Providers for Linux and UNIX

System Center 2012 R2 Operations Manager

Microsoft Corporation
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1 Introduction

Welcome to the Providers for Linux and UNIX, a set of providers for Linux and UNIX operating systems as used in System Center 2012 R2 Operations Manager. This document describes the classes, properties, and methods implemented by these providers.

1.1 License

The Providers for Linux and UNIX are published under the Microsoft Public License, which is described here http://opensource.org/licenses/ms-pl.html.

1.2 Platforms

The Providers for Linux and UNIX have been tested on the following operating systems:

- Red Hat Enterprise Linux 4, 5, and 6 (x86/x64)
- SUSE Linux Enterprise Server 9 (x86), 10 SP1 (x86/x64), and 11 (x86/64)
- CentOS Linux 5 and 6 (x86/64)
- Debian GNU/Linux 5, 6, and 7 (x86/x64)
- Oracle Linux 5 and 6 (x86/x64)
- Ubuntu Linux Server 10.04 and 12.04 (x86/x64)
- IBM AIX 5.3, 6.1, and 7.1 (POWER)
- HP-UX 11i v2 and v3 (PA-RISC and IA64)
- Oracle Solaris 9 (SPARC), Solaris 10 (SPARC and x86), and Solaris 11 (SPARC and x86)

1.3 About the Providers

The Providers for Linux and UNIX are intended for use with Open Management Infrastructure(OMI): https://collaboration.opengroup.org/omi/.

1.4 Installing and Using the Providers

Details on unpacking the source code, building the providers, and creating a working version of the Operations Manager agent for Linux and UNIX is described in a separate document entitled Building Linux UNIX Agents.pdf. That document is available for download on the http://scx.codeplex.com site.

2 Provider Classes

This chapter discusses the CIM classes and methods implemented by XPlatProviders. See scx.mof, located in the MOF installation directory (--mofdir) for more details.

2.1 SCX_Agent

There is a single instance of this class. It provides information about the XPlatProviders package and the system it is installed on. The following instance was obtained from a Suse 10.1 system.

```
Architecture=x86
BuildDate=2009-06-29T00:00:00Z
BuildNumber=1
Caption=SCX Agent meta-information
Description=XPlatProviders_Build - 20090629
Hostname=scxcore-suse01.scx.com
InstallDate=2009-06-29T10:14:37Z
KitVersionString=1.0.0-001
MajorVersion=1
MinActiveLogSeverityThreshold=INFO
MinorVersion=0
Name=scx
OSAlias=SLES
OSName=SUSE Linux Enterprise Server
OSType=Linux
OSVersion=10.1
RevisionNumber=0
UnameArchitecture=i686
VersionString="1.0.0-1"
MachineType=Virtual
PhysicalProcessors=2
LogicalProcessors=4
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.1.1 Name

This key property uniquely identifies the single instance of this class. The value is always "scx", which stands for "System-Center X-Platform".

2.1.2 Caption

A human readable name for this instance.

2.1.3 Description

The build date of XPlatProviders.

2.1.4 VersionString

The version of XPlatProviders (major, minor, revision, and build number).

2.1.5 MajorVersion

The major version number of the XPlatProviders package.

2.1.6 `MinorVersion`

The minor version number of the XPlatProviders package.

2.1.7 `RevisionNumber`

The revision number of the XPlatProviders package.

2.1.8 `BuildNumber`

The build number of the XPlatProviders package.

2.1.9 `BuildDate`

The build date of the XPlatProviders package.

2.1.10 `Architecture`

The system architecture (e.g., `x86` or `IA64`)

2.1.11 `OSName`

The system's operating system type (e.g., Linux or SunOS)

2.1.12 `OSType`

The system operating system version (e.g. 10 or 5.10)

2.1.13 `OSVersion`

The system operating system version (e.g. 10 or 5.10)

2.1.14 `KitVersionString`

A string representing the complete software version of the installed kit.

2.1.15 `Hostname`

The hostname of the machine (including domain name if available).

2.1.16 `OSAlias`

Short name version of the OSName that provides an abbreviated name of OS without formatting.

2.1.17 `UnameArchitecture`

Output of `uname -m` or `uname -p`.

2.1.18 `MinActiveLogSeverityThreshold`

Lowest log severity threshold currently in use in the agent, which is one of the following: "HYSTERICAL", "TRACE", "INFO", "WARNING", "ERROR", "SUPPRESS".

2.1.19 `MachineType`

An indicator of whether the hardware running the monitored operating system is physical or virtual. Possible values of this field are: Physical, Virtual, and Unknown.

2.1.20 PhysicalProcessors

The number of physical processors in the hardware, as seen by the monitored operating system.

2.1.21 LogicalProcessors

The number of logical processors in the hardware, as seen by the monitored operating system.

2.2 SCX_DiskDrive

Each instance of this class provides information about a disk drive attached to the current system. A typical instance looks like this.

