

Management Information Base for Virtual Machines Controlled by a Hypervisor

<draft-asai-vmm-mib-04>

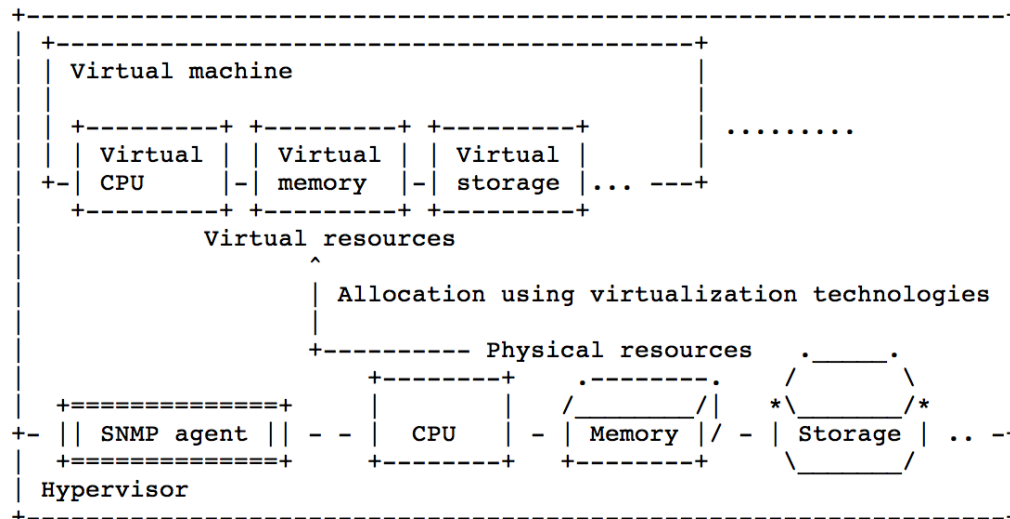
H. Asai, M. MacFaden, J. Schoenwaelder,
Y. Sekiya, K. Shima, T. Tsou, C. Zhou, H. Esaki

OPSA WG, IETF 87

July 31, 2013

VM-MIB

- Defines MIB objects related to virtual machines controlled by a hypervisor
 - Objects
 - Hypervisor software information
 - Virtual machine list (info, config and stats)
 - Virtual resources (info, config, and stats)
 - Virtual CPU, Virtual memory, Virtual storage, Virtual network interface
 - Viewpoint: Hypervisor (for hypervisor operators)



Summary of Changes

- Comments in IETF86
 - “Need more time to review the MIB”
 - Posted -03 on April 10 and -04 on July 2
 - Discussion through the mailing list
- From mailing list
 - Scalability issue: Support bulk notification to reduce traps
 - Per-VM and bulk notifications are defined and controlled by “vmPerVMNotificationsEnabled” and “vmBulkNotificationsEnabled”, respectively

New TC

VirtualMachineList ::= TEXTUAL-CONVENTION

DISPLAY-HINT "1x"

STATUS current

DESCRIPTION

"Each octet within this value specifies a set of eight Virtual Machine vmIndex, with the first octet specifying Virtual Machine 1 through 8, the second octet specifying Virtual Machine 9 through 16, etc. Within each octet, the most significant bit represents the lowest numbered vmIndex, and the least significant bit represents the highest numbered vmIndex. Thus, each Virtual Machine of the host is represented by a single bit within the value of this object. If that bit has a value of '1', then that Virtual Machine is included in the set of Virtual Machines; the Virtual Machine is not included if its bit has a value of '0'."

SYNTAX OCTET STRING

for bulk notification

MIB tree summary

Root of vmMIB

```
--vmMIB (1.3.6.1.2.1.yyy)
  +--vmNotifications(0)
  +--vmObjects(1)
  +--vmConformance(2)
```

MIB tree summary

Notifications

--vmMIB (1.3.6.1.2.1.yyy)
+--vmNotifications(0)

Per-VM notifications for detailed traps Enabled by “vmPerVMNotificationsEnabled”

+--vmRunning(1) [vmName, vmUUID, vmOperState]
+--vmShutdown(2) [vmName, vmUUID, vmOperState]
+--vmPaused(3) [vmName, vmUUID, vmOperState]
+--vmSuspended(4) [vmName, vmUUID, vmOperState]
+--vmCrashed(5) [vmName, vmUUID, vmOperState]
+--vmDeleted(6) [vmName, vmUUID, vmOperState, vmPersistent]

Bulk notifications for reducing traps Enabled by “vmBulkNotificationsEnabled”

+--vmBulkRunning(7) [vmAffectedVMs]
+--vmBulkShutdown(8) [vmAffectedVMs]
+--vmBulkPaused(9) [vmAffectedVMs]
+--vmBulkSuspended(10) [vmAffectedVMs]
+--vmBulkCrashed(11) [vmAffectedVMs]
+--vmBulkDeleted(12) [vmAffectedVMs]

Note: The notification filtering mechanism [RFC3413] could be applied.

