



# Xen Management API

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# Chapter 1

## Introduction

This document contains a description of the Xen Management API—an interface for remotely configuring and controlling virtualised guests running on a Xen-enabled host.

The API is presented here as a set of Remote Procedure Calls, with a wire format based upon XML-RPC. No specific language bindings are prescribed, although examples will be given in the python programming language.

Although we adopt some terminology from object-oriented programming, future client language bindings may or may not be object oriented. The API reference uses the terminology *classes* and *objects*. For our purposes a *class* is simply a hierarchical namespace; an *object* is an instance of a class with its fields set to specific values. Objects are persistent and exist on the server-side. Clients may obtain opaque references to these server-side objects and then access their fields via get/set RPCs.

For each class we specify a list of fields along with their *types* and *qualifiers*. A qualifier is one of:

- *RO<sub>run</sub>*: the field is Read Only. Furthermore, its value is automatically computed at runtime. For example: current CPU load and disk IO throughput.
- *RO<sub>ins</sub>*: the field must be manually set when a new object is created, but is then Read Only for the duration of the object's life. For example, the maximum memory addressable by a guest is set before the guest boots.
- *RW*: the field is Read/Write. For example, the name of a VM.

A full list of types is given in Chapter 2. However, there are three types that require explicit mention:

- *t Ref*: signifies a reference to an object of type *t*.
- *t Set*: signifies a set containing values of type *t*.
- *(t<sub>1</sub>, t<sub>2</sub>) Map*: signifies a mapping from values of type *t<sub>1</sub>* to values of type *t<sub>2</sub>*.

Note that there are a number of cases where *Refs* are *doubly linked*—e.g. a VM has a field called *VIFs* of type *(VIF Ref) Set*; this field lists the network interfaces attached to a particular VM. Similarly, the VIF class has a field called *VM* of type *(VM Ref)* which references the VM to which the interface is connected. These two fields are *bound together*, in the sense that creating a new VIF causes the *VIFs* field of the corresponding VM object to be updated automatically.

The API reference explicitly lists the fields that are bound together in this way. It also contains a diagram that shows relationships between classes. In this diagram an edge signifies the existence of a pair of fields that are bound together, using standard crows-foot notation to signify the type of relationship (e.g. one-many, many-many).

## 1.1 RPCs associated with fields

Each field, *f*, has an RPC accessor associated with it that returns *f*'s value:

- “**get\_f**(Ref *x*)”: takes a Ref that refers to an object and returns the value of *f*.

Each field, *f*, with attribute *RW* and whose outermost type is *Set* has the following additional RPCs associated with it:

- an “**add\_to\_f**(Ref *x*, *v*)” RPC adds a new element *v* to the set<sup>1</sup>;
- a “**remove\_from\_f**(Ref *x*, *v*)” RPC removes element *v* from the set;

Each field, *f*, with attribute *RW* and whose outermost type is *Map* has the following additional RPCs associated with it:

- an “**add\_to\_f**(Ref *x*, *k*, *v*)” RPC adds new pair (*k*, *v*) to the mapping stored in *f* in object *x*. Adding a new pair for duplicate key, *k*, overwrites any previous mapping for *k*.
- a “**remove\_from\_f**(Ref *x*, *k*)” RPC removes the pair with key *k* from the mapping stored in *f* in object *x*.

Each field whose outermost type is neither *Set* nor *Map*, but whose attribute is *RW* has an RPC accessor associated with it that sets its value:

- For *RW* (Read/Write), a “**set\_f**(Ref *x*, *v*)” RPC function is also provided. This sets field *f* on object *x* to value *v*.

## 1.2 RPCs associated with classes

- Each class has a *constructor* RPC named “**create**” that takes as parameters all fields marked *RW* and *RO<sub>ins</sub>*. The result of this RPC is that a new *persistent* object is created on the server-side with the specified field values.
- Each class has a **get\_by\_uuid**(*uuid*) RPC that returns the object of that class that has the specified *uuid*.
- Each class that has a *name\_label* field has a “**get\_by\_name\_label**(*name*)” RPC that returns a set of objects of that class that have the specified *label*.
- Each class has a “**destroy**(Ref *x*)” RPC that explicitly deletes the persistent object specified by *x* from the system. This is a non-cascading delete – if the object being removed is referenced by another object then the **destroy** call will fail.

### 1.2.1 Additional RPCs

As well as the RPCs enumerated above, some classes have additional RPCs associated with them. For example, the VM class has RPCs for cloning, suspending, starting etc. Such additional RPCs are described explicitly in the API reference.

---

<sup>1</sup> Since sets cannot contain duplicate values this operation has no action in the case that *v* was already in the set.

## 1.3 Wire Protocol for Remote API Calls

API calls are sent over a network to a Xen-enabled host using the XML-RPC protocol. In this Section we describe how the higher-level types used in our API Reference are mapped to primitive XML-RPC types.

In our API Reference we specify the signatures of API functions in the following style:

```
(ref_vm Set) VM.get_all()
```

This specifies that the function with name `VM.get_all` takes no parameters and returns a Set of `ref_vms`. These types are mapped onto XML-RPC types in a straight-forward manner:

- Floats, Booleans, DateTimes and Strings map directly to the XML-RPC `double`, `boolean`, `dateTime.iso8601`, and `string` elements.
- all “`ref_`” types are opaque references, encoded as the XML-RPC’s `String` type. Users of the API should not make assumptions about the concrete form of these strings and should not expect them to remain valid after the client’s session with the server has terminated.
- fields named “`uuid`” of type “`String`” are mapped to the XML-RPC `String` type. The string itself is the OSF DCE UUID presentation format (as output by `uuidgen`, etc).
- ints are all assumed to be 64-bit in our API and are encoded as a string of decimal digits (rather than using XML-RPC’s built-in 32-bit `i4` type).
- values of enum types are encoded as strings. For example, a value of `destroy` of type `on_normal_exit`, would be conveyed as:

```
<value><string>destroy</string></value>
```

- for all our types, `t`, our type `t Set` simply maps to XML-RPC’s `Array` type, so for example a value of type `cpu_feature Set` would be transmitted like this:

```
<array>
  <data>
    <value><string>CX8</string></value>
    <value><string>PSE36</string></value>
    <value><string>FPU</string></value>
  </data>
</array>
```

- for types `k` and `v`, our type `(k, v) Map` maps onto an XML-RPC struct, with the key as the name of the struct. Note that the `(k, v) Map` type is only valid when `k` is a `String`, `Ref`, or `Int`, and in each case the keys of the maps are stringified as above. For example, the `(String, double) Map` containing a the mappings `Mike → 2.3` and `John → 1.2` would be represented as:

```
<value>
  <struct>
```

```

    <member>
      <name>Mike</name>
      <value><double>2.3</double></value>
    </member>
    <member>
      <name>John</name>
      <value><double>1.2</double></value>
    </member>
  </struct>
</value>

```

- our Void type is transmitted as an empty string.

### 1.3.1 Note on References vs UUIDs

References are opaque types — encoded as XML-RPC strings on the wire — understood only by the particular server which generated them. Servers are free to choose any concrete representation they find convenient; clients should not make any assumptions or attempt to parse the string contents. References are not guaranteed to be permanent identifiers for objects; clients should not assume that references generated during one session are valid for any future session. References do not allow objects to be compared for equality. Two references to the same object are not guaranteed to be textually identical.

UUIDs are intended to be permanent names for objects. They are guaranteed to be in the OSF DCE UUID presentation format (as output by `uuidgen`). Clients may store UUIDs on disk and use them to lookup objects in subsequent sessions with the server. Clients may also test equality on objects by comparing UUID strings. The API provides mechanisms for translating between UUIDs and opaque references. Each class that contains a UUID field provides:

- A “`get_by_uuid`” method that takes a UUID, *u*, and returns an opaque reference to the server-side object that has `UUID=u`;
- A `get_uuid` function (a regular “field getter” RPC) that takes an opaque reference, *r*, and returns the UUID of the server-side object that is referenced by *r*.

### 1.3.2 Return Values/Status Codes

The return value of an RPC call is an XML-RPC Struct.

- The first element of the struct is named **Status**; it contains a string value indicating whether the result of the call was a “**Success**” or a “**Failure**”.

If **Status** was set to **Success** then the Struct contains a second element named **Value**:

- The element of the struct named **Value** contains the function’s return value.

In the case where **Status** is set to **Failure** then the struct contains a second element named **ErrorDescription**:

- The element of the struct named **ErrorDescription** contains an array of string values. The first element of the array is an error code; the remainder of the array are strings representing error parameters relating to that code.

For example, an XML-RPC return value from the `host.get_resident_VMs` function above may look like this:

```
<struct>
  <member>
    <name>Status</name>
    <value>Success</value>
  </member>
  <member>
    <name>Value</name>
    <value>
      <array>
        <data>
          <value>81547a35-205c-a551-c577-00b982c5fe00</value>
          <value>61c85a22-05da-b8a2-2e55-06b0847da503</value>
          <value>1d401ec4-3c17-35a6-fc79-cee6bd9811fe</value>
        </data>
      </array>
    </value>
  </member>
</struct>
```

## 1.4 Making XML-RPC Calls

### 1.4.1 Transport Layer

The following transport layers are currently supported:

- HTTP/S for remote administration
- HTTP over Unix domain sockets for local administration

### 1.4.2 Session Layer

The XML-RPC interface is session-based; before you can make arbitrary RPC calls you must login and initiate a session. For example:

```
session_id    session.login_with_password(string uname, string pwd)
```

Where `uname` and `password` refer to your username and password respectively, as defined by the Xen administrator. The `session_id` returned by `session.login_with_password` is passed to subsequent RPC calls as an authentication token.

A session can be terminated with the `session.logout` function:

```
void          session.logout(session_id session)
```

### 1.4.3 Synchronous and Asynchronous invocation

Each method call (apart from methods on “Session” and “Task” objects and “getters” and “setters” derived from fields) can be made either synchronously or asynchronously. A synchronous RPC call blocks until the return value is received; the return value of a synchronous RPC call is exactly as specified in Section 1.3.2.

Only synchronous API calls are listed explicitly in this document. All asynchronous versions are in the special `Async` namespace. For example, synchronous call `VM.clone(...)` (described in Chapter 2) has an asynchronous counterpart, `Async.VM.clone(...)`, that is non-blocking.

Instead of returning its result directly, an asynchronous RPC call returns a `task-id`; this identifier is subsequently used to track the status of a running asynchronous RPC. Note that an asynchronous call may fail immediately, before a `task-id` has even been created—to represent this eventuality, the returned `task-id` is wrapped in an XML-RPC struct with a `Status`, `ErrorDescription` and `Value` fields, exactly as specified in Section 1.3.2.

The `task-id` is provided in the `Value` field if `Status` is set to `Success`.

The RPC call

```
(ref_task Set) Task.get_all(session_id s)
```

returns a set of all task IDs known to the system. The status (including any returned result and error codes) of these tasks can then be queried by accessing the fields of the `Task` object in the usual way. Note that, in order to get a consistent snapshot of a task's state, it is advisable to call the “`get_record`” function.

## 1.5 Example interactive session

This section describes how an interactive session might look, using the python API.

All python versions starting from 2.4 should work.

The examples in this section use a remote Xen host with the ip address of 192.168.7.20 and the xmlrpc port 9363. No authentication is used.

Note that the remote server must be configured in the way, that it accepts remote connections. Some lines must be added to the `xend-config.sxp` configuration file:

```
(xen-api-server ((9363 none)
                 (unix none)))
(xend-tcp-xmlrpc-server yes)
```

The `xend` must be restarted after changing the configuration.

Before starting python, the `PYTHONPATH` must be set that the `XenAPI.py` can be found. Typically the `XenAPI.py` is installed with one of the Xen helper packages which the last part of the path is `xen/xm/XenAPI.py`.

Example: Under Debian 5.0 the package which contains the `XenAPI.py` is `xen-utils-3.2-1`. `XenAPI.py` is located in `/usr/lib/xen-3.2-1/lib/python/xen/xm`. The following command will set the `PYTHONPATH` environment variable in a bash:

```
$ export PYTHONPATH=/usr/lib/xen-3.2-1/lib/python
```

Then python can be started and the `XenAPI` must be imported:

```
$ python
...
>>> import xen.xm.XenAPI
```

To create a session to the remote server, the `xen.xm.XenAPI.Session` constructor is used:

```
>>> session = xen.xm.XenAPI.Session("http://192.168.7.20:9363")
```

For authentication with a username and password the `login_with_password` is used:

```
>>> session.login_with_password("", "")
```

When serialised, this call looks like:

```
POST /RPC2 HTTP/1.0
Host: 192.168.7.20:9363
User-Agent: xmlrpclib.py/1.0.1 (by www.pythonware.com)
Content-Type: text/xml
Content-Length: 221
```

```
<?xml version='1.0'?>
<methodCall>
<methodName>session.login_with_password</methodName>
<params>
<param>
<value><string></string></value>
</param>
<param>
<value><string></string></value>
</param>
</params>
</methodCall>
```

And the response:

```
HTTP/1.1 200 OK
Server: BaseHTTP/0.3 Python/2.5.2
Date: Fri, 10 Jul 2009 09:01:27 GMT
Content-Type: text/xml
Content-Length: 313
```

```
<?xml version='1.0'?>
<methodResponse>
<params>
<param>
<value><struct>
<member>
<name>Status</name>
<value><string>Success</string></value>
</member>
<member>
<name>Value</name>
<value><string>68e3a009-0249-725b-246b-7fc43cf4f154</string></value>
</member>
</struct></value>
</param>
</params>
</methodResponse>
```

Next, the user may acquire a list of all the VMs known to the host:

```
>>> vms = session.xenapi.VM.get_all()
>>> vms
['00000000-0000-0000-0000-000000000000', 'b28e4ee3-216f-fa85-9cae-615e954dbbe7']
```

The VM references here have the form of an uuid, though they may change in the future, and they should be treated as opaque strings. Some examples of using accessors for object fields:

```
>>> session.xenapi.VM.get_name_label(vms[1])
```

```
'guest002'  
>>> session.xenapi.VM.get_actions_after_reboot(vms[1])  
'restart'
```

Grab the actual memory and cpu utilisation of one vm:

```
>>> m = session.xenapi.VM.get_metrics(vms[1])  
>>> session.xenapi.VM_metrics.get_memory_actual(m)  
'268435456'  
>>> session.xenapi.VM_metrics.get_VCPUs_utilisation(m)  
{'0': 0.00041759955632935362}
```

(The virtual machine has about 256 MByte RAM and is idle.)

Pausing and unpausing a vm:

```
>>> session.xenapi.VM.pause(vms[1])  
,,  
>>> session.xenapi.VM.unpause(vms[1])  
,,
```

Trying to start an vm:

```
>>> session.xenapi.VM.start(vms[1], False)  
...  
: Xen-API failure: ['VM_BAD_POWER_STATE', \  
  'b28e4ee3-216f-fa85-9cae-615e954dbbe7', 'Halted', 'Running']
```

In this case the `start` message has been rejected, because the VM is already running, and so an error response has been returned. These high-level errors are returned as structured data (rather than as XML-RPC faults), allowing them to be internationalised.

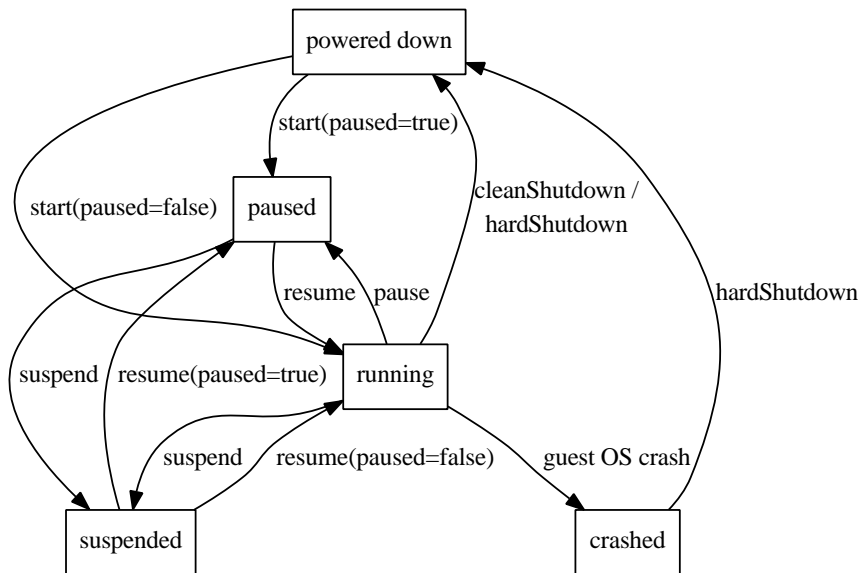


Figure 1.1: VM Lifecycle

## 1.6 VM Lifecycle

Figure 1.1 shows the states that a VM can be in and the API calls that can be used to move the VM between these states. The crashed state indicates that the guest OS running within the VM has crashed. There is no API to explicitly move to the crashed state, however a hardShutdown will move the VM to the powered down state.

## 1.7 VM boot parameters

The VM class contains a number of fields that control the way in which the VM is booted. With reference to the fields defined in the VM class (see later in this document), this section outlines the boot options available and the mechanisms provided for controlling them.

VM booting is controlled by setting one of the two mutually exclusive groups: “PV”, and “HVM”. If HVM.boot\_policy is the empty string, then paravirtual domain building and booting will be used; otherwise the VM will be loaded as an HVM domain, and booted using an emulated BIOS.

When paravirtual booting is in use, the PV/bootloader field indicates the bootloader to use. It may be “pygrub”, in which case the platform’s default installation of pygrub will be used, or a full path within the control domain to some other bootloader. The other fields, PV/kernel, PV/ramdisk, PV/args and PV/bootloader\_args will be passed to the bootloader unmodified, and interpretation of those fields is then specific to the bootloader itself, including the possibility that the bootloader will ignore some or all of those given values. Finally the paths of all bootable disks are added to the bootloader commandline (a disk is bootable if its VBD has the bootable flag set). There may be zero, one or many bootable disks; the bootloader decides which disk (if any) to boot from.

If the bootloader is pygrub, then the menu.lst is parsed if present in the guest’s filesystem, otherwise the specified kernel and ramdisk are used, or an autodetected kernel is used if nothing is specified and autodetection is possible. PV/args is

appended to the kernel command line, no matter which mechanism is used for finding the kernel.

If PV/bootloader is empty but PV/kernel is specified, then the kernel and ramdisk values will be treated as paths within the control domain. If both PV/bootloader and PV/kernel are empty, then the behaviour is as if PV/bootloader was specified as “pygrub”.

When using HVM booting, HVM/boot\_policy and HVM/boot\_params specify the boot handling. Only one policy is currently defined: “BIOS order”. In this case, HVM/boot\_params should contain one key-value pair “order” = “N” where N is the string that will be passed to QEMU.

## Chapter 2

# API Reference

### 2.1 Classes

The following classes are defined:

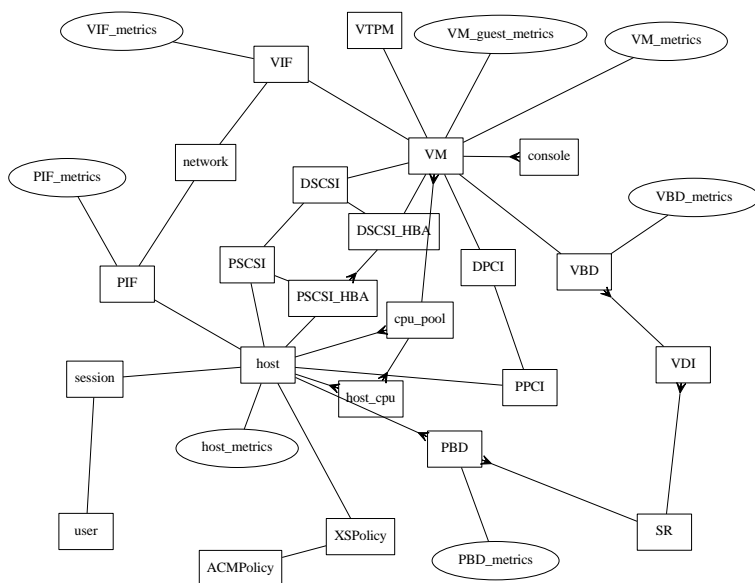
Name	Description
<code>session</code>	A session
<code>task</code>	A long-running asynchronous task
<code>event</code>	Asynchronous event registration and handling
<code>VM</code>	A virtual machine (or 'guest')
<code>VM_metrics</code>	The metrics associated with a VM
<code>VM_guest_metrics</code>	The metrics reported by the guest (as opposed to inferred from outside)
<code>host</code>	A physical host
<code>host_metrics</code>	The metrics associated with a host
<code>host_cpu</code>	A physical CPU
<code>network</code>	A virtual network
<code>VIF</code>	A virtual network interface
<code>VIF_metrics</code>	The metrics associated with a virtual network device
<code>PIF</code>	A physical network interface (note separate VLANs are represented as several PIFs)
<code>PIF_metrics</code>	The metrics associated with a physical network interface
<code>SR</code>	A storage repository
<code>VDI</code>	A virtual disk image
<code>VBD</code>	A virtual block device
<code>VBD_metrics</code>	The metrics associated with a virtual block device
<code>PBD</code>	The physical block devices through which hosts access SRs
<code>crashdump</code>	A VM crashdump
<code>VTPM</code>	A virtual TPM device
<code>console</code>	A console
<code>DPCI</code>	A pass-through PCI device
<code>PPCI</code>	A physical PCI device
<code>DSCSI</code>	A half-virtualized SCSI device
<code>DSCSI_HBA</code>	A half-virtualized SCSI host bus adapter
<code>PSCSI</code>	A physical SCSI device
<code>PSCSI_HBA</code>	A physical SCSI host bus adapter
<code>user</code>	A user of the system
<code>debug</code>	A basic class for testing
<code>XSPolicy</code>	A class for handling Xen Security Policies
<code>ACMPolicy</code>	A class for handling ACM-type policies
<code>cpu_pool</code>	A container for VMs which should shared the same host_cpu(s)

## 2.2 Relationships Between Classes

Fields that are bound together are shown in the following table:

<i>object.field</i>	<i>object.field</i>	<i>relationship</i>
host.PBDs	PBD.host	many-to-one
SR.PBDs	PBD.SR	many-to-one
VDI.VBDs	VBD.VDI	many-to-one
VDI.crash_dumps	crashdump.VDI	many-to-one
VBD.VM	VM.VBDs	one-to-many
crashdump.VM	VM.crash_dumps	one-to-many
VIF.VM	VM.VIFs	one-to-many
VIF.network	network.VIFs	one-to-many
PIF.host	host.PIFs	one-to-many
PIF.network	network.PIFs	one-to-many
SR.VDIs	VDI.SR	many-to-one
VTPM.VM	VM.VTPMs	one-to-many
console.VM	VM.consoles	one-to-many
DPCI.VM	VM.DPCIs	one-to-many
PPCI.host	host.PPCIs	one-to-many
DSCSI.VM	VM.DSCSIs	one-to-many
DSCSI.HBA	DSCSI_HBA.DSCSIs	one-to-many
DSCSI_HBA.VM	VM.DSCSI_HBAs	one-to-many
PSCSI.host	host.PSCSIs	one-to-many
PSCSI.HBA	PSCSI_HBA.PSCSIs	one-to-many
PSCSI_HBA.host	host.PSCSI_HBAs	one-to-many
host.resident_VMs	VM.resident_on	many-to-one
host.host_CPUs	host_cpu.host	many-to-one
host.resident_cpu_pools	cpu_pool.resident_on	many-to-one
cpu_pool.started_VMs	VM.cpu_pool	many-to-one
cpu_pool.host_CPUs	host_cpu.cpu_pool	many-to-one

The following represents bound fields (as specified above) diagrammatically, using crow's-foot notation to specify one-to-one, one-to-many or many-to-many relationships:



### 2.2.1 List of bound fields

## 2.3 Types

### 2.3.1 Primitives

The following primitive types are used to specify methods and fields in the API Reference:

Type	Description
String	text strings
Int	64-bit integers
Float	IEEE double-precision floating-point numbers
Bool	boolean
DateTime	date and timestamp
Ref (object name)	reference to an object of class name

### 2.3.2 Higher order types

The following type constructors are used:

Type	Description
List (t)	an arbitrary-length list of elements of type t
Map (a $\rightarrow$ b)	a table mapping values of type a to values of type b

### 2.3.3 Enumeration types

The following enumeration types are used:

enum event_operation	
add	An object has been created
del	An object has been deleted
mod	An object has been modified

enum console_protocol	
vt100	VT100 terminal
rfb	Remote FrameBuffer protocol (as used in VNC)
rdp	Remote Desktop Protocol

enum vdi_type	
system	a disk that may be replaced on upgrade
user	a disk that is always preserved on upgrade
ephemeral	a disk that may be reformatted on upgrade
suspend	a disk that stores a suspend image
crashdump	a disk that stores VM crashdump information

enum vm_power_state	
Halted	Halted
Paused	Paused
Running	Running
Suspended	Suspended
Crashed	Crashed
Unknown	Some other unknown state

enum task_allowed_operations	
Cancel	Cancel

enum task_status_type	
pending	task is in progress
success	task was completed successfully
failure	task has failed
cancelling	task is being cancelled
cancelled	task has been cancelled

enum on_normal_exit	
destroy	destroy the VM state
restart	restart the VM

enum on_crash_behaviour	
destroy	destroy the VM state
coredump_and_destroy	record a coredump and then destroy the VM state
restart	restart the VM
coredump_and_restart	record a coredump and then restart the VM
preserve	leave the crashed VM as-is
rename_restart	rename the crashed VM and start a new copy

enum vbd_mode	
RO	disk is mounted read-only
RW	disk is mounted read-write

enum vbd_type	
CD	VBD will appear to guest as CD
Disk	VBD will appear to guest as disk

## 2.4 Error Handling

When a low-level transport error occurs, or a request is malformed at the HTTP or XML-RPC level, the server may send an XML-RPC Fault response, or the client may simulate the same. The client must be prepared to handle these errors, though they may be treated as fatal. On the wire, these are transmitted in a form similar to this:

```
<methodResponse>
  <fault>
    <value>
      <struct>
        <member>
          <name>faultCode</name>
          <value><int>-1</int></value>
        </member>
        <member>
          <name>faultString</name>
          <value><string>Malformed request</string></value>
        </member>
      </struct>
    </value>
  </fault>
</methodResponse>
```

All other failures are reported with a more structured error response, to allow better automatic response to failures, proper internationalisation of any error message, and easier debugging. On the wire, these are transmitted like this:

```
<struct>
  <member>
    <name>Status</name>
    <value>Failure</value>
  </member>
  <member>
    <name>ErrorDescription</name>
    <value>
      <array>
        <data>
          <value>MAP_DUPLICATE_KEY</value>
          <value>Customer</value>
          <value>eSpeil Inc.</value>
          <value>eSpeil Incorporated</value>
        </data>
      </array>
    </value>
  </member>
</struct>
```

Note that `ErrorDescription` value is an array of string values. The first element of the array is an error code; the remainder of the array are strings representing error parameters relating to that code. In this case, the client has attempted to add the mapping `Customer`  $\rightarrow$  `eSpeil Incorporated` to a Map, but it already contains the mapping `Customer`  $\rightarrow$  `eSpeil Inc.`, and so the request has failed.