```
EnabledState = 5
RequestedState = 12
EnabledDefault = 2
SystemCreationClassName = "SCX_ComputerSystem"
SystemName = "scxcore-suse01.scx.com"
CreationClassName = "SCX_DiskDrive"
DeviceID = "sda"
MaxMediaSize = 17179869184
Caption = "Disk drive information"
Description = "Information pertaining to a physical unit of secondary storage"
Name = "sda"
IsOnline = TRUE
InterfaceType = "SCSI"
Model = ""
TotalCylinders = 2088
TotalHeads = 255
TotalSectors = 63
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.2.1 Caption

A human readable caption for this disk.

2.2.2 Description

A textual description of this disk.

2.2.3 Name

A unique key property that uniquely identifies this disk.

2.2.4 IsOnline

True if the disk is online.

2.2.5 InterfaceType

Type of interface (e.g., SCSI, IDE).

2.2.6 `Manufacturer`

Name of the disk manufacturer if available.

2.2.7 `Model`

Model of the disk if available.

2.2.8 `TotalCylinders`

Total number of cylinders on this disk.

2.2.9 `TotalHeads`

Total number of heads on this disk.

2.2.10 `TotalSectors`

Total number of sectors on this disk.

2.2.11 `TotalTracks`

Total number of tracks on this disk.

2.2.12 `TracksPerCylinder`

The number of tracks per cylinder if available.

2.2.13 `RemoveByName()`

```
boolean SCX_DiskDrive.RemoveByName(
    [IN] string Name)
```

Remove the disk with the given `Name` from the list of monitored disks.

2.3 `SCX_FileSystem`

Each instance of this class provides information about a file system on this computer. Here is an example instance obtained from a Linux system. This instance represents the root file system.

```
EnabledState = 5;
RequestedState = 12;
EnabledDefault = 2;
CSCreationClassName = "SCX_ComputerSystem";
CSName = "scxcore-suse01.scx.com";
CreationClassName = "SCX_FileSystem";
Name = "/";
Root = "/";
BlockSize = 4096;
FileSystemSize = 16376020992;
AvailableSpace = 6574993408;
ReadOnly = FALSE;
EncryptionMethod = "Not Encrypted";
CompressionMethod = "Not Compressed";
```

```
CaseSensitive = TRUE;
CasePreserved = TRUE;
MaxFileNameLength = 255;
FileSystemType = "reiserfs";
PersistenceType = 2;
Caption = "File system information";
Description = "Information about a logical unit of secondary storage";
IsOnline = TRUE;
TotalInodes = 2048000
FreeInodes = 1984563
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.3.1 Caption

A human-readable caption for this instance.

2.3.2 Description

A human-readable description of this instance.

2.3.3 IsOnline

True if this file system is online (mounted).

2.3.4 TotalInodes

The total number of inodes allocated in this file system. A value of zero indicates that this file system does not have a preset number of inodes.

2.3.5 FreeInodes

The number of inodes in this file system that are currently free and hence available for creating a new file.

2.3.6 RemoveByName

```
boolean RemoveByName(
    [IN] string Name)
```

Removes from the list of monitored file systems.

2.4 SCX_LogFile

Each instance of this class provides information about a 'log' file, on which SCX_LogFile.GetMatchedRows() has been called. It defines a single static method, described below.

2.4.1 GetMatchedRows

```
uint32 GetMatchedRows(
    [IN] string filename,
    [IN] string regexps[],
    [IN] string qid,
```

```
      [OUT, ArrayType("Ordered")] string rows[]);
```

Gets rows from the named file that match any of the supplied regular expressions. On the
first invocation, it returns all matching lines in the file. On subsequent calls, only lines
that appeared since the previous call are returned. After the first call, a CIM instance of
`SCX_LogFile` is created. To begin where the previous call left off, you must pass in exactly
he same values for the `filename`, `regexps`, and `qid` parameters.

2.5 SCX_UnixProcess

Each instance of this class provides information about a Unix (or Linux) process. The
following instance provides information about the Unix `init` process obtained from a Linux
system.

