



XenEnterprise Management API Draft

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Chapter 1

Introduction

This document defines the XenEnterprise Management API—an API for remotely configuring and controlling virtualised guests running on a Xen-enabled cluster. The API is presented here as a set of Remote Procedure Calls. Although we adopt some terminology from object-orientated programming, this document does not specify how RPCs are exposed to a programmer by client-side language bindings. For example, the developer of a set of bindings may choose to wrap up the RPC calls described here in an object-orientated manner or a more procedural style as appropriate. 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. Object fields are accessed from the client-side via get/set RPCs.

In each class there is a *uuid* field that assigns a *globally* unique name to each object. This *uuid* serves as an object reference on both client- and server-side, and is often included as an argument in RPC messages.

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.
- *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.
- *RW*: the field is Read/Write.

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

- *t Ref*: signifies a reference to an object of type *t*.
- *t Set*: signifies a set containing values of type *t*.
- (t_1, t_2) *Map*: signifies a mapping from values of type t_1 to values of type t_2 .

Note that there are a number of cases where *Refs* are *doubly linked*—e.g. a VM has a field called **groups** of type $(VMGroup Ref) Set$; this field lists the VMGroups that a particular VM is part of. Similarly, the VMGroups class has a field called **VMs** of type $(VM Ref) Set$ that contains the VMs that are part of a particular VMGroup. These two fields are *bound together*, in the sense that adding a new VMGroup to a VM causes the VMs field of the corresponding VMGroup 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(uuid u)`”: takes a `uuid` 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(uuid, v)`” RPC adds a new element *v* to the set¹;
- a “`remove_from_f(uuid, v)`” RPC removes element *v* from the list;

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

- an “`add_to_f(uuid, k, v)`” RPC adds new pair (*k*, *v*) to the mapping stored in *f* in object `uuid`. Adding a new pair for duplicate key, *k*, overwrites any previous mapping for *k*.
- a “`remove_from_f(uuid, k)`” RPC removes the pair with key *k* from the mapping stored in *f* in object `uuid`.

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(uuid, v)`” RPC function is also provided. This sets field *f* on object `uuid` to value *v*.

1.2 RPCs associated with classes

- Each class has a *constructor* RPC 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_all()`” RPC that returns a set of all persistent objects of that class that the system knows about. For example, `VM.get_all()` would return a list of VM objects that are currently installed.
- 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 `short_name` field has a “`get_by_short_name(name)`” RPC that returns a list of objects of that class that have the specified `name`.
- Each class has a “`to_XML()`” RPC that serialises the state of all fields as an XML string.
- Each class has a “`delete(uuid)`” RPC that explicitly deletes the persistent object specified by `uuid` from the system.

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 have RPCs for cloning, suspending, starting etc. Such additional RPCs are described explicitly in the API reference.

¹Since 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 a Java-like manner. For example:

```
List<vm_id> Host.ListAllVMs()
```

This specifies that the function with name `Host.ListAllVMs` takes no parameters and returns an list of `vm_ids`. These types are mapped onto XML-RPC types in a straight-forward manner:

- all our “_id” types (e.g. `vm_id` in the above example) map to XML-RPC’s `String` type.
- for all our types, `t`, type `List<t>` simply maps to XML-RPC’s `Array` type².
- our type `void` maps onto an empty XML-RPC `String`.

1.3.1 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 represents an error code; the remainder of the array represents error parameters relating to that code.

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

```
<struct>
  <member> <name> Status </name>
    <value> Success </value>
  </member>
  <member> <name> Value </name>
    <array>
      <data>
        <value> vm-id-1 </value>
        <value> vm-id-2 </value>
        <value> vm-id-3 </value>
      </data>
    </array>
  </member>
</struct>
```

²XML-RPC does not explicitly support a parameterised array type so we have no means of specifying the type of elements at this level.

1.4 Making XML-RPC Calls

1.4.1 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.LoginWithUsernamePassword(string uname, string pwd)
```

Where `uname` and `password` refer to your username and password respectively, as defined by the Xen cluster administrator. The `session_id` returned by `Session.Login` 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)
```

1.4.2 Synchronous and Asynchronous invocation

Each method call (apart from those on “Session” and “Task” objects) 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 1.3.1.

Each of the methods specified in the API Reference is synchronous. However, although not listed explicitly in this document, each method call has an asynchronous analogue in the `Async` namespace. For example, synchronous call `VM.Install(...)` (described in Chapter 2) has an asynchronous counterpart, `Async.VM.Install(...)`, 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 1.3.1.

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

Two special RPC calls are provided to poll the status of asynchronous calls:

```
Array<task_id> Async.Task.GetAllTasks (session_id s)
task_status    Async.Task.GetStatus   (session_id s, task_id t)
```

`Async.Task.GetAllTasks` returns a list of the currently executing asynchronous tasks belong to the current user³.

`Async.Task.GetStatus` returns a `task_status` result. This is an XML-RPC struct with two elements:

- The first element is named `Progress` and contains an `Integer` between 0 and 100 representing the estimated percentage of the task currently completed.
- The second element is named `Result`. If `Progress` is not 100 then `Result` contains the empty string. If `Progress` is set to 100, then `Result` contains the function’s return result (as specified in Section 1.3.1)⁴.

1.5 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.

³The current user is determined by the username that was provided to `Session.Login`.

⁴Recall that this itself is a struct potentially containing status, errorcode, value fields etc.

