



Xen Management API

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Contents

| | | |
|----------|---|-----------|
| 1 | Introduction | 5 |
| 1.1 | RPCs associated with fields | 6 |
| 1.2 | RPCs associated with classes | 6 |
| 1.2.1 | Additional RPCs | 6 |
| 1.3 | Wire Protocol for Remote API Calls | 7 |
| 1.3.1 | Note on References vs UUIDs | 8 |
| 1.3.2 | Return Values/Status Codes | 8 |
| 1.4 | Making XML-RPC Calls | 9 |
| 1.4.1 | Transport Layer | 9 |
| 1.4.2 | Session Layer | 9 |
| 1.4.3 | Synchronous and Asynchronous invocation | 9 |
| 1.5 | Example interactive session | 10 |
| 1.6 | VM Lifecycle | 13 |
| 1.7 | VM boot parameters | 13 |
| 2 | API Reference | 15 |
| 2.1 | Classes | 15 |
| 2.2 | Relationships Between Classes | 16 |
| 2.2.1 | List of bound fields | 18 |
| 2.3 | Types | 18 |
| 2.3.1 | Primitives | 18 |
| 2.3.2 | Higher order types | 18 |
| 2.3.3 | Enumeration types | 18 |
| 2.4 | Error Handling | 21 |
| 2.4.1 | Error Codes | 22 |
| 2.5 | Class: session | 27 |
| 2.5.1 | Fields for class: session | 27 |
| 2.5.2 | RPCs associated with class: session | 27 |
| 2.6 | Class: task | 30 |
| 2.6.1 | Fields for class: task | 30 |
| 2.6.2 | RPCs associated with class: task | 30 |
| 2.7 | Class: event | 35 |
| 2.7.1 | Fields for class: event | 35 |
| 2.7.2 | RPCs associated with class: event | 35 |
| 2.8 | Class: VM | 37 |
| 2.8.1 | Fields for class: VM | 37 |
| 2.8.2 | Parameter Details | 38 |
| 2.8.3 | RPCs associated with class: VM | 39 |
| 2.9 | Class: VM_metrics | 71 |
| 2.9.1 | Fields for class: VM_metrics | 71 |
| 2.9.2 | RPCs associated with class: VM_metrics | 71 |
| 2.10 | Class: VM_guest_metrics | 76 |
| 2.10.1 | Fields for class: VM_guest_metrics | 76 |

| | | |
|--------|--|-----|
| 2.10.2 | RPCs associated with class: VM_guest_metrics | 76 |
| 2.11 | Class: host | 80 |
| 2.11.1 | Fields for class: host | 80 |
| 2.11.2 | RPCs associated with class: host | 81 |
| 2.12 | Class: host_metrics | 96 |
| 2.12.1 | Fields for class: host_metrics | 96 |
| 2.12.2 | RPCs associated with class: host_metrics | 96 |
| 2.13 | Class: host_cpu | 99 |
| 2.13.1 | Fields for class: host_cpu | 99 |
| 2.13.2 | RPCs associated with class: host_cpu | 99 |
| 2.14 | Class: network | 104 |
| 2.14.1 | Fields for class: network | 104 |
| 2.14.2 | RPCs associated with class: network | 104 |
| 2.15 | Class: VIF | 111 |
| 2.15.1 | Fields for class: VIF | 111 |
| 2.15.2 | RPCs associated with class: VIF | 111 |
| 2.16 | Class: VIF_metrics | 121 |
| 2.16.1 | Fields for class: VIF_metrics | 121 |
| 2.16.2 | RPCs associated with class: VIF_metrics | 121 |
| 2.17 | Class: PIF | 124 |
| 2.17.1 | Fields for class: PIF | 124 |
| 2.17.2 | RPCs associated with class: PIF | 124 |
| 2.18 | Class: PIF_metrics | 130 |
| 2.18.1 | Fields for class: PIF_metrics | 130 |
| 2.18.2 | RPCs associated with class: PIF_metrics | 130 |
| 2.19 | Class: SR | 133 |
| 2.19.1 | Fields for class: SR | 133 |
| 2.19.2 | RPCs associated with class: SR | 133 |
| 2.20 | Class: VDI | 139 |
| 2.20.1 | Fields for class: VDI | 139 |
| 2.20.2 | RPCs associated with class: VDI | 139 |
| 2.21 | Class: VBD | 148 |
| 2.21.1 | Fields for class: VBD | 148 |
| 2.21.2 | RPCs associated with class: VBD | 148 |
| 2.22 | Class: VBD_metrics | 158 |
| 2.22.1 | Fields for class: VBD_metrics | 158 |
| 2.22.2 | RPCs associated with class: VBD_metrics | 158 |
| 2.23 | Class: PBD | 161 |
| 2.23.1 | Fields for class: PBD | 161 |
| 2.23.2 | RPCs associated with class: PBD | 161 |
| 2.24 | Class: crashdump | 165 |
| 2.24.1 | Fields for class: crashdump | 165 |
| 2.24.2 | RPCs associated with class: crashdump | 165 |
| 2.25 | Class: VTPM | 168 |
| 2.25.1 | Fields for class: VTPM | 168 |
| 2.25.2 | RPCs associated with class: VTPM | 168 |
| 2.26 | Class: console | 172 |
| 2.26.1 | Fields for class: console | 172 |
| 2.26.2 | RPCs associated with class: console | 172 |
| 2.27 | Class: DPCI | 176 |
| 2.27.1 | Fields for class: DPCI | 176 |
| 2.27.2 | RPCs associated with class: DPCI | 176 |
| 2.28 | Class: PPCI | 181 |
| 2.28.1 | Fields for class: PPCI | 181 |