```
EnabledState = 5
RequestedState = 12
EnabledDefault = 2
CSCreationClassName = "SCX_ComputerSystem"
CSName = "scxcore-suse01.scx.com"
OSCreationClassName = "SCX_OperatingSystem"
OSName = "SuSE Distribution"
CreationClassName = "SCX_UnixProcess"
Handle = "1"
Name = "init"
Priority = 76
ExecutionState = 6
CreationDate = "20090416105118.035100-420"
KernelModeTime = 19300
UserModeTime = 2000
ParentProcessID = "0"
RealUserID = 0
ProcessGroupID = 0
ProcessSessionID = 0
ModulePath = "/sbin/init"
Parameters = "init [3]"
ProcessNiceValue = 20
ProcessWaitingForEvent = "_stext"
Caption = "Unix process information"
Description = "A snapshot of a current process"
```

The following subsections describe the local properties and methods of this class. See the
superclass for a description of inherited features.

2.5.1 Caption

A human-readable caption for this instance.

2.5.2 Description

A human-readable description of this instance.

2.5.3 `TopResourceConsumers()`

```
string TopResourceConsumers(
    [IN] string resource,
    [IN] uint16 count)
```

Returns a list of processes that are the top `count` consumers of the given `resource`. The `resource` parameter is one of the following.

- `"CPUTime"`
- `"BlockReadsPerSecond"`
- `"BlockWritesPerSecond"`
- `"BlockTransfersPerSecond"`
- `"PercentUserTime"`
- `"PercentPrivilegedTime"`
- `"UsedMemory"`
- `"PercentUsedMemory"`
- `"PagesReadPerSec"`

The returned string is formatted with one process per line (includes the `pid` and process name).

The following call, finds the top 10 consumers of memory.

```
TopResourceConsumers("UsedMemory", 10)
```

2.6 `SCX_IPProtocolEndpoint`

Each instance of this class provides information about an IP protocol endpoint. The following instance provides information about Ethernet interface `eth1`.

```
ElementName = "eth1"
RequestedState = 12
EnabledDefault = 2
SystemCreationClassName = "SCX_ComputerSystem"
SystemName = "scxcore-suse01.scx.com"
CreationClassName = "SCX_IPProtocolEndpoint"
EnabledState = 2
Name = "eth1";
IPv4Address = "10.195.173.73"
SubnetMask = "255.255.254.0"
ProtocolIFType = 4096
Caption = "IP protocol endpoint information"
Description = "Properties of an IP protocol connection endpoint"
IPv4BroadcastAddress = "10.195.173.255"
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.6.1 `Caption`

A human-readable caption for this instance.

2.6.2 `Description`

A human-readable description of this instance.

2.6.3 `IPv4BroadcastAddress`

The IPV4 broadcast IP for this ProtocolEndpoint.

2.7 `SCX_OperatingSystem`

The instance of this class represents the operating system on the current system. The following instance was obtained from a Linux Suse 10.1 system.

```
Caption = "SUSE Linux Enterprise Server 10 (i586)"
Description = "SUSE Linux Enterprise Server 10 (i586)"
EnabledState = 5
RequestedState = 12
EnabledDefault = 2
CSCreationClassName = "SCX_ComputerSystem"
CSName = "scxcore-suse01.scx.com"
CreationClassName = "SCX_OperatingSystem"
Name = "SuSE Distribution"
OSType = 36
OtherTypeDescription = "2.6.16.54-0.2.8-smp #1 SMP Mon Jun 23 13:41:12 UTC 2008"
Version = "2.6.16.54-0.2.8-smp"
LastBootUpTime = "20090416105118.029909-420"
LocalDateTime = "20090610135832.699909-420"
CurrentTimeZone = -420
NumberOfLicensedUsers = 0
NumberOfUsers = 13
NumberOfProcesses = 114
MaxNumberOfProcesses = 8192
TotalSwapSpaceSize = 778240
TotalVirtualMemorySize = 1292288
FreeVirtualMemory = 1157120
FreePhysicalMemory = 386048
TotalVisibleMemorySize = 514048
SizeStoredInPagingFiles = 778240
FreeSpaceInPagingFiles = 771072
MaxProcessMemorySize = 0
MaxProcessesPerUser = 4096
OperatingSystemCapability = "32 bit"
SystemUpTime = 4763234
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.7.1 `Caption`

A human-readable caption for this instance.

2.7.2 `Description`

A human-readable description of this instance.

2.7.3 `OperatingSystemCapability`

The capability of this operating system, either '`32 bit`' or '`64 bit`'.

2.7.4 `SystemUpTime`

The elapsed time, in seconds, since the OS was booted. A convenience property, versus having to calculate the time delta from `LastBootUpTime` to `LocalDateTime`.

2.7.5 `ExecuteCommand()`

