QATzip

1.2.0

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4.1 Data Compression API

Classes

- struct QzSessionParams_S
- struct QzSession_S
- struct QzStatus_S
- struct QzCrc64Config_S
- struct QzStream_S

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- #define QATZIP_API_VERSION_NUM_MAJOR (2)
- #define QATZIP_API_VERSION_NUM_MINOR (3)
- #define QZ_OK (0)
- #define QZ_SW_BACKUP_BIT_POSITION (0)
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- #define QZ_MAX_STRING_LENGTH 64
- #define QZ_SKID_PAD_SZ 48

Typedefs

- typedef enum QzHuffmanHdr_E QzHuffmanHdr_T
- typedef enum PinMem_E PinMem_T
- typedef enum QzDirection_E QzDirection_T
- typedef enum QzDataFormat_E QzDataFormat_T
- typedef enum QzPollingMode_E QzPollingMode_T
- typedef enum QzCrcType_E QzCrcType_T
- typedef enum QzSoftwareComponentType_E QzSoftwareComponentType_T
- typedef int(∗ qzLZ4SCallbackFn) (void ∗external, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, int ∗ExtStatus)
- typedef struct QzSessionParams_S QzSessionParams_T
- typedef struct QzSession_S QzSession_T
- typedef struct QzStatus_S QzStatus_T
- typedef struct QzCrc64Config_S QzCrc64Config_T
- typedef void ∗ QzMetadataBlob_T
- typedef struct QzStream_S QzStream_T

Enumerations

- enum QzHuffmanHdr_E { QZ_DYNAMIC_HDR = 0 , QZ_STATIC_HDR }
- enum PinMem_E { COMMON_MEM = 0 , PINNED_MEM }
- enum QzDirection_E { QZ_DIR_COMPRESS = 0 , QZ_DIR_DECOMPRESS , QZ_DIR_BOTH }
- enum QzDataFormat_E {
  QZ_DEFLATE_4B = 0 , QZ_DEFLATE_GZIP , QZ_DEFLATE_GZIP_EXT , QZ_DEFLATE_RAW ,
  QZ_FMT_NUM }
- enum QzPollingMode_E { QZ_PERIODICAL_POLLING = 0 , QZ_BUSY_POLLING }
- enum QzCrcType_E { QZ_CRC32 = 0 , QZ_ADLER , NONE }
- enum QzSoftwareComponentType_E {
  QZ_COMPONENT_FIRMWARE = 0 , **QZ_COMPONENT_KERNEL_DRIVER** , **QZ_COMPONENT_USER↩
  _DRIVER** , **QZ_COMPONENT_QATZIP_API** ,
  QZ_COMPONENT_SOFTWARE_PROVIDER }

Functions

- QATZIP_API int qzInit (QzSession_T ∗sess, unsigned char sw_backup)
- QATZIP_API int qzSetupSession (QzSession_T ∗sess, QzSessionParams_T ∗params)
- QATZIP_API int qzCompress (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last)
- QATZIP_API int qzCompressCrc (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last, unsigned long ∗crc)
- QATZIP_API int qzCompressWithMetadataExt (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last, uint64_t ∗ext_rc, QzMetadataBlob_T ∗metadata, uint32_t hw_buff_sz_override, uint32_t comp_thrshold)
- QATZIP_API int qzDecompress (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len)
- QATZIP_API int qzDecompressCrc (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned long ∗crc)
- QATZIP_API int qzDecompressWithMetadataExt (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, uint64_t ∗ext_rc, QzMetadataBlob_T ∗metadata, uint32_t hw_buff_sz_override)
- QATZIP_API int qzTeardownSession (QzSession_T ∗sess)
- QATZIP_API int qzClose (QzSession_T ∗sess)
- QATZIP_API int qzGetStatus (QzSession_T ∗sess, QzStatus_T ∗status)
- QATZIP_API int qzSetDefaults (QzSessionParams_T ∗defaults)
- QATZIP_API int qzGetDefaults (QzSessionParams_T ∗defaults)
- QATZIP_API void ∗ qzMalloc (size_t sz, int numa, int force_pinned)
- QATZIP_API int qzAllocateMetadata (QzMetadataBlob_T ∗metadata, size_t data_size, uint32_t hw_buff_sz)
- QATZIP_API void qzFree (void ∗m)
- QATZIP_API int qzFreeMetadata (QzMetadataBlob_T metadata)
- QATZIP_API int qzMemFindAddr (unsigned char ∗a)
- QATZIP_API int qzCompressStream (QzSession_T ∗sess, QzStream_T ∗strm, unsigned int last)
- QATZIP_API int qzDecompressStream (QzSession_T ∗sess, QzStream_T ∗strm, unsigned int last)
- QATZIP_API int qzEndStream (QzSession_T ∗sess, QzStream_T ∗strm)
- QATZIP_API int qzGetSoftwareComponentVersionList (QzSoftwareVersionInfo_T ∗api_info, unsigned int ∗num_elem)
- QATZIP_API int qzGetSoftwareComponentCount (unsigned int ∗num_elem)
- QATZIP_API int qzGetSessionCrc64Config (QzSession_T ∗sess, QzCrc64Config_T ∗crc64_config)
- QATZIP_API int qzSetSessionCrc64Config (QzSession_T ∗sess, QzCrc64Config_T ∗crc64_config)
- QATZIP_API int qzMetadataBlockRead (uint32_t block_num, QzMetadataBlob_T metadata, uint32_↩
  t ∗block_offset, uint32_t ∗block_size, uint32_t ∗block_flags, uint32_t ∗block_hash)
- QATZIP_API int qzMetadataBlockWrite (uint32_t block_num, QzMetadataBlob_T metadata, uint32_↩
  t ∗block_offset, uint32_t ∗block_size, uint32_t ∗block_flags, uint32_t ∗block_hash)

4.1.1 Detailed Description

@description These functions specify the API for data compression operations.

Remarks

4.1.2 Macro Definition Documentation

4.1.2.1 QATZIP_API_VERSION_NUM_MAJOR

```
#define QATZIP_API_VERSION_NUM_MAJOR (2)
```

QATzip Major Version Number @description The QATzip API major version number. This number will be incremented when significant changes to the API have occurred. The combination of the major and minor number definitions represent the complete version number for this interface.

4.1.2.2 QATZIP_API_VERSION_NUM_MINOR

```
#define QATZIP_API_VERSION_NUM_MINOR (3)
```

QATzip Minor Version Number @description The QATzip API minor version number. This number will be incremented when minor changes to the API have occurred. The combination of the major and minor number definitions represent the complete version number for this interface.

4.1.2.3 QZ_MAX_STRING_LENGTH

```
#define QZ_MAX_STRING_LENGTH 64
```

QATzip software version structure

@description This structure contains data relating to the versions of a QATZip or a subcomponent of this library platform.

4.1.2.4 QZ_OK

```
#define QZ_OK (0)
```

QATzip Session Status definitions and function return codes

@description This list identifies valid values for session status and function return codes. Success

4.1.2.5 QZ_SKID_PAD_SZ

```
#define QZ_SKID_PAD_SZ 48
```

Get the maximum compressed output length

@description Get the maximum compressed output length.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*src_sz*	Input data length in bytes sess Session handle (pointer to opaque instance and session data)

Return values

dest_sz	Max compressed data output length in bytes. When src_sz is equal to 0, the return value is QZ_COMPRESSED_SZ_OF_EMPTY_FILE(34). When integer overflow happens, the return value is 0

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.2.6 QZ_SW_BACKUP_BIT_POSITION

```
#define QZ_SW_BACKUP_BIT_POSITION (0)
```

QATzip Session software configuration settings

@description The following definitions can be used with the sw_backup variable in structs and functions to configure the session

QZ_ENABLE_SOFTWARE_BACKUP Congifure session with software fallback

QZ_ENABLE_SOFTWARE_ONLY_EXECUTION Configure session to only use software

4.1.2.7 QZ_SW_EXECUTION_BIT

```
#define QZ_SW_EXECUTION_BIT (4)
```

QATzip Extended return information

@description The following definitions can be used with the extended return values.

QZ_SW_EXECUTION indicates if a request for services was performed in software.

QZ_HW_TIMEOUT indicates if a request to hardware was timed out.

If set in the extended return value, QZ_POST_PROCESS_FAIL indicates post processing of the LZ4s compressed data has failed.

4.1.3 Typedef Documentation

4.1.3.1 PinMem_T

```
typedef enum PinMem_E PinMem_T
```

Supported memory types

@description This enumerated list identifies memory types supported by QATzip.

4.1.3.2 QzCrc64Config_T

```
typedef struct QzCrc64Config_S QzCrc64Config_T
```

QATzip CRC64 configuration structure

@description This structure contains data relating to configuration of the sessions CRC64 functionality.Session defaults to using ECMA-182 Normal on creation.

4.1.3.3 QzCrcType_T

```
typedef enum QzCrcType_E QzCrcType_T
```

Supported checksum type

@description This enumerated list identifies the checksum type for input/output data. The format can be CRC32, Adler or none.

4.1.3.4 QzDataFormat_T

```
typedef enum QzDataFormat_E QzDataFormat_T
```

Streaming API input and output format

@description This enumerated list identifies the data format supported by QATzip streaming API. A format can be raw deflate data block, deflate block wrapped by GZip header and footer, or deflate data block wrapped by GZip extension header and footer.

4.1.3.5 QzDirection_T

```
typedef enum QzDirection_E QzDirection_T
```

Compress or decompress setting

@description This enumerated list identifies the session directions supported by QATzip. A session can be compress, decompress or both.

4.1.3.6 QzHuffmanHdr_T

```
typedef enum QzHuffmanHdr_E QzHuffmanHdr_T
```

This API provides access to underlying compression functions in QAT hardware. The API supports an implementation that provides compression service in software if all of the required resources are not available to execute the compression service in hardware.

The API supports threaded applications. Applications can create threads and each of these threads can invoke the API defined herein.

For simplicity, initializations and setup function calls are not required to obtain compression services. If the initialization and setup functions are not called before compression or decompression requests, then they will be called with default arguments from within the compression or decompression functions. This results in several legal calling scenarios, described below.

Scenario 1 - All functions explicitly invoked by caller, with all arguments provided.

qzInit(&sess, sw_backup); qzSetupSession(&sess, &params); qzCompress(&sess, src, &src_len, dest, &dest_len, 1); qzDecompress(&sess, src, &src_len, dest, &dest_len); qzTeardownSession(&sess); qzClose(&sess);

Scenario 2 - Initialization function called, setup function not invoked by caller. This scenario can be used to specify the sw_backup argument to qzInit.

qzInit(&sess, sw_backup); qzCompress(&sess, src, &src_len, dest, &dest_len, 1); calls qzSetupSession(sess, NULL); qzTeardownSession(&sess); qzClose(&sess);

Scenario 3 - Calling application simply invokes the actual qzCompress functions.

qzCompress(&sess, src, &src_len, dest, &dest_len, 0); calls qzInit(sess, 1); calls qzSetupSession(sess, NULL); qzCompress(&sess, src, &src_len, dest, &dest_len, 1);

Notes: Invoking qzSetupSession with NULL for params sets up a session with default session attributed, detailed in the function description below.

If an application terminates without invoking tear down and close functions, process termination will invoke memory and hardware instance cleanup.

If a thread terminates without invoking tear down and close functions, memory and hardware are not cleaned up until the application exits.

Additions for QAT 2.0 and beyond platforms though Extending QzSessionParamsGen3_T, QzDataFormatGen3_T and Using qzSetupSessionGen3 to setup session.

1. Addition of LZ4 and LZ4s
2. Addition of post processing functions for out of LZ4s
3. Compression level up to 12 for LZ4 and LZ4s
4. Support for gzip header with additional compression algorithms

   Supported Huffman Headers

@description This enumerated list identifies the Huffman header types supported by QATzip.

4.1.3.7 qzLZ4SCallbackFn

```
typedef int(* qzLZ4SCallbackFn) (void *external, const unsigned char *src, unsigned int *src_↩
len, unsigned char *dest, unsigned int *dest_len, int *ExtStatus)
```

Post processing callback after LZ4s compression

@description This function will be called in qzCompressCrc for post processing of lz4s payloads. Function implementation should be provided by user and comply with this prototype's rules. The input paramter 'dest' will contain the compressed lz4s format data.

The user callback function should be provided through the QzSessionParams_T. And set data format of compression to 'QZ_LZ4S_FH', then post-processing will be trigger.

qzCallback's first parameter 'external' can be a customized compression context which can be setup before QAT qzSetupSession. It can be provided to QATZip though the 'qzCallback_external' variable in the QzSessionParams↩ _T structure.

ExtStatus will be embedded into extended return codes when qzLZ4SCallbackFn return `QZ_POST_PROCESS_↩ ERROR`. See extended return code section and *Ext API for details.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*external*	User context provided through the 'qzCallback_external' pointer in the QzSessionParams_T structure.
`in`	*src*	Point to source buffer
`in,out`	*src_len*	Length of source buffer. Modified to number of bytes consumed
`in`	*dest*	Point to destination buffer
`in,out`	*dest_len*	Length of destination buffer. Modified to length of compressed data when function returns
`in,out`	*ExtStatus*	'qzCallback' customized error code.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	params are invalid
QZ_POST_PROCESS_ERROR	post processing error

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.3.8 QzMetadataBlob_T

```
typedef void* QzMetadataBlob_T
```

QATzip pointer to opaque metadata.

