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Chapter 1. Modules

Here is a list of all modules:

- ▶ [Data types used by cuDLA driver](#)
- ▶ [cuDLA API](#)

1.1. Data types used by cuDLA driver

`union cudlaDevAttribute`

`struct cudlaExternalMemoryHandleDesc_t`

`struct cudlaExternalSemaphoreHandleDesc_t`

`struct CudlaFence`

`union cudlaModuleAttribute`

`struct cudlaModuleTensorDescriptor`

`struct cudlaSignalEvents`

`struct cudlaTask`

`struct cudlaWaitEvents`

`enum cudlaAccessPermissionFlags`

Access permission flags for importing NvSciBuffers

Values

CUDLA_READ_WRITE_PERM = 0

Flag to import memory with read-write permission

CUDLA_READ_ONLY_PERM = 1

Flag to import memory with read-only permission

CUDLA_TASK_STATISTICS = 1<<1

Flag to indicate buffer as layerwise statistics buffer.

`enum cudlaDevAttributeType`

Device attribute type.

Values

CUDLA_UNIFIED_ADDRESSING = 0

Flag to check for support for UVA.

CUDLA_DEVICE_VERSION = 1

Flag to check for DLA HW version.

enum cudlaFenceType

Supported fence types.

Values

CUDLA_NVSCISYNC_FENCE = 1

NvSciSync fence type for EOF.

CUDLA_NVSCISYNC_FENCE_SOF = 2

enum cudlaMode

Device creation modes.

Values

CUDLA_CUDA_DLA = 0

Hybrid mode.

CUDLA_STANDALONE = 1

Standalone mode.

enum cudlaModuleAttributeType

Module attribute types.

Values

CUDLA_NUM_INPUT_TENSORS = 0

Flag to retrieve number of input tensors.

CUDLA_NUM_OUTPUT_TENSORS = 1

Flag to retrieve number of output tensors.

CUDLA_INPUT_TENSOR_DESCRIPTOR = 2

Flag to retrieve all the input tensor descriptors.

CUDLA_OUTPUT_TENSOR_DESCRIPTOR = 3

Flag to retrieve all the output tensor descriptors.

CUDLA_NUM_OUTPUT_TASK_STATISTICS = 4

Flag to retrieve total number of output task statistics buffer.

CUDLA_OUTPUT_TASK_STATISTICS_DESCRIPTOR = 5

Flag to retrieve all the output task statistics descriptors.

enum cudlaModuleLoadFlags

Module load flags for [cudlaModuleLoadFromMemory](#).

Values

CUDLA_MODULE_DEFAULT = 0

Default flag.

CUDLA_MODULE_ENABLE_FAULT_DIAGNOSTICS = 1

Flag to load a module that is used to perform permanent fault diagnostics for DLA HW.

enum cudlaNvSciSyncAttributes

cuDLA NvSciSync attributes.

Values

CUDLA_NVSCISYNC_ATTR_WAIT = 1

Wait attribute.

CUDLA_NVSCISYNC_ATTR_SIGNAL = 2

Signal attribute.

enum cudlaStatus

Error codes.

Values

cudlaSuccess = 0

The API call returned with no errors.

cudlaErrorInvalidParam = 1

This indicates that one or more parameters passed to the API is/are incorrect.

cudlaErrorOutOfResources = 2

This indicates that the API call failed due to lack of underlying resources.

cudlaErrorCreationFailed = 3

This indicates that an internal error occurred during creation of device handle.

cudlaErrorInvalidAddress = 4

This indicates that the memory object being passed in the API call has not been registered before.

cudlaErrorOs = 5

This indicates that an OS error occurred.

cudlaErrorCuda = 6

This indicates that there was an error in a CUDA operation as part of the API call.

cudlaErrorUmd = 7

This indicates that there was an error in the DLA runtime for the API call.

cudlaErrorInvalidDevice = 8

This indicates that the device handle passed to the API call is invalid.

cudlaErrorInvalidAttribute = 9

This indicates that an invalid attribute is being requested.

cudlaErrorIncompatibleDlaSWVersion = 10

This indicates that the underlying DLA runtime is incompatible with the current cuDLA version.

