Interconnect Library

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Chapter 1

Hierarchical Index

1.1 Class Hierarchy

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

Chapter 2

Class Index

2.1 Class List

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

Chapter 3

File Index

3.1 File List

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

Chapter 4

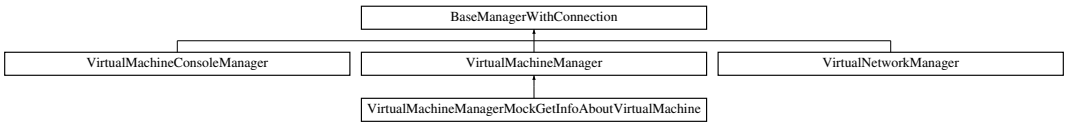
Class Documentation

4.1 BaseManagerWithConnection Class Reference

Base class for managers that require a libvirt connection.

`#include <BaseManagerWithConnection.h>`

Inheritance diagram for BaseManagerWithConnection:



Public Member Functions

- BaseManagerWithConnection (ILibvirtWrapper *libvirt)

  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()

  Constructs a BaseManagerWithConnection with default libvirt wrapper.
- void updateConnection (virConnectPtr conn)

  Updates the libvirt connection pointer.

Protected Member Functions

- void checkIfConnectionIsSet () const

  Checks if the connection is set and throws an exception if not.

Protected Attributes

- ILibvirtWrapper * **libvirt**
- virConnectPtr **conn**

4.1.1 Detailed Description

Base class for managers that require a libvirt connection.

This abstract class provides common functionality for managers that need access to a libvirt connection and wrapper. It serves as a foundation for specific manager classes like VirtualMachineManager and VirtualNetworkManager.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 BaseManagerWithConnection()

```
BaseManagerWithConnection::BaseManagerWithConnection (
            ILibvirtWrapper * libvirt)  [inline], [explicit]
```

Constructs a BaseManagerWithConnection with a specific libvirt wrapper.

Parameters

libvirt	Pointer to an ILibvirtWrapper implementation.

4.1.3 Member Function Documentation

4.1.3.1 checkIfConnectionIsSet()

```
void BaseManagerWithConnection::checkIfConnectionIsSet () const  [protected]
```

Checks if the connection is set and throws an exception if not.

Verifies that a hypervisor connection has been set.

Checks if the connection pointer is valid (not nullptr).

Exceptions

VirtualizationException	if no active connection has been set.

4.1.3.2 updateConnection()

```
void BaseManagerWithConnection::updateConnection (
            virConnectPtr conn)
```

Updates the libvirt connection pointer.

Updates the hypervisor connection for this manager.

Parameters

conn	New connection pointer to use for operations.

Sets the connection pointer that will be used by this manager instance for all virtualization operations.

Parameters

conn	The hypervisor connection pointer.

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

- src/virt/managers/BaseManagerWithConnection.h
- src/virt/managers/BaseManagerWithConnection.cpp

4.2 ConnectionInfo Struct Reference

Structure containing information about a hypervisor connection.

`#include <ConnectionInfo.h>`

Public Attributes

- unsigned int **cpuCount**

  Number of CPUs available on the host.
- unsigned int **cpuFreq**

  CPU frequency in MHz.
- unsigned long **totalMemory**

  Total memory available on the host in bytes.
- char **connectionUrl** [256]

  Connection URL to the hypervisor.
- char **driverType** [256]

  Type of the hypervisor driver (e.g., QEMU, KVM).
- Version **libVersion**

  Version of the libvirt library.
- Version **driverVersion**

  Version of the hypervisor driver.

4.2.1 Detailed Description

Structure containing information about a hypervisor connection.

This structure holds detailed information about the connection to a libvirt hypervisor, including hardware resources and version information.

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

- src/models/ConnectionInfo.h

4.3 ConnectionManager Class Reference

Manages connections to libvirt hypervisors.

`#include <ConnectionManager.h>`

Public Member Functions

- ConnectionManager (ILibvirtWrapper *libvirt)

  Constructs a ConnectionManager with a specific libvirt wrapper.
- **ConnectionManager** ()

  Constructs a ConnectionManager with default libvirt wrapper.
- void initializeConnection (const std::optional< std::string > &customConnectionUrl=std::nullopt)

  Initializes the connection to the libvirt backend.
- ConnectionInfo getConnectionInfo () const

  Retrieves detailed information about the current connection.
- bool isConnectionAlive () const

  Checks if the connection is alive and active.
- virConnectPtr getConnection () const

  Gets the raw libvirt connection pointer.

4.3.1 Detailed Description

Manages connections to libvirt hypervisors.

This class handles the lifecycle of connections to libvirt, including initialization, status checking, and retrieving connection information.

4.3.2 Constructor & Destructor Documentation

4.3.2.1 ConnectionManager()

```
ConnectionManager::ConnectionManager (
            ILibvirtWrapper * libvirt)  [inline], [explicit]
```

Constructs a ConnectionManager with a specific libvirt wrapper.

Parameters

libvirt	Pointer to an ILibvirtWrapper implementation.

4.3.3 Member Function Documentation

4.3.3.1 getConnection()

```
virConnectPtr ConnectionManager::getConnection () const
```

Gets the raw libvirt connection pointer.

Gets the underlying hypervisor connection pointer.

Returns

virConnectPtr Pointer to the libvirt connection.

virConnectPtr The hypervisor connection pointer.

4.3.3.2 getConnectionInfo()

```
ConnectionInfo ConnectionManager::getConnectionInfo () const
```

Retrieves detailed information about the current connection.

Retrieves detailed information about the hypervisor connection.

Returns

ConnectionInfo Structure containing connection and host information.

Gathers information about the connected hypervisor including CPU count, CPU frequency, memory, and version information for both libvirt and the driver.

Returns

ConnectionInfo Structure containing connection details.

Exceptions

VirtualizationException	if no connection is active or retrieval fails.

4.3.3.3 initializeConnection()

```
void ConnectionManager::initializeConnection (
            const std::optional< std::string > & customConnectionUrl = std::nullopt)
```

Initializes the connection to the libvirt backend.

Initializes a connection to a hypervisor.

Parameters

customConnectionUrl	Optional URL for a custom hypervisor connection. If not provided, default connection is used.

Establishes a connection to the specified hypervisor URI or uses the default "qemu:///system" if no custom URI is provided.

Parameters

customConnectionUrl	Optional custom connection URI.

Exceptions

VirtualizationException	if connection fails.

4.3.3.4 isConnectionAlive()

```
bool ConnectionManager::isConnectionAlive () const
```

Checks if the connection is alive and active.

Checks if the hypervisor connection is still active.

Returns

bool True if connection is alive, false otherwise.

bool True if the connection is alive, false if dead.

Exceptions

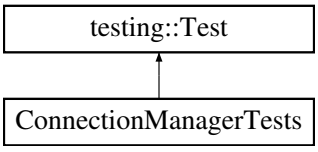
VirtualizationException	if an error occurs during the check.

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

- src/virt/managers/ConnectionManager.h
- src/virt/managers/ConnectionManager.cpp

4.4 ConnectionManagerTests Class Reference

Inheritance diagram for ConnectionManagerTests:



Protected Attributes

- LibvirtWrapperMock **mockLibvirt**
- ConnectionManager **manager**

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

- tests/ConnectionManagerTests.cpp

4.5 ExecutionInfo Struct Reference

Structure containing execution result information.

`#include <ExecutionInfo.h>`

Public Attributes

- bool **errorOccurred**

  Flag indicating whether an error occurred during execution.
- char **msg** [128]

  Error or status message describing the execution result.

4.5.1 Detailed Description

Structure containing execution result information.

This structure is used to return status and error information from function executions.

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

- src/models/ExecutionInfo.h

4.6 ExecutionInfoObtainer Class Reference

Utility class for executing functions and capturing execution information.

`#include <ExecutionInfoObtainer.h>`

Static Public Member Functions

- static void runAndObtainExecutionInfo (ExecutionInfo *executionInfo, const std::function< void()> &func)

  Executes a function and captures execution result information.

4.6.1 Detailed Description

Utility class for executing functions and capturing execution information.

This class provides a wrapper for running functions while automatically capturing any exceptions and converting them to ExecutionInfo structures.

4.6.2 Member Function Documentation

4.6.2.1 runAndObtainExecutionInfo()

```
void ExecutionInfoObtainer::runAndObtainExecutionInfo (
            ExecutionInfo * executionInfo,
            const std::function< void()> & func)  [static]
```

Executes a function and captures execution result information.

Executes a function and captures execution status information.

This method runs the provided function and populates an ExecutionInfo structure with the result. If the function throws an exception, the error flag is set and the exception message is captured.

Parameters

executionInfo	Pointer to ExecutionInfo structure to be filled with results.
func	Function to execute.

Runs the provided function within a try-catch block, capturing any exceptions and storing error information in the ExecutionInfo structure.

Parameters

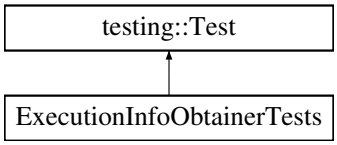
executionInfo	Pointer to ExecutionInfo structure that will be populated with: • errorOccurred: boolean flag indicating if an exception was caught • msg: error message if an exception occurred, empty otherwise
func	A function or callable object to execute.

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

- src/utils/ExecutionInfoObtainer.h
- src/utils/ExecutionInfoObtainer.cpp

4.7 ExecutionInfoObtainerTests Class Reference

Inheritance diagram for ExecutionInfoObtainerTests:



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

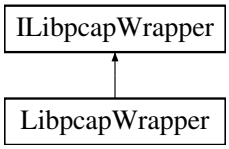
- tests/utils/ExecutionInfoObtainerTests.cpp

4.8 ILibpcapWrapper Class Reference

Interface for libpcap wrapper functionality.

`#include <ILibpcapWrapper.h>`

Inheritance diagram for ILibpcapWrapper:



Public Member Functions

- virtual pcap_t ∗ openHandlerLive (const std::string &interfaceName, char ∗errBuff)=0
  Opens a live packet capture handler for a network interface.
- virtual int getLinkLayerType (pcap_t ∗handler)=0
  Gets the link-layer header type for a capture handler.
- virtual void closeHandler (pcap_t ∗handler)=0
  Closes a packet capture handler.
- virtual int listenForPackets (pcap_t ∗handler, pcap_handler callback, u_char ∗args)=0
  Starts listening for packets on the capture handler.
- virtual void close (pcap_t ∗handler)=0
  Closes the packet capture handler and releases resources.

4.8.1 Detailed Description

Interface for libpcap wrapper functionality.

This abstract class defines an interface for interacting with the libpcap library for packet capture operations.

4.8.2 Member Function Documentation

4.8.2.1 close()

```
virtual void ILibpcapWrapper::close (
            pcap_t * handler)  [pure virtual]
```

Closes the packet capture handler and releases resources.

Parameters

handler	Packet capture handler to close.

Implemented in LibpcapWrapper.

4.8.2.2 closeHandler()

```
virtual void ILibpcapWrapper::closeHandler (
            pcap_t * handler)  [pure virtual]
```

Closes a packet capture handler.

Parameters

handler	Packet capture handler to close.

Implemented in LibpcapWrapper.

4.8.2.3 getLinkLayerType()

```
virtual int ILibpcapWrapper::getLinkLayerType (
            pcap_t * handler)  [pure virtual]
```

Gets the link-layer header type for a capture handler.

Parameters

handler	Active packet capture handler.

Implemented in LibpcapWrapper.

4.8.2.4 listenForPackets()

```
virtual int ILibpcapWrapper::listenForPackets (
            pcap_t * handler,
            pcap_handler callback,
            u_char * args)  [pure virtual]
```

Starts listening for packets on the capture handler.

Parameters

handler	Active packet capture handler.
callback	Function to call when a packet is captured.
args	User-defined arguments to pass to the callback function.

Implemented in LibpcapWrapper.

4.8.2.5 openHandlerLive()

```
virtual pcap_t * ILibpcapWrapper::openHandlerLive (
            const std::string & interfaceName,
            char * errBuff)  [pure virtual]
```

Opens a live packet capture handler for a network interface.

Parameters

interfaceName	Name of the network interface to capture packets from.
errBuff	Buffer to store error messages.

Returns

pcap_t∗ Pointer to the packet capture handler, or nullptr on failure.

Implemented in LibpcapWrapper.

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

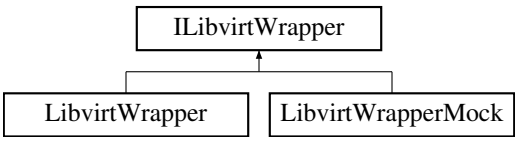
- src/interfaces/ILibpcapWrapper.h

4.9 ILibvirtWrapper Class Reference

Interface for Libvirt wrapper functionality.

`#include <ILibvirtWrapper.h>`

Inheritance diagram for ILibvirtWrapper:



Public Member Functions

- virtual virConnectPtr connectOpen (const char ∗name)=0

  Opens a connection to a hypervisor.
- virtual virDomainPtr createVirtualMachineFromXml (virConnectPtr conn, const char ∗xmlConfig)=0

  Creates a virtual machine from XML configuration.
- virtual void getUuidFromDomain (virDomainPtr domain, char ∗uuid)=0

  Retrieves the UUID of a domain.
- virtual int getNodeInfo (virConnectPtr conn, virNodeInfoPtr info)=0

  Gets information about the physical host node.
- virtual int getLibVersion (virConnectPtr conn, unsigned long ∗version)=0

  Gets the version of the libvirt library.
- virtual int getDriverVersion (virConnectPtr conn, unsigned long ∗version)=0

  Gets the version of the hypervisor driver.
- virtual std::string getConnectUrl (virConnectPtr conn)=0

  Gets the connection URI.
- virtual std::string getDriverType (virConnectPtr conn)=0

  Gets the type of hypervisor driver.
- virtual std::string getLastError ()=0

Gets the last error message from libvirt.

- virtual virDomainPtr domainLookupByName (virConnectPtr conn, std::string name)=0

  Looks up a domain by its name.
- virtual int domainGetInfo (virDomainPtr domain, virDomainInfo &domainInfo)=0

  Gets information about a domain.
- virtual int getDomainUUID (virDomainPtr domain, std::string &uuid)=0

  Gets the UUID of a domain.
- virtual int getListOfAllDomains (virConnectPtr conn, virDomainPtr **domains)=0

  Gets a list of all domains on the connection.
- virtual std::string getDomainName (virDomainPtr domain)=0

  Gets the name of a domain.
- virtual void freeDomain (virDomainPtr domain)=0

  Frees a domain handle.
- virtual int connectionIsAlive (virConnectPtr conn)=0

  Checks if a connection is alive.
- virtual virStreamPtr createNewStream (virConnectPtr conn)=0

  Creates a new stream object.
- virtual int openDomainConsole (virDomainPtr domain, virStreamPtr stream)=0

  Opens a console connection to a domain.
- virtual virDomainPtr domainLookupByUuid (virConnectPtr conn, const std::string &uuid)=0

  Looks up a domain by its UUID.
- virtual int receiveDataFromStream (virStreamPtr stream, char *buffer, int bufferSize)=0

  Receives data from a stream.
- virtual void sendDataToStream (virStreamPtr stream, const char *buffer, int bufferSize)=0

  Sends data to a stream.
- virtual void finishAndFreeStream (virStreamPtr stream)=0

  Finishes and frees a stream.
- virtual virNetworkPtr createNetworkFromXml (virConnectPtr conn, const std::string &networkDefinition)=0

  Creates a virtual network from XML definition.
- virtual int attachDeviceToVm (virDomainPtr domain, const std::string &deviceDefinition)=0

  Attaches a device to a virtual machine.
- virtual int detachDeviceFromVm (virDomainPtr domain, const std::string &deviceDefinition)=0

  Detaches a device from a virtual machine.
- virtual int updateVmDevice (virDomainPtr domain, const std::string &deviceDefinition)=0

  Updates a device configuration in a virtual machine.
- virtual virNetworkPtr getNetworkByName (virConnectPtr conn, const std::string &name)=0

  Gets a network by its name.
- virtual int destroyNetwork (virNetworkPtr network)=0

  Destroys (stops and removes) a virtual network.
- virtual std::string getNetworkDefinition (virNetworkPtr network)=0

  Gets the XML definition of a network.

