CFNetwork

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2 License

Namespace Index

2.1	Namespace	List

Here is a list of all documented namespaces with brief descriptions:	
CFNetwork	1

4 Namespace Index

Hierarchical Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

CFNetwork::Connection	15
std::exception	
std::runtime_error	
CFNetwork::InvalidArgument	20
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CFNetwork::Socket	20

6 Hierarchical Index

Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

CFNetwork::Connection	 														15
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File Index

5.1 File List

Here is a list of all documented files with brief descriptions:

CFNetwork.cpp					 											 						
CFNetwork.hpp																						
Connection.cpp					 											 						
Connection.hpp					 											 						
Socket.cpp					 											 						
Socket.hpp																 						

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Namespace Documentation

6.1 CFNetwork Namespace Reference

Classes

- class Connection
- · class InvalidArgument
- class Socket
- class UnexpectedError

Enumerations

- enum ConnectionFlow { ConnectionFlow::Inbound, Inbound, ConnectionFlow::Outbound, Outbound }
- enum SocketFamily { SocketFamily::IPv4, IPv4 = AF_INET, SocketFamily::IPv6, IPv6 = AF_INET6 }
- enum SocketType { TCP = SOCK_STREAM, UDP = SOCK_DGRAM }

Functions

struct sockaddr_storage parseAddress (const std::string &addr)

Variables

• const int MAX_BYTES = 8192

6.1.1 Detailed Description

CFNetwork is a collection of utilities that simplifies the process of developing an application that will make use of the network

6.1.2 Enumeration Type Documentation

6.1.2.1 enum CFNetwork::ConnectionFlow [strong]

The ConnectionFlow enum is responsible for communicating whether or not a given Connection is setup for outbound connectivity or was received inbound from a Socket object

Enumerator

```
Inbound Represents an inbound ConnectionOutbound Represents an outbound Connection
```

6.1.2.2 enum CFNetwork::SocketFamily [strong]

The SocketFamily enum is responsible for communicating which address family that a Socket object is using

Enumerator

```
IPv4 Refers to the AF_INET socket familyIPv6 Refers to the AF_INET6 socket family
```

6.1.2.3 enum CFNetwork::SocketType [strong]

The Socket Type enum is responsible for communicating whether a given Socket object is using TCP or UDP as its transport.

6.1.3 Function Documentation

6.1.3.1 struct sockaddr_storage CFNetwork::parseAddress (const std::string & addr)

Dynamically parse a std::string into a sockaddr_storage structure that is capable of being used in socket operations

The struct sockaddr_storage can be reinterpret cast into any of the following structures (after checking the ss_family attribute):

- struct sockaddr
- struct sockaddr_in
- struct sockaddr_in6

Exceptions

Returns

struct sockaddr_storage containing the relevant information

6.1.4 Variable Documentation

6.1.4.1 CFNetwork::MAX_BYTES = 8192

The maximum number of bytes that should be contained within all buffers in this namespace's classes

Class Documentation

7.1 CFNetwork::Connection Class Reference

```
#include <Connection.hpp>
```

Public Member Functions

- Connection (const std::string &addr, int port)
- Connection (const std::string &laddr, const std::string &raddr, int port, int socket)
- ∼Connection ()
- int getDescriptor () const
- · SocketFamily getFamily () const
- · ConnectionFlow getFlow () const
- const std::string & getListen () const
- int getPort () const
- const std::string & getRemote () const
- std::string read () const
- · bool valid () const
- void write (std::string data, bool newline=true) const

Protected Attributes

- SocketFamily family = SocketFamily::IPv4
- ConnectionFlow flow = ConnectionFlow::Inbound
- std::string listen = ""
- int port = 0
- std::string remote = "0.0.0.0"
- int socket = -1

7.1.1 Detailed Description

An object-oriented encapsulation for network connections

The Connection object is responsible for communication between two network endpoints. The object can be setup by accepting an incoming connection on a Socket object, or by explicitly making an outgoing connection to a given address and port

The Connection object is not copyable or assignable since it contains resources that do not lend themselves well to duplication

