passes control to the compression service for processing

In synchronous mode the function returns the error status returned from the service. In asynchronous mode the status is returned by the callback function.

This function may be called repetitively with input until all of the input has been consumed by the compression service and all the output has been produced.

When this function returns, it may be that all of the available data in the input buffer has not been compressed. This situation will occur when there is insufficient space in the output buffer. The calling application should note the amount of data processed, and clear the output buffer and then submit the request again, with the input buffer pointer to the data that was not previously compressed.

Relationship between input buffers and results buffers.

1. Implementations of this API must not modify the individual flat buffers of the input buffer list.
2. The implementation communicates the amount of data consumed from the source buffer list via pResults->consumed arg.
3. The implementation communicates the amount of data in the destination buffer list via pResults->produced arg.

Source Buffer Setup Rules

1. The buffer list must have the correct number of flat buffers. This is specified by the numBuffers element of the CpaBufferList.
2. Each flat buffer must have a pointer to contiguous memory that has been allocated by the calling application. The number of octets to be compressed or decompressed must be stored in the dataLenInBytes element of the flat buffer.
3. It is permissible to have one or more flat buffers with a zero length data store. This function will process all flat buffers until the destination buffer is full or all source data has been processed. If a buffer has zero length, then no data will be processed from that buffer.

Source Buffer Processing Rules.

1. The buffer list is processed in index order - SrcBuff->pBuffers[0] will be completely processed before SrcBuff->pBuffers[1] begins to be processed.
2. The application must drain the destination buffers. If the source data was not completely consumed, the application must resubmit the request.
3. On return, the pResults->consumed will indicate the number of bytes consumed from the input buffers.

Destination Buffer Setup Rules

1. The destination buffer list must have storage for processed data. This implies at least one flat buffer must exist in the buffer list.
2. For each flat buffer in the buffer list, the dataLenInBytes element must be set to the size of the buffer space.
3. It is permissible to have one or more flat buffers with a zero length data store. If a buffer has zero length, then no data will be added to that buffer.

Destination Buffer Processing Rules.

5.12 Function Documentation

1. The buffer list is processed in index order - DestBuff->pBuffers[0] will be completely processed before DestBuff->pBuffers[1] begins to be processed.
2. On return, the pResults->produced will indicate the number of bytes written to the output buffers.
3. If processing has not been completed, the application must drain the destination buffers and resubmit the request. The application must reset the dataLenInBytes for each flat buffer in the destination buffer list.

Checksum rules. If a checksum is specified in the session setup data, then:

1. For the first request for a particular data segment the checksum is initialised internally by the implementation.
2. The checksum is maintained by the implementation between calls until the flushFlag is set to CPA_DC_FLUSH_FINAL indicating the end of a particular data segment.
 - a. Intermediate checksum values are returned to the application, via the CpaDcRqResults structure, in response to each request. However these checksum values are not guaranteed to be valid until the call with flushFlag set to CPA_DC_FLUSH_FINAL completes successfully.

The application should set flushFlag to CPA_DC_FLUSH_FINAL to indicate processing a particular data segment is complete. It should be noted that this function may have to be called more than once to process data after the flushFlag parameter has been set to CPA_DC_FLUSH_FINAL if the destination buffer fills. Refer to buffer processing rules.

For stateful operations, when the function is invoked with flushFlag set to CPA_DC_FLUSH_NONE or CPA_DC_FLUSH_SYNC, indicating more data is yet to come, the function may or may not retain data. When the function is invoked with flushFlag set to CPA_DC_FLUSH_FULL or CPA_DC_FLUSH_FINAL, the function will process all buffered data.

For stateless operations, CPA_DC_FLUSH_FINAL will cause the BFINAL bit to be set for deflate compression. The initial checksum for the stateless operation should be set to 0. CPA_DC_FLUSH_NONE and CPA_DC_FLUSH_SYNC should not be used for stateless operations.

It is possible to maintain checksum and length information across **cpaDcCompressData()** calls with a stateless session without maintaining the full history state that is maintained by a stateful session. In this mode of operation, an initial checksum value of 0 is passed into the first **cpaDcCompressData()** call with the flush flag set to CPA_DC_FLUSH_FULL. On subsequent calls to **cpaDcCompressData()** for this session, the checksum passed to cpaDcCompressData should be set to the checksum value produced by the previous call to **cpaDcCompressData()**. When the last block of input data is passed to **cpaDcCompressData()**, the flush flag should be set to CP_DC_FLUSH_FINAL. This will cause the BFINAL bit to be set in a deflate stream. It is the responsibility of the calling application to maintain overall lengths across the stateless requests and to pass the checksum produced by one request into the next request.

When an instance supports compressAndVerifyAndRecover, it is enabled by default when using **cpaDcCompressData()**. If this feature needs to be disabled, **cpaDcCompressData2()** must be used.

Synchronous or Asynchronous operation of the API is determined by the value of the callbackFn parameter passed to **cpaDcInitSession()** when the sessionHandle was setup. If a non-NULL value was specified then the supplied callback function will be invoked asynchronously with the response of this request.

Response ordering: For each session, the implementation must maintain the order of responses. That is, if in asynchronous mode, the order of the callback functions must match the order of jobs submitted by this function. In a simple synchronous mode implementation, the practice of submitting a request and blocking on its completion ensure ordering is preserved.

This limitation does not apply if the application employs multiple threads to service a single session.

5.12 Function Documentation

If this API is invoked asynchronously, the return code represents the success or not of asynchronously scheduling the request. The results of the operation, along with the amount of data consumed and produced become available when the callback function is invoked. As such, `pResults->consumed` and `pResults->produced` are available only when the operation is complete.

The application must not use either the source or destination buffers until the callback has completed.

See also:

None

```
CpaStatus cpaDcCompressData2 ( CpaInstanceHandle   dclInstance,  
                             CpaDcSessionHandle pSessionHandle,  
                             CpaBufferList *      pSrcBuff,  
                             CpaBufferList *      pDestBuff,  
                             CpaDcOpData *        pOpData,  
                             CpaDcRqResults *     pResults,  
                             void *               callbackTag  
                             )
```

Submit a request to compress a buffer of data.

This API consumes data from the input buffer and generates compressed data in the output buffer. This API is very similar to **cpaDcCompressData()** except it provides a `CpaDcOpData` structure for passing additional input parameters not covered in **cpaDcCompressData()**.

Context:

When called as an asynchronous function it cannot sleep. It can be executed in a context that does not permit sleeping. When called as a synchronous function it may sleep. It MUST NOT be executed in a context that DOES NOT permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes when configured to operate in synchronous mode.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dclInstance</i>	Target service instance.
[in, out]	<i>pSessionHandle</i>	Session handle.
[in]	<i>pSrcBuff</i>	Pointer to data buffer for compression.
[in]	<i>pDestBuff</i>	Pointer to buffer space for data after compression.
[in]	<i>pOpData</i>	Additional input parameters.
[in, out]	<i>pResults</i>	Pointer to results structure
[in]	<i>callbackTag</i>	User supplied value to help correlate the callback with its associated request.

Return values:

5.12 Function Documentation

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_RETRY</i>	Resubmit the request.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_DC_BAD_DATA</i>	The input data was not properly formed.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.

Precondition:

pSessionHandle has been setup using **cpaDclnitSession()**

Postcondition:

pSessionHandle has session related state information

Note:

This function passes control to the compression service for processing

See also:

cpaDcCompressData()

```
CpaStatus cpaDcDecompressData ( CpaInstanceHandle   dclInstance,
                                CpaDcSessionHandle pSessionHandle,
                                CpaBufferList *       pSrcBuff,
                                CpaBufferList *       pDestBuff,
                                CpaDcRqResults *     pResults,
                                CpaDcFlush           flushFlag,
                                void *                 callbackTag
                                )
```

Submit a request to decompress a buffer of data.

This API consumes compressed data from the input buffer and generates uncompressed data in the output buffer.

Context:

When called as an asynchronous function it cannot sleep. It can be executed in a context that does not permit sleeping. When called as a synchronous function it may sleep. It MUST NOT be executed in a context that DOES NOT permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes when configured to operate in synchronous mode.

Reentrant:

No

Thread-safe:

Yes

Parameters:

5.12 Function Documentation

[in]	<i>dclInstance</i>	Target service instance.
[in, out]	<i>pSessionHandle</i>	Session handle.
[in]	<i>pSrcBuff</i>	Pointer to data buffer for compression.
[in]	<i>pDestBuff</i>	Pointer to buffer space for data after decompression.
[in, out]	<i>pResults</i>	Pointer to results structure
[in]	<i>flushFlag</i>	When set to CPA_DC_FLUSH_FINAL, indicates that the input buffer contains all of the data for the compression session, allowing the function to release history data.
[in]	<i>callbackTag</i>	User supplied value to help correlate the callback with its associated request.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_RETRY</i>	Resubmit the request.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_DC_BAD_DATA</i>	The input data was not properly formed.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

pSessionHandle has been setup using **cpaDclnitSession()**

Postcondition:

pSessionHandle has session related state information

Note:

This function passes control to the compression service for decompression. The function returns the status from the service.

This function may be called repetitively with input until all of the input has been provided and all the output has been consumed.

This function has identical buffer processing rules as **cpaDcCompressData()**.

This function has identical checksum processing rules as **cpaDcCompressData()**.

The application should set *flushFlag* to CPA_DC_FLUSH_FINAL to indicate processing a particular compressed data segment is complete. It should be noted that this function may have to be called more than once to process data after *flushFlag* has been set if the destination buffer fills. Refer to buffer processing rules in **cpaDcCompressData()**.

Synchronous or Asynchronous operation of the API is determined by the value of the *callbackFn* parameter passed to **cpaDclnitSession()** when the *sessionHandle* was setup. If a non-NULL value was specified then the supplied callback function will be invoked asynchronously with the response of this request, along with the *callbackTag* specified in the function.

The same response ordering constraints identified in the *cpaDcCompressData* API apply to this function.

See also:

cpaDcCompressData()

```

CpaStatus cpaDcDecompressData2 ( CpaInstanceHandle   dclInstance,
                                CpaDcSessionHandle pSessionHandle,
                                CpaBufferList *      pSrcBuff,
                                CpaBufferList *      pDestBuff,
                                CpaDcOpData *        pOpData,
                                CpaDcRqResults *     pResults,
                                void *                callbackTag
                                )

```

Submit a request to decompress a buffer of data.

This API consumes compressed data from the input buffer and generates uncompressed data in the output buffer. This API is very similar to **cpaDcDecompressData()** except it provides a **CpaDcOpData** structure for passing additional input parameters not covered in **cpaDcDecompressData()**.