4.9.1 Detailed Description

Interface for Libvirt wrapper functionality.

This abstract class defines an interface for interacting with the libvirt API.

4.9.2 Member Function Documentation

4.9.2.1 attachDeviceToVm()

```
virtual int ILibvirtWrapper::attachDeviceToVm (
            virDomainPtr domain,
            const std::string & deviceDefinition)  [pure virtual]
```

Attaches a device to a virtual machine.

Parameters

domain	Domain to attach device to.
deviceDefinition	XML string defining the device.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.2 connectionIsAlive()

```
virtual int ILibvirtWrapper::connectionIsAlive (
            virConnectPtr conn)  [pure virtual]
```

Checks if a connection is alive.

Parameters

conn	Connection to check.

Returns

int 1 if alive, 0 if not, -1 on error.

Implemented in LibvirtWrapper.

4.9.2.3 connectOpen()

```
virtual virConnectPtr ILibvirtWrapper::connectOpen (
            const char * name)  [pure virtual]
```

Opens a connection to a hypervisor.

Parameters

name	URI or name of the hypervisor connection.

Returns

virConnectPtr Connection handle, or nullptr on failure.

Implemented in LibvirtWrapper.

4.9.2.4 createNetworkFromXml()

```
virtual virNetworkPtr ILibvirtWrapper::createNetworkFromXml (
            virConnectPtr conn,
            const std::string & networkDefinition)  [pure virtual]
```

Creates a virtual network from XML definition.

Parameters

conn	Active connection to the hypervisor.
networkDefinition	XML string defining the network.

Returns

virNetworkPtr Network handle, or nullptr on failure.

Implemented in LibvirtWrapper.

4.9.2.5 createNewStream()

```
virtual virStreamPtr ILibvirtWrapper::createNewStream (
            virConnectPtr conn)  [pure virtual]
```

Creates a new stream object.

Parameters

conn	Active connection to the hypervisor.

Returns

virStreamPtr Stream handle, or nullptr on failure.

Implemented in LibvirtWrapper.

4.9.2.6 createVirtualMachineFromXml()

```
virtual virDomainPtr ILibvirtWrapper::createVirtualMachineFromXml (
            virConnectPtr conn,
            const char * xmlConfig)  [pure virtual]
```

Creates a virtual machine from XML configuration.

Parameters

conn	Active connection to the hypervisor.
xmlConfig	XML string describing the VM configuration.

Returns

virDomainPtr Domain handle for the created VM.

Implemented in LibvirtWrapper.

4.9.2.7 destroyNetwork()

```
virtual int ILibvirtWrapper::destroyNetwork (
            virNetworkPtr network)  [pure virtual]
```

Destroys (stops and removes) a virtual network.

Parameters

network	Network to destroy.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.8 detachDeviceFromVm()

```
virtual int ILibvirtWrapper::detachDeviceFromVm (
            virDomainPtr domain,
            const std::string & deviceDefinition)  [pure virtual]
```

Detaches a device from a virtual machine.

Parameters

domain	Domain to detach device from.
deviceDefinition	XML string defining the device.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.9 domainGetInfo()

```
virtual int ILibvirtWrapper::domainGetInfo (
            virDomainPtr domain,
            virDomainInfo & domainInfo)  [pure virtual]
```

Gets information about a domain.

Parameters

domain	Domain to get information from.
domainInfo	Reference to structure to be filled with domain information.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.10 domainLookupByName()

```
virtual virDomainPtr ILibvirtWrapper::domainLookupByName (
            virConnectPtr conn,
            std::string name)  [pure virtual]
```

Looks up a domain by its name.

Parameters

conn	Active connection to the hypervisor.
name	Name of the domain to look up.

Returns

virDomainPtr Domain handle, or nullptr if not found.

Implemented in LibvirtWrapper.

4.9.2.11 domainLookupByUuid()

```
virtual virDomainPtr ILibvirtWrapper::domainLookupByUuid (
            virConnectPtr conn,
            const std::string & uuid)  [pure virtual]
```

Looks up a domain by its UUID.

Parameters

conn	Active connection to the hypervisor.
uuid	UUID string of the domain to find.

Returns

virDomainPtr Domain handle, or nullptr if not found.

Implemented in LibvirtWrapper.

4.9.2.12 finishAndFreeStream()

```
virtual void ILibvirtWrapper::finishAndFreeStream (
            virStreamPtr stream)  [pure virtual]
```

Finishes and frees a stream.

Parameters

stream	Stream to finish and free.

Implemented in LibvirtWrapper.

4.9.2.13 freeDomain()

```
virtual void ILibvirtWrapper::freeDomain (
            virDomainPtr domain)  [pure virtual]
```

Frees a domain handle.

Parameters

domain	Domain handle to free.

Implemented in LibvirtWrapper.

4.9.2.14 getConnectUrl()

```
virtual std::string ILibvirtWrapper::getConnectUrl (
            virConnectPtr conn)  [pure virtual]
```

Gets the connection URI.

Parameters

conn	Active connection to the hypervisor.

Returns

std::string Connection URI string.

Implemented in LibvirtWrapper.

4.9.2.15 getDomainName()

```
virtual std::string ILibvirtWrapper::getDomainName (
            virDomainPtr domain)  [pure virtual]
```

Gets the name of a domain.

Parameters

domain	Domain to get name from.

Returns

std::string Domain name.

Implemented in LibvirtWrapper.

4.9.2.16 getDomainUUID()

```
virtual int ILibvirtWrapper::getDomainUUID (
            virDomainPtr domain,
            std::string & uuid)  [pure virtual]
```

Gets the UUID of a domain.

Parameters

domain	Domain to get UUID from.
uuid	Reference to string to store the UUID.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.17 getDriverType()

```
virtual std::string ILibvirtWrapper::getDriverType (
            virConnectPtr conn)  [pure virtual]
```

Gets the type of hypervisor driver.

Parameters

conn	Active connection to the hypervisor.

Returns

std::string Driver type (e.g., "QEMU", "KVM").

Implemented in LibvirtWrapper.

4.9.2.18 getDriverVersion()

```
virtual int ILibvirtWrapper::getDriverVersion (
            virConnectPtr conn,
            unsigned long * version)  [pure virtual]
```

Gets the version of the hypervisor driver.

Parameters

conn	Active connection to the hypervisor.
version	Pointer to store the driver version number.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.19 getLastError()

```
virtual std::string ILibvirtWrapper::getLastError ()  [pure virtual]
```

Gets the last error message from libvirt.

Returns

std::string Last error message.

Implemented in LibvirtWrapper.

4.9.2.20 getLibVersion()

```
virtual int ILibvirtWrapper::getLibVersion (
            virConnectPtr conn,
            unsigned long * version)  [pure virtual]
```

Gets the version of the libvirt library.

Parameters

conn	Active connection to the hypervisor.
version	Pointer to store the version number.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.21 getListOfAllDomains()

```
virtual int ILibvirtWrapper::getListOfAllDomains (
            virConnectPtr conn,
            virDomainPtr ** domains)  [pure virtual]
```

Gets a list of all domains on the connection.

Parameters

conn	Active connection to the hypervisor.
domains	Pointer to array that will be allocated and filled with domain handles.

Returns

int Number of domains found, or -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.22 getNetworkByName()

```
virtual virNetworkPtr ILibvirtWrapper::getNetworkByName (
            virConnectPtr conn,
            const std::string & name)  [pure virtual]
```

Gets a network by its name.

Parameters

conn	Active connection to the hypervisor.
name	Name of the network to find.

Returns

virNetworkPtr Network handle, or nullptr if not found.

Implemented in LibvirtWrapper.

4.9.2.23 getNetworkDefinition()

```
virtual std::string ILibvirtWrapper::getNetworkDefinition (
            virNetworkPtr network)  [pure virtual]
```

Gets the XML definition of a network.

Parameters

network	Network to get definition from.

Returns

std::string XML definition of the network.

Implemented in LibvirtWrapper.

4.9.2.24 getNodeInfo()

```
virtual int ILibvirtWrapper::getNodeInfo (
            virConnectPtr conn,
            virNodeInfoPtr info)  [pure virtual]
```

Gets information about the physical host node.

Parameters

conn	Active connection to the hypervisor.
info	Pointer to structure to be filled with node information.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.25 getUuidFromDomain()

```
virtual void ILibvirtWrapper::getUuidFromDomain (
            virDomainPtr domain,
            char * uuid)  [pure virtual]
```

Retrieves the UUID of a domain.

Parameters

domain	Domain to get UUID from.
uuid	Buffer to store the UUID string (must be at least VIR_UUID_STRING_BUFLEN bytes).

Implemented in LibvirtWrapper.

4.9.2.26 openDomainConsole()

```
virtual int ILibvirtWrapper::openDomainConsole (
            virDomainPtr domain,
            virStreamPtr stream)  [pure virtual]
```

Opens a console connection to a domain.

Parameters

domain	Domain to open console for.
stream	Stream to use for console I/O.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

4.9.2.27 receiveDataFromStream()

```
virtual int ILibvirtWrapper::receiveDataFromStream (
            virStreamPtr stream,
            char * buffer,
            int bufferSize)  [pure virtual]
```

Receives data from a stream.

Parameters

stream	Active stream to read from.
buffer	Buffer to store received data.
bufferSize	Size of the buffer.

Returns

int Number of bytes read, 0 on EOF, -1 on error.

Implemented in LibvirtWrapper.

4.9.2.28 sendDataToStream()

```
virtual void ILibvirtWrapper::sendDataToStream (
            virStreamPtr stream,
            const char * buffer,
            int bufferSize)  [pure virtual]
```

Sends data to a stream.

Parameters

stream	Active stream to write to.
buffer	Data to send.
bufferSize	Size of data to send.

Implemented in LibvirtWrapper.

4.9.2.29 updateVmDevice()

```
virtual int ILibvirtWrapper::updateVmDevice (
            virDomainPtr domain,
            const std::string & deviceDefinition)  [pure virtual]
```

Updates a device configuration in a virtual machine.

Parameters

domain	Domain to update device in.
deviceDefinition	XML string defining the new device configuration.

Returns

int 0 on success, -1 on failure.

Implemented in LibvirtWrapper.

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

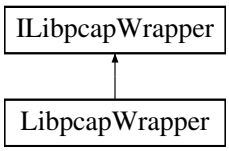
- src/interfaces/ILibvirtWrapper.h

4.10 LibpcapWrapper Class Reference

Concrete implementation of the ILibpcapWrapper interface.

```
#include <LibpcapWrapper.h>
```

Inheritance diagram for LibpcapWrapper:



Public Member Functions

- pcap_t * openHandlerLive (const std::string &interfaceName, char *errBuff) override

  Opens a live packet capture handler for a network interface.
- int getLinkLayerType (pcap_t *handler) override

  Gets the link-layer header type for a capture handler.
- void closeHandler (pcap_t *handler) override

  Closes a packet capture handler.
- int listenForPackets (pcap_t *handler, pcap_handler callback, u_char *args) override

  Starts listening for packets on the capture handler.
- void close (pcap_t *handler) override

  Closes the packet capture handler and releases resources.

4.10.1 Detailed Description

Concrete implementation of the ILibpcapWrapper interface.

This class provides actual implementations for packet capture operations using the libpcap library.

4.10.2 Member Function Documentation

4.10.2.1 close()

```
void LibpcapWrapper::close (
            pcap_t * handler)  [override], [virtual]
```

Closes the packet capture handler and releases resources.

Closes and releases a packet capture handler.

Parameters

handler	Packet capture handler to close.
handler	The packet capture handler to close.

Implements ILibpcapWrapper.

4.10.2.2 closeHandler()

```
void LibpcapWrapper::closeHandler (
            pcap_t * handler)  [override], [virtual]
```

Closes a packet capture handler.

Parameters

handler	Packet capture handler to close.
handler	The packet capture handler to close.

Implements ILibpcapWrapper.

4.10.2.3 getLinkLayerType()

```
int LibpcapWrapper::getLinkLayerType (
            pcap_t * handler)  [override], [virtual]
```

Gets the link-layer header type for a capture handler.

Gets the data link layer type of the opened interface.

Parameters

handler	Active packet capture handler.

Returns

int Link-layer header type identifier.

Parameters

handler	The packet capture handler.

Returns

int The data link type (e.g., DLT_EN10MB for Ethernet).

Implements ILibpcapWrapper.

4.10.2.4 listenForPackets()

```
int LibpcapWrapper::listenForPackets (
            pcap_t * handler,
            pcap_handler callback,
            u_char * args)  [override], [virtual]
```

Starts listening for packets on the capture handler.

Dispatches packets to a callback handler.

Parameters

handler	Active packet capture handler.
callback	Function to call when a packet is captured.
args	User-defined arguments to pass to the callback function.

Returns

int Number of packets processed, or error code.

Processes packets from the capture interface and invokes the callback for each packet.

Parameters

handler	The packet capture handler.
callback	Function to be called for each captured packet.
args	User-defined data to be passed to the callback.

Returns

int Number of packets processed, or -1 on error.

Implements ILibpcapWrapper.

4.10.2.5 openHandlerLive()

```
pcap_t * LibpcapWrapper::openHandlerLive (
            const std::string & interfaceName,
            char * errBuff)  [override], [virtual]
```

Opens a live packet capture handler for a network interface.

Parameters

interfaceName	Name of the network interface to capture packets from.
errBuff	Buffer to store error messages if opening fails.

Returns

pcap_t* Pointer to the packet capture handler, or nullptr on failure.

Parameters

interfaceName	The name of the network interface to capture from.
errBuff	Buffer to store error messages if the operation fails.

Returns

pcap_t* Pointer to the opened handler, or nullptr if an error occurs.

Implements ILibpcapWrapper.

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

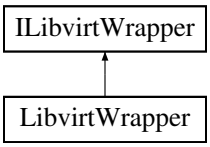
- src/wrappers/LibpcapWrapper.h
- src/wrappers/LibpcapWrapper.cpp

4.11 LibvirtWrapper Class Reference

Concrete implementation of the ILibvirtWrapper interface.

