CICS Transaction Server for z/OS



C++ OO Class Libraries

Version 5 Release 4

CICS Transaction Server for z/OS



C++ OO Class Libraries

Version 5 Release 4

Note
Before using this information and the product it supports, read the information in "Notices" on page 217.

This edition applies to the IBM CICS Transaction Server for z/OS Version 5 Release 4 (product number 5655-Y04) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this PDF

This PDF describes how to use the CICS C++ foundation classes, which allow an application programmer to access CICS services that are available via the EXEC CICS API.

For details of the terms and notation used, see Conventions and terminology used in the CICS documentation in IBM Knowledge Center.

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Chapter 1. Installation and setup

This section describes the CICS® foundation classes installed on your CICS server.

Getting ready for object oriented CICS

You must be familiar with object oriented concepts and technology, the C++ language and with CICS in order to understand the topics that follow.

This is not intended to be an introduction to any of these subjects.

Installed contents

The CICS foundation classes package consists of several files or data sets.

The CICS foundation classes package consists of several files or data sets. These contain the:

- header files
- executables (DLL's)
- samples
- other CICS Transaction Server for z/OS® files

This section describes the files that comprise the CICS C++ Foundation Classes and explains where you can find them on your CICS server.

Header files

The header files are the C++ class definitions needed to compile CICS C++ Foundation Class programs.

C++ Header File	Classes Defined in this Header
ICCABDEH	IccAbendData
ICCBASEH	IccBase
ICCBUFEH	IccBuf
ICCCLKEH	IccClock
ICCCNDEH	IccCondition (struct)
ICCCONEH	IccConsole
ICCCTLEH	IccControl
ICCDATEH	IccDataQueue
ICCEH	see 1 on page 2
ICCEVTEH	IccEvent
ICCEXCEH	IccException
ICCFILEH	IccFile
ICCFLIEH	IccFileIterator
ICCGLBEH	Icc (struct) (global functions)
ICCJRNEH	IccJournal
ICCMSGEH	IccMessage
ICCPRGEH	IccProgram
ICCRECEH	IccRecordIndex, IccKey, IccRBA and IccRRN
ICCRESEH	IccResource
ICCRIDEH	IccResourceId + subclasses (such as IccConvId)

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C++ Header File	Classes Defined in this Header
ICCSEMEH	IccSemaphore
ICCSESEH	IccSession
ICCSRQEH	IccStartRequestQ
ICCSYSEH	IccSystem
ICCTIMEH	IccTime, IccAbsTime, IccTimeInterval, IccTimeOfDay
ICCTMDEH	IccTerminalData
ICCTMPEH	IccTempStore
ICCTRMEH	IccTerminal
ICCTSKEH	IccTask
ICCUSREH	IccUser
ICCVALEH	IccValue (struct)

Note:

1. A single header that #includes all the listed header files is supplied as `ICCEH`
2. The file `ICCMAIN` is also supplied with the C++ header files. This contains the **main** function stub that should be used when you build a Foundation Class program.
3. Header files are located in CICSTS54.CICS .SDFHC370.

Location

PDS: CICSTS54.CICS.SDFHC370.

Dynamic link library

The Dynamic Link Library is the runtime environment that is needed to support a CICS C++ Foundation Class program.

Location

`ICCFCDLL` module in PDS: CICSTS54.CICS.SDFHLOAD.

Sample source code

The samples are provided to help you understand how to use the classes to build object oriented applications.

Location

PDS: CICSTS54.CICS.SDFHSAMP.

Running the sample applications

If you have installed the resources defined in the member `DFHCURDS`, you should be ready to run some of the sample applications.

The sample programs are supplied as source code in library CICSTS54.CICS.SDFHSAMP and before you can run the sample programs, you need to compile, pre-link and link them. To do this, use the procedure `ICCFCCL` in data set CICSTS54.CICS.SDFHPROC.

`ICCFCCL` contains the Job Control Language needed to compile, pre-link and link a CICS user application. Before using `ICCFCCL` you may find it necessary to perform some customization to conform to your installation standards. See also Compiling programs.

Sample programs such as `ICC$BUF`, `ICC$CLK` and `ICC$HEL` require no additional CICS resource definitions, and should now execute successfully.

Other sample programs, in particular the DTP samples named ICC$SES1 and ICC$SES2, require additional CICS resource definitions. Refer to the prologues in the source of the sample programs for information about these additional requirements.

Other data sets for CICS Transaction Server for z/OS

CICSTS54.CICS.SDFHSDCK contains the member

- ICCFCIMP - 'sidedeck' containing import control statements

CICSTS54.CICS.SDFHPROC contains the members

- ICCFCC - JCL to compile a CFC user program
- ICCFCCL - JCL to compile, prelink and link a CFC user program
- ICCFCGL - JCL to compile and link an XPLINK program that uses CFC libraries.
- ICCFCL - JCL to prelink and link a CFC user program

CICSTS54.CICS.SDFHLOAD contains the members

- DFHCURDS - program definitions required for CICS system definition.
- DFHCURDI - program definitions required for CICS system definition.

Chapter 2. Using the CICS foundation classes

This section describes the CICS foundation classes and how to use them. There is a formal listing of the user interface in Foundation Classes: reference.

C++ Objects

This section describes how to create, use, and delete objects.

This section describes how to create, use, and delete objects. In our context an object is an instance of a class. An object cannot be an instance of a base or abstract base class. It is possible to create objects of all the concrete (non-base) classes described in the reference part of this book.

Creating an object

If a class has a constructor it is executed when an object of that class is created. This constructor typically initializes the state of the object. Foundation Classes' constructors often have mandatory positional parameters that the programmer must provide at object creation time.

C++ objects can be created in one of two ways:

1. Automatically, where the object is created on the C++ stack. For example: Here, objX and objY are automatically created on the stack. Their lifetime is

```
{
ClassX objX
ClassY objY(parameter1);
} //objects deleted here
```

   limited by the context in which they were created; when they go out of scope they are automatically deleted (that is, their destructors run and their storage is released).

2. Dynamically, where the object is created on the C++ heap. For example: Here we deal with pointers to objects instead of the objects themselves. The

```
{
ClassX* pObjX = new ClassX;
ClassY* pObjY = new ClassY(parameter1);
} //objects NOT deleted here
```

   lifetime of the object outlives the scope in which it was created. In the previous sample the pointers (pObjX and pObjY) are 'lost' as they go out of scope but the objects they pointed to still exist! The objects exist until they are explicitly deleted as shown here:

```
{
ClassX* pObjX = new ClassX;
ClassY* pObjY = new ClassY(parameter1);
⋮
pObjX->method1();
pObjY->method2();
⋮
delete pObjX;
delete pObjY;
}
```

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Most of the samples in this book use automatic storage. You are ***advised*** to use automatic storage, because you do not have remember to explicitly delete objects, but you are free to use either style for CICS C++ Foundation Class programs. For more information on Foundation Classes and storage management see "Storage management" on page 45.

Using an object

Any of the class public methods can be called on an object of that class.

Any of the class public methods can be called on an object of that class. The following example creates object *obj* and then calls method **doSomething** on it:

```
ClassY obj("TEMP1234");
obj.doSomething();
```

Alternatively, you can do this using dynamic object creation:

```
ClassY* pObj = new ClassY("parameter1");
pObj->doSomething();
```

Deleting an object

When an object is destroyed its destructor function, which has the same name as the class preceded with ~(tilde), is automically called. (You cannot call the destructor explicitly).

If the object was created automatically it is automatically destroyed when it goes out of scope.

If the object was created dynamically it exists until an explicit **delete** operator is used.

Overview of the foundation classes

This topic is a formal introduction to what the Foundation Classes can do for you.

See ICC$HEL: C++ Hello World sample for a simple example to get you started. The section takes a brief look at the CICS C++ Foundation Class library by considering the categories in turn.

See Foundation classes reference for more detailed information on the Foundation Classes.

Every class that belongs to the CICS Foundation Classes is prefixed by **Icc**.

Base classes

All classes inherit, directly or indirectly, from **IccBase** .

IccBase
IccRecordIndex
IccResource
IccControl
IccTime
IccResourceId

Figure 1. Base classes

All resource identification classes, such as **IccTermId** , and **IccTransId** , inherit from **IccResourceId** class. These are typically CICS table entries.

All CICS resources—in fact any class that needs access to CICS services—inherit from **IccResource** class.

Base classes enable common interfaces to be defined for categories of class. They are used to create the foundation classes, as provided by IBM® , and they can be used by application programmers to create their own derived classes.

IccBase
The base for every other foundation class. It enables memory management and allows objects to be interrogated to discover which type they are.

IccControl
The abstract base class that the application program has to subclass and provide with an implementation of the **run** method.

IccResource
The base class for all classes that access CICS resources or services. See "Resource classes" on page 9.

IccResourceId
The base class for all table entry (resource name) classes, such as **IccFileId** and **IccTempStoreId**.

IccTime
The base class for the classes that store time information: **IccAbsTime** , **IccTimeInterval** and **IccTimeOfDay**.

Resource identification classes

Resource identification classes are as follows.

IccBase
IccResourceId
IccConvId
IccDataQueueId
IccFileId
IccGroupId
IccJournalId
IccJournalTypeId
IccLockId
IccPartnerId
IccProgramId
IccRequestId
IccAlarmRequestId
IccSysId
IccTempStoreId
IccTermId
IccTPNameId
IccTransId
IccUserId

Figure 2. Resource identification classes

CICS resource identification classes define CICS resource identifiers – typically the name of the resource as specified in its RDO resource definition. For example an **IccFileId** object represents a CICS file name. All concrete resource identification classes have the following properties:

- The name of the class ends in **Id**.
- The class is a subclass of the **IccResourceId** class.
- The constructors check that any supplied resource identifier meets CICS standards. For example, an **IccFileId** object must contain a 1 to 8 byte character field; providing a 9-byte field is not tolerated.

The resource identification classes improve type checking; methods that expect an **IccFileId** object as a parameter do not accept an **IccProgramId** object instead. If character strings representing the resource names are used instead, the compiler cannot check for validity – it cannot check whether the string is a file name or a program name.

Many of the resource classes, described in "Resource classes" on page 9 , contain resource identification classes. For example, an **IccFile** object contains an **IccFileId** object. You must use the resource object, not the resource identification object, to operate on a CICS resource. For example, you must use **IccFile** , rather than **IccFileId** to read a record from a file.

Class	CICS resource
IccAlarmRequestId	alarm request
IccConvId	conversation
IccDataQueueId	transient data queue
IccFileId	file
IccGroupId	group
IccJournalId	journal
IccJournalTypeId	journal type
IccLockId	(Not applicable)
IccPartnerId	APPC partner definition files
IccProgramId	program
IccRequestId	request

Class	CICS resource
IccSysId	remote system
IccTempStoreId	temporary storage queue
IccTermId	terminal
IccTPNameId	remote APPC TP name
IccTransId	transaction
IccUserId	user

Resource classes

All CICS resource classes inherit from the **IccResource** base class.

IccBase
- **IccResource**
- **IccAbendData**
- **IccClock**
- **IccConsole**
- **IccControl**
- **IccDataQueue**
- **IccFile**
- **IccFileIterator**
- **IccJournal**
- **IccProgram**
- **IccSemaphore**
- **IccSession**
- **IccStartRequestQ**
- **IccSystem**
- **IccTask**
- **IccTempStore**
- **IccTerminal**
- **IccTerminalData**
- **IccUser**

Figure 3. Resource classes

These classes model the behavior of the major CICS resources, for example:

- Terminals are modelled by **IccTerminal**.
- Programs are modelled by **IccProgram**.
- Temporary Storage queues are modelled by **IccTempStore**.
- Transient Data queues are modelled by **IccDataQueue**.

Any operation on a CICS resource may raise a CICS condition; the **condition** method of **IccResource** (see IccResource method: condition) can interrogate it.

(Any class that accesses CICS services ***must*** be derived from **IccResource**).

Class	CICS resource
IccAbendData	task abend data
IccClock	CICS time and date services
IccConsole	CICS console
IccControl	control of executing program
IccDataQueue	transient data queue
IccFile	file

Class	CICS resource
IccFileIterator	file iterator (browsing files)
IccJournal	user or system journal
IccProgram	program (outside executing program)
IccSemaphore	semaphore (locking services)
IccSession	session
IccStartRequestQ	start request queue; asynchronous transaction starts
IccSystem	CICS system
IccTask	current task
IccTempStore	temporary storage queue
IccTerminal	terminal belonging to current task
IccTerminalData	attributes of **IccTerminal**
IccTime	time specification
IccUser	user (security attributes)

Support Classes

Support classes are as follows.

IccBase
- **IccBuf**
- **IccEvent**
- **IccException**
- **IccMessage**
- **IccRecordIndex**
- **IccKey**
- **IccRBA**
- **IccRRN**
- **IccResource**
- **IccTime**
- **IccAbsTime**
- **IccTimeInterval**
- **IccTimeOfDay**

Figure 4. Support classes

These classes are tools that complement the resource classes: they make life easier for the application programmer and thus add value to the object model.

Resource class	Description
IccAbsTime	Absolute time (milliseconds since January 1 1900)
IccBuf	Data buffer (makes manipulating data areas easier)
IccEvent	Event (the outcome of a CICS command)
IccException	Foundation Class exception (supports the C++ exception handling model)
IccTimeInterval	Time interval (for example, five minutes)
IccTimeOfDay	Time of day (for example, five minutes past six)

IccAbsTime, IccTimeInterval and **IccTimeOfDay** classes make it simpler for the application programmer to specify time measurements as objects within an application program. **IccTime** is a base class: **IccAbsTime** , **IccTimeInterval** , and **IccTimeOfDay** are derived from **IccTime**.

Consider method **delay** in class **IccTask** , whose signature is as follows:

```
void delay(const IccTime& time, const IccRequestId*
reqId = 0);
```

To request a delay of 1 minute and 7 seconds (that is, a time interval) the application programmer can do this:

```
IccTimeInterval time(0, 1, 7);
task()->delay(time);
```

Note: The task method is provided in class **IccControl** and returns a pointer to the application's task object.

Alternatively, to request a delay until 10 minutes past twelve (lunchtime?) the application programmer can do this:

```
IccTimeOfDay lunchtime(12, 10);
task()->delay(lunchtime);
```

The **IccBuf** class allows easy manipulation of buffers, such as file record buffers, transient data record buffers, and COMMAREAs (for more information on **IccBuf** class see “Buffer objects” on page 13).

IccMessage class is used primarily by **IccException** class to encapsulate a description of why an exception was thrown. The application programmer can also use **IccMessage** to create their own message objects.

IccException objects are thrown from many of the methods in the Foundation Classes when an error is encountered.

The **IccEvent** class allows a programmer to gain access to information relating to a particular CICS event (command).

Using CICS resources

To use a CICS resource, such as a file or program, you must first create an appropriate object and then call methods on the object.

Creating a resource object

When you create a resource object you create a representation of the actual CICS resource (such as a file or program). You do not create the CICS resource; the object is the application's view of the resource. The same is true of destroying objects.

U se an accompanying resource identification object when creating a resource object. For example:
This allows the C++ compiler to protect you against doing something wrong such

```
IccFileId id("XYZ123");
IccFile file(id);
```

as:

```
IccDataQueueId id("WXYZ");
IccFile file(id); //gives error at compile time
```

The alternative of using the text name of the resource when creating the object is also permitted:

```
IccFile file("XYZ123");
```

Singleton classes:

Many resource classes, such as **IccFile** , can be used to create multiple resource objects within a single program.

```
IccFileId id1("File1");
IccFileId id2("File2");
IccFile file1(id1);
IccFile file2(id2);
```

However, some resource classes are designed to allow the programmer to create only ***one*** instance of the class; these are called singleton classes. The following Foundation Classes are singleton:

- **IccAbendData** provides information about task abends.
- **IccConsole** , or a derived class, represents the system console for operator messages.
- **IccControl** , or a derived class, such as **IccUserControl** , controls the executing program.
- **IccStartRequestQ** , or a derived class, allows the application program to start CICS transactions (tasks) asynchronously.
- **IccSystem** , or a derived class, is the application view of the CICS system in which it is running.
- **IccTask** , or a derived class, represents the CICS task under which the executing program is running.
- **IccTerminal** , or a derived class, represents your task's terminal, provided that your principal facility is a 3270 terminal.

Any attempt to create more than one object of a singleton class results in an error – a C++ exception is thrown.

A class method, **instance** , is provided for each of these singleton classes, which returns a pointer to the requested object and creates one if it does not already exist. For example:

```
IccControl* pControl = IccControl::instance();
```

Calling methods on a resource object

Any of the public methods can be called on an object of that class.

For example:

```
IccTempStoreId id("TEMP1234");
IccTempStore temp(id);
temp.writeItem("Hello TEMP1234");
```

Method **writeItem** writes the contents of the string it is passed ("Hello TEMP1234") to the CICS Temporary Storage queue "TEMP1234".

Buffer objects

The Foundation Classes make extensive use of **IccBuf** objects – buffer objects that simplify the task of handling pieces of data or records.

Understanding the use of these objects is a necessary precondition for much of the rest of this book.

Each of the CICS Resource classes that involve passing data to CICS (for example by writing data records) and getting data from CICS (for example by reading data records) make use of the **IccBuf** class. Examples of such classes are **IccConsole** , **IccDataQueue** , **IccFile** , **IccFileIterator** , **IccJournal** , **IccProgram** , **IccSession** , **IccStartRequestQ** , **IccTempStore** , and **IccTerminal**.

IccBuf class

IccBuf , which is described in detail in the reference part of this book, provides generalized manipulation of data areas.

Because it can be used in a number of ways, there are several **IccBuf** constructors that affect the behavior of the object. Two important attributes of an **IccBuf** object are now described.

Data area ownership

IccBuf has an attribute indicating whether the data area has been allocated inside or outside of the object.

The possible values of this attribute are 'internal' and 'external'. It can be interrogated by using the **dataAreaOwner** method.

Internal/External ownership of buffers:

When **DataAreaOwner** = external, it is the application programmer's responsibility to ensure the validity of the storage on which the **IccBuf** object is based. If the storage is invalid or inappropriate for a particular method applied to the object, unpredictable results will occur.

Data area extensibility

This attribute defines whether the length of the data area within the **IccBuf** object, once created, can be increased.

The possible values of this attribute are 'fixed' and 'extensible'. It can be interrogated by using the **dataAreaType** method.

As an object that is 'fixed' cannot have its data area size increased, the length of the data (for example, a file record) assigned to the **IccBuf** object must not exceed the data area length, otherwise a C++ exception is thrown.

Note: By definition, an 'extensible' buffer ***must*** also be 'internal'.

IccBuf constructors

There are several forms of the **IccBuf** constructor, used when creating **IccBuf** objects.

Some examples are shown here.

```
IccBuf buffer;
```

This creates an 'internal' and 'extensible' data area that has an initial length of zero. When data is assigned to the object the data area length is automatically extended to accommodate the data being assigned.

```
IccBuf buffer(50);
```

This creates an 'internal' and 'extensible' data area that has an initial length of 50 bytes. The data length is zero until data is assigned to the object. If 50 bytes of data are assigned to the object, both the data length and the data area length return a value of 50. When more than 50 bytes of data are assigned into the object, the data area length is automatically (that is, without further intervention) extended to accommodate the data.

```
IccBuf buffer(50, IccBuf::fixed);
```

This creates an 'internal' and 'fixed' data area that has a length of 50 bytes. If an attempt is made to assign more than 50 bytes of data into the object, the data is truncated and an exception is thrown to notify the application of the error situation.

```
struct MyRecordStruct
{
short id;
short code;
char data(30);
char rating;
};
MyRecordStruct myRecord;
IccBuf buffer(sizeof(MyRecordStruct), &myRecord);
```

This creates an **IccBuf** object that uses an 'external' data area called myRecord. By definition, an 'external' data area is also 'fixed'. Data can be assigned using the methods on the **IccBuf** object or using the `myRecord` structure directly.

```
IccBuf buffer("Hello World");
```

This creates an 'internal' and 'extensible' data area that has a length equal to the length of the string "Hello World". The string is copied into the object's data area. This initial data assignment can then be changed using one of the manipulation methods (such as **insert** , **cut** , or **replace**) provided.

```
IccBuf buffer("Hello World");
buffer << " out there";
IccBuf buffer2(buffer);
```

Here the copy constructor creates the second buffer with almost the same attributes as the first; the exception is the data area ownership attribute – the second object always contains an 'internal' data area that is a copy of the data area in the first. In the given example buffer2 contains "Hello World out there" and has both data area length and data length of 21.

IccBuf methods

An **IccBuf** object can be manipulated using a number of supplied methods; for example you can append data to the buffer, change the data in the buffer, cut data out of the buffer, or insert data into the middle of the buffer.

The operators **const char*** , **=** , **+=** , **==** , **!=** , and **<<** have been overloaded in class **IccBuf** . There are also methods that allow the **IccBuf** attributes to be queried. For more details see the reference section.

Working with IccResource subclasses

To illustrate working with IccResource subclasses, consider writing a queue item to CICS temporary storage using **IccTempstore** class.

```
IccTempStore store("TEMP1234");
IccBuf buffer(50);
```

The **IccTempStore** object created is the application's view of the CICS temporary storage queue named "TEMP1234". The **IccBuf** object created holds a 50-byte data area (it also happens to be 'extensible').

```
buffer = "Hello Temporary Storage Queue";
store.writeItem(buffer);
```

The character string "Hello Temporary Storage Queue" is copied into the buffer. This is possible because the **operator=** method has been overloaded in the **IccBuf** class.

The **IccTempStore** object calls its **writeItem** method, passing a reference to the **IccBuf** object as the first parameter. The contents of the **IccBuf** object are written out to the CICS temporary storage queue.

Now consider the inverse operation, reading a record from the CICS resource into the application program's **IccBuf** object:

```
buffer = store.readItem(5);
```

The **readItem** method reads the contents of the fifth item in the CICS Temporary Storage queue and returns the data as an **IccBuf** reference.

The C++ compiler resolves the given line of code into two method calls, **readItem** defined in class **IccTempStore** and **operator=** which has been overloaded in class **IccBuf** . This second method takes the contents of the returned **IccBuf** reference and copies its data into the buffer.

The given style of reading and writing records using the foundation classes is typical. The final example shows how to write code – using a similar style to the above example – but this time accessing a CICS transient data queue.

```
IccDataQueue queue("DATQ");
IccBuf buffer(50);
buffer = queue.readItem();
buffer << "Some extra data";
queue.writeItem(buffer);
```

The **readItem** method of the **IccDataQueue** object is called, returning a reference to an **IccBuf** which it then assigns (via **operator=** method, overloaded in class **IccBuf**) to the `buffer` object. The character string – "Some extra data" – is appended to the buffer (via **operator chevron** « method, overloaded in class **IccBuf**). The **writeItem** method then writes back this modified buffer to the CICS transient data queue.

You can find further examples of this syntax in the samples presented in the following sections, which describe how to use the foundation classes to access CICS services.

Refer to the reference section for further information on the **IccBuf** class. You might also find the supplied sample – `ICC$BUF` – helpful.

Using CICS Services

This section describes how to use CICS services. The services are considered in turn.

File control

The file control classes **IccFile** , **IccFileId** , **IccKey** , **IccRBA** , and **IccRRN** allow you to read, write, update and delete records in files.

In addition, **IccFileIterator** class allows you to browse through all the records in a file.

An **IccFile** object is used to represent a file. It is convenient, but not necessary, to use an **IccFileId** object to identify a file by name.

An application program reads and writes its data in the form of individual records. Each read or write request is made by a method call. To access a record, the program must identify both the file and the particular record.

VSAM (or VSAM-like) files are of the following types:

KSDS
Key-sequenced: each record is identified by a key – a field in a predefined position in the record. Each key must be unique in the file.

The logical order of records within a file is determined by the key. The physical location is held in an index which is maintained by VSAM.

When browsing, records are found in their logical order.

ESDS Entry-sequenced: each record is identified by its relative byte address (RBA).

Records are held in an ESDS in the order in which they were first loaded into the file. New records are always added at the end and records may not be deleted or have their lengths altered.

When browsing, records are found in the order in which they were originally written.

RRDS file
Relative record: records are written in fixed-length slots. A record is identified by the relative record number (RRN) of the slot which holds it.

Reading records

A read operation uses two classes – **IccFile** to perform the operation and one of **IccKey** , **IccRBA** , and **IccRRN** to identify the particular record, depending on whether the file access type is KSDS, ESDS, or RRDS.

The **readRecord** method of **IccFile** class reads the record.

Reading KSDS records:

Before reading a record you must use the **registerRecordIndex** method of **IccFile** to associate an object of class **IccKey** with the file.

You must use a key, held in the **IccKey** object, to access records. A 'complete' key is a character string of the same length as the physical file's key. Every record can be separately identified by its complete key.

A key can also be 'generic'. A generic key is shorter than a complete key and is used for searching for a set of records. The **IccKey** class has methods that allow you to set and change the key.

IccFile class has methods **isReadable** , **keyLength** , **keyPosition** , **recordIndex** , and **recordLength** , which help you when reading KSDS records.

Reading ESDS records:

You must use a relative byte address (RBA) held in an **IccRBA** object to access the beginning of a record.

Before reading a record you must use the **registerRecordIndex** method of **IccFile** to associate an object of class **IccRBA** with the file.

IccFile class has methods **isReadable** , **recordFormat** , **recordIndex** , and **recordLength** that help you when reading ESDS records.

Reading RRDS records:

You must use a relative record number (RRN) held in an **IccRRN** object to access a record.

Before reading a record you must use **registerRecordIndex** method of **IccFile** to associate an object of class **IccRRN** with the file.

IccFile class has methods **isReadable** , **recordFormat** , **recordIndex** , and **recordLength** which help you when reading RRDS records.

Writing records

Writing records is also known as “adding records”.

This topic describes writing records that have not previously been written. Writing records that already exist is not permitted unless they have been previously been put into 'update' mode. See “Updating records” on page 18 for more information.

Before writing a record you must use **registerRecordIndex** method of **IccFile** to associate an object of class **IccKey** , **IccRBA** , or **IccRRN** with the file. The **writeRecord** method of **IccFile** class writes the record.

A write operation uses two classes – **IccFile** to perform the operation and one of **IccKey** , **IccRBA** , and **IccRRN** to identify the particular record, depending on whether the file access type is KSDS, ESDS, or RRDS.

If you have more than one record to write, you can improve the speed of writing by using mass insertion of data. You begin and end this mass insertion by calling the **beginInsert** and **endInsert** methods of **IccFile**.

Writing KSDS records:

You must use a key, held in an **IccKey** object to access records.

A 'complete' key is a character string that uniquely identifies a record. Every record can be separately identified by its complete key.

The **writeRecord** method of **IccFile** class writes the record.

IccFile class has methods **isAddable** , **keyLength** , **keyPosition** , **recordIndex** , **recordLength** , and **registerRecordIndex** which help you when writing KSDS records.

Writing ESDS records:

You must use a relative byte address (RBA) held in an **IccRBA** object to access the beginning of a record.

IccFile class has methods **isAddable** , **recordFormat** , **recordIndex** , **recordLength** , and **registerRecordIndex** that help you when writing ESDS records.

Writing RRDS records:

Use the **writeRecord** method to add a new ESDS record.

IccFile class has methods **isAddable** , **recordFormat** , **recordIndex** , **recordLength** , and **registerRecordIndex** that help you when writing RRDS records.

Updating records

Updating a record is also known as “rewriting a record”.

Before updating a record you must first read it, using **readRecord** method in 'update' mode. This locks the record so that nobody else can change it.

Use **rewriteRecord** method to update the record. Note that the **IccFile** object remembers which record is being processed and this information is not passed in again.

For an example, see code fragment: "Read record for update".

The base key in a KSDS file must not be altered when the record is modified. If the file definition allows variable-length records, the length of the record can be changed.

The length of records in an ESDS, RRDS, or fixed-length KSDS file must not be changed on update.

For a file defined to CICS as containing fixed-length records, the length of record being updated must be the same as the original length. The length of an updated record must not be greater than the maximum defined to VSAM.

Deleting records

Records can never be deleted from an ESDS file.

Deleting normal records:

The **deleteRecord** method of **IccFile** class deletes one or more records, provided they are not locked by virtue of being in 'update' mode.

The records to be deleted are defined by the **IccKey** or **IccRRN** object.

Deleting locked records:

The **deleteLockedRecord** method of **IccFile** class deletes a record which has been previously locked by virtue of being put in 'update' mode by the **readRecord** method.

Browsing records

Browsing, or sequential reading of files uses another class – **IccFileIterator** .

An object of this class must be associated with an **IccFile** object and an **IccKey** , **IccRBA** , or **IccRRN** object. After this association has been made the **IccFileIterator** object can be used without further reference to the other objects.

Browsing can be done either forwards, using **readNextRecord** method or backwards, using **readPreviousRecord** method. The **reset** method resets the **IccFileIterator** object to point to the record specified by the **IccKey** or **IccRBA** object.

Examples of browsing files are shown in page Code fragment "List all records in assending order of key".

Example of file control

This sample program demonstrates how to use the **IccFile** and **IccFileIterator** classes.

The source for this sample can be found in C++ sample programs , in file `ICC$FIL`. Here the code is presented without any of the terminal input and output that can be found in the source file.

```
#include "icceh.hpp"
#include "iccmain.hpp"
```

The first two lines include the header files for the Foundation Classes and the standard **main** function which sets up the operating environment for the application program.

```
const char* fileRecords[] =
{
//NAME KEY PHONE USERID
"BACH, J S 003 00-1234 BACH ",
"BEETHOVEN, L 007 00-2244 BEET ",
"CHOPIN, F 004 00-3355 CHOPIN ",
"HANDEL, G F 005 00-4466 HANDEL ",
"MOZART, W A 008 00-5577 WOLFGANG "
};
```

This defines several lines of data that are used by the sample program.

```
void IccUserControl::run()
{
```

The **run** method of **IccUserControl** class contains the user code for this example. As a terminal is to be used, the example starts by creating a terminal object and clearing the associated screen.

```
 short recordsDeleted = 0;
IccFileId id("ICCKFILE");
IccKey key(3,IccKey::generic);
IccFile file( id );
file.registerRecordIndex( &key );
key = "00";
recordsDeleted = file.deleteRecord();
```

The *key* and *file* objects are first created and then used to delete all the records whose key starts with "00" in the KSDS file "ICCKFILE". *key* is defined as a generic key having 3 bytes, only the first two of which are used in this instance.

```
 IccBuf buffer(40);
      key.setKind( IccKey::complete );
      for (short j = 0; j < 5; j++)
      {
      buffer = fileRecords[j];
      key.assign(3, fileRecords[j]+15);
      file.writeRecord( buffer );
      }
```

This next fragment writes all the data provided into records in the file. The data is passed by means of an **IccBuf** object that is created for this purpose. **setKind** method is used to change *key* from 'generic' to 'complete'.