```
boolean ExecuteCommand(
    [IN] string Command,
    [OUT] sint32 ReturnCode,
    [OUT] string StdOut,
    [OUT] string StdErr,
    [IN] uint32 timeout)
```

Execute a command, with the option of terminating the command after a timeout specified in seconds. Never times out if `timeout` is zero.

2.7.6 `ExecuteShellCommand()`

```
boolean ExecuteShellCommand(
    [IN] string Command,
    [OUT] sint32 ReturnCode,
    [OUT] string StdOut,
    [OUT] string StdErr,
    [IN] uint32 timeout)
```

Execute a command in the default shell, with the option of terminating the command after a timeout specified in seconds. Never times out if `timeout` is zero.

2.7.7 `ExecuteScript()`

```
boolean ExecuteScript(
    [IN] string Script,
    [IN] string Arguments,
    [OUT] sint32 ReturnCode,
    [OUT] string StdOut,
    [OUT] string StdErr,
    [IN] uint32 timeout)
```

Execute a script, with the option of terminating the script after a timeout specified in seconds. Never times out if `timeout` is zero.

2.8 `SCX_StatisticalInformation`

This is a base class for two other classes defined below. It defines one local property defined below. See the superclass for a description of inherited features.

2.8.1 IsAggregate

True if data is aggregated from several instances.

2.9 SCX_ProcessorStatisticalInformation

Instances of this class capture statistical information about processors on the current system. An instance is defined for each processor and an additional instance is defined that aggregates statistical information about all processors. The following instance was obtained from a dual-processor Linux system and has statistical information about the first processor.

```
IsAggregate = FALSE
Caption = "Processor information"
Description = "CPU usage statistics"
Name = "0"
PercentIdleTime = 0
PercentUserTime = 0
PercentNiceTime = 0
PercentPrivilegedTime = 0
PercentInterruptTime = 0
PercentDPCTime = 0
PercentProcessorTime = 100
PercentIOWaitTime = 0
```

A second instance has the following properties.

```
IsAggregate = FALSE
Caption = "Processor information"
Description = "CPU usage statistics"
Name = "1"
PercentIdleTime = 0
PercentUserTime = 0
PercentNiceTime = 0
PercentPrivilegedTime = 0
PercentInterruptTime = 0
PercentDPCTime = 0
PercentProcessorTime = 100
PercentIOWaitTime = 0
```

And finally, a third instance aggregates these two instances and is shown below (note that IsAggregate is TRUE).

```
IsAggregate = TRUE
Caption = "Processor information"
Description = "CPU usage statistics"
Name = "_Total"
PercentIdleTime = 0
PercentUserTime = 0
PercentNiceTime = 0
PercentPrivilegedTime = 0
PercentInterruptTime = 0
PercentDPCTime = 0
```

```
    PercentProcessorTime = 100
    PercentIOWaitTime = 0
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.9.1 `Caption`

A human-readable caption for this instance.

2.9.2 `Description`

A human-readable description of this instance.

2.9.3 `Name`

This key property uniquely identifies this instance. It holds the processor number.

2.9.4 `PercentIdleTime`

Percentage of time during the sample interval that the processor was idle.

2.9.5 `PercentUserTime`

Percentage of non-idle processor time spent in user mode.

2.9.6 `PercentNiceTime`

Percentage of non-idle processor time spent in user mode.

2.9.7 `PercentPrivilegedTime`

Percentage of non-idle processor time spent in privileged.

2.9.8 `PercentDPCTime`

Percentage of time spent receiving and servicing DPC (Deferred Procedure Calls).

2.9.9 `PercentProcessorTime`

Percentage of time that the processor spent executing a non-idle thread.

2.9.10 `PercentIOWaitTime`

Percentage of time that the processor spent waiting for IO operations to complete.

