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Chapter 1

IrisSupportLib Reference Manual

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About this book

This book contains API reference documentation for IrisSupportLib. It was generated from the source code using Doxygen.

The IrisSupportLib library contains the code to create an IrisInstance object and helper classes to add functionality to the instance. It also contains the code to communicate with the Iris system using U64JSON and general support code used by the library, for example thread abstraction.

IrisSupportLib is built as a static library. It must be linked in to any executable or DSO that needs to connect to Iris. The source code is public and it is intended to be buildable and modifiable by customers to integrate with their components or clients. Headers are found in the directories include/iris and include/iris/detail and the source code is found under the directory IrisSupportLib.

Other information

For more information, see the Iris Developer Guide.

Feedback

Feedback on this product

If you have any comments or suggestions about this product, contact your supplier and give:

• The product name.
• The product revision or version.
• An explanation with as much information as you can provide. Include symptoms and diagnostic procedures if appropriate.
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- The number 101319_0100_01_en.
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Product Status

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Web Address


Release Information

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<td>Non-Confidential</td>
<td>Update for v11.6.</td>
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Chapter 2

IrisSupportLib NAMESPACE macros

To allow multiple different versions of IrisSupportLib to be used by different components in the same executable, all IrisSupportLib code is defined in a hidden inner namespace. This namespace is constructed from the revision and fork from iris/detail/IrisSupportLibRevision.h. For example, if revision=0 and fork=master, this means IrisSupportLib code is in the namespace iris::r0master.

This is then imported into the namespace iris so all Iris code can be used without the hidden internal namespace. Make sure you include the Iris NAMESPACE_ macros in any new source files, for example:

```c
#ifndef ARM_INCLUDE_MyHeader_h
#define ARM_INCLUDE_MyHeader_h

#include "iris/detail/IrisCommon.h"

NAMESPACE_IRIS_START

// Code goes here

NAMESPACE_IRIS_END

#endif // ARM_INCLUDE_MyHeader_h
```
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Chapter 7

Module Documentation

7.1 Instance Flags

Flags that can be set when registering an IrisInstance.

Variables

- static const uint64_t iris::IrisInstance::DEFAULT_FLAGS = THROW_ON_ERROR
  Default flags used if not otherwise specified.
- static const uint64_t iris::IrisInstance::MARSHAL_REQUESTS = (1 << 1)
  Marshal future incoming messages on to the current thread.
- static const uint64_t iris::IrisInstance::THROW_ON_ERROR = (1 << 2)
  Throw an exception when an Iris call returns an error response.
- static const uint64_t iris::IrisInstance::UNIQUIFY = (1 << 0)
  Uniquify instance name when registering.

7.1.1 Detailed Description

Flags that can be set when registering an IrisInstance.
7.2 IrisInstanceBuilder resource APIs

Set up resource and register metadata and delegates.

Classes

- **class iris::IrisInstanceBuilder::FieldBuilder**
  
  Used to set metadata on a register field resource.

- **class iris::IrisInstanceBuilder::RegisterBuilder**
  
  Used to set metadata on a register resource.

- **class iris::IrisInstanceBuilder::ResourceBuilder**
  
  Used to set metadata on a resource.

Functions

- **RegisterBuilder iris::IrisInstanceBuilder::addNoValueRegister** (const std::string &name, const std::string &descr, const std::string &format)
  
  Add metadata for one noValue resource.

- **ResourceBuilder iris::IrisInstanceBuilder::addNoValueResource** (const std::string &name, const std::string &descr, const std::string &format)
  
  Add metadata for one noValue resource.

- **RegisterBuilder iris::IrisInstanceBuilder::addRegister** (const std::string &name, uint64_t bitWidth, const std::string &descr, uint64_t addressOffset=IRIS_UINT64_MAX, uint64_t canonicalRn=IRIS_UINT64_MAX)
  
  Add metadata for one numeric register resource.

- **ResourceBuilder iris::IrisInstanceBuilder::addResource** (const std::string &name, uint64_t bitWidth, const std::string &descr)
  
  Add metadata for one numeric resource.

- **RegisterBuilder iris::IrisInstanceBuilder::addStringRegister** (const std::string &name, const std::string &descr)
  
  Add metadata for one string register resource.

- **ResourceBuilder iris::IrisInstanceBuilder::addStringResource** (const std::string &name, const std::string &descr)
  
  Add metadata for one string resource.

- **void iris::IrisInstanceBuilder::beginResourceGroup** (const std::string &name, const std::string &descr, ResourceId rscIdStart=0, const std::string &cname=std::string())
  
  Begin a new resource group.

- **template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &) READER, IrisErrorCode(T::*)(const ResourceInfo &, const ResourceWriteValue &) WRITER > void iris::IrisInstanceBuilder::setDefaultResourceDelegates (T *instance)**
  
  Set both read and write resource delegates if they are defined in the same class.

- **template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &) METHOD > void iris::IrisInstanceBuilder::setDefaultResourceReadDelegate (T *instance)**
  
  Set default read access function for all subsequently added resources.

- **template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &) FUNC > void iris::IrisInstanceBuilder::setDefaultResourceWriteDelegate ()**
  
  Set default write access function for all subsequently added resources.

- **void iris::IrisInstanceBuilder::setDefaultResourceWriteDelegate (ResourceWriteDelegate delegate=ResourceWriteDelegate())**
  
  Set default write access function for all subsequently added resources.
7.2 IrisInstanceBuilder resource APIs

- template<typename T, IrisErrorCode(T::*)(const ResourceInfo&, const ResourceWriteValue&): METHOD>
  void iris::IrisInstanceBuilder::setDefaultResourceWriteDelegate (T *instance)
  
  Set default write access function for all subsequently added resources.

- template<IrisErrorCode(*)(const ResourceInfo&, const ResourceWriteValue&): FUNC>
  void iris::IrisInstanceBuilder::setDefaultResourceWriteDelegate ()
  
  Set default write access function for all subsequently added resources.

- void iris::IrisInstanceBuilder::setNextRscId (ResourceId nextRscId)
  
  Set the rscId that will be used for the next resource to be added.

- void iris::IrisInstanceBuilder::setPropertyCanonicalRnScheme (const std::string &canonicalRnScheme)
  
  Set the register.canonicalRnScheme instance property.

- void iris::IrisInstanceBuilder::setTag (ResourceId rscId, const std::string &tag)
  
  Set a tag for a specific resource.

7.2.1 Detailed Description

Set up resource and register metadata and delegates.

7.2.2 Function Documentation

7.2.2.1 addNoValueRegister()

```
RegisterBuilder iris::IrisInstanceBuilder::addNoValueRegister {
    const std::string & name,
    const std::string & descr,
    const std::string & format
}
```

Add metadata for one noValue resource.

Resource group: `beginResourceGroup()` must have been called before calling this function. The added resource is automatically added to the last group added by `beginResourceGroup()`.

Type: The added resource is of type 'noValue'. Use `addRegister()` to add a register of type 'numeric' or 'numericFp'. Use `addStringRegister()` to add a register of type 'string'. Use `addNoValueResource()` to add a noValue generic resource.

The returned builder object is only valid until another resource is added. It is only intended to modify the resource that was added last.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the resource. This is the same as the 'name' field of ResourceInfo.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>Human readable description of the resource. This is the same as the 'descr' field of ResourceInfo.</td>
</tr>
<tr>
<td>format</td>
<td>The format used to display this resource.</td>
</tr>
</tbody>
</table>

Returns

A `RegisterBuilder` object that can be used to set additional metadata for this resource.
### 7.2.2.2 addNoValueResource()

```cpp
ResourceBuilder iris::IrisInstanceBuilder::addNoValueResource (
    const std::string & name,
    const std::string & descr,
    const std::string & format )
```

Add metadata for one noValue resource.

Resource group: `beginResourceGroup()` must have been called before calling this function. The added resource is automatically added to the last group added by `beginResourceGroup()`.

Type: The added resource is of type 'noValue'. Use `addResource()` to add a resource of a type 'numeric' or 'numericFp'. Use `addStringResource()` to add a resource of a type 'string'. Use `addNoValueRegister()` to add a noValue register resource.

The returned builder object is only valid until another resource is added. It is only intended to modify the resource that was added last.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>Name of the resource. This is the same as the 'name' field of ResourceInfo.</td>
</tr>
<tr>
<td>descr</td>
<td>Human readable description of the resource. This is the same as the 'descr' field of ResourceInfo.</td>
</tr>
<tr>
<td>format</td>
<td>The format used to display this resource.</td>
</tr>
</tbody>
</table>

**Returns**

A `ResourceBuilder` object that can be used to set additional metadata for this resource.

### 7.2.2.3 addRegister()

```cpp
RegisterBuilder iris::IrisInstanceBuilder::addRegister (
    const std::string & name,
    uint64_t bitWidth,
    const std::string & descr,
    uint64_t addressOffset = IRIS_UINT64_MAX,
    uint64_t canonicalRn = IRIS_UINT64_MAX )
```

Add metadata for one numeric register resource.

Resource group: `beginResourceGroup()` must have been called before calling this function. The added resource is automatically added to the last group added by `beginResourceGroup()`.

Type: The added resource is of type 'numeric'. Call `setType("numericFp")` on the returned `RegisterBuilder` to add a 'numericFp' (pure floating-point) register. Use `addStringRegister()` to add a register of type 'string'.

The returned builder object is only valid until another resource is added. It is only intended to modify the resource that was added last.
### 7.2 IrisInstanceBuilder resource APIs

#### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>name</strong></td>
<td>Name of the register. This is the same as the 'name' field of ResourceInfo.</td>
</tr>
<tr>
<td><strong>bitWidth</strong></td>
<td>Width of the resource in bits. This is the same as the 'bitWidth' field of ResourceInfo.</td>
</tr>
<tr>
<td><strong>descr</strong></td>
<td>Human readable description of the resource. This is the same as the 'descr' field of ResourceInfo.</td>
</tr>
<tr>
<td><strong>addressOffset</strong></td>
<td>The address offset of this register inside the parent device. This is the same as the 'addressOffset' field of RegisterInfo.</td>
</tr>
<tr>
<td><strong>canonicalRn</strong></td>
<td>Canonical Register Number. This is the same as the 'canonicalRn' field of RegisterInfo.</td>
</tr>
</tbody>
</table>

#### Returns

A **RegisterBuilder** object that can be used to set additional metadata for this register resource.

#### Remarks

A value of $2^{64}-1$ (0xFFFFFFFFFFFFFFFFF) for the arguments `addressOffset` and `canonicalRn` (the default value) is used to indicate that the field is not set. To set an `addressOffset` of $2^{64}-1$ use:

```cpp
addRegister(...) .setAddressOffset(0xFFFFFFFFFFFFFFFF);
```

To set a `canonicalRn` of $2^{64}-1$ use:

```cpp
addRegister(...) .setCanonicalRn(0xFFFFFFFFFFFFFFFF);
```

#### 7.2.2.4 addResource()

```
ResourceBuilder iris::IrisInstanceBuilder::addResource (    
const std::string & name,    
uint64_t bitWidth,    
const std::string & descr )
```

Add metadata for one numeric resource.

Resource group: `beginResourceGroup()` must have been called before calling this function. The added resource is automatically added to the last group added by `beginResourceGroup()`.

Type: The added resource is of type 'numeric'. Call `setType("numericFp")` on the returned **ResourceBuilder** to add a 'numericFp' (pure floating point) resource. Use `addStringResource()` to add a resource of type 'string'. Use `addRegister()` to add a numeric register resource.

The returned builder object is only valid until another resource is added. It is only intended to modify the resource that was added last.

#### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td><strong>name</strong></td>
<td>Name of the resource. This is the same as the 'name' field of ResourceInfo.</td>
</tr>
<tr>
<td><strong>bitWidth</strong></td>
<td>Width of the resource in bits. This is the same as the 'bitWidth' field of ResourceInfo.</td>
</tr>
<tr>
<td><strong>descr</strong></td>
<td>Human readable description of the resource. This is the same as the 'descr' field of ResourceInfo.</td>
</tr>
</tbody>
</table>
Returns

A `ResourceBuilder` object that can be used to set additional metadata for this resource.

### 7.2.2.5 addStringRegister()

```cpp
RegisterBuilder iris::IrisInstanceBuilder::addStringRegister {
  const std::string & name,
  const std::string & descr )
```

Add metadata for one string register resource.

Resource group: `beginResourceGroup()` must have been called before calling this function. The added resource is automatically added to the last group added by `beginResourceGroup()`.

Type: The added resource is of type ‘string’. Use `addRegister()` to add a register of type ‘numeric’.

The returned builder object is only valid until another resource is added. It is only intended to modify the resource that was added last.

**Parameters**

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the register. This is the same as the ‘name’ field of ResourceInfo.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>Human readable description of the resource. This is the same as the ‘descr’ field of ResourceInfo.</td>
</tr>
</tbody>
</table>

Returns

A `RegisterBuilder` object that can be used to set additional metadata for this register resource.

### 7.2.2.6 addStringResource()

```cpp
ResourceBuilder iris::IrisInstanceBuilder::addStringResource {
  const std::string & name,
  const std::string & descr )
```

Add metadata for one string resource.

Resource group: `beginResourceGroup()` must have been called before calling this function. The added resource is automatically added to the last group added by `beginResourceGroup()`.

Type: The added resource is of type ‘string’. Use `addResource()` to add a resource of a type ‘numeric’ or ‘numericFp’. Use `addStringRegister()` to add a string register resource.

The returned builder object is only valid until another resource is added. It is only intended to modify the resource that was added last.
### 7.2 IrisInstanceBuilder resource APIs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>Name of the resource. This is the same as the 'name' field of ResourceInfo.</td>
</tr>
<tr>
<td>descr</td>
<td>Human readable description of the resource. This is the same as the 'descr' field of ResourceInfo.</td>
</tr>
</tbody>
</table>

Returns

A `ResourceBuilder` object that can be used to set additional metadata for this resource.

#### 7.2.2.7 beginResourceGroup()

```cpp
void iris::IrisInstanceBuilder::beginResourceGroup (const std::string & name, const std::string & descr, ResourceId rscIdStart = 0, const std::string & cname = std::string())
```

Begin a new resource group.

This has the following effects:

- Add a resource group if it does not yet exist.
- Assign all resources that were added by `addResource()` calls to this group, starting with rscId `rscIdStart` if possible. If `rscIdStart` is already used, the next free id after `rscIdStart` is used.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>Name of the resource group.</td>
</tr>
<tr>
<td>descr</td>
<td>Description of the resource group.</td>
</tr>
<tr>
<td>rscIdStart</td>
<td>The number from which to start numbering new resources when they are added to this group.</td>
</tr>
<tr>
<td>cname</td>
<td>C identifier-style name to use for this group if it is different from <code>name</code>.</td>
</tr>
</tbody>
</table>

See also

- `addResource`
- `addStringResource`
- `addNoValueResource`
- `addRegister`
- `addStringRegister`
- `addNoValueRegister`

#### 7.2.2.8 setDefaultResourceDelegates()

```cpp
template<typename T, IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &)> READER, IrisErrorCode(T::*)(const ResourceInfo &, const ResourceWriteValue &)> WRITER
```

Generated by Doxygen
void iris::IrisInstanceBuilder::setDefaultResourceDelegates ( 
    T * instance ) [inline]

Set both read and write resource delegates if they are defined in the same class.

See also
setDefaultResourceReadDelegate
setDefaultResourceWriteDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines resource read and write delegate methods.</th>
</tr>
</thead>
<tbody>
<tr>
<td>READER</td>
<td>A method of class T which is a resource read delegate.</td>
</tr>
<tr>
<td>WRITER</td>
<td>A method of class T which is a resource write delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which READER and WRITER should be called. |

7.2.2.9  setDefaultResourceReadDelegate() [1/3]

void iris::IrisInstanceBuilder::setDefaultResourceReadDelegate ( 
    ResourceReadDelegate delegate = ResourceReadDelegate() ) [inline]

Set default read access function for all subsequently added resources.

Resources that do not explicitly override the access function using

addResource(...).setReadDelegate(...) 

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns E← not_implemented for all resources.

Usage: Pass an instance of ResourceReadDelegate into this function to delegate reading to any class T:

class MyClass
{
    ...
    iris::IrisErrorCode myReadFunction(const iris::ResourceInfo &resourceInfo,
        iris::ResourceReadResult &result);
};

MyClass myInstanceOfMyClass;
ResourceReadDelegate delegate = ResourceReadDelegate::make<MyClass, &MyClass::myReadFunction>({myInstanceOfMyClass});
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultReadDelegate(delegate);
builder->addResource(...); // Uses myReadFunction
7.2 IrisInstanceBuilder resource APIs

Parameters

| delegate | Delegate object which will be called to read resources. |

7.2.2.10 setDefaultResourceReadDelegate() [2/3]

template<typename T, IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &METHOD> void iris::IrisInstanceBuilder::setDefaultResourceReadDelegate ( 
    T * instance ) [inline]

Set default read access function for all subsequently added resources.

Resources that do not explicitly override the access function using

addResource(...).setReadDelegate(...)

will use this delegate.

Usage: Pass an instance of class T where T::METHOD() is a resource read method:

class MyClass
{
    ...
    iris::IrisErrorCode myReadFunction(const iris::ResourceInfo &resourceInfo, 
        iris::ResourceReadResult &result);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultReadDelegate<
    MyClass, &MyClass::myReadFunction>(myInstanceOfMyClass);
builder->addResource(...); // Uses myReadFunction

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a resource read delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a resource read delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

7.2.2.11 setDefaultResourceReadDelegate() [3/3]

template<IrisErrorCode(*)(const ResourceInfo &, ResourceReadResult & FUNC> void iris::IrisInstanceBuilder::setDefaultResourceReadDelegate ( ) [inline]

Set default read access function for all subsequently added resources.

Resources that do not explicitly override the access function using
addResource(...) . setReadDelegate(...) 

will use this delegate.

Usage: Pass in a global function to delegate resource reading to that function:

```cpp
iris::IrisErrorCode myReadFunction(const iris::ResourceInfo &resourceInfo,
                                   iris::ResourceReadResult &result);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultReadDelegate<myReadFunction>();
builder->addResource(...); // Uses myReadFunction
```

Template Parameters

| FUNC | A function which is a resource read delegate. |

7.2.2.12 setDefaultResourceWriteDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setDefaultResourceWriteDelegate (
    ResourceWriteDelegate delegate = ResourceWriteDelegate() ) [inline]
```

Set default write access function for all subsequently added resources.

Resources that do not explicitly override the access function using

```cpp
addResource(...) . setWriteDelegate(...) 
```

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns E←
not_implemented for all resources.

Usage: Pass an instance of class T where T::METHOD() is a resource write method:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode myWriteFunction(const iris::ResourceInfo &resourceInfo, const uint64_t *data);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
iris::ResourceWriteDelegate delegate = iris::ResourceWriteDelegate::make<MyClass, &MyClass::myWriteFunction>(myInstanceOfMyClass);
builder->setDefaultWriteDelegate(delegate);
builder->addResource(...); // Uses myWriteFunction
```

Parameters

| delegate | Delegate object which will be called to write resources. |
7.2.2.13 setDefaultResourceWriteDelegate() [2/3]

**template<typename T, IrisErrorCode(T::*)(const ResourceInfo &, const ResourceWriteValue &)* METHOD>  
void iris::IrisInstanceBuilder::setDefaultResourceWriteDelegate ( 
    T * instance ) [inline]**

Set default write access function for all subsequently added resources.

Resources that do not explicitly override the access function using

```
addResource(...).setWriteDelegate(...)  
```

will use this delegate.

Usage: Pass an instance of class T where T::METHOD() is a resource write method:

```c++
class MyClass  
{
    ...  
    iris::IrisErrorCode myWriteFunction(const iris::ResourceInfo &resourceInfo, const uint64_t *data);  
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();  
builder->setDefaultWriteDelegate<MyClass, &MyClass::myWriteFunction>(myInstanceOfMyClass);  
builder->addResource(...); // Uses myWriteFunction
```

**Template Parameters**

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a resource write delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a resource write delegate.</td>
</tr>
</tbody>
</table>

**Parameters**

| instance | An instance of class T on which METHOD should be called. |

7.2.2.14 setDefaultResourceWriteDelegate() [3/3]

**template<IrisErrorCode(*)(const ResourceInfo &, const ResourceWriteValue &)* FUNC>  
void iris::IrisInstanceBuilder::setDefaultResourceWriteDelegate ( ) [inline]**

Set default write access function for all subsequently added resources.

Resources that do not explicitly override the access function using

```
addResource(...).setWriteDelegate(...)  
```
will use this delegate.

Usage: Pass in a global function to delegate resource writing to that function:

```cpp
iris::IrisErrorCode myWriteFunction(const iris::ResourceInfo &resourceInfo, const uint64_t *data);
```

```cpp
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
bUILDER->setDefaultWriteDelegate<myWriteFunction>();
bUILDER->addResource(...); // Uses myWriteFunction
```

Template Parameters

- **FUNC** A function that is a resource write delegate.

### 7.2.2.15 setNextRscId()

```cpp
void iris::IrisInstanceBuilder::setNextRscId ( const ResourceId nextRscId ) [inline]
```

Set the rscId that will be used for the next resource to be added.

Resources that are added following this call are assigned rsclds starting at nextRscId, if possible. It is usually not necessary to call this function. It might however be useful to achieve a certain rscId numbering scheme which simplifies the evaluation of the rscId in the read/write function.

**Parameters**

- **nextRscId** The rscId that is used for the next resource to be added.

### 7.2.2.16 setPropertyCanonicalRnScheme()

```cpp
void iris::IrisInstanceBuilder::setPropertyCanonicalRnScheme ( const std::string & canonicalRnScheme )
```

Set the register.canonicalRnScheme instance property.

This property is visible in the list of properties returned by `instance_getProperties()`.

This property defines the scheme used by the 'canonicalRn' member of the `RegisterInfo` object. The default is 'arm.com/registers' which is used by all Arm components. This default can be overridden by calling this function. This should be called upon initialization, before other instances have a chance to call `instance_getProperties()`.

**Parameters**

- **canonicalRnScheme** Name of the canonical register number scheme used by this instance.
### 7.2.2.17 setTag()

```cpp
void iris::IrisInstanceBuilder::setTag ( 
    ResourceId rscId, 
    const std::string & tag 
)
```

Set a tag for a specific resource.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>rscId</code></td>
<td>Resource Id for the resource that will have this tag set.</td>
</tr>
<tr>
<td><code>tag</code></td>
<td>Name of the boolean tag that will be set to true.</td>
</tr>
</tbody>
</table>

**See also**

- `ResourceBuilder::setTag`
- `RegisterBuilder::setTag`
7.3 IrisInstanceBuilder event APIs

Set up event source metadata and event stream delegates.

Classes

- class iris::IrisInstanceBuilder::EventSourceBuilder
  
  * Used to set metadata on an EventSource.*

Functions

- EventSourceBuilder iris::IrisInstanceBuilder::addEventSource (const std::string &name, bool isHidden=false)
  
  * Add metadata for an event source.

- EventSourceBuilder iris::IrisInstanceBuilder::addEventSource (const std::string &name, IrisEventEmitterBase &event_emitter, bool isHidden=false)
  
  * Add metadata for an event source that uses an IrisEventEmitter.

- void iris::IrisInstanceBuilder::finalizeRegisterReadEvent ()

- void iris::IrisInstanceBuilder::finalizeRegisterUpdateEvent ()
  
  * Finalize set up of an IrisEventEmitter.

- void iris::IrisInstanceBuilder::setDefaultEsCreateDelegate (EventStreamCreateDelegate delegate)
  
  * Set the delegate that helps to create a new event stream for the simulation-specific event.

- template<typename T , IrisErrorCode(T::*)(EventStream *, const EventSourceInfo &, const std::vector<std::string> &)*> METHOD
  
  void iris::IrisInstanceBuilder::setDefaultEsCreateDelegate (T *instance)
  
  * Set the delegate that helps to create a new event stream for the simulation-specific event.

- void iris::IrisInstanceBuilder::setDefaultEsCreateDelegate ()
  
  * Set the delegate that helps to create a new event stream for the simulation-specific event.

- EventSourceBuilder iris::IrisInstanceBuilder::setRegisterReadEvent (const std::string &name, const std::string &description=std::string())
  
  * Add a new register read event source.

- EventSourceBuilder iris::IrisInstanceBuilder::setRegisterReadEvent (const std::string &name, IrisRegisterEventEmitterBase &event_emitter)
  
  * Add a new register read event source.

- EventSourceBuilder iris::IrisInstanceBuilder::setRegisterUpdateEvent (const std::string &name, const std::string &description=std::string())
  
  * Add a new register update event source.

- EventSourceBuilder iris::IrisInstanceBuilder::setRegisterUpdateEvent (const std::string &name, IrisRegisterEventEmitterBase &event_emitter)
  
  * Add a new register update event source.

7.3.1 Detailed Description

Set up event source metadata and event stream delegates.

7.3.2 Function Documentation
7.3.2.1  addEventSource() \{1/2\}

```cpp
EventSourceBuilder iris::IrisInstanceBuilder::addEventSource ( 
    const std::string & name,
    bool isHidden = false ) [inline]
```

Add metadata for an event source.
Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of the new event source.</th>
</tr>
</thead>
<tbody>
<tr>
<td>isHidden</td>
<td>If true, the event source is hidden.</td>
</tr>
</tbody>
</table>

See also

EventSourceBuilder::setHidden

Returns

An EventSourceBuilder object that can be used to set additional attributes for this event source. The returned EventSourceBuilder is only valid until the next call to addEventSource().

7.3.2.2 addEventSource() [2/2]

EventSourceBuilder iris::IrisInstanceBuilder::addEventSource (const std::string & name, IrisEventEmitterBase & event_emitter, bool isHidden = false) [inline]

Add metadata for an event source that uses an IrisEventEmitter.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of the new event source.</th>
</tr>
</thead>
<tbody>
<tr>
<td>event_emitter</td>
<td>The IrisEventEmitter for this event source.</td>
</tr>
<tr>
<td>isHidden</td>
<td>If true, the event source is hidden.</td>
</tr>
</tbody>
</table>

See also

EventSourceBuilder::setHidden

Returns

An EventSourceBuilder object that can be used to set additional attributes for this event source. The returned EventSourceBuilder is only valid until the next call to addEventSource(), setRegisterReadEvent(), or setRegisterWriteEvent().

7.3.2.3 finalizeRegisterReadEvent()

void iris::IrisInstanceBuilder::finalizeRegisterReadEvent ( )

Finalize the setup of an IrisEventEmitter.

When all the registers associated with all the read events have been added, call finalizeRegisterReadEvent() to add the event sources to the IrisInstance.
7.3.2.4 finalizeRegisterUpdateEvent()

```cpp
void iris::IrisInstanceBuilder::finalizeRegisterUpdateEvent()
```

Finalize set up of an IrisEventEmitter.

When all the registers associated with all the write events have been added, call `finalizeRegisterReadEvent()` to add the event sources to the IrisInstance.

7.3.2.5 setDefaultEsCreateDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setDefaultEsCreateDelegate(EventStreamCreateDelegate delegate) [inline]
```

Set the delegate that helps to create a new event stream for the simulation-specific event.

Event sources that do not explicitly override the access function using

```cpp
addEventSource(...).setEventStreamCreateDelegate(...)
```

use this delegate.

Usage: Pass an instance of class T where T::METHOD() is an event stream creation method:

```cpp
class MyClass
{
    iris::IrisErrorCode createEventStream(iris::EventStream & event, const iris::EventSourceInfo & source, const std::vector<std::string> & names)
};
```

```cpp
MyClass myInstanceOfMyClass;
EventStreamCreateDelegate delegate = EventStreamCreateDelegate::make<MyClass, &MyClass::createEventStream>(myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultEsCreateDelegateC(delegate);
builder->addEventSource(...); // Uses createEventStream
```

Parameters

| delegate | Delegate object that will be called to create an event stream. |

7.3.2.6 setDefaultEsCreateDelegate() [2/3]

```cpp
template<typename T , IrisErrorCode(T::*)(EventStream *, const EventSourceInfo &, const std::vector<std::string> &)> METHOD
void iris::IrisInstanceBuilder::setDefaultEsCreateDelegate (T * instance) [inline]
```

Set the delegate that helps to create a new event stream for the simulation-specific event.

Event sources that do not explicitly override the access function using
use this delegate.

Usage: Pass an instance of class T where T::METHOD() is an event stream creation method:

```cpp
class MyClass
{
...
iris::IrisErrorCode createEventStream(iris::EventStream*, const iris::EventSourceInfo&,
const std::vector<std::string> &)
};
MyClass myInstanceOfMyClass;
builder->setDefaultEsCreateDelegate<MyClass, &MyClass::createEventStream>(myInstanceOfMyClass);
builder->addEventSource(...); // Uses createEventStream
```

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines an event stream creation method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is an event stream creation method.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which METHOD should be called. |

7.3.2.7 setDefaultEsCreateDelegate() [3/3]

template<iris::IrisErrorCode(#) (EventStream *, const EventSourceInfo &, const std::vector<std::string> &) FUNC>
void iris::IrisInstanceBuilder::setDefaultEsCreateDelegate ( ) [inline]

Set the delegate that helps to create a new event stream for the simulation-specific event.

Event sources that do not explicitly override the access function using

```cpp
addEventSource(...).setEventStreamCreateDelegate(...)
```

use this delegate.

Usage: Pass in a global function to which to delegate event stream creation:

```cpp
iris::IrisErrorCode createEventStream(iris::EventStream*, const iris::EventSourceInfo&,
const std::vector<std::string> &)
builder->setDefaultEsCreateDelegate<&MyClass::createEventStream>();
builder->addEventSource(...); // Uses createEventStream
```

Template Parameters

| FUNC | Global function to which to delegate event stream creation. |
7.3.2.8 setRegisterReadEvent() [1/2]

```
EventSourceBuilder iris::IrisInstanceBuilder::setRegisterReadEvent {
    const std::string & name,
    const std::string & description = std::string()
}
```

Add a new register read event source.

Any registers added after calling `setRegisterReadEvent()` and before the next call to `setRegisterReadEvent()` or `finalizeRegisterReadEvent()` are associated with this event.

A call to `setRegisterReadEvent()` implicitly calls `finalizeRegisterReadEvent()` on the event source with name `name` iff an event emitter object (type `IrisRegisterEventEmitterBase`) is provided as an argument.

If the register read event source already exists (identified by name), the active register read event source simply switches to it.

Register read events have three standard fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGISTER</td>
<td>The Iris rscId of the register accessed.</td>
</tr>
<tr>
<td>DEBUG</td>
<td>True if the read originated from a debug access.</td>
</tr>
<tr>
<td>VALUE</td>
<td>The value that was read.</td>
</tr>
</tbody>
</table>

**Parameters**

- `name` Name of the event source.
- `description` Description of the event source.

**Returns**

An `EventSourceBuilder` for the event allowing extra custom fields to be added.

7.3.2.9 setRegisterReadEvent() [2/2]

```
EventSourceBuilder iris::IrisInstanceBuilder::setRegisterReadEvent {
    const std::string & name,
    IrisRegisterEventEmitterBase & event_emitter
}
```

Add a new register read event source.

Any registers added after calling `setRegisterReadEvent()` and before the next call to `setRegisterReadEvent()` or `finalizeRegisterReadEvent()` are associated with this event.

A call to `setRegisterReadEvent()` implicitly calls `finalizeRegisterReadEvent()` on the event source with name `name` iff an event emitter object (type `IrisRegisterEventEmitterBase`) is provided as an argument.

If the register read event source already exists (identified by name), the active register read event source simply switches to it.

Register read events have three standard fields:
### Field Description

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGISTER</td>
<td>The Iris rscId of the register accessed.</td>
</tr>
<tr>
<td>DEBUG</td>
<td>True if the read originated from a debug access.</td>
</tr>
<tr>
<td>VALUE</td>
<td>The value that was read.</td>
</tr>
</tbody>
</table>

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the event source.</th>
</tr>
</thead>
<tbody>
<tr>
<td>event_emitter</td>
<td>The event_emitter to associate with this event source.</td>
</tr>
</tbody>
</table>

Returns

An EventSourceBuilder for the event allowing extra custom fields to be added.

#### 7.3.2.10  setRegisterUpdateEvent()

```cpp
EventSourceBuilder iris::IrisInstanceBuilder::setRegisterUpdateEvent(
    const std::string & name,
    const std::string & description = std::string())
```

Add a new register update event source.

Any registers added after calling setRegisterUpdateEvent() and before the next call to setRegisterUpdateEvent() or finalizeRegisterUpdateEvent() are associated with this event.

A call to setRegisterUpdateEvent implicitly calls finalizeRegisterUpdateEvent() on the event source with name name iff an event emitter object (type IrisRegisterEventEmitterBase) is provided as an argument.

If the register update event source (identified by name) already exists, the active register update event source simply switches to it.

Register update events have four standard fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGISTER</td>
<td>The Iris rscId of the register accessed.</td>
</tr>
<tr>
<td>DEBUG</td>
<td>True if the update originated from a debug access.</td>
</tr>
<tr>
<td>OLD_VALUE</td>
<td>The value that would have been read before the access was made.</td>
</tr>
<tr>
<td>NEW_VALUE</td>
<td>The value that would be read after the access was made.</td>
</tr>
</tbody>
</table>

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the event source.</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Description of the event source.</td>
</tr>
</tbody>
</table>

Returns

An EventSourceBuilder for the event allowing extra custom fields to be added.
### 7.3.2.11 setRegisterUpdateEvent() [2/2]

```cpp
EventSourceBuilder iris::IrisInstanceBuilder::setRegisterUpdateEvent ( 
    const std::string & name, 
    IrisRegisterEventEmitterBase & event_emitter )
```

Add a new register update event source.

Any registers added after calling `setRegisterUpdateEvent()` and before the next call to `setRegisterUpdateEvent()` or `finalizeRegisterUpdateEvent()` are associated with this event.

A call to `setRegisterUpdateEvent` implicitly calls `finalizeRegisterUpdateEvent` on the event source with name `name` iff an event emitter object (type `IrisRegisterEventEmitterBase`) is provided as an argument.

If the register update event source (identified by `name`) already exists, the active register update event source simply switches to it.

Register update events have four standard fields:

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGISTER</td>
<td>The Iris rscId of the register accessed.</td>
</tr>
<tr>
<td>DEBUG</td>
<td>True if the update originated from a debug access.</td>
</tr>
<tr>
<td>OLD_VALUE</td>
<td>The value that would have been read before the access was made.</td>
</tr>
<tr>
<td>NEW_VALUE</td>
<td>The value that would be read after the access was made.</td>
</tr>
</tbody>
</table>

**Parameters**

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the event source.</th>
</tr>
</thead>
<tbody>
<tr>
<td>event_emitter</td>
<td>The event_emitter to associate with this event source.</td>
</tr>
</tbody>
</table>

**Returns**

An `EventSourceBuilder` for the event allowing extra custom fields to be added.
7.4 IrisInstanceBuilder breakpoint APIs

Set up breakpoint hit notifications and breakpoint delegates.

Functions

• void iris::IrisInstanceBuilder::addBreakpointCondition (const std::string &name, const std::string &type, const std::string &description, const std::vector<std::string> &bpt_types=std::vector<std::string>());
  Add an optional component-specific condition.

• const BreakpointInfo * iris::IrisInstanceBuilder::getBreakpointInfo (BreakpointId bptId)
  Get the breakpoint information for a given breakpoint.

• void iris::IrisInstanceBuilder::notifyBreakpointHit (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId)
  Notify clients that a code breakpoint was hit.

• void iris::IrisInstanceBuilder::notifyBreakpointHitData (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId, uint64_t accessAddr, uint64_t accessSize, const std::string &accessRw, const std::vector<uint64_t> &data)
  Notify clients that a data breakpoint was hit (IRIS_BREAKPOINT_HIT).

• void iris::IrisInstanceBuilder::notifyBreakpointHitRegister (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId, const std::string &accessRw, const std::vector<uint64_t> &data)
  Notify clients that a register breakpoint was hit (IRIS_BREAKPOINT_HIT).

• void iris::IrisInstanceBuilder::setBreakpointDeleteDelegate (BreakpointDeleteDelegate delegate)
  Set the delegate that is called when a breakpoint is deleted.

• void iris::IrisInstanceBuilder::setBreakpointDeleteDelegate (T *instance)
  Set the delegate that is called when a breakpoint is deleted.

• void iris::IrisInstanceBuilder::setBreakpointDeleteDelegate ()
  Set the delegate that is called when a breakpoint is deleted.

• void iris::IrisInstanceBuilder::setBreakpointSetDelegate (BreakpointSetDelegate delegate)
  Set the delegate that is called when a breakpoint is set.

• void iris::IrisInstanceBuilder::setBreakpointSetDelegate (T *instance)
  Set the delegate that is called when a breakpoint is set.

• void iris::IrisInstanceBuilder::setBreakpointSetDelegate ()
  Set the delegate that is called when a breakpoint is set.

7.4.1 Detailed Description

Set up breakpoint hit notifications and breakpoint delegates.

7.4.2 Function Documentation

7.4.2.1 getBreakpointInfo()

    const BreakpointInfo * iris::IrisInstanceBuilder::getBreakpointInfo (BreakpointId bptId) [inline]

Get the breakpoint information for a given breakpoint.
### 7.4 IrisInstanceBuilder breakpoint APIs

#### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bptId</td>
<td>The breakpoint id of the breakpoint for which information is being requested.</td>
</tr>
</tbody>
</table>

**Returns**

The breakpoint information for the requested breakpoint. This returns nullptr if `bptId` is invalid.

#### 7.4.2.2 `notifyBreakpointHit()`

```cpp
void iris::IrisInstanceBuilder::notifyBreakpointHit ( BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId ) [inline]
```

Notify clients that a code breakpoint was hit.

This emits an *(IRIS_BREAKPOINT_HIT)* event.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bptId</td>
<td>Breakpoint id for the breakpoint that was hit.</td>
</tr>
<tr>
<td>time</td>
<td>Simulation time at which the breakpoint was hit.</td>
</tr>
<tr>
<td>pc</td>
<td>Value of the program counter when the breakpoint was hit.</td>
</tr>
<tr>
<td>pcSpaceId</td>
<td>Memory space id for the PC when the breakpoint was hit.</td>
</tr>
</tbody>
</table>

#### 7.4.2.3 `notifyBreakpointHitData()`

```cpp
void iris::IrisInstanceBuilder::notifyBreakpointHitData ( BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId, uint64_t accessAddr, uint64_t accessSize, const std::string & accessRw, const std::vector< uint64_t > & data ) [inline]
```

Notify clients that a data breakpoint was hit *(IRIS_BREAKPOINT_HIT)*.

This emits an *(IRIS_BREAKPOINT_HIT)* event.
### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>bptId</code></td>
<td>Breakpoint id for the breakpoint that was hit.</td>
</tr>
<tr>
<td><code>time</code></td>
<td>Simulation time at which the breakpoint was hit.</td>
</tr>
<tr>
<td><code>pc</code></td>
<td>Value of the program counter when the breakpoint was hit.</td>
</tr>
<tr>
<td><code>pcSpaceId</code></td>
<td>Memory space id for the PC when the breakpoint was hit.</td>
</tr>
<tr>
<td><code>accessAddr</code></td>
<td>Address of the access that hit.</td>
</tr>
<tr>
<td><code>accessSize</code></td>
<td>Size in bytes of the access that hit.</td>
</tr>
<tr>
<td><code>accessRw</code></td>
<td>Access direction. Should be &quot;r&quot; for a read access or &quot;w&quot; for a write access.</td>
</tr>
<tr>
<td><code>data</code></td>
<td>The data transferred by the access that hit.</td>
</tr>
</tbody>
</table>

---

### 7.4.2.4 notifyBreakpointHitRegister()

```cpp
def notifyBreakpointHitRegister (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId, const std::string & accessRw, const std::vector<uint64_t> & data) [inline]
```

Notify clients that a register breakpoint was hit (**IRIS_BREAKPOINT_HIT**).

This emits an (**IRIS_BREAKPOINT_HIT**) event.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>bptId</code></td>
<td>Breakpoint id for the breakpoint that was hit.</td>
</tr>
<tr>
<td><code>time</code></td>
<td>Simulation time at which the breakpoint was hit.</td>
</tr>
<tr>
<td><code>pc</code></td>
<td>Value of the program counter when the breakpoint was hit.</td>
</tr>
<tr>
<td><code>pcSpaceId</code></td>
<td>Memory space id for the PC when the breakpoint was hit.</td>
</tr>
<tr>
<td><code>accessRw</code></td>
<td>Access direction. Should be &quot;r&quot; for a read access or &quot;w&quot; for a write access.</td>
</tr>
<tr>
<td><code>data</code></td>
<td>The data transferred by the access that hit.</td>
</tr>
</tbody>
</table>

---

### 7.4.2.5 setBreakpointDeleteDelegate() [1/3]

```cpp
def setBreakpointDeleteDelegate (BreakpointDeleteDelegate delegate) [inline]
```

Set the delegate that is called when a breakpoint is deleted.

**Usage:** Pass an instance of class T, where T::METHOD() is a breakpoint delete delegate:
class MyClass
{
    ...
    iris::IrisErrorCode deleteBreakpoint(iris::BreakpointInfo&);
};

MyClass myInstanceOfMyClass;

BreakpointSetDelegate delegate = BreakpointSetDelegate::make<MyClass, &MyClass::deleteBreakpoint>(
    myInstanceOfMyClass);

iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setBreakpointDeleteDelegate(delegate);

Parameters

| delegate | Delegate object which will be called to delete a breakpoint. |

7.4.2.6 setBreakpointDeleteDelegate() [2/3]

template<typename T, IrisErrorCode(T::*)(const BreakpointInfo &)* METHOD>
void iris::IrisInstanceBuilder::setBreakpointDeleteDelegate (T * instance) [inline]

Set the delegate that is called when a breakpoint is deleted.

Usage: Pass an instance of class T, where T::METHOD() is a breakpoint delete delegate:

class MyClass
{
    ...
    iris::IrisErrorCode deleteBreakpoint(iris::BreakpointInfo&);
};

MyClass myInstanceOfMyClass;

iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setBreakpointDeleteDelegate<MyClass, &MyClass::deleteBreakpoint>(myInstanceOfMyClass);

Template Parameters

| T | Class that defines a breakpoint delete method. |
| METHOD | A method of class T which is a breakpoint delete delegate method. |

Parameters

| instance | The instance of class T on which METHOD should be called. |

7.4.2.7 setBreakpointDeleteDelegate() [3/3]

template<IrisErrorCode (*)(const BreakpointInfo &)* FUNC>
void iris::IrisInstanceBuilder::setBreakpointDeleteDelegate ( ) [inline]

Generated by Doxygen
Set the delegate that is called when a breakpoint is deleted.

**Usage:** Pass in a global function to call when a breakpoint is deleted:

```cpp
iris::IrisErrorCode deleteBreakpoint(iris::BreakpointInfo&);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setBreakpointDeleteDelegate<&MyClass::deleteBreakpoint>();
```

**Template Parameters**

FUNC | Global function to call when a breakpoint is deleted.

### 7.4.2.8 setBreakpointSetDelegate()

```cpp
void iris::IrisInstanceBuilder::setBreakpointSetDelegate (BreakpointSetDelegate delegate) [inline]
```

Set the delegate that is called when a breakpoint is set.

**Usage:** Pass an instance of class T, where T::METHOD() is a breakpoint set delegate:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode setBreakpoint(iris::BreakpointInfo&);
};
MyClass myInstanceOfMyClass;
BreakpointSetDelegate delegate = BreakpointSetDelegate::make<MyClass, &MyClass::setBreakpoint>(myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setBreakpointSetDelegate(delegate);
```

**Parameters**

delegate | Delegate object which will be called to set a breakpoint.

### 7.4.2.9 setBreakpointSetDelegate()

```cpp
template<typename T , IrisErrorCode(T::*)(BreakpointInfo &) METHOD>
void iris::IrisInstanceBuilder::setBreakpointSetDelegate (T * instance) [inline]
```

Set the delegate that is called when a breakpoint is set.

**Usage:** Pass an instance of class T, where T::METHOD() is a breakpoint set delegate:
```cpp
class MyClass
{
    ...
    iris::IrisErrorCode setBreakpoint(iris::BreakpointInfo&);
};

MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setBreakpointSetDelegate<MyClass, &MyClass::setBreakpoint>(myInstanceOfMyClass);
```

### Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a breakpoint set method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a breakpoint set delegate method.</td>
</tr>
</tbody>
</table>

### Parameters

| instance | The instance of class T on which METHOD should be called. |

### 7.4.2.10 setBreakpointSetDelegate() [3/3]

```cpp
template<IrisErrorCode(*)(BreakpointInfo &)> FUNC
void iris::IrisInstanceBuilder::setBreakpointSetDelegate ( ) [inline]
```

Set the delegate that is called when a breakpoint is set.

**Usage:** Pass in a global function to call when a breakpoint is set:

```cpp
iris::IrisErrorCode setBreakpoint(iris::BreakpointInfo&);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setBreakpointSetDelegate<&MyClass::setBreakpoint>();
```

### Template Parameters

| FUNC | Global function to call when a breakpoint is set. |
7.5 IrisInstanceBuilder memory APIs

Set up address translation and memory space metadata and delegates.

Classes

- `class iris::IrisInstanceBuilder::AddressTranslationBuilder`  
  Used to set metadata for an address translation.
- `class iris::IrisInstanceBuilder::MemorySpaceBuilder`  
  Used to set metadata for a memory space.