The **for** loop between these calls loops round all the data, passing the data into the buffer, using the **operator=** method of **IccBuf** , and thence into a record in the file, by means of **writeRecord**. On the way the key for each record is set, using **assign** , to be a character string that occurs in the data (3 characters, starting 15 characters in).

```
 IccFileIterator fIterator( &file,
      &key );
      key = "000";
      buffer = fIterator.readNextRecord();
      while (fIterator.condition() == IccCondition::NORMAL)
      {
      term->sendLine("- record read: [%s]",(const char*) buffer);
      buffer = fIterator.readNextRecord();
      }
```

The loop shown here lists to the terminal, using **sendLine** , all the records in ascending order of key. It uses an **IccFileIterator** object to browse the records. It starts by setting the minimum value for the key which, as it happens, does not exist in this example, and relying on CICS to find the first record in key sequence.

The loop continues until any condition other than NORMAL is returned.

```
 key = "\xFF\xFF\xFF";
fIterator.reset( &key );
buffer = fIterator.readPreviousRecord();
while (fIterator.condition() == IccCondition::NORMAL)
{
buffer = fIterator.readPreviousRecord();
}
```

The next loop is nearly identical to the last, but lists the records in reverse order of key.

```
 key = "008";
      buffer = file.readRecord( IccFile::update );
      buffer.replace( 4, "5678", 23);
      file.rewriteRecord( buffer );
```

This fragment reads a record for update, locking it so that others cannot change it. It then modifies the record in the buffer and writes the updated record back to the file.

```
 buffer = file.readRecord();
```

The same record is read again and sent to the terminal, to show that it has indeed been updated.

```
 return;
}
```

The end of **run** , which returns control to CICS.

See C++ sample programs for the expected output from this sample.

Program control

This section describes how to access and use a program other than the one that is currently executing.

Program control uses **IccProgram** class, one of the resource classes.

Programs may be loaded, unloaded and linked to, using an **IccProgram** object. An **IccProgram** object can be interrogated to obtain information about the program. See IccProgram class for more details.

The example shown here shows one program calling another two programs in turn, with data passing between them via a COMMAREA. One program is assumed to be local, the second is on a remote CICS system. The programs are in two files, `ICC$PRG1` and `ICC$PRG2`. See C++ sample programs for the location of these files and the expected output from these sample programs.

Most of the terminal IO in these samples has been omitted from the code that follows.

```
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
```

The code for both programs starts by including the header files for the Foundation Classes and the stub for **main** method. The user code is located in the **run** method of the **IccUserControl** class for each program.

```
IccSysId sysId( "ICC2" );
IccProgram icc$prg2( "ICC$PRG2" );
IccProgram remoteProg( "ICC$PRG3" );
IccBuf commArea( 100, IccBuf::fixed );
```

The first program (ICC$PRG1) creates an **IccSysId** object representing the remote region, and two **IccProgram** objects representing the local and remote programs that will be called from this program. A 100 byte, fixed length buffer object is also created to be used as a communication area between programs.

```
icc$prg2.load();
if (icc$prg2.condition() == IccCondition::NORMAL)
{
term->sendLine( "Loaded program: %s <%s> Length=%ld Address=%x",
icc$prg2.name(),
icc$prg2.conditionText(),
icc$prg2.length(),
icc$prg2.address() );
icc$prg2.unload();
}
```

The program then attempts to load and interrogate the properties of program ICC$PRG2.

```
 commArea = "DATA SET BY ICC$PRG1";
icc$prg2.link( &commArea );
```

The communication area buffer is set to contain some data to be passed to the first program that ICC$PRG1 links to (ICC$PRG2). ICC$PRG1 is suspended while ICC$PRG2 is run.

The called program, ICC$PRG2, is a simple program, the gist of which is as follows:

```
IccBuf& commArea = IccControl::commArea();
commArea = "DATA RETURNED BY ICC$PRG2";
return;
```

ICC$PRG2 gains access to the communication area that was passed to it. It then modifies the data in this communication area and passes control back to the program that called it.

The first program (ICC$PRG1) now calls another program, this time on another system, as follows:

```
remoteProg.setRouteOption( sysId );
commArea = "DATA SET BY ICC$PRG1";
remoteProg.link( &commArea );
```

The **setRouteOption** requests that calls on this object are routed to the remote system. The communication area is set again (because it will have been changed by ICC$PRG2) and it then links to the remote program (ICC$PRG3 on system ICC2).

The called program uses CICS temporary storage but the three lines we consider are:

```
IccBuf& commArea = IccControl::commArea();
commArea = "DATA RETURNED BY ICC$PRG3";
return;
```

Again, the remote program (ICC$PRG3) gains access to the communication area that was passed to it. It modifies the data in this communication area and passes control back to the program that called it.

```
 return;
};
```

Finally, the calling program itself ends and returns control to CICS.

Starting transactions asynchronously

The **IccStartRequestQ** class enables a program to start another CICS transaction instance asynchronously (and optionally pass data to the started transaction).

The same class is used by a started transaction to gain access to the data that the task that issued the start request passed to it. Finally start requests (for some time in the future) can be cancelled.

Starting transactions

You can use any of the following methods to establish what data will be sent to the started transaction.

- **registerData** or **setData**
- **setQueueName**
- **setReturnTermId**
- **setReturnTransId**

The actual start is requested using the **start** method.

Accessing start data

A started transaction can access its start data by invoking the **retrieveData** method.

This method stores all the start data attributes in the **IccStartRequestQ** object such that the individual attributes can be accessed using the following methods:

- **data**
- **queueName**
- **returnTermId**
- **returnTransId**

Cancelling unexpired start requests

Unexpired start requests (that is, start requests for some future time that has not yet been reached) can be cancelled using the **cancel** method.

Example of starting transactions

start transaction ISR1 on terminal PEO1 on system ICC1.

CICS system	**ICC1**	**ICC2**
Transaction	ISR1/ITMP	ISR2
Program	ICC$SRQ1/ICC$TMP	ICC$SRQ2
Terminal	PEO1	PEO2

This issues two start requests; the first is cancelled before it has expired. The second starts transaction ISR2 on terminal PEO2 on system ICC2. This transaction accesses its start data and finishes by starting transaction ITMP on the original terminal (PEO1 on system ICC1).

The programs and the expected output from them, can be found in C++ sample programs as files `ICC$SRQ1` and `ICC$SRQ2`. Here the code is presented without the terminal IO requests.

Transaction ISR1 runs program ICC$SRQ1 on system ICC1. Let us consider this program first:

```
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
```

These lines include the header files for the Foundation Classes, and the **main** function needed to set up the class library for the application program. The **run** method of **IccUserControl** class contains the user code for this example.

```
 IccRequestId req1;
IccRequestId req2("REQUEST1");
IccTimeInterval ti(0,0,5);
IccTermId remoteTermId("PE02");
IccTransId ISR2("ISR2");
IccTransId ITMP("ITMP");
IccBuf buffer;
IccStartRequestQ* startQ = startRequestQ();
```

Here we are creating a number of objects:

req1 An empty **IccRequestId** object ready to identify a particular start request.

req2 An **IccRequestId** object containing the user-supplied identifier "REQUEST1".

ti An **IccTimeInterval** object representing 0 hours, 0 minutes, and 5 seconds.

remoteTermId
An **IccTermId** object; the terminal on the remote system where we start a transaction.

ISR2 An **IccTransId** object; the transaction we start on the remote system.

ITMP An **IccTransId** object; the transaction that the started transaction starts on this program's terminal.

buffer
An **IccBuf** object that holds start data.

Finally, the **startRequestQ** method of **IccControl** class returns a pointer to the single instance (singleton) class **IccStartRequestQ**.

```
 startQ->setRouteOption( "ICC2" );
startQ->registerData( &buffer );
startQ->setReturnTermId( terminal()->name() );
startQ->setReturnTransId( ITMP );
startQ->setQueueName( "startqnm" );
```

This code fragment prepares the start data that is passed when we issue a start request. The **setRouteOption** says we will issue the start request on the remote system, ICC2. The **registerData** method associates an **IccBuf** object that will contain the start data (the contents of the **IccBuf** object are not extracted until we issue the start request). The **setReturnTermId** and **setReturnTransId** methods allow the start requester to pass a transaction and terminal name to the started transaction. These fields are typically used to allow the started transaction to start ***another*** transaction (as specified) on another terminal, in this case ours.

The **setQueueName** is another piece of information that can be passed to the started transaction.

```
 buffer = "This is a greeting from program
'icc$srq1'!!";
req1 = startQ->start( ISR2, &remoteTermId, &ti );
startQ->cancel( req1 );
```

Here we set the data that we pass on the start requests. We start transaction ISR2 after an interval *ti* (5 seconds). The request identifier is stored in *req1* . Before the five seconds has expired (that is, immediately) we cancel the start request.

```
 req1 = startQ->start( ISR2, &remoteTermID,
&ti, &req2 );
return;
}
```

Again we start transaction ISR2 after an interval *ti* (5 seconds). This time the request is allowed to expire so transaction ISR2 is started on the remote system. Meanwhile, we end by returning control to CICS.

Let us now consider the started program, `ICC$SRQ2`.

```
 IccBuf buffer;
IccRequestId req("REQUESTX");
IccTimeInterval ti(0,0,5);
IccStartRequestQ* startQ = startRequestQ();
```

Here, as in `ICC$SRQ1` , we create a number of objects:

buffer
: An **IccBuf** object to hold the start data we were passed by our caller (ICC$SRQ1).

req
: An **IccRequestId** object to identify the start we will issue on our caller's terminal.

ti
: An **IccTimeInterval** object representing 0 hours, 0 minutes, and 5 seconds.

The **startRequestQ** method of **IccControl** class returns a pointer to the singleton class **IccStartRequestQ**.

```
 if ( task()->startType() != IccTask::startRequest )
{
term->sendLine(
"This program should only be started via the StartRequestQ");
task()->abend( "OOPS" );
}
```

Here we use the **startType** method of **IccTask** class to check that `ICC$SRQ2` was started by the **start** method, and not in any other way (such as typing the transaction name on a terminal). If it was not started as intended, we abend with an "OOPS" abend code.

```
 startQ->retrieveData();
```

We retrieve the start data that we were passed by `ICC$SRQ1` and store within the **IccStartRequestQ** object for subsequent access.

```
 buffer = startQ->data();
term->sendLine( "Start buffer contents = [%s]", buffer.dataArea() );
term->sendLine( "Start queue= [%s]", startQ->queueName() );
term->sendLine( "Start rtrn = [%s]",
startQ->returnTransId().name());
term->sendLine( "Start rtrm = [%s]", startQ->returnTermId().name() );
```

The start data buffer is copied into our **IccBuf** object. The other start data items (queue, returnTransId, and returnTermId) are displayed on the terminal.

```
 task()->delay( ti );
```

We delay for five seconds (that is, we sleep and do nothing).

```
 startQ->setRouteOption( "ICC1" );
```

The **setRouteOption** signals that we will start on our caller's system (ICC1).

```
 startQ->start(
startQ->returnTransId(),startQ->returnTermId());
return;
```

We start a transaction called ITMP (the name of which was passed by `ICC$SRQ1` in the returnTransId start information) on the originating terminal (where `ICC$SRQ1` completed as it started this transaction). Having issued the start request, `ICC$SRQ1` ends, by returning control to CICS.

Finally, transaction ITMP runs on the first terminal. This is the end of this demonstration of starting transactions asynchronously.

Transient Data

The transient data classes, **IccDataQueue** and **IccDataQueueId** , allow you to store data in transient data queues for subsequent processing.

You can:

- Read data from a transient data queue (**readItem** method)
- Write data to a transient data queue (**writeItem** method)
- Delete a transient data queue (**empty** method)

An **IccDataQueue** object is used to represent a temporary storage queue. An **IccDataQueueId** object is used to identify a queue by name. Once the **IccDataQueueId** object is initialized it can be used to identify the queue as an alternative to using its name, with the advantage of additional error detection by the C++ compiler.

The methods available in **IccDataQueue** class are similar to those in the **IccTempStore** class. For more information on these see “Temporary storage” on page 28.

Reading data

The **readItem** method is used to read items from the queue.

It returns a reference to the **IccBuf** object that contains the information.

Writing data

The **writeItem** method of **IccDataQueue** adds a new item of data to the queue, taking the data from the buffer specified.

Deleting queues

The **empty** method deletes all items on the queue.

Example of managing transient data

This sample program demonstrates how to use the **IccDataQueue** and **IccDataQueueId** classes.

It can be found, along with the expected output, in C++ sample programs as file ICC$DAT. Here the code is presented without the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
```

The first two lines include the header files for the foundation classes and the standard **main** function that sets up the operating environment for the application program.

```
const char* queueItems[] =
{
"Hello World - item 1",
"Hello World - item 2",
"Hello World - item 3"
};
```

This defines some buffer for the sample program.

```
void IccUserControl::run()
{
```

The **run** method of **IccUserControl** class contains the user code for this example.

```
 short itemNum =1;
IccBuf buffer( 50 );
IccDataQueueId id( "ICCQ" );
IccDataQueue queue( id );
queue.empty();
```

This fragment first creates an identification object, of type IccDataQueueId containing "ICCQ". It then creates an **IccDataQueue** object representing the transient data queue "ICCQ", which it empties of data.

```
 for (short i=0 ; i<3 ; i++)
{
buffer = queueItems[i];
queue.writeItem( buffer );
}
```

This loop writes the three data items to the transient data object. The data is passed by means of an **IccBuf** object that was created for this purpose.

```
 buffer = queue.readItem();
while ( queue.condition() == IccCondition::NORMAL )
{
buffer = queue.readItem();
}
```

Having written out three records we now read them back in to show they were successfully written.

```
 return;
}
```

The end of **run** , which returns control to CICS.

Temporary storage

The temporary storage classes, **IccTempStore** and **IccTempStoreId** , allow you to store data in temporary storage queues.

You can:

- Read an item from the temporary storage queue (**readItem** method)
- Write a new item to the end of the temporary storage queue (**writeItem** method)
- Update an item in the temporary storage queue (**rewriteItem** method)
- Read the next item in the temporary storage queue (**readNextItem** method)
- Delete all the temporary data (**empty** method)

An **IccTempStore** object is used to represent a temporary storage queue. An **IccTempStoreId** object is used to identify a queue by name. Once the **IccTempStoreId** object is initialized it can be used to identify the queue as an alternative to using its name, with the advantage of additional error detection by the C++ compiler.

The methods available in **IccTempStore** class are similar to those in the **IccDataQueue** class. For more information on these see “Transient Data” on page 26.

Reading items

The **readItem** method of **IccTempStore** reads the specified item from the temporary storage queue.

It returns a reference to the **IccBuf** object that contains the information.

Writing items

Writing items is also known as "adding" items.

This section describes writing items that have not previously been written. Writing items that already exist can be done using the **rewriteItem** method. See “Updating items” for more information.

The **writeItem** method of **IccTempStore** adds a new item at the end of the queue, taking the data from the buffer specified. If this is done successfully, the item number of the record added is returned.

Updating items

Updating an item is also known as "rewriting" an item.

The **rewriteItem** method of **IccTempStore** class is used to update the specified item in the temporary storage queue.

Deleting items

You cannot delete individual items in a temporary storage queue.

To delete *all* the temporary data associated with an **IccTempStore** object use the **empty** method of **IccTempStore** class.

Example of Temporary Storage

This sample program demonstrates how to use the **IccTempStore** and **IccTempStoreId** classes.

This program, and the expected output from it, can be found in C++ sample programs , as file `ICC$TMP`. The sample is presented here without the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
#include <stdlib.h>
```

The first three lines include the header files for the foundation classes, the standard **main** function that sets up the operating environment for the application program, and the standard library.

```
const char* bufferItems[] =
{
"Hello World - item 1",
"Hello World - item 2",
"Hello World - item 3"
};
```

This defines some buffer for the sample program.

```
void IccUserControl::run()
{
```

The **run** method of **IccUserControl** class contains the user code for this example.

```
 short itemNum = 1;
IccTempStoreId id("ICCSTORE");
IccTempStore store( id );
IccBuf buffer( 50 );
store.empty();
```

This fragment first creates an identification object, **IccTempStoreId** containing the field "ICCSTORE". It then creates an **IccTempStore** object representing the temporary storage queue "ICCSTORE", which it empties of records.

```
 for (short j=1 ; j <= 3 ; j++)
{
buffer = bufferItems[j-1];
store.writeItem( buffer );
}
```

This loop writes the three data items to the Temporary Storage object. The data is passed by means of an **IccBuf** object that was created for this purpose.

```
 buffer = store.readItem( itemNum );
while ( store.condition() == IccCondition::NORMAL )
{
buffer.insert( 9, "Modified " );
store.rewriteItem( itemNum, buffer );
itemNum++;
buffer = store.readItem( itemNum );
}
```

This next fragment reads the items back in, modifies the item, and rewrites it to the temporary storage queue. First, the **readItem** method is used to read the buffer from the temporary storage object. The data in the buffer object is changed using

the **insert** method of **IccBuf** class and then the **rewriteItem** method overwrites the buffer. The loop continues with the next buffer item being read.

```
 itemNum = 1;
buffer = store.readItem( itemNum );
while ( store.condition() == IccCondition::NORMAL )
{
term->sendLine( " - record #%d = [%s]", itemNum,
(const char*)buffer );
buffer = store.readNextItem();
}
```

This loop reads the temporary storage queue items again to show they have been updated.

```
 return;
}
```

The end of **run** , which returns control to CICS.

Terminal control

The terminal control classes, **IccTerminal** , **IccTermId** , and **IccTerminalData** , allow you to send data to, receive data from, and find out information about the terminal belonging to the CICS task.

An **IccTerminal** object is used to represent the terminal that belongs to the CICS task. It can only be created if the transaction has a 3270 terminal as its principal facility. The **IccTermId** class is used to identify the terminal. **IccTerminalData** , which is owned by **IccTerminal** , contains information about the terminal characteristics.

Sending data to a terminal

The **send** and **sendLine** methods of **IccTerminal** class are used to write data to the screen.

The **set...** methods allow you to do this. You may also want to erase the data currently displayed at the terminal, using the **erase** method, and free the keyboard so that it is ready to receive input, using the **freeKeyboard** method.

Receiving data from a terminal

The **receive** and **receive3270data** methods of **IccTerminal** class are used to receive data from the terminal.

Finding out information about a terminal

You can find out information about both the characteristics of the terminal and its current state.

The **data** object points to the **IccTerminalData** object that contains information about the characteristics of the terminal. The methods in **IccTerminalData** allow you to discover, for example, the height of the screen or whether the terminal supports Erase Write Alternative. Some of the methods in **IccTerminal** also give you information about characteristics, such as how many lines a screen holds.

Other methods give you information about the current state of the terminal. These include **line** , which returns the current line number, and **cursor** , which returns the current cursor position.

Example of terminal control

This sample program demonstrates how to use the **IccTerminal** , **IccTermId** , and **IccTerminalData** classes.

This program, and the expected output from it, can be found in C++ sample programs , as file ICC$TRM.

```
#include "icceh.hpp"
#include "iccmain.hpp"
```

The first two lines include the header files for the Foundation Classes and the standard **main** function that sets up the operating environment for the application program.

```
void IccUserControl::run()
{
IccTerminal& term = *terminal();
term.erase();
```

The **run** method of **IccUserControl** class contains the user code for this example. As a terminal is to be used, the example starts by creating a terminal object and clearing the associated screen.

```
 term.sendLine( "First part of the line..." );
term.send( "... a continuation of the line." );
term.sendLine( "Start this on the next line" );
term.sendLine( 40, "Send this to column 40 of current line" );
term.send( 5, 10, "Send this to row 5, column 10" );
term.send( 6, 40, "Send this to row 6, column 40" );
```

This fragment shows how the **send** and **sendLine** methods are used to send data to the terminal. All of these methods can take **IccBuf** references (const IccBuf&) instead of string literals (const char*).

```
 term.setNewLine();
```

This sends a blank line to the screen.

```
 term.setColor( IccTerminal::red );
term.sendLine( "A Red line of text.");
term.setColor( IccTerminal::blue );
term.setHighlight( IccTerminal::reverse );
term.sendLine( "A Blue, Reverse video line of text.");
```

The **setColor** method is used to set the color of the text on the screen and the **setHighlight** method to set the highlighting.

```
 term << "A cout sytle interface... " <<
endl;
term << "you can " << "chain input together; "
<< "use different types, eg numbers: " << (short)123 <<
" "
<< (long)4567890 << " " << (double)123456.7891234
<< endl;
term << "... and everything is buffered till you issue a flush."
<< flush;
```

This fragment shows how to use the iostream–like interface **endl** to start data on the next line. To improve performance, you can buffer data in the terminal until

flush is issued, which sends the data to the screen.

```
 term.send( 24,1, "Program 'icc$trm' complete: Hit PF12
to End" );
term.waitForAID( IccTerminal::PF12 );
term.erase();
```

The **waitForAID** method causes the terminal to wait until the specified key is hit, before calling the **erase** method to clear the display.

```
 return;
}
```

The end of **run** , which returns control to CICS.

Time and date services

The **IccClock** class controls access to the CICS time and date services.

IccAbsTime holds information about absolute time (the time in milliseconds that have elapsed since the beginning of 1900), and this can be converted to other forms of date and time. The methods available on **IccClock** objects and on **IccAbsTime** objects are very similar.

Example of time and date services

This sample program demonstrates how to use **IccClock** class.

The source for this program, and the expected output from it, can be found in C++ sample programs , as file `ICC$CLK` . The sample is presented here without the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
```

The first two lines include the header files for the Foundation Classes and the standard **main** function that sets up the operating environment for the application program.

The **run** method of **IccUserControl** class contains the user code for this example.

```
 IccClock clock;
```

This creates a clock object.

```
 term->sendLine( "date() = [%s]",
clock.date() );
term->sendLine( "date(DDMMYY) = [%s]",
clock.date(IccClock::DDMMYY) );
term->sendLine( "date(DDMMYY,':') = [%s]",
clock.date(IccClock::DDMMYY,':'));
term->sendLine( "date(MMDDYY) = [%s]",
clock.date(IccClock::MMDDYY));
term->sendLine( "date(YYDDD) = [%s]",
clock.date(IccClock::YYDDD));
```

Here the **date** method is used to return the date in the format specified by the *format* enumeration. In order the formats are system, DDMMYY, DD:MM:YY, MMDDYY and YYDDD. The character used to separate the fields is specified by

the *dateSeparator* character (that defaults to nothing if not specified).

```
 term->sendLine( "daysSince1900() = %ld",
clock.daysSince1900());
term->sendLine( "dayOfWeek() = %d",
clock.dayOfWeek());
if ( clock.dayOfWeek() == IccClock::Friday )
term->sendLine( 40, "Today IS Friday" );
else
term->sendLine( 40, "Today is NOT Friday" );
```

This fragment demonstrates the use of the **daysSince1900** and **dayOfWeek** methods. **dayOfWeek** returns an enumeration that indicates the day of the week. If it is Friday, a message is sent to the screen, 'Today IS Friday'; otherwise the message 'Today is NOT Friday' is sent.

```
 term->sendLine( "dayOfMonth() = %d",
clock.dayOfMonth());
term->sendLine( "monthOfYear() = %d",
clock.monthOfYear());
```

This demonstrates the **dayOfMonth** and **monthOfYear** methods of **IccClock** class.

```
 term->sendLine( "time() = [%s]",
clock.time() );
term->sendLine( "time('-') = [%s]",
clock.time('-') );
term->sendLine( "year() = [%ld]",
clock.year());
```

The current time is sent to the terminal, first without a separator (that is HHMMSS format), then with '-' separating the digits (that is, HH-MM-SS format). The year is sent, for example 1996.

```
 return;
};
```

The end of **run** , which returns control to CICS.

Compiling, executing, and debugging

This section describes how to compile, execute, and debug a CICS Foundation Class program.

Compiling Programs

To compile and link a CICS Foundation Class program you need access to the program source, a compiler, header files and a dynamic link library.

You need access to the following items:

- The source of the program you are compiling

  Your C++ program source code needs `#include` statements for the Foundation Class headers and the Foundation Class `main()` program stub:

  ```
  #include "icceh.hpp"
  #include "iccmain.hpp"
  ```

- The IBM C++ compiler
- The Foundation Classes header files (see “Header files” on page 1)
- The Foundation Classes dynamic link library (DLL). The `ICCFCDLL` module is in CICSTS54.CICS .SDFHLOAD.

Note that, when using the Foundation Classes, you do not need to translate the "EXEC CICS " API so the translator program should not be used.

The following sample job statements show how to compile, prelink and link a program called ICC$HEL :

```
//ICC$HEL JOB 1,user_name,MSGCLASS=A,CLASS=A,NOTIFY=userid
//PROCLIB JCLLIB ORDER=(
CICSTS54.CICS
.SDFHPROC)
//ICC$HEL EXEC ICCFCCL,INFILE=
indatasetname
(ICC$HEL),OUTFILE=
outdatasetname
(ICC$HEL)
//
```

Header files

The header files are the C++ class definitions needed to compile CICS C++ Foundation Class programs.

C++ Header File	Classes Defined in this Header
ICCABDEH	IccAbendData
ICCBASEH	IccBase
ICCBUFEH	IccBuf
ICCCLKEH	IccClock
ICCCNDEH	IccCondition (struct)
ICCCONEH	IccConsole
ICCCTLEH	IccControl
ICCDATEH	IccDataQueue
ICCEH	see 1 on page 2
ICCEVTEH	IccEvent
ICCEXCEH	IccException
ICCFILEH	IccFile
ICCFLIEH	IccFileIterator
ICCGLBEH	Icc (struct) (global functions)
ICCJRNEH	IccJournal
ICCMSGEH	IccMessage
ICCPRGEH	IccProgram
ICCRECEH	IccRecordIndex, IccKey, IccRBA and IccRRN
ICCRESEH	IccResource
ICCRIDEH	IccResourceId + subclasses (such as IccConvId)
ICCSEMEH	IccSemaphore
ICCSESEH	IccSession
ICCSRQEH	IccStartRequestQ
ICCSYSEH	IccSystem
ICCTIMEH	IccTime, IccAbsTime, IccTimeInterval, IccTimeOfDay
ICCTMDEH	IccTerminalData
ICCTMPEH	IccTempStore
ICCTRMEH	IccTerminal
ICCTSKEH	IccTask
ICCUSREH	IccUser
ICCVALEH	IccValue (struct)

Note:

1. A single header that #includes all the listed header files is supplied as ICCEH

2. The file ICCMAIN is also supplied with the C++ header files. This contains the **main** function stub that should be used when you build a Foundation Class program.
3. Header files are located in CICSTS54.CICS .SDFHC370.

Executing Programs

To run a compiled and linked (that is, executable) Foundation Classes program you need to do the following.

1. Make the executable program available to CICS . This involves making sure the program is in a suitable directory or load library. Depending on your server, you may also need to create a CICS program definition (using CICS resource definition facilities) before you can execute the program.
2. Logon to a CICS terminal.
3. Run the program.

Program debugging

Having successfully compiled, linked, and attempted to run your Foundation Classes program, you might need to debug it.

There are three options available to help debug a CICS Foundation Classes program:

- Use a symbolic debugger
- Run the Foundation Class Program with tracing active
- Run the Foundation Class Program with the CICS Execution Diagnostic Facility

Symbolic debugger

You can use a symbolic debugger to step through the source of your CICS Foundation Classes program. Debug Tool is shipped as a feature with IBM C/C++. To debug a CICS Foundation Classes program with a symbolic debugger, compile the program with a flag that adds debugging information to your executable program. For CICS Transaction Server for z/OS , this flag is TEST(ALL).

For more information, see the *Debug Tool for z/OS and OS/390 User's Guide*.

Tracing

You can configure the CICS Foundation Classes to write a trace file for debugging purposes.

Exception tracing is always active. The CETR transaction controls the auxiliary and internal traces for all CICS programs including those developed using the C++ classes.

Execution diagnostic facility

You can use the Execution Diagnostic Facility (EDF) to step through your CICS program, stopping at each **EXEC CICS** call. The display screen shows the procedural **EXEC CICS** call interface rather than the CICS Foundation Class type interface.

To enable EDF, use the preprocessor macro ICC_EDF in your source code before including the file ICCMAIN.

```
 #define ICC_EDF //switch EDF on
#include "iccmain.hpp"
```

Alternatively use the appropriate flag on your compiler CPARM to declare ICC_EDF.

Conditions, errors, and exceptions

This section describes how the Foundation Classes have been designed to respond to various error situations they might encounter.

Foundation Class Abend codes

For serious errors (such as insufficient storage to create an object) the Foundation Classes immediately terminate the CICS task.

All CICS Foundation Class abend codes are of the form ACLx. If your application is terminated with an abend code starting 'ACL' then please refer to .

C++ Exceptions and the Foundation Classes

C++ exceptions are managed using the reserved words **try** , **throw** , and **catch**.

Refer to your compiler's documentation or one of the C++ books in the bibliography for more information.

Here is sample `ICC$EXC1` (see C++ sample programs):

```
#include "icceh.hpp"
#include "iccmain.hpp"
class Test {
public:
void tryNumber( short num ) {
IccTerminal* term = IccTerminal::instance();
*term << "Number passed = " << num << endl <<
flush;
if ( num > 10 ) {
*term << ">>Out of Range - throwing exception" << endl
<< flush;
throw "!!Number is out of range!!";
}
}
};
```

The first two lines include the header files for the Foundation Classes and the standard **main** function that sets up the operating environment for the application program.

We then declare class **Test** , which has one public method, **tryNumber** . This method is implemented inline so that if an integer greater than ten is passed an exception is thrown. We also write out some information to the CICS terminal.

```
void IccUserControl::run()
{
IccTerminal* term = IccTerminal::instance();
term->erase();
*term << "This is program 'icc$exc1' ..." << endl;
try {
Test test;
test.tryNumber( 1 );
test.tryNumber( 7 );
test.tryNumber( 11 );
test.tryNumber( 6 );
}
catch( const char* exception ) {
term->setLine( 22 );
*term << "Exception caught: " << exception << endl
<< flush;
}
term->send( 24,1,"Program 'icc$exc1' complete: Hit PF12 to End" );
term->waitForAID( IccTerminal::PF12 );
term->erase();
return;
}
```

The **run** method of **IccUserControl** class contains the user code for this example.

After erasing the terminal display and writing some text, we begin our **try** block. A **try** block can scope any number of lines of C++ code.

Here we create a **Test** object and invoke our only method, **tryNumber** , with various parameters. The first two invocations (1, 7) succeed, but the third (11) causes **tryNumber** to throw an exception. The fourth **tryNumber** invocation (6) is not executed because an exception causes the program execution flow to leave the current **try** block.

We then leave the **try** block and look for a suitable **catch** block. A suitable **catch** block is one with arguments that are compatible with the type of exception being thrown (here a **char***). The **catch** block writes a message to the CICS terminal and then execution resumes at the line after the **catch** block.

The output from this CICS program is as follows:

```
This is program 'icc$exc1' ...
     Number passed = 1
     Number passed = 7
     Number passed = 11
     >>Out of Range - throwing exception
     Exception caught: !!Number is out of range!!
     Program 'icc$exc1' complete: Hit PF12 to End
```

The CICS C++ Foundation Classes do not throw **char*** exceptions as in the previous sample but they do throw **IccException** objects instead.

There are several types of **IccException** . The **type** method returns an enumeration that indicates the type. Here is a description of each type in turn.

objectCreationError
: An attempt to create an object was invalid. This happens, for example, if an attempt is made to create a second instance of a singleton class, such as **IccTask**.

invalidArgument
: A method was called with an invalid argument. This happens, for example,

if an **IccBuf** object with too much data is passed to the **writeItem** method of the **IccTempStore** class by the application program.

It also happens when attempting to create a subclass of **IccResourceId** , such as **IccTermId** , with a string that is too long.

The following sample can be found in C++ sample programs , as file `ICC$EXC2` . The sample is presented here without many of the terminal IO requests.