The reference below lists each possible error returned by each method. As well as the errors explicitly listed, any method may return low-level errors as described above, or any of the following generic errors:

- `HANDLE_INVALID`
- `INTERNAL_ERROR`
- `MAP_DUPLICATE_KEY`
- `MESSAGE_METHOD_UNKNOWN`
- `MESSAGE_PARAMETER_COUNT_MISMATCH`
- `OPERATION_NOT_ALLOWED`
- `PERMISSION_DENIED`
- `SESSION_INVALID`

Each possible error code is documented in the following section.

### 2.4.1 Error Codes

#### **`HANDLE_INVALID`**

You gave an invalid handle. The object may have recently been deleted. The class parameter gives the type of reference given, and the handle parameter echoes the bad value given.

**Signature:**

`HANDLE_INVALID(class, handle)`

---

#### **`INTERNAL_ERROR`**

The server failed to handle your request, due to an internal error. The given message may give details useful for debugging the problem.

**Signature:**

`INTERNAL_ERROR(message)`

---

#### **`MAP_DUPLICATE_KEY`**

You tried to add a key-value pair to a map, but that key is already there. The key, current value, and the new value that you tried to set are all echoed.

**Signature:**

`MAP_DUPLICATE_KEY(key, current value, new value)`

---

**MESSAGE\_METHOD\_UNKNOWN**

You tried to call a method that does not exist. The method name that you used is echoed.

**Signature:**

MESSAGE\_METHOD\_UNKNOWN(method)

---

**MESSAGE\_PARAMETER\_COUNT\_MISMATCH**

You tried to call a method with the incorrect number of parameters. The fully-qualified method name that you used, and the number of received and expected parameters are returned.

**Signature:**

MESSAGE\_PARAMETER\_COUNT\_MISMATCH(method, expected, received)

---

**NETWORK\_ALREADY\_CONNECTED**

You tried to create a PIF, but the network you tried to attach it to is already attached to some other PIF, and so the creation failed.

**Signature:**

NETWORK\_ALREADY\_CONNECTED(network, connected PIF)

---

**OPERATION\_NOT\_ALLOWED**

You attempted an operation that was not allowed.

No parameters.

---

**PERMISSION\_DENIED**

You do not have the required permissions to perform the operation.

No parameters.

---

**PIF\_IS\_PHYSICAL**

You tried to destroy a PIF, but it represents an aspect of the physical host configuration, and so cannot be destroyed. The parameter echoes the PIF handle you gave.

**Signature:**

PIF\_IS\_PHYSICAL(PIF)

---

**SESSION\_AUTHENTICATION\_FAILED**

The credentials given by the user are incorrect, so access has been denied, and you have not been issued a session handle.

No parameters.

---

**SESSION\_INVALID**

You gave an invalid session handle. It may have been invalidated by a server restart, or timed out. You should get a new session handle, using one of the `session.login_` calls. This error does not invalidate the current connection. The handle parameter echoes the bad value given.

**Signature:**

`SESSION_INVALID(handle)`

---

**SESSION\_NOT\_REGISTERED**

This session is not registered to receive events. You must call `event.register` before `event.next`. The session handle you are using is echoed.

**Signature:**

`SESSION_NOT_REGISTERED(handle)`

---

**VALUE\_NOT\_SUPPORTED**

You attempted to set a value that is not supported by this implementation. The fully-qualified field name and the value that you tried to set are returned. Also returned is a developer-only diagnostic reason.

**Signature:**

`VALUE_NOT_SUPPORTED(field, value, reason)`

---

**VLAN\_TAG\_INVALID**

You tried to create a VLAN, but the tag you gave was invalid – it must be between 0 and 4095. The parameter echoes the VLAN tag you gave.

**Signature:**

`VLAN_TAG_INVALID(VLAN)`

---

**VM\_BAD\_POWER\_STATE**

You attempted an operation on a VM that was not in an appropriate power state at the time; for example, you attempted to start a VM that was already running. The parameters returned are the VM's handle, and the expected and actual VM state at the time of the call.

**Signature:**

```
VM_BAD_POWER_STATE(vm, expected, actual)
```

---

**VM\_HVM\_REQUIRED**

HVM is required for this operation

**Signature:**

```
VM_HVM_REQUIRED(vm)
```

---

**SECURITY\_ERROR**

A security error occurred. The parameter provides the xen security error code and a message describing the error.

**Signature:**

```
SECURITY_ERROR(xserr, message)
```

---

**POOL\_BAD\_STATE**

You attempted an operation on a pool that was not in an appropriate state at the time; for example, you attempted to activate a pool that was already activated.

**Signature:**

```
POOL_BAD_STATE(current pool state)
```

---

**INSUFFICIENT\_CPUS**

You attempted to activate a cpu.pool but there are not enough unallocated CPUs to satisfy the request.

**Signature:**

```
INSUFFICIENT_CPUS(needed cpu count, available cpu count)
```

---

**UNKOWN\_SCHED\_POLICY**

The specified scheduler policy is unkown to the host.

**Signature:**

UNKOWN\_SCHED\_POLICY()

---

**INVALID\_CPU**

You tried to reconfigure a cpu\_pool with a CPU that is unkown to the host or has a wrong state.

**Signature:**

INVALID\_CPU(message)

---

**LAST\_CPU\_NOT\_REMOVEABLE**

You tried to remove the last CPU from a cpu\_pool that has one or more active domains.

**Signature:**

LAST\_CPU\_NOT\_REMOVEABLE(message)

---

## 2.5 Class: session

### 2.5.1 Fields for class: session

Name	session		
Description	<i>A session.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	this_host	host ref	Currently connected host
<i>RO<sub>run</sub></i>	this_user	user ref	Currently connected user
<i>RO<sub>run</sub></i>	last_active	int	Timestamp for last time session was active

### 2.5.2 RPCs associated with class: session

**RPC name:** login\_with\_password

**Overview:** Attempt to authenticate the user, returning a session\_id if successful.

**Signature:**

```
(session ref) login_with_password (string uname, string pwd)
```

**Arguments:**

type	name	description
string	uname	Username for login.
string	pwd	Password for login.

**Return Type:** session ref

ID of newly created session

**Possible Error Codes:** SESSION\_AUTHENTICATION\_FAILED

**RPC name:** logout

**Overview:** Log out of a session.

**Signature:**

```
void logout (session_id s)
```

**Return Type:** void

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given session.

**Signature:**

```
string get_uuid (session_id s, session ref self)
```

**Arguments:**

type	name	description
session ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_this\_host

**Overview:** Get the this\_host field of the given session.

**Signature:**

```
(host ref) get_this_host (session_id s, session ref self)
```

**Arguments:**

type	name	description
session ref	self	reference to the object

**Return Type:** host ref  
value of the field

**RPC name:** get\_this\_user

**Overview:** Get the this\_user field of the given session.

**Signature:**

```
(user ref) get_this_user (session_id s, session ref self)
```

**Arguments:**

type	name	description
session ref	self	reference to the object

**Return Type:** user ref  
value of the field

**RPC name:** get\_last\_active

**Overview:** Get the last\_active field of the given session.

**Signature:**

```
int get_last_active (session_id s, session ref self)
```

**Arguments:**

type	name	description
session ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** `get_by_uuid`

**Overview:** Get a reference to the session instance with the specified UUID.

**Signature:**

`(session ref) get_by_uuid (session_id s, string uuid)`

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** `session ref`  
reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given session.

**Signature:**

`(session record) get_record (session_id s, session ref self)`

**Arguments:**

type	name	description
session ref	self	reference to the object

**Return Type:** `session record`  
all fields from the object

## 2.6 Class: task

### 2.6.1 Fields for class: task

Name	<b>task</b>		
Description	<i>A long-running asynchronous task.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{run}$	name/label	string	a human-readable name
$RO_{run}$	name/description	string	a notes field containing human-readable description
$RO_{run}$	status	task_status_type	current status of the task
$RO_{run}$	session	session ref	the session that created the task
$RO_{run}$	progress	int	if the task is still pending, this field contains the estimated percentage complete (0-100). If task has completed (successfully or unsuccessfully) this should be 100.
$RO_{run}$	type	string	if the task has completed successfully, this field contains the type of the encoded result (i.e. name of the class whose reference is in the result field). Undefined otherwise.
$RO_{run}$	result	string	if the task has completed successfully, this field contains the result value (either Void or an object reference). Undefined otherwise.
$RO_{run}$	error_info	string Set	if the task has failed, this field contains the set of associated error strings. Undefined otherwise.
$RO_{run}$	allowed_operations	(task_allowed_operations) Set	Operations allowed on this task

### 2.6.2 RPCs associated with class: task

#### RPC name: cancel

**Overview:** Cancel this task. If task.allowed\_operations does not contain Cancel, then this will fail with OPERATION\_NOT\_ALLOWED. The task will show the status 'cancelling', and you should continue to check its status until it shows 'cancelled'. There is no guarantee as to the time within which this task will be cancelled.

#### Signature:

```
void cancel (session_id s, task ref task)
```

#### Arguments:

type	name	description
task ref	task	The task

**Return Type:** void

**Possible Error Codes:** OPERATION\_NOT\_ALLOWED

**RPC name:** get\_all

**Overview:** Return a list of all the tasks known to the system.

**Signature:**

```
((task ref) Set) get_all (session_id s)
```

**Return Type:** (task ref) Set

references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given task.

**Signature:**

```
string get_uuid (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** get\_name\_label

**Overview:** Get the name/label field of the given task.

**Signature:**

```
string get_name_label (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** get\_name\_description

**Overview:** Get the name/description field of the given task.

**Signature:**

```
string get_name_description (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_status

**Overview:** Get the status field of the given task.

**Signature:**

```
(task_status_type) get_status (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** task\_status\_type  
value of the field

**RPC name:** get\_session

**Overview:** Get the session field of the given task.

**Signature:**

```
(session ref) get_session (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** session ref  
value of the field

**RPC name:** get\_progress

**Overview:** Get the progress field of the given task.

**Signature:**

```
int get_progress (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** `get_type`**Overview:** Get the type field of the given task.**Signature:**

```
string get_type (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** `get_result`**Overview:** Get the result field of the given task.**Signature:**

```
string get_result (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** `get_error_info`**Overview:** Get the error\_info field of the given task.**Signature:**

```
((string Set) get_error_info (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** string Set  
value of the field

**RPC name:** `get_allowed_operations`**Overview:** Get the allowed\_operations field of the given task.**Signature:**

```
((task_allowed_operations) Set) get_allowed_operations (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** (task\_allowed\_operations) Set  
value of the field

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the task instance with the specified UUID.

**Signature:**

```
(task ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** task ref  
reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given task.

**Signature:**

```
(task record) get_record (session_id s, task ref self)
```

**Arguments:**

type	name	description
task ref	self	reference to the object

**Return Type:** task record  
all fields from the object

**RPC name:** get\_by\_name\_label

**Overview:** Get all the task instances with the given label.

**Signature:**

```
((task ref) Set) get_by_name_label (session_id s, string label)
```

**Arguments:**

type	name	description
string	label	label of object to return

**Return Type:** (task ref) Set  
references to objects with match names

## 2.7 Class: event

### 2.7.1 Fields for class: event

Name	<b>event</b>		
Description	<i>Asynchronous event registration and handling.</i>		
Quals	Field	Type	Description
$RO_{ins}$	id	int	An ID, monotonically increasing, and local to the current session
$RO_{ins}$	timestamp	datetime	The time at which the event occurred
$RO_{ins}$	class	string	The name of the class of the object that changed
$RO_{ins}$	operation	event_operation	The operation that was performed
$RO_{ins}$	ref	string	A reference to the object that changed
$RO_{ins}$	obj_uuid	string	The uuid of the object that changed

### 2.7.2 RPCs associated with class: event

#### RPC name: register

**Overview:** Registers this session with the event system. Specifying the empty list will register for all classes.

**Signature:**

```
void register (session_id s, string Set classes)
```

**Arguments:**

type	name	description
string Set	classes	register for events for the indicated classes

**Return Type:** void

#### RPC name: unregister

**Overview:** Unregisters this session with the event system.

**Signature:**

```
void unregister (session_id s, string Set classes)
```

**Arguments:**

type	name	description
string Set	classes	remove this session's registration for the indicated classes

**Return Type:** void

**RPC name:** next

**Overview:** Blocking call which returns a (possibly empty) batch of events.

**Signature:**

```
((event record) Set) next (session_id s)
```

**Return Type:** (event record) Set  
the batch of events

**Possible Error Codes:** SESSION\_NOT\_REGISTERED

## 2.8 Class: VM

### 2.8.1 Fields for class: VM

Name <b>VM</b>			
<i>Description: A virtual machine (or 'guest').</i>			
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	<code>uuid</code>	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	<code>power_state</code>	vm_power_state	Current power state of the machine
<i>RW</i>	<code>name/label</code>	string	a human-readable name
<i>RW</i>	<code>name/description</code>	string	a notes field containing human-readable description
<i>RW</i>	<code>user_version</code>	int	a user version number for this machine
<i>RW</i>	<code>is_a_template</code>	bool	true if this is a template. Template VMs can never be started, they are used only for cloning other VMs
<i>RW</i>	<code>auto_power_on</code>	bool	true if this VM should be started automatically after host boot
<i>RO<sub>run</sub></i>	<code>suspend_VDI</code>	VDI ref	The VDI that a suspend image is stored on. (Only has meaning if VM is currently suspended)
<i>RO<sub>run</sub></i>	<code>resident_on</code>	host ref	the host the VM is currently resident on
<i>RW</i>	<code>memory/static_max</code>	int	Statically-set (i.e. absolute) maximum (bytes)
<i>RW</i>	<code>memory/dynamic_max</code>	int	Dynamic maximum (bytes)
<i>RW</i>	<code>memory/dynamic_min</code>	int	Dynamic minimum (bytes)
<i>RW</i>	<code>memory/static_min</code>	int	Statically-set (i.e. absolute) minimum (bytes)
<i>RW</i>	<code>VCPUs/params</code>	(string → string) Map	configuration parameters for the selected VCPU policy
<i>RW</i>	<code>VCPUs/max</code>	int	Max number of VCPUs
<i>RW</i>	<code>VCPUs/at_startup</code>	int	Boot number of VCPUs
<i>RW</i>	<code>actions/after_shutdown</code>	on_normal_exit	action to take after the guest has shutdown itself
<i>RW</i>	<code>actions/after_reboot</code>	on_normal_exit	action to take after the guest has rebooted itself
<i>RW</i>	<code>actions/after_crash</code>	on_crash_behaviour	action to take if the guest crashes
<i>RO<sub>run</sub></i>	<code>consoles</code>	(console ref) Set	virtual console devices
<i>RO<sub>run</sub></i>	<code>VIFs</code>	(VIF ref) Set	virtual network interfaces
<i>RO<sub>run</sub></i>	<code>VBDs</code>	(VBD ref) Set	virtual block devices
<i>RO<sub>run</sub></i>	<code>crash_dumps</code>	(crashdump ref) Set	crash dumps associated with this VM
<i>RO<sub>run</sub></i>	<code>VTPMs</code>	(VTPM ref) Set	virtual TPMs
<i>RO<sub>run</sub></i>	<code>DPCIs</code>	(DPCI ref) Set	pass-through PCI devices

<i>RO<sub>run</sub></i>	DSCSI <sub>s</sub>	(DSCSI ref) Set	half-virtualized SCSI devices
<i>RO<sub>run</sub></i>	DSCSI_HBAs	(DSCSI_HBA ref) Set	half-virtualized SCSI host bus adapters
<i>RW</i>	PV/bootloader	string	name of or path to bootloader
<i>RW</i>	PV/kernel	string	URI of kernel
<i>RW</i>	PV/ramdisk	string	URI of initrd
<i>RW</i>	PV/args	string	kernel command-line arguments
<i>RW</i>	PV/bootloader_args	string	miscellaneous arguments for the bootloader
<i>RW</i>	HVM/boot_policy	string	HVM boot policy
<i>RW</i>	HVM/boot_params	(string → string) Map	HVM boot params
<i>RW</i>	platform	(string → string) Map	platform-specific configuration
<i>RW</i>	PCI_bus	string	PCI bus path for pass-through devices
<i>RW</i>	other_config	(string → string) Map	additional configuration
<i>RO<sub>run</sub></i>	domid	int	domain ID (if available, -1 otherwise)
<i>RO<sub>run</sub></i>	is_control_domain	bool	true if this is a control domain (domain 0 or a driver domain)
<i>RO<sub>run</sub></i>	metrics	VM_metrics ref	metrics associated with this VM
<i>RO<sub>run</sub></i>	guest_metrics	VM_guest_metrics ref	metrics associated with the running guest
<i>RO<sub>run</sub></i>	security/label	string	the VM's security label

## 2.8.2 Parameter Details

### PV/kernel and PV/ramdisk

The `PV/kernel` and `PV/ramdisk` parameters should be specified as URIs with either a `file` or `data` scheme.

The `file` scheme must be used when a file on the remote dom0 should be used. The remote dom0 is the one where the guest system should be started on. Only absolute filenames are supported, i.e. the string must start with `file://` appended with the absolute path. This is typically used when the guest system use the same operating systems as the dom0 or there is some kind of shared storage for the images inside the dom0s.

Note that for compatibility reasons it is possible — but not recommended — to leave out the scheme specification for `file`, i.e. `file:///some/path` and `/some/path` is equivalent.

Examples (in python):

Use kernel image which resides in the `/boot` directory:

```
xenapi.VM.create({ ...
    'PV_kernel': 'file:///boot/vmlinuz-2.6.26-2-xen-686',
    ... })
```

Use ramdisk image which resides on a (shared) nfs directory:

```
xenapi.VM.create({ ...
    'PV_ramdisk': 'file:///nfs/xen/debian/5.0.1/initrd.img-2.6.26-2-xen-686'
    ... })
```

When an image should be used which resides on the local system, i.e. the system where the XenAPI call is send from, it is possible to use the **data** URI scheme as described in [RFC2397]. The media-type must be set to **application/octet-stream**. Currently only base64 encoding is supported. The URI must therefore start with **data:application/octet-stream;base64**, followed by the base64 encoded image. The `xen/util/fileuri.py` provides a helper function which takes a local filename as parameter and build up the correct URI from this.

Examples (in python):

Use kernel image specified inline:

```
xenapi.VM.create({ ...
    'PV_kernel': 'data:application/octet-stream;base64,H4Zu....'
    # most of base64 encoded data is omitted
    ... })
```

Using the utility function:

```
from xen.util.fileuri import scheme_data
xenapi.VM.create({ ...
    'PV_kernel': scheme_data.create_from_file(
        "/xen/guests/images/debian/5.0.1/vmlinuz-2.6.26-2-xen-686"),
    ... })
```

Currently when using the **data** URI scheme, a temporary file is created on the remote dom0 in the directory `/var/run/xend/boot` which is then used for booting. When not used any longer the file is deleted. (Therefore reading of the **PV/kernel** or **PV/ramdisk** parameters when created with a **data** URI scheme returns a filename to a temporary file — which might even not exists when querying.) This implementation might change in the way that the data is directly used — without the indirection using a file. Therefore do not rely on the data resulting from a read of a variables which was set using the **data** scheme.

Note: a mix of different schemes for the parameters is possible; e.g. the kernel can be specified with a **file** and the ramdisk with the **data** URI scheme.

### 2.8.3 RPCs associated with class: VM

#### RPC name: clone

**Overview:** Clones the specified VM, making a new VM. Clone automatically exploits the capabilities of the underlying storage repository in which the VM's disk images are stored (e.g. Copy on Write). This function can only be called when the VM is in the Halted State.

#### Signature:

```
(VM ref) clone (session_id s, VM ref vm, string new_name)
```

#### Arguments:

type	name	description
VM ref	vm	The VM to be cloned
string	new_name	The name of the cloned VM

#### Return Type: VM ref

The ID of the newly created VM.

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name:** start

**Overview:** Start the specified VM. This function can only be called with the VM is in the Halted State.

**Signature:**

```
void start (session_id s, VM ref vm, bool start_paused)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to start
bool	start_paused	Instantiate VM in paused state if set to true.

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE, VM\_HVM\_REQUIRED

**RPC name:** pause

**Overview:** Pause the specified VM. This can only be called when the specified VM is in the Running state.

**Signature:**

```
void pause (session_id s, VM ref vm)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to pause

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name:** unpause

**Overview:** Resume the specified VM. This can only be called when the specified VM is in the Paused state.

**Signature:**

```
void unpause (session_id s, VM ref vm)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to unpause

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name: clean\_shutdown**

**Overview:** Attempt to cleanly shutdown the specified VM. (Note: this may not be supported—e.g. if a guest agent is not installed).

Once shutdown has been completed perform poweroff action specified in guest configuration.