Functions

- `AddressTranslationBuilder iris::IrisInstanceBuilder::addAddressTranslation (MemorySpaceId inSpaceld, MemorySpaceId outSpaceId, const std::string &description)`  
  Add an address translation.
- `MemorySpaceBuilder iris::IrisInstanceBuilder::addMemorySpace (const std::string &name)`  
  Add metadata for one memory space.
- `void iris::IrisInstanceBuilder::setDefaultAddressTranslateDelegate (MemoryAddressTranslateDelegate delegate=MemoryAddressTranslateDelegate())`  
  Set the default address translation function for all subsequently added memory spaces.
- `template<typename T , IrisErrorCode(T::*)(uint64_t, uint64_t, uint64_t, MemoryAddressTranslationResult &)> METHOD void iris::IrisInstanceBuilder::setDefaultAddressTranslateDelegate (T *instance)`  
  Set the default address translation function for all subsequently added memory spaces.
- `template<IrisErrorCode(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &)> FUNC void iris::IrisInstanceBuilder::setDefaultAddressTranslateDelegate ()`  
  Set the default address translation function for all subsequently added memory spaces.
- `void iris::IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate (MemoryGetSidebandInfoDelegate delegate)`  
  Set the default sideband info function for all subsequently added memory spaces.
- `template<typename T , IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &)> METHOD void iris::IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate (T *instance)`  
  Set the default sideband info function for all subsequently added memory spaces.
- `template<IrisErrorCode(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &)> FUNC void iris::IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate ()`  
  Set the default sideband info function for all subsequently added memory spaces.
- `void iris::IrisInstanceBuilder::setDefaultMemoryReadDelegate (MemoryReadDelegate delegate=MemoryReadDelegate())`  
  Set the default read function for all subsequently added memory spaces.
- `template<typename T , IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &)> METHOD void iris::IrisInstanceBuilder::setDefaultMemoryReadDelegate (T *instance)`  
  Set the default read function for all subsequently added memory spaces.
- `template<IrisErrorCode(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &)> FUNC void iris::IrisInstanceBuilder::setDefaultMemoryReadDelegate ()`  
  Set the default read function for all subsequently added memory spaces.
- `void iris::IrisInstanceBuilder::setDefaultMemoryWriteDelegate (MemoryWriteDelegate delegate=MemoryWriteDelegate())`  
  Set the default write function for all subsequently added memory spaces.
7.5 IrisInstanceBuilder memory APIs

- template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *, MemoryWriteResult &)}> void iris::IrisInstanceBuilder::setDefaultMemoryWriteDelegate (T *instance) 

  Set the default write function for all subsequently added memory spaces.

- template<IrisErrorCode(*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *, MemoryWriteResult &)> void iris::IrisInstanceBuilder::setDefaultMemoryWriteDelegate () 

  Set default write function for all subsequently added memory spaces.

- void iris::IrisInstanceBuilder::setPropertyCanonicalMsnScheme (const std::string &canonicalMsnScheme) 

  Set the memory.canonicalMsnScheme instance property.

7.5.1 Detailed Description

Set up address translation and memory space metadata and delegates.

7.5.2 Function Documentation

7.5.2.1 addAddressTranslation()

AddressTranslationBuilder iris::IrisInstanceBuilder::addAddressTranslation ( 
    MemorySpaceId inSpaceId, 
    MemorySpaceId outSpaceId, 
    const std::string & description ) [inline]

Add an address translation.

Add metadata for the address translation from the memory space indicated by inSpaceId to the memory space indicated by outSpaceId.

By explicitly adding an address translation using this function, the Iris instance can tell clients which address translations are supported and a component can provide a specific delegate function to perform that translation.

Parameters

| **inSpaceId** | Memory space id for the input memory space of this translation. |
| **outSpaceId** | Memory space id for the output memory space of this translation. |
| description | A human readable description of this translation. return An AddressTranslationBuilder object which allows additional configuration of this translation. |

7.5.2.2 addMemorySpace()

MemorySpaceBuilder iris::IrisInstanceBuilder::addMemorySpace ( 
    const std::string & name ) [inline]

Generated by Doxygen
Add metadata for one memory space.

Typical use pattern:

```cpp
addMemorySpace("name")
   .setDescription("description")
   .setMinAddr(...)
   .setMaxAddr(...)
   .setEndianness(...)
   .addAttribute(...)
   .addAttributeDefault(...);
```

**Parameters**

| name | Name of the memory space to add. |

**Returns**

A `MemorySpaceBuilder` object which can be used to configure metadata for the memory space.

### 7.5.2.3 `setDefaultAddressTranslateDelegate()` [1/3]

```cpp
void iris::IrisInstanceBuilder::setDefaultAddressTranslateDelegate (  
   MemoryAddressTranslateDelegate delegate = MemoryAddressTranslateDelegate() )
```

Set the default address translation function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using

```cpp
addMemorySpace(...).setTranslationDelegate(...)
```

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns `E←not_implemented` for all requests.

**Usage:**

```cpp
class MyClass
{
   ...
   iris::IrisErrorCode translateAddress(MemorySpaceId inSpaceId, uint64_t address,  
      MemorySpaceId outSpaceId,  
      iris::MemoryAddressTranslationResult &result);
};
```

```cpp
MyClass myInstanceOfMyClass;
iris::MemoryAddressTranslateDelegate delegate =  
   iris::MemoryAddressTranslateDelegate::make<MyClass, &MyClass::translateAddress>(myInstanceOfMyClass);  
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultAddressTranslateDelegate(delegate);  
builder->addMemorySpace(...); // Uses translateAddress
```
Parameters

| delegate  | Delegate object which will be called to translate addresses. |

7.5.2.4  
setDefaultAddressTranslateDelegate()  [2/3]

```
template<typename T, IrisErrorCode(T::*)(uint64_t, uint64_t, uint64_t, MemoryAddressTranslationResult & result) METHOD>
void iris::IrisInstanceBuilder::setDefaultAddressTranslateDelegate ( T * instance ) [inline]
```

Set the default address translation function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using

```
addMemorySpace(...).setTranslationDelegate(...)
```

will use this delegate.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode translateAddress(MemorySpaceId inSpaceId, uint64_t address,
                                          MemorySpaceId outSpaceId,
                                          iris::MemoryAddressTranslationResult &result);
};
```

```cpp
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultAddressTranslateDelegate<MyClass, &MyClass::translateAddress>(&myInstanceOfMyClass);
builder->addMemorySpace(...); // Uses translateAddress
```

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines an address translation delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is an address translation delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

7.5.2.5  
setDefaultAddressTranslateDelegate()  [3/3]

```
template<IrisErrorCode(*)(uint64_t, uint64_t, uint64_t, MemoryAddressTranslationResult & result) Fu-
NC>
void iris::IrisInstanceBuilder::setDefaultAddressTranslateDelegate ( ) [inline]
```

Generated by Doxygen
Set the default address translation function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using

```c++
addMemorySpace(...).setTranslationDelegate(...)
```

will use this delegate.

Usage:

```c++
iris::IrisErrorCode translateAddress(MemorySpaceId inSpaceId, uint64_t address,
                                     MemorySpaceId outSpaceId,
                                     iris::MemoryAddressTranslationResult &result);
```

```c++
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultAddressTranslateDelegate<translateAddress>();
builder->addMemorySpace(...); // Uses translateAddress
```

**Template Parameters**

| **FUNC** | Global function to call to translate addresses. |

7.5.2.6 setDefaultGetMemorySidebandInfoDelegate() [1/3]

```c++
void iris::IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate {
  MemoryGetSidebandInfoDelegate delegate } [inline]
```

Set the default sideband info function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the sideband function using

```c++
addMemorySpace(...).setSidebandDelegate(...)
```

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns `E←not_implemented` for all requests.

Usage:

```c++
class MyClass
{
  ...
  iris::IrisErrorCode getSidebandInfo(const iris::MemorySpaceInfo &spaceInfo, uint64_t address,
                                       const iris::IrisValueMap &attrib,
                                       const std::vector<std::string> &request,
                                       iris::IrisValueMap &result);
};
```

```c++
MyClass myInstanceOfMyClass;
iris::MemoryAddressTranslateDelegate delegate =
  iris::MemoryAddressTranslateDelegate::make<MyClass, &MyClass::getSidebandInfo>(myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultGetMemorySidebandInfoDelegate(delegate);
builder->addMemorySpace(...); // Uses getSidebandInfo
```
Parameters

| delegate | Delegate object which will be called to get sideband info. |

7.5.2.7 `setDefaultGetMemorySidebandInfoDelegate()` [2/3]

```cpp
template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &)> METHOD
void iris::IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate (T * instance ) [inline]
```

Set the default sideband info function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the sideband function using

```cpp
addMemorySpace(...).setSidebandDelegate(...) 
```

will use this delegate.

Usage:

```cpp
class MyClass
{
  ...
  iris::IrisErrorCode getSidebandInfo(const iris::MemorySpaceInfo &spaceInfo, uint64_t address,
                                           const iris::IrisValueMap &attrib,
                                           const std::vector<std::string> &request,
                                           iris::IrisValueMap &result);
};
```

MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultGetMemorySidebandInfoDelegate<MyClass, &MyClass::getSidebandInfo>(&myInstanceOfMyClass);
builder->addMemorySpace(...); // Uses getSidebandInfo
```

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a sideband info delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a sideband info delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

7.5.2.8 `setDefaultGetMemorySidebandInfoDelegate()` [3/3]

```cpp
template<IrisErrorCode(*)(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &)> FUNC
void iris::IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate ( ) [inline]
```

Generated by Doxygen
Set the default sideband info function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the sideband function using

```cpp
addMemorySpace(...).setSidebandDelegate(...)```

will use this delegate.

**Usage:**

```cpp
iris::IrisErrorCode getSidebandInfo(const iris::MemorySpaceInfo &spaceInfo, uint64_t address,
    const iris::IrisValueMap &attrib,
    const std::vector<std::string> &request,
    iris::IrisValueMap &result);
```

```cpp
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultGetMemorySidebandInfoDelegate<&getSidebandInfo>();
builder->addMemorySpace(...); // Uses getSidebandInfo```

**Template Parameters**

- **FUNC**: Global function to call to get sideband info.

### 7.5.2.9 setDefaultMemoryReadDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setDefaultMemoryReadDelegate (MemoryReadDelegate delegate = MemoryReadDelegate() ) [inline]
```

Set the default read function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using

```cpp
addMemorySpace(...).setReadDelegate(...)```

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns E←not_implemented for all requests.

**Usage:** Pass an instance of class T, where T::METHOD() is a memory read method:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode readMemory(const iris::MemorySpaceInfo &spaceInfo, uint64_t address,
        uint64_t byteWidth, uint64_t count,
        const iris::IrisValueMap &attrib,
        iris::MemoryReadResult &result);
};
```

```cpp
MyClass myInstanceOfMyClass;
iris::MemoryReadDelegate delegate =
    iris::MemoryReadDelegate::make<MyClass, &MyClass::readMemory*>(&myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultMemoryReadDelegate(delegate);
builder->addMemorySpace(...); // Uses readMemory```
7.5 IrisInstanceBuilder memory APIs

Parameters

| delegate | Delegate object which will be called to read memory. |

7.5.2.10 setDefaultMemoryReadDelegate() [2/3]

```
template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &)> METHOD
void iris::IrisInstanceBuilder::setDefaultMemoryReadDelegate (T * instance) [inline]
```

Set the default read function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using

```
addMemorySpace(...).setReadDelegate(...) 
```

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns E_not_implemented for all requests.

Usage: Pass an instance of class T, where T::METHOD() is a memory read method:

```
class MyClass
{
   ...
   iris::IrisErrorCode readMemory(const iris::MemorySpaceInfo &spaceInfo, uint64_t address, uint64_t byteWidth, uint64_t count, const iris::IrisValueMap &attrib, iris::MemoryReadResult &result);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultMemoryReadDelegate<MyClass, &MyClass::readMemory>(myInstanceOfMyClass);
builder->addMemorySpace(...); // Uses readMemory
```

Template Parameters

| T | Class that defines a memory read delegate method. |
| METHOD | A method of class T which is a memory read delegate. |

Parameters

| instance | An instance of class T on which METHOD should be called. |
7.5.2.11 setDefaultMemoryReadDelegate() [3/3]

```cpp
template<typename IrisErrorCode (*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &) FUNC>
void iris::IrisInstanceBuilder::setDefaultMemoryReadDelegate () [inline]
```

Set the default read function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using

```cpp
addMemorySpace(...) .setReadDelegate(...)```

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns Eˌnot_implemented for all requests.

Usage: Pass an instance of class T, where T::METHOD() is a memory read method:

```cpp
iris::IrisErrorCode readMemory(const iris::MemorySpaceInfo &spaceInfo, uint64_t address, uint64_t byteWidth, uint64_t count, const iris::IrisValueMap &attrib, iris::MemoryReadResult &result);
```

```cpp
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultMemoryReadDelegate<readMemory>();
builder->addMemorySpace(...); // Uses readMemory
```

**Template Parameters**

- `FUNC`: A memory read delegate function.

7.5.2.12 setDefaultMemoryWriteDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setDefaultMemoryWriteDelegate (MemoryWriteDelegate delegate = MemoryWriteDelegate()) [inline]
```

Set the default write function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using

```cpp
addMemorySpace(...) .setWriteDelegate(...)```

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns Eˌnot_implemented for all requests.

Usage: Pass an instance of class T, where T::METHOD() is a memory read method:
class MyClass
{
    ...
    iris::IrisErrorCode writeMemory(const iris::MemorySpaceInfo &spaceInfo, uint64_t address,
        uint64_t byteWidth, uint64_t count,
        const iris::IrisValueMap &attrib,
        const uint64_t *data,
        iris::MemoryWriteResult &result);
};
MyClass myInstanceOfMyClass;
iris::MemoryReadDelegate delegate =
    iris::MemoryWriteDelegate::make<MyClass, &MyClass::writeMemory>(myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultMemoryWriteDelegate(delegate);
builder->addMemorySpace(...); // Uses writeMemory

Parameters

delegate | Delegate object which will be called to write memory.

7.5.2.13 setDefaultMemoryWriteDelegate() [2/3]

template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t,
    const AttributeValueMap &, const uint64_t *, MemoryWriteResult &) METHOD>
void iris::IrisInstanceBuilder::setDefaultMemoryWriteDelegate (T * instance) [inline]

Set the default write function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using

addMemorySpace(...).setWriteDelegate(...)  

will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns E_not_implemented for all requests.

Usage: Pass an instance of class T, where T::METHOD() is a memory read method:

class MyClass
{
    ...
    iris::IrisErrorCode writeMemory(const iris::MemorySpaceInfo &spaceInfo, uint64_t address,
        uint64_t byteWidth, uint64_t count,
        const iris::IrisValueMap &attrib,
        const uint64_t *data,
        iris::MemoryWriteResult &result);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultMemoryWriteDelegate<MyClass, &MyClass::writeMemory>(myInstanceOfMyClass);
builder->addMemorySpace(...); // Uses writeMemory

Generated by Doxygen
Template Parameters

<table>
<thead>
<tr>
<th>$T$</th>
<th>Class that defines a memory read delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a memory read delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

7.5.2.14 setDefaultMemoryWriteDelegate() [3/3]

```
template<
    template<
        IrisErrorCode(∗)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t ∗, MemoryWriteResult &) FUNC
    >

void iris::IrisInstanceBuilder::setDefaultMemoryWriteDelegate ( ) [inline]
```

Set default write function for all subsequently added memory spaces.

Memory spaces that do not explicitly override the access function using `addMemorySpace(...).setWriteDelegate(...)` will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns `E←not_implemented` for all requests.

Usage: Pass an instance of class T, where T::METHOD() is a memory read method:

```
iris::IrisErrorCode writeMemory(const iris::MemorySpaceInfo &spaceInfo, uint64_t address, uint64_t byteWidth, uint64_t count, const iris::IrisValueMap &attrib, const uint64_t ∗data, iris::MemoryWriteResult &result);
```

iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultMemoryWriteDelegate<writeMemory>();
builder->addMemorySpace(...); // Uses writeMemory

Template Parameters

| FUNC | Global function to call to write memory. |

7.5.2.15 setPropertyCanonicalMsnScheme()  

```
void iris::IrisInstanceBuilder::setPropertyCanonicalMsnScheme ( const std::string & canonicalMsnScheme )
```

Generated by Doxygen
Set the memory.canonicalMsnScheme instance property.

This property is visible in the list of properties returned by instance_getProperties().

This property defines the scheme used by the 'canonicalMsn' member of the MemorySpaceInfo object. The default is 'arm.com/memoryspaces' which is used by all Arm components. This default can be overridden by calling this function. This should be called upon initialisation, before other instances have a chance to call instance_getProperties().

Parameters

| canonicalMsnScheme | Name of the canonical memory space number scheme used by this instance. |
7.6 IrisInstanceBuilder image loading APIs

Set up image-loading delegates.

### Functions

- **void iris::IrisInstanceBuilder::setLoadImageDataDelegate (ImageLoadDataDelegate delegate=ImageLoadDataDelegate())**
  
  Set the delegate to load an image from the data provided.

- **template<typename T, IrisErrorCode(T::*)(const std::vector<uint64_t>&, uint64_t) METHOD> void iris::IrisInstanceBuilder::setLoadImageDataDelegate (T* instance)**
  
  Set the delegate to load an image from the data provided.

- **void iris::IrisInstanceBuilder::setLoadImageDataDelegate ()**
  
  Set the delegate to load an image from the data provided.

- **void iris::IrisInstanceBuilder::setLoadImageFileDelegate (ImageLoadFileDelegate delegate=ImageLoadFileDelegate())**
  
  Set the delegate to load an image from a file.

- **template<typename T, IrisErrorCode(T::*)(const std::string&) METHOD> void iris::IrisInstanceBuilder::setLoadImageFileDelegate (T* instance)**
  
  Set the delegate to load an image from a file.

- **template<typename T, IrisErrorCode(T::*)(const std::string&) FUNC> void iris::IrisInstanceBuilder::setLoadImageFileDelegate ()**
  
  Set the delegate to load an image from a file.

7.6.1 Detailed Description

Set up image-loading delegates.

7.6.2 Function Documentation

7.6.2.1 setLoadImageDataDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setLoadImageDataDelegate (
    ImageLoadDataDelegate delegate = ImageLoadDataDelegate() ) [inline]
```

Set the delegate to load an image from the data provided.

Passing an empty delegate (the default argument) restores the default implementation which always returns E←not_implemented for all requests.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode loadImageData(const std::vector<uint64_t>& data, uint64_t dataSizeInBytes);
};

MyClass myInstanceOfMyClass;
iris::MemoryAddressTranslateDelegate delegate =
    iris::MemoryAddressTranslateDelegate::make<MyClass, &MyClass::loadImageData>(&myInstanceOfMyClass);
iris::IrisInstanceBuilder builder = myIrisInstance.getBuilder();
builder->setLoadImageDataDelegate(delegate);
```
Parameters

| delegate | Delegate object to call for image loading. |

### 7.6.2.2 setLoadImageDataDelegate() [2/3]

\[
\text{template}<\text{typename } T, \text{iris::ErrorCallback}(T::*)(\text{const std::vector<}\text{uint64}_t &, \text{uint64}_t) \text{METHOD}> \\
void \text{iris::IrisInstanceBuilder::setLoadImageDataDelegate} ( \\
\quad T * \text{instance}) [\text{inline}] \\
\]

Set the delegate to load an image from the data provided.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode loadImageData(const std::vector<uint64_t> &data, uint64_t dataSizeInBytes);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setLoadImageDataDelegate<MyClass, &MyClass::loadImageData>(&myInstanceOfMyClass);
```

**Template Parameters**

| T | Class that defines an image-loading delegate method. |
| METHOD | A method of class T which is an image-loading delegate. |

**Parameters**

| instance | An instance of class T on which METHOD should be called. |

### 7.6.2.3 setLoadImageDataDelegate() [3/3]

\[
\text{template}<\text{iris::ErrorCallback}(*)(\text{const std::vector<}\text{uint64}_t &, \text{uint64}_t) \text{FUNC}> \\
void \text{iris::IrisInstanceBuilder::setLoadImageDataDelegate} ( ) [\text{inline}] \\
\]

Set the delegate to load an image from the data provided.

Usage:

```cpp
iris::IrisErrorCode loadImageData(const std::vector<uint64_t> &data, uint64_t dataSizeInBytes);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setLoadImageDataDelegate(&loadImageData());
```
Template Parameters

| FUNC | Global function to call for image loading. |

### 7.6.2.4 `setLoadImageFileDelegate()` [1/3]

```cpp
void iris::IrisInstanceBuilder::setLoadImageFileDelegate (ImageLoadFileDelegate delegate = ImageLoadFileDelegate()) [inline]
```

Set the delegate to load an image from a file.

Passing an empty delegate (the default argument) restores the default implementation which always returns `E←not_implemented` for all requests.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode loadImageFile(const std::string &path);
};
MyClass myInstanceOfMyClass;
iris::MemoryAddressTranslateDelegate delegate = iris::MemoryAddressTranslateDelegate::make<MyClass, &MyClass::loadImageFile>(&myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setLoadImageFileDelegate(delegate);
```

Parameters

| delegate | Delegate object to call for image loading. |

### 7.6.5 `setLoadImageFileDelegate()` [2/3]

```cpp
template<typename T, IrisErrorCode(T::*)(const std::string &)> METHOD
void iris::IrisInstanceBuilder::setLoadImageFileDelegate (T * instance) [inline]
```

Set the delegate to load an image from a file.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode loadImageFile(const std::string &path);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setLoadImageFileDelegate<MyClass, &MyClass::loadImageFile>(&myInstanceOfMyClass);
```
Template Parameters

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Class that defines an image-loading delegate method.</td>
</tr>
<tr>
<td>METHOD</td>
<td>A method of class T which is an image-loading delegate.</td>
</tr>
</tbody>
</table>

Parameters

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>instance</td>
<td>An instance of class T on which METHOD should be called.</td>
</tr>
</tbody>
</table>

7.6.2.6 setLoadImageFileDelegate()

```
template< IrisErrorCode (*)(const std::string &) FUNC >
void iris::IrisInstanceBuilder::setLoadImageFileDelegate ( ) [inline]
```

Set the delegate to load an image from a file.

Usage:

```cpp
class IrisErrorCode
iris::IrisErrorCode loadImageFile(const std::string &path);
```

iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setLoadImageFileDelegate<&loadImageFile>();

Template Parameters

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FUNC</td>
<td>Global function to call for image loading.</td>
</tr>
</tbody>
</table>
7.7 IrisInstanceBuilder image readData callback APIs.

Open images for reading.

Functions

- `uint64_t iris::IrisInstanceBuilder::openImage (const std::string &filename)`
  
  Open an image to be read using `image_loadDataPull()` or `image_loadDataRead()`.

7.7.1 Detailed Description

Open images for reading.

7.7.2 Function Documentation

7.7.2.1 openImage()

```
uint64_t iris::IrisInstanceBuilder::openImage (const std::string & filename) [inline]
```

Open an image to be read using `image_loadDataPull()` or `image_loadDataRead()`.

Parameters

| filename | The name of the file to be read. |

Returns

The tag number to use when calling `image_loadDataPull()`.
7.8 IrisInstanceBuilder execution stepping APIs

Set up delegates to set and get the step count and the remaining steps.

**Functions**

- void `iris::IrisInstanceBuilder::setRemainingStepGetDelegate (RemainingStepGetDelegate delegate)`
  
  
  _Set the delegate to get the remaining steps for this instance._

- template<typename T, IrisErrorCode(T::)(uint64_t & const std::string & METHOD>
  void `iris::IrisInstanceBuilder::setRemainingStepGetDelegate (T *instance)`
  
  _Set the delegate to get the remaining steps for this instance._

- template<IrisErrorCode(+)uint64_t & const std::string & FUNC>
  void `iris::IrisInstanceBuilder::setRemainingStepGetDelegate ()`
  
  _Set the delegate to get the remaining steps for this instance._

- void `iris::IrisInstanceBuilder::setRemainingStepSetDelegate (RemainingStepSetDelegate delegate=RemainingStepSetDelegate())`
  
  _Set the delegate to set the remaining steps for this instance._

- template<typename T, IrisErrorCode(T::)(uint64_t const std::string & METHOD>
  void `iris::IrisInstanceBuilder::setRemainingStepSetDelegate (T *instance)`
  
  _Set the delegate to set the remaining steps for this instance._

- template<IrisErrorCode(+)uint64_t const std::string & FUNC>
  void `iris::IrisInstanceBuilder::setRemainingStepSetDelegate ()`
  
  _Set the delegate to set the remaining steps for this instance._

- void `iris::IrisInstanceBuilder::setStepCountGetDelegate (StepCountDelegate delegate=StepCountDelegate())`
  
  _Set the delegate to get the step count for this instance._

- template<typename T, IrisErrorCode(T::)(uint64_t & const std::string & METHOD>
  void `iris::IrisInstanceBuilder::setStepCountGetDelegate (T *instance)`
  
  _Set the delegate to get the step count for this instance._

- template<IrisErrorCode(+)uint64_t & const std::string & FUNC>
  void `iris::IrisInstanceBuilder::setStepCountGetDelegate ()`
  
  _Set the delegate to get the step count for this instance._

### 7.8.1 Detailed Description

Set up delegates to set and get the step count and the remaining steps.

### 7.8.2 Function Documentation
7.8.2.1 setRemainingStepGetDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setRemainingStepGetDelegate ( RemainingStepGetDelegate delegate ) [inline]
```

Set the delegate to get the remaining steps for this instance.

Passing an empty delegate (the default argument) restores the default implementation which always returns E←not_implemented for all requests.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode getRemainingSteps(uint64_t &steps, const std::string &unit);
};
MyClass myInstanceOfMyClass;
iris::RemainingStepGetDelegate delegate =
    iris::RemainingStepGetDelegate::make<MyClass, &MyClass::getRemainingSteps>(&myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setRemainingStepGetDelegate(delegate);
```

Parameters

| delegate | Delegate object to call to get the remaining steps. |

7.8.2.2 setRemainingStepGetDelegate() [2/3]

```cpp
template<
    typename T ,
    IrisErrorCode(T::*)(uint64_t &, const std::string &) METHOD
>
void iris::IrisInstanceBuilder::setRemainingStepGetDelegate ( T * instance ) [inline]
```

Set the delegate to get the remaining steps for this instance.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode getRemainingSteps(uint64_t &steps, const std::string &unit);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setRemainingStepGetDelegate<MyClass, &MyClass::getRemainingSteps>(&myInstanceOfMyClass);
```

Template Parameters

| T | Class that defines a get remaining steps delegate method. |
| METHOD | A method of class T that is a get remaining steps delegate. |
Parameters

| instance | An instance of class T on which METHOD should be called. |

7.8.2.3 setRemainingStepGetDelegate() [3/3]

```cpp
template<iris::IrisErrorCode(*FUNC)(uint64_t &, const std::string &)> 
void iris::IrisInstanceBuilder::setRemainingStepGetDelegate ( ) [inline]
```

Set the delegate to get the remaining steps for this instance.

Usage:

```cpp
iris::IrisErrorCode getRemainingSteps(uint64_t &steps, const std::string &unit);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setRemainingStepGetDelegate<&getRemainingSteps>();
```

Template Parameters

| FUNC | Global function to call to get the remaining steps. |

7.8.2.4 setRemainingStepSetDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setRemainingStepSetDelegate ( 
    RemainingStepSetDelegate delegate = RemainingStepSetDelegate() ) [inline]
```

Set the delegate to set the remaining steps for this instance.

Passing an empty delegate (the default argument) restores the default implementation which always returns `E←not_implemented` for all requests.

Usage:

```cpp
class MyClass
    ...
    iris::IrisErrorCode setRemainingSteps(uint64_t steps, const std::string &unit);
    
MyClass myInstanceOfMyClass;
iris::RemainingStepSetDelegate delegate = iris::RemainingStepSetDelegate::make<MyClass, 4MyClass::setRemainingSteps>(myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setRemainingStepSetDelegate(delegate);
```
7.8.2.5 setRemainingStepSetDelegate() [2/3]

template<typename T, IrisErrorCode(T::*)(uint64_t, const std::string &)> METHOD>
void iris::IrisInstanceBuilder::setRemainingStepSetDelegate ( 
    T * instance ) [inline]

Set the delegate to set the remaining steps for this instance.

Usage:

class MyClass
{...
    iris::IrisErrorCode setRemainingSteps(uint64_t steps, const std::string &unit);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setRemainingStepSetDelegate<MyClass, &MyClass::setRemainingSteps>(myInstanceOfMyClass);

Template Parameters

| T | Class that defines a set remaining steps delegate method. |
| METHOD | A method of class T that is a set remaining steps delegate. |

Parameters

| instance | An instance of class T on which METHOD should be called. |

7.8.2.6 setRemainingStepSetDelegate() [3/3]

template<IrisErrorCode(*)(uint64_t, const std::string &)> FUNC>
void iris::IrisInstanceBuilder::setRemainingStepSetDelegate ( ) [inline]

Set the delegate to set the remaining steps for this instance.

Usage:

iris::IrisErrorCode setRemainingSteps(uint64_t steps, const std::string &unit);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setRemainingStepSetDelegate<setRemainingSteps>();
7.8 IrisInstanceBuilder execution stepping APIs

Template Parameters

| FUNC | Global function to call to set the remaining steps. |

7.8.2.7 setStepCountGetDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setStepCountGetDelegate (
    StepCountGetDelegate delegate = StepCountGetDelegate() ) [inline]
```

Set the delegate to get the step count for this instance.

Passing an empty delegate (the default argument) restores the default implementation which always returns `E←not_implemented` for all requests.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode getStepCount(uint64_t &count, const std::string &unit);
};
MyClass myInstanceOfMyClass;
iris::IrisStepCountGetDelegate delegate =
    iris::IrisStepCountGetDelegate::make<MyClass, &MyClass::getStepCount>(&myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setStepCountGetDelegate(delegate);
```

Parameters

| delegate | Delegate object to call to get the step count. |

7.8.2.8 setStepCountGetDelegate() [2/3]

```cpp
template<typename T , IrisErrorCode(T::*)[uint64_t &, const std::string &] METHOD>
void iris::IrisInstanceBuilder::setStepCountGetDelegate ( 
    T * instance ) [inline]
```

Set the delegate to get the step count for this instance.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode getStepCount(uint64_t &count, const std::string &unit);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setStepCountGetDelegate<MyClass, &MyClass::getStepCount>(&myInstanceOfMyClass);
```
Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a get step count delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a get step count delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

7.8.2.9 `setStepCountGetDelegate()` [3/3]

```cpp
template<IrisErrorCode(*)(uint64_t &, const std::string &)> FUNC>
void iris::IrisInstanceBuilder::setStepCountGetDelegate() [inline]
```

Set the delegate to get the step count for this instance.

Usage:

```cpp
iris::IrisErrorCode getStepCount(uint64_t &count, const std::string &unit);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setStepCountGetDelegate<&getStepCount>();
```

Template Parameters

| FUNC | Global function to call to get the step count. |
7.9 Disassembler delegate functions

Set disassembler delegates.

Classes

- class iris::IrisInstanceDisassembler
  
  Disassembler add-on for IrisInstance.

TypeDefs

- typedef IrisDelegate< const std::vector<uint64_t> &, uint64_t, const std::string &, DisassembleContext &, DisassemblyLine & > iris::DisassembleOpcodeDelegate
  
  Get the disassembly for an individual opcode.

- typedef IrisDelegate< std::string & > iris::GetCurrentDisassemblyModeDelegate
  
  Get the current disassembly mode.

- typedef IrisDelegate< uint64_t, const std::string &, MemoryReadResult &, uint64_t, uint64_t, std::vector<DisassemblyLine> & > iris::GetDisassemblyDelegate
  
  Get the disassembly of a chunk of memory.

Functions

- void iris::IrisInstanceDisassembler::addDisassemblyMode (const std::string &name, const std::string &description)
  
  Add a disassembly mode.

- void iris::IrisInstanceDisassembler::attachTo (IrisInstance *irisInstance)
  
  Attach this IrisInstance add-on to a specific IrisInstance.

- iris::IrisInstanceDisassembler::IrisInstanceDisassembler (IrisInstance *irisInstance=nullptr)
  
  Construct an IrisInstanceDisassembler.

- void iris::IrisInstanceDisassembler::setDisassembleOpcodeDelegate (DisassembleOpcodeDelegate delegate)
  
  Set the delegate to get the disassembly of Opcode.

- void iris::IrisInstanceDisassembler::setGetCurrentModeDelegate (GetCurrentDisassemblyModeDelegate delegate)
  
  Set the delegate to get the current disassembly mode.

- void iris::IrisInstanceDisassembler::setGetDisassemblyDelegate (GetDisassemblyDelegate delegate)
  
  Set the delegate to get the disassembly of a chunk of memory.

7.9.1 Detailed Description

Set disassembler delegates.

7.9.2 Typedef Documentation
7.9.2.1 DisassembleOpcodeDelegate

typedef IrisDelegate<const std::vector<uint64_t> &, uint64_t, const std::string &, DisassembleContext &, DisassemblyLine &> iris::DisassembleOpcodeDelegate

Get the disassembly for an individual opcode.

IrisErrorCode disassembleOpcode(const std::vector<uint64_t> &opcode, uint64_t address, const std::string &mode, DisassembleContext &context, DisassemblyLine &disassemblyLineOut)

Error: Return E_* error code if it failed to disassemble.

7.9.2.2 GetCurrentDisassemblyModeDelegate

typedef IrisDelegate<std::string &> iris::GetCurrentDisassemblyModeDelegate

Get the current disassembly mode.

IrisErrorCode getCurrentMode(std::string &currentMode)

Error: Return E_* error code if it failed to get the current mode.

7.9.2.3 GetDisassemblyDelegate

typedef IrisDelegate<uint64_t, const std::string &, MemoryReadResult &, uint64_t, uint64_t, std::vector<DisassemblyLine> &> iris::GetDisassemblyDelegate

Get the disassembly of a chunk of memory.

IrisErrorCode getDisassembly(uint64_t address, const std::string &mode, MemoryReadResult &memoryReadData, uint64_t count, uint64_t maxAddr, std::vector<DisassemblyLine> &disassemblyLineOut)

Error: Return E_* error code if it failed to disassemble.

7.9.3 Function Documentation

7.9.3.1 addDisassemblyMode()

void iris::IrisInstanceDisassembler::addDisassemblyMode (const std::string & name, const std::string & description)

Add a disassembly mode.

This function should only be called during the initial setup of the instance, after which the list of disassembly modes should be static.
7.9 Disassembler delegate functions

### Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Description of the mode being added.</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td>Description of the mode being added.</td>
</tr>
</tbody>
</table>

#### 7.9.3.2 attachTo()

```c++
void iris::IrisInstanceDisassembler::attachTo (irisInstance ∗irisInstance)
```

Attach this `IrisInstance` add-on to a specific `IrisInstance`.

**Parameters**

| irisInstance | The `IrisInstance` to attach to. |

#### 7.9.3.3 IrisInstanceDisassembler()

```c++
iris::IrisInstanceDisassembler::IrisInstanceDisassembler (irisInstance ∗irisInstance = nullptr)
```

Construct an `IrisInstanceDisassembler`.

**Parameters**

| irisInstance | `IrisInstance` to attach this add-on to. |

#### 7.9.3.4 setDisassembleOpcodeDelegate()

```c++
void iris::IrisInstanceDisassembler::setDisassembleOpcodeDelegate (DisassembleOpcodeDelegate delegate) [inline]
```

Set the delegate to get the disassembly of Opcode.

**Parameters**

| delegate | Delegate object that will be called to get the disassembly of an opcode. |
7.9.3.5 setGetCurrentModeDelegate()

void iris::IrisInstanceDisassembler::setGetCurrentModeDelegate (  
    GetCurrentDisassemblyModeDelegate delegate ) [inline]

Set the delegate to get the current disassembly mode.

Parameters

| delegate | Delegate object that will be called to get the current disassembly mode. |

7.9.3.6 setGetDisassemblyDelegate()

void iris::IrisInstanceDisassembler::setGetDisassemblyDelegate (  
    GetDisassemblyDelegate delegate ) [inline]

Set the delegate to get the disassembly of a chunk of memory.

Parameters

| delegate | Delegate object that will be called to get the disassembly of a chunk of memory. |
7.10  Semihosting data request flag constants

Flags used to define the behavior of the readData() method.

Variables

- static const uint64_t iris::semihost::BLOCK = (0 << 1)
  Block until enough data has been provided based on the specified size hint.
- static const uint64_t iris::semihost::COOKED = (0 << 0)
  Request that the client sends data when the user presses the return key.
- static const uint64_t iris::semihost::DEFAULT = COOKED | BLOCK | EMIT_EVENT
  The default flags used if none are specified.
- static const uint64_t iris::semihost::EMIT_EVENT = (0 << 2)
  If the buffer is empty, emit an event to request input.
- static const uint64_t iris::semihost::NO_EVENT = (1 << 2)
  Do not request input. Return only the data currently buffered.
- static const uint64_t iris::semihost::NONBLOCK = (1 << 1)
  Do not block if sufficient data is not available.
- static const uint64_t iris::semihost::RAW = (1 << 0)
  Request that the client sends data to the model as soon as it is available.

7.10.1  Detailed Description

Flags used to define the behavior of the readData() method.

7.10.2  Variable Documentation

7.10.2.1  BLOCK

const uint64_t iris::semihost::BLOCK = (0 << 1) [static]

Block until enough data has been provided based on the specified size hint.

Remarks

While the function blocks, Iris messages to all instances continue to be processed.
Chapter 8

Class Documentation

8.1 iris::IrisInstanceBuilder::AddressTranslationBuilder Class Reference

Used to set metadata for an address translation.
#include <IrisInstanceBuilder.h>

Public Member Functions

- AddressTranslationBuilder (IrisInstanceMemory::AddressTranslationInfoAndAccess &info_)
- AddressTranslationBuilder & setTranslateDelegate (MemoryAddressTranslateDelegate delegate)
  Set the delegate to perform an address translation.
- template<typename T , IrisErrorCode(T::*)(uint64_t, uint64_t, uint64_t, MemoryAddressTranslationResult &) METHOD>
  AddressTranslationBuilder & setTranslateDelegate (T *instance)
  Set the delegate to perform an address translation.
- template<IrisErrorCode(*)(uint64_t, uint64_t, uint64_t, MemoryAddressTranslationResult &) FUNC>
  AddressTranslationBuilder & setTranslateDelegate ()
  Set the delegate to perform an address translation.

8.1.1 Detailed Description

Used to set metadata for an address translation.

8.1.2 Member Function Documentation

8.1.2.1 setTranslateDelegate() [1/3]

AddressTranslationBuilder& iris::IrisInstanceBuilder::AddressTranslationBuilder::setTranslateDelegate (MemoryAddressTranslateDelegate delegate) [inline]

Set the delegate to perform an address translation.
If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultAddressTranslationDelegate
Parameters

| delegate | MemoryAddressTranslateDelegate object |

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.1.2.2 setTranslateDelegate() [2/3]

```cpp
template<typename T, IrisErrorCode(T::*)(uint64_t, uint64_t, uint64_t, MemoryAddressTranslationResult&) METHOD>
AddressTranslationBuilder& iris::IrisInstanceBuilder::AddressTranslationBuilder::setTranslateDelegate(
    T * instance ) [inline]
```

Set the delegate to perform an address translation.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultAddressTranslationDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a memory address translation delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A memory address translation delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.1.2.3 setTranslateDelegate() [3/3]

```cpp
template<IrisErrorCode(*)(uint64_t, uint64_t, uint64_t, MemoryAddressTranslationResult&) FU->NC>
AddressTranslationBuilder& iris::IrisInstanceBuilder::AddressTranslationBuilder::setTranslateDelegate( ) [inline]
```

Set the delegate to perform an address translation.

If this is not set, the default delegate is used.
Contains static address translation information.

```cpp
#include <IrisInstanceMemory.h>
```

### Public Member Functions

- `AddressTranslationInfoAndAccess` (MemorySpaceId inSpaceId, MemorySpaceId outSpaceId, const std::string &description)

### Public Attributes

- `MemoryAddressTranslateDelegate translateDelegate`
- `MemorySupportedAddressTranslationResult translationInfo`

#### 8.2.1 Detailed Description

Contains static address translation information.

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

- `IrisInstanceMemory.h`

### 8.3 iris::IrisInstanceBuilder::EventSourceBuilder Class Reference

Used to set metadata on an EventSource.