MIB tree summary

vmObjects – Hypervisor&VMs

```
--vmMIB (1.3.6.1.2.1.yyy)
+--vmObjects(1)
+--vmHypervisor(1)
| +-- r-n SnmpAdminString   vmHvSoftware(1)
| +-- r-n SnmpAdminString   vmHvVersion(2)
| +-- r-n OBJECT IDENTIFIER vmHvObjectID(3)
| +-- r-n TimeTicks         vmHvUpTime(4)
+-- r-n Integer32           vmNumber(2)
+-- r-n TimeTicks          vmTableLastChange(3)
+--vmTable(4)
| +--vmEntry(1) [vmIndex]
|   +-- --- VirtualMachineIndex   vmIndex(1)
|   +-- r-n SnmpAdminString        vmName(2)
|   +-- r-n UUIDorZero             vmUUID(3)
|   +-- r-n SnmpAdminString        vmOSType(4)
|   +-- rwn VirtualMachineAdminState vmAdminState(5)
|   +-- r-n VirtualMachineOperState vmOperState(6)
|   +-- rwn VirtualMachineAutoStart vmAutoStart(7)
|   +-- r-n VirtualMachinePersistent vmPersistent(8)
|   +-- r-n Integer32              vmCurCpuNumber(9)
|   +-- rwn Integer32              vmMinCpuNumber(10)
|   +-- rwn Integer32              vmMaxCpuNumber(11)
|   +-- r-n Integer32              vmMemUnit(12)
|   +-- r-n Integer32              vmCurMem(13)
|   +-- rwn Integer32              vmMinMem(14)
|   +-- rwn Integer32              vmMaxMem(15)
|   +-- r-n TimeTicks              vmUpTime(16)
|   +-- r-n Couter64               vmCpuTime(17)
```

Hypervisor software information

Virtual machine list

- *configuration*
- *statistics (CPU time)*

MIB tree summary

vmObjects – CPU & Storage

```
--vmMIB (1.3.6.1.2.1.yyy)
+--vmObjects(1)
```

+--vmCpuTable(5)	
+--vmCpuEntry(1) [vmIndex, vmCpuIndex]	
+-- --- VirtualMachineCpuIndex	vmCpuIndex(1)
+-- r-n Counter64	vmCpuCoreTime(2)
+--vmCpuAffinityTable(6)	
+--vmCpuAffinityEntry(1) [vmIndex, vmCpuIndex, vmCpuPhysIndex]	
+-- --- Integer32	vmCpuPhysIndex(1)
+-- rwn Integer32	vmCpuAffinity(2)
+--vmStorageTable(7)	
+--vmStorageEntry(1) [vmStorageVmIndex, vmStorageIndex]	
+-- --- VirtualMachineIndexOrZero	vmStorageVmIndex(1)
+-- --- VirtualMachineStorageIndex	vmStorageIndex(2)
+-- r-n Integer32	vmStorageParent(4)
+-- r-n VritualMachineStorageSourceType	vmStorageSourceType(4)
+-- r-n SnmpAdminString	vmStorageSourceTypeString(5)
+-- r-n SnmpAdminString	vmStorageResourceID(6)
+-- r-n VirtualMachineStorageAccess	vmStorageAccess(7)
+-- r-n VirtualMachineStorageMediaType	vmStorageMediaType(8)
+-- r-n SnmpAdminString	vmStorageMediaTypeString(9)
+-- r-n Integer32	vmStorageSizeUnit(10)
+-- r-n Integer32	vmStorageDefinedSize(11)
+-- r-n Integer32	vmStorageAllocatedSize(12)
+-- r-n Counter64	vmStorageReadIOs(13)
+-- r-n Counter64	vmStorageWriteIOs(14)

Virtual CPU info&stats

CPU affinity configuration

Virtual storage info&stats

MIB tree summary

vmObjects – Network interfaces

```
--vmMIB (1.3.6.1.2.1.yyy)
```

```
+--vmObjects(1)
```

```
+--vmNetworkTable(8)
```

```
+--vmNetworkEntry(1) [vmIndex, vmNetworkIndex]
```

```
+-- --- VirtualMachineNetworkIndex vmNetworIndex(1)
```

```
+-- r-n InterfaceIndexOrZero vmNetworIfIndex(2)
```

```
+-- r-n InterfaceIndexOrZero vmNetworParent(3)
```

```
+-- r-n SnmpAdminString vmNetworkModel(4)
```

```
+-- r-n PhysAddress vmNetworkPhysAddress(5)
```

Virtual network interface info

Note: Other info&stats are in IF-MIB

MIB tree summary

vmObjects – Settings for notifications

--vmMIB (1.3.6.1.2.1.yyy)

+--vmObjects(1)

+-- rwn TruthValue	vmPerVMNotificationsEnabled(9)
+-- rwn TruthValue	vmBulkNotificationsEnabled(10)
+-- --n VirtualMachineList	vmAffectedVMs(11) <i>for bulk notification</i>