`#include <LibvirtWrapper.h>`

Inheritance diagram for LibvirtWrapper:



Public Member Functions

- virConnectPtr connectOpen (const char ∗connectionUri) override

  Opens a connection to the hypervisor.
- virDomainPtr createVirtualMachineFromXml (virConnectPtr conn, const char ∗xmlConfig) override

  Creates a virtual machine from an XML configuration.
- void getUuidFromDomain (virDomainPtr domain, char ∗uuid) override

  Retrieves the UUID of the given domain.
- int getNodeInfo (virConnectPtr conn, virNodeInfoPtr info) override

  Gets information about the physical host node.
- int getLibVersion (virConnectPtr conn, unsigned long ∗libVersion) override

  Gets the version of the libvirt library.
- int getDriverVersion (virConnectPtr conn, unsigned long ∗version) override

  Gets the version of the hypervisor driver.
- std::string getConnectUrl (virConnectPtr conn) override

  Gets the connection URI.
- std::string getDriverType (virConnectPtr conn) override

  Gets the type of hypervisor driver.
- std::string getLastError () override

  Gets the last error message from libvirt.
- virDomainPtr domainLookupByName (virConnectPtr conn, std::string name) override

  Looks up a domain by its name.
- int domainGetInfo (virDomainPtr domain, virDomainInfo &domainInfo) override

  Gets information about a domain.
- int getDomainUUID (virDomainPtr domain, std::string &uuid) override

  Gets the UUID of a domain.
- int getListOfAllDomains (virConnectPtr conn, virDomainPtr ∗∗domains) override

  Gets a list of all domains on the connection.
- std::string getDomainName (virDomainPtr domain) override

  Gets the name of a domain.
- void freeDomain (virDomainPtr domain) override

  Frees a domain handle.
- int connectionIsAlive (virConnectPtr conn) override

  Checks if a connection is alive.
- virStreamPtr createNewStream (virConnectPtr conn) override

  Creates a new stream object.
- int openDomainConsole (virDomainPtr domain, virStreamPtr stream) override

  Opens a console connection to a domain.
- virDomainPtr domainLookupByUuid (virConnectPtr conn, const std::string &uuid) override

  Looks up a domain by its UUID.
- int receiveDataFromStream (virStreamPtr stream, char ∗buffer, int bufferSize) override

  Receives data from a stream.
- void sendDataToStream (virStreamPtr stream, const char ∗buffer, int bufferSize) override

  Sends data to a stream.
- void finishAndFreeStream (virStreamPtr stream) override

  Finishes and frees a stream.
- virNetworkPtr createNetworkFromXml (virConnectPtr conn, const std::string &networkDefinition) override

  Creates a virtual network from XML definition.
- int attachDeviceToVm (virDomainPtr domain, const std::string &deviceDefinition) override

  Attaches a device to a virtual machine.
- int detachDeviceFromVm (virDomainPtr domain, const std::string &deviceDefinition) override

Detaches a device from a virtual machine.

- int updateVmDevice (virDomainPtr domain, const std::string &deviceDefinition) override

  Updates a device configuration in a virtual machine.
- virNetworkPtr getNetworkByName (virConnectPtr conn, const std::string &name) override

  Gets a network by its name.
- int destroyNetwork (virNetworkPtr network) override

  Destroys (stops and removes) a virtual network.
- std::string getNetworkDefinition (virNetworkPtr network) override

  Gets the XML definition of a network.

4.11.1 Detailed Description

Concrete implementation of the ILibvirtWrapper interface.

This class provides actual implementations for connecting to the libvirt C API.

4.11.2 Member Function Documentation

4.11.2.1 attachDeviceToVm()

```
int LibvirtWrapper::attachDeviceToVm (
            virDomainPtr domain,
            const std::string & deviceDefinition)  [override], [virtual]
```

Attaches a device to a virtual machine.

Parameters

domain	Domain to attach device to.
deviceDefinition	XML string defining the device.

Returns

int 0 on success, -1 on failure.

Parameters

domain	The virtual machine domain.
deviceDefinition	XML definition of the device to attach.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.2 connectionIsAlive()

```
int LibvirtWrapper::connectionIsAlive (
            virConnectPtr conn)  [override], [virtual]
```

Checks if a connection is alive.

Checks if the hypervisor connection is still alive.

Parameters

conn	Connection to check.

Returns

int 1 if alive, 0 if not, -1 on error.

Parameters

conn	The hypervisor connection.

Returns

int 1 if alive, 0 if dead, -1 on error.

Implements ILibvirtWrapper.

4.11.2.3 connectOpen()

```
virConnectPtr LibvirtWrapper::connectOpen (
            const char * connectionUri)  [override], [virtual]
```

Opens a connection to the hypervisor.

Opens a connection to a hypervisor.

Parameters

connectionUri	The name or URI of the hypervisor to connect to.

Returns

virConnectPtr A pointer to the connection object on success.

Parameters

connectionUri	The URI of the hypervisor to connect to.

Returns

virConnectPtr Pointer to the connection, or nullptr on failure.

Implements ILibvirtWrapper.

4.11.2.4 createNetworkFromXml()

```
virNetworkPtr LibvirtWrapper::createNetworkFromXml (
            virConnectPtr conn,
            const std::string & networkDefinition)  [override], [virtual]
```

Creates a virtual network from XML definition.

Creates a network from an XML definition.

Parameters

conn	Active connection to the hypervisor.
networkDefinition	XML string defining the network.

Returns

virNetworkPtr Network handle, or nullptr on failure.

Parameters

conn	The hypervisor connection.
networkDefinition	XML definition of the network.

Returns

virNetworkPtr Pointer to the created network, or nullptr on failure.

Implements ILibvirtWrapper.

4.11.2.5 createNewStream()

```
virStreamPtr LibvirtWrapper::createNewStream (
            virConnectPtr conn)  [override], [virtual]
```

Creates a new stream object.

Creates a new stream for communication with a domain.

Parameters

conn	Active connection to the hypervisor.

Returns

virStreamPtr Stream handle, or nullptr on failure.

Parameters

conn	The hypervisor connection.

Returns

virStreamPtr Pointer to the new stream, or nullptr on failure.

Implements ILibvirtWrapper.

4.11.2.6 createVirtualMachineFromXml()

```
virDomainPtr LibvirtWrapper::createVirtualMachineFromXml (
            virConnectPtr conn,
            const char * xmlConfig)  [override], [virtual]
```

Creates a virtual machine from an XML configuration.

Creates a virtual machine from an XML definition.

Parameters

conn	The active connection to the hypervisor.
xmlConfig	The XML string describing the VM configuration.

Returns

virDomainPtr A pointer to the newly created virtual machine domain.

Parameters

conn	The hypervisor connection.
xmlConfig	XML definition of the virtual machine.

Returns

virDomainPtr Pointer to the created domain, or nullptr on failure.

Implements ILibvirtWrapper.

4.11.2.7 destroyNetwork()

```
int LibvirtWrapper::destroyNetwork (
            virNetworkPtr network)  [override], [virtual]
```

Destroys (stops and removes) a virtual network.

Destroys (deletes) a network.

Parameters

network	Network to destroy.

Returns

int 0 on success, -1 on failure.

Parameters

network	The network to destroy.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.8 detachDeviceFromVm()

```
int LibvirtWrapper::detachDeviceFromVm (
            virDomainPtr domain,
            const std::string & deviceDefinition)  [override], [virtual]
```

Detaches a device from a virtual machine.

Parameters

domain	Domain to detach device from.
deviceDefinition	XML string defining the device.

Returns

int 0 on success, -1 on failure.

Parameters

domain	The virtual machine domain.
deviceDefinition	XML definition of the device to detach.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.9 domainGetInfo()

```
int LibvirtWrapper::domainGetInfo (
            virDomainPtr domain,
            virDomainInfo & domainInfo)  [override], [virtual]
```

Gets information about a domain.

Parameters

domain	Domain to get information from.
domainInfo	Reference to structure to be filled with domain information.

Returns

int 0 on success, -1 on failure.

Parameters

domain	The virtual machine domain.
domainInfo	Reference to virDomainInfo structure to be populated.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.10 domainLookupByName()

```
virDomainPtr LibvirtWrapper::domainLookupByName (
            virConnectPtr conn,
            std::string name)  [override], [virtual]
```

Looks up a domain by its name.

Parameters

conn	Active connection to the hypervisor.
name	Name of the domain to look up.

Returns

virDomainPtr Domain handle, or nullptr if not found.

Parameters

conn	The hypervisor connection.
name	The name of the virtual machine to look up.

Returns

virDomainPtr Pointer to the domain, or nullptr if not found.

Implements ILibvirtWrapper.

4.11.2.11 domainLookupByUuid()

```
virDomainPtr LibvirtWrapper::domainLookupByUuid (
            virConnectPtr conn,
            const std::string & uuid)  [override], [virtual]
```

Looks up a domain by its UUID.

Parameters

conn	Active connection to the hypervisor.
uuid	UUID string of the domain to find.

Returns

virDomainPtr Domain handle, or nullptr if not found.

Parameters

conn	The hypervisor connection.
uuid	The UUID string of the virtual machine.

Returns

virDomainPtr Pointer to the domain, or nullptr if not found.

Implements ILibvirtWrapper.

4.11.2.12 finishAndFreeStream()

```
void LibvirtWrapper::finishAndFreeStream (
            virStreamPtr stream)  [override], [virtual]
```

Finishes and frees a stream.

Parameters

stream	Stream to finish and free.

Closes the stream and releases all associated resources.

Parameters

stream	The stream to finish and free.

Implements ILibvirtWrapper.

4.11.2.13 freeDomain()

```
void LibvirtWrapper::freeDomain (
            virDomainPtr domain)  [override], [virtual]
```

Frees a domain handle.

Frees resources associated with a domain pointer.

Parameters

domain	Domain handle to free.
domain	The domain pointer to free.

Exceptions

std::runtime_error	if freeing the domain fails.

Implements ILibvirtWrapper.

4.11.2.14 getConnectUrl()

```
std::string LibvirtWrapper::getConnectUrl (
            virConnectPtr conn)  [override], [virtual]
```

Gets the connection URI.

Gets the URI of the hypervisor connection.

Parameters

conn	Active connection to the hypervisor.

Returns

std::string Connection URI string.

Parameters

conn	The hypervisor connection.

Returns

std::string The connection URI.

Implements ILibvirtWrapper.

4.11.2.15 getDomainName()

```
std::string LibvirtWrapper::getDomainName (
            virDomainPtr domain)  [override], [virtual]
```

Gets the name of a domain.

Parameters

domain	Domain to get name from.

Returns

std::string Domain name.

Parameters

domain	The virtual machine domain.

Returns

std::string The domain name, or empty string if retrieval fails.

Implements ILibvirtWrapper.

4.11.2.16 getDomainUUID()

```
int LibvirtWrapper::getDomainUUID (
            virDomainPtr domain,
            std::string & uuid)  [override], [virtual]
```

Gets the UUID of a domain.

Gets the UUID of a domain as a string.

Parameters

domain	Domain to get UUID from.
uuid	Reference to string to store the UUID.

Returns

int 0 on success, -1 on failure.

Parameters

domain	The virtual machine domain.
uuid	Reference to string to store the UUID.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.17 getDriverType()

```
std::string LibvirtWrapper::getDriverType (
            virConnectPtr conn)  [override], [virtual]
```

Gets the type of hypervisor driver.

Parameters

conn	Active connection to the hypervisor.

Returns

std::string Driver type (e.g., "QEMU", "KVM").

Parameters

conn	The hypervisor connection.

Returns

std::string The driver type (e.g., "qemu", "xen").

Implements ILibvirtWrapper.

4.11.2.18 getDriverVersion()

```
int LibvirtWrapper::getDriverVersion (
            virConnectPtr conn,
            unsigned long * version)  [override], [virtual]
```

Gets the version of the hypervisor driver.

Parameters

conn	Active connection to the hypervisor.
version	Pointer to store the driver version number.

Returns

int 0 on success, -1 on failure.

Parameters

conn	The hypervisor connection.
version	Pointer to store the driver version.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.19 getLastError()

```
std::string LibvirtWrapper::getLastError ()  [override], [virtual]
```

Gets the last error message from libvirt.

Returns

std::string Last error message.

std::string The error message from the last failed operation.

Implements ILibvirtWrapper.

4.11.2.20 getLibVersion()

```
int LibvirtWrapper::getLibVersion (
            virConnectPtr conn,
            unsigned long * libVersion)  [override], [virtual]
```

Gets the version of the libvirt library.

Parameters

conn	Active connection to the hypervisor.
libVersion	Pointer to store the version number.

Returns

int 0 on success, -1 on failure.

Parameters

conn	The hypervisor connection.
libVersion	Pointer to store the library version.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.21 getListOfAllDomains()

```
int LibvirtWrapper::getListOfAllDomains (
            virConnectPtr conn,
            virDomainPtr ** domains)  [override], [virtual]
```

Gets a list of all domains on the connection.

Gets a list of all domains (both active and inactive).

Parameters

conn	Active connection to the hypervisor.
domains	Pointer to array that will be allocated and filled with domain handles.

Returns

int Number of domains found, or -1 on failure.

Parameters

conn	The hypervisor connection.
domains	Pointer to array of virDomainPtr to be allocated and populated.

Returns

int Number of domains retrieved, or -1 on error.

Implements ILibvirtWrapper.

4.11.2.22 getNetworkByName()

```
virNetworkPtr LibvirtWrapper::getNetworkByName (
            virConnectPtr conn,
            const std::string & name)  [override], [virtual]
```

Gets a network by its name.

Looks up a network by name.

Parameters

conn	Active connection to the hypervisor.
name	Name of the network to find.

Returns

virNetworkPtr Network handle, or nullptr if not found.

Parameters

conn	The hypervisor connection.
name	The name of the network.

Returns

virNetworkPtr Pointer to the network, or nullptr if not found.

Implements ILibvirtWrapper.

4.11.2.23 getNetworkDefinition()

```
std::string LibvirtWrapper::getNetworkDefinition (
            virNetworkPtr network)  [override], [virtual]
```

Gets the XML definition of a network.

Parameters

network	Network to get definition from.

Returns

std::string XML definition of the network.

Parameters

network	The network.

Returns

std::string The XML definition.

Implements ILibvirtWrapper.

4.11.2.24 getNodeInfo()

```
int LibvirtWrapper::getNodeInfo (
            virConnectPtr conn,
            virNodeInfoPtr info)  [override], [virtual]
```

Gets information about the physical host node.

Retrieves node information from the hypervisor.

Parameters

conn	Active connection to the hypervisor.
info	Pointer to structure to be filled with node information.

Returns

int 0 on success, -1 on failure.

Parameters

conn	The hypervisor connection.
info	Pointer to virNodeInfo structure to be populated.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.25 getUuidFromDomain()

```
void LibvirtWrapper::getUuidFromDomain (
            virDomainPtr domain,
            char * uuid)  [override], [virtual]
```

Retrieves the UUID of the given domain.

Retrieves the UUID from a domain.

Parameters

domain	The domain to get the UUID from.
uuid	A buffer to store the resulting UUID string.
domain	The virtual machine domain.
uuid	Buffer to store the UUID string.

Implements ILibvirtWrapper.

4.11.2.26 openDomainConsole()

```
int LibvirtWrapper::openDomainConsole (
            virDomainPtr domain,
            virStreamPtr stream)  [override], [virtual]
```

Opens a console connection to a domain.

Opens a console to a domain via a stream.

Parameters

domain	Domain to open console for.
stream	Stream to use for console I/O.

Returns

int 0 on success, -1 on failure.

Parameters

domain	The virtual machine domain.
stream	The stream to connect to the console.

Returns

int 0 on success, -1 on failure.

Implements ILibvirtWrapper.

4.11.2.27 receiveDataFromStream()

```
int LibvirtWrapper::receiveDataFromStream (
            virStreamPtr stream,
            char * buffer,
            int bufferSize)  [override], [virtual]
```

Receives data from a stream.

Parameters

stream	Active stream to read from.
buffer	Buffer to store received data.
bufferSize	Size of the buffer.

Returns

int Number of bytes read, 0 on EOF, -1 on error.