```cpp
#include <IrisInstanceBuilder.h>
```
Public Member Functions

- **EventSourceBuilder & addEnumElement (uint64_t value, const std::string &symbol, const std::string &description="")**
  Add an enum element for the last field added.
- **EventSourceBuilder & addField (const std::string &name, const std::string &type, uint64_t size, const std::string &description)**
  Add a field to this event source.
- **EventSourceBuilder (IrisInstanceEvent::EventSourceInfoAndDelegate &info_)**
- **EventSourceBuilder & setCounter (bool counter=true)**
  Set the counter field.
- **EventSourceBuilder & setDescription (const std::string &descr)**
  Set the descr field.
- **EventSourceBuilder & setEventStreamCreateDelegate (EventStreamCreateDelegate delegate)**
  Set the delegate to create an event stream.
- **EventSourceBuilder & setFormat (const std::string &format)**
  Set the format field.
- **EventSourceBuilder & setHidden (bool hidden=true)**
  Hide/unhide this event source.
- **EventSourceBuilder & setName (const std::string &name)**
  Set the name field.
- **EventSourceBuilder & setRingBuffer (bool ringBuffer=true)**
  Set the ringBuffer field.

8.3.1 Detailed Description

Used to set metadata on an EventSource.

8.3.2 Member Function Documentation

8.3.2.1 addEnumElement()

```cpp
EventSourceBuilder iris::IrisInstanceBuilder::EventSourceBuilder::addEnumElement (  
   uint64_t value,  
   const std::string & symbol,  
   const std::string & description = "") [inline]
```

Add an enum element for the last field added.

This must be called after addField().

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the enum element.</td>
</tr>
<tr>
<td>symbol</td>
<td>The symbol string that will be displayed instead of the value.</td>
</tr>
<tr>
<td>description</td>
<td>A human readable description of this enum.</td>
</tr>
</tbody>
</table>
Returns

A reference to this `EventSourceBuilder` object allowing calls to be chained together.

### 8.3.2.2 `addField()`

```cpp
EventSourceBuilder& iris::IrisInstanceBuilder::EventSourceBuilder::addField (  
    const std::string & name,  
    const std::string & type,  
    uint64_t size,  
    const std::string & description ) [inline]
```

Add a field to this event source.

This method constructs an `EventSourceFieldInfo` object and adds it to the EventSource. It should be called multiple times to add multiple fields.

Parameters

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>name</td>
<td>The name of the field.</td>
</tr>
<tr>
<td>type</td>
<td>The type of the field.</td>
</tr>
<tr>
<td>size</td>
<td>The size of the field in bytes.</td>
</tr>
<tr>
<td>description</td>
<td>A human readable description of the field.</td>
</tr>
</tbody>
</table>

Returns

A reference to this `EventSourceBuilder` object allowing calls to be chained together.

### 8.3.2.3 `setCounter()`

```cpp
EventSourceBuilder& iris::IrisInstanceBuilder::EventSourceBuilder::setCounter (  
    bool counter = true ) [inline]
```

Set the `counter` field.

Parameters

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>counter</td>
<td>The counter field of the EventSourceInfo object.</td>
</tr>
</tbody>
</table>

Returns

A reference to this `EventSourceBuilder` object allowing calls to be chained together.
8.3.2.4 setDescription()

```cpp
EventSourceBuilder& iris::IrisInstanceBuilder::EventSourceBuilder::setDescription (const std::string & descr) [inline]
```

Set the `descr` field.

**Parameters**

| descr | The descr field of the EventSourceInfo object. |

**Returns**

A reference to this `EventSourceBuilder` object allowing calls to be chained together.

8.3.2.5 setEventStreamCreateDelegate() [1/2]

```cpp
EventSourceBuilder& iris::IrisInstanceBuilder::EventSourceBuilder::setEventStreamCreateDelegate (EventStreamCreateDelegate delegate) [inline]
```

Set the delegate to create an event stream.

If this is not set, the default delegate is used.

**See also**

`IrisInstanceBuilder::setDefaultEsCreateDelegate`

**Parameters**

| delegate | EventStreamCreateDelegate object. |

**Returns**

A reference to this `EventSourceBuilder` object allowing calls to be chained together.

8.3.2.6 setEventStreamCreateDelegate() [2/2]

```cpp
template<typename T, IrisErrorCode(T::*)(EventStream *, const EventSourceInfo &, const std::vector<std::string> &) METHOD>
EventSourceBuilder& iris::IrisInstanceBuilder::EventSourceBuilder::setEventStreamCreateDelegate (T * instance) [inline]
```

Set the delegate to create an event stream.

If this is not set, the default delegate is used.
8.3 iris::IrisInstanceBuilder::EventSourceBuilder Class Reference

See also

IrisInstanceBuilder::setDefaultEsCreateDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be an event stream creation method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>An event stream creation delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this EventSourceBuilder object allowing calls to be chained together.

8.3.2.7 setFormat()

EventSourceBuilder& iris::IrisInstanceBuilder::EventSourceBuilder::setFormat (const std::string & format) [inline]

Set the format field.

Parameters

| format | The format field of the EventSourceInfo object. |

Returns

A reference to this EventSourceBuilder object allowing calls to be chained together.

8.3.2.8 setHidden()

EventSourceBuilder& iris::IrisInstanceBuilder::EventSourceBuilder::setHidden (bool hidden = true) [inline]

Hide/unhide this event source.

Parameters

| hidden | If true, this event source is not listed in event_getEventSources() calls but can still be accessed by event_getEventSource() for clients that know the event source's name. |
Returns

A reference to this EventSourceBuilder object allowing calls to be chained together.

8.3.2.9 setName()

EventSourceBuilder iris::IrisInstanceBuilder::EventSourceBuilder::setName (const std::string & name) [inline]

Set the name field.

Parameters

| name   | The name field of the EventSourceInfo object. |

Returns

A reference to this EventSourceBuilder object allowing calls to be chained together.

8.3.2.10 setRingBuffer()

EventSourceBuilder iris::IrisInstanceBuilder::EventSourceBuilder::setRingBuffer (bool ringBuffer = true) [inline]

Set the ringBuffer field.

Parameters

| ringBuffer | The ringBuffer field of the EventSourceInfo object. |

Returns

A reference to this EventSourceBuilder object allowing calls to be chained together.

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

- IrisInstanceBuilder.h

8.4 iris::IrisInstanceEvent::EventSourceInfoAndDelegate Struct Reference

Contains the metadata and delegates for a single EventSource.

#include <IrisInstanceEvent.h>
Public Attributes

- EventStreamCreateDelegate createEventStream
- EventSourceInfo info

8.4.1 Detailed Description

Contains the metadata and delegates for a single EventSource.

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

- IrisInstanceEvent.h

8.5 iris::EventStream Class Reference

Base class for event streams.

#include <IrisInstanceEvent.h>

Inherited by iris::IrisEventStream.

Public Member Functions

- void addField (const IrisU64StringConstant &field, uint64_t value)
  Add a uint field value.
- void addField (const IrisU64StringConstant &field, int64_t value)
  Add a sint field value.
- void addField (const IrisU64StringConstant &field, bool value)
  Add a boolean field value.
- template<class T>
  void addField (const IrisU64StringConstant &field, const T &value)
  Add a field value.
- void addFieldSlow (const std::string &field, uint64_t value)
  Add a uint field value.
- void addFieldSlow (const std::string &field, int64_t value)
  Add a sint field value.
- void addFieldSlow (const std::string &field, bool value)
  Add a boolean field value.
- template<class T>
  void addFieldSlow (const std::string &field, const T &value)
  Add a field value.
- bool checkRangePc (uint64_t pc) const
  Check the range for the PC.
- virtual IrisErrorCode disable ()=0
  Disable this event stream.
- void emitEventBegin (IrisRequest &req, uint64_t time, uint64_t pc=IRIS_UINT64_MAX)
  Start to emit an event callback.
- void emitEventBegin (uint64_t time, uint64_t pc=IRIS_UINT64_MAX)
  Start to emit an event callback.
Start to emit an event callback.

- void **emitEventEnd** (bool send=true)
  Emit the callback.
- virtual IrisErrorCode **enable** ()=0
  Enable this event stream.
- **EventStream** ()
  Construct a new event stream.
- **uint64_t getCountVal** () const
  Get the current value of the counter.
- **InstanceId getEcInstId** () const
  Get the event callback instance id for this event stream.
- virtual IrisErrorCode **getState** (IrisValueMap &fields)
  Query the current state of the event.
- bool **isCounter** () const
  Is this event stream a counter.
- bool **isEnabled** () const
  Is this event stream currently enabled.
- void **selfRelease** ()
  Trigger the event stream to be released.
- void **setCounter** (uint64_t startVal, const EventCounterMode &counterMode)
  Set the counter mode and starting value for this event stream.
- void **setProperties** (IrisAdmin *irisInstance, const EventSourceInfo *srcInfo, InstanceId ecInstId, const std::string &ecFunc, EventStreamId esId, bool syncEc)
  Initialize this event stream.
- IrisErrorCode **setRanges** (const std::string &aspect, const std::vector<uint64_t> &ranges)
  Set the trace ranges for this event stream.

**Protected Attributes**

- std::string **aspect**
  — members for range —
- bool **aspectFound**
  Found aspect in one of the fields.
- bool **counter**
  — members for a counter —
- EventCounterMode **counterMode**
  Specified counter mode.
- **uint64_t curAspectValue**
  The current aspect value.
- **uint64_t curVal**
- std::string **ecFunc**
  The event callback function name specified by eventEnable().
- InstanceId **ecInstId**
  Specify target instance that this event is sent to.
- bool **enabled**
  Event is only generated when the event stream is enabled.
- EventStreamId **esId**
  The event stream id.
- IrisU64JsonWriter::Object **fieldObj**
- IrisRequest * **internal_req**
- IrisInstance * irisInstance
  — basic members —
- std::vector<uint64_t> ranges
- IrisRequest * req
  Generate callback requests.
- const EventSourceInfo * srcInfo
  The event source info.
- uint64_t startVal
  Start value and current value for a counter.
- bool syncEc
  Synchronous callback behavior.

8.5.1 Detailed Description

Base class for event streams.

This class is abstract as it is not known how to enable or disable an event for a simulation.

8.5.2 Member Function Documentation

8.5.2.1 addField() [1/4]

```cpp
void iris::EventStream::addField (  
    const IrisU64StringConstant & field,  
    uint64_t value ) [inline]
```

Add a uint field value.

Fast variant for argument names up to 23 chars. Use this if you can. This will also record the aspect value if the aspect of range check is set.

Parameters

| field | The name of the field whose value is set. |
| value | The value of the field. |

8.5.2.2 addField() [2/4]

```cpp
void iris::EventStream::addField (  
    const IrisU64StringConstant & field,  
    int64_t value ) [inline]
```

Add a sint field value.
Fast variant for argument names up to 23 chars. Use this if you can. This will also record the aspect value if the aspect of range check is set.
Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>

### 8.5.2.3 addField() [3/4]

```cpp
void iris::EventStream::addField (  
    const IrisU64StringConstant & field,  
    bool value ) [inline]
```

Add a boolean field value.

Fast variant for argument names up to 23 chars. Use this if you can. This will also record the aspect value if the aspect of range check is set.

Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>

### 8.5.2.4 addField() [4/4]

```cpp
template<class T >  
void iris::EventStream::addField (  
    const IrisU64StringConstant & field,  
    const T & value ) [inline]
```

Add a field value.

This is supported for all types supported by IrisU64JsonWriter and IrisObjects.h. Fast variant for argument names up to 23 chars. Use this if you can.

Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>

### 8.5.2.5 addFieldSlow() [1/4]

```cpp
void iris::EventStream::addFieldSlow (  
    const std::string & field,  
    uint64_t value ) [inline]
```

Generated by Doxygen
Add a uint field value.

Slow variant for argument names with more than 23 chars. Do not use unless you have to. This will also record the aspect value if the aspect of range check is set.

Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>

8.5.2.6 addFieldSlow() [2/4]

```cpp
gvoid iris::EventStream::addFieldSlow (  
    const std::string & field,  
    int64_t value ) [inline]
```

Add a sint field value.

Slow variant for argument names with more than 23 chars. Do not use unless you have to. This will also record the aspect value if the aspect of range check is set.

Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>

8.5.2.7 addFieldSlow() [3/4]

```cpp
gvoid iris::EventStream::addFieldSlow (  
    const std::string & field,  
    bool value ) [inline]
```

Add a boolean field value.

Slow variant for argument names with more than 23 chars. Do not use unless you have to. This will also record the aspect value if the aspect of range check is set.

Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>
8.5.2.8 addFieldSlow() [4/4]

```cpp
template<class T >
void iris::EventStream::addFieldSlow (  
    const std::string & field,  
    const T & value ) [inline]
```

Add a field value.

This is supported for all types supported by IrisU64JsonWriter and IrisObjects.h. Slow variant for argument names with more than 23 chars. Do not use unless you have to.

Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>

8.5.2.9 checkRangePc()

```cpp
bool iris::EventStream::checkRangePc (  
    uint64_t pc ) const
```

Check the range for the PC.

This can optionally be called before generating the callback request (before calling `emitEventBegin()`).

Parameters

| pc | The program counter value to check. |

Returns

true if the PC value is in range or no range is configured, false otherwise.

8.5.2.10 disable()

```cpp
virtual IrisErrorCode iris::EventStream::disable ( ) [pure virtual]
```

Disable this event stream.

Returns

An error code indicating whether the event stream was successfully disabled. This should be E_ok if it was disabled or E_error_enabling_event_stream if it could not be disabled.

Implemented in ```iris::IrisEventStream```.

Generated by Doxygen
8.5.2.11 emitEventBegin() [1/2]

```cpp
void iris::EventStream::emitEventBegin (
    IrisRequest & req,
    uint64_t time,
    uint64_t pc = IRIS_UINT64_MAX )
```

Start to emit an event callback.

**Parameters**

| req  | A request object to use to construct the event callback. |
| time | The time in simulation ticks at which the event occurred. |
| pc   | The program counter value when the event occurred. |

8.5.2.12 emitEventBegin() [2/2]

```cpp
void iris::EventStream::emitEventBegin ( 
    uint64_t time, 
    uint64_t pc = IRIS_UINT64_MAX )
```

Start to emit an event callback.

**Parameters**

| time | The time in simulation ticks at which the event occurred. |
| pc   | The program counter value when the event occurred. |

8.5.2.13 emitEventEnd() 

```cpp
void iris::EventStream::emitEventEnd ( 
    bool send = true )
```

Emit the callback.

This will also check the ranges and maintain the counter.

**Parameters**

| send  | If true, event callbacks are sent to the callee immediately. If false, the callback are not sent immediately, allowing the caller to delay sending. |
8.5.2.14  enable()

virtual IrisErrorCode iris::EventStream::enable ( ) [pure virtual]

Enable this event stream.

Returns

An error code indicating whether the event stream was successfully enabled. This should be E_ok if it was
enabled or E_error_enabling_event_stream if it could not be enabled.

Implemented in iris::IrisEventStream.

8.5.2.15  getCountVal()

uint64_t iris::EventStream::getCountVal ( ) const [inline]

Get the current value of the counter.

Returns

The current value of the event counter.

8.5.2.16  getEcInstId()

InstanceId iris::EventStream::getEcInstId ( ) const [inline]

Get the event callback instance id for this event stream.

Returns

The instId for the instance that this event stream calls when an event fires.

8.5.2.17  getState()

virtual IrisErrorCode iris::EventStream::getState ( 
    IrisValueMap & fields ) [inline], [virtual]

Query the current state of the event.

Supported in the derived classes for specific event sources.
Parameters

| fields | A map which will be populated with the current values for this event's fields. |

Returns

An error code indicating whether the operation was successful.

8.5.2.18 isCounter()

bool iris::EventStream::isCounter () const [inline]

Is this event stream a counter.

Returns

true if this event stream is a counter, otherwise false.

8.5.2.19 isEnabled()

bool iris::EventStream::isEnabled () const [inline]

Is this event stream currently enabled.

Returns

true if this event stream is enabled or false if it disabled.

8.5.2.20 selfRelease()

void iris::EventStream::selfRelease () [inline]

Trigger the event stream to be released.

If this event stream is not waiting for any response, release it immediately. Otherwise, release it when it has finished waiting.

Note

Do not touch anything related to this object after calling this function.

Do not call this function if this object was not created by 'new'.

8.5.2.21 setCounter()

void iris::EventStream::setCounter (uint64_t startVal, const EventCounterMode & counterMode )

Set the counter mode and starting value for this event stream.
Parameters

<table>
<thead>
<tr>
<th>startVal</th>
<th>The starting value of the counter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>counterMode</td>
<td>The mode in which this counter operates.</td>
</tr>
</tbody>
</table>

### 8.5.2.22 setProperties()

```cpp
void iris::EventStream::setProperties (  
    IrisInstance ∗ irisInstance,  
    const EventSourceInfo ∗ srcInfo,  
    InstanceId ecInstId,  
    const std::string & ecFunc,  
    EventStreamId esId,  
    bool syncEc )
```

Initialize this event stream.

Parameters

| irisInstance | The IrisInstance that is producing this stream. This will be used to send event callback requests. |
| srcInfo | The metadata for the event source generating this stream. |
| ecInstId | The event callback instId: the instance that this stream calls when an event fires. |
| ecFunc | The event callback function: the function that is called when an event fires. |
| esId | The event stream id for this event stream. |
| syncEc | True if this event stream is synchronous and should send event callbacks as requests. If false event callbacks are sent as notifications and do not wait for a response. |

### 8.5.2.23 setRanges()

```cpp
IrisErrorCode iris::EventStream::setRanges (  
    const std::string & aspect,  
    const std::vector< uint64_t > & ranges )
```

Set the trace ranges for this event stream.

Parameters

| aspect | The field whose range to check. |
| ranges | A list where each 3 elements form a 3-tuple of (mask, start, end) values to configure ranges. |

Returns

An error code indicating whether the ranges could be set successfully.
8.5.3 Member Data Documentation

8.5.3.1 counter

```cpp
bool iris::EventStream::counter [protected]
```

— members for a counter —

Is a counter?

8.5.3.2 irisInstance

```cpp
IrisInstance* iris::EventStream::irisInstance [protected]
```

— basic members —

The Iris instance that created this event.

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

- IrisInstanceEvent.h

8.6 iris::IrisInstanceBuilder::FieldBuilder Class Reference

Used to set metadata on a register field resource.

```cpp
#include <IrisInstanceBuilder.h>
```

Public Member Functions

- `FieldBuilder & addEnum (const std::string &symbol, const IrisValue &value, const std::string &descr=std::string())`
  - Add a symbol to the enums field for numeric resources.
- `FieldBuilder addField (const std::string &name, uint64_t lsbOffset, uint64_t bitWidth, const std::string &descr)`
  - Add another subregister field to the parent register.
- `FieldBuilder & addStringEnum (const std::string &stringValue, const std::string &descr=std::string())`
  - Add a symbol to the enums field for string resources.
- `FieldBuilder (IrisInstanceResource::ResourceInfoAndAccess &info_, RegisterBuilder *parent_reg_)`
- `ResourceId getRscld () const`
  - Return the rscld that was allocated for this resource.
- `RegisterBuilder & parent ()`
  - Get the RegisterBuilder for the parent register.
- `FieldBuilder & setAddressOffset (uint64_t addressOffset)`
  - Set the addressOffset field.
- `FieldBuilder & setBitWidth (uint64_t bitWidth)`
  - Set the bitWidth field.
• FieldBuilder & setCanonicalRn (uint64_t canonicalRn_)  
  Set the canonicalRn field.
• FieldBuilder & setCname (const std::string &cname)  
  Set the cname field.
• FieldBuilder & setDescr (const std::string &descr)  
  Set the descr field.
• FieldBuilder & setFormat (const std::string &format)  
  Set the format field.
• FieldBuilder & setLsbOffset (uint64_t lsbOffset)  
  Set the lsbOffset field.
• FieldBuilder & setName (const std::string &name)  
  Set the name field.
• FieldBuilder & setParameterInfo (const ParameterInfo &paramInfo)  
  Set the paramterInfo field.
• FieldBuilder & setReadDelegate (ResourceReadDelegate readDelegate)  
  Set the delegate to read the resource.
• FieldBuilder & setResetData (uint64_t resetData)  
  Set the resetData field.
• FieldBuilder & setResetString (const std::string &resetString)  
  Set the resetString field.
• FieldBuilder & setRwMode (const std::string &rwMode)  
  Set the rwMode field.
• FieldBuilder & setSubRscId (uint64_t subRscId)  
  Set the subRscId field.
• FieldBuilder & setTag (const std::string &tag)  
  Set the named boolean tag to true (e.g. isPc)
• FieldBuilder & setTag (const std::string &tag, const IrisValue &value)  
  Set a tag to the specified value.
• FieldBuilder & setType (const std::string &type)  
  Set the type field.
• FieldBuilder & setWriteDelegate (ResourceWriteDelegate writeDelegate)  
  Set the delegate to write the resource.
• FieldBuilder & setWriteDelegate (ResourceWriteDelegate writeDelegate)  
  Set the delegate to write the resource.
• FieldBuilder & setWriteMask (uint64_t writeMask)  
  Set the writeMask field.

Protected Attributes

• IrisInstanceResource::ResourceInfoAndAccess * info
• RegisterBuilder * parent_reg
• RegisterInfo * regInfo

Generated by Doxygen
8.6.1 Detailed Description

Used to set metadata on a register field resource.

8.6.2 Member Function Documentation

8.6.2.1 addEnum()

```cpp
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::addEnum(
    const std::string & symbol,
    const IrisValue & value,
    const std::string & descr = std::string() ) [inline]
```

Add a symbol to the enums field for numeric resources.

This should be called multiple times to add multiple symbols.

**Parameters**

<table>
<thead>
<tr>
<th>symbol</th>
<th>The symbol string to be associated with the specified value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of this symbol.</td>
</tr>
<tr>
<td>descr</td>
<td>A description of this symbol.</td>
</tr>
</tbody>
</table>

**Returns**

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.2 addField()

```cpp
FieldBuilder iris::IrisInstanceBuilder::FieldBuilder::addField(
    const std::string & name,
    uint64_t lsbOffset,
    uint64_t bitWidth,
    const std::string & descr ) [inline]
```

Add another subregister field to the parent register.
See also

RegisterBuilder::addField

### 8.6.2.3 addStringEnum()

```cpp
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::addStringEnum(
    const std::string & stringValue,
    const std::string & descr = std::string()) [inline]
```

Add a symbol to the enums field for string resources.

This should be called multiple times to add multiple symbols.

**Parameters**

<table>
<thead>
<tr>
<th>value</th>
<th>The string value of this symbol. This is also used as the symbols string.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>A description of this symbol.</td>
</tr>
</tbody>
</table>

**Returns**

A reference to this `FieldBuilder` object allowing calls to be chained together.

### 8.6.2.4 getRscId()

```cpp
ResourceId iris::IrisInstanceBuilder::FieldBuilder::getRscId() const [inline]
```

Return the rscId that was allocated for this resource.

**Returns**

The rscId that was allocated for this resource.

### 8.6.2.5 parent()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::FieldBuilder::parent() [inline]
```

Get the `RegisterBuilder` for the parent register.

**Returns**

The `RegisterBuilder` object for the parent register.
8.6.2.6 setAddressOffset()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setAddressOffset ( 
    uint64_t addressOffset ) [inline]

Set the addressOffset field.

Parameters

| addressOffset | The addressOffset field of the RegisterInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.7 setBitWidth()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setBitWidth ( 
    uint64_t bitWidth ) [inline]

Set the bitWidth field.

Parameters

| bitWidth | The bitWidth field of the ResourceInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.8 setCanonicalRn()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setCanonicalRn ( 
    uint64_t canonicalRn_ ) [inline]

Set the canonicalRn field.

Parameters

| canonicalRn | The canonicalRn field of the RegisterInfo object. |
Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.9 setCname()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setCname (const std::string & cname) [inline]

Set the cname field.

Parameters

| cname | The cname field of the ResourceInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.10 setDescr()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setDescr (const std::string & descr) [inline]

Set the descr field.

Parameters

| descr | The descr field of the ResourceInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.11 setFormat()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setFormat (const std::string & format) [inline]

Set the format field.
**Parameters**

| format | The format field of the ResourceInfo object. |

**Returns**

A reference to this FieldBuilder object allowing calls to be chained together.

### 8.6.2.12 setLsbOffset()

```cpp
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setLsbOffset (uint64_t lsbOffset) [inline]
```

Set the lsbOffset field.

**Parameters**

| lsbOffset | The lsbOffset field of the RegisterInfo object. |

**Returns**

A reference to this FieldBuilder object allowing calls to be chained together.

### 8.6.2.13 setName()

```cpp
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setName (const std::string & name) [inline]
```

Set the name field.

**Parameters**

| name | The name field of the ResourceInfo object. |

**Returns**

A reference to this FieldBuilder object allowing calls to be chained together.
8.6.2.14 setParameterInfo()

```cpp
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setParameterInfo (
    const ParameterInfo & paramInfo ) [inline]
```

Set the parameterInfo field.

This will make the resource a parameter.

**Parameters**

- `paramInfo` ParameterInfo object.

**Returns**

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.15 setReadDelegate() [1/3]

```cpp
template<typename T, IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &)> METHOD>
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setReadDelegate ( 
    T * instance ) [inline]
```

Set the delegate to read the resource.

Set a delegate which calls METHOD() on an instance of class T.

If this is not set, the default delegate is used.

**See also**

IrisInstanceBuilder::setDefaultResourceReadDelegate
Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a resource read delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A resource read delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.16 setReadDelegate() [2/3]

```
template<typename ErrorCode>(const ResourceInfo & ri, ResourceReadResult & res) { FUNC >
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setReadDelegate ( ) [inline]
```

Set the delegate to read the resource.

Set a delegate which calls function FUNC().

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceReadDelegate

Template Parameters

| FUNC | A resource read delegate function. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.
8.6.2.17  setReadDelegate() [3/3]

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setReadDelegate (ResourceReadDelegate readDelegate) [inline]

Set the delegate to read the resource.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceReadDelegate

Parameters

| readDelegate | ResourceReadDelegate object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.18  setResetData()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setResetData (uint64_t resetData) [inline]

Set the resetData field.

Set the reset value for numeric registers.

Parameters

| resetData | The resetData field of the RegisterInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.
8.6.2.19 setResetString()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setResetString (const std::string & resetString) [inline]

Set the resetString field.
Set the reset value for string registers.

Parameters

| resetString | The resetString field of the RegisterInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.20 setRwMode()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setRwMode (const std::string & rwMode) [inline]

Set the rwMode field.
Parameters

| rwMode | The rwMode field of the ResourceInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.21 setSubRscId()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setSubRscId (uint64_t subRscId) [inline]

Set the subRscId field.
Parameters

| sub←RscId | The subRscId field of the ResourceInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.22 setTag() [1/2]

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setTag ( const std::string & tag ) [inline]

Set the named boolean tag to true (e.g. isPc)

Parameters

| tag | The name of the tag to set. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.23 setTag() [2/2]

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setTag ( const std::string & tag, const IrisValue & value ) [inline]

Set a tag to the specified value.

Parameters

| tag | The name of the tag to set. |
| value | The value to set the tag to. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.
8.6.2.24  setType()

FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setType (
    const std::string & type ) [inline]

Set the type field.

Parameters

| type  | The type field of the ResourceInfo object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

8.6.2.25  setWriteDelegate() [1/3]

template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, const ResourceWriteValue &) METHOD>
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setWriteDelegate ( 
    T * instance ) [inline]

Set the delegate to write the resource.

Set a delegate which calls METHOD() on an instance of class T.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceWriteDelegate
Template Parameters

<table>
<thead>
<tr>
<th>$T$</th>
<th>A class that defines a method with the right signature to be a resource write delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A resource write delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.

### 8.6.2.26 setWriteDelegate() [2/3]

```cpp
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setWriteDelegate ( ResourceWriteDelegate writeDelegate ) [inline]
```

Set the delegate to write the resource.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceWriteDelegate

Parameters

| writeDelegate | ResourceWriteDelegate object. |

Returns

A reference to this FieldBuilder object allowing calls to be chained together.
### 8.6.2.27 setWriteDelegate()

```cpp
template<IrisErrorCode(*) (const ResourceInfo &, const ResourceWriteValue &) FUNC>
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setWriteDelegate() [inline]
```

Set the delegate to write the resource.

Set a delegate which calls function `FUNC()`.

If this is not set, the default delegate is used.

See also

- `IrisInstanceBuilder::setDefaultResourceWriteDelegate`

#### Template Parameters

| `FUNC` | A resource write delegate function. |

#### Returns

A reference to this `FieldBuilder` object allowing calls to be chained together.

### 8.6.2.28 setWriteMask()

```cpp
FieldBuilder& iris::IrisInstanceBuilder::FieldBuilder::setWriteMask(uint64_t writeMask) [inline]
```

Set the `writeMask` field.

#### Parameters

| `writeMask` | The `writeMask` field of the `RegisterInfo` object. |

#### Returns

A reference to this `FieldBuilder` object allowing calls to be chained together.

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

- IrisInstanceBuilder.h
8.7 iris::IrisCConnection Class Reference

Provide an IrisConnectionInterface which loads an IrisC library.

#include <IrisCConnection.h>

Inherits IrisConnectionInterface.

Public Member Functions

- virtual IrisInterface * getIrisInterface () IRIS_OVERRIDE
  Get the IrisInterface for this connection. See also IrisConnectionInterface::getIrisInterface().
- IrisCConnection (IrisC_Functions * functions)
- virtual IrisErrorCode processAsyncMessages (uint64_t flags) IRIS_OVERRIDE
  Process asynchronous messages for the calling thread. See also IrisConnectionInterface::processAsyncMessages().
- virtual uint64_t registerIrisInterfaceChannel (IrisInterface * iris_interface) IRIS_OVERRIDE
  Register a communication channel. See also IrisConnectionInterface::registerIrisInterfaceChannel().
- virtual void unregisterIrisInterfaceChannel (uint64_t channelId) IRIS_OVERRIDE
  Unregister a communication channel. See also IrisConnectionInterface::unregisterIrisInterfaceChannel().

Protected Member Functions

- int64_t IrisC_handleMessage (const uint64_t * message)
  Wrapper functions to call the underlying IrisC functions.
- int64_t IrisC_obtainInterface (InstanceId instId, const char * requested_interface, void ** interface_ptr_out)
- int64_t IrisC_processAsyncMessages (uint64_t flags)
- int64_t IrisC_registerChannel (IrisC_CommunicationChannel * channel, uint64_t * channelId_out)
- int64_t IrisC_unregisterChannel (uint64_t channelId)
- IrisCConnection ()
  Construct an empty object. Used by subclasses that need to load a DSO and call init().

Protected Attributes

- void * iris_c_context
  Context pointer to use when calling IrisC_ functions. This is also needed by subclasses.

8.7.1 Detailed Description

Provide an IrisConnectionInterface which loads an IrisC library.

See also

IrisClientConnection
IrisCoreConnection

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

- IrisCConnection.h
8.8  iris::IrisClientConnection Class Reference

Provide an IrisConnectionInterface for an Iris Client.

#include <IrisClientConnection.h>

Inherits IrisConnectionInterface.

Public Member Functions

- virtual IrisInterface * getIrisInterface () IRIS_OVERRIDE
  Get the IrisInterface for this connection.
- IrisClientConnection (const std::string &hostname, uint16_t port)
  Construct a connection to an Iris server.
- virtual IrisErrorCode processAsyncMessages (uint64_t flags) IRIS_OVERRIDE
  Process asynchronous messages for the calling thread.
- virtual uint64_t registerIrisInterfaceChannel (IrisInterface *iris_interface) IRIS_OVERRIDE
  Register a communication channel.
- virtual void unregisterIrisInterfaceChannel (uint64_t channelId) IRIS_OVERRIDE
  Unregister a communication channel.
- ~IrisClientConnection ()
  Disconnect from the server.

8.8.1  Detailed Description

Provide an IrisConnectionInterface for an Iris Client.

See also

IrisCoreConnection

8.8.2  Constructor & Destructor Documentation

8.8.2.1  IrisClientConnection()

iris::IrisClientConnection::IrisClientConnection ( 
    const std::string & hostname, 
    uint16_t port )

Construct a connection to an Iris server.
Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hostname</td>
<td>Hostname of the Iris server. This can be an IP address. For example:</td>
</tr>
<tr>
<td></td>
<td>• &quot;192.168.0.5&quot; IP address of a different host.</td>
</tr>
<tr>
<td></td>
<td>• &quot;127.0.0.1&quot; Loopback IP address to connect to a server on the same machine.</td>
</tr>
<tr>
<td></td>
<td>• &quot;localhost&quot; Hostname of the loopback interface.</td>
</tr>
<tr>
<td></td>
<td>• &quot;foo.bar.com&quot; Hostname of a remote machine.</td>
</tr>
<tr>
<td>port</td>
<td>Server port number to connect to on the host.</td>
</tr>
</tbody>
</table>

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

- IrisClientConnection.h

8.9 iris::IrisCoreConnection Class Reference

Provide an IrisConnectionInterface for an Iris server instance.

#include <IrisCoreConnection.h>

Inherits IrisConnectionInterface.

Public Member Functions

- virtual IrisInterface * getIrisInterface () IRIS_OVERRIDE
  Get the IrisInterface for this connection.
- IrisCoreConnection ()
  Initialise and start an Iris server.
- virtual iris::ErrorCode processAsyncMessages (uint64_t flags) IRIS_OVERRIDE
  Process asynchronous messages for the calling thread.
- virtual uint64_t registerIrisInterfaceChannel (IrisInterface *iris_interface) IRIS_OVERRIDE
  Register a communication channel.
- virtual void unregisterIrisInterfaceChannel (uint64_t channelId) IRIS_OVERRIDE
  Unregister a communication channel.
- ~IrisCoreConnection ()
  Shut down the Iris server.

8.9.1 Detailed Description

Provide an IrisConnectionInterface for an Iris server instance.

See also

- IrisClientConnection

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

- IrisCoreConnection.h
A helper class for generating Iris events.

#include <IrisEventEmitter.h>

Inherits IrisEventEmitterBase.

**Public Member Functions**

- **IrisEventEmitter()**
  
  Construct an event emitter.

- **void operator() (ARGS... args)**
  
  Emit an event.

### 8.10.1 Detailed Description

**template<typename... ARGS>**

class iris::IrisEventEmitter<ARGS>

A helper class for generating Iris events.

**Template Parameters**

| ARGS | Argument types corresponding to the fields in this event. |

Use **IrisEventEmitter** with **IrisInstanceBuilder** to add events to your Iris instance:

```cpp
// Declare an event emitter
iris::IrisEventEmitter<uint64_t, bool> my_event;

// Add it to an Iris instance
iris::IrisInstance my_instance(...);
my_instance->getBuilder()->addEventSource("MY_EVENT", my_event)
  .addField("FOO", "uint", 8, "A value")
  .addField("FLAG", "bool", 1, "A flag");

// Emit an event
my_event(0x1234, true);
```

### 8.10.2 Member Function Documentation

#### 8.10.2.1 operator()()

**template<typename... ARGS>**

```cpp
void iris::IrisEventEmitter<ARGS>::operator() (ARGS... args) [inline]
```

Generated by Doxygen
Emit an event.

The arguments to this function are the fields of the event source, in the same order that they appear in the template arguments to the `IrisEventEmitter` class.

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

- `IrisEventEmitter.h`

## 8.11 iris::IrisEventRegistry Class Reference

Class to register Iris event streams for an event.

```cpp
#include <IrisInstanceEvent.h>
```

### Public Types

- ```cpp
typedef std::set<EventStream*>::const_iterator iterator
```

### Public Member Functions

- ```cpp
template<class T>
void addField (const IrisU64StringConstant &field, const T &value) const
Add a field value.
```
- ```cpp
template<class T>
void addFieldSlow (const std::string &field, const T &value) const
Add a field value.
```
- ```cpp
iterator begin () const
Get an iterator to the beginning of the event stream set.
```
- ```cpp
void emitEventBegin (uint64_t time, uint64_t pc=IRIS_UINT64_MAX) const
```
- ```cpp
void emitEventEnd () const
```
- ```cpp
bool empty () const
Return true if no event streams are registered.
```
- ```cpp
iterator end () const
Get an iterator to the end of the event stream set.
```
- ```cpp
bool registerEventStream (EventStream *evStream)
Register an event stream.
```
- ```cpp
bool unregisterEventStream (EventStream *evStream)
Unregister an event stream.
```

### 8.11.1 Detailed Description

Class to register Iris event streams for an event.
8.11.2 Member Function Documentation

8.11.2.1 addField()

template <class T>
void iris::IrisEventRegistry::addField (  
   const IrisU64StringConstant & field,  
   const T & value ) const [inline]

Add a field value.

This is supported for all types supported by IrisU64JsonWriter and IrisObjects.h. Fast variant for argument names up to 23 chars. Use this if you can.

Template Parameters

$T$ The type of value.

Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>

8.11.2.2 addFieldSlow()

template <class T>
void iris::IrisEventRegistry::addFieldSlow (  
   const std::string & field,  
   const T & value ) const [inline]

Add a field value.

This is supported for all types supported by IrisU64JsonWriter and IrisObjects.h. Slow variant for argument names with more than 23 chars. Do not use unless you have to.

Template Parameters

$T$ The type of value.

Parameters

<table>
<thead>
<tr>
<th>field</th>
<th>The name of the field whose value is set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of the field.</td>
</tr>
</tbody>
</table>
### 8.11.2.3 begin()

```cpp
iterator iris::IrisEventRegistry::begin ( ) const [inline]
```

Get an iterator to the beginning of the event stream set.

**See also**

```cpp
depend
```

**Returns**

An iterator to the beginning of the event stream set.

### 8.11.2.4 emitEventEnd()

```cpp
void iris::IrisEventRegistry::emitEventEnd ( ) const
```

Emit the callback.

This also checks the ranges and maintains the counter.

### 8.11.2.5 empty()

```cpp
bool iris::IrisEventRegistry::empty ( ) const [inline]
```

Return true if no event streams are registered.

**Returns**

```cpp
true if no event streams are registered.
```

### 8.11.2.6 end()

```cpp
iterator iris::IrisEventRegistry::end ( ) const [inline]
```

Get an iterator to the end of the event stream set.

**See also**

```cpp
begin
```

**Returns**

An iterator to the end of the event stream set.

### 8.11.2.7 registerEventStream()

```cpp
bool iris::IrisEventRegistry::registerEventStream ( EventStream * evStream )
```

Register an event stream.
Parameters

\textit{evStream} \hspace{1em} The stream to be registered.

Returns

\texttt{true} if the stream was registered successfully.

8.11.2.8 \texttt{unregisterEventStream()}

\begin{verbatim}
bool iris::IrisEventRegistry::unregisterEventStream ( 
       EventStream * evStream )
\end{verbatim}

Unregister an event stream.

Parameters

\textit{evStream} \hspace{1em} The stream to be unregistered.

Returns

\texttt{true} if the stream was unregistered successfully.

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

- IrisInstanceEvent.h

8.12 \texttt{iris::IrisEventStream Class Reference}

Event stream class for Iris-specific events.

\texttt{#include <IrisInstanceEvent.h>}

Inherits \texttt{iris::EventStream}.

Public Member Functions

- virtual \texttt{IrisErrorCode disable () IRIS_OVERRIDE} \\
  \hspace{1em} Disable this event stream.
- virtual \texttt{IrisErrorCode enable () IRIS_OVERRIDE} \\
  \hspace{1em} Enable this event stream.
- \texttt{IrisEventStream (IrisEventRegistry \* registry_)}
Additional Inherited Members

8.12.1 Detailed Description

Event stream class for Iris-specific events.

8.12.2 Member Function Documentation

8.12.2.1 disable()

```cpp
virtual IrisErrorCode iris::IrisEventStream::disable() [virtual]
```

Disable this event stream.

Returns

An error code indicating whether the event stream was successfully disabled. This should be E_ok if it was disabled or E_error_enabling_event_stream if it could not be disabled.

Implements iris::EventStream.

8.12.2.2 enable()

```cpp
virtual IrisErrorCode iris::IrisEventStream::enable() [virtual]
```

Enable this event stream.

Returns

An error code indicating whether the event stream was successfully enabled. This should be E_ok if it was enabled or E_error_enabling_event_stream if it could not be enabled.

Implements iris::EventStream.

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

- IrisInstanceEvent.h
8.13  iris::IrisInstance Class Reference

Public Member Functions

- **IrisInstanceBuilder **getBuilder ()
  Get the IrisInstanceBuilder object for this instance. This can be used to set up metadata and callbacks for standard Iris functions.

- const std::string & getInstanceName () const
  Get the instance name of this instance. This is valid after registerInstance() returns.

- InstanceId getInstId () const
  Get the instance id of this instance. This is valid after registerInstance() returns.

- IrisInterface * getLocalIrisInterface ()
  Get the local IrisInterface of this instance. This is the interface that other instances use to send their requests and responses to this instance.

- IrisInterface * getRemoteIrisInterface ()
  Get the remote Iris interface.

- IrisCppAdapter & irisCall ()
  Get an IrisCppAdapter to call an Iris function of any other instance.

- IrisCppAdapter & irisCallNoThrow ()
  Get an IrisCppAdapter to call an Iris function of any other instance.

- IrisCppAdapter & irisCallThrow ()
  Get an IrisCppAdapter to call an Iris function of any other instance. When an Iris function returns an error response, this adapter always throws an exception. Usage:

- IrisInstance (IrisConnectionInterface * connection_interface=nullptr, const std::string &instName=std::string(), uint64_t flags=DEFAULT_FLAGS)
  Construct a new Iris instance.

- IrisInstance (IrisInstantiationContext * context)
  Construct a new Iris instance using an IrisInstantiationContext.

- void notifyStateChanged ()
  Send an IRIS_STATE_CHANGED event if the simulation is not running.

- void processAsyncRequests ()
  Process async requests. Use this to keep the Iris system running while a thread is blocked waiting for something.

- template<class T>
  void registerEventCallback (T * instance, const std::string &name, const std::string &description, void(T::*memberFunctionPtr)(IrisReceivedRequest &), const std::string &instanceTypeStr)
  Register a general event callback.

- void registerEventCallback (EventCallbackDelegate delegate, const std::string &name, const std::string &description, const std::string &dlgInstanceTypeStr)
  Register a general event callback using an EventCallbackDelegate.

- template<typename T , IrisErrorCode(T::*)(uint64_t, const AttributeValueMap &, uint64_t, uint64_t, bool, std::string &) METHOD>
  void registerEventCallback (T * instance, const std::string &name, const std::string &description, const std::string &dlgInstanceTypeStr)
  Register a general event callback using an EventCallbackDelegate.

- template<class T>
  void registerFunction (T * instance, const std::string &name, void(T::*memberFunctionPtr)(IrisReceivedRequest &), const std::string &functionInfoJson, const std::string &instanceTypeStr)
  Register an Iris function implementation.

- IrisErrorCode registerInstance (const std::string &instName, uint64_t flags=DEFAULT_FLAGS)
  Register this instance if it was not registered when constructed.

- bool sendRequest (IrisRequest &req)
  Send an Iris request or notification and potentially wait for a response.

- void sendResponse (const uint64_t *response)
Send a response to the remote Iris interface.

- void `setConnectionInterface` (IrisConnectionInterface *connection_interface)
  Set the remote connection interface.
- void `setEventHandler` (IrisInstanceEvent *handler)
  Set the event handler and enable the `IRIS_STATE_CHANGED` event.
- template<class T>
  void `setProperty` (const std::string &propertyName, const T &propertyValue)
  Set/add instance property.
- void `setThrowOnError` (bool throw_on_error)
  Set default error behavior for `irisCall()`.
- void `unregisterEventCallback` (const std::string &name)
  Unregister the named event callback function.
- void `unregisterFunction` (const std::string &name)
  Unregister a function that was previously registered with `registerFunction()` or `irisRegisterFunction()`.
- IrisErrorCode `unregisterInstance` ()
  Unregister this instance.

**Static Public Attributes**

- static const uint64_t `DEFAULT_FLAGS` = THROW_ON_ERROR
  Default flags used if not otherwise specified.
- static const uint64_t `MARSHAL_REQUESTS` = (1 << 1)
  Marshal future incoming messages on to the current thread.
- static const uint64_t `THROW_ON_ERROR` = (1 << 2)
  Throw an exception when an Iris call returns an error response.
- static const uint64_t `UNIQUIFY` = (1 << 0)
  Uniquify instance name when registering.

**Protected Attributes**

- InstanceInfo `thisInstanceInfo` ()
  InstanceInfo of this instance.

### 8.13.1 Constructor & Destructor Documentation

#### 8.13.1.1 IrisInstance()

iris::IrisInstance::IrisInstance (
   IrisConnectionInterface *connection_interface = nullptr,
   const std::string &instName = std::string(),
   uint64_t flags = DEFAULT_FLAGS )

Construct a new Iris instance.
Parameters

<table>
<thead>
<tr>
<th>connection_interface</th>
<th>The IrisConnectionInterface that this instance should use to connect to the simulation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>instName</td>
<td>Name of the instance. This should be prefixed with one of the following, as appropriate:</td>
</tr>
<tr>
<td></td>
<td>• &quot;client.&quot;</td>
</tr>
<tr>
<td></td>
<td>• &quot;component.&quot;</td>
</tr>
<tr>
<td></td>
<td>• &quot;framework.&quot;</td>
</tr>
<tr>
<td>flags</td>
<td>A bitwise OR of Instance Flags. Client instances should usually set the flag iris::IrisInstance::UNIQUIFY. Component instances should usually set the flag iris::IrisInstance::MARSHAL_REQUESTS.</td>
</tr>
</tbody>
</table>

8.13.1.2 IrisInstance() [2/2]

iris::IrisInstance::IrisInstance ( IrisInstantiationContext * context )

Construct a new Iris instance using an IrisInstantiationContext.

Parameters

| context | A context object that provides the necessary information to instantiate an instance. |

8.13.2 Member Function Documentation

8.13.2.1 getBuilder()

IrisInstanceBuilder* iris::IrisInstance::getBuilder ( )

Get the IrisInstanceBuilder object for this instance. This can be used to set up metadata and callbacks for standard Iris functions.

Returns

The IrisInstanceBuilder object for this instance.
8.13.2.2 getInstanceName()

const std::string& iris::IrisInstance::getInstanceName ( ) const [inline]

Get the instance name of this instance. This is valid after registerInstance() returns.

Returns

The instance name of this instance. This is the same as the name parameter passed to the constructor or registerInstance() unless this instance was registered with the UNIQUIFY flag set and the name was modified to make it unique.

8.13.2.3 getInstId()

InstanceId iris::IrisInstance::getInstId ( ) const [inline]

Get the instance id of this instance. This is valid after registerInstance() returns.

Returns

The instId for this instance.

8.13.2.4 getLocalIrisInterface()

IrisInterface* iris::IrisInstance::getLocalIrisInterface ( ) [inline]

Get the local IrisInterface of this instance. This is the interface that other instances use to send their requests and responses to this instance.

Returns

IrisInterface to send messages to this instance.

8.13.2.5 getRemoteIrisInterface()

IrisInterface* iris::IrisInstance::getRemoteIrisInterface ( ) [inline]

Get the remote Iris interface.

Returns

Returns the IrisInterface that this instance sends requests and responses to.
**8.13.2.6 irisCall()**

IrisCppAdapter& iris::IrisInstance::irisCall() [inline]

Get an IrisCppAdapter to call an Iris function of any other instance.

Usage:

```cpp
class IrisInstance
```
```cpp
irisCall().resource_read(...);
```

for the Iris function `resource_read()`.

**8.13.2.7 irisCallNoThrow()**

IrisCppAdapter& iris::IrisInstance::irisCallNoThrow() [inline]

Get an IrisCppAdapter to call an Iris function of any other instance.

When an Iris function returns an error response, this adapter returns the error code and does not throw an exception.

Usage:

```cpp
class IrisInstance
```
```cpp
iris::IrisErrorCode code = irisCallNoThrow().resource_read(...);
```

**8.13.2.8 irisCallThrow()**

IrisCppAdapter& iris::IrisInstance::irisCallThrow() [inline]

Get an IrisCppAdapter to call an Iris function of any other instance. When an Iris function returns an error response, this adapter always throws an exception.

Usage:

```cpp
try
{
    irisCall().resource_read(...);
}
```
```cpp
catch (iris::IrisErrorException &e) {
    ...
}
```

**8.13.2.9 registerEventCallback() [1/3]**

```cpp
template<class T>
```
```cpp
void iris::IrisInstance::registerEventCallback ( 
    T * instance, 
    const std::string & name, 
    const std::string & description, 
    void(T::*)(IrisReceivedRequest &) memberFunctionPtr, 
    const std::string & instanceTypeStr ) [inline]
```

Register a general event callback.

Event callbacks have the same signature, only the description is different.
### Parameters

<table>
<thead>
<tr>
<th><strong>instance</strong></th>
<th>An instance of class T on which to call the member function.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>name</strong></td>
<td>Name of the function as it will be published.</td>
</tr>
<tr>
<td><strong>description</strong></td>
<td>Description of this event callback function.</td>
</tr>
<tr>
<td><strong>memberFunctionPtr</strong></td>
<td>Pointer to the C++ implementation of the function.</td>
</tr>
<tr>
<td><strong>instanceTypeStr</strong></td>
<td>The name of class T. This is only used for logging purposes.</td>
</tr>
</tbody>
</table>

#### 8.13.2.10 registerEventCallback() [2/3]

```cpp
define iris::IrisInstance::registerEventCallback (  
    EventCallbackDelegate delegate,  
    const std::string & name,  
    const std::string & description,  
    const std::string & dlgInstanceTypeStr ) [inline]
```

Register a general event callback using an EventCallbackDelegate.

#### Parameters

<table>
<thead>
<tr>
<th><strong>delegate</strong></th>
<th>EventCallbackDelegate to call to handle the function.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>name</strong></td>
<td>Name of the function as it will be published.</td>
</tr>
<tr>
<td><strong>description</strong></td>
<td>Description of this event callback function.</td>
</tr>
<tr>
<td><strong>dlgInstanceTypeStr</strong></td>
<td>The name of the delegate type. This is only used for logging purposes.</td>
</tr>
</tbody>
</table>

#### 8.13.2.11 registerEventCallback() [3/3]

```cpp
template<

    typename T, 

    IrisErrorCode<

        T::*

        (uint64_t, const AttributeValueMap &, uint64_t, uint64_t)

        METHOD>

void iris::IrisInstance::registerEventCallback (  
    T * instance,  
    const std::string & name,  
    const std::string & description,  
    const std::string & dlgInstanceTypeStr ) [inline]
```

Register a general event callback using an EventCallbackDelegate.