This can only be called when the specified VM is in the Running state.

**Signature:**

```
void clean_shutdown (session_id s, VM ref vm)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to shutdown

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name: clean\_reboot**

**Overview:** Attempt to cleanly shutdown the specified VM (Note: this may not be supported—e.g. if a guest agent is not installed).

Once shutdown has been completed perform reboot action specified in guest configuration.

This can only be called when the specified VM is in the Running state.

**Signature:**

```
void clean_reboot (session_id s, VM ref vm)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to shutdown

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name: hard\_shutdown**

**Overview:** Stop executing the specified VM without attempting a clean shutdown. Then perform poweroff action specified in VM configuration.

**Signature:**

```
void hard_shutdown (session_id s, VM ref vm)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to destroy

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name: hard\_reboot**

**Overview:** Stop executing the specified VM without attempting a clean shutdown. Then perform reboot action specified in VM configuration.

**Signature:**

```
void hard_reboot (session_id s, VM ref vm)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to reboot

**Return Type:** void

**RPC name: suspend**

**Overview:** Suspend the specified VM to disk. This can only be called when the specified VM is in the Running state.

**Signature:**

```
void suspend (session_id s, VM ref vm)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to suspend

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name: resume**

**Overview:** Awaken the specified VM and resume it. This can only be called when the specified VM is in the Suspended state.

**Signature:**

```
void resume (session_id s, VM ref vm, bool start_paused)
```

**Arguments:**

type	name	description
VM ref	vm	The VM to resume
bool	start_paused	Resume VM in paused state if set to true.

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name: set\_VCPUs\_number\_live**

**Overview:** Set this VM's VCPUs/at.startup value, and set the same value on the VM, if running.

**Signature:**

```
void set_VCPUs_number_live (session_id s, VM ref self, int nvcpu)
```

**Arguments:**

type	name	description
VM ref	self	The VM
int	nvcpu	The number of VCPUs

**Return Type:** void

**RPC name:** add\_to\_VCPUs\_params\_live

**Overview:** Add the given key-value pair to VM.VCPUs\_params, and apply that value on the running VM.

**Signature:**

```
void add_to_VCPUs_params_live (session_id s, VM ref self, string key, string value)
```

**Arguments:**

type	name	description
VM ref	self	The VM
string	key	The key
string	value	The value

**Return Type:** void

**RPC name:** set\_memory\_dynamic\_max\_live

**Overview:** Set memory\_dynamic\_max in database and on running VM.

**Signature:**

```
void set_memory_dynamic_max_live (session_id s, VM ref self, int max)
```

**Arguments:**

type	name	description
VM ref	self	The VM
int	max	The memory_dynamic_max value

**Return Type:** void

**RPC name:** set\_memory\_dynamic\_min\_live

**Overview:** Set memory\_dynamic\_min in database and on running VM.

**Signature:**

```
void set_memory_dynamic_min_live (session_id s, VM ref self, int min)
```

**Arguments:**

type	name	description
VM ref	self	The VM
int	min	The memory_dynamic_min value

**Return Type:** void

**RPC name:** send\_sysrq

**Overview:** Send the given key as a sysrq to this VM. The key is specified as a single character (a String of length 1). This can only be called when the specified VM is in the Running state.

**Signature:**

```
void send_sysrq (session_id s, VM ref vm, string key)
```

**Arguments:**

type	name	description
VM ref	vm	The VM
string	key	The key to send

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name:** send\_trigger

**Overview:** Send the named trigger to this VM. This can only be called when the specified VM is in the Running state.

**Signature:**

```
void send_trigger (session_id s, VM ref vm, string trigger)
```

**Arguments:**

type	name	description
VM ref	vm	The VM
string	trigger	The trigger to send

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name:** migrate

**Overview:** Migrate the VM to another host. This can only be called when the specified VM is in the Running state.

**Signature:**

```
void migrate (session_id s, VM ref vm, string dest, bool live, (string -> string) Map options)
```

**Arguments:**

type	name	description
VM ref	vm	The VM
string	dest	The destination host
bool	live	Live migration
(string → string) Map	options	Other parameters

**Return Type:** void

**Possible Error Codes:** VM\_BAD\_POWER\_STATE

**RPC name:** get\_all

**Overview:** Return a list of all the VMs known to the system.

**Signature:**

```
((VM ref) Set) get_all (session_id s)
```

**Return Type:** (VM ref) Set

A list of all the IDs of all the VMs

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given VM.

**Signature:**

```
string get_uuid (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** get\_power\_state

**Overview:** Get the power\_state field of the given VM.

**Signature:**

```
(vm_power_state) get_power_state (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** vm\_power\_state

value of the field

**RPC name:** get\_name\_label

**Overview:** Get the name/label field of the given VM.

**Signature:**

```
string get_name_label (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_name\_label

**Overview:** Set the name/label field of the given VM.

**Signature:**

```
void set_name_label (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_name\_description

**Overview:** Get the name/description field of the given VM.

**Signature:**

```
string get_name_description (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_name\_description

**Overview:** Set the name/description field of the given VM.

**Signature:**

```
void set_name_description (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name: get\_user\_version****Overview:** Get the user\_version field of the given VM.**Signature:**

```
int get_user_version (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name: set\_user\_version****Overview:** Set the user\_version field of the given VM.**Signature:**

```
void set_user_version (session_id s, VM ref self, int value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
int	value	New value to set

**Return Type:** void**RPC name: get\_is\_a\_template****Overview:** Get the is\_a\_template field of the given VM.**Signature:**

```
bool get_is_a_template (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** bool

value of the field

**RPC name: set\_is\_a\_template****Overview:** Set the is\_a\_template field of the given VM.**Signature:**

```
void set_is_a_template (session_id s, VM ref self, bool value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
bool	value	New value to set

**Return Type:** void**RPC name:** get\_auto\_power\_on**Overview:** Get the auto\_power\_on field of the given VM.**Signature:**

```
bool get_auto_power_on (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** bool

value of the field

**RPC name:** set\_auto\_power\_on**Overview:** Set the auto\_power\_on field of the given VM.**Signature:**

```
void set_auto_power_on (session_id s, VM ref self, bool value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
bool	value	New value to set

**Return Type:** void**RPC name:** get\_suspend\_VDI**Overview:** Get the suspend\_VDI field of the given VM.**Signature:**

```
(VDI ref) get_suspend_VDI (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** VDI ref

value of the field

**RPC name:** `get_resident_on`**Overview:** Get the `resident_on` field of the given VM.**Signature:**

```
(host ref) get_resident_on (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** `host ref`

value of the field

**RPC name:** `get_memory_static_max`**Overview:** Get the `memory/static_max` field of the given VM.**Signature:**

```
int get_memory_static_max (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `set_memory_static_max`**Overview:** Set the `memory/static_max` field of the given VM.**Signature:**

```
void set_memory_static_max (session_id s, VM ref self, int value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
int	value	New value to set

**Return Type:** `void`**RPC name:** `get_memory_dynamic_max`**Overview:** Get the `memory/dynamic_max` field of the given VM.**Signature:**

```
int get_memory_dynamic_max (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** set\_memory\_dynamic\_max

**Overview:** Set the memory/dynamic\_max field of the given VM.

**Signature:**

```
void set_memory_dynamic_max (session_id s, VM ref self, int value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
int	value	New value to set

**Return Type:** void

**RPC name:** get\_memory\_dynamic\_min

**Overview:** Get the memory/dynamic\_min field of the given VM.

**Signature:**

```
int get_memory_dynamic_min (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** set\_memory\_dynamic\_min

**Overview:** Set the memory/dynamic\_min field of the given VM.

**Signature:**

```
void set_memory_dynamic_min (session_id s, VM ref self, int value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
int	value	New value to set

**Return Type:** void

**RPC name:** `get_memory_static_min`**Overview:** Get the `memory/static_min` field of the given VM.**Signature:**

```
int get_memory_static_min (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `set_memory_static_min`**Overview:** Set the `memory/static_min` field of the given VM.**Signature:**

```
void set_memory_static_min (session_id s, VM ref self, int value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
int	value	New value to set

**Return Type:** `void`**RPC name:** `get_VCPUs_params`**Overview:** Get the `VCPUs/params` field of the given VM.**Signature:**

```
((string -> string) Map) get_VCPUs_params (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** `(string → string) Map`

value of the field

**RPC name:** `set_VCPUs_params`**Overview:** Set the `VCPUs/params` field of the given VM.**Signature:**

```
void set_VCPUs_params (session_id s, VM ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void**RPC name:** add\_to\_VCPUs\_params**Overview:** Add the given key-value pair to the VCPUs/params field of the given VM.**Signature:**

```
void add_to_VCPUs_params (session_id s, VM ref self, string key, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void**RPC name:** remove\_from\_VCPUs\_params**Overview:** Remove the given key and its corresponding value from the VCPUs/params field of the given VM. If the key is not in that Map, then do nothing.**Signature:**

```
void remove_from_VCPUs_params (session_id s, VM ref self, string key)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	key	Key to remove

**Return Type:** void**RPC name:** get\_VCPUs\_max**Overview:** Get the VCPUs/max field of the given VM.**Signature:**

```
int get_VCPUs_max (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** set\_VCPUs\_max

**Overview:** Set the VCPUs/max field of the given VM.

**Signature:**

```
void set_VCPUs_max (session_id s, VM ref self, int value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
int	value	New value to set

**Return Type:** void

**RPC name:** get\_VCPUs\_at\_startup

**Overview:** Get the VCPUs/at\_startup field of the given VM.

**Signature:**

```
int get_VCPUs_at_startup (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** set\_VCPUs\_at\_startup

**Overview:** Set the VCPUs/at\_startup field of the given VM.

**Signature:**

```
void set_VCPUs_at_startup (session_id s, VM ref self, int value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
int	value	New value to set

**Return Type:** void

**RPC name:** `get_actions_after_shutdown`**Overview:** Get the actions/after\_shutdown field of the given VM.**Signature:**

```
(on_normal_exit) get_actions_after_shutdown (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** `on_normal_exit`

value of the field

**RPC name:** `set_actions_after_shutdown`**Overview:** Set the actions/after\_shutdown field of the given VM.**Signature:**

```
void set_actions_after_shutdown (session_id s, VM ref self, on_normal_exit value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
on_normal_exit	value	New value to set

**Return Type:** `void`**RPC name:** `get_actions_after_reboot`**Overview:** Get the actions/after\_reboot field of the given VM.**Signature:**

```
(on_normal_exit) get_actions_after_reboot (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** `on_normal_exit`

value of the field

**RPC name:** `set_actions_after_reboot`**Overview:** Set the actions/after\_reboot field of the given VM.**Signature:**

```
void set_actions_after_reboot (session_id s, VM ref self, on_normal_exit value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
on_normal_exit	value	New value to set

**Return Type:** void**RPC name:** get\_actions\_after\_crash**Overview:** Get the actions/after\_crash field of the given VM.**Signature:**

```
(on_crash_behaviour) get_actions_after_crash (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** on\_crash\_behaviour

value of the field

**RPC name:** set\_actions\_after\_crash**Overview:** Set the actions/after\_crash field of the given VM.**Signature:**

```
void set_actions_after_crash (session_id s, VM ref self, on_crash_behaviour value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
on_crash_behaviour	value	New value to set

**Return Type:** void**RPC name:** get\_consoles**Overview:** Get the consoles field of the given VM.**Signature:**

```
((console ref) Set) get_consoles (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (console ref) Set

value of the field

**RPC name:** get\_VIFs**Overview:** Get the VIFs field of the given VM.**Signature:**

```
((VIF ref) Set) get_VIFs (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (VIF ref) Set  
value of the field

**RPC name:** get\_VBDs**Overview:** Get the VBDs field of the given VM.**Signature:**

```
((VBD ref) Set) get_VBDs (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (VBD ref) Set  
value of the field

**RPC name:** get\_crash\_dumps**Overview:** Get the crash\_dumps field of the given VM.**Signature:**

```
((crashdump ref) Set) get_crash_dumps (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (crashdump ref) Set  
value of the field

**RPC name:** get\_VTPMs**Overview:** Get the VTPMs field of the given VM.**Signature:**

```
((VTPM ref) Set) get_VTPMs (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (VTPM ref) Set  
value of the field

**RPC name:** get\_DPCIs

**Overview:** Get the DPCIs field of the given VM.

**Signature:**

((DPCI ref) Set) get\_DPCIs (session\_id s, VM ref self)

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (DPCI ref) Set  
value of the field

**RPC name:** get\_DSCSI

**Overview:** Get the DSCSI field of the given VM.

**Signature:**

((DSCSI ref) Set) get\_DSCSI (session\_id s, VM ref self)

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (DSCSI ref) Set  
value of the field

**RPC name:** get\_DSCSI\_HBAs

**Overview:** Get the DSCSI\_HBAs field of the given VM.

**Signature:**

((DSCSI\_HBA ref) Set) get\_DSCSI\_HBAs (session\_id s, VM ref self)

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (DSCSI\_HBA ref) Set  
value of the field

**RPC name:** get\_PV\_bootloader**Overview:** Get the PV/bootloader field of the given VM.**Signature:**

```
string get_PV_bootloader (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** set\_PV\_bootloader**Overview:** Set the PV/bootloader field of the given VM.**Signature:**

```
void set_PV_bootloader (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** get\_PV\_kernel**Overview:** Get the PV/kernel field of the given VM.**Signature:**

```
string get_PV_kernel (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** set\_PV\_kernel**Overview:** Set the PV/kernel field of the given VM.**Signature:**

```
void set_PV_kernel (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** get\_PV\_ramdisk**Overview:** Get the PV/ramdisk field of the given VM.**Signature:**

```
string get_PV_ramdisk (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** set\_PV\_ramdisk**Overview:** Set the PV/ramdisk field of the given VM.**Signature:**

```
void set_PV_ramdisk (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** get\_PV\_args**Overview:** Get the PV/args field of the given VM.**Signature:**

```
string get_PV_args (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name: set\_PV\_args****Overview:** Set the PV/args field of the given VM.**Signature:**

```
void set_PV_args (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name: get\_PV\_bootloader\_args****Overview:** Get the PV/bootloader\_args field of the given VM.**Signature:**

```
string get_PV_bootloader_args (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name: set\_PV\_bootloader\_args****Overview:** Set the PV/bootloader\_args field of the given VM.**Signature:**

```
void set_PV_bootloader_args (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name: get\_HVM\_boot\_policy****Overview:** Get the HVM/boot\_policy field of the given VM.**Signature:**

```
string get_HVM_boot_policy (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_HVM\_boot\_policy

**Overview:** Set the HVM/boot\_policy field of the given VM.

**Signature:**

```
void set_HVM_boot_policy (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_HVM\_boot\_params

**Overview:** Get the HVM/boot\_params field of the given VM.

**Signature:**

```
((string -> string) Map) get_HVM_boot_params (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** set\_HVM\_boot\_params

**Overview:** Set the HVM/boot\_params field of the given VM.

**Signature:**

```
void set_HVM_boot_params (session_id s, VM ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name: add\_to\_HVM\_boot\_params**

**Overview:** Add the given key-value pair to the HVM/boot\_params field of the given VM.

**Signature:**

```
void add_to_HVM_boot_params (session_id s, VM ref self, string key, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void

**RPC name: remove\_from\_HVM\_boot\_params**

**Overview:** Remove the given key and its corresponding value from the HVM/boot\_params field of the given VM. If the key is not in that Map, then do nothing.

**Signature:**

```
void remove_from_HVM_boot_params (session_id s, VM ref self, string key)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	key	Key to remove

**Return Type:** void

**RPC name: get\_platform**

**Overview:** Get the platform field of the given VM.

**Signature:**

```
((string -> string) Map) get_platform (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name: set\_platform**

**Overview:** Set the platform field of the given VM.

**Signature:**

```
void set_platform (session_id s, VM ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name:** add\_to\_platform

**Overview:** Add the given key-value pair to the platform field of the given VM.

**Signature:**

```
void add_to_platform (session_id s, VM ref self, string key, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void

**RPC name:** remove\_from\_platform

**Overview:** Remove the given key and its corresponding value from the platform field of the given VM. If the key is not in that Map, then do nothing.

**Signature:**

```
void remove_from_platform (session_id s, VM ref self, string key)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	key	Key to remove

**Return Type:** void

**RPC name:** get\_PCI\_bus

**Overview:** Get the PCI\_bus field of the given VM.

**Signature:**

```
string get_PCI_bus (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_PCI\_bus

**Overview:** Set the PCI\_bus field of the given VM.

**Signature:**

```
void set_PCI_bus (session_id s, VM ref self, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_other\_config

**Overview:** Get the other\_config field of the given VM.

**Signature:**

```
((string -> string) Map) get_other_config (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** set\_other\_config

**Overview:** Set the other\_config field of the given VM.

**Signature:**

```
void set_other_config (session_id s, VM ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name: add\_to\_other\_config****Overview:** Add the given key-value pair to the other\_config field of the given VM.**Signature:**

```
void add_to_other_config (session_id s, VM ref self, string key, string value)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void**RPC name: remove\_from\_other\_config****Overview:** Remove the given key and its corresponding value from the other\_config field of the given VM. If the key is not in that Map, then do nothing.**Signature:**

```
void remove_from_other_config (session_id s, VM ref self, string key)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	key	Key to remove

**Return Type:** void**RPC name: get\_domid****Overview:** Get the domid field of the given VM.**Signature:**

```
int get_domid (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** int  
value of the field**RPC name: get\_is\_control\_domain****Overview:** Get the is\_control\_domain field of the given VM.**Signature:**

```
bool get_is_control_domain (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** bool  
value of the field

**RPC name:** get\_metrics

**Overview:** Get the metrics field of the given VM.

**Signature:**

```
(VM_metrics ref) get_metrics (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** VM\_metrics ref  
value of the field

**RPC name:** get\_guest\_metrics

**Overview:** Get the guest\_metrics field of the given VM.

**Signature:**

```
(VM_guest_metrics ref) get_guest_metrics (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** VM\_guest\_metrics ref  
value of the field

**RPC name:** get\_security\_label

**Overview:** Get the security label field of the given VM. Refer to the XSPolicy class for the format of the security label.

**Signature:**

```
string get_security_label (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name: set\_security\_label**

**Overview:** Set the security label field of the given VM. Refer to the XSPolicy class for the format of the security label.

**Signature:**

```
int set_security_label (session_id s, VM ref self, string
security_label, string old_label)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	security_label	security label for the VM
string	old_label	Label value that the security label must currently have for the change to succeed.

**Return Type: int**

Returns the ssidref in case of an VM that is currently running or paused, zero in case of a dormant VM (halted, suspended).

**Possible Error Codes:** SECURITY\_ERROR

**RPC name: create**

**Overview:** Create a new VM instance, and return its handle.

**Signature:**

```
(VM ref) create (session_id s, VM record args)
```

**Arguments:**

type	name	description
VM record	args	All constructor arguments

**Return Type: VM ref**

reference to the newly created object

**RPC name: destroy**

**Overview:** Destroy the specified VM. The VM is completely removed from the system. This function can only be called when the VM is in the Halted State.

**Signature:**

```
void destroy (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type: void**

**RPC name:** `get_by_uuid`**Overview:** Get a reference to the VM instance with the specified UUID.**Signature:**`(VM ref) get_by_uuid (session_id s, string uuid)`**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** VM ref

reference to the object

**RPC name:** `get_record`**Overview:** Get a record containing the current state of the given VM.**Signature:**`(VM record) get_record (session_id s, VM ref self)`**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** VM record

all fields from the object

**RPC name:** `get_by_name_label`**Overview:** Get all the VM instances with the given label.**Signature:**`((VM ref) Set) get_by_name_label (session_id s, string label)`**Arguments:**

type	name	description
string	label	label of object to return

**Return Type:** (VM ref) Set

references to objects with match names

**RPC name:** `get_cpu_pool`**Overview:** Get the cpu\_pool field of the given VM.**Signature:**`((cpu_pool ref) Set) get_cpu_pool (session_id s, VM ref self)`

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** (cpu\_pool ref) Set  
references to cpu\_pool objects.

**RPC name:** get\_pool\_name

**Overview:** Get the pool\_name field of the given VM.

**Signature:**

```
string get_cpu_pool (session_id s, VM ref self)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object

**Return Type:** string  
name of cpu pool to use

**RPC name:** cpu\_pool\_migrate

**Overview:** Migrate the VM to another cpu\_pool.

**Signature:**

```
void cpu_pool_migrate (session_id s, VM ref self, cpu_pool ref pool)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
cpu_pool ref	pool	reference to new cpu_pool

**Return Type:** void

**Possible Error Codes:** POOL\_BAD\_STATE, VM\_BAD\_POWER\_STATE

**RPC name:** set\_pool\_name

**Overview:** Set cpu pool name to use for next activation.

**Signature:**

```
void set_pool_name (session_id s, VM ref self, string pool\_name)
```

**Arguments:**

type	name	description
VM ref	self	reference to the object
string	pool_name	New pool name

**Return Type:** void

## 2.9 Class: VM\_metrics

### 2.9.1 Fields for class: VM\_metrics

Name	VM_metrics		
Description	<i>The metrics associated with a VM.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	memory/actual	int	Guest's actual memory (bytes)
<i>RO<sub>run</sub></i>	VCPUs/number	int	Current number of VCPUs
<i>RO<sub>run</sub></i>	VCPUs/utilisation	(int → float) Map	Utilisation for all of guest's current VCPUs
<i>RO<sub>run</sub></i>	VCPUs/CPU	(int → int) Map	VCPU to PCPU map
<i>RO<sub>run</sub></i>	VCPUs/params	(string → string) Map	The live equivalent to VM.VCPUs_params
<i>RO<sub>run</sub></i>	VCPUs/flags	(int → string Set) Map	CPU flags (blocked,online,running)
<i>RO<sub>run</sub></i>	state	string Set	The state of the guest, eg blocked, dying etc
<i>RO<sub>run</sub></i>	start_time	datetime	Time at which this VM was last booted
<i>RO<sub>run</sub></i>	last_updated	datetime	Time at which this information was last updated

### 2.9.2 RPCs associated with class: VM\_metrics

**RPC name:** get\_all

**Overview:** Return a list of all the VM\_metrics instances known to the system.

**Signature:**

```
((VM_metrics ref) Set) get_all (session_id s)
```

**Return Type:** (VM\_metrics ref) Set

references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given VM\_metrics.

**Signature:**

```
string get_uuid (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name: get\_memory\_actual****Overview:** Get the memory/actual field of the given VM\_metrics.**Signature:**

```
int get_memory_actual (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name: get\_VCPUs\_number****Overview:** Get the VCPUs/number field of the given VM\_metrics.**Signature:**

```
int get_VCPUs_number (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name: get\_VCPUs\_utilisation****Overview:** Get the VCPUs/utilisation field of the given VM\_metrics.**Signature:**

```
((int -> float) Map) get_VCPUs_utilisation (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** (int → float) Map

value of the field

**RPC name: get\_VCPUs\_CPU****Overview:** Get the VCPUs/CPU field of the given VM\_metrics.**Signature:**

```
((int -> int) Map) get_VCPUs_CPU (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** (int → int) Map  
value of the field

**RPC name:** get\_VCPUs\_params

**Overview:** Get the VCPUs/params field of the given VM\_metrics.

**Signature:**

```
((string -> string) Map) get_VCPUs_params (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** get\_VCPUs\_flags

**Overview:** Get the VCPUs/flags field of the given VM\_metrics.

**Signature:**

```
((int -> string Set) Map) get_VCPUs_flags (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** (int → string Set) Map  
value of the field

**RPC name:** get\_state

**Overview:** Get the state field of the given VM\_metrics.

**Signature:**

```
(string Set) get_state (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** string Set  
value of the field

**RPC name:** `get_start_time`**Overview:** Get the `start_time` field of the given `VM_metrics`.**Signature:**

```
datetime get_start_time (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** `datetime`

value of the field

**RPC name:** `get_last_updated`**Overview:** Get the `last_updated` field of the given `VM_metrics`.**Signature:**

```
datetime get_last_updated (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** `datetime`

value of the field

**RPC name:** `get_by_uuid`**Overview:** Get a reference to the `VM_metrics` instance with the specified UUID.**Signature:**