@description The opaque pointer to metadata.

4.1.3.9 QzPollingMode_T

```
typedef enum QzPollingMode_E QzPollingMode_T
```

Supported polling mode

@description Specifies whether the instance must be busy polling, or be periodical polling.

4.1.3.10 QzSession_T

```
typedef struct QzSession_S QzSession_T
```

QATzip Session opaque data storage

@description This structure contains a pointer to a structure with session state.

4.1.3.11 QzSessionParams_T

```
typedef struct QzSessionParams_S QzSessionParams_T
```

QATzip Session Initialization parameters

@description This structure contains data for initializing a session.

4.1.3.12 QzSoftwareComponentType_T

```
typedef enum QzSoftwareComponentType_E QzSoftwareComponentType_T
```

Software Component type

@description This enumerated list specifies the type of software that is being described.

4.1.3.13 QzStatus_T

```
typedef struct QzStatus_S QzStatus_T
```

QATzip status structure

@description This structure contains data relating to the status of QAT on the platform.

4.1.3.14 QzStream_T

```
typedef struct QzStream_S QzStream_T
```

QATzip Stream data storage

@description This structure contains metadata needed for stream operation.

4.1.4 Enumeration Type Documentation

4.1.4.1 PinMem_E

```
enum PinMem_E
```

Supported memory types

@description This enumerated list identifies memory types supported by QATzip.

Enumerator

COMMON_MEM	Allocate non-contiguous memory
PINNED_MEM	Allocate contiguous memory

4.1.4.2 QzCrcType_E

```
enum QzCrcType_E
```

Supported checksum type

@description This enumerated list identifies the checksum type for input/output data. The format can be CRC32, Adler or none.

Enumerator

QZ_CRC32	CRC32 checksum
QZ_ADLER	Adler checksum
NONE	No checksum

4.1.4.3 QzDataFormat_E

```
enum QzDataFormat_E
```

Streaming API input and output format

@description This enumerated list identifies the data format supported by QATzip streaming API. A format can be raw deflate data block, deflate block wrapped by GZip header and footer, or deflate data block wrapped by GZip extension header and footer.

Enumerator

QZ_DEFLATE_4B	Data is in raw deflate format with 4 byte header
QZ_DEFLATE_GZIP	Data is in deflate wrapped by GZip header and footer
QZ_DEFLATE_GZIP_EXT	Data is in deflate wrapped by GZip extended header and footer
QZ_DEFLATE_RAW	Data is in raw deflate format

4.1.4.4 QzDirection_E

```
enum QzDirection_E
```

Compress or decompress setting

@description This enumerated list identifies the session directions supported by QATzip. A session can be compress, decompress or both.

Enumerator

QZ_DIR_COMPRESS	Session will be used for compression
QZ_DIR_DECOMPRESS	Session will be used for decompression
QZ_DIR_BOTH	Session will be used for both compression and decompression

4.1.4.5 QzHuffmanHdr_E

```
enum QzHuffmanHdr_E
```

This API provides access to underlying compression functions in QAT hardware. The API supports an implementation that provides compression service in software if all of the required resources are not available to execute the compression service in hardware.

The API supports threaded applications. Applications can create threads and each of these threads can invoke the API defined herein.

For simplicity, initializations and setup function calls are not required to obtain compression services. If the initialization and setup functions are not called before compression or decompression requests, then they will be called with default arguments from within the compression or decompression functions. This results in several legal calling scenarios, described below.

Scenario 1 - All functions explicitly invoked by caller, with all arguments provided.

qzInit(&sess, sw_backup); qzSetupSession(&sess, &params); qzCompress(&sess, src, &src_len, dest, &dest_len, 1); qzDecompress(&sess, src, &src_len, dest, &dest_len); qzTeardownSession(&sess); qzClose(&sess);

Scenario 2 - Initialization function called, setup function not invoked by caller. This scenario can be used to specify the sw_backup argument to qzInit.

qzInit(&sess, sw_backup); qzCompress(&sess, src, &src_len, dest, &dest_len, 1); calls qzSetupSession(sess, NULL); qzTeardownSession(&sess); qzClose(&sess);

Scenario 3 - Calling application simply invokes the actual qzCompress functions.

qzCompress(&sess, src, &src_len, dest, &dest_len, 0); calls qzInit(sess, 1); calls qzSetupSession(sess, NULL); qzCompress(&sess, src, &src_len, dest, &dest_len, 1);

Notes: Invoking qzSetupSession with NULL for params sets up a session with default session attributed, detailed in the function description below.

If an application terminates without invoking tear down and close functions, process termination will invoke memory and hardware instance cleanup.

If a thread terminates without invoking tear down and close functions, memory and hardware are not cleaned up until the application exits.

Additions for QAT 2.0 and beyond platforms though Extending QzSessionParamsGen3_T, QzDataFormatGen3_T and Using qzSetupSessionGen3 to setup session.

1. Addition of LZ4 and LZ4s
2. Addition of post processing functions for out of LZ4s
3. Compression level up to 12 for LZ4 and LZ4s
4. Support for gzip header with additional compression algorithms

   Supported Huffman Headers

@description This enumerated list identifies the Huffman header types supported by QATzip.

Enumerator

QZ_DYNAMIC_HDR	Full Dynamic Huffman Trees
QZ_STATIC_HDR	Static Huffman Trees

4.1.4.6 QzPollingMode_E

```
enum QzPollingMode_E
```

Supported polling mode

@description Specifies whether the instance must be busy polling, or be periodical polling.

Enumerator

QZ_PERIODICAL_POLLING	No busy polling
QZ_BUSY_POLLING	busy polling

4.1.4.7 QzSoftwareComponentType_E

```
enum QzSoftwareComponentType_E
```

Software Component type

@description This enumerated list specifies the type of software that is being described.

4.1.5 Function Documentation

4.1.5.1 qzAllocateMetadata()

```
QATZIP_API int qzAllocateMetadata (
            QzMetadataBlob_T * metadata,
            size_t data_size,
            uint32_t hw_buff_sz )
```

Allocate memory for metadata.

@description Allocate memory for metadata. The function takes the size of entire input buffer and the data size at which individual block will be compressed. These parameters will be used to calculate and allocate required memory for metadata.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in,out	*metadata*	Pointer to opaque metadata.
in	*data_size*	Size of uncompressed buffer.
in	*hw_buff_sz*	Data size at which individual block will be compressed.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	*metadata is NULL, or data_size is 0, or data_size is greater than 1GB, or incorrect hw_buff_sz.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.2 qzClose()

```
QATZIP_API int qzClose (
            QzSession_T * sess )
```

Terminates a QATzip session

@description This function closes the connection with QAT.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*sess*	Session handle (pointer to opaque instance and session data)

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess is NULL or member of params is invalid

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.3 qzCompress()

```
QATZIP_API int qzCompress (
            QzSession_T * sess,
            const unsigned char * src,
            unsigned int * src_len,
            unsigned char * dest,
            unsigned int * dest_len,
            unsigned int last )
```

Compress a buffer

@description This function will compress a buffer if either a hardware based session or a software based session is available. If no session has been established - as indicated by the contents of ∗sess - then this function will attempt to set up a session using qzInit and qzSetupSession.

The resulting compressed block of data will be composed of one or more gzip blocks, as per RFC 1952.

This function will place completed compression blocks in the output buffer.

The caller must check the updated src_len. This value will be the number of consumed bytes on exit. The calling API may have to process the destination buffer and call again.

The parameter dest_len will be set to the number of bytes produced in the destination buffer. This value may be zero if no data was produced which may occur if the consumed data is retained internally. A possible reason for this may be small amounts of data in the src buffer.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in`	*src*	Point to source buffer
`in,out`	*src_len*	Length of source buffer. Modified to number of bytes consumed
`in`	*dest*	Point to destination buffer
`in,out`	*dest_len*	Length of destination buffer. Modified to length of compressed data when function returns
`in`	*last*	1 for 'No more data to be compressed' 0 for 'More data to be compressed'
`in,out`	*ext_rc*	qzCompressExt only. If not NULL, ext_rc point to a location where extended return codes may be returned. See extended return code section for details. if NULL, no extended information will be provided.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess is NULL or member of params is invalid

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.4 qzCompressCrc()

```
QATZIP_API int qzCompressCrc (
            QzSession_T * sess,
            const unsigned char * src,
            unsigned int * src_len,
            unsigned char * dest,
            unsigned int * dest_len,
            unsigned int last,
            unsigned long * crc )
```

Compress a buffer and return the CRC checksum

@description This function will compress a buffer if either a hardware based session or a software based session is available. If no session has been established - as indicated by the contents of *sess - then this function will attempt to set up a session using qzInit and qzSetupSession.

The resulting compressed block of data will be composed of one or more gzip blocks, as per RFC 1952.

This function will place completed compression blocks in the output buffer and put CRC32 or CRC64 checksum for compressed input data in the user provided buffer *crc.

The caller must check the updated src_len. This value will be the number of consumed bytes on exit. The calling API may have to process the destination buffer and call again.

The parameter dest_len will be set to the number of bytes produced in the destination buffer. This value may be zero if no data was produced which may occur if the consumed data is retained internally. A possible reason for this may be small amounts of data in the src buffer.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in`	*src*	Point to source buffer
`in,out`	*src_len*	Length of source buffer. Modified to number of bytes consumed
`in`	*dest*	Point to destination buffer
`in,out`	*dest_len*	Length of destination buffer. Modified to length of compressed data when function returns
`in`	*last*	1 for 'No more data to be compressed' 0 for 'More data to be compressed'
`in,out`	*crc*	Pointer to CRC32 or CRC64 checksum buffer
`in,out`	*ext_rc*	qzCompressCrcExt or qzCompressCrc64Ext only. If not NULL, ext_rc point to a location where extended return codes may be returned. See extended return code section for details. if NULL, no extended information will be provided.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	*sess is NULL or member of params is invalid

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.5 qzCompressStream()

```
QATZIP_API int qzCompressStream (
             QzSession_T * sess,
             QzStream_T * strm,
             unsigned int last )
```

Compress data in stream and return checksum

@description This function will compress data in stream buffer if either a hardware based session or a software based session is available. If no session has been established - as indicated by the contents of ∗sess - then this function will attempt to set up a session using qzInit and qzSetupSession. The function will start to compress the data when receiving sufficient number of bytes - as defined by hw_buff_sz in QzSessionParams_T - or reaching the end of input data - as indicated by last parameter.

The resulting compressed block of data will be composed of one or more gzip blocks, per RFC 1952, or deflate blocks, per RFC 1951.

This function will place completed compression blocks in the ∗out of QzStream_T structure and put checksum for compressed input data in crc32 of QzStream_T structure.

The caller must check the updated in_sz of QzStream_T. This value will be the number of consumed bytes on exit. The calling API may have to process the destination buffer and call again.

The parameter out_sz in QzStream_T will be set to the number of bytes produced in the destination buffer. This value may be zero if no data was produced which may occur if the consumed data is retained internally. A possible reason for this may be small amounts of data in the src buffer.

The caller must check the updated pending_in of QzStream_T. This value will be the number of unprocessed bytes held in QATzip. The calling API may have to feed more input data or indicate reaching the end of input and call again.

The caller must check the updated pending_out of QzStream_T. This value will be the number of processed bytes held in QATzip. The calling API may have to process the destination buffer and call again.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in,out`	*strm*	Stream handle
`in`	*last*	1 for 'No more data to be compressed' 0 for 'More data to be compressed' (always set to 1 in the Microsoft(R) Windows(TM) QATzip implementation)

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess is NULL or member of params is invalid

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.6 qzCompressWithMetadataExt()

```
QATZIP_API int qzCompressWithMetadataExt (
             QzSession_T * sess,
             const unsigned char * src,
             unsigned int * src_len,
             unsigned char * dest,
             unsigned int * dest_len,
             unsigned int last,
             uint64_t * ext_rc,
             QzMetadataBlob_T * metadata,
             uint32_t hw_buff_sz_override,
             uint32_t comp_thrshold )
```

Compress a buffer and write metadata for each compressed block into the opaque metadata structure.

@description This function will compress a buffer if either a hardware based session or a software based session is available. If no session has been established - as indicated by the contents of ∗sess - then this function will attempt to set up a session using qzInit and qzSetupSession.

This function will place completed compression blocks in the output buffer.

The caller must check the updated src_len. This value will be the number of consumed bytes on exit. The calling API may have to process the destination buffer and call again.

The parameter dest_len will be set to the number of bytes produced in the destination buffer. This value may be zero if no data was produced which may occur if the consumed data is retained internally. A possible reason for this may be small amounts of data in the src buffer.