#### Parameters

<table>
<thead>
<tr>
<th><strong>instance</strong></th>
<th>An instance of class T on which to call the delegate T::METHOD().</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>name</strong></td>
<td>Name of the function as it will be published.</td>
</tr>
<tr>
<td><strong>description</strong></td>
<td>Description of this event callback function.</td>
</tr>
<tr>
<td><strong>dlgInstanceTypeStr</strong></td>
<td>The name of the delegate type. This is only used for logging purposes.</td>
</tr>
</tbody>
</table>

Generated by Doxygen
8.13.2.12 registerFunction()

template<class T >
void iris::IrisInstance::registerFunction (  
    T * instance,  
    const std::string & name,  
    void(T::*)(IrisReceivedRequest &) memberFunctionPtr,  
    const std::string & functionInfoJson,  
    const std::string & instanceTypeStr ) [inline]

Register an Iris function implementation.

The following macro can be used instead of calling this function to avoid specifying the function name twice:

: irisRegisterFunction(instancePtr, instanceType, functionName, implFunctionName, functionInfoJson)

Parameters

| instance | An instance of class T on which to call the member function. |
| name     | Name of the function as it will be published.               |
| memberFunctionPtr | Pointer to the C++ implementation of the function.         |
| functionInfoJson | A string containing the JSON-encoded FunctionInfo object for this function. |
| instanceTypeStr | The name of class T. This is only used for logging purposes. |

8.13.2.13 registerInstance()

IrisErrorCode iris::IrisInstance::registerInstance (  
    const std::string & instName,  
    uint64_t flags = DEFAULT_FLAGS )

Register this instance if it was not registered when constructed.

Parameters

<table>
<thead>
<tr>
<th>instName</th>
<th>Name of the instance. This should be prefixed with one of the following, as appropriate:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &quot;client.&quot;</td>
</tr>
<tr>
<td></td>
<td>• &quot;component.&quot;</td>
</tr>
<tr>
<td></td>
<td>• &quot;framework.&quot;</td>
</tr>
<tr>
<td>flags</td>
<td>A bitwise OR of Instance Flags. Client instances should usually set the flag iris::IrisInstance::UNIQUIFY. Component instances should usually set the flag iris::IrisInstance::MARSHAL_REQUESTS.</td>
</tr>
</tbody>
</table>

8.13.2.14 sendRequest()

bool iris::IrisInstance::sendRequest (  
    IrisRequest & req ) [inline]
Send an Iris request or notification and potentially wait for a response.

**Parameters**

| req | Iris request to send. |

**Returns**

Returns true iff a non-error response was received, and therefore the result values must be decoded.

Use this to manually call functions implemented in the called target but not implemented in IrisCppAdapter.

### 8.13.2.15 sendResponse()

```cpp
def sendResponse (const uint64_t *response) [inline]
```

Send a response to the remote Iris interface.

Call this from the function implementations registered with registerFunction() or irisRegisterFunction().

**Parameters**

| response | The Iris response message to send. |

### 8.13.2.16 setConnectionInterface()

```cpp
def setConnectionInterface (IrisConnectionInterface *connection_interface)
```

Set the remote connection interface.

Used to set the IrisConnectionInterface if it was not set in the constructor.

**Parameters**

| connection_interface | The interface used to connect to an Iris simulation. |

### 8.13.2.17 setProperty()

```cpp
template<class T >
def setProperty (const std::string &propertyName, const T &propertyValue) [inline]
```

Generated by Doxygen
Set/add instance property.

This creates a new property or overwrites an existing one.

Properties (name and value) are defined by the instance that has them. Properties are not to be confused with parameters, whose values are defined by clients or by parent components and some parameters might change at runtime.

Properties are exposed by the function instance_getProperties(). This should only ever be called upon initialization, before other components have a chance to call instance_getProperties(). Properties are constant and should not be changed at runtime. T can be bool, uint64_t, int64_t, or std::string.

### Parameters

<table>
<thead>
<tr>
<th>propertyName</th>
<th>Name of the property.</th>
</tr>
</thead>
<tbody>
<tr>
<td>propertyValue</td>
<td>Value of the property.</td>
</tr>
</tbody>
</table>

#### 8.13.2.18 setThrowOnError()

```cpp
def setThrowOnError (bool throw_on_error) [inline]
```

Set default error behavior for irisCall().

### Parameters

| throw_on_error | If true, calls made using irisCall() that respond with an error response will throw an exception. This is the same behavior as irisCallThrow(). If false, calls made using irisCall() that respond with an error response will return the error code and not throw an exception. This is the same behavior as irisCallNoThrow(). |

#### 8.13.2.19 unregisterInstance()

```cpp
IrisErrorCode unregisterInstance ()
```

Unregister this instance.

Iris calls must not be made after the instance has been unregistered.

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

- IrisInstance.h

### 8.14 iris::IrisInstanceBreakpoint Class Reference

Breakpoint add-on for IrisInstance.

```cpp
#include <IrisInstanceBreakpoint.h>
```
Public Member Functions

- **void addCondition (const std::string &name, const std::string &type, const std::string &description, const std::vector<std::string> &bpt_types) = default**
  
  Add an optional component-specific condition that can be configured by clients.

- **void attachTo (IrisInstance *irisInstance)**
  
  Attach this IrisInstance add-on to a specific IrisInstance.

- **void attachTo (IrisInstance +irisInstance)**
  
  Attach this IrisInstance add-on to a specific IrisInstance.

- **const BreakpointInfo *getBreakpointInfo (BreakpointId bptId) const**
  
  Get BreakpointInfo for a breakpoint id.

- **IrisInstanceBreakpoint (IrisInstance *irisInstance=nullptr)**
  
  Create a new IrisInstanceBreakpoint.

- **void notifyBreakpointHit (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId)**
  
  Notify clients that a code breakpoint was hit.

- **void notifyBreakpointHitData (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId, uint64_t accessAddr, uint64_t accessSize, const std::string &accessRw, const std::vector<uint64_t> &data)**
  
  Notify clients that a data breakpoint was hit.

- **void notifyBreakpointHitRegister (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId, const std::string &accessRw, const std::vector<uint64_t> &data)**
  
  Notify clients that a register breakpoint was hit.

- **void setBreakpointDeleteDelegate (BreakpointDeleteDelegate delegate)**
  
  Set breakpoint delete delegate for all breakpoints deleted by this instance.

- **void setBreakpointSetDelegate (BreakpointSetDelegate delegate)**
  
  Set breakpoint set delegate for all breakpoints set by this instance.

- **void setEventHandler (IrisInstanceEvent *handler)**
  
  Set the event handler used to notify the clients that enable the IRIS_BREAKPOINT_HIT event.

### 8.14.1 Detailed Description

Breakpoint add-on for IrisInstance.

Instances use this class to support breakpoint functionality. It implements all Iris breakpoint functions and maintains the breakpoint information that is set by breakpoint_set() and is exposed by breakpoint_getList().

Example usage:

```cpp
irisInstanceBpt = new iris::IrisInstanceBreakpoint(irisInstance);
irisInstanceBpt->setBreakpointSetDelegate(bptSetDel); // Use this delegate for breakpoint set.
irisInstanceBpt->setBreakpointDeleteDelegate(bptDeleteDel); // Use this delegate for breakpoint delete.

// When a breakpoint is hit, notify the instances that enable the IRIS_BREAKPOINT_HIT event.
irisInstanceBpt->setEventHandler(irisInstanceEvent);
```

See DummyComponent.h for a working example.

### 8.14.2 Member Function Documentation

#### 8.14.2.1 addCondition()

```cpp
void iris::IrisInstanceBreakpoint::addCondition (const std::string &name, const std::string &type, const std::string &description, const std::vector<std::string> &bpt_types = std::vector<std::string>())
```

Add an optional component-specific condition that can be configured by clients.
Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of the condition.</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>The type of the value that clients set to configure the condition.</td>
</tr>
<tr>
<td>description</td>
<td>A description of the condition.</td>
</tr>
<tr>
<td>bpt_types</td>
<td>A list of breakpoint types that this condition can be applied to. An empty list indicates all types.</td>
</tr>
</tbody>
</table>

### 8.14.2.2 attachTo()

```cpp
def iris::IrisInstanceBreakpoint::attachTo (IrisInstance * irisInstance)
```

Attach this `IrisInstance` add-on to a specific `IrisInstance`.

Only use this method if `nullptr` was passed to the constructor.

**Parameters**

| irisInstance | The `IrisInstance` to attach to. |

### 8.14.2.3 getBreakpointInfo()

```cpp
def const BreakpointInfo* iris::IrisInstanceBreakpoint::getBreakpointInfo (BreakpointId bptId) const
```

Get BreakpointInfo for a breakpoint id.

**Parameters**

| bptId | The breakpoint id for which the BreakpointInfo is requested. |

**Returns**

A pointer to the BreakpointInfo for the requested breakpoint or `nullptr` if `bptId` is not a valid breakpoint id.

### 8.14.2.4 notifyBreakpointHit()

```cpp
def void iris::IrisInstanceBreakpoint::notifyBreakpointHit (BreakpointId bptId, uint64_t time,
```
8.14.2.5 notifyBreakpointHitData()

```cpp
tvoid iris::IrisInstanceBreakpoint::notifyBreakpointHitData ( 
    BreakpointId bptId, 
    uint64_t time, 
    uint64_t pc, 
    MemorySpaceId pcSpaceId, 
    uint64_t accessAddr, 
    uint64_t accessSize, 
    const std::string & accessRw, 
    const std::vector<uint64_t> & data )
```

Notify clients that a data breakpoint was hit.

It notifies clients by emitting an IRIS_BREAKPOINT_HIT event.

Parameters

<table>
<thead>
<tr>
<th>bptId</th>
<th>Breakpoint id for the breakpoint that was hit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>time</td>
<td>Simulation time at which the breakpoint hit.</td>
</tr>
<tr>
<td>pc</td>
<td>Value of the relevant program counter when the event hit.</td>
</tr>
<tr>
<td>pcSpaceId</td>
<td>Memory space Id for the memory space that the PC address corresponds to.</td>
</tr>
<tr>
<td>accessAddr</td>
<td>The address of the data access that triggered the breakpoint.</td>
</tr>
<tr>
<td>accessSize</td>
<td>The size of the data access that triggered the breakpoint.</td>
</tr>
<tr>
<td>accessRw</td>
<td>Indicates the direction of the access. &quot;r&quot; = read access or &quot;w&quot; = write access.</td>
</tr>
<tr>
<td>data</td>
<td>The data that was written or read during the access that triggered the breakpoint.</td>
</tr>
</tbody>
</table>

8.14.2.6 notifyBreakpointHitRegister()

```cpp
tvoid iris::IrisInstanceBreakpoint::notifyBreakpointHitRegister ( 
    BreakpointId bptId, 
```
notify clients that a register breakpoint was hit.

It notifies clients by emitting an IRIS_BREAKPOINT_HIT event.

Parameters

<table>
<thead>
<tr>
<th>bptId</th>
<th>Breakpoint id for the breakpoint that was hit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>time</td>
<td>Simulation time at which the breakpoint hit.</td>
</tr>
<tr>
<td>pc</td>
<td>Value of the relevant program counter when the event hit.</td>
</tr>
<tr>
<td>pcSpaceId</td>
<td>Memory space Id for the memory space that the PC address corresponds to.</td>
</tr>
<tr>
<td>accessRw</td>
<td>Indicates the direction of the access. &quot;r&quot; = read access or &quot;w&quot; = write access.</td>
</tr>
<tr>
<td>data</td>
<td>The data that was written or read during the access that triggered the breakpoint.</td>
</tr>
</tbody>
</table>

8.14.2.7 setBreakpointDeleteDelegate()

void iris::IrisInstanceBreakpoint::setBreakpointDeleteDelegate ( BreakpointDeleteDelegate delegate )

Set breakpoint delete delegate for all breakpoints deleted by this instance.

Parameters

| delegate | A BreakpointDeleteDelegate to call when a breakpoint is deleted. |

8.14.2.8 setBreakpointSetDelegate()

void iris::IrisInstanceBreakpoint::setBreakpointSetDelegate ( BreakpointSetDelegate delegate )

Set breakpoint set delegate for all breakpoints set by this instance.

Parameters

| delegate | A BreakpointSetDelegate to call when a breakpoint is set. |
8.14.2.9 setEventHandler()

```cpp
void iris::IrisInstanceBreakpoint::setEventHandler ( IrisInstanceEvent * handler )
```

Set the event handler used to notify the clients that enable the IRIS_BREAKPOINT_HIT event.

All breakpoint events are normal events and are handled through the same mechanism as other events.

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

- IrisInstanceBreakpoint.h

8.15 iris::IrisInstanceBuilder Class Reference

Helper class to set up Iris instances.

#include <IrisInstanceBuilder.h>

Classes

- class AddressTranslationBuilder
  Used to set metadata for an address translation.
- class EventSourceBuilder
  Used to set metadata on an EventSource.
- class FieldBuilder
  Used to set metadata on a register field resource.
- class MemorySpaceBuilder
  Used to set metadata for a memory space.
- class RegisterBuilder
  Used to set metadata on a register resource.
- class ResourceBuilder
  Used to set metadata on a resource.
- class SemihostingManager
  semihosting_apis IrisInstanceBuilder semihosting APIs
- class TableBuilder
  Used to set metadata for a table.
- class TableColumnBuilder
  Used to set metadata for a table column.
Public Member Functions

- **AddressTranslationBuilder addAddressTranslation (MemorySpaceId inSpaceId, MemorySpaceId outSpaceId, const std::string &description)**
  
  Add an address translation.

- **void addBreakpointCondition (const std::string &name, const std::string &type, const std::string &description, const std::vector<std::string> bpt_types=std::vector<std::string>())**
  
  Add an optional component-specific condition.

- **EventSourceBuilder addEventSource (const std::string &name, IrisEventEmitterBase &event_emitter, bool isHidden=false)**
  
  Add metadata for an event source that uses an IrisEventEmitter.

- **MemorySpaceBuilder addMemorySpace (const std::string &name)**
  
  Add metadata for one memory space.

- **RegisterBuilder addNoValueRegister (const std::string &name, const std::string &descr, const std::string &format)**
  
  Add metadata for one noValue resource.

- **ResourceBuilder addNoValueResource (const std::string &name, const std::string &descr, const std::string &format)**
  
  Add metadata for one noValue resource.

- **RegisterBuilder addRegister (const std::string &name, uint64_t bitWidth, const std::string &descr, uint64_t addressOffset=IRIS_UINT64_MAX, uint64_t canonicalRn=IRIS_UINT64_MAX)**
  
  Add metadata for one numeric register resource.

- **ResourceBuilder addResource (const std::string &name, uint64_t bitWidth, const std::string &descr)**
  
  Add metadata for one numeric resource.

- **RegisterBuilder addStringRegister (const std::string &name, const std::string &descr)**
  
  Add metadata for one string register resource.

- **ResourceBuilder addStringResource (const std::string &name, const std::string &descr)**
  
  Add metadata for one string resource.

- **TableBuilder addTable (const std::string &name)**
  
  Add metadata for one table.

- **void beginResourceGroup (const std::string &name, const std::string &descr, ResourceId rscIdStart=0, const std::string &cname=std::string())**
  
  Begin a new resource group.

- **void finalizeRegisterReadEvent ()**
  
  Finalize set up of an IrisEventEmitter.

- **const BreakpointInfo *getBreakpointInfo (BreakpointId bptId)**
  
  Get the breakpoint information for a given breakpoint.

- **IrisInstanceBuilder (IrisInstance *iris_instance)**
  
  Construct an IrisInstanceBuilder for an Iris instance.

- **void notifyBreakpointHit (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId)**
  
  Notify clients that a code breakpoint was hit.

- **void notifyBreakpointHitData (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId, uint64_t accessAddr, uint64_t accessSize, const std::string &accessRw, const std::vector<uint64_t> &data)**
  
  Notify clients that a data breakpoint was hit (IRIS_BREAKPOINT_HIT).

- **void notifyBreakpointHitRegister (BreakpointId bptId, uint64_t time, uint64_t pc, MemorySpaceId pcSpaceId, const std::string &accessRw, const std::vector<uint64_t> &data)**
  
  Notify clients that a register breakpoint was hit (IRIS_BREAKPOINT_HIT).

- **uint64_t openImage (const std::string &filename)**
  
  Generated by Doxygen
Open an image to be read using image_loadDataPull() or image_loadDataRead().

- **void setBreakpointDeleteDelegate (BreakpointDeleteDelegate delegate)**
  
  Set the delegate that is called when a breakpoint is deleted.

- **template<typename T, IrisErrorCode(T::*)(const BreakpointInfo &)) METHOD void setBreakpointDeleteDelegate (T *instance)**
  
  Set the delegate that is called when a breakpoint is deleted.

- **void setBreakpointDeleteDelegate (BreakpointDeleteDelegate delegate)**
  
  Set the delegate that is called when a breakpoint is deleted.

- **template<typename T, IrisErrorCode(T::*)(const BreakpointInfo &)) METHOD void setBreakpointDeleteDelegate (T *instance)**
  
  Set the delegate that is called when a breakpoint is deleted.

- **void setBreakpointSetDelegate (BreakpointSetDelegate delegate)**
  
  Set the delegate that is called when a breakpoint is set.

- **template<typename T, IrisErrorCode(T::*)(BreakpointInfo &)) METHOD void setBreakpointSetDelegate (T *instance)**
  
  Set the default address translation function for all subsequently added memory spaces.

- **template<typename T, IrisErrorCode(T::*)(const BreakpointInfo &)) METHOD void setBreakpointSetDelegate (T *instance)**
  
  Set the default address translation function for all subsequently added memory spaces.

- **void setBreakpointSetDelegate ()**
  
  Set the default address translation function for all subsequently added memory spaces.

- **template<typename T, IrisErrorCode(T::*)(EventStream &&, const EventSourceInfo &, const std::vector<std::string> &, IrisValueMap &)) METHOD void setDefaultEsCreateDelegate (T *instance)**
  
  Set the delegate that helps to create a new event stream for the simulation-specific event.

- **template<typename T, IrisErrorCode(T::*)(EventStream &&, const EventSourceInfo &, const std::vector<std::string> &, IrisValueMap &)) METHOD void setDefaultEsCreateDelegate ()**
  
  Set the delegate that helps to create a new event stream for the simulation-specific event.

- **void setDefaultEsCreateDelegate (EventStreamCreateDelegate delegate)**
  
  Set the delegate that helps to create a new event stream for the simulation-specific event.

- **template<typename T, IrisErrorCode(T::*)(EventStream &&, const EventSourceInfo &, const std::vector<std::string> &, IrisValueMap &)) METHOD void setDefaultEsCreateDelegate (T *instance)**
  
  Set the delegate that helps to create a new event stream for the simulation-specific event.

- **void setDefaultEsCreateDelegate (EventStreamCreateDelegate delegate) ()**
  
  Set the default sideband info function for all subsequently added memory spaces.

- **template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &)) METHOD void setDefaultGetMemorySidebandInfoDelegate (T *instance)**
  
  Set the default sideband info function for all subsequently added memory spaces.

- **template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &)) METHOD void setDefaultGetMemorySidebandInfoDelegate ()**
  
  Set the default sideband info function for all subsequently added memory spaces.

- **void setDefaultMemoryReadDelegate (MemoryReadDelegate delegate=MemoryReadDelegate())**
  
  Set the default read function for all subsequently added memory spaces.

- **template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &)) METHOD void setDefaultMemoryReadDelegate (T *instance)**
  
  Set the default read function for all subsequently added memory spaces.

- **template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &)) METHOD void setDefaultMemoryReadDelegate (T *instance)**
  
  Set the default read function for all subsequently added memory spaces.
• void setDefaultMemoryWriteDelegate (MemoryWriteDelegate delegate=MemoryWriteDelegate())
  
  Set the default write function for all subsequently added memory spaces.

• template<typename T , IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *, MemoryWriteResult &) METHOD>
void setDefaultMemoryWriteDelegate (T *instance)
  
  Set the default write function for all subsequently added memory spaces.

• template<typename T , IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *, MemoryWriteResult &) FUNC>
void setDefaultMemoryWriteDelegate ()
  
  Set default write function for all subsequently added memory spaces.

• template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &) METHOD>
void setDefaultResourceReadDelegate (T *instance)
  
  Set default read access function for all subsequently added resources.

• template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &) FUNC>
void setDefaultResourceReadDelegate ()
  
  Set default read access function for all subsequently added resources.

• void setDefaultResourceWriteDelegate (ResourceWriteDelegate delegate=ResourceWriteDelegate())
  
  Set default write access function for all subsequently added resources.

• template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, const ResourceWriteValue &) METHOD>
void setDefaultResourceWriteDelegate (T *instance)
  
  Set default write access function for all subsequently added resources.

• template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, const ResourceWriteValue &) FUNC>
void setDefaultResourceWriteDelegate ()
  
  Set default write access function for all subsequently added resources.

• void setDefaultTableReadDelegate (TableReadDelegate delegate=TableReadDelegate())
  
  Set the default table read function for all subsequently added tables.

• template<typename T , IrisErrorCode(T::*)(const TableInfo &, uint64_t, uint64_t, TableReadResult &) METHOD>
void setDefaultTableReadDelegate (T *instance)
  
  Set the default table read function for all subsequently added tables.

• template<typename T , IrisErrorCode(T::*)(const TableInfo &, uint64_t, uint64_t, TableReadResult &) FUNC>
void setDefaultTableReadDelegate ()
  
  Set the default table read function for all subsequently added tables.

• void setDefaultTableWriteDelegate (TableWriteDelegate delegate=TableWriteDelegate())
  
  Set the default table write function for all subsequently added tables.

• template<typename T , IrisErrorCode(T::*)(const TableInfo &, const TableRecords &, TableWriteResult &) METHOD>
void setDefaultTableWriteDelegate (T *instance)
  
  Set the default table write function for all subsequently added tables.

• template<typename T , IrisErrorCode(T::*)(const TableInfo &, const TableRecords &, TableWriteResult &) FUNC>
void setDefaultTableWriteDelegate ()
  
  Set the default table write function for all subsequently added tables.

• void setExecutionStateGetDelegate (PerInstanceExecutionStateGetDelegate delegate)
  
  Set the delegate to get the execution state for this instance.

• template<typename T , IrisErrorCode(T::*)(bool &) METHOD>
void setExecutionStateGetDelegate (T *instance)
  
  Set the delegate to get the execution state for this instance.

• template<typename T , IrisErrorCode(T::*)(bool &) FUNC>
void setExecutionStateGetDelegate ()
Set the delegate to get the execution state for this instance.

- void setExecutionStateGetDelegate (PerInstanceExecutionStateGetDelegate delegate=PerInstanceExecutionStateGetDelegate())

Set the delegate to set the execution state for this instance.

- template<typename T , IrisErrorCode(T::*)(bool) METHOD>
  void setExecutionStateSetDelegate (T *instance)

Set the delegate to set the execution state for this instance.

- template<typename T , IrisErrorCode(T::*)(const std::vector<uint64_t> &, uint64_t) METHOD>
  void setExecutionStateSetDelegate (T *instance)

Set the delegate to set the execution state for this instance.

- void setLoadImageDataDelegate (ImageLoadDataDelegate delegate=ImageLoadDataDelegate())

Set the delegate to load an image from the data provided.

- template<typename T , IrisErrorCode(T::*)(const std::vector<uint64_t> &, uint64_t) METHOD>
  void setLoadImageDataDelegate (T *instance)

Set the delegate to load an image from the data provided.

- template<typename T , IrisErrorCode(T::*)(const std::string & ) FUNCTION>
  void setLoadImageDataDelegate ()

Set the delegate to load an image from the data provided.

- void setLoadImageFileDelegate (ImageLoadFileDelegate delegate=ImageLoadFileDelegate())

Set the delegate to load an image from a file.

- template<typename T , IrisErrorCode(T::*)(const std::string &) METHOD>
  void setLoadImageFileDelegate (T *instance)

Set the delegate to load an image from a file.

- template<typename T , IrisErrorCode(T::*)(const std::string &) FUNCTION>
  void setLoadImageFileDelegate ()

Set the delegate to load an image from a file.

- void setNextRsclId (ResourceId nextRscId)

Set the rscId that will be used for the next resource to be added.

- void setPropertyCanonicalMsnScheme (const std::string & canonicalMsnScheme)

Set the memory.canonicalMsnScheme instance property.

- void setPropertyCanonicalRnScheme (const std::string & canonicalRnScheme)

Set the register.canonicalRnScheme instance property.

- EventSourceBuilder setRegisterReadEvent (const std::string & name, const std::string & description=std::string())

Add a new register read event source.

- EventSourceBuilder setRegisterReadEvent (const std::string & name, IrisRegisterEventEmitterBase & event_emitter)

Add a new register read event source.

- EventSourceBuilder setRegisterUpdateEvent (const std::string & name, const std::string & description=std::string())

Add a new register update event source.

- EventSourceBuilder setRegisterUpdateEvent (const std::string & name, IrisRegisterEventEmitterBase & event_emitter)

Add a new register update event source.

- void setRemainingStepGetDelegate (RemainingStepGetDelegate delegate)

Set the delegate to get the remaining steps for this instance.

- template<typename T , IrisErrorCode(T::*)(uint64_t &, const std::string &) METHOD>
  void setRemainingStepGetDelegate (T *instance)

Set the delegate to get the remaining steps for this instance.

- template<typename T , IrisErrorCode(T::*)(uint64_t &, const std::string &) FUNCTION>
  void setRemainingStepGetDelegate ()

Set the delegate to get the remaining steps for this instance.

- void setRemainingStepSetDelegate (RemainingStepSetDelegate delegate=RemainingStepSetDelegate())

Generated by Doxygen
Set the delegate to set the remaining steps for this instance.

- template<typename T, IrisErrorCode(T::*)(uint64_t, const std::string&)> METHOD
  void setRemainingStepSetDelegate (T* instance)

Set the delegate to set the remaining steps for this instance.

- template<IrisErrorCode(*)(uint64_t, const std::string&)> FUNC
  void setRemainingStepSetDelegate ()

Set the delegate to set the remaining steps for this instance.

- void setRemainingStepGetDelegate (StepCountGetDelegate delegate=StepCountGetDelegate())

Set the delegate to get the step count for this instance.

- template<typename T, IrisErrorCode(T::*)(std::string&)> METHOD
  void setStepCountGetDelegate (T* instance)

Set the delegate to get the step count for this instance.

- template<IrisErrorCode(*)(std::string&)> FUNC
  void setStepCountGetDelegate ()

Set the delegate to get the step count for this instance.

- void setTag (ResourceId rscId, const std::string& tag)
  Set a tag for a specific resource.

- void setGetCurrentDisassemblyModeDelegate (GetCurrentDisassemblyModeDelegate delegate)
  disass_apis IrisInstanceBuilder disassembler APIs

- template<typename T, IrisErrorCode(T::*)(std::string&)> METHOD
  void setGetCurrentDisassemblyModeDelegate (T* instance)

Set the delegate to get the disassembly of a chunk of memory.

- template<IrisErrorCode(*)(std::string&)> FUNC
  void setGetCurrentDisassemblyModeDelegate ()

Set the delegate to get the disassembly of Opcode.

- template<typename T, IrisErrorCode(T::*)(const std::vector<uint64_t>&, uint64_t, const std::string&, DisassembleContext&, DisassemblyLine&)> METHOD
  void setDisassembleOpcodeDelegate (T* instance)

Set the delegate to get the disassembly of Opcode.

- template<IrisErrorCode(*)(const std::vector<uint64_t>&, uint64_t, const std::string&, DisassembleContext&, DisassemblyLine&)> FUNC
  void setDisassembleOpcodeDelegate ()

Add a disassembly mode.

- void addDisassemblyMode (const std::string& name, const std::string& description)
  Add a disassembly mode.

- void setDbgStateSetRequestDelegate (DebuggableStateSetRequestDelegate delegate=DebuggableStateSetRequestDelegate())
  debuggable_state_apis IrisInstanceBuilder debuggable state APIs

- template<typename T, IrisErrorCode(T::*)(bool)> METHOD
  void setDbgStateSetRequestDelegate (T* instance)

Set the delegate to set the debuggable state request flag for this instance.
**8.15 iris::IrisInstanceBuilder Class Reference**

- **template<typename T, IrisErrorCode(T::*)(bool & METHOD)>**
  
  void setDbgStateGetAcknowledgeDelegate (T *instance)
  
  Set the delegate to get the debuggable state acknowledge flag for this instance.

- **void setDbgStateDelegates (T *instance)**
  
  Set both the debuggable state delegates.

- **SemihostingManager enableSemihostingAndGetManager ()**
  
  Enable semihosting functionality for this instance and get a manager object to make use of it.

- **void setSyncLevelSetDelegate (SyncLevelSetDelegate delegate=SyncLevelSetDelegate())**
  
  sync_level_apis IrisInstanceBuilder sync-level APIs

- **void setSyncLevelSetDelegate (T *instance)**
  
  Set the delegate that is called when the sync level is changed for this instance.

- **void setSyncLevelSetDelegate ()**
  
  Set the delegate that is called when the sync level is changed for this instance.

### 8.15.1 Detailed Description

Helper class to set up Iris instances.

See DummyComponent.h for a working example.

### 8.15.2 Constructor & Destructor Documentation

#### 8.15.2.1 IrisInstanceBuilder()

iris::IrisInstanceBuilder::IrisInstanceBuilder ( IrisInstance * iria_instance )

Construct an IrisInstanceBuilder for an Iris instance.
Parameters

| iris_instance | The instance to build |

8.15.3 Member Function Documentation

8.15.3.1 addTable()

TableBuilder iris::IrisInstanceBuilder::addTable (const std::string & name) [inline]

Add metadata for one table.

Typical use pattern:

addTableInfo("name")
  .setDescription("description")
  .setMinIndex(...)  
  .setMaxIndex(...)  
  .setIndexFormatHint(...)  
  .setFormatShort(...)  
  .setFormatLong(...)  
  .setReadDelegate(...)  
  .setWriteDelegate(...)  
  .addColumnInfo(...)  
  .addColumnInfo(...)  
  ...

Parameters

| name | Name of the new table |

Returns

A TableBuilder object than can be used to set metadata for the new table.

8.15.3.2 enableSemihostingAndGetManager()

SemihostingManager iris::IrisInstanceBuilder::enableSemihostingAndGetManager () [inline]

Enable semihosting functionality for this instance and get a manager object to make use of it.

Returns

A SemihostingManager object to manage semihosting functionality for this instance.
8.15.3.3 setDbgStateDelegates()

```
template<
    typename T,
    IrisErrorCode(T::*)(bool) SET_REQUEST,
    IrisErrorCode(T::*)(bool &) GET_ACKNOWLEDGE
>
void iris::IrisInstanceBuilder::setDbgStateDelegates(
    T * instance ) [inline]
```

Set both the debuggable state delegates.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode setRequestFlag(bool request_debuggable_state);
    iris::IrisErrorCode getAcknowledgeFlag(bool &debuggable_state_acknowledge);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDbgStateDelegates<MyClass,
    &MyClass::setRequest,
    &MyClass::getAcknowledgeFlag>(&myInstanceOfMyClass);
```

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines both a debuggable state request set and a get acknowledge delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET_REQUEST</td>
<td>A method of class T which is a debuggable state request set delegate.</td>
</tr>
<tr>
<td>GET_ACKNOWLEDGE</td>
<td>A method of class T which is a debuggable state get acknowledge delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which SET_REQUEST and GET_ACKNOWLEDGE should be called. |

8.15.3.4 setDbgStateGetAcknowledgeDelegate() [1/3]

```
void iris::IrisInstanceBuilder::setDbgStateGetAcknowledgeDelegate ( 
    DebuggableStateGetAcknowledgeDelegate delegate = DebuggableStateGetAcknowledgeDelegate() 
) [inline]
```

Set the delegate to get the debuggable state acknowledge flag for this instance.

Passing an empty delegate (the default argument) restores the default implementation which always returns E←not_implemented for all requests.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode getAcknowledgeFlag(bool &debuggable_state_acknowledge);
};
```
MyClass myInstanceOfMyClass;
iris::DebuggableStateGetAcknowledgeDelegate delegate =
    iris::DebuggableStateGetAcknowledgeDelegate::make<MyClass, &MyClass::getAcknowledgeFlag>(&
    myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDbgStateGetAcknowledgeDelegate(delegate);

### Parameters

| **delegate** | Delegate object to call to get the debuggable state acknowledge flag. |

#### 8.15.3.5 setDbgStateGetAcknowledgeDelegate() [2/3]

```cpp
template<typename T , IrisErrorCode(T::*)(bool &) METHOD>
void iris::IrisInstanceBuilder::setDbgStateGetAcknowledgeDelegate ( 
    T * instance ) [inline]
```

Set the delegate to get the debuggable state acknowledge flag for this instance.

**Usage:**

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode getAcknowledgeFlag(bool &debuggable_state_acknowledge);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDbgStateGetAcknowledgeDelegate<MyClass, &MyClass::getAcknowledgeFlag>(&myInstanceOfMyClass);
```

**Template Parameters**

| **T** | Class that defines a debuggable state get acknowledge delegate method. |
| **METHOD** | A method of class T which is a debuggable state get acknowledge delegate. |

**Parameters**

| **instance** | An instance of class T on which METHOD should be called. |

#### 8.15.3.6 setDbgStateGetAcknowledgeDelegate() [3/3]

```cpp
template<IrisErrorCode(*)(bool &) FUNC>
void iris::IrisInstanceBuilder::setDbgStateGetAcknowledgeDelegate () [inline]
```

Set the delegate to get the debuggable state acknowledge flag for this instance.

**Usage:**

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode getAcknowledgeFlag(bool &debuggable_state_acknowledge);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDbgStateGetAcknowledgeDelegate<MyClass, &MyClass::getAcknowledgeFlag>(&myInstanceOfMyClass);
```

Generated by Doxygen
iris::IrisErrorCode getAcknowledgeFlag(bool &debuggable_state_acknowledge);

iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDbgStateGetAcknowledgeDelegate<&getAcknowledgeFlag>();

Template Parameters

| FUNC | Global function to call to get the debuggable state acknowledge flag. |

8.15.3 setDbgStateSetRequestDelegate() [1/3]

void iris::IrisInstanceBuilder::setDbgStateSetRequestDelegate ( DebuggableStateSetRequestDelegate delegate = DebuggableStateSetRequestDelegate() ) [inline]

debuggable_state_apis IrisInstanceBuilder debuggable state APIs

Set the delegate to set the debuggable state request flag for this instance.

Passing an empty delegate (the default argument) restores the default implementation which always returns E←not_implemented for all requests.

Usage:

class MyClass
{
    ...
    iris::IrisErrorCode setRequestFlag(bool request_debuggable_state);
};

MyClass myInstanceOfMyClass;

iris::DebuggableStateSetRequestDelegate delegate =
    iris::DebuggableStateSetRequestDelegate::make<MyClass, &MyClass::setRequestFlag>(&myInstanceOfMyClass);

iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDbgStateSetRequestDelegate(delegate);

Parameters

| delegate | Delegate object to call to set the debuggable state request flag. |

8.15.3.8 setDbgStateSetRequestDelegate() [2/3]

template<typename T , IrisErrorCode(T::*)(bool) METHOD>
void iris::IrisInstanceBuilder::setDbgStateSetRequestDelegate ( T * instance ) [inline]

Set the delegate to set the debuggable state request flag for this instance.

Usage:
class MyClass
{
    ...
    iris::IrisErrorCode setRequestFlag(bool request_debuggable_state);
};

MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDbgStateSetRequestDelegate<MyClass, &MyClass::setRequestFlag>(&myInstanceOfMyClass);

**Template Parameters**

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a debuggable state request set delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a debuggable state request set delegate.</td>
</tr>
</tbody>
</table>

**Parameters**

| instance | An instance of class T on which METHOD should be called. |

8.15.3.9  setDbgStateSetRequestDelegate() [3/3]

```cpp
template<IrisErrorCode (*)(bool) FUNC>
void iris::IrisInstanceBuilder::setDbgStateSetRequestDelegate {
    ...
} [inline]
```

Set the delegate to set the debuggable state request flag for this instance.

**Usage:**

```cpp
iris::IrisErrorCode setRequestFlag(bool request_debuggable_state);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDbgStateSetRequestDelegate<&setRequestFlag>();
```

**Template Parameters**

| FUNC    | Global function to call to set the debuggable state request flag. |

8.15.3.10  setDefaultTableReadDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setDefaultTableReadDelegate {
    TableReadDelegate delegate = TableReadDelegate();
} [inline]
```

Set the default table read function for all subsequently added tables.

**Tables that do not explicitly override the access function using**

```cpp
addTable(...).setReadDelegate(...)
```
will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns E_not_implemented for all requests.

Usage:

```cpp
class MyClass
{
    ... iris::IrisErrorCode readTable(const iris::TableInfo &tableInfo, uint64_t index,
         uint64_t count, iris::TableReadResult &result);
};
MyClass myInstanceOfMyClass;
iris::TableReadDelegate delegate = iris::TableReadDelegate::make<MyClass, &MyClass::readTable>(&myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultTableReadDelegate(delegate);
builder->addTable(...); // Uses readTable
```

Parameters

| delegate | Delegate object to call to read a table. |

8.15.3.11 `setDefaultTableReadDelegate()` [2/3]

```cpp
template<typename T, IrisErrorCode(T::*)(const TableInfo &, uint64_t, uint64_t, TableReadResult &)> METHOD
void iris::IrisInstanceBuilder::setDefaultTableReadDelegate (T * instance ) [inline]
```

Set the default table read function for all subsequently added tables.

Tables that do not explicitly override the access function using `addTable(...).setReadDelegate(...)` will use this delegate.

Usage:

```cpp
class MyClass
{
    ... iris::IrisErrorCode readTable(const iris::TableInfo &tableInfo, uint64_t index,
         uint64_t count, iris::TableReadResult &result);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultTableReadDelegate<MyClass, &MyClass::readTable>(&myInstanceOfMyClass);
builder->addTable(...); // Uses readTable
```
Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a table read delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a table read delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

8.15.3.12 setDefaultTableReadDelegate() [3/3]

```cpp
template<
    template<typename,...> (const TableInfo &, uint64_t, uint64_t, TableReadResult &)
FUNC>
void iris::IrisInstanceBuilder::setDefaultTableReadDelegate ( ) [inline]
```

Set the default table read function for all subsequently added tables.

Tables that do not explicitly override the access function using

```
addTable(...).setReadDelegate(...)```

will use this delegate.

Usage:

```
iris::IrisErrorCode readTable(const iris::TableInfo &tableInfo, uint64_t index,
    uint64_t count, iris::TableReadResult &result);
iris::IrisInstanceBuilder &builder = myIrisInstance.getBuilder();
builder->setDefaultTableReadDelegate<&readTable>();
builder->addTable(...); // Uses readTable
```

Template Parameters

| FUNC | Global function to call to read a table. |

8.15.3.13 setDefaultTableWriteDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setDefaultTableWriteDelegate ( 
    TableWriteDelegate delegate = TableWriteDelegate() ) [inline]
```

Set the default table write function for all subsequently added tables.

Tables that do not explicitly override the access function using

```
addTable(...).setWriteDelegate(...)```

Generated by Doxygen
will use this delegate.

Passing an empty delegate (the default argument) restores the default implementation which always returns `E←not_implemented` for all requests.

Usage:

```cpp
class MyClass
{
    ...  
    iris::IrisErrorCode writeTable(const iris::TableInfo &tableInfo,
                                    const iris::TableRecords &records,
                                    iris::TableWriteResult &result);
};
MyClass myInstanceOfMyClass;
iris::TableWriteDelegate delegate =
    iris::TableWriteDelegate::make<MyClass, &MyClass::writeTable>(myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultTableWriteDelegate(delegate);
builder->addTable(...); // Uses writeTable
```

Parameters

| delegate | Delegate object to call to write a table. |

8.15.3.14 `setDefaultTableWriteDelegate()` [2/3]

template<typename T , IrisErrorCode(T::*)(const TableInfo & , const TableRecords & , TableWriteResult & ) METHOD>
void iris::IrisInstanceBuilder::setDefaultTableWriteDelegate ( 
    T * instance ) [inline]

Set the default table write function for all subsequently added tables.

Tables that do not explicitly override the access function using

```
addTable(...).setWriteDelegate(...)```

will use this delegate.

Usage:

```cpp
class MyClass
{
    ...  
    iris::IrisErrorCode writeTable(const iris::TableInfo &tableInfo,
                                    const iris::TableRecords &records,
                                    iris::TableWriteResult &result);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultTableWriteDelegate<MyClass, &MyClass::writeTable>(myInstanceOfMyClass);
builder->addTable(...); // Uses writeTable
```
Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a table write delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a table write delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

8.15.3.15 setDefaultTableWriteDelegate() [3/3]

```c++
template<iris::IrisErrorCode (*)(const iris::TableInfo &, const iris::TableRecords &, iris::TableWriteResult &)> FUNC>
void iris::IrisInstanceBuilder::setDefaultTableWriteDelegate ( ) { } [inline]
```

Set the default table write function for all subsequently added tables.

Tables that do not explicitly override the access function using

```
addTable(...).setWriteDelegate(...)
```

will use this delegate.

Usage:

```c++
iris::IrisErrorCode writeTable(const iris::TableInfo &tableInfo,
                                 const iris::TableRecords &records,
                                 iris::TableWriteResult &result);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setDefaultTableWriteDelegate<writeTable>();
builder->addTable(...); // Uses writeTable
```

Template Parameters

| FUNC | Global function to call to write a table. |

8.15.3.16 setExecutionStateGetDelegate() [1/3]

```c++
void iris::IrisInstanceBuilder::setExecutionStateGetDelegate ( PerInstanceExecutionStateGetDelegate delegate ) { inline}
```

Set the delegate to get the execution state for this instance.

Passing an empty delegate (the default argument) restores the default implementation which always returns E←not_implemented for all requests.

Usage:
class MyClass
{
    ...
    iris::IrisErrorCode getState(bool &execution_enabled);
};
MyClass myInstanceOfMyClass;
iris::PerInstanceExecutionStateGetDelegate delegate =
    iris::PerInstanceExecutionStateGetDelegate::make<MyClass, &MyClass::getState>(myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setExecutionStateGetDelegate(delegate);

Parameters

| delegate | Delegate object to call to get the execution state. |

8.15.3.17 setExecutionStateGetDelegate() [2/3]

template<typename T, IrisErrorCode(T::*)(bool &) METHOD>
void iris::IrisInstanceBuilder::setExecutionStateGetDelegate {
    T * instance ) [inline]

Set the delegate to get the execution state for this instance.

Usage:

class MyClass
{
    ...
    iris::IrisErrorCode getState(bool &execution_enabled);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setExecutionStateGetDelegate<MyClass, &MyClass::getState>(myInstanceOfMyClass);

Template Parameters

| T | Class that defines a get execution state delegate method. |
| METHOD | A method of class T which is a get execution state delegate. |

Parameters

| instance | An instance of class T on which METHOD should be called. |

8.15.3.18 setExecutionStateGetDelegate() [3/3]

template<IrisErrorCode (*)(bool &) FUNC>
void iris::IrisInstanceBuilder::setExecutionStateGetDelegate ( ) [inline]

Generated by Doxygen
Set the delegate to get the execution state for this instance.

Usage:

    iris::IrisErrorCode getState(bool &execution_enabled);

iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setExecutionStateGetDelegate<&getState>();

Template Parameters

| FUNC | Global function to call to get the execution state. |

8.15.3.19 setExecutionStateSetDelegate() [1/3]

    void iris::IrisInstanceBuilder::setExecutionStateSetDelegate (PerInstanceExecutionStateSetDelegate delegate = PerInstanceExecutionStateSetDelegate()); [inline]

Set the delegate to set the execution state for this instance.

Passing an empty delegate (the default argument) restores the default implementation which always returns E← not_implemented for all requests.

Usage:

    class MyClass
    { ...
    iris::IrisErrorCode setState(bool enable_execution);
    };

MyClass myInstanceOfMyClass;
iris::PerInstanceExecutionStateSetDelegate delegate = iris::PerInstanceExecutionStateSetDelegate::make<MyClass, &MyClass::setState>(&myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setExecutionStateSetDelegate(delegate);

Parameters

| delegate | Delegate object to call to set the execution state. |

8.15.3.20 setExecutionStateSetDelegate() [2/3]

    template<typename T, IrisErrorCode(T::*)(bool) METHOD> void iris::IrisInstanceBuilder::setExecutionStateSetDelegate (T * instance) [inline]
Set the delegate to set the execution state for this instance.

Usage:

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode setState(bool enable_execution);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setExecutionStateSetDelegate<&MyClass::setState>(myInstanceOfMyClass);
```

**Template Parameters**

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a set execution state delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T which is a set execution state delegate.</td>
</tr>
</tbody>
</table>

**Parameters**

| instance | An instance of class T on which METHOD should be called. |

8.15.3.21 `setExecutionStateSetDelegate()` [3/3]

```cpp
template<class Func>
void iris::IrisInstanceBuilder::setExecutionStateSetDelegate ( ) [inline]
```

Set the delegate to set the execution state for this instance.