Parameters

stream	The stream to read from.
buffer	Buffer to store received data.
bufferSize	Size of the buffer.

Returns

int Number of bytes received, 0 if stream was closed, -1 on error.

Implements ILibvirtWrapper.

4.11.2.28 sendDataToStream()

```
void LibvirtWrapper::sendDataToStream (
            virStreamPtr stream,
            const char * buffer,
            int bufferSize)  [override], [virtual]
```

Sends data to a stream.

Parameters

stream	Active stream to write to.
buffer	Data to send.
bufferSize	Size of data to send.
stream	The stream to write to.
buffer	Data to send.
bufferSize	Size of the data.

Implements ILibvirtWrapper.

4.11.2.29 updateVmDevice()

```
int LibvirtWrapper::updateVmDevice (
            virDomainPtr domain,
            const std::string & deviceDefinition)  [override], [virtual]
```

Updates a device configuration in a virtual machine.

Updates a device configuration on a virtual machine.

Parameters

domain	Domain to update device in.
deviceDefinition	XML string defining the new device configuration.

Returns

int 0 on success, -1 on failure.

Parameters

domain	The virtual machine domain.
deviceDefinition	Updated XML definition of the device.

Returns

int 0 on success, -1 on failure.

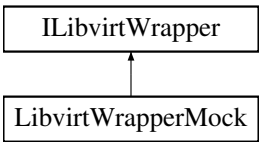
Implements ILibvirtWrapper.

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

- src/wrappers/LibvirtWrapper.h
- src/wrappers/LibvirtWrapper.cpp

4.12 LibvirtWrapperMock Class Reference

Inheritance diagram for LibvirtWrapperMock:



Public Member Functions

- **MOCK_METHOD** (virConnectPtr, connectOpen,(const char ∗name),(override))
- **MOCK_METHOD** (virDomainPtr, createVirtualMachineFromXml,(virConnectPtr conn, const char ∗xml↩ Config),(override))
- **MOCK_METHOD** (void, getUuidFromDomain,(virDomainPtr domain, char ∗uuid),(override))
- **MOCK_METHOD** (int, getNodeInfo,(virConnectPtr conn, virNodeInfoPtr info),(override))
- **MOCK_METHOD** (int, getLibVersion,(virConnectPtr conn, unsigned long ∗version),(override))
- **MOCK_METHOD** (int, getDriverVersion,(virConnectPtr conn, unsigned long ∗version),(override))
- **MOCK_METHOD** (std::string, getConnectUrl,(virConnectPtr conn),(override))
- **MOCK_METHOD** (std::string, getDriverType,(virConnectPtr conn),(override))
- **MOCK_METHOD** (std::string, getLastError,(),(override))
- **MOCK_METHOD** (virDomainPtr, domainLookupByName,(virConnectPtr conn, std::string name),(override))

- **MOCK_METHOD** (int, domainGetInfo,(virDomainPtr domain, virDomainInfo &domainInfo),(override))
- **MOCK_METHOD** (int, getDomainUUID,(virDomainPtr domain, std::string &uuid),(override))
- **MOCK_METHOD** (int, getListOfAllDomains,(virConnectPtr conn, virDomainPtr **domains),(override))
- **MOCK_METHOD** (std::string, getDomainName,(virDomainPtr domain),(override))
- **MOCK_METHOD** (void, freeDomain,(virDomainPtr domain),(override))
- **MOCK_METHOD** (int, connectionIsAlive,(virConnectPtr conn),(override))
- **MOCK_METHOD** (virStreamPtr, createNewStream,(virConnectPtr conn),(override))
- **MOCK_METHOD** (int, openDomainConsole,(virDomainPtr domain, virStreamPtr stream),(override))
- **MOCK_METHOD** (virDomainPtr, domainLookupByUuid,(virConnectPtr conn, const std::string &uuid),(override))
- **MOCK_METHOD** (int, receiveDataFromStream,(virStreamPtr stream, char *buffer, int bufferSize),(override))
- **MOCK_METHOD** (void, sendDataToStream,(virStreamPtr stream, const char *buffer, int bufferSize),(override))
- **MOCK_METHOD** (void, finishAndFreeStream,(virStreamPtr stream),(override))
- **MOCK_METHOD** (virNetworkPtr, createNetworkFromXml,(virConnectPtr conn, const std::string &networkDefinition),(override))
- **MOCK_METHOD** (int, attachDeviceToVm,(virDomainPtr domain, const std::string &deviceDefinition),(override))
- **MOCK_METHOD** (int, detachDeviceFromVm,(virDomainPtr domain, const std::string &deviceDefinition),(override))
- **MOCK_METHOD** (int, updateVmDevice,(virDomainPtr domain, const std::string &deviceDefinition),(override))
- **MOCK_METHOD** (virNetworkPtr, getNetworkByName,(virConnectPtr conn, const std::string &name),(override))
- **MOCK_METHOD** (int, destroyNetwork,(virNetworkPtr network),(override))
- **MOCK_METHOD** (std::string, getNetworkDefinition,(virNetworkPtr network),(override))

Public Member Functions inherited from ILibvirtWrapper

- virtual virConnectPtr connectOpen (const char *name)=0

  Opens a connection to a hypervisor.
- virtual virDomainPtr createVirtualMachineFromXml (virConnectPtr conn, const char *xmlConfig)=0

  Creates a virtual machine from XML configuration.
- virtual void getUuidFromDomain (virDomainPtr domain, char *uuid)=0

  Retrieves the UUID of a domain.
- virtual int getNodeInfo (virConnectPtr conn, virNodeInfoPtr info)=0

  Gets information about the physical host node.
- virtual int getLibVersion (virConnectPtr conn, unsigned long *version)=0

  Gets the version of the libvirt library.
- virtual int getDriverVersion (virConnectPtr conn, unsigned long *version)=0

  Gets the version of the hypervisor driver.
- virtual std::string getConnectUrl (virConnectPtr conn)=0

  Gets the connection URI.
- virtual std::string getDriverType (virConnectPtr conn)=0

  Gets the type of hypervisor driver.
- virtual std::string getLastError ()=0

  Gets the last error message from libvirt.
- virtual virDomainPtr domainLookupByName (virConnectPtr conn, std::string name)=0

  Looks up a domain by its name.
- virtual int domainGetInfo (virDomainPtr domain, virDomainInfo &domainInfo)=0

  Gets information about a domain.
- virtual int getDomainUUID (virDomainPtr domain, std::string &uuid)=0

  Gets the UUID of a domain.
- virtual int getListOfAllDomains (virConnectPtr conn, virDomainPtr **domains)=0

  Gets a list of all domains on the connection.
- virtual std::string getDomainName (virDomainPtr domain)=0

Gets the name of a domain.

- virtual void freeDomain (virDomainPtr domain)=0

  Frees a domain handle.
- virtual int connectionIsAlive (virConnectPtr conn)=0

  Checks if a connection is alive.
- virtual virStreamPtr createNewStream (virConnectPtr conn)=0

  Creates a new stream object.
- virtual int openDomainConsole (virDomainPtr domain, virStreamPtr stream)=0

  Opens a console connection to a domain.
- virtual virDomainPtr domainLookupByUuid (virConnectPtr conn, const std::string &uuid)=0

  Looks up a domain by its UUID.
- virtual int receiveDataFromStream (virStreamPtr stream, char *buffer, int bufferSize)=0

  Receives data from a stream.
- virtual void sendDataToStream (virStreamPtr stream, const char *buffer, int bufferSize)=0

  Sends data to a stream.
- virtual void finishAndFreeStream (virStreamPtr stream)=0

  Finishes and frees a stream.
- virtual virNetworkPtr createNetworkFromXml (virConnectPtr conn, const std::string &networkDefinition)=0

  Creates a virtual network from XML definition.
- virtual int attachDeviceToVm (virDomainPtr domain, const std::string &deviceDefinition)=0

  Attaches a device to a virtual machine.
- virtual int detachDeviceFromVm (virDomainPtr domain, const std::string &deviceDefinition)=0

  Detaches a device from a virtual machine.
- virtual int updateVmDevice (virDomainPtr domain, const std::string &deviceDefinition)=0

  Updates a device configuration in a virtual machine.
- virtual virNetworkPtr getNetworkByName (virConnectPtr conn, const std::string &name)=0

  Gets a network by its name.
- virtual int destroyNetwork (virNetworkPtr network)=0

  Destroys (stops and removes) a virtual network.
- virtual std::string getNetworkDefinition (virNetworkPtr network)=0

  Gets the XML definition of a network.

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

- tests/mocks/LibvirtWrapperMock.h

4.13 ListenCallbackArgs Struct Reference

Structure containing arguments for packet listening callbacks.

`#include <ListenCallbackArgs.h>`

Public Attributes

- PacketSniffer * **sniffer**

  Pointer to the PacketSniffer instance handling the capture.
- std::string **interfaceName**

  Name of the network interface being monitored.

4.13.1 Detailed Description

Structure containing arguments for packet listening callbacks.

This structure is passed to packet capture callback functions to provide context about the packet sniffer and interface being monitored.

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

- src/models/ListenCallbackArgs.h

4.14 NetworkDefinition Struct Reference

Structure containing network definition in XML format.

`#include <NetworkDefinition.h>`

Public Attributes

- char **content** [4096]
  XML content defining the network configuration.

4.14.1 Detailed Description

Structure containing network definition in XML format.

This structure holds the XML configuration for defining virtual networks.

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

- src/models/NetworkDefinition.h

4.15 Packet Struct Reference

Structure representing a captured network packet.

`#include <Packet.h>`

Public Attributes

- char **interfaceName** [64]
  Name of the network interface where the packet was captured.
- unsigned char * **content**
  Pointer to the raw packet data.
- int **contentLength**
  Length of the packet content in bytes.
- unsigned int **timestampMicroseconds**
  Timestamp of packet capture in microseconds.

4.15.1 Detailed Description

Structure representing a captured network packet.

This structure holds all the information about a single captured packet, including its content, length, timestamp, and the interface it was captured on.

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

- src/models/Packet.h

4.16 PacketSniffer Class Reference

Class for capturing network packets.

`#include <PacketSniffer.h>`

Public Member Functions

- **PacketSniffer** ()
  Constructs a PacketSniffer with default libpcap wrapper.
- pcap_t * openSnifferHandler (const std::string &interfaceName)
  Opens a packet capture handler for the specified network interface.
- bool listenForPacket (pcap_t *snifferHandler, const std::string &interfaceName)
  Listens for a single packet on the specified interface.
- void closeAndStopListening (pcap_t *handler) const
  Closes the packet capture handler and stops listening.
- Packet getPacketFromQueue ()
  Retrieves and removes a packet from the internal queue.
- int getNumberOfReceivedPackets () const
  Gets the number of packets currently in the queue.

4.16.1 Detailed Description

Class for capturing network packets.

This class provides functionality for capturing packets from network interfaces using the libpcap library. It maintains a queue of captured packets and handles the packet capture lifecycle.

4.16.2 Member Function Documentation

4.16.2.1 closeAndStopListening()

```
void PacketSniffer::closeAndStopListening (
            pcap_t * handler) const
```

Closes the packet capture handler and stops listening.

Parameters

handler	Packet capture handler to close.

Properly closes and releases resources associated with the packet capture handler.

Parameters

handler	The packet capture handler to close.

4.16.2.2 getNumberOfReceivedPackets()

```
int PacketSniffer::getNumberOfReceivedPackets () const  [nodiscard]
```

Gets the number of packets currently in the queue.

Returns

int Number of captured packets waiting in the queue.

Returns the count of captured packets waiting in the internal queue.

Returns

int The number of packets in the queue.

4.16.2.3 getPacketFromQueue()

```
Packet PacketSniffer::getPacketFromQueue ()  [nodiscard]
```

Retrieves and removes a packet from the internal queue.

Returns

Packet The oldest packet in the queue.

Removes and returns the oldest packet stored in the capture queue.

Returns

Packet The packet at the front of the queue.

4.16.2.4 listenForPacket()

```
bool PacketSniffer::listenForPacket (
            pcap_t * snifferHandler,
            const std::string & interfaceName)  [nodiscard]
```

Listens for a single packet on the specified interface.

This method captures one packet and adds it to the internal queue.

Parameters

snifferHandler	Active packet capture handler.
interfaceName	Name of the network interface.

Returns

bool True if a packet was successfully captured, false otherwise.

Captures one packet from the network and adds it to the internal queue. Registers a callback function to process the captured packet.

Parameters

snifferHandler	The active packet capture handler.
interfaceName	The name of the network interface.

Returns

bool True if a packet was successfully captured, false otherwise.

Exceptions

PacketSnifferException	if an error occurs during packet capture.

4.16.2.5 openSnifferHandler()

```
pcap_t * PacketSniffer::openSnifferHandler (
            const std::string & interfaceName)  [nodiscard]
```

Opens a packet capture handler for the specified network interface.

Parameters

interfaceName	Name of the network interface to capture packets from.

Returns

pcap_t∗ Pointer to the packet capture handler.

Initializes a packet sniffer handler for live packet capture on the given interface. Verifies that the interface supports Ethernet headers (DLT_EN10MB).

Parameters

interfaceName	The name of the network interface to capture from.

Returns

pcap_t∗ Pointer to the opened packet capture handler.

Exceptions

PacketSnifferException	if handler cannot be opened or interface is not Ethernet.

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

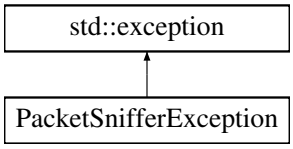
- src/packetsniffer/PacketSniffer.h
- src/packetsniffer/PacketSniffer.cpp

4.17 PacketSnifferException Class Reference

Exception class for packet sniffer-related errors.

`#include <PacketSnifferException.h>`

Inheritance diagram for PacketSnifferException:



Public Member Functions

- PacketSnifferException (std::string msg)

  Constructs a PacketSnifferException with a descriptive message.
- const char * what () const noexcept override

  Returns the explanatory error message.

4.17.1 Detailed Description

Exception class for packet sniffer-related errors.

This exception is thrown when errors occur during packet capture operations.

4.17.2 Constructor & Destructor Documentation

4.17.2.1 PacketSnifferException()

```
PacketSnifferException::PacketSnifferException (
            std::string msg)  [inline], [explicit]
```

Constructs a PacketSnifferException with a descriptive message.

Parameters

msg	Error message describing the exception.

4.17.3 Member Function Documentation

4.17.3.1 what()

```
const char * PacketSnifferException::what () const  [inline], [nodiscard], [override], [noexcept]
```

Returns the explanatory error message.

Returns

const char* Pointer to the error message string.

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

- src/exceptions/PacketSnifferException.h

4.18 StreamData Struct Reference

Structure containing data received from a virtual machine console stream.

```
#include <StreamData.h>
```

Public Attributes

- char **buffer** [255]

  Buffer containing data read from the stream.
- bool **isStreamBroken**

  Flag indicating whether the stream connection is broken.

4.18.1 Detailed Description

Structure containing data received from a virtual machine console stream.

This structure holds data read from a VM console stream along with the stream status.

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

- src/models/StreamData.h

4.19 StringUtils Class Reference

Utility class for string manipulation operations.

`#include <StringUtils.h>`

Static Public Member Functions

- static void copyStringToCharArray (const std::string &src, char ∗charArray, int length)
  Copies a std::string to a character array with specified length.

4.19.1 Detailed Description

Utility class for string manipulation operations.

This class provides static helper methods for converting and copying strings.