The metadata for each compressed block will be written into the opaque metadata structure specified as function param metadata.

comp_thrshold specifies compression threshold of a block. If compressed size of the block is $>$ comp_thrshold, the compression function shall copy the uncompressed data to the output buffer and set the size of the block in the metadata to the size of the uncompressed block. If the compressed size of the block is $<=$ comp_thrshold, the compressed data will be copied to the output buffer and the compressed size will be set in the metadata.

hw_buff_sz_override specifies the data size to be used for the each compression operation. It overrides the hw↩ _buff_sz parameter specified at session creation. If 0 is provided for this parameter, then the hw_buff_sz specified at session creation will be used. Memory for the opaque metadata structure should be allocated based on the hw_buff_sz or the hw_buff_sz_override that is used for the compression operation.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in`	*src*	Point to source buffer.
`in,out`	*src_len*	Length of source buffer. Modified to number of bytes consumed.
`in`	*dest*	Point to destination buffer.
`in,out`	*dest_len*	Length of destination buffer. Modified to length of compressed data when function returns.
`in`	*last*	1 for 'No more data to be compressed' 0 for 'More data to be compressed'
`in,out`	*ext_rc*	If not NULL, ext_rc point to a location where extended return codes may be returned. See extended return code section for details. if NULL, no extended information will be provided.
`in,out`	*metadata*	Pointer to opaque metadata.
`in`	*hw_buff_sz_override*	Data size to be used for compression.
`in`	*comp_thrshold*	Compressed block threshold.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess or metadata is NULL or Member of params is invalid, hw_buff_sz_override is invalid data size.
QZ_METADATA_OVERFLOW	Unable to populate metadata due to insufficient memory allocated.
QZ_NOT_SUPPORTED	Compression with metadata is not supported with given algorithm or format.
QZ_NOSW_NO_HW	Function did not find an installed kernel driver or software provider.
QZ_NOSW_NO_INST_ATTACH	No instance available.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.7 qzDecompress()

```
QATZIP_API int qzDecompress (
            QzSession_T ∗ sess,
            const unsigned char ∗ src,
            unsigned int ∗ src_len,
            unsigned char ∗ dest,
            unsigned int ∗ dest_len )
```

Decompress a buffer

@description This function will decompress a buffer if either a hardware based session or a software based session is available. If no session has been established - as indicated by the contents of ∗sess - then this function will attempt to set up a session using qzInit and qzSetupSession.

The input compressed block of data will be composed of one or more gzip blocks, as per RFC 1952.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in`	*src*	Point to source buffer
`in`	*src_len*	Length of source buffer. Modified to length of processed compressed data when function returns
`in`	*dest*	Point to destination buffer
`in,out`	*dest_len*	Length of destination buffer. Modified to length of decompressed data when function returns
`in,out`	*ext_rc*	qzDecompressExt only. If not NULL, ext_rc point to a location where extended return codes may be returned. See extended return code section for details. if NULL, no extended information will be provided.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess is NULL or member of params is invalid

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.8 qzDecompressCrc()

```
QATZIP_API int qzDecompressCrc (
            QzSession_T * sess,
            const unsigned char * src,
            unsigned int * src_len,
            unsigned char * dest,
            unsigned int * dest_len,
            unsigned long * crc )
```

Decompress a buffer and return the CRC checksum

@description This function will decompress a buffer if either a hardware based session or a software based session is available. If no session has been established - as indicated by the contents of ∗sess - then this function will attempt to set up a session using qzInit and qzSetupSession.

This function will place completed decompression chunks in the output buffer and put the CRC32 or CRC64 checksum for compressed input data in the user provided buffer ∗crc.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in`	*src*	Point to source buffer
`in`	*src_len*	Length of source buffer. Modified to length of processed compressed data when function returns
`in`	*dest*	Point to destination buffer
`in,out`	*dest_len*	Length of destination buffer. Modified to length of decompressed data when function returns
`in,out`	*crc*	Pointer to CRC32 or CRC64 checksum buffer
`in,out`	*ext_rc*	qzDecompressCrcExt or qzDecompressCrc64Ext only. If not NULL, ext_rc point to a location where extended return codes may be returned. See extended return code section for details. if NULL, no extended information will be provided.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess is NULL or member of params is invalid

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.9 qzDecompressStream()

```
QATZIP_API int qzDecompressStream (
            QzSession_T * sess,
            QzStream_T * strm,
            unsigned int last )
```

Decompress data in stream and return checksum

@description This function will decompress data in stream buffer if either a hardware based session or a software based session is available. If no session has been established - as indicated by the contents of ∗sess - then this function will attempt to set up a session using qzInit and qzSetupSession. The function will start to decompress the data when receiving sufficient number of bytes - as defined by hw_buff_sz in QzSessionParams_T - or reaching the end of input data - as indicated by last parameter.

The input compressed block of data will be composed of one or more gzip blocks, per RFC 1952, or deflate blocks, per RFC 1951.

This function will place completed decompression blocks in the ∗out of QzStream_T structure and put checksum for decompressed data in crc32 of QzStream_T structure.

The caller must check the updated in_sz of QzStream_T. This value will be the number of consumed bytes on exit. The calling API may have to process the destination buffer and call again.

The parameter out_sz in QzStream_T will be set to the number of bytes produced in the destination buffer. This value may be zero if no data was produced which may occur if the consumed data is retained internally. A possible reason for this may be small amounts of data in the src buffer.

The caller must check the updated pending_in of QzStream_T. This value will be the number of unprocessed bytes held in QATzip. The calling API may have to feed more input data or indicate reaching the end of input and call again.

The caller must check the updated pending_out of QzStream_T. This value will be the number of processed bytes held in QATzip. The calling API may have to process the destination buffer and call again.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in,out`	*strm*	Stream handle
`in`	*last*	1 for 'No more data to be compressed' 0 for 'More data to be compressed'

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess is NULL or member of params is invalid
QZ_NEED_MORE	∗last is set but end of block is absent

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.10 qzDecompressWithMetadataExt()

```
QATZIP_API int qzDecompressWithMetadataExt (
             QzSession_T * sess,
             const unsigned char * src,
             unsigned int * src_len,
             unsigned char * dest,
             unsigned int * dest_len,
             uint64_t * ext_rc,
             QzMetadataBlob_T * metadata,
             uint32_t hw_buff_sz_override )
```

Decompress a buffer with metadata.

@description This function will decompress a buffer if either a hardware based session or a software based session is available. If no session has been established - as indicated by the content of ∗sess - then this function will attempt to set up a session using qzInit and qzSetupSession.

The metadata function parameter specifies metadata of compressed file which can be used for regular or parallel decompression.

hw_buff_sz_override specifies the data size to be used for the each decompression operation. It overrides the hw←_buff_sz parameter specified at session creation. If 0 is provided for this parameter, then the hw_buff_sz specified at session creation will be used. Memory for the opaque metadata structure should be allocated based on the hw_buff_sz or the hw_buff_sz_override that is used for the compression operation.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in`	*src*	Point to source buffer
`in`	*src_len*	Length of source buffer. Modified to length of processed compressed data when function returns
`in`	*dest*	Point to destination buffer
`in,out`	*dest_len*	Length of destination buffer. Modified to length of decompressed data when function returns
`in,out`	*ext_rc*	If not NULL, ext_rc points to a location where extended return codes may be returned. See extended return code section for details. if NULL, no extended information will be provided.
`in`	*metadata*	Pointer to opaque metadata.
`in`	*hw_buff_sz_override*	Expected size of decompressed block.

Return values

QZ_OK	Function executed successfully.
QZ_FAIL	Function did not succeed.
QZ_PARAMS	∗sess or metadata is NULL or Member of params is invalid, hw_buff_sz_override is invalid data size.
QZ_METADATA_OVERFLOW	Unable to populate metadata due to insufficient memory allocated.
QZ_NOT_SUPPORTED	Decompression with metadata is not supported with given algorithm or format.
QZ_NOSW_NO_HW	Function did not find an installed kernel driver or software provider.
QZ_NOSW_NO_INST_ATTACH	No instance available.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.11 qzEndStream()

```
QATZIP_API int qzEndStream (
            QzSession_T * sess,
            QzStream_T * strm )
```

Terminates a QATzip stream

@description This function disconnects stream handle from session handle then reset stream flag and release stream memory.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*sess*	Session handle (pointer to opaque instance and session data)

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess is NULL or member of params is invalid

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.12 qzFree()

```
QATZIP_API void qzFree (
             void * m )
```

Free allocated memory

@description Free allocated memory.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*m*	Memory address to be freed

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.13 qzFreeMetadata()

```
QATZIP_API int qzFreeMetadata (
            QzMetadataBlob_T metadata )
```

Free memory allocated for metadata.

@description Free memory allocated for metadata.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*metadata*	Pointer to opaque metadata.

Return values

QZ_OK	Function executed successfully.
QZ_FAIL	Function did not succeed.
QZ_PARAMS	metadata is NULL.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.14 qzGetDefaults()

```
QATZIP_API int qzGetDefaults (
            QzSessionParams_T * defaults )
```

Get default QzSessionParams_T value

@description Get default QzSessionParams_T value.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*defaults*	The pointer to default value

Return values

QZ_OK	Success on getting default value
QZ_PARAM	Fail to get default value

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.15 qzGetSessionCrc64Config()

```
QATZIP_API int qzGetSessionCrc64Config (
            QzSession_T * sess,
            QzCrc64Config_T * crc64_config )
```

Requests the CRC64 configuration of the provided session

@description This function populates crc64_config with the CRC64 configuration details of sess. This function has a dependency on invoking a setup session function first.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant Yes @threadSafe Yes

Parameters

in	*sess*	Session handle (pointer to opaque instance and session data)
out	*crc64_config*	Configuration for CRC 64 generation.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Session was not setup
QZ_PARAMS	∗sess or ∗crc64_config is NULL

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.16 qzGetSoftwareComponentCount()

```
QATZIP_API int qzGetSoftwareComponentCount (
             unsigned int * num_elem )
```

Requests the number of Software components used by the QATZip library

@description This function populates num_elem variable with the number of software components available to the library.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant Yes @threadSafe Yes

Parameters

in,out	*num_elem*	pointer to an unsigned int to populate how many software componets are associated with QATZip

Return values

QZ_OK	Function executed successfully

Return values

QZ_FAIL	Function did not succeed
QZ_NO_SW_AVAIL	Function did not find a software provider for fallback
QZ_NO_HW	Function did not find an installed kernel driver
QZ_NOSW_NO_HW	Functions did not find an installed kernel driver or software provider
QZ_PARAMS	∗num_elem is NULL

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.17 qzGetSoftwareComponentVersionList()

```
QATZIP_API int qzGetSoftwareComponentVersionList (
            QzSoftwareVersionInfo_T * api_info,
            unsigned int * num_elem )
```

Requests the release versions of the QATZip Library sub components.

@description Populate an array of pre-allocated QzSoftwareVersionInfo_T structs with the names and versions of QATzip sub components.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant Yes @threadSafe Yes

Parameters

`in,out`	*api_info*	pointer to a QzSoftwareVersionInfo_T structure to populate.
`in,out`	*num_elem*	pointer to an unsigned int expressing how many elements are in the array provided in api_info

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_NO_SW_AVAIL	Function did not find a software provider for fallback

Return values

QZ_NO_HW	Function did not find an installed kernel driver
QZ_NOSW_NO_HW	Functions did not find an installed kernel driver or software provider
QZ_PARAMS	∗api_info or num_elem is NULL or not large enough to store all QzSoftwareVersionInfo_T structures

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.18 qzGetStatus()

```
QATZIP_API int qzGetStatus (
             QzSession_T * sess,
             QzStatus_T * status )
```

Get current QAT status

@description This function retrieves the status of QAT in the platform. The status structure will be filled in as follows: qat_hw_count Number of discovered QAT devices on PCU bus qat_service_init 1 if qzInit has been successfully run, 0 otherwise qat_mem_drvr 1 if the QAT memory driver is installed, 0 otherwise qat_instance_attach 1 if session has attached to a hardware instance, 0 otherwise memory_alloced Amount of memory, in kilobytes, from kernel or huge pages allocated by this process/thread. using_huge_pages 1 if memory is being allocated from huge pages, 0 if memory is being allocated from standard kernel memory hw_session_status Hw session status: one of: QZ_OK QZ_FAIL QZ_NO_HW QZ_NO_MDRV QZ_NO_INST_ATTACH QZ_LOW_MEM QZ_NOSW_NO_HW QZ_NOSW_NO_MDRV QZ_NOSW_NO_INST_ATTACH QZ_NOSW_LOW_MEM QZ_NO_SW_AVAIL

Applications should verify the elements of the status structure are correct for the required operations. It should be noted that some information will be available only after qzInit has been called, either implicitly or explicitly. The qat_service_init element of the status structure will indicate if initialization has taken place.

The hw_session_status will depend on the availability of hardware based compression and software based compression. The following table indicates what hw_session_status based on the availability of compression engines and the sw_backup flag.

| HW | SW Engine | sw_backup | hw_session_stat |

avail	avail	setting	
N	N	0	QZ_NOSW_NO_HW
N	N	1	QZ_NOSW_NO_HW
N	Y	0	QZ_FAIL
N	Y	1	QZ_NO_HW (1)
Y	N	0	QZ_OK
Y	N	1	QZ_NO_SW_AVAIL (2)
Y	Y	0	QZ_OK
Y	Y	1	QZ_OK

Note 1: If an application indicates software backup is required by setting sw_backup=1, and a software engine is available and if no hardware based compression engine is available then the hw_session_status will be set to QZ_NO_HW. All compression and decompression will use the software engine. Note 2: If an application indicates software backup is required by setting sw_backup=1, and if no software based compression engine is available then the hw_session_status will be set to QZ_NO_SW_AVAIL. In this case, QAT based compression may be used however no software backup will available. If the application relies on software backup being avialable, then this return code can be treated as an error. @context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)
`in`	*status*	Pointer to QATzip status structure

Return values

QZ_OK	Function executed successfully. The hardware based compression session has been created
QZ_PARAMS	∗status is NULL

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.19 qzInit()

```
QATZIP_API int qzInit (
            QzSession_T * sess,
            unsigned char sw_backup )
```

Initialize QAT hardware

@description This function initializes the QAT hardware. This function is optional in the function calling sequence. If desired, this call can be made to avoid latency impact during the first call to qzDecompress or qzCompress, or to set the sw_backup parameter explicitly. The input parameter sw_backup specifies the behavior of the function and that of the functions called with the same session in the event there are insufficient resources to establish a QAT based compression or decompression session.