Usage:

```cpp
iris::IrisErrorCode setState(bool enable_execution);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setExecutionStateSetDelegate(setState);
```

**Template Parameters**

| Func | Global function to call to set the execution state. |

8.15.3.22 `setGetCurrentDisassemblyModeDelegate()`

```cpp
void iris::IrisInstanceBuilder::setGetCurrentDisassemblyModeDelegate ( ) [inline]
```

disass_apis IrisInstanceBuilder disassembler APIs

Set the delegates to get the current disassembly mode

---

Generated by Doxygen
8.15.3.23 setSyncLevelSetDelegate() [1/3]

```cpp
void iris::IrisInstanceBuilder::setSyncLevelSetDelegate {
    SyncLevelSetDelegate delegate = SyncLevelSetDelegate()  } [inline]
```

### sync_level_apis IrisInstanceBuilder sync-level APIs

Set the delegate that is called when the sync level is changed for this instance.

Passing an empty delegate (the default argument) restores the default implementation which always returns `E←not_implemented` for all requests.

**Usage:**

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode setSynclevel(uint64_t new_level);
};
MyClass myInstanceOfMyClass;
iris::SyncLevelSetDelegate delegate =
    iris::SyncLevelSetDelegate::make<MyClass, &MyClass::setSynclevel>(&myInstanceOfMyClass);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setSyncLevelSetDelegate(delegate);
```

**Parameters**

- **delegate** Delegate object to call to set the sync level.

8.15.3.24 setSyncLevelSetDelegate() [2/3]

```cpp
template<typename T , IrisErrorCode(T::*)(uint64_t) METHOD>
void iris::IrisInstanceBuilder::setSyncLevelSetDelegate {
    T * instance ) [inline]
```

Set the delegate that is called when the sync level is changed for this instance.

**Usage:**

```cpp
class MyClass
{
    ...
    iris::IrisErrorCode setSynclevel(uint64_t new_level);
};
MyClass myInstanceOfMyClass;
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setSyncLevelSetDelegate<MyClass, &MyClass::setSynclevel>(&myInstanceOfMyClass);
```

**Template Parameters**

- **T** Class that defines a set sync level delegate method.
- **METHOD** A method of class T which is a set sync level delegate.
Parameters

| instance | An instance of class T on which METHOD should be called. |

8.15.3.25 `setSyncLevelSetDelegate()` [3/3]

```cpp
template<
  IrisErrorCode(*)(uint64_t) FUNC
>
void iris::IrisInstanceBuilder::setSyncLevelSetDelegate () [inline]
```

Set the delegate that is called when the sync level is changed for this instance.

Usage:

```cpp
iris::IrisErrorCode setSyncLevel(uint64_t new_level);
iris::IrisInstanceBuilder *builder = myIrisInstance.getBuilder();
builder->setSyncLevelSetDelegate<&setSyncLevel>();
```

Template Parameters

| FUNC | Global function to call to set the sync level. |

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

- IrisInstanceBuilder.h

8.16 `iris::IrisInstanceDebuggableState Class Reference`

Debuggable-state add-on for IrisInstance.

`#include <IrisInstanceDebuggableState.h>`

Public Member Functions

- void `attachTo` (IrisInstance *irisInstance)
  
  Attach this IrisInstance add-on to a specific IrisInstance.
- IrisInstanceDebuggableState (IrisInstance *iris_instance=nullptr)
- void `setGetAcknowledgeDelegate` (DebuggableStateGetAcknowledgeDelegate delegate)
  
  Set the get acknowledge flag delegate.
- void `setSetRequestDelegate` (DebuggableStateSetRequestDelegate delegate)
  
  Set the set request flag delegate.

8.16.1 Detailed Description

Debuggable-state add-on for IrisInstance.
8.16.2 Member Function Documentation

8.16.2.1 attachTo()

```cpp
void iris::IrisInstanceDebuggableState::attachTo ( IrisInstance * irisInstance )
```

Attach this IrisInstance add-on to a specific IrisInstance.

**Parameters**

| irisInstance | The IrisInstance to attach to. |

8.16.2.2 setGetAcknowledgeDelegate()

```cpp
void iris::IrisInstanceDebuggableState::setGetAcknowledgeDelegate ( DebuggableStateGetAcknowledgeDelegate delegate ) [inline]
```

Set the get acknowledge flag delegate.

**Parameters**

| delegate | Delegate that will be called to get the debuggable-state acknowledge flag. |

8.16.2.3 setRequestDelegate()

```cpp
void iris::IrisInstanceDebuggableState::setRequestDelegate ( DebuggableStateSetRequestDelegate delegate ) [inline]
```

Set the set request flag delegate.

**Parameters**

| delegate | Delegate that will be called to set or clear the debuggable-state request flag. |

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

- IrisInstanceDebuggableState.h
8.17 iris::IrisInstanceDisassembler Class Reference

Disassembler add-on for IrisInstance.

#include <IrisInstanceDisassembler.h>

Public Member Functions

- void addDisassemblyMode (const std::string &name, const std::string &description)
  Add a disassembly mode.
- void attachTo (IrisInstance *irisInstance)
  Attach this IrisInstance add-on to a specific IrisInstance.
- IrisInstanceDisassembler (IrisInstance *irisInstance=nullptr)
  Construct an IrisInstanceDisassembler.
- void setDisassembleOpcodeDelegate (DisassembleOpcodeDelegate delegate)
  Set the delegate to get the disassembly of Opcode.
- void setCurrentModeDelegate (GetCurrentDisassemblyModeDelegate delegate)
  Set the delegate to get the current disassembly mode.
- void setGetDisassemblyDelegate (GetDisassemblyDelegate delegate)
  Set the delegate to get the disassembly of a chunk of memory.

8.17.1 Detailed Description

Disassembler add-on for IrisInstance.

This class is used by instances that want to support disassembly functionality.

It implements all Iris disassembler*() functions.

Example usage:

irisInstanceDisassembler = new iris::IrisInstanceDisassembler(irisInstance);
irisInstanceDisassembler->setCurrentModeDelegate(dasmCurrentModeGetDel);  // Get the current disassembly mode
irisInstanceDisassembler->setGetDisassemblyDelegate(dasmDisassemblyGetDel);  // Get the disassembly of a chunk of memory
irisInstanceDisassembler->setDisassembleOpcodeDelegate(dasmOpcodeDasmGetDel);  // Disassemble specific opcode

See DummyComponent.h for a working example.

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

- IrisInstanceDisassembler.h

8.18 iris::IrisInstanceEvent Class Reference

Event add-on for IrisInstance.

#include <IrisInstanceEvent.h>
Classes

• struct EventSourceInfoAndDelegate
  
  Contains the metadata and delegates for a single EventSource.

Public Member Functions

• EventSourceInfoAndDelegate & addEventSource (const std::string &name, bool isHidden=false)
  
  Add metadata for an event source.

• uint64_t addEventSource (const EventSourceInfoAndDelegate &info)
  
  Add metadata for an event source.

• void attachTo (IrisInstance *irisInstance)
  
  Attach this IrisInstanceEvent add-on to a specific IrisInstance.

• IrisInstanceEvent (IrisInstance *irisInstance=nullptr)
  
  Construct an IrisInstanceEvent add-on.

• void setDefaultEsCreateDelegate (EventStreamCreateDelegate delegate)
  
  Set the default delegate for creating EventStreams for the attached instance.

8.18.1 Detailed Description

Event add-on for IrisInstance.

This class is used by instances to support event functionality. Generally, there are two kinds of event sources:

• Iris-specific event sources. These are defined in the Iris spec, for example IRIS_BREAKPOINT_HIT and IRIS_SIMULATION_TIME_EVENT.

• Simulation-specific event sources. These are not defined in the Iris spec. They could be quite different for different simulations or instances. For example INST (every instruction executed).

This class implements all Iris event*() functions. It maintains event source information that is added by addEventSource() and exposed by event_getEventSources() or event_getEventSource(). This class maintains all event streams. Iris-specific event streams are created by this add-on. Simulation-specific event streams are created by a delegate, which could be different for different simulations or instances.

8.18.2 Constructor & Destructor Documentation

8.18.2.1 IrisInstanceEvent()

iris::IrisInstanceEvent::IrisInstanceEvent ( IrisInstance * irisInstance = nullptr )

Construct an IrisInstanceEvent add-on.
Parameters

| irisInstance | The IrisInstance to which to attach this add-on. |

8.18.3 Member Function Documentation

8.18.3.1 addEventSource() [1/2]

```
EventSourceInfoAndDelegate& iris::IrisInstanceEvent::addEventSource (
    const std::string & name,
    bool isHidden = false)
```

Add metadata for an event source.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of the event source.</th>
</tr>
</thead>
<tbody>
<tr>
<td>isHidden</td>
<td>If true, this event source is hidden. The EventSourceInfo is not included in the list of event sources returned by event_getEventSources() but can still be accessed by event_getEventSource() if the client knows the name of the hidden event.</td>
</tr>
</tbody>
</table>

Returns

A reference to an object which keeps the metadata and event-specific delegates (if applicable) for this event. The reference is valid until the next call to addEventSource().

8.18.3.2 addEventSource() [2/2]

```
uint64_t iris::IrisInstanceEvent::addEventSource (
    const EventSourceInfoAndDelegate & info)
```

Add metadata for an event source.

Parameters

| info | The metadata and event-specific delegates (if applicable) for a new event to add. |

Returns

The evSrcId of the newly added event source.
8.18.3.3 attachTo()  

```c++
void iris::IrisInstanceEvent::attachTo (  
    IrisInstance * irisInstance  
)
```

Attach this `IrisInstanceEvent` add-on to a specific `IrisInstance`.

This should only be used if no instance was attached when this object was constructed.

**Parameters**

| **irisInstance** | The `IrisInstance` to which to attach this add-on. |

8.18.3.4 setDefaultEsCreateDelegate()  

```c++
void iris::IrisInstanceEvent::setDefaultEsCreateDelegate (  
    EventStreamCreateDelegate delegate  
)
```

Set the default delegate for creating EventStreams for the attached instance.

**Parameters**

| **delegate** | A delegate that will be called to create an event stream for event sources in the attached instance that have not set an event source-specific delegate. |

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

- IrisInstanceEvent.h

8.19 iris::IrisInstanceFactoryBuilder Class Reference

A builder class to construct instantiation parameter metadata.

```cpp
#include <IrisInstanceFactoryBuilder.h>
```

Inherited by iris::IrisPluginFactoryBuilder.

**Public Member Functions**

- `IrisParameterBuilder addBooleanParameter` (const std::string &name, const std::string &descr)  
  Add a new boolean parameter.

- `IrisParameterBuilder addHiddenBooleanParameter` (const std::string &name, const std::string &descr)  
  Add a new hidden boolean parameter.

- `IrisParameterBuilder addHiddenStringParameter` (const std::string &name, const std::string &descr)  
  Add a new hidden string parameter.
8.19 iris::IrisInstanceFactoryBuilder Class Reference

- IrisParameterBuilder addHidenParameter (const std::string &name, uint64_t bitWidth, const std::string &descr)
  Add a new hidden numeric parameter.
- IrisParameterBuilder addParameter (const std::string &name, uint64_t bitWidth, const std::string &descr)
  Add a new numeric parameter.
- IrisParameterBuilder addStringParameter (const std::string &name, const std::string &descr)
  Add a new string parameter.
- const std::vector<ResourceInfo>& getHiddenParameterInfo () const
  Get all ResourceInfo for hidden parameters.
- const std::vector<ResourceInfo>& getParameterInfo () const
  Get all ResourceInfo for non-hidden parameters.
- IrisInstanceFactoryBuilder (const std::string &prefix)
  Construct an IrisInstanceFactoryBuilder.

8.19.1 Detailed Description

A builder class to construct instantiation parameter metadata.

8.19.2 Constructor & Destructor Documentation

8.19.2.1 IrisInstanceFactoryBuilder()

iris::IrisInstanceFactoryBuilder::IrisInstanceFactoryBuilder {
    const std::string & prefix } [inline]

Construct an IrisInstanceFactoryBuilder.

Parameters

prefix | All parameters added to this builder are prefixed with this string.

8.19.3 Member Function Documentation

8.19.3.1 addBooleanParameter()

IrisParameterBuilder iris::IrisInstanceFactoryBuilder::addBooleanParameter {
    const std::string & name,
    const std::string & descr } [inline]

Add a new boolean parameter.

Boolean parameters are numeric parameters with a bitWidth of 1 and "true" and "false" enum symbols.
Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>Description of the parameter.</td>
</tr>
</tbody>
</table>

Returns

An IrisParameterBuilder object which can be used to set further metadata for this parameter. The object is valid until another parameter is added.

8.19.3.2 addHiddenBooleanParameter()

IrisParameterBuilder iris::IrisInstanceFactoryBuilder::addHiddenBooleanParameter (  
const std::string & name,  
const std::string & descr ) [inline]

Add a new hidden boolean parameter.

Boolean parameters are numeric parameters with a bitWidth of 1 and “true” and “false” enum symbols.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>Description of the parameter.</td>
</tr>
</tbody>
</table>

Returns

An IrisParameterBuilder object which can be used to set further metadata for this parameter. The object is valid until another parameter is added.

8.19.3.3 addHiddenStringParameter()

IrisParameterBuilder iris::IrisInstanceFactoryBuilder::addHiddenStringParameter (  
const std::string & name,  
const std::string & descr ) [inline]

Add a new hidden string parameter.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>Description of the parameter.</td>
</tr>
</tbody>
</table>
Returns

An IrisParameterBuilder object which can be used to set further metadata for this parameter. The object is valid until another parameter is added.

### 8.19.3.4 addHiddenParameter()

```cpp
IrisParameterBuilder iris::IrisInstanceFactoryBuilder::addHiddenParameter (  
    const std::string & name,  
    uint64_t bitWidth,  
    const std::string & descr  ) [inline]
```

Add a new hidden numeric parameter.

**Parameters**

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>bitWidth</td>
<td>Width of the parameter in bits.</td>
</tr>
<tr>
<td>descr</td>
<td>Description of the parameter.</td>
</tr>
</tbody>
</table>

Returns

An IrisParameterBuilder object which can be used to set further metadata for this parameter. The object is valid until another parameter is added.

### 8.19.3.5 addParameter()

```cpp
IrisParameterBuilder iris::IrisInstanceFactoryBuilder::addParameter (  
    const std::string & name,  
    uint64_t bitWidth,  
    const std::string & descr  ) [inline]
```

Add a new numeric parameter.

**Parameters**

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>bitWidth</td>
<td>Width of the parameter in bits.</td>
</tr>
<tr>
<td>descr</td>
<td>Description of the parameter.</td>
</tr>
</tbody>
</table>

Returns

An IrisParameterBuilder object which can be used to set further metadata for this parameter. The object is valid until another parameter is added.
8.19.3.6 addStringParameter()

IrisParameterBuilder iris::IrisInstanceFactoryBuilder::addStringParameter (  
    const std::string & name, 
    const std::string & descr ) [inline]

Add a new string parameter.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>Description of the parameter.</td>
</tr>
</tbody>
</table>

Returns

An IrisParameterBuilder object which can be used to set further metadata for this parameter. The object is valid until another parameter is added.

8.19.3.7 getHiddenParameterInfo()

const std::vector<ResourceInfo>& iris::IrisInstanceFactoryBuilder::getHiddenParameterInfo ( ) const [inline]

Get all ResourceInfo for hidden parameters.

Returns

A vector of ResourceInfo. Iterators for this vector are invalidated if a new hidden parameter is added.

8.19.3.8 getParameterInfo()

const std::vector<ResourceInfo>& iris::IrisInstanceFactoryBuilder::getParameterInfo ( ) const [inline]

Get all ResourceInfo for non-hidden parameters.

Returns

A vector of ResourceInfo. Iterators for this vector are invalidated if a new non-hidden parameter is added.

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

- IrisInstanceFactoryBuilder.h
8.20  iris::IrisInstanceImage Class Reference

Image loading add-on for IrisInstance.

#include <IrisInstanceImage.h>

Public Member Functions

• void attachTo (IrisInstance ∗irisInstance)
  Attach this IrisInstance add-on to a specific IrisInstance.
• IrisInstanceImage (IrisInstance ∗irisInstance=0)
  Construct a new IrisInstanceImage.
• void setLoadImageDataDelegate (ImageLoadDataDelegate delegate)
  Set image loading from (pushed/pulled) data delegate.
• void setLoadImageFileDelegate (ImageLoadFileDelegate delegate)
  Set image loading from file delegate.

Static Public Member Functions

• static IrisErrorCode readFileData (const std::string &fileName, std::vector< uint64_t > &data, uint64_t &count)
  Read file data into a uint64_t array and record the number of bytes read.

8.20.1  Detailed Description

Image loading add-on for IrisInstance.

This class is used by instances to support image loading. It is also used by instances that want to use image_loadDataPull() to implement the image_loadDataRead() callback.

This class implements the Iris image() functions. It maintains or implements two main things:

• Functions to load images:
  – From a file, by image_loadFile(), or from a data buffer, by image_loadData() or image_loadDataPull().
  – As raw data, by specifying rawAddr and rawSpaceId.
• Image meta information, which is exposed by image_getMetaInfoList() or cleared by image_clearMetaInfoList().

See DummyComponent.h for a working example.

8.20.2  Constructor & Destructor Documentation

8.20.2.1  IrisInstanceImage()

iris::IrisInstanceImage::IrisInstanceImage ( IrisInstance ∗irisInstance = 0 )

Construct a new IrisInstanceImage.
Parameters

| irisInstance | The IrisInstance to attach this add-on to. |

8.20.3 Member Function Documentation

8.20.3.1 attachTo()

```cpp
void iris::IrisInstanceImage::attachTo (
    IrisInstance ∗ irisInstance )
```

Attach this IrisInstance add-on to a specific IrisInstance.

Parameters

| irisInstance | The IrisInstance to attach this add-on to. |

8.20.3.2 readFileData()

```cpp
static IrisErrorCode iris::IrisInstanceImage::readFileData ( 
    const std::string & fileName, 
    std::vector< uint64_t > & data, 
    uint64_t & count ) [static]
```

Read file data into a uint64_t array and record the number of bytes read.

Parameters

| fileName | Name of the file to read. |
| data     | A reference to a vector which is populated with the file contents. |
| count    | A reference to a variable which is set to the number of bytes that were read. |

Returns

An error code indicating success or failure.

8.20.3.3 setLoadImageDataDelegate()

```cpp
void iris::IrisInstanceImage::setLoadImageDataDelegate ( 
    ImageLoadDataDelegate delegate )
```

Set image loading from (pushed/pulled) data data delegate.
Parameters

| delegate | The delegate that will be called to load an image from a data buffer. |

8.20.3.4 setLoadImageFileDelegate()

```cpp
void iris::IrisInstanceImage::setLoadImageFileDelegate (ImageLoadFileDelegate delegate)
```

Set image loading from file delegate.

Parameters

| delegate | The delegate that will be called to load an image from a file. |

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

- IrisInstanceImage.h

8.21 iris::IrisInstanceImage_Callback Class Reference

Image loading add-on for IrisInstance clients implementing image_loadDataRead().

```cpp
#include <IrisInstanceImage.h>
```

Public Member Functions

- void attachTo (IrisInstance *irisInstance)  
  Attach this IrisInstance add-on to a specific IrisInstance.
- IrisInstanceImage_Callback (IrisInstance *irisInstance=0)  
  Construct an IrisInstanceImage_Callback add-on.
- uint64_t openImage (const std::string &fileName)  
  Open an image for read.

Protected Member Functions

- void impl_image_loadDataRead (IrisReceivedRequest &request)  
  Implementation of the Iris function image_loadDataRead().

Generated by Doxygen
8.21.1 Detailed Description

Image loading add-on for IrisInstance clients implementing image_loadDataRead().

This is used by instances that call the instances supporting image_loadDataPull().

This class maintains/implements:

- Iris image_loadDataRead() function.
- Image opening, data reading.
- Tags of images.

8.21.2 Constructor & Destructor Documentation

8.21.2.1 IrisInstanceImage_Callback()

iris::IrisInstanceImage_Callback::IrisInstanceImage_Callback ( IrisInstance * irisInstance = 0 )

Construct an IrisInstanceImage_Callback add-on.

Parameters

| irisInstance | The IrisInstance to attach this add-on to. |

8.21.3 Member Function Documentation

8.21.3.1 attachTo()

void iris::IrisInstanceImage_Callback::attachTo ( IrisInstance * irisInstance )

Attach this IrisInstance add-on to a specific IrisInstance.

Parameters

| irisInstance | The IrisInstance to attach this add-on to. |
8.21.3.2 openImage()

```cpp
uint64_t iris::IrisInstanceImage_Callback::openImage ( const std::string & fileName )
```

Open an image for read.

**Parameters**

| fileName | File name of the image file to read. |

**Returns**

An opaque tag number that is passed to image_loadDataRead() to identify the file to read from. This returns `iris::IRIS_UINT64_MAX` on failure to open the image.

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

- IrisInstanceImage.h

8.22 iris::IrisInstanceMemory Class Reference

Memory add-on for IrisInstance.

```cpp
#include <IrisInstanceMemory.h>
```

**Classes**

- `struct AddressTranslationInfoAndAccess`
  Contains static address translation information.
- `struct SpaceInfoAndAccess`
  Entry in 'spaceInfos'.

**Public Member Functions**

- `AddressTranslationInfoAndAccess & addAddressTranslation (MemorySpaceId inSpaceId, MemorySpaceId outSpaceId, const std::string &description)`
  Add one memory address translation as well as the translate interface.
- `SpaceInfoAndAccess & addMemorySpace (const std::string &name)`
  Add meta information for one memory space.
- `void attachTo (IrisInstance *irisInstance)`
  Attach this IrisInstance add-on to a specific IrisInstance.
- `IrisInstanceMemory (IrisInstance *irisInstance=0)`
  Construct an IrisInstanceMemory.
- `void setDefaultGetSidebandInfoDelegate (MemoryGetSidebandInfoDelegate delegate=MemoryGetSidebandInfoDelegate())`
  Set the default delegate to retrieve sideband information.
- `void setDefaultReadDelegate (MemoryReadDelegate delegate=MemoryReadDelegate())`
  Set default read function for all subsequently added memory spaces.
- `void setDefaultTranslateDelegate (MemoryAddressTranslateDelegate delegate=MemoryAddressTranslateDelegate())`
  Set the default memory translation delegate.
- `void setDefaultWriteDelegate (MemoryWriteDelegate delegate=MemoryWriteDelegate())`
  Set default write function for all subsequently added memory spaces.
8.22.1 Detailed Description

Memory add-on for `IrisInstance`.

This class is used by instances to expose their own memory.

It implements all Iris memory\*() functions. It maintains/implements two main things:

- Memory space meta information (exposed by `memory_getMemorySpaces()`).
- Forwarding memory read/write and address translate accesses to functions with a simple prototype which is easy to implement by components, hiding a lot of the complexity of `memory_read()`, `memory_write()`, and `memory_translateAddress()`.

Example usage:

```cpp
irisInstance = new iris::IrisInstance(irisInterface, instanceName);
irisInstanceMemory = new iris::IrisInstanceMemory(irisInstance);
// Use these delegates for read/write for all following memory spaces.
irisInstanceMemory->setDefaultReadDelegate<DummyComponent, &DummyComponent::readMemory>(this);
irisInstanceMemory->setDefaultWriteDelegate<DummyComponent, &DummyComponent::writeMemory>(this);
irisInstanceMemory->addMemorySpace("Memory"); // Add a memory address space.
```

See `setDefaultReadDelegate()` for an example of read/write delegates.

See `DummyComponent.h` for a working example.

See also

`IrisInstanceBuilder` memory APIs

8.22.2 Constructor & Destructor Documentation

8.22.2.1 IrisInstanceMemory()

```cpp
iris::IrisInstanceMemory::IrisInstanceMemory ( IrisInstance * irisInstance = 0 )
```

Construct an `IrisInstanceMemory`.

Optionally attaches to an `IrisInstance`.

Parameters

- `irisInstance` The `IrisInstance` to attach to.
8.22.3 Member Function Documentation

8.22.3.1 addAddressTranslation()

```cpp
AddressTranslationInfoAndAccess& iris::IrisInstanceMemory::addAddressTranslation (
    MemorySpaceId inSpaceId,
    MemorySpaceId outSpaceId,
    const std::string & description )
```

Add one memory address translation as well as the translate interface.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>inSpaceId</code></td>
<td>Memory space id for the input memory space of this translation.</td>
</tr>
<tr>
<td><code>outSpaceId</code></td>
<td>Memory space id for the output memory space of this translation.</td>
</tr>
<tr>
<td><code>description</code></td>
<td>A human-readable description of this translation.</td>
</tr>
</tbody>
</table>

**Returns**

A reference to an `AddressTranslationInfoAndAccess` object for the new translation. This reference is valid until the next time `addAddressTranslation()` is called.

8.22.3.2 addMemorySpace()

```cpp
SpaceInfoAndAccess& iris::IrisInstanceMemory::addMemorySpace ( 
    const std::string & name )
```

Add meta information for one memory space.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>name</code></td>
<td>Name of the memory space.</td>
</tr>
</tbody>
</table>

**Returns**

A reference to a `SpaceInfoAndAccess` object for this new memory space. This reference is valid until the next time `addMemorySpace()` is called.

8.22.3.3 attachTo()

```cpp
void iris::IrisInstanceMemory::attachTo ( 
    IrisInstance * irisInstance )
```

Generated by Doxygen
Attach this `IrisInstance` add-on to a specific `IrisInstance`.
### 8.22.3.4 setDefaultGetSidebandInfoDelegate()

```cpp
class iris::IrisInstanceMemory::setDefaultGetSidebandInfoDelegate {
    MemoryGetSidebandInfoDelegate delegate = MemoryGetSidebandInfoDelegate(); } [inline]
```

Set the default delegate to retrieve sideband information.

**Parameters**

| delegate | Delegate object which will be called to get sideband information for a memory space. |

### 8.22.3.5 setDefaultReadDelegate()

```cpp
class iris::IrisInstanceMemory::setDefaultReadDelegate {
    MemoryReadDelegate delegate = MemoryReadDelegate(); } [inline]
```

Set default read function for all subsequently added memory spaces.

**Parameters**

| delegate | Delegate object which will be called to read memory. |

### 8.22.3.6 setDefaultTranslateDelegate()

```cpp
class iris::IrisInstanceMemory::setDefaultTranslateDelegate {
    MemoryAddressTranslateDelegate delegate = MemoryAddressTranslateDelegate(); } [inline]
```

Set the default memory translation delegate.

**Parameters**

| delegate | Delegate object which will be called to translate addresses. |
8.22.3.7 setDefaultWriteDelegate()

```cpp
template-transparent
void iris::IrisInstanceMemory::setDefaultWriteDelegate (MemoryWriteDelegate delegate = MemoryWriteDelegate()) [inline]
```

Set default write function for all subsequently added memory spaces.

**Parameters**

- `delegate` Delegate object which will be called to write memory.

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

- IrisInstanceMemory.h

---

8.23 iris::IrisInstancePerInstanceExecution Class Reference

Per-instance execution control add-on for IrisInstance.

```cpp
#include <IrisInstancePerInstanceExecution.h>
```

**Public Member Functions**

- void `attachTo(IrisInstance *irisInstance)`
  - Attach this IrisInstancePerInstanceExecution add-on to a specific IrisInstance.
- IrisInstancePerInstanceExecution(IrisInstance *irisInstance=nullptr)
  - Construct an IrisInstancePerInstanceExecution add-on.
- void `setExecutionStateGetDelegate(PerInstanceExecutionStateGetDelegate delegate)`
  - Set the delegate for getting execution state.
- void `setExecutionStateSetDelegate(PerInstanceExecutionStateSetDelegate delegate)`
  - Set the delegate for setting execution state.

---

8.23.1 Detailed Description

Per-instance execution control add-on for IrisInstance.

This class is used by instances to support per-instance execution control functionality.

This class implements all Iris perInstanceExecution*() functions.

---

8.23.2 Constructor & Destructor Documentation

---

8.23.2.1 IrisInstancePerInstanceExecution()

```cpp
iris::IrisInstancePerInstanceExecution::IrisInstancePerInstanceExecution (IrisInstance *irisInstance = nullptr)
```

Construct an IrisInstancePerInstanceExecution add-on.
Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>irisInstance</td>
<td>The IrisInstance to attach this add-on to.</td>
</tr>
</tbody>
</table>

8.23.3 Member Function Documentation

8.23.3.1 attachTo()

```cpp
void iris::IrisInstancePerInstanceExecution::attachTo ( IrisInstance * irisInstance )
```

Attach this IrisInstancePerInstanceExecution add-on to a specific IrisInstance.

This should only be used if no instance was attached when this object was constructed.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>irisInstance</td>
<td>The IrisInstance to attach this add-on to.</td>
</tr>
</tbody>
</table>

8.23.3.2 setExecutionStateGetDelegate()

```cpp
void iris::IrisInstancePerInstanceExecution::setExecutionStateGetDelegate ( PerInstanceExecutionStateGetDelegate delegate )
```

Set the delegate for getting execution state.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>delegate</td>
<td>A delegate object which will be called to get the current execution state for the attached instance.</td>
</tr>
</tbody>
</table>

8.23.3.3 setExecutionStateSetDelegate()

```cpp
void iris::IrisInstancePerInstanceExecution::setExecutionStateSetDelegate ( PerInstanceExecutionStateSetDelegate delegate )
```

Set the delegate for setting execution state.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>delegate</td>
<td>A delegate object which will be called to set execution state for the attached instance.</td>
</tr>
</tbody>
</table>
The documentation for this class was generated from the following file:

- IrisInstancePerInstanceExecution.h

### 8.24 iris::IrisInstanceResource Class Reference

Resource add-on for IrisInstance.

```cpp
#include <IrisInstanceResource.h>
```

**Classes**

- struct ResourceInfoAndAccess
  
  *Entry in 'resourceInfos'.*

**Public Member Functions**

- `ResourceInfoAndAccess & addResource (const std::string &type, const std::string &name, const std::string &descr)`
  
  *Add a new resource.*
- `void attachTo (IrisInstance *irisInstance)`
  
  *Attach this IrisInstance add-on to a specific IrisInstance.*
- `void beginResourceGroup (const std::string &name, const std::string &descr, ResourceId rscIdStart=0, const std::string &cname=std::string())`
  
  *Begin a new resource group.*
- `ResourceInfoAndAccess *getResourceInfo (ResourceId rscId)`
  
  *Get the resource info for a resource that was already added.*
- `IrisInstanceResource (IrisInstance *irisInstance=0)`
  
  *Construct an IrisInstanceResource.*
- `void setNextRscId (ResourceId nextRscId_)`
  
  *Set next rsclid.*
- `void setTag (ResourceId rscId, const std::string &tag)`
  
  *Set a tag for a specific resource.*

**Protected Member Functions**

- `void impl_resource_getList (IrisReceivedRequest &request)`
- `void impl_resource_getListOfResourceGroups (IrisReceivedRequest &request)`
- `void impl_resource_read (IrisReceivedRequest &request)`
- `void impl_resource_write (IrisReceivedRequest &request)`
8.24.1 Detailed Description

Resource add-on for IrisInstance.

This class implements all Iris resource+( ) functions. It maintains/implements two main things:

- Resource meta information that is exposed by resource_getList() and resource_getListOfResourceGroups().
- Forwarding resource read/write accesses to functions with a simple prototype which is easy to implement by components, hiding a lot of the complexity of resource_read() and resource_write().

In most cases, an instance should not use IrisInstanceResource directly but should use IrisInstanceBuilder instead.

8.24.2 Constructor & Destructor Documentation

8.24.2.1 IrisInstanceResource()

iris::IrisInstanceResource::IrisInstanceResource ( IrisInstance * irisInstance = 0 )

Construct an IrisInstanceResource.

Optionally attaches to an IrisInstance.

Parameters

| irisInstance | The IrisInstance to attach to. |

8.24.3 Member Function Documentation

8.24.3.1 addResource()

ResourceInfoAndAccess& iris::IrisInstanceResource::addResource ( const std::string & type, const std::string & name, const std::string & descr )

Add a new resource.
Parameters

<table>
<thead>
<tr>
<th>type</th>
<th>The type of the resource. This should be one of:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• &quot;numeric&quot;</td>
</tr>
<tr>
<td></td>
<td>• &quot;numericFp&quot;</td>
</tr>
<tr>
<td></td>
<td>• &quot;String&quot;</td>
</tr>
<tr>
<td></td>
<td>• &quot;noValue&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>name</th>
<th>The name of the resource.</th>
</tr>
</thead>
</table>

| descr | A human-readable description of the resource.   |

Returns

A reference to a ResourceInfoAndAccess object for this new resource. This reference is valid until the next time addResource() is called.

8.24.3.2 attachTo()

```cpp
void iris::IrisInstanceResource::attachTo ( IrisInstance * irisInstance )
```

Attach this IrisInstance add-on to a specific IrisInstance.

Parameters

| irisInstance | The IrisInstance to attach to. |

8.24.3.3 beginResourceGroup()

```cpp
void iris::IrisInstanceResource::beginResourceGroup ( const std::string & name,
                                                      const std::string & descr,
                                                      ResourceId rscIdStart = 0,
                                                      const std::string & cname = std::string() )
```

Begin a new resource group.

This method has these effects:

- Add a resource group (only if it does not yet exist).
- Assign all resources that are added through addResource() calls to this group, starting with rscId rscIdStart (if possible).
Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of the resource group.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>A description of this resource group.</td>
</tr>
<tr>
<td>rscIdStart</td>
<td>Start counting from this rscId when new resources are added.</td>
</tr>
<tr>
<td>cname</td>
<td>A C identifier version of the resource name if different from name.</td>
</tr>
</tbody>
</table>

8.24.3.4 getResourceInfo()

```
ResourceInfoAndAccess* iris::IrisInstanceResource::getResourceInfo ( 
    ResourceId rscId )
```

Get the resource info for a resource that was already added.

Parameters

| rscId | A resource id for a resource that was already added. |

Returns

A pointer to the ResourceInfoAndAccess object for the requested resource. This pointer is valid until the next call to addResource(). If rscId is not a valid id, this function returns nullptr.

8.24.3.5 setNextRscId()

```
void iris::IrisInstanceResource::setNextRscId ( 
    ResourceId nextRscId_ ) [inline]
```

Set next rscId.

Resources that are added following this call are assigned rscIds starting at nextRscId (if possible). It is usually not necessary to call this function. It might however be useful to achieve a certain rscId naming scheme which simplifies the evaluation of the rscId in the read/write function.

Parameters

| nextRscId | Next rscId |

8.24.3.6 setTag()

```
void iris::IrisInstanceResource::setTag ( 
```
ResourceId rscId,
const std::string & tag)

Set a tag for a specific resource.

Parameters

<table>
<thead>
<tr>
<th>rscId</th>
<th>Resource Id for the resource that will have this tag set.</th>
</tr>
</thead>
<tbody>
<tr>
<td>tag</td>
<td>Name of the boolean tag which will be set to true.</td>
</tr>
</tbody>
</table>

See also

IrisInstanceBuilder::setTag

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

- IrisInstanceResource.h

### 8.25 iris::IrisInstanceSemihosting Class Reference

#### Public Member Functions

- **attachTo** (IrisInstance *iris_instance)
  
  Attach this IrisInstance add-on to a specific IrisInstance.

- **enableExtensions** ()
  
  Instances that support semihosting extensions should call this method to enable the IRIS_SEMIHOSTING_CA_LL_EXTENSION event.

- **IrisInstanceSemihosting** (IrisInstance *iris_instance=nullptr, IrisInstanceEvent *inst_event=nullptr)
  
  Read data for a given file descriptor.

- **std::vector<uint8_t> readData** (uint64_t fDes, size_t max_size=0, uint64_t flags=semihost::DEFAULT)
  
  Allow a client to perform a semihosting extension defined by operation and parameter.

- **void setEventHandler** (IrisInstanceEvent *handler)
  
  Set the corresponding IrisInstanceEvent object to use to manage semihosting events.

- **bool writeData** (uint64_t fDes, const uint8_t *data, size_t size)
  
#### 8.25.1 Member Function Documentation

8.25.1.1 **attachTo()**

```c
void iris::IrisInstanceSemihosting::attachTo {
    IrisInstance * iris_instance
}
```

Attach this IrisInstance add-on to a specific IrisInstance.
Parameters

| iris_instance | The instance to attach to. |

### 8.25.1.2 readData()

```cpp
std::vector<uint8_t> iris::IrisInstanceSemihosting::readData ( 
    uint64_t fDes, 
    size_t max_size = 0,
    uint64_t flags = semihost::DEFAULT 
)
```

Read data for a given file descriptor.

The exact behavior of this method depends on the value of the max_size and flags parameters. If the NONBLOCK flag is set, the method returns immediately with whatever data is already buffered, if any. If NONBLOCK is not set, the method blocks until data is available. Iris messages continue to be processed while this methods blocks. If max_size is not zero, then at most max_size bytes will be returned.

Parameters

<table>
<thead>
<tr>
<th>fDes</th>
<th>File descriptor to read from. Usually semihost::STDIN.</th>
</tr>
</thead>
<tbody>
<tr>
<td>max_size</td>
<td>The maximum amount of bytes to read or zero for no limit.</td>
</tr>
<tr>
<td>flags</td>
<td>A bitwise OR of Semihosting data request flag constants</td>
</tr>
</tbody>
</table>

Returns

A vector of data that was read.

### 8.25.1.3 semihostedCall()

```cpp
std::pair<bool, uint64_t> iris::IrisInstanceSemihosting::semihostedCall ( 
    uint64_t operation, 
    uint64_t parameter 
)
```

Allow a client to perform a semihosting extension defined by operation and parameter.

This might implement a user-defined operation or override the default implementation for a predefined operation.

Parameters

<table>
<thead>
<tr>
<th>operation</th>
<th>A number indicating the operation to perform. This is defined by the semihosting standard for standard operations or by the client for user-defined operations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>parameter</td>
<td>A parameter to the operation. This meaning of this parameter is defined by the operation.</td>
</tr>
</tbody>
</table>
Class Documentation

Returns

A pair of (bool success, uint64_t result). If status is true, a client performed the function and returned the value in result. If status is false, no client performed the function and result is 0.

8.25.1.4 setEventHandler()

void iris::IrisInstanceSemihosting::setEventHandler (IrisInstanceEvent * handler)

Set the corresponding IrisInstanceEvent object to use to manage semihosting events.

This must not be called more than once and must be called with an Event add-on that is attached to the same IrisInstance as this semihosting add-on.

Parameters

| handler | The event add-on for this Iris instance. |

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

- IrisInstanceSemihosting.h

8.26 iris::IrisInstanceSimulation Class Reference

An IrisInstance add-on that adds simulation functions for the SimulationEngine instance.

#include <IrisInstanceSimulation.h>

Public Member Functions

- void attachTo (IrisInstance *iris_instance)
  
  Attach this IrisInstance add-on to a specific IrisInstance.
- void enterPostInstantiationPhase ()
  
  Move from the pre-instantiation to the post-instantiation phase.
- IrisInstanceSimulation (IrisInstance *iris_instance=nullptr, IrisConnectionInterface *connection_interface=nullptr)
  
  Construct an IrisInstanceSimulation add-on.
- void notifySimPhase (uint64_t time, IrisSimulationPhase phase)
  
  Emit an IRIS_SIM_PHASE event for the supplied phase.
- void setConnectionInterface (IrisConnectionInterface *connection_interface_)
  
  Set the IrisConnectionInterface to use for the instantiation.
- void setEventHandler (IrisInstanceEvent *handler)
  
  Set up IRIS_SIM_PHASE events.
- void setGetParameterInfoDelegate (SimulationGetParameterInfoDelegate delegate, bool cache_result=true)
  
  Set the getParameterInfo() delegate.
8.26 iris::IrisInstanceSimulation Class Reference

- template<typename T, IrisErrorCode(T::)(std::vector<ResourceInfo>&) METHOD>
  void setGetParameterInfoDelegate (T* instance, bool cache_result=true)
    Set the getParameterInfo() delegate.

- template<IrisErrorCode(T::)(std::vector<ResourceInfo>&) FUNC>
  void setGetParameterInfoDelegate (bool cache_result=true)
    Set the getParameterInfo() delegate.

- void setInstantiateDelegate (SimulationInstantiateDelegate delegate)
  Set the instantiate() delegate.

- template<typename T, IrisErrorCode(T::)(InstantiationResult&) METHOD>
  void setInstantiateDelegate (T* instance)
  Set the instantiate() delegate.

- template<IrisErrorCode(T::)(InstantiationResult&) FUNC>
  void setInstantiateDelegate ()
  Set the instantiate() delegate.

- void setRequestShutdownDelegate (SimulationRequestShutdownDelegate delegate)
  Set the requestShutdown() delegate.

- template<typename T, IrisErrorCode(T::)() METHOD>
  void setRequestShutdownDelegate (T* instance)
  Set the requestShutdown() delegate.

- template<IrisErrorCode(T::)() FUNC>
  void setRequestShutdownDelegate ()
  Set the requestShutdown() delegate.

- void setResetDelegate (SimulationResetDelegate delegate)
  Set the reset() delegate.

- template<typename T, IrisErrorCode(T::)(const IrisSimulationResetContext&) METHOD>
  void setResetDelegate (T* instance)
  Set the reset() delegate.

- template<IrisErrorCode(T::)(const IrisSimulationResetContext&) FUNC>
  void setResetDelegate ()
  Set the reset() delegate.

- void setSetParameterValueDelegate (SimulationSetParameterValueDelegate delegate)
  Set the setParameterValue() delegate.

- template<typename T, IrisErrorCode(T::)(const InstantiationParameterValue&) METHOD>
  void setSetParameterValueDelegate (T* instance)
  Set the setParameterValue() delegate.

- template<IrisErrorCode(T::)(const InstantiationParameterValue&) FUNC>
  void setSetParameterValueDelegate ()
  Set the setParameterValue() delegate.

8.26.1 Detailed Description

An IrisInstance add-on that adds simulation functions for the SimulationEngine instance.

8.26.2 Constructor & Destructor Documentation

8.26.2.1 IrisInstanceSimulation()

iris::IrisInstanceSimulation::IrisInstanceSimulation ( IrisInstance* iri_instance = nullptr,
IrisConnectionInterface* connection_interface = nullptr )

Construct an IrisInstanceSimulation add-on.
Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>iris_instance</code></td>
<td>The IrisInstance to attach this add-on to.</td>
</tr>
<tr>
<td><code>connection_interface</code></td>
<td>The connection interface that will be used when the simulation is instantiated.</td>
</tr>
</tbody>
</table>

8.26.3 Member Function Documentation

8.26.3.1 attachTo()

```cpp
void iris::IrisInstanceSimulation::attachTo ( IrisInstance * iris_instance )
```

Attach this IrisInstance add-on to a specific IrisInstance.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>iris_instance</code></td>
<td>The IrisInstance to attach to.</td>
</tr>
</tbody>
</table>

8.26.3.2 enterPostInstantiationPhase()

```cpp
void iris::IrisInstanceSimulation::enterPostInstantiationPhase ( )
```

Move from the pre-instantiation to the post-instantiation phase.

This effects which functions are published. Only call this function if the simulation is instantiated outside of Iris. This object automatically enters post-instantiation phase when the simulation is successfully instantiated by an Iris call to simulation_instantiate().

8.26.3.3 notifySimPhase()

```cpp
void iris::IrisInstanceSimulation::notifySimPhase ( uint64_t time, IrisSimulationPhase phase )
```

Emit an IRIS_SIM_PHASE* event for the supplied phase.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>time</code></td>
<td>The simulation time at which the event occurred.</td>
</tr>
<tr>
<td><code>phase</code></td>
<td>The simulation phase that was reached.</td>
</tr>
</tbody>
</table>
8.26.3.4 setConnectionInterface()

void iris::IrisInstanceSimulation::setConnectionInterface ( 
    IrisConnectionInterface * connection_interface_ ) [inline]

Set the IrisConnectionInterface to use for the instantiation.
This will be passed to the instantiate() delegate when the simulation is instantiated.

8.26.3.5 setEventHandler()

void iris::IrisInstanceSimulation::setEventHandler ( 
    IrisInstanceEvent * handler )

Set up IRIS_SIM_PHASE events.

Parameters

| handler | An IrisInstanceEvent add-on that is attached to the same instance as this add-on. |

8.26.3.6 setGetParameterInfoDelegate() [1/3]

void iris::IrisInstanceSimulation::setGetParameterInfoDelegate ( 
    SimulationGetParameterInfoDelegate delegate, 
    bool cache_result = true ) [inline]

Set the getParameterInfo() delegate.

Parameters

| delegate | A delegate object that is called to get instantiation parameter information for the simulation. |
| cache_result | If true, the delegate is only called once and the result is cached and used for subsequent calls to simulation_getInstantiationParameterInfo(). If false, the result is not cached and the delegate is called every time. |

8.26.3.7 setGetParameterInfoDelegate() [2/3]

template<typename T , IrisErrorCode(T::*) (std::vector<ResourceInfo> &) METHOD> 
void iris::IrisInstanceSimulation::setGetParameterInfoDelegate ( 
    T * instance, 
    bool cache_result = true ) [inline]

Set the getParameterInfo() delegate.

Set the delegate to call a method in class T.

Generated by Doxygen
Class Documentation

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a getParameterInfo delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class $T$ that is a getParameterInfo delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class $T$ on which METHOD should be called. |
| cache_result | If true, the delegate is called once and the result is cached and used for subsequent calls to simulation_getInstantiationParameterInfo(). If false, the result is not cached and the delegate is called every time. |

8.26.3.8 setGetParameterInfoDelegate() [3/3]