```
#include "icceh.hpp"
#include "iccmain.hpp"
void IccUserControl::run()
{
try
{
IccTermId id1( "1234" );
IccTermId id2( "12345");
}
catch( IccException& exception )
{
terminal()->send( 21, 1, exception.summary() );
}
return;
}
```

In the previous example the first **IccTermId** object is successfully created, but the second caused an **IccException** to be thrown, because the string "12345" is 5 bytes where only 4 are allowed. See C++ sample programs for the expected output from this sample program.

invalidMethodCall
A method cannot be called. A typical reason is that the object cannot honor the call in its current state. For example, a **readRecord** call on an **IccFile** object is only honored if an **IccRecordIndex** object, to specify ***which*** record is to be read, has already been associated with the file.

CICSCondition
A CICS condition, listed in the **IccCondition** structure, has occurred in the object and the object was configured to throw an exception.

familyConformanceError
Family subset enforcement is on for this program and an operation that is not valid on all supported platforms has been attempted.

internalError
The CICS foundation classes have detected an internal error. Please call service.

CICS conditions

The CICS foundation classes provide a powerful framework for handling conditions that happen when executing an application.

Accessing a CICS resource can raise a number of CICS conditions as documented in Foundation classes reference.

A condition might represent an error or information being returned to the calling application; the deciding factor is often the context in which the condition is raised.

The application program can handle the CICS conditions in a number of ways. Each CICS resource object, such as a program, file, or data queue, can handle CICS conditions differently, if required.

A resource object can be configured to take one of the following actions for each condition it can encounter:

noAction
Manual condition handling

callHandleEvent
Automatic condition handling

throwException
Exception handling

abendTask
Severe error handling.

Manual condition handling (noAction)

This is the default action for all CICS conditions (for any resource object).

This means that the condition must be handled manually, using the **condition** method. For example:

```
IccTempStore temp("TEMP1234");
IccBuf buf(40);
temp.setActionOnCondition(IccResource::noAction,
IccCondition::QIDERR);
buf = temp.readNextItem();
switch (temp.condition())
{
case IccCondition::QIDERR:
//do whatever here
:
default:
//do something else here
}
```

Automatic condition handling (callHandleEvent)

Activate this for any CICS condition, such as QIDERR, as follows.

```
IccTempStore temp("TEMP1234");
temp.setActionOnCondition(IccResource::callHandleEvent,
IccCondition::QIDERR);
```

When a call to any method on object 'temp' causes CICS to raise the QIDERR condition, **handleEvent** method is automatically called. As the **handleEvent** method is only a virtual method, this call is only useful if the object belongs to a subclass of **IccTempStore** and the **handleEvent** method has been overridden.

Make a subclass of **IccTempStore** , declare a constructor, and override the **handleEvent** method.

```
class MyTempStore : public IccTempStore
{
public:
MyTempStore(const char* storeName) : IccTempStore(storeName) {}
HandleEventReturnOpt handleEvent(IccEvent& event);
};
```

Now implement the **handleEvent** method.

```
IccResource::HandleEventReturnOpt
MyTempStore::handleEvent(IccEvent& event)
{
switch (event.condition())
{
case ...
:
:
case IccCondition::QIDERR:
//Handle QIDERR condition here.
:
:
//
default:
return rAbendTask;
}
}
```

This code is called for any **MyTempStore** object which is configured to 'callHandleEvent' for a particular CICS condition.

Exception handling (throwException)

Activate this for any CICS condition, such as QIDERR, as follows.

```
IccTempStore temp("TEMP1234");
temp.setActionOnCondition(IccResource::throwException,
IccCondition::QIDERR);
```

Exception handling is by means of the C++ exception handling model using **try** , **throw** , and **catch** . For example:

```
try
{
buf = temp.readNextItem();
:
:
}
catch (IccException& exception)
{
//Exception handling code
:
:
}
```

An exception is thrown if any of the methods inside the try block raise the QIDERR condition for object 'temp'. When an exception is thrown, C++ unwinds the stack and resumes execution at an appropriate **catch** block – it is not possible to resume within the **try** block. For a fuller example, see sample `ICC$EXC3`.

Note: Exceptions can be thrown from the Foundation Classes for many reasons other than this example – see "C++ Exceptions and the Foundation Classes" on page 36 for more details.

Severe error handling (abendTask)

This option allows CICS to terminate the task when certain conditions are raised.

Activate this for any CICS condition, such as QIDERR, as follows:

```
IccTempStore temp("TEMP1234");
temp.setActionOnCondition(IccResource::abendTask,
IccCondition::QIDERR);
```

If CICS raises the QIDERR condition for object 'temp' the CICS task terminates with an ACL3 abend.

Platform differences

The CICS Foundation Classes, as described here, are designed to be independent of the particular CICS platform on which they are running. There are however some differences between platforms; these, and ways of coping with them, are described here.

Note: References in this section to other CICS platforms are included for completeness. There have been Technology Releases of the CICS Foundation Classes on those platforms.

Applications can be run in one of two modes:

fsAllowPlatformVariance
: Applications written using the CICS Foundation Classes are able to access all the functions available on the target CICS server.

fsEnforce
: Applications are restricted to the CICS functions that are available across all CICS Servers (z/OS and UNIX).

The default is to allow platform variance and the alternative is to force the application to only use features which are common to all CICS platforms.

The class headers are the same for all platforms and they "support" (that is, define) all the CICS functions that are available through the Foundation Classes on any of the CICS platforms. The restrictions on each platform are documented in Foundation classes reference. Platform variations exist at:

- object level
- method level
- parameter level

Object level

Some objects are not supported on certain platforms.

For example, **IccConsole** objects cannot be created on CICS(r) for AIX® as CICS(r) for AIX(r) does not support console services.

Any attempt to create an **IccConsole** object on CICS(r) for AIX(r) causes an **IccException** object of type 'platformError' to be thrown, but would be acceptable on the other platforms

```
IccConsole* cons = console(); //No good on CICS for AIX
```

If you initialize your application with 'fsEnforce' selected (see initializeEnvironment) the previous examples both cause an **IccException** object, of type 'familyConformanceError' to be thrown on all platforms.

Unlike objects of the **IccConsole** and **IccJournal** classes, most objects can be created on any CICS server platform. However the use of the methods can be restricted. Foundation Classes: reference fully documents all platform restrictions.

Method level

Methods that run successfully on one platform can cause a problem on another platform.

Consider, for example method **programId** in the **IccControl** class:

```
void IccUserControl::run()
{
if (strcmp(programId.name(), "PROG1234") == 0)
//do something
}
```

Here method **programId** executes correctly on CICS TS for z/OS but throws an **IccException** object of type 'platformError' on CICS(r) for AIX(r).

Alternatively, if you initialize your application with family subset enforcement on (see **initializeEnvironment** function of **Icc** structure), method **programId** throws an **IccException** object of type 'familyConformanceError' on *any* CICS server platform.

Parameter level

At this level a method is supported on all platforms, but a particular positional parameter has some platform restrictions.

Consider method **abend** in **IccTask** class.

```
task()->abend();
 1

task()->abend("WXYZ");
 2

task()->abend("WXYZ", IccTask::respectAbendHandler);
 3

task()->abend("WXYZ", IccTask::ignoreAbendHandler);
 4

task()->abend("WXYZ", IccTask::ignoreAbendHandler,
 5

IccTask::suppressDump);
```

Abends 1 to 4 run successfully on all CICS server platforms.

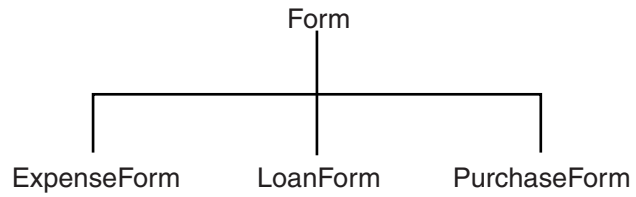
If family subset enforcement is off, abend 5 throws an **IccException** object of type 'platformError' on a CICS(r) for AIX(r) platform, but not on a CICS Transaction Server for z/OS platform.

If family subset enforcement is on, abend 5 throws an **IccException** object of type 'familyConformanceError', irrespective of the target CICS platform.

Polymorphic Behavior

Polymorphism (*poly* = many, *morphe* = form) is the ability to treat many different forms of an object as if they were the same.

Polymorphism is achieved in C++ by using inheritance and virtual functions. Consider the scenario where we have three forms (ExpenseForm, LoanForm, PurchaseForm) that are specializations of a general Form:



Each form needs printing at some time. In procedural programming, we would either code a print function to handle the three different forms or we would write three different functions (printExpenseForm, printLoanForm, printPurchaseForm).

In C++ this can be achieved far more elegantly as follows:

```
 class Form {
public:
virtual void print();
};
class ExpenseForm : public Form {
public:
virtual void print();
};
class LoanForm : public Form {
public:
virtual void print();
};
class PurchaseForm : public Form {
public:
virtual void print();
};
```

Each of these overridden functions is implemented so that each form prints correctly. Now an application using form objects can do this:

```
Form* pForm[10]
//create Expense/Loan/Purchase Forms...
for (short i=0 ; i < 9 ; i++)
pForm->print();
```

Here we create ten objects that might be any combination of Expense, Loan, and Purchase Forms. However, because we are dealing with pointers to the base class, **Form** , we do not need to know which sort of form object we have; the correct **print** method is called automatically.

Limited polymorphic behavior is available in the Foundation Classes. Three virtual functions are defined in the base class **IccResource** :

```
virtual void clear();
virtual const IccBuf& get();
virtual void put(const IccBuf&
buffer
);
```

These methods have been implemented in the subclasses of **IccResource** wherever possible:

Class	clear	get	put
IccConsole	×	×	✓
IccDataQueue	✓	✓	✓
IccJournal	×	×	✓
IccSession	×	✓	✓
IccTempStore	✓	✓	✓
IccTerminal	✓	✓	✓

These virtual methods are ***not*** supported by any subclasses of **IccResource** except those in the table.

Note: The default implementations of **clear** , **get** , and **put** in the base class **IccResource** throw an exception to prevent the user from calling an unsupported method.

Example of polymorphic behavior

The following sample can be found in the samples directory as file `ICC$RES2`.

It is presented here without the terminal IO requests. See C++ sample programs.

```
#include "icceh.hpp"
#include "iccmain.hpp"
char* dataItems[] =
{
"Hello World - item 1",
"Hello World - item 2",
"Hello World - item 3"
};
void IccUserControl::run()
{
```

Here we include Foundation Class headers and the **main** function. **dataItems** contains some sample data items. We write our application code in the **run** method of **IccUserControl** class.

```
 IccBuf buffer( 50 );
IccResource* pObj[2];
```

We create an **IccBuf** object (50 bytes initially) to hold our data items. An array of two pointers to **IccResource** objects is declared.

```
 pObj[0] = new IccDataQueue("ICCQ");
pObj[1] = new IccTempStore("ICCTEMPS");
```

We create two objects whose classes are derived from **IccResource** – **IccDataQueue** and **IccTempStore**.

```
 for ( short index=0; index <= 1 ; index++ )
{
pObj[index]->clear();
}
```

For both objects we invoke the **clear** method. This is handled differently by each object in a way that is transparent to the application program; this is polymorphic

behavior.

```
 for ( index=0; index <= 1 ; index++ )
{
for (short j=1 ; j <= 3 ; j++)
{
buffer = dataItems[j-1];
pObj[index]->put( buffer );
}
}
```

Now we **put** three data items in each of our resource objects. Again the **put** method responds to the request in a way that is appropriate to the object type.

```
 for ( index=0; index <= 1 ; index++ )
{
buffer = pObj[index]->get();
while (pObj[index]->condition() == IccCondition::NORMAL)
{
buffer = pObj[index]->get();
}
delete pObj[index];
}
return;
}
```

The data items are read back in from each of our resource objects using the **get** method. We delete the resource objects and return control to CICS.

Storage management

C++ objects are usually stored on the stack or heap.

Objects on the stack are automatically destroyed when they go out of scope, but objects on the heap are not.

Many of the objects that the CICS Foundation Classes create internally are created on the heap rather than the stack. This can cause a problem in some CICS server environments.

On CICS Transaction Server for z/OS ,, CICS and Language Environment® manage all task storage so that it is released at task termination (normal or abnormal).

In a CICS for AIX environment, storage allocated on the heap is not automatically released at task termination. This can lead to "memory leaks" if the application programmer forgets to explicitly delete an object on the heap, or, more seriously, if the task abends.

This problem has been overcome in the CICS Foundation Classes by providing operators **new** and **delete** in the base Foundation Class, **IccBase** . These can be configured to map dynamic storage allocation requests to CICS task storage, so that ***all*** storage is automatically released at task termination. The disadvantage of this approach is a performance hit as the Foundation Classes typically issue a large number of small storage allocation requests rather than a single, larger allocation request.

This facility is affected by the **Icc::initializeEnvironment** call that must be issued before using the Foundation Classes. (This function is called from the default **main** function; see main function .)

The first parameter passed to the **initializeEnvironment** function is an enumeration that takes one of these three values:

cmmDefault
The default action is platform dependent:

z/OS same as 'cmmNonCICS' - see the 'cmmNonCICS' section.

UNIX same as 'cmmCICS' - see the 'cmmCICS' section.

cmmNonCICS
The **new** and **delete** operators in class **IccBase** ***do not*** map dynamic storage allocation requests to CICS task storage; instead the C++ default **new** and **delete** operators are invoked.

cmmCICS
The **new** and **delete** operators in class **IccBase** map dynamic storage allocation requests to CICS task storage (which is automatically released at normal or abnormal task termination).

The default **main** function supplied with the Foundation Classes calls **initializeEnvironment** with an enum of 'cmmDefault'. You can change this in your program without changing the supplied "header file" `ICCMAIN` as follows:

```
#define ICC_CLASS_MEMORY_MGMT Icc::cmmNonCICS
#include "iccmain.hpp"
```

Alternatively, set the option **DEV(ICC_CLASS_MEMORY_MGMT)** when compiling.

Parameter passing conventions

The convention used for passing objects on Foundation Classes method calls is if the object is mandatory, pass by reference; if it is optional pass by pointer.

For example, consider method **start** of class **IccStartRequestQ** , which has the following signature:

```
const IccRequestId& start( const IccTransId&
transId,
const IccTime* time=0,
const IccRequestId* reqId=0 );
```

Using the preceding convention, we see that an **IccTransId** object is mandatory, while an **IccTime** and an **IccRequestId** object are both optional. This enables an application to use this method in any of the following ways:

```
 IccTransId trn("ABCD");
IccTimeInterval int(0,0,5);
IccRequestId req("MYREQ");
IccStartRequestQ* startQ = startRequestQ();
startQ->start( trn );
startQ->start( trn, &int );
startQ->start( trn, &int, &req );
startQ->start( trn, 0, &req );
```

Scope of data in IccBuf reference returned from 'read' methods

Many of the subclasses of **IccResource** have 'read' methods that return **const IccBuf** references; for example, **IccFile::readRecord** , **IccTempStore::readItem** and **IccTerminal::receive**.

Care should be taken if you choose to maintain a reference to the **IccBuf** object, rather than copy the data from the **IccBuf** reference into your own **IccBuf** object. For example, consider the following

```
 IccBuf buf(50);
IccTempStore store("TEMPSTOR");
buf = store.readNextItem();
```

Here, the data in the **IccBuf** reference returned from **IccTempStore::readNextItem** is ***immediately*** copied into the application's own **IccBuf** object, so it does not matter if the data is later invalidated. However, the application might look like this

```
 IccTempStore store("TEMPSTOR");
const IccBuf& buf = store.readNextItem();
```

Here, the **IccBuf** reference returned from **IccTempStore::readNextItem** is ***not*** copied into the application's own storage and care must therefore be taken.

Note: You are recommended not to use this style of programming to avoid using a reference to an **IccBuf** object that does not contain valid data.

The returned **IccBuf** reference typically contains valid data until one of the following conditions is met:

- Another 'read' method is invoked on the **IccResource** object (for example, another **readNextItem** or **readItem** method in the example).
- The resource updates are committed (see method **IccTask::commitUOW**).
- The task ends (normally or abnormally).

Chapter 3. Foundation Classes: reference

This section contains the reference information on the foundation classes and structures that are provided as part of CICS. The classes and structures are arranged in alphabetic order. All the functionality you require to create object-oriented CICS programs is included within these classes and structures.

All of the classes and structures begin with the unique prefix **Icc**. Do not create your own classes with this prefix.

Icc structure contains some functions and enumerations that are widely applicable. **IccValue** structure consists of a large enumeration of all the CVDA values used in traditional CICS programs.

The description of each class starts with a simple diagram that shows how it is derived from **IccBase** class, the basis of all the other classes. This is followed by a short description and an indication of the name of the header file that includes it and, where appropriate, a sample source file that uses it.

Within each class or structure description are, where appropriate, the following sections:

1. Inheritance diagram
2. Brief description of class
3. Header file where class is defined. For the location of the C++ header files on your system see Header files.
4. Sample program demonstrating class. For the location of the supplied C++ sample programs on your system see C++ sample programs.
5. Icc... constructors
6. Public methods (in alphabetic order)
7. Protected methods (in alphabetic order)
8. Inherited public methods (in tabular form)
9. Inherited protected methods (in tabular form)
10. Enumerations

Methods, including constructors, start with a formal function prototype that shows what a call returns and what the parameters are. There follows a description, in order, of the parameters. To avoid duplication, inherited methods just have an indication of the class from which they are derived (and where they are described).

The convention for names is:

1. Variable names are shown as *variable*.
2. Names of classes, structures, enumerations and methods are shown as **method**
3. Members of enumerations are shown as 'enumMember'.
4. The names of all the supplied classes and structures begin with **Icc**.
5. Compound names have no separators, but have capital letters to demark the beginning of second and subsequent words, as in **IccJournalTypeId**.
6. Class and structure names and enumeration types begin with capital letters. Other names begin with lowercase letters.

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For further information on how to use these classes, see Using the CICS C++ OO foundation classes.

Mapping EXEC CICS calls to Foundation Class methods

The following table shows the correspondence between CICS calls made using the EXEC CICS API and the equivalent calls from the Foundation Classes.

EXEC CICS	Class	Method
ABEND	IccTask	abend
ADDRESS COMMAREA	IccControl	commArea
ADDRESS CWA	IccSystem	workArea
ADDRESS EIB	No direct access to EIB: please use appropriate method on appropriate class.	
ADDRESS TCTUA	IccTerminal	workArea
ADDRESS TWA	IccTask	workArea
ALLOCATE	IccSession	allocate
ASKTIME	IccClock	update
ASSIGN ABCODE	IccAbendData	abendCode
ASSIGN ABDUMP	IccAbendData	isDumpAvaliable
ASSIGN ABPROGRAM	IccAbendData	programName
ASSIGN ALTSCRNHT	IccTerminalData	alternateHeight
ASSIGN ALTSCRNWD	IccTerminalData	alternateWidth
ASSIGN APLKYBD	IccTerminalData	isAPLKeyboard
ASSIGN APLTEXT	IccTerminalData	isAPLText
ASSIGN ASRAINTRPT	IccAbendData	ASRAInterrupt
ASSIGN ASRAKEY	IccAbendData	ASRAKeyType
ASSIGN ASRAPSW	IccAbendData	ASRAPSW
ASSIGN ASRAREGS	IccAbendData	ASRARegisters
ASSIGN ASRASPC	IccAbendData	ASRASpaceType
ASSIGN ASRASTG	IccAbendData	ASRAStorageType
ASSIGN APPLID	IccSystem	applName
ASSIGN BTRANS	IccTerminalData	isBTrans
ASSIGN CMDSEC	IccTask	isCommandSecurityOn
ASSIGN COLOR	IccTerminalData	isColor
ASSIGN CWALENG	IccSystem	workArea
ASSIGN DEFSCRNHT	IccTerminalData	defaultHeight
ASSIGN DEFSCRNWD	IccTerminalData	defaultWidth
ASSIGN EWASUPP	IccTerminalData	isEWA
ASSIGN EXTDS	IccTerminalData	isExtended3270
ASSIGN FACILITY	IccTerminal	name
ASSIGN FCI	IccTask	facilityType
ASSIGN GCHARS	IccTerminalData	graphicCharSetId
ASSIGN GCODES	IccTerminalData	graphicCharCodeSet

EXEC CICS	Class	Method
ASSIGN GMMI	IccTerminalData	isGoodMorning
ASSIGN HILIGHT	IccTerminalData	isHighlight
ASSIGN INITPARM	IccControl	initData
ASSIGN INITPARMLEN	IccControl	initData
ASSIGN INVOKINGPROG	IccControl	callingProgramId
ASSIGN KATAKANA	IccTerminalData	isKatakana
ASSIGN NETNAME	IccTerminal	netName
ASSIGN OUTLINE	IccTerminalData	isFieldOutline
ASSIGN ORGABCODE	IccAbendData	originalAbendCode
ASSIGN PRINSYSID	IccTask	principalSysId
ASSIGN PROGRAM	IccControl	programId
ASSIGN PS	IccTerminalData	isPS
ASSIGN QNAME	IccTask	triggerDataQueueId
ASSIGN RESSEC	IccTask	isResourceSecurityOn
ASSIGN RESTART	IccTask	isRestarted
ASSIGN SCRNHT	IccTerminal	height
ASSIGN SCRNWD	IccTerminal	width
ASSIGN SOSI	IccTerminalData	isSOSI
ASSIGN STARTCODE	IccTask	startType, isCommitSupported, isStartDataAvailable
ASSIGN SYSID	IccSystem	sysId
ASSIGN TASKPRIORITY	IccTask	priority
ASSIGN TCTUALENG	IccTerminal	workArea
ASSIGN TEXTKYBD	IccTerminalData	isTextKeyboard
ASSIGN TEXTPRINT	IccTerminalData	isTextPrint
ASSIGN TWALENG	IccTask	workArea
ASSIGN USERID	IccTask	userId
ASSIGN VALIDATION	IccTerminalData	isValidation
CANCEL	IccClock	cancelAlarm
CANCEL	IccStartRequestQ	cancel
CHANGE PASSWORD	IccUser	changePassword
CHANGE TASK	IccTask	setPriority
CONNECT PROCESS	IccSession	connectProcess
CONVERSE	IccSession	converse
DELAY	IccTask	delay
DELETE	IccFile	deleteRecord
DELETE	IccFile	deleteLockedRecord
DELETEQ TD	IccDataQueue	empty
DELETEQ TS	IccTempStore	empty
DEQ	IccSemaphore	unlock

EXEC CICS	Class	Method
DUMP TRANSACTION	IccTask	dump
DUMP TRANSACTION	IccTask	setDumpOpts
ENDBR	IccFileIterator	IccFileIterator (destructor)
ENQ	IccSemaphore	lock
ENQ	IccSemaphore	tryLock
ENTER TRACENUM	IccTask	enterTrace
EXTRACT ATTRIBUTES	IccSession	state, stateText
EXTRACT PROCESS	IccSession	extractProcess
FORMATTIME YYDDD, YYMMDD, etc	IccClock	date
FORMATTIME DATE	IccClock	date
FORMATTIME DATEFORM	IccSystem	dateFormat
FORMATTIME DAYCOUNT	IccClock	daysSince1900
FORMATTIME DAYOFWEEK	IccClock	dayOfWeek
FORMATTIME DAYOFMONTH	IccClock	dayOfMonth
FORMATTIME MONTHOFYEAR	IccClock	monthOfYear
FORMATTIME TIME	IccClock	time
FORMATTIME YEAR	IccClock	year
FREE	IccSession	free
FREEMAIN	IccTask	freeStorage
GETMAIN	IccTask	getStorage
HANDLE ABEND	IccControl	setAbendHandler, cancelAbendHandler, resetAbendHandler
INQUIRE FILE ACCESSMETHOD	IccFile	accessMethod
INQUIRE FILE ADD	IccFile	isAddable
INQUIRE FILE BROWSE	IccFile	isBrowsable
INQUIRE FILE DELETE	IccFileControl	isDeletable
INQUIRE FILE EMPTYSTATUS	IccFile	isEmptyOn
INQUIRE FILE ENABLESTATUS	IccFile	enableStatus
INQUIRE FILE KEYPOSITION	IccFile	keyPosition
INQUIRE FILE OPENSTATUS	IccFile	openStatus
INQUIRE FILE READ	IccFile	isReadable
INQUIRE FILE RECORDFORMAT	IccFile	recordFormat
INQUIRE FILE RECORDSIZE	IccFile	recordLength

EXEC CICS	Class	Method
INQUIRE FILE RECOVSTATUS	IccFile	isRecoverable
INQUIRE FILE TYPE	IccFile	type
INQUIRE FILE UPDATE	IccFile	isUpdatable
ISSUE ABEND	IccSession	issueAbend
ISSUE CONFIRMATION	IccSession	issueConfirmation
ISSUE ERROR	IccSession	issueError
ISSUE PREPARE	IccSession	issuePrepare
ISSUE SIGNAL	IccSession	issueSignal
LINK	IccProgram	link
LINK INPUTMSG INPUTMSGLEN	IccProgram	setInputMessage
LOAD	IccProgram	load
POST	IccClock	setAlarm
READ	IccFile	readRecord
READNEXT	IccFileIterator	readNextRecord
READPREV	IccFileIterator	readPreviousRecord
READQ TD	IccDataQueue	readItem
READQ TS	IccTempStore	readItem
RECEIVE (APPC)	IccSession	receive
RECEIVE (3270)	IccTerminal	receive, receive3270Data
RELEASE	IccProgram	unload
RESETBR	IccFileIterator	reset
RETRIEVE	IccStartRequestQ	retrieveData [1]
Note: The **retrieveData** method gets the start information from CICS and stores it in the IccStartRequestQ object: the information can then be accessed using **data, queueName, returnTermId and returnTransId** methods.		
RETRIEVE INTO, LENGTH	IccStartRequestQ	data
RETRIEVE QUEUE	IccStartRequestQ	queueName
RETRIEVE RTRANSID	IccStartRequestQ	returnTransId
RETRIEVE RTERMID	IccStartRequestQ	returnTermId
RETURN	IccControl	main [2]
Note: Returning (using C++ reserved word **return**) from method **run** in class **IccControl** results in an EXEC CICS RETURN.		
RETURN TRANSID	IccTerminal	setNextTransId [3]
RETURN IMMEDIATE	IccTerminal	setNextTransId [3]
RETURN COMMAREA LENGTH	IccTerminal	setNextCommArea [3]
RETURN INPUTMSG, INPUTMSGLEN	IccTerminal	setNextInputMessage [3]
Note: Issue this call before returning from **IccControl::run**.		
REWRITE	IccFile	rewriteRecord
SEND (APPC)	IccSession	send, sendInvite, sendLast

EXEC CICS	Class	Method
SEND (3270)	IccTerminal	send, sendLine
SEND CONTROL CURSOR	IccTerminal	setCursor setLine, setNewLine
SEND CONTROL ERASE	IccTerminal	erase
SEND CONTROL FREEKB	IccTerminal	freeKeyboard
SET FILE ADD|BROWSE|DELETE|...	IccFile	setAccess
SET FILE EMPTYSTATUS	IccFile	setEmptyOnOpen
SET FILE OPEN STATUS|ENABLESTATUS	IccFile	setStatus
SIGNOFF	IccTerminal	signoff
SIGNON	IccTerminal	signon
START TRANSID AT/AFTER	IccStartRequestQ	start [4]
START TRANSID FROM LENGTH	IccStartRequestQ	setData, registerDataBuffer [4]
START TRANSID NOCHECK	IccStartRequestQ	setStartOpts [4]
START TRANSID PROTECT	IccStartRequestQ	setStartOpts [4]
START TRANSID QUEUE	IccStartRequestQ	setQueueName [4]
START TRANSID REQID	IccStartRequestQ	start [4]
START TRANSID TERMID	IccStartRequestQ	start [4]
START TRANSID USERID	IccStartRequestQ	start [4]
START TRANSID RTERMID	IccStartRequestQ	setReturnTermId [4]
START TRANSID RTRANSID	IccStartRequestQ	setReturnTransId [4]
Note: Use methods **setData, setQueueName, setReturnTermId, setReturnTransId, setStartOpts** to set the state of the **IccStartRequestQ** object before issuing start requests with the **start** method.		
STARTBR	IccFileIterator	IccFileIterator (constructor)
SUSPEND	IccTask	suspend
SYNCPOINT	IccTask	commitUOW
SYNCPOINT ROLLBACK	IccTask	rollBackUOW
UNLOCK	IccFile	unlockRecord
VERIFY PASSWORD	IccUser	verifyPassword
WAIT CONVID	IccSession	flush
WAIT EVENT	IccTask	waitOnAlarm
WAIT EXTERNAL	IccTask	waitExternal
WAIT JOURNALNUM	IccJournal	wait
WRITE	IccFile	writeRecord
WRITE OPERATOR	IccConsole	write, writeAndGetReply
WRITEQ TD	IccDataQueue	writeItem
WRITEQ TS	IccTempStore	writeItem, rewriteItem

Mapping Foundation Class methods to EXEC CICS calls

The following table shows the correspondence between CICS calls made using the Foundation Classes and the equivalent EXEC CICS API calls.

Table 1. IccAbendData Class

Method	EXEC CICS
abendCode	ASSIGN ABCODE
ASRAInterrupt	ASSIGN ASRAINTRPT
ASRAKeyType	ASSIGN ASRAKEY
ASRAPSW	ASSIGN ASRAPSW
ASRARegisters	ASSIGN ASRAREGS
ASRASpaceType	ASSIGN ASRASPC
ASRAStorageType	ASSIGN ASRASTG
isDumpAvailable	ASSIGN ABDUMP
originalAbendCode	ASSIGN ORGABCODE
programName	ASSIGN ABPROGRAM

Table 2. IccAbsTime Class

Method	EXEC CICS
date	FORMATTIME YYDDD/YYMMDD/etc.
dayOfMonth	FORMATTIME DAYOFMONTH
dayOfWeek	FORMATTIME DAYOFWEEK
daysSince1900	FORMATTIME DAYCOUNT
monthOfYear	FORMATTIME MONTHOFYEAR
time	FORMATTIME TIME
year	FORMATTIME YEAR

Table 3. IccClock Class

Method	EXEC CICS
cancelAlarm	CANCEL
date	FORMATTIME YYDDD/YYMMDD/etc.
dayOfMonth	FORMATTIME DAYOFMONTH
dayOfWeek	FORMATTIME DAYOFWEEK
daysSince1900	FORMATTIME DAYCOUNT
monthOfYear	FORMATTIME MONTHOFYEAR
setAlarm	POST
time	FORMATTIME TIME
update	ASKTIME
year	FORMATTIME YEAR

Table 4. IccConsole Class

Method	EXEC CICS
write	WRITE OPERATOR

Table 4. IccConsole Class (continued)

Method	EXEC CICS
writeAndGetReply	WRITE OPERATOR

Table 5. IccControl Class

Method	EXEC CICS
callingProgramId	ASSIGN INVOKINGPROG
cancelAbendHandler	HANDLE ABEND CANCEL
commArea	ADDRESS COMMAREA
initData	ASSIGN INITPARM & INITPARMLEN
programId	ASSIGN PROGRAM
resetAbendHandler	HANDLE ABEND RESET
setAbendHandler	HANDLE ABEND PROGRAM

Table 6. IccDataQueue Class

Method	EXEC CICS
empty	DELETEQ TD
readItem	READQ TD
writeItem	WRITEQ TD

Table 7. IccFile Class

Method	EXEC CICS
access	INQUIRE FILE ADD | BROWSE | DELETE | READ | UPDATE
accessMethod	INQUIRE FILE ACCESSMETHOD
deleteRecord	DELETE FILE RIDFLD
deleteLockedRecord	DELETE FILE
enableStatus	INQUIRE FILE ENABLESTATUS
isAddable	INQUIRE FILE ADD
isBrowsable	INQUIRE FILE BROWSE
isDeletable	INQUIRE FILE DELETE
isEmptyOnOpen	INQUIRE FILE EMPTYSTATUS
isReadable	INQUIRE FILE READ
isRecoverable	INQUIRE FILE RECOVSTATUS
isUpdatable	INQUIRE FILE UPDATE
keyPosition	INQUIRE FILE KEYPOSITION
openStatus	INQUIRE FILE OPENSTATUS
readRecord	READ FILE
recordFormat	INQUIRE FILE RECORDFORMAT
recordLength	INQUIRE FILE RECORDSIZE
rewriteRecord	REWRITE FILE
setAccess	SET FILE ADD BROWSE DELETE etc.
setEmptyOnOpen	SET FILE EMPTYSTATUS

Table 7. IccFile Class (continued)

Method	EXEC CICS
setStatus	SET FILE OPENSTATUS ENABLESTATUS
type	INQUIRE FILE TYPE
unlockRecord	UNLOCK FILE
writeRecord	WRITE FILE

Table 8. IccFileIterator Class

Method	EXEC CICS
IccFileIterator (constructor)	STARTBR FILE
~IccFileIterator (destructor)	ENDBR FILE
readNextRecord	READNEXT FILE
readPreviousRecord	READPREV FILE
reset	RESETBR FILE

Table 9. IccJournal Class

Method	EXEC CICS
wait	WAIT JOURNALNUM
writeRecord	WRITE JOURNALNUM

Table 10. IccProgram Class

Method	EXEC CICS
link	LINK PROGRAM
load	LOAD PROGRAM
unload	RELEASE PROGRAM

Table 11. IccResource Class

Method	EXEC CICS
condition	(RESP & RESP2)
setRouteOption	(SYSID)

Table 12. IccSemaphore Class

Method	EXEC CICS
lock	ENQ RESOURCE
tryLock	ENQ RESOURCE NOSUSPEND
unlock	DEQ RESOURCE

Table 13. IccSession Class

Method	EXEC CICS
allocate	ALLOCATE
connectProcess	CONNECT PROCESS CONVID
converse	CONVERSE CONVID
extractProcess	EXTRACT PROCESS CONVID

Table 13. IccSession Class (continued)

Method	EXEC CICS
flush	WAIT CONVID
free	FREE CONVID
issueAbend	ISSUE ABEND CONVID
issueConfirmation	ISSUE CONFIRMATION CONVID
issueError	ISSUE ERROR CONVID
issuePrepare	ISSUE PREPARE CONVID
issueSignal	ISSUE SIGNAL CONVID
receive	RECEIVE CONVID
send	SEND CONVID
sendInvite	SEND CONVID INVITE
sendLast	SEND CONVID LAST
state	EXTRACT ATTRIBUTES

Table 14. IccStartRequestQ Class

Method	EXEC CICS
cancel	CANCEL
retrieveData	RETRIEVE
start	START TRANSID

Table 15. IccSystem Class

Method	EXEC CICS
applName	ASSIGN APPLID
beginBrowse	INQUIRE (FILE, TDQUEUE, etc) START
dateFormat	FORMATTIME DATEFORM
endBrowse	INQUIRE (FILE, TDQUEUE, etc) END
freeStorage	FREEMAIN
getFile	INQUIRE FILE
getNextFile	INQUIRE FILE NEXT
getStorage	GETMAIN SHARED
operatingSystem	INQUIRE SYSTEM OPSYS
operatingSystemLevel	INQUIRE SYSTEM OPREL
release	INQUIRE SYSTEM RELEASE
releaseText	INQUIRE SYSTEM RELEASE
sysId	ASSIGN SYSID
workArea	ADDRESS CWA

Table 16. IccTask Class

Method	EXEC CICS
abend	ABEND
commitUOW	SYNCPOINT

Table 16. IccTask Class (continued)

Method	EXEC CICS
delay	DELAY
dump	DUMP TRANSACTION
enterTrace	ENTER TRACENUM
facilityType	ASSIGN STARTCODE, TERMCODE, PRINSYSID, FCI
freeStorage	FREEMAIN
isCommandSecurityOn	ASSIGN CMDSEC
isCommitSupported	ASSIGN STARTCODE
isResourceSecurityOn	ASSIGN RESSEC
isRestarted	ASSIGN RESTART
isStartDataAvailable	ASSIGN STARTCODE
principalSysId	ASSIGN PRINSYSID
priority	ASSIGN TASKPRIORITY
rollBackUOW	SYNCPOINT ROLLBACK
setPrioity	CHANGE TASK PRIORITY
startType	ASSIGN STARTCODE
suspend	SUSPEND
triggerDataQueueId	ASSIGN QNAME
userId	ASSIGN USERID
waitExternal	WAIT EXTERNAL / WAITCICS
waitOnAlarm	WAIT EVENT
workArea	ADDRESS TWA

Table 17. IccTempStore Class

Method	EXEC CICS
empty	DELETEQ TS
readItem	READQ TS ITEM
readNextItem	READQ TS NEXT
rewriteItem	WRITEQ TS ITEM REWRITE
writeItem	WRITEQ TS ITEM

Table 18. IccTerminal Class

Method	EXEC CICS
erase	SEND CONTROL ERASE
freeKeyboard	SEND CONTROL FREEKB
height	ASSIGN SCRNHT
netName	ASSIGN NETNAME
receive	RECEIVE
receive3270Data	RECEIVE BUFFER
send	SEND

Table 18. IccTerminal Class (continued)

Method	EXEC CICS
sendLine	SEND
setCursor	SEND CONTROL CURSOR
setLine	SEND CONTROL CURSOR
setNewLine	SEND CONTROL CURSOR
signoff	SIGNOFF
signon	SIGNON
waitForAID	RECEIVE
width	ASSIGN SCRNWD
workArea	ADDRESS TCTUA

Table 19. IccTerminalData Class

Method	EXEC CICS
alternateHeight	ASSIGN ALTSCRNHT
alternateWidth	ASSIGN ALTSCRNWD
defaultHeight	ASSIGN DEFSCRNHT
defaultWidth	ASSIGN DEFSCRNWD
graphicCharSetId	ASSIGN GCHARS
graphicCharCodeSet	ASSIGN GCODES
isAPLKeyboard	ASSIGN APLKYBD
isAPLText	ASSIGN APLTEXT
isBTrans	ASSIGN BTRANS
isColor	ASSIGN COLOR
isEWA	ASSIGN ESASUPP
isExtended3270	ASSIGN EXTDS
isGoodMorning	ASSIGN GMMI
isHighlight	ASSIGN HILIGHT
isKatakana	ASSIGN KATAKANA
isMSRControl	ASSIGN MSRCONTROL
isFieldOutline	ASSIGN OUTLINE
isPS	ASSIGN PS
isSOSI	ASSIGN SOSI
isTextKeyboard	ASSIGN TEXTKYBD
isTextPrint	ASSIGN TEXTPRINT
isValidation	ASSIGN VALIDATION

Table 20. IccUser Class

Method	EXEC CICS
changePassword	CHANGE PASSWORD
verifyPassword	VERIFY PASSWORD

Icc structure

This structure holds global enumerations and functions for the CICS Foundation Classes. These globals are defined within this structure to avoid name conflicts.

Header file: ICCGLBEH

Functions

Functions in Icc structure are as follows.

boolText

Returns the text that represents the boolean value described by the parameters, such as "yes" or "on".

static const char* boolText (Bool *test*,
BoolSet *set* **=** trueFalse**)**

test
A boolean value, defined in this structure, that has one of two values, chosen from a set of values given by *set*.

set
An enumeration, defined in this structure, that indicates from which pair of values *test* is selected. The default is to use true and false.

catchException

This is the function of last resort, used to intercept **IccException** objects that the application fails to catch. It can be called from the **main** function in the stub program, listed in ICCMAIN header file, and described in "main function" on page 215. All OO CICS programs should use this stub or a close equivalent.

static void catchException(IccException&*exception*)

exception
A reference to an **IccException** object that holds information about a particular type of exception.

conditionText

Returns the symbolic name associated with a condition value. For example, if **conditionText** is called with *condition* of IccCondition::NORMAL, it returns "NORMAL", if it is called with *condition* of IccCondition::IOERR, it returns "IOERR", and so on.

static const char* conditionText(IccCondition::Codes *condition***)**

condition
An enumeration, defined in the **IccCondition** structure, that indicates the condition returned by a call to CICS.

initializeEnvironment

Initializes the CICS Foundation Classes. The rest of the class library can only be called after this function has been called. It is called from the **main** function in the stub program, listed in ICCMAIN header file, and described in "main function" on page 215. All OO CICS programs should use this stub or a close equivalent.

static void initializeEnvironment (ClassMemoryMgmt *mem* **=** cmmDefault**,**
FamilySubset *fam* **=** fsDefault**,**
Icc::Bool *EDF***)**

mem
An enumeration, defined in this structure, that indicates the memory management policy for the foundation classes.

fam
An enumeration, defined in this structure, that indicates whether the use of CICS features that are not available on all platforms is permitted.

EDF
A boolean that indicates whether EDF tracing is initially on.

isClassMemoryMgmtOn

Returns a boolean value, defined in this structure, that indicates whether class memory management is on.

static Bool isClassMemoryMgmtOn()

isEDFOn

Returns a Boolean value, defined in this structure, that indicates whether EDF tracing is on at the global level.

static Bool isEDFOn()

See **setEDF** in this structure, **isEDFOn** and **setEDF** in **IccResource** class on "IccResource class" on page 141 and Program debugging.

isFamilySubsetEnforcementOn

Returns a boolean value, defined in this structure, that indicates whether it is permitted to use CICS features that are not available on all platforms.

static Bool isFamilySubsetEnforcementOn()

returnToCICS

This call returns the program flow to CICS.

static void returnToCICS()

It is called by the **main** function in the stub program, listed in `ICCMAIN` header file, and described in "main function" on page 215. All OO CICS programs should use this stub or a close equivalent.

setEDF

Sets EDF tracing on or off at the global level.

static void setEDF(Icc::Bool *onOff* **=** off**)**

onOff
A boolean, defined in this structure, that indicates whether EDF tracing is

enabled. As EDF is more suitable for tracing programs that use EXEC CICS calls than object oriented programs, the default is off.

unknownException

This function is called by the **main** function in `ICCMAIN` header file and is used to intercept unknown exceptions.

static void unknownException()

See "main function" on page 215 and **catchException** in this structure).

Enumerations

References in this section to other CICS platforms, such as CICS(r) for AIX, are included for completeness. There have been Technology Releases of the CICS Foundation Classes on those platforms.

Bool

Three equivalent pairs of boolean values are as follows.

- true, yes, on
- false, no, off

true, yes, and on evaluate to 1, while false, no, and off evaluate to zero. Thus you can code test functions as follows:

```
if (task()->isStartDataAvailable())
{
    //do something
}
```

Note: 'true' and 'false' are compiler keywords in the z/OS 1.2 C/C++ compiler and will not be generated by ICCGLBEH when using this compiler, or any later version.

BoolSet

BoolSet enumerations are as follows.

- trueFalse
- yesNo
- onOff

ClassMemoryMgmt

ClassMemoryMgmt enumerations are as folows.

cmmDefault

The defaults for the different platforms are:

z/OS cmmNonCICS

UNIX cmmCICS

cmmNonCICS

The C++ environment performs the memory management required by the program.

In z/OS Language Environment ensures that the storage for CICS tasks is released at the end of the task, or if the task terminates abnormally.

On CICS for AIX dynamic storage release does not occur at normal or abnormal task termination. This means that programs are susceptible to memory leaks.

cmmCICS
The **new** and **delete** operators defined in **IccBase** class map storage allocations to CICS; storage is automatically released at task termination.

FamilySubset

FamilySubset enumerations are as follows.

fsDefault
The defaults for the different platforms are all the same: fsAllowPlatformVariance

fsEnforce
Enforces Family Subset conformance; that is, it disallows use of any CICS features that are not available on all CICS servers (OS/2, AIX, and z/OS).

Note: CICS OS/2 is no longer supported.

fsAllowPlatformVariance
Allows each platform to access all the CICS features available on that platform.

GetOpt

This enumeration is used on a number of methods throughout the classes. It indicates whether the value held internally by the object is to be returned to the caller, or whether it has to be refreshed from CICS first.

object
If the value has been previously retrieved from CICS and stored within the object, return this stored value. Otherwise, get a copy of the value from CICS and store within the object.

CICS Force the object to retrieve a fresh value from CICS (and store it within the object) even if there is already a value stored within the object from a previous invocation.

Platforms

Indicates on which operating system the program is being run.

Possible values are:

- OS2
- UNIX
- MVS™

IccAbendData class

This is a singleton class used to retrieve diagnostic information from CICS about a program abend.

IccBase
IccResource
IccAbendData

Header file: `ICCABDEH`

IccAbendData constructor (protected)

IccAbendData constructor in IccAbendData class

Constructor

IccAbendData()

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method.

abendCode

Returns the current 4-character abend code.

const char* abendCode(Icc::GetOpt *opt* **=** Icc::object**)**

opt
An enumeration, defined in the **Icc** structure, that indicates whether a value should be refreshed from CICS or whether the existing value should be retained. The possible values are described under the **GetOpt** enumeration in the **Icc** structure in "GetOpt" on page 64.

Conditions

INVREQ

ASRAInterrupt

Returns 8 characters of status word (PSW) interrupt information at the point when the latest abend with a code of ASRA, ASRB, ASRD, or AICA occurred.The field contains binary zeroes if no ASRA or ASRB abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server program.

const char* ASRAInterrupt(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

ASRAKeyType

Returns an enumeration, defined in **IccValue**, that indicates the execution key at the time of the last ASRA, ASRB, AICA, or AEYD abend, if any.

The possible values are:

CICSEXECKEY
The task was executing in CICS-key at the time of the last ASRA, ASRB, AICA, or AEYD abend. Note that all programs execute in CICS key if CICS subsystem storage protection is not active.

USEREXECKEY
The task was executing in user-key at the time of the last ASRA, ASRB,

AICA, or AEYD abend. Note that all programs execute in CICS key if CICS subsystem storage protection is not active.

NONCICS
The execution key at the time of the last abend was not one of the CICS keys; that is, not key 8 or key 9.

NOTAPPLIC
There has not been an ASRA, ASRB, AICA, or AEYD abend.

IccValue::CVDA ASRAKeyType(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

ASRAPSW

Returns an 8-character status word (PSW) at the point when the latest abend with a code of ASRA, ASRB, ASRD, or AICA occurred.The field contains nulls if no ASRA, ASRB, ASRD, or AICA abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server.

const char* ASRAPSW(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

ASRARegisters

Returns the contents of general registers 0–15, as a 64-byte data area, at the point when the latest ASRA, ASRB, ASRD, or AICA abend occurred. The contents of the registers are returned in the order 0, 1, ..., 15.Note that nulls are returned if no ASRA, ASRB, ASRD, or AICA abend occurred during the execution of the issuing transaction, or if the abend originally occurred in a remote DPL server program.

const char* ASRARegisters(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

ASRASpaceType

Returns an enumeration, defined in **IccValue** structure, that indicates what type of space, if any, was in control at the time of the last ASRA, ASRB, AICA, or AEYD abend.

Possible values are:

SUBSPACE
The task was executing in either its own subspace or the common subspace at the time of the last ASRA, ASRB, AICA, or AEYD abend.

BASESPACE
The task was executing in the base space at the time of the last ASRA, ASRB, AICA, or AEYD abend. Note that all tasks execute in the base space if transaction isolation is not active.

NOTAPPLIC
There has not been an ASRA, ASRB, AICA, or AEYD abend.

IccValue::CVDA ASRASpaceType(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

ASRAStorageType

Returns an enumeration, defined in **IccValue** structure, that indicates what type of storage, if any, was being addressed at the time of the last ASRA, ASRB, AICA, or AEYD abend.

Possible values are:

CICS CICS-key storage is being addressed. This can be in one of the CICS dynamic storage areas (CDSA or ECDSA), or in one of the read-only dynamic storage areas (RDSA or ERDSA) if either of the following apply:

- CICS is running with the NOPROTECT option on the RENTPGM system initialization parameter
- storage protection is not active

USER
User-key storage in one of the user dynamic storage areas (RDSA or ERDSA) is being addressed.

READONLY
Read-only storage in one of the read-only dynamic storage areas (RDSA or ERDSA) when CICS is running with the PROTECT option on the RENTPGM system initialization parameter.

NOTAPPLIC
One of:

- No ASRA or AEYD abend has been found for this task.
- The storage affected by an abend is not managed by CICS.
- The ASRA abend is not caused by a 0C4 abend.
- An ASRB or AICA abend has occurred since the last ASRA or AEYD abend.

IccValue::CVDA ASRAStorageType(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

instance

Returns a pointer to the single **IccAbendData** object. If the object does not already exist, it is created by this method.

static IccAbendData* instance()

isDumpAvailable

Returns a boolean, defined in **Icc** structure, that indicates whether a dump has been produced. If it has, use **programName** method to find the name of the failing program of the latest abend.

Icc::Bool isDumpAvailable(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

originalAbendCode

Returns the original abend code for this task in case of repeated abends.

const char* originalAbendCode(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

programName

Returns the name of the program that caused the abend.

const char* programName(Icc::GetOpt *opt* **=** Icc::oldValue**)**

Conditions

INVREQ

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccAbsTime class

This class holds information about absolute time, the time in milliseconds that has elapsed since the beginning of the year 1900.

IccBase
IccResource
IccTime
IccAbsTime

Header file: `ICCTIMEH`

IccAbsTime constructor

IccAbsTime constructor in IccAbsTime class.

Constructor (1)

IccAbsTime(const char* *absTime***)**

absTime
The 8-byte value of time, in packed decimal format.

Constructor (2)

The copy constructor.

IccAbsTime(const IccAbsTime& *time***)**

Public methods

These are the public methods in this class.

date

Returns the date, as a character string.

const char* date (IccClock::DateFormat *format* **=** IccClock::defaultFormat**,**
char *dateSeparator* **= '\0')**

format
An enumeration, defined in **IccClock** class, that indicates the format of the date. The default is to use the installation default, the value set when the CICS region is initialized.

dateSeparator
The character that separates the different fields of the date The default is no separation character.

Conditions

INVREQ

dayOfMonth

Returns the day of the month in the range 1 to 31.

unsigned long dayOfMonth()

Conditions

INVREQ

dayOfWeek

Returns an enumeration, defined in **IccClock** class, that indicates the day of the week.

IccClock::DayOfWeek dayOfWeek()

Conditions

INVREQ

daysSince1900

Returns the number of days that have elapsed since the first day of 1900.

unsigned long daysSince1900()

Conditions

INVREQ

hours

Returns the hours component of the time.

virtual unsigned long hours() const

milliSeconds

Returns the number of milliseconds that have elapsed since the first day of 1900.

long double milliSeconds()

minutes

Returns the minutes component of the time.

virtual unsigned long minutes() const

monthOfYear

Returns an enumeration, defined in **IccClock** class, that indicates the month of the year.

IccClock::MonthOfYear monthOfYear()

Conditions

INVREQ

operator=

Assigns one **IccAbsTime** object to another.

IccAbsTime& operator=(const IccAbsTime& *absTime***)**

packedDecimal

Returns the time as an 8-byte packed decimal string that expresses the number of milliseconds that have elapsed since the beginning of the year 1900.

const char* packedDecimal() const

seconds
Returns the seconds component of the time.

virtual unsigned long seconds() const

time
Returns the time as a text string.

const char* time(char *timeSeparator* **= '\0')**

timeSeparator
The character that delimits the time fields. The default is no time separation character.

Conditions

INVREQ

timeInHours
Returns the number of hours that have elapsed since the day began.

unsigned long timeInHours()

timeInMinutes
Returns the number of minutes that have elapsed since the day began.

unsigned long timeInMinutes()

timeInSeconds
Returns the number of seconds that have elapsed since the day began.

unsigned long timeInSeconds()

year
Returns the year as a 4-digit integer, e.g. 1996.

unsigned long year()

Conditions

INVREQ

Inherited public methods
These are the inherited public methods in IccAbsTime class.

Inherited protected methods

Inherited protected methods in IccAbsTime class:

IccAlarmRequestId class

An **IccAlarmRequestId** object represents a unique alarm request.

IccBase
IccResourceId
IccRequestId
IccAlarmRequestId

It contains the 8-character name of the request identifier and a pointer to a 4-byte timer event control area. **IccAlarmRequestId** is used by the **setAlarm** method of **IccClock** class when setting an alarm, and the **waitOnAlarm** method of **IccTask** when waiting for an alarm.

Header file: `ICCRIDEH`

IccAlarmRequestId constructors

IccAlarmRequestId constructors IccAlarmRequestId constructors:

Constructor (1)

Creates a new object with no information present.

IccAlarmRequestId()

Constructor (2)

Creates an object with information already set.

IccAlarmRequestId (const char* *nam*,
const void* *timerECA*)

name
The 8-character name of the request.

timerECA
A pointer to a 4-byte timer event control area.

Constructor (3)

The copy constructor.

IccAlarmRequestId(const IccAlarmRequestId& *id*)

id
A reference to an **IccAlarmRequestId** object.

Public methods

These methods are used to copy information into an **IccAlarmRequestId** object.

isExpired
Returns a boolean, defined in **Icc** structure, that indicates whether the alarm has expired.

Icc::Bool isExpired()

operator= (1)
IccAlarmRequestId& operator=(const IccRequestId& *id***)**

id
A reference to an **IccRequestId** object.

operator= (2)
IccAlarmRequestId& operator=(const IccAlarmRequestId& *id***)**

id
A reference to an **IccAlarmRequestId** object.

operator= (3)
IccAlarmRequestId& operator=(const char* *requestName***)**

requestName
The 8-character name of the alarm request.

setTimerECA
void setTimerECA(const void* *timerECA***)**

timerECA
A pointer to a 4-byte timer event control area.

timerECA
Returns a pointer to the 4-byte timer event control area.

const void* timerECA() const

Inherited public methods
These are the public methods inherited by this class.

Inherited protected methods
These are the protected methods inherited by this class.

IccBase class
IccBase class is the base class from which ***all*** CICS Foundation Classes are derived.

IccBase

(The methods associated with **IccBase** are described here although, in practice, they can only be called on objects of the derived classes).

Header file: ICCBASEH

IccBase constructor (protected)

IccBase constructor (protected) in IccBase class

Constructor

IccBase(ClassType *type***)**

type
An enumeration that indicates what the subclass type is. For example, for an **IccTempStore** object, the class type is 'cTempStore'.

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in“abendCode” on page 65.

classType

Returns an enumeration that indicates what the subclass type is. For example, for an **IccTempStore** object, the class type is 'cTempStore'. The possible values are listed under **ClassType** on page “ClassType” on page 75.

ClassType classType() const

className

Returns the name of the class. For example, an **IccTempStore** object returns "IccTempStore".Suppose a class **MyDataQueue** inherits from **IccDataQueue**. If **MyDataQueue** calls **setClassName("MyDataQueue")**, **MyDataQueue::className(IccBase::customName)** returns "MyDataQueue" and **MyDataQueue::className(IccBase::baseName)** returns "IccDataQueue". An **IccDataQueue** object returns "IccDataQueue" for both *opt* values.

const char* className(NameOpt *opt*=customName)

opt
An enumerator, defined in this class, that indicates whether to return the base name of the class or the name as customized by a derived class.

customClassNum

Returns the number that an application designer has associated with a subclass that he or she has designed.

unsigned short customClassNum() const

operator delete

Destroys an object in an orderly manner.

void operator delete(void* *object*)

object
A pointer to an object that is to be destroyed.

operator new

Creates a new object of given size. This operator enables the Foundation Classes to use CICS storage allocation (see "initializeEnvironment" on page 61).

void* operator new(size_t *size*)

size
The size of the object that is to be created, in bytes.

Protected methods

setClassName

Sets the name of the class. It is useful for diagnostic purposes to be able to get a string representation of the name of the class to which an object belongs.

void setClassName(const char* *className*)

className
The name of the class. For example, if you create a class **MyTempStore** that is a specialization of **IccTempStore**, you might call **setClassName("MyTempStore")**.

setCustomClassNum

Assigns an identification number to a subclass that is not an original part of the classes, as supplied.

void setCustomClassNum(unsigned short *number*)

number

The number that an application designer associates with a subclass for identification purposes.

Enumerations

Enumerations in IccBase class:

ClassType

The names are derived by deleting the first two characters from the name of the class.

The possible values are:

- cAbendData
- cAlarmRequestId
- cBuf

- cClock
- cConsole
- cControl
- cConvId
- cCUSTOM
- cDataQueue
- cDataQueueId
- cEvent
- cException
- cFile
- cFileId
- cFileIterator
- cGroupId
- cJournal
- cJournalId
- cJournalTypeId
- cLockId
- cMessage
- cPartnerId
- cProgram
- cProgramId
- cRecordIndex
- cRequestId
- cSemaphore
- cSession
- cStartRequestQ
- cSysId
- cSystem
- cTask
- cTempStore
- cTempStoreId
- cTermId
- cTerminal
- cTerminalData
- cTime
- cTPNameId
- cTransId
- cUser
- cUserId

Note: cCUSTOM allows the class library to be extended by non-IBM developers.

NameOpt

NameOpt in Enumerations:

See“className” on page 74.

baseName
Returns the default name assigned to the class as provided by IBM.

customName
Returns the name assigned using **setClassName** method from a subclass *or*, if **setClassName** has not been invoked, the same as *baseName*.

IccBuf class

IccBuf class is supplied for the general manipulation of buffers.

IccBase
IccBuf

This class is used by other classes that make calls to CICS, but does not itself call CICS services. See Buffer objects.

Header file: ICCBUFEH

Sample: ICC$BUF

IccBuf constructors

IccBuf constructors in IccBuf class:

Constructor (1)

Creates an **IccBuf** object, allocating its own data area with the given length and with all the bytes within it set to NULL.

IccBuf (unsigned long *length* **= 0,**
DataAreaType *type* **=** extensible**)**

length
The initial length of the data area, in bytes. The default length is 0.

type
An enumeration that indicates whether the data area can be dynamically extended. Possible values are extensible or fixed. The default is extensible.

Constructor (2)

Creates an **IccBuf** object that cannot be extended, adopting the given data area as its own.See warning about Internal/External ownership of buffers.

IccBuf (unsigned long *length***,**
void* *dataArea***)**

length
The length of the supplied data area, in bytes

dataArea
The address of the first byte of the supplied data area.

Constructor (3)

Creates an **IccBuf** object, allocating its own data area with the same length as the *text* string, and copies the string into its data area.

IccBuf (const char* *text*,
DataAreaType *type* = extensible**)**

text
A null-terminated string to be copied into the new **IccBuf** object.

type
An enumeration that indicates whether the data area can be extended. Possible values are **extensible** or **fixed**. The default is **extensible**.

Constructor (4)

The copy constructor—creates a new **IccBuf** object that is a copy of the given object. The created **IccBuf** object ***always*** has an internal data area.

IccBuf(const IccBuf& *buffer***)**

buffer
A reference to an **IccBuf** object that is to be copied into the new object.

Public methods

These are the public methods in this class.

append (1)

Appends data from the given data area to the data area in the object.

IccBuf& append (unsigned long *length*,
const void* *dataArea***)**

length
The length of the source data area, in bytes

dataArea
The address of the source data area.

append (2)

Append data, in the form of format string and variable argument, to the data area in the object. This is the same as the form used by **printf** in the standard C library. Note that it is the responsibility of the application programmer to ensure that the optional parameters are consistent with the format string.

IccBuf& append (const char* *format*,
...)

format
The null-terminated format string

...
The optional parameters.

assign (1)

Assigns data from the given data area to the data area in the object.

IccBuf& assign (unsigned long *length*,
const void* *dataArea*)

length
The length of the source data area, in bytes

dataArea
The address of the source data area.

assign (2)

Assigns data, in the form of format string and variable argument, to the data area in the object. This is the same as the form used by **printf** in the standard C library.

IccBuf& assign (const char* *format*,
...)

format
The format string

...
The optional parameters.

cut

Makes the specified cut to the data in the data area and returns a reference to the **IccBuf** object.

IccBuf& cut (unsigned long *length*,
unsigned long *offset* **= 0)**

length
The number of bytes to be cut from the data area.

offset
The offset into the data area. The default is no offset.

dataArea

Returns the address of data at the given offset into the data area.

const void* dataArea(unsigned long *offset* **= 0) const**

offset
The offset into the data area. The default is no offset.

dataAreaLength

Returns the length of the data area in bytes.

unsigned long dataAreaLength() const

dataAreaOwner

Returns an enumeration that indicates whether the data area has been allocated by the **IccBuf** constructor or has been supplied from elsewhere.

DataAreaOwner dataAreaOwner() const

The possible values are listed under “DataAreaOwner” on page 85.

dataAreaType

DataAreaType dataAreaType() const

Returns an enumeration that indicates whether the data area can be extended. The possible values are listed under “DataAreaType” on page 85.

dataLength

Returns the length of data in the data area. This cannot be greater than the value returned by **dataAreaLength**

unsigned long dataLength() const

insert

Inserts the given data into the data area at the given offset and returns a reference to the **IccBuf** object.

IccBuf& insert (unsigned long *length*,
const void* *dataArea*,
unsigned long *offset* **= 0)**

length
The length of the data, in bytes, to be inserted into the **IccBuf** object

dataArea
The start of the source data to be inserted into the **IccBuf** object

offset
The offset in the data area where the data is to be inserted. The default is no offset.

isFMHContained

Icc::Bool isFMHContained() const

Returns a boolean, defined in **Icc** structure, that indicates whether the data area contains FMHs (function management headers).

operator const char*

operator const char*() const

Casts an **IccBuf** object to a null terminated string.