| | | |
|----------|--|------------|
| 2.28.2 | RPCs associated with class: PPCI | 181 |
| 2.29 | Class: DSCSI | 188 |
| 2.29.1 | Fields for class: DSCSI | 188 |
| 2.29.2 | RPCs associated with class: DSCSI | 188 |
| 2.30 | Class: DSCSI_HBA | 193 |
| 2.30.1 | Fields for class: DSCSI_HBA | 193 |
| 2.30.2 | RPCs associated with class: DSCSI_HBA | 193 |
| 2.31 | Class: PSCSI | 197 |
| 2.31.1 | Fields for class: PSCSI | 197 |
| 2.31.2 | RPCs associated with class: PSCSI | 197 |
| 2.32 | Class: PSCSI_HBA | 204 |
| 2.32.1 | Fields for class: PSCSI_HBA | 204 |
| 2.32.2 | RPCs associated with class: PSCSI_HBA | 204 |
| 2.33 | Class: user | 207 |
| 2.33.1 | Fields for class: user | 207 |
| 2.33.2 | RPCs associated with class: user | 207 |
| 2.34 | Class: XSPolicy | 210 |
| 2.34.1 | Fields for class: XSPolicy | 210 |
| 2.34.2 | Semantics of the class: XSPolicy | 210 |
| 2.34.3 | Structure and datatypes of class: XSPolicy | 210 |
| 2.34.4 | Additional RPCs associated with class: XSPolicy | 211 |
| 2.35 | Class: ACMPolicy | 215 |
| 2.35.1 | Fields for class: ACMPolicy | 215 |
| 2.35.2 | Structure and datatypes of class: ACMPolicy | 215 |
| 2.36 | Class: debug | 219 |
| 2.36.1 | Fields for class: debug | 219 |
| 2.36.2 | RPCs associated with class: debug | 219 |
| 2.37 | Class: cpu_pool | 221 |
| 2.37.1 | Fields for class: cpu_pool | 221 |
| 2.37.2 | RPCs associated with class: cpu_pool | 221 |
| 3 | GNU Free Documentation License | 232 |
| 1. | APPLICABILITY AND DEFINITIONS | 232 |
| 2. | VERBATIM COPYING | 234 |
| 3. | COPYING IN QUANTITY | 234 |
| 4. | MODIFICATIONS | 234 |
| 5. | COMBINING DOCUMENTS | 236 |
| 6. | COLLECTIONS OF DOCUMENTS | 236 |
| 7. | AGGREGATION WITH INDEPENDENT WORKS | 236 |
| 8. | TRANSLATION | 237 |
| 9. | TERMINATION | 237 |
| 10. | FUTURE REVISIONS OF THIS LICENSE | 237 |
| | ADDENDUM: How to use this License for your documents | 237 |

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_{run}*: the field is Read Only. Furthermore, its value is automatically computed at runtime. For example: current CPU load and disk IO throughput.
- *RO_{ins}*: 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*.
- *(t₁, t₂) Map*: signifies a mapping from values of type *t₁* to values of type *t₂*.