```cpp
template<IrisErrorCode(*)(std::vector<ResourceInfo>&) FUNC>
void iris::IrisInstanceSimulation::setGetParameterInfoDelegate (bool cache_result = true) [inline]
```

Set the getParameterInfo() delegate.

Set the delegate to a global function.

Template Parameters

| FUNC | A function that is a getParameterInfo delegate. |

Parameters

| cache_result | If true, the delegate is only called once and the result is cached and used for subsequent calls to simulation_getInstantiationParameterInfo(). If false, the result is not cached and the delegate is called every time. |

8.26.3.9 setInstantiateDelegate() [1/3]

```cpp
void iris::IrisInstanceSimulation::setInstantiateDelegate (SimulationInstantiateDelegate delegate) [inline]
```

Set the instantiate() delegate.

Parameters

| delegate | A delegate object that will be called to instantiate the simulation. |
8.26.3.10  setInstantiateDelegate() [2/3]

template<typename T, IrisErrorCode(T::*)(InstantiationResult &) METHOD>
void iris::IrisInstanceSimulation::setInstantiateDelegate (T * instance) [inline]

Set the instantiate() delegate.

Set the delegate to call a method in class T.

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines an instantiate delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T that is an instantiate delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance   | An instance of class T on which METHOD should be called. |

8.26.3.11  setInstantiateDelegate() [3/3]

template<IrisErrorCode(*)(InstantiationResult &) FUNC>
void iris::IrisInstanceSimulation::setInstantiateDelegate ( ) [inline]

Set the instantiate() delegate.

Set the delegate to a global function.

Template Parameters

| FUNC     | A function that is an instantiate delegate. |

8.26.3.12  setRequestShutdownDelegate() [1/3]

void iris::IrisInstanceSimulation::setRequestShutdownDelegate (SimulationRequestShutdownDelegate delegate) [inline]

Set the requestShutdown() delegate.

Parameters

| delegate | A delegate object that will be called to request that the simulation be shut down. |
8.26.3.13 setRequestShutdownDelegate() [2/3]

```cpp
template<typename T, IrisErrorCode(T::*>() METHOD>
void iris::IrisInstanceSimulation::setRequestShutdownDelegate ( T * instance ) [inline]
```

Set the requestShutdown() delegate.

Set the delegate to call a method in class T.

Template Parameters

- **T**  
  Class that defines a requestShutdown delegate method.

- **METHOD**  
  A method of class T that is a requestShutdown delegate.

Parameters

- **instance**  
  An instance of class T on which METHOD should be called.

8.26.3.14 setRequestShutdownDelegate() [3/3]

```cpp
template<IrisErrorCode(*>() () FUNC>
void iris::IrisInstanceSimulation::setRequestShutdownDelegate ( ) [inline]
```

Set the requestShutdown() delegate.

Set the delegate to a global function.

Template Parameters

- **FUNC**  
  A function that is a requestShutdown delegate.

8.26.3.15 setResetDelegate() [1/3]

```cpp
void iris::IrisInstanceSimulation::setResetDelegate ( SimulationResetDelegate delegate ) [inline]
```

Set the reset() delegate.

Parameters

- **delegate**  
  A delegate object which will be called to reset the simulation.
8.26.3.16 setResetDelegate() [2/3]

template<typename T , IrisErrorCode(T::* )(const IrisSimulationResetContext & ) METHOD>
void iris::IrisInstanceSimulation::setResetDelegate ( 
    T * instance ) [inline]

Set the reset() delegate.

Set the delegate to call a method in class T.

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a reset delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T that is a reset delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

8.26.3.17 setResetDelegate() [3/3]

template<IrisErrorCode( *)(const IrisSimulationResetContext & ) FUNC>
void iris::IrisInstanceSimulation::setResetDelegate ( ) [inline]

Set the reset() delegate.

Set the delegate to a global function.

Template Parameters

| FUNC     | A function that is a reset delegate. |

8.26.3.18 setSetParameterValueDelegate() [1/3]

void iris::IrisInstanceSimulation::setSetParameterValueDelegate ( 
    SimulationSetParameterValueDelegate delegate ) [inline]

Set the setParameterValue() delegate.

Parameters

| delegate | A delegate object that is called to set instantiation parameter values before instantiation. |
8.26.3.19  setSetParameterValueDelegate() [2/3]

template<typename T , IrisErrorCode(T::*)(const InstantiationParameterValue & ) METHOD>
void iris::IrisInstanceSimulation::setSetParameterValueDelegate ( 
    T * instance ) [inline]

Set the setParameterValue() delegate.

Set the delegate to call a method in class T.

Template Parameters

T | Class that defines a setParameterValue delegate method.
METHOD | A method of class T that is a setParameterValue delegate.

Parameters

instance | An instance of class T on which METHOD should be called.

8.26.3.20  setSetParameterValueDelegate() [3/3]

template<IrisErrorCode(*)(const InstantiationParameterValue & ) FUNC>
void iris::IrisInstanceSimulation::setSetParameterValueDelegate ( ) [inline]

Set the setParameterValue() delegate.

Set the delegate to a global function.

Template Parameters

FUNC | A function that is a setParameterValue delegate.

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

- IrisInstanceSimulation.h

8.27  iris::IrisInstanceSimulationTime Class Reference

Simulation time add-on for IrisInstance.

#include <IrisInstanceSimulationTime.h>
Public Member Functions

- void attachTo (IrisInstance *irisInstance)
  Attach this IrisInstance add-on to a specific IrisInstance.
- IrisInstanceSimulationTime (IrisInstance *iris_instance=nullptr, IrisInstanceEvent *inst_event=nullptr)
  Construct an IrisInstanceSimulationTime add-on.
- void notifySimulationTimeEvent (TIME_EVENT_REASON reason=TIME_EVENT_UNKNOWN)
  Generate the IRIS_SIMULATION_TIME_EVENT event callback.
- void setEventHandler (IrisInstanceEvent *handler)
  Set the event handler to use to send simulation time-related events.
- void setSimTimeGetDelegate (SimulationTimeGetDelegate delegate)
  Set the getTime() delegate.
- template<typename T, IrisErrorCode(T::*)(uint64_t &, uint64_t &, bool &) METHOD>
  void setSimTimeGetDelegate (T *instance)
  Set the getTime() delegate.
- template<typename T, IrisErrorCode(T::*)(uint64_t &, uint64_t &, bool &) FUNC>
  void setSimTimeGetDelegate ()
  Set the getTime() delegate.
- void setSimTimeRunDelegate (SimulationTimeRunDelegate delegate)
  Set the run() delegate.
- template<typename T, IrisErrorCode(T::*)(VOID) METHOD>
  void setSimTimeRunDelegate (T *instance)
  Set the run() delegate.
- template<typename T, IrisErrorCode(T::*)(VOID) FUNC>
  void setSimTimeRunDelegate ()
  Set the run() delegate.
- void setSimTimeStopDelegate (SimulationTimeStopDelegate delegate)
  Set the stop() delegate.
- template<typename T, IrisErrorCode(T::*)(VOID) METHOD>
  void setSimTimeStopDelegate (T *instance)
  Set the stop() delegate.
- template<typename T, IrisErrorCode(T::*)(VOID) FUNC>
  void setSimTimeStopDelegate ()
  Set the stop() delegate.

8.27.1 Detailed Description

Simulation time add-on for IrisInstance.

8.27.2 Constructor & Destructor Documentation

8.27.2.1 IrisInstanceSimulationTime()

iris::IrisInstanceSimulationTime::IrisInstanceSimulationTime (  
    IrisInstance * iris_instance = nullptr,  
    IrisInstanceEvent * inst_event = nullptr )

Construct an IrisInstanceSimulationTime add-on.
### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>iris_instance</code></td>
<td>An <code>IrisInstance</code> to attach this add-on to.</td>
</tr>
<tr>
<td><code>inst_event</code></td>
<td>An <code>IrisInstanceEvent</code> add-on that is already attached to <code>IrisInstance</code>. This is used to set up simulation time events.</td>
</tr>
</tbody>
</table>

### 8.27.3 Member Function Documentation

#### 8.27.3.1 attachTo()

```cpp
default
iris::IrisInstanceSimulationTime::attachTo (IrisInstance * irisInstance)
```

Attach this `IrisInstance` add-on to a specific `IrisInstance`.

**Parameters**

- `irisInstance` An `IrisInstance` to attach this add-on to.

#### 8.27.3.2 setEventHandler()

```cpp
default
iris::IrisInstanceSimulationTime::setEventHandler (IrisInstanceEvent * handler)
```

Set the event handler to use to send simulation time-related events.

**Parameters**

- `handler` An `IrisInstanceEvent` add-on that is already attached to `IrisInstance`. This is used to set up simulation time events.

#### 8.27.3.3 setSimTimeGetDelegate() [1/3]

```cpp
default
iris::IrisInstanceSimulationTime::setSimTimeGetDelegate (SimulationTimeGetDelegate delegate) [inline]
```

Set the `getTime()` delegate.

**Parameters**

- `delegate` A delegate that is called to get the current simulation time.
8.27.3.4 setSimTimeGetDelegate() [2/3]

```cpp
template<typename T, IrisErrorCode(T::*)(uint64_t &_, uint64_t &_, bool &_) METHOD>
void iris::IrisInstanceSimulationTime::setSimTimeGetDelegate ( T * instance ) [inline]
```

Set the getTime() delegate.

**Template Parameters**

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a getTime delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T that is a getTime delegate.</td>
</tr>
</tbody>
</table>

**Parameters**

| instance | An instance of class T on which METHOD should be called. |

8.27.3.5 setSimTimeGetDelegate() [3/3]

```cpp
template<IrisErrorCode(*)(uint64_t &, uint64_t &, bool &) FUNC>
void iris::IrisInstanceSimulationTime::setSimTimeGetDelegate ( ) [inline]
```

Set the getTime() delegate.

Set the delegate to a global function.

**Template Parameters**

| FUNC | A function that is a getTime delegate. |

8.27.3.6 setSimTimeRunDelegate() [1/3]

```cpp
void iris::IrisInstanceSimulationTime::setSimTimeRunDelegate ( SimulationTimeRunDelegate delegate ) [inline]
```

Set the run() delegate.

**Parameters**

| delegate | A delegate that is called to start/resume progress of simulation time. |
8.27.3.7  setSimTimeRunDelegate() [2/3]

template<typename T, IrisErrorCode(T::*)() METHOD>
void iris::IrisInstanceSimulationTime::setSimTimeRunDelegate ( 
    T * instance ) [inline]

Set the run() delegate.

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a run delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T that is a run delegate.</td>
</tr>
</tbody>
</table>

Parameters

| instance | An instance of class T on which METHOD should be called. |

8.27.3.8  setSimTimeRunDelegate() [3/3]

template<IrisErrorCode(*)() FUNC>
void iris::IrisInstanceSimulationTime::setSimTimeRunDelegate ( ) [inline]

Set the run() delegate.

Set the delegate to a global function.

Template Parameters

| FUNC | A function that is a run delegate. |

8.27.3.9  setSimTimeStopDelegate() [1/3]

void iris::IrisInstanceSimulationTime::setSimTimeStopDelegate ( 
    SimulationTimeStopDelegate delegate ) [inline]

Set the stop() delegate.

Parameters

| delegate | A delegate that is called to stop the progress of simulation time. |
8.27.3.10 setSimTimeStopDelegate() [2/3]

```cpp
template<typename T , IrisErrorCode(T::* METHOD>
void iris::IrisInstanceSimulationTime::setSimTimeStopDelegate ( 
    T * instance ) [inline]
```

Set the stop() delegate.

**Template Parameters**

<table>
<thead>
<tr>
<th>T</th>
<th>Class that defines a stop delegate method.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A method of class T that is a stop delegate.</td>
</tr>
</tbody>
</table>

**Parameters**

| instance | An instance of class T on which METHOD should be called. |

8.27.3.11 setSimTimeStopDelegate() [3/3]

```cpp
template<IrisErrorCode( ) () FUNC>
void iris::IrisInstanceSimulationTime::setSimTimeStopDelegate ( ) [inline]
```

Set the stop() delegate.

Set the delegate to a global function.

**Template Parameters**

| FUNC | A function that is a stop delegate. |

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

- IrisInstanceSimulationTime.h

8.28 iris::IrisInstanceStep Class Reference

Step add-on for IrisInstance.

```cpp
#include <IrisInstanceStep.h>
```
Public Member Functions

- void attachTo (IrisInstance *irisInstance)
  Attach this IrisInstanceStep add-on to a specific IrisInstance.
- IrisInstanceStep (IrisInstance *irisInstance=nullptr)
  Construct an IrisInstanceStep add-on.
- void setRemainingStepGetDelegate (RemainingStepGetDelegate delegate)
  Set the delegate for getting the remaining steps.
- void setRemainingStepSetDelegate (RemainingStepSetDelegate delegate)
  Set the delegate for setting the remaining steps.
- void setStepCountGetDelegate (StepCountGetDelegate delegate)
  Set the delegate for getting the step count.

8.28.1 Detailed Description

Step add-on for IrisInstance.

This is used by instances to support stepping functionality.

This class implements all Iris step() functions.

8.28.2 Constructor & Destructor Documentation

8.28.2.1 IrisInstanceStep()

iris::IrisInstanceStep::IrisInstanceStep ( IrisInstance * irisInstance = nullptr )

Construct an IrisInstanceStep add-on.

Parameters

| irisInstance | The IrisInstance to attach this add-on to. |

8.28.3 Member Function Documentation

8.28.3.1 attachTo()

void iris::IrisInstanceStep::attachTo ( IrisInstance * irisInstance )

Attach this IrisInstanceStep add-on to a specific IrisInstance.

This should only be used if no instance was attached when this object was constructed.
Parameters

| irisInstance | The IrisInstance to attach this add-on to. |

8.28.3.2 setRemainingStepGetDelegate()

void iris::IrisInstanceStep::setRemainingStepGetDelegate ( RemainingStepGetDelegate delegate )

Set the delegate for getting the remaining steps.

Parameters

| delegate | A delegate object that is called to get the remaining steps for the attached instance. |

8.28.3.3 setRemainingStepSetDelegate()

void iris::IrisInstanceStep::setRemainingStepSetDelegate ( RemainingStepSetDelegate delegate )

Set the delegate for setting the remaining steps.

Parameters

| delegate | A delegate object that is called to set the remaining steps for the attached instance. |

8.28.3.4 setStepCountGetDelegate()

void iris::IrisInstanceStep::setStepCountGetDelegate ( StepCountGetDelegate delegate )

Set the delegate for getting the step count.

Parameters

| delegate | A delegate object that is called to get the step count for the attached instance. |

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

- IrisInstanceStep.h

Generated by Doxygen
8.29 iris::IrisInstanceSyncLevel Class Reference

Synchronisation level add-on for IrisInstance.

#include <IrisInstanceSyncLevel.h>

Public Member Functions

- **void attachTo (IrisInstance *iris_instance)**
  Attach this IrisInstanceSyncLevel add-on to a specific IrisInstance.
- **IrisInstanceSyncLevel (IrisInstance *iris_instance=nullptr)**
  Construct an IrisInstanceSyncLevel add-on.
- **void setSyncLevelSetDelegate (SyncLevelSetDelegate delegate)**
  Set the delegate for setting the sync level.

8.29.1 Detailed Description

Synchronisation level add-on for IrisInstance.

This is used by instances to support sync-level functionality.

8.29.2 Constructor & Destructor Documentation

8.29.2.1 IrisInstanceSyncLevel()

iris::IrisInstanceSyncLevel::IrisInstanceSyncLevel ( IrisInstance * iris_instance = nullptr )

Construct an IrisInstanceSyncLevel add-on.

Parameters

| iris_instance | The IrisInstance to attach this add-on to. |

8.29.3 Member Function Documentation

8.29.3.1 attachTo()

void iris::IrisInstanceSyncLevel::attachTo ( IrisInstance * iris_instance )
Attach this `IrisInstanceSyncLevel` add-on to a specific `IrisInstance`.

This should only be used if no instance was attached when this object was constructed.

Parameters

| `iris_instance` | The `IrisInstance` to attach this add-on to. |

8.29.3.2 `setSyncLevelSetDelegate()`

```cpp
void iris::IrisInstanceSyncLevel::setSyncLevelSetDelegate (  
    SyncLevelSetDelegate delegate  )  [inline]
```

Set the delegate for setting the sync level.

Parameters

| `delegate` | A delegate object that is called to set the sync level for the attached instance when the effective sync level changes. |

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

- `IrisInstanceSyncLevel.h`

8.30 `iris::IrisInstanceTable Class Reference`

Table add-on for `IrisInstance`.

```cpp
#include <IrisInstanceTable.h>
```

Classes

- `struct TableInfoAndAccess`
  
  Entry in 'tableInfos'.

Public Member Functions

- `TableInfoAndAccess & addTableInfo (const std::string &name)`
  
  Add metadata for one table.
- `void attachTo (IrisInstance *irisInstance)`
  
  Attach this `IrisInstanceTable` add-on to a specific `IrisInstance`.
- `IrisInstanceTable (IrisInstance *irisInstance=nullptr)`
  
  Construct an `IrisInstanceTable` add-on.
- `void setDefaultReadDelegate (TableReadDelegate delegate=TableReadDelegate())`
  
  Set the default delegate for reading table data.
- `void setDefaultWriteDelegate (TableWriteDelegate delegate=TableWriteDelegate())`
  
  Set the default delegate for writing table data.
8.30.1 Detailed Description

Table add-on for IrisInstance.

This is used by instances to support table functionality.

8.30.2 Constructor & Destructor Documentation

8.30.2.1 IrisInstanceTable()

iris::IrisInstanceTable::IrisInstanceTable (  
    IrisInstance * irisInstance = nullptr )

Construct an IrisInstanceTable add-on.

Parameters

- irisInstance: The IrisInstance to attach this add-on to.

8.30.3 Member Function Documentation

8.30.3.1 addTableInfo()

TableInfoAndAccess & iris::IrisInstanceTable::addTableInfo (  
    const std::string & name )

Add metadata for one table.

Parameters

- name: The name of this table.

Returns

A reference to a TableInfoAndAccess object that can be used to set metadata and access delegates for this table.

8.30.3.2 attachTo()

void iris::IrisInstanceTable::attachTo (  
    IrisInstance * irisInstance )
Attach this IrisInstanceTable add-on to a specific IrisInstance.

This should only be used if no instance was attached when this object was constructed.

Parameters

| `irisInstance` | The IrisInstance to attach this add-on to. |

8.30.3.3 setDefaultReadDelegate()

```cpp
defaultReadDelegate ( 
    TableReadDelegate delegate = TableReadDelegate() ) [inline]
```

Set the default delegate for reading table data.

Parameters

| `delegate` | A delegate object that is called to read table data for tables in the attached instance that did not set a table-specific delegate. |

8.30.3.4 setDefaultWriteDelegate()

```cpp
defaultWriteDelegate ( 
    TableWriteDelegate delegate = TableWriteDelegate() ) [inline]
```

Set the default delegate for writing table data.

Parameters

| `delegate` | A delegate object that is called to write table data for tables in the attached instance that did not set a table-specific delegate. |

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

- IrisInstanceTable.h

8.31 iris::IrisInstantiationContext Class Reference

Provides context when instantiating an Iris instance from a factory.

```cpp
#include <IrisInstantiationContext.h>
```
Public Member Functions

- void void void error (const std::string &code, const char *format,...) INTERNAL_IRIS_PRINTF(3
  
  Add an error to the InstantiationResult.
- IrisConnectionInterface * getConnectionInterface () const
  
  Get the connection interface to use to register the instance being instantiated.
- std::string getInstanceName () const
  
  Get the instance name to use when registering the instance being instantiated.
- template<typename T >
  void getParameter (const std::string &name, T &value)
  
  Get the value of an instantiation parameter.
- void getParameter (const std::string &name, std::vector< uint64_t > &value)
  
  Get the value of a large numeric instantiation parameter.
- uint64_t getRecommendedInstanceFlags () const
  
  Get the flags to use when registering the instance being instantiated.
- IrisInstantiationContext * getSubcomponentContext (const std::string &child_name)
  
  Get an IrisInstantiationContext pointer for a subcomponent instance.
- IrisInstantiationContext (IrisConnectionInterface *connection_interface_, InstantiationResult &result_,
  const std::vector< ResourceInfo > &param_info_,
  const std::vector< InstantiationParameterValue > &param_values_,
  const std::string &prefix_,
  const std::string &component_name_,
  uint64_t instance_flags)
- void void void void parameterError (const std::string &code, const std::string &parameterName, const char *format,...) INTERNAL_IRIS_PRINTF(4
  
  Add an error to the InstantiationResult.
- void void parameterWarning (const std::string &code, const std::string &parameterName, const char *format,...) INTERNAL_IRIS_PRINTF(4
  
  Add a warning to the InstantiationResult.
- void warning (const std::string &code, const char *format,...) INTERNAL_IRIS_PRINTF(3
  
  Add a warning to the InstantiationResult.

8.31.1 Detailed Description

Provides context when instantiating an Iris instance from a factory.

8.31.2 Member Function Documentation

8.31.2.1 error()

void void void iris::IrisInstantiationContext::error (const std::string &code,
  const char * format,
  ... )

Add an error to the InstantiationResult.

See also

  parameterError
Parameters

<table>
<thead>
<tr>
<th>code</th>
<th>An error code symbol. This should be one of the codes specified for the InstantiationError object.</th>
</tr>
</thead>
<tbody>
<tr>
<td>format</td>
<td>A printf-style format string.</td>
</tr>
<tr>
<td>...</td>
<td>Printf substitution arguments.</td>
</tr>
</tbody>
</table>

8.31.2.2 getConnectionInterface()

IrisConnectionInterface* iris::IrisInstantiationContext::getConnectionInterface() const [inline]

Get the connection interface to use to register the instance being instantiated.

Returns

A value to use for the connection_interface argument of IrisInstance::IrisInstance().

8.31.2.3 getInstanceName()

std::string iris::IrisInstantiationContext::getInstanceName() const [inline]

Get the instance name to use when registering the instance being instantiated.

Returns

A value to use for the instName argument of IrisInstance::IrisInstance() or IrisInstance::registerInstance().

8.31.2.4 getParameter()[1/2]

template<typename T>
void iris::IrisInstantiationContext::getParameter(
    const std::string & name,
    T & value ) [inline]

Get the value of an instantiation parameter.

Template Parameters

| T | The type of the value. This must be a type that is appropriate to receive the value of this parameter. |
Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of the parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>A reference to a value of type $T$ that receives the value of the named parameter.</td>
</tr>
</tbody>
</table>

8.31.2.5 getParameter()

```cpp
void iris::IrisInstantiationContext::getParameter ( const std::string & name, std::vector< uint64_t > & value )
```

Get the value of a large numeric instantiation parameter.

This is used for numeric parameters that are outside the range of `uint64_t/int64_t`.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of the parameter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>A reference to a value of type $T$ that receives the value of the named parameter.</td>
</tr>
</tbody>
</table>

8.31.2.6 getRecommendedInstanceFlags()

```cpp
uint64_t iris::IrisInstantiationContext::getRecommendedInstanceFlags ( ) const [inline]
```

Get the flags to use when registering the instance being instantiated.

Returns

A value to use for the flags argument of `IrisInstance::IrisInstance()` or `IrisInstance::registerInstance()`.

8.31.2.7 getSubcomponentContext()

```cpp
IrisInstantiationContext* iris::IrisInstantiationContext::getSubcomponentContext ( const std::string & child_name )
```

Get an IrisInstantiationContext pointer for a subcomponent instance.

For example, you might call `getSubcomponentContext("cpu0")` on the context "component.cluster0" to get the context to instantiate "component.cluster0.cpu0". The object pointed to by the return value is owned by its parent context and has the same lifetime as the parent context.
Parameters

| child_name | The name of a child instance. |

Returns

A pointer to an IrisInstantiationContext object for the named child.

8.31.2.8 parameterError()

```cpp
void iris::IrisInstantiationContext::parameterError (  
    const std::string & code,  
    const std::string & parameterName,  
    const char * format,  
    ...  )
```

Add an error to the InstantiationResult.

See also

- error

Parameters

<table>
<thead>
<tr>
<th>code</th>
<th>An error code symbol. This should be one of the codes specified for the InstantiationError object.</th>
</tr>
</thead>
<tbody>
<tr>
<td>parameterName</td>
<td>The name of the parameter this error relates to.</td>
</tr>
<tr>
<td>format</td>
<td>A printf-style format string.</td>
</tr>
<tr>
<td>...</td>
<td>Printf substitution arguments.</td>
</tr>
</tbody>
</table>

8.31.2.9 parameterWarning()

```cpp
void iris::IrisInstantiationContext::parameterWarning (  
    const std::string & code,  
    const std::string & parameterName,  
    const char * format,  
    ...  )
```

Add a warning to the InstantiationResult.

See also

- warning
Parameters

<table>
<thead>
<tr>
<th>code</th>
<th>An error code symbol. This should be one of the codes specified for the InstantiationError object.</th>
</tr>
</thead>
<tbody>
<tr>
<td>parameterName</td>
<td>The name of the parameter this warning relates to.</td>
</tr>
<tr>
<td>format</td>
<td>A printf-style format string.</td>
</tr>
<tr>
<td>...</td>
<td>Printf substitution arguments.</td>
</tr>
</tbody>
</table>

8.31.2.10 warning()

```cpp
definition
void iris::IrisInstantiationContext::warning (  
    const std::string & code,  
    const char * format,  
    ...  )
```

Add a warning to the InstantiationResult.

See also

- [parameterWarning](#)

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

- IrisInstantiationContext.h

8.32 iris::IrisParameterBuilder Class Reference

Helper class to construct instantiation parameters.

```cpp
#include <IrisParameterBuilder.h>
```

Public Member Functions

- **IrisParameterBuilder & addEnum** (const std::string &symbol, const IrisValue &value, const std::string &descr=std::string())
  
  Add an enum symbol for this parameter.

- **IrisParameterBuilder & addStringEnum** (const std::string &value, const std::string &descr=std::string())
  
  Add a string enum symbol for this parameter.
• IrisParameterBuilder (ResourceInfo &info_)
  Construct a parameter builder for a given parameter resource.
• IrisParameterBuilder & setBitWidth (uint64_t bitWidth)
  Set the bitWidth field.
• IrisParameterBuilder & setDefault (const std::string &value)
  Set the default value for a string parameter.
• IrisParameterBuilder & setDefault (uint64_t value)
  Set the default value for a numeric parameter.
• IrisParameterBuilder & setDefault (const std::vector< uint64_t > &value)
  Set the default value for a numeric parameter.
• IrisParameterBuilder & setDefaultFloat (double value)
  Set the default value for a numericFp parameter.
• IrisParameterBuilder & setDefaultSigned (int64_t value)
  Set the default value for a numericSigned parameter.
• IrisParameterBuilder & setDefaultValue (const std::vector< uint64_t > &value)
  Set the default value for a numericSigned parameter.
• IrisParameterBuilder & setDescr (const std::string &descr)
  Set the descr field.
• IrisParameterBuilder & setFormat (const std::string &format)
  Set the format field.
• IrisParameterBuilder & setInitOnly (bool value=true)
  Set the initOnly field.
• IrisParameterBuilder & setMax (uint64_t max)
  Set the max field.
• IrisParameterBuilder & setMax (const std::vector< uint64_t > &max)
  Set the max field.
• IrisParameterBuilder & setMaxFloat (double max)
  Set the max field for floating-point parameters.
• IrisParameterBuilder & setMaxSigned (int64_t max)
  Set the max field.
• IrisParameterBuilder & setMaxSigned (const std::vector< uint64_t > &max)
  Set the max field.
• IrisParameterBuilder & setMin (uint64_t min)
  Set the min field.
• IrisParameterBuilder & setMin (const std::vector< uint64_t > &min)
  Set the min field.
• IrisParameterBuilder & setMinFloat (double min)
  Set the min field for floating-point parameters.
• IrisParameterBuilder & setMinSigned (int64_t min)
  Set the min field.
• IrisParameterBuilder & setMinSigned (const std::vector< uint64_t > &min)
  Set the min field.
• IrisParameterBuilder & setName (const std::string &name)
  Set the name field.
• IrisParameterBuilder & setRange (uint64_t min, uint64_t max)
  Set both the min field and the max field.
• IrisParameterBuilder & setRange (const std::vector< uint64_t > &min, const std::vector< uint64_t > &max)
  Set both the min field and the max field.
• IrisParameterBuilder & setRangeFloat (double min, double max)
  Set both the min field and the max field.
• IrisParameterBuilder & setRangeSigned (int64_t min, int64_t max)
Set both the min field and the max field.

- IrisParameterBuilder & setRangeSigned (const std::vector<uint64_t> &min, const std::vector<uint64_t> &max)
  
  Set both the min field and the max field.

- IrisParameterBuilder & setRwMode (const std::string &rwMode)
  
  Set the rwMode field.

- IrisParameterBuilder & setSubRscId (uint64_t subRscId)
  
  Set the subRscId field.

- IrisParameterBuilder & setTag (const std::string &tag)
  
  Set a boolean tag for this parameter resource.

- IrisParameterBuilder & setTag (const std::string &tag, const IrisValue &value)
  
  Set a tag for this parameter resource.

- IrisParameterBuilder & setTopology (bool value=true)
  
  Set the topology field.

- IrisParameterBuilder & setType (const std::string &type)
  
  Set the type of this parameter.

### 8.32.1 Detailed Description

Helper class to construct instantiation parameters.

### 8.32.2 Constructor & Destructor Documentation

#### 8.32.2.1 IrisParameterBuilder()

iris::IrisParameterBuilder::IrisParameterBuilder (ResourceInfo & info_) [inline]

Construct a parameter builder for a given parameter resource.

Parameters

| info_ | The resource info object for the parameter being built. |

### 8.32.3 Member Function Documentation

#### 8.32.3.1 addEnum()

IrisParameterBuilder& iris::IrisParameterBuilder::addEnum (const std::string & symbol,
Add an enum symbol for this parameter.

Parameters

<table>
<thead>
<tr>
<th>symbol</th>
<th>The enum symbol that is being added.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value associated with the symbol.</td>
</tr>
<tr>
<td>descr</td>
<td>A description explaining the meaning of the symbol.</td>
</tr>
</tbody>
</table>

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.2 addStringEnum()

IrisParameterBuilder & iris::IrisParameterBuilder::addStringEnum (const std::string & value, const std::string & descr = std::string()) [inline]

Add a string enum symbol for this parameter.

For string enums, the symbol and value are the same.

Parameters

<table>
<thead>
<tr>
<th>value</th>
<th>The value associated with the symbol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>A description explaining the meaning of the symbol.</td>
</tr>
</tbody>
</table>

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.3 setBitWidth()

IrisParameterBuilder & iris::IrisParameterBuilder::setBitWidth (uint64_t bitWidth) [inline]

Set the bitWidth field.

Parameters

| bitWidth | The bitWidth field of the ResourceInfo object. |
Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.4 setDefault() [1/3]

IrisParameterBuilder& iris::IrisParameterBuilder::setDefault ( const std::string & value ) [inline]

Set the default value for a string parameter.

Parameters

| value | The defaultString field of the ParameterInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.5 setDefault() [2/3]

IrisParameterBuilder& iris::IrisParameterBuilder::setDefault ( uint64_t value ) [inline]

Set the default value for a numeric parameter.

Parameters

| value | The defaultData field of the ParameterInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.6 setDefault() [3/3]

IrisParameterBuilder& iris::IrisParameterBuilder::setDefault ( const std::vector< uint64_t > & value ) [inline]

Set the default value for a numeric parameter.

Use this variant for values that are $\geq 2^{64}$. 

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Parameters

| value | The `defaultData` field of the `ParameterInfo` object |

Returns

A reference to this `IrisParameterBuilder` object allowing calls to be chained together.

### 8.32.3.7 setDefaultFloat()

```cpp
IrisParameterBuilder& iris::IrisParameterBuilder::setDefaultFloat ( double value ) [inline]
```

Set the default value for a numericFp parameter.

Parameters

| value | The `defaultData` field of the `ParameterInfo` object |

Returns

A reference to this `IrisParameterBuilder` object allowing calls to be chained together.

### 8.32.3.8 setDefaultSigned() [1/2]

```cpp
IrisParameterBuilder& iris::IrisParameterBuilder::setDefaultSigned ( int64_t value ) [inline]
```

Set the default value for a numericSigned parameter.

Parameters

| value | The `defaultData` field of the `ParameterInfo` object |

Returns

A reference to this `IrisParameterBuilder` object allowing calls to be chained together.

### 8.32.3.9 setDefaultSigned() [2/2]

```cpp
IrisParameterBuilder& iris::IrisParameterBuilder::setDefaultSigned ( const std::vector<uint64_t>& value ) [inline]
```
Set the default value for a numericSigned parameter. Use this variant for values that are out of range for int64_t.

Parameters

| value      | The defaultData field of the ParameterInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.10 setDescr()

IrisParameterBuilder& iris::IrisParameterBuilder::setDescr ( const std::string & descr ) [inline]

Set the descr field.

Parameters

| descr      | The descr field of the ResourceInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.11 setFormat()

IrisParameterBuilder& iris::IrisParameterBuilder::setFormat ( const std::string & format ) [inline]

Set the format field.

Parameters

| format     | The format field of the ResourceInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.
8.32.3.12 setInitOnly()

IrisParameterBuilder& iris::IrisParameterBuilder::setInitOnly (bool value = true) [inline]

Set the initOnly field.

Parameters

| value | The initOnly field of the ParameterInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.13 setMax() [1/2]

IrisParameterBuilder& iris::IrisParameterBuilder::setMax (uint64_t max) [inline]

Set the max field.

Parameters

| max | The max field of the ParameterInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.14 setMax() [2/2]

IrisParameterBuilder& iris::IrisParameterBuilder::setMax (const std::vector<uint64_t>& max) [inline]

Set the max field.

Use this variant to set values that are >= 2**64.

Parameters

| max | The max field of the ParameterInfo object. |
Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.15 setMaxFloat()

IrisParameterBuilder& iris::IrisParameterBuilder::setMaxFloat (  
    double max ) [inline]

Set the max field for floating-point parameters.

This implies that the parameter type is "numericFp".

Parameters

| max | The max field of the ParameterInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.16 setMaxSigned() [1/2]

IrisParameterBuilder& iris::IrisParameterBuilder::setMaxSigned (  
    int64_t max ) [inline]

Set the max field.

This implies that the parameter type is "numericSigned".

Parameters

| max | The max field of the ParameterInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.17 setMaxSigned() [2/2]

IrisParameterBuilder& iris::IrisParameterBuilder::setMaxSigned (  
    const std::vector< uint64_t >& max ) [inline]
Set the `max` field.

This implies that the parameter type is "numericSigned". Use this variant for signed values that are out of range for `int64_t`. 
Parameters

max | The max field of the ParameterInfo object.

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.18 setMin() [1/2]

IrisParameterBuilder& iris::IrisParameterBuilder::setMin (  
  uint64_t min ) [inline]

Set the min field.

Parameters

min | The min field of the ParameterInfo object.

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.19 setMin() [2/2]

IrisParameterBuilder& iris::IrisParameterBuilder::setMin (  
  const std::vector<uint64_t> & min ) [inline]

Set the min field.

Use this variant to set values that are \geq 2^{64}.

Parameters

min | The min field of the ParameterInfo object.

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.
### setMinFloat()

```cpp
IrisParameterBuilder& iris::IrisParameterBuilder::setMinFloat ( double min ) [inline]
```

Set the `min` field for floating-point parameters.

This implies that the parameter type is "numericFp".

**Parameters**

| `min` | The `min` field of the ParameterInfo object. |

**Returns**

A reference to this `IrisParameterBuilder` object allowing calls to be chained together.

### setMinSigned() [1/2]

```cpp
IrisParameterBuilder& iris::IrisParameterBuilder::setMinSigned ( int64_t min ) [inline]
```

Set the `min` field.

This implies that the parameter type is "numericSigned".

**Parameters**

| `min` | The `min` field of the ParameterInfo object. |

**Returns**

A reference to this `IrisParameterBuilder` object allowing calls to be chained together.

### setMinSigned() [2/2]

```cpp
IrisParameterBuilder& iris::IrisParameterBuilder::setMinSigned ( const std::vector< uint64_t > & min ) [inline]
```

Set the `min` field.

This implies that the parameter type is "numericSigned". Use this variant for signed values that are out of range for `int64_t`.  

---

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Parameters

\textbf{\textit{min}} \hspace{1em} The \textit{min} field of the ParameterInfo object.

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.23 \hspace{1em} \texttt{setName()}

\begin{verbatim}
IrisParameterBuilder& iris::IrisParameterBuilder::setName ( const std::string & name ) [inline]
\end{verbatim}

Set the \textit{name} field.

Parameters

\begin{tabular}{|l|l|}
\hline
\textbf{name} & The \textit{name} field of the ResourceInfo object. \\
\hline
\end{tabular}

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.24 \hspace{1em} \texttt{setRange()} [1/2]

\begin{verbatim}
IrisParameterBuilder& iris::IrisParameterBuilder::setRange ( uint64_t min, 
uint64_t max ) [inline]
\end{verbatim}

Set both the \textit{min} field and the \textit{max} field.

Parameters

\begin{tabular}{|l|l|}
\hline
\textbf{min} & The \textit{min} field of the ParameterInfo object. \\
\textbf{max} & The \textit{max} field of the ParameterInfo object. \\
\hline
\end{tabular}

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.
8.32.3.25  setRange() [2/2]

IrisParameterBuilder& iris::IrisParameterBuilder::setRange (  
    const std::vector< uint64_t >& min,  
    const std::vector< uint64_t >& max ) [inline]

Set both the \texttt{min} field and the \texttt{max} field.

Use this variant to set values that are $\geq 2^{**64}$.

Parameters

| \texttt{min} | The \texttt{min} field of the ParameterInfo object. |
| \texttt{max} | The \texttt{max} field of the ParameterInfo object. |

Returns

A reference to this \texttt{IrisParameterBuilder} object allowing calls to be chained together.

8.32.3.26  setRangeFloat()

IrisParameterBuilder& iris::IrisParameterBuilder::setRangeFloat (  
    double \texttt{min},  
    double \texttt{max} ) [inline]

Set both the \texttt{min} field and the \texttt{max} field.

This implies that the parameter type is "numericFp".

Parameters

| \texttt{min} | The \texttt{min} field of the ParameterInfo object. |
| \texttt{max} | The \texttt{max} field of the ParameterInfo object. |

Returns

A reference to this \texttt{IrisParameterBuilder} object allowing calls to be chained together.

8.32.3.27  setRangeSigned() [1/2]

IrisParameterBuilder& iris::IrisParameterBuilder::setRangeSigned (  
    int64_t \texttt{min},  
    int64_t \texttt{max} ) [inline]

Set both the \texttt{min} field and the \texttt{max} field.

This implies that the parameter type is "numericSigned".
8.32.3.28 setRangeSigned() [2/2]

IrisParameterBuilder & iris::IrisParameterBuilder::setRangeSigned (  
    const std::vector<uint64_t> & min,  
    const std::vector<uint64_t> & max ) [inline]

Set both the min field and the max field.

This implies that the parameter type is "numericSigned". Use this variant for signed values that are out of range for int64_t.

Parameters

<table>
<thead>
<tr>
<th>min</th>
<th>The min field of the ParameterInfo object.</th>
</tr>
</thead>
<tbody>
<tr>
<td>max</td>
<td>The max field of the ParameterInfo object.</td>
</tr>
</tbody>
</table>

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.29 setRwMode()

IrisParameterBuilder & iris::IrisParameterBuilder::setRwMode (  
    const std::string & rwMode ) [inline]

Set the rwMode field.

Parameters

|  rwMode | The rwMode field of the ResourceInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.
8.32.3.30 setSubRscId()

IrisParameterBuilder & iris::IrisParameterBuilder::setSubRscId ( 
    uint64_t subRscId ) [inline]

Set the subRscId field.

Parameters

| subRscId | The subRscId field of the ResourceInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.31 setTag() [1/2]

IrisParameterBuilder & iris::IrisParameterBuilder::setTag ( 
    const std::string & tag ) [inline]

Set a boolean tag for this parameter resource.

Parameters

| tag | The name of the tag to set. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.32 setTag() [2/2]

IrisParameterBuilder & iris::IrisParameterBuilder::setTag ( 
    const std::string & tag, 
    const IrisValue & value ) [inline]

Set a tag for this parameter resource.

Parameters

| tag | The name of the tag to set. |
| value | The value to set for this tag. |
8.32.3.33  setTopology()

IrisParameterBuilder & iris::IrisParameterBuilder::setTopology (  
    bool value = true ) [inline]

Set the topology field.

Parameters

| value | The topology field of the ParameterInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

8.32.3.34  setType()

IrisParameterBuilder & iris::IrisParameterBuilder::setType (  
    const std::string & type ) [inline]

Set the type of this parameter.

The bitWidth field must be set before setting the type.

Parameters

| type | The type field of the ResourceInfo object. |

Returns

A reference to this IrisParameterBuilder object allowing calls to be chained together.

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

- IrisParameterBuilder.h

8.33  iris::IrisPluginFactory< PLUGIN_INSTANCE > Class Template Reference

Public Member Functions

- IrisPluginFactory (IrisC_Functions *iris_c_functions, const std::string &plugin_name)
- IrisErrorCode unregisterInstance ()
Static Public Member Functions

- static int64_t initPlugin (IrisC_Functions *functions, const std::string &plugin_name)

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

- IrisPluginFactory.h

8.34 iris::IrisPluginFactoryBuilder Class Reference

Set metadata for instantiating a plug-in instance.

#include <IrisPluginFactory.h>

Inherits iris::IrisInstanceFactoryBuilder.

Public Member Functions

- const std::string & getDefaultInstanceName () const
  Get the default name to use for plug-in instances.
- const std::string & getInstanceNamePrefix () const
  Get the prefix to use for instances of this plug-in.
- const std::string & getPluginName () const
  Get the plug-in name.
- iris::IrisPluginFactoryBuilder (const std::string &name)
- void setDefaultInstanceName (const std::string &name)
  Override the default instance name for plug-in instances.
- void setInstanceNamePrefix (const std::string &prefix)
  Override the instance name prefix. The default is "client.plugin".
- void setPluginName (const std::string &name)
  Override the plug-in name.

8.34.1 Detailed Description

Set metadata for instantiating a plug-in instance.

8.34.2 Constructor & Destructor Documentation

8.34.2.1 IrisPluginFactoryBuilder()
Parameters

| name | The name of the plug-in to build. |

### 8.34.3 Member Function Documentation

#### 8.34.3.1 getDefaultInstanceName()

```cpp
class iris::IrisPluginFactoryBuilder::getDefaultInstanceName ( ) const [inline]
```

Get the default name to use for plug-in instances.

Returns

The default name for plug-in instances.

#### 8.34.3.2 getInstanceNamePrefix()

```cpp
class std::string iris::IrisPluginFactoryBuilder::getInstanceNamePrefix ( ) const [inline]
```

Get the prefix to use for instances of this plug-in.

Returns

The prefix to use for instances of this plug-in.

#### 8.34.3.3 getPluginName()

```cpp
class std::string iris::IrisPluginFactoryBuilder::getPluginName ( ) const [inline]
```

Get the plug-in name.

Returns

The name of the plug-in.

#### 8.34.3.4 setDefaultInstanceName()

```cpp
void iris::IrisPluginFactoryBuilder::setDefaultInstanceName ( 
    const std::string & name ) [inline]
```

Override the default instance name for plug-in instances.

The factory provides a sensible default for this name so it should only be overridden if there is a good reason to do so.
Parameters

| name | The default name for plug-in instances. |

### 8.34.3.5 setInstanceNamePrefix()

```cpp
def void iris::IrisPluginFactoryBuilder::setInstanceNamePrefix (const std::string & prefix) [inline]
```

Override the instance name prefix. The default is "client.plugin".

The factory provides a sensible default for this prefix so it should only be overridden if there is a good reason to do so.

Parameters

| prefix | The prefix that will be used for instances of this plug-in. |

### 8.34.3.6 setPluginName()

```cpp
def void iris::IrisPluginFactoryBuilder::setPluginName (const std::string & name) [inline]
```

Override the plug-in name.

The factory provides a sensible default for this name so it should only be overridden if there is a good reason to do so.

Parameters

| name | The name of the plug-in. |

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

- IrisPluginFactory.h

### 8.35 iris::IrisRegisterReadEventEmitter< REG_T, ARGS > Class Template Reference

An EventEmitter class for register read events.