4.19.2 Member Function Documentation

4.19.2.1 copyStringToCharArray()

```
void StringUtils::copyStringToCharArray (
            const std::string & src,
            char * charArray,
            int length)  [static]
```

Copies a std::string to a character array with specified length.

Copies a C++ string to a fixed-size character array.

This method safely copies a string to a fixed-size character array, ensuring null-termination and preventing buffer overflow.

Parameters

src	Source string to copy.
charArray	Destination character array.
length	Maximum length of the destination array including null terminator.

Safely copies the contents of a std::string to a C-style character array, ensuring null-termination and preventing buffer overflow.

Parameters

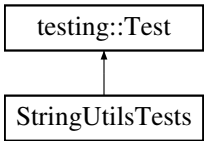
src	The source std::string to copy from.
charArray	The destination character array.
length	The size of the destination array (including space for null terminator).

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

- src/utils/StringUtils.h
- src/utils/StringUtils.cpp

4.20 StringUtilsTests Class Reference

Inheritance diagram for StringUtilsTests:



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

- tests/utils/StringUtilsTests.cpp

4.21 TestingUtils Class Reference

Static Public Member Functions

- static void **expectThrowWithMessage** (const std::function< void()> &func, const std::string &expectedMessage)

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

- tests/TestingUtils.h
- tests/TestingUtils.cpp

4.22 Version Struct Reference

Structure representing a semantic version number.

`#include <Version.h>`

Public Attributes

- unsigned int **major**

  Major version number.
- unsigned int **minor**

  Minor version number.
- unsigned int **patch**

  Patch version number.

4.22.1 Detailed Description

Structure representing a semantic version number.

This structure follows the semantic versioning convention (MAJOR.MINOR.PATCH).

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

- src/models/Version.h

4.23 VersionUtils Class Reference

Utility class for version number operations.

`#include <VersionUtils.h>`

Static Public Member Functions

- static Version getVersion (unsigned long version)
  Converts a packed version number to a Version structure.

4.23.1 Detailed Description

Utility class for version number operations.

This class provides static helper methods for parsing and converting version numbers.

4.23.2 Member Function Documentation

4.23.2.1 getVersion()

```
Version VersionUtils::getVersion (
            unsigned long version)  [static]
```

Converts a packed version number to a Version structure.

Extracts version components from a packed version number.

This method decodes a libvirt-style packed version number (unsigned long) into separate major, minor, and patch components.

Parameters

version	Packed version number (e.g., from libvirt API).

Returns

Version Structure containing major, minor, and patch version numbers.

Decomposes a packed unsigned long version number into its major, minor, and patch components. The encoding format is: MMMMMMNNNNNNPPPP where M=major, N=minor, P=patch.

Parameters

version	The packed version number (format: major∗1000000 + minor∗1000 + patch).

Returns

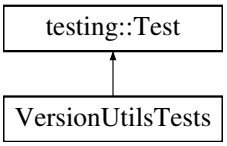
Version A Version object containing separated major, minor, and patch components.

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

- src/utils/VersionUtils.h
- src/utils/VersionUtils.cpp

4.24 VersionUtilsTests Class Reference

Inheritance diagram for VersionUtilsTests:



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

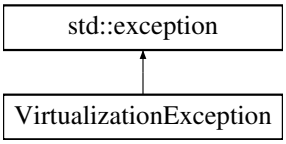
- tests/utils/VersionUtilsTests.cpp

4.25 VirtualizationException Class Reference

Exception class for virtualization-related errors.

`#include <VirtualizationException.h>`

Inheritance diagram for VirtualizationException:



Public Member Functions

- VirtualizationException (std::string msg)

  Constructs a VirtualizationException with a descriptive message.
- const char ∗ what () const noexcept override

  Returns the explanatory error message.

4.25.1 Detailed Description

Exception class for virtualization-related errors.

This exception is thrown when errors occur during virtualization operations

4.25.2 Constructor & Destructor Documentation

4.25.2.1 VirtualizationException()

```
VirtualizationException::VirtualizationException (
            std::string msg)  [inline], [explicit]
```

Constructs a VirtualizationException with a descriptive message.

Parameters

msg	Error message describing the exception.

4.25.3 Member Function Documentation

4.25.3.1 what()

```
const char * VirtualizationException::what () const  [inline], [nodiscard], [override], [noexcept]
```

Returns the explanatory error message.

Returns

const char* Pointer to the error message string.

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

- src/exceptions/VirtualizationException.h

4.26 VirtualizationFacade Class Reference

Facade class providing a unified interface for virtualization operations.

```
#include <VirtualizationFacade.h>
```

Public Member Functions

- VirtualizationFacade (ILibvirtWrapper *libvirt)

  Constructs a VirtualizationFacade with a specific libvirt wrapper.
- VirtualizationFacade ()

  Constructs a VirtualizationFacade with default libvirt wrapper.
- void initializeConnection (const char *customConnectionUrl) const

  Initializes the connection to the hypervisor.
- void getConnectionInfo (ConnectionInfo *infoPtr) const

  Retrieves detailed information about the hypervisor connection.
- void createVirtualMachine (const std::string &virtualMachineXml) const

  Creates a new virtual machine from XML definition.
- void getInfoAboutVirtualMachine (VirtualMachineInfo *virtualMachineInfo, const std::string &name) const

  Retrieves information about a specific virtual machine.
- void getListOfVirtualMachinesWithInfo (VirtualMachineInfo **arrayOfVirtualMachines, int *numberOf↩ VirtualMachines) const

  Retrieves a list of all virtual machines with their information.
- void isConnectionAlive (bool *isAlive) const

  Checks if the hypervisor connection is alive.
- virStreamPtr openVirtualMachineConsole (const std::string &vmUuid) const

  Opens a console stream to a virtual machine.
- void receiveDataFromConsole (virStreamPtr stream, StreamData *streamData) const

  Receives data from a virtual machine console.
- void sendDataToConsole (virStreamPtr stream, const std::string &data) const

  Sends data to a virtual machine console.
- void closeStream (virStreamPtr stream) const

  Closes a console stream.
- virNetworkPtr createVirtualNetworkFromXml (const std::string &networkDefinition) const

  Creates a virtual network from XML definition.
- void attachDeviceToVm (const std::string &uuid, const std::string &deviceDefinition) const

  Attaches a device to a virtual machine.
- void detachDeviceFromVm (const std::string &uuid, const std::string &deviceDefinition) const

  Detaches a device from a virtual machine.
- void updateVmDevice (const std::string &uuid, const std::string &deviceDefinition) const

  Updates a device configuration in a virtual machine.
- void destroyNetwork (const std::string &name) const

  Destroys (stops and removes) a virtual network.
- std::string getNetworkDefinition (const std::string &name) const

  Retrieves the XML definition of a virtual network.

4.26.1 Detailed Description

Facade class providing a unified interface for virtualization operations.

This class serves as a high-level interface that coordinates multiple manager classes to provide comprehensive virtualization functionality including connection management, virtual machine operations, console access, and network management.

4.26.2 Constructor & Destructor Documentation

4.26.2.1 VirtualizationFacade() [1/2]

```
VirtualizationFacade::VirtualizationFacade (
            ILibvirtWrapper * libvirt)  [explicit]
```

Constructs a VirtualizationFacade with a specific libvirt wrapper.

Constructs a VirtualizationFacade with a custom libvirt wrapper.

Parameters

libvirt	Pointer to an ILibvirtWrapper implementation.

Initializes the facade with the specified libvirt wrapper implementation and creates manager instances for virtual machines, consoles, connections, and networks.

Parameters

libvirt	Custom ILibvirtWrapper implementation to use.

4.26.2.2 VirtualizationFacade() [2/2]

```
VirtualizationFacade::VirtualizationFacade ()  [explicit]
```

Constructs a VirtualizationFacade with default libvirt wrapper.

Initializes the facade with the default LibvirtWrapper implementation and creates manager instances for all virtualization components.

4.26.3 Member Function Documentation

4.26.3.1 attachDeviceToVm()

```
void VirtualizationFacade::attachDeviceToVm (
            const std::string & uuid,
            const std::string & deviceDefinition) const
```

Attaches a device to a virtual machine.

Parameters

uuid	UUID of the virtual machine.
deviceDefinition	XML string defining the device to attach.
uuid	The UUID of the virtual machine.
deviceDefinition	XML definition of the device.

Exceptions

VirtualizationException	if device attachment fails.

4.26.3.2 closeStream()

```
void VirtualizationFacade::closeStream (
            virStreamPtr stream) const
```

Closes a console stream.

Parameters

stream	Console stream to close.
stream	The stream to close.

4.26.3.3 createVirtualMachine()

```
void VirtualizationFacade::createVirtualMachine (
            const std::string & virtualMachineXml) const
```

Creates a new virtual machine from XML definition.

Creates a new virtual machine from an XML definition.

Parameters

virtualMachineXml	XML string defining the virtual machine configuration.
virtualMachineXml	XML definition of the virtual machine to create.

Exceptions

VirtualizationException	if VM creation fails.

4.26.3.4 createVirtualNetworkFromXml()

```
virNetworkPtr VirtualizationFacade::createVirtualNetworkFromXml (
            const std::string & networkDefinition) const  [nodiscard]
```

Creates a virtual network from XML definition.

Creates a virtual network from an XML definition.

Parameters

networkDefinition	XML string defining the network configuration.

Returns

virNetworkPtr Pointer to the created network.

Parameters

networkDefinition	XML definition of the network.

Returns

virNetworkPtr Pointer to the created network.

Exceptions

VirtualizationException	if network creation fails.

4.26.3.5 destroyNetwork()

```
void VirtualizationFacade::destroyNetwork (
            const std::string & name) const
```

Destroys (stops and removes) a virtual network.

Destroys (deletes) a virtual network.

Parameters

name	Name of the network to destroy.
name	The name of the network.

Exceptions

VirtualizationException	if network destruction fails.

4.26.3.6 detachDeviceFromVm()

```
void VirtualizationFacade::detachDeviceFromVm (
            const std::string & uuid,
            const std::string & deviceDefinition) const
```

Detaches a device from a virtual machine.

Parameters

uuid	UUID of the virtual machine.
deviceDefinition	XML string defining the device to detach.
uuid	The UUID of the virtual machine.
deviceDefinition	XML definition of the device.

Exceptions

VirtualizationException	if device detachment fails.

4.26.3.7 getConnectionInfo()

```
void VirtualizationFacade::getConnectionInfo (
            ConnectionInfo * infoPtr) const
```

Retrieves detailed information about the hypervisor connection.

Retrieves information about the current hypervisor connection.

Parameters

infoPtr	Pointer to ConnectionInfo structure to be filled with connection data.
infoPtr	Pointer to ConnectionInfo structure to be populated with connection details.

Exceptions

VirtualizationException	if no active connection exists.

4.26.3.8 getInfoAboutVirtualMachine()

```
void VirtualizationFacade::getInfoAboutVirtualMachine (
            VirtualMachineInfo * virtualMachineInfo,
            const std::string & name) const
```

Retrieves information about a specific virtual machine.

Parameters

virtualMachineInfo	Pointer to VirtualMachineInfo structure to be filled.
name	Name of the virtual machine.
virtualMachineInfo	Pointer to VirtualMachineInfo structure to be populated.
name	The name of the virtual machine.

Exceptions

VirtualizationException	if VM is not found or info retrieval fails.

4.26.3.9 getListOfVirtualMachinesWithInfo()

```
void VirtualizationFacade::getListOfVirtualMachinesWithInfo (
            VirtualMachineInfo ** arrayOfVirtualMachines,
            int * numberOfVirtualMachines) const
```

Retrieves a list of all virtual machines with their information.

Retrieves information about all virtual machines.

Parameters

arrayOfVirtualMachines	Pointer to array that will be allocated and filled with VM info.
numberOfVirtualMachines	Pointer to integer that will store the count of VMs.
arrayOfVirtualMachines	Pointer to array of VirtualMachineInfo structures to be populated.
numberOfVirtualMachines	Pointer to store the count of virtual machines.

Exceptions

VirtualizationException	if retrieval fails.

4.26.3.10 getNetworkDefinition()

```
std::string VirtualizationFacade::getNetworkDefinition (
            const std::string & name) const  [nodiscard]
```

Retrieves the XML definition of a virtual network.

Retrieves the XML definition of a network.

Parameters

name	Name of the network.

Returns

std::string XML definition of the network.

Parameters

name	The name of the network.

Returns

std::string The XML definition of the network.

Exceptions

VirtualizationException	if retrieval fails.

4.26.3.11 initializeConnection()

```
void VirtualizationFacade::initializeConnection (
            const char * customConnectionUrl) const
```

Initializes the connection to the hypervisor.

Initializes a connection to a hypervisor.

Parameters

customConnectionUrl	Optional custom connection URL. If nullptr, default connection is used.

Establishes a connection to the specified hypervisor and updates all manager instances with the new connection.

Parameters

customConnectionUrl	Optional custom connection URI. If nullptr, uses default "qemu:///system".

Exceptions

VirtualizationException	if connection fails.

4.26.3.12 isConnectionAlive()

```
void VirtualizationFacade::isConnectionAlive (
            bool * isAlive) const
```

Checks if the hypervisor connection is alive.

Checks if the hypervisor connection is still active.

Parameters

isAlive	Pointer to boolean that will store the connection status.
isAlive	Pointer to boolean to be set with connection status.

Returns

bool True if connection is alive, false otherwise.

4.26.3.13 openVirtualMachineConsole()

```
virStreamPtr VirtualizationFacade::openVirtualMachineConsole (
            const std::string & vmUuid) const  [nodiscard]
```

Opens a console stream to a virtual machine.

Opens a console connection to a virtual machine.

Parameters

vmUuid	UUID of the virtual machine to connect to.

Returns

virStreamPtr Pointer to the opened console stream.

Parameters

vmUuid	The UUID of the virtual machine.

Returns

virStreamPtr Stream pointer for console communication.

Exceptions

VirtualizationException	if console opening fails.

4.26.3.14 receiveDataFromConsole()

```
void VirtualizationFacade::receiveDataFromConsole (
            virStreamPtr stream,
            StreamData * streamData) const
```

Receives data from a virtual machine console.

Parameters

stream	Active console stream to read from.
streamData	Pointer to StreamData structure to be filled with received data.
stream	The console stream.
streamData	Pointer to StreamData structure to receive the data.

4.26.3.15 sendDataToConsole()

```
void VirtualizationFacade::sendDataToConsole (
            virStreamPtr stream,
            const std::string & data) const
```

Sends data to a virtual machine console.

Parameters

stream	Active console stream to write to.
data	Data string to send to the console.
stream	The console stream.
data	The data to send.

4.26.3.16 updateVmDevice()

```
void VirtualizationFacade::updateVmDevice (
            const std::string & uuid,
            const std::string & deviceDefinition) const
```

Updates a device configuration in a virtual machine.

Updates a device configuration on a virtual machine.

Parameters

uuid	UUID of the virtual machine.
deviceDefinition	XML string defining the new device configuration.
uuid	The UUID of the virtual machine.
deviceDefinition	Updated XML definition of the device.

Exceptions

VirtualizationException	if device update fails.

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

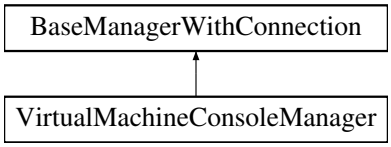
- src/virt/VirtualizationFacade.h
- src/virt/VirtualizationFacade.cpp

4.27 VirtualMachineConsoleManager Class Reference

Manages virtual machine console connections.