Context:

When called as an asynchronous function it cannot sleep. It can be executed in a context that does not permit sleeping. When called as a synchronous function it may sleep. It MUST NOT be executed in a context that DOES NOT permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes when configured to operate in synchronous mode.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dclInstance</i>	Target service instance.
[in, out]	<i>pSessionHandle</i>	Session handle.
[in]	<i>pSrcBuff</i>	Pointer to data buffer for compression.
[in]	<i>pDestBuff</i>	Pointer to buffer space for data after decompression.
[in]	<i>pOpData</i>	Additional input parameters.
[in, out]	<i>pResults</i>	Pointer to results structure
[in]	<i>callbackTag</i>	User supplied value to help correlate the callback with its associated request.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_RETRY</i>	Resubmit the request.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_DC_BAD_DATA</i>	The input data was not properly formed.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.

5.12 Function Documentation

Precondition:

`pSessionHandle` has been setup using `cpaDclnitSession()`

Postcondition:

`pSessionHandle` has session related state information

Note:

This function passes control to the compression service for decompression. The function returns the status from the service.

See also:

`cpaDcDecompressData()` `cpaDcCompressData2()` `cpaDcCompressData()`

```
CpaStatus cpaDcGenerateHeader ( CpaDcSessionHandle pSessionHandle,  
                                CpaFlatBuffer * pDestBuff,  
                                Cpa32U * count  
                                )
```

Generate compression header.

This API generates the gzip or the zlib header and stores it in the output buffer.

Context:

This function may be call from any context.

Assumptions:

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in, out]	<i>pSessionHandle</i>	Session handle.
[in]	<i>pDestBuff</i>	Pointer to data buffer where the compression header will go.
[out]	<i>count</i>	Pointer to counter filled in with header size.

Return values:

<code>CPA_STATUS_SUCCESS</code>	Function executed successfully.
<code>CPA_STATUS_FAIL</code>	Function failed.
<code>CPA_STATUS_INVALID_PARAM</code>	Invalid parameter passed in.
<code>CPA_STATUS_RESTARTING</code>	API implementation is restarting. Resubmit the request.
<code>CPA_STATUS_UNSUPPORTED</code>	Function is not supported.

Precondition:

`pSessionHandle` has been setup using `cpaDclnitSession()`

Note:

5.12 Function Documentation

This function can output a 10 byte gzip header or 2 byte zlib header to the destination buffer. The session properties are used to determine the header type. To output a header the session must have been initialized with CpaDcCompType CPA_DC_DEFLATE for any other value no header is produced. To output a gzip header the session must have been initialized with CpaDcChecksum CPA_DC_CRC32. To output a zlib header the session must have been initialized with CpaDcChecksum CPA_DC_ADLER32. For CpaDcChecksum CPA_DC_NONE no header is output.

If the compression requires a gzip header, then this header requires at a minimum the following fields, defined in RFC1952: ID1: 0x1f ID2: 0x8b CM: Compression method = 8 for deflate

The zlib header is defined in RFC1950 and this function must implement as a minimum: CM: four bit compression method - 8 is deflate with window size to 32k CINFO: four bit window size (see RFC1950 for details), 7 is 32k window FLG: defined as:

- Bits 0 - 4: check bits for CM, CINFO and FLG (see RFC1950)
- Bit 5: FDICT 0 = default, 1 is preset dictionary
- Bits 6 - 7: FLEVEL, compression level (see RFC 1950)

The counter parameter will be set to the number of bytes added to the buffer. The pData will be not be changed.

See also:

None

```
CpaStatus cpaDcGenerateFooter ( CpaDcSessionHandle pSessionHandle,  
                                CpaFlatBuffer * pDestBuff,  
                                CpaDcRqResults * pResults  
                                )
```

Generate compression footer.

This API generates the footer for gzip or zlib and stores it in the output buffer.

Context:

This function may be call from any context.

Assumptions:

None

Side-Effects:

All session variables are reset

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

- | | | |
|-----------|-----------------------|---|
| [in, out] | <i>pSessionHandle</i> | Session handle. |
| [in] | <i>pDestBuff</i> | Pointer to data buffer where the compression footer will go. |
| [in, out] | <i>pResults</i> | Pointer to results structure filled by CpaDcCompressData. Updated with the results of this API call |

5.12 Function Documentation

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

pSessionHandle has been setup using **cpaDclnitSession()** pResults structure has been filled by CpaDcCompressData().

Note:

Depending on the session variables, this function can add the alder32 footer to the zlib compressed data as defined in RFC1950. If required, it can also add the gzip footer, which is the crc32 of the uncompressed data and the length of the uncompressed data. This section is defined in RFC1952. The session variables used to determine the header type are CpaDcCompType and CpaDcChecksum, see cpaDcGenerateHeader for more details.

An artifact of invoking this function for writing the footer data is that all opaque session specific data is re-initialized. If the compression level and file types are consistent, the upper level application can continue processing compression requests using the same session handle.

The produced element of the pResults structure will be incremented by the numbers bytes added to the buffer. The pointer to the buffer will not be modified.

This function is not supported for stateless sessions.

See also:

None

```
CpaStatus cpaDcGetStats ( CpaInstanceHandle dclInstance,  
                        CpaDcStats * pStatistics  
                        )
```

Retrieve statistics

This API retrieves the current statistics for a compression instance.

Context:

This function may be call from any context.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes

Reentrant:

No

Thread-safe:

Yes

5.12 Function Documentation

Parameters:

[in] *dcInstance* Instance handle.
[out] *pStatistics* Pointer to statistics structure.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_RESTARTING API implementation is restarting. Resubmit the request.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

See also:

None

CpaStatus `cpaDcGetNumInstances (Cpa16U * pNumInstances)`

Get the number of device instances that are supported by the API implementation.

This function will get the number of device instances that are supported by an implementation of the compression API. This number is then used to determine the size of the array that must be passed to **cpaDcGetInstances()**.

Context:

This function MUST NOT be called from an interrupt context as it MAY sleep.

Assumptions:

None

Side-Effects:

None

Blocking:

This function is synchronous and blocking.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[out] *pNumInstances* Pointer to where the number of instances will be written.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_UNSUPPORTED Function is not supported.

5.12 Function Documentation

Precondition:

None

Postcondition:

None

Note:

This function operates in a synchronous manner and no asynchronous callback will be generated

See also:

cpaDcGetInstances

```
CpaStatus cpaDcGetInstances ( Cpa16U          numInstances,  
                             CpaInstanceHandle* dclInstances  
                             )
```

Get the handles to the device instances that are supported by the API implementation.

This function will return handles to the device instances that are supported by an implementation of the compression API. These instance handles can then be used as input parameters with other compression API functions.

This function will populate an array that has been allocated by the caller. The size of this API is determined by the **cpaDcGetNumInstances()** function.

Context:

This function MUST NOT be called from an interrupt context as it MAY sleep.

Assumptions:

None

Side-Effects:

None

Blocking:

This function is synchronous and blocking.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *numInstances* Size of the array.
[out] *dclInstances* Pointer to where the instance handles will be written.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

5.12 Function Documentation

Postcondition:

None

Note:

This function operates in a synchronous manner and no asynchronous callback will be generated

See also:

cpaDcGetInstances

```
CpaStatus cpaDcGetNumIntermediateBuffers ( CpaInstanceHandle instanceHandle,  
                                           Cpa16U * pNumBuffers  
                                           )
```

Compression Component utility function to determine the number of intermediate buffers required by an implementation.

This function will determine the number of intermediate buffer lists required by an implementation for a compression instance. These buffers should then be allocated and provided when calling **cpaDcStartInstance()** to start a compression instance that will use dynamic compression.

Context:

This function may sleep, and MUST NOT be called in interrupt context.

Assumptions:

None

Side-Effects:

None

Blocking:

This function is synchronous and blocking.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in, out] *instanceHandle* Handle to an instance of this API to be initialized.
[out] *pNumBuffers* When the function returns, this will specify the number of buffer lists that should be used as intermediate buffers when calling **cpaDcStartInstance()**.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed. Suggested course of action is to shutdown and restart.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

5.12 Function Documentation

Note:

Note that this is a synchronous function and has no completion callback associated with it.

See also:

cpaDcStartInstance()

```
CpaStatus cpaDcStartInstance ( CpaInstanceHandle instanceHandle,  
                             Cpa16U numBuffers,  
                             CpaBufferList ** pIntermediateBuffers  
                             )
```

Compression Component Initialization and Start function.

This function will initialize and start the compression component. It MUST be called before any other compress function is called. This function SHOULD be called only once (either for the very first time, or after an **cpaDcStopInstance** call which succeeded) per instance. Subsequent calls will have no effect.

If required by an implementation, this function can be provided with instance specific intermediate buffers. The intent is to provide an instance specific location to store intermediate results during dynamic instance Huffman tree compression requests. The memory should be accessible by the compression engine. The buffers are to support deflate compression with dynamic Huffman Trees. Each buffer list should be similar in size to twice the destination buffer size passed to the compress API. The number of intermediate buffer lists may vary between implementations and so **cpaDcGetNumIntermediateBuffers()** should be called first to determine the number of intermediate buffers required by the implementation.

If not required, this parameter can be passed in as NULL.

Context:

This function may sleep, and MUST NOT be called in interrupt context.

Assumptions:

None

Side-Effects:

None

Blocking:

This function is synchronous and blocking.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in, out]	<i>instanceHandle</i>	Handle to an instance of this API to be initialized.
[in]	<i>numBuffers</i>	Number of buffer lists represented by the <i>pIntermediateBuffers</i> parameter. Note: cpaDcGetNumIntermediateBuffers() can be used to determine the number of intermediate buffers that an implementation requires.
[in]	<i>pIntermediateBuffers</i>	Optional pointer to Instance specific DRAM buffer.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed. Suggested course of action is to shutdown and

restart.

CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

Note:

Note that this is a synchronous function and has no completion callback associated with it.

See also:

cpaDcStopInstance() cpaDcGetNumIntermediateBuffers()

CpaStatus cpaDcStopInstance (**CpaInstanceHandle** *instanceHandle*)

Compress Component Stop function.

This function will stop the Compression component and free all system resources associated with it. The client MUST ensure that all outstanding operations have completed before calling this function. The recommended approach to ensure this is to deregister all session or callback handles before calling this function. If outstanding operations still exist when this function is invoked, the callback function for each of those operations will NOT be invoked and the shutdown will continue. If the component is to be restarted, then a call to cpaDcStartInstance is required.

Context:

This function may sleep, and so MUST NOT be called in interrupt context.

Assumptions:

None

Side-Effects:

None

Blocking:

This function is synchronous and blocking.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *instanceHandle* Handle to an instance of this API to be shutdown.

Return values:

CPA_STATUS_SUCCESS

Function executed successfully.

CPA_STATUS_FAIL

Function failed. Suggested course of action is to ensure requests are not still being submitted and that all sessions are deregistered. If this does not help, then forcefully remove the component from the system.

CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

5.12 Function Documentation

The component has been initialized via `cpaDcStartInstance`

Postcondition:

None

Note:

Note that this is a synchronous function and has no completion callback associated with it.

See also:

`cpaDcStartInstance()`

```
CpaStatus cpaDcInstanceGetInfo2 ( const CpaInstanceHandle instanceHandle,  
                                CpaInstanceInfo2 * pInstanceInfo2  
                                )
```

Function to get information on a particular instance.