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7.1.2 Constructor & Destructor Documentation

7.1.2.1 CFNetwork::Connection::Connection (const std::string & addr, int port)

Connection Constructor (outbound)

Allows for constructing a Connection object to an outbound endpoint

Parameters

addr	The address of the remote endpoint
port	The port of the remote endpoint

7.1.2.2 CFNetwork::Connection::Connection (const std::string & laddr, const std::string & raddr, int port, int socket)

Connection Constructor (inbound)

Allows for constructing a Connection object from an inbound client file descriptor that was accepted by a listening socket

Parameters

laddr	The address of the local listening socket	
raddr	The address of the remote client	
port	The port of the listening socket that received the client	
socket	The file descriptor for the client	

7.1.2.3 CFNetwork::Connection::~Connection()

Connection Destructor

Upon destruction of a Connection object, close its associated file descriptor (if still valid)

7.1.3 Member Function Documentation

7.1.3.1 int CFNetwork::Connection::getDescriptor () const

Fetches the file descriptor of the Connection instance

The internal file descriptor can be used to perform more advanced actions that this class doesn't accommodate for

Returns

int representing a file descriptor

7.1.3.2 SocketFamily CFNetwork::Connection::getFamily () const

Fetches the address family of the Connection instance

See also

SocketFamily for more information on socket families

Returns

SocketFamily value describing the address family

7.1.3.3 ConnectionFlow CFNetwork::Connection::getFlow () const

Fetches the flow type of the Connection instance

See also

ConnectionFlow for more information on flow types

Returns

ConnectionFlow value describing the flow type

7.1.3.4 const std::string & CFNetwork::Connection::getListen () const

Fetches the listening address of the Connection instance

This method will produce a std::string of an IPv4/IPv6 address only (no IP addresses will be reverse resolved into hostnames)

In the context of an outbound Connection, the resulting value will be an empty std::string

Returns

std::string containing the listening address

7.1.3.5 int CFNetwork::Connection::getPort () const

Fetches the port of the Connection instance

If the Connection represents an inbound client, the port will be that of the originating Socket listening port. For outbound connections, the port will be the original value provided during construction

Returns

int representing the port

18 Class Documentation

7.1.3.6 const std::string & CFNetwork::Connection::getRemote () const

Fetches the remote address of the Connection instance

This method will produce a std::string of an IPv4/IPv6 address only (no IP addresses will be reverse resolved into hostnames)

Returns

std::string containing the remote peer's IP address

7.1.3.7 std::string CFNetwork::Connection::read () const

Attempts to read data from the internal file descriptor

Performs a blocking read on the internal file descriptor up to MAX_BYTES - 1. If there were zero bytes read then the Connection will be invalidated due to being reset by the remote peer

Exceptions

<tt>InvalidArgument</tt>	if the Connection is invalid
<tt>UnexpectedError</tt>	if the Connection was reset by peer

Returns

std::string containing the data that was read

7.1.3.8 bool CFNetwork::Connection::valid () const

Determines if the file descriptor is considered valid for read, write, or any other operations

A file descriptor is considered invalid if a call requesting its flags fails with the return value of -1 or errno is set to EBADF (the provided argument is not an open file descriptor). If neither case is satisfied, the file descriptor is considered valid

See also

fcntl() For more information regarding this procedure's test

Returns

true if the file descriptor is valid, false otherwise

7.1.3.9 void CFNetwork::Connection::write (std::string data, bool newline = true) const

Attempts to write the provided data to the internal file descriptor

An optional newline character is inserted into the provided data by default, however this can be avoided using the appropriate parameter for this method.