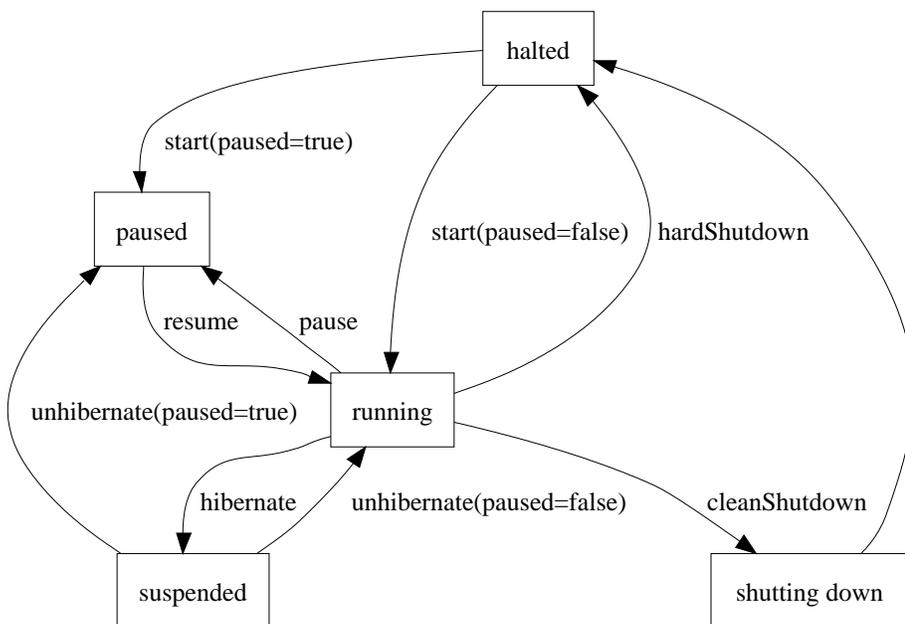


Figure 1.1: VM Lifecycle

Chapter 2

API Reference

This API Reference is autogenerated from datamodel specification and IDL — do not hand-edit.

2.1 Classes

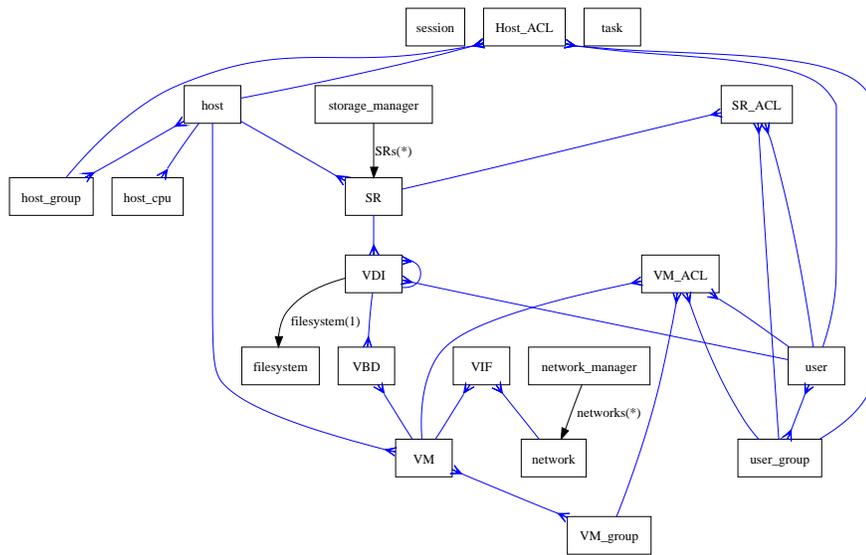
The following classes are defined:

Name	Description
<code>session</code>	a session
<code>VM</code>	a virtual machine (or ‘guest’)
<code>host</code>	a physical host
<code>host_cpu</code>	a physical CPU
<code>network_manager</code>	creates and manages virtual networks
<code>network</code>	a virtual network
<code>VIF</code>	a virtual network interface
<code>storage_manager</code>	creates and manages storage repositories
<code>SR</code>	a storage repository
<code>VDI</code>	a virtual disk image
<code>VBD</code>	a virtual block device
<code>filesystem</code>	an on-disk filesystem
<code>user</code>	a user of the system
<code>user_group</code>	a group of users
<code>host_group</code>	a group of physical hosts
<code>VM_group</code>	a group of virtual machines
<code>VM_ACL</code>	ACL entries for VMs. Each entry has 1 of either <code>vm</code> or <code>vmgroup</code> set; and 1 of either <code>user</code> or <code>usergroup</code> set. It grants access to the specified <code>vm/vmgroup</code> for the specified <code>user/usergroup</code> .
<code>Host_ACL</code>	ACL entries for Hosts. Each entry has 1 of either <code>host</code> or <code>host_group</code> set; and 1 of either <code>user</code> or <code>usergroup</code> set. It grants access to the specified <code>vm/vmgroup</code> for the specified <code>user/usergroup</code> .
<code>SR_ACL</code>	ACL entries for Storage. <code>SR</code> is always set; and 1 of either <code>user</code> or <code>usergroup</code> set. It grants access to the specified <code>SR</code> for the specified <code>user/usergroup</code> .
<code>task</code>	a longrunning asynchronous task

2.2 Relationships Between Classes

The relationship between classes is displayed in the following diagram. Nodes are classes while edges represent references between class instances. Black edges with arrows and labels represent the notion that an instance of one class contains a field referencing instances of the other class. The

label indicates the field name and a (1) annotation indicates a single object is referenced while a (*) indicates multiple objects (e.g. through a list or map). Blue lines indicate bidirectional relationships between instances of the two classes using crows-feet notation to specify one-to-one, one-to-many or many-to-many



2.2.1 List of bound fields

<i>object.field</i>	<i>object.field</i>	<i>relationship</i>
VM.VM_groups	VM_group.VMs	many-to-many
VM_ACL.VM	VM.VM_ACL_entries	one-to-many
VM_ACL.VM_group	VM_group.VM_ACL_entries	one-to-many
VM_ACL.user	user.VM_ACL_entries	one-to-many
VM_ACL.user_group	user_group.VM_ACL_entries	one-to-many
Host_ACL.host	host.host_ACL_entries	one-to-many
Host_ACL.host_group	host_group.host_ACL_entries	one-to-many
Host_ACL.user	user.host_ACL_entries	one-to-many
Host_ACL.user_group	user_group.host_ACL_entries	one-to-many
SR_ACL.SR	SR.SR_ACL_entries	one-to-many
SR_ACL.user	user.SR_ACL_entries	one-to-many
SR_ACL.user_group	user_group.SR_ACL_entries	one-to-many
user.user_groups	user_group.users	many-to-many
VDI.VBDs	VBD.VDI	many-to-one
VDI.parent	VDI.children	one-to-many
VDI.creator	user.created_VDIs	one-to-many
VBD.VM	VM.VBDs	one-to-many
VIF.VM	VM.VIFs	one-to-many
VIF.network	network.VIFs	one-to-many
SR.VDIs	VDI.SR	many-to-one
host.SRs	SR.local_node	many-to-one
host.host_groups	host_group.hosts	many-to-many
host.resident_VMs	VM.running_on	many-to-one
host.host_CPUs	host_cpu.host	many-to-one