This function will provide instance specific information through a **CpaInstanceInfo2** structure.

Context:

This function will be executed in a context that requires that sleeping **MUST NOT** be permitted.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *instanceHandle* Handle to an instance of this API to be initialized.
[out] *pInstanceInfo2* Pointer to the memory location allocated by the client into which the **CpaInstanceInfo2** structure will be written.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

The client has retrieved an `instanceHandle` from successive calls to `cpaDcGetNumInstances` and `cpaDcGetInstances`.

Postcondition:

None

Note:

5.12 Function Documentation

None

See also:

cpaDcGetNumInstances, cpaDcGetInstances, CpaInstanceInfo2

CpaStatus		
<code>cpaDcInstanceSetNotificationCb</code>	<code>(const CpaInstanceHandle const CpaDcInstanceNotificationCbFunc void *)</code>	<i>instanceHandle,</i> <i>pInstanceNotificationCb,</i> <i>pCallbackTag</i>

Subscribe for instance notifications.

Clients of the CpaDc interface can subscribe for instance notifications by registering a **CpaDcInstanceNotificationCbFunc** function.

Context:

This function may be called from any context.

Assumptions:

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

<code>[in] instanceHandle</code>	Instance handle.
<code>[in] pInstanceNotificationCb</code>	Instance notification callback function pointer.
<code>[in] pCallbackTag</code>	Opaque value provided by user while making individual function calls.

Return values:

<code>CPA_STATUS_SUCCESS</code>	Function executed successfully.
<code>CPA_STATUS_FAIL</code>	Function failed.
<code>CPA_STATUS_INVALID_PARAM</code>	Invalid parameter passed in.
<code>CPA_STATUS_UNSUPPORTED</code>	Function is not supported.

Precondition:

Instance has been initialized.

Postcondition:

None

Note:

None

See also:**CpaDclInstanceNotificationCbFunc**

```

CpaStatus cpaDcGetSessionSize ( CpaInstanceHandle      dclInstance,
                                CpaDcSessionSetupData * pSessionData,
                                Cpa32U *                pSessionSize,
                                Cpa32U *                pContextSize
                                )

```

Get the size of the memory required to hold the session information.

The client of the Data Compression API is responsible for allocating sufficient memory to hold session information and the context data. This function provides a means for determining the size of the session information and the size of the context data.

Context:

No restrictions

Assumptions:

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Instance handle.

[in] *pSessionData* Pointer to a user instantiated structure containing session data.

[out] *pSessionSize* On return, this parameter will be the size of the memory that will be required by **cpaDclInitSession()** for session data.

[out] *pContextSize* On return, this parameter will be the size of the memory that will be required for context data. Context data is save/restore data including history and any implementation specific data that is required for a save/restore operation.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.

CPA_STATUS_FAIL Function failed.

CPA_STATUS_INVALID_PARAM Invalid parameter passed in.

CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

Note:

Only a synchronous version of this function is provided.

5.12 Function Documentation

It is expected that context data is comprised of the history and any data stores that are specific to the history such as linked lists or hash tables. For stateless sessions the context size returned from this function will be zero. For stateful sessions the context size returned will depend on the session setup data and may be zero.

Session data is expected to include interim checksum values, various counters and other session related data that needs to persist between invocations. For a given implementation of this API, it is safe to assume that **cpaDcGetSessionSize()** will always return the same session size and that the size will not be different for different setup data parameters. However, it should be noted that the size may change: (1) between different implementations of the API (e.g. between software and hardware implementations or between different hardware implementations) (2) between different releases of the same API implementation.

See also:

cpaDcInitSession()

```
CpaStatus cpaDcBufferListGetMetaSize ( const CpaInstanceHandle instanceHandle,  
                                       Cpa32U numBuffers,  
                                       Cpa32U * pSizeInBytes  
                                       )
```

Function to return the size of the memory which must be allocated for the pPrivateMetaData member of CpaBufferList.

This function is used to obtain the size (in bytes) required to allocate a buffer descriptor for the pPrivateMetaData member in the CpaBufferList structure. Should the function return zero then no meta data is required for the buffer list.

Context:

This function may be called from any context.

Assumptions:

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>instanceHandle</i>	Handle to an instance of this API.
[in]	<i>numBuffers</i>	The number of pointers in the CpaBufferList. This is the maximum number of CpaFlatBuffers which may be contained in this CpaBufferList.
[out]	<i>pSizeInBytes</i>	Pointer to the size in bytes of memory to be allocated when the client wishes to allocate a cpaFlatBuffer.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.

5.12 Function Documentation

CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

Note:

None

See also:

cpaDcGetInstances()

```
CpaStatus cpaDcGetStatusText ( const CpaInstanceHandle dclInstance,  
                               const CpaStatus           errStatus,  
                               Cpa8S *                 pStatusText  
                               )
```

Function to return a string indicating the specific error that occurred within the system.

When a function returns any error including *CPA_STATUS_SUCCESS*, the client can invoke this function to get a string which describes the general error condition, and if available additional information on the specific error. The Client MUST allocate *CPA_STATUS_MAX_STR_LENGTH_IN_BYTES* bytes for the buffer string.

Context:

This function may be called from any context.

Assumptions:

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dclInstance</i>	Handle to an instance of this API.
[in]	<i>errStatus</i>	The error condition that occurred.
[in, out]	<i>pStatusText</i>	Pointer to the string buffer that will be updated with the status text. The invoking application MUST allocate this buffer to be exactly <i>CPA_STATUS_MAX_STR_LENGTH_IN_BYTES</i> .

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed. Note, in this scenario it is <i>INVALID</i> to call this function a second time.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.

5.12 Function Documentation

CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

Note:

None

See also:

CpaStatus

```
CpaStatus cpaDcSetAddressTranslation ( const CpaInstanceHandle instanceHandle,  
                                     CpaVirtualToPhysical virtual2Physical  
                                     )
```

Set Address Translation function

This function is used to set the virtual to physical address translation routine for the instance. The specified routine is used by the instance to perform any required translation of a virtual address to a physical address. If the application does not invoke this function, then the instance will use its default method, such as *virt2phys*, for address translation.

Assumptions:

None

Side-Effects:

None

Blocking:

This function is synchronous and blocking.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *instanceHandle* Data Compression API instance handle.

[in] *virtual2Physical* Routine that performs virtual to physical address translation.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.

CPA_STATUS_FAIL Function failed.

CPA_STATUS_INVALID_PARAM Invalid parameter passed in.

CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

5.12 Function Documentation

See also:

None

```
CpaStatus cpaDcDpGetSessionSize ( CpaInstanceHandle    dclInstance,  
                                CpaDcSessionSetupData * pSessionData,  
                                Cpa32U * pSessionSize  
                                )
```

Get the size of the memory required to hold the data plane session information.

The client of the Data Compression API is responsible for allocating sufficient memory to hold session information. This function provides a means for determining the size of the session information and statistics information.

Context:

No restrictions

Assumptions:

None

Side-Effects:

None

Blocking:

Yes

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Instance handle.
[in] *pSessionData* Pointer to a user instantiated structure containing session data.
[out] *pSessionSize* On return, this parameter will be the size of the memory that will be required by **cpaDcInitSession()** for session data.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

None

Postcondition:

None

Note:

Only a synchronous version of this function is provided.

Session data is expected to include interim checksum values, various counters and other other session related data that needs to persist between invocations. For a given implementation of this API, it is safe to

5.12 Function Documentation

assume that **cpaDcDpGetSessionSize()** will always return the same session size and that the size will not be different for different setup data parameters. However, it should be noted that the size may change: (1) between different implementations of the API (e.g. between software and hardware implementations or between different hardware implementations) (2) between different releases of the same API implementation

See also:

cpaDcDpInitSession()

```
CpaStatus cpaDcDpUpdateSession ( const CpaInstanceHandle    dclInstance,  
                                CpaDcSessionHandle      pSessionHandle,  
                                CpaDcSessionUpdateData * pSessionUpdateData  
                                )
```

Compression Session Update Function.

This function is used to modify some select compression parameters of a previously initialized session handle for a data plane session. The update will fail if resources required for the new session settings are not available. Specifically, this function may fail if no intermediate buffers are associated with the instance, and the intended change would require these buffers. This function can be called at any time after a successful call of **cpaDcDpInitSession()**. This function does not change the parameters to compression request already in flight.

Context:

This is a synchronous function that cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

No.

Reentrant:

No

Thread-safe:

No

Parameters:

[in]	<i>dclInstance</i>	Instance handle.
[in, out]	<i>pSessionHandle</i>	Session handle.
[in]	<i>pSessionUpdateData</i>	Session Data.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request

Precondition:

5.12 Function Documentation

The component has been initialized via `cpaDcStartInstance` function. The session has been initialized via `cpaDcDpInitSession` function.

Postcondition:

None

Note:

This is a synchronous function and has no completion callback associated with it.

See also:

`cpaDcDpInitSession()`

```
CpaStatus cpaDcDpRemoveSession ( const CpaInstanceHandle dclInstance,  
                                CpaDcSessionHandle   pSessionHandle  
                                )
```

Compression Data Plane Session Remove Function.

This function will remove a previously initialized session handle and the installed callback handler function. Removal will fail if outstanding calls still exist for the initialized session handle. The client needs to retry the remove function at a later time. The memory for the session handle **MUST** not be freed until this call has completed successfully.

Context:

This is a synchronous function that cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

No.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Instance handle.
[in, out] *pSessionHandle* Session handle.

Return values:

<code>CPA_STATUS_SUCCESS</code>	Function executed successfully.
<code>CPA_STATUS_FAIL</code>	Function failed.
<code>CPA_STATUS_RETRY</code>	Resubmit the request.
<code>CPA_STATUS_INVALID_PARAM</code>	Invalid parameter passed in.
<code>CPA_STATUS_RESOURCE</code>	Error related to system resources.
<code>CPA_STATUS_RESTARTING</code>	API implementation is restarting. Resubmit the request.
<code>CPA_STATUS_UNSUPPORTED</code>	Function is not supported.

Precondition:

5.12 Function Documentation

The component has been initialized via **cpaDcStartInstance** function.

Postcondition:

None

Note:

This is a synchronous function and has no completion callback associated with it.

See also:

cpaDcDplnitSession

6 Data Compression Batch and Pack API

[Data Compression API]

Collaboration diagram for Data Compression Batch and Pack API:



6.1 Detailed Description

File: `cpa_dc_bp.h`

These functions specify the API for Data Compression operations related to the 'Batch and Pack' mode of operation.