The required resources include access to the QAT hardware, contiguous pinned memory for mapping the hardware rings, and contiguous pinned memory for buffers.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects This function will: 1) start the user space driver if necessary 2) allocate all hardware instances available @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*sess*	Session handle (pointer to opaque instance and session data.)
in	*sw_backup*	see QZ_SW_∗ definitions for expected behavior

Return values

QZ_OK	Function executed successfully. A hardware or software instance has been allocated to the calling process/thread
QZ_DUPLICATE	This process/thread already has a hardware instance
QZ_PARAMS	∗sess is NULL
QZ_NOSW_NO_HW	No hardware and no software session being established
QZ_NOSW_NO_MDRV	No memory driver. No software session established
QZ_NOSW_NO_INST_ATTACH	No instance available No software session established
QZ_NOSW_LOW_MEM	Not enough pinned memory available No software session established
QZ_UNSUPPORTED_FMT	No support for requested algorithm; using software
QZ_NOSW_UNSUPPORTED_FMT	No support for requested algorithm; No software session established
QZ_NO_SW_AVAIL	No software is available. This will be returned when sw_backup is set but the session does not support software operations or software fallback is unavailable to the application.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.20 qzMalloc()

```
QATZIP_API void * qzMalloc (
             size_t sz,
             int numa,
             int force_pinned )
```

Allocate different types of memory

@description Allocate different types of memory.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*sz*	Memory size to be allocated
in	*numa*	NUMA node from which to allocate memory
in	*force_pinned*	PINNED_MEM allocate contiguous memory COMMON_MEM allocate non-contiguous memory

Return values

NULL	Fail to allocate memory
address	The address of allocated memory

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.21 qzMemFindAddr()

```
QATZIP_API int qzMemFindAddr (
             unsigned char * a )
```

Check whether the address is available

@description Check whether the address is available.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*a*	Address to be checked

Return values

1	The address is available
0	The address is not available

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.22 qzMetadataBlockRead()

```
QATZIP_API int qzMetadataBlockRead (
             uint32_t block_num,
             QzMetadataBlob_T metadata,
             uint32_t * block_offset,
             uint32_t * block_size,
             uint32_t * block_flags,
             uint32_t * block_hash )
```

Read metadata parameters.

@description This function reads metadata information for the block specified by the function param block_num.

block_offset returns offset value in bytes from the previous compressed block of the compressed data.

block_size returns the block size in bytes of the compressed block. Some blocks may be uncompressed if size $>$ threshold as specified during compression and the size returned will reflect the same.

block_flags returns the value 1 if the data is compressed and 0 if the data is not compressed.

block_hash returns the xxHash value of the plain text of the hw_buff_sz payload sent for compression operation.

If NULL is specified for any of the metadata parameters (block_offset, block_size, block_flags, block_hash) reading the parameter value will be ignored.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*block_num*	Block number of which metadata information should be read.
`in`	*metadata*	Pointer to opaque metadata.
`in,out`	*block_offset*	Pointer to the block offset value.
`in,out`	*block_size*	Pointer to the block size value.
`in,out`	*block_flags*	Pointer to the block flags value.
`in,out`	*block_hash*	Pointer to the block xxHash value.

Return values

QZ_OK	Function executed successfully.
QZ_FAIL	Function did not succeed.
QZ_PARAMS	Metadata is NULL.
QZ_OUT_OF_RANGE	block_num specified is out of range.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.23 qzMetadataBlockWrite()

```
QATZIP_API int qzMetadataBlockWrite (
             uint32_t block_num,
             QzMetadataBlob_T metadata,
             uint32_t * block_offset,
             uint32_t * block_size,
             uint32_t * block_flags,
             uint32_t * block_hash )
```

Write metadata parameters.

@description This function writes metadata information for the block specified by the function param block_num.

block_offset writes offset value in bytes from the previous compressed block of the compressed data.

block_size writes the block size in bytes of the compressed block.

block_flags causes the metadata to indicate the data is compressed if passed a value of 1 and indicates uncompressed if value passed is zero (0).

block_hash writes the xxHash value of the plain text of the hw_buff_sz payload sent for compression operation.

If NULL is specified for any of the metadata parameters (block_offset, block_size, block_flags, block_hash) writing the parameter value into metadata will be ignored.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*block_num*	Block number into which metadata information should be written.
`in,out`	*metadata*	Pointer to opaque metadata.
`in`	*block_offset*	Pointer to the block offset value.
`in`	*block_size*	Pointer to the block size value.
`in`	*block_flags*	Pointer to the block flags value.
`in`	*block_hash*	Pointer to the block xxHash value.

Return values

QZ_OK	Function executed successfully.
QZ_FAIL	Function did not succeed.
QZ_PARAMS	Metadata is NULL.
QZ_OUT_OF_RANGE	block_num specified is out of range.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.24 qzSetDefaults()

```
QATZIP_API int qzSetDefaults (
             QzSessionParams_T * defaults )
```

Set default QzSessionParams_T value

@description Set default QzSessionParams_T value.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*defaults*	The pointer to value to be set as default

Return values

QZ_OK	Success on setting default value
QZ_PARAM	Fail to set default value

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.25 qzSetSessionCrc64Config()

```
QATZIP_API int qzSetSessionCrc64Config (
             QzSession_T * sess,
             QzCrc64Config_T * crc64_config )
```

Sets the CRC64 configuration of the provided session with a user defined set of parameters.

@description This function populates the CRC64 configuration details of sess using the paramaters provided in crc64_config. This function has a dependency on invoking a setup session function first.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant Yes @threadSafe Yes

Parameters

in	*sess*	Session handle (pointer to opaque instance and session data)
out	*crc64_config*	Configuration for CRC 64 generation.

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Session was not setup
QZ_PARAMS	∗sess or ∗crc64_config is NULL or contains invalid paramters.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.26 qzSetupSession()

```
QATZIP_API int qzSetupSession (
             QzSession_T * sess,
             QzSessionParams_T * params )
```

Initialize a QATzip session

@description This function establishes a QAT session. This involves associating a hardware instance to the session, allocating buffers. If all of these activities can not be completed successfully, then this function will set up a software based session of param->sw_backup that is set to 1.

Before this function is called, the hardware must have been successfully started via qzInit.

If ∗sess includes an existing hardware or software session, then QZ_DUPLICATE will be returned without modifying the existing session.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

in	*sess*	Session handle (pointer to opaque instance and session data)
in	*params*	Parameters for session

Return values

QZ_OK	Function executed successfully. A hardware or software based compression session has been created
QZ_DUPLICATE	∗sess includes an existing hardware or software session
QZ_PARAMS	∗sess is NULL or member of params is invalid
QZ_NOSW_NO_HW	No hardware and no sw session being established
QZ_NOSW_NO_MDRV	No memory driver. No software session established
QZ_NOSW_NO_INST_ATTACH	No instance available No software session established
QZ_NO_LOW_MEM	Not enough pinned memory available No software session established
QZ_UNSUPPORTED_FMT	No support for requested algorithm; using software
QZ_NOSW_UNSUPPORTED_FMT	No support for requested algorithm; No software session established
QZ_NO_SW_AVAIL	No software is available. This may returned when sw_backup is set to 1 but the session does not support software backup or software backup is unavailable to the application.

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.1.5.27 qzTeardownSession()

```
QATZIP_API int qzTeardownSession (
            QzSession_T ∗ sess )
```

Uninitialize a QATzip session

@description This function disconnects a session from a hardware instance and deallocates buffers. If no session has been initialized, then no action will take place.

@context This function shall not be called in an interrupt context. @assumptions None @sideEffects None @blocking Yes @reentrant No @threadSafe Yes

Parameters

`in`	*sess*	Session handle (pointer to opaque instance and session data)

Return values

QZ_OK	Function executed successfully
QZ_FAIL	Function did not succeed
QZ_PARAMS	∗sess is NULL or member of params is invalid

Precondition

None

Postcondition

None

Note

Only a synchronous version of this function is provided.

See also

None

4.2 debug API

@description These functions specify the API for debug operations.

Remarks

Chapter 5

Class Documentation

5.1 QatThread_S Struct Reference

Public Attributes

- ThreadList_T * **comp_th_list**
- unsigned int **num_comp_th**
- pthread_mutex_t **comp_lock**
- ThreadList_T * **decomp_th_list**
- unsigned int **num_decomp_th**
- pthread_mutex_t **decomp_lock**

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qz_utils.h

5.2 QzCrc64Config_S Struct Reference

```
#include <qatzip.h>
```

Public Attributes

- uint64_t polynomial
- uint64_t initial_value
- uint32_t reflect_in
- uint32_t reflect_out
- uint64_t xor_out

5.2.1 Detailed Description

QATzip CRC64 configuration structure

@description This structure contains data relating to configuration of the sessions CRC64 functionality.Session defaults to using ECMA-182 Normal on creation.

5.2.2 Member Data Documentation

5.2.2.1 initial_value

```
uint64_t QzCrc64Config_S::initial_value
```

Defaults to 0x0000000000000000

5.2.2.2 polynomial

```
uint64_t QzCrc64Config_S::polynomial
```

Polynomial used for CRC64 calculation. Default 0x42F0E1EBA9EA3693

5.2.2.3 reflect_in

```
uint32_t QzCrc64Config_S::reflect_in
```

Reflect bit order before CRC calculation. Default 0

5.2.2.4 reflect_out

```
uint32_t QzCrc64Config_S::reflect_out
```

Reflect bit order after CRC calculation.Default 0

5.2.2.5 xor_out

```
uint64_t QzCrc64Config_S::xor_out
```

Defaults to 0x0000000000000000

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.3 QzSession_S Struct Reference

```
#include <qatzip.h>
```

Public Attributes

- signed long int hw_session_stat
- int thd_sess_stat
- void * internal
- unsigned long total_in
- unsigned long total_out

5.3.1 Detailed Description

QATzip Session opaque data storage

@description This structure contains a pointer to a structure with session state.

5.3.2 Member Data Documentation

5.3.2.1 hw_session_stat

```
signed long int QzSession_S::hw_session_stat
```

Filled in during initialization, session startup and decompression

5.3.2.2 internal

```
void* QzSession_S::internal
```

Session data is opaque to outside world

5.3.2.3 thd_sess_stat

```
int QzSession_S::thd_sess_stat
```

Note process compression and decompression thread state

5.3.2.4 total_in

```
unsigned long QzSession_S::total_in
```

Total processed input data length in this session

5.3.2.5 total_out

```
unsigned long QzSession_S::total_out
```

Total output data length in this session

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.4 QzSessionParams_S Struct Reference

```
#include <qatzip.h>
```

Public Attributes

- QzHuffmanHdr_T huffman_hdr
- QzDirection_T direction
- QzDataFormat_T data_fmt
- unsigned int comp_lvl
- unsigned char comp_algorithm
- unsigned int max_forks
- unsigned char sw_backup
- unsigned int hw_buff_sz
- unsigned int strm_buff_sz
- unsigned int input_sz_thrshold
- unsigned int req_cnt_thrshold
- unsigned int wait_cnt_thrshold

5.4.1 Detailed Description

QATzip Session Initialization parameters

@description This structure contains data for initializing a session.