Exceptions

<tt>InvalidArgument</tt>	if the internal file descriptor is considered invalid
--------------------------	---

Parameters

data	std::string containing the contents to write
newline	Whether or not a newline character should be included

7.1.4 Member Data Documentation

7.1.4.1 CFNetwork::Connection::family = SocketFamily::IPv4 [protected]

Used to describe the socket family type of a Connection

7.1.4.2 CFNetwork::Connection::flow = ConnectionFlow::Inbound [protected]

Used to describe the connection flow direction of a Connection

7.1.4.3 CFNetwork::Connection::listen = "" [protected]

Holds the listening address associated with an inbound ${\tt Connection}$

7.1.4.4 CFNetwork::Connection::port = 0 [protected]

Holds the listening port for an inbound Connection or the outbound port for an outbound Connection

7.1.4.5 CFNetwork::Connection::remote = "0.0.0.0" [protected]

Holds the remote address of a Connection

7.1.4.6 CFNetwork::Connection::socket = -1 [protected]

Holds the file descriptor associated with a Connection

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

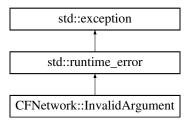
- · Connection.hpp
- Connection.cpp

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7.2 CFNetwork::InvalidArgument Class Reference

```
#include <CFNetwork.hpp>
```

Inheritance diagram for CFNetwork::InvalidArgument:



7.2.1 Detailed Description

The InvalidArgument exception can be thrown by methods in the CFNetwork namespace when an invalid argument is provided. This is a non-critical exception, and can safely be caught.

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

· CFNetwork.hpp

7.3 CFNetwork::Socket Class Reference

```
#include <Socket.hpp>
```

Public Member Functions

- Socket (const std::string &addr, int port)
- ∼Socket ()
- std::shared_ptr< Connection > accept () const
- int getDescriptor () const
- · SocketFamily getFamily () const
- · const std::string & getHost () const
- int getPort () const
- bool valid () const

Protected Attributes

- SocketFamily family = SocketFamily::IPv4
- std::string host = "0.0.0.0"
- int port = 0
- int socket = -1

7.3.1 Detailed Description

An object-oriented encapsulation for sockets

The Socket object is responsible for preparations in order to ultimately accept connections on a given listening address and port number

The Socket object is not copyable or assignable since it contains resources that do not lend themselves well to duplication

7.3.2 Constructor & Destructor Documentation

7.3.2.1 CFNetwork::Socket::Socket (const std::string & addr, int port)

Socket Constructor

Constructs a Socket object given a listening address/port and begins listening for clients

Parameters

addr	std::string object containing the listen address
port	int containing the port number to listen on

7.3.2.2 CFNetwork::Socket::~Socket()

Socket Destructor

Upon destruction of a Socket object, close its associated file descriptor

7.3.3 Member Function Documentation

7.3.3.1 std::shared_ptr< Connection > CFNetwork::Socket::accept () const

Accepts an incoming client and creates a Connection object for it

This method blocks execution until a client is accepted

Returns

Connection object representing the accepted client

7.3.3.2 int CFNetwork::Socket::getDescriptor () const

Fetches the file descriptor of the Socket instance

The internal file descriptor can be used to perform more advanced actions that this class doesn't accommodate for

Returns

int representing a file descriptor

22 Class Documentation

7.3.3.3 SocketFamily CFNetwork::Socket::getFamily () const

Fetches the address family of the Socket instance

See also

SocketFamily for more information on socket families

Returns

SocketFamily value describing the address family

7.3.3.4 const std::string & CFNetwork::Socket::getHost () const

Fetches the listening address of the associated Socket

This method can produce a std::string of either an IPv4 address or an IPv6 address. This method will not produce hostnames

Returns

std::string of the listening address

7.3.3.5 int CFNetwork::Socket::getPort () const

Fetches the port of the Socket instance

The port should represent the value that the Socket was constructed with

Returns

 $\verb"int" representing the port"$

7.3.3.6 bool CFNetwork::Socket::valid () const

Determines if the file descriptor is considered valid for read, write, or any other operations

A file descriptor is considered invalid if a call requesting its flags fails with the return value of -1 or errno is set to EBADF (the provided argument is not an open file descriptor). If neither case is satisfied, the file descriptor is considered valid

See also

fcntl() For more information regarding this procedure's test

Returns

 ${\tt true} \ \textit{if the file descriptor is valid}, \ {\tt false} \ \textit{otherwise}$