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 set¹;
- 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_{ins}*. 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.

¹ 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.

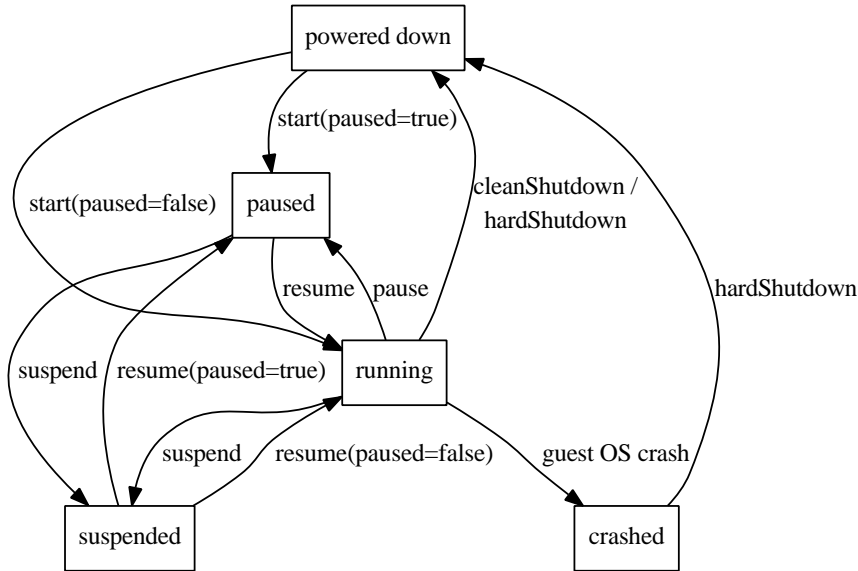


Figure 1.1: VM Lifecycle

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:

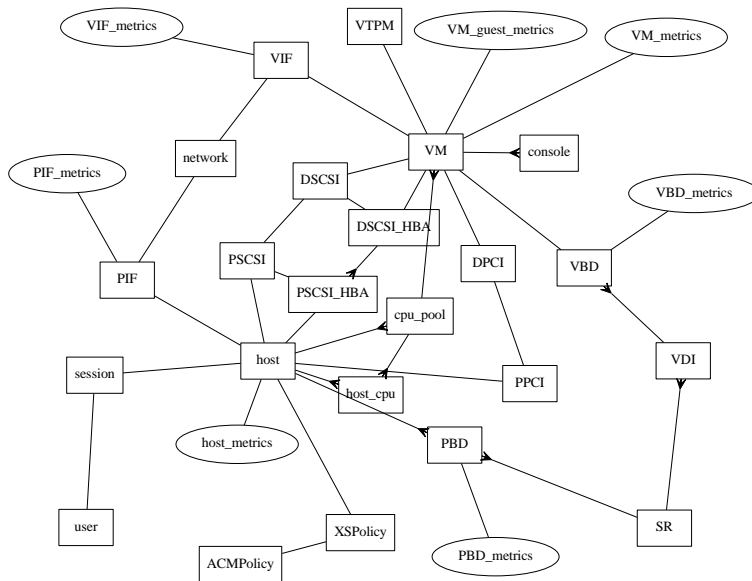
| Name | Description |
|------------------|--|
| session | A session |
| task | A long-running asynchronous task |
| event | Asynchronous event registration and handling |
| VM | A virtual machine (or 'guest') |
| VM_metrics | The metrics associated with a VM |
| VM_guest_metrics | The metrics reported by the guest (as opposed to inferred from outside) |
| host | A physical host |
| host_metrics | The metrics associated with a host |
| host_cpu | A physical CPU |
| network | A virtual network |
| VIF | A virtual network interface |
| VIF_metrics | The metrics associated with a virtual network device |
| PIF | A physical network interface (note separate VLANs are represented as several PIFs) |
| PIF_metrics | The metrics associated with a physical network interface |
| SR | A storage repository |
| VDI | A virtual disk image |
| VBD | A virtual block device |
| VBD_metrics | The metrics associated with a virtual block device |
| PBD | The physical block devices through which hosts access SRs |
| crashdump | A VM crashdump |
| VTPM | A virtual TPM device |
| console | A console |
| DPCI | A pass-through PCI device |
| PPCI | A physical PCI device |
| DSCSI | A half-virtualized SCSI device |
| DSCSI_HBA | A half-virtualized SCSI host bus adapter |
| PSCSI | A physical SCSI device |
| PSCSI_HBA | A physical SCSI host bus adapter |
| user | A user of the system |
| debug | A basic class for testing |
| XSPolicy | A class for handling Xen Security Policies |
| ACMPolicy | A class for handling ACM-type policies |
| cpu_pool | 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 | A session. | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{run}</i> | this_host | host ref | Currently connected host |
| <i>RO_{run}</i> | this_user | user ref | Currently connected user |
| <i>RO_{run}</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 | task | | |
| 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 | event | | |
| 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 VM | | | |
|---|-------------------------------------|-----------------------|---|
| <i>Description: A virtual machine (or 'guest').</i> | | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | <code>uuid</code> | string | unique identifier/object reference |
| <i>RO_{run}</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_{run}</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_{run}</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_{run}</i> | <code>consoles</code> | (console ref) Set | virtual console devices |
| <i>RO_{run}</i> | <code>VIFs</code> | (VIF ref) Set | virtual network interfaces |
| <i>RO_{run}</i> | <code>VBDs</code> | (VBD ref) Set | virtual block devices |
| <i>RO_{run}</i> | <code>crash_dumps</code> | (crashdump ref) Set | crash dumps associated with this VM |
| <i>RO_{run}</i> | <code>VTPMs</code> | (VTPM ref) Set | virtual TPMs |
| <i>RO_{run}</i> | <code>DPCIs</code> | (DPCI ref) Set | pass-through PCI devices |