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 → 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 power_behaviour	
destroy	destroy the VM state
restart	automatically restart the VM
preserve	leave VM running
rename_restart	leave VM running and restart a new one

enum bios_boot_option	
floppy	boot from emulated floppy
HD	boot from emulated HD
CDROM	boot from emulated CDROM

enum boot_type	
bios	boot an HVM guest using an emulated BIOS
grub	boot from inside the machine using grub
kernel_external	boot from an external kernel
kernel_internal	boot from a kernel inside the machine

enum cpu_feature

FPU	Onboard FPU
VME	Virtual Mode Extensions
DE	Debugging Extensions
PSE	Page Size Extensions
TSC	Time Stamp Counter
MSR	Model-Specific Registers, RDMSR, WRMSR
PAE	Physical Address Extensions
MCE	Machine Check Architecture
CX8	CMPXCHG8 instruction
APIC	Onboard APIC
SEP	SYSENTER/SYSEXIT
MTRR	Memory Type Range Registers
PGE	Page Global Enable
MCA	Machine Check Architecture
CMOV	CMOV instruction (FCMOVCC and FCOMI too if FPU present)
PAT	Page Attribute Table
PSE36	36-bit PSEs
PN	Processor serial number
CLFLSH	Supports the CLFLUSH instruction
DTES	Debug Trace Store
ACPI	ACPI via MSR
MMX	Multimedia Extensions
FXSR	FXSAVE and FXRSTOR instructions (fast save and restore)
XMM	Streaming SIMD Extensions
XMM2	Streaming SIMD Extensions-2
SELFSNOOP	CPU self snoop
HT	Hyper-Threading
ACC	Automatic clock control
IA64	IA-64 processor
SYSCALL	SYSCALL/SYSRET
MP	MP Capable.
NX	Execute Disable
MMXEXT	AMD MMX extensions
LM	Long Mode (x86-64)
3DNOWEXT	AMD 3DNow! extensions
3DNOW	3DNow!
RECOVERY	CPU in recovery mode
LONGRUN	Longrun power control
LRTI	LongRun table interface
CXMMX	Cyrix MMX extensions
K6_MTRR	AMD K6 nonstandard MTRRs
CYRIX_ARR	Cyrix ARRs (= MTRRs)
CENTAUR_MCR	Centaur MCRs (= MTRRs)
K8	Opteron, Athlon64
K7	Athlon
P3	P3
P4	P4
CONSTANT_TSC	TSC ticks at a constant rate
FXSAVE_LEAK	FXSAVE leaks FOP/FIP/FOP
XMM3	Streaming SIMD Extensions-3
MWAIT	Monitor/Mwait support
DSCPL	CPL Qualified Debug Store
EST	Enhanced SpeedStep
TM2	Thermal Monitor 2

CID	Context ID
CX16	CMPXCHG16B
XTPR	Send Task Priority Messages
XSTORE	on-CPU RNG present (xstore insn)
XSTORE_EN	on-CPU RNG enabled
XCRYPT	on-CPU crypto (xcrypt insn)
XCRYPT_EN	on-CPU crypto enabled
LAHF_LM	LAHF/SAHF in long mode
CMP_LEGACY	If yes HyperThreading not valid

enum vdi_type	
system	disks which are wiped on upgrade
user	user disks which are always preserved
ephemeral	disks which may be wiped on boot

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

enum driver_type	
ioemu	use hardware emulation
paravirtualised	use paravirtualised driver

2.4 Class: session

2.4.1 Fields for class: session

Class session has no fields.

2.4.2 Additional RPCs associated with class: session

RPC name: login_with_password

Overview: Attempt to authenticate the user, returning a session_id if successful

Signature:

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

Arguments:

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

Return Type: session_id

ID of newly created session

RPC name: logout

Overview: Log out of a session

Signature:

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

Return Type: void

2.5 Class: VM

2.5.1 Fields for class: VM

Name	VM		
Description	<i>a virtual machine (or 'guest')</i>		
Quals	Field	Type	Description
<i>RO</i> _{run}	uuid	string	globally-unique ID
<i>RW</i>	VM_ACL_entries	VM_ACL ref Set	The VM ACL entries that refer to this VM directly (i.e. not via a VM-Group)
<i>RW</i>	name/label	string	a short human-readable label
<i>RW</i>	name/short_description	string	a short human-readable description
<i>RW</i>	name/long_description	string	a slightly longer human-readable description
<i>RW</i>	name/detail	string	everything you can think of, and then some more
<i>RW</i>	VM_groups	VM_group ref Set	The groups the VM belongs to
<i>RW</i>	user_version	int	a user version number for this machine
<i>RW</i>	is_a_template	bool	true if this is a template, false a VM
<i>RW</i>	running_on	host ref	the host the VM is currently resident on
<i>RO</i> _{ins}	memory/static_max	int	Statically-set (i.e. absolute) maximum
<i>RW</i>	memory/dynamic_max	int	Dynamic maximum
<i>RO</i> _{run}	memory/actual	int	Guest's actual usage
<i>RW</i>	memory/dynamic_min	int	Dynamic minimum
<i>RO</i> _{ins}	memory/static_min	int	Statically-set (i.e. absolute) minimum
<i>RW</i>	VCPUs/policy	string	the name of the VCPU scheduling policy to be applied
<i>RW</i>	VCPUs/params	string	string-encoded parameters passed to selected VCPU policy
<i>RO</i> _{run}	VCPUs/utilisation	(int → float) Map	Utilisation for all of guest's current VCPUs
<i>RO</i> _{ins}	VCPUs/features/required	cpu_feature Set	CPU features the guest demands the host supports
<i>RO</i> _{ins}	VCPUs/features/can_use	cpu_feature Set	CPU features the guest can use if available
<i>RW</i>	VCPUs/features/force_on	cpu_feature Set	CPU features to hide from the guest
<i>RW</i>	VCPUs/features/force_off	cpu_feature Set	extra features to expose to the guest above the bare minimum
<i>RW</i>	actions/power_off	power_behaviour	action to take when the guest powers off
<i>RW</i>	actions/reboot	power_behaviour	action to take when the guest reboots
<i>RW</i>	actions/crash	power_behaviour	action to take if the guest crashes
<i>RW</i>	actions/standby	power_behaviour	action to take when the guest enters standby mode
<i>RW</i>	coredump	bool	set to true to generate coredump on poweroff, reboot, crash, standby
<i>RW</i>	VIFs	VIF ref Set	virtual network interfaces
<i>RW</i>	VBDs	VBD ref Set	virtual block devices
<i>RO</i> _{ins}	TPM/instance	int	?
<i>RO</i> _{ins}	TPM/backend	int	?