```
(VM_metrics ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** `VM_metrics ref`

reference to the object

**RPC name:** `get_record`**Overview:** Get a record containing the current state of the given `VM_metrics`.**Signature:**

```
(VM_metrics record) get_record (session_id s, VM_metrics ref self)
```

**Arguments:**

type	name	description
VM_metrics ref	self	reference to the object

**Return Type:** VM\_metrics record  
all fields from the object

## 2.10 Class: VM\_guest\_metrics

### 2.10.1 Fields for class: VM\_guest\_metrics

Name	VM_guest_metrics		
Description	<i>The metrics reported by the guest (as opposed to inferred from outside).</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	os_version	(string → string) Map	version of the OS
<i>RO<sub>run</sub></i>	PV_drivers_version	(string → string) Map	version of the PV drivers
<i>RO<sub>run</sub></i>	memory	(string → string) Map	free/used/total memory
<i>RO<sub>run</sub></i>	disks	(string → string) Map	disk configuration/free space
<i>RO<sub>run</sub></i>	networks	(string → string) Map	network configuration
<i>RO<sub>run</sub></i>	other	(string → string) Map	anything else
<i>RO<sub>run</sub></i>	last_updated	datetime	Time at which this information was last updated

### 2.10.2 RPCs associated with class: VM\_guest\_metrics

**RPC name:** get\_all

**Overview:** Return a list of all the VM\_guest\_metrics instances known to the system.

**Signature:**

```
((VM_guest_metrics ref) Set) get_all (session_id s)
```

**Return Type:** (VM\_guest\_metrics ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given VM\_guest\_metrics.

**Signature:**

```
string get_uuid (session_id s, VM_guest_metrics ref self)
```

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_os\_version

**Overview:** Get the os.version field of the given VM\_guest\_metrics.

**Signature:**

```
((string -> string) Map) get_os_version (session_id s, VM_guest_metrics ref self)
```

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** get\_PV\_drivers\_version

**Overview:** Get the PV\_drivers\_version field of the given VM\_guest\_metrics.

**Signature:**

```
((string -> string) Map) get_PV_drivers_version (session_id s, VM_guest_metrics ref self)
```

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** get\_memory

**Overview:** Get the memory field of the given VM\_guest\_metrics.

**Signature:**

```
((string -> string) Map) get_memory (session_id s, VM_guest_metrics ref self)
```

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** get\_disks

**Overview:** Get the disks field of the given VM\_guest\_metrics.

**Signature:**

```
((string -> string) Map) get_disks (session_id s, VM_guest_metrics ref self)
```

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** `get_networks`

**Overview:** Get the networks field of the given VM\_guest\_metrics.

**Signature:**

```
((string -> string) Map) get_networks (session_id s, VM_guest_metrics ref self)
```

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** `(string → string) Map`  
value of the field

**RPC name:** `get_other`

**Overview:** Get the other field of the given VM\_guest\_metrics.

**Signature:**

```
((string -> string) Map) get_other (session_id s, VM_guest_metrics ref self)
```

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** `(string → string) Map`  
value of the field

**RPC name:** `get_last_updated`

**Overview:** Get the last\_updated field of the given VM\_guest\_metrics.

**Signature:**

```
datetime get_last_updated (session_id s, VM_guest_metrics ref self)
```

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** `datetime`  
value of the field

**RPC name:** `get_by_uuid`

**Overview:** Get a reference to the VM\_guest\_metrics instance with the specified UUID.

**Signature:**

```
(VM_guest_metrics ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** VM\_guest\_metrics ref  
reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given VM\_guest\_metrics.

**Signature:**

(VM\_guest\_metrics record) get\_record (session\_id s, VM\_guest\_metrics ref self)

**Arguments:**

type	name	description
VM_guest_metrics ref	self	reference to the object

**Return Type:** VM\_guest\_metrics record  
all fields from the object

## 2.11 Class: host

### 2.11.1 Fields for class: host

Name	host		
Description	<i>A physical host.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RW</i>	name/label	string	a human-readable name
<i>RW</i>	name/description	string	a notes field containing human-readable description
<i>RO<sub>run</sub></i>	API_version/major	int	major version number
<i>RO<sub>run</sub></i>	API_version/minor	int	minor version number
<i>RO<sub>run</sub></i>	API_version/vendor	string	identification of vendor
<i>RO<sub>run</sub></i>	API_version/vendor_implementation	(string → string) Map	details of vendor implementation
<i>RO<sub>run</sub></i>	enabled	bool	True if the host is currently enabled
<i>RO<sub>run</sub></i>	software_version	(string → string) Map	version strings
<i>RW</i>	other_config	(string → string) Map	additional configuration
<i>RO<sub>run</sub></i>	capabilities	string Set	Xen capabilities
<i>RO<sub>run</sub></i>	cpu_configuration	(string → string) Map	The CPU configuration on this host. May contain keys such as “nr_nodes”, “sockets_per_node”, “cores_per_socket”, or “threads_per_core”
<i>RO<sub>run</sub></i>	sched_policy	string	Scheduler policy currently in force on this host
<i>RO<sub>run</sub></i>	supported_bootloaders	string Set	a list of the bootloaders installed on the machine
<i>RO<sub>run</sub></i>	resident_VMs	(VM ref) Set	list of VMs currently resident on host
<i>RW</i>	logging	(string → string) Map	logging configuration
<i>RO<sub>run</sub></i>	PIFs	(PIF ref) Set	physical network interfaces
<i>RW</i>	suspend_image_sr	SR ref	The SR in which VDI for suspend images are created
<i>RW</i>	crash_dump_sr	SR ref	The SR in which VDIs for crash dumps are created
<i>RO<sub>run</sub></i>	PBDs	(PBD ref) Set	physical blockdevices
<i>RO<sub>run</sub></i>	PPCIs	(PPCI ref) Set	physical PCI devices
<i>RO<sub>run</sub></i>	PSCSIs	(PSCSI ref) Set	physical SCSI devices
<i>RO<sub>run</sub></i>	PSCSI_HBAs	(PSCSI_HBA ref) Set	physical SCSI host bus adapters
<i>RO<sub>run</sub></i>	host_CPUs	(host_cpu ref) Set	The physical CPUs on this host
<i>RO<sub>run</sub></i>	metrics	host_metrics ref	metrics associated with this host
<i>RO<sub>run</sub></i>	resident_cpu_pools	(cpu_pool ref) Set	list of cpu-pools currently resident on the host

### 2.11.2 RPCs associated with class: host

#### RPC name: disable

**Overview:** Puts the host into a state in which no new VMs can be started. Currently active VMs on the host continue to execute.

**Signature:**

```
void disable (session_id s, host ref host)
```

**Arguments:**

type	name	description
host ref	host	The Host to disable

**Return Type:** void

#### RPC name: enable

**Overview:** Puts the host into a state in which new VMs can be started.

**Signature:**

```
void enable (session_id s, host ref host)
```

**Arguments:**

type	name	description
host ref	host	The Host to enable

**Return Type:** void

#### RPC name: shutdown

**Overview:** Shutdown the host. (This function can only be called if there are no currently running VMs on the host and it is disabled.).

**Signature:**

```
void shutdown (session_id s, host ref host)
```

**Arguments:**

type	name	description
host ref	host	The Host to shutdown

**Return Type:** void

#### RPC name: reboot

**Overview:** Reboot the host. (This function can only be called if there are no currently running VMs on the host and it is disabled.).

**Signature:**

```
void reboot (session_id s, host ref host)
```

**Arguments:**

type	name	description
host ref	host	The Host to reboot

**Return Type:** void**RPC name:** dmesg**Overview:** Get the host xen dmesg.**Signature:**

```
string dmesg (session_id s, host ref host)
```

**Arguments:**

type	name	description
host ref	host	The Host to query

**Return Type:** string

dmesg string

**RPC name:** dmesg\_clear**Overview:** Get the host xen dmesg, and clear the buffer.**Signature:**

```
string dmesg_clear (session_id s, host ref host)
```

**Arguments:**

type	name	description
host ref	host	The Host to query

**Return Type:** string

dmesg string

**RPC name:** get\_log**Overview:** Get the host's log file.**Signature:**

```
string get_log (session_id s, host ref host)
```

**Arguments:**

type	name	description
host ref	host	The Host to query

**Return Type:** string

The contents of the host's primary log file

**RPC name: send\_debug\_keys****Overview:** Inject the given string as debugging keys into Xen.**Signature:**

```
void send_debug_keys (session_id s, host ref host, string keys)
```

**Arguments:**

type	name	description
host ref	host	The host
string	keys	The keys to send

**Return Type:** void**RPC name: list\_methods****Overview:** List all supported methods.**Signature:**

```
(string Set) list_methods (session_id s)
```

**Return Type:** string Set

The name of every supported method.

**RPC name: get\_all****Overview:** Return a list of all the hosts known to the system.**Signature:**

```
((host ref) Set) get_all (session_id s)
```

**Return Type:** (host ref) Set

A list of all the IDs of all the hosts

**RPC name: get\_uuid****Overview:** Get the uuid field of the given host.**Signature:**

```
string get_uuid (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_name_label`**Overview:** Get the name/label field of the given host.**Signature:**

```
string get_name_label (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `set_name_label`**Overview:** Set the name/label field of the given host.**Signature:**

```
void set_name_label (session_id s, host ref self, string value)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
string	value	New value to set

**Return Type:** `void`**RPC name:** `get_name_description`**Overview:** Get the name/description field of the given host.**Signature:**

```
string get_name_description (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `set_name_description`**Overview:** Set the name/description field of the given host.**Signature:**

```
void set_name_description (session_id s, host ref self, string value)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** get\_API\_version\_major**Overview:** Get the API\_version/major field of the given host.**Signature:**

```
int get_API_version_major (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name:** get\_API\_version\_minor**Overview:** Get the API\_version/minor field of the given host.**Signature:**

```
int get_API_version_minor (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name:** get\_API\_version\_vendor**Overview:** Get the API\_version/vendor field of the given host.**Signature:**

```
string get_API_version_vendor (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name: get\_API\_version\_vendor\_implementation****Overview:** Get the API\_version/vendor\_implementation field of the given host.**Signature:**

```
((string -> string) Map) get_API_version_vendor_implementation (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name: get\_enabled****Overview:** Get the enabled field of the given host.**Signature:**

```
bool get_enabled (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** bool  
value of the field

**RPC name: get\_software\_version****Overview:** Get the software\_version field of the given host.**Signature:**

```
((string -> string) Map) get_software_version (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name: get\_other\_config****Overview:** Get the other\_config field of the given host.**Signature:**

```
((string -> string) Map) get_other_config (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** set\_other\_config

**Overview:** Set the other\_config field of the given host.

**Signature:**

```
void set_other_config (session_id s, host ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name:** add\_to\_other\_config

**Overview:** Add the given key-value pair to the other\_config field of the given host.

**Signature:**

```
void add_to_other_config (session_id s, host ref self, string key, string value)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void

**RPC name:** remove\_from\_other\_config

**Overview:** Remove the given key and its corresponding value from the other\_config field of the given host. If the key is not in that Map, then do nothing.

**Signature:**

```
void remove_from_other_config (session_id s, host ref self, string key)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
string	key	Key to remove

**Return Type:** void

**RPC name:** get\_capabilities

**Overview:** Get the capabilities field of the given host.

**Signature:**

```
(string Set) get_capabilities (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** string Set

value of the field

**RPC name:** get\_cpu\_configuration

**Overview:** Get the cpu.configuration field of the given host.

**Signature:**

```
((string -> string) Map) get_cpu_configuration (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (string → string) Map

value of the field

**RPC name:** get\_sched\_policy

**Overview:** Get the sched\_policy field of the given host.

**Signature:**

```
string get_sched_policy (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_supported_bootloaders`**Overview:** Get the `supported_bootloaders` field of the given host.**Signature:**

```
((string Set) get_supported_bootloaders (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** `string Set`

value of the field

**RPC name:** `get_resident_VMs`**Overview:** Get the `resident_VMs` field of the given host.**Signature:**

```
((VM ref) Set) get_resident_VMs (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** `(VM ref) Set`

value of the field

**RPC name:** `get_logging`**Overview:** Get the `logging` field of the given host.**Signature:**

```
((string -> string) Map) get_logging (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** `(string → string) Map`

value of the field

**RPC name:** `set_logging`**Overview:** Set the `logging` field of the given host.**Signature:**

```
void set_logging (session_id s, host ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name:** add\_to\_logging

**Overview:** Add the given key-value pair to the logging field of the given host.

**Signature:**

```
void add_to_logging (session_id s, host ref self, string key, string value)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void

**RPC name:** remove\_from\_logging

**Overview:** Remove the given key and its corresponding value from the logging field of the given host. If the key is not in that Map, then do nothing.

**Signature:**

```
void remove_from_logging (session_id s, host ref self, string key)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
string	key	Key to remove

**Return Type:** void

**RPC name:** get\_PIFs

**Overview:** Get the PIFs field of the given host.

**Signature:**

```
((PIF ref) Set) get_PIFs (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (PIF ref) Set

value of the field

**RPC name:** `get_suspend_image_sr`

**Overview:** Get the `suspend_image_sr` field of the given host.

**Signature:**

```
(SR ref) get_suspend_image_sr (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** SR ref

value of the field

**RPC name:** `set_suspend_image_sr`

**Overview:** Set the `suspend_image_sr` field of the given host.

**Signature:**

```
void set_suspend_image_sr (session_id s, host ref self, SR ref value)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
SR ref	value	New value to set

**Return Type:** void

**RPC name:** `get_crash_dump_sr`

**Overview:** Get the `crash_dump_sr` field of the given host.

**Signature:**

```
(SR ref) get_crash_dump_sr (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** SR ref

value of the field

**RPC name: set\_crash\_dump\_sr****Overview:** Set the crash\_dump\_sr field of the given host.**Signature:**

```
void set_crash_dump_sr (session_id s, host ref self, SR ref value)
```

**Arguments:**

type	name	description
host ref	self	reference to the object
SR ref	value	New value to set

**Return Type:** void**RPC name: get\_PBDs****Overview:** Get the PBDs field of the given host.**Signature:**

```
((PBD ref) Set) get_PBDs (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (PBD ref) Set  
value of the field**RPC name: get\_PPCIs****Overview:** Get the PPCIs field of the given host.**Signature:**

```
((PPCI ref) Set) get_PPCIs (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (PPCI ref) Set  
value of the field**RPC name: get\_PSCSIs****Overview:** Get the PSCSIs field of the given host.**Signature:**

```
((PSCSI ref) Set) get_PSCSIs (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (PSCSI ref) Set  
value of the field

**RPC name:** get\_PSCSI\_HBAs

**Overview:** Get the PSCSI\_HBAs field of the given host.

**Signature:**

```
((PSCSI_HBA ref) Set) get_PSCSI_HBAs (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (PSCSI\_HBA ref) Set  
value of the field

**RPC name:** get\_host\_CPUs

**Overview:** Get the host\_CPUs field of the given host.

**Signature:**

```
((host_cpu ref) Set) get_host_CPUs (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (host\_cpu ref) Set  
value of the field

**RPC name:** get\_metrics

**Overview:** Get the metrics field of the given host.

**Signature:**

```
(host_metrics ref) get_metrics (session_id s, host ref self)
```

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** host\_metrics ref  
value of the field

**RPC name:** `get_by_uuid`**Overview:** Get a reference to the host instance with the specified UUID.**Signature:**`(host ref) get_by_uuid (session_id s, string uuid)`**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** `host ref`

reference to the object

**RPC name:** `get_record`**Overview:** Get a record containing the current state of the given host.**Signature:**`(host record) get_record (session_id s, host ref self)`**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** `host record`

all fields from the object

**RPC name:** `get_by_name_label`**Overview:** Get all the host instances with the given label.**Signature:**`((host ref) Set) get_by_name_label (session_id s, string label)`**Arguments:**

type	name	description
string	label	label of object to return

**Return Type:** `(host ref) Set`

references to objects with match names

**RPC name:** `get_resident_cpu_pools`**Overview:** Get the `resident_cpu_pools` field of the given host.**Signature:**`((cpu_pool ref) Set) get_resident_cpu_pools (session_id s, host ref self)`

**Arguments:**

type	name	description
host ref	self	reference to the object

**Return Type:** (cpu\_pool ref) Set  
references to all known cpu\_pools.

## 2.12 Class: host\_metrics

### 2.12.1 Fields for class: host\_metrics

Name	<b>host_metrics</b>		
Description	<i>The metrics associated with a host.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	memory/total	int	Host's total memory (bytes)
<i>RO<sub>run</sub></i>	memory/free	int	Host's free memory (bytes)
<i>RO<sub>run</sub></i>	last_updated	datetime	Time at which this information was last updated

### 2.12.2 RPCs associated with class: host\_metrics

**RPC name:** get\_all

**Overview:** Return a list of all the host\_metrics instances known to the system.

**Signature:**

```
((host_metrics ref) Set) get_all (session_id s)
```

**Return Type:** (host\_metrics ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given host\_metrics.

**Signature:**

```
string get_uuid (session_id s, host_metrics ref self)
```

**Arguments:**

type	name	description
host_metrics ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_memory\_total

**Overview:** Get the memory/total field of the given host\_metrics.

**Signature:**

```
int get_memory_total (session_id s, host_metrics ref self)
```

**Arguments:**

type	name	description
host_metrics ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_memory\_free

**Overview:** Get the memory/free field of the given host\_metrics.

**Signature:**

```
int get_memory_free (session_id s, host_metrics ref self)
```

**Arguments:**

type	name	description
host_metrics ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_last\_updated

**Overview:** Get the last\_updated field of the given host\_metrics.

**Signature:**

```
datetime get_last_updated (session_id s, host_metrics ref self)
```

**Arguments:**

type	name	description
host_metrics ref	self	reference to the object

**Return Type:** datetime  
value of the field

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the host\_metrics instance with the specified UUID.

**Signature:**

```
(host_metrics ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** host\_metrics ref  
reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given `host_metrics`.

**Signature:**

```
(host_metrics record) get_record (session_id s, host_metrics ref self)
```

**Arguments:**

type	name	description
<code>host_metrics ref</code>	<code>self</code>	reference to the object

**Return Type:** `host_metrics record`

all fields from the object

## 2.13 Class: host\_cpu

### 2.13.1 Fields for class: host\_cpu

Name	<b>host_cpu</b>		
Description	<i>A physical CPU</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	host	host ref	the host the CPU is in
<i>RO<sub>run</sub></i>	number	int	the number of the physical CPU within the host
<i>RO<sub>run</sub></i>	vendor	string	the vendor of the physical CPU
<i>RO<sub>run</sub></i>	speed	int	the speed of the physical CPU
<i>RO<sub>run</sub></i>	modelname	string	the model name of the physical CPU
<i>RO<sub>run</sub></i>	stepping	string	the stepping of the physical CPU
<i>RO<sub>run</sub></i>	flags	string	the flags of the physical CPU (a decoded version of the features field)
<i>RO<sub>run</sub></i>	features	string	the physical CPU feature bitmap
<i>RO<sub>run</sub></i>	utilisation	float	the current CPU utilisation
<i>RO<sub>run</sub></i>	cpu-pool	(cpu-pool ref) Set	reference to cpu-pool the cpu belongs to

### 2.13.2 RPCs associated with class: host\_cpu

#### RPC name: get\_all

**Overview:** Return a list of all the host\_cpus known to the system.

**Signature:**

```
((host_cpu ref) Set) get_all (session_id s)
```

**Return Type:** (host\_cpu ref) Set  
references to all objects

#### RPC name: get\_uuid

**Overview:** Get the uuid field of the given host\_cpu.

**Signature:**

```
string get_uuid (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** `get_host`**Overview:** Get the host field of the given `host_cpu`.**Signature:**

```
(host ref) get_host (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** `host ref`

value of the field

**RPC name:** `get_number`**Overview:** Get the number field of the given `host_cpu`.**Signature:**

```
int get_number (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_vendor`**Overview:** Get the vendor field of the given `host_cpu`.**Signature:**

```
string get_vendor (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `get_speed`**Overview:** Get the speed field of the given `host_cpu`.**Signature:**

```
int get_speed (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_modelname

**Overview:** Get the modelname field of the given host\_cpu.

**Signature:**

```
string get_modelname (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_stepping

**Overview:** Get the stepping field of the given host\_cpu.

**Signature:**

```
string get_stepping (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_flags

**Overview:** Get the flags field of the given host\_cpu. As of this version of the API, the semantics of the returned string are explicitly unspecified, and may change in the future.

**Signature:**

```
string get_flags (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_features`

**Overview:** Get the features field of the given `host_cpu`. As of this version of the API, the semantics of the returned string are explicitly unspecified, and may change in the future.

**Signature:**

```
string get_features (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `get_utilisation`

**Overview:** Get the utilisation field of the given `host_cpu`.

**Signature:**

```
float get_utilisation (session_id s, host_cpu ref self)
```

**Arguments:**

type	name	description
host_cpu ref	self	reference to the object

**Return Type:** `float`

value of the field

**RPC name:** `get_by_uuid`

**Overview:** Get a reference to the `host_cpu` instance with the specified UUID.

**Signature:**

```
(host_cpu ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** `host_cpu ref`

reference to the object

**RPC name:** `get_record`**Overview:** Get a record containing the current state of the given `host_cpu`.**Signature:**`((host_cpu record) get_record (session_id s, host_cpu ref self)`**Arguments:**

type	name	description
<code>host_cpu ref</code>	<code>self</code>	reference to the object

**Return Type:** `host_cpu record`

all fields from the object

**RPC name:** `get_cpu_pool`**Overview:** Get the `cpu_pool` field of the given `host_cpu`.**Signature:**`((cpu_pool) Set) get_cpu_pool (session_id s, host_cpu ref self)`**Arguments:**

type	name	description
<code>host_cpu ref</code>	<code>self</code>	reference to the object

**Return Type:** `(cpu_pool) Set`

value of the field

**RPC name:** `get_unassigned_cpus`**Overview:** Get a reference to all cpus that are not assigned to any `cpu_pool`.**Signature:**`((host_cpu) Set) get_unassigned_cpus (session_id s)`**Arguments:**

type	name	description
------	------	-------------

**Return Type:** `(host_cpu ref) Set`

Set of free (not assigned) cpus

## 2.14 Class: network

### 2.14.1 Fields for class: network

Name	<b>network</b>		
Description	<i>A virtual network.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RW</i>	name/label	string	a human-readable name
<i>RW</i>	name/description	string	a notes field containing human-readable description
<i>RO<sub>run</sub></i>	VIFs	(VIF ref) Set	list of connected vifs
<i>RO<sub>run</sub></i>	PIFs	(PIF ref) Set	list of connected pifs
<i>RW</i>	default_gateway	string	default gateway
<i>RW</i>	default_netmask	string	default netmask
<i>RW</i>	other_config	(string → string) Map	additional configuration

### 2.14.2 RPCs associated with class: network

#### RPC name: get\_all

**Overview:** Return a list of all the networks known to the system

**Signature:**

```
((network ref) Set) get_all (session_id s)
```

**Return Type:** (network ref) Set

A list of all the IDs of all the networks

#### RPC name: get\_uuid

**Overview:** Get the uuid field of the given network.

**Signature:**

```
string get_uuid (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** string

value of the field

#### RPC name: get\_name\_label

**Overview:** Get the name/label field of the given network.

**Signature:**

```
string get_name_label (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_name\_label

**Overview:** Set the name/label field of the given network.

**Signature:**

```
void set_name_label (session_id s, network ref self, string value)
```

**Arguments:**

type	name	description
network ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_name\_description

**Overview:** Get the name/description field of the given network.

**Signature:**

```
string get_name_description (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_name\_description

**Overview:** Set the name/description field of the given network.

**Signature:**

```
void set_name_description (session_id s, network ref self, string value)
```

**Arguments:**

type	name	description
network ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_VIFs**Overview:** Get the VIFs field of the given network.**Signature:**

```
((VIF ref) Set) get_VIFs (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** (VIF ref) Set  
value of the field**RPC name:** get\_PIFs**Overview:** Get the PIFs field of the given network.**Signature:**

```
((PIF ref) Set) get_PIFs (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** (PIF ref) Set  
value of the field**RPC name:** get\_default\_gateway**Overview:** Get the default\_gateway field of the given network.**Signature:**

```
string get_default_gateway (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** string  
value of the field**RPC name:** set\_default\_gateway**Overview:** Set the default\_gateway field of the given network.**Signature:**

```
void set_default_gateway (session_id s, network ref self, string value)
```

**Arguments:**

type	name	description
network ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** get\_default\_netmask**Overview:** Get the default\_netmask field of the given network.**Signature:**

```
string get_default_netmask (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** set\_default\_netmask**Overview:** Set the default\_netmask field of the given network.**Signature:**

```
void set_default_netmask (session_id s, network ref self, string value)
```

**Arguments:**

type	name	description
network ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** get\_other\_config**Overview:** Get the other\_config field of the given network.**Signature:**

```
((string -> string) Map) get_other_config (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** (string → string) Map

value of the field

**RPC name: set\_other\_config****Overview:** Set the other\_config field of the given network.**Signature:**

```
void set_other_config (session_id s, network ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
network ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void**RPC name: add\_to\_other\_config****Overview:** Add the given key-value pair to the other\_config field of the given network.**Signature:**

```
void add_to_other_config (session_id s, network ref self, string key, string value)
```

**Arguments:**

type	name	description
network ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void**RPC name: remove\_from\_other\_config****Overview:** Remove the given key and its corresponding value from the other\_config field of the given network. If the key is not in that Map, then do nothing.**Signature:**

```
void remove_from_other_config (session_id s, network ref self, string key)
```

**Arguments:**

type	name	description
network ref	self	reference to the object
string	key	Key to remove

**Return Type:** void**RPC name: create****Overview:** Create a new network instance, and return its handle.**Signature:**

```
(network ref) create (session_id s, network record args)
```

**Arguments:**

type	name	description
network record	args	All constructor arguments

**Return Type:** network ref  
reference to the newly created object

**RPC name:** destroy

**Overview:** Destroy the specified network instance.

**Signature:**

```
void destroy (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** void

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the network instance with the specified UUID.

**Signature:**

```
(network ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** network ref  
reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given network.