Remarks:

6.2 Data Structures

- `struct _CpaDcBatchOpData`

6.3 Typedefs

- `typedef _CpaDcBatchOpData CpaDcBatchOpData`

6.4 Functions

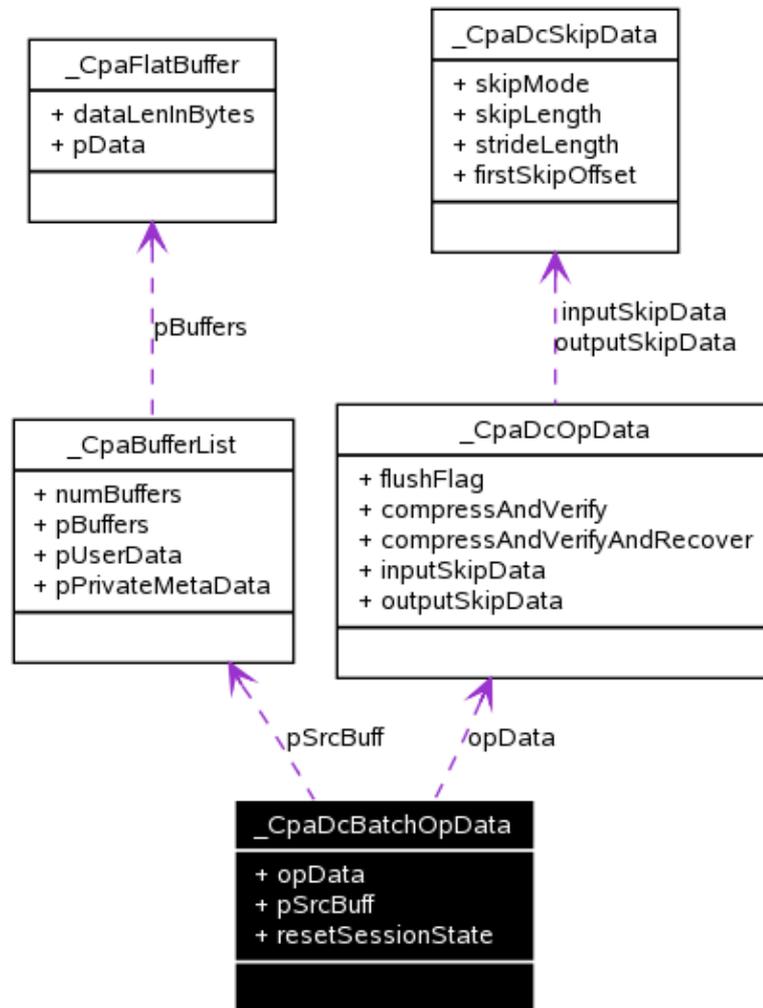
- `CpaStatus cpaDcBPCompressData` (`CpaInstanceHandle` `dcInstance`, `CpaDcSessionHandle` `pSessionHandle`, `const Cpa32U` `numRequests`, `CpaDcBatchOpData` `*pBatchOpData`, `CpaBufferList` `*pDestBuff`, `CpaDcRqResults` `*pResults`, `void` `*callbackTag`)
 - `CpaStatus cpaDcBnpBufferListGetMetaSize` (`const CpaInstanceHandle` `instanceHandle`, `Cpa32U` `numJobs`, `Cpa32U` `*pSizeInBytes`)
-

6.5 Data Structure Documentation

6.5.1 `_CpaDcBatchOpData` Struct Reference

Collaboration diagram for `_CpaDcBatchOpData`:

6.5.1 _CpaDcBatchOpData Struct Reference



6.5.1.1 Detailed Description

Batch request input parameters.

This structure contains the request information for use with batched compression operations.

6.5.1.2 Data Fields

- `CpaDcOpData` `opData`
- `CpaBufferList` * `pSrcBuff`
- `CpaBoolean` `resetSessionState`

6.5.1.3 Field Documentation

`CpaDcOpData` `_CpaDcBatchOpData::opData`

Compression input parameters

`CpaBufferList`* `_CpaDcBatchOpData::pSrcBuff`

Input buffer list containing the data to be compressed.

CpaBoolean _CpaDcBatchOpData::resetSessionState

Reset the session state at the beginning of this request within the batch. Only applies to stateful sessions. When this flag is set, the history from previous requests in this session will not be used when compressing the input data for this request in the batch.

6.6 Typedef Documentation

typedef struct _CpaDcBatchOpData CpaDcBatchOpData

Batch request input parameters.

This structure contains the request information for use with batched compression operations.

6.7 Function Documentation

```
CpaStatus cpaDcBPCompressData ( CpaInstanceHandle dclInstance,
                                CpaDcSessionHandle pSessionHandle,
                                const Cpa32U numRequests,
                                CpaDcBatchOpData * pBatchOpData,
                                CpaBufferList * pDestBuff,
                                CpaDcRqResults * pResults,
                                void * callbackTag
                                )
```

Submit a batch of requests to compress a batch of input buffers into a common output buffer. The same output buffer is used for each request in the batch. This is termed 'batch and pack'.

This API consumes data from the input buffer and generates compressed data in the output buffer. This API compresses a batch of input buffers and concatenates the compressed data into the output buffer. A results structure is also generated for each request in the batch.

Context:

When called as an asynchronous function it cannot sleep. It can be executed in a context that does not permit sleeping. When called as a synchronous function it may sleep. It MUST NOT be executed in a context that DOES NOT permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes when configured to operate in synchronous mode.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Target service instance.
 [in, out] *pSessionHandle* Session handle.

6.7 Function Documentation

[in]	<i>numRequests</i>	Number of requests in the batch.
[in]	<i>pBatchOpData</i>	Pointer to an array of CpaDcBatchOpData structures which contain the input buffers and parameters for each request in the batch. There should be numRequests entries in the array.
[in]	<i>pDestBuff</i>	Pointer to buffer space for data after compression.
[in, out]	<i>pResults</i>	Pointer to an array of results structures. There should be numRequests entries in the array.
[in]	<i>callbackTag</i>	User supplied value to help correlate the callback with its associated request.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_RETRY</i>	Resubmit the request.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_DC_BAD_DATA</i>	The input data was not properly formed.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.

Precondition:

pSessionHandle has been setup using **cpaDcInitSession()** Session must be setup as a stateless session.

Note:

This function passes control to the compression service for processing

In synchronous mode the function returns the error status returned from the service. In asynchronous mode the status is returned by the callback function.

This function may be called repetitively with input until all of the input has been consumed by the compression service and all the output has been produced.

When this function returns, it may be that all of the available buffers in the input list has not been compressed. This situation will occur when there is insufficient space in the output buffer. The calling application should note the amount of buffers processed, and then submit the request again, with a new output buffer and with the input buffer list containing the buffers that were not previously compressed.

Relationship between input buffers and results buffers.

1. Implementations of this API must not modify the individual flat buffers of the input buffer list.
2. The implementation communicates the number of buffers consumed from the source buffer list via pResults->consumed arg.
3. The implementation communicates the amount of data in the destination buffer list via pResults->produced arg.

Source Buffer Setup Rules

1. The buffer list must have the correct number of flat buffers. This is specified by the numBuffers element of the CpaBufferList.
2. Each flat buffer must have a pointer to contiguous memory that has been allocated by the calling application. The number of octets to be compressed or decompressed must be stored in the dataLenInBytes element of the flat buffer.
3. It is permissible to have one or more flat buffers with a zero length data store. This function will process all flat buffers until the destination buffer is full or all source data has been processed. If a

6.7 Function Documentation

buffer has zero length, then no data will be processed from that buffer.

Source Buffer Processing Rules.

1. The buffer list is processed in index order - SrcBuff->pBuffers[0] will be completely processed before SrcBuff->pBuffers[1] begins to be processed.
2. The application must drain the destination buffers. If the source data was not completely consumed, the application must resubmit the request.
3. On return, the pResults->consumed will indicate the number of buffers consumed from the input buffer list.

Destination Buffer Setup Rules

1. The destination buffer list must have storage for processed data and for the packed header information. This means that least two flat buffer must exist in the buffer list. The first buffer entry will be used for the header information. Subsequent entries will be used for the compressed data.
2. For each flat buffer in the buffer list, the dataLenInBytes element must be set to the size of the buffer space.
3. It is permissible to have one or more flat buffers with a zero length data store. If a buffer has zero length, then no data will be added to that buffer.

Destination Buffer Processing Rules.

1. The buffer list is processed in index order.
2. On return, the pResults->produced will indicate the number of bytes of compressed data written to the output buffers. Note that this will not include the header information buffer.
3. If processing has not been completed, the application must drain the destination buffers and resubmit the request. The application must reset the dataLenInBytes for each flat buffer in the destination buffer list.

Synchronous or Asynchronous operation of the API is determined by the value of the callbackFn parameter passed to **cpaDclnitSession()** when the sessionHandle was setup. If a non-NULL value was specified then the supplied callback function will be invoked asynchronously with the response of this request.

Response ordering: For each session, the implementation must maintain the order of responses. That is, if in asynchronous mode, the order of the callback functions must match the order of jobs submitted by this function. In a simple synchronous mode implementation, the practice of submitting a request and blocking on its completion ensure ordering is preserved.

This limitation does not apply if the application employs multiple threads to service a single session.

If this API is invoked asynchronous, the return code represents the success or not of asynchronously scheduling the request. The results of the operation, along with the amount of data consumed and produced become available when the callback function is invoked. As such, pResults->consumed and pResults->produced are available only when the operation is complete.

The application must not use either the source or destination buffers until the callback has completed.

See also:

None

```
CpaStatus cpaDcBnpBufferListGetMetaSize ( const CpaInstanceHandle instanceHandle,  
                                           Cpa32U numJobs,  
                                           Cpa32U * pSizeInBytes  
                                           )
```

6.7 Function Documentation

Function to return the size of the memory which must be allocated for the `pPrivateMetaData` member of `CpaBufferList` contained within `CpaDcBatchOpData`.

This function is used to obtain the size (in bytes) required to allocate a buffer descriptor for the `pPrivateMetaData` member in the `CpaBufferList` structure when Batch and Pack API are used. Should the function return zero then no meta data is required for the buffer list.

Context:

This function may be called from any context.

Assumptions:

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>instanceHandle</i>	Handle to an instance of this API.
[in]	<i>numJobs</i>	The number of jobs defined in the <code>CpaDcBatchOpData</code> table.
[out]	<i>pSizeInBytes</i>	Pointer to the size in bytes of memory to be allocated when the client wishes to allocate a <code>cpaFlatBuffer</code> and the Batch and Pack OP data.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.

Precondition:

None

Postcondition:

None

Note:

None

See also:

`cpaDcBPCompressData()`

7 Data Compression Chaining API

[Data Compression API]

Collaboration diagram for Data Compression Chaining API:



7.1 Detailed Description

File: `cpa_dc_chain.h`

These functions specify the API for Data Compression Chaining operations.