<i>RW</i>	bios/cdrom	string	path for emulated CDROM e.g. /dev/cdrom or /foo.iso
<i>RW</i>	bios/boot	bios_boot_option	default device to boot the guest from
<i>RW</i>	platform/std_VGA	bool	emulate standard VGA instead of cirrus logic
<i>RW</i>	platform/SDL	bool	enable the SDL console
<i>RW</i>	platform/VNC	bool	enable the VNC console
<i>RW</i>	platform/serial	string	redirect serial port to pty
<i>RW</i>	platform/localtime	bool	set RTC to local time
<i>RW</i>	platform/clock_offset	string	timeshift applied to guest's clock
<i>RW</i>	platform/enable_audio	bool	emulate audio
<i>RW</i>	builder	string	domain builder to use
<i>RO_{ins}</i>	console_port	int	Xen port number to which console is redirected
<i>RW</i>	boot_method	boot_type	select how this machine should boot
<i>RW</i>	kernel/kernel	string	path to kernel e.g. /boot/vmlinuz
<i>RW</i>	kernel/initrd	string	path to the initrd e.g. /boot/initrd.img
<i>RW</i>	kernel/args	string	extra kernel command-line arguments
<i>RW</i>	grub/cmdline	string	grub command-line
<i>RO_{ins}</i>	PCI_bus	string	PCI bus path for pass-through devices
<i>RO_{run}</i>	tools_version	(string → string) Map	versions of installed paravirtualised drivers

2.5.2 Additional 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_id clone (session_id s, vm_id vm, string new_name)
```

Arguments:

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

Return Type: vm_id

The ID of the newly created VM.

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_id vm, bool start_paused)
```

Arguments:

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

Return Type: void**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_id vm)
```

Arguments:

type	name	description
vm_id	vm	The VM to pause

Return Type: void**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_id vm)
```

Arguments:

type	name	description
vm_id	vm	The VM to pause

Return Type: void**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.**Signature:**

```
void clean_shutdown (session_id s, vm_id vm)
```

Arguments:

type	name	description
vm_id	vm	The VM to shutdown

Return Type: void

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.

Signature:

```
void clean_reboot (session_id s, vm_id vm)
```

Arguments:

type	name	description
vm_id	vm	The VM to shutdown

Return Type: void

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_id vm)
```

Arguments:

type	name	description
vm_id	vm	The VM to destroy

Return Type: void

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_id vm)
```

Arguments:

type	name	description
vm_id	vm	The VM to reboot

Return Type: void

RPC name: hibernate

Overview: Hibernate the specified VM, suspending to disk.

Signature:

```
void hibernate (session_id s, vm_id vm, bool live)
```

Arguments:

type	name	description
vm_id	vm	The VM to hibernate
bool	live	If set to true, perform a live hibernate; otherwise suspend the VM before commencing hibernate

Return Type: void

RPC name: unhibernate

Overview: Awaken the specified VM from hibernation and resume it.

Signature:

```
void unhibernate (session_id s, vm_id vm, bool start_paused)
```

Arguments:

type	name	description
vm_id	vm	The VM to unhibernate
bool	start_paused	Unhibernate VM in paused state if set to true.

Return Type: void

2.6 Class: host

2.6.1 Fields for class: host

Name	host		
Description	<i>a physical host</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	name/label	string	a short human-readable label
<i>RW</i>	name/short_description	string	a short human-readable description
<i>RW</i>	name/long_description	string	a slightly longer human-readable description
<i>RW</i>	name/detail	string	everything you can think of, and then some more
<i>RO_{run}</i>	software_version	(string → string) Map	version strings
<i>RW</i>	SRs	SR ref Set	list of mounted storage repositories
<i>RO_{run}</i>	resident_VMs	VM ref Set	list of VMs resident on host
<i>RW</i>	host_groups	host_group ref Set	list of groups that the host belongs to
<i>RW</i>	host_ACL_entries	Host_ACL ref Set	The Host ACL entries that refer to this host directly (i.e. not via a group)
<i>RO_{run}</i>	host_CPUs	host_cpu ref Set	The physical CPUs on this host

2.6.2 Additional RPCs associated with class: host

RPC name: disable

Overview: Puts the host into a state in which no new VMs can be started.

Signature:

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

Arguments:

type	name	description
host_id	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_id host)
```

Arguments:

type	name	description
host_id	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_id host)
```

Arguments:

type	name	description
host_id	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_id host)
```

Arguments:

type	name	description
host_id	host	The Host to reboot

Return Type: void

2.7 Class: host_cpu

2.7.1 Fields for class: host_cpu

Name	host_cpu		
Description	<i>a physical CPU</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RO_{ins}</i>	host	host ref	the host the CPU is in
<i>RO_{ins}</i>	number	int	the number of the physical CPU within the host
<i>RO_{ins}</i>	features	cpu_feature Set	the features supported by the CPU
<i>RO_{run}</i>	utilisation	float	the current CPU utilisation

2.7.2 Additional RPCs associated with class: host_cpu

Class `host_cpu` has no additional RPCs associated with it.

2.8 Class: `network_manager`

2.8.1 Fields for class: `network_manager`

Name	network_manager		
Description	<i>creates and manages virtual networks</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	networks	network ref Set	networks known to the network manager

2.8.2 Additional RPCs associated with class: `network_manager`

Class `network_manager` has no additional RPCs associated with it.

2.9 Class: network

2.9.1 Fields for class: network

Name	network		
Description	<i>a virtual network</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	name/label	string	a short human-readable label
<i>RW</i>	name/short_description	string	a short human-readable description
<i>RW</i>	name/long_description	string	a slightly longer human-readable description
<i>RW</i>	name/detail	string	everything you can think of, and then some more
<i>RW</i>	VIFs	VIF ref Set	list of connected vifs
<i>RW</i>	NIC	string	ethernet device to use to access this network. Note: in this revision of the API all hosts will use the specified NIC to access this network
<i>RW</i>	VLAN	string	VLAN tag to use to access this network. Note: in this revision of the API all hosts will use the specified VLAN tag to access this network
<i>RW</i>	default_gateway	string	default gateway IP address. Used for auto-configuring guests with fixed IP setting
<i>RW</i>	default_netmask	string	default netmask. Used for auto-configuring guests with fixed IP setting

2.9.2 Additional RPCs associated with class: network

Class network has no additional RPCs associated with it.

2.10 Class: VIF

2.10.1 Fields for class: VIF

Name	VIF		
Description	<i>a virtual network interface</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	name	string	human-readable name of the interface
<i>RW</i>	type	driver_type	interface type
<i>RW</i>	device	string	network device to use e.g. eth0
<i>RW</i>	network	network ref	virtual network to which this vif is connected
<i>RW</i>	VM	VM ref	virtual machine to which this vif is connected
<i>RW</i>	MAC	string	ethernet MAC address
<i>RW</i>	MTU	int	MTU in octets
<i>RO_{run}</i>	network_read_kbs	float	Incoming network bandwidth
<i>RO_{run}</i>	network_write_kbs	float	Outgoing network bandwidth
<i>RW</i>	qos/algorithm.type	string	QoS algorithm to use
<i>RW</i>	qos/algorithm.params	string	Paramters for chosen QoS algorithm
<i>RO_{run}</i>	IO_bandwidth/incoming_kbs	float	Read bandwidth (Kb/s)
<i>RO_{run}</i>	IO_bandwidth/outgoing_kbs	float	Write bandwidth (Kb/s)

2.10.2 Additional RPCs associated with class: VIF

Class VIF has no additional RPCs associated with it.

2.11 Class: storage_manager

2.11.1 Fields for class: storage_manager

Name	storage_manager		
Description	<i>creates and manages storage repositories</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	SRs	SR ref Set	list of currently-known storage repositories

2.11.2 Additional RPCs associated with class: storage_manager

Class storage_manager has no additional RPCs associated with it.

2.12 Class: SR

2.12.1 Fields for class: SR

Name	SR		
Description	<i>a storage repository</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	<code>uuid</code>	string	globally-unique ID
<i>RW</i>	<code>name/label</code>	string	a short human-readable label
<i>RW</i>	<code>name/short_description</code>	string	a short human-readable description
<i>RW</i>	<code>name/long_description</code>	string	a slightly longer human-readable description
<i>RW</i>	<code>name/detail</code>	string	everything you can think of, and then some more
<i>RW</i>	<code>VDIs</code>	VDI ref Set	managed virtual disks
<i>RO_{run}</i>	<code>total_promised</code>	int	total amount of space promised to virtual disks
<i>RO_{run}</i>	<code>total_guaranteed</code>	int	total amount of space guaranteed to virtual disks
<i>RO_{ins}</i>	<code>physical_size</code>	int	total physical size of the repository
<i>RO_{ins}</i>	<code>type</code>	string	type?
<i>RO_{ins}</i>	<code>location</code>	string	location?
<i>RO_{ins}</i>	<code>globally_shared</code>	bool	true if the repository can be seen by all hosts; otherwise it is considered local
<i>RO_{ins}</i>	<code>local_node</code>	host ref	host to which this repository is considered to be local
<i>RW</i>	<code>SR_ACL_entries</code>	SR_ACL ref Set	The SRACL entries that refer to this SR.

2.12.2 Additional RPCs associated with class: SR

Class SR has no additional RPCs associated with it.

2.13 Class: VDI

2.13.1 Fields for class: VDI

Name	VDI		
Description	<i>a virtual disk image</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	<code>uuid</code>	string	globally-unique ID
<i>RW</i>	<code>name/label</code>	string	a short human-readable label
<i>RW</i>	<code>name/short_description</code>	string	a short human-readable description
<i>RW</i>	<code>name/long_description</code>	string	a slightly longer human-readable description
<i>RW</i>	<code>name/detail</code>	string	everything you can think of, and then some more
<i>RW</i>	<code>SR</code>	SR ref	storage repository to create the disk on
<i>RW</i>	<code>VBDs</code>	VBD ref Set	list of vbds which have mounted this disk
<i>RO_{run}</i>	<code>filesystem</code>	filesystem ref	information about the filesystem (if known)
<i>RO_{ins}</i>	<code>virtual_size</code>	int	size of disk to present to the guest
<i>RO_{run}</i>	<code>guaranteed_size</code>	int	amount of space guaranteed by the storage repository
<i>RO_{ins}</i>	<code>type</code>	<code>vdi_type</code>	type of the VDI
<i>RO_{ins}</i>	<code>parent</code>	VDI ref	parent disk (e.g. in the case of copy on write)
<i>RO_{ins}</i>	<code>children</code>	VDI ref Set	child disks (e.g. in the case of copy on write)
<i>RW</i>	<code>sharable</code>	bool	true if this disk may be shared
<i>RO_{run}</i>	<code>creator</code>	user ref	person who created this disk
<i>RO_{run}</i>	<code>creation_time</code>	datetime	time and date VDI was created
<i>RO_{run}</i>	<code>last_mounted</code>	datetime	time the VDI was last mounted by a guest

2.13.2 Additional RPCs associated with class: VDI