2.10 `SCX_MemoryStatisticalInformation`

A single instance of this class provides memory statistics for the current system. The following instance was obtained from a Linux system.

```
    IsAggregate = TRUE
    Caption = "Memory information"
    Description = "Memory usage and performance statistics"
    Name = "Memory"
    AvailableMemory = 378
    PercentAvailableMemory = 75
```

```
UsedMemory = 124
PercentUsedMemory = 25
PagesPerSec = 0
PagesReadPerSec = 0
PagesWrittenPerSec = 0
AvailableSwap = 753
PercentAvailableSwap = 99
UsedSwap = 7
PercentUsedSwap = 1
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.10.1 Caption

A human-readable caption for this instance.

2.10.2 Description

A human-readable description of instance.

2.10.3 Name

This key property uniquely identifies the memory instance.

2.10.4 AvailableMemory

Available physical memory in megabytes.

2.10.5 PercentAvailableMemory

Available physical memory in percent.

2.10.6 UsedMemory

Used physical memory in megabytes.

2.10.7 PercentUsedMemory

Used physical memory in percent.

2.10.8 PagesPerSec

Pages read or written from/to disk per second to resolve hard page faults.

2.10.9 PagesReadPerSec

Pages read from disk per second to resolve hard page faults.

2.10.10 PagesWrittenPerSec

Pages written to disk per second to resolve hard page faults.

2.10.11 AvailableSwap

Available swap space in megabytes.

2.10.12 `PercentAvailableSwap`

Available swap space in percent.

2.10.13 `UsedSwap`

Used swap space in megabytes.

2.10.14 `PercentUsedSwap`

Used swap space in percent.

2.11 `SCX_EthernetPortStatistics`

Each instance of this class provides statistical information about an Ethernet port. For example, the following instance provides statistics for the Ethernet interface `eth1`.

```
InstanceID = "eth1"
SampleInterval = "00000000000000.000000:000"
BytesTransmitted = 1634798148
BytesReceived = 2938050399
PacketsTransmitted = 40129891
PacketsReceived = 72116482
Caption = "Ethernet port information"
Description = "Statistics on transfer performance for a port"
BytesTotal = 4572848547
TotalRxErrors = 147
TotalTxErrors = 0
TotalCollisions = 0
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.11.1 `Caption`

A human-readable caption for this instance.

2.11.2 `Description`

A human-readable description of instance.

2.11.3 `BytesTotal`

The total number of bytes sent or received through the port.

2.11.4 `TotalRxErrors`

The aggregated number of receive errors.

2.11.5 `TotalTxErrors`

The aggregated number of transmit errors.

2.11.6 `TotalCollisions`

The aggregated number of collisions.

2.12 SCX_DiskDriveStatisticalInformation

Each instance of this class provides statistical information about a disk drive. For example, consider the following instance.

```
IsAggregate = TRUE
Caption = "Disk drive information"
Description = "Performance statistics related to a physical unit of secondary storage"
Name = "_Total"
IsOnline = TRUE
BytesPerSecond = 0
ReadBytesPerSecond = 0
WriteBytesPerSecond = 0
TransfersPerSecond = 0
ReadsPerSecond = 0
WritesPerSecond = 0
AverageReadTime = 0.0000000000000000e+00
AverageWriteTime = 0.0000000000000000e+00
AverageTransferTime = 0.0000000000000000e+00
AverageDiskQueueLength = 0.0000000000000000e+00
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.12.1 Caption

A human-readable caption for this instance.

2.12.2 Description

A human-readable description of instance.

2.12.3 Name

A key property that uniquely identifies this instance.

2.12.4 IsOnline

True if this disk is online.

2.12.5 PercentBusyTime

Percent of time the disk is busy.

2.12.6 PercentIdleTime

Percent of time the disk is idle.

2.12.7 BytesPerSecond

Total Disk bytes per second.

2.12.8 ReadBytesPerSecond

Bytes read from disk per second.

2.12.9 `WriteBytesPerSecond`

Bytes written to from disk per second.

2.12.10 `TransfersPerSecond`

Total I/Os per second.

2.12.11 `ReadsPerSecond`

Read I/Os per second.

2.12.12 `WritePerSecond`

Write I/Os per second.

2.12.13 `AverageReadTime`

Average time, in seconds, of a read of data from the disk.

2.12.14 `AverageWriteTime`

Average time, in seconds, of a write of data to the disk.

2.12.15 `AverageTransferTime`

Average time, in seconds, of a disk transfer.

2.12.16 `AverageDiskQueueLength`

Average number of queued read/write requests.

2.13 `SCX_FileSystemStatisticalInformation`

Each instance of this class provides statistical information about a file system. The following instance provides statistics for the root files system.