```
IccBuf data("Hello World");
cout « (const char*) data;
```

operator= (1)

Assigns data from another buffer object and returns a reference to the **IccBuf** object.

IccBuf& operator=(const IccBuf& *buffer***)**

buffer
A reference to an **IccBuf** object.

operator= (2)

Assigns data from a null-terminated string and returns a reference to the **IccBuf** object. See also the **assign** method.

IccBuf& operator=(const char* *text***)**

text
The null-terminated string to be assigned to the **IccBuf** object.

operator+= (1)

Appends data from another buffer object and returns a reference to the **IccBuf** object.

IccBuf& operator+=(const IccBuf& *buffer***)**

buffer
A reference to an **IccBuf** object.

operator+= (2)

Appends data from a null-terminated string and returns a reference to the **IccBuf** object. See also the **append** method.

IccBuf& operator+=(const char* *text***)**

text
The null-terminated string to be appended to the **IccBuf** object.

operator==

Returns a boolean, defined in **Icc** structure, that indicates whether the data contained in the buffers of the two **IccBuf** objects is the same. It is true if the current lengths of the two data areas are the same and the contents are the same.

Icc::Bool operator==(const IccBuf& *buffer***) const**

buffer
A reference to an **IccBuf** object.

operator!=

Returns a boolean, defined in **Icc** structure, that indicates whether the data contained in the buffers of the two **IccBuf** objects is different. It is true if the current lengths of the two data areas are different or if the contents are different.

Icc::Bool operator!=(const IccBuf& *buffer***) const**

buffer
A reference to an **IccBuf** object.

operator« (1)
Appends another buffer.

operator«(const IccBuf& *buffer***)**

operator« (2)
Appends a string.

operator«(const char* *text***)**

operator« (3)
Appends a character.

operator«(char *ch***)**

operator« (4)
Appends a character.

operator«(signed char *ch***)**

operator« (5)
Appends a character.

operator«(unsigned char *ch***)**

operator« (6)
Appends a string.

operator«(const signed char* *text***)**

operator« (7)
Appends a string.

operator«(const unsigned char* *text***)**

operator« (8)
Appends a short.

operator«(short *num***)**

operator« (9)
Appends an unsigned short.

operator«(unsigned short *num***)**

operator« (10)
Appends a long.

operator«(long *num***)**

operator« (11)
Appends an unsigned long.

operator«(unsigned long *num***)**

operator« (12)
Appends an integer.

operator«(int *num***)**

operator« (13)
Appends a float.

operator«(float *num***)**

operator« (14)
Appends a double.

operator«(double *num***)**

operator« (15)
Appends a long double.

operator«(long double *num***)**

Appends data of various types to the **IccBuf** object. The types are converted to a 'readable' format, for example from a long to a string representation.

overlay
Makes the data area external and fixed. Any existing internal data area is destroyed.See warning about Internal/External ownership of buffers.

IccBuf& overlay (unsigned long *length*,
void* *dataArea***)**

length
The length of the existing data area.

dataArea
The address of the existing data area.

replace

Replaces the current contents of the data area at the given offset with the data provided and returns a reference to the **IccBuf** object.

IccBuf& replace (unsigned long *length*,
const void* *dataArea*,
unsigned long *offset* **= 0)**

length
The length of the source data area, in bytes.

dataArea
The address of the start of the source data area.

offset
The position where the new data is to be written, relative to the start of the **IccBuf** data area. The default is no offset.

setDataLength

Changes the current length of the data area and returns the new length. If the **IccBuf** object is not extensible, the data area length is set to either the original length of the data area or *length* , whichever is less.

unsigned long setDataLength(unsigned long *length***)**

length
The new length of the data area, in bytes

setFMHContained

Allows an application program to indicate that a data area contains function management headers.

void setFMHContained(Icc::Bool *yesNo* **=** Icc::yes**)**

yesNo
A boolean, defined in **Icc** structure, that indicates whether the data area contains FMHs. The default value is yes.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

DataAreaOwner

Indicates whether the data area of a **IccBuf** object has been allocated outside the object.

Possible values are:

internal
The data area has been allocated by the **IccBuf** constructor.

external
The data area has been allocated externally.

DataAreaType

Indicates whether the data area of a **IccBuf** object can be made longer than its original length.

Possible values are:

extensible
The data area can be automatically extended to accommodate more data.

fixed The data area cannot grow in size. If you attempt to assign too much data, the data is truncated, and an exception is thrown.

IccClock class

The **IccClock** class controls access to the CICS time and date services.

IccBase
IccResource
IccClock

Header file: `ICCCLKEH`

Sample: `ICC$CLK`

IccClock constructor

Constructor

IccClock(UpdateMode *update* **=** manual**)**

update
An enumeration, defined in this class, that indicates whether the clock is to update its time automatically whenever a time or date service is used, or whether it is to wait until an explicit **update** method call is made. If the time is updated manually, the initial clock time is the time when the **IccClock object** object is created.

Public methods

These are the public methods in this class.

absTime

Returns a reference to an **IccAbsTime** object that contains the absolute time as provided by CICS.

```
IccAbsTime& absTime()
```

cancelAlarm

Cancels a previous **setAlarm** request if the alarm time has not yet been reached, that is, the request has not expired.

```
void cancelAlarm(const IccRequestId* reqId = 0)
```

reqId
An optional pointer to the **IccRequestId** object that holds information on an alarm request.

Conditions

ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR

date

Returns the date as a string.

```
const char* date (DateFormat format = defaultFormat,
                  char dateSeparator = '\0')
```

format
An enumeration, defined in this class, that indicates in which format you want the date to be returned.

dateSeparator
The character that is used to separate different fields in the date. The default is no separation character.

Conditions

INVREQ

dayOfMonth

Returns the day component of the date, in the range 1 to 31.

```
unsigned long dayOfMonth()
```

Conditions

INVREQ

dayOfWeek

Returns an enumeration, defined in this class, that indicates the day of the week.

```
DayOfWeek dayOfWeek()
```

Conditions

INVREQ

daysSince1900

Returns the number of days that have elapsed since 1st January, 1900.

unsigned long daysSince1900()

Conditions

INVREQ

milliSeconds

Returns the number of milliseconds that have elapsed since 00:00 on 1st January, 1900.

long double milliSeconds()

monthOfYear

MonthOfYear monthOfYear()

Returns an enumeration, defined in this class, that indicates the month of the year.

Conditions

INVREQ

setAlarm

Sets an alarm at the time specified in *time*. It returns a reference to an **IccAlarmRequestId** object that can be used to cancel the alarm—see **cancelAlarm** method.

See also the **"waitOnAlarm" on page 179** method of class **IccTask**.

const IccAlarmRequestId& setAlarm (const IccTime& *time*,
const IccRequestId* *reqId* **= 0)**

time
A reference to an **IccTime** object that contains time information. As **IccTime** is an abstract class *time* is, in practise, an object of class **IccAbsTime**, **IccTimeOfDay**, or **IccTimeInterval**.

reqId
An optional pointer to an **IccRequestId** object that is used to identify this particular alarm request.

Conditions

EXPIRED, INVREQ

time

Returns the time as a text string.

const char* time(char *timeSeparator* **= '\0')**

timeSeparator
The character that delimits the time fields. The default is no separation character.

Conditions

INVREQ

update

Updates the clock time and date from CICS. See the **IccClock** constructor.

void update()

year

unsigned long year()

Returns the 4-figure year number, such as 1996.

Conditions

INVREQ

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

DateFormat

- defaultFormat
- DDMMYY
- MMDDYY
- YYDDD
- YYDDMM
- YYMMDD
- DDMMYYYY
- MMDDYYYY

- YYYYDDD
- YYYYDDMM
- YYYYMMDD

DayOfWeek

Indicates the day of the week.

- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday

MonthOfYear

Indicates the month of the year.

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December

UpdateMode

Indicates whether the clock is automatically updated.

manual
: The clock initially holds the time at which it was created. It is subsequently updated only when an **update** method call is made.

automatic
: The clock is updated to the current CICS time and date whenever any time or date method is called (for example, **daysSince1900**).

IccCondition structure

This structure contains an enumeration of all the CICS condition codes.

Header file: `ICCCNDEH`

Enumerations

Codes

The possible values are:

	Value		Value		Value
0	NORMAL	35	TSIOERR	70	NOTAUTH
1	ERROR	36	MAPFAIL	__	
2	RDATT	37	INVERRTERM	72	SUPPRESSED
3	WRBRK	38	INVMPSZ	__	
4	ICCEOF	39	IGREQID	__	
5	EODS	40	OVERFLOW	75	RESIDERR
6	EOC	41	INVLDC	__	
7	INBFMH	42	NOSTG	__	
8	ENDINPT	43	JIDERR	__	
9	NONVAL	44	QIDERR	__	
10	NOSTART	45	NOJBUFSP	80	NOSPOOL
11	TERMIDERR	46	DSSTAT	81	TERMERR
12	FILENOTFOUND	47	SELNERR	82	ROLLEDBACK
13	NOTFND	48	FUNCERR	83	END
14	DUPREC	49	UNEXPIN	84	DISABLED
15	DUPKEY	50	NOPASSBKRD	85	ALLOCERR
16	INVREQ	51	NOPASSBKWR	86	STRELERR
17	IOERR	__		87	OPENERR
18	NOSPACE	53	SYSIDERR	88	SPOLBUSY
19	NOTOPEN	54	ISCINVREQ	89	SPOLERR
20	ENDFILE	55	ENQBUSY	90	NODEIDERR
21	ILLOGIC	56	ENVDEFERR	91	TASKIDERR
22	LENGERR	57	IGREQCD	92	TCIDERR
23	QZERO	58	SESSIONERR	93	DSNNOTFOUND
24	SIGNAL	59	SYSBUSY	94	LOADING
25	QBUSY	60	SESSBUSY	95	MODELIDERR
26	ITEMERR	61	NOTALLOC	96	OUTDESCERR
27	PGMIDERR	62	CBIDERR	97	PARTNERIDERR
28	TRANSIDERR	63	INVEXITREQ	98	PROFILEIDERR
29	ENDDATA	64	INVPARTNSET	99	NETNAMEIDERR
30	INVTSREQ	65	INVPARTN	100	LOCKED
31	EXPIRED	66	PARTNFAIL	101	RECORDBUSY
32	RETPAGE	__		102	UOWNOTFOUND
33	RTEFAIL	__		103	UOWLNOTFOUND
34	RTESOME	69	USERIDERR		

Range

maxValue
The highest CICS condition, currently 103.

IccConsole class

This is a singleton class that represents the CICS console.

IccBase
IccResource
IccConsole

Header file: ICCCONEH

Sample: ICC$CON

IccConsole constructor (protected)

Constructor

No more than one of these objects is permitted in a task. An attempt to create more objects causes an exception to be thrown.

IccConsole()

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 65.

instance

Returns a pointer to the single **IccConsole** object that represents the CICS console. If the object does not already exist, it is created by this method.

static IccConsole* instance()

put

Writes the data in *send* to the CICS console. **put** is a synonym for **write**. See Polymorphic Behavior.

virtual void put(const IccBuf& *send***)**

send
A reference to an **IccBuf** object that contains the data that is to be written to the console.

replyTimeout

unsigned long replyTimeout() const

Returns the length of the reply timeout in milliseconds.

resetRouteCodes

void resetRouteCodes()

Removes all route codes held in the **IccConsole** object.

setAllRouteCodes

void setAllRouteCodes()

Sets all possible route codes in the **IccConsole** object, that is, 1 through 28.

setReplyTimeout (1)

void setReplyTimeout(IccTimeInterval& *interval***)**

interval
A reference to a **IccTimeInterval** object that describes the length of the time interval required.

setReplyTimeout (2)

The two different forms of this method are used to set the length of the reply timeout.

void setReplyTimeout(unsigned long *seconds***)**

seconds
The length of the time interval required, in seconds.

setRouteCodes

Saves route codes in the object for use on subsequent **write** and **writeAndGetReply** calls. Up to 28 codes can be held in this way.

void setRouteCodes (unsigned short *numRoutes*,
...)

numRoutes
The number of route codes provided in this call—the number of arguments that follow this one.

...
One or more arguments, the number of which is given by *numRoutes*. Each argument is a route code, of type **unsigned short**, in the range 1 to 28.

write

Writes the data in *send* to the CICS console.

void write (const IccBuf& *send*,
SeverityOpt *opt* **=** none**)**

send
A reference to an **IccBuf** object that contains the data that is to be written to the console.

opt
An enumeration that indicates the severity of the console message.

Conditions

INVREQ, LENGERR, EXPIRED

writeAndGetReply

Writes the data in *send* to the CICS console and returns a reference to an **IccBuf** object that contains the reply from the CICS operator.

```
const IccBuf& writeAndGetReply (const IccBuf& send,
                                SeverityOpt opt= none)
```

send
A reference to an **IccBuf** object that contains the data that is to be written to the console.

opt
An enumeration that indicates the severity of the console message.

Conditions

INVREQ, LENGERR, EXPIRED

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

SeverityOpt

Possible values are:

- none
- warning
- error
- severe

IccControl class

IccControl class controls an application program that uses the supplied Foundation Classes.

IccBase
  IccResource
    IccControl

This class is a singleton class in the application program; each program running under a CICS task has a single **IccControl** object.

IccControl has a pure virtual **run** method, where application code is written, and is therefore an abstract base class. The application programmer must subclass **IccControl**, and implement the **run** method.

Header file: ICCCTLEH

IccControl constructor (protected)

Constructor

IccControl()

Public methods

These are the public methods in this class.

callingProgramId

Returns a reference to an **IccProgramId** object that represents the program that called this program. The returned **IccProgramId** reference contains a null name if the executing program was not called by another program.

const IccProgramId& callingProgramId()

Conditions

INVREQ

cancelAbendHandler

Cancels a previously established exit at this logical program level.

void cancelAbendHandler()

Conditions

NOTAUTH, PGMIDERR

commArea

Returns a reference to an **IccBuf** object that encapsulates the COMMAREA—the communications area of CICS memory that is used for passing data between CICS programs and transactions.

IccBuf& commArea()

Conditions

INVREQ

console

Returns a pointer to the single **IccConsole** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

IccConsole* console()

initData

const IccBuf& initData()

Returns a reference to an **IccBuf** object that contains the initialization parameters specified for the program in the INITPARM system initialization parameter.

Conditions

INVREQ

instance

Returns a pointer to the single **IccControl** object. The object is created if it does not already exist.

static IccControl* instance()

isCreated

static Icc::Bool isCreated()

Returns a boolean value that indicates whether the **IccControl** object already exists. Possible values are true or false.

programId

const IccProgramId& programId()

Returns a reference to an **IccProgramId** object that refers to this executing program.

Conditions

INVREQ

resetAbendHandler

Reactivates a previously cancelled abend handler for this logical program level. (See **cancelAbendHandler on page** "cancelAbendHandler" on page 94).

void resetAbendHandler()

Conditions

NOTAUTH, PGMIDERR

returnProgramId

Returns a reference to an **IccProgramId** object that refers to the program that resumes control when this logical program level issues a return.

const IccProgramId& returnProgramId()

run

virtual void run() = 0

This method should be implemented in a subclass of **IccControl** by the application programmer.

session

IccSession* session()

Returns a pointer to the **IccSession** object that represents the principal facility for this program. An exception is thrown if this program does not have a session as its principal facility.

setAbendHandler (1)

void setAbendHandler(const IccProgramId& *programId***)**

programId
A reference to the **IccProgramId** object that indicates which program is affected.

setAbendHandler (2)

These methods set the abend handler to the named program for this logical program level.

void setAbendHandler(const char* *programName***)**

programName
The name of the program affected.

Conditions

NOTAUTH, PGMIDERR

startRequestQ

Returns a pointer to the **IccStartRequestQ** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

IccStartRequestQ* startRequestQ()

system

IccSystem* system()

Returns a pointer to the **IccSystem** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

task

IccTask* task()

Returns a pointer to the **IccTask** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

terminal

IccTerminal* terminal()

Returns a pointer to the **IccTerminal** object. If this object has not yet been created, this method creates the object before returning a pointer to it.

This method has a condition, that the transaction must have a terminal as its principal facility. That is, there must be a physical terminal involved.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccConvId class

IccConvId class is used to identify an APPC conversation.

IccBase
  IccResourceId
    IccConvId

IccConvId class is used to identify an APPC conversation.

Header file: `ICCRIDEH`

IccConvId constructors

Constructor (1)

IccConvId(const char* *convName***)**

convName
The 4-character name of the conversation.

Constructor (2)

The copy constructor.

IccConvId(const IccConvId& *convId***)**

convId
A reference to an **IccConvId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccConvId& operator=(const char* *convName***)**

operator= (2)

Assigns new value.

IccConvId& operator=(const IccConvId *id***)**

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccDataQueue class

This class represents a CICS transient data queue.

IccBase
IccResource
IccDataQueue

Header file: ICCDATEH

Sample: ICC$DAT

IccDataQueue constructors

Constructor (1)

IccDataQueue(const IccDataQueueId& *id***)**

id
A reference to an **IccDataQueueId** object that contains the name of the CICS transient data queue.

Constructor (2)

IccDataQueue(const char* *queueName***)**

queueName
The 4-byte name of the queue that is to be created. An exception is thrown if *queueName* is not valid.

Public methods

These are the public methods in this class.

clear

A synonym for **empty**. See Polymorphic Behavior.

virtual void clear()

empty

void empty()

Empties the queue, that is, deletes all items on the queue.

Conditions

ISCINVREQ, NOTAUTH, QIDERR, SYSIDERR, DISABLED, INVREQ

get

A synonym for **readItem**. See Polymorphic Behavior.

virtual const IccBuf& get()

put

A synonym for **writeItem**. See Polymorphic Behavior.

virtual void put(const IccBuf& *buffer***)**

buffer
A reference to an **IccBuf** object that contains data to be put into the queue.

readItem

const IccBuf& readItem()

Returns a reference to an **IccBuf** object that contains one item read from the data queue.

Conditions

IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTOPEN, QBUSY, QIDERR, QZERO, SYSIDERR, DISABLED, INVREQ

writeItem (1)

void writeItem(const IccBuf& *item***)**

item
A reference to an **IccBuf** object that contains data to be written to the queue.

writeItem (2)

Writes an item of data to the queue.

void writeItem(const char* *text***)**

text
Text that is to be written to the queue.

Conditions

IOERR, ISCINVREQ, LENGERR, NOSPACE, NOTAUTH, NOTOPEN, QIDERR, SYSIDERR, DISABLED, INVREQ

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccDataQueueId class

IccDataQueueId is used to identify a CICS Transient Data Queue name.

IccBase
  IccResourceId
    IccDataQueueId

IccDataQueueId is used to identify a CICS Transient Data Queue name.

Header file: `ICCRIDEH`

IccDataQueueId constructors

Constructor (1)

IccDataQueueId(const char* *queueName***)**

queueName
The 4-character name of the queue

Constructor (2)

IccDataQueueId(const IccDataQueueId& *id***)**

id A reference to an **IccDataQueueId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccDataQueueId& operator=(const char* *queueName***)**

queueName
The 4-character name of the queue

operator= (2)

Assigns new value.

IccDataQueueId& operator=(const IccDataQueueId& *id***)**

id A reference to an **IccDataQueueId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccEvent class

The **IccEvent** class contains information on a specific CICS call, called a CICS event.

IccBase
IccEvent

Header file: ICCEVTEH

Sample: ICC$RES1

IccEvent constructor

Constructor

IccEvent (const IccResource* *object*,
const char* *methodName***)**

object
A pointer to the **IccResource** object that is responsible for this event.

methodName
The name of the method that caused the event to be created.

Public methods

These are the public methods in this class.

className

Returns the name of the class responsible for this event.

const char* className() const

classType

IccBase::ClassType classType() const

Returns an enumeration, described under **classType** on page "classType" on page 74 in **IccBase** class, that indicates the type of class that is responsible for this event.

condition

Returns an enumerated type that indicates the condition returned from this CICS event. The possible values are described under the **Codes** type in the **IccCondition** structure.

IccCondition::Codes condition(IccResource::ConditionType *type* **=**
IccResource::majorCode**) const**

type
An enumeration that indicates whether a major code or minor code is being requested. Possible values are 'majorCode' or 'minorCode'. 'majorCode' is the default value.

conditionText

const char* conditionText() const

Returns the text of the CICS condition code, such as "NORMAL" or "LENGERR".

methodName

const char* methodName() const

Returns the name of the method responsible for this event.

summary

const char* summary()

Returns a summary of the CICS event in the form:

```
CICS event summary: IccDataQueue::readItem condition=23 (QZERO) minor=0
```

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccException class

IccException class contains information about CICS Foundation Class exceptions.

IccBase
    IccException

It is used to create objects that are 'thrown' to application programs. They are generally used for error conditions such as invalid method calls, but the application programmer can also request an exception is thrown when CICS raises a particular condition.

Header file: ICCEXCEH

Samples: ICC$EXC1, ICC$EXC2, ICC$EXC3

IccException constructor

Constructor

IccException (Type *exceptionType*,
IccBase::ClassType *classType*,
const char* *className*,
const char* *methodName*,
IccMessage* *message*,
IccBase* *object* **= 0**,
unsigned short *exceptionNum* **= 0)**

exceptionType
An enumeration, defined in this class, that indicates the type of the exception

classType
An enumeration, defined in this class, that indicates from which type of class the exception was thrown

className
The name of the class from which the exception was thrown

methodName
The name of the method from which the exception was thrown

message
A pointer to the **IccMessage** object that contains information about why the exception was created.

object
A pointer to the object that threw the exception

exceptionNum
The unique exception number.

Note: When the **IccException** object is created it takes ownership of the **IccMessage** given on the constructor. When the **IccException** is deleted, the **IccMessage** object is deleted automatically by the **IccException** destructor. Therefore, do not delete the **IccMessage** object before deleting the **IccException** object.

Public methods

These are the public methods in this class.

className

Returns the name of the class responsible for throwing this exception.

const char* className() const

classType

IccBase::ClassType classType() const

Returns an enumeration, described under **ClassType** in **IccBase** class, that indicates the type of class which threw this exception.

message

IccMessage* message() const

Returns a pointer to an **IccMessage** object that contains information on any message associated with this exception.

methodName

const char* methodName() const

Returns the name of the method responsible for throwing this exception.

number

unsigned short number() const

Returns the unique exception number.

This is a useful diagnostic for IBM service. The number uniquely identifies from where in the source code the exception was thrown.

summary

const char* summary()

Returns a string containing a summary of the exception. This combines the **className**, **methodName**, **number**, **Type**, and **IccMessage::text** methods into the following form:

```
CICS exception summary: 094 IccTempStore::readNextItem type=CICSCondition
```

type

Type type() const

Returns an enumeration, defined in this class, that indicates the type of exception.

typeText

const char* typeText() const

Returns a string representation of the exception type, for example, "objectCreationError", "invalidArgument".

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

Type

objectCreationError
An attempt to create an object was invalid. This happens, for example, if an attempt is made to create a second instance of a singleton class, such as **IccTask**.

invalidArgument
A method was called with an invalid argument. This happens, for example, if an **IccBuf** object with too much data is passed to the **writeItem** method of the **IccTempStore** class by the application program. An attempt to create an **IccFileId** object with a 9-character filename also generates an exception of this type.

invalidMethodCall
A method call cannot proceed. A typical reason is that the object cannot honor the call in its current state. For example, a **readRecord** call on an **IccFile** object is only honored if an **IccRecordIndex** object, to specify ***which*** record is to be read, has already been associated with the file.

CICSCondition
A CICS condition, listed in the **IccCondition** structure, has occurred in the object and the object was configured to throw an exception.

platformError
An operation is invalid because of limitations of this particular platform.

A platformError exception can occur at 3 levels:

1. An object is not supported on this platform.
2. An object is supported on this platform, but a particular method is not.
3. A method is supported on this platform, but a particular positional parameter is not.

See Platform differences for more details.

familyConformanceError
Family subset enforcement is on for this program and an operation that is not valid on all supported platforms has been attempted.

internalError
The CICS Foundation Classes have detected an internal error. Please call your support organization.

IccFile class

IccFile class enables the application program to access CICS files.

IccBase
IccResource
IccFile

Header file: ICCFILEH

Sample: ICC$FIL

IccFile constructors

Constructor (1)

IccFile (const IccFileId& *id*,
IccRecordIndex* *index* **= 0)**

id
A reference to the **IccFileId** object that identifies which file is being operated on

index
An optional pointer to the **IccRecordIndex** object that identifies which record in the file is being operated on.

Constructor (2)

To access files using an **IccFile** object, it must have an **IccRecordIndex** object associated with it. If this association is not made when the object is created, use the **registerRecordIndex** method.

IccFile (const char* *fileName*,
IccRecordIndex* *index* **= 0)**

fileName
The 8-character name of the file

index
An optional pointer to the **IccRecordIndex** object that identifies which record in the file is being operated on.

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 65.

access

Returns a composite number indicating the access properties of the file. See also **isReadable**, **isBrowsable**, **isAddable**, **isDeletable**, and **isUpdatable** methods.

unsigned long access(Icc::GetOpt *opt* **=Icc::object)**

opt
An enumeration, defined in **Icc** structure, that indicates whether you can use a value previously retrieved from CICS (object), or whether the object should retrieve a fresh value from CICS.

accessMethod

Returns an enumeration, defined in **IccValue**, that represents the access method for this file.

Possible values are:

- VSAM
- BDAM
- SFS

IccValue::CVDA accessMethod(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

beginInsert (VSAM only)

Signals the start of a mass insertion of data into the file.

void beginInsert()

deleteLockedRecord

Deletes a record that has been previously locked by **readRecord** method in update mode. (See also **readRecord** method.)

void deleteLockedRecord(unsigned long *updateToken* **= 0)**

updateToken
A token that indicates which previously read record is to be deleted. This is the token that is returned from **readRecord** method when in update mode.

Conditions

DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFIND, NOTOPEN, SYSIDERR, LOADING

deleteRecord

Deletes one or more records, as specified by the associated **IccRecordIndex** object, and returns the number of deleted records.

unsigned short deleteRecord()

Conditions

DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFIND, NOTOPEN, SYSIDERR, LOADING

enableStatus

Returns an enumeration, defined in **IccValue**, that indicates whether the file is enabled to be used by programs.

Possible values are:

- DISABLED
- DISABLING
- ENABLED
- UNENABLED

IccValue::CVDA enableStatus(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

endInsert (VSAM only)

Marks the end of a mass insertion operation. See **beginInsert**.

void endInsert()

isAddable

Indicates whether more records can be added to the file.

Icc::Bool isAddable(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

isBrowsable

Indicates whether the file can be browsed.

Icc::Bool isBrowsable(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

isDeletable

Indicates whether the records in the file can be deleted.

Icc::Bool isDeletable(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

isEmptyOnOpen

Returns a Boolean that indicates whether the EMPTYREQ option is specified. EMPTYREQ causes the object associated with this file to be set to empty when opened, if it is a VSAM data set defined as reusable.

Icc::Bool isEmptyOnOpen(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

isReadable

Indicates whether the file records can be read.

Icc::Bool isReadable(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

isRecoverable

Icc::Bool isRecoverable(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions: END, FILENOTFOUND, ILLOGIC, NOTAUTH

isUpdatable

Indicates whether the file can be updated.

Icc::Bool isUpdatable(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

keyLength

Returns the length of the search key.

unsigned long keyLength(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

keyPosition

Returns the position of the key field in each record relative to the beginning of the record. If there is no key, zero is returned.

long keyPosition(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

openStatus

Returns a CVDA that indicates the open status of the file. Possible values are:

IccValue::CVDA openStatus(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

CLOSED
The file is closed.

CLOSING
The file is in the process of being closed. Closing a file may require dynamic deallocation of data sets and deletion of shared resources, so the process may last a significant length of time.

CLOSEREQUEST
The file is open and one or more application tasks are using it. A request has been received to close it.

OPEN
The file is open.

OPENING
The file is in the process of being opened.

Conditions: END, FILENOTFOUND, ILLOGIC, NOTAUTH

readRecord

Reads a record and returns a reference to an **IccBuf** object that contains the data from the record.

const IccBuf& readRecord (ReadMode *mode* **=** normal**,**
unsigned long* *updateToken* **= 0)**

mode
An enumeration, defined in this class, that indicates in which mode the record is to be read.

updateToken
A pointer to an **unsigned long** token that will be updated by the method when *mode* is update and you want to make multiple read updates. The token uniquely identifies the update request and is passed to the **deleteLockedRecord**, **rewriteRecord**, or **unlockRecord** methods

Conditions

DISABLED, DUPKEY, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING

recordFormat

Returns a CVDA that indicates the format of the data. Possible values are:

IccValue::CVDA recordFormat(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

FIXED
The records are of fixed length.

UNDEFINED (BDAM data sets only)
The format of records on the file is undefined.

VARIABLE
The records are of variable length. If the file is associated with a data table, the record format is always variable length, even if the source data set contains fixed-length records.

Conditions: END, FILENOTFOUND, ILLOGIC, NOTAUTH

recordIndex

Returns a pointer to an **IccRecordIndex** object that indicates which records are to be accessed when using methods such as **readRecord**, **writeRecord**, and **deleteRecord**.

IccRecordIndex* recordIndex() const

recordLength

Returns the length of the current record.

unsigned long recordLength(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

registerRecordIndex

void registerRecordIndex(IccRecordIndex* *index***)**

index
A pointer to an **IccKey**, **IccRBA**, or **IccRRN** object that will be used by methods such as **readRecord**, **writeRecord**, etc..

rewriteRecord

Updates a record with the contents of *buffer*.

void rewriteRecord (const IccBuf& *buffer***,**
unsigned long *updateToken* **= 0)**

buffer
A reference to the **IccBuf** object that holds the new record data to be written to the file.

updateToken
The token that identifies which previously read record is to be rewritten. See **readRecord**.

Conditions

DISABLED, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING

setAccess

Sets the permitted access to the file.

For example:

```
file.setAccess(IccFile::readable + IccFile::notUpdatable);
```

void setAccess(unsigned long *access***)**

access
A positive integer value created by ORing (or adding) one or more of the values of the Access enumeration, defined in this class.

Conditions

FILENOTFOUND, INVREQ, IOERR, NOTAUTH

setEmptyOnOpen

void setEmptyOnOpen(Icc::Bool *trueFalse***)**

Specifies whether or not to make the file empty when it is next opened.

Conditions

FILENOTFOUND, INVREQ, IOERR, NOTAUTH

setStatus

Sets the status of the file.

void setStatus(Status *status***)**

status
An enumeration, defined in this class, that indicates the required status of the file after this method is called.

Conditions

FILENOTFOUND, INVREQ, IOERR, NOTAUTH

type

Returns a CVDA that identifies the type of data set that corresponds to this file. Possible values are:

IccValue::CVDA type(Icc::GetOpt *opt* **=** Icc::object**)**

opt
See **access** method.

ESDS
The data set is an entry-sequenced data set.

KEYED
The data set is addressed by physical keys.

KSDS
The data set is a key-sequenced data-set.

NOTKEYED
The data set is not addressed by physical keys.

RRDS
The data set is a relative record data set.

VRRDS
The data set is a variable relative record data set.

Conditions: END, FILENOTFOUND, ILLOGIC, NOTAUTH

unlockRecord

Unlock a record, previously locked by reading it in update mode. See **readRecord**.

void unlockRecord(unsigned long *updateToken* **= 0)**

updateToken
A token that indicates which previous **readRecord** update request is to be unlocked.

Conditions

DISABLED, FILENOTFOUND, ILLOGIC, IOERR, ISCINVREQ, NOTAUTH, NOTOPEN, SYSIDERR, INVREQ

writeRecord

Write either a single record or a sequence of records, if used with the **beginInsert** and **endInsert** methods.

void writeRecord(const IccBuf& *buffer***)**

buffer
A reference to the **IccBuf** object that holds the data that is to be written into the record.

Conditions

DISABLED, DUPREC, FILENOTFOUND, ILLOGIC, INVREEQ, IOERR, ISCINVREQ, LENGERR, NOSPACE, NOTAUTH, NOTOPEN, SYSIDERR, LOADING, SUPPRESSED

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

Access

readable
File records can be read by CICS tasks.

notReadable
File records cannot be read by CICS tasks.

browsable
File records can be browsed by CICS tasks.

notBrowsable
File records cannot be browsed by CICS tasks.

addable
Records can be added to the file by CICS tasks.

notAddable
Records cannot be added to the file by CICS tasks.

updatable
Records in the file can be updated by CICS tasks.

notUpdatable
Records in the file cannot be updated by CICS tasks.

deletable
Records in the file can be deleted by CICS tasks.

notDeletable
Records in the file cannot be deleted by CICS tasks.

fullAccess
Equivalent to readable AND browsable AND addable AND updatable AND deletable.

noAccess
Equivalent to notReadable AND notBrowsable AND notAddable AND notUpdatable AND notDeletable.

ReadMode

ReadMode is the mode in which a file is read.

normal
No update is to be performed (that is, read-only mode)

update
The record is to be updated. The record is locked by CICS until:

- it is rewritten using the **rewriteRecord** method *or*
- it is deleted using the **deleteLockedRecord** method *or*
- it is unlocked using the **unlockRecord** method *or*
- the task commits or rolls back its resource updates *or*
- the task is abended.

SearchCriterion

equalToKey
The search only finds an exact match.

gteqToKey
The search finds either an exact match or the next record in search order.

Status

open File is open, ready for read/write requests by CICS tasks.

closed
File is closed, and is therefore not currently being used by CICS tasks.

enabled
File is enabled for access by CICS tasks.

disabled
File is disabled from access by CICS tasks.

IccFileId class

IccFileId is used to identify a file name in the CICS system.

IccBase
IccResourceId
IccFileId

Header file: `ICCRIDEH`

IccFileId constructors

Constructor (1)

IccFileId(const char* *fileName***)**

fileName
The name of the file.

Constructor (2)

IccFileId(const IccFileId& *id***)**

id
A reference to an **IccFileId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccFileId& operator=(const char* *fileName***)**

fileName
The 8-byte name of the file.

operator= (2)

Assigns new value.

IccFileId& operator=(const IccFileId& *id***)**

id
A reference to an **IccFileId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccFileIterator class

This class is used to create **IccFileIterator** objects that can be used to browse through the records of a CICS file, represented by an **IccFile** object.

IccBase
IccResource
IccFileIterator

Header file: ICCFLIEH

Sample: ICC$FIL

IccFileIterator constructor

Constructor

The **IccFile** and **IccRecordIndex** object must exist before the **IccFileIterator** is created.

IccFileIterator (IccFile* *file*,
IccRecordIndex* *index*,
IccFile::SearchCriterion *search* **=** IccFile::gteqToKey**)**

file
A pointer to the **IccFile** object that is to be browsed

index
A pointer to the **IccRecordIndex** object that is being used to select a record in the file

search
An enumeration, defined in **IccFile**, that indicates the criterion being used to find a search match. The default is gteqToKey.

Conditions

DISABLED, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, NOTOPEN, SYSIDERR, LOADING

Public methods

These are the public methods in this class.

readNextRecord

Read the record that follows the current record.

const IccBuf& readNextRecord (IccFile::ReadMode *mode* **=** IccFile::normal**,**
unsigned long* *updateToken* **=** 0**)**

mode
An enumeration, defined in **IccFile** class, that indicates the type of read request

updateToken
A returned token that is used to identify this unique update request on a subsequent **rewriteRecord**, **deleteLockedRecord**, or **unlockRecord** method on the file object.

Conditions

DUPKEY, ENDFILE, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFIND, SYSIDERR

readPreviousRecord

Read the record that precedes the current record.