Class VDI has no additional RPCs associated with it.

2.14 Class: VBD

2.14.1 Fields for class: VBD

Name	VBD		
Description	<i>a virtual block device</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	VM	VM ref	the virtual machine
<i>RW</i>	VDI	VDI ref	the virtual disk
<i>RW</i>	device	string	device seen by the guest e.g. hda1
<i>RW</i>	mode	vbd_mode	the mode the disk should be mounted with
<i>RW</i>	driver	driver_type	the style of driver
<i>RW</i>	qos/algorithm_type	string	QoS algorithm to use
<i>RW</i>	qos/algorithm_params	string	Parameters for chosen QoS algorithm
<i>RO_{run}</i>	IO_bandwidth/incoming_kbs	float	Read bandwidth (Kb/s)
<i>RO_{run}</i>	IO_bandwidth/outgoing_kbs	float	Write bandwidth (Kb/s)

2.14.2 Additional RPCs associated with class: VBD

Class VBD has no additional RPCs associated with it.

2.15 Class: filesystem

2.15.1 Fields for class: filesystem

Name	filesystem		
Description	<i>an on-disk filesystem</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RO_{run}</i>	block_size	int	block size
<i>RO_{run}</i>	total_blocks	int	total blocks on disk
<i>RO_{run}</i>	available_blocks	int	blocks available for allocation
<i>RO_{run}</i>	used_blocks	int	blocks already in use
<i>RO_{run}</i>	percentage_free	int	Percentage of free space left in filesystem
<i>RO_{run}</i>	type	string	filesystem type

2.15.2 Additional RPCs associated with class: filesystem

Class filesystem has no additional RPCs associated with it.

2.16 Class: user

2.16.1 Fields for class: user

Name	user		
Description	<i>a user of the system</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RO_{ins}</i>	short_name	string	short name (e.g. userid)
<i>RW</i>	fullname	string	full name
<i>RW</i>	user_groups	user_group ref Set	the groups this user belongs to
<i>RW</i>	created_VDIs	VDI ref Set	the VDIs this user has created
<i>RW</i>	VM_ACL_entries	VM_ACL ref Set	The VM ACL entries that refer to this user can directly (i.e. not via a group)
<i>RW</i>	host_ACL_entries	Host_ACL ref Set	The Host ACL entries that refer to this user directly (i.e. not via a group)
<i>RW</i>	SR_ACL_entries	SR_ACL ref Set	The SR ACL entries that refer to this user directly.

2.16.2 Additional RPCs associated with class: user

Class user has no additional RPCs associated with it.

2.17 Class: user_group

2.17.1 Fields for class: user_group

Name	user_group		
Description	<i>a group of users</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	name/label	string	a short human-readable label
<i>RW</i>	name/short_description	string	a short human-readable description
<i>RW</i>	name/long_description	string	a slightly longer human-readable description
<i>RW</i>	name/detail	string	everything you can think of, and then some more
<i>RW</i>	users	user ref Set	Users in the group
<i>RW</i>	VM_ACL_entries	VM_ACL ref Set	The VM ACL entries that refer to this UserGroup
<i>RW</i>	host_ACL_entries	Host_ACL ref Set	The Host ACL entries that refer to this UserGroup
<i>RW</i>	SR_ACL_entries	SR_ACL ref Set	The SR ACL entries that refer to this UserGroup

2.17.2 Additional RPCs associated with class: user_group

Class user_group has no additional RPCs associated with it.

2.18 Class: host_group

2.18.1 Fields for class: host_group

Name	host_group		
Description	<i>a group of physical hosts</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	name/label	string	a short human-readable label
<i>RW</i>	name/short_description	string	a short human-readable description
<i>RW</i>	name/long_description	string	a slightly longer human-readable description
<i>RW</i>	name/detail	string	everything you can think of, and then some more
<i>RW</i>	hosts	host ref Set	Hosts in the group
<i>RW</i>	host_ACL_entries	Host_ACL ref Set	The Host ACL entries that refer to this Hostgroup

2.18.2 Additional RPCs associated with class: host_group

Class `host_group` has no additional RPCs associated with it.

2.19 Class: VM_group

2.19.1 Fields for class: VM_group

Name	VM_group		
Description	<i>a group of virtual machines</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	name/label	string	a short human-readable label
<i>RW</i>	name/short_description	string	a short human-readable description
<i>RW</i>	name/long_description	string	a slightly longer human-readable description
<i>RW</i>	name/detail	string	everything you can think of, and then some more
<i>RW</i>	VMs	VM ref Set	VMs in the group
<i>RW</i>	VM_ACL_entries	VM_ACL ref Set	The VM ACL entries that refer to this VM Group.

2.19.2 Additional RPCs associated with class: VM_group

Class VM_group has no additional RPCs associated with it.

2.20 Class: VM_ACL

2.20.1 Fields for class: VM_ACL

Name	VM_ACL		
Description	<i>ACL entries for VMs. Each entry has 1 of either vm or vmgroup set; and 1 of either user or usergroup set. It grants access to the specified vm/vmgroup for the specified user/usergroup.</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	VM	VM ref	VM to grant access to
<i>RW</i>	VM_group	VM_group ref	VMGroup to grant access to
<i>RW</i>	user	user ref	User to give access to
<i>RW</i>	user_group	user_group ref	Usergroup to give access to

2.20.2 Additional RPCs associated with class: VM_ACL

Class VM_ACL has no additional RPCs associated with it.

2.21 Class: Host_ACL

2.21.1 Fields for class: Host_ACL

Name	Host_ACL		
Description	<i>ACL entries for Hosts. Each entry has 1 of either host or hostgroup set; and 1 of either user or usergroup set. It grants access to the specified vm/vmgroup for the specified user/usergroup.</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	host	host ref	Host to grant access to
<i>RW</i>	host_group	host_group ref	Host group to grant access to
<i>RW</i>	user	user ref	User to give access to
<i>RW</i>	user_group	user_group ref	Usergroup to give access to

2.21.2 Additional RPCs associated with class: Host_ACL

Class Host_ACL has no additional RPCs associated with it.

2.22 Class: SR_ACL

2.22.1 Fields for class: SR_ACL

Name	SR_ACL		
Description	<i>ACL entries for Storage. SR is always set; and 1 of either user or usergroup set. It grants access to the specified SR for the specified user/usergroup.</i>		
Quals	Field	Type	Description
<i>RO_{run}</i>	uuid	string	globally-unique ID
<i>RW</i>	SR	SR ref	SR to grant access to
<i>RW</i>	user	user ref	User to give access to
<i>RW</i>	user_group	user_group ref	Usergroup to give access to

2.22.2 Additional RPCs associated with class: SR_ACL

Class SR_ACL has no additional RPCs associated with it.

2.23 Class: task

2.23.1 Fields for class: task

Class task has no fields.

2.23.2 Additional RPCs associated with class: task

RPC name: `get_status`

Overview: Poll a running asynchronous RPC invocation and query its status

Signature:

```
XML get_status (session_id s, task_id task)
```

Arguments:

type	name	description
task_id	task	The ID of the RPC call to poll

Return Type: XML

XML string describing status of specified asynchronous RPC invocation

RPC name: `get_all_tasks`

Overview: List all asynchronous RPC calls currently executing

Signature:

```
task_id Set get_all_tasks (session_id s)
```

Return Type: task_id Set

A list of tasks currently executing. Note that tasks are associated with users rather than sessions. Thus, if you logout and login again with a different session but the same user, this function will still return the user's running tasks.

2.24 DTD

General notes:

- Values of primitive types (int, bool, etc) and higher-order types (Sets, Maps) are encoded as simple strings, rather than being expanded into XML fragments. For example "5", "true", "1, 2, 3, 4", "(1, 2), (2, 3), (3, 4)"
- Values of enumeration types are represented as strings (e.g. "PAE", "3DNow!")
- Object References are represented as UUIDs, written in string form

```
<!ELEMENT networks (#PCDATA)>  
<!ELEMENT guaranteed_size (#PCDATA)>  
<!ELEMENT VMs (#PCDATA)>  
<!ELEMENT long_description (#PCDATA)>
```

```

<!ELEMENT PCI_bus (#PCDATA)>
<!ELEMENT required (#PCDATA)>
<!ELEMENT dynamic_max (#PCDATA)>
<!ELEMENT coredump (#PCDATA)>
<!ELEMENT boot_method (#PCDATA)>
<!ELEMENT TPM (instance, backend)>
<!ELEMENT network_manager (uuid, networks)>
<!ELEMENT VM_ACL_entries (#PCDATA)>
<!ELEMENT creator (#PCDATA)>
<!ELEMENT MTU (#PCDATA)>
<!ELEMENT running_on (#PCDATA)>
<!ELEMENT physical_size (#PCDATA)>
<!ELEMENT total_promised (#PCDATA)>
<!ELEMENT total_guaranteed (#PCDATA)>
<!ELEMENT total_blocks (#PCDATA)>
<!ELEMENT crash (#PCDATA)>
<!ELEMENT name ((#PCDATA) | (label, short_description, long_description, detail))>
<!ELEMENT algorithm_params (#PCDATA)>
<!ELEMENT cdrom (#PCDATA)>
<!ELEMENT kernel ((kernel, initrd, args) | (#PCDATA))>
<!ELEMENT builder (#PCDATA)>
<!ELEMENT uuid (#PCDATA)>
<!ELEMENT user ((#PCDATA) | (uuid, short_name, fullname, user_groups, created_VDI,
VM_ACL_entries, host_ACL_entries, SR_ACL_entries))>
<!ELEMENT user_version (#PCDATA)>
<!ELEMENT Host_ACL (uuid, host, host_group, user, user_group)>
<!ELEMENT IO_bandwidth (incoming_kbs, outgoing_kbs)>
<!ELEMENT VIFs (#PCDATA)>
<!ELEMENT force_off (#PCDATA)>
<!ELEMENT VM ((#PCDATA) | (uuid, VM_ACL_entries, name, VM_groups, user_version, is_a_template,
running_on, memory, VCPUs, actions, coredump, VIFs, VBDs, TPM, bios, platform, builder,
console_port, boot_method, kernel, grub, PCI_bus, tools_version))>
<!ELEMENT globally_shared (#PCDATA)>
<!ELEMENT VNC (#PCDATA)>
<!ELEMENT platform (std_VGA, SDL, VNC, serial, localtime, clock_offset, enable_audio)>
<!ELEMENT host_group ((#PCDATA) | (uuid, name, hosts, host_ACL_entries))>
<!ELEMENT session ()>
<!ELEMENT policy (#PCDATA)>
<!ELEMENT standby (#PCDATA)>
<!ELEMENT VM_group ((#PCDATA) | (uuid, name, VMs, VM_ACL_entries))>
<!ELEMENT actual (#PCDATA)>
<!ELEMENT host_cpu (uuid, host, number, features, utilisation)>
<!ELEMENT SRs (#PCDATA)>
<!ELEMENT number (#PCDATA)>
<!ELEMENT actions (power_off, reboot, crash, standby)>
<!ELEMENT VLAN (#PCDATA)>
<!ELEMENT VIF (uuid, name, type, device, network, VM, MAC, MTU, network_read_kbs, network_write_kbs,
qos, IO_bandwidth)>
<!ELEMENT creation_time (#PCDATA)>
<!ELEMENT VM_ACL (uuid, VM, VM_group, user, user_group)>
<!ELEMENT algorithm_type (#PCDATA)>
<!ELEMENT network_read_kbs (#PCDATA)>
<!ELEMENT VDIs (#PCDATA)>
<!ELEMENT SR_ACL (uuid, SR, user, user_group)>

```

```

<!ELEMENT dynamic_min (#PCDATA)>
<!ELEMENT resident_VMs (#PCDATA)>
<!ELEMENT cmdline (#PCDATA)>
<!ELEMENT storage_manager (uuid, SRs)>
<!ELEMENT power_off (#PCDATA)>
<!ELEMENT used_blocks (#PCDATA)>
<!ELEMENT tools_version (#PCDATA)>
<!ELEMENT sharable (#PCDATA)>
<!ELEMENT VDI ((#PCDATA) | (uuid, name, SR, VBDs, filesystem, virtual_size, guaranteed_size,
type, parent, children, sharable, creator, creation_time, last_mounted))>
<!ELEMENT outgoing_kbs (#PCDATA)>
<!ELEMENT static_max (#PCDATA)>
<!ELEMENT features ((#PCDATA) | (required, can_use, force_on, force_off))>
<!ELEMENT incoming_kbs (#PCDATA)>
<!ELEMENT percentage_free (#PCDATA)>
<!ELEMENT memory (static_max, dynamic_max, actual, dynamic_min, static_min)>
<!ELEMENT initrd (#PCDATA)>
<!ELEMENT last_mounted (#PCDATA)>
<!ELEMENT bios (cdrom, boot)>
<!ELEMENT device (#PCDATA)>
<!ELEMENT MAC (#PCDATA)>
<!ELEMENT default_gateway (#PCDATA)>
<!ELEMENT qos (algorithm_type, algorithm_params)>
<!ELEMENT software_version (#PCDATA)>
<!ELEMENT location (#PCDATA)>
<!ELEMENT instance (#PCDATA)>
<!ELEMENT short_name (#PCDATA)>
<!ELEMENT VM_groups (#PCDATA)>
<!ELEMENT params (#PCDATA)>
<!ELEMENT serial (#PCDATA)>
<!ELEMENT boot (#PCDATA)>
<!ELEMENT console_port (#PCDATA)>
<!ELEMENT short_description (#PCDATA)>
<!ELEMENT NIC (#PCDATA)>
<!ELEMENT SR_ACL_entries (#PCDATA)>
<!ELEMENT virtual_size (#PCDATA)>
<!ELEMENT host_groups (#PCDATA)>
<!ELEMENT children (#PCDATA)>
<!ELEMENT driver (#PCDATA)>
<!ELEMENT host_ACL_entries (#PCDATA)>
<!ELEMENT host ((#PCDATA) | (uuid, name, software_version, SRs, resident_VMs, host_groups,
host_ACL_entries, host_CPUs))>
<!ELEMENT is_a_template (#PCDATA)>
<!ELEMENT force_on (#PCDATA)>
<!ELEMENT local_node (#PCDATA)>
<!ELEMENT std_VGA (#PCDATA)>
<!ELEMENT network_write_kbs (#PCDATA)>
<!ELEMENT localtime (#PCDATA)>
<!ELEMENT args (#PCDATA)>
<!ELEMENT user_groups (#PCDATA)>
<!ELEMENT parent (#PCDATA)>
<!ELEMENT network ((#PCDATA) | (uuid, name, VIFs, NIC, VLAN, default_gateway, default_netmask))>
<!ELEMENT VBDs (#PCDATA)>
<!ELEMENT clock_offset (#PCDATA)>

```