```
IsAggregate = FALSE
Caption = "File system information"
Description = "Performance statistics related to a logical unit of secondary storage"
Name = "/"
IsOnline = TRUE
FreeMegabytes = 6271
UsedMegabytes = 9347
PercentFreeSpace = 40
PercentUsedSpace = 60
PercentFreeInodes = 83
PercentUsedInodes = 17
PercentBusyTime = NULL
PercentIdleTime = NULL
BytesPerSecond = 1583
ReadBytesPerSecond = 0
WriteBytesPerSecond = 1583
TransfersPerSecond = 0
ReadsPerSecond = 0
```

```
WritesPerSecond = 0
AverageTransferTime = NULL
AverageDiskQueueLength = NULL
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.13.1 Caption

A human-readable caption for this instance.

2.13.2 Description

A human-readable description of instance.

2.13.3 Name

A key property that uniquely identifies this instance.

2.13.4 IsOnline

True if this file system is online (mounted).

2.13.5 FreeMegabytes

Available space in megabytes.

2.13.6 UsedMegabytes

Used space in megabytes.

2.13.7 PercentFreeSpace

Available space in percent.

2.13.8 PercentUsedSpace

Used space in percent.

2.13.9 PercentFreeInodes

Available inodes in percent.

2.13.10 PercentUsedInodes

Used inodes in percent.

2.13.11 PercentBusyTime

Percent of time filesystem is busy.

2.13.12 PercentIdleTime

Percent of time filesystem is idle.

2.13.13 BytesPerSecond

Total bytes per second.

2.13.14 ReadBytesPerSecond

Bytes read per second.

2.13.15 WriteBytesPerSecond

Bytes written per second.

2.13.16 TransfersPerSecond

Total I/Os per second.

2.13.17 ReadsPerSecond

Read I/Os per second.

2.13.18 WritesPerSecond

Write I/Os per second.

2.13.19 AverageTransferTime

Average time of transfer in seconds.

2.13.20 AverageDiskQueueLength

Average number of queued read/write requests.

2.14 SCX_UnixProcessStatisticalInformation

Each instance of this class provides statistical information about a Unix process. The following instance provides statistics for the `init` process.

```
CSCreationClassName = "SCX_ComputerSystem"
CSName = "scxcore-suse01.scx.com"
OSCreationClassName = "SCX_OperatingSystem"
OSName = "SuSE Distribution"
Handle = "1"
ProcessCreationClassName = "SCX_UnixProcessStatisticalInformation"
Name = "init"
CPUTime = 0
VirtualText = 499712
VirtualData = 233472
VirtualSharedMemory = 40
CpuTimeDeadChildren = 3170331
SystemTimeDeadChildren = 1418717
Caption = "Unix process information"
Description = "Performance statistics for an individual Unix process"
PercentUserTime = 0
PercentPrivilegedTime = 0
UsedMemory = 64
PercentUsedMemory = 8
PagesReadPerSec = 0
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.14.1 Caption

A human-readable caption for this instance.

2.14.2 Description

A human-readable description of instance.

2.14.3 BlockReadsPerSecond

Block reads per second.

2.14.4 BlockWritesPerSecond

Block writes per second.

2.14.5 BlockTransfersPerSecond

Block transfers per second.

2.14.6 PercentUserTime

Percentage of non-idle processor time spent in user mode.

2.14.7 PercentPrivilegedTime

Percentage of non-idle processor time spent in privileged mode.

2.14.8 UsedMemory

Used physical memory in kilobytes.

2.14.9 PercentUsedMemory

Ratio of Resident Set Size to Virtual Memory for process (essentially percentage of process loaded into memory).

2.14.10 PagesReadPerSec

Pages read from disk per second to resolve hard page faults.

2.15 SCX_LanEndpoint

Each instance of this class provides information about an Ethernet endpoint on this computer. Here is an example instance obtained from a Linux system. This instance represents the eth0 endpoint.