5.4.2 Member Data Documentation

5.4.2.1 comp_algorithm

```
unsigned char QzSessionParams_S::comp_algorithm
```

Compress/decompression algorithms

5.4.2.2 comp_lvl

```
unsigned int QzSessionParams_S::comp_lvl
```

Compression level 1 to 9

5.4.2.3 data_fmt

```
QzDataFormat_T QzSessionParams_S::data_fmt
```

Deflate, deflate with GZip or deflate with GZip ext

5.4.2.4 direction

```
QzDirection_T QzSessionParams_S::direction
```

Compress or decompress

5.4.2.5 huffman_hdr

```
QzHuffmanHdr_T QzSessionParams_S::huffman_hdr
```

Dynamic or Static Huffman headers

5.4.2.6 hw_buff_sz

```
unsigned int QzSessionParams_S::hw_buff_sz
```

Default buffer size, must be a power of 2k 4K,8K,16K,32K,64K,128K

5.4.2.7 input_sz_thrshold

```
unsigned int QzSessionParams_S::input_sz_thrshold
```

Default threshold of compression service's input size for sw failover, if the size of input request is less than the threshold, QATzip will route the request to software

5.4.2.8 max_forks

```
unsigned int QzSessionParams_S::max_forks
```

Maximum forks permitted in the current thread 0 means no forking permitted

5.4.2.9 req_cnt_thrshold

```
unsigned int QzSessionParams_S::req_cnt_thrshold
```

Set between 1 and NUM_BUFF, default NUM_BUFF NUM_BUFF is defined in qatzip_internal.h

5.4.2.10 strm_buff_sz

```
unsigned int QzSessionParams_S::strm_buff_sz
```

Stream buffer size between [1K .. 2M - 5K] Default strm_buf_sz equals to hw_buff_sz

5.4.2.11 sw_backup

```
unsigned char QzSessionParams_S::sw_backup
```

bit field defining SW configuration (see QZ_SW_$*$ definitions)

5.4.2.12 wait_cnt_thrshold

```
unsigned int QzSessionParams_S::wait_cnt_thrshold
```

When previous try failed, wait for specific number of calls before retrying to open device. Default threshold is 8

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.5 QzSessionParamsCommon_S Struct Reference

Public Attributes

- QzDirection_T direction
- unsigned int comp_lvl
- unsigned char comp_algorithm
- unsigned int max_forks
- unsigned char sw_backup
- unsigned int hw_buff_sz
- unsigned int strm_buff_sz
- unsigned int input_sz_thrshold
- unsigned int req_cnt_thrshold
- unsigned int wait_cnt_thrshold
- QzPollingMode_T polling_mode
- unsigned int is_sensitive_mode

5.5.1 Member Data Documentation

5.5.1.1 comp_algorithm

```
unsigned char QzSessionParamsCommon_S::comp_algorithm
```

Compress/decompression algorithms

5.5.1.2 comp_lvl

```
unsigned int QzSessionParamsCommon_S::comp_lvl
```

Compression level 1 to 9

5.5.1.3 direction

```
QzDirection_T QzSessionParamsCommon_S::direction
```

Compress or decompress

5.5.1.4 hw_buff_sz

```
unsigned int QzSessionParamsCommon_S::hw_buff_sz
```

Default buffer size, must be a power of 2k 4K,8K,16K,32K,64K,128K

5.5.1.5 input_sz_thrshold

```
unsigned int QzSessionParamsCommon_S::input_sz_thrshold
```

Default threshold of compression service's input size for sw failover, if the size of input request is less than the threshold, QATzip will route the request to software

5.5.1.6 is_sensitive_mode

```
unsigned int QzSessionParamsCommon_S::is_sensitive_mode
```

0 means disable sensitive mode, 1 means enable sensitive mode

5.5.1.7 max_forks

```
unsigned int QzSessionParamsCommon_S::max_forks
```

Maximum forks permitted in the current thread 0 means no forking permitted

5.5.1.8 polling_mode

```
QzPollingMode_T QzSessionParamsCommon_S::polling_mode
```

0 means no busy polling, 1 means busy polling

5.5.1.9 req_cnt_thrshold

```
unsigned int QzSessionParamsCommon_S::req_cnt_thrshold
```

Set between 1 and NUM_BUFF, default NUM_BUFF NUM_BUFF is defined in qatzip_internal.h

5.5.1.10 strm_buff_sz

```
unsigned int QzSessionParamsCommon_S::strm_buff_sz
```

Stream buffer size between [1K .. 2M - 5K] Default strm_buf_sz equals to hw_buff_sz

5.5.1.11 sw_backup

```
unsigned char QzSessionParamsCommon_S::sw_backup
```

bit field defining SW configuration (see QZ_SW_∗ definitions)

5.5.1.12 wait_cnt_thrshold

```
unsigned int QzSessionParamsCommon_S::wait_cnt_thrshold
```

When previous try failed, wait for specific number of calls before retrying to open device. Default threshold is 8

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.6 QzSessionParamsDeflate_S Struct Reference

Public Attributes

- QzSessionParamsCommon_T **common_params**
- QzHuffmanHdr_T huffman_hdr
- QzDataFormat_T data_fmt

5.6.1 Member Data Documentation

5.6.1.1 data_fmt

```
QzDataFormat_T QzSessionParamsDeflate_S::data_fmt
```

Deflate, deflate with GZip or deflate with GZip ext

5.6.1.2 huffman_hdr

```
QzHuffmanHdr_T QzSessionParamsDeflate_S::huffman_hdr
```

Dynamic or Static Huffman headers

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.7 QzSessionParamsLZ4_S Struct Reference

Public Attributes

- QzSessionParamsCommon_T **common_params**

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.8 QzSessionParamsLZ4S_S Struct Reference

Public Attributes

- QzSessionParamsCommon_T **common_params**
- qzLZ4SCallbackFn qzCallback
- void ∗ qzCallback_external
- unsigned int lz4s_mini_match

5.8.1 Member Data Documentation

5.8.1.1 lz4s_mini_match

```
unsigned int QzSessionParamsLZ4S_S::lz4s_mini_match
```

Set lz4s dictionary mini match, which would be 3 or 4

5.8.1.2 qzCallback

```
qzLZ4SCallbackFn QzSessionParamsLZ4S_S::qzCallback
```

post processing callback for zstd compression

5.8.1.3 qzCallback_external

```
void* QzSessionParamsLZ4S_S::qzCallback_external
```

An opaque pointer provided by the user to be passed into qzCallback during post processing

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.9 QzSoftwareVersionInfo_S Struct Reference

Public Attributes

- QzSoftwareComponentType_T **component_type**
- unsigned char **component_name** [QZ_MAX_STRING_LENGTH]
- unsigned int **major_version**
- unsigned int **minor_version**
- unsigned int **patch_version**
- unsigned int **build_number**
- unsigned char **reserved** [52]

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.10 QzStatus_S Struct Reference

```
#include <qatzip.h>
```

Public Attributes

- unsigned short int qat_hw_count
- unsigned char qat_service_init
- unsigned char qat_mem_drvr
- unsigned char qat_instance_attach
- unsigned long int memory_alloced
- unsigned char using_huge_pages
- signed long int hw_session_status
- unsigned char algo_sw [QZ_MAX_ALGORITHMS]
- unsigned char algo_hw [QZ_MAX_ALGORITHMS]

5.10.1 Detailed Description

QATzip status structure

@description This structure contains data relating to the status of QAT on the platform.

5.10.2 Member Data Documentation

5.10.2.1 algo_hw

```
unsigned char QzStatus_S::algo_hw[QZ_MAX_ALGORITHMS]
```

Count of hardware devices supporting algorithms

5.10.2.2 algo_sw

```
unsigned char QzStatus_S::algo_sw[QZ_MAX_ALGORITHMS]
```

Support software algorithms

5.10.2.3 hw_session_status

```
signed long int QzStatus_S::hw_session_status
```

One of QATzip Session Status

5.10.2.4 memory_alloced

```
unsigned long int QzStatus_S::memory_alloced
```

Amount of memory allocated by this thread/process

5.10.2.5 qat_hw_count

```
unsigned short int QzStatus_S::qat_hw_count
```

From PCI scan

5.10.2.6 qat_instance_attach

```
unsigned char QzStatus_S::qat_instance_attach
```

Is this thread/g_process properly attached to an Instance?

5.10.2.7 qat_mem_drvr

```
unsigned char QzStatus_S::qat_mem_drvr
```

1 if /dev/qat_mem exists 2 if /dev/qat_mem has been opened 0 otherwise

5.10.2.8 qat_service_init

```
unsigned char QzStatus_S::qat_service_init
```

Check if the available services have been initialized

5.10.2.9 using_huge_pages

```
unsigned char QzStatus_S::using_huge_pages
```

Are memory slabs coming from huge pages?

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.11 QzStream_S Struct Reference

```
#include <qatzip.h>
```

Public Attributes

- unsigned int in_sz
- unsigned int out_sz
- unsigned char * in
- unsigned char * out
- unsigned int pending_in
- unsigned int pending_out
- QzCrcType_T crc_type
- unsigned int crc_32
- unsigned long long reserved
- void * opaque

5.11.1 Detailed Description

QATzip Stream data storage

@description This structure contains metadata needed for stream operation.

5.11.2 Member Data Documentation

5.11.2.1 crc_32

```
unsigned int QzStream_S::crc_32
```

Checksum value

5.11.2.2 crc_type

```
QzCrcType_T QzStream_S::crc_type
```

Checksum type in Adler, CRC32 or none

5.11.2.3 in

```
unsigned char* QzStream_S::in
```

Input data pointer set by application

5.11.2.4 in_sz

```
unsigned int QzStream_S::in_sz
```

Set by application, reset by QATzip to indicate consumed data

5.11.2.5 opaque

```
void* QzStream_S::opaque
```

Internal storage managed by QATzip

5.11.2.6 out

```
unsigned char* QzStream_S::out
```

Output data pointer set by application

5.11.2.7 out_sz

```
unsigned int QzStream_S::out_sz
```

Set by application, reset by QATzip to indicate processed data

5.11.2.8 pending_in

```
unsigned int QzStream_S::pending_in
```

Unprocessed bytes held in QATzip

5.11.2.9 pending_out

```
unsigned int QzStream_S::pending_out
```

Processed bytes held in QATzip

5.11.2.10 reserved

```
unsigned long long QzStream_S::reserved
```

Reserved for future use

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qatzip.h

5.12 ThreadList_S Struct Reference

Public Attributes

- unsigned int **thread_id**
- unsigned int **comp_hw_count**
- unsigned int **comp_sw_count**
- unsigned int **decomp_hw_count**
- unsigned int **decomp_sw_count**
- struct ThreadList_S ∗ **next**

The documentation for this struct was generated from the following file:

- applications.qat.shims.qatzip.qatzip/include/qz_utils.h

Chapter 6

File Documentation

6.1 applications.qat.shims.qatzip.qatzip/include/qatzip.h File Reference

```
#include <string.h>
#include <stdint.h>
```

Classes

- struct QzSessionParams_S
- struct QzSessionParamsCommon_S
- struct QzSessionParamsDeflate_S
- struct QzSessionParamsLZ4_S
- struct QzSessionParamsLZ4S_S
- struct QzSession_S
- struct QzStatus_S
- struct QzSoftwareVersionInfo_S
- struct QzCrc64Config_S
- struct QzStream_S

Macros

- #define QATZIP_API_VERSION_NUM_MAJOR (2)
- #define QATZIP_API_VERSION_NUM_MINOR (3)
- #define QATZIP_API_VERSION
- #define QATZIP_API
- #define QZ_OK (0)
- #define QZ_DUPLICATE (1)
- #define QZ_FORCE_SW (2)
- #define QZ_PARAMS (-1)
- #define QZ_FAIL (-2)
- #define QZ_BUF_ERROR (-3)
- #define QZ_DATA_ERROR (-4)
- #define QZ_TIMEOUT (-5)
- #define QZ_INTEG (-100)
- #define QZ_NO_HW (11)

- #define QZ_NO_MDRV (12)
- #define QZ_NO_INST_ATTACH (13)
- #define QZ_LOW_MEM (14)
- #define QZ_LOW_DEST_MEM (15)
- #define QZ_UNSUPPORTED_FMT (16)
- #define QZ_NONE (100)
- #define QZ_NOSW_NO_HW (-101)
- #define QZ_NOSW_NO_MDRV (-102)
- #define QZ_NOSW_NO_INST_ATTACH (-103)
- #define QZ_NOSW_LOW_MEM (-104)
- #define QZ_NO_SW_AVAIL (-105)
- #define QZ_NOSW_UNSUPPORTED_FMT (-116)
- #define QZ_POST_PROCESS_ERROR (-117)
- #define QZ_METADATA_OVERFLOW (-118)
- #define QZ_OUT_OF_RANGE (-119)
- #define QZ_NOT_SUPPORTED (-200)
- #define **QZ_MAX_ALGORITHMS** ((int)255)
- #define QZ_DEFLATE ((unsigned char)8)
- #define **QZ_LZ4** ((unsigned char)'4')
- #define **QZ_LZ4s** ((unsigned char)'s')
- #define **QZ_ZSTD** ((unsigned char)'Z')
- #define **MIN**(a, b) (((a)<(b))?(a):(b))
- #define **QZ_HUFF_HDR_DEFAULT** QZ_DYNAMIC_HDR
- #define **QZ_DIRECTION_DEFAULT** QZ_DIR_BOTH
- #define **QZ_DATA_FORMAT_DEFAULT** QZ_DEFLATE_GZIP_EXT
- #define **QZ_COMP_LEVEL_DEFAULT** 1
- #define **QZ_COMP_ALGOL_DEFAULT** QZ_DEFLATE
- #define **QZ_POLL_SLEEP_DEFAULT** 10
- #define **QZ_MAX_FORK_DEFAULT** 3
- #define **QZ_SW_BACKUP_DEFAULT** 1
- #define **QZ_HW_BUFF_SZ** (64∗1024)
- #define **QZ_HW_BUFF_SZ_Gen3** (1∗1024∗1024)
- #define **QZ_HW_BUFF_MIN_SZ** (1∗1024)
- #define **QZ_HW_BUFF_MAX_SZ** (512∗1024)
- #define **QZ_HW_BUFF_MAX_SZ_Gen3** (2∗1024∗1024∗1024U)
- #define **QZ_STRM_BUFF_SZ_DEFAULT** QZ_HW_BUFF_SZ
- #define **QZ_STRM_BUFF_MIN_SZ** (1∗1024)
- #define **QZ_STRM_BUFF_MAX_SZ** (2∗1024∗1024 - 5∗1024)
- #define **QZ_COMP_THRESHOLD_DEFAULT** 1024
- #define **QZ_COMP_THRESHOLD_MINIMUM** 128
- #define **QZ_REQ_THRESHOLD_MINIMUM** 1
- #define **QZ_REQ_THRESHOLD_MAXIMUM** NUM_BUFF
- #define **QZ_REQ_THRESHOLD_DEFAULT** QZ_REQ_THRESHOLD_MAXIMUM
- #define **QZ_WAIT_CNT_THRESHOLD_DEFAULT** 8
- #define **QZ_DEFLATE_COMP_LVL_MINIMUM** (1)
- #define **QZ_DEFLATE_COMP_LVL_MAXIMUM** (9)
- #define **QZ_DEFLATE_COMP_LVL_MAXIMUM_Gen3** (12)
- #define **QZ_LZS_COMP_LVL_MINIMUM** (1)
- #define **QZ_LZS_COMP_LVL_MAXIMUM** (12)
- #define QZ_SW_BACKUP_BIT_POSITION (0)
- #define **QZ_SW_FORCESW_BIT_POSITION** (1)
- #define QZ_ENABLE_SOFTWARE_BACKUP(_BackupVariable) (_BackupVariable |= (1 << QZ_SW_BACKUP_BIT_POSITIO
- #define QZ_ENABLE_SOFTWARE_ONLY_EXECUTION(_BackupVariable) (_BackupVariable |= (1 << QZ_SW_FORCESW_BIT_POSITION))
- #define QZ_DISABLE_SOFTWARE_BACKUP(_BackupVariable) (_BackupVariable &= ∼(1 << QZ_SW_BACKUP_BIT_POSI