7.3.4 Member Data Documentation

7.3.4.1 CFNetwork::Socket::family = SocketFamily::IPv4 [protected]

Used to describe the socket family type of a Socket

7.3.4.2 CFNetwork::Socket::host = "0.0.0.0" [protected]

Holds the listening address associated with a Socket

7.3.4.3 CFNetwork::Socket::port = 0 [protected]

Holds the listening port associated with a Socket

7.3.4.4 CFNetwork::Socket::socket = -1 [protected]

Holds the file descriptor associated with a Socket

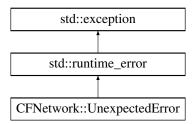
The documentation for this class was generated from the following files:

- · Socket.hpp
- · Socket.cpp

7.4 CFNetwork::UnexpectedError Class Reference

#include <CFNetwork.hpp>

Inheritance diagram for CFNetwork::UnexpectedError:



7.4.1 Detailed Description

The ${\tt UnexpectedError}$ exception can be thrown by methods in the ${\tt CFNetwork}$ namespace when an unexpected error is encountered. This is a non-critical exception, and can safely be caught

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

· CFNetwork.hpp

24 Class Documentation

File Documentation

8.1 CFNetwork.cpp File Reference

```
#include <cstring>
#include <netdb.h>
#include <string>
#include <sys/socket.h>
#include "CFNetwork.hpp"
```

Namespaces

CFNetwork

Functions

• struct sockaddr_storage CFNetwork::parseAddress (const std::string &addr)

8.1.1 Detailed Description

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Implementation source for the CFNetwork helper functions

8.2 CFNetwork.hpp File Reference

```
#include <stdexcept>
#include <string>
#include <sys/socket.h>
```

26 File Documentation

Classes

- · class CFNetwork::InvalidArgument
- · class CFNetwork::UnexpectedError

Namespaces

CFNetwork

Enumerations

- enum CFNetwork::ConnectionFlow { CFNetwork::ConnectionFlow::Inbound, Inbound, CFNetwork::←
 ConnectionFlow::Outbound, Outbound }
- enum CFNetwork::SocketFamily { CFNetwork::SocketFamily::IPv4, IPv4 = AF_INET, CFNetwork::Socket←
 Family::IPv6, IPv6 = AF_INET6 }
- enum CFNetwork::SocketType { TCP = SOCK_STREAM, UDP = SOCK_DGRAM }

Functions

• struct sockaddr_storage CFNetwork::parseAddress (const std::string &addr)

Variables

• const int CFNetwork::MAX_BYTES = 8192

8.2.1 Detailed Description

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Forward declaration of the CFNetwork namespace and related items

8.3 Connection.cpp File Reference

```
#include <arpa/inet.h>
#include <cstring>
#include <netinet/in.h>
#include <string>
#include <sys/errno.h>
#include <sys/fcntl.h>
#include <sys/socket.h>
#include <unistd.h>
#include "CFNetwork.hpp"
#include "Connection.hpp"
```

Namespaces

CFNetwork

8.3.1 Detailed Description

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Implementation source for the Connection object

8.4 Connection.hpp File Reference

```
#include <string>
#include "CFNetwork.hpp"
```

Classes

• class CFNetwork::Connection

Namespaces

CFNetwork

8.4.1 Detailed Description

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Implementation reference for the Connection object

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8.5 Socket.cpp File Reference

```
#include <arpa/inet.h>
#include <memory>
#include <netinet/in.h>
#include <string>
#include <sys/errno.h>
#include <sys/fcntl.h>
#include <sys/socket.h>
#include <unistd.h>
#include "CFNetwork.hpp"
#include "Connection.hpp"
#include "Socket.hpp"
```

Namespaces

CFNetwork

8.5.1 Detailed Description

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Implementation source for the Socket object

8.6 Socket.hpp File Reference

```
#include <memory>
#include <string>
#include "CFNetwork.hpp"
```

Classes

· class CFNetwork::Socket

Namespaces

CFNetwork

8.6.1 Detailed Description

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Implementation reference for the Socket object

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