```

<!ELEMENT task ()>
<!ELEMENT static_min (#PCDATA)>
<!ELEMENT grub (cmdline)>
<!ELEMENT fullname (#PCDATA)>
<!ELEMENT label (#PCDATA)>
<!ELEMENT SDL (#PCDATA)>
<!ELEMENT VCPUs (policy, params, utilisation, features)>
<!ELEMENT host_CPUs (#PCDATA)>
<!ELEMENT created_VDIs (#PCDATA)>
<!ELEMENT reboot (#PCDATA)>
<!ELEMENT available_blocks (#PCDATA)>
<!ELEMENT enable_audio (#PCDATA)>
<!ELEMENT can_use (#PCDATA)>
<!ELEMENT users (#PCDATA)>
<!ELEMENT SR ((#PCDATA) | (uuid, name, VDIs, total_promised, total_guaranteed, physical_size,
type, location, globally_shared, local_node, SR_ACL_entries))>
<!ELEMENT block_size (#PCDATA)>
<!ELEMENT utilisation (#PCDATA)>
<!ELEMENT filesystem ((uuid, block_size, total_blocks, available_blocks, used_blocks,
percentage_free, type) | (#PCDATA))>
<!ELEMENT mode (#PCDATA)>
<!ELEMENT VBD (uuid, VM, VDI, device, mode, driver, qos, IO_bandwidth)>
<!ELEMENT type (#PCDATA)>
<!ELEMENT backend (#PCDATA)>
<!ELEMENT user_group ((#PCDATA) | (uuid, name, users, VM_ACL_entries, host_ACL_entries,
SR_ACL_entries))>
<!ELEMENT default_netmask (#PCDATA)>
<!ELEMENT detail (#PCDATA)>
<!ELEMENT hosts (#PCDATA)>

```

2.24.1 XML configuration examples

2.24.2 A virtual network interface

```

<vif>
  <name = "virtual interface 0">
  <type = "paravirtualised">
  <device = "eth0">

  <!-- The virtual machine to which the vif is attached -->
  <vm = "uuid-1579-1324-1597-2911">

  <!-- The virtual network the vif is attached to
  (This tells the host on which the guest is running
  how packets to/from this vif should be dealt with) -->
  <network = "uuid-1234-5678-1234-5678">

  <!-- VIF parameters -->
  <mac = "00:11:22:33:44:55">
  <mtu = "1500">

  <!-- Specify leaky bucket qos and give parameters -->
  <qos>

```

```

    <algorithm_type = "leaky_bucket">
    <algorithm_params = "r=0.15, b=3">
  </qos>
</vif>

```

2.24.3 A paravirtualised guest

```

<vm>
  <name>
    <label>debian</label>
    <shortDescription>Debian etch unstable</shortDescription>
    <longDescription>A completely vanilla install of Debian etch unstable</longDescription>
    <detail>I could write a long description here, including versions of all the software
      installed, all the licenses, everything I can think of.</detail>
  </name>
  <memory>
    <staticmax>1G</staticmax>
    <staticmin>128M</staticmin>
    <!-- actual is a runtime property -->
    <dynamicmax>512M</dynamicmax>
    <dynamicmin>128M</dynamicmin>
  </memory>
  <vcpus>

    <policy="variable_within_range">
    <params="range=(0,5)">

    <features>
      <required> FPU, P4 </required>
      <canuse> SSE, 3DNow! </canuse>
      <force_on> SSE </force_on>
      <force_off> 3DNow! </force_off>
    </features>
  </vcpus>

  <!-- set how guest behaves on poweroff, reboot, crash, standby -->
  <actions>
    <poweroff> destroy </poweroff>
    <reboot> restart </reboot>
    <crash> preserve </crash>
    <standby> rename-restart </standby>
  </actions>

  <!-- generate coredump on poweroff, reboot, crash, standby -->
  <coredump> true </coredump>

  <!-- attach following vifs and vdis to guest on startup -->
  <vifs> uuid-1234-5678-1234-5678, uuid-2345-6789-2345-6789 </vifs>
  <vdis> uuid-1234-5678-1234-5678, uuid-2345-6789-2345-6789 </vdis>

  <tpm>
    <instance>0</instance>
    <backend>0</backend>
  </tpm>

```

```

<bios>
  <cdrom>/dev/cdrom</cdrom>
  <boot>cdrom</boot>
</bios>

<platform>
  <stdvga>>false</stdvga>
  <sdl>>false</sdl>
  <vnc>>true</vnc>
  <serial>/dev/pty1</serial>
  <localtime>>true</localtime>
  <enable_audio>>true</enable_audio>
</platform>

<builder> /domain/builder/part/of/virtual/bios </builder>

<console_port>1234</console_port>

<boot_method>kernel_internal</boot_method>
<kernel>
  <kernel>/boot/vmlinuz</kernel>
  <initrd>/boot/initrd.img</initrd>
  <args>root=/dev/nfs ... </args>
</kernel>

<grub>
  <cmdline></cmdline> <!-- not used by this boot_method -->
</grub>
<pci_bus></pci_bus> <!-- no devices to pass-through -->
<!-- toolsVersion is a runtime property -->
</vm>

```