| | | | |
|-------------------------|--------------------|-----------------------|--|
| <i>RO_{run}</i> | DSCSI _s | (DSCSI ref) Set | half-virtualized SCSI devices |
| <i>RO_{run}</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_{run}</i> | domid | int | domain ID (if available, -1 otherwise) |
| <i>RO_{run}</i> | is_control_domain | bool | true if this is a control domain (domain 0 or a driver domain) |
| <i>RO_{run}</i> | metrics | VM_metrics ref | metrics associated with this VM |
| <i>RO_{run}</i> | guest_metrics | VM_guest_metrics ref | metrics associated with the running guest |
| <i>RO_{run}</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_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{run}</i> | memory/actual | int | Guest's actual memory (bytes) |
| <i>RO_{run}</i> | VCPUs/number | int | Current number of VCPUs |
| <i>RO_{run}</i> | VCPUs/utilisation | (int → float) Map | Utilisation for all of guest's current VCPUs |
| <i>RO_{run}</i> | VCPUs/CPU | (int → int) Map | VCPU to PCPU map |
| <i>RO_{run}</i> | VCPUs/params | (string → string) Map | The live equivalent to VM.VCPUs_params |
| <i>RO_{run}</i> | VCPUs/flags | (int → string Set) Map | CPU flags (blocked,online,running) |
| <i>RO_{run}</i> | state | string Set | The state of the guest, eg blocked, dying etc |
| <i>RO_{run}</i> | start_time | datetime | Time at which this VM was last booted |
| <i>RO_{run}</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: $(\text{int} \rightarrow \text{int})$ 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: $(\text{string} \rightarrow \text{string})$ 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: $(\text{int} \rightarrow \text{string Set})$ 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_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{run}</i> | os_version | (string → string) Map | version of the OS |
| <i>RO_{run}</i> | PV_drivers_version | (string → string) Map | version of the PV drivers |
| <i>RO_{run}</i> | memory | (string → string) Map | free/used/total memory |
| <i>RO_{run}</i> | disks | (string → string) Map | disk configuration/free space |
| <i>RO_{run}</i> | networks | (string → string) Map | network configuration |
| <i>RO_{run}</i> | other | (string → string) Map | anything else |
| <i>RO_{run}</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</i> _{run} | 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</i> _{run} | API_version/major | int | major version number |
| <i>RO</i> _{run} | API_version/minor | int | minor version number |
| <i>RO</i> _{run} | API_version/vendor | string | identification of vendor |
| <i>RO</i> _{run} | API_version/vendor_implementation | (string → string) Map | details of vendor implementation |
| <i>RO</i> _{run} | enabled | bool | True if the host is currently enabled |
| <i>RO</i> _{run} | software_version | (string → string) Map | version strings |
| <i>RW</i> | other_config | (string → string) Map | additional configuration |
| <i>RO</i> _{run} | capabilities | string Set | Xen capabilities |
| <i>RO</i> _{run} | 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</i> _{run} | sched_policy | string | Scheduler policy currently in force on this host |
| <i>RO</i> _{run} | supported_bootloaders | string Set | a list of the bootloaders installed on the machine |
| <i>RO</i> _{run} | resident_VMs | (VM ref) Set | list of VMs currently resident on host |
| <i>RW</i> | logging | (string → string) Map | logging configuration |
| <i>RO</i> _{run} | 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</i> _{run} | PBDs | (PBD ref) Set | physical blockdevices |
| <i>RO</i> _{run} | PPCIs | (PPCI ref) Set | physical PCI devices |
| <i>RO</i> _{run} | PSCSIs | (PSCSI ref) Set | physical SCSI devices |
| <i>RO</i> _{run} | PSCSI_HBAs | (PSCSI_HBA ref) Set | physical SCSI host bus adapters |
| <i>RO</i> _{run} | host_CPUs | (host_cpu ref) Set | The physical CPUs on this host |
| <i>RO</i> _{run} | metrics | host_metrics ref | metrics associated with this host |
| <i>RO</i> _{run} | 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 | host_metrics | | |
|-------------------------|--|----------|---|