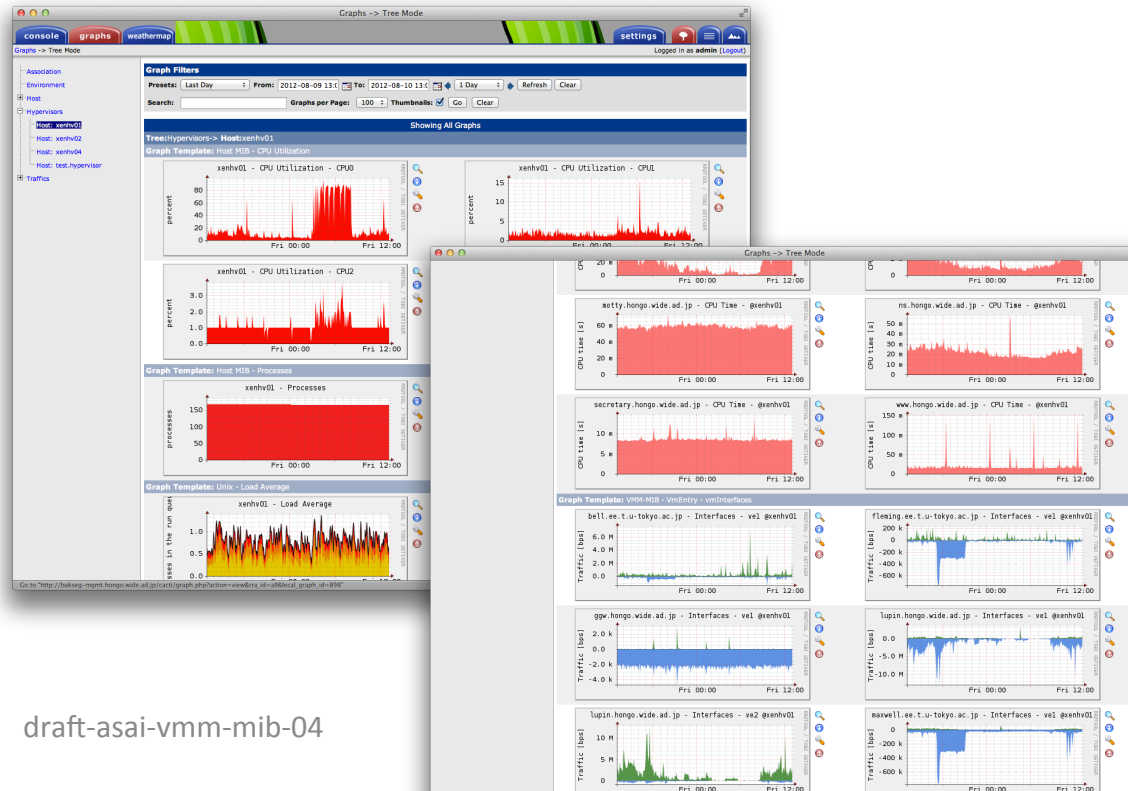
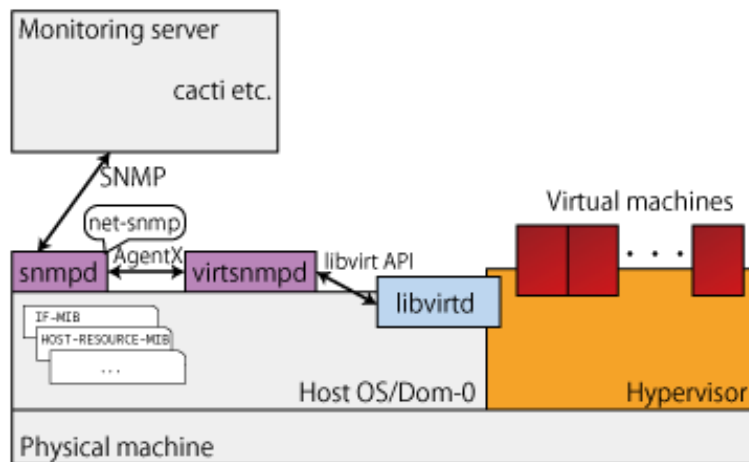
MIB tree summary

Conformance

```
--vmMIB (1.3.6.1.2.1.yyy)
  +--vmConformance(2)
    +--vmCompliances(1)
      | +--vmFullCompliances(1)
      | +--vmReadOnlyCompliances(2)
    +--vmGroups(2)
      +--vmHypervisorGroup(1)
      +--vmVirtualMachineGroup(2)
      +--vmCpuGroup(3)
      +--vmCpuAffinityGroup(4)
      +--vmStorageGroup(5)
      +--vmNetworkGroup(6)
      +--vmPerVMNotificationOptionalGroup(7)
      +--vmBulkNotificationsVariablesGroup(8)
      +--vmBulkNotificationOptionalGroup(9)
```

Implementation

- Subagent of NetSNMP using libvirt API
 - for Xen, KVM, etc.
 - <http://cloud.jar.jp/misc/virtsnmpd-0.2.0a.tar.gz>
 - Written in C



Next step: Submit this I-D as <draft-ietf-opsawg-vm-mib-00>
Need consensus of WG adoption