cudaErrorMemoryRegistered = 11

This indicates that the memory object is already registered.

cudaErrorInvalidModule = 12

This indicates that the module being passed is invalid.

cudaErrorUnsupportedOperation = 13

This indicates that the operation being requested by the API call is unsupported.

cudaErrorNvSci = 14

This indicates that the NvSci operation requested by the API call failed.

cudaErrorDlaErrInvalidInput = 0x40000001

DLA HW Error.

cudaErrorDlaErrInvalidPreAction = 0x40000002

DLA HW Error.

cudaErrorDlaErrNoMem = 0x40000003

DLA HW Error.

cudaErrorDlaErrProcessorBusy = 0x40000004

DLA HW Error.

cudaErrorDlaErrTaskStatusMismatch = 0x40000005

DLA HW Error.

cudaErrorDlaErrEngineTimeout = 0x40000006

DLA HW Error.

cudaErrorDlaErrDataMismatch = 0x40000007

DLA HW Error.

cudaErrorUnknown = 0x7fffffff

This indicates that an unknown error has occurred.

enum cudaSubmissionFlags

Task submission flags for [cudaSubmitTask](#).

Values

CUDA_SUBMIT_NOOP = 1

Flag to specify that the submitted task must be bypassed for execution.

CUDA_SUBMIT_SKIP_LOCK_ACQUIRE = 1<<1

Flag to specify that the global lock acquire must be skipped.

CUDA_SUBMIT_DIAGNOSTICS_TASK = 1<<2

Flag to specify that the submitted task is to run permanent fault diagnostics for DLA HW.

typedef cudaDevHandle_t *cudaDevHandle

cuDLA Device Handle

```
typedef cudlaModule_t *cudlaModule
```

cuDLA Module Handle

1.2. Modules

Here is a list of all modules:

- ▶ [Data types used by cuDLA driver](#)
- ▶ [cuDLA API](#)

1.1. Data types used by cuDLA driver

```
union cudlaDevAttribute
```

```
struct cudlaExternalMemoryHandleDesc_t
```

```
struct cudlaExternalSemaphoreHandleDesc_t
```

```
struct CudlaFence
```

```
union cudlaModuleAttribute
```

```
struct cudlaModuleTensorDescriptor
```

```
struct cudlaSignalEvents
```

```
struct cudlaTask
```

```
struct cudlaWaitEvents
```

```
enum cudlaAccessPermissionFlags
```

Access permission flags for importing NvSciBuffers

Values

```
CUDLA_READ_WRITE_PERM = 0
```

Flag to import memory with read-write permission

```
CUDLA_READ_ONLY_PERM = 1
```

Flag to import memory with read-only permission

CUDLA_TASK_STATISTICS = 1<<1

Flag to indicate buffer as layerwise statistics buffer.

enum cudlaDevAttributeType

Device attribute type.

Values

CUDLA_UNIFIED_ADDRESSING = 0

Flag to check for support for UVA.

CUDLA_DEVICE_VERSION = 1

Flag to check for DLA HW version.

enum cudlaFenceType

Supported fence types.

Values

CUDLA_NVSCISYNC_FENCE = 1

NvSciSync fence type for EOF.

CUDLA_NVSCISYNC_FENCE_SOF = 2

enum cudlaMode

Device creation modes.

Values

CUDLA_CUDA_DLA = 0

Hybrid mode.

CUDLA_STANDALONE = 1

Standalone mode.

enum cudlaModuleAttributeType

Module attribute types.

Values

CUDLA_NUM_INPUT_TENSORS = 0

Flag to retrieve number of input tensors.

CUDLA_NUM_OUTPUT_TENSORS = 1

Flag to retrieve number of output tensors.

CUDLA_INPUT_TENSOR_DESCRIPTOR = 2

Flag to retrieve all the input tensor descriptors.

CUDLA_OUTPUT_TENSOR_DESCRIPTOR = 3

Flag to retrieve all the output tensor descriptors.

CUDLA_NUM_OUTPUT_TASK_STATISTICS = 4

Flag to retrieve total number of output task statistics buffer.