| Description | <i>The metrics associated with a host.</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{run}</i> | memory/total | int | Host's total memory (bytes) |
| <i>RO_{run}</i> | memory/free | int | Host's free memory (bytes) |
| <i>RO_{run}</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 | host_cpu | | |
| Description | <i>A physical CPU</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{run}</i> | host | host ref | the host the CPU is in |
| <i>RO_{run}</i> | number | int | the number of the physical CPU within the host |
| <i>RO_{run}</i> | vendor | string | the vendor of the physical CPU |
| <i>RO_{run}</i> | speed | int | the speed of the physical CPU |
| <i>RO_{run}</i> | modelname | string | the model name of the physical CPU |
| <i>RO_{run}</i> | stepping | string | the stepping of the physical CPU |
| <i>RO_{run}</i> | flags | string | the flags of the physical CPU (a decoded version of the features field) |
| <i>RO_{run}</i> | features | string | the physical CPU feature bitmap |
| <i>RO_{run}</i> | utilisation | float | the current CPU utilisation |
| <i>RO_{run}</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 |
|---------------------------|-------------------|-------------------------|
| <code>host_cpu ref</code> | <code>self</code> | 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 |
|---------------------------|-------------------|-------------------------|
| <code>host_cpu ref</code> | <code>self</code> | 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 |
|---------------------------|-------------------|-------------------------|
| <code>host_cpu ref</code> | <code>self</code> | 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 | network | | |
|-------------------------|---------------------------|-----------------------|---|
| Description | <i>A virtual network.</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</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_{run}</i> | VIFs | (VIF ref) Set | list of connected vifs |
| <i>RO_{run}</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 | VIF | | |
|-------------------------|---------------------------------------|-----------------------|---|
| Description | <i>A virtual network interface.</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</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_{ins}</i> | <code>network</code> | network ref | virtual network to which this vif is connected |
| <i>RO_{ins}</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_{run}</i> | <code>currently_attached</code> | bool | is the device currently attached (erased on reboot) |
| <i>RO_{run}</i> | <code>status_code</code> | int | error/success code associated with last attach-operation (erased on reboot) |
| <i>RO_{run}</i> | <code>status_detail</code> | string | error/success information associated with last attach-operation status (erased on reboot) |
| <i>RO_{run}</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_{run}</i> | <code>qos/supported_algorithms</code> | string Set | supported QoS algorithms for this VIF |
| <i>RO_{run}</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 | PIF | | |
| Description | <i>A physical network interface (note separate VLANs are represented as several PIFs).</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RW</i> | device | string | machine-readable name of the interface (e.g. eth0) |
| <i>RO_{ins}</i> | network | network ref | virtual network to which this pif is connected |
| <i>RO_{ins}</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_{run}</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_{run}</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_{run}</i> | VDIs | (VDI ref) Set | managed virtual disks |
| <i>RO_{run}</i> | PBDs | (PBD ref) Set | physical blockdevices |
| <i>RO_{run}</i> | virtual_allocation | int | sum of virtual_sizes of all VDIs in this storage repository (in bytes) |
| <i>RO_{run}</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_{ins}</i> | physical_size | int | total physical size of the repository (in bytes) |
| <i>RO_{ins}</i> | type | string | type of the storage repository |
| <i>RO_{ins}</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_VDI