Remarks:

7.2 Data Structures

- struct `_CpaDcChainSessionSetupData`
- struct `_CpaDcChainOpData`
- struct `_CpaDcChainRqResults`

7.3 Typedefs

- typedef enum `_CpaDcChainOperations` `CpaDcChainOperations`
- typedef enum `_CpaDcChainSessionType` `CpaDcChainSessionType`
- typedef `_CpaDcChainSessionSetupData` `CpaDcChainSessionSetupData`
- typedef `_CpaDcChainOpData` `CpaDcChainOpData`
- typedef `_CpaDcChainRqResults` `CpaDcChainRqResults`

7.4 Enumerations

- enum `_CpaDcChainOperations` {
 `CPA_DC_CHAIN_COMPRESS_THEN_HASH`,
 `CPA_DC_CHAIN_COMPRESS_THEN_ENCRYPT`,
 `CPA_DC_CHAIN_COMPRESS_THEN_HASH_ENCRYPT`,
 `CPA_DC_CHAIN_COMPRESS_THEN_ENCRYPT_HASH`,
 `CPA_DC_CHAIN_COMPRESS_THEN_AEAD`,
 `CPA_DC_CHAIN_HASH_THEN_COMPRESS`,
 `CPA_DC_CHAIN_HASH_VERIFY_THEN_DECOMPRESS`,
 `CPA_DC_CHAIN_DECRYPT_THEN_DECOMPRESS`,
 `CPA_DC_CHAIN_HASH_VERIFY_DECRYPT_THEN_DECOMPRESS`,
 `CPA_DC_CHAIN_DECRYPT_HASH_VERIFY_THEN_DECOMPRESS`,
 `CPA_DC_CHAIN_AEAD_THEN_DECOMPRESS`,
 `CPA_DC_CHAIN_DECOMPRESS_THEN_HASH_VERIFY`,
 `CPA_DC_CHAIN_COMPRESS_THEN_AEAD_THEN_HASH`
}
- enum `_CpaDcChainSessionType` {
 `CPA_DC_CHAIN_COMPRESS_DECOMPRESS`,
 `CPA_DC_CHAIN_SYMMETRIC_CRYPTO`
}

7.4 Enumerations

```
}
```

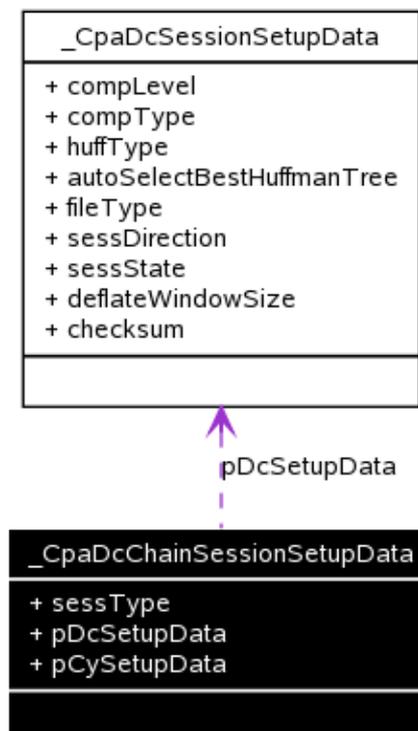
7.5 Functions

- **CpaStatus cpaDcChainGetSessionSize** (**CpaInstanceHandle** dcInstance, **CpaDcChainOperations** operation, **Cpa8U** numSessions, **CpaDcChainSessionSetupData** *pSessionData, **Cpa32U** *pSessionSize)
 - **CpaStatus cpaDcChainInitSession** (**CpaInstanceHandle** dcInstance, **CpaDcSessionHandle** pSessionHandle, **CpaDcChainOperations** operation, **Cpa8U** numSessions, **CpaDcChainSessionSetupData** *pSessionData, **CpaDcCallbackFn** callbackFn)
 - **CpaStatus cpaDcChainResetSession** (const **CpaInstanceHandle** dcInstance, **CpaDcSessionHandle** pSessionHandle)
 - **CpaStatus cpaDcChainRemoveSession** (const **CpaInstanceHandle** dcInstance, **CpaDcSessionHandle** pSessionHandle)
 - **CpaStatus cpaDcChainPerformOp** (**CpaInstanceHandle** dcInstance, **CpaDcSessionHandle** pSessionHandle, **CpaBufferList** *pSrcBuff, **CpaBufferList** *pDestBuff, **CpaDcChainOperations** operation, **Cpa8U** numOpDatas, **CpaDcChainOpData** *pChainOpData, **CpaDcChainRqResults** *pResults, void *callbackTag)
-

7.6 Data Structure Documentation

7.6.1 _CpaDcChainSessionSetupData Struct Reference

Collaboration diagram for _CpaDcChainSessionSetupData:



7.6.1.1 Detailed Description

Chaining Session Setup Data.

7.6.1 _CpaDcChainSessionSetupData Struct Reference

This structure contains data relating to set up chaining sessions. The client needs to complete the information in this structure in order to setup chaining sessions.

7.6.1.2 Data Fields

- **CpaDcChainSessionType** sessType
- **CpaDcSessionSetupData** * pDcSetupData
- **CpaCySymSessionSetupData** * pCySetupData

7.6.1.3 Field Documentation

CpaDcSessionSetupData* **_CpaDcChainSessionSetupData::pDcSetupData**

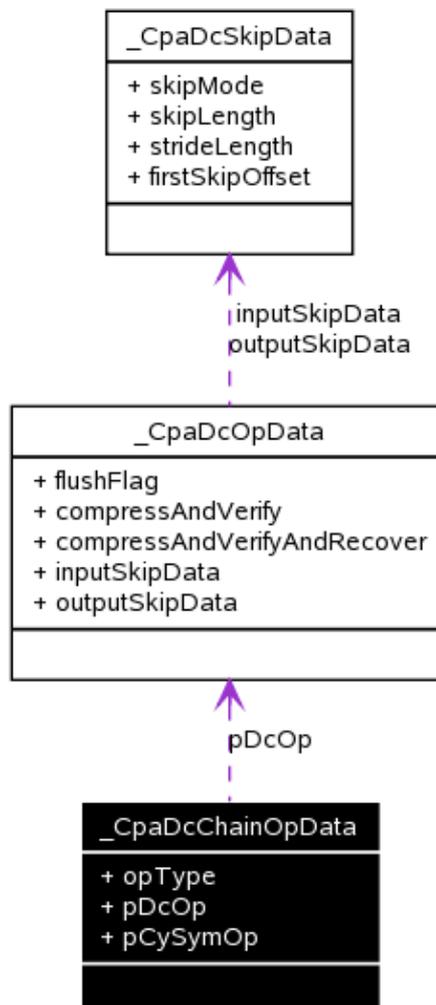
Pointer to compression session setup data

CpaCySymSessionSetupData* **_CpaDcChainSessionSetupData::pCySetupData**

Pointer to symmetric crypto session setup data

7.6.2 _CpaDcChainOpData Struct Reference

Collaboration diagram for _CpaDcChainOpData:



7.6.2 _CpaDcChainOpData Struct Reference

7.6.2.1 Detailed Description

Compression chaining request input parameters.

This structure contains the request information to use with compression chaining operations.

7.6.2.2 Data Fields

- **CpaDcChainSessionType opType**
- **CpaDcOpData * pDcOp**
- **CpaCySymOpData * pCySymOp**

7.6.2.3 Field Documentation

CpaDcChainSessionType _CpaDcChainOpData::opType

Indicate the type for this operation

CpaDcOpData* _CpaDcChainOpData::pDcOp

Pointer to compression operation data

CpaCySymOpData* _CpaDcChainOpData::pCySymOp

Pointer to symmetric crypto operation data

7.6.3 _CpaDcChainRqResults Struct Reference

7.6.3.1 Detailed Description

Chaining request results data

This structure contains the request results.

7.6.3.2 Data Fields

- **CpaDcReqStatus dcStatus**
- **CpaStatus cyStatus**
- **CpaBoolean verifyResult**
- **Cpa32U produced**
- **Cpa32U consumed**
- **Cpa32U crc32**
- **Cpa32U adler32**

7.6.3.3 Field Documentation

CpaDcReqStatus _CpaDcChainRqResults::dcStatus

Additional status details from compression accelerator

CpaStatus _CpaDcChainRqResults::cyStatus

Additional status details from symmetric crypto accelerator

CpaBoolean _CpaDcChainRqResults::verifyResult

7.6.3 _CpaDcChainRqResults Struct Reference

This parameter is valid when the verifyDigest option is set in the CpaCySymSessionSetupData structure. A value of CPA_TRUE indicates that the compare succeeded. A value of CPA_FALSE indicates that the compare failed

Cpa32U _CpaDcChainRqResults::produced

Octets produced to the output buffer

Cpa32U _CpaDcChainRqResults::consumed

Octets consumed from the input buffer

Cpa32U _CpaDcChainRqResults::crc32

crc32 checksum produced by chaining operations

Cpa32U _CpaDcChainRqResults::adler32

adler32 checksum produced by chaining operations

7.7 Typedef Documentation

typedef enum _CpaDcChainOperations CpaDcChainOperations

Supported operations for compression chaining

This enumeration lists the supported operations for compression chaining

typedef enum _CpaDcChainSessionType CpaDcChainSessionType

Supported session types for data compression chaining.

This enumeration lists the supported session types for data compression chaining.

typedef struct _CpaDcChainSessionSetupData CpaDcChainSessionSetupData

Chaining Session Setup Data.

This structure contains data relating to set up chaining sessions. The client needs to complete the information in this structure in order to setup chaining sessions.

typedef struct _CpaDcChainOpData CpaDcChainOpData

Compression chaining request input parameters.

This structure contains the request information to use with compression chaining operations.

typedef struct _CpaDcChainRqResults CpaDcChainRqResults

Chaining request results data

This structure contains the request results.

7.8 Enumeration Type Documentation

enum _CpaDcChainOperations

7.8 Enumeration Type Documentation

Supported operations for compression chaining

This enumeration lists the supported operations for compression chaining

Enumerator:

CPA_DC_CHAIN_COMPRESS_THEN_HASH

2 operations for chaining: 1st operation is to perform compression on plain text 2nd operation is to perform hash on compressed text < 2 entries in CpaDcChainSessionSetupData array: 1st entry is for compression setup data 2nd entry is for hash setup data

CPA_DC_CHAIN_COMPRESS_THEN_ENCRYPT

2 operations for chaining: 1st operation is to perform compression on plain text 2nd operation is to perform encryption on compressed text < 2 entries in CpaDcChainSessionSetupData array: 1st entry is for compression setup data 2nd entry is for encryption setup data

CPA_DC_CHAIN_COMPRESS_THEN_HASH_ENCRYPT

2 operations for chaining: 1st operation is to perform compression on plain text 2nd operation is to perform hash on compressed text and encryption on compressed text < 2 entries in CpaDcChainSessionSetupData array: 1st entry is for compression setup data 2nd entry is for hash and encryption setup data

CPA_DC_CHAIN_COMPRESS_THEN_ENCRYPT_HASH

2 operations for chaining: 1st operation is to perform compression on plain text 2nd operation is to perform encryption on compressed text and hash on compressed & encrypted text < 2 entries in CpaDcChainSessionSetupData array: 1st entry is for compression setup data 2nd entry is for encryption and hash setup data

CPA_DC_CHAIN_COMPRESS_THEN_AEAD

2 operations for chaining: 1st operation is to perform compression on plain text 2nd operation is to perform AEAD encryption on compressed text < 2 entries in CpaDcChainSessionSetupData