```
const IccBuf& readPreviousRecord (IccFile::ReadMode mode = IccFile::normal,
                                  unsigned long* updateToken = 0)
```

mode
An enumeration, defined in **IccFile** class, that indicates the type of read request.

updateToken
See **readNextRecord**.

Conditions

DUPKEY, ENDFILE, FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, NOTFIND, SYSIDERR

reset

Resets the **IccFileIterator** object to point to the record identified by the **IccRecordIndex** object and the specified search criterion.

```
void reset (IccRecordIndex* index,
            IccFile::SearchCriterion search = IccFile::gteqToKey)
```

index
A pointer to the **IccRecordIndex** object that is being used to select a record in the file.

search
An enumeration, defined in **IccFile**, that indicates the criterion being used to find a search match. The default is gteqToKey.

Conditions

FILENOTFOUND, ILLOGIC, INVREQ, IOERR, ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccGroupId class

IccGroupId class is used to identify a CICS group.

IccBase
IccResourceId
IccGroupId

IccGroupId class is used to identify a CICS group.

Header file: ICCRIDEH

IccGroupId constructors

Constructor (1)

IccGroupId(const char* *groupName***)**

groupName
The 8-character name of the group.

Constructor (2)

The copy constructor.

IccGroupId(const IccGroupId& *id***)**

id A reference to an **IccGroupId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccGroupId& operator=(const char* *groupName***)**

groupName
The 8-character name of the group.

operator= (2)

Assigns new value.

IccGroupId& operator=(const IccGroupId& *id***)**

id A reference to an **IccGroupId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccJournal class

IccJournal class represents a user or system CICS journal.

IccBase
  IccResource
    IccJournal

Header file: ICCJRNEH

Sample: ICC$JRN

IccJournal constructors

Constructor (1)

IccJournal (const IccJournalId& *id*,
unsigned long *options* **= 0)**

id
A reference to an **IccJournalId** object that identifies which journal is being used.

options
An integer, constructed from the **Options** enumeration defined in this class, that affects the behavior of **writeRecord** calls on the **IccJournal** object. The values may be combined by addition or bitwise ORing, for example:

```
IccJournal::startIO | IccJournal::synchronous
```

The default is to use the system default.

Constructor (2)

IccJournal (unsigned short *journalNum*,
unsigned long *options* **= 0)**

journalNum
The journal number (in the range 1-99)

options
See above.

Public methods

These are the public methods in this class.

clearPrefix

Clears the current prefix as set by **registerPrefix** or **setPrefix**.If the current prefix was set using **registerPrefix**, then the **IccJournal** class only removes its own reference to the prefix. The buffer itself is left unchanged.If the current prefix was set by **setPrefix**, then the **IccJournal**'s copy of the buffer is deleted.

void clearPrefix()

journalTypeId

Returns a reference to an **IccJournalTypeId** object that contains a 2-byte field used to identify the origin of journal records.

const IccJournalTypeId& journalTypeId() const

put

A synonym for **writeRecord**—puts data into the journal. See Polymorphic Behavior for information on polymorphism.

virtual void put(const IccBuf& *buffer***)**

buffer
A reference to an **IccBuf** object that holds data to be put into the journal.

registerPrefix

void registerPrefix(const IccBuf* *prefix***)**

Stores pointer to prefix object for use when the **writeRecord** method is called on this **IccJournal** object.

setJournalTypeId (1)

void setJournalTypeId(const IccJournalTypeId& *id***)**

setJournalTypeId (2)

Sets the journal type—a 2 byte identifier—included in the journal record created when using the **writeRecord** method.

void setJournalTypeId(const char* *jtypeid***)**

setPrefix (1)

void setPrefix(const IccBuf& *prefix***)**

setPrefix (2)

void setPrefix(const char* *prefix***)**

Stores the *current* contents of *prefix* for inclusion in the journal record created when the **writeRecord** method is called.

wait

Waits until a previous journal write has completed.

void wait (unsigned long *requestNum***=0,**
unsigned long *option* **= 0)**

requestNum
The write request. Zero indicates the last write on this journal.

option
An integer that affects the behaviour of **writeRecord** calls on the **IccJournal** object. Values other than 0 should be made from the **Options** enumeration, defined in this class. The values may be combined by addition or bitwise ORing, for example `IccJournal::startIO + IccJournal::synchronous`. The default is to use the system default.

writeRecord (1)

unsigned long writeRecord (const IccBuf& *record*,
unsigned long *option* **= 0)**

record
A reference to an **IccBuf** object that holds the record

option
See above.

writeRecord (2)

Writes the data in the record to the journal.The returned number represents the particular write request and can be passed to the **wait** method in this class.

unsigned long writeRecord (const char* *record*,
unsigned long *option* **= 0)**

record
The name of the record

option
See above.

Conditions

IOERR, JIDERR, LENGERR, NOJBUFSP, NOTAUTH, NOTOPEN

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

Options

The behaviour of **writeRecord** calls on the **IccJournal** object.

The values can be combined in an integer by addition or bitwise ORing.

startIO
Specifies that the output of the journal record is to be initiated immediately. If 'synchronous' is specified for a journal that is not frequently used, you should also specify 'startIO' to prevent the requesting task waiting for the journal buffer to be filled. If the journal is used frequently, startIO is unnecessary.

noSuspend
Specifies that the NOJBUFSP condition does not suspend an application program.

synchronous
Specifies that synchronous journal output is required. The requesting task waits until the record has been written.

IccJournalId class

IccJournalId is used to identify a journal number in the CICS sytem.

IccBase
IccResourceId
IccJournalId

Header file: `ICCRIDEH`

IccJournalId constructors

Constructor (1)

IccJournalId(unsigned short *journalNum***)**

journalNum
The number of the journal, in the range 1 to 99

Constructor (2)

The copy constructor.

IccJournalId(const IccJournalId& *id***)**

id
A reference to an **IccJournalId** object.

Public methods

These are the public methods in this class.

number

Returns the journal number, in the range 1 to 99.

unsigned short number() const

operator= (1)

IccJournalId& operator=(unsigned short *journalNum***)**

journalNum
The number of the journal, in the range 1 to 99

operator= (2)

Assigns new value.

IccJournalId& operator=(const IccJournalId& *id***)**

id
A reference to an **IccJournalId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccJournalTypeId class

An **IccJournalTypeId** class object is used to help identify the origin of a journal record—it contains a 2-byte field that is included in the journal record.

IccBase
IccResourceId
IccJournalTypeId

An **IccJournalTypeId** class object is used to help identify the origin of a journal record—it contains a 2-byte field that is included in the journal record.

Header file: `ICCRIDEH`

IccJournalTypeId constructors

Constructor (1)

IccJournalTypeId(const char* *journalTypeName***)**

journalTypeName
A 2-byte identifier used in journal records.

Constructor (2)

IccJournalTypeId(const IccJournalId& *id***)**

id A reference to an **IccJournalTypeId** object.

Public methods

These are the public methods in this class.

operator= (1)

void operator=(const IccJournalTypeId& *id***)**

id A reference to an **IccJournalTypeId** object.

operator= (2)

Sets the 2-byte field that is included in the journal record.

void operator=(const char* *journalTypeName***)**

journalTypeName
A 2-byte identifier used in journal records.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccKey class

IccKey class is used to hold a search key for an indexed (KSDS) file.

IccBase
IccRecordIndex
IccKey

Header file: ICCRECEH

Sample: ICC$FIL

IccKey constructors

Constructor (1)

IccKey (const char* *initValue*,
Kind *kind* **=** complete**)**

Constructor (2)

IccKey (unsigned short *completeLength*,
Kind *kind***=** complete**)**

Constructor (3)

IccKey(const IccKey& *key***)**

Public methods

These are the public methods in this class.

assign

Copies the search key into the **IccKey** object.

void assign (unsigned short *length*,
const void* *dataArea***)**

length
The length of the data area

dataArea
A pointer to the start of the data area that holds the search key.

completeLength

Returns the length of the key when it is complete.

unsigned short completeLength() const

kind

Kind kind() const

Returns an enumeration, defined in this class, that indicates whether the key is generic or complete.

operator= (1)

IccKey& operator=(const IccKey& *key***)**

operator= (2)

IccKey& operator=(const IccBuf& buffer)

operator= (3)

Assigns new value to key.

IccKey& operator=(const char* *value***)**

operator== (1)

Icc::Bool operator==(const IccKey& *key***) const**

operator== (2)

Icc::Bool operator==(const IccBuf& *text***) const**

operator== (3)

Tests equality.

Icc::Bool operator==(const char* *text***) const**

operator!= (1)

Icc::Bool operator !=(const IccKey& *key***) const**

operator!= (2)

Icc::Bool operator!=(const IccBuf& *text***) const**

operator!= (3)

Tests inequality.

Icc::Bool operator!=(const char* *text***) const**

setKind

Changes the type of key from generic to complete or vice versa.

void setKind(Kind *kind***)**

kind
An enumeration, defined in this class, that indicates whether the key is generic or complete.

value

const char* value()

Returns the start of the data area containing the search key.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

Kind

complete
Specifies that the supplied key is not generic.

generic
Specifies that the search key is generic. A search is satisfied when a record is found with a key whose prefix matches the supplied key.

IccLockId class

IccLockId class is used to identify a lock request.

IccBase
IccResourceId
IccLockId

IccLockId class is used to identify a lock request.

Header file: ICCRIDEH

IccLockId constructors

Constructor (1)

IccLockId(const char* *name***)**

name
The 8-character name of the lock request.

Constructor (2)

The copy constructor.

IccLockId(const IccLockId& *id***)**

id A reference to an **IccLockId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccLockId& operator=(const char* *name***)**

name
The 8-character name of the lock request.

operator= (2)

Assigns new value.

IccLockId& operator=(const IccLockId& *id***)**

id A reference to an **IccLockId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccMessage class

IccMessage can be used to hold a message description.

IccBase
IccMessage

It is used primarily by the **IccException** class to describe why the **IccException** object was created.

Header file: ICCMSGEH

IccMessage constructor

Constructor

IccMessage (unsigned short *number***,**
const char* *text***,**
const char* *className* **= 0,**
const char* *methodName* **= 0)**

number
The number associated with the message

text
The text associated with the message

className
The optional name of the class associated with the message

methodName
The optional name of the method associated with the message.

Public methods

These are the public methods in this class.

className

Returns the name of the class with which the message is associated, if any. If there is no name to return, a null pointer is returned.

const char* className() const

methodName

const char* methodName() const

Returns the name of the method with which the message is associated, if any. If there is no name to return, a null pointer is returned.

number

unsigned short number() const

Returns the number of the message.

summary

const char* summary()

Returns the text of the message.

text

const char* text() const

Returns the text of the message in the same way as summary.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccPartnerId class

IccPartnerId class represents CICS remote (APPC) partner transaction definitions.

IccBase
  IccResourceId
    IccPartnerId

IccPartnerId class represents CICS remote (APPC) partner transaction definitions.

Header file: ICCRIDEH

IccPartnerId constructors

Constructor (1)

IccPartnerId(const char* *partnerName***)**

partnerName
The 8-character name of an APPC partner.

Constructor (2)

The copy constructor.

IccPartnerId(const IccPartnerId& *id***)**

id A reference to an **IccPartnerId** object.

Public methods

operator= (1)

IccPartnerId& operator=(const char* *partnerName***)**

partnerName
The 8-character name of an APPC partner.

operator= (2)

Assigns new value.

IccPartnerId& operator=(const IccPartnerId& *id***)**

id A reference to an **IccPartnerId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccProgram class

The **IccProgram** class represents any CICS program outside of your currently executing one, which the **IccControl** object represents.

IccBase
  IccResource
    IccProgram

Header file: ICCPRGEH

Sample: ICC$PRG1, ICC$PRG2, ICC$PRG3

IccProgram constructors

Constructor (1)

IccProgram(const IccProgramId& *id***)**

id
A reference to an **IccProgramId** object.

Constructor (2)

IccProgram(const char* *progName***)**

progName
The 8-character name of the program.

Public methods

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 65.

address

Returns the address of a program module in memory. This is only valid after a successful **load** call.

const void* address() const

clearInputMessage

Clears the current input message which was set by **setInputMessage** or **registerInputMessage**.If the current input message was set using **registerInputMessage** then only the pointer is deleted: the buffer is left unchanged.If the current input message was set using **setInputMessage** then **clearInputMessage** releases the memory used by that buffer.

void clearInputMessage()

entryPoint

const void* entryPoint() const

Returns a pointer to the entry point of a loaded program module. This is only valid after a successful **load** call.

length

unsigned long length() const

Returns the length of a program module. This is only valid after a successful **load** call.

link

void link (const IccBuf* *commArea* **= 0,**
const IccTransId* *transId* **= 0,**
CommitOpt *opt* **=** noCommitOnReturn**)**

commArea
An optional pointer to the **IccBuf** object that contains the COMMAREA—the buffer used to pass information between the calling program and the program that is being called

transId
An optional pointer to the **IccTransId** object that indicates the name of the mirror transaction under which the program is to run if it is a remote (DPL) program link

opt
An enumeration, defined in this class, that affects the behavior of the link when the program is remote (DPL). The default (noCommitOnReturn) is not to commit resource changes on the remote CICS region until the current task commits its resources. The alternative (commitOnReturn) means that the resources of the remote program are committed whether or not this task subsequently abends or encounters a problem.

Conditions: INVREQ, NOTAUTH, PGMIDERR, SYSIDERR, LENGERR, ROLLEDBACK, TERMERR

Restrictions

Links may be nested, that is, a linked program may **link** to another program. However, due to implementation restrictions, you may only nest such programs 15 times. If this is exceeded, an exception is thrown.

load

void load(LoadOpt *opt* **=** releaseAtTaskEnd**)**

opt
An enumeration, defined in this class, that indicates whether CICS should automatically allow the program to be unloaded at task termination (releaseAtTaskEnd), or not (hold).

Conditions: NOTAUTH, PGMIDERR, INVREQ, LENGERR

registerInputMessage

Store pointer to InputMessage for when the **link** method is called.

void registerInputMessage(const IccBuf& *msg***)**

setInputMessage

Specifies data to be made available, by the **IccSession::receive()** method, to the called program, when using the **link** method in this class.

void setInputMessage(const IccBuf& *msg***)**

unload

Allow a program to be unloaded. It can be reloaded by a call to **load**.

void unload()

Conditions

NOTAUTH, PGMIDERR, INVREQ

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

CommitOpt

noCommitOnReturn
Changes to resources on the remote CICS region are not committed until the current task commits its resources. This is the default setting.

commitOnReturn
Changes to resources on the remote CICS region are committed whether or not the current task subsequently abends or encounters a problem.

LoadOpt

releaseAtTaskEnd
Indicates that CICS should automatically allow the program to be unloaded at task termination.

hold Indicates that CICS should not automatically allow the program to be unloaded at task termination. (In this case, this or another task must explicitly use the **unload** method).

IccProgramId class

IccProgramId objects represent program names in the CICS system.

IccBase
IccResourceId
IccProgramId

Header file: ICCRIDEH

IccProgramId constructors

Constructor (1)

IccProgramId(const char* *progName***)**

progName
The 8-character name of the program.

Constructor (2)

The copy constructor.

IccProgramId(const IccProgramId& *id***)**

id
A reference to an **IccProgramId** object.

Public methods

operator= (1)

IccProgramId& operator=(const char* *progName***)**

progName
The 8-character name of the program.

operator= (2)

Assigns new value.

IccProgramId& operator=(const IccProgramId& *id***)**

id
A reference to an **IccProgramId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccRBA class

An **IccRBA** object holds a relative byte address which is used for accessing VSAM ESDS files.

IccBase
    IccRecordIndex
        IccRBA

An **IccRBA** object holds a relative byte address which is used for accessing VSAM ESDS files.

Header file: ICCRECEH

IccRBA constructor

Constructor

IccRBA(unsigned long *initRBA* **= 0)**

initRBA
An initial value for the relative byte address.

Public methods

operator= (1)

IccRBA& operator=(const IccRBA& *rba***)**

operator= (2)

Assigns a new value for the relative byte address.

IccRBA& operator=(unsigned long *num***)**

num
A valid relative byte address.

operator== (1)

Icc::Bool operator== (const IccRBA& *rba*) const

operator== (2)

Tests equality

Icc::Bool operator== (unsigned long *num*) const

operator!= (1)

Icc!:Bool operator== (const IccRBA& *rba*) const

operator!= (2)

Tests inequality

Icc::Bool operator!=(unsigned long *num*) const

number

unsigned long number() const

Returns the relative byte address.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccRecordIndex class

CICS File Control Record Identifier.

IccBase
  IccRecordIndex
    IccKey
    IccRBA
    IccRRN

CICS File Control Record Identifier. Used to tell CICS which particular record the program wants to retrieve, delete, or update. **IccRecordIndex** is a base class from which **IccKey**, **IccRBA**, and **IccRRN** are derived.

Header file: ICCRECEH

IccRecordIndex constructor (protected)

Constructor

IccRecordIndex(Type *type***)**

type
An enumeration, defined in this class, that indicates whether the index type is key, RBA, or RRN.

Note: This is protected because you should not create **IccRecordIndex** objects; see subclasses **IccKey**, **IccRBA**, and **IccRRN**.

Public methods

length
Returns the length of the record identifier.

unsigned short length() const

type

Type type() const

Returns an enumeration, defined in this class, that indicates whether the index type is key, RBA, or RRN.

Inherited public methods
These are the public methods inherited by this class.

Inherited protected methods
These are the protected methods inherited by this class.

Enumerations

Type
Type indicates the access method.

Possible values are:
- key
- RBA
- RRN

IccRequestId class

An **IccRequestId** is used to hold the name of a request.

IccBase
IccResourceId
IccRequestId

An **IccRequestId** is used to hold the name of a request. This request identifier can subsequently be used to cancel a request—see, for example, **start** and **cancel** methods in **IccStartRequestQ** class.

Header file: ICCRIDEH

IccRequestId constructors

Constructor (1)

An empty **IccRequestId** object.

IccRequestId()

Constructor (2)

IccRequestId(const char* *requestName***)**

requestName
The 8-character name of the request.

Constructor (3)

The copy constructor.

IccRequestId(const IccRequestId& *id***)**

id A reference to an **IccRequestId**.

Public methods

operator= (1)

IccRequestId& operator=(const IccRequestId& *id***)**

id A reference to an **IccRequestId** object whose properties are copied into this object.

operator= (2)

Assigns new value.

IccRequestId& operator=(const char* *reqestName***)**

requestName
An 8-character string which is copied into this object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccResource class

IccResource class is a base class that is used to derive other classes.

IccBase
    IccResource

The methods associated with **IccResource** are described here although, in practise, they are only called on objects of derived classes.

IccResource is the parent class for all CICS resources—tasks, files, programs, etc. Every class inherits from **IccBase**, but only those that use CICS services inherit from **IccResource**.

Header file: `ICCRESEH`

Sample: `ICC$RES1`, `ICC$RES2`

IccResource constructor (protected)

Constructor

IccResource(IccBase::ClassType *classType***)**

`classType`
    An enumeration that indicates what the subclass type is. For example, for an **IccTempStore** object, the class type is cTempStore. The possible values are listed under **ClassType** in the description of the **IccBase** class.

Public methods

actionOnCondition

Returns an enumeration that indicates what action the class will take in response to the specified condition being raised by CICS. The possible values are described in this class.

ActionOnCondition actionOnCondition(IccCondition::Codes *condition***)**

`condition`
    The name of the condition as an enumeration. See **IccCondition** structure for a list of the possible values.

actionOnConditionAsChar

char actionOnConditionAsChar(IccCondition::Codes *condition***)**

This method is the same as **actionOnCondition** but returns a character, rather than an enumeration, as follows:

0 (zero)
No action is taken for this CICS condition.

H The virtual method **handleEvent** is called for this CICS condition.

X An exception is generated for this CICS condition.

A This program is abended for this CICS condition.

actionsOnConditionsText

Returns a string of characters, one character for each possible condition. Each character indicates the actions to be performed for that corresponding condition. .

The characters used in the string are described in "actionOnConditionAsChar." For example, the string: `0X00H0A ...` shows the actions for the first seven conditions are as follows:

condition 0 (NORMAL)
action=0 (noAction)

condition 1 (ERROR)
action=X (throwException)

condition 2 (RDATT)
action=0 (noAction)

condition 3 (WRBRK)
action=0 (noAction)

condition 4 (ICCEOF)
action=H (callHandleEvent)

condition 5 (EODS)
action=0 (noAction)

condition 6 (EOC)
action=A (abendTask)

const char* actionsOnConditionsText()

clear

Clears the contents of the object. This method is virtual and is implemented, wherever appropriate, in the derived classes. See Polymorphic Behavior for a description of polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

virtual void clear()

condition

Returns a number that indicates the condition code for the most recent CICS call made by this object.

unsigned long condition(ConditionType *type* **=** majorCode**) const**

type
An enumeration, defined in this class, that indicates the type of condition requested. Possible values are majorCode (the default) and minorCode.

conditionText

const char* conditionText() const

Returns the symbolic name of the last CICS condition for this object.

get

virtual const IccBuf& get()

Gets data from the **IccResource** object and returns it as an **IccBuf** reference. This method is virtual and is implemented, wherever appropriate, in the derived classes. See Polymorphic Behavior for a description of polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

handleEvent

This virtual function may be re-implemented in a subclass (by the application programmer) to handle CICS events (see **IccEvent** class on page "IccEvent class" on page 101).

virtual HandleEventReturnOpt handleEvent(IccEvent& *event*)

event
A reference to an **IccEvent** object that describes the reason why this method is being called.

id

const IccResourceId* id() const

Returns a pointer to the **IccResourceId** object associated with this **IccResource** object.

isEDFOn

Icc::Bool isEDFOn() const

Returns a boolean value that indicates whether EDF trace is active. Possible values are yes or no.

isRouteOptionOn

Icc::Bool isRouteOptionOn() const

Returns a boolean value that indicates whether the route option is active. Possible values are yes or no.

name

const char* name() const

Returns a character string that gives the name of the resource that is being used. For an **IccTempStore** object, the 8-character name of the temporary storage queue is returned. For an **IccTerminal** object, the 4-character terminal name is returned. This is equivalent to calling **id()→name**.

put

Puts information from the buffer into the **IccResource** object. This method is virtual and is implemented, wherever appropriate, in the derived classes. See Polymorphic Behavior for more information on polymorphism. The default implementation in this class throws an exception to indicate that it has not been overridden in a subclass.

virtual void put(const IccBuf& *buffer*)

buffer
A reference to an **IccBuf** object that contains data that is to be put into the object.

routeOption

const IccSysId& routeOption() const

Returns a reference to an **IccSysId** object that represents the system to which all CICS requests are routed—explicit function shipping.

setActionOnAnyCondition

Specifies the default action to be taken by the CICS foundation classes when a CICS condition occurs.

void setActionOnAnyCondition(ActionOnCondition *action***)**

action
The name of the action as an enumeration. The possible values are listed under the description of this class.

setActionOnCondition

Specifies what action is automatically taken by the CICS foundation classes when a given CICS condition occurs.

void setActionOnCondition (ActionOnCondition *action*,
IccCondition::Codes *condition*)

action
The name of the action as an enumeration. The possible values are listed under the description of this class.

condition
See **IccCondition** structure.

setActionsOnConditions

void setActionsOnConditions(const char* *actions* **= 0)**

actions
A string that indicates what action is to be taken for each condition. The default is not to indicate any actions, in which case each condition is given a default **ActionOnCondition** of noAction. The string should have the same format as the one returned by the **actionsOnConditionsText** method.

setEDF

Switches EDF on or off for this resource object. These methods force the object to route CICS requests to the named remote system. This is called explicit function shipping.

void setEDF(Icc::Bool *onOff*)

onOff
A boolean value that selects whether EDF trace is switched on or off.

setRouteOption (1)

The parameters are:

void setRouteOption(const IccSysId& *sysId*)

sysId
The **IccSysId** object that represents the remote system to which commands are routed.

setRouteOption (2)

This option is only valid for certain classes: Attempting to use this method on other subclasses of **IccResource** causes an exception to be thrown.

Valid classes are:

- **IccDataQueue**
- **IccFile**
- **IccFileIterator**
- **IccProgram**
- **IccStartRequestQ**
- **IccTempStore**

To turn off the route option specify no parameter, for example:

```
obj.setRouteOption()
```

void setRouteOption(const char* *sysName* **= 0)**

sysName
The 4-character name of the system to which commands are routed.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

ActionOnCondition

Possible values are:

noAction
Carry on as normal; it is the application program's responsibility to test CICS conditions using the **condition** method, after executing a method that calls CICS services.

callHandleEvent
Call the virtual **handleEvent** method.

throwException
An **IccException** object is created and thrown. This is typically used for more serious conditions or errors.

abendTask
Abend the CICS task.

HandleEventReturnOpt

Possible values are:

rContinue
The CICS event proceeded satisfactorily and normal processing is to resume.

rThrowException
The application program could not handle the CICS event and an exception is to be thrown.

rAbendTask
The application program could not handle the CICS event and the CICS task is to be abended.

ConditionType

Possible values are:

majorCode
The returned value is the CICS RESP value. This is one of the values in IccCondition::codes.

minorCode
The returned value is the CICS RESP2 value.

IccResourceId class

This is a base class from which **IccTransId** and other classes, whose names all end in "Id", are derived.

IccBase
IccResourceId

Many of these derived classes represent CICS resource names.

Header file: ICCRIDEH

IccResourceId constructors (protected)

Constructor (1)

IccResourceId (IccBase::ClassType *typ*,
const IccResourceId& *id*)

type
An enumeration, defined in **IccBase** class, that indicates the type of class.

id
A reference to an **IccResourceId** object that is used to create this object.

Constructor (2)

IccResourceId (IccBase::ClassType *type*,
const char* *resName*)

type
An enumeration, defined in **IccBase** class, that indicates the type of class.

resName
The name of a resource that is used to create this object.

Public methods

These are the public methods in this class.

name

Returns the name of the resource identifier as a string. Most **...Id** objects have 4- or 8-character names.

const char* name() const

nameLength

unsigned short nameLength() const

Returns the length of the name returned by the **name** method.

Protected methods

operator=

Set an **IccResourceId** object to be identical to *id*.

IccResourceId& operator=(const IccResourceId& *id*)

id
A reference to an **IccResourceId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccRRN class

An **IccRRN** object holds a relative record number and is used to identify records in VSAM RRDS files.

IccBase
IccRecordIndex
IccRRN

An **IccRRN** object holds a relative record number and is used to identify records in VSAM RRDS files.

Header file: ICCRECEH

IccRRN constructors

Constructor

IccRRN(unsigned long *initRRN* **= 1)**

initRRN
The initial relative record number—an integer greater than 0. The default is 1.

Public methods

These are the public methods in this class.

operator= (1)

IccRRN& operator=(const IccRRN& *rrn*)

operator= (2)

Assigns a new value for the relative record number.

IccRRN& operator=(unsigned long *num*)

num
A relative record number—an integer greater than 0.

operator== (1)

Icc::Bool operator== (const IccRRN& *rrn*) const

operator== (2)

Tests equality

Icc::Bool operator== (unsigned long num) const

operator!= (1)

Icc::Bool operator!= (const IccRRN& *rrn*) const

operator!= (2)

Tests inequality

Icc::Bool operator!=(unsigned long num) const

number

unsigned long number() const

Returns the relative record number.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccSemaphore class

This class enables synchronization of resource updates.

IccBase
IccResource
IccSemaphore

Header file: ICCSEMEH

Sample: ICC$SEM

IccSemaphore constructor

Constructor (1)

IccSemaphore (const char* *resource*,
LockType *type* **= byValue,**
LifeTime *life* **= UOW)**

resource
A text string, if *type* is byValue, otherwise an address in storage.

type
An enumeration, defined in this class, that indicates whether locking is by value or by address. The default is by value.

life
An enumeration, defined in this class, that indicates how long the semaphore lasts. The default is to last for the length of the UOW.

Constructor (2)

IccSemaphore (const IccLockId& *id*,
LifeTime *life* **= UOW)**

id
A reference to an **IccLockId** object

life
An enumeration, defined in this class, that indicates how long the semaphore lasts. The default is to last for the length of the UOW.

Public methods

These are the public methods in this class.

lifeTime

Returns an enumeration, defined in this class, that indicates whether the lock lasts for the length of the current unit-of-work ('UOW') or until the task terminates('task').

LifeTime lifeTime() const

lock

void lock()

Attempts to get a lock. This method blocks if another task already owns the lock.

Conditions

ENQBUSY, LENGERR, INVREQ

tryLock

Attempts to get a lock. This method does not block if another task already owns the lock. It returns a boolean that indicates whether it succeeded.

Icc::Bool tryLock()

Conditions

ENQBUSY, LENGERR, INVREQ

type

Returns an enumeration, defined in this class, that indicates what type of semaphore this is.

LockType type() const

unlock

void unlock()

Release a lock.

Conditions

LENGERR, INVREQ

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

LockType

byValue
The lock is on the contents (for example, name).

byAddress
The lock is on the memory address.

LifeTime

UOW The semaphore lasts for the length of the current unit of work.

task The semaphore lasts for the length of the task.

IccSession class

This class enables APPC and DTP programming.

IccBase
IccResource
IccSession

Header file: `ICCSESEH`

Sample: `ICC$SES1`, `ICC$SES2`

IccSession constructors (public)

Constructor (1)

IccSession(const IccPartnerId& *id***)**

id
A reference to an **IccPartnerId** object

Constructor (2)

IccSession (const IccSysId& *sysId***,**
const char* *profile* **= 0)**

sysId
A reference to an **IccSysId** object that represents a remote CICS system

profile
The 8-character name of the profile.

Constructor (3)

IccSession (const char* *sysName***,**
const char* *profile* **= 0)**

sysName
The 4-character name of the remote CICS system with which this session is associated

profile
The 8-character name of the profile.

IccSession constructor (protected)

Constructor

This constructor is for back end DTP CICS tasks that have a session as their principal facility. In this case the application program uses the **session** method on the **IccControl** object to gain access to their **IccSession** object.

IccSession()

Public methods

These are the public methods in this class.

allocate

Establishes a session (communication channel) to the remote system.

void allocate(AllocateOpt *option* **= queue)**

option
An enumeration, defined in this class, that indicates what action CICS is to take if a communication channel is unavailable when this method is called.

Conditions

INVREQ, SYSIDERR, CBIDERR, NETNAMEIDERR, PARTNERIDERR, SYSBUSY

connectProcess (1)

This method can only be used if an **IccPartnerId** object was used to construct this session object.

void connectProcess (SyncLevel *level*,
const IccBuf* *PIP* **= 0)**

level
An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

PIP
An optional pointer to an **IccBuf** object that contains the PIP data to be sent to the remote system

connectProcess (2)

void connectProcess (SyncLevel *level*,
const IccTransId& *transId*,
const IccBuf* *PIP* **= 0)**

level
An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

transId
A reference to an **IccTransId** object that holds the name of the transaction to be started on the remote system

PIP
An optional pointer to an **IccBuf** object that contains the PIP data to be sent to the remote system

connectProcess (3)

Starts a partner process on the remote system in preparation for sending and receiving information.

void connectProcess (SyncLevel *level*,
const IccTPNameId& *TPName*,
const IccBuf* *PIP* **= 0)**

level
An enumeration, defined in this class, that indicates what sync level is to be used for this conversation

TPName
A reference to an **IccTPNameId** object that contains the 1–64 character TP name.

PIP
An optional pointer to an **IccBuf** object that contains the PIP data to be sent to the remote system

Conditions

INVREQ, LENGERR, NOTALLOC, PARTNERIDERR, NOTAUTH, TERMERR, SYSBUSY

converse

converse sends the contents of *send* and returns a reference to an **IccBuf** object that holds the reply from the remote APPC partner.

const IccBuf& converse(const IccBuf& *send***)**

send
A reference to an **IccBuf** object that contains the data that is to be sent.

Conditions

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

convId

Returns a reference to an **IccConvId** object that contains the 4-byte conversation identifier.

const IccConvId& convId()

errorCode

const char* errorCode() const

Returns the 4-byte error code received when **isErrorSet** returns true. See the relevant DTP Guide for more information.

extractProcess

void extractProcess()

Retrieves information from an APPC conversation attach header and holds it inside the object. See **PIPList**, **process**, and **syncLevel** methods to retrieve the information from the object. This method should be used by the back end task if it wants access to the PIP data, the process name, or the synclevel under which it is running.

Conditions

INVREQ, NOTALLOC, LENGERR

flush

Ensure that accumulated data and control information are transmitted on an APPC mapped conversation.

void flush()

Conditions

INVREQ, NOTALLOC

free

Return the APPC session to CICS so that it may be used by other tasks.

void free()

Conditions

INVREQ, NOTALLOC

get

A synonym for **receive**. See Polymorphic Behavior for information on polymorphism.

virtual const IccBuf& get()

isErrorSet

Icc::Bool isErrorSet() const

Returns a boolean variable, defined in **Icc** structure, that indicates whether an error has been set.

isNoDataSet

Icc::Bool isNoDataSet() const

Returns a boolean variable, defined in **Icc** structure, that indicates if no data was returned on a **send**—just control information.

isSignalSet

Icc::Bool isSignalSet() const

Returns a boolean variable, defined in **Icc** structure, that indicates whether a signal has been received from the remote process.

issueAbend

void issueAbend()

Abnormally ends the conversation. The partner transaction sees the TERMERR condition.

Conditions

INVREQ, NOTALLOC, TERMERR

issueConfirmation

Sends positive response to a partner's **send** request that specified the confirmation option.

void issueConfirmation()

Conditions

INVREQ, NOTALLOC, TERMERR, SIGNAL

issueError

Signals an error to the partner process.

void issueError()

Conditions

INVREQ, NOTALLOC, TERMERR, SIGNAL

issuePrepare

This only applies to DTP over APPC links. It enables a syncpoint initiator to prepare a syncpoint slave for syncpointing by sending only the first flow ('prepare to commit') of the syncpoint exchange.

void issuePrepare()

Conditions

INVREQ, NOTALLOC, TERMERR

issueSignal

Signals that a mode change is needed.

void issueSignal()

Conditions

INVREQ, NOTALLOC, TERMERR

PIPList

Returns a reference to an **IccBuf** object that contains the PIP data sent from the front end process. A call to this method should be preceded by a call to **extractProcess** on back end DTP processes.

IccBuf& PIPList()

process

const IccBuf& process() const

Returns a reference to an **IccBuf** object that contains the process data sent from the front end process. A call to this method should be preceded by a call to **extractProcess** on back end DTP processes.

put

A synonym for **send**. See Polymorphic Behavior for information on polymorphism.

virtual void put(const IccBuf& *data*)

data
A reference to an **IccBuf** object that holds the data to be sent to the remote process.

receive

const IccBuf& receive()

Returns a reference to an **IccBuf** object that contains the data received from the remote system.

Conditions

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

send (1)

void send (const IccBuf& *send*,
SendOpt *option* = normal**)**

send
A reference to an **IccBuf** object that contains the data that is to be sent.

option
An enumeration, defined in this class, that affects the behavior of the **send** method. The default is normal.

send (2)

Sends data to the remote partner.

void send(SendOpt *option* = normal**)**

option
An enumeration, defined in this class, that affects the behavior of the **send** method. The default is normal.

Conditions

INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

sendInvite (1)

void sendInvite (const IccBuf& *send*,
SendOpt *option* = normal**)**

send
A reference to an **IccBuf** object that contains the data that is to be sent.

option
An enumeration, defined in this class, that affects the behavior of the **sendInvite** method. The default is normal.

sendInvite (2)

Sends data to the remote partner and indicates a change of direction, that is, the next method on this object will be **receive**.

void sendInvite(SendOpt *option* = normal**)**

option
An enumeration, defined in this class, that afffects the behavior of the **sendInvite** method. The default is normal.

Conditions

INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

sendLast (1)

void sendLast (const IccBuf& *send*,
SendOpt *option* **=** normal**)**

send
A reference to an **IccBuf** object that contains the data that is to be sent.

option
An enumeration, defined in this class, that affects the behavior of the **sendLast** method. The default is normal.

sendLast (2)

Sends data to the remote partner and indicates that this is the final transmission. The **free** method must be invoked next, unless the sync level is 2, when you must commit resource updates before the **free**. (See **commitUOW** on page "commitUOW" on page 173 in **IccTaskClass**).

void sendLast(SendOpt *option* **=** normal**)**

option
An enumeration, defined in this class, that affects the behavior of the **sendLast** method. The default is normal.

Conditions

INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

state

Returns a CVDA, defined in **IccValue** structure, that indicates the current state of the APPC conversation.

Possible values are:

- ALLOCATED
- CONFFREE
- CONFSEND
- FREE
- PENDFREE
- PENDRECEIVE
- RECEIVE
- ROLLBACK
- SEND
- SYNCFREE
- SYNCRECEIVE
- SYNCSEND
- NOTAPPLIC

IccValue::NOTAPPLIC is returned if there is no APPC conversation state.

IccValue::CVDA state(StateOpt *option* **=** lastCommand**)**

option
An enumeration, defined in this class, that indicates how to report the state of the conversation

Conditions

INVREQ, NOTALLOC

stateText

Returns the symbolic name of the state that **state** method would return. For example, if **state** returns IccValue::ALLOCATED, **stateText** would return "ALLOCATED".

const char* stateText(StateOpt *option* **=** lastCommand**)**

option
An enumeration, defined in this class, that indicates how to report the state of the conversation

syncLevel

SyncLevel syncLevel() const

Returns an enumeration, defined in this class, that indicates the synchronization level that is being used in this session. A call to this method should be preceded by a call to **extractProcess** on back end DTP processes.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

AllocateOpt

queue
If all available sessions are in use, CICS is to queue this request (and block the method) until it can allocate a session.

noQueue
Control is returned to the application if it cannot allocate a session. CICS raises the SYSBUSY condition.

Indicates whether queuing is required on an **allocate** method.

SendOpt

normal
The default.

confirmation
Indicates that a program using SyncLevel level1 or level2 requires a response from the remote partner program. The remote partner can respond positively, using the **issueConfirmation** method, or negatively, using the **issueError** method. The sending program does not receive control back from CICS until the response is received.

wait Requests that the data is sent and not buffered internally. CICS is free to buffer requests to improve performance if this option is not specified.

StateOpt

Use StateOpt to indicate how the state of a conversation is to be reported.

lastCommand
Return the state at the time of the completion of the last operation on the session.

extractState
Return the explicitly extracted current state.

SyncLevel

level0
Sync level 0

level1
Sync level 1

level2
Sync level 2

IccStartRequestQ class

This is a singleton class that enables the application programmer to request an asynchronous start of another CICS transaction.

IccBase
IccResource
IccStartRequestQ

(see the **start** method on page "start" on page 165).

An asynchronously started transaction uses the **IccStartRequestQ** class method **retrieveData** to gain the information passed to it by the transaction that issued the **start** request.

An unexpired start request can be cancelled by using the **cancel** method.

Header file: `ICCSRQEH`

Sample: `ICC$SRQ1`, `ICC$SRQ2`

IccStartRequestQ constructor (protected)

Constructor

IccStartRequestQ()

Public methods

These are the public methods in this class.

cancel

Cancels a previously issued **start** request that has not yet expired.

void cancel (const IccRequestId& *reqId*,
const IccTransId* *transId* **= 0)**

reqId
A reference to an **IccRequestId** object that represents the request to be cancelled

transId
An optional pointer to an **IccTransId** object that represents the transaction that is to be cancelled.

Conditions

ISCINVREQ, NOTAUTH, NOTFND, SYSIDERR

clearData

clearData clears the current data that is to be passed to the started transaction.

void clearData()

The data was set using **setData** or **registerData**.

If the data was set using **registerData**, only the pointer to the data is removed, the data in the buffer is left unchanged.

If the data was set using **setData**, then **clearData** releases the memory used by the buffer.

data

Returns a reference to an **IccBuf** object that contains data passed on a start request. A call to this method should be preceded by a call to **retrieveData** method.

const IccBuf& data() const

instance

static IccStartRequestQ* instance()

Returns a pointer to the single **IccStartRequestQ** object. If the object does not exist it is created. See also **startRequestQ** method on page "startRequestQ" on page 96 of **IccControl**.

queueName

const char* queueName() const

Returns the name of the queue that was passed by the start requester. A call to this method should be preceded by a call to **retrieveData** method.

registerData

Registers an **IccBuf** object to be interrogated for start data on each subsequent **start** method invocation.This just stores the address of the **IccBuf** object within the **IccStartRequestQ** so that the **IccBuf** object can be found when using the **start** method. This differs from the **setData** method, which takes a copy of the data held in the **IccBuf** object during the time that it is invoked.

void registerData(const IccBuf* *buffer*)

buffer
A pointer to the **IccBuf** object that holds data to be passed on a **start** request.

reset

void reset()

Clears any associations previously made by **set...** methods in this class.

retrieveData

Used by a task that was started, via an async start request, to gain access to the information passed by the start requester. The information is returned by the **data**, **queueName**, **returnTermId**, and **returnTransId** methods.

void retrieveData(RetrieveOpt *option* **=** noWait**)**

option
An enumeration, defined in this class, that indicates what happens if there is no start data available.

Conditions

ENDDATA, ENVDEFERR, IOERR, LENGERR, NOTFND, INVREQ

Note: The ENVDEFERR condition will be raised if all the possible options (**setData**, **setQueueName**, **setReturnTermId**, and **setReturnTransId**) are not used before issuing the **start** method. This condition is therefore not necessarily an error condition and your program should handle it accordingly.

returnTermId

Returns a reference to an **IccTermId** object that identifies which terminal is involved in the session. A call to this method should be preceded by a call to **retrieveData** method.

const IccTermId& returnTermId() const

returnTransId

const IccTransId& returnTransId() const

Returns a reference to an **IccTransId** object passed on a start request. A call to this method should be preceded by a call to **retrieveData** method.

setData

void setData(const IccBuf& *buf*)

Copies the data in *buf* into the **IccStartRequestQ**, which passes it to the started transaction when the **start** method is called. See also **registerData** on page "registerData" on page 163 for an alternative way to pass data to started transactions.

setQueueName

Requests that this queue name be passed to the started transaction when the **start** method is called.

void setQueueName(const char* *queueName*)

queueName
An 8-character queue name.

setReturnTermId (1)

void setReturnTermId(const IccTermId& *termId*)

termId
A reference to an **IccTermId** object that identifies which terminal is involved in the session.

setReturnTermId (2)

Requests that this return terminal ID be passed to the started transaction when the **start** method is called.

void setReturnTermId(const char* *termName*)

termName
The 4-character name of the terminal that is involved in the session.

setReturnTransId (1)

void setReturnTransId(const IccTransId& *transId*)

transId
A reference to an **IccTransId** object.

setReturnTransId (2)

Requests that this return transaction ID be passed to the started transaction when the **start** method is called.

void setReturnTransId(const char* *transName*)

transName
The 4-character name of the return transaction.

setStartOpts

Sets whether the started transaction is to have protection and whether it is to be checked.

```
void setStartOpts (ProtectOpt popt = none,
                   CheckOpt copt = check)
```

popt
An enumeration, defined in this class, that indicates whether start requests are to be protected

copt
An enumeration, defined in this class, that indicates whether start requests are to be checked.

start

Asynchronously starts the named CICS transaction. The returned reference to an **IccRequestId** object identifies the **start** request and can be used subsequently to **cancel** the **start** request.

```
const IccRequestId& start (const IccTransId& transId,
                           const IccTermId* termId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)
```

or

```
const IccRequestId& start (const IccTransId& transId,
                           const IccUserId* userId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)
```

or

```
const IccRequestId& start (const IccTransId& transId,
                           const IccTime* time = 0,
                           const IccRequestId* reqId = 0)
```

transId
A reference to an **IccTransId** object that represents the transaction to be started

termId
A reference to an **IccTermId** object that identifies which terminal is involved in the session.

userId
A reference to an **IccUserId** object that represents the user ID.

time
An (optional) pointer to an **IccTime** object that specifies when the task is to be started. The default is for the task to be started immediately.

reqId
An (optional) pointer to an **IccRequestId** object that is used to identify this start request so that the **cancel** can cancel the request.

Conditions

INVREQ, IOERR, ISCINVREQ, LENGERR, NOTAUTH, SYSIDERR, TERMIDERR, TRANSIDERR, USERIDERR

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

RetrieveOpt

- noWait
- wait

ProtectOpt

- none
- protect

CheckOpt

- check
- noCheck

IccSysId class

IccSysId class is used to identify a remote CICS system.

IccBase
  IccResourceId
    IccSysId

IccSysId class is used to identify a remote CICS system.

Header file: ICCRIDEH

IccSysId constructors

Constructor (1)

IccSysId(const char* *name***)**

name
The 4-character name of the CICS system.

Constructor (2)
The copy constructor.

IccSysId(const IccSysId& *id*)

id A reference to an **IccSysId** object.

Public methods
These are the public methods in this class.

operator= (1)

IccSysId& operator=(const IccSysId& *id*)

id A reference to an existing **IccSysId** object.

operator= (2)
Sets the name of the CICS system held in the object.

IccSysId& operator=(const char* *name*)

name
The 4-character name of the CICS system.

Inherited public methods

Inherited protected methods
These are the protected methods inherited by this class.

IccSystem class

This is a singleton class that represents the CICS system. It is used by an application program to discover information about the CICS system on which it is running.

IccBase
IccResource
IccSystem

Header file: ICCSYSEH

Sample: ICC$SYS

IccSystem constructor (protected)

Constructor

IccSystem()

Public methods

These are the public methods in this class.

applName

Returns the 8-character name of the CICS region.

const char* applName()

Conditions

INVREQ

beginBrowse (1)

void beginBrowse (ResourceType *resource*,
const IccResourceId* *resId* **= 0)**

resource
An enumeration, defined in this class, that indicates the type of resource to be browsed within the CICS system.

resId
An optional pointer to an **IccResourceId** object that indicates the starting point for browsing through the resources.

beginBrowse (2)

Signals the start of a browse through a set of CICS resources.

void beginBrowse (ResourceType *resource*,
const char* *resName***)**

resource
An enumeration, defined in this class, that indicates the type of resource to be browsed within the CICS system.

resName
The name of the resource that is to be the starting point for browsing the resources.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

dateFormat

Returns the default dateFormat for the CICS region.

const char* dateFormat()

Conditions

INVREQ

endBrowse

Signals the end of a browse through a set of CICS resources.

void endBrowse(ResourceType *resource*)

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

freeStorage

Releases the storage obtained by the **IccSystem getStorage** method.

void freeStorage(void* *pStorage*)

Conditions

INVREQ

getFile (1)

IccFile* getFile(const IccFileId& *id*)

id
A reference to an **IccFileId** object that identifies a CICS file.

getFile (2)

Returns a pointer to the **IccFile** object identified by the argument.

IccFile* getFile(const char* *fileName*)

fileName
The name of a CICS file.

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

getNextFile

This method is only valid after a successful **beginBrowse(IccSystem::file)** call. It returns the next file object in the browse sequence in the CICS system.

IccFile* getNextFile()

Conditions

END, FILENOTFOUND, ILLOGIC, NOTAUTH

getStorage

Obtains a block of storage of the requested size and returns a pointer to it. The storage is not released automatically at the end of task; it is only released when a **freeStorage** operation is performed.

```
void* getStorage (unsigned long size,
                  char initByte = -1,
                  unsigned long storageOpts = 0)
```

size
The amount of storage being requested, in bytes

initByte
The initial setting of all bytes in the allocated storage

storageOpts
An enumeration, defined in **IccTask** class, that affects the way that CICS allocates storage.

Conditions

LENGERR, NOSTG

instance

Returns a pointer to the singleton **IccSystem** object. The object is created if it does not already exist.

static IccSystem* instance()

operatingSystem

char operatingSystem()

Returns a 1-character value that identifies the operating system under which CICS is running:

A AIX

N Windows

X z/OS

Conditions

NOTAUTH

operatingSystemLevel

Returns a halfword binary field giving the release number of the operating system under which CICS is running. The value returned is ten times the formal release number (the version number is not represented). For example, MVS/ESA Version 3 Release 2.1 would produce a value of 21.

unsigned short operatingSystemLevel()

Conditions

NOTAUTH

IccSystem public method: release

Returns the level of the CICS system. The value is taken from the number returned in the **RELEASE** parameter of the **EXE CICS INQUIRE SYSTEM** command.

For example, the release level returned for CICS Transaction Server for z/OS Version 4 Release 2 is 670.

unsigned long release()

Conditions

NOTAUTH

releaseText
Returns the same as **release**, except as a 4-character string. For example, CICS Transaction Server for z/OS [Version 1] Release 3 would return "0130".

const char* releaseText()

Conditions

NOTAUTH

sysId
Returns a reference to the **IccSysId** object that identifies this CICS system.

IccSysId& sysId()

Conditions

INVREQ

workArea
Returns a reference to the **IccBuf** object that holds the work area for the CICS system.

const IccBuf& workArea()

Conditions

INVREQ

Inherited public methods
These are the public methods inherited by this class.

Inherited protected methods
These are the protected methods inherited by this class.

Enumerations

ResourceType
- autoInstallModel
- connection

- dataQueue
- exitProgram
- externalDataSet
- file
- journal
- modename
- partner
- profile
- program
- requestId
- systemDumpCode
- tempStore
- terminal
- transactionDumpCode
- transaction
- transactionClass

IccTask class

IccTask is a singleton class used to invoke task related CICS services.

IccBase
IccResource
IccTask

Header file: ICCTSKEH

Sample: ICC$TSK

IccTask Constructor (protected)

Constructor

IccTask()

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 65.

abend

Requests CICS to abend this task.

```
void abend (const char* abendCode = 0,
            AbendHandlerOpt opt1 = respectAbendHandler,
            AbendDumpOpt opt2 = createDump)
```

abendCode
The 4-character abend code

opt1
An enumeration, defined in this class, that indicates whether to respect or ignore any abend handling program specified by **setAbendHandler** method in **IccControl** class

opt2
An enumeration, defined in this class, that indicates whether a dump is to be created.

abendData

IccAbendData* abendData()

Returns a pointer to an **IccAbendData** object that contains information about the program abends, if any, that relate to this task.

commitUOW

void commitUOW()

Commit the resource updates within the current UOW for this task. This also causes a new UOW to start for subsequent resource update activity.

Conditions

INVREQ, ROLLEDBACK

delay

Requests that this task be delayed for an interval of time, or until a specific time.

```
void delay (const IccTime& time,
            const IccRequestId* reqId = 0)
```

time
A reference to an object that contains information about the delay time. The object can be one of these types:

IccAbsTime
Expresses time as the number of milliseconds since the beginning of the year 1900.

IccTimeInterval
Expresses an interval of time, such as 3 hours, 2 minutes, and 1 second.

IccTimeOfDay
Expresses a time of day, such as 13 hours, 30 minutes (1-30 pm).

reqId
An optional pointer to an **IccRequestId** object that can be used to cancel an unexpired delay request.

Conditions

EXPIRED, INVREQ

dump

Requests CICS to take a memory dump for this task. (See also **setDumpOpts**.) Returns the character identifier of the dump.

```
const char* dump (const char* dumpCode,
                  const IccBuf* buf = 0)
```

dumpCode
A 4-character label that identifies this dump

buf
A pointer to the **IccBuf** object that contains additional data to be included in the dump.

Conditions

INVREQ, IOERR, NOSPACE, NOSTG, NOTOPEN, OPENERR, SUPPRESSED

enterTrace

Writes a user trace entry in the CICS trace table.

```
void enterTrace (unsigned short traceNum,
                 const char* resource = 0,
                 IccBuf* data = 0,
                 TraceOpt opt = normal)
```

traceNum
The trace identifier for a user trace table entry; a value in the range 0 through 199.

resource
An 8-character name to be entered in the resource field of the trace table entry.

data
A pointer to the **IccBuf** object containing data to be included in the trace record.

opt
An enumeration, defined in this class, that indicates whether tracing should be normal or whether only exceptions should be traced.

Conditions

INVREQ, LENGERR

facilityType

Returns an enumeration, defined in this class, that indicates what type of principal facility this task has. This is usually a terminal, such as when the task was started by someone keying a transaction name on a CICS terminal. It is a session if the task is the back end of a mapped APPC conversation.

FacilityType facilityType()

Conditions

INVREQ

freeStorage

Releases the storage obtained by the **IccTask getStorage** method.

void freeStorage(void* pStorage)

Conditions

INVREQ

getStorage

Obtains a block of storage of the requested size. The storage is released automatically at the end of task, or when the **freeStorage** operation is performed. See also **getStorage** on page "getStorage" on page 169 in **IccSystem**class.