Overview: Get the VDI field of the given SR.

Signature:

```
((VDI ref) Set) get_VDI (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_PBD

Overview: Get the PBD field of the given SR.

Signature:

```
((PBD ref) Set) get_PBD (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_{run}</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_{ins}</i> | SR | SR ref | storage repository in which the VDI resides |
| <i>RO_{run}</i> | VBDs | (VBD ref) Set | list of vbds that refer to this disk |
| <i>RO_{run}</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_{run}</i> | physical_utilisation | int | amount of physical space that the disk image is currently taking up on the storage repository (in bytes) |
| <i>RO_{ins}</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_{run}</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_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{ins}</i> | VM | VM ref | the virtual machine |
| <i>RO_{ins}</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_{run}</i> | currently_attached | bool | is the device currently attached (erased on reboot) |
| <i>RO_{run}</i> | status_code | int | error/success code associated with last attach-operation (erased on reboot) |
| <i>RO_{run}</i> | status_detail | string | error/success information associated with last attach-operation status (erased on reboot) |
| <i>RO_{run}</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_{run}</i> | qos/supported_algorithms | string Set | supported QoS algorithms for this VBD |
| <i>RO_{run}</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 | crashdump | | |
| 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 | VTPM | | |
| 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_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{run}</i> | protocol | console_protocol | the protocol used by this console |
| <i>RO_{run}</i> | location | string | URI for the console service |
| <i>RO_{run}</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 | DPCI | | |
|--------------------------|-----------------------------------|----------|--|
| Description | <i>A pass-through PCI device.</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{inst}</i> | VM | VM ref | the virtual machine |
| <i>RO_{inst}</i> | PPCI | PPCI ref | the physical PCI device |
| <i>RO_{inst}</i> | hotplug_slot | int | the slot number to which this PCI device is inserted |
| <i>RO_{run}</i> | virtual_domain | int | the virtual domain number |
| <i>RO_{run}</i> | virtual_bus | int | the virtual bus number |
| <i>RO_{run}</i> | virtual_slot | int | the virtual slot number |
| <i>RO_{run}</i> | virtual_func | int | the virtual func number |
| <i>RO_{run}</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_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{run}</i> | host | host ref | the physical machine to which this PPCI is connected |
| <i>RO_{run}</i> | domain | int | the domain number |
| <i>RO_{run}</i> | bus | int | the bus number |
| <i>RO_{run}</i> | slot | int | the slot number |
| <i>RO_{run}</i> | func | int | the func number |
| <i>RO_{run}</i> | name | string | the PCI name |
| <i>RO_{run}</i> | vendor_id | int | the vendor ID |
| <i>RO_{run}</i> | vendor_name | string | the vendor name |
| <i>RO_{run}</i> | device_id | int | the device ID |
| <i>RO_{run}</i> | device_name | string | the device name |
| <i>RO_{run}</i> | revision_id | int | the revision ID |
| <i>RO_{run}</i> | class_code | int | the class code |
| <i>RO_{run}</i> | class_name | string | the class name |
| <i>RO_{run}</i> | subsystem_vendor_id | int | the subsystem vendor ID |
| <i>RO_{run}</i> | subsystem_vendor_name | string | the subsystem vendor name |
| <i>RO_{run}</i> | subsystem_id | int | the subsystem ID |
| <i>RO_{run}</i> | subsystem_name | string | the subsystem name |
| <i>RO_{run}</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 | DSCSI | | |
| 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 | DSCSI_HBA | | |
| Description | <i>A half-virtualized SCSI host bus adapter.</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{inst}</i> | VM | VM ref | the virtual machine |
| <i>RO_{run}</i> | PSCSI_HBAs | (PSCSI_HBA ref) Set | the physical SCSI HBAs |
| <i>RO_{run}</i> | DSCSIIs | (DSCSI ref) Set | the half-virtualized SCSI devices which are connected to this DSCSI HBA |
| <i>RO_{inst}</i> | virtual_host | int | the virtual host number |
| <i>RO_{inst}</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 | PSCSI | | |
|-------------------------|--------------------------------|---------------|---|
| Description | <i>A physical SCSI device.</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{run}</i> | host | host ref | the physical machine to which this PSCSI is connected |
| <i>RO_{run}</i> | HBA | PSCSI_HBA ref | the physical SCSI host bus adapter |
| <i>RO_{run}</i> | physical_host | int | the physical host number |
| <i>RO_{run}</i> | physical_channel | int | the physical channel number |
| <i>RO_{run}</i> | physical_target | int | the physical target number |
| <i>RO_{run}</i> | physical_lun | int | the physical logical unit number |
| <i>RO_{run}</i> | physical_HCTL | string | the physical HCTL |
| <i>RO_{run}</i> | vendor_name | string | the vendor name |
| <i>RO_{run}</i> | model | string | the model |
| <i>RO_{run}</i> | type_id | int | the SCSI type ID |
| <i>RO_{run}</i> | type | string | the SCSI type |
| <i>RO_{run}</i> | dev_name | string | the SCSI device name (e.g. sda or st0) |
| <i>RO_{run}</i> | sg_name | string | the SCSI generic device name (e.g. sg0) |
| <i>RO_{run}</i> | revision | string | the revision |
| <i>RO_{run}</i> | scsi_id | string | the SCSI ID |
| <i>RO_{run}</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 | PSCSI_HBA | | |
| 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_PSCSIs