7.8 Enumeration Type Documentation

CPA_DC_CHAIN_HASH_THEN_COMPRESS

array: 1st entry is for compression setup data 2nd entry is for AEAD encryption setup data

2 operations for chaining: 1st operation is to perform hash on plain text 2nd operation is to perform compression on plain text < 2 entries in

CpaDcChainSessionSetupData array: 1st entry is for hash setup data 2nd entry is for compression setup data

CPA_DC_CHAIN_HASH_VERIFY_THEN_DECOMPRESS

2 operations for chaining: 1st operation is to perform hash verify on compressed text 2nd operation is to perform decompression on compressed text < 2 entries in

CpaDcChainSessionSetupData array: 1st entry is for hash setup data 2nd entry is for decompression setup data

CPA_DC_CHAIN_DECRYPT_THEN_DECOMPRESS

2 operations for chaining: 1st operation is to perform decryption on compressed & encrypted text 2nd operation is to perform decompression on compressed text < 2 entries in CpaDcChainSessionSetupData array: 1st entry is for decryption setup data 2nd entry is for decompression setup data

CPA_DC_CHAIN_HASH_VERIFY_DECRYPT_THEN_DECOMPRESS

2 operations for chaining: 1st operation is to perform hash verify on compressed & encrypted text and decryption on compressed & encrypted text 2nd operation is to perform decompression on compressed text < 2 entries in

CpaDcChainSessionSetupData array: 1st entry is for hash and decryption setup data 2nd entry is for decompression setup data

CPA_DC_CHAIN_DECRYPT_HASH_VERIFY_THEN_DECOMPRESS

2 operations for chaining: 1st operation is to perform decryption on compressed & encrypted text and hash verify on compressed text 2nd operation is to perform decompression on compressed text < 2 entries in

CpaDcChainSessionSetupData array: 1st entry is for decryption and hash setup data 2nd entry

7.9 Function Documentation

CPA_DC_CHAIN_AEAD_THEN_DECOMPRESS

is for decompression setup data
2 operations for chaining: 1st operation is to perform AEAD decryption on compressed & encrypted text 2nd operation is to perform decompression on compressed text < 2 entries in CpaDcChainSessionSetupData array: 1st entry is for AEAD decryption setup data 2nd entry is for decompression setup data

CPA_DC_CHAIN_DECOMPRESS_THEN_HASH_VERIFY

2 operations for chaining: 1st operation is to perform decompression on compressed text 2nd operation is to perform hash verify on plain text < 2 entries in

CPA_DC_CHAIN_COMPRESS_THEN_AEAD_THEN_HASH

CpaDcChainSessionSetupData array: 1st entry is for decompression setup data 2nd entry is for hash setup data
3 operations for chaining: 1st operation is to perform compression on plain text 2nd operation is to perform AEAD encryption compressed text 3rd operation is to perform hash on compressed & encrypted text < 3 entries in CpaDcChainSessionSetupData array: 1st entry is for compression setup data 2nd entry is for AEAD encryption setup data 3rd entry is for hash setup data

enum **_CpaDcChainSessionType**

Supported session types for data compression chaining.

This enumeration lists the supported session types for data compression chaining.

Enumerator:

CPA_DC_CHAIN_COMPRESS_DECOMPRESS Indicate the session is for compression or decompression

CPA_DC_CHAIN_SYMMETRIC_CRYPTO Indicate the session is for symmetric crypto

7.9 Function Documentation

CpaStatus cpaDcChainGetSessionSize (CpaInstanceHandle CpaDcChainOperations Cpa8U CpaDcChainSessionSetupData * Cpa32U *	<i>dcInstance,</i> <i>operation,</i> <i>numSessions,</i> <i>pSessionData,</i> <i>pSessionSize</i>
---	---

)

Get the size of the memory required to hold the chaining sessions information.

The client of the Data Compression API is responsible for allocating sufficient memory to hold chaining sessions information. This function provides a way for determining the size of chaining sessions.

Context:

No restrictions

Assumptions:

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dcInstance</i>	Instance handle.
[in]	<i>operation</i>	The operation for chaining
[in]	<i>numSessions</i>	Number of sessions for the chaining
[in]	<i>pSessionData</i>	Pointer to an array of CpaDcChainSessionSetupData structures. There should be numSessions entries in the array.
[out]	<i>pSessionSize</i>	On return, this parameter will be the size of the memory that will be required by cpaDcChainInitSession() for session data.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

None

Postcondition:

None

Note:

Only a synchronous version of this function is provided.

See also:

cpaDcChainInitSession()

```

CpaStatus cpaDcChainInitSession ( CpaInstanceHandle           dclInstance,
                                   CpaDcSessionHandle        pSessionHandle,
                                   CpaDcChainOperations       operation,
                                   Cpa8U                     numSessions,
                                   CpaDcChainSessionSetupData * pSessionData,
                                   CpaDcCallbackFn           callbackFn
                                   )

```

Initialize data compression chaining session

This function is used to initialize compression/decompression chaining sessions. This function returns a unique session handle each time this function is invoked. If the session has been configured with a callback function, then the order of the callbacks are guaranteed to be in the same order the compression or decompression requests were submitted for each session, so long as a single thread of execution is used for job submission.

Context:

This is a synchronous function and it cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dclInstance</i>	Instance handle derived from discovery functions.
[in, out]	<i>pSessionHandle</i>	Pointer to a session handle.
[in]	<i>operation</i>	The operations for chaining
[in]	<i>numSessions</i>	Number of sessions for chaining
[in, out]	<i>pSessionData</i>	Pointer to an array of CpaDcChainSessionSetupData structures. There should be numSessions entries in the array.
[in]	<i>callbackFn</i>	For synchronous operation this callback shall be a null pointer.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

dclInstance has been started using cpaDcStartInstance.

Postcondition:

7.9 Function Documentation

None

Note:

Only a synchronous version of this function is provided.

pSessionData Setup Rules

1. Each element in CpaDcChainSessionSetupData structure array provides (de)compression or a symmetric crypto session setup data.
1. The supported chaining operations are listed in CpaDcChainOperations. This enum indicates the number of operations in a chain and the order in which they are performed.
1. The order of entries in pSessionData[] should be consistent with the CpaDcChainOperations perform order. As an example, for CPA_DC_CHAIN_COMPRESS_THEN_ENCRYPT, pSessionData[0] holds the compression setup data and pSessionData[1] holds the encryption setup data..
1. The numSessions for each chaining operation are provided in the comments of enum CpaDcChainOperations.
1. For a (de)compression session, the corresponding pSessionData[]->sessType should be set to CPA_DC_CHAIN_COMPRESS_DECOMPRESS and pSessionData[]->pDcSetupData should point to a CpaDcSessionSetupData structure.
1. For a symmetric crypto session, the corresponding pSessionData[]->sessType should be set to CPA_DC_CHAIN_SYMMETRIC_CRYPTO and pSessionData[]->pCySetupData should point to a CpaCySymSessionSetupData structure.
1. Combined compression sessions are not supported for chaining.
1. Stateful compression is not supported for chaining.
1. Both CRC32 and Adler32 over the input data are supported for chaining.

See also:

None

```
CpaStatus cpaDcChainResetSession ( const CpaInstanceHandle dcInstance,  
                                CpaDcSessionHandle pSessionHandle  
                                )
```

Reset a compression chaining session.

This function will reset a previously initialized session handle. Reset will fail if outstanding calls still exist for the initialized session handle. The client needs to retry the reset function at a later time.

Context:

This is a synchronous function that cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

7.9 Function Documentation

Blocking:

No.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Instance handle.
[in, out] *pSessionHandle* Session handle.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_RETRY Resubmit the request.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

The component has been initialized via `cpaDcStartInstance` function. The session has been initialized via `cpaDcChainInitSession` function.

Postcondition:

None

Note:

This is a synchronous function and has no completion callback associated with it.

See also:

`cpaDcChainInitSession()`

```
CpaStatus cpaDcChainRemoveSession ( const CpaInstanceHandle dclInstance,  
                                     CpaDcSessionHandle pSessionHandle  
                                     )
```

Remove a compression chaining session.

This function will remove a previously initialized session handle and the installed callback handler function. Removal will fail if outstanding calls still exist for the initialized session handle. The client needs to retry the remove function at a later time. The memory for the session handle **MUST** not be freed until this call has completed successfully.

Context:

This is a synchronous function that cannot sleep. It can be executed in a context that does not permit sleeping.

Assumptions:

None

Side-Effects:

None

Blocking:

No.

7.9 Function Documentation

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in] *dclInstance* Instance handle.
[in, out] *pSessionHandle* Session handle.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.
CPA_STATUS_FAIL Function failed.
CPA_STATUS_RETRY Resubmit the request.
CPA_STATUS_INVALID_PARAM Invalid parameter passed in.
CPA_STATUS_RESOURCE Error related to system resources.
CPA_STATUS_RESTARTING API implementation is restarting. Resubmit the request.
CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

The component has been initialized via `cpaDcStartInstance` function.

Postcondition:

None

Note:

This is a synchronous function and has no completion callback associated with it.

See also:

`cpaDcChainInitSession()`

```
CpaStatus cpaDcChainPerformOp ( CpaInstanceHandle dclInstance,  
                                CpaDcSessionHandle pSessionHandle,  
                                CpaBufferList * pSrcBuff,  
                                CpaBufferList * pDestBuff,  
                                CpaDcChainOperations operation,  
                                Cpa8U numOpDatas,  
                                CpaDcChainOpData * pChainOpData,  
                                CpaDcChainRqResults * pResults,  
                                void * callbackTag  
                                )
```

Submit a request to perform chaining operations.

This function is used to perform chaining operations over data from the source buffer.

Context:

When called as an asynchronous function it cannot sleep. It can be executed in a context that does not permit sleeping. When called as a synchronous function it may sleep. It MUST NOT be executed in a context that DOES NOT permit sleeping.

Assumptions:

None

Side-Effects:

None

7.9 Function Documentation

Blocking:

Yes when configured to operate in synchronous mode.

Reentrant:

No

Thread-safe:

Yes

Parameters:

[in]	<i>dclInstance</i>	Target service instance.
[in, out]	<i>pSessionHandle</i>	Session handle.
[in]	<i>pSrcBuff</i>	Pointer to input data buffer.
[out]	<i>pDestBuff</i>	Pointer to output data buffer.
[in]	<i>operation</i>	Operation for the chaining request
[in]	<i>numOpDatas</i>	The entries size CpaDcChainOpData array
[in]	<i>pChainOpData</i>	Pointer to an array of CpaDcChainOpData structures. There should be numOpDatas entries in the array.
[in, out]	<i>pResults</i>	Pointer to CpaDcChainRqResults structure.
[in]	<i>callbackTag</i>	User supplied value to help correlate the callback with its associated request.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_RETRY</i>	Resubmit the request.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_DC_BAD_DATA</i>	The input data was not properly formed.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

pSessionHandle has been setup using **cpaDcChainInitSession()**

Postcondition:

pSessionHandle has session related state information

Note:

This function passes control to the compression service for chaining processing, the supported chaining operations are described in CpaDcChainOperations.

pChainOpData Setup Rules

1. Each element in CpaDcChainOpData structure array holds either a (de)compression or a symmetric crypto operation data.
1. The order of entries in pChainOpData[] must be consistent with the order of operations described for the chaining operation in CpaDcChainOperations. As an example, for CPA_DC_CHAIN_COMPRESS_THEN_ENCRYPT, pChainOpData[0] must contain the compression operation data and pChainOpData[1] must contain the encryption operation data.
1. The numOpDatas for each chaining operation are specified in the comments for the operation in CpaDcChainOperations.

