

Intercepting Object Insertion and Extraction in C++

In some situations it may be necessary for an application to intercept the insertion and extraction of Ice objects. For example, the [Ice extension for PHP](#) is implemented using Ice for C++ but represents Ice objects as native PHP objects. The PHP extension accomplishes this by manually encoding and decoding Ice objects as directed by the [data encoding](#) rules. However, the extension obviously cannot pass a native PHP object to the C++ stream function for writing objects. To bridge this gap between object systems, Ice supplies the helper classes described below.

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Inserting Objects in C++

The `ObjectWriter` base class facilitates the insertion of objects to a stream:

```
C++

namespace Ice {
    class ObjectWriter : public Ice::Object {
    public:
        virtual void write(const OutputStreamPtr&) const = 0;
        // ...
    };
    typedef ... ObjectWriterPtr;
}
```

A foreign Ice object is inserted into a stream using the following technique:

1. A C++ "wrapper" class is derived from `ObjectWriter`. This class wraps the foreign object and implements the `write` member function.
2. An instance of the wrapper class is passed to `writeObject`. (This is possible because `ObjectWriter` derives from `Ice::Object`.) Eventually, the `write` member function is invoked on the wrapper instance.
3. The implementation of `write` encodes the object's state as directed by the [data encoding rules for classes](#).

It is the application's responsibility to ensure that there is a one-to-one mapping between foreign Ice objects and wrapper objects. This is necessary in order to ensure the proper encoding of object graphs.

Extracting Objects in C++

The `ObjectReader` class facilitates the extraction of objects from a stream:

```
C++

namespace Ice {
    class ObjectReader : public Ice::Object {
    public:
        virtual void read(const InputStreamPtr&) = 0;
        // ...
    };
    typedef ... ObjectReaderPtr;

    class CompactIdResolver : public IceUtil::Shared {
    public:
        virtual std::string resolve(Ice::Int) const = 0;
    };
    typedef ... CompactIdResolverPtr;
}
```

Extracting the state of a foreign Ice object is more complicated than insertion:

1. A C++ "wrapper" class is derived from `ObjectReader`. An instance of this class represents a foreign Ice object.
2. An [object factory](#) is installed that returns instances of the wrapper class. Note that a single object factory can be used for all Slice types if it is registered with an empty Slice type ID.
3. A C++ callback class is derived from `ReadObjectCallback`. The implementation of `invoke` expects its argument to be either nil or an instance of the wrapper class as returned by the object factory.
4. An instance of the callback class is passed to `readObject`.
5. When the stream is ready to extract the state of an object, it invokes `read` on the wrapper class. The implementation of `read` decodes the object's state as directed by the [data encoding rules for classes](#).
6. The callback object passed to `readObject` is invoked, passing the instance of the wrapper object. All other callback objects representing the same instance in the stream (in case of object graphs) are invoked with the same wrapper object.

If your class definitions use [compact type IDs](#), you must also supply an implementation of `CompactIdResolver` when [initializing the communicator](#). This object is responsible for translating numeric type IDs into their string equivalents.

See Also

- [Client-Side Slice-to-PHP Mapping](#)
- [Data Encoding](#)
- [Data Encoding for Classes](#)
- [C++ Mapping for Classes](#)
- [Communicator Initialization](#)