Overview: Get the PSCSIs field of the given PSCSI HBA.

Signature:

```
((PSCSI ref) Set) get_PSCSIs (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 | user | | |
| Description | <i>A user of the system.</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier/object reference |
| <i>RO_{ins}</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 | XSPolicy | | |
| Description | <i>A Xen Security Policy</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | <i>uuid</i> | string | unique identifier / object reference |
| <i>RW</i> | <i>repr</i> | string | representation of policy, i.e., XML |
| <i>RO_{run}</i> | <i>type</i> | xs_type | type of the policy |
| <i>RO_{run}</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 |
|----------------|-----------------------|--|
| <i>xserr</i> | int | Error code from operation (if applicable) |
| <i>xs_ref</i> | XSPolicy ref | reference to the XS policy as returned by the API |
| <i>repr</i> | string | representation of the policy, i.e., XML |
| <i>type</i> | xs_type | the type of the policy |
| <i>flags</i> | xs_instantiationflags | instantiation flags of the policy |
| <i>version</i> | string | version of the policy |
| <i>errors</i> | 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 | ACMPolicy | | |
| Description | <i>An ACM Security Policy</i> | | |
| Quals | Field | Type | Description |
| <i>RO_{run}</i> | uuid | string | unique identifier / object reference |
| <i>RW</i> | repr | string | representation of policy, in XML |
| <i>RO_{run}</i> | type | xs_type | type of the policy |
| <i>RO_{run}</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_{run}</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_{run}</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_{run}</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_{run}</i> | host_CPUs | (VM ref) Set | list of host_cpus currently assigned to this cpu_pool |
| <i>RO_{run}</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 |
|---------------------------|-------------------|-------------------------|
| <code>cpu_pool ref</code> | <code>self</code> | 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 |
|---------------------------|-------------------|-------------------------|
| <code>cpu_pool ref</code> | <code>self</code> | 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 |
|---------------------------|-------------------|-------------------------|
| <code>cpu_pool ref</code> | <code>self</code> | 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 |
|---------------------------|-------------------|-------------------------|
| <code>cpu_pool ref</code> | <code>self</code> | 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 |
|---------------------------|--------------------|--------------------------------------|
| <code>cpu_pool ref</code> | <code>self</code> | reference to the object |
| <code>bool</code> | <code>value</code> | new <code>auto_power_on</code> 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 |
|---------------------------|-------------------|---------------------------------------|
| <code>cpu_pool ref</code> | <code>self</code> | reference to the object |
| <code>string Set</code> | <code>cpus</code> | 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>