**Signature:**

```
(network record) get_record (session_id s, network ref self)
```

**Arguments:**

type	name	description
network ref	self	reference to the object

**Return Type:** network record  
all fields from the object

**RPC name:** `get_by_name_label`

**Overview:** Get all the network instances with the given label.

**Signature:**

```
((network ref) Set) get_by_name_label (session_id s, string label)
```

**Arguments:**

type	name	description
string	label	label of object to return

**Return Type:** (network ref) Set  
references to objects with match names

## 2.15 Class: VIF

### 2.15.1 Fields for class: VIF

Name	<b>VIF</b>		
Description	<i>A virtual network interface.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	<code>uuid</code>	string	unique identifier/object reference
<i>RW</i>	<code>device</code>	string	name of network device as exposed to guest e.g. eth0
<i>RO<sub>ins</sub></i>	<code>network</code>	network ref	virtual network to which this vif is connected
<i>RO<sub>ins</sub></i>	<code>VM</code>	VM ref	virtual machine to which this vif is connected
<i>RW</i>	<code>MAC</code>	string	ethernet MAC address of virtual interface, as exposed to guest
<i>RW</i>	<code>MTU</code>	int	MTU in octets
<i>RO<sub>run</sub></i>	<code>currently_attached</code>	bool	is the device currently attached (erased on reboot)
<i>RO<sub>run</sub></i>	<code>status_code</code>	int	error/success code associated with last attach-operation (erased on reboot)
<i>RO<sub>run</sub></i>	<code>status_detail</code>	string	error/success information associated with last attach-operation status (erased on reboot)
<i>RO<sub>run</sub></i>	<code>runtime_properties</code>	(string → string) Map	Device runtime properties
<i>RW</i>	<code>qos/algorithm.type</code>	string	QoS algorithm to use
<i>RW</i>	<code>qos/algorithm.params</code>	(string → string) Map	parameters for chosen QoS algorithm
<i>RO<sub>run</sub></i>	<code>qos/supported_algorithms</code>	string Set	supported QoS algorithms for this VIF
<i>RO<sub>run</sub></i>	<code>metrics</code>	VIF_metrics ref	metrics associated with this VIF

### 2.15.2 RPCs associated with class: VIF

#### RPC name: plug

**Overview:** Hotplug the specified VIF, dynamically attaching it to the running VM.

#### Signature:

```
void plug (session_id s, VIF ref self)
```

#### Arguments:

type	name	description
VIF ref	self	The VIF to hotplug

**Return Type:** void

**RPC name: unplug**

**Overview:** Hot-unplug the specified VIF, dynamically unattaching it from the running VM.

**Signature:**

```
void unplug (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	The VIF to hot-unplug

**Return Type:** void

**RPC name: get\_all**

**Overview:** Return a list of all the VIFs known to the system.

**Signature:**

```
((VIF ref) Set) get_all (session_id s)
```

**Return Type:** (VIF ref) Set

references to all objects

**RPC name: get\_uuid**

**Overview:** Get the uuid field of the given VIF.

**Signature:**

```
string get_uuid (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name: get\_device**

**Overview:** Get the device field of the given VIF.

**Signature:**

```
string get_device (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `set_device`

**Overview:** Set the device field of the given VIF.

**Signature:**

```
void set_device (session_id s, VIF ref self, string value)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** `get_network`

**Overview:** Get the network field of the given VIF.

**Signature:**

```
(network ref) get_network (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** network ref

value of the field

**RPC name:** `get_VM`

**Overview:** Get the VM field of the given VIF.

**Signature:**

```
(VM ref) get_VM (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** VM ref

value of the field

**RPC name:** get\_MAC**Overview:** Get the MAC field of the given VIF.**Signature:**

```
string get_MAC (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** set\_MAC**Overview:** Set the MAC field of the given VIF.**Signature:**

```
void set_MAC (session_id s, VIF ref self, string value)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** get\_MTU**Overview:** Get the MTU field of the given VIF.**Signature:**

```
int get_MTU (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name:** set\_MTU**Overview:** Set the MTU field of the given VIF.**Signature:**

```
void set_MTU (session_id s, VIF ref self, int value)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object
int	value	New value to set

**Return Type:** void**RPC name:** `get_currently_attached`**Overview:** Get the `currently_attached` field of the given VIF.**Signature:**

```
bool get_currently_attached (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** bool

value of the field

**RPC name:** `get_status_code`**Overview:** Get the `status_code` field of the given VIF.**Signature:**

```
int get_status_code (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name:** `get_status_detail`**Overview:** Get the `status_detail` field of the given VIF.**Signature:**

```
string get_status_detail (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_runtime_properties`**Overview:** Get the `runtime_properties` field of the given VIF.**Signature:**

```
((string -> string) Map) get_runtime_properties (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** `(string → string) Map`  
 value of the field

**RPC name:** `get_qos_algorithm_type`**Overview:** Get the `qos/algorithm_type` field of the given VIF.**Signature:**

```
string get_qos_algorithm_type (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** `string`  
 value of the field

**RPC name:** `set_qos_algorithm_type`**Overview:** Set the `qos/algorithm_type` field of the given VIF.**Signature:**

```
void set_qos_algorithm_type (session_id s, VIF ref self, string value)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object
string	value	New value to set

**Return Type:** `void`

**RPC name:** `get_qos_algorithm_params`**Overview:** Get the `qos/algorithm_params` field of the given VIF.**Signature:**

```
((string -> string) Map) get_qos_algorithm_params (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** set\_qos\_algorithm\_params

**Overview:** Set the qos/algorithm\_params field of the given VIF.

**Signature:**

```
void set_qos_algorithm_params (session_id s, VIF ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name:** add\_to\_qos\_algorithm\_params

**Overview:** Add the given key-value pair to the qos/algorithm\_params field of the given VIF.

**Signature:**

```
void add_to_qos_algorithm_params (session_id s, VIF ref self, string key, string value)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void

**RPC name:** remove\_from\_qos\_algorithm\_params

**Overview:** Remove the given key and its corresponding value from the qos/algorithm\_params field of the given VIF. If the key is not in that Map, then do nothing.

**Signature:**

```
void remove_from_qos_algorithm_params (session_id s, VIF ref self, string key)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object
string	key	Key to remove

**Return Type:** void

**RPC name:** get\_qos\_supported\_algorithms

**Overview:** Get the qos/supported\_algorithms field of the given VIF.

**Signature:**

```
(string Set) get_qos_supported_algorithms (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** string Set

value of the field

**RPC name:** get\_metrics

**Overview:** Get the metrics field of the given VIF.

**Signature:**

```
(VIF_metrics ref) get_metrics (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** VIF\_metrics ref

value of the field

**RPC name:** set\_security\_label

**Overview:** Set the security label of the given VIF. Refer to the XSPolicy class for the format of the security label.

**Signature:**

```
void set_security_label (session_id s, VIF ref self, string
security_label, string old_label)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object
string	security_label	New value of the security label
string	old_label	Label value that the security label must currently have for the change to succeed.

**Return Type:** void

**Possible Error Codes:** SECURITY\_ERROR

**RPC name:** `get_security_label`**Overview:** Get the security label of the given VIF.**Signature:**

```
string get_security_label (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** `string`

value of the given field

**RPC name:** `create`**Overview:** Create a new VIF instance, and return its handle.**Signature:**

```
(VIF ref) create (session_id s, VIF record args)
```

**Arguments:**

type	name	description
VIF record	args	All constructor arguments

**Return Type:** `VIF ref`

reference to the newly created object

**RPC name:** `destroy`**Overview:** Destroy the specified VIF instance.**Signature:**

```
void destroy (session_id s, VIF ref self)
```

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** `void`**RPC name:** `get_by_uuid`**Overview:** Get a reference to the VIF instance with the specified UUID.**Signature:**

```
(VIF ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** VIF ref  
reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given VIF.

**Signature:**

(VIF record) get\_record (session\_id s, VIF ref self)

**Arguments:**

type	name	description
VIF ref	self	reference to the object

**Return Type:** VIF record  
all fields from the object

## 2.16 Class: VIF\_metrics

### 2.16.1 Fields for class: VIF\_metrics

Name	VIF_metrics		
Description	<i>The metrics associated with a virtual network device.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{run}$	io/read_kbs	float	Read bandwidth (KiB/s)
$RO_{run}$	io/write_kbs	float	Write bandwidth (KiB/s)
$RO_{run}$	last_updated	datetime	Time at which this information was last updated

### 2.16.2 RPCs associated with class: VIF\_metrics

**RPC name:** get\_all

**Overview:** Return a list of all the VIF\_metrics instances known to the system.

**Signature:**

```
((VIF_metrics ref) Set) get_all (session_id s)
```

**Return Type:** (VIF\_metrics ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given VIF\_metrics.

**Signature:**

```
string get_uuid (session_id s, VIF_metrics ref self)
```

**Arguments:**

type	name	description
VIF_metrics ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_io\_read\_kbs

**Overview:** Get the io/read\_kbs field of the given VIF\_metrics.

**Signature:**

```
float get_io_read_kbs (session_id s, VIF_metrics ref self)
```

**Arguments:**

type	name	description
VIF_metrics ref	self	reference to the object

**Return Type:** float  
value of the field

**RPC name:** get\_io\_write\_kbs

**Overview:** Get the io/write\_kbs field of the given VIF\_metrics.

**Signature:**

```
float get_io_write_kbs (session_id s, VIF_metrics ref self)
```

**Arguments:**

type	name	description
VIF_metrics ref	self	reference to the object

**Return Type:** float  
value of the field

**RPC name:** get\_last\_updated

**Overview:** Get the last\_updated field of the given VIF\_metrics.

**Signature:**

```
datetime get_last_updated (session_id s, VIF_metrics ref self)
```

**Arguments:**

type	name	description
VIF_metrics ref	self	reference to the object

**Return Type:** datetime  
value of the field

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the VIF\_metrics instance with the specified UUID.

**Signature:**

```
(VIF_metrics ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** VIF\_metrics ref  
reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given `VIF_metrics`.

**Signature:**

`(VIF_metrics record) get_record (session_id s, VIF_metrics ref self)`

**Arguments:**

type	name	description
<code>VIF_metrics ref</code>	<code>self</code>	reference to the object

**Return Type:** `VIF_metrics record`

all fields from the object

## 2.17 Class: PIF

### 2.17.1 Fields for class: PIF

Name	<b>PIF</b>		
Description	<i>A physical network interface (note separate VLANs are represented as several PIFs).</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RW</i>	device	string	machine-readable name of the interface (e.g. eth0)
<i>RO<sub>ins</sub></i>	network	network ref	virtual network to which this pif is connected
<i>RO<sub>ins</sub></i>	host	host ref	physical machine to which this pif is connected
<i>RW</i>	MAC	string	ethernet MAC address of physical interface
<i>RW</i>	MTU	int	MTU in octets
<i>RW</i>	VLAN	int	VLAN tag for all traffic passing through this interface
<i>RO<sub>run</sub></i>	metrics	PIF_metrics ref	metrics associated with this PIF

### 2.17.2 RPCs associated with class: PIF

#### RPC name: create\_VLAN

**Overview:** Create a VLAN interface from an existing physical interface.

**Signature:**

(PIF ref) create\_VLAN (session\_id s, string device, network ref network, host ref host, int VLAN)

**Arguments:**

type	name	description
string	device	physical interface on which to create the VLAN interface
network ref	network	network to which this interface should be connected
host ref	host	physical machine to which this PIF is connected
int	VLAN	VLAN tag for the new interface

**Return Type:** PIF ref

The reference of the created PIF object

**Possible Error Codes:** VLAN\_TAG\_INVALID

#### RPC name: destroy

**Overview:** Destroy the interface (provided it is a synthetic interface like a VLAN; fail if it is a physical interface).

**Signature:**

```
void destroy (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	the PIF object to destroy

**Return Type:** void

**Possible Error Codes:** PIF\_IS\_PHYSICAL

**RPC name:** get\_all

**Overview:** Return a list of all the PIFs known to the system.

**Signature:**

```
((PIF ref) Set) get_all (session_id s)
```

**Return Type:** (PIF ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given PIF.

**Signature:**

```
string get_uuid (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_device

**Overview:** Get the device field of the given PIF.

**Signature:**

```
string get_device (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** `set_device`**Overview:** Set the device field of the given PIF.**Signature:**

```
void set_device (session_id s, PIF ref self, string value)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** `get_network`**Overview:** Get the network field of the given PIF.**Signature:**

```
(network ref) get_network (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** network ref  
value of the field**RPC name:** `get_host`**Overview:** Get the host field of the given PIF.**Signature:**

```
(host ref) get_host (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** host ref  
value of the field**RPC name:** `get_MAC`**Overview:** Get the MAC field of the given PIF.**Signature:**

```
string get_MAC (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_MAC

**Overview:** Set the MAC field of the given PIF.

**Signature:**

```
void set_MAC (session_id s, PIF ref self, string value)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_MTU

**Overview:** Get the MTU field of the given PIF.

**Signature:**

```
int get_MTU (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** set\_MTU

**Overview:** Set the MTU field of the given PIF.

**Signature:**

```
void set_MTU (session_id s, PIF ref self, int value)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object
int	value	New value to set

**Return Type:** void

**RPC name: get\_VLAN****Overview:** Get the VLAN field of the given PIF.**Signature:**

```
int get_VLAN (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name: set\_VLAN****Overview:** Set the VLAN field of the given PIF.**Signature:**

```
void set_VLAN (session_id s, PIF ref self, int value)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object
int	value	New value to set

**Return Type:** void**RPC name: get\_metrics****Overview:** Get the metrics field of the given PIF.**Signature:**

```
(PIF_metrics ref) get_metrics (session_id s, PIF ref self)
```

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** PIF\_metrics ref

value of the field

**RPC name: get\_by\_uuid****Overview:** Get a reference to the PIF instance with the specified UUID.**Signature:**

```
(PIF ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** PIF ref  
reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given PIF.

**Signature:**

(PIF record) get\_record (session\_id s, PIF ref self)

**Arguments:**

type	name	description
PIF ref	self	reference to the object

**Return Type:** PIF record  
all fields from the object

## 2.18 Class: PIF\_metrics

### 2.18.1 Fields for class: PIF\_metrics

Name	PIF_metrics		
Description	<i>The metrics associated with a physical network interface.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{run}$	io/read_kbs	float	Read bandwidth (KiB/s)
$RO_{run}$	io/write_kbs	float	Write bandwidth (KiB/s)
$RO_{run}$	last_updated	datetime	Time at which this information was last updated

### 2.18.2 RPCs associated with class: PIF\_metrics

**RPC name:** get\_all

**Overview:** Return a list of all the PIF\_metrics instances known to the system.

**Signature:**

```
((PIF_metrics ref) Set) get_all (session_id s)
```

**Return Type:** (PIF\_metrics ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given PIF\_metrics.

**Signature:**

```
string get_uuid (session_id s, PIF_metrics ref self)
```

**Arguments:**

type	name	description
PIF_metrics ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_io\_read\_kbs

**Overview:** Get the io/read\_kbs field of the given PIF\_metrics.

**Signature:**

```
float get_io_read_kbs (session_id s, PIF_metrics ref self)
```

**Arguments:**

type	name	description
PIF_metrics ref	self	reference to the object

**Return Type:** float  
value of the field

**RPC name:** get\_io\_write\_kbs

**Overview:** Get the io/write\_kbs field of the given PIF\_metrics.

**Signature:**

```
float get_io_write_kbs (session_id s, PIF_metrics ref self)
```

**Arguments:**

type	name	description
PIF_metrics ref	self	reference to the object

**Return Type:** float  
value of the field

**RPC name:** get\_last\_updated

**Overview:** Get the last\_updated field of the given PIF\_metrics.

**Signature:**

```
datetime get_last_updated (session_id s, PIF_metrics ref self)
```

**Arguments:**

type	name	description
PIF_metrics ref	self	reference to the object

**Return Type:** datetime  
value of the field

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the PIF\_metrics instance with the specified UUID.

**Signature:**

```
(PIF_metrics ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** PIF\_metrics ref  
reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given `PIF_metrics`.

**Signature:**

`(PIF_metrics record) get_record (session_id s, PIF_metrics ref self)`

**Arguments:**

type	name	description
<code>PIF_metrics ref</code>	<code>self</code>	reference to the object

**Return Type:** `PIF_metrics record`

all fields from the object

## 2.19 Class: SR

### 2.19.1 Fields for class: SR

Name	SR		
Description	<i>A storage repository.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RW</i>	name/label	string	a human-readable name
<i>RW</i>	name/description	string	a notes field containing human-readable description
<i>RO<sub>run</sub></i>	VDIs	(VDI ref) Set	managed virtual disks
<i>RO<sub>run</sub></i>	PBDs	(PBD ref) Set	physical blockdevices
<i>RO<sub>run</sub></i>	virtual_allocation	int	sum of virtual_sizes of all VDIs in this storage repository (in bytes)
<i>RO<sub>run</sub></i>	physical_utilisation	int	physical space currently utilised on this storage repository (in bytes). Note that for sparse disk formats, physical_utilisation may be less than virtual_allocation
<i>RO<sub>ins</sub></i>	physical_size	int	total physical size of the repository (in bytes)
<i>RO<sub>ins</sub></i>	type	string	type of the storage repository
<i>RO<sub>ins</sub></i>	content_type	string	the type of the SR's content, if required (e.g. ISOs)

### 2.19.2 RPCs associated with class: SR

**RPC name:** `get_supported_types`

**Overview:** Return a set of all the SR types supported by the system.

**Signature:**

```
(string Set) get_supported_types (session_id s)
```

**Return Type:** `string Set`

the supported SR types

**RPC name:** `get_all`

**Overview:** Return a list of all the SRs known to the system.

**Signature:**

```
((SR ref) Set) get_all (session_id s)
```

**Return Type:** `(SR ref) Set`

references to all objects

**RPC name:** `get_uuid`**Overview:** Get the uuid field of the given SR.**Signature:**

```
string get_uuid (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_name_label`**Overview:** Get the name/label field of the given SR.**Signature:**

```
string get_name_label (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `set_name_label`**Overview:** Set the name/label field of the given SR.**Signature:**

```
void set_name_label (session_id s, SR ref self, string value)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** `get_name_description`**Overview:** Get the name/description field of the given SR.**Signature:**

```
string get_name_description (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_name\_description

**Overview:** Set the name/description field of the given SR.

**Signature:**

```
void set_name_description (session_id s, SR ref self, string value)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_VDIs

**Overview:** Get the VDIs field of the given SR.

**Signature:**

```
((VDI ref) Set) get_VDIs (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** (VDI ref) Set  
value of the field

**RPC name:** get\_PBDs

**Overview:** Get the PBDs field of the given SR.

**Signature:**

```
((PBD ref) Set) get_PBDs (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** (PBD ref) Set  
value of the field

**RPC name: get\_virtual\_allocation****Overview:** Get the virtual\_allocation field of the given SR.**Signature:**

```
int get_virtual_allocation (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name: get\_physical\_utilisation****Overview:** Get the physical\_utilisation field of the given SR.**Signature:**

```
int get_physical_utilisation (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name: get\_physical\_size****Overview:** Get the physical\_size field of the given SR.**Signature:**

```
int get_physical_size (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name: get\_type****Overview:** Get the type field of the given SR.**Signature:**

```
string get_type (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_content\_type

**Overview:** Get the content\_type field of the given SR.

**Signature:**

```
string get_content_type (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the SR instance with the specified UUID.