- #define QZ_DISABLE_SOFTWARE_ONLY_EXECUTION(_BackupVariable) (_BackupVariable &= ∼(1 << QZ_SW_FORCESW_BIT_POSITION))
- #define QZ_SW_EXECUTION_BIT (4)
- #define **QZ_SW_EXECUTION_MASK** (1 << QZ_SW_EXECUTION_BIT)
- #define **QZ_SW_EXECUTION**(ret, ext_rc) (!ret && (ext_rc & QZ_SW_EXECUTION_MASK))
- #define **QZ_TIMEOUT_BIT** (8)
- #define **QZ_TIMEOUT_MASK** (1 << QZ_TIMEOUT_BIT)
- #define **QZ_HW_TIMEOUT**(ret, ext_rc) (!ret && (ext_rc & QZ_TIMEOUT_MASK))
- #define **QZ_POST_PROCESS_FAIL_BIT** (10)
- #define **QZ_POST_PROCESS_FAIL_MASK** (1 << QZ_POST_PROCESS_FAIL_BIT)
- #define **QZ_POST_PROCESS_FAIL**(ret, ext_rc) (ret && (ext_rc & QZ_POST_PROCESS_FAIL_MASK))
- #define QZ_MAX_STRING_LENGTH 64
- #define QZ_SKID_PAD_SZ 48
- #define **QZ_COMPRESSED_SZ_OF_EMPTY_FILE** 34

Typedefs

- typedef enum QzHuffmanHdr_E QzHuffmanHdr_T
- typedef enum PinMem_E PinMem_T
- typedef enum QzDirection_E QzDirection_T
- typedef enum QzDataFormat_E QzDataFormat_T
- typedef enum QzPollingMode_E QzPollingMode_T
- typedef enum QzCrcType_E QzCrcType_T
- typedef enum QzSoftwareComponentType_E QzSoftwareComponentType_T
- typedef int(∗ qzLZ4SCallbackFn) (void ∗external, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, int ∗ExtStatus)
- typedef struct QzSessionParams_S QzSessionParams_T
- typedef struct QzSessionParamsCommon_S **QzSessionParamsCommon_T**
- typedef struct QzSessionParamsDeflate_S **QzSessionParamsDeflate_T**
- typedef struct QzSessionParamsLZ4_S **QzSessionParamsLZ4_T**
- typedef struct QzSessionParamsLZ4S_S **QzSessionParamsLZ4S_T**
- typedef struct QzSession_S QzSession_T
- typedef struct QzStatus_S QzStatus_T
- typedef struct QzSoftwareVersionInfo_S **QzSoftwareVersionInfo_T**
- typedef struct QzCrc64Config_S QzCrc64Config_T
- typedef void ∗ QzMetadataBlob_T
- typedef struct QzStream_S QzStream_T

Enumerations

- enum QzHuffmanHdr_E { QZ_DYNAMIC_HDR = 0 , QZ_STATIC_HDR }
- enum PinMem_E { COMMON_MEM = 0 , PINNED_MEM }
- enum QzDirection_E { QZ_DIR_COMPRESS = 0 , QZ_DIR_DECOMPRESS , QZ_DIR_BOTH }
- enum QzDataFormat_E {
  QZ_DEFLATE_4B = 0 , QZ_DEFLATE_GZIP , QZ_DEFLATE_GZIP_EXT , QZ_DEFLATE_RAW ,
  QZ_FMT_NUM }
- enum QzPollingMode_E { QZ_PERIODICAL_POLLING = 0 , QZ_BUSY_POLLING }
- enum QzCrcType_E { QZ_CRC32 = 0 , QZ_ADLER , NONE }
- enum QzSoftwareComponentType_E {
  QZ_COMPONENT_FIRMWARE = 0 , **QZ_COMPONENT_KERNEL_DRIVER** , **QZ_COMPONENT_USER↩_DRIVER** , **QZ_COMPONENT_QATZIP_API** ,
  QZ_COMPONENT_SOFTWARE_PROVIDER }

Functions

- QATZIP_API int qzInit (QzSession_T ∗sess, unsigned char sw_backup)
- QATZIP_API int qzSetupSession (QzSession_T ∗sess, QzSessionParams_T ∗params)
- QATZIP_API int **qzSetupSessionDeflate** (QzSession_T ∗sess, QzSessionParamsDeflate_T ∗params)
- QATZIP_API int **qzSetupSessionLZ4** (QzSession_T ∗sess, QzSessionParamsLZ4_T ∗params)
- QATZIP_API int **qzSetupSessionLZ4S** (QzSession_T ∗sess, QzSessionParamsLZ4S_T ∗params)
- QATZIP_API int qzCompress (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last)
- QATZIP_API int **qzCompressExt** (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last, uint64_t ∗ext_rc)
- QATZIP_API int qzCompressCrc (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last, unsigned long ∗crc)
- QATZIP_API int **qzCompressCrcExt** (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last, unsigned long ∗crc, uint64_t ∗ext_rc)
- QATZIP_API int **qzCompressCrc64** (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last, uint64_t ∗crc)
- QATZIP_API int **qzCompressCrc64Ext** (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src↩_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last, uint64_t ∗crc, uint64_t ∗ext_rc)
- QATZIP_API int qzCompressWithMetadataExt (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned int last, uint64_t ∗ext_rc, QzMetadataBlob_T ∗metadata, uint32_t hw_buff_sz_override, uint32_t comp_thrshold)
- QATZIP_API int qzDecompress (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len)
- QATZIP_API int **qzDecompressExt** (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, uint64_t ∗ext_rc)
- QATZIP_API int qzDecompressCrc (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned long ∗crc)
- QATZIP_API int **qzDecompressCrcExt** (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src↩_len, unsigned char ∗dest, unsigned int ∗dest_len, unsigned long ∗crc, uint64_t ∗ext_rc)
- QATZIP_API int **qzDecompressCrc64** (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_↩len, unsigned char ∗dest, unsigned int ∗dest_len, uint64_t ∗crc)
- QATZIP_API int **qzDecompressCrc64Ext** (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, uint64_t ∗crc, uint64_t ∗ext_rc)
- QATZIP_API int qzDecompressWithMetadataExt (QzSession_T ∗sess, const unsigned char ∗src, unsigned int ∗src_len, unsigned char ∗dest, unsigned int ∗dest_len, uint64_t ∗ext_rc, QzMetadataBlob_T ∗metadata, uint32_t hw_buff_sz_override)
- QATZIP_API int qzTeardownSession (QzSession_T ∗sess)
- QATZIP_API int qzClose (QzSession_T ∗sess)
- QATZIP_API int qzGetStatus (QzSession_T ∗sess, QzStatus_T ∗status)
- QATZIP_API unsigned int **qzMaxCompressedLength** (unsigned int src_sz, QzSession_T ∗sess)
- QATZIP_API int qzSetDefaults (QzSessionParams_T ∗defaults)
- QATZIP_API int **qzSetDefaultsDeflate** (QzSessionParamsDeflate_T ∗defaults)
- QATZIP_API int **qzSetDefaultsLZ4** (QzSessionParamsLZ4_T ∗defaults)
- QATZIP_API int **qzSetDefaultsLZ4S** (QzSessionParamsLZ4S_T ∗defaults)
- QATZIP_API int qzGetDefaults (QzSessionParams_T ∗defaults)
- QATZIP_API int **qzGetDefaultsDeflate** (QzSessionParamsDeflate_T ∗defaults)
- QATZIP_API int **qzGetDefaultsLZ4** (QzSessionParamsLZ4_T ∗defaults)
- QATZIP_API int **qzGetDefaultsLZ4S** (QzSessionParamsLZ4S_T ∗defaults)
- QATZIP_API void ∗ qzMalloc (size_t sz, int numa, int force_pinned)
- QATZIP_API int qzAllocateMetadata (QzMetadataBlob_T ∗metadata, size_t data_size, uint32_t hw_buff_sz)
- QATZIP_API void qzFree (void ∗m)
- QATZIP_API int qzFreeMetadata (QzMetadataBlob_T metadata)
- QATZIP_API int qzMemFindAddr (unsigned char ∗a)
- QATZIP_API int qzCompressStream (QzSession_T ∗sess, QzStream_T ∗strm, unsigned int last)
- QATZIP_API int qzDecompressStream (QzSession_T ∗sess, QzStream_T ∗strm, unsigned int last)

- QATZIP_API int qzEndStream (QzSession_T ∗sess, QzStream_T ∗strm)
- QATZIP_API int qzGetSoftwareComponentVersionList (QzSoftwareVersionInfo_T ∗api_info, unsigned int ∗num_elem)
- QATZIP_API int qzGetSoftwareComponentCount (unsigned int ∗num_elem)
- QATZIP_API int qzGetSessionCrc64Config (QzSession_T ∗sess, QzCrc64Config_T ∗crc64_config)
- QATZIP_API int qzSetSessionCrc64Config (QzSession_T ∗sess, QzCrc64Config_T ∗crc64_config)
- QATZIP_API int qzMetadataBlockRead (uint32_t block_num, QzMetadataBlob_T metadata, uint32_↩ t ∗block_offset, uint32_t ∗block_size, uint32_t ∗block_flags, uint32_t ∗block_hash)
- QATZIP_API int qzMetadataBlockWrite (uint32_t block_num, QzMetadataBlob_T metadata, uint32_↩ t ∗block_offset, uint32_t ∗block_size, uint32_t ∗block_flags, uint32_t ∗block_hash)

6.1.1 Macro Definition Documentation

6.1.1.1 QATZIP_API

```
#define QATZIP_API
```

These macros define how the project will be built QATZIP_LINK_DLL must be defined if linking the DLL QATZIP↩ _BUILD_DLL must be defined when building a DLL No definition required if building the project as static library

6.1.1.2 QATZIP_API_VERSION

```
#define QATZIP_API_VERSION
```

Value:

```
(QATZIP_API_VERSION_NUM_MAJOR * 10000 +      \
QATZIP_API_VERSION_NUM_MINOR * 100)
```

6.1.1.3 QZ_BUF_ERROR

```
#define QZ_BUF_ERROR (-3)
```

Insufficient buffer error

6.1.1.4 QZ_DATA_ERROR

```
#define QZ_DATA_ERROR (-4)
```

Input data was corrupted

6.1.1.5 QZ_DEFLATE

```
#define QZ_DEFLATE ((unsigned char)8)
```

used in gzip header to indicate deflate blocks and in session params

6.1.1.6 QZ_DISABLE_SOFTWARE_BACKUP

```
#define QZ_DISABLE_SOFTWARE_BACKUP(
              _BackupVariable )  (_BackupVariable &= ~(1 << QZ_SW_BACKUP_BIT_POSITION))
```

SW backup/fallback disabled

6.1.1.7 QZ_DISABLE_SOFTWARE_ONLY_EXECUTION

```
#define QZ_DISABLE_SOFTWARE_ONLY_EXECUTION(
              _BackupVariable )  (_BackupVariable &= ~(1 << QZ_SW_FORCESW_BIT_POSITION))
```

Disable SW only compression/decompression operations

6.1.1.8 QZ_DUPLICATE

```
#define QZ_DUPLICATE (1)
```

Can not process function again. No failure

6.1.1.9 QZ_ENABLE_SOFTWARE_BACKUP

```
#define QZ_ENABLE_SOFTWARE_BACKUP(
              _BackupVariable )  (_BackupVariable |= (1 << QZ_SW_BACKUP_BIT_POSITION))
```

SW backup/fallback enabled

6.1.1.10 QZ_ENABLE_SOFTWARE_ONLY_EXECUTION

```
#define QZ_ENABLE_SOFTWARE_ONLY_EXECUTION(
              _BackupVariable )  (_BackupVariable |= (1 << QZ_SW_FORCESW_BIT_POSITION))
```