```cpp
#include <IrisRegisterEventEmitter.h>
```

Inherits IrisRegisterEventEmitterBase.
Public Member Functions

- void operator() (ResourceId rscId, bool debug, REG_T value, ARGS... args)
  
  Emit an event.

8.35.1 Detailed Description

template<typename REG_T, typename... ARGS>
class iris::IrisRegisterReadEventEmitter<REG_T, ARGS>

An EventEmitter class for register read events.

Template Parameters

<table>
<thead>
<tr>
<th>REG_T</th>
<th>The type of the register being read.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARGS</td>
<td>The types of any custom fields that this event source defines, in addition to the standard fields defined for register read events.</td>
</tr>
</tbody>
</table>

Use IrisRegisterReadEventEmitter with IrisInstanceBuilder to add register read events to your Iris instance:

```cpp
// Declare an event emitter
iris::IrisRegisterReadEventEmitter<uint64_t> reg_read_event;

// Add it to an Iris instance
iris::IrisInstance my_instance(...);
iris::IrisInstanceBuilder &builder = my_instance->getBuilder();
builder->setRegisterReadEvent("READ_REG", reg_read_event);

// Add some registers that will be traced by this event
builder->setNextRscId(0x1000);
builder->addRegister("X0", 64, "Register X0");
builder->addRegister("X1", 64, "Register X1");
builder->addRegister("X2", 64, "Register X2");
builder->addRegister("X3", 64, "Register X3");

// Now that the Instance builder has the metadata for the registers, we need to finalize the register read event to populate the event metadata.
builder->finalizeRegisterReadEvent();

uint64_t readRegister(unsigned reg_index, bool is_debug)
{
  uint64_t value = readRegValue(reg_index);
  // Emit an event
  reg_read_event(0x1000 | reg_index, is_debug, value);
  return value;
}
```

8.35.2 Member Function Documentation

8.35.2.1 operator()()

template<typename REG_T, typename... ARGS>
void iris::IrisRegisterReadEventEmitter<REG_T, ARGS>::operator() {
Emit an event.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rscId</td>
<td>Resource id for the register that was accessed.</td>
</tr>
<tr>
<td>debug</td>
<td>True if this access originated from a debug access.</td>
</tr>
<tr>
<td>value</td>
<td>The register value that was read during this event.</td>
</tr>
<tr>
<td>args</td>
<td>Any additional custom fields for this event.</td>
</tr>
</tbody>
</table>

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

- IrisRegisterEventEmitter.h

8.36  iris::IrisRegisterUpdateEventEmitter< REG_T, ARGS >  Class Template Reference

An EventEmitter class for register update events.

#include <IrisRegisterEventEmitter.h>

Inherits IrisRegisterEventEmitterBase.

Public Member Functions

- void operator() (ResourceId rsclId, bool debug, REG_T old_value, REG_T new_value, ARGS... args)
  
  Emit an event.

8.36.1  Detailed Description

Template< typename REG_T, typename... ARGS>

class iris::IrisRegisterUpdateEventEmitter< REG_T,ARGS >

An EventEmitter class for register update events.

Template Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>REG_T</td>
<td>The type of the register being read.</td>
</tr>
<tr>
<td>ARGS</td>
<td>Types of any custom fields that this event source defines, in addition to the standard fields defined for register update events.</td>
</tr>
</tbody>
</table>

Use IrisRegisterUpdateEventEmitter with IrisInstanceBuilder to add register update events to your Iris instance:
// Declare an event emitter
iris::IrisRegisterUpdateEventEmitter<uint64_t> reg_update_event;

// Add it to an Iris instance
iris::IrisInstance my_instance(...);
iris::IrisInstanceBuilder *builder = my_instance->getBuilder();
builder->setRegisterUpdateEvent("WRITE_REG", reg_update_event);

// Add some registers that will be traced by this event
builder->setNextRscId(0x1000);
builder->addRegister("X0", 64, "Register X0");
builder->addRegister("X1", 64, "Register X1");
builder->addRegister("X2", 64, "Register X2");
builder->addRegister("X3", 64, "Register X3");

// Now that the Instance builder has the metadata for the registers, we need
// to finalize the register update event to populate the event metadata.
builder->finalizeRegisterUpdateEvent();

void writeRegister(unsigned reg_index, bool is_debug, uint64_t new_value)
{
    uint64_t old_value = readRegValue(reg_index);
    writeRegValue(reg_index, new_value);

    // Emit an event
    reg_update_event(0x1000 | reg_index, is_debug, old_value, new_value);
}

8.36.2 Member Function Documentation

8.36.2.1 operator()()

template<typename REG_T, typename... ARGS>
void iris::IrisRegisterUpdateEventEmitter< REG_T, ARGS >::operator() ( ResourceId rscId,
bool debug,
REG_T old_value,
REG_T new_value,
ARGS... args ) [inline]

Emit an event.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rscId</td>
<td>Resource id for the register that was accessed.</td>
</tr>
<tr>
<td>debug</td>
<td>True if this access originated from a debug access.</td>
</tr>
<tr>
<td>old_value</td>
<td>The register value before the event.</td>
</tr>
<tr>
<td>new_value</td>
<td>The register value after the event.</td>
</tr>
<tr>
<td>args</td>
<td>Any additional custom fields for this event.</td>
</tr>
</tbody>
</table>

The documentation for this class was generated from the following file:
- IrisRegisterEventEmitter.h

8.37 iris::IrisSimulationResetContext Class Reference

Provides context to a reset delegate call.

#include <IrisInstanceSimulation.h>
Public Member Functions

- bool getAllowPartialReset () const
  
  Get the allowPartialReset flag.

- void setAllowPartialReset (bool value=true)

8.37.1 Detailed Description

Provides context to a reset delegate call.

8.37.2 Member Function Documentation

8.37.2.1 getAllowPartialReset()

bool iris::IrisSimulationResetContext::getAllowPartialReset ( ) const [inline]

Get the allowPartialReset flag.

Returns

Returns true if simulation_reset() was called with allowPartialReset=true.

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

- IrisInstanceSimulation.h

8.38 iris::IrisInstanceBuilder::MemorySpaceBuilder Class Reference

Used to set metadata for a memory space.

#include <IrisInstanceBuilder.h>
Public Member Functions

• MemorySpaceBuilder & addAttribute (const std::string &name, AttributeInfo attrib)
  
  Add an attribute to the attrib field.

• MemorySpaceId getSpaceId () const
  
  Get the memory space id for this memory space.

• MemorySpaceBuilder (IrisInstanceMemory::SpaceInfoAndAccess &info_)

• MemorySpaceBuilder & setAttributeDefault (const std::string &name, IrisValue value)
  
  Set the default value for an attribute in the attrib field.

• MemorySpaceBuilder & setCanonicalMsn (uint64_t canonicalMsn)
  
  Set the description field.

• MemorySpaceBuilder & setDescription (const std::string &description)
  
  Set the description field.

• MemorySpaceBuilder & setEndianness (const std::string &endianness)
  
  Set the endianness field.

• MemorySpaceBuilder & setMaxAddr (uint64_t maxAddr)
  
  Set the maxAddr field.

• MemorySpaceBuilder & setMinAddr (uint64_t minAddr)
  
  Set the minAddr field.

• MemorySpaceBuilder & setName (const std::string &name)
  
  Set the name field.

• MemorySpaceBuilder & setReadDelegate (MemoryReadDelegate delegate)
  
  Set the delegate to read this memory space.

• template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &)> METHOD
    MemorySpaceBuilder & setReadDelegate (T *instance)
  
  Set the delegate to read this memory space.

• template<IrisErrorCode(*)(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &, memory::MemoryReadResult &) FUNC>
    MemorySpaceBuilder & setReadDelegate ()

  Set the delegate to read this memory space.

• MemorySpaceBuilder & setSidebandDelegate (MemoryGetSidebandInfoDelegate delegate)
  
  Set the delegate to read sideband information.

• template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &, memory::MemoryReadResult &)> METHOD
    MemorySpaceBuilder & setSidebandDelegate (T *instance)
  
  Set the delegate to read sideband information.

• template<IrisErrorCode(*)(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &)> FUNC
    MemorySpaceBuilder & setSidebandDelegate ()

  Set the delegate to read sideband information.

• MemorySpaceBuilder & setWriteDelegate (MemoryWriteDelegate delegate)
  
  Set the delegate to write to this memory space.

• template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *) METHOD>
    MemorySpaceBuilder & setWriteDelegate (T *instance)
  
  Set the delegate to write to this memory space.

• template<IrisErrorCode(*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *) FUNC>
    MemorySpaceBuilder & setWriteDelegate ()

  Set the delegate to write to this memory space.
8.38.1 Detailed Description

Used to set metadata for a memory space.

8.38.2 Member Function Documentation

8.38.2.1 addAttribute()

```cpp
MemorySpaceBuilder iris::IrisInstanceBuilder::MemorySpaceBuilder::addAttribute (  
    const std::string & name,  
    AttributeInfo attrib ) [inline]
```

Add an attribute to the `attrib` field.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of this attribute.</th>
</tr>
</thead>
<tbody>
<tr>
<td>attrib</td>
<td>AttributeInfo for this attribute.</td>
</tr>
</tbody>
</table>

Returns

A reference to this `MemorySpaceBuilder` object allowing calls to be chained together.

8.38.2.2 getSpaceId()

```cpp
MemorySpaceId iris::IrisInstanceBuilder::MemorySpaceBuilder::getSpaceId ( ) const [inline]
```

Get the memory space id for this memory space.

This can be useful for setting up address translations and to map access requests to the correct memory space in memory access delegates.

Returns

The memory space id for this memory space.

8.38.2.3 setAttributeDefault()

```cpp
MemorySpaceBuilder iris::IrisInstanceBuilder::MemorySpaceBuilder::setAttributeDefault (  
    const std::string & name,  
    IrisValue value ) [inline]
```

Set the default value for an attribute in the `attrib` field.
Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>The name of this attribute.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>Default value of the named attribute.</td>
</tr>
</tbody>
</table>

Returns

A reference to this `MemorySpaceBuilder` object allowing calls to be chained together.

8.38.2.4 setCanonicalMsn()

```cpp
MemorySpaceBuilder& iris::IrisInstanceBuilder::MemorySpaceBuilder::setCanonicalMsn ( 
    uint64_t canonicalMsn ) [inline]
```

Set the `description` field.

Parameters

| canonicalMsn | The canonicalMsn field of the MemorySpaceInfo object. |

Returns

A reference to this `MemorySpaceBuilder` object allowing calls to be chained together.

8.38.2.5 setDescription()

```cpp
MemorySpaceBuilder& iris::IrisInstanceBuilder::MemorySpaceBuilder::setDescription ( 
    const std::string & description ) [inline]
```

Set the `description` field.

Parameters

| description | The description field of the MemorySpaceInfo object. |

Returns

A reference to this `MemorySpaceBuilder` object allowing calls to be chained together.

8.38.2.6 setEndianness()

```cpp
MemorySpaceBuilder& iris::IrisInstanceBuilder::MemorySpaceBuilder::setEndianness ( 
    const std::string & endianness ) [inline]
```
Set the **endianness** field.

**Parameters**

| endianness | The endianness field of the MemorySpaceInfo object. |

**Returns**

A reference to this `MemorySpaceBuilder` object allowing calls to be chained together.

### 8.38.2.7 setMaxAddr()

`MemorySpaceBuilder& iris::IrisInstanceBuilder::MemorySpaceBuilder::setMaxAddr (uint64_t maxAddr ) [inline]`

Set the **maxAddr** field.

**Parameters**

| maxAddr | The maxAddr field of the MemorySpaceInfo object. |

**Returns**

A reference to this `MemorySpaceBuilder` object allowing calls to be chained together.

### 8.38.2.8 setMinAddr()

`MemorySpaceBuilder& iris::IrisInstanceBuilder::MemorySpaceBuilder::setMinAddr (uint64_t minAddr ) [inline]`

Set the **minAddr** field.

**Parameters**

| minAddr | The minAddr field of the MemorySpaceInfo object. |

**Returns**

A reference to this `MemorySpaceBuilder` object allowing calls to be chained together.
8.38.2.9 setName()

MemorySpaceBuilder iris::IrisInstanceBuilder::MemorySpaceBuilder::setName (  
    const std::string & name ) [inline]

Set the name field.

Parameters

| name | The name field of the MemorySpaceInfo object. |

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.10 setReadDelegate() [1/3]

MemorySpaceBuilder iris::IrisInstanceBuilder::MemorySpaceBuilder::setReadDelegate (  
    MemoryReadDelegate delegate ) [inline]

Set the delegate to read this memory space.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultMemoryReadDelegate

Parameters

| delegate | MemoryReadDelegate object. |

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.11 setReadDelegate() [2/3]

template<typename T , IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, MemoryReadResult &) METHOD>  
MemorySpaceBuilder iris::IrisInstanceBuilder::MemorySpaceBuilder::setReadDelegate (  
    T * instance ) [inline]

Set the delegate to read this memory space.

If this is not set, the default delegate is used.
See also

IrisInstanceBuilder::setDefaultMemoryReadDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a memory read delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A memory read delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.12 setReadDelegate() [3/3]

template<
    IrisErrorCode(
        const MemorySpaceInfo &,
        _Iris::Memory::uint64_t,
        _Iris::Memory::uint64_t,
        _Iris::Memory::uint64_t,
        const AttributeValueMap &,
        MemoryReadResult &
    ) FUNC>

MemorySpaceBuilder & iris::IrisInstanceBuilder::MemorySpaceBuilder::setReadDelegate { } [inline]

Set the delegate to read this memory space.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultMemoryReadDelegate

Template Parameters

| FUNC | A memory read delegate function. |

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.13 setSidebandDelegate() [1/3]

MemorySpaceBuilder & iris::IrisInstanceBuilder::MemorySpaceBuilder::setSidebandDelegate (MemoryGetSidebandInfoDelegate delegate) [inline]

Set the delegate to read sideband information.

If this is not set, the default delegate is used.
See also

IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate

Parameters

| delegate | MemoryGetSidebandInfoDelegate object. |

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.14 setSidebandDelegate() [2/3]

```
template<typename T, IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &) METHOD>
MemorySpaceBuilder& iris::IrisInstanceBuilder::MemorySpaceBuilder::setSidebandDelegate (T * instance) [inline]
```

Set the delegate to read sideband information.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a memory sideband information delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A memory sideband information delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.15 setSidebandDelegate() [3/3]

```
template<IrisErrorCode(*)(const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &) FUNC>
```

Generated by Doxygen
Set the delegate to read sideband information.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultGetMemorySidebandInfoDelegate

Template Parameters

FUNC A memory sideband information delegate function.

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.16 setWriteDelegate() [1/3]

Set the delegate to write to this memory space.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultMemoryWriteDelegate

Parameters

delegate MemoryWriteDelegate object.

Returns

A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.17 setDelegate() [2/3]

template<
typename T , IrisErrorCode(T::*)(const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *, MemoryWriteResult &)> METHOD>
MemorySpaceBuilder& iris::IrisInstanceBuilder::MemorySpaceBuilder::setWriteDelegate (T* instance) [inline]

Set the delegate to write to this memory space.

If this is not set, the default delegate is used.

See also

   IrisInstanceBuilder::setDefaultMemoryWriteDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a memory write delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A memory write delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

   A reference to this MemorySpaceBuilder object allowing calls to be chained together.

8.38.2.18 setWriteDelegate() [3/3]

template< IrisErrorCode(*) (const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *, MemoryWriteResult & ) FUNC >
MemorySpaceBuilder& iris::IrisInstanceBuilder::MemorySpaceBuilder::setWriteDelegate ( ) [inline]

Set the delegate to write to this memory space.

If this is not set, the default delegate is used.

See also

   IrisInstanceBuilder::setDefaultMemoryWriteDelegate

Template Parameters

| FUNC    | A memory write delegate function. |

Returns

   A reference to this MemorySpaceBuilder object allowing calls to be chained together.

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

   • IrisInstanceBuilder.h
8.39  iris::IrisInstanceBuilder::RegisterBuilder Class Reference

Used to set metadata on a register resource.

```cpp
#include <IrisInstanceBuilder.h>
```

Public Member Functions

- `RegisterBuilder & addEnum (const std::string &symbol, const IrisValue &value, const std::string &descr=default::string())`
  
  Add a symbol to the enums field for numeric resources.

- `FieldBuilderaddField (const std::string &name, uint64_t lsbOffset, uint64_t bitWidth, const std::string &descr)`
  
  Add a subregister field to this register. By default, the field copies attributes from its parent register, but any field can be overridden.

- `RegisterBuilder & addStringEnum (const std::string &stringValue, const std::string &descr=default::string())`
  
  Add a symbol to the enums field for string resources.

- `ResourceId getRscId () const`
  
  Return the rscId that was allocated for this resource.

- `RegisterBuilder (IrisInstanceResource::ResourceInfoAndAccess &info_, IrisInstanceResource *inst_, resource_)`

- `RegisterBuilder & setAddressOffset (uint64_t addressOffset)`
  
  Set the `addressOffset` field.

- `RegisterBuilder & setBitWidth (uint64_t bitWidth)`
  
  Set the `bitWidth` field.

- `RegisterBuilder & setCanonicalRn (uint64_t canonicalRn_)`
  
  Set the `canonicalRn` field.

- `RegisterBuilder & setCname (const std::string &cname)`
  
  Set the `cname` field.

- `RegisterBuilder & setDescr (const std::string &descr)`
  
  Set the `descr` field.

- `RegisterBuilder & setFormat (const std::string &format)`
  
  Set the `format` field.

- `RegisterBuilder & setLsbOffset (uint64_t lsbOffset)`
  
  Set the `lsbOffset` field.

- `RegisterBuilder & setName (const std::string &name)`
  
  Set the `name` field.

- `RegisterBuilder & setParameterInfo (const ParameterInfo &paramInfo)`
  
  Set the `paramterInfo` field.

- `RegisterBuilder & setReadDelegate (ResourceReadDelegate readDelegate)`
  
  Set the delegate to read the resource.

- ```cpp
    template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &) METHOD>
    RegisterBuilder & setReadDelegate (T *instance)
    ```

  Set the delegate to read the resource.

- ```cpp
    template<IrisErrorCode(*)(const ResourceInfo &, ResourceReadResult &)> FUNC
    RegisterBuilder & setReadDelegate ()
    ```

  Set the delegate to read the resource.

- `RegisterBuilder & setResetData (uint64_t resetData)`
  
  Set the `resetData` field.

- `RegisterBuilder & setResetString (const std::string &resetString)`
  
  Set the `resetString` field.

- `RegisterBuilder & setRwMode (const std::string &rwMode)`
  
  Set the `rwMode` field.

Generated by Doxygen
Set the `rwMode` field.

- `RegisterBuilder & setSubRscId (uint64_t subRscId)`
  Set the `subRscId` field.

- `RegisterBuilder & setTag (const std::string &tag, const IrisValue &value)`
  Set a tag to the specified value.

- `RegisterBuilder & setTag (const std::string &tag)`
  Set the named boolean tag to true (e.g. `isPc`)

- `RegisterBuilder & setType (const std::string &type)`
  Set the `type` field.

- `template<typename T, IrisErrorCode(T::*)(const ResourceInfo &, const ResourceWriteValue &)> METHOD>
  RegisterBuilder & setWriteDelegate (T *instance)`
  Set the delegate to write the resource.

- `RegisterBuilder & setWriteDelegate (ResourceWriteDelegate writeDelegate)`
  Set the delegate to write the resource.

- `template<IrisErrorCode()>(const ResourceInfo &, const ResourceWriteValue &) FUNC>
  RegisterBuilder & setWriteDelegate ()`
  Set the delegate to write the resource.

- `RegisterBuilder & setWriteMask (uint64_t writeMask)`
  Set the `writeMask` field.

### 8.39.1 Detailed Description

Used to set metadata on a register resource.

### 8.39.2 Member Function Documentation

#### 8.39.2.1 `addEnum()`

```cpp
RegisterBuilder & iris::IrisInstanceBuilder::RegisterBuilder::addEnum (const std::string & symbol,
  const IrisValue & value,
  const std::string & descr = std::string() ) [inline]
```

Add a symbol to the enums field for numeric resources.

This should be called multiple times to add multiple symbols.

**Parameters**

<table>
<thead>
<tr>
<th>symbol</th>
<th>The symbol string to be associated with the specified value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of this symbol.</td>
</tr>
<tr>
<td>descr</td>
<td>A description of this symbol.</td>
</tr>
</tbody>
</table>
Returns

A reference to this `RegisterBuilder` object allowing calls to be chained together.

### 8.39.2.2 addField()

```cpp
FieldBuilder iris::IrisInstanceBuilder::RegisterBuilder::addField (  
    const std::string & name,  
    uint64_t lsbOffset,  
    uint64_t bitWidth,  
    const std::string & descr )
```

Add a subregister field to this register. By default, the field copies attributes from its parent register, but any field can be overridden.

Parameters

<table>
<thead>
<tr>
<th>name</th>
<th>Name of the register field.</th>
</tr>
</thead>
<tbody>
<tr>
<td>lsbOffset</td>
<td>The bit offset of this field inside its parent register.</td>
</tr>
<tr>
<td>bitWidth</td>
<td>The size of the field.</td>
</tr>
<tr>
<td>descr</td>
<td>Description of this field.</td>
</tr>
</tbody>
</table>

Returns

A `FieldBuilder` object that allows the caller to set attributes for this field.

### 8.39.2.3 addStringEnum()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::addStringEnum (  
    const std::string & stringValue,  
    const std::string & descr = std::string() ) [inline]
```

Add a symbol to the enums field for string resources.

This should be called multiple times to add multiple symbols.

Parameters

<table>
<thead>
<tr>
<th>value</th>
<th>The string value of this symbol. This is also used as the symbols string.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>A description of this symbol.</td>
</tr>
</tbody>
</table>
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Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.4 getRscId()

ResourceId iris::IrisInstanceBuilder::RegisterBuilder::getRscId ( ) const [inline]

Return the rscId that was allocated for this resource.

Returns

The rscId that was allocated for this resource.

8.39.2.5 setAddressOffset()

RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setAddressOffset ( uint64_t addressOffset ) [inline]

Set the addressOffset field.

Parameters

| addressOffset | The addressOffset field of the RegisterInfo object. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.6 setBitWidth()

RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setBitWidth ( uint64_t bitWidth ) [inline]

Set the bitWidth field.

Parameters

| bitWidth | The bitWidth field of the ResourceInfo object. |
Returns

A reference to this `RegisterBuilder` object allowing calls to be chained together.

### 8.39.2.7 setCanonicalRn()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setCanonicalRn (uint64_t canonicalRn_) [inline]
```

Set the `canonicalRn` field.

**Parameters**

| canonicalRn | The canonicalRn field of the `RegisterInfo` object. |

Returns

A reference to this `RegisterBuilder` object allowing calls to be chained together.

### 8.39.2.8 setCname()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setCname (const std::string & cname) [inline]
```

Set the `cname` field.

**Parameters**

| cname | The `cname` field of the `ResourceInfo` object. |

Returns

A reference to this `RegisterBuilder` object allowing calls to be chained together.

### 8.39.2.9 setDescr()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setDescr (const std::string & descr) [inline]
```

Set the `descr` field.

Generated by Doxygen
Parameters

| descr      | The descr field of the ResourceInfo object. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.10 setFormat()

RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setFormat (const std::string & format) [inline]

Set the format field.

Parameters

| format | The format field of the ResourceInfo object. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.11 setLsbOffset()

RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setLsbOffset (uint64_t lsbOffset) [inline]

Set the lsbOffset field.

Parameters

| lsbOffset  | The lsbOffset field of the RegisterInfo object. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.
8.39.2.12 setName()

```
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setName (  
    const std::string & name ) [inline]
```

Set the `name` field.

**Parameters**

| name | The name field of the ResourceInfo object. |

**Returns**

A reference to this `RegisterBuilder` object allowing calls to be chained together.

8.39.2.13 setParameterInfo()

```
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setParameterInfo (  
    const ParameterInfo & paramInfo ) [inline]
```

Set the `paramInfo` field.

This will make the resource a parameter.

**Parameters**

| paramInfo | ParameterInfo object. |

**Returns**

A reference to this `RegisterBuilder` object allowing calls to be chained together.

8.39.2.14 setReadDelegate() [1/3]

```
template<typename T , IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult & ) METHOD>  
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setReadDelegate (  
    T * instance ) [inline]
```

Set the delegate to read the resource.

Set a delegate which calls `METHOD()` on an instance of class `T`.

Generated by Doxygen
If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceReadDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a resource read delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A resource read delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.15 setReadDelegate() [2/3]

template<IrisErrorCode (*)(const ResourceInfo &, ResourceReadResult &)> FUNC>
RegisterBuilder & iris::IrisInstanceBuilder::RegisterBuilder::setReadDelegate () [inline]

Set the delegate to read the resource.
Set a delegate which calls function FUNC().

If this is not set, the default delegate is used.
See also

`IrisInstanceBuilder::setDefaultResourceReadDelegate`

Template Parameters

| FUNC | A resource read delegate function. |

Returns

A reference to this `RegisterBuilder` object allowing calls to be chained together.

### 8.39.2.16 setReadDelegate()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setReadDelegate (ResourceReadDelegate readDelegate) [inline]
```

Set the delegate to read the resource.

If this is not set, the default delegate is used.

See also

`IrisInstanceBuilder::setDefaultResourceReadDelegate`

Parameters

| readDelegate | ResourceReadDelegate object. |

Returns

A reference to this `RegisterBuilder` object allowing calls to be chained together.

### 8.39.2.17 setResetData()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setResetData (uint64_t resetData) [inline]
```

Generated by Doxygen
Set the `resetData` field.

Set the reset value for numeric registers.

**Parameters**

| resetData | The resetData field of the RegisterInfo object. |

**Returns**

A reference to this `RegisterBuilder` object allowing calls to be chained together.

### 8.39.2.18 setResetString()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setResetString (const std::string & resetString) [inline]
```

Set the `resetString` field.

Set the reset value for string registers.

**Parameters**

| resetString | The resetString field of the RegisterInfo object. |

**Returns**

A reference to this `RegisterBuilder` object allowing calls to be chained together.

### 8.39.2.19 setRwMode()

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setRwMode (const std::string & rwMode ) [inline]
```

Set the `rwMode` field.

**Parameters**

| rwMode | The rwMode field of the ResourceInfo object. |
Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.20  setSubRscId()

RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setSubRscId (uint64_t subRscId) [inline]

Set the subRscId field.

Parameters

| subRscId | The subRscId field of the ResourceInfo object. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.21  setTag() [1/2]

RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setTag (const std::string & tag) [inline]

Set the named boolean tag to true (e.g. isPc)

Parameters

| tag | The name of the tag to set. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.22  setTag() [2/2]

RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setTag (const std::string & tag, const IrisValue & value) [inline]

Set a tag to the specified value.
### Parameters

<table>
<thead>
<tr>
<th>Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>tag</td>
<td>The name of the tag to set.</td>
</tr>
<tr>
<td>value</td>
<td>The value to set the tag to.</td>
</tr>
</tbody>
</table>

### Returns

A reference to this `RegisterBuilder` object allowing calls to be chained together.

---

#### 8.39.2.23 `setType()`

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setType (const std::string & type) [inline]
```

Set the `type` field.

**Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>The type field of the ResourceInfo object.</td>
</tr>
</tbody>
</table>

**Returns**

A reference to this `RegisterBuilder` object allowing calls to be chained together.

---

#### 8.39.2.24 `setWriteDelegate()` [1/3]

```cpp
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setWriteDelegate (ResourceWriteDelegate writeDelegate) [inline]
```

Set the delegate to write the resource.

If this is not set, the default delegate is used.

**See also**

`IrisInstanceBuilder::setDefaultResourceWriteDelegate`
Parameters

| writeDelegate | ResourceWriteDelegate object. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.25 setWriteDelegate() [2/3]

```cpp
template<typename Func>
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setWriteDelegate(Func) [inline]
```

Set the delegate to write the resource.

Set a delegate which calls function FUNC().

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceWriteDelegate

Template Parameters

| Func  | A resource write delegate function. |

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

8.39.2.26 setWriteDelegate() [3/3]

```cpp
template<typename T, IrisErrorCode(T::*)(const ResourceInfo&, const ResourceWriteValue&)
METHOD>
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setWriteDelegate (T * instance) [inline]
```

Generated by Doxygen
Set the delegate to write the resource.

Set a delegate which calls \texttt{METHOD()} on an instance of class \texttt{T}.

If this is not set, the default delegate is used.

\textbf{See also}

\texttt{IrisInstanceBuilder::setDefaultResourceWriteDelegate}

\textbf{Template Parameters}

<table>
<thead>
<tr>
<th>\texttt{T}</th>
<th>A class that defines a method with the right signature to be a resource write delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>\texttt{METHOD}</td>
<td>A resource write delegate method in class \texttt{T}.</td>
</tr>
</tbody>
</table>

\textbf{Parameters}

| \texttt{instance} | The instance of class \texttt{T} on which to call \texttt{METHOD}. |

\textbf{Returns}

A reference to this \texttt{RegisterBuilder} object allowing calls to be chained together.

\texttt{8.39.27 setWriteMask()}

\begin{verbatim}
RegisterBuilder& iris::IrisInstanceBuilder::RegisterBuilder::setWriteMask ( uint64_t writeMask ) [inline]
\end{verbatim}

Set the \texttt{writeMask} field.
Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>writeMask</td>
<td>The writeMask field of the RegisterInfo object.</td>
</tr>
</tbody>
</table>

Returns

A reference to this RegisterBuilder object allowing calls to be chained together.

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

- IrisInstanceBuilder.h

### 8.40 iris::IrisInstanceBuilder::ResourceBuilder Class Reference

Used to set metadata on a resource.

```cpp
#include <IrisInstanceBuilder.h>
```

#### Public Member Functions

- **ResourceBuilder & addEnum (const std::string &symbol, const IrisValue &value, const std::string &descr=std::string());**
  
  Add a symbol to the enums field for numeric resources.

- **ResourceBuilder & addStringEnum (const std::string &stringValue, const std::string &descr=std::string());**
  
  Add a symbol to the enums field for string resources.

- **ResourceId getRscId () const**
  
  Return the rscId that was allocated for this resource.

- **ResourceBuilder (IrisInstanceResource::ResourceInfoAndAccess &info_);**

- **ResourceBuilder & setBitWidth (uint64_t bitWidth);**
  
  Set the bitWidth field.

- **ResourceBuilder & setCname (const std::string &cname);**
  
  Set the cname field.

- **ResourceBuilder & setDescr (const std::string &descr);**
  
  Set the descr field.

- **ResourceBuilder & setFormat (const std::string &format);**
  
  Set the format field.

- **ResourceBuilder & setName (const std::string &name);**
  
  Set the name field.

- **ResourceBuilder & setParameterInfo (const ParameterInfo &paramInfo);**
  
  Set the paramterInfo field.

- **ResourceBuilder & setReadDelegate ()**
  
  Set the delegate to read the resource.

- **ResourceBuilder & setReadDelegate (ResourceReadDelegate readDelegate);**
  
  Set the delegate to read the resource.

- **template<typename T, IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &) METHOD> ResourceBuilder & setReadDelegate (T *instance);**

Generated by Doxygen
Set the delegate to read the resource.

- **ResourceBuilder & setRwMode** (const std::string &rwMode)
  Set the rwMode field.

- **ResourceBuilder & setSubRscId** (uint64_t subRscId)
  Set the subRscId field.

- **ResourceBuilder & setTag** (const std::string &tag, const IrisValue &value)
  Set a tag to the specified value.

- **ResourceBuilder & setTag** (const std::string &tag)
  Set the named boolean tag to true (e.g. isPc)

- **ResourceBuilder & setType** (const std::string &type)
  Set the type field.

- **template< IrisErrorCode(∗)(const ResourceInfo &, const ResourceWriteValue & ) FUNC > ResourceBuilder & setWriteDelegate ()**
  Set the delegate to write the resource.

- **ResourceBuilder & setWriteDelegate** (ResourceWriteDelegate writeDelegate)
  Set the delegate to write the resource.

- **template< typename T, IrisErrorCode(T:: )(const ResourceInfo &, const ResourceWriteValue & ) METHOD > ResourceBuilder & setWriteDelegate (T ∗instance)**
  Set the delegate to write the resource.

---

### 8.40.1 Detailed Description

Used to set metadata on a resource.

### 8.40.2 Member Function Documentation

#### 8.40.2.1 addEnum()

```cpp
ResourceBuilder & iris::IrisInstanceBuilder::ResourceBuilder::addEnum ( 
  const std::string & symbol, 
  const IrisValue & value, 
  const std::string & descr = std::string() ) [inline]
```

Add a symbol to the enums field for numeric resources.

This should be called multiple times to add multiple symbols.

**Parameters**

<table>
<thead>
<tr>
<th>symbol</th>
<th>The symbol string to be associated with the specified value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>The value of this symbol.</td>
</tr>
<tr>
<td>descr</td>
<td>A description of this symbol.</td>
</tr>
</tbody>
</table>
Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.2  addStringEnum()

ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::addStringEnum (
    const std::string & stringValue,
    const std::string & descr = std::string() ) [inline]

Add a symbol to the enums field for string resources.

This should be called multiple times to add multiple symbols.

Parameters

<table>
<thead>
<tr>
<th>value</th>
<th>The string value of this symbol. This is also used as the symbols string.</th>
</tr>
</thead>
<tbody>
<tr>
<td>descr</td>
<td>A description of this symbol.</td>
</tr>
</tbody>
</table>

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.3  getRscId()

ResourceId iris::IrisInstanceBuilder::ResourceBuilder::getRscId ( ) const [inline]

Return the rscId that was allocated for this resource.

Returns

The rscId that was allocated for this resource.

8.40.2.4  setBitWidth()

ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setBitWidth ( 
    uint64_t bitWidth ) [inline]

Set the bitWidth field.
Parameters

| bitWidth | The bitWidth field of the ResourceInfo object. |

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.5 setCname()

ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setCname (const std::string & cname) [inline]

Set the cname field.

Parameters

| cname | The cname field of the ResourceInfo object. |

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.6 setDescr()

ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setDescr (const std::string & descr) [inline]

Set the descr field.

Parameters

| descr | The descr field of the ResourceInfo object. |

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.
8.40.2.7 setFormat()

```cpp
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setFormat (
    const std::string & format ) [inline]
```

Set the format field.

**Parameters**

| format | The format field of the ResourceInfo object. |

**Returns**

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.8 setName()

```cpp
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setName (
    const std::string & name ) [inline]
```

Set the name field.

**Parameters**

| name | The name field of the ResourceInfo object. |

**Returns**

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.9 setParameterInfo()

```cpp
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setParameterInfo (
    const ParameterInfo & paramInfo ) [inline]
```

Set the parameterInfo field.

This will make the resource a parameter.
Parameters

| paramInfo | ParameterInfo object. |

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.10 setReadDelegate() [1/3]

```
template<typename T, IrisErrorCode(T::*)(const ResourceInfo &, ResourceReadResult &) METHOD>
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setReadDelegate (T * instance) [inline]
```

Set the delegate to read the resource.

Set a delegate which calls METHOD() on an instance of class T.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceReadDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a resource read delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A resource read delegate method in class T.</td>
</tr>
</tbody>
</table>
Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.11 setReadDelegate() [2/3]

```
template<IrisErrorCode(*)(const ResourceInfo &, ResourceReadResult &)> FUNC>
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setReadDelegate ( ) [inline]
```

Set the delegate to read the resource.

Set a delegate which calls function FUNC().

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceReadDelegate

Template Parameters

| FUNC | A resource read delegate function. |

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.12 setReadDelegate() [3/3]

```
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setReadDelegate ( ResourceReadDelegate readDelegate ) [inline]
```

Set the delegate to read the resource.
If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultResourceReadDelegate

Parameters

<table>
<thead>
<tr>
<th>readDelegate</th>
<th>ResourceReadDelegate object.</th>
</tr>
</thead>
</table>

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.13 setRwMode()

ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setRwMode (const std::string & rwMode) [inline]

Set the rwMode field.

Parameters

<table>
<thead>
<tr>
<th>rwMode</th>
<th>The rwMode field of the ResourceInfo object.</th>
</tr>
</thead>
</table>

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

8.40.2.14 setSubRscId()

ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setSubRscId (uint64_t subRscId) [inline]

Set the subRscId field.
Parameters

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{sub}$</td>
<td>The subRscId field of the ResourceInfo object.</td>
</tr>
</tbody>
</table>

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

### 8.40.2.15 setTag() [1/2]

```
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setTag (
    const std::string & tag ) [inline]
```

Set the named boolean tag to true (e.g. isPc)

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{tag}$</td>
<td>The name of the tag to set.</td>
</tr>
</tbody>
</table>

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

### 8.40.2.16 setTag() [2/2]

```
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setTag ( 
    const std::string & tag, 
    const IrisValue & value ) [inline]
```

Set a tag to the specified value.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{tag}$</td>
<td>The name of the tag to set.</td>
</tr>
<tr>
<td>$\text{value}$</td>
<td>The value to set the tag to.</td>
</tr>
</tbody>
</table>

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.
8.40.2.17 setType()

`ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setType (const std::string & type)` [inline]

Set the `type` field.

**Parameters**

<table>
<thead>
<tr>
<th>type</th>
<th>The type field of the ResourceInfo object.</th>
</tr>
</thead>
</table>

**Returns**

A reference to this `ResourceBuilder` object allowing calls to be chained together.

8.40.2.18 setWriteDelegate() [1/3]

`ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setWriteDelegate (ResourceWriteDelegate writeDelegate)` [inline]

Set the delegate to write the resource.

If this is not set, the default delegate is used.

**See also**

`IrisInstanceBuilder::setDefaultResourceWriteDelegate`

**Parameters**

<table>
<thead>
<tr>
<th>writeDelegate</th>
<th>ResourceWriteDelegate object.</th>
</tr>
</thead>
</table>

**Returns**

A reference to this `ResourceBuilder` object allowing calls to be chained together.

8.40.2.19 setWriteDelegate() [2/3]

`template< IrisErrorCode(*FUNC) (const ResourceInfo &, const ResourceWriteValue &)> ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setWriteDelegate ( )` [inline]
Set the delegate to write the resource.

Set a delegate which calls function `FUNC()`.

If this is not set, the default delegate is used.

See also

`IrisInstanceBuilder::setDefaultResourceWriteDelegate`

Template Parameters

| FUNC | A resource write delegate function. |

Returns

A reference to this `ResourceBuilder` object allowing calls to be chained together.

8.40.2.20 setWriteDelegate() [3/3]

template<typename T, IrisErrorCode(T::*)(const ResourceInfo &, const ResourceWriteValue &)
METHOD>
ResourceBuilder& iris::IrisInstanceBuilder::ResourceBuilder::setWriteDelegate (  
T * instance ) [inline]

Set the delegate to write the resource.

Set a delegate which calls `METHOD()` on an instance of class `T`.

If this is not set, the default delegate is used.

See also

`IrisInstanceBuilder::setDefaultResourceWriteDelegate`
Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a resource write delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A resource write delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this ResourceBuilder object allowing calls to be chained together.

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

- IrisInstanceBuilder.h

8.41 iris::IrisInstanceResource::ResourceInfoAndAccess Struct Reference

Entry in 'resourceInfos'.

#include <IrisInstanceResource.h>

Public Attributes

- ResourceReadDelegate readDelegate
- ResourceInfo resourceInfo
- ResourceWriteDelegate writeDelegate

8.41.1 Detailed Description

Entry in 'resourceInfos'.

Contains static resource information and information on how to access the resource.

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

- IrisInstanceResource.h
8.42 iris::ResourceWriteValue Struct Reference

Public Attributes

- const uint64_t * data
- const std::string * str

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

- IrisInstanceResource.h

8.43 iris::IrisInstanceBuilder::SemihostingManager Class Reference

semihosting_apis IrisInstanceBuilder semihosting APIs

#include <IrisInstanceBuilder.h>

Public Member Functions

- void enableExtensions ()
  Instances that support semihosting extensions should call this function to enable the IRIS_SEMIHOSTING_CA←
    LL_EXTENSION event.
- std::vector<uint8_t> readData (uint64_t fDes, size_t max_size=0, uint64_t flags=semihost::DEFAULT)
  Read data for a given file descriptor.
- std::pair<bool, uint64_t> semihostedCall (uint64_t operation, uint64_t parameter)
  Allow a client to perform a semihosting extension defined by operation and parameter.
- SemihostingManager (IrisInstanceSemihosting *inst_semihost_)
- bool writeData (uint64_t fDes, const uint8_t *data, size_t size)
- bool writeData (uint64_t fDes, const std::vector<uint8_t> &data)

8.43.1 Detailed Description

semihosting_apis IrisInstanceBuilder semihosting APIs

Manage semihosting functionality

8.43.2 Member Function Documentation

8.43.2.1 readData()

std::vector<uint8_t> iris::IrisInstanceBuilder::SemihostingManager::readData (uint64_t fDes, size_t max_size = 0, uint64_t flags = semihost::DEFAULT) [inline]

Read data for a given file descriptor.

The exact behavior of this method depends on the value of the max_size and flags parameters. If the NONBLOCK
flag is set, the method returns immediately with whatever data is already buffered, if any. If NONBLOCK is not set,
the method blocks until data is available. Iris messages continue to be processed while this methods blocks. If
max_size is not zero, then at most max_size bytes will be returned.
Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>fDes</code></td>
<td>File descriptor to read from. Usually semihost::STDIN.</td>
</tr>
<tr>
<td><code>max_size</code></td>
<td>The maximum amount of bytes to read or zero for no limit.</td>
</tr>
<tr>
<td><code>flags</code></td>
<td>A bitwise OR of Semihosting data request flag constants.</td>
</tr>
</tbody>
</table>

Returns

A vector of data that was read.

8.43.2.2 semihostedCall()

```cpp
std::pair<bool, uint64_t> iris::IrisInstanceBuilder::SemihostingManager::semihostedCall ( uint64_t operation, uint64_t parameter ) [inline]
```

Allow a client to perform a semihosting extension defined by `operation` and `parameter`.

This might implement a user-defined operation or override the default implementation for a predefined operation.

Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>operation</code></td>
<td>A number indicating the operation to perform. This is defined by the semihosting standard for standard operations or by the client for user-defined operations.</td>
</tr>
<tr>
<td><code>parameter</code></td>
<td>A parameter to the operation. The meaning of this parameter is defined by the operation.</td>
</tr>
</tbody>
</table>

Returns

A pair of (bool success, uint64_t result). If success is true, a client performed the function and returned the value in result. If success is false, no client performed the function and result is 0.

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

- IrisInstanceBuilder.h

8.44 iris::IrisInstanceMemory::SpaceInfoAndAccess Struct Reference

Entry in 'spaceInfos'.

#include <IrisInstanceMemory.h>

Public Attributes

- `MemoryReadDelegate readDelegate`
- `MemoryGetSidebandInfoDelegate sidebandDelegate`
- `MemorySpaceInfo spaceInfo`
- `MemoryWriteDelegate writeDelegate`
8.44.1 Detailed Description

Entry in 'spaceInfos'.

Contains static memory space information and information on how to access the space.

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

- IrisInstanceMemory.h

8.45 iris::IrisInstanceBuilder::TableBuilder Class Reference

Used to set metadata for a table.

#include <IrisInstanceBuilder.h>

Public Member Functions

- TableColumnBuilder addColumn (const std::string &name)
  Add a new column.
- TableBuilder & addColumnInfo (const TableColumnInfo &columnInfo)
  Add a column with a preconstructed TableColumnInfo.
- TableBuilder & setDescription (const std::string &description)
  Set the description field.
- TableBuilder & setFormatLong (const std::string &format)
  Set the formatLong field.
- TableBuilder & setFormatShort (const std::string &format)
  Set the formatShort field.
- TableBuilder & setIndexFormatHint (const std::string &hint)
  Set the indexFormatHint field.
- TableBuilder & setMaxIndex (uint64_t maxIndex)
  Set the maxIndex field.
- TableBuilder & setMinIndex (uint64_t minIndex)
  Set the minIndex field.
- TableBuilder & setName (const std::string &name)
  Set the name field.
- TableBuilder & setReadDelegate (TableReadDelegate delegate)
  Set the delegate to read the table.
- template<typename T , IrisErrorCode(T::*)(const TableInfo &, uint64_t, uint64_t, TableReadResult &) METHOD>
  TableBuilder & setReadDelegate (T *instance)
  Set the delegate to read the table.
- template<IrisErrorCode(*)(const TableInfo &, uint64_t, uint64_t, TableWriteResult &) FUNC>
  TableBuilder & setWriteDelegate ()
  Set the delegate to write to the table.
- TableBuilder & setWriteDelegate (TableWriteDelegate delegate)
  Set the delegate to write to the table.
- template<typename T , IrisErrorCode(T::*)(const TableInfo &, const TableRecords &, TableWriteResult &) METHOD>
  TableBuilder & setWriteDelegate (T *instance)
  Set the delegate to write to the table.
- template<IrisErrorCode(*)(const TableInfo &, const TableRecords &, TableWriteResult &) FUNC>
  TableBuilder & setWriteDelegate ()
  Set the delegate to write to the table.
8.45.1 Detailed Description

Used to set metadata for a table.

8.45.2 Member Function Documentation

8.45.2.1 addColumn()

```
IrisInstanceBuilder::TableColumnBuilder iris::IrisInstanceBuilder::TableBuilder::addColumn(
    const std::string & name)
```

Add a new column.

Call this multiple times for multiple columns

See also

AddColumnInfo

Parameters

- **name** | The name of the new column.

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

8.45.2.2 addColumnInfo()

```
TableBuilder& iris::IrisInstanceBuilder::TableBuilder::addColumnInfo(
    const TableColumnInfo & columnInfo)
```

Add a column with a preconstructed TableColumnInfo.

Call this multiple times for multiple columns.

See also

addColumn

Parameters

- **columnInfo** | A preconstructed TableColumnInfo object for the new column.
Returns
A reference to this TableBuilder allowing calls to be chained together.

8.45.2.3 setDescription()

TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setDescription (const std::string & description) [inline]

Set the description field.
Parameters

| description | The description field of the TableInfo object. |

Returns
A reference to this TableBuilder allowing calls to be chained together.

8.45.2.4 setFormatLong()

TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setFormatLong (const std::string & format) [inline]

Set the formatLong field.
Parameters

| format | The formatLong field of the TableInfo object. |

Returns
A reference to this TableBuilder allowing calls to be chained together.

8.45.2.5 setFormatShort()

TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setFormatShort (const std::string & format) [inline]

Set the formatShort field.
Parameters

| format | The formatShort field of the TableInfo object. |

Returns

A reference to this TableBuilder allowing calls to be chained together.