`#include <VirtualMachineConsoleManager.h>`

Inheritance diagram for VirtualMachineConsoleManager:



Public Member Functions

- virStreamPtr openVirtualMachineConsole (const std::string &vmUuid) const

  Opens a console stream to a virtual machine.
- void getDataFromStream (virStreamPtr stream, StreamData ∗streamData) const

  Receives data from a virtual machine console stream.
- void sendDataToStream (virStreamPtr stream, const char ∗data, int dataSize) const

  Sends data to a virtual machine console stream.
- void closeStream (virStreamPtr stream) const

  Closes a console stream and releases resources.
- BaseManagerWithConnection (ILibvirtWrapper ∗libvirt)

  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()

  Constructs a BaseManagerWithConnection with default libvirt wrapper.

Public Member Functions inherited from BaseManagerWithConnection

- BaseManagerWithConnection (ILibvirtWrapper *libvirt)

  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()

  Constructs a BaseManagerWithConnection with default libvirt wrapper.
- void updateConnection (virConnectPtr conn)

  Updates the libvirt connection pointer.

Additional Inherited Members

Protected Member Functions inherited from BaseManagerWithConnection

- void checkIfConnectionIsSet () const

  Checks if the connection is set and throws an exception if not.

Protected Attributes inherited from BaseManagerWithConnection

- ILibvirtWrapper * **libvirt**
- virConnectPtr **conn**

4.27.1 Detailed Description

Manages virtual machine console connections.

This class provides functionality for opening and managing console streams to virtual machines, allowing for interactive terminal access.

4.27.2 Member Function Documentation

4.27.2.1 BaseManagerWithConnection()

```
BaseManagerWithConnection::BaseManagerWithConnection (
            ILibvirtWrapper * libvirt)  [inline], [explicit]
```

Constructs a BaseManagerWithConnection with a specific libvirt wrapper.

Parameters

libvirt	Pointer to an ILibvirtWrapper implementation.

4.27.2.2 closeStream()

```
void VirtualMachineConsoleManager::closeStream (
            virStreamPtr stream) const
```

Closes a console stream and releases resources.

Closes and frees a console stream.

Parameters

stream	Console stream to close.

Properly closes the stream and releases all associated resources.

Parameters

stream	The stream to close.

4.27.2.3 getDataFromStream()

```
void VirtualMachineConsoleManager::getDataFromStream (
            virStreamPtr stream,
            StreamData * streamData) const
```

Receives data from a virtual machine console stream.

Receives data from a console stream.

Parameters

stream	Active console stream to read from.
streamData	Pointer to StreamData structure to be filled with received data.

Attempts to read data from the stream. Sets isStreamBroken flag if the stream is closed or an error occurs.

Parameters

stream	The console stream.
streamData	Pointer to StreamData structure to store received data and status.

4.27.2.4 openVirtualMachineConsole()

```
virStreamPtr VirtualMachineConsoleManager::openVirtualMachineConsole (
            const std::string & vmUuid) const
```

Opens a console stream to a virtual machine.

Opens a console connection to a virtual machine.

Parameters

vmUuid	UUID of the virtual machine to connect to.

Returns

virStreamPtr Pointer to the opened console stream.

Creates a stream and opens a console connection to the specified VM, allowing text I/O with the VM console.

Parameters

vmUuid	The UUID of the virtual machine.

Returns

virStreamPtr Stream pointer for console communication.

Exceptions

VirtualizationException	if connection is not set, VM not found, or console opening fails.

4.27.2.5 sendDataToStream()

```
void VirtualMachineConsoleManager::sendDataToStream (
            virStreamPtr stream,
            const char * data,
            int dataSize) const
```

Sends data to a virtual machine console stream.

Sends data to a console stream.

Parameters

stream	Active console stream to write to.
data	Data to send to the console.
dataSize	Size of data in bytes.

Writes data to the stream for transmission to the VM console.

Parameters

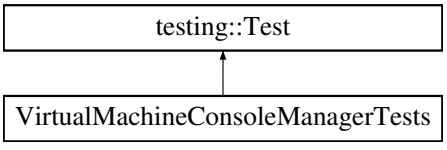
stream	The console stream.
data	The data to send.
dataSize	Size of the data in bytes.

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

- src/virt/managers/VirtualMachineConsoleManager.h
- src/virt/managers/VirtualMachineConsoleManager.cpp

4.28 VirtualMachineConsoleManagerTests Class Reference

Inheritance diagram for VirtualMachineConsoleManagerTests:



Protected Attributes

- LibvirtWrapperMock **mockLibvirt**
- VirtualMachineConsoleManager **manager**

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

- tests/VirtualMachineConsoleManager.cpp

4.29 VirtualMachineInfo Struct Reference

Structure containing basic information about a virtual machine.

`#include <VirtualMachineInfo.h>`

Public Attributes

- char **uuid** [128]

  The identifier of the virtual machine in libvirt system.
- char **name** [256]
- unsigned long **usedMemory**
- unsigned char **state**

4.29.1 Detailed Description

Structure containing basic information about a virtual machine.

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

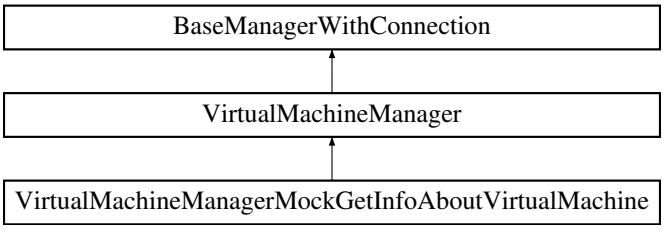
- src/models/VirtualMachineInfo.h

4.30 VirtualMachineManager Class Reference

Manages virtual machines.

`#include <VirtualMachineManager.h>`

Inheritance diagram for VirtualMachineManager:



Public Member Functions

- void createVirtualMachine (const std::string &virtualMachineXml) const
  Creates a virtual machine based on an XML configuration.
- virtual VirtualMachineInfo getInfoAboutVirtualMachine (const std::string &name)
  Retrieves information about a virtual machine identified by its name.
- std::vector< VirtualMachineInfo > getListOfVirtualMachinesWithInfo ()
  Retrieves a list of all virtual machines with their information.
- void attachDeviceToVirtualMachine (const std::string &uuid, const std::string &deviceDefinition) const
  Attaches a device to a virtual machine.
- void detachDeviceFromVirtualMachine (const std::string &uuid, const std::string &deviceDefinition) const
  Detaches a device from a virtual machine.
- void updateVmDevice (const std::string &uuid, const std::string &deviceDefinition) const
  Updates a device configuration in a virtual machine.
- BaseManagerWithConnection (ILibvirtWrapper *libvirt)
  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()
  Constructs a BaseManagerWithConnection with default libvirt wrapper.

Public Member Functions inherited from BaseManagerWithConnection

- BaseManagerWithConnection (ILibvirtWrapper *libvirt)
  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()
  Constructs a BaseManagerWithConnection with default libvirt wrapper.
- void updateConnection (virConnectPtr conn)
  Updates the libvirt connection pointer.

Additional Inherited Members

Protected Member Functions inherited from BaseManagerWithConnection

- void checkIfConnectionIsSet () const
  Checks if the connection is set and throws an exception if not.

Protected Attributes inherited from BaseManagerWithConnection

- ILibvirtWrapper * **libvirt**
- virConnectPtr **conn**

4.30.1 Detailed Description

Manages virtual machines.

This class handles the connection to the libvirt backend and operations related to virtual machines such as creation and retrieving information.

4.30.2 Member Function Documentation

4.30.2.1 attachDeviceToVirtualMachine()

```
void VirtualMachineManager::attachDeviceToVirtualMachine (
            const std::string & uuid,
            const std::string & deviceDefinition) const
```

Attaches a device to a virtual machine.

Parameters

uuid	UUID of the virtual machine.
deviceDefinition	XML string defining the device to attach.
uuid	The UUID of the virtual machine.
deviceDefinition	XML definition of the device to attach.

Exceptions

VirtualizationException	if connection is not set or attachment fails.

4.30.2.2 BaseManagerWithConnection()

```
BaseManagerWithConnection::BaseManagerWithConnection (
            ILibvirtWrapper * libvirt)  [inline], [explicit]
```

Constructs a BaseManagerWithConnection with a specific libvirt wrapper.

Parameters

libvirt	Pointer to an ILibvirtWrapper implementation.

4.30.2.3 createVirtualMachine()

```
void VirtualMachineManager::createVirtualMachine (
            const std::string & virtualMachineXml) const
```

Creates a virtual machine based on an XML configuration.

Creates a new virtual machine from an XML definition.

Parameters

virtualMachineXml	XML string describing the virtual machine configuration.
virtualMachineXml	The XML definition of the virtual machine.

Exceptions

VirtualizationException	if the connection is not set or VM creation fails.

4.30.2.4 detachDeviceFromVirtualMachine()

```
void VirtualMachineManager::detachDeviceFromVirtualMachine (
            const std::string & uuid,
            const std::string & deviceDefinition) const
```

Detaches a device from a virtual machine.

Parameters

uuid	UUID of the virtual machine.
deviceDefinition	XML string defining the device to detach.
uuid	The UUID of the virtual machine.
deviceDefinition	XML definition of the device to detach.

Exceptions

VirtualizationException	if connection is not set or detachment fails.

4.30.2.5 getInfoAboutVirtualMachine()

```
VirtualMachineInfo VirtualMachineManager::getInfoAboutVirtualMachine (
            const std::string & name)  [virtual]
```

Retrieves information about a virtual machine identified by its name.

Retrieves detailed information about a specific virtual machine.

Parameters

name	Name string of the virtual machine.

Returns

VirtualMachineInfo Information about the virtual machine.

Gets information including memory usage, state, UUID, and name for the VM.

Parameters

name	The name of the virtual machine.

Returns

VirtualMachineInfo Structure containing VM information.

Exceptions

VirtualizationException	if VM is not found or info retrieval fails.

4.30.2.6 getListOfVirtualMachinesWithInfo()

```
std::vector< VirtualMachineInfo > VirtualMachineManager::getListOfVirtualMachinesWithInfo ()
```

Retrieves a list of all virtual machines with their information.

Retrieves information about all virtual machines.

Returns

std::vector<VirtualMachineInfo> Vector containing information about all VMs.

Gets a list of all active and inactive virtual machines with their details.

Returns

std::vector<VirtualMachineInfo> Vector of VM information structures.

Exceptions

VirtualizationException	if connection is not set or retrieval fails.

4.30.2.7 updateVmDevice()

```
void VirtualMachineManager::updateVmDevice (
            const std::string & uuid,
            const std::string & deviceDefinition) const
```

Updates a device configuration in a virtual machine.

Updates a device configuration on a virtual machine.

Parameters

uuid	UUID of the virtual machine.
deviceDefinition	XML string defining the new device configuration.
uuid	The UUID of the virtual machine.
deviceDefinition	Updated XML definition of the device.

Exceptions

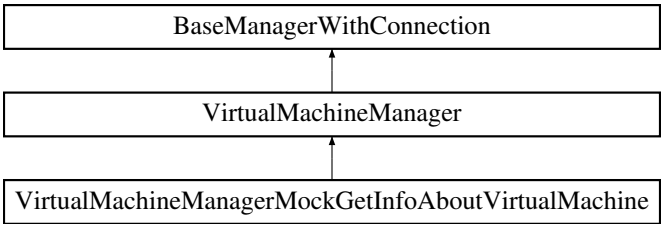
VirtualizationException	if connection is not set or update fails.

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

- src/virt/managers/VirtualMachineManager.h
- src/virt/managers/VirtualMachineManager.cpp

4.31 VirtualMachineManagerMockGetInfoAboutVirtualMachine Class Reference

Inheritance diagram for VirtualMachineManagerMockGetInfoAboutVirtualMachine:



Public Member Functions

- **VirtualMachineManagerMockGetInfoAboutVirtualMachine** (ILibvirtWrapper *libvirt)
- **MOCK_METHOD** (VirtualMachineInfo, getInfoAboutVirtualMachine,(const std::string &uuid),(override))

Public Member Functions inherited from VirtualMachineManager

- void createVirtualMachine (const std::string &virtualMachineXml) const

  Creates a virtual machine based on an XML configuration.
- virtual VirtualMachineInfo getInfoAboutVirtualMachine (const std::string &name)

  Retrieves information about a virtual machine identified by its name.
- std::vector< VirtualMachineInfo > getListOfVirtualMachinesWithInfo ()

  Retrieves a list of all virtual machines with their information.
- void attachDeviceToVirtualMachine (const std::string &uuid, const std::string &deviceDefinition) const

  Attaches a device to a virtual machine.
- void detachDeviceFromVirtualMachine (const std::string &uuid, const std::string &deviceDefinition) const

  Detaches a device from a virtual machine.
- void updateVmDevice (const std::string &uuid, const std::string &deviceDefinition) const

  Updates a device configuration in a virtual machine.
- BaseManagerWithConnection (ILibvirtWrapper *libvirt)

  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()

  Constructs a BaseManagerWithConnection with default libvirt wrapper.

Public Member Functions inherited from BaseManagerWithConnection

- BaseManagerWithConnection (ILibvirtWrapper *libvirt)

  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()

  Constructs a BaseManagerWithConnection with default libvirt wrapper.
- void updateConnection (virConnectPtr conn)

  Updates the libvirt connection pointer.

Additional Inherited Members

Protected Member Functions inherited from BaseManagerWithConnection

- void checkIfConnectionIsSet () const

  Checks if the connection is set and throws an exception if not.

Protected Attributes inherited from BaseManagerWithConnection

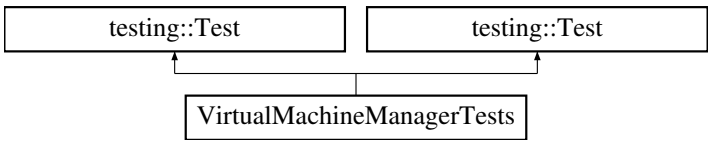
- ILibvirtWrapper * **libvirt**
- virConnectPtr **conn**

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

- tests/mocks/VirtualMachineManagerMockGetInfoAboutVirtualMachine.h

4.32 VirtualMachineManagerTests Class Reference

Inheritance diagram for VirtualMachineManagerTests:



Protected Attributes

- LibvirtWrapperMock **mockLibvirt**
- VirtualMachineManager **manager**
- VirtualNetworkManager **manager**

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

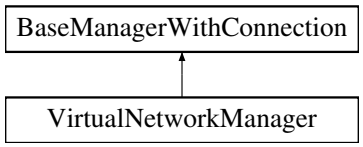
- tests/VirtualMachineManagerTests.cpp
- tests/VirtualNetworkManagerTests.cpp

4.33 VirtualNetworkManager Class Reference

Manages virtual networks.

`#include <VirtualNetworkManager.h>`

Inheritance diagram for VirtualNetworkManager:



Public Member Functions

- virNetworkPtr createNetworkFromXml (const std::string &networkDefinition) const

  Creates a virtual network from an XML definition.
- void destroyNetwork (const std::string &name) const

  Destroys (stops and removes) a virtual network.
- std::string getNetworkXmlDefinition (const std::string &name) const

  Retrieves the XML definition of a virtual network.
- BaseManagerWithConnection (ILibvirtWrapper *libvirt)

  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()

  Constructs a BaseManagerWithConnection with default libvirt wrapper.