```
InstanceID=eth0
Caption=LAN endpoint caption information
Description=LAN Endpoint description information
ElementName=eth0
[Key] Name=eth0
[Key] SystemCreationClassName=SCX_ComputerSystem
[Key] SystemName=lab-nx-02.contosolab.com
```

```
[Key] CreationClassName=SCX_LANEndpoint
MACAddress=00155d84495b
FormattedMACAddress=00-15-5D-84-49-5B
```

The following subsections describe the local properties and methods of this class. See the superclass for a description of inherited features.

2.15.1 Caption

A human-readable caption for this instance.

2.15.2 Description

A human-readable description of instance.

2.15.3 Name

The name of the LAN endpoint.

2.15.4 MACAddress

The MAC address of the LAN endpoint.

2.15.5 FormattedMACAddress

The formatted MAC address of the LAN endpoint.

3 Configuration Files

XPlatProviders uses the following two configuration files.

```
{confdir}/scxlog.conf
{confdir}/scxrunas.conf
```

These are discussed in the sections below.

3.1 scxlog.conf

This configuration file controls the provider logging facility. By default, all provider logging is directed to {logdir}/log/scx.log. The default logging threshold is 'WARNING'. The scxlog.conf file can redirect logging to multiple files and it may control the logging threshold for those files. For example, consider the following file.

```
FILE (
PATH: /opt/xplatproviders/log/log1
MODULE: WARNING
MODULE: scx.core.providers TRACE
)
FILE (
PATH: /opt/xplatproviders/log/log2
MODULE: WARNING
MODULE: scx.core.common TRACE
)
```

This log has two sections. Each section sends logging output to a specific file. The first section directs log output to `/opt/xplatproviders/log/myfile`. TRACE severity log messages are logged for the logging module called `scx.core.providers`. For the 'root' module (everything else), only WARNING severity log messages are logged. Any section may have multiple module lines.

The logging severities are as follows.

- `ERROR` - The system could not perform the task it was supposed to perform. Contact support.
- `WARNING` - Abnormal behavior that could be handled.
- `INFORMATION` - Information that is useful to someone trying to figure out the general state of the application. Example: Successful initialization.
- `TRACE` - Information that is useful to someone trying to follow general program execution flow.
- `HYSTERICAL` - Information that is useful to someone trying to follow very detailed program execution flow. This level will normally only be used for finding and fixing bugs and in those cases only for small modules. Note that `HYSTERICAL` is not inherited by lower levels for a given logging module.
- `SUPPRESS` - It must be possible to suppress messages using a severity threshold that is higher than any log message can have.

The logging modules are listed here.

```
scx
scx.core
scx.core.common
scx.core.common.pal
scx.core.common.pal.os
scx.core.common.pal.os.filepath
scx.core.common.pal.os.filestream
scx.core.common.pal.system
scx.core.common.pal.system.common
scx.core.common.pal.system.common.entityenumeration
scx.core.common.pal.system.common.entityinstance
scx.core.common.pal.system.cpu.cpuenumeration
scx.core.common.pal.system.cpu.cpuinstance
scx.core.common.util
scx.core.common.util.math
scx.core.common.util.stringaid
scx.core.providers
scx.core.providers.cpu
scx.core.providersupport
scx.core.providersupport.cmpibase
```

These are arranged in a hierarchy, so specifying `scx.core.providers` also affects the following modules (of which `scx.core.providers` is a prefix).

```
scx.core.providers
scx.core.providers.cpu
```

```
scx.core.providersupport
scx.core.providersupport.cmpibase
```

3.2 `scxrunas.conf`

This configuration file controls the execution of the following extrinsic methods (described above).

```
SCX_OperatingSystem.ExecuteCommand()
SCX_OperatingSystem.ExecuteShellCommand()
SCX_OperatingSystem.ExecuteScript()
```

The `SCX_OperatingSystem` provider runs in its own agent process. The process owner is the same as the user that initiated the CIM client request. The three methods above spawn a new process to execute the command or script. This configuration file controls three options that affect this new process. The following `scxrunas.conf` file has the default settings (the settings used if the file is empty or missing).

```
AllowRoot=false
ChRootPath=
CWD=/opt/xplatproviders/run
```

The `AllowRoot` option indicates whether the process may execute as root. By default it cannot. The `ChRootPath`, if non-empty, is the path on which a `chroot` system call is performed immediately after creating the process but before executing the command or script. By default `ChRootPath` is empty, indicating that no `chroot` is performed. The `CWD` option is the directory that the process executes in. By default it is the same as the `{rundir}` configured during installation.