**Signature:**

```
(SR ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** SR ref  
reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given SR.

**Signature:**

```
(SR record) get_record (session_id s, SR ref self)
```

**Arguments:**

type	name	description
SR ref	self	reference to the object

**Return Type:** SR record  
all fields from the object

**RPC name:** `get_by_name_label`

**Overview:** Get all the SR instances with the given label.

**Signature:**

`((SR ref) Set) get_by_name_label (session_id s, string label)`

**Arguments:**

type	name	description
string	label	label of object to return

**Return Type:** (SR ref) Set

references to objects with match names

## 2.20 Class: VDI

### 2.20.1 Fields for class: VDI

Name	VDI		
Description	<i>A virtual disk image.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RW</i>	name/label	string	a human-readable name
<i>RW</i>	name/description	string	a notes field containing human-readable description
<i>RO<sub>ins</sub></i>	SR	SR ref	storage repository in which the VDI resides
<i>RO<sub>run</sub></i>	VBDs	(VBD ref) Set	list of vbds that refer to this disk
<i>RO<sub>run</sub></i>	crash_dumps	(crashdump ref) Set	list of crash dumps that refer to this disk
<i>RW</i>	virtual_size	int	size of disk as presented to the guest (in bytes). Note that, depending on storage backend type, requested size may not be respected exactly
<i>RO<sub>run</sub></i>	physical_utilisation	int	amount of physical space that the disk image is currently taking up on the storage repository (in bytes)
<i>RO<sub>ins</sub></i>	type	vdi_type	type of the VDI
<i>RW</i>	sharable	bool	true if this disk may be shared
<i>RW</i>	read_only	bool	true if this disk may ONLY be mounted read-only
<i>RW</i>	other_config	(string → string) Map	additional configuration
<i>RO<sub>run</sub></i>	security/label	string	the VM's security label

### 2.20.2 RPCs associated with class: VDI

#### RPC name: get\_all

**Overview:** Return a list of all the VDIs known to the system.

**Signature:**

```
((VDI ref) Set) get_all (session_id s)
```

**Return Type:** (VDI ref) Set

references to all objects

#### RPC name: get\_uuid

**Overview:** Get the uuid field of the given VDI.

**Signature:**

```
string get_uuid (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_name\_label

**Overview:** Get the name/label field of the given VDI.

**Signature:**

```
string get_name_label (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_name\_label

**Overview:** Set the name/label field of the given VDI.

**Signature:**

```
void set_name_label (session_id s, VDI ref self, string value)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_name\_description

**Overview:** Get the name/description field of the given VDI.

**Signature:**

```
string get_name_description (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name: set\_name\_description****Overview:** Set the name/description field of the given VDI.**Signature:**

```
void set_name_description (session_id s, VDI ref self, string value)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name: get\_SR****Overview:** Get the SR field of the given VDI.**Signature:**

```
((SR ref) get_SR (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** SR ref

value of the field

**RPC name: get\_VBDs****Overview:** Get the VBDs field of the given VDI.**Signature:**

```
((VBD ref) Set) get_VBDs (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** (VBD ref) Set

value of the field

**RPC name: get\_crash\_dumps****Overview:** Get the crash\_dumps field of the given VDI.**Signature:**

```
((crashdump ref) Set) get_crash_dumps (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** (crashdump ref) Set  
value of the field

**RPC name:** get\_virtual\_size

**Overview:** Get the virtual\_size field of the given VDI.

**Signature:**

```
int get_virtual_size (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** set\_virtual\_size

**Overview:** Set the virtual\_size field of the given VDI.

**Signature:**

```
void set_virtual_size (session_id s, VDI ref self, int value)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
int	value	New value to set

**Return Type:** void

**RPC name:** get\_physical\_utilisation

**Overview:** Get the physical\_utilisation field of the given VDI.

**Signature:**

```
int get_physical_utilisation (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** `get_type`**Overview:** Get the type field of the given VDI.**Signature:**

```
(vdi_type) get_type (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** `vdi_type`

value of the field

**RPC name:** `get_sharable`**Overview:** Get the sharable field of the given VDI.**Signature:**

```
bool get_sharable (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** `bool`

value of the field

**RPC name:** `set_sharable`**Overview:** Set the sharable field of the given VDI.**Signature:**

```
void set_sharable (session_id s, VDI ref self, bool value)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
bool	value	New value to set

**Return Type:** `void`**RPC name:** `get_read_only`**Overview:** Get the read\_only field of the given VDI.**Signature:**

```
bool get_read_only (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** bool  
value of the field

**RPC name:** set\_read\_only

**Overview:** Set the read\_only field of the given VDI.

**Signature:**

```
void set_read_only (session_id s, VDI ref self, bool value)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
bool	value	New value to set

**Return Type:** void

**RPC name:** get\_other\_config

**Overview:** Get the other\_config field of the given VDI.

**Signature:**

```
((string -> string) Map) get_other_config (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** set\_other\_config

**Overview:** Set the other\_config field of the given VDI.

**Signature:**

```
void set_other_config (session_id s, VDI ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name: add\_to\_other\_config**

**Overview:** Add the given key-value pair to the other\_config field of the given VDI.

**Signature:**

```
void add_to_other_config (session_id s, VDI ref self, string key, string value)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void

**RPC name: remove\_from\_other\_config**

**Overview:** Remove the given key and its corresponding value from the other\_config field of the given VDI. If the key is not in that Map, then do nothing.

**Signature:**

```
void remove_from_other_config (session_id s, VDI ref self, string key)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
string	key	Key to remove

**Return Type:** void

**RPC name: set\_security\_label**

**Overview:** Set the security label of the given VDI. Refer to the XSPolicy class for the format of the security label.

**Signature:**

```
void set_security_label (session_id s, VDI ref self, string security_label, string old_label)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object
string	security_label	New value of the security label
string	old_label	Label value that the security label must currently have for the change to succeed.

**Return Type:** void

**Possible Error Codes:** SECURITY\_ERROR

**RPC name:** `get_security_label`**Overview:** Get the security label of the given VDI.**Signature:**

```
string get_security_label (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** `string`

value of the given field

**RPC name:** `create`**Overview:** Create a new VDI instance, and return its handle.**Signature:**

```
(VDI ref) create (session_id s, VDI record args)
```

**Arguments:**

type	name	description
VDI record	args	All constructor arguments

**Return Type:** `VDI ref`

reference to the newly created object

**RPC name:** `destroy`**Overview:** Destroy the specified VDI instance.**Signature:**

```
void destroy (session_id s, VDI ref self)
```

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** `void`**RPC name:** `get_by_uuid`**Overview:** Get a reference to the VDI instance with the specified UUID.**Signature:**

```
(VDI ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** VDI ref  
reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given VDI.

**Signature:**

(VDI record) get\_record (session\_id s, VDI ref self)

**Arguments:**

type	name	description
VDI ref	self	reference to the object

**Return Type:** VDI record  
all fields from the object

**RPC name:** get\_by\_name\_label

**Overview:** Get all the VDI instances with the given label.

**Signature:**

((VDI ref) Set) get\_by\_name\_label (session\_id s, string label)

**Arguments:**

type	name	description
string	label	label of object to return

**Return Type:** (VDI ref) Set  
references to objects with match names

## 2.21 Class: VBD

### 2.21.1 Fields for class: VBD

Name	VBD		
Description	<i>A virtual block device.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>ins</sub></i>	VM	VM ref	the virtual machine
<i>RO<sub>ins</sub></i>	VDI	VDI ref	the virtual disk
<i>RW</i>	device	string	device seen by the guest e.g. hda1
<i>RW</i>	bootable	bool	true if this VBD is bootable
<i>RW</i>	mode	vbd_mode	the mode the VBD should be mounted with
<i>RW</i>	type	vbd_type	how the VBD will appear to the guest (e.g. disk or CD)
<i>RO<sub>run</sub></i>	currently_attached	bool	is the device currently attached (erased on reboot)
<i>RO<sub>run</sub></i>	status_code	int	error/success code associated with last attach-operation (erased on reboot)
<i>RO<sub>run</sub></i>	status_detail	string	error/success information associated with last attach-operation status (erased on reboot)
<i>RO<sub>run</sub></i>	runtime_properties	(string → string) Map	Device runtime properties
<i>RW</i>	qos/algorithm_type	string	QoS algorithm to use
<i>RW</i>	qos/algorithm_params	(string → string) Map	parameters for chosen QoS algorithm
<i>RO<sub>run</sub></i>	qos/supported_algorithms	string Set	supported QoS algorithms for this VBD
<i>RO<sub>run</sub></i>	metrics	VBD_metrics ref	metrics associated with this VBD

### 2.21.2 RPCs associated with class: VBD

#### RPC name: media\_change

**Overview:** Change the media in the device for CDROM-like devices only. For other devices, detach the VBD and attach a new one.

#### Signature:

```
void media_change (session_id s, VBD ref vbd, VDI ref vdi)
```

#### Arguments:

type	name	description
VBD ref	vbd	The vbd representing the CDROM-like device
VDI ref	vdi	The new VDI to 'insert'

**Return Type:** void

**RPC name:** plug

**Overview:** Hotplug the specified VBD, dynamically attaching it to the running VM.

**Signature:**

```
void plug (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	The VBD to hotplug

**Return Type:** void

**RPC name:** unplug

**Overview:** Hot-unplug the specified VBD, dynamically unattaching it from the running VM.

**Signature:**

```
void unplug (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	The VBD to hot-unplug

**Return Type:** void

**RPC name:** get\_all

**Overview:** Return a list of all the VBDs known to the system.

**Signature:**

```
((VBD ref) Set) get_all (session_id s)
```

**Return Type:** (VBD ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given VBD.

**Signature:**

```
string get_uuid (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** get\_VM

**Overview:** Get the VM field of the given VBD.

**Signature:**

```
(VM ref) get_VM (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** VM ref

value of the field

**RPC name:** get\_VDI

**Overview:** Get the VDI field of the given VBD.

**Signature:**

```
(VDI ref) get_VDI (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** VDI ref

value of the field

**RPC name:** get\_device

**Overview:** Get the device field of the given VBD.

**Signature:**

```
string get_device (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** set\_device**Overview:** Set the device field of the given VBD.**Signature:**

```
void set_device (session_id s, VBD ref self, string value)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** get\_bootable**Overview:** Get the bootable field of the given VBD.**Signature:**

```
bool get_bootable (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** bool

value of the field

**RPC name:** set\_bootable**Overview:** Set the bootable field of the given VBD.**Signature:**

```
void set_bootable (session_id s, VBD ref self, bool value)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object
bool	value	New value to set

**Return Type:** void**RPC name:** get\_mode**Overview:** Get the mode field of the given VBD.**Signature:**

```
(vbd_mode) get_mode (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** vbd\_mode  
value of the field

**RPC name: set\_mode**

**Overview:** Set the mode field of the given VBD.

**Signature:**

```
void set_mode (session_id s, VBD ref self, vbd_mode value)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object
vbd_mode	value	New value to set

**Return Type:** void

**RPC name: get\_type**

**Overview:** Get the type field of the given VBD.

**Signature:**

```
(vbd_type) get_type (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** vbd\_type  
value of the field

**RPC name: set\_type**

**Overview:** Set the type field of the given VBD.

**Signature:**

```
void set_type (session_id s, VBD ref self, vbd_type value)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object
vbd_type	value	New value to set

**Return Type:** void

**RPC name:** `get_currently_attached`**Overview:** Get the `currently_attached` field of the given VBD.**Signature:**

```
bool get_currently_attached (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** `bool`

value of the field

**RPC name:** `get_status_code`**Overview:** Get the `status_code` field of the given VBD.**Signature:**

```
int get_status_code (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_status_detail`**Overview:** Get the `status_detail` field of the given VBD.**Signature:**

```
string get_status_detail (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `get_runtime_properties`**Overview:** Get the `runtime_properties` field of the given VBD.**Signature:**

```
((string -> string) Map) get_runtime_properties (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** get\_qos\_algorithm\_type

**Overview:** Get the qos/algorithm\_type field of the given VBD.

**Signature:**

```
string get_qos_algorithm_type (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_qos\_algorithm\_type

**Overview:** Set the qos/algorithm\_type field of the given VBD.

**Signature:**

```
void set_qos_algorithm_type (session_id s, VBD ref self, string value)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** get\_qos\_algorithm\_params

**Overview:** Get the qos/algorithm\_params field of the given VBD.

**Signature:**

```
((string -> string) Map) get_qos_algorithm_params (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name: set\_qos\_algorithm\_params****Overview:** Set the qos/algorithm\_params field of the given VBD.**Signature:**

```
void set_qos_algorithm_params (session_id s, VBD ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void**RPC name: add\_to\_qos\_algorithm\_params****Overview:** Add the given key-value pair to the qos/algorithm\_params field of the given VBD.**Signature:**

```
void add_to_qos_algorithm_params (session_id s, VBD ref self, string key, string value)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void**RPC name: remove\_from\_qos\_algorithm\_params****Overview:** Remove the given key and its corresponding value from the qos/algorithm\_params field of the given VBD. If the key is not in that Map, then do nothing.**Signature:**

```
void remove_from_qos_algorithm_params (session_id s, VBD ref self, string key)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object
string	key	Key to remove

**Return Type:** void**RPC name: get\_qos\_supported\_algorithms****Overview:** Get the qos/supported\_algorithms field of the given VBD.**Signature:**

```
(string Set) get_qos_supported_algorithms (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** string Set  
value of the field

**RPC name:** get\_metrics

**Overview:** Get the metrics field of the given VBD.

**Signature:**

```
(VBD_metrics ref) get_metrics (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** VBD\_metrics ref  
value of the field

**RPC name:** create

**Overview:** Create a new VBD instance, and return its handle.

**Signature:**

```
(VBD ref) create (session_id s, VBD record args)
```

**Arguments:**

type	name	description
VBD record	args	All constructor arguments

**Return Type:** VBD ref  
reference to the newly created object

**RPC name:** destroy

**Overview:** Destroy the specified VBD instance.

**Signature:**

```
void destroy (session_id s, VBD ref self)
```

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** void

**RPC name:** `get_by_uuid`

**Overview:** Get a reference to the VBD instance with the specified UUID.

**Signature:**

(VBD ref) `get_by_uuid (session_id s, string uuid)`

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** VBD ref

reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given VBD.

**Signature:**

(VBD record) `get_record (session_id s, VBD ref self)`

**Arguments:**

type	name	description
VBD ref	self	reference to the object

**Return Type:** VBD record

all fields from the object

## 2.22 Class: VBD\_metrics

### 2.22.1 Fields for class: VBD\_metrics

Name	VBD_metrics		
Description	<i>The metrics associated with a virtual block device.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{run}$	io/read_kbs	float	Read bandwidth (KiB/s)
$RO_{run}$	io/write_kbs	float	Write bandwidth (KiB/s)
$RO_{run}$	last_updated	datetime	Time at which this information was last updated

### 2.22.2 RPCs associated with class: VBD\_metrics

**RPC name:** get\_all

**Overview:** Return a list of all the VBD\_metrics instances known to the system.

**Signature:**

```
((VBD_metrics ref) Set) get_all (session_id s)
```

**Return Type:** (VBD\_metrics ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given VBD\_metrics.

**Signature:**

```
string get_uuid (session_id s, VBD_metrics ref self)
```

**Arguments:**

type	name	description
VBD_metrics ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_io\_read\_kbs

**Overview:** Get the io/read\_kbs field of the given VBD\_metrics.

**Signature:**

```
float get_io_read_kbs (session_id s, VBD_metrics ref self)
```

**Arguments:**

type	name	description
VBD_metrics ref	self	reference to the object

**Return Type:** float  
value of the field

**RPC name:** get\_io\_write\_kbs

**Overview:** Get the io/write\_kbs field of the given VBD\_metrics.

**Signature:**

```
float get_io_write_kbs (session_id s, VBD_metrics ref self)
```

**Arguments:**

type	name	description
VBD_metrics ref	self	reference to the object

**Return Type:** float  
value of the field

**RPC name:** get\_last\_updated

**Overview:** Get the last\_updated field of the given VBD\_metrics.

**Signature:**

```
datetime get_last_updated (session_id s, VBD_metrics ref self)
```

**Arguments:**

type	name	description
VBD_metrics ref	self	reference to the object

**Return Type:** datetime  
value of the field

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the VBD\_metrics instance with the specified UUID.

**Signature:**

```
(VBD_metrics ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** VBD\_metrics ref  
reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given `VBD_metrics`.

**Signature:**

`(VBD_metrics record) get_record (session_id s, VBD_metrics ref self)`

**Arguments:**

type	name	description
<code>VBD_metrics ref</code>	<code>self</code>	reference to the object

**Return Type:** `VBD_metrics record`

all fields from the object

## 2.23 Class: PBD

### 2.23.1 Fields for class: PBD

Name	PBD		
Description	<i>The physical block devices through which hosts access SRs.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{ins}$	host	host ref	physical machine on which the pbd is available
$RO_{ins}$	SR	SR ref	the storage repository that the pbd realises
$RO_{ins}$	device_config	(string $\rightarrow$ string) Map	a config string to string map that is provided to the host's SR-backend-driver
$RO_{run}$	currently_attached	bool	is the SR currently attached on this host?

### 2.23.2 RPCs associated with class: PBD

**RPC name:** `get_all`

**Overview:** Return a list of all the PBDs known to the system.

**Signature:**

```
((PBD ref) Set) get_all (session_id s)
```

**Return Type:** (PBD ref) Set

references to all objects

**RPC name:** `get_uuid`

**Overview:** Get the uuid field of the given PBD.

**Signature:**

```
string get_uuid (session_id s, PBD ref self)
```

**Arguments:**

type	name	description
PBD ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_host`

**Overview:** Get the host field of the given PBD.

**Signature:**

```
(host ref) get_host (session_id s, PBD ref self)
```

**Arguments:**

type	name	description
PBD ref	self	reference to the object

**Return Type:** host ref  
value of the field

**RPC name:** get\_SR

**Overview:** Get the SR field of the given PBD.

**Signature:**

```
(SR ref) get_SR (session_id s, PBD ref self)
```

**Arguments:**

type	name	description
PBD ref	self	reference to the object

**Return Type:** SR ref  
value of the field

**RPC name:** get\_device\_config

**Overview:** Get the device\_config field of the given PBD.

**Signature:**

```
((string -> string) Map) get_device_config (session_id s, PBD ref self)
```

**Arguments:**

type	name	description
PBD ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** get\_currently\_attached

**Overview:** Get the currently\_attached field of the given PBD.

**Signature:**

```
bool get_currently_attached (session_id s, PBD ref self)
```

**Arguments:**

type	name	description
PBD ref	self	reference to the object

**Return Type:** bool  
value of the field

**RPC name: create****Overview:** Create a new PBD instance, and return its handle.**Signature:**`(PBD ref) create (session_id s, PBD record args)`**Arguments:**

type	name	description
PBD record	args	All constructor arguments

**Return Type:** PBD ref

reference to the newly created object

**RPC name: destroy****Overview:** Destroy the specified PBD instance.**Signature:**`void destroy (session_id s, PBD ref self)`**Arguments:**

type	name	description
PBD ref	self	reference to the object

**Return Type:** void**RPC name: get\_by\_uuid****Overview:** Get a reference to the PBD instance with the specified UUID.**Signature:**`(PBD ref) get_by_uuid (session_id s, string uuid)`**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** PBD ref

reference to the object

**RPC name: get\_record****Overview:** Get a record containing the current state of the given PBD.**Signature:**`(PBD record) get_record (session_id s, PBD ref self)`

**Arguments:**

type	name	description
PBD ref	self	reference to the object

**Return Type:** PBD record  
all fields from the object

## 2.24 Class: crashdump

### 2.24.1 Fields for class: crashdump

Name	<b>crashdump</b>		
Description	<i>A VM crashdump.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{ins}$	VM	VM ref	the virtual machine
$RO_{ins}$	VDI	VDI ref	the virtual disk

### 2.24.2 RPCs associated with class: crashdump

**RPC name:** destroy

**Overview:** Destroy the specified crashdump.

**Signature:**

```
void destroy (session_id s, crashdump ref self)
```

**Arguments:**

type	name	description
crashdump ref	self	The crashdump to destroy

**Return Type:** void

**RPC name:** get\_all

**Overview:** Return a list of all the crashdumps known to the system.

**Signature:**

```
((crashdump ref) Set) get_all (session_id s)
```

**Return Type:** (crashdump ref) Set

references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given crashdump.

**Signature:**

```
string get_uuid (session_id s, crashdump ref self)
```

**Arguments:**

type	name	description
crashdump ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name: get\_VM**

**Overview:** Get the VM field of the given crashdump.

**Signature:**

```
(VM ref) get_VM (session_id s, crashdump ref self)
```

**Arguments:**

type	name	description
crashdump ref	self	reference to the object

**Return Type:** VM ref

value of the field

**RPC name: get\_VDI**

**Overview:** Get the VDI field of the given crashdump.

**Signature:**

```
(VDI ref) get_VDI (session_id s, crashdump ref self)
```

**Arguments:**

type	name	description
crashdump ref	self	reference to the object

**Return Type:** VDI ref

value of the field

**RPC name: get\_by\_uuid**

**Overview:** Get a reference to the crashdump instance with the specified UUID.

**Signature:**

```
(crashdump ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** crashdump ref

reference to the object

**RPC name: get\_record**

**Overview:** Get a record containing the current state of the given crashdump.

**Signature:**

```
(crashdump record) get_record (session_id s, crashdump ref self)
```

**Arguments:**

type	name	description
crashdump ref	self	reference to the object

**Return Type:** crashdump record  
all fields from the object

## 2.25 Class: VTPM

### 2.25.1 Fields for class: VTPM

Name	<b>VTPM</b>		
Description	<i>A virtual TPM device.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{ins}$	VM	VM ref	the virtual machine
$RO_{ins}$	backend	VM ref	the domain where the backend is located
$RW$	other_config	(string $\rightarrow$ string) Map	additional configuration

### 2.25.2 RPCs associated with class: VTPM

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given VTPM.

**Signature:**

```
string get_uuid (session_id s, VTPM ref self)
```

**Arguments:**

type	name	description
VTPM ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** get\_VM

**Overview:** Get the VM field of the given VTPM.

**Signature:**

```
(VM ref) get_VM (session_id s, VTPM ref self)
```

**Arguments:**

type	name	description
VTPM ref	self	reference to the object

**Return Type:** VM ref

value of the field

**RPC name:** get\_backend

**Overview:** Get the backend field of the given VTPM.

**Signature:**

```
(VM ref) get_backend (session_id s, VTPM ref self)
```

**Arguments:**

type	name	description
VTPM ref	self	reference to the object

**Return Type:** VM ref  
value of the field

**RPC name:** get\_other\_config

**Overview:** Get the other\_config field of the given VTPM.

**Signature:**

```
((string -> string) Map) get_other_config (session_id s, VTPM ref self)
```

**Arguments:**

type	name	description
VTPM ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name:** set\_other\_config

**Overview:** Set the other\_config field of the given VTPM.

**Signature:**

```
void set_other_config (session_id s, VTPM ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
VTPM ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name:** get\_runtime\_properties

**Overview:** Get the runtime\_properties field of the given VTPM.

**Signature:**

```
((string -> string) Map) get_runtime_properties (session_id s, VTPM ref self)
```

**Arguments:**

type	name	description
VTPM ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name: create****Overview:** Create a new VTPM instance, and return its handle.**Signature:**

```
(VTPM ref) create (session_id s, VTPM record args)
```

**Arguments:**

type	name	description
VTPM record	args	All constructor arguments

**Return Type:** VTPM ref

reference to the newly created object

**RPC name: destroy****Overview:** Destroy the specified VTPM instance.**Signature:**

```
void destroy (session_id s, VTPM ref self)
```

**Arguments:**

type	name	description
VTPM ref	self	reference to the object

**Return Type:** void**RPC name: get\_by\_uuid****Overview:** Get a reference to the VTPM instance with the specified UUID.**Signature:**

```
(VTPM ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** VTPM ref

reference to the object

**RPC name: get\_record****Overview:** Get a record containing the current state of the given VTPM.**Signature:**

```
(VTPM record) get_record (session_id s, VTPM ref self)
```

**Arguments:**

type	name	description
VTPM ref	self	reference to the object

**Return Type:** VTPM record  
all fields from the object

## 2.26 Class: console

### 2.26.1 Fields for class: console

Name	console		
Description	<i>A console.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	protocol	console_protocol	the protocol used by this console
<i>RO<sub>run</sub></i>	location	string	URI for the console service
<i>RO<sub>run</sub></i>	VM	VM ref	VM to which this console is attached
<i>RW</i>	other_config	(string → string) Map	additional configuration

### 2.26.2 RPCs associated with class: console

#### RPC name: get\_all

**Overview:** Return a list of all the consoles known to the system.

**Signature:**

```
((console ref) Set) get_all (session_id s)
```

**Return Type:** (console ref) Set  
references to all objects

#### RPC name: get\_uuid

**Overview:** Get the uuid field of the given console.

**Signature:**

```
string get_uuid (session_id s, console ref self)
```

**Arguments:**

type	name	description
console ref	self	reference to the object

**Return Type:** string  
value of the field

#### RPC name: get\_protocol

**Overview:** Get the protocol field of the given console.

**Signature:**

```
(console_protocol) get_protocol (session_id s, console ref self)
```

**Arguments:**

type	name	description
console ref	self	reference to the object

**Return Type:** console\_protocol  
value of the field

**RPC name:** get\_location

**Overview:** Get the location field of the given console.

**Signature:**

```
string get_location (session_id s, console ref self)
```

**Arguments:**

type	name	description
console ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_VM

**Overview:** Get the VM field of the given console.

**Signature:**

```
(VM ref) get_VM (session_id s, console ref self)
```

**Arguments:**

type	name	description
console ref	self	reference to the object

**Return Type:** VM ref  
value of the field

**RPC name:** get\_other\_config

**Overview:** Get the other\_config field of the given console.

**Signature:**

```
((string -> string) Map) get_other_config (session_id s, console ref self)
```

**Arguments:**

type	name	description
console ref	self	reference to the object

**Return Type:** (string → string) Map  
value of the field

**RPC name: set\_other\_config****Overview:** Set the other\_config field of the given console.**Signature:**

```
void set_other_config (session_id s, console ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
console ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void**RPC name: add\_to\_other\_config****Overview:** Add the given key-value pair to the other\_config field of the given console.**Signature:**

```
void add_to_other_config (session_id s, console ref self, string key, string value)
```

**Arguments:**

type	name	description
console ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void**RPC name: remove\_from\_other\_config****Overview:** Remove the given key and its corresponding value from the other\_config field of the given console. If the key is not in that Map, then do nothing.**Signature:**

```
void remove_from_other_config (session_id s, console ref self, string key)
```

**Arguments:**

type	name	description
console ref	self	reference to the object
string	key	Key to remove

**Return Type:** void**RPC name: create****Overview:** Create a new console instance, and return its handle.**Signature:**

```
(console ref) create (session_id s, console record args)
```

**Arguments:**

type	name	description
console record	args	All constructor arguments

**Return Type:** console ref  
reference to the newly created object

**RPC name:** destroy

**Overview:** Destroy the specified console instance.

**Signature:**

```
void destroy (session_id s, console ref self)
```

**Arguments:**

type	name	description
console ref	self	reference to the object

**Return Type:** void

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the console instance with the specified UUID.