Public Member Functions inherited from BaseManagerWithConnection

- BaseManagerWithConnection (ILibvirtWrapper *libvirt)

  Constructs a BaseManagerWithConnection with a specific libvirt wrapper.
- **BaseManagerWithConnection** ()

  Constructs a BaseManagerWithConnection with default libvirt wrapper.
- void updateConnection (virConnectPtr conn)

  Updates the libvirt connection pointer.

Additional Inherited Members

Protected Member Functions inherited from BaseManagerWithConnection

- void checkIfConnectionIsSet () const

  Checks if the connection is set and throws an exception if not.

Protected Attributes inherited from BaseManagerWithConnection

- ILibvirtWrapper * **libvirt**
- virConnectPtr **conn**

4.33.1 Detailed Description

Manages virtual networks.

This class provides functionality for creating, destroying, and managing virtual networks using libvirt.

4.33.2 Member Function Documentation

4.33.2.1 BaseManagerWithConnection()

```
BaseManagerWithConnection::BaseManagerWithConnection (
            ILibvirtWrapper * libvirt)  [inline], [explicit]
```

Constructs a BaseManagerWithConnection with a specific libvirt wrapper.

Parameters

libvirt	Pointer to an ILibvirtWrapper implementation.

4.33.2.2 createNetworkFromXml()

```
virNetworkPtr VirtualNetworkManager::createNetworkFromXml (
            const std::string & networkDefinition) const
```

Creates a virtual network from an XML definition.

Parameters

networkDefinition	XML string defining the network configuration.

Returns

virNetworkPtr Pointer to the created network.

Parameters

networkDefinition	XML definition of the network.

Returns

virNetworkPtr Pointer to the created network.

Exceptions

VirtualizationException	if connection is not set or creation fails.

4.33.2.3 destroyNetwork()

```
void VirtualNetworkManager::destroyNetwork (
            const std::string & name) const
```

Destroys (stops and removes) a virtual network.

Destroys (deletes) a virtual network.

Parameters

name	Name of the network to destroy.
name	The name of the network to destroy.

Exceptions

VirtualizationException	if connection is not set or destruction fails.

4.33.2.4 getNetworkXmlDefinition()

```
std::string VirtualNetworkManager::getNetworkXmlDefinition (
            const std::string & name) const  [nodiscard]
```

Retrieves the XML definition of a virtual network.

Parameters

name	Name of the network.

Returns

std::string XML definition of the network.

Parameters

name	The name of the network.

Returns

std::string The XML definition of the network.

Exceptions

VirtualizationException	if connection is not set or retrieval fails.

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

- src/virt/managers/VirtualNetworkManager.h
- src/virt/managers/VirtualNetworkManager.cpp

Chapter 5

File Documentation

5.1 PacketSnifferException.h

```
00001 #ifndef SNIFFEREXCEPTION_H
00002 #define SNIFFEREXCEPTION_H
00003 #include <string>
00004 #include <utility>
00005
00011 class PacketSnifferException final : public std::exception
00012 {
00013     std::string message;
00014
00015 public:
00021     explicit PacketSnifferException(std::string  msg) : message(std::move(msg))
00022     {
00023     }
00024
00030     [[nodiscard]] const char* what() const noexcept override
00031     {
00032         return message.c_str();
00033     }
00034 };
00035 #endif //SNIFFEREXCEPTION_H
```

5.2 VirtualizationException.h

```
00001 #ifndef VIRTUALIZATIONEXCEPTION_H
00002 #define VIRTUALIZATIONEXCEPTION_H
00003 #include <exception>
00004 #include <string>
00005 #include <utility>
00006
00012 class VirtualizationException final : public std::exception {
00013     std::string message;
00014
00015 public:
00021     explicit VirtualizationException(std::string msg) : message(std::move(msg)) {
00022     }
00023
00029     [[nodiscard]] const char *what() const noexcept override {
00030         return message.c_str();
00031     }
00032 };
00033 #endif //VIRTUALIZATIONEXCEPTION_H
```

5.3 ILibpcapWrapper.h

```
00001 #ifndef ILIBPCAPWRAPPER_H
00002 #define ILIBPCAPWRAPPER_H
00003 #include <string>
00004 #include <pcap/pcap.h>
```

```
00005
00012 class ILibpcapWrapper
00013 {
00014 public:
00015     virtual ~ILibpcapWrapper() = default;
00016
00024     virtual pcap_t* openHandlerLive(const std::string& interfaceName, char* errBuff) = 0;
00025
00031     virtual int getLinkLayerType(pcap_t* handler) = 0;
00032
00038     virtual void closeHandler(pcap_t* handler) = 0;
00039
00047     virtual int listenForPackets(pcap_t* handler, pcap_handler callback, u_char* args) = 0;
00048
00054     virtual void close(pcap_t* handler) = 0;
00055 };
00056
00057 #endif //ILIBPCAPWRAPPER_H
```

5.4 ILibvirtWrapper.h

```
00001 #ifndef ILIBVIRTWRAPPER_H
00002 #define ILIBVIRTWRAPPER_H
00003 #include <string>
00004 #include <libvirt/libvirt.h>
00005
00012 class ILibvirtWrapper
00013 {
00014 public:
00015     virtual ~ILibvirtWrapper() = default;
00016
00023     virtual virConnectPtr connectOpen(const char* name) = 0;
00024
00032     virtual virDomainPtr createVirtualMachineFromXml(virConnectPtr conn, const char* xmlConfig) = 0;
00033
00040     virtual void getUuidFromDomain(virDomainPtr domain, char* uuid) = 0;
00041
00049     virtual int getNodeInfo(virConnectPtr conn, virNodeInfoPtr info) = 0;
00050
00058     virtual int getLibVersion(virConnectPtr conn, unsigned long* version) = 0;
00059
00067     virtual int getDriverVersion(virConnectPtr conn, unsigned long* version) = 0;
00068
00075     virtual std::string getConnectUrl(virConnectPtr conn) = 0;
00076
00083     virtual std::string getDriverType(virConnectPtr conn) = 0;
00084
00090     virtual std::string getLastError() = 0;
00091
00099     virtual virDomainPtr domainLookupByName(virConnectPtr conn, std::string name) = 0;
00100
00108     virtual int domainGetInfo(virDomainPtr domain, virDomainInfo& domainInfo) = 0;
00109
00117     virtual int getDomainUUID(virDomainPtr domain, std::string& uuid) = 0;
00118
00126     virtual int getListOfAllDomains(virConnectPtr conn, virDomainPtr** domains) = 0;
00127
00134     virtual std::string getDomainName(virDomainPtr domain) = 0;
00135
00141     virtual void freeDomain(virDomainPtr domain) = 0;
00142
00149     virtual int connectionIsAlive(virConnectPtr conn) = 0;
00150
00157     virtual virStreamPtr createNewStream(virConnectPtr conn) = 0;
00158
00166     virtual int openDomainConsole(virDomainPtr domain, virStreamPtr stream) = 0;
00167
00175     virtual virDomainPtr domainLookupByUuid(virConnectPtr conn, const std::string& uuid) = 0;
00176
00185     virtual int receiveDataFromStream(virStreamPtr stream, char* buffer, int bufferSize) = 0;
00186
00194     virtual void sendDataToStream(virStreamPtr stream, const char* buffer, int bufferSize) = 0;
00195
00201     virtual void finishAndFreeStream(virStreamPtr stream) = 0;
00202
00210     virtual virNetworkPtr createNetworkFromXml(virConnectPtr conn, const std::string&
      networkDefinition) = 0;
00211
00219     virtual int attachDeviceToVm(virDomainPtr domain, const std::string& deviceDefinition) = 0;
00220
00228     virtual int detachDeviceFromVm(virDomainPtr domain, const std::string& deviceDefinition) = 0;
00229
00237     virtual int updateVmDevice(virDomainPtr domain, const std::string& deviceDefinition) = 0;
```

```
00238
00246     virtual virNetworkPtr getNetworkByName(virConnectPtr conn, const std::string& name) = 0;
00247
00254     virtual int destroyNetwork(virNetworkPtr network) = 0;
00255
00262     virtual std::string getNetworkDefinition(virNetworkPtr network) = 0;
00263 };
00264
00265
00266 #endif // ILIBVIRTWRAPPER_H
```

5.5 ConnectionInfo.h

```
00001 #ifndef CONNECTIONINFO_H
00002 #define CONNECTIONINFO_H
00003 #include "Version.h"
00004
00011 struct ConnectionInfo {
00015     unsigned int cpuCount;
00016
00020     unsigned int cpuFreq;
00021
00025     unsigned long totalMemory;
00026
00030     char connectionUrl[256];
00031
00035     char driverType[256];
00036
00040     Version libVersion;
00041
00045     Version driverVersion;
00046 };
00047
00048 #endif //CONNECTIONINFO_H
```

5.6 ExecutionInfo.h

```
00001 #ifndef EXECUTIONINFO_H
00002 #define EXECUTIONINFO_H
00003
00009 struct ExecutionInfo
00010 {
00014     bool errorOccurred;
00015
00019     char msg[128];
00020 };
00021
00022 #endif // EXECUTIONINFO_H
```

5.7 ListenCallbackArgs.h

```
00001 #ifndef LISTENCALLBACKARGS_H
00002 #define LISTENCALLBACKARGS_H
00003 #include "../packetsniffer/PacketSniffer.h"
00004
00011 struct ListenCallbackArgs
00012 {
00016     PacketSniffer* sniffer;
00017
00021     std::string interfaceName;
00022 };
00023
00024 #endif //LISTENCALLBACKARGS_H
```

5.8 NetworkDefinition.h

```
00001 #ifndef NETWORKDEFINITION_H
00002 #define NETWORKDEFINITION_H
00003
```

```
00009 struct NetworkDefinition
00010 {
00014     char content[4096];
00015 };
00016
00017 #endif
```

5.9 Packet.h

```
00001 #ifndef PACKET_H
00002 #define PACKET_H
00003
00010 struct Packet
00011 {
00015     char interfaceName[64];
00016
00020     unsigned char* content;
00021
00025     int contentLength;
00026
00030     unsigned int timestampMicroseconds;
00031 };
00032
00033 #endif //PACKET_H
```

5.10 StreamData.h

```
00001 #ifndef STREAMRESPONSE_H
00002 #define STREAMRESPONSE_H
00003
00009 struct StreamData
00010 {
00014     char buffer[255];
00015
00019     bool isStreamBroken;
00020 };
00021
00022 #endif // STREAMRESPONSE_H
```

5.11 Version.h

```
00001 #ifndef VERSION_H
00002 #define VERSION_H
00003
00009 struct Version {
00013     unsigned int major;
00014
00018     unsigned int minor;
00019
00023     unsigned int patch;
00024 };
00025
00026 #endif //VERSION_H
```

5.12 VirtualMachineInfo.h

```
00001 #ifndef VIRTUALMACHINEINFO_H
00002 #define VIRTUALMACHINEINFO_H
00003
00007 struct VirtualMachineInfo
00008 {
00012     char uuid[128];
00013     char name[256];
00014     unsigned long usedMemory;
00015     unsigned char state;
00016 };
00017
00018 #endif //VIRTUALMACHINEINFO_H
```

5.13 PacketSniffer.h

```
00001 #ifndef PACKETSNIFFER_H
00002 #define PACKETSNIFFER_H
00003 #include <queue>
00004 #include <string>
00005
00006 #include "../interfaces/ILibpcapWrapper.h"
00007 #include "../models/Packet.h"
00008 #include "../wrappers/LibpcapWrapper.h"
00009
00017 class PacketSniffer
00018 {
00019     ILibpcapWrapper* pcap;
00020     char errBuffer[PCAP_ERRBUF_SIZE]{};
00021     std::queue<Packet> packetsQueue;
00022
00023 public:
00027     PacketSniffer()
00028     {
00029         pcap = new LibpcapWrapper();
00030     }
00031
00038     [[nodiscard]] pcap_t* openSnifferHandler(const std::string& interfaceName);
00039
00049     [[nodiscard]] bool listenForPacket(pcap_t* snifferHandler, const std::string& interfaceName);
00050
00056     void closeAndStopListening(pcap_t* handler) const;
00057
00063     [[nodiscard]] Packet getPacketFromQueue();
00064
00070     [[nodiscard]] int getNumberOfReceivedPackets() const;
00071
00072 private:
00082     static void handlePackets(u_char* args, const pcap_pkthdr* header, const u_char* packet);
00083 };
00084
00085 #endif //PACKETSNIFFER_H
```

5.14 ExecutionInfoObtainer.h

```
00001 #ifndef EXECUTIONINFOOBTAINER_H
00002 #define EXECUTIONINFOOBTAINER_H
00003 #include <functional>
00004
00005 #include "../models/ExecutionInfo.h"
00006
00013 class ExecutionInfoObtainer
00014 {
00015 public:
00026     static void runAndObtainExecutionInfo(ExecutionInfo* executionInfo, const std::function<void()>&
      func);
00027 };
00028
00029 #endif // EXECUTIONINFOOBTAINER_H
```

5.15 StringUtils.h

```
00001 #ifndef STRINGTOCHARUTILS_H
00002 #define STRINGTOCHARUTILS_H
00003 #include <string>
00004
00010 class StringUtils
00011 {
00012 public:
00023     static void copyStringToCharArray(const std::string& src, char* charArray, int length);
00024 };
00025
00026
00027 #endif //STRINGTOCHARUTILS_H
```

5.16 VersionUtils.h

```
00001 #ifndef VERSIONUTILS_H
```

```
00002 #define VERSIONUTILS_H
00003 #include "../models/Version.h"
00004
00010 class VersionUtils {
00011 public:
00021     static Version getVersion(unsigned long version);
00022 };
00023
00024 #endif //VERSIONUTILS_H
```

5.17 BaseManagerWithConnection.h

```
00001 #ifndef BASEMANAGERWITHCONNECTION_H
00002 #define BASEMANAGERWITHCONNECTION_H
00003 #include "../../wrappers/LibvirtWrapper.h"
00004 #include "../../interfaces/ILibvirtWrapper.h"
00005
00013 class BaseManagerWithConnection
00014 {
00015 protected:
00016     ILibvirtWrapper* libvirt;
00017     virConnectPtr conn;
00018
00019 public:
00020     virtual ~BaseManagerWithConnection() = default;
00021
00027     explicit BaseManagerWithConnection(ILibvirtWrapper* libvirt)
00028         : libvirt(libvirt), conn(nullptr)
00029     {
00030     }
00031
00035     explicit BaseManagerWithConnection(): conn(nullptr)
00036     {
00037         libvirt = new LibvirtWrapper();
00038     }
00039
00045     void updateConnection(virConnectPtr conn);
00046
00047 protected:
00051     void checkIfConnectionIsSet() const;
00052 };
00053
00054 #endif //BASEMANAGERWITHCONNECTION_H
```

5.18 ConnectionManager.h

```
00001 #ifndef CONNECTIONMANAGER_H
00002 #define CONNECTIONMANAGER_H
00003 #include <optional>
00004 #include <string>
00005
00006 #include "../../wrappers/LibvirtWrapper.h"
00007 #include "../../models/ConnectionInfo.h"
00008
00015 class ConnectionManager
00016 {
00017     ILibvirtWrapper* libvirt;
00018     virConnectPtr conn = nullptr;
00019
00020 public:
00021     virtual ~ConnectionManager() = default;
00022
00028     explicit ConnectionManager(ILibvirtWrapper* libvirt)
00029         : libvirt(libvirt)
00030     {
00031     }
00032
00036     explicit ConnectionManager()
00037     {
00038         libvirt = new LibvirtWrapper();
00039     }
00040
00047     void initializeConnection(const std::optional<std::string>& customConnectionUrl = std::nullopt);
00048
00054     ConnectionInfo getConnectionInfo() const;
00055
00061     bool isConnectionAlive() const;
00062
```

```
00068     virConnectPtr getConnection() const;
00069 };
00070
00071
00072 #endif //CONNECTIONMANAGER_H
```