CUDLA_OUTPUT_TASK_STATISTICS_DESCRIPTOR = 5

Flag to retrieve all the output task statistics descriptors.

enum cudlaModuleLoadFlags

Module load flags for [cudlaModuleLoadFromMemory](#).

Values

CUDLA_MODULE_DEFAULT = 0

Default flag.

CUDLA_MODULE_ENABLE_FAULT_DIAGNOSTICS = 1

Flag to load a module that is used to perform permanent fault diagnostics for DLA HW.

enum cudlaNvSciSyncAttributes

cuDLA NvSciSync attributes.

Values

CUDLA_NVSCISYNC_ATTR_WAIT = 1

Wait attribute.

CUDLA_NVSCISYNC_ATTR_SIGNAL = 2

Signal attribute.

enum cudlaStatus

Error codes.

Values

cudlaSuccess = 0

The API call returned with no errors.

cudlaErrorInvalidParam = 1

This indicates that one or more parameters passed to the API is/are incorrect.

cudlaErrorOutOfResources = 2

This indicates that the API call failed due to lack of underlying resources.

cudlaErrorCreationFailed = 3

This indicates that an internal error occurred during creation of device handle.

cudlaErrorInvalidAddress = 4

This indicates that the memory object being passed in the API call has not been registered before.

cudlaErrorOs = 5

This indicates that an OS error occurred.

cudaErrorCuda = 6

This indicates that there was an error in a CUDA operation as part of the API call.

cudaErrorUmd = 7

This indicates that there was an error in the DLA runtime for the API call.

cudaErrorInvalidDevice = 8

This indicates that the device handle passed to the API call is invalid.

cudaErrorInvalidAttribute = 9

This indicates that an invalid attribute is being requested.

cudaErrorIncompatibleDlaSWVersion = 10

This indicates that the underlying DLA runtime is incompatible with the current cuDLA version.

cudaErrorMemoryRegistered = 11

This indicates that the memory object is already registered.

cudaErrorInvalidModule = 12

This indicates that the module being passed is invalid.

cudaErrorUnsupportedOperation = 13

This indicates that the operation being requested by the API call is unsupported.

cudaErrorNvSci = 14

This indicates that the NvSci operation requested by the API call failed.

cudaErrorDlaErrInvalidInput = 0x40000001

DLA HW Error.

cudaErrorDlaErrInvalidPreAction = 0x40000002

DLA HW Error.

cudaErrorDlaErrNoMem = 0x40000003

DLA HW Error.

cudaErrorDlaErrProcessorBusy = 0x40000004

DLA HW Error.

cudaErrorDlaErrTaskStatusMismatch = 0x40000005

DLA HW Error.

cudaErrorDlaErrEngineTimeout = 0x40000006

DLA HW Error.

cudaErrorDlaErrDataMismatch = 0x40000007

DLA HW Error.

cudaErrorUnknown = 0x7fffffff

This indicates that an unknown error has occurred.

enum cudaSubmissionFlags

Task submission flags for [cudaSubmitTask](#).

Values

CUDA_SUBMIT_NOOP = 1

Flag to specify that the submitted task must be bypassed for execution.

CUDA_SUBMIT_SKIP_LOCK_ACQUIRE = 1<<1

Flag to specify that the global lock acquire must be skipped.

CUDLA_SUBMIT_DIAGNOSTICS_TASK = 1<<2

Flag to specify that the submitted task is to run permanent fault diagnostics for DLA HW.

```
typedef cudlaDevHandle_t *cudlaDevHandle
```

cuDLA Device Handle

```
typedef cudlaModule_t *cudlaModule
```

cuDLA Module Handle

Chapter 2. Data Structures

Here are the data structures with brief descriptions:

[cudaDevAttribute](#)

[cudaExternalMemoryHandleDesc](#)

[cudaExternalSemaphoreHandleDesc](#)

[CudlaFence](#)

[cudaModuleAttribute](#)

[cudaModuleTensorDescriptor](#)

[cudaSignalEvents](#)

[cudaTask](#)

[cudaWaitEvents](#)

2.1. `cudaDevAttribute` Union Reference

Device attribute.