**Signature:**

```
(console ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** console ref  
reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given console.

**Signature:**

```
(console record) get_record (session_id s, console ref self)
```

**Arguments:**

type	name	description
console ref	self	reference to the object

**Return Type:** console record  
all fields from the object

## 2.27 Class: DPCI

### 2.27.1 Fields for class: DPCI

Name	<b>DPCI</b>		
Description	<i>A pass-through PCI device.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>inst</sub></i>	VM	VM ref	the virtual machine
<i>RO<sub>inst</sub></i>	PPCI	PPCI ref	the physical PCI device
<i>RO<sub>inst</sub></i>	hotplug_slot	int	the slot number to which this PCI device is inserted
<i>RO<sub>run</sub></i>	virtual_domain	int	the virtual domain number
<i>RO<sub>run</sub></i>	virtual_bus	int	the virtual bus number
<i>RO<sub>run</sub></i>	virtual_slot	int	the virtual slot number
<i>RO<sub>run</sub></i>	virtual_func	int	the virtual func number
<i>RO<sub>run</sub></i>	virtual_name	string	the virtual PCI name

### 2.27.2 RPCs associated with class: DPCI

**RPC name:** `get_all`

**Overview:** Return a list of all the DPCIs known to the system.

**Signature:**

```
((DPCI ref) Set) get_all (session_id s)
```

**Return Type:** (DPCI ref) Set

references to all objects

**RPC name:** `get_uuid`

**Overview:** Get the uuid field of the given DPCI.

**Signature:**

```
string get_uuid (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_VM`

**Overview:** Get the VM field of the given DPCI.

**Signature:**

```
(VM ref) get_VM (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** VM ref  
value of the field

**RPC name:** get\_PPCI

**Overview:** Get the PPCI field of the given DPCI.

**Signature:**

```
(PPCI ref) get_PPCI (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** PPCI ref  
value of the field

**RPC name:** get\_hotplug\_slot

**Overview:** Get the hotplug\_slot field of the given DPCI.

**Signature:**

```
int get_hotplug_slot (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_virtual\_domain

**Overview:** Get the virtual\_domain field of the given DPCI.

**Signature:**

```
int get_virtual_domain (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** `get_virtual_bus`**Overview:** Get the `virtual_bus` field of the given DPCI.**Signature:**

```
int get_virtual_bus (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_virtual_slot`**Overview:** Get the `virtual_slot` field of the given DPCI.**Signature:**

```
int get_virtual_slot (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_virtual_func`**Overview:** Get the `virtual_func` field of the given DPCI.**Signature:**

```
int get_virtual_func (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_virtual_name`**Overview:** Get the `virtual_name` field of the given DPCI.**Signature:**

```
string get_virtual_name (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** create

**Overview:** Create a new DPCI instance, and return its handle.

**Signature:**

```
(DPCI ref) create (session_id s, DPCI record args)
```

**Arguments:**

type	name	description
DPCI record	args	All constructor arguments

**Return Type:** DPCI ref  
reference to the newly created object

**RPC name:** destroy

**Overview:** Destroy the specified DPCI instance.

**Signature:**

```
void destroy (session_id s, DPCI ref self)
```

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** void

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the DPCI instance with the specified UUID.

**Signature:**

```
(DPCI ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** DPCI ref  
reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given DPCI.

**Signature:**

(DPCI record) `get_record (session_id s, DPCI ref self)`

**Arguments:**

type	name	description
DPCI ref	self	reference to the object

**Return Type:** DPCI record

all fields from the object

## 2.28 Class: PPCI

### 2.28.1 Fields for class: PPCI

Name	PPCI		
Description	<i>A physical PCI device.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	host	host ref	the physical machine to which this PPCI is connected
<i>RO<sub>run</sub></i>	domain	int	the domain number
<i>RO<sub>run</sub></i>	bus	int	the bus number
<i>RO<sub>run</sub></i>	slot	int	the slot number
<i>RO<sub>run</sub></i>	func	int	the func number
<i>RO<sub>run</sub></i>	name	string	the PCI name
<i>RO<sub>run</sub></i>	vendor_id	int	the vendor ID
<i>RO<sub>run</sub></i>	vendor_name	string	the vendor name
<i>RO<sub>run</sub></i>	device_id	int	the device ID
<i>RO<sub>run</sub></i>	device_name	string	the device name
<i>RO<sub>run</sub></i>	revision_id	int	the revision ID
<i>RO<sub>run</sub></i>	class_code	int	the class code
<i>RO<sub>run</sub></i>	class_name	string	the class name
<i>RO<sub>run</sub></i>	subsystem_vendor_id	int	the subsystem vendor ID
<i>RO<sub>run</sub></i>	subsystem_vendor_name	string	the subsystem vendor name
<i>RO<sub>run</sub></i>	subsystem_id	int	the subsystem ID
<i>RO<sub>run</sub></i>	subsystem_name	string	the subsystem name
<i>RO<sub>run</sub></i>	driver	string	the driver name

### 2.28.2 RPCs associated with class: PPCI

**RPC name:** get\_all

**Overview:** Return a list of all the PPCIs known to the system.

**Signature:**

```
((PPCI ref) Set) get_all (session_id s)
```

**Return Type:** (PPCI ref) Set

references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given PPCI.

**Signature:**

```
string get_uuid (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_host`

**Overview:** Get the host field of the given PPCI.

**Signature:**

```
(host ref) get_host (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `host ref`

value of the field

**RPC name:** `get_domain`

**Overview:** Get the domain field of the given PPCI.

**Signature:**

```
int get_domain (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_bus`

**Overview:** Get the bus field of the given PPCI.

**Signature:**

```
int get_bus (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_slot`**Overview:** Get the slot field of the given PPCI.**Signature:**

```
int get_slot (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_func`**Overview:** Get the func field of the given PPCI.**Signature:**

```
int get_func (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_name`**Overview:** Get the name field of the given PPCI.**Signature:**

```
string get_name (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `get_vendor_id`**Overview:** Get the vendor\_id field of the given PPCI.**Signature:**

```
int get_vendor_id (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_vendor\_name

**Overview:** Get the vendor\_name field of the given PPCI.

**Signature:**

```
string get_vendor_name (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_device\_id

**Overview:** Get the device\_id field of the given PPCI.

**Signature:**

```
int get_device_id (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_device\_name

**Overview:** Get the device\_name field of the given PPCI.

**Signature:**

```
string get_device_name (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** `get_revision_id`**Overview:** Get the `revision_id` field of the given PPCI.**Signature:**

```
int get_revision_id (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_class_code`**Overview:** Get the `class_code` field of the given PPCI.**Signature:**

```
int get_class_code (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_class_name`**Overview:** Get the `class_name` field of the given PPCI.**Signature:**

```
string get_class_name (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `get_subsystem_vendor_id`**Overview:** Get the `subsystem_vendor_id` field of the given PPCI.**Signature:**

```
int get_subsystem_vendor_id (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_subsystem\_vendor\_name

**Overview:** Get the subsystem\_vendor\_name field of the given PPCI.

**Signature:**

```
string get_subsystem_vendor_name (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_subsystem\_id

**Overview:** Get the subsystem\_id field of the given PPCI.

**Signature:**

```
int get_subsystem_id (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_subsystem\_name

**Overview:** Get the subsystem\_name field of the given PPCI.

**Signature:**

```
string get_subsystem_name (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** `get_driver`**Overview:** Get the driver field of the given PPCI.**Signature:**

```
string get_driver (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `get_by_uuid`**Overview:** Get a reference to the PPCI instance with the specified UUID.**Signature:**

```
(PPCI ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** `PPCI ref`

reference to the object

**RPC name:** `get_record`**Overview:** Get a record containing the current state of the given PPCI.**Signature:**

```
(PPCI record) get_record (session_id s, PPCI ref self)
```

**Arguments:**

type	name	description
PPCI ref	self	reference to the object

**Return Type:** `PPCI record`

all fields from the object

## 2.29 Class: DSCSI

### 2.29.1 Fields for class: DSCSI

Name	<b>DSCSI</b>		
Description	<i>A half-virtualized SCSI device.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{inst}$	VM	VM ref	the virtual machine
$RO_{inst}$	PSCSI	PSCSI ref	the physical SCSI device
$RO_{run}$	HBA	DSCSI_HBA ref	the half-virtualized SCSI host bus adapter
$RO_{run}$	virtual_host	int	the virtual host number
$RO_{run}$	virtual_channel	int	the virtual channel number
$RO_{run}$	virtual_target	int	the virtual target number
$RO_{run}$	virtual_lun	int	the virtual logical unit number
$RO_{inst}$	virtual_HCTL	string	the virtual HCTL
$RO_{run}$	runtime_properties	(string $\rightarrow$ string) Map	Device runtime properties

### 2.29.2 RPCs associated with class: DSCSI

**RPC name:** `get_all`

**Overview:** Return a list of all the DSCSIs known to the system.

**Signature:**

```
((DSCSI ref) Set) get_all (session_id s)
```

**Return Type:** (DSCSI ref) Set

references to all objects

**RPC name:** `get_uuid`

**Overview:** Get the uuid field of the given DSCSI.

**Signature:**

```
string get_uuid (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name:** `get_VM`

**Overview:** Get the VM field of the given DSCSI.

**Signature:**

```
(VM ref) get_VM (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** VM ref  
value of the field

**RPC name:** get\_PSCSI

**Overview:** Get the PSCSI field of the given DSCSI.

**Signature:**

```
(PSCSI ref) get_PSCSI (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** PSCSI ref  
value of the field

**RPC name:** get\_HBA

**Overview:** Get the HBA field of the given DSCSI.

**Signature:**

```
(DSCSI_HBA ref) get_HBA (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** DSCSI\_HBA ref  
value of the field

**RPC name:** get\_virtual\_host

**Overview:** Get the virtual\_host field of the given DSCSI.

**Signature:**

```
int get_virtual_host (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name:** `get_virtual_channel`

**Overview:** Get the `virtual_channel` field of the given DSCSI.

**Signature:**

```
int get_virtual_channel (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_virtual_target`

**Overview:** Get the `virtual_target` field of the given DSCSI.

**Signature:**

```
int get_virtual_target (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_virtual_lun`

**Overview:** Get the `virtual_lun` field of the given DSCSI.

**Signature:**

```
int get_virtual_lun (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_virtual_HCTL`**Overview:** Get the `virtual_HCTL` field of the given DSCSI.**Signature:**

```
string get_virtual_HCTL (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `get_runtime_properties`**Overview:** Get the `runtime_properties` field of the given DSCSI.**Signature:**

```
((string -> string) Map) get_runtime_properties (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** `(string → string) Map`

value of the field

**RPC name:** `create`**Overview:** Create a new DSCSI instance, and create a new DSCSI\_HBA instance as needed that the new DSCSI instance connects to, and return the handle of the new DSCSI instance.**Signature:**

```
(DSCSI ref) create (session_id s, DSCSI record args)
```

**Arguments:**

type	name	description
DSCSI record	args	All constructor arguments

**Return Type:** `DSCSI ref`

reference to the newly created object

**RPC name:** `destroy`**Overview:** Destroy the specified DSCSI instance, and destroy a DSCSI\_HBA instance as needed that the specified DSCSI instance connects to.**Signature:**

```
void destroy (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** void

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the DSCSI instance with the specified UUID.

**Signature:**

```
(DSCSI ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** DSCSI ref

reference to the object

**RPC name:** get\_record

**Overview:** Get a record containing the current state of the given DSCSI.

**Signature:**

```
(DSCSI record) get_record (session_id s, DSCSI ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** DSCSI record

all fields from the object

## 2.30 Class: DSCSI\_HBA

### 2.30.1 Fields for class: DSCSI\_HBA

Name	<b>DSCSI_HBA</b>		
Description	<i>A half-virtualized SCSI host bus adapter.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>inst</sub></i>	VM	VM ref	the virtual machine
<i>RO<sub>run</sub></i>	PSCSI_HBAs	(PSCSI_HBA ref) Set	the physical SCSI HBAs
<i>RO<sub>run</sub></i>	DSCSIIs	(DSCSI ref) Set	the half-virtualized SCSI devices which are connected to this DSCSI HBA
<i>RO<sub>inst</sub></i>	virtual_host	int	the virtual host number
<i>RO<sub>inst</sub></i>	assignment_mode	string	the assignment mode of the half-virtualized SCSI devices which are connected to this DSCSI HBA

### 2.30.2 RPCs associated with class: DSCSI\_HBA

**RPC name:** get\_all

**Overview:** Return a list of all the DSCSI HBAs known to the system.

**Signature:**

```
((DSCSI_HBA ref) Set) get_all (session_id s)
```

**Return Type:** (DSCSI\_HBA ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given DSCSI HBA.

**Signature:**

```
string get_uuid (session_id s, DSCSI_HBA ref self)
```

**Arguments:**

type	name	description
DSCSI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_VM

**Overview:** Get the VM field of the given DSCSI HBA.

**Signature:**

```
(VM ref) get_VM (session_id s, DSCSI_HBA ref self)
```

**Arguments:**

type	name	description
DSCSI_HBA ref	self	reference to the object

**Return Type:** VM ref  
value of the field

**RPC name:** get\_PSCSI\_HBAs

**Overview:** Get the PSCSI\_HBAs field of the given DSCSI HBA.

**Signature:**

```
((PSCSI_HBA ref) Set) get_PSCSI_HBAs (session_id s, DSCSI_HBA ref self)
```

**Arguments:**

type	name	description
DSCSI_HBA ref	self	reference to the object

**Return Type:** (PSCSI\_HBA ref) Set  
value of the field

**RPC name:** get\_DSCSIIs

**Overview:** Get the DSCSIIs field of the given DSCSI HBA.

**Signature:**

```
((DSCSI ref) Set) get_DSCSIIs (session_id s, DSCSI_HBA ref self)
```

**Arguments:**

type	name	description
DSCSI_HBA ref	self	reference to the object

**Return Type:** (DSCSI ref) Set  
value of the field

**RPC name:** get\_virtual\_host

**Overview:** Get the virtual\_host field of the given DSCSI HBA.

**Signature:**

```
int get_virtual_host (session_id s, DSCSI_HBA ref self)
```

**Arguments:**

type	name	description
DSCSI_HBA ref	self	reference to the object

**Return Type:** int

value of the field

**RPC name:** `get_assignment_mode`

**Overview:** Get the `assignment_mode` field of the given DSCSI HBA.

**Signature:**

```
string get_assignment_mode (session_id s, DSCSI_HBA ref self)
```

**Arguments:**

type	name	description
DSCSI_HBA ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `create`

**Overview:** Create a new DSCSI\_HBA instance, and create new DSCSI instances of half-virtualized SCSI devices which are connected to the half-virtualized SCSI host bus adapter, and return the handle of the new DSCSI\_HBA instance.

**Signature:**

```
(DSCSI_HBA ref) create (session_id s, DSCSI_HBA record args)
```

**Arguments:**

type	name	description
DSCSI_HBA record	args	All constructor arguments

**Return Type:** `DSCSI_HBA ref`

reference to the newly created object

**RPC name:** `destroy`

**Overview:** Destroy the specified DSCSI\_HBA instance, and destroy DSCSI instances of half-virtualized SCSI devices which are connected to the half-virtualized SCSI host bus adapter.

**Signature:**

```
void destroy (session_id s, DSCSI_HBA ref self)
```

**Arguments:**

type	name	description
DSCSI_HBA ref	self	reference to the object

**Return Type:** `void`

**RPC name:** `get_by_uuid`

**Overview:** Get a reference to the DSCSI\_HBA instance with the specified UUID.

**Signature:**

(DSCSI\_HBA ref) `get_by_uuid` (session\_id s, string uuid)

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** DSCSI\_HBA ref

reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given DSCSI HBA.

**Signature:**

(DSCSI\_HBA record) `get_record` (session\_id s, DSCSI\_HBA ref self)

**Arguments:**

type	name	description
DSCSI_HBA ref	self	reference to the object

**Return Type:** DSCSI\_HBA record

all fields from the object

## 2.31 Class: PSCSI

### 2.31.1 Fields for class: PSCSI

Name	<b>PSCSI</b>		
Description	<i>A physical SCSI device.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>run</sub></i>	host	host ref	the physical machine to which this PSCSI is connected
<i>RO<sub>run</sub></i>	HBA	PSCSI_HBA ref	the physical SCSI host bus adapter
<i>RO<sub>run</sub></i>	physical_host	int	the physical host number
<i>RO<sub>run</sub></i>	physical_channel	int	the physical channel number
<i>RO<sub>run</sub></i>	physical_target	int	the physical target number
<i>RO<sub>run</sub></i>	physical_lun	int	the physical logical unit number
<i>RO<sub>run</sub></i>	physical_HCTL	string	the physical HCTL
<i>RO<sub>run</sub></i>	vendor_name	string	the vendor name
<i>RO<sub>run</sub></i>	model	string	the model
<i>RO<sub>run</sub></i>	type_id	int	the SCSI type ID
<i>RO<sub>run</sub></i>	type	string	the SCSI type
<i>RO<sub>run</sub></i>	dev_name	string	the SCSI device name (e.g. sda or st0)
<i>RO<sub>run</sub></i>	sg_name	string	the SCSI generic device name (e.g. sg0)
<i>RO<sub>run</sub></i>	revision	string	the revision
<i>RO<sub>run</sub></i>	scsi_id	string	the SCSI ID
<i>RO<sub>run</sub></i>	scsi_level	int	the SCSI level

### 2.31.2 RPCs associated with class: PSCSI

**RPC name:** `get_all`

**Overview:** Return a list of all the PSCSIs known to the system.

**Signature:**

```
((PSCSI ref) Set) get_all (session_id s)
```

**Return Type:** (PSCSI ref) Set  
references to all objects

**RPC name:** `get_uuid`

**Overview:** Get the uuid field of the given PSCSI.

**Signature:**

```
string get_uuid (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_host

**Overview:** Get the host field of the given PSCSI.

**Signature:**

```
(host ref) get_host (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** host ref  
value of the field

**RPC name:** get\_HBA

**Overview:** Get the HBA field of the given PSCSI.

**Signature:**

```
(PSCSI_HBA ref) get_HBA (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** PSCSI\_HBA ref  
value of the field

**RPC name:** get\_physical\_host

**Overview:** Get the physical\_host field of the given PSCSI.

**Signature:**

```
int get_physical_host (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** `get_physical_channel`**Overview:** Get the `physical_channel` field of the given PSCSI.**Signature:**

```
int get_physical_channel (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_physical_target`**Overview:** Get the `physical_target` field of the given PSCSI.**Signature:**

```
int get_physical_target (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_physical_lun`**Overview:** Get the `physical_lun` field of the given PSCSI.**Signature:**

```
int get_physical_lun (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_physical_HCTL`**Overview:** Get the `physical_HCTL` field of the given PSCSI.**Signature:**

```
string get_physical_HCTL (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_vendor\_name

**Overview:** Get the vendor\_name field of the given PSCSI.

**Signature:**

```
string get_vendor_name (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_model

**Overview:** Get the model field of the given PSCSI.

**Signature:**

```
string get_model (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_type\_id

**Overview:** Get the type\_id field of the given PSCSI.

**Signature:**

```
int get_type_id (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** `get_type`**Overview:** Get the type field of the given PSCSI.**Signature:**

```
string get_type (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field**RPC name:** `get_dev_name`**Overview:** Get the dev\_name field of the given PSCSI.**Signature:**

```
string get_dev_name (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field**RPC name:** `get_sg_name`**Overview:** Get the sg\_name field of the given PSCSI.**Signature:**

```
string get_sg_name (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field**RPC name:** `get_revision`**Overview:** Get the revision field of the given PSCSI.**Signature:**

```
string get_revision (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_scsi\_id

**Overview:** Get the scsi\_id field of the given PSCSI.

**Signature:**

```
string get_scsi_id (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_scsi\_level

**Overview:** Get the scsi\_level field of the given PSCSI.

**Signature:**

```
int get_scsi_level (session_id s, PSCSI ref self)
```

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the PSCSI instance with the specified UUID.

**Signature:**

```
(PSCSI ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** PSCSI ref  
reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given PSCSI.

**Signature:**

(PSCSI record) `get_record (session_id s, PSCSI ref self)`

**Arguments:**

type	name	description
PSCSI ref	self	reference to the object

**Return Type:** PSCSI record

all fields from the object

## 2.32 Class: PSCSI\_HBA

### 2.32.1 Fields for class: PSCSI\_HBA

Name	<b>PSCSI_HBA</b>		
Description	<i>A physical SCSI host bus adapter.</i>		
Quals	Field	Type	Description
$RO_{run}$	uuid	string	unique identifier/object reference
$RO_{run}$	host	host ref	the physical machine to which this PSCSI HBA is connected
$RO_{run}$	physical_host	int	the physical host number
$RO_{run}$	PSCSIs	(PSCSI ref) Set	the physical SCSI devices which are connected to this PSCSI HBA

### 2.32.2 RPCs associated with class: PSCSI\_HBA

**RPC name:** get\_all

**Overview:** Return a list of all the PSCSI HBAs known to the system.

**Signature:**

```
((PSCSI_HBA ref) Set) get_all (session_id s)
```

**Return Type:** (PSCSI\_HBA ref) Set  
references to all objects

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given PSCSI HBA.

**Signature:**

```
string get_uuid (session_id s, PSCSI_HBA ref self)
```

**Arguments:**

type	name	description
PSCSI_HBA ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_host

**Overview:** Get the host field of the given PSCSI HBA.

**Signature:**

```
(host ref) get_host (session_id s, PSCSI_HBA ref self)
```

**Arguments:**

type	name	description
PSCSI_HBA ref	self	reference to the object

**Return Type:** host ref  
value of the field

**RPC name:** get\_physical\_host

**Overview:** Get the physical\_host field of the given PSCSI HBA.

**Signature:**

```
int get_physical_host (session_id s, PSCSI_HBA ref self)
```

**Arguments:**

type	name	description
PSCSI_HBA ref	self	reference to the object

**Return Type:** int  
value of the field

**RPC name:** get\_PSCSIIs

**Overview:** Get the PSCSIIs field of the given PSCSI HBA.

**Signature:**

```
((PSCSI ref) Set) get_PSCSIIs (session_id s, PSCSI_HBA ref self)
```

**Arguments:**

type	name	description
PSCSI_HBA ref	self	reference to the object

**Return Type:** (PSCSI ref) Set  
value of the field

**RPC name:** get\_by\_uuid

**Overview:** Get a reference to the PSCSI HBA instance with the specified UUID.

**Signature:**

```
(PSCSI_HBA ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** PSCSI\_HBA ref  
reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given PSCSI HBA.