5.19 VirtualMachineConsoleManager.h

```
00001 #ifndef VIRTUALMACHINECONSOLEMANAGER_H
00002 #define VIRTUALMACHINECONSOLEMANAGER_H
00003 #include "BaseManagerWithConnection.h"
00004 #include "../../wrappers/LibvirtWrapper.h"
00005 #include "../../interfaces/ILibvirtWrapper.h"
00006 #include "../../models/StreamData.h"
00007
00014 class VirtualMachineConsoleManager : public BaseManagerWithConnection
00015 {
00016 public:
00017     using BaseManagerWithConnection::BaseManagerWithConnection;
00018
00025     virStreamPtr openVirtualMachineConsole(const std::string& vmUuid) const;
00026
00033     void getDataFromStream(virStreamPtr stream, StreamData* streamData) const;
00034
00042     void sendDataToStream(virStreamPtr stream, const char* data, int dataSize) const;
00043
00049     void closeStream(virStreamPtr stream) const;
00050 };
00051
00052
00053 #endif //VIRTUALMACHINECONSOLEMANAGER_H
```

5.20 VirtualMachineManager.h

```
00001 #ifndef VIRTUALMACHINEMANAGER_H
00002 #define VIRTUALMACHINEMANAGER_H
00003 #include <string>
00004 #include <vector>
00005 #include <libvirt/libvirt.h>
00006
00007 #include "BaseManagerWithConnection.h"
00008 #include "../../models/VirtualMachineInfo.h"
00009
00017 class VirtualMachineManager : public BaseManagerWithConnection
00018 {
00019 public:
00020     using BaseManagerWithConnection::BaseManagerWithConnection;
00021
00027     void createVirtualMachine(const std::string& virtualMachineXml) const;
00028
00035     virtual VirtualMachineInfo getInfoAboutVirtualMachine(const std::string& name);
00036
00042     std::vector<VirtualMachineInfo> getListOfVirtualMachinesWithInfo();
00043
00050     void attachDeviceToVirtualMachine(const std::string& uuid, const std::string& deviceDefinition)
      const;
00051
00058     void detachDeviceFromVirtualMachine(const std::string& uuid, const std::string& deviceDefinition)
      const;
00059
00066     void updateVmDevice(const std::string& uuid, const std::string& deviceDefinition) const;
00067
00068 private:
00075     [[nodiscard]] virDomainPtr getVirtualMachineByName(const std::string& name) const;
00076
00083     [[nodiscard]] virDomainPtr getVirtualMachineByUuid(const std::string& uuid) const;
00084 };
00085
00086 #endif //VIRTUALMACHINEMANAGER_H
```

5.21 VirtualNetworkManager.h

```
00001 #ifndef VIRTUALNETWORKMANAGER_H
```

```
00002 #define VIRTUALNETWORKMANAGER_H
00003 #include "BaseManagerWithConnection.h"
00004 #include "../../wrappers/LibvirtWrapper.h"
00005 #include "../../interfaces/ILibvirtWrapper.h"
00006
00013 class VirtualNetworkManager : public BaseManagerWithConnection
00014 {
00015 public:
00016     using BaseManagerWithConnection::BaseManagerWithConnection;
00017
00024     virNetworkPtr createNetworkFromXml(const std::string& networkDefinition) const;
00025
00031     void destroyNetwork(const std::string& name) const;
00032
00039     [[nodiscard]] std::string getNetworkXmlDefinition(const std::string& name) const;
00040 };
00041
00042 #endif //VIRTUALNETWORKMANAGER_H
```

5.22 VirtualizationFacade.h

```
00001 #ifndef VIRTUALIZATIONFACADE_H
00002 #define VIRTUALIZATIONFACADE_H
00003 #include "managers/ConnectionManager.h"
00004 #include "managers/VirtualMachineConsoleManager.h"
00005 #include "managers/VirtualMachineManager.h"
00006 #include "../models/StreamData.h"
00007 #include "managers/VirtualNetworkManager.h"
00008
00016 class VirtualizationFacade
00017 {
00018     ConnectionManager* connManager = nullptr;
00019     VirtualMachineManager* vmManager = nullptr;
00020     VirtualMachineConsoleManager* vmConsoleManager = nullptr;
00021     VirtualNetworkManager* networkManager = nullptr;
00022
00023 public:
00024     virtual ~VirtualizationFacade() = default;
00025
00031     explicit VirtualizationFacade(ILibvirtWrapper* libvirt);
00032
00036     explicit VirtualizationFacade();
00037
00043     void initializeConnection(const char* customConnectionUrl) const;
00044
00050     void getConnectionInfo(ConnectionInfo* infoPtr) const;
00051
00057     void createVirtualMachine(const std::string& virtualMachineXml) const;
00058
00065     void getInfoAboutVirtualMachine(VirtualMachineInfo* virtualMachineInfo, const std::string& name)
      const;
00066
00073     void getListOfVirtualMachinesWithInfo(VirtualMachineInfo** arrayOfVirtualMachines,
00074                                           int* numberOfVirtualMachines) const;
00075
00081     void isConnectionAlive(bool* isAlive) const;
00082
00089     [[nodiscard]] virStreamPtr openVirtualMachineConsole(const std::string& vmUuid) const;
00090
00097     void receiveDataFromConsole(virStreamPtr stream, StreamData* streamData) const;
00098
00105     void sendDataToConsole(virStreamPtr stream, const std::string& data) const;
00106
00112     void closeStream(virStreamPtr stream) const;
00113
00120     [[nodiscard]] virNetworkPtr createVirtualNetworkFromXml(const std::string& networkDefinition)
      const;
00121
00128     void attachDeviceToVm(const std::string& uuid, const std::string& deviceDefinition) const;
00129
00136     void detachDeviceFromVm(const std::string& uuid, const std::string& deviceDefinition) const;
00137
00144     void updateVmDevice(const std::string& uuid, const std::string& deviceDefinition) const;
00145
00151     void destroyNetwork(const std::string& name) const;
00152
00159     [[nodiscard]] std::string getNetworkDefinition(const std::string& name) const;
00160 };
00161
00162 #endif //VIRTUALIZATIONFACADE_H
```

5.23 LibpcapWrapper.h

```
00001 #ifndef LIBPCAPWRAPPER_H
00002 #define LIBPCAPWRAPPER_H
00003 #include "../interfaces/ILibpcapWrapper.h"
00004
00011 class LibpcapWrapper final : public ILibpcapWrapper
00012 {
00013 public:
00021     pcap_t* openHandlerLive(const std::string& interfaceName, char* errBuff) override;
00022
00029     int getLinkLayerType(pcap_t* handler) override;
00030
00036     void closeHandler(pcap_t* handler) override;
00037
00046     int listenForPackets(pcap_t* handler, pcap_handler callback, u_char* args) override;
00047
00053     void close(pcap_t* handler) override;
00054 };
00055
00056 #endif //LIBPCAPWRAPPER_H
```

5.24 LibvirtWrapper.h

```
00001 #ifndef LIBVIRTWRAPPER_H
00002 #define LIBVIRTWRAPPER_H
00003 #include "../interfaces/ILibvirtWrapper.h"
00004 #include <libvirt/virterror.h>
00005
00011 class LibvirtWrapper final : public ILibvirtWrapper
00012 {
00013 public:
00020     virConnectPtr connectOpen(const char* connectionUri) override;
00021
00029     virDomainPtr createVirtualMachineFromXml(virConnectPtr conn, const char* xmlConfig) override;
00030
00037     void getUuidFromDomain(virDomainPtr domain, char* uuid) override;
00038
00046     int getNodeInfo(virConnectPtr conn, virNodeInfoPtr info) override;
00047
00055     int getLibVersion(virConnectPtr conn, unsigned long* libVersion) override;
00056
00064     int getDriverVersion(virConnectPtr conn, unsigned long* version) override;
00065
00072     std::string getConnectUrl(virConnectPtr conn) override;
00073
00080     std::string getDriverType(virConnectPtr conn) override;
00081
00087     std::string getLastError() override;
00088
00096     virDomainPtr domainLookupByName(virConnectPtr conn, std::string name) override;
00097
00105     int domainGetInfo(virDomainPtr domain, virDomainInfo& domainInfo) override;
00106
00114     int getDomainUUID(virDomainPtr domain, std::string& uuid) override;
00115
00123     int getListOfAllDomains(virConnectPtr conn, virDomainPtr** domains) override;
00124
00131     std::string getDomainName(virDomainPtr domain) override;
00132
00138     void freeDomain(virDomainPtr domain) override;
00139
00146     int connectionIsAlive(virConnectPtr conn) override;
00147
00154     virStreamPtr createNewStream(virConnectPtr conn) override;
00155
00163     int openDomainConsole(virDomainPtr domain, virStreamPtr stream) override;
00164
00172     virDomainPtr domainLookupByUuid(virConnectPtr conn, const std::string& uuid) override;
00173
00182     int receiveDataFromStream(virStreamPtr stream, char* buffer, int bufferSize) override;
00183
00191     void sendDataToStream(virStreamPtr stream, const char* buffer, int bufferSize) override;
00192
00198     void finishAndFreeStream(virStreamPtr stream) override;
00199
00207     virNetworkPtr createNetworkFromXml(virConnectPtr conn, const std::string& networkDefinition)
      override;
00208
00216     int attachDeviceToVm(virDomainPtr domain, const std::string& deviceDefinition) override;
00217
00225     int detachDeviceFromVm(virDomainPtr domain, const std::string& deviceDefinition) override;
```

```
00226
00234     int updateVmDevice(virDomainPtr domain, const std::string& deviceDefinition) override;
00235
00243     virNetworkPtr getNetworkByName(virConnectPtr conn, const std::string& name) override;
00244
00251     int destroyNetwork(virNetworkPtr network) override;
00252
00259     std::string getNetworkDefinition(virNetworkPtr network) override;
00260 };
00261
00262
00263 #endif //LIBVIRTWRAPPER_H
```

5.25 LibvirtWrapperMock.h

```
00001 #ifndef LIBVIRTWRAPPERMOCK_H
00002 #define LIBVIRTWRAPPERMOCK_H
00003 #include <gmock/gmock.h>
00004 #include "interfaces/ILibvirtWrapper.h"
00005
00006 class LibvirtWrapperMock final : public ILibvirtWrapper
00007 {
00008 public:
00009     MOCK_METHOD(virConnectPtr, connectOpen, (const char *name), (override));
00010     MOCK_METHOD(virDomainPtr, createVirtualMachineFromXml, (virConnectPtr conn, const char
      *xmlConfig), (override));
00011     MOCK_METHOD(void, getUuidFromDomain, (virDomainPtr domain, char *uuid), (override));
00012     MOCK_METHOD(int, getNodeInfo, (virConnectPtr conn, virNodeInfoPtr info), (override));
00013     MOCK_METHOD(int, getLibVersion, (virConnectPtr conn, unsigned long *version), (override));
00014     MOCK_METHOD(int, getDriverVersion, (virConnectPtr conn, unsigned long *version), (override));
00015     MOCK_METHOD(std::string, getConnectUrl, (virConnectPtr conn), (override));
00016     MOCK_METHOD(std::string, getDriverType, (virConnectPtr conn), (override));
00017     MOCK_METHOD(std::string, getLastError, (), (override));
00018     MOCK_METHOD(virDomainPtr, domainLookupByName, (virConnectPtr conn, std::string name), (override));
00019     MOCK_METHOD(int, domainGetInfo, (virDomainPtr domain, virDomainInfo& domainInfo), (override));
00020     MOCK_METHOD(int, getDomainUUID, (virDomainPtr domain, std::string& uuid), (override));
00021     MOCK_METHOD(int, getListOfAllDomains, (virConnectPtr conn, virDomainPtr **domains), (override));
00022     MOCK_METHOD(std::string, getDomainName, (virDomainPtr domain), (override));
00023     MOCK_METHOD(void, freeDomain, (virDomainPtr domain), (override));
00024     MOCK_METHOD(int, connectionIsAlive, (virConnectPtr conn), (override));
00025     MOCK_METHOD(virStreamPtr, createNewStream, (virConnectPtr conn), (override));
00026     MOCK_METHOD(int, openDomainConsole, (virDomainPtr domain, virStreamPtr stream), (override));
00027     MOCK_METHOD(virDomainPtr, domainLookupByUuid, (virConnectPtr conn, const std::string& uuid),
      (override));
00028     MOCK_METHOD(int, receiveDataFromStream, (virStreamPtr stream, char* buffer, int bufferSize),
      (override));
00029     MOCK_METHOD(void, sendDataToStream, (virStreamPtr stream, const char* buffer, int bufferSize),
      (override));
00030     MOCK_METHOD(void, finishAndFreeStream, (virStreamPtr stream), (override));
00031     MOCK_METHOD(virNetworkPtr, createNetworkFromXml, (virConnectPtr conn, const std::string&
      networkDefinition),
00032                 (override));
00033     MOCK_METHOD(int, attachDeviceToVm, (virDomainPtr domain, const std::string& deviceDefinition),
      (override));
00034     MOCK_METHOD(int, detachDeviceFromVm, (virDomainPtr domain, const std::string& deviceDefinition),
      (override));
00035     MOCK_METHOD(int, updateVmDevice, (virDomainPtr domain, const std::string& deviceDefinition),
      (override));
00036     MOCK_METHOD(virNetworkPtr, getNetworkByName, (virConnectPtr conn, const std::string& name),
      (override));
00037     MOCK_METHOD(int, destroyNetwork, (virNetworkPtr network), (override));
00038     MOCK_METHOD(std::string, getNetworkDefinition, (virNetworkPtr network), (override));
00039 };
00040
00041
00042 #endif //LIBVIRTWRAPPERMOCK_H
```

5.26 VirtualMachineManagerMockGetInfoAboutVirtualMachine.h

```
00001 #ifndef VIRTUALMACHINEMANAGERMOCKGETINFOABOUTVIRTUALMACHINE_H
00002 #define VIRTUALMACHINEMANAGERMOCKGETINFOABOUTVIRTUALMACHINE_H
00003 #include <gmock/gmock-function-mocker.h>
00004
00005 #include "virt/managers/VirtualMachineManager.h"
00006
00007 class VirtualMachineManagerMockGetInfoAboutVirtualMachine final : public VirtualMachineManager
00008 {
00009 public:
```

```
00010     explicit VirtualMachineManagerMockGetInfoAboutVirtualMachine(ILibvirtWrapper* libvirt)
00011         : VirtualMachineManager(libvirt)
00012     {
00013     }
00014
00015     MOCK_METHOD(VirtualMachineInfo, getInfoAboutVirtualMachine, (const std::string &uuid),
      (override));
00016 };
00017
00018 #endif //VIRTUALMACHINEMANAGERMOCKGETINFOABOUTVIRTUALMACHINE_H
```

5.27 TestingUtils.h

```
00001 #ifndef TESTINGUTILS_H
00002 #define TESTINGUTILS_H
00003 #include <functional>
00004 #include <string>
00005
00006
00007 class TestingUtils
00008 {
00009 public:
00010     static void expectThrowWithMessage(const std::function<void()>& func, const std::string&
      expectedMessage);
00011 };
00012
00013
00014 #endif //TESTINGUTILS_H
```

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