7.9 Function Documentation

1. For a (de)compression operation, the corresponding pChainOpData[]->opType should be set to CPA_DC_CHAIN_COMPRESS_DECOMPRESS and pChainOpData[]->pDcOp should point to a CpaDcOpData structure.
1. For a symmetric crypto operation, the corresponding pChainOpData[]->opType should be set to CPA_DC_CHAIN_SYMMETRIC_CRYPTO and pChainOpData[]->pCySymOp should point to a CpaCySymOpData structure.
1. Stateful compression is not supported for chaining.
1. Partial packet processing is not supported.

This function has identical buffer processing rules as **cpaDcCompressData()**.

This function has identical checksum processing rules as **cpaDcCompressData()**, except:

1. pResults->crc32 is available to application if CpaDcSessionSetupData->checksum is set to CPA_DC_CRC32
1. pResults->adler32 is available to application if CpaDcSessionSetupData->checksum is set to CPA_DC_ADLER32
1. Both pResults->crc32 and pResults->adler32 are available if CpaDcSessionSetupData->checksum is set to CPA_DC_CRC32_ADLER32

Synchronous or asynchronous operation of the API is determined by the value of the callbackFn parameter passed to **cpaDcChainInitSession()** when the sessionHandle was setup. If a non-NULL value was specified then the supplied callback function will be invoked asynchronously with the response of this request.

This function has identical response ordering rules as **cpaDcCompressData()**.

See also:

cpaDcCompressData

8 Data Compression Data Plane API

[Data Compression API]

Collaboration diagram for Data Compression Data Plane API:



8.1 Detailed Description

File: `cpa_dc_dp.h`

These data structures and functions specify the Data Plane API for compression and decompression operations.

This API is recommended for data plane applications, in which the cost of offload - that is, the cycles consumed by the driver in sending requests to the hardware, and processing responses - needs to be minimized. In particular, use of this API is recommended if the following constraints are acceptable to your application:

- Thread safety is not guaranteed. Each software thread should have access to its own unique instance (`CpaInstanceHandle`) to avoid contention.
- Polling is used, rather than interrupts (which are expensive). Implementations of this API will provide a function (not defined as part of this API) to read responses from the hardware response queue and dispatch callback functions, as specified on this API.
- Buffers and buffer lists are passed using physical addresses, to avoid virtual to physical address translation costs.
- The ability to enqueue one or more requests without submitting them to the hardware allows for certain costs to be amortized across multiple requests.
- Only asynchronous invocation is supported.
- There is no support for partial packets.
- Implementations may provide certain features as optional at build time, such as atomic counters.
- There is no support for stateful operations.
 - ◆ The "default" instance (`CPA_INSTANCE_HANDLE_SINGLE`) is not supported on this API. The specific handle should be obtained using the instance discovery functions (`cpaDcGetNumInstances`, `cpaDcGetInstances`).

8.2 Data Structures

- `struct _CpaDcDpOpData`

8.3 Typedefs

- `typedef _CpaDcDpOpData CpaDcDpOpData`
- `typedef void(* CpaDcDpCallbackFn)(CpaDcDpOpData *pOpData)`

8.4 Functions

- `CpaStatus cpaDcDpInitSession(CpaInstanceHandle dclInstance, CpaDcSessionHandle pSessionHandle, CpaDcSessionSetupData *pSessionData)`

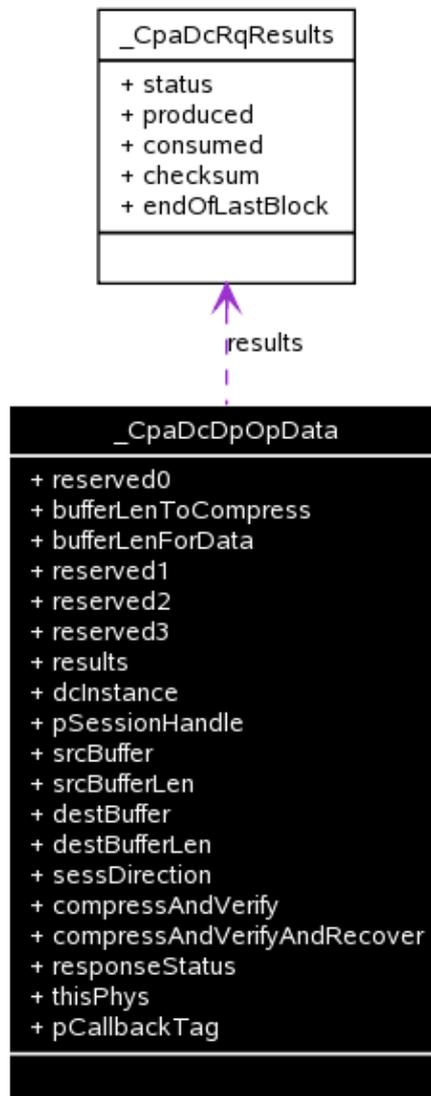
8.4 Functions

- **CpaStatus cpaDcDpRegCbFunc** (const **CpaInstanceHandle** dclInstance, const **CpaDcDpCallbackFn** pNewCb)
 - **CpaStatus cpaDcDpEnqueueOp** (**CpaDcDpOpData** *pOpData, const **CpaBoolean** performOpNow)
 - **CpaStatus cpaDcDpEnqueueOpBatch** (const **Cpa32U** numberRequests, **CpaDcDpOpData** *pOpData[], const **CpaBoolean** performOpNow)
 - **CpaStatus cpaDcDpPerformOpNow** (**CpaInstanceHandle** dclInstance)
-

8.5 Data Structure Documentation

8.5.1 _CpaDcDpOpData Struct Reference

Collaboration diagram for `_CpaDcDpOpData`:



8.5.1.1 Detailed Description

File: `cpa_dc_dp.h`

Operation Data for compression data plane API.

8.5.1 _CpaDcDpOpData Struct Reference

This structure contains data relating to a request to perform compression processing on one or more data buffers.

The physical memory to which this structure points should be at least 8-byte aligned.

All reserved fields SHOULD NOT be written or read by the calling code.

See also:

cpaDcDpEnqueueOp, cpaDcDpEnqueueOpBatch

8.5.1.2 Data Fields

- **Cpa64U reserved0**
- **Cpa32U bufferLenToCompress**
- **Cpa32U bufferLenForData**
- **Cpa64U reserved1**
- **Cpa64U reserved2**
- **Cpa64U reserved3**
- **CpaDcRqResults results**
- **CpaInstanceHandle dclInstance**
- **CpaDcSessionHandle pSessionHandle**
- **CpaPhysicalAddr srcBuffer**
- **Cpa32U srcBufferLen**
- **CpaPhysicalAddr destBuffer**
- **Cpa32U destBufferLen**
- **CpaDcSessionDir sessDirection**
- **CpaBoolean compressAndVerify**
- **CpaBoolean compressAndVerifyAndRecover**
- **CpaStatus responseStatus**
- **CpaPhysicalAddr thisPhys**
- **void * pCallbackTag**

8.5.1.3 Field Documentation

Cpa64U _CpaDcDpOpData::reserved0

Reserved for internal use. Source code should not read or write this field.

Cpa32U _CpaDcDpOpData::bufferLenToCompress

The number of bytes from the source buffer to compress. This must be less than, or more typically equal to, the total size of the source buffer (or buffer list).

Cpa32U _CpaDcDpOpData::bufferLenForData

The maximum number of bytes that should be written to the destination buffer. This must be less than, or more typically equal to, the total size of the destination buffer (or buffer list).

Cpa64U _CpaDcDpOpData::reserved1

Reserved for internal use. Source code should not read or write

Cpa64U _CpaDcDpOpData::reserved2

Reserved for internal use. Source code should not read or write

Cpa64U _CpaDcDpOpData::reserved3

Reserved for internal use. Source code should not read or write

8.5.1 _CpaDcDpOpData Struct Reference

CpaDcRqResults _CpaDcDpOpData::results

Results of the operation. Contents are valid upon completion.

CpaInstanceHandle _CpaDcDpOpData::dclInstance

Instance to which the request is to be enqueued

CpaDcSessionHandle _CpaDcDpOpData::pSessionHandle

DC Session associated with the stream of requests

CpaPhysicalAddr _CpaDcDpOpData::srcBuffer

Physical address of the source buffer on which to operate. This is either the location of the data, of length srcBufferLen; or, if srcBufferLen has the special value **CPA_DP_BUFLIST**, then srcBuffer contains the location where a **CpaPhysBufferList** is stored.

Cpa32U _CpaDcDpOpData::srcBufferLen

If the source buffer is a "flat buffer", then this field specifies the size of the buffer, in bytes. If the source buffer is a "buffer list" (of type **CpaPhysBufferList**), then this field should be set to the value **CPA_DP_BUFLIST**.

CpaPhysicalAddr _CpaDcDpOpData::destBuffer

Physical address of the destination buffer on which to operate. This is either the location of the data, of length destBufferLen; or, if destBufferLen has the special value **CPA_DP_BUFLIST**, then destBuffer contains the location where a **CpaPhysBufferList** is stored.

Cpa32U _CpaDcDpOpData::destBufferLen

If the destination buffer is a "flat buffer", then this field specifies the size of the buffer, in bytes. If the destination buffer is a "buffer list" (of type **CpaPhysBufferList**), then this field should be set to the value **CPA_DP_BUFLIST**.

CpaDcSessionDir _CpaDcDpOpData::sessDirection

Session direction indicating whether session is used for compression, decompression. For the DP implementation, CPA_DC_DIR_COMBINED is not a valid selection.

CpaBoolean _CpaDcDpOpData::compressAndVerify

If set to true, for compression operations, the implementation will verify that compressed data, generated by the compression operation, can be successfully decompressed. This behavior is only supported for stateless compression. This behavior is only supported on instances that support the compressAndVerify capability.

CpaBoolean _CpaDcDpOpData::compressAndVerifyAndRecover

If set to true, for compression operations, the implementation will automatically recover from a compressAndVerify error. This behavior is only supported for stateless compression. This behavior is only supported on instances that support the compressAndVerifyAndRecover capability. The compressAndVerify field in CpaDcOpData MUST be set to CPA_TRUE if compressAndVerifyAndRecover is set to CPA_TRUE.

CpaStatus _CpaDcDpOpData::responseStatus

Status of the operation. Valid values are CPA_STATUS_SUCCESS, CPA_STATUS_FAIL and CPA_STATUS_UNSUPPORTED.