**Signature:**

`(PSCSI_HBA record) get_record (session_id s, PSCSI_HBA ref self)`

**Arguments:**

type	name	description
PSCSI_HBA ref	self	reference to the object

**Return Type:** PSCSI\_HBA record

all fields from the object

## 2.33 Class: user

### 2.33.1 Fields for class: user

Name	<b>user</b>		
Description	<i>A user of the system.</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier/object reference
<i>RO<sub>ins</sub></i>	short_name	string	short name (e.g. userid)
<i>RW</i>	fullname	string	full name

### 2.33.2 RPCs associated with class: user

#### RPC name: get\_uuid

**Overview:** Get the uuid field of the given user.

**Signature:**

```
string get_uuid (session_id s, user ref self)
```

**Arguments:**

type	name	description
user ref	self	reference to the object

**Return Type:** string

value of the field

#### RPC name: get\_short\_name

**Overview:** Get the short\_name field of the given user.

**Signature:**

```
string get_short_name (session_id s, user ref self)
```

**Arguments:**

type	name	description
user ref	self	reference to the object

**Return Type:** string

value of the field

#### RPC name: get\_fullname

**Overview:** Get the fullname field of the given user.

**Signature:**

```
string get_fullname (session_id s, user ref self)
```

**Arguments:**

type	name	description
user ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** set\_fullname

**Overview:** Set the fullname field of the given user.

**Signature:**

```
void set_fullname (session_id s, user ref self, string value)
```

**Arguments:**

type	name	description
user ref	self	reference to the object
string	value	New value to set

**Return Type:** void

**RPC name:** create

**Overview:** Create a new user instance, and return its handle.

**Signature:**

```
(user ref) create (session_id s, user record args)
```

**Arguments:**

type	name	description
user record	args	All constructor arguments

**Return Type:** user ref  
reference to the newly created object

**RPC name:** destroy

**Overview:** Destroy the specified user instance.

**Signature:**

```
void destroy (session_id s, user ref self)
```

**Arguments:**

type	name	description
user ref	self	reference to the object

**Return Type:** void

**RPC name:** `get_by_uuid`

**Overview:** Get a reference to the user instance with the specified UUID.

**Signature:**

(user ref) `get_by_uuid (session_id s, string uuid)`

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** user ref

reference to the object

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given user.

**Signature:**

(user record) `get_record (session_id s, user ref self)`

**Arguments:**

type	name	description
user ref	self	reference to the object

**Return Type:** user record

all fields from the object

## 2.34 Class: XSPolicy

### 2.34.1 Fields for class: XSPolicy

Name	<b>XSPolicy</b>		
Description	<i>A Xen Security Policy</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	<i>uuid</i>	string	unique identifier / object reference
<i>RW</i>	<i>repr</i>	string	representation of policy, i.e., XML
<i>RO<sub>run</sub></i>	<i>type</i>	xs_type	type of the policy
<i>RO<sub>run</sub></i>	<i>flags</i>	xs_instantiationflags	policy status flags

### 2.34.2 Semantics of the class: XSPolicy

The XSPolicy class is used for administering Xen Security policies. Through this class a new policy can be uploaded to the system, loaded into the Xen hypervisor for enforcement and be set as the policy that the system is automatically loading when the machine is started.

This class returns information about the currently administered policy, including a reference to the policy. This reference can then be used with policy-specific classes, i.e., the ACMPolicy class, to allow retrieval of information or changes to be made to a particular policy.

### 2.34.3 Structure and datatypes of class: XSPolicy

Format of the security label:

A security label consist of the three different parts *policy type*, *policy name* and *label* separated with colons. To specify the virtual machine label for an ACM-type policy *xm-test*, the security label string would be *ACM:xm-test:blue*, where blue denotes the virtual machine's label. The format of resource labels is the same.

The following flags are used by this class:

xs_type	value	meaning
XS_POLICY_ACM	(1 << 0)	ACM-type policy

xs_instantiationflags	value	meaning
XS_INST_NONE	0	do nothing
XS_INST_BOOT	(1 << 0)	make system boot with this policy
XS_INST_LOAD	(1 << 1)	load policy immediately

xs_policystate	type	meaning
xserr	int	Error code from operation (if applicable)
xs_ref	XSPolicy ref	reference to the XS policy as returned by the API
repr	string	representation of the policy, i.e., XML
type	xs_type	the type of the policy
flags	xs_instantiationflags	instantiation flags of the policy
version	string	version of the policy
errors	string	Base64-encoded sequence of integer tuples consisting

		of (error code, detail); will be returned as part of the <code>xs_setpolicy</code> function.
--	--	--

#### 2.34.4 Additional RPCs associated with class: XSPolicy

**RPC name:** `get_xstype`

**Overview:** Return the Xen Security Policy types supported by this system

**Signature:**

```
xs_type get_xstype (session_id s)
```

**Return Type:** `xs_type`

flags representing the supported Xen security policy types

**RPC name:** `set_xspolicy`

**Overview:** Set the current XSPolicy. This function can also be used for updating of an existing policy whose name must be equivalent to the one of the currently running policy.

**Signature:**

```
xs_policystate set_xspolicy (session_id s, xs_type type, string repr,
xs_instantiationflags flags, bool overwrite)
```

**Arguments:**

type	name	description
<code>xs_type</code>	<code>type</code>	the type of policy
<code>string</code>	<code>repr</code>	representation of the policy, i.e., XML
<code>xs_instantiationflags</code>	<code>flags</code>	flags for the setting of the policy
<code>bool</code>	<code>overwrite</code>	whether to overwrite an existing policy

**Return Type:** `xs_policystate`

State information about the policy. In case an error occurred, the '`xs_err`' field contains the error code. The '`errors`' may contain further information about the error.

**RPC name:** `reset_xspolicy`

**Overview:** Attempt to reset the system's policy by installing the default policy. Since this function is implemented as an update to the current policy, it underlies the same restrictions. This function may fail if for example other domains than Domain-0 are running and use a different label than Domain-0

**Signature:**

```
xs_policystate reset_xspolicy (session_id s, xs_type type)
```

**Arguments:**

type	name	description
<code>xs_type</code>	<code>type</code>	the type of policy

**Return Type:** `xs_policystate`

State information about the policy. In case an error occurred, the 'xs\_err' field contains the error code. The 'errors' may contain further information about the error.

**RPC name:** `get_xspolicy`

**Overview:** Get information regarding the currently set Xen Security Policy

**Signature:**

```
xs_policystate get_xspolicy (session_id s)
```

**Return Type:** `xs_policystate`

Policy state information.

**RPC name:** `rm_xsbootpolicy`

**Overview:** Remove any policy from the default boot configuration.

**Signature:**

```
void rm_xsbootpolicy (session_id s)
```

**Possible Error Codes:** `SECURITY_ERROR`

**RPC name:** `get_labeled_resources`

**Overview:** Get a list of resources that have been labeled.

**Signature:**

```
((string -> string) Map) get_labeled_resources (session_id s)
```

**Return Type:** `(string → string) Map`

A map of resources with their labels.

**RPC name:** `set_resource_label`

**Overview:** Label the given resource with the given label. An empty label removes any label from the resource.

**Signature:**

```
void set_resource_label (session_id s, string resource, string  
label, string old_label)
```

**Arguments:**

type	name	description
string	resource	resource to label
string	label	label for the resource
string	old_label	Optional label value that the security label must currently have for the change to succeed.

**Possible Error Codes:** SECURITY\_ERROR

**RPC name:** get\_resource\_label

**Overview:** Get the label of the given resource.

**Signature:**

```
string get_resource_label (session_id s, string resource)
```

**Arguments:**

type	name	description
string	resource	resource to label

**Return Type:** string

The label of the given resource.

**RPC name:** can\_run

**Overview:** Check whether a VM with the given security label could run on the system.

**Signature:**

```
int can_run (session_id s, string security_label)
```

**Arguments:**

type	name	description
string	security_label	reference to the object

**Return Type:** int

Error code indicating whether a VM with the given security label could run. If zero, it can run.

**Possible Error Codes:** SECURITY\_ERROR

**RPC name:** get\_all

**Overview:** Return a list of all the XSPolicies known to the system.

**Signature:**

```
((XSPolicy ref) Set) get_all (session_id s)
```

**Return Type:** (XSPolicy ref) Set

A list of all the IDs of all the XSPolicies

**RPC name:** get\_uuid

**Overview:** Get the uuid field of the given XSPolicy.

**Signature:**

```
string get_uuid (session_id s, XSPolicy ref self)
```

**Arguments:**

type	name	description
XSPolicy ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_record

**Overview:** Get a record of the referenced XSPolicy.

**Signature:**

(XSPolicy record) get\_record (session\_id s, xs\_ref xspolicy)

**Arguments:**

type	name	description
xs ref	self	reference to the object

**Return Type:** XSPolicy record  
all fields from the object

## 2.35 Class: ACMPolicy

### 2.35.1 Fields for class: ACMPolicy

Name	<b>ACMPolicy</b>		
Description	<i>An ACM Security Policy</i>		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier / object reference
<i>RW</i>	repr	string	representation of policy, in XML
<i>RO<sub>run</sub></i>	type	xs_type	type of the policy
<i>RO<sub>run</sub></i>	flags	xs_instantiationflags	policy status flags

### 2.35.2 Structure and datatypes of class: ACMPolicy

The following data structures are used:

RIP acm_policyheader	type	meaning
policyname	string	name of the policy
policyurl	string	URL of the policy
date	string	data of the policy
reference	string	reference of the policy
namespaceurl	string	namespaceurl of the policy
version	string	version of the policy

**RPC name:** get\_header

**Overview:** Get the referenced policy's header information.

**Signature:**

```
acm_policyheader get_header (session_id s, xs ref self)
```

**Arguments:**

type	name	description
xs ref	self	reference to the object

**Return Type:** acm\_policyheader

The policy's header information.

**RPC name:** get\_xml

**Overview:** Get the XML representation of the given policy.

**Signature:**

```
string get_XML (session_id s, xs ref self)
```

**Arguments:**

type	name	description
xs ref	self	reference to the object

**Return Type:** string

XML representation of the referenced policy

**RPC name:** `get_map`**Overview:** Get the mapping information of the given policy.**Signature:**

```
string get_map (session_id s, xs ref self)
```

**Arguments:**

type	name	description
xs ref	self	reference to the object

**Return Type:** string

Mapping information of the referenced policy.

**RPC name:** `get_binary`**Overview:** Get the binary policy representation of the referenced policy.**Signature:**

```
string get_binary (session_id s, xs ref self)
```

**Arguments:**

type	name	description
xs ref	self	reference to the object

**Return Type:** string

Base64-encoded representation of the binary policy.

**RPC name:** `get_enforced_binary`

**Overview:** Get the binary policy representation of the currently enforced ACM policy. In case the default policy is loaded in the hypervisor, a policy may be managed by xend that is not yet loaded into the hypervisor.

**Signature:**

```
string get_enforced_binary (session_id s, xs ref self)
```

**Arguments:**

type	name	description
xs ref	self	reference to the object

**Return Type:** string

Base64-encoded representation of the binary policy.

**RPC name:** `get_VM_ssidref`

**Overview:** Get the ACM ssidref of the given virtual machine.

**Signature:**

```
string get_VM_ssidref (session_id s, vm ref vm)
```

**Arguments:**

type	name	description
vm ref	vm	reference to a valid VM

**Return Type:** `int`

The ssidref of the given virtual machine.

**Possible Error Codes:** `HANDLE_INVALID`, `VM_BAD_POWER_STATE`, `SECURITY_ERROR`

**RPC name:** `get_all`

**Overview:** Return a list of all the ACMPolicies known to the system.

**Signature:**

```
((ACMPolicy ref) Set) get_all (session_id s)
```

**Return Type:** `(ACMPolicy ref) Set`

A list of all the IDs of all the ACMPolicies

**RPC name:** `get_uuid`

**Overview:** Get the uuid field of the given ACMPolicy.

**Signature:**

```
string get_uuid (session_id s, ACMPolicy ref self)
```

**Arguments:**

type	name	description
ACMPolicy ref	self	reference to the object

**Return Type:** `string`

value of the field

**RPC name:** `get_record`

**Overview:** Get a record of the referenced ACMPolicy.

**Signature:**

```
(XSPolicy record) get_record (session_id s, xs_ref xspolicy)
```

**Arguments:**

type	name	description
xs ref	self	reference to the object

**Return Type:** XSPolicy record  
all fields from the object

## 2.36 Class: debug

### 2.36.1 Fields for class: debug

Class debug has no fields.

### 2.36.2 RPCs associated with class: debug

**RPC name:** get\_all

**Overview:** Return a list of all the debug records known to the system

**Signature:**

```
((debug ref) Set) get_all (session_id s)
```

**Return Type:** (debug ref) Set

A list of all the IDs of all the debug records

**RPC name:** return\_failure

**Overview:** Return an API 'successful' failure.

**Signature:**

```
void return_failure (session_id s)
```

**Return Type:** void

**RPC name:** create

**Overview:** Create a new debug instance, and return its handle.

**Signature:**

```
(debug ref) create (session_id s, debug record args)
```

**Arguments:**

type	name	description
debug record	args	All constructor arguments

**Return Type:** debug ref

reference to the newly created object

**RPC name:** destroy

**Overview:** Destroy the specified debug instance.

**Signature:**

```
void destroy (session_id s, debug ref self)
```

**Arguments:**

type	name	description
debug ref	self	reference to the object

**Return Type:** void**RPC name:** get\_by\_uuid**Overview:** Get a reference to the debug instance with the specified UUID.**Signature:**

```
(debug ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** debug ref  
reference to the object**RPC name:** get\_record**Overview:** Get a record containing the current state of the given debug.**Signature:**

```
(debug record) get_record (session_id s, debug ref self)
```

**Arguments:**

type	name	description
debug ref	self	reference to the object

**Return Type:** debug record  
all fields from the object

## 2.37 Class: cpu\_pool

### 2.37.1 Fields for class: cpu\_pool

Name	cpu_pool		
Description	A CPU pool		
Quals	Field	Type	Description
<i>RO<sub>run</sub></i>	uuid	string	unique identifier / object reference
<i>RW</i>	name_label	string	name of cpu_pool
<i>RW</i>	name_description	string	cpu_pool description
<i>RO<sub>run</sub></i>	resident_on	host ref	the host the cpu_pool is currently resident on
<i>RW</i>	auto_power_on	bool	True if this cpu_pool should be activated automatically after host boot
<i>RO<sub>run</sub></i>	started_VMs	(VM ref) Set	list of VMs currently started in this cpu_pool
<i>RW</i>	ncpu	integer	number of host_CPUs requested for this cpu_pool at next start
<i>RW</i>	sched_policy	string	scheduler policy on this cpu_pool
<i>RW</i>	proposed_CPUs	(string) Set	list of proposed host_CPUs to assign at next activation
<i>RO<sub>run</sub></i>	host_CPUs	(VM ref) Set	list of host_cpus currently assigned to this cpu_pool
<i>RO<sub>run</sub></i>	activated	bool	True if this cpu_pool is activated
<i>RW</i>	other_config	(string → string) Map	additional configuration

### 2.37.2 RPCs associated with class: cpu\_pool

#### RPC name: activate

**Overview:** Activate the cpu\_pool and assign the given CPUs to it. CPUs specified in field proposed\_CPUs, that are not existing or not free, are ignored. If value of ncpu is greater than the number of CPUs in field proposed\_CPUs, additional free CPUs are assigned to the cpu\_pool.

#### Signature:

```
void activate (session_id s, cpu_pool ref self)
```

#### Arguments:

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** void

**Possible Error Codes:** POOL\_BAD\_STATE, INSUFFICIENT\_CPUS, UNKOWN\_SCHED\_POLICY

#### RPC name: create

**Overview:** Create a new cpu\_pool instance, and return its handle.

**Signature:**

```
(cpu_pool ref) create (session_id s, cpu_pool record args)
```

**Arguments:**

type	name	description
cpu_pool record	args	All constructor arguments

**Return Type:** cpu\_pool ref  
reference to the newly created object

**RPC name: deactivate**

**Overview:** Deactivate the cpu\_pool and release all CPUs assigned to it. This function can only be called if there are no domains active in the cpu\_pool.

**Signature:**

```
void deactivate (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** void

**Possible Error Codes:** POOL\_BAD\_STATE

**RPC name: destroy**

**Overview:** Destroy the specified cpu\_pool. The cpu\_pool is completely removed from the system. This function can only be called if the cpu\_pool is deactivated.

**Signature:**

```
void destroy (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** void

**Possible Error Codes:** POOL\_BAD\_STATE

**RPC name: add\_host\_CPU\_live**

**Overview:** Add a additional CPU immediatly to the cpu\_pool.

**Signature:**

```
void add_host_CPU_live (session_id s, cpu_pool ref self, host_cpu ref host_cpu)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
host_cpu ref	host_cpu	CPU to add

**Return Type:** void**Possible Error Codes:** POOL\_BAD\_STATE, INVALID\_CPU**RPC name:** remove\_host\_CPU\_live**Overview:** Remove a CPU immediatly from the cpu\_pool.**Signature:**

```
void remove_host_CPU_live (session_id s, cpu_pool ref self, host_cpu ref host_cpu)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
host_cpu ref	host_cpu	CPU to remove

**Return Type:** void**Possible Error Codes:** POOL\_BAD\_STATE, INVALID\_CPU, LAST\_CPU\_NOT\_REMOVEABLE**RPC name:** get\_all**Overview:** Return a list of all the cpu pools known to the system.**Signature:**

```
((cpu_pool ref) Set) get_all (session_id s)
```

**Return Type:** (cpu\_pool ref) Set A list of all the IDs of the cpu pools.**RPC name:** get\_all\_records**Overview:** Return a map of all the cpu pool records known to the system.**Signature:**

```
((cpu_pool ref) -> (cpu_pool record)) Map) get_all_records (session_id s)
```

**Return Type:** ((cpu\_pool ref) → (cpu\_pool record)) Map A map of all the cpu pool records indexed by cpu pool ref.

**RPC name:** `get_by_name_label`**Overview:** Get all the `cpu_pool` instances with the given label.**Signature:**

```
((cpu_pool ref) Set) get_by_name_label (session_id s, string label)
```

**Arguments:**

type	name	description
string	label	label of object to return

**Return Type:** `(cpu_pool ref) Set`  
 references to objects with matching names

**RPC name:** `get_by_uuid`**Overview:** Get a reference to the `cpu_pool` instance with the specified UUID.**Signature:**

```
(cpu_pool ref) get_by_uuid (session_id s, string uuid)
```

**Arguments:**

type	name	description
string	uuid	UUID of object to return

**Return Type:** `cpu_pool ref`  
 reference to the object

**RPC name:** `get_activated`**Overview:** Return the activation state of the `cpu_pool` object.**Signature:**

```
bool get_activated (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
<code>cpu_pool ref</code>	self	reference to the object

**Return Type:** `bool` Returns `true` if `cpu_pool` is active.

**RPC name:** `get_auto_power_on`**Overview:** Return the auto power attribute of the `cpu_pool` object.**Signature:**

```
bool get_auto_power_on (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** bool Returns **true** if cpu\_pool has to be activated on xend start.

**RPC name:** get\_host\_CPUs

**Overview:** Return the list of host\_cpu refs assigned to the cpu\_pool object.

**Signature:**

```
((host_cpu ref) Set) get_host_CPUs (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** (host\_cpu ref) Set Returns a list of references of all host cpus assigned to the cpu\_pool.

**RPC name:** get\_name\_description

**Overview:** Get the name/description field of the given cpu\_pool.

**Signature:**

```
string get_name_description (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_name\_label

**Overview:** Get the name/label field of the given cpu\_pool.

**Signature:**

```
string get_name_label (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** `get_ncpu`

**Overview:** Get the `ncpu` field of the given `cpu_pool`.

**Signature:**

```
int get_ncpu (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** `int`

value of the field

**RPC name:** `get_proposed_CPUs`

**Overview:** Get the `proposed_CPUs` field of the given `cpu_pool`.

**Signature:**

```
((string) Set) get_proposed_CPUs (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** `(string) Set`

value of the field

**RPC name:** `get_other_config`

**Overview:** Get the `other_config` field of the given `cpu_pool`.

**Signature:**

```
((string -> string) Map) get_other_config (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** `(string → string) Map`

value of the field

**RPC name:** `get_record`

**Overview:** Get a record containing the current state of the given `cpu_pool`.

**Signature:**

```
(cpu_pool record) get_record (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** cpu\_pool record  
all fields of the object.

**RPC name:** get\_resident\_on

**Overview:** Get the resident\_on field of the given cpu\_pool.

**Signature:**

```
(host ref) get_resident_on (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** host ref  
value of the field

**RPC name:** get\_sched\_policy

**Overview:** Get the sched\_policy field of the given cpu\_pool.

**Signature:**

```
string get_sched_policy (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** string  
value of the field

**RPC name:** get\_started\_VMs

**Overview:** Get the started\_VMs field of the given cpu\_pool.

**Signature:**

```
((VM ref) Set) get_started_VMs (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** (VM ref) Set  
value of the field

**RPC name: get\_uuid****Overview:** Get the uuid field of the given cpu\_pool.**Signature:**

```
string get_uuid (session_id s, cpu_pool ref self)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object

**Return Type:** string

value of the field

**RPC name: set\_auto\_power\_on****Overview:** Set the auto\_power\_on field of the given cpu\_pool.**Signature:**

```
void set_auto_power_on (session_id s, cpu_pool ref self, bool value)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
bool	value	new auto_power_on value

**Return Type:** void**RPC name: set\_proposed\_CPUs****Overview:** Set the proposed\_CPUs field of the given cpu\_pool.**Signature:**

```
void set_proposed_CPUs (session_id s, cpu_pool ref self, string Set cpus)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
string Set	cpus	Set of preferred CPU (numbers) to use

**Return Type:** void**Possible Error Codes:** POOL\_BAD\_STATE**RPC name: add\_to\_proposed\_CPUs****Overview:** Add a CPU (number) to the proposed\_CPUs field of the given cpu\_pool.**Signature:**

```
void add_to_proposed_CPUs (session_id s, cpu_pool ref self, integer cpu)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
integer	cpu	Number of CPU to add

**Return Type:** void**Possible Error Codes:** POOL\_BAD\_STATE**RPC name:**remove\_from\_proposed\_CPUs**Overview:** Remove a CPU (number) from the proposed\_CPUs field of the given cpu\_pool.**Signature:**

```
void remove_from_proposed_CPUs (session_id s, cpu_pool ref self, integer cpu)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
integer	cpu	Number of CPU to remove

**Return Type:** void**Possible Error Codes:** POOL\_BAD\_STATE**RPC name:** set\_name\_label**Overview:** Set the name/label field of the given cpu\_pool.**Signature:**

```
void set_name_label (session_id s, cpu_pool ref self, string value)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
string	value	New value to set

**Return Type:** void**RPC name:** set\_ncpu**Overview:** Set the ncpu field of the given cpu\_pool.**Signature:**

```
void set_ncpu (session_id s, cpu_pool ref self, integer value)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
integer	value	Number of cpus to use

**Return Type:** void

**Possible Error Codes:** POOL\_BAD\_STATE

**RPC name:** set\_other\_config

**Overview:** Set the other\_config field of the given cpu\_pool.

**Signature:**

```
void set_other_config (session_id s, cpu_pool ref self, (string -> string) Map value)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
(string → string) Map	value	New value to set

**Return Type:** void

**RPC name:** add\_to\_other\_config

**Overview:** Add the given key-value pair to the other\_config field of the given cpu\_pool.

**Signature:**

```
void add_to_other_config (session_id s, cpu_pool ref self, string key, string value)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
string	key	Key to add
string	value	Value to add

**Return Type:** void

**RPC name:** remove\_from\_other\_config

**Overview:** Remove the given key and its corresponding value from the other\_config field of the given cpu\_pool. If the key is not in that Map, then do nothing.

**Signature:**

```
void remove_from_other_config (session_id s, cpu_pool ref self, string key)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
string	key	Key to remove

**Return Type:** void

**RPC name:** set\_sched\_policy

**Overview:** Set the sched\_policy field of the given cpu\_pool.

**Signature:**

```
void set_sched_policy (session_id s, cpu_pool ref self, string new_sched_policy)
```

**Arguments:**

type	name	description
cpu_pool ref	self	reference to the object
string	new_sched_policy	New value to set

**Return Type:** void

## Chapter 3

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# Bibliography

- [RFC2397] Masinter L., **The "data" URL scheme**, RFC 2397, August 1998,  
Network Working Group, <http://www.ietf.org/rfc/rfc2397.txt>