Force SW to perform all compression/decompression operations

6.1.1.11 QZ_FAIL

```
#define QZ_FAIL (-2)
```

Unspecified error

6.1.1.12 QZ_FORCE_SW

```
#define QZ_FORCE_SW (2)
```

Using SW: Switch to software because of previous block

6.1.1.13 QZ_INTEG

```
#define QZ_INTEG (-100)
```

Integrity checked failed

6.1.1.14 QZ_LOW_DEST_MEM

```
#define QZ_LOW_DEST_MEM (15)
```

Using SW: Not enough pinned memory for dest buffer

6.1.1.15 QZ_LOW_MEM

```
#define QZ_LOW_MEM (14)
```

Using SW: Not enough pinned memory

6.1.1.16 QZ_METADATA_OVERFLOW

```
#define QZ_METADATA_OVERFLOW (-118)
```

Insufficent memory allocated for metadata

6.1.1.17 QZ_NO_HW

```
#define QZ_NO_HW (11)
```

Using SW: No QAT HW detected

6.1.1.18 QZ_NO_INST_ATTACH

```
#define QZ_NO_INST_ATTACH (13)
```

Using SW: Could not attach to an instance

6.1.1.19 QZ_NO_MDRV

```
#define QZ_NO_MDRV (12)
```

Using SW: No memory driver detected

6.1.1.20 QZ_NO_SW_AVAIL

```
#define QZ_NO_SW_AVAIL (-105)
```

Session may require software, but no software is available

6.1.1.21 QZ_NONE

```
#define QZ_NONE (100)
```

Device uninitialized

6.1.1.22 QZ_NOSW_LOW_MEM

```
#define QZ_NOSW_LOW_MEM (-104)
```

Not using SW: not enough pinned memory

6.1.1.23 QZ_NOSW_NO_HW

```
#define QZ_NOSW_NO_HW (-101)
```

Not using SW: No QAT HW detected

6.1.1.24 QZ_NOSW_NO_INST_ATTACH

```
#define QZ_NOSW_NO_INST_ATTACH (-103)
```

Not using SW: Could not attach to instance

6.1.1.25 QZ_NOSW_NO_MDRV

```
#define QZ_NOSW_NO_MDRV (-102)
```

Not using SW: No memory driver detected

6.1.1.26 QZ_NOSW_UNSUPPORTED_FMT

```
#define QZ_NOSW_UNSUPPORTED_FMT (-116)
```

Not using SW: QAT device does not support data format

6.1.1.27 QZ_NOT_SUPPORTED

```
#define QZ_NOT_SUPPORTED (-200)
```

Request not supported

6.1.1.28 QZ_OUT_OF_RANGE

```
#define QZ_OUT_OF_RANGE (-119)
```

Metadata block_num specified is out of range

6.1.1.29 QZ_PARAMS

```
#define QZ_PARAMS (-1)
```

Invalid parameter in function call

6.1.1.30 QZ_POST_PROCESS_ERROR

```
#define QZ_POST_PROCESS_ERROR (-117)
```

Using post process: post process callback encountered an error

6.1.1.31 QZ_TIMEOUT

```
#define QZ_TIMEOUT (-5)
```

Operation timed out

6.1.1.32 QZ_UNSUPPORTED_FMT

```
#define QZ_UNSUPPORTED_FMT (16)
```

Using SW: QAT device does not support data format

6.2 qatzip.h

Go to the documentation of this file.

```
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 *
 ***************************************************************************/

```

```
#ifndef _QATZIP_H
#define _QATZIP_H

#ifdef __cplusplus
extern"C" {
#endif

#include <string.h>
#include <stdint.h>

#define QATZIP_API_VERSION_NUM_MAJOR (2)

#define QATZIP_API_VERSION_NUM_MINOR (3)

/* Define a macro as an integer to test */
#define QATZIP_API_VERSION    (QATZIP_API_VERSION_NUM_MAJOR * 10000 +      \
                               QATZIP_API_VERSION_NUM_MINOR * 100)

#if defined QATZIP_LINK_DLL
#define QATZIP_API __declspec(dllimport)
#elif defined QATZIP_BUILD_DLL
#define QATZIP_API __declspec(dllexport)
#else
#define QATZIP_API
#endif

typedef enum QzHuffmanHdr_E {
    QZ_DYNAMIC_HDR = 0,
    QZ_STATIC_HDR
} QzHuffmanHdr_T;

typedef enum PinMem_E {
    COMMON_MEM = 0,
    PINNED_MEM
} PinMem_T;

typedef enum QzDirection_E {
    QZ_DIR_COMPRESS = 0,
    QZ_DIR_DECOMPRESS,
    QZ_DIR_BOTH
} QzDirection_T;

typedef enum QzDataFormat_E {
    QZ_DEFLATE_4B = 0,
    QZ_DEFLATE_GZIP,
    QZ_DEFLATE_GZIP_EXT,
    QZ_DEFLATE_RAW,
    QZ_FMT_NUM
} QzDataFormat_T;

typedef enum QzPollingMode_E {
    QZ_PERIODICAL_POLLING = 0,
    QZ_BUSY_POLLING,
} QzPollingMode_T;

typedef enum QzCrcType_E {
    QZ_CRC32 = 0,
    QZ_ADLER,
    NONE
} QzCrcType_T;

typedef enum QzSoftwareComponentType_E {
    QZ_COMPONENT_FIRMWARE = 0,
    QZ_COMPONENT_KERNEL_DRIVER,
    QZ_COMPONENT_USER_DRIVER,
    QZ_COMPONENT_QATZIP_API,
    QZ_COMPONENT_SOFTWARE_PROVIDER
} QzSoftwareComponentType_T;

#define QZ_OK                   (0)
#define QZ_DUPLICATE            (1)
#define QZ_FORCE_SW             (2)
#define QZ_PARAMS              (-1)
#define QZ_FAIL                (-2)
#define QZ_BUF_ERROR            (-3)
#define QZ_DATA_ERROR           (-4)
#define QZ_TIMEOUT              (-5)
#define QZ_INTEG                (-100)
#define QZ_NO_HW                (11)
#define QZ_NO_MDRV              (12)
#define QZ_NO_INST_ATTACH       (13)
#define QZ_LOW_MEM              (14)
#define QZ_LOW_DEST_MEM         (15)
#define QZ_UNSUPPORTED_FMT      (16)
#define QZ_NONE                 (100)
#define QZ_NOSW_NO_HW           (-101)
#define QZ_NOSW_NO_MDRV         (-102)
```

```
#define QZ_NOSW_NO_INST_ATTACH  (-103)
#define QZ_NOSW_LOW_MEM         (-104)
#define QZ_NO_SW_AVAIL          (-105)
#define QZ_NOSW_UNSUPPORTED_FMT (-116)
#define QZ_POST_PROCESS_ERROR   (-117)
#define QZ_METADATA_OVERFLOW    (-118)
#define QZ_OUT_OF_RANGE         (-119)
#define QZ_NOT_SUPPORTED        (-200)
#define QZ_MAX_ALGORITHMS  ((int)255)
#define QZ_DEFLATE         ((unsigned char)8)
#define QZ_LZ4             ((unsigned char)'4')
#define QZ_LZ4s            ((unsigned char)'s')
#define QZ_ZSTD            ((unsigned char)'Z')

#ifndef MIN
#define MIN(a,b) (((a)<(b))?(a):(b))
#endif
#ifdef __linux__
#define QZ_MEMCPY(dest, src, dest_sz, src_sz) \
        memcpy((void *)(dest), (void *) (src), (size_t)MIN(dest_sz, src_sz))
#endif
#ifdef _WIN64
#define QZ_MEMCPY(dest, src, dest_sz, src_sz) \
        memcpy_s((void *)(dest), dest_sz, (void *) (src), MIN(dest_sz, src_sz))
#endif

typedef int (*qzLZ4SCallbackFn)(void *external, const unsigned char *src,
                                unsigned int *src_len, unsigned char *dest,
                                unsigned int *dest_len, int *ExtStatus);

typedef struct QzSessionParams_S {
    QzHuffmanHdr_T huffman_hdr;
    QzDirection_T direction;
    QzDataFormat_T data_fmt;
    unsigned int comp_lvl;
    unsigned char comp_algorithm;
    unsigned int max_forks;
    unsigned char sw_backup;
    unsigned int hw_buff_sz;
    unsigned int strm_buff_sz;
    unsigned int input_sz_thrshold;
    unsigned int req_cnt_thrshold;
    unsigned int wait_cnt_thrshold;
#ifdef ERR_INJECTION
    void *fbError;
    void *fbErrorCurr;
    /* Linked list for simulated errors from HW */
#endif
} QzSessionParams_T;

typedef struct QzSessionParamsCommon_S {
    QzDirection_T direction;
    unsigned int comp_lvl;
    unsigned char comp_algorithm;
    unsigned int max_forks;
    unsigned char sw_backup;
    unsigned int hw_buff_sz;
    unsigned int strm_buff_sz;
    unsigned int input_sz_thrshold;
    unsigned int req_cnt_thrshold;
    unsigned int wait_cnt_thrshold;
    QzPollingMode_T polling_mode;
    unsigned int is_sensitive_mode;
#ifdef ERR_INJECTION
    void *fbError;
    void *fbErrorCurr;
    /* Linked list for simulated errors from HW */
#endif
} QzSessionParamsCommon_T;

typedef struct QzSessionParamsDeflate_S {
    QzSessionParamsCommon_T common_params;
    QzHuffmanHdr_T huffman_hdr;
    QzDataFormat_T data_fmt;
} QzSessionParamsDeflate_T;

typedef struct QzSessionParamsLZ4_S {
    QzSessionParamsCommon_T common_params;
} QzSessionParamsLZ4_T;

typedef struct QzSessionParamsLZ4S_S {
    QzSessionParamsCommon_T common_params;
    qzLZ4SCallbackFn qzCallback;
    void *qzCallback_external;
    unsigned int lz4s_mini_match;
} QzSessionParamsLZ4S_T;