8.45.2.6 `setIndexFormatHint()`

```cpp
tablebuilder::iris::TableBuilder& setIndexFormatHint (const std::string & hint) [inline]
```

Set the `indexFormatHint` field.

Parameters

| hint | The indexFormatHint field of the TableInfo object. |

Returns

A reference to this TableBuilder allowing calls to be chained together.

8.45.2.7 `setMaxIndex()`

```cpp
tablebuilder::iris::TableBuilder& setMaxIndex (uint64_t maxIndex) [inline]
```

Set the `maxIndex` field.

Parameters

| maxIndex | The maxIndex field of the TableInfo object. |

Returns

A reference to this TableBuilder allowing calls to be chained together.

8.45.2.8 `setMinIndex()`

```cpp
tablebuilder::iris::TableBuilder& setMinIndex (uint64_t minIndex) [inline]
```
Set the \texttt{minIndex} field.
Parameters

| minIndex | The minIndex field of the TableInfo object. |

Returns

A reference to this TableBuilder allowing calls to be chained together.

8.45.2.9  setName()

```
TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setName (const std::string & name ) [inline]
```

Set the name field.

Parameters

| name | The name field of the TableInfo object. |

Returns

A reference to this TableBuilder allowing calls to be chained together.

8.45.2.10  setReadDelegate() [1/3]

```
TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setReadDelegate (TableReadDelegate delegate ) [inline]
```

Set the delegate to read the table.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultTableReadDelegate

Parameters

| delegate | TableReadDelegate object. |

Returns

A reference to this TableBuilder object allowing calls to be chained together.
8.45.2.11 setReadDelegate() [2/3]

template<
typename T , IrisErrorCode(T::*)(const TableInfo &, uint64_t, uint64_t, TableReadResult &)
> METHOD

TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setReadDelegate (
    T * instance ) [inline]

Set the delegate to read the table.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultTableReadDelegate

Template Parameters

<table>
<thead>
<tr>
<th>T</th>
<th>A class that defines a method with the right signature to be a table read delegate.</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>A table read delegate method in class T.</td>
</tr>
</tbody>
</table>

Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this TableBuilder object allowing calls to be chained together.

8.45.2.12 setReadDelegate() [3/3]

template<
IrisErrorCode(*)(const TableInfo &, uint64_t, uint64_t, TableReadResult &)
> FUNC

TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setReadDelegate ( ) [inline]

Set the delegate to read the table.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultTableReadDelegate

Template Parameters

| FUNC | A table read delegate function. |

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Returns

A reference to this TableBuilder object allowing calls to be chained together.

8.45.2.13 setWriteDelegate() [1/3]

TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setWriteDelegate (TableWriteDelegate delegate) [inline]

Set the delegate to write to the table.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultTableWriteDelegate

Parameters

| delegate | TableWriteDelegate object |

Returns

A reference to this TableBuilder object allowing calls to be chained together.

8.45.2.14 setWriteDelegate() [2/3]

template<

 typename T , IrisErrorCode(T::*)(const TableInfo &, const TableRecords &, TableWriteResult &) METHOD>

 TableBuilder& iris::IrisInstanceBuilder::TableBuilder::setWriteDelegate (T * instance) [inline]

Set the delegate to write to the table.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultTableWriteDelegate

Template Parameters

| T | A class that defines a method with the right signature to be a table write delegate. |
| METHOD | A table write delegate method in class T. |
Parameters

| instance | The instance of class T on which to call METHOD. |

Returns

A reference to this TableBuilder object allowing calls to be chained together.

8.45.2.15 setWriteDelegate() [3/3]

template< IrisErrorCode(∗) (const TableInfo &, const TableRecords &, TableWriteResult &)* FUNC>
TableBuilder iris::IrisInstanceBuilder::TableBuilder::setWriteDelegate ( ) [inline]

Set the delegate to write to the table.

If this is not set, the default delegate is used.

See also

IrisInstanceBuilder::setDefaultTableWriteDelegate

Template Parameters

| FUNC | A table write delegate function. |

Returns

A reference to this TableBuilder object allowing calls to be chained together.

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

- IrisInstanceBuilder.h

8.46 iris::IrisInstanceBuilder::TableColumnBuilder Class Reference

Used to set metadata for a table column.

#include <IrisInstanceBuilder.h>
Public Member Functions

- TableColumnBuilder addColumn (const std::string &name)
  Add another new column.
- TableBuilder & addColumnInfo (const TableColumnInfo &columnInfo)
  Add another column with a preconstructed TableColumnInfo.
- TableBuilder & endColumn ()
  Stop building this column and go back to the parent table.
- TableColumnBuilder & setBitWidth (uint64_t bitWidth)
  Set the bitWidth field.
- TableColumnBuilder & setDescription (const std::string &description)
  Set the description field.
- TableColumnBuilder & setFormat (const std::string &format)
  Set the format field.
- TableColumnBuilder & setFormatLong (const std::string &format)
  Set the formatLong field.
- TableColumnBuilder & setFormatShort (const std::string &format)
  Set the formatShort field.
- TableColumnBuilder & setName (const std::string &name)
  Set the name field.
- TableColumnBuilder & setRwMode (const std::string &rwMode)
  Set the rwMode field.
- TableColumnBuilder & setType (const std::string &type)
  Set the type field.
- TableColumnBuilder (TableBuilder &parent_, TableColumnInfo &info_)

8.46.1 Detailed Description

Used to set metadata for a table column.

8.46.2 Member Function Documentation

8.46.2.1 addColumn()

```
TableColumnBuilder iris::IrisInstanceBuilder::TableColumnBuilder::addColumn ( 
    const std::string & name ) [inline]
```

Add another new column.

Call this multiple times for multiple columns

See also

```
TableBuilder::addColumn
```
Parameters

- `name`  
The name of the new column.

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

---

### 8.46.2.2 addColumnInfo()

```cpp
c TableBuilder& iris::IrisInstanceBuilder::TableColumnBuilder::addColumnInfo (const TableColumnInfo & columnInfo) [inline]
```

Add another column with a preconstructed TableColumnInfo.

See also

- `TableBuilder::addColumnInfo`
- `addColumn`

Parameters

- `columnInfo`  
A preconstructed TableColumnInfo object for the new column.

Returns

A reference to the parent TableBuilder for this table.

---

### 8.46.2.3 endColumn()

```cpp
c TableBuilder& iris::IrisInstanceBuilder::TableColumnBuilder::endColumn ( ) [inline]
```

Stop building this column and go back to the parent table.

See also

- `addColumn`
- `addColumnInfo`

Returns

The parent TableBuilder for this table.

---

### 8.46.2.4 setBitWidth()

```cpp
c TableColumnBuilder& iris::IrisInstanceBuilder::TableColumnBuilder::setBitWidth (uint64_t bitWidth) [inline]
```

Set the bitWidth field.
Parameters

| bitWidth | The bitWidth field of the TableColumnInfo object. |

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

8.46.2.5 setDescription()

```
TableColumnBuilder& iris::IrisInstanceBuilder::TableColumnBuilder::setDescription (const std::string & description) [inline]
```

Set the description field.

Parameters

| description | The description field of the TableColumnInfo object. |

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

8.46.2.6 setFormat()

```
TableColumnBuilder& iris::IrisInstanceBuilder::TableColumnBuilder::setFormat (const std::string & format) [inline]
```

Set the format field.

Parameters

| format | The format field of the TableColumnInfo object. |

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

8.46.2.7 setFormatLong()

```
TableColumnBuilder& iris::IrisInstanceBuilder::TableColumnBuilder::setFormatLong (const std::string & format) [inline]
```
Set the `formatLong` field.
Parameters

| format | The formatLong field of the TableColumnInfo object. |

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

8.46.2.8 setFormatShort()

TableColumnBuilder iris::IrisInstanceBuilder::TableColumnBuilder::setFormatShort (const std::string & format) [inline]

Set the formatShort field.

Parameters

| format | The formatShort field of the TableColumnInfo object. |

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

8.46.2.9 setName()

TableColumnBuilder iris::IrisInstanceBuilder::TableColumnBuilder::setName (const std::string & name) [inline]

Set the name field.

Parameters

| name | The name field of the TableColumnInfo object. |

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

8.46.2.10 setRwMode()

TableColumnBuilder iris::IrisInstanceBuilder::TableColumnBuilder::setRwMode (const std::string & rwMode) [inline]
Set the `rwMode` field.
Parameters

| rwMode | The rwMode field of the TableColumnInfo object. |

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

8.46.2.11 setType()

```
TableColumnBuilder& iris::IrisInstanceBuilder::TableColumnBuilder::setType (  
   const std::string & type )  [inline]
```

Set the type field.

Parameters

| type | The type field of the TableColumnInfo object. |

Returns

A TableColumnBuilder object that can be used to add metadata for the new column.

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

- IrisInstanceBuilder.h

8.47 iris::IrisInstanceTable::TableInfoAndAccess Struct Reference

Entry in 'tableInfos'.

`#include <IrisInstanceTable.h>`

Public Attributes

- `TableReadDelegate readDelegate`
  
  *Can be empty, in which case defaultReadDelegate is used.*

- `TableInfo tableInfo`

- `TableWriteDelegate writeDelegate`
  
  *Can be empty, in which case defaultWriteDelegate is used.*

8.47.1 Detailed Description

Entry in 'tableInfos'.

Contains static table information and information on how to access the table.

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

- IrisInstanceTable.h
File Documentation

9.1 IrisCConnection.h File Reference

IrisConnectionInterface implementation based on IrisC.

```c
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisInterface.h"
#include "iris/detail/IrisC.h"
#include "iris/detail/IrisErrorException.h"
#include <string>
```

Classes

- class iris::IrisCConnection

  Provide an IrisConnectionInterface which loads an IrisC library.

9.1.1 Detailed Description

IrisConnectionInterface implementation based on IrisC.

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9.2 IrisClientConnection.h File Reference

Manage a connection with an Iris server.

```c
#include "iris/detail/IrisInterface.h"
```
Classes

- class iris::IrisClientConnection
  
  *Provide an IrisConnectionInterface for an Iris Client.*

9.2.1 Detailed Description

Manage a connection with an Iris server.

Copyright

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9.3 IrisCoreConnection.h File Reference

Manage an Iris server.

```cpp
#include <memory>
#include "iris/detail/IrisInterface.h"
```

Classes

- class iris::IrisCoreConnection
  
  *Provide an IrisConnectionInterface for an Iris server instance.*

9.3.1 Detailed Description

Manage an Iris server.

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9.4 IrisEventEmitter.h File Reference

A utility class for emitting Iris events.

```cpp
#include "iris/detail/IrisEventEmitterBase.h"
```

Classes

- class iris::IrisEventEmitter<ARGS>
  
  *A helper class for generating Iris events.*
9.4.1 Detailed Description

A utility class for emitting Iris events.

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9.5 IrisInstance.h File Reference

Boilerplate code for an Iris instance, including clients and components.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisFunctionDecoder.h"
#include "iris/detail/IrisCppAdapter.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/IrisInstanceBuilder.h"
#include <cassert>
#include <mutex>
```

Classes

- class iris::IrisInstance

Macros

- `#define irisRegisterEventCallback(instancePtr, instanceType, functionName, description) registerEventCallback<instanceType, &instanceType::impl_##functionName>(instancePtr, functionName, description, instanceType)`

  Register an event callback function using an EventCallbackDelegate.

- `#define irisRegisterFunction(instancePtr, instanceType, functionName, functionInfoJson) registerFunction(instancePtr, functionName, &instanceType::impl_##functionName, functionInfoJson, instanceType)`

  Register an Iris function implementation. The function can be implemented in this class or in any other class. The helper macro is here to avoid repeating the function name. The 'impl_' prefix limits namespace pollution.

Typedefs

- `typedef IrisDelegate< uint64_t, const IrisValueMap &, uint64_t, uint64_t, bool, std::string & > iris::EventCallbackDelegate`

  Event callback delegate.
9.5.1 Detailed Description

Boilerplate code for an Iris instance, including clients and components.

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The IrisInstance class provides infrastructure that is:

- Necessary for all Iris instances.
- Useful for Iris components.
- Useful for Iris clients.

Note

Using this class to implement a correct Iris interface is optional. This class does not form an interface between instances. It just forms an interface between itself and the code of an instance.

This class is useful for, and used by, both components and clients.

9.5.2 Typedef Documentation

9.5.2.1 EventCallbackDelegate

typedef IrisDelegate<
    uint64_t, const IrisValueMap&, uint64_t, uint64_t, bool, std::string&>

iris::EventCallbackDelegate

Event callback delegate.

Used to register a function that can receive event callbacks.


Example:

class MyEventCallback
{
public:
    iris::IrisErrorCode impl_ec_FOO(EventStreamId esId, const iris::IrisValueMap &fields, uint64_t time,
        InstanceId sInstId, bool syncEc, std::string &errorMessageOut)
    {
        return E_ok;
    }
};
MyEventCallback* my_event_callback_ptr;
iris_instance->irisRegisterEventCallback(my_event_callback_ptr, MyEventCallback, ec_FOO, "Handle event FOO"
}
9.6 IrisInstanceBreakpoint.h File Reference

Breakpoint add-on to IrisInstance.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisLogger.h"
#include <cstdio>
```

### Classes

- **class iris::IrisInstanceBreakpoint**
  
  Breakpoint add-on for IrisInstance.

### Typedefs

- **typedef IrisDelegate<const BreakpointInfo &> iris::BreakpointDeleteDelegate**
  
  `Delete the breakpoint corresponding to the given information.`

- **typedef IrisDelegate<BreakpointInfo &> iris::BreakpointSetDelegate**
  
  `Set a breakpoint corresponding to the given information.`

9.6.1 Detailed Description

Breakpoint add-on to IrisInstance.

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The IrisInstanceBreakpoint class:

- Implements all breakpoint-related Iris functions.
- Maintains and provides breakpoint information, for example type, address, and rsclId.
- Converts between Iris breakpoint functions (breakpoint+()) and various C++ access functions.

9.6.2 Typedef Documentation

Generated by Doxygen
9.6.2.1 BreakpointDeleteDelegate

typedef IrisDelegate<const BreakpointInfo&> iris::BreakpointDeleteDelegate

Delete the breakpoint corresponding to the given information.

IrisErrorCode deleteBpt(const BreakpointInfo &bptInfo)

The breakpoint is guaranteed to exist and to be valid.

Error: Return E_* error code if it failed to delete the breakpoint.

9.6.2.2 BreakpointSetDelegate

typedef IrisDelegate<BreakpointInfo&> iris::BreakpointSetDelegate

Set a breakpoint corresponding to the given information.

IrisErrorCode setBpt(BreakpointInfo &bptInfo)

The breakpoint information members are guaranteed to be valid. The BreakpointInfo is non-const as the metadata might need to be modified. For example, in some cases it might be useful to align the address and fix the size of a data breakpoint. It should never modify the bptId, which is uniquely set by this add-on.

Error: Return E_* error code if it failed to set the breakpoint.

9.7 IrisInstanceBuilder.h File Reference

A high level interface to build up functionality on an IrisInstance.

#include "iris/detail/IrisCommon.h"
#include "iris/IrisInstanceResource.h"
#include "iris/IrisInstanceEvent.h"
#include "iris/IrisEventEmitter.h"
#include "iris/IrisInstanceBreakpoint.h"
#include "iris/IrisInstanceMemory.h"
#include "iris/IrisInstanceImage.h"
#include "iris/IrisInstanceStep.h"
#include "iris/IrisInstancePerInstanceExecution.h"
#include "iris/IrisInstanceTable.h"
#include "iris/IrisInstanceDisassembler.h"
#include "iris/IrisInstanceDebuggableState.h"
#include "iris/IrisInstanceSemihosting.h"
#include "iris/IrisInstanceSyncLevel.h"
#include <cassert>
Classes

- class iris::IrisInstanceBuilder::AddressTranslationBuilder
  Used to set metadata for an address translation.
- class iris::IrisInstanceBuilder::EventSourceBuilder
  Used to set metadata on an EventSource.
- class iris::IrisInstanceBuilder::FieldBuilder
  Used to set metadata on a register field resource.
- class iris::IrisInstanceBuilder
  Helper class to set up Iris instances.
- class iris::IrisInstanceBuilder::MemorySpaceBuilder
  Used to set metadata on a memory space.
- class iris::IrisInstanceBuilder::RegisterBuilder
  Used to set metadata on a register resource.
- class iris::IrisInstanceBuilder::ResourceBuilder
  Used to set metadata on a resource.
- class iris::IrisInstanceBuilder::SemihostingManager
  semihosting_apis IrisInstanceBuilder semihosting APIs
- class iris::IrisInstanceBuilder::TableBuilder
  Used to set metadata for a table.
- class iris::IrisInstanceBuilder::TableColumnBuilder
  Used to set metadata for a table column.

9.7.1 Detailed Description

A high level interface to build up functionality on an IrisInstance.

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9.8 IrisInstanceDebuggableState.h File Reference

IrisInstance add-on to implement debuggableState functions.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisDelegate.h"

Classes

- class iris::IrisInstanceDebuggableState
  Debuggable-state add-on for IrisInstance.

Typedefs

- typedef IrisDelegate< bool & > iris::DebuggableStateGetAcknowledgeDelegate
  Interface to stop the simulation time progress.
- typedef IrisDelegate< bool > iris::DebuggableStateSetRequestDelegate
  Delegate to set the debuggable-state-request flag.
9.8.1 Detailed Description

IrisInstance add-on to implement debuggableState functions.

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9.8.2 Typedef Documentation

9.8.2.1 DebuggableStateGetAcknowledgeDelegate

typedef IrisDelegate<bool &> iris::DebuggableStateGetAcknowledgeDelegate

Interface to stop the simulation time progress.

IrisErrorCode getAcknowledge(bool &acknowledge_out);

9.8.2.2 DebuggableStateSetRequestDelegate

typedef IrisDelegate<bool> iris::DebuggableStateSetRequestDelegate

Delegate to set the debuggable-state-request flag.

IrisErrorCode setRequest(bool request);

9.9 IrisInstanceDisassembler.h File Reference

Disassembler add-on to IrisInstance.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisLogger.h"
#include <cstdio>

Classes

• class iris::IrisInstanceDisassembler

Disassembler add-on for IrisInstance.
## 9.10 IrisInstanceEvent.h File Reference

### Typedefs

- **typedef IrisDelegate< const std::vector<uint64_t> &, uint64_t, const std::string &, DisassembleContext &, DisassemblyLine & > iris::DisassembleOpcodeDelegate**
  
  Get the disassembly for an individual opcode.

- **typedef IrisDelegate< std::string & > iris::GetCurrentDisassemblyModeDelegate**
  
  Get the current disassembly mode.

- **typedef IrisDelegate< uint64_t, const std::string &, MemoryReadResult &, uint64_t, uint64_t, std::vector<DisassemblyLine> & > iris::GetDisassemblyDelegate**
  
  Get the disassembly of a chunk of memory.

### 9.9.1 Detailed Description

Disassembler add-on to IrisInstance.

### Copyright

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The IrisInstanceDisassembler class implements all disassembly-related Iris functions.

### 9.10 IrisInstanceEvent.h File Reference

Event add-on to IrisInstance.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisLogger.h"
#include "iris/detail/IrisRequest.h"
#include <cstdio>
#include <set>
```

### Classes

- **struct iris::IrisInstanceEvent::EventSourceInfoAndDelegate**
  
  Contains the metadata and delegates for a single EventSource.

- **class iris::EventStream**
  
  Base class for event streams.

- **class iris::IrisEventRegistry**
  
  Class to register Iris event streams for an event.

- **class iris::IrisEventStream**
  
  Event stream class for Iris-specific events.

- **class iris::IrisInstanceEvent**
  
  Event add-on for IrisInstance.
9.10.1 Detailed Description

Event add-on to IrisInstance.

Copyright

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The IrisInstanceEvent class:

- Implements all event-related Iris functions.
- Maintains and provides event source metadata.
- Converts between Iris event functions (event()) and various C++ access functions.

9.10.2 Typedef Documentation

9.10.2.1 EventStreamCreateDelegate

typedef IrisDelegate<EventStream *, const EventSourceInfo &, const std::vector<std::string> &>
iris::EventStreamCreateDelegate

Delegate to create an EventStream.

iris::EventStreamCreateDelegate

Delegate to create an EventStream.

IrisErrorCode create(EventStream *&evStream, const EventSourceInfo &srcInfo, const std::vector<std::string> &fields)

Create a new event stream with the specified fields for an event source.

The new event stream is maintained and destroyed in the event add-on.

Error: Return E_* error code, for example E_unknown_event_field, if the event stream could not be created.

9.11 IrisInstanceFactoryBuilder.h File Reference

A helper class to build instantiation parameter metadata.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/IrisParameterBuilder.h"
#include <vector>
#include <string>
Classes

- class iris::IrisInstanceFactoryBuilder
  
  A builder class to construct instantiation parameter metadata.

9.11.1 Detailed Description

A helper class to build instantiation parameter metadata.

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9.12 IrisInstanceImage.h File Reference

Image-loading add-on to IrisInstance and image-loading callback add-on to the caller.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisLogger.h"
#include <cstdio>
```

Classes

- class iris::IrisInstanceImage
  
  Image loading add-on for IrisInstance.

- class iris::IrisInstanceImage_Callback
  
  Image loading add-on for IrisInstance clients implementing image_loadDataRead().

Typedefs

- typedef IrisDelegate< const std::vector< uint64_t > &, uint64_t > iris::ImageLoadDataDelegate
  
  Delegate to load an image from the given data.

- typedef IrisDelegate< const std::string & > iris::ImageLoadFileDelegate
  
  Delegate function to load an image from the given file.

9.12.1 Detailed Description

Image-loading add-on to IrisInstance and image-loading callback add-on to the caller.

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The IrisInstanceImage class:

- Implements all image-loading Iris functions.
- Maintains and provides image metadata, for example path, instanceSideFile, rawAddr.
- Converts between Iris image-loading functions (image_load(*)) and various C++ access functions.
9.12.2 Typedef Documentation

9.12.2.1 ImageLoadDataDelegate

typedef IrisDelegate<const std::vector<uint64_t> &, uint64_t> iris::ImageLoadDataDelegate

Delegate to load an image from the given data.

Bytes are stored in little-endian format.

IrisErrorCode loadImage(const std::vector<uint64_t> &data, uint64_t dataSize)

Typical implementations try to load the data with the supported formats.

Errors:

- If the image format is unknown, E_unknown_image_format is returned.
- If the image format is known but the image could not be loaded, E_image_format_error is returned.

9.12.2.2 ImageLoadFileDelegate

typedef IrisDelegate<const std::string &, iris::ImageLoadFileDelegate

Delegate function to load an image from the given file.

The path can be absolute or relative to the current working directory.

IrisErrorCode loadImage(const std::string &path)

Typical implementations try to load the file with the supported formats.

Errors:

- If the file specified by path could not be opened, E_error_opening_file is returned.
- If the file could be opened but could not be read, E_io_error is returned.
- If the image format is unknown, E_unknown_image_format is returned.
- If the image format is known but the image could not be loaded, E_image_format_error is returned.
Memory add-on to IrisInstance.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisLogger.h"
```

### Classes

- **struct iris::IrisInstanceMemory::AddressTranslationInfoAndAccess**
  
  Contains static address translation information.

- **class iris::IrisInstanceMemory**
  
  Memory add-on for IrisInstance.

- **struct iris::IrisInstanceMemory::SpaceInfoAndAccess**
  
  Entry in `spaceInfos`.

### Typedefs

- **typedef IrisDelegate<uint64_t, uint64_t, uint64_t, MemoryAddressTranslationResult &> iris::MemoryAddressTranslateDelegate**
  
  Delegate to translate an address.

- **typedef IrisDelegate<const MemorySpaceInfo &, uint64_t, const IrisValueMap &, const std::vector<std::string> &, IrisValueMap &> iris::MemoryGetSidebandInfoDelegate**

- **typedef IrisDelegate<const MemorySpaceInfo &, uint64_t, uint64_t, MemoryReadResult &, const AttributeValueMap &, const uint64_t *> iris::MemoryReadDelegate**
  
  Delegate to read memory data.

- **typedef IrisDelegate<const MemorySpaceInfo &, uint64_t, uint64_t, uint64_t, const AttributeValueMap &, const uint64_t *, MemoryWriteResult &> iris::MemoryWriteDelegate**
  
  Delegate to write memory data.

### 9.13.1 Detailed Description

Memory add-on to IrisInstance.

**Copyright**

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The IrisInstanceMemory class:

- Implements all memory-related Iris functions.
- Feeds memory-related properties (memory.*) to instance_getProperties() of the associated IrisInstance.
- Provides infrastructure that is useful for Iris clients.
- Maintains and provides memory meta information (memory spaces, address translations, sideband information).
- Converts between Iris memory access functions (memory_read()) and various C++ access functions.
9.13.2 Typedef Documentation

9.13.2.1 MemoryAddressTranslateDelegate

typedef IrisDelegate\<uint64\_t, uint64\_t, uint64\_t, MemoryAddressTranslationResult &\> iris::MemoryAddressTranslateDelegate

Delegate to translate an address.

IrisErrorCode translate(MemorySpaceId inSpaceId, uint64\_t address, MemorySpaceId outSpaceId, MemoryAddressTranslationResult &result)

inSpaceId, address, and outSpaceId are guaranteed to be valid.

Typical implementations inspect the inSpaceId and outSpaceId to determine how to translate the address.

Return addresses are appended to result.address, which is a vector<uint64\_t>:

- If this array is empty then ‘address’ is not mapped in ‘outSpaceId’.
- If the array contains exactly one element then the mapping is unique.
- If it contains multiple addresses then ‘address’ is accessible in the same way under all of these addresses in ‘outSpaceId’.

Error: Return E_\* error code for translation errors.

9.13.2.2 MemoryGetSidebandInfoDelegate

typedef IrisDelegate\<const MemorySpaceInfo &, uint64\_t, const IrisValueMap &, const std::vector\<std::string\> &, IrisValueMap &\> iris::MemoryGetSidebandInfoDelegate

Delegate to get memory sideband information.

IrisErrorCode getSidebandInfo(const MemorySpaceInfo &spaceInfo, uint64\_t address, const IrisValueMap &attrib, const std::vector\<std::string\> &request, IrisValueMap &result)

Returns sideband information for a range of addresses in a given memory space.
9.13.2.3 MemoryReadDelegate

typedef IrisDelegate<
    const MemorySpaceInfo&,
    uint64_t, uint64_t, uint64_t,
    const AttributeValueMap&,
    MemoryReadResult&
> iris::MemoryReadDelegate

Delegate to read memory data.

IrisErrorCode read(
    const MemorySpaceInfo &spaceInfo,
    uint64_t address,
    uint64_t byteWidth,
    uint64_t count,
    const AttributeValueMap &attrib,
    MemoryReadResult &result)

spaceInfo, address, byteWidth, and count are guaranteed to be valid.

Typical implementations inspect the spaceId, address, byteWidth, and count to determine which memory elements
should be read. Then they append the read elements to result.data, which is a vector<uint64_t>:

• Data elements are read from ascending addresses, packed into uint64_ts such that the lowest address is in
  the lowest bits.
• Elements of byteWidth >= 2 are read with the endianness of the memory space inside each element, but
  elements are stored with the lowest bits inside each uint64_t (for byteWidth < 8) and with the lowest bits
  first in sequences of uint64_t (for byteWidth > 8).

Error: Return E_* error code for read errors. It appends the address that could not be read to result.error.

9.13.2.4 MemoryWriteDelegate

typedef IrisDelegate<
    const MemorySpaceInfo&,
    uint64_t, uint64_t, uint64_t,
    const AttributeValueMap&,
    const uint64_t*,
    MemoryWriteResult&
> iris::MemoryWriteDelegate

Delegate to write memory data.

IrisErrorCode write(
    const MemorySpaceInfo &spaceInfo,
    uint64_t address,
    uint64_t byteWidth,
    uint64_t count,
    const AttributeValueMap &attrib,
    const uint64_t* data,
    MemoryWriteResult &result)

See also

MemoryReadDelegate data contains the data elements to be written in the same format as MemoryRead<
Result.data for reads.

9.14 IrisInstancePerInstanceExecution.h File Reference

Per-instance execution control add-on to IrisInstance.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisLogger.h"
#include <cstdio>
Classes

- class iris::IrisInstancePerInstanceExecution
  
  Per-instance execution control add-on for IrisInstance.

Typedefs

- typedef IrisDelegate<bool & > iris::PerInstanceExecutionStateGetDelegate
  
  Get the execution state.

- typedef IrisDelegate<bool > iris::PerInstanceExecutionStateSetDelegate
  
  Delegate to set the execution state.

9.14.1 Detailed Description

Per-instance execution control add-on to IrisInstance.

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Implements all per-instance execution control-related Iris functions.

9.14.2 Typedef Documentation

9.14.2.1 PerInstanceExecutionStateGetDelegate

typedef IrisDelegate<bool & > iris::PerInstanceExecutionStateGetDelegate

Get the execution state.

enabled should be set to true if execution is enabled and false otherwise.

IrisErrorCode getState(bool & enabled)

Return E_ok on success, otherwise return the error code.

9.14.2.2 PerInstanceExecutionStateSetDelegate

typedef IrisDelegate<bool > iris::PerInstanceExecutionStateSetDelegate

Delegate to set the execution state.

Enable or disable the execution of instructions (or processing of work items).

IrisErrorCode setState(bool enable)

Return E_ok on success, otherwise return the error code.
9.15 IrisInstanceResource.h File Reference

Resource add-on to IrisInstance.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisLogger.h"
#include <cassert>
```

### Classes

- class `iris::IrisInstanceResource`
  
  Resource add-on for IrisInstance.

- struct `iris::IrisInstanceResource::ResourceInfoAndAccess`
  
  Entry in 'resourceInfos'.

- struct `iris::ResourceWriteValue`

### Typedefs

- typedef `IrisDelegate< const ResourceInfo &, ResourceReadResult & > iris::ResourceReadDelegate`
  
  Delegate to read resources.

- typedef `IrisDelegate< const ResourceInfo &, const ResourceWriteValue & > iris::ResourceWriteDelegate`
  
  Delegate to write resources.

9.15.1 Detailed Description

Resource add-on to IrisInstance.

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The IrisInstanceResource class:

- Implements all resource-related Iris functions.
- Feeds resource-related properties (resource.*) to instance_getProperties() of the associated IrisInstance.
- Provides infrastructure that is useful for Iris clients.
- Maintains and provides resource meta information (name, bitwidth).
- Converts between Iris resource-access functions (resource_read()) and various C++ access functions.

9.15.2 Typedef Documentation
9.15.2.1 ResourceReadDelegate

typedef IrisDelegate<
const ResourceInfo &, ResourceReadResult &>
iris::ResourceReadDelegate

Delegate to read resources.

IrisErrorCode read(const ResourceInfo &resourceInfo, ResourceReadResult &result)

resourceInfo.rscId is guaranteed to be valid.

Typical implementations inspect the rscId, canonicalRn, addressOffset, or even the name or cname value to determine which resource should be read and then append the read data to result:

- Return data (no undefined bits):
  - Append data to result.data, which is a vector<uint64_t>. Append one uint64_t if resource is <= 64 bits.
  - Append multiple uint64_t for wider resources, least significant uint64_t first.
- Return data with undefined bits:
  - Same as above, but in addition, append a mask which contains 1 bit for all undefined bits to result.

Error: If the resource could not be read, return E_* error code, for example E_error_reading_write_only_resource, E_error_reading_resource, or E_not_implemented, and leave result unchanged.

9.15.2.2 ResourceWriteDelegate

typedef IrisDelegate<
const ResourceInfo &, const ResourceWriteValue &>
iris::ResourceWriteDelegate

Delegate to write resources.

IrisErrorCode write(const ResourceInfo &resourceInfo, const ResourceWriteValue &value)

resourceInfo.rscId is guaranteed to be valid.

Typical implementations inspect the rscId, canonicalRn, addressOffset, or even the name or cname value to determine which resource should be written.

data contains the data for all resources to be written in the same format as ResourceReadResult.data for reads. The number of elements in the data array is resourceInfo.getDataSizeInU64Chunks(). data is only evaluated for string resources.

9.16 IrisInstanceSemihosting.h File Reference

IrisInstance add-on to implement semihosting functionality.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisLogger.h"
#include "iris/detail/IrisObjects.h"
#include "iris/IrisInstanceEvent.h"
#include <queue>
#include <mutex>
9.17 IrisInstanceSimulation.h File Reference

Classes

• class iris::IrisInstanceSemihosting

Variables

• static const uint64_t iris::semihost::BLOCK = (0 << 1)
  Block until enough data has been provided based on the specified size hint.
• static const uint64_t iris::semihost::COOKED = (0 << 0)
  Request that the client sends data when the user presses the return key.
• static const uint64_t iris::semihost::DEFAULT = COOKED | BLOCK | EMIT_EVENT
  The default flags used if none are specified.
• static const uint64_t iris::semihost::EMIT_EVENT = (0 << 2)
  If the buffer is empty, emit an event to request input.
• static const uint64_t iris::semihost::NO_EVENT = (1 << 2)
  Do not request input. Return only the data currently buffered.
• static const uint64_t iris::semihost::NONBLOCK = (1 << 1)
  Do not block if sufficient data is not available.
• static const uint64_t iris::semihost::RAW = (1 << 0)
  Request that the client sends data to the model as soon as it is available.
• static const uint64_t iris::semihost::STDERR = 2
  File descriptor used with writeData() for semihosted standard error output.
• static const uint64_t iris::semihost::STDIN = 0
  Usual file descriptor used for semihosted input with readData().
• static const uint64_t iris::semihost::STDOUT = 1
  File descriptor used with writeData() for semihosted standard output.

9.16.1 Detailed Description

IrisInstance add-on to implement semihosting functionality.

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9.17 IrisInstanceSimulation.h File Reference

IrisInstance add-on to implement simulation_* functions.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisLogger.h"
#include "iris/IrisInstantiationContext.h"
#include <vector>
#include <string>
#include <map>
#include <mutex>
Classes

- class iris::IrisInstanceSimulation
  
  An IrisInstance add-on that adds simulation functions for the SimulationEngine instance.

- class iris::IrisSimulationResetContext
  
  Provides context to a reset delegate call.

Typedefs

- typedef IrisDelegate< std::vector<ResourceInfo> & > iris::SimulationGetParameterInfoDelegate
  
  Delegate to get a list of parameter information.

- typedef IrisDelegate< InstantiationResult & > iris::SimulationInstantiateDelegate
  
  Delegate to instantiate the simulation.

- typedef IrisDelegate iris::SimulationRequestShutdownDelegate
  
  Delegate to request that the simulation be shut down.

- typedef IrisDelegate< const IrisSimulationResetContext & > iris::SimulationResetDelegate
  
  Delegate to reset the simulation.

- typedef IrisDelegate< const InstantiationParameterValue & > iris::SimulationSetParameterValueDelegate
  
  Delegate to set the value of an instantiation parameter.

Enumerations

- enum iris::IrisSimulationPhase {
  }

  List of IRIS_SIMULATION_PHASE events.

Variables

- static const size_t iris::IrisSimulationPhase_total = 20

9.17.1 Detailed Description

IrisInstance add-on to implement simulation functions.

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9.17.2 Typedef Documentation

9.17.2.1 SimulationGetParameterInfoDelegate

typedef IrisDelegate<std::vector<ResourceInfo> &> iris::SimulationGetParameterInfoDelegate

Delegate to get a list of parameter information.

IrisErrorCode getInstantiationParameterInfo(std::vector<ResourceInfo> &parameters_out)

9.17.2.2 SimulationInstantiateDelegate

typedef IrisDelegate<InstantiationResult &> iris::SimulationInstantiateDelegate

Delegate to instantiate the simulation.

IrisErrorCode instantiate(InstantiationResult &result_out)

9.17.2.3 SimulationRequestShutdownDelegate

typedef IrisDelegate iris::SimulationRequestShutdownDelegate

Delegate to request that the simulation be shut down.

IrisErrorCode requestShutdown()

9.17.2.4 SimulationResetDelegate

typedef IrisDelegate<const IrisSimulationResetContext &> iris::SimulationResetDelegate

Delegate to reset the simulation.

IrisErrorCode reset(const IrisSimulationResetContext &)
9.17.2.5 SimulationSetParameterValueDelegate

typedef IrisDelegate< const InstantiationParameterValue & > iris::SimulationSetParameterValueDelegate

Delegate to set the value of an instantiation parameter.

IrisErrorCode setInstantiationParameterValue(const InstantiationParameterValue &value)

9.18 IrisInstanceSimulationTime.h File Reference

IrisInstance add-on to implement simulationTime functions.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisDelegate.h"
#include <vector>
#include <string>

Classes

• class iris::IrisInstanceSimulationTime
  Simulation time add-on for IrisInstance.

Typedefs

• typedef IrisDelegate< uint64_t &, uint64_t &, bool & > iris::SimulationTimeGetDelegate
  Delegate to get the simulation time.
• typedef IrisDelegate iris::SimulationTimeRunDelegate
  Delegate to resume the simulation time progress.
• typedef IrisDelegate iris::SimulationTimeStopDelegate
  Delegate to stop the simulation time progress.

Enumerations

• enum iris::TIME_EVENT_REASON { iris::TIME_EVENT_UNKNOWN, iris::TIME_EVENT_STOP, iris::TIME_EVENT_BREAKPOINT,
  iris::TIME_EVENT_TRACE_COUNTER_OVERFLOW }
  The reasons why the simulation time stopped.

9.18.1 Detailed Description

IrisInstance add-on to implement simulationTime functions.

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9.18.2 Typedef Documentation

9.18.2.1 SimulationTimeGetDelegate

typedef IrisDelegate<uint64_t &, uint64_t &, bool &> iris::SimulationTimeGetDelegate

Delegate to get the simulation time.

IrisErrorCode getTime(uint64_t &ticks, uint64_t &tickHz, bool &running);

9.18.2.2 SimulationTimeRunDelegate

typedef IrisDelegate iris::SimulationTimeRunDelegate

Delegate to resume the simulation time progress.

IrisErrorCode run();

9.18.2.3 SimulationTimeStopDelegate

typedef IrisDelegate iris::SimulationTimeStopDelegate

Delegate to stop the simulation time progress.

IrisErrorCode stop();

9.18.3 Enumeration Type Documentation

9.18.3.1 TIME_EVENT_REASON

defined iris::TIME_EVENT_REASON

The reasons why the simulation time stopped.
## 9.19 IrisInstanceStep.h File Reference

Stepping-related add-on to an IrisInstance.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/detail/IrisLogger.h"
#include <cstdio>
```

### Classes

- **class** `iris::IrisInstanceStep`  
  Step add-on for `IrisInstance`.

### Typedefs

- **typedef IrisDelegate< uint64_t &, const std::string & >** as `iris::RemainingStepGetDelegate`  
  Delegate to get the value of the currently remaining steps.
- **typedef IrisDelegate< uint64_t, const std::string & >** as `iris::RemainingStepSetDelegate`  
  Delegate to set the remaining steps measured in the specified unit.
- **typedef IrisDelegate< uint64_t &, const std::string & >** as `iris::StepCountGetDelegate`  
  Delegate to get the value of the step count.

## 9.19.1 Detailed Description

Stepping-related add-on to an IrisInstance.

### Copyright

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The `IrisInstanceStep` class implements all stepping-related Iris functions.
9.19.2.1 RemainingStepGetDelegate

typedef IrisDelegate<uint64_t &, const std::string &> iris::RemainingStepGetDelegate

Delegate to get the value of the currently remaining steps.

IrisErrorCode getRemainingSteps(uint64_t &steps, const std::string &unit)

Error: Return E_ error code if it failed to get the remaining steps.

9.19.2.2 RemainingStepSetDelegate

typedef IrisDelegate<uint64_t, const std::string &> iris::RemainingStepSetDelegate

Delegate to set the remaining steps measured in the specified unit.

IrisErrorCode setRemainingSteps(uint64_t steps, const std::string &unit)

Error: Return E_ error code if it failed to set the steps.

9.19.2.3 StepCountGetDelegate

typedef IrisDelegate<uint64_t &, const std::string &> iris::StepCountGetDelegate

Delegate to get the value of the step count.

IrisErrorCode getStepCount(uint64_t &count, const std::string &unit)

Error: Return E_ error code if it failed to get the step count.

9.20 IrisInstanceSyncLevel.h File Reference

IrisInstance add-on to implement sync-level functionality.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisLogger.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"
#include "iris/IrisInstanceEvent.h"
#include <mutex>

Classes

- class iris::IrisInstanceSyncLevel

Synchronisation level add-on for IrisInstance.
### Typedefs

- typedef IrisDelegate< uint64_t > iris::SyncLevelSetDelegate
  
  Delegate to inform the simulation that the sync level has changed.

### 9.20.1 Detailed Description

IrisInstance add-on to implement sync-level functionality.

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### 9.20.2 Typedef Documentation

#### 9.20.2.1 SyncLevelSetDelegate

typedef IrisDelegate< uint64_t > iris::SyncLevelSetDelegate

Delegate to inform the simulation that the sync level has changed.

IrisErrorCode setSyncLevel(uint64_t level)

### 9.21 IrisInstanceTable.h File Reference

Table add-on to IrisInstance.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisDelegate.h"

### Classes

- class iris::IrisInstanceTable
  
  Table add-on for IrisInstance.

- struct iris::IrisInstanceTable::TableInfoAndAccess
  
  Entry in 'tableInfos'.

### Typedefs

- typedef IrisDelegate< const TableInfo &, uint64_t, uint64_t, TableReadResult & > iris::TableReadDelegate
  
  Delegate to read table data.

- typedef IrisDelegate< const TableInfo &, const TableRecords &, TableWriteResult & > iris::TableWriteDelegate
  
  Delegate to write table data.
9.21.1 Detailed Description

Table add-on to IrisInstance.

Copyright

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The IrisInstanceTable class implements all table-related Iris functions.

9.21.2 Typedef Documentation

9.21.2.1 TableReadDelegate

typedef IrisDelegate<const TableInfo&, uint64_t, uint64_t, TableReadResult &> iris::TableReadDelegate

Delegate to read table data.

IrisErrorCode read(const TableInfo &tableInfo, uint64_t index, uint64_t count, TableReadResult &result)

tableInfo, index, and count are guaranteed to be valid. count is non-zero.

TableReadResult holds the read results and any errors from reading table cell values.

9.21.2.2 TableWriteDelegate

typedef IrisDelegate<const TableInfo&, const TableRecords &, TableWriteResult &> iris::TableWriteDelegate

Delegate to write table data.

IrisErrorCode write(const TableInfo &tableInfo, const TableRecords &records, TableWriteResult &result)

records is guaranteed to be non-empty.

TableWriteResult holds any errors from writing table cell values.

9.22 IrisInstantiationContext.h File Reference

Helper class used to instantiate Iris instances from generic factories.

#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisUtils.h"
#include "iris/detail/IrisObjects.h"
#include <vector>
#include <string>

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Classes

- class iris::IrisInstantiationContext
  
  Provides context when instantiating an Iris instance from a factory.

9.22.1 Detailed Description

Helper class used to instantiate Iris instances from generic factories.

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9.23 IrisParameterBuilder.h File Reference

Helper class to construct instantiation parameters.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include <vector>
#include <string>
```

Classes

- class iris::IrisParameterBuilder
  
  Helper class to construct instantiation parameters.

9.23.1 Detailed Description

Helper class to construct instantiation parameters.

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9.24 IrisPluginFactory.h File Reference

A generic plug-in factory for instantiating plug-in instances.

```cpp
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisObjects.h"
#include "iris/detail/IrisU64JsonReader.h"
#include "iris/detail/IrisU64JsonWriter.h"
#include "iris/detail/IrisFunctionInfo.h"
#include "iris/IrisCConnection.h"
#include "iris/IrisInstance.h"
#include "iris/IrisInstantiationContext.h"
#include "iris/IrisInstanceFactoryBuilder.h"
#include <vector>
#include <string>
#include <mutex>
```
Classes

- class iris::IrisPluginFactory< PLUGIN_INSTANCE >
- class iris::IrisPluginFactoryBuilder
  
  Set metadata for instantiating a plug-in instance.

Macros

- #define IRIS_PLUGIN_FACTORY(plugin_instance)
  
  Use this macro to create an Iris plug-in entry point.

9.24.1 Detailed Description

A generic plug-in factory for instantiating plug-in instances.

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9.24.2 Macro Definition Documentation

9.24.2.1 IRIS_PLUGIN_FACTORY

#define IRIS_PLUGIN_FACTORY(
    plugin_instance 
)

Value:

extern "C" IRIS_EXPORT int64_t irisInitPlugin(IrisC_Functions *functions) \
{ \
    return ::iris::IrisPluginFactory<plugin_instance>::initPlugin(functions, #plugin_instance); \
}

Use this macro to create an Iris plug-in entry point.

Parameters

| plugin_instance | Objects of this type are instantiated for each plug-in instance created. |

9.25 IrisRegisterEventEmitter.h File Reference

Utility classes for emitting register read and register update events.

Generated by Doxygen
#include "iris/detail/IrisCommon.h"
#include "iris/detail/IrisRegisterEventEmitterBase.h"

## Classes

- **class iris::IrisRegisterReadEventEmitter< REG_T, ARGS >**
  
  An EventEmitter class for register read events.

- **class iris::IrisRegisterUpdateEventEmitter< REG_T, ARGS >**
  
  An EventEmitter class for register update events.

### 9.25.1 Detailed Description

Utility classes for emitting register read and register update events.

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