`uint32_t cudaDevAttribute::deviceVersion`

DLA device version. Xavier has 1.0 and Orin has 2.0.

`uint8_t cudaDevAttribute::unifiedAddressingSupported`

Returns 0 if unified addressing is not supported.

2.2. `cudaExternalMemoryHandleDesc_t` Struct Reference

External memory handle descriptor.

`const void`

`*cudaExternalMemoryHandleDesc_t::extBufObject`

A handle representing an external memory object.

`unsigned long long`

`cudaExternalMemoryHandleDesc_t::size`

Size of the memory allocation

2.3. `cudaExternalSemaphoreHandleDesc_t` Struct Reference

External semaphore handle descriptor.

`const void`

`*cudaExternalSemaphoreHandleDesc_t::extSyncObject`

A handle representing an external synchronization object.

2.4. `CudlaFence` Struct Reference

Fence description.

`void *CudlaFence::fence`

Fence.

`cudaFenceType CudlaFence::type`

Fence type.

2.5. `cudaModuleAttribute` Union Reference

Module attribute.

cudaModuleTensorDescriptor

*cudaModuleAttribute::inputTensorDesc

Returns an array of input tensor descriptors.

uint32_t cudaModuleAttribute::numInputTensors

Returns the number of input tensors.

uint32_t cudaModuleAttribute::numOutputTensors

Returns the number of output tensors.

cudaModuleTensorDescriptor

*cudaModuleAttribute::outputTensorDesc

Returns an array of output tensor descriptors.

2.6. cudaModuleTensorDescriptor Struct Reference

Tensor descriptor.

2.7. cudaSignalEvents Struct Reference

Signal events for [cudaSubmitTask](#)

const **cudaSignalEvents::devPtrs

Array of registered synchronization objects (via [cudaImportExternalSemaphore](#)).

CudlaFence *cudaSignalEvents::eofFences

Array of fences pointers for all the signal events corresponding to the synchronization objects.

uint32_t cudaSignalEvents::numEvents

Total number of signal events.

2.8. cudlaTask Struct Reference

Structure of Task.

`const **cudlaTask::inputTensor`

Array of input tensors.

`cudlaModule cudlaTask::moduleHandle`

cuDLA module handle.

`uint32_t cudlaTask::numInputTensors`

Number of input tensors.

`uint32_t cudlaTask::numOutputTensors`

Number of output tensors.

`const **cudlaTask::outputTensor`

Array of output tensors.

`cudlaSignalEvents *cudlaTask::signalEvents`

Signal events.

`const cudlaWaitEvents *cudlaTask::waitEvents`

Wait events.

2.9. cudlaWaitEvents Struct Reference

Wait events for [cudlaSubmitTask](#).

`uint32_t cudlaWaitEvents::numEvents`

Total number of wait events.

```
const CudlaFence *cudlaWaitEvents::preFences
```

Array of fence pointers for all the wait events.

Chapter 3. Data Fields

Here is a list of all documented struct and union fields with links to the struct/union documentation for each field:

deviceVersion

[cudlaDevAttribute](#)

devPtrs

[cudlaSignalEvents](#)

eofFences

[cudlaSignalEvents](#)

extBufObject

[cudlaExternalMemoryHandleDesc](#)

extSyncObject

[cudlaExternalSemaphoreHandleDesc](#)

fence

[CudlaFence](#)

inputTensor

[cudlaTask](#)

inputTensorDesc

[cudlaModuleAttribute](#)

moduleHandle

[cudlaTask](#)

numEvents

[cudlaWaitEvents](#)

[cudlaSignalEvents](#)

numInputTensors

[cudlaTask](#)

[cudlaModuleAttribute](#)

numOutputTensors

[cudlaTask](#)

[cudlaModuleAttribute](#)

outputTensor

[cudlaTask](#)

outputTensorDesc

[cudlaModuleAttribute](#)

preFences[cudaWaitEvents](#)**signalEvents**[cudaTask](#)**size**[cudaExternalMemoryHandleDesc](#)**type**[CudlaFence](#)**unifiedAddressingSupported**[cudaDevAttribute](#)**waitEvents**[cudaTask](#)

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