```

```
#define QZ_HUFF_HDR_DEFAULT          QZ_DYNAMIC_HDR
#define QZ_DIRECTION_DEFAULT         QZ_DIR_BOTH
#define QZ_DATA_FORMAT_DEFAULT       QZ_DEFLATE_GZIP_EXT
#define QZ_COMP_LEVEL_DEFAULT        1
#define QZ_COMP_ALGOL_DEFAULT        QZ_DEFLATE
#define QZ_POLL_SLEEP_DEFAULT        10
#define QZ_MAX_FORK_DEFAULT          3
#define QZ_SW_BACKUP_DEFAULT         1
#define QZ_HW_BUFF_SZ                (64*1024)
#define QZ_HW_BUFF_SZ_Gen3           (1*1024*1024)
#define QZ_HW_BUFF_MIN_SZ            (1*1024)
#define QZ_HW_BUFF_MAX_SZ            (512*1024)
#define QZ_HW_BUFF_MAX_SZ_Gen3       (2*1024*1024*1024U)
#define QZ_STRM_BUFF_SZ_DEFAULT      QZ_HW_BUFF_SZ
#define QZ_STRM_BUFF_MIN_SZ          (1*1024)
#define QZ_STRM_BUFF_MAX_SZ          (2*1024*1024 - 5*1024)
#define QZ_COMP_THRESHOLD_DEFAULT    1024
#define QZ_COMP_THRESHOLD_MINIMUM    128
#define QZ_REQ_THRESHOLD_MINIMUM     1
#define QZ_REQ_THRESHOLD_MAXIMUM     NUM_BUFF
#define QZ_REQ_THRESHOLD_DEFAULT     QZ_REQ_THRESHOLD_MAXIMUM
#define QZ_WAIT_CNT_THRESHOLD_DEFAULT 8
#define QZ_DEFLATE_COMP_LVL_MINIMUM      (1)
#define QZ_DEFLATE_COMP_LVL_MAXIMUM      (9)
#define QZ_DEFLATE_COMP_LVL_MAXIMUM_Gen3 (12)
#define QZ_LZS_COMP_LVL_MINIMUM          (1)
#define QZ_LZS_COMP_LVL_MAXIMUM          (12)

#define QZ_SW_BACKUP_BIT_POSITION   (0)
#define QZ_SW_FORCESW_BIT_POSITION  (1)

#define QZ_ENABLE_SOFTWARE_BACKUP(_BackupVariable) \
        (_BackupVariable |= (1 « QZ_SW_BACKUP_BIT_POSITION))
#define QZ_ENABLE_SOFTWARE_ONLY_EXECUTION(_BackupVariable) \
        (_BackupVariable |= (1 « QZ_SW_FORCESW_BIT_POSITION))
#define QZ_DISABLE_SOFTWARE_BACKUP(_BackupVariable) \
        (_BackupVariable &= ~(1 « QZ_SW_BACKUP_BIT_POSITION))
#define QZ_DISABLE_SOFTWARE_ONLY_EXECUTION(_BackupVariable) \
        (_BackupVariable &= ~(1 « QZ_SW_FORCESW_BIT_POSITION))
#define QZ_SW_EXECUTION_BIT            (4)
#define QZ_SW_EXECUTION_MASK          (1 « QZ_SW_EXECUTION_BIT)
#define QZ_SW_EXECUTION(ret, ext_rc) \
     (!ret && (ext_rc & QZ_SW_EXECUTION_MASK))

#define QZ_TIMEOUT_BIT                 (8)
#define QZ_TIMEOUT_MASK               (1 « QZ_TIMEOUT_BIT)
#define QZ_HW_TIMEOUT(ret, ext_rc)    \
     (!ret && (ext_rc & QZ_TIMEOUT_MASK))

#define QZ_POST_PROCESS_FAIL_BIT       (10)
#define QZ_POST_PROCESS_FAIL_MASK     (1 « QZ_POST_PROCESS_FAIL_BIT)
#define QZ_POST_PROCESS_FAIL(ret, ext_rc)    \
     (ret && (ext_rc & QZ_POST_PROCESS_FAIL_MASK))

typedef struct QzSession_S {
    signed long int hw_session_stat;
    int thd_sess_stat;
    void *internal;
    unsigned long total_in;
    unsigned long total_out;
} QzSession_T;

typedef struct QzStatus_S {
    unsigned short int qat_hw_count;
    unsigned char qat_service_init;
    unsigned char qat_mem_drvr;
    unsigned char qat_instance_attach;
    unsigned long int memory_alloced;
    unsigned char using_huge_pages;
    signed long int hw_session_status;
    unsigned char algo_sw[QZ_MAX_ALGORITHMS];
    unsigned char algo_hw[QZ_MAX_ALGORITHMS];
} QzStatus_T;

#define QZ_MAX_STRING_LENGTH 64
typedef struct QzSoftwareVersionInfo_S {
    QzSoftwareComponentType_T component_type;
    unsigned char component_name[QZ_MAX_STRING_LENGTH];
    unsigned int major_version;
    unsigned int minor_version;
    unsigned int patch_version;
    unsigned int build_number;
    unsigned char reserved[52];
} QzSoftwareVersionInfo_T;

typedef struct QzCrc64Config_S {
    uint64_t polynomial;
    uint64_t initial_value;
    uint32_t reflect_in;
    uint32_t reflect_out;
    uint64_t xor_out;
} QzCrc64Config_T;

typedef void *QzMetadataBlob_T;

QATZIP_API int qzInit(QzSession_T *sess,  unsigned char sw_backup);

QATZIP_API int qzSetupSession(QzSession_T *sess,  QzSessionParams_T *params);

QATZIP_API int qzSetupSessionDeflate(QzSession_T *sess,
                                     QzSessionParamsDeflate_T *params);

QATZIP_API int qzSetupSessionLZ4(QzSession_T *sess,
                                 QzSessionParamsLZ4_T *params);

QATZIP_API int qzSetupSessionLZ4S(QzSession_T *sess,
                                  QzSessionParamsLZ4S_T *params);

QATZIP_API int qzCompress(QzSession_T *sess, const unsigned char *src,
                          unsigned int *src_len, unsigned char *dest,
                          unsigned int *dest_len, unsigned int last);

QATZIP_API int qzCompressExt(QzSession_T *sess, const unsigned char *src,
                             unsigned int *src_len, unsigned char *dest,
                             unsigned int *dest_len, unsigned int last,
                             uint64_t *ext_rc);


QATZIP_API int qzCompressCrc(QzSession_T *sess,
                             const unsigned char *src,
                             unsigned int *src_len,
                             unsigned char *dest,
                             unsigned int *dest_len,
                             unsigned int last,
                             unsigned long *crc);

QATZIP_API int qzCompressCrcExt(QzSession_T *sess,
                                const unsigned char *src,
                                unsigned int *src_len,
                                unsigned char *dest,
                                unsigned int *dest_len,
                                unsigned int last,
                                unsigned long *crc,
                                uint64_t *ext_rc);

QATZIP_API int qzCompressCrc64(QzSession_T *sess,
                               const unsigned char *src,
                               unsigned int *src_len,
                               unsigned char *dest,
                               unsigned int *dest_len,
                               unsigned int last,
                               uint64_t *crc);

QATZIP_API int qzCompressCrc64Ext(QzSession_T *sess,
                                  const unsigned char *src,
                                  unsigned int *src_len,
                                  unsigned char *dest,
                                  unsigned int *dest_len,
                                  unsigned int last,
                                  uint64_t *crc,
                                  uint64_t *ext_rc);

QATZIP_API int qzCompressWithMetadataExt(QzSession_T *sess,
        const unsigned char *src,
        unsigned int *src_len,
        unsigned char *dest,
        unsigned int *dest_len,
        unsigned int last,
        uint64_t *ext_rc,
        QzMetadataBlob_T *metadata,
        uint32_t hw_buff_sz_override,
        uint32_t comp_thrshold);

QATZIP_API int qzDecompress(QzSession_T *sess, const unsigned char *src,
                            unsigned int *src_len, unsigned char *dest,
                            unsigned int *dest_len);

QATZIP_API int qzDecompressExt(QzSession_T *sess, const unsigned char *src,
                               unsigned int *src_len, unsigned char *dest,
                               unsigned int *dest_len, uint64_t *ext_rc);

QATZIP_API int qzDecompressCrc(QzSession_T *sess,
                               const unsigned char *src,
                               unsigned int *src_len,
                                unsigned char *dest,
                                unsigned int *dest_len,
                                unsigned long *crc);

QATZIP_API int qzDecompressCrcExt(QzSession_T *sess,
                                  const unsigned char *src,
                                  unsigned int *src_len,
                                  unsigned char *dest,
                                  unsigned int *dest_len,
                                  unsigned long *crc,
                                  uint64_t *ext_rc);

QATZIP_API int qzDecompressCrc64(QzSession_T *sess,
                                 const unsigned char *src,
                                 unsigned int *src_len,
                                 unsigned char *dest,
                                 unsigned int *dest_len,
                                 uint64_t *crc);

QATZIP_API int qzDecompressCrc64Ext(QzSession_T *sess,
                                    const unsigned char *src,
                                    unsigned int *src_len,
                                    unsigned char *dest,
                                    unsigned int *dest_len,
                                    uint64_t *crc,
                                    uint64_t *ext_rc);

QATZIP_API int qzDecompressWithMetadataExt(QzSession_T *sess,
        const unsigned char *src,
        unsigned int *src_len,
        unsigned char *dest,
        unsigned int *dest_len,
        uint64_t *ext_rc,
        QzMetadataBlob_T *metadata,
        uint32_t hw_buff_sz_override);

QATZIP_API int qzTeardownSession(QzSession_T *sess);

QATZIP_API int qzClose(QzSession_T *sess);

QATZIP_API int qzGetStatus(QzSession_T *sess, QzStatus_T *status);

#define QZ_SKID_PAD_SZ 48
#define QZ_COMPRESSED_SZ_OF_EMPTY_FILE 34
QATZIP_API
unsigned int qzMaxCompressedLength(unsigned int src_sz, QzSession_T *sess);

QATZIP_API int qzSetDefaults(QzSessionParams_T *defaults);

QATZIP_API int qzSetDefaultsDeflate(QzSessionParamsDeflate_T *defaults);

QATZIP_API int qzSetDefaultsLZ4(QzSessionParamsLZ4_T *defaults);

QATZIP_API int qzSetDefaultsLZ4S(QzSessionParamsLZ4S_T *defaults);

QATZIP_API int qzGetDefaults(QzSessionParams_T *defaults);

QATZIP_API int qzGetDefaultsDeflate(QzSessionParamsDeflate_T *defaults);

QATZIP_API int qzGetDefaultsLZ4(QzSessionParamsLZ4_T *defaults);

QATZIP_API int qzGetDefaultsLZ4S(QzSessionParamsLZ4S_T *defaults);

QATZIP_API void *qzMalloc(size_t sz, int numa, int force_pinned);

QATZIP_API int qzAllocateMetadata(QzMetadataBlob_T *metadata,
                                  size_t data_size,
                                  uint32_t hw_buff_sz);

QATZIP_API void qzFree(void *m);

QATZIP_API int qzFreeMetadata(QzMetadataBlob_T metadata);

QATZIP_API int qzMemFindAddr(unsigned char *a);

typedef struct QzStream_S {
    unsigned int in_sz;
    unsigned int out_sz;
    unsigned char *in ;
    unsigned char *out ;
    unsigned int pending_in;
    unsigned int pending_out;
    QzCrcType_T crc_type;
    unsigned int crc_32;
    unsigned long long reserved;
    void *opaque;
} QzStream_T;
```

```
QATZIP_API
int qzCompressStream(QzSession_T *sess, QzStream_T *strm, unsigned int last);

QATZIP_API
int qzDecompressStream(QzSession_T *sess, QzStream_T *strm, unsigned int last);

QATZIP_API int qzEndStream(QzSession_T *sess, QzStream_T *strm);

QATZIP_API
int qzGetSoftwareComponentVersionList(QzSoftwareVersionInfo_T *api_info,
                                      unsigned int *num_elem);

QATZIP_API int qzGetSoftwareComponentCount(unsigned int *num_elem);

QATZIP_API int qzGetSessionCrc64Config(QzSession_T *sess,
                                       QzCrc64Config_T *crc64_config);

QATZIP_API int qzSetSessionCrc64Config(QzSession_T *sess,
                                       QzCrc64Config_T *crc64_config);

QATZIP_API int qzMetadataBlockRead(uint32_t block_num,
                                   QzMetadataBlob_T metadata,
                                   uint32_t *block_offset,
                                   uint32_t *block_size,
                                   uint32_t *block_flags,
                                   uint32_t *block_hash);

QATZIP_API int qzMetadataBlockWrite(uint32_t block_num,
                                    QzMetadataBlob_T metadata,
                                    uint32_t *block_offset,
                                    uint32_t *block_size,
                                    uint32_t *block_flags,
                                    uint32_t *block_hash);

#ifdef __cplusplus
}
#endif

#endif
```

6.3 applications.qat.shims.qatzip.qatzip/include/qz_utils.h File Reference

```
#include <stdarg.h>
#include <pthread.h>
#include <stdio.h>
#include <time.h>
```

Classes

- struct ThreadList_S
- struct QatThread_S

Macros

- #define **QZ_DEBUG**(...)

Typedefs

- typedef enum SERV_E **Serv_T**
- typedef enum ENGINE_E **Engine_T**
- typedef struct ThreadList_S **ThreadList_T**
- typedef struct QatThread_S **QatThread_T**

Enumerations

- enum **SERV_E** { **COMPRESSION** = 0 , **DECOMPRESSION** }
- enum **ENGINE_E** { **HW** = 0 , **SW** }

Functions

- void **initDebugLock** (void)
- void **dumpThreadInfo** (void)
- void **insertThread** (unsigned int th_id, Serv_T serv_type, Engine_T engine_type)

6.4 qz_utils.h

Go to the documentation of this file.

```
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 *
 ***************************************************************************/

#ifndef _QZ_UTILS_H_
#define _QZ_UTILS_H_

#include <stdarg.h>
#include <pthread.h>
#include <stdio.h>
#include <time.h>

typedef enum SERV_E {
    COMPRESSION = 0,
    DECOMPRESSION
} Serv_T;

typedef enum ENGINE_E {
    HW = 0,
    SW
} Engine_T;

typedef struct ThreadList_S {
    unsigned int thread_id;
    unsigned int comp_hw_count;
    unsigned int comp_sw_count;
    unsigned int decomp_hw_count;
    unsigned int decomp_sw_count;
    struct ThreadList_S *next;
} ThreadList_T;
```

```
typedef struct QatThread_S {
    ThreadList_T *comp_th_list;
    unsigned int num_comp_th;
    pthread_mutex_t comp_lock;
    ThreadList_T *decomp_th_list;
    unsigned int num_decomp_th;
    pthread_mutex_t decomp_lock;
} QatThread_T;

extern void initDebugLock(void);
extern void dumpThreadInfo(void);
extern void insertThread(unsigned int th_id,
                         Serv_T serv_type,
                         Engine_T engine_type);

#ifdef QATZIP_DEBUG
static inline void QZ_DEBUG(const char *format, ...)
{
    va_list args;
    va_start(args, format);
    vfprintf(stdout, format, args);
    va_end(args);
}
#else
#define QZ_DEBUG(...)
#endif

#ifdef ENABLE_TESTLOG
#define QZ_TESTLOG(debuglevel, Readable, tag, ...) { \
    FILE *fd = debuglevel > 1 ? stdout : stderr; \
    fprintf(fd, "Tag: %s; ", tag); \
    if (Readable) { \
        fprintf(fd, "Time: %s %s; Location: %s->%s->%d; ", \
                __DATE__, __TIME__, __FILE__, __func__, __LINE__); \
    } else { \
        struct timespec ts = { 0 }; \
        clock_gettime(CLOCK_MONOTONIC_RAW, &ts); \
        fprintf(fd, "Time: %ld.%06lds; ", ts.tv_sec, ts.tv_nsec / 1000); \
    } \
    fprintf(fd, "%s", "Info: "); \
    fprintf(fd, __VA_ARGS__); \
    fprintf(fd, " \n"); \
}
#endif

static inline void QZ_PRINT(const char *format, ...)
{
    va_list args;
    va_start(args, format);
    vfprintf(stdout, format, args);
    va_end(args);
}

static inline void QZ_ERROR(const char *format, ...)
{
    va_list args;
    va_start(args, format);
    vfprintf(stderr, format, args);
    va_end(args);
}

#endif
```

Index