```
void* getStorage (unsigned long size,
                  char initByte = -1,
                  unsigned short storageOpts = 0)
```

size
The amount of storage being requested, in bytes

initByte
The initial setting of all bytes in the allocated storage

storageOpts
An enumeration, defined in this class, that affects the way that CICS allocates storage.

Conditions

LENGERR, NOSTG

instance

Returns a pointer to the singleton **IccTask** object. The object is created if it does not already exist.

static IccTask* instance();

isCommandSecurityOn

Icc::Bool isCommandSecurityOn()

Returns a boolean, defined in **Icc** structure, that indicates whether this task is subject to command security checking.

Conditions

INVREQ

isCommitSupported

Returns a boolean, defined in **Icc** structure that indicates whether this task can support the **commit** method. This method returns true in most environments; the exception to this is in a DPL environment (see **link** on page "link" on page 134 in **IccProgram**).

Icc::Bool isCommitSupported()

Conditions

INVREQ

isResourceSecurityOn

Returns a boolean, defined in **Icc** structure, that indicates whether this task is subject to resource security checking.

Icc::Bool isResourceSecurityOn()

Conditions

INVREQ

isRestarted

Returns a boolean, defined in **Icc** structure, that indicates whether this task has been automatically restarted by CICS.

Icc::Bool isRestarted()

Conditions

INVREQ

isStartDataAvailable

Returns a boolean, defined in **Icc** structure, that indicates whether start data is available for this task. See the **retrieveData** method in **IccStartRequestQ** class if start data is available.

Icc::Bool isStartDataAvailable()

Conditions

INVREQ

number

Returns the number of this task, unique within the CICS system.

unsigned long number() const

principalSysId

IccSysId& principalSysId(Icc::GetOpt *opt* **=** Icc::object**)**

Returns a reference to an **IccSysId** object that identifies the principal system identifier for this task.

Conditions

INVREQ

priority
Returns the priority for this task.

unsigned short priority(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

rollBackUOW
Roll back (backout) the resource updates associated with the current UOW within this task.

void rollBackUOW()

Conditions

INVREQ, ROLLEDBACK

setDumpOpts
Set the dump options for this task. This method affects the behavior of the **dump** method defined in this class.

void setDumpOpts(unsigned long *opts* = dDefault)

opts
An integer, made by adding or logically ORing values from the **DumpOpts** enumeration, defined in this class.

setPriority
Changes the dispatch priority of this task.

void setPriority(unsigned short *pri*)

pri
The new priority.

Conditions

INVREQ

setWaitText
Sets the text that will appear when someone inquires on this task while it is suspended as a result of a **waitExternal** or **waitOnAlarm** method call.

void setWaitText(const char* *name*)

name
The 8-character string label that indicates why this task is waiting.

startType

StartType startType()

Returns an enumeration, defined in this class, that indicates how this task was started.

Conditions

INVREQ

suspend

Suspend this task, allowing other tasks to be dispatched.

void suspend()

transId

const IccTransId& transId()

Returns the **IccTransId** object representing the transaction name of this CICS task.

triggerDataQueueId

const IccDataQueueId& triggerDataQueueId()

Returns a reference to the **IccDataQueueId** representing the trigger queue, if this task was started as a result of data arriving on an **IccDataQueue**. See **startType** method.

Conditions

INVREQ

userId

Returns the ID of the user associated with this task.

const IccUserId& userId(Icc::GetOpt *opt* = Icc::object)

opt
: An enumeration, defined in **Icc** structure, that indicates whether the information already existing in the object is to be used or whether it is to be refreshed from CICS.

Conditions

INVREQ

waitExternal

Waits for events that post Event Control Blocks (ECBs).

The call causes the issuing task to be suspended until one of the ECBs has been posted—that is, one of the events has occurred. The task can wait on more than one ECB and can be dispatched as soon as any of them are posted. For more information about ECB, see WAIT EXTERNAL.

void waitExternal (long** *ECBList*,
unsigned long *numEvents*,
WaitPurgeability *opt* = purgeable,
WaitPostType *type* = MVSPost**)**

ECBList
A pointer to a list of addresses of ECBs that represent events.

numEvents
The number of events in *ECBList*.

opt
An enumeration, defined in this class, that indicates whether the wait is purgeable.

type
An enumeration, defined in this class, that indicates whether the post type is a standard MVS POST.

Conditions

INVREQ

waitOnAlarm

Suspends the task until the alarm goes off (expires).

See also "setAlarm" on page 87 in **IccClock**.

void waitOnAlarm(const IccAlarmRequestId& *id*)

id
A reference to the **IccAlarmRequestId** object that identifies a particular alarm request.

Conditions

INVREQ

workArea

Returns a reference to the **IccBuf** object that holds the work area for this task.

IccBuf& workArea()

Conditions

INVREQ

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

AbendHandlerOpt

respectAbendHandler
Allows control to be passed to an abend handling program if one is in effect.

ignoreAbendHandler
Does not allow control to be passed to any abend handling program that may be in effect.

AbendDumpOpt

createDump
Take a transaction dump when servicing an abend request.

suppressDump
Do not take a transaction dump when servicing an abend request.

DumpOpts

The values may be added, or bitwise ORed, together to get the intended combination.

The values may be added, or bitwise ORed, together to get the intended combination. For example `IccTask::dProgram + IccTask::dDCT + IccTask::dSIT`.

dDefault

dComplete

dTask

dStorage

dProgram

dTerminal

dTables

dDCT

dFCT

dPCT

dPPT

dSIT

dTCT

dTRT

FacilityType

none The task has no principal facility, that is, it is a background task.

terminal
This task has a terminal as its principal facility.

session
This task has a session as its principal facility, that is, it was probably started as a back-end DTP program.

dataqueue
This task has a transient data queue as its principal facility.

StartType

DPL Distributed program link request

dataQueueTrigger
Trigger by data arriving on a data queue

startRequest
Started as a result of an asynchronous start request. See **IccStartRequestQ** class.

FEPIRequest
Front end programming interface.

terminalInput
Started via a terminal input

CICSInternalTask
Started by CICS.

StorageOpts

ifSOSReturnCondition
If insufficient space is available, return NOSTG condition instead of blocking the task.

below
Allocate storage below the 16Mb line.

userDataKey
Allocate storage in the USER data key.

CICSDataKey
Allocate storage in the CICS data key.

TraceOpt

normal
The trace entry is a standard entry.

exception
The trace entry is an exception entry.

WaitPostType

MVSPost
ECB is posted using the MVS POST service.

handPost
ECB is hand posted (that is, using some method other than the MVS POST service).

WaitPurgeability

purgeable
Task can be purged via a system call.

notPurgeable
Task cannot be purged via a system call.

IccTempStore class

IccTempStore objects are used to manage the temporary storage of data.

IccBase
IccResource
IccTempStore

(**IccTempStore** data can exist between transaction calls.)

Header file: ICCTMPEH

Sample: ICC$TMP

IccTempStore constructors

Constructor (1)

IccTempStore (const IccTempStoreId& *id*,
Location *loc* **= auxStorage)**

id
Reference to an **IccTempStoreId** object

loc
An enumeration, defined in this class, that indicates where the storage is to be located when it is first created. The default is to use auxiliary storage (disk).

Constructor (2)

IccTempStore (const char* *storeName*,
Location *loc* **= auxStorage)**

storeName
Specifies the 8-character name of the queue to be used. The name must be unique within the CICS system.

loc
An enumeration, defined in this class, that indicates where the storage is to be located when it is first created. The default is to use auxiliary storage (disk).

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 65.

clear

A synonym for **empty**. See Polymorphic Behavior for information on polymorphism.

virtual void clear()

empty

void empty()

Deletes all the temporary data associated with the **IccTempStore** object and deletes the associated TD queue.

Conditions

INVREQ, ISCINVREQ, NOTAUTH, QIDERR, SYSIDERR

get

A synonym for **readNextItem**. See Polymorphic Behavior for information on polymorphism.

virtual const IccBuf& get()

numberOfItems

unsigned short numberOfItems() const

Returns the number of items in temporary storage. This is only valid after a successful **writeItem** call.

put

A synonym for **writeItem**. See Polymorphic Behavior for information on polymorphism.

virtual void put(const IccBuf& *buffer*)

buffer
A reference to an **IccBuf** object that contains the data that is to be added to the end of the temporary storage queue.

readItem

Reads the specified item from the temporary storage queue and returns a reference to the **IccBuf** object that contains the information.

const IccBuf& readItem(unsigned short *itemNum*)

itemNum
Specifies the item number of the logical record to be retrieved from the queue.

Conditions

INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOTAUTH, QIDERR, SYSIDERR

readNextItem

Reads the next item from a temporary storage queue and returns a reference to the **IccBuf** object that contains the information.

const IccBuf& readNextItem()

Conditions

INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOTAUTH, QIDERR, SYSIDERR

rewriteItem

The parameters are:This method updates the specified item in the temporary storage queue.

void rewriteItem (unsigned short *itemNum*,
const IccBuf& *item*,
NoSpaceOpt *opt* **=** suspend**)**

itemNum
Specifies the item number of the logical record that is to be modified

item
The name of the **IccBuf** object that contains the update data.

opt
An enumeration, defined in this class, that indicates whether the application program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.

Conditions

INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOSPACE, NOTAUTH, QIDERR, SYSIDERR

writeItem (1)

unsigned short writeItem (const IccBuf& *item*,
NoSpaceOpt *opt* **=** suspend**)**

item
The name of the **IccBuf** object that contains the data that is to added to the end of the temporary storage queue.

opt
An enumeration, defined in this class, that indicates whether the application program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.

writeItem (2)

This method adds a new record at the end of the temporary storage queue. The returned value is the item number that was created (if this was done successfully).

unsigned short writeItem (const char* *text*,
NoSpaceOpt *opt* **=** suspend**)**

text
The text string that is to added to the end of the temporary storage queue.

opt
An enumeration, defined in this class, that indicates whether the application

program is to be suspended if a shortage of space in the queue prevents the record being added. suspend is the default.

Conditions

INVREQ, IOERR, ISCINVREQ, ITEMERR, LENGERR, NOSPACE, NOTAUTH, QIDERR, SYSIDERR

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

Location

auxStorage
Temporary store data is to reside in auxiliary storage (disk).

memory
Temporary store data is to reside in memory.

NoSpaceOpt

Take this action if a shortage of space in the queue prevents the record being added immediately.

suspend
Suspend the application program.

returnCondition
Do not suspend the application program, but raise the NOSPACE condition instead.

IccTempStoreId class

IccTempStoreId class is used to identify a temporary storage name in the CICS system.

IccBase
IccResourceId
IccTempStoreId

Header file: `ICCRIDEH`

IccTempStoreId constructors

Constructor (1)

IccTempStoreId(const char* *name***)**

name
The 8-character name of the temporary storage entry.

Constructor (2)

The copy constructor.

IccTempStoreId(const IccTempStoreId& *id***)**

id
A reference to an **IccTempStoreId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccTempStoreId& operator=(const char* *name***)**

name
The 8-character name of the temporary storage entry.

operator= (2)

Assigns a new value.

IccTempStoreId& operator=(const IccTempStoreId& *id***)**

id
A reference to an **IccTempStoreId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccTermId class

IccTermId class is used to identify a terminal name in the CICS system.

IccBase
IccResourceId
IccTermId

Header file: ICCRIDEH

IccTermId constructors

Constructor (1)

IccTermId(const char* *name***)**

name
The 4-character name of the terminal

Constructor (2)

The copy constructor.

IccTermId(const IccTermId& *id***)**

id
A reference to an **IccTermId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccTermId& operator=(const char* *name*)

name
The 4-character name of the terminal

operator= (2)

Assigns a new value.

IccTermId& operator=(const IccTermId& *id***)**

id
A reference to an **IccTermId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccTerminal class

This is a singleton class that represents the terminal that belongs to the CICS task. It can only be created if the transaction has a 3270 terminal as its principal facility, otherwise an exception is thrown.

IccBase
IccResource
IccTerminal

Header file: ICCTRMEH

Sample: ICC$TRM

IccTerminal constructor (protected)

Constructor

IccTerminal()

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 65.

AID

Returns an enumeration, defined in this class, that indicates which AID (action identifier) key was last pressed at this terminal.

AIDVal AID()

clear

virtual void clear()

A synonym for **erase**. See Polymorphic Behavior for information on polymorphism.

cursor

unsigned short cursor()

Returns the current cursor position as an offset from the upper-left corner of the screen.

data

IccTerminalData* data()

Returns a pointer to an **IccTerminalData** object that contains information about the characteristics of the terminal. The object is created if it does not already exist.

erase

void erase()

Erase all the data displayed at the terminal.

Conditions

INVREQ, INVPARTN

freeKeyboard

Frees the keyboard so that the terminal can accept input.

void freeKeyboard()

Conditions

INVREQ, INVPARTN

get

A synonym for **receive**. See Polymorphic Behavior for information on polymorphism.

virtual const IccBuf& get()

height

unsigned short height(Icc::getopt *opt* = Icc::object)

Returns how many lines the screen holds.

Conditions

INVREQ

inputCursor

Returns the position of the cursor on the screen.

unsigned short inputCursor()

instance

static IccTerminal* instance()

Returns a pointer to the single **IccTerminal** object. The object is created if it does not already exist.

line

unsigned short line()

Returns the current line number of the cursor from the beginning of the screen.

netName

const char* netName()

Returns the 8-byte string representing the network logical unit name of the principal facility.

operator« (1)

Sets the foreground color for data subsequently sent to the terminal.

IccTerminal& operator « (Color *color***)**

operator« (2)

Sets the highlighting used for data subsequently sent to the terminal.

IccTerminal& operator « (Highlight *highlight***)**

operator« (3)

Writes another buffer.

IccTerminal& operator « (const IccBuf& *buffer***)**

operator« (4)

Writes a character.

IccTerminal& operator « (char *ch***)**

operator« (5)

Writes a character.

IccTerminal& operator « (signed char *ch***)**

operator« (6)

Writes a character.

IccTerminal& operator « (unsigned char *ch***)**

operator« (7)

Writes a string.

IccTerminal& operator « (const char* *text***)**

operator« (8)

Writes a string.

IccTerminal& operator « (const signed char* *text***)**

operator« (9)
Writes a string.

IccTerminal& operator « (const unsigned char* *text***)**

operator« (10)
Writes a short.

IccTerminal& operator « (short *num***)**

operator« (11)
Writes an unsigned short.

IccTerminal& operator « (unsigned short *num***)**

operator« (12)
Writes a long.

IccTerminal& operator « (long *num***)**

operator« (13)
Writes an unsigned long.

IccTerminal& operator « (unsigned long *num***)**

operator« (14)
Writes an integer.

IccTerminal& operator « (int *num***)**

operator« (15)
Writes a float.

IccTerminal& operator « (float *num***)**

operator« (16)
Writes a double.

IccTerminal& operator « (double *num***)**

operator« (17)
Writes a long double.

IccTerminal& operator « (long double *num***)**

operator« (18)

IccTerminal& operator « (IccTerminal& (*f)(IccTerminal&))

Enables the following syntax:

```
Term « "Hello World" « endl;
Term « "Hello again" « flush;
```

put

virtual void put(const IccBuf& *buf*)

A synonym for **sendLine**. See Polymorphic Behavior for information on polymorphism.

receive

Receives data from the terminal

const IccBuf& receive(Case *caseOpt* **=** upper**)**

caseOpt
An enumeration, defined in this class, that indicates whether text is to be converted to uppercase.

Conditions

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

receive3270Data

Receives the 3270 data buffer from the terminal

const IccBuf& receive3270Data(Case *caseOpt* **=** upper**)**

caseOpt
An enumeration, defined in this class, that indicates whether text is to be converted to uppercase.

Conditions

INVREQ, LENGERR, TERMERR

send (1)

void send(const IccBuf& *buffer*)

buffer
A reference to an **IccBuf** object that holds the data that is to be sent.

send (2)

void send (const char* *format*,
...)

format
A format string, as in the **printf** standard library function.

...
The optional arguments that accompany *format*.

send (3)

void send (unsigned short *row*,
unsigned short *col*,
const IccBuf& *buffer***)**

row
The row where the writing of the data is started.

col
The column where the writing of the data is started.

buffer
A reference to an **IccBuf** object that holds the data that is to be sent.

send (4)

Writes the specified data to either the current cursor position or to the cursor position specified by the arguments.

void send (unsigned short *row*,
unsigned short *col*,
const char* *format*,
...)

row
The row where the writing of the data is started.

col
The column where the writing of the data is started.

format
A format string, as in the **printf** standard library function.

...
The optional arguments that accompany *format*.

Conditions

INVREQ, LENGERR, TERMERR

send3270Data (1)

void send3270Data(const IccBuf& *buffer*)

buffer
A reference to an **IccBuf** object that holds the data that is to be sent.

send3270Data (2)

void send3270 Data(const char* *format*,
...)

format
A format string, as in the **printf** standard library function

...
The optional arguments that accompany *format*.

send3270Data (3)

void send3270Data (unsigned short *col*,
const IccBuf& *buf*)

col
The column where the writing of the data is started

buffer
A reference to an **IccBuf** object that holds the data that is to be sent.

send3270Data (4)

Writes the specified data to either the next line of the terminal or to the specified column of the current line.

void send3270Data (unsigned short *col*,
const char* *format*,
...)

col
The column where the writing of the data is started

format
A format string, as in the **printf** standard library function

...
The optional arguments that accompany *format*.

Conditions

INVREQ, LENGERR, TERMERR

sendLine (1)

void sendLine(const IccBuf&*buffer***)**

buffer
A reference to an **IccBuf** object that holds the data that is to be sent.

sendLine (2)

void sendLine (const char* *format*,
...)

format
A format string, as in the **printf** standard library function

...
The optional arguments that accompany *format*.

sendLine (3)

void sendLine (unsigned short *col*,
const IccBuf& *buf*)

col
The column where the writing of the data is started

buffer
A reference to an **IccBuf** object that holds the data that is to be sent.

sendLine (4)

Writes the specified data to either the next line of the terminal or to the specified column of the current line.

void sendLine (unsigned short *col*,
const char* *format*,
...)

col
The column where the writing of the data is started

format
A format string, as in the **printf** standard library function

...
The optional arguments that accompany *format*.

Conditions

INVREQ, LENGERR, TERMERR

setColor

Changes the color of the text subsequently sent to the terminal.

void setColor(Color *color*=defaultColor)

color
An enumeration, defined in this class, that indicates the color of the text that is written to the screen.

setCursor (1)

void setCursor(unsigned short *offset*)

offset
The position of the cursor where the upper-left corner is 0.

setCursor (2)

Two different ways of setting the position of the cursor on the screen.

void setCursor (unsigned short *row*,
unsigned short *col*)

row
The row number of the cursor where the top row is 1

col
The column number of the cursor where the left column is 1

Conditions

INVREQ, INVPARTN

setHighlight
Changes the higlighting of the data subsequently sent to the terminal.

void setHighlight(Highlight *highlight* = normal)

highlight
An enumeration, defined in this class, that indicates the highlighting of the text that is written to the screen.

setLine
Moves the cursor to the start of line *lineNum*, where 1 is the first line of the terminal. The default is to move the cursor to the start of line 1.

void setLine(unsigned short *lineNum* = 1)

lineNum
The line number, counting from the start.

Conditions

INVREQ, INVPARTN

setNewLine
Requests that *numLines* blank lines be sent to the terminal.

void setNewLine(unsigned short *numLines* = 1)

numLines
The number of blank lines.

Conditions

INVREQ, INVPARTN

setNextCommArea
Specifies the COMMAREA that is to be passed to the next transaction started on this terminal.

void setNextCommArea(const IccBuf& *commArea*)

commArea
A reference to the buffer that is to be used as a COMMAREA.

setNextInputMessage
Specifies data that is to be made available, by the **receive** method, to the next transaction started at this terminal.

void setNextInputMessage(const IccBuf& *message*)

message
A reference to the buffer that holds the input message.

setNextTransId

Specifies the next transaction that is to be started on this terminal.

```
void setNextTransId (const IccTransId& transid,
                     NextTransIdOpt opt = queue)
```

transid
A reference to the **IccTransId** object that holds the name of a transaction

opt
An enumeration, defined in this class, that indicates whether *transId* should be queued or started immediately (that is, it should be the very next transaction) at this terminal.

signoff

void signoff()

Signs off the user who is currently signed on. Authority reverts to the default user.

Conditions

INVREQ

signon (1)

```
void signon (const IccUserId& id,
             const char* password = 0,
             const char* newPassword = 0)
```

id
A reference to an **IccUserId** object

password
The 8-character existing password.

newPassword
An optional 8-character new password.

signon (2)

Signs the user on to the terminal.

```
void signon (IccUser& user,
             const char* password = 0,
             const char* newPassword = 0)
```

user
A reference to an **IccUser** object

password
The 8-character existing password.

newPassword
An optional 8-character new password. This method differs from the first **signon** method in that the **IccUser** object is interrogated to discover **IccGroupId** and language information. The object is also updated with language and ESM return and response codes.

Conditions

INVREQ, NOTAUTH, USERIDERR

waitForAID (1)
Waits for any input and returns an enumeration, defined in this class, that indicates which AID key is expected.

AIDVal waitForAID()

waitForAID (2)
Waits for the specified AID key to be pressed, before returning control. This method loops, receiving input from the terminal, until the correct AID key is pressed by the operator.

void waitForAID(AIDVal *aid***)**

aid
An enumeration, defined in this class, that indicates which AID key was last pressed.

Conditions

EOC, INVREQ, LENGERR, NOTALLOC, SIGNAL, TERMERR

width
Returns the width of the screen in characters.

unsigned short width(Icc::getopt *opt* **=** Icc::object**)**

Conditions

INVREQ

workArea
Returns a reference to the **IccBuf** object that holds the terminal work area.

IccBuf& workArea()

Inherited public methods
These are the public methods inherited by this class.

Inherited protected methods
These are the protected methods inherited by this class.

Enumerations

AIDVal

ENTER

CLEAR

PA1 to PA3

PF1 to PF24

Case

upper

mixed

Color

defaultColor

blue

red

pink

green

cyan

yellow

neutral

Highlight

defaultHighlight

blink

reverse

underscore

NextTransIdOpt

queue
Queue the transaction with any other outstanding starts queued on the terminal.

immediate
Start the transaction immediately, that is, before any other outstanding starts queued on the terminal.

IccTerminalData class

IccTerminalData is a singleton class owned by **IccTerminal**. It contains information about the terminal characteristics.

See “data” on page 188 in **IccTerminal** class).

IccBase
IccResource
IccTerminalData

Header file: ICCTMDEH

Sample: ICC$TRM

IccTerminalData constructor (protected)

Constructor

IccTerminalData()

Public methods

These are the public methods in this class.

The opt parameter

Many methods have the same parameter, *opt*, which is described under the **abendCode** method in"abendCode" on page 65.

alternateHeight

Returns the alternate height of the screen, in lines.

unsigned short alternateHeight(Icc::GetOpt *opt* **=** Icc::object**)**

opt
An enumeration that indicates whether the information in the object should be refreshed from CICS before being extracted. The default is not to refresh.

Conditions

INVREQ

alternateWidth

Returns the alternate width of the screen, in characters.

unsigned short alternateWidth(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

defaultHeight

Returns the default height of the screen, in lines.

unsigned short defaultHeight(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

defaultWidth

Returns the default width of the screen, in characters.

unsigned short defaultWidth(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

graphicCharCodeSet

Returns the binary code page global identifier as a value in the range 1 to 65534, or 0 for a non-graphics terminal.

unsigned short graphicCharCodeSet(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

graphicCharSetId

Returns the graphic character set global identifier as a number in the range 1 to 65534, or 0 for a non-graphics terminal.

unsigned short graphicCharSetId(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isAPLKeyboard

Returns a boolean that indicates whether the terminal has the APL keyboard feature.

Icc::Bool isAPLKeyboard(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isAPLText

Returns a boolean that indicates whether the terminal has the APL text feature.

Icc::Bool isAPLText(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isBTrans

Returns a boolean that indicates whether the terminal has the background transparency capability.

Icc::Bool isBTrans(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isColor

Returns a boolean that indicates whether the terminal has the extended color capability.

Icc::Bool isColor(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isEWA

Returns a Boolean that indicates whether the terminal supports Erase Write Alternative.

Icc::Bool isEWA(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isExtended3270

Returns a Boolean that indicates whether the terminal supports the 3270 extended data stream.

Icc::Bool isExtended3270(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isFieldOutline

Returns a boolean that indicates whether the terminal supports field outlining.

Icc::Bool isFieldOutline(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isGoodMorning

Returns a boolean that indicates whether the terminal has a 'good morning' message.

Icc::Bool isGoodMorning(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isHighlight

Returns a boolean that indicates whether the terminal has extended highlight capability.

Icc::Bool isHighlight(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isKatakana

Returns a boolean that indicates whether the terminal supports Katakana.

Icc::Bool isKatakana(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isMSRControl

Returns a boolean that indicates whether the terminal supports magnetic slot reader control.

Icc::Bool isMSRControl(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isPS

Returns a boolean that indicates whether the terminal supports programmed symbols.

Icc::Bool isPS(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isSOSI

Returns a boolean that indicates whether the terminal supports mixed EBCDIC/DBCS fields.

Icc::Bool isSOSI(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isTextKeyboard

Returns a boolean that indicates whether the terminal supports TEXTKYBD.

Icc::Bool isTextKeyboard(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isTextPrint

Returns a boolean that indicates whether the terminal supports TEXTPRINT.

Icc::Bool isTextPrint(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

isValidation

Returns a boolean that indicates whether the terminal supports validation.

Icc::Bool isValidation(Icc::GetOpt *opt* **=** Icc::object**)**

Conditions

INVREQ

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccTime class

IccTime is used to contain time information and is the base class from which **IccAbsTime**, **IccTimeInterval**, and **IccTimeOfDay** classes are derived.

IccBase
  IccResource
    IccTime

Header file: `ICCTIMEH`

IccTime constructor (protected)

Constructor

```
IccTime (unsigned long hours = 0,
         unsigned long minutes = 0,
         unsigned long seconds = 0)
```

hours
The number of hours

minutes
The number of minutes

seconds
The number of seconds

Public methods

These are the public methods in this class.

hours

Returns the hours component of time—the value specified in the constructor.

virtual unsigned long hours() const

minutes

virtual unsigned long minutes() const

Returns the minutes component of time—the value specified in the constructor.

seconds

virtual unsigned long seconds() const

Returns the seconds component of time—the value specified in the constructor.

timeInHours

virtual unsigned long timeInHours()

Returns the time in hours.

timeInMinutes

virtual unsigned long timeInMinutes()

Returns the time in minutes.

timeInSeconds

virtual unsigned long timeInSeconds()

Returns the time in seconds.

type

Type type() const

Returns an enumeration, defined in this class, that indicates what type of subclass of **IccTime** this is.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

Enumerations

Type

absTime
The object is of **IccAbsTime** class. It is used to represent a current date and time as the number of milliseconds that have elapsed since the beginning of the year 1900.

timeInterval
The object is of **IccTimeInterval** class. It is used to represent a length of time, such as 5 minutes.

timeOfDay
The object is of **IccTimeOfDay** class. It is used to represent a particular time of day, such as midnight.

IccTimeInterval class

This class holds information about a time interval.

IccBase
IccResource
IccTime
IccTimeInterval

Header file: `ICCTIMEH`

IccTimeInterval constructors

Constructor (1)

IccTimeInterval (unsigned long *hours* **= 0,**
unsigned long *minutes* **= 0,**
unsigned long *seconds* **= 0)**

hours
The initial hours setting. The default is 0.

minutes
The initial minutes setting. The default is 0.

seconds
The initial seconds setting. The default is 0.

Constructor (2)

The copy constructor.

IccTimeInterval(const IccTimeInterval& *time***)**

Public methods

These are the public methods in this class.

operator=

Assigns one **IccTimeInterval** object to another.

IccTimeInterval& operator=(const IccTimeInterval& *timeInterval***)**

set

Changes the time held in the **IccTimeInterval** object.

void set (unsigned long *hours*,
unsigned long *minutes*,
unsigned long *seconds***)**

hours
The new hours setting

minutes
The new minutes setting

seconds
The new seconds setting

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccTimeOfDay class

This class holds information about the time of day.

IccBase
IccResource
IccTime
IccTimeOfDay

Header file: ICCTIMEH

IccTimeOfDay constructors

Constructor (1)

IccTimeOfDay (unsigned long *hours* **= 0,**
unsigned long *minutes* **= 0,**
unsigned long *seconds* **= 0)**

hours
The initial hours setting. The default is 0.

minutes
The initial minutes setting. The default is 0.

seconds
The initial seconds setting. The default is 0.

Constructor (2)

The copy constructor

IccTimeOfDay(const IccTimeOfDay& *time***)**

Public methods

These are the public methods in this class.

operator=

Assigns one **IccTimeOfDay** object to another.

IccTimeOfDay& operator=(const IccTimeOfDay& *timeOfDay***)**

set

Changes the time held in the **IccTimeOfDay** object.

void set (unsigned long *hours***,**
unsigned long *minutes***,**
unsigned long *seconds***)**

hours
The new hours setting

minutes
The new minutes setting

seconds
The new seconds setting

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccTPNameId class

IccTPNameId class holds a 1-64 byte TP partner name.

IccBase
IccResourceId
IccTPNameId

IccTPNameId class holds a 1-64 byte TP partner name.

Header file: ICCRIDEH

IccTPNameId constructors

Constructor (1)

IccTPNameId(const char* *name***)**

name
The 1- to 64-character TP name.

Constructor (2)

The copy constructor.

IccTPNameId(const IccTPNameId& *id***)**

id A reference to an **IccTPNameId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccTPNameId& operator=(const char* *name***)**

name
The 1- to 64-character TP name.

operator= (2)
Assigns a new value.

IccTPNameId& operator=(const IccTPNameId& *id***)**

id A reference to an **IccTPNameId** object.

Inherited public methods
These are the public methods inherited by this class.

Inherited protected methods
These are the protected methods inherited by this class.

IccTransId class

IccTransId class identifies a transaction name in the CICS system.

IccBase
IccResourceId
IccTransId

Header file: ICCRIDEH

IccTransId constructors

Constructor (1)

IccTransId(const char* *name***)**

name
The 4-character transaction name.

Constructor (2)
The copy constructor.

IccTransId(const IccTransId& *id***)**

id
A reference to an **IccTransId** object.

Public methods
These are the public methods in this class.

operator= (1)

IccTransId& operator=(const char* *name***)**

name
The 4-character transaction name.

operator= (2)

Assigns a new value.

IccTransId& operator=(const IccTransId& *id***)**

id
A reference to an **IccTransId** object.

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccUser class

This class represents a CICS user.

IccBase
IccResource
IccUser

Header file: ICCUSREH

Sample: ICC$USR

IccUser constructors

Constructor (1)

IccUser (const IccUserId& *id***,**
const IccGroupId* *gid* **= 0)**

id
A reference to an **IccUserId** object that contains the user ID name

gid
An optional pointer to an **IccGroupId** object that contains information about the user's group ID.

Constructor (2)

IccUser (const char* *userName*,
const char* *groupName* **= 0)**

userName
The 8-character user ID

gid
The optional 8-character group ID.

Public methods

These are the public methods in this class.

changePassword

Attempts to change the user's password.

void changePassword (const char* *password*,
const char* *newPassword***)**

password
The user's existing password—a string of up to 8 characters

newPassword
The user's new password—a string of up to 8 characters.

Conditions

INVREQ, NOTAUTH, USERIDERR

daysUntilPasswordExpires

Returns the number of days before the password expires. This method is valid after a successful **verifyPassword** method call in this class.

unsigned short daysUntilPasswordExpires() const

ESMReason

unsigned long ESMReason() const

Returns the external security reason code of interest if a **changePassword** or **verifyPassword** method call is unsuccessful.

ESMResponse

unsigned long ESMResponse() const

Returns the external security response code of interest if a **changePassword** or **verifyPassword** method call is unsuccessful.

groupId

const IccGroupId& groupId() const

Returns a reference to the **IccGroupId** object that holds information on the user's group ID.

invalidPasswordAttempts

unsigned long invalidPasswordAttempts() const

Returns the number of times the wrong password has been entered for this user since the last successful signon. This method should only be used after a successful **verifyPassword** method.

language

const char* language() const

Returns the user's language after a successful call to **signon** in **IccTerminal**.

lastPasswordChange

const IccAbsTime& lastPasswordChange() const

Returns a reference to an **IccAbsTime** object that holds the time when the password was last changed. This method should only be used after a successful **verifyPassword** method.

lastUseTime

const IccAbsTime& lastUseTime() const

Returns a reference to an **IccAbsTime** object that holds the time when the user ID was last used. This method should only be used after a successful **verifyPassword** method.

passwordExpiration

const IccAbsTime& passwordExpiration() const

Returns a reference to an **IccAbsTime** object that holds the time when the password will expire. This method should only be used after a successful **verifyPassword** method.

setLanguage

void setLanguage(const char* *language*)

Sets the IBM-defined national language code that is to be associated with this user. This should be a three character value.

verifyPassword

void verifyPassword(const char* *password*)

Checks that the supplied password matches the password recorded by the external security manager for this **IccUser**.

Conditions

INVREQ, NOTAUTH, USERIDERR

Inherited public methods

These are the public methods inherited by this class.

Inherited protected methods

These are the protected methods inherited by this class.

IccUserId class

IccUserId class represents an 8-character user name.

IccBase
  IccResourceId
    IccUserId

IccUserId class represents an 8-character user name.

Header file: ICCRIDEH

IccUserId constructors

Constructor (1)

IccUserId(const char* *name***)**

name
The 8-character name of the user ID.

Constructor (2)

The copy constructor.

IccUserId(const IccUserId& *id***)**

id A reference to an **IccUserId** object.

Public methods

These are the public methods in this class.

operator= (1)

IccUserId& operator=(const char* *name***)**

name
The 8-character name of the user ID.

operator= (2)
Assigns a new value.

IccUserId& operator=(const IccUserId& *id***)**

id A reference to an **IccUserId** object.

Inherited public methods
These are the public methods inherited by this class.

Inherited protected methods
These are the protected methods inherited by this class.

IccValue structure
This structure contains CICS-value data areas (CVDAs) as an enumeration.

Header file: ICCVALEH

Enumeration

Listing of valid CVDAs
Valid CVDAs are listed in the CVDAs and numeric values topics in the System Programming reference information.

main function
You are recommended to include this code in your application.

It initializes the CICS Foundation Classes correctly, provides default exception handling, and releases allocated memory after it is finished. You may substitute your own variation of this **main** function, but this should rarely be necessary.

Source file: ICCMAIN

The stub has three functions:

1. It initializes the Foundation Classes environment. You can customize the way it does this by using #defines that control:
   - Memory management (see Storage management)
   - Family Subset enforcement (see "FamilySubset" on page 64)
   - EDF enablement (see Program debugging)
2. It provides a default definition of a class **IccUserControl**, derived from **IccControl**, that includes a default constructor and **run** method.
3. It invokes the **run** method of the user's control object using a try-catch construct.

The following information is the functional part of the **main** code:

```
int main()                                          1

{
    Icc::initializeEnvironment(ICC_CLASS_MEMORY_MGMT,     2

                               ICC_FAMILY_SUBSET,
                               ICC_EDF_BOOL);
    try                                             3

    {
        ICC_USER_CONTROL control;                   4

        control.run();                              5

    }
    catch(IccException& exc)                        6

    {
        Icc::catchException(exc);                   7

    }
    catch(...)                                      8

    {
        Icc::unknownException();                    9

    }
    Icc::returnToCICS();                            10

}
```

1 This is the main C++ entry point.

2 This call initializes the environment and is essential. The three parameters have previously been defined to the defaults for the platform.

3 Run the user's application code, using **try** and **catch**, in case the application code does not catch exceptions.

4 Create control object.

5 Invoke **run** method of control object (defined as pure virtual in **IccControl**.

6 Catch any **IccException** objects not caught by the application.

7 Call this function to abend task.

8 Catch any other exceptions not caught by application.

9 Call this function to abend task.

10 Return control to CICS.

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- Developing applications
- Developing system programs
- RACF security overview
- Developing for external interfaces
- Reference: application developmenth
- Reference: system programming
- Reference: connectivity

Information that is NOT intended to be used as a Programming Interface of CICS Transaction Server for z/OS, Version 5 Release 4 , but that might be misconstrued as Programming Interfaces, is included in the following sections of the online product documentation:

- Troubleshooting and support
- Reference: diagnostics

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- Application Programming Guide and Application Programming Reference
- Business Transaction Services
- Customization Guide
- C++ OO Class Libraries
- Debugging Tools Interfaces Reference
- Distributed Transaction Programming Guide
- External Interfaces Guide
- Front End Programming Interface Guide
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- CICSPlex SM Managing Workloads
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- Diagnosis Reference
- Problem Determination Guide
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