CpaPhysicalAddr _CpaDcDpOpData::thisPhys

8.6 Typedef Documentation

Physical address of this data structure

```
void* _CpaDcDpOpData::pCallbackTag
```

Opaque data that will be returned to the client in the function completion callback.

This opaque data is not used by the implementation of the API, but is simply returned as part of the asynchronous response. It may be used to store information that might be useful when processing the response later.

8.6 Typedef Documentation

```
typedef struct _CpaDcDpOpData CpaDcDpOpData
```

File: `cpa_dc_dp.h`

Operation Data for compression data plane API.

This structure contains data relating to a request to perform compression processing on one or more data buffers.

The physical memory to which this structure points should be at least 8-byte aligned.

All reserved fields SHOULD NOT be written or read by the calling code.

See also:

`cpaDcDpEnqueueOp`, `cpaDcDpEnqueueOpBatch`

```
typedef void(* CpaDcDpCallbackFn)(CpaDcDpOpData *pOpData)
```

File: `cpa_dc_dp.h`

Definition of callback function for compression data plane API.

This is the callback function prototype. The callback function is registered by the application using the `cpaDcDpRegCbFunc` function call, and called back on completion of asynchronous requests made via calls to `cpaDcDpEnqueueOp` or `cpaDcDpEnqueueOpBatch`.

Context:

This callback function can be executed in a context that DOES NOT permit sleeping to occur.

Assumptions:

None

Side-Effects:

None

Reentrant:

No

Thread-safe:

No

8.7 Function Documentation

Parameters:

[in] *pOpData* Pointer to the **CpaDcDpOpData** object which was supplied as part of the original request.

Returns:

None

Precondition:

Instance has been initialized. Callback has been registered with **cpaDcDpRegCbFunc**.

Postcondition:

None

Note:

None

See also:

cpaDcDpRegCbFunc

8.7 Function Documentation

```
CpaStatus cpaDcDpInitSession ( CpaInstanceHandle      dclInstance,  
                               CpaDcSessionHandle     pSessionHandle,  
                               CpaDcSessionSetupData * pSessionData  
                               )
```

File: **cpa_dc_dp.h**

Initialize compression or decompression data plane session.

This function is used to initialize a compression/decompression session. A single session can be used for both compression and decompression requests. Clients **MUST** register a callback function for the compression service using this function. This function returns a unique session handle each time this function is invoked. The order of the callbacks are guaranteed to be in the same order the compression or decompression requests were submitted for each session, so long as a single thread of execution is used for job submission.

Context:

This function may be called from any context.

Assumptions:

None

Side-Effects:

None

Blocking:

Yes

Reentrant:

No

Thread-safe:

Yes

8.7 Function Documentation

Parameters:

[in]	<i>dclInstance</i>	Instance handle derived from discovery functions.
[in, out]	<i>pSessionHandle</i>	Pointer to a session handle.
[in, out]	<i>pSessionData</i>	Pointer to a user instantiated structure containing session data.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESOURCE</i>	Error related to system resources.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

dclInstance has been started using **cpaDcStartInstance**.

Postcondition:

None

Note:

Only a synchronous version of this function is provided.

This initializes opaque data structures in the session handle. Data compressed under this session will be compressed to the level specified in the *pSessionData* structure. Lower compression level numbers indicate a request for faster compression at the expense of compression ratio. Higher compression level numbers indicate a request for higher compression ratios at the expense of execution time.

The session is opaque to the user application and the session handle contains job specific data.

The window size specified in the *pSessionData* must match exactly one of the supported window sizes specified in the capability structure. If a bi-directional session is being initialized, then the window size must be valid for both compress and decompress.

Note stateful sessions are not supported by this API.

See also:

None

```
CpaStatus cpaDcDpRegCbFunc ( const
                             CpaInstanceHandle dclInstance,
                             const
                             CpaDcDpCallbackFn pNewCb
                             )
```

File: **cpa_dc_dp.h**

Registration of the operation completion callback function.

This function allows a completion callback function to be registered. The registered callback function is invoked on completion of asynchronous requests made via calls to **cpaDcDpEnqueueOp** or **cpaDcDpEnqueueOpBatch**.

Context:

This is a synchronous function and it cannot sleep. It can be executed in a context that DOES NOT permit sleeping.

8.7 Function Documentation

Assumptions:

None

Side-Effects:

None

Reentrant:

No

Thread-safe:

No

Parameters:

[in] *dclInstance* Instance on which the callback function is to be registered.

[in] *pNewCb* Callback function for this instance.

Return values:

CPA_STATUS_SUCCESS Function executed successfully.

CPA_STATUS_FAIL Function failed.

CPA_STATUS_INVALID_PARAM Invalid parameter passed in.

CPA_STATUS_RESOURCE Error related to system resources.

CPA_STATUS_RESTARTING API implementation is restarting. Resubmit the request.

CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

Instance has been initialized.

Postcondition:

None

Note:

None

See also:

cpaDcDpCbFunc

```
CpaStatus cpaDcDpEnqueueOp ( CpaDcDpOpData * pOpData,  
                           const CpaBoolean performOpNow  
                           )
```

File: *cpa_dp_dp.h*

Enqueue a single compression or decompression request.

This function enqueues a single request to perform a compression, decompression operation.

The function is asynchronous; control is returned to the user once the request has been submitted. On completion of the request, the application may poll for responses, which will cause a callback function (registered via **cpaDcDpRegCbFunc**) to be invoked. Callbacks within a session are guaranteed to be in the same order in which they were submitted.

The following restrictions apply to the *pOpData* parameter:

- The memory MUST be aligned on an 8-byte boundary.
- The reserved fields of the structure MUST NOT be written to or read from.

8.7 Function Documentation

- The structure **MUST** reside in physically contiguous memory.

Context:

This function will not sleep, and hence can be executed in a context that does not permit sleeping.

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

No

Parameters:

- [in] *pOpData* Pointer to a structure containing the request parameters. The client code allocates the memory for this structure. This component takes ownership of the memory until it is returned in the callback, which was registered on the instance via **cpaDcDpRegCbFunc**. See the above Description for some restrictions that apply to this parameter.
- [in] *performOpNow* Flag to indicate whether the operation should be performed immediately (CPA_TRUE), or simply enqueued to be performed later (CPA_FALSE). In the latter case, the request is submitted to be performed either by calling this function again with this flag set to CPA_TRUE, or by invoking the function **cpaDcDpPerformOpNow**.

Return values:

- CPA_STATUS_SUCCESS* Function executed successfully.
- CPA_STATUS_FAIL* Function failed.
- CPA_STATUS_RETRY* Resubmit the request.
- CPA_STATUS_INVALID_PARAM* Invalid parameter passed in.
- CPA_STATUS_RESTARTING* API implementation is restarting. Resubmit the request.
- CPA_STATUS_UNSUPPORTED* Function is not supported.

Precondition:

The session identified by *pOpData->pSessionHandle* was setup using **cpaDcDpInitSession**. The instance identified by *pOpData->dclInstance* has had a callback function registered via **cpaDcDpRegCbFunc**.

Postcondition:

None

Note:

A callback of type **CpaDcDpCallbackFn** is generated in response to this function call. Any errors generated during processing are reported as part of the callback status code.

See also:

cpaDcDpPerformOpNow

```
CpaStatus cpaDcDpEnqueueOpBatch ( const Cpa32U      numberRequests,
                                CpaDcDpOpData *  pOpData[],
                                const CpaBoolean performOpNow
```

)

File: cpa_dc_dp.h

Enqueue multiple requests to the compression data plane API.

This function enqueues multiple requests to perform compression or decompression operations.

The function is asynchronous; control is returned to the user once the request has been submitted. On completion of the request, the application may poll for responses, which will cause a callback function (registered via **cpaDcDpRegCbFunc**) to be invoked. Separate callbacks will be invoked for each request. Callbacks within a session and at the same priority are guaranteed to be in the same order in which they were submitted.

The following restrictions apply to each element of the pOpData array:

- The memory MUST be aligned on an 8-byte boundary.
- The reserved fields of the structure MUST be set to zero.
- The structure MUST reside in physically contiguous memory.

Context:

This function will not sleep, and hence can be executed in a context that does not permit sleeping.

Assumptions:

Client MUST allocate the request parameters to 8 byte alignment. Reserved elements of the CpaDcDpOpData structure MUST not be used. The CpaDcDpOpData structure MUST reside in physically contiguous memory.

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

No

Parameters:

- | | |
|----------------------------|---|
| [in] <i>numberRequests</i> | The number of requests in the array of CpaDcDpOpData structures. |
| [in] <i>pOpData</i> | An array of pointers to CpaDcDpOpData structures. Each CpaDcDpOpData structure contains the request parameters for that request. The client code allocates the memory for this structure. This component takes ownership of the memory until it is returned in the callback, which was registered on the instance via cpaDcDpRegCbFunc . See the above Description for some restrictions that apply to this parameter. |
| [in] <i>performOpNow</i> | Flag to indicate whether the operation should be performed immediately (CPA_TRUE), or simply enqueued to be performed later (CPA_FALSE). In the latter case, the request is submitted to be performed either by calling this function again with this flag set to CPA_TRUE, or by invoking the function cpaDcDpPerformOpNow . |

Return values:

8.7 Function Documentation

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_RETRY</i>	Resubmit the request.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.
<i>CPA_STATUS_UNSUPPORTED</i>	Function is not supported.

Precondition:

The session identified by `pOpData[i]->pSessionHandle` was setup using **cpaDcDpInitSession**. The instance identified by `pOpData[i]->dclInstance` has had a callback function registered via **cpaDcDpRegCbFunc**.

Postcondition:

None

Note:

Multiple callbacks of type **CpaDcDpCallbackFn** are generated in response to this function call (one per request). Any errors generated during processing are reported as part of the callback status code.

See also:

cpaDcDpEnqueueOp

CpaStatus `cpaDcDpPerformOpNow (CpaInstanceHandle dclInstance)`

File: `cpa_dp_dp.h`

Submit any previously enqueued requests to be performed now on the compression data plane API.

This function triggers processing of previously enqueued requests on the referenced instance.

Context:

Will not sleep. It can be executed in a context that does not permit sleeping.

Side-Effects:

None

Blocking:

No

Reentrant:

No

Thread-safe:

No

Parameters:

[in] *dclInstance* Instance to which the requests will be submitted.

Return values:

<i>CPA_STATUS_SUCCESS</i>	Function executed successfully.
<i>CPA_STATUS_FAIL</i>	Function failed.
<i>CPA_STATUS_RETRY</i>	Resubmit the request.
<i>CPA_STATUS_INVALID_PARAM</i>	Invalid parameter passed in.
<i>CPA_STATUS_RESTARTING</i>	API implementation is restarting. Resubmit the request.

8.7 Function Documentation

CPA_STATUS_UNSUPPORTED Function is not supported.

Precondition:

The component has been initialized via **cpaDcStartInstance** function. A compression session has been previously setup using the **cpaDcDpInitSession** function call.

Postcondition:

None

See also:

cpaDcDpEnqueueOp, cpaDcDpEnqueueOpBatch