Infront Enterprise Virtual Machine Discovery Management Pack Guide for Operations Manager 2007 R2 and 2012

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Infront Virtual Machine Discovery Management Pack Guide

The Infront Enterprise Virtual Machine Discovery Management Pack for Operations Manager 2007 R2 and 2012 (SCOM) extends SCOM to accurately identify Microsoft and third party virtual machines and important properties of virtual machine guests, including.

- Virtualization platform on which that guest resides
- If virtual machine tools installed and version of the installed tools.
- If dynamic memory* is enabled for the discovered virtual machine
- Discover when a Hyper-V virtual machine has been moved to a new host and update the host property of the virtual machine

The management pack also includes dynamic groups for use in SCOM reporting and tuning activities, including.
- Hyper-V (Windows Server 2008 and Windows Server 2008 R2)
- VMware (ESX 3.x, vSphere 4.x, vSphere 5.x and ESXi)
- Citrix XenServer 5.x
- Physical Servers *(minus cluster virtual server that is included when group in the UI)*
- Cluster Virtual Servers

The platforms tested with this version of the management pack are:
- Hyper-V (Windows Server 2008 and Windows Server 2008 R2)
- VMware (ESX 3.x, vSphere 4.x, vSphere 5.x and ESXi)
- Citrix XenServer 5.x
- Xen Hypervisor (xen.org) 3.x and 4.x

*Of general concern for all platforms is the interpretation of baseline memory usage pattern. This is challenging since it is unknown how much RAM has been handed back to the parent via an inflated balloon driver. The concern is remedied in this management pack through discovery of a dynamic memory flag as a visual indicator to administrators to take into account the parent's performance collection rather than solely the data collected by the client.

Why are these important?

To facilitate dynamic discovery, monitoring and management of the virtualization platforms in your organization, you must first be able to identify these systems, there important characteristic and then organize them into groups for easy administration. The Infront Virtual Machine Discovery MP makes this possible with no manual configuration. Because the memory-related properties of a virtual machine will change frequently when dynamic memory is in use, the potential for config churn** exists if not considered in management pack design. The Infront Virtual Machine Management Pack is designed to safely discover Hyper-V virtual machine guests with dynamic memory enabled.

**Only a concern on Hyper-V 2008 R2 SP1 and later → remedy by setting OS RAM property to -1 of dynamic memory is in use

Document Version

This guide was written based on the *10.0.0.2* version of the Infront Virtual Machine Discovery Management Pack.
Revision History

Release Date	Changes
June 15, 2012	Original release of this guide MP version 10.0.0.2

Getting the Latest Management Pack and Documentation

You can find the Infront Virtual Machine Discovery Management Pack at http://www.Infront.com/downloads

Known Issues in this Release

Event ID 1207 on Cluster Nodes
Virtual machine discovery will trigger Event ID 1207 on nodes in a Windows Cluster as. This is expected behavior and can be safely ignored.

Tested Configurations

The Infront Virtual Machine Discovery Management Pack for Operations Manager 2007 R2 and 2012 supports the following OpsMgr agent configurations

Agent Operating System	Required Components	Supported OS Languages
Windows Server 2000 SP4+	• Operations Manager 2007 R2 or 2012 Agent	Should be functional on all localized Windows versions
Windows Server 2003 RTM+ (32-bit and 64-bit)		
Windows Server 2008 RTM/SP1/R2 (32-bit and 64-bit)		

Table 1 - Management Pack Compatibility

Getting Started

Files in This Management Pack

The Infront Virtual Machine Discovery Management Pack consists of the following files:

File	Version	Description
Infront.Enterprise.Virtual.Machine.Discovery.mp	10.0.0.2	Infront Virtual Machine Discovery MP, containing class definitions and object discoveries.

Required Configuration

The Infront Virtual Machine Discovery Management Pack requires no configuration for full functionality. Simply import the management pack and allow a few hours for the initial object discoveries to run successfully.

Import the Management Pack

Import the management pack file from disk.
For detailed instructions, see "How to Import a Management Pack in Operations Manager 2007 R2" (http://go.microsoft.com/fwlink/?LinkId=142351).

Create a New Management Pack for Customizations

The Infront Virtual Machine Discovery Management Pack is sealed. None of the original settings in the management pack file can be changed. However, customizations, such as overrides or new monitoring objects, may be created by saving them to a different management pack. By default, Operations Manager 2007 R2 and 2012 saves all customizations to the default management pack. **As a best practice, a separate management pack for each sealed management pack that needs customization should be created.**
Creating a new management pack for storing overrides has the following advantages:

- **It simplifies the process of exporting customizations that were created in test and pre-production environments to the production environment**. For example, instead of exporting a default management pack that contains customizations from multiple management packs, just the management pack that contains customizations for a single management pack needs to be exported and re-imported.
- **The original management pack may be deleted without first needing to delete the default management pack.** A management pack that contains customizations is dependent on the original management pack. This dependency requires deleting the management pack with customizations before allowing deleting the original management pack. If all customizations are saved to the default management pack, the default management pack must be deleted, before it is possible to delete an original management pack.
- **It is easier to track and update customizations to individual management packs.**

Security Considerations

The Infront Virtual Machine Discovery Management Pack has not been tested in low privilege scenarios.

Required Privileges and Run As Profile

There are no Run As Profiles associated with this management pack.

Enabling or Disabling Discovery

All object discoveries are enabled by default. You can safely disable platform-specific object discoveries for any virtualization platform not present in your environment. Simply use an override to set the Enabled property to **false** for each discovery that pertains to that virtualization platform.

Root (Seed) Discovery

This is the only discovery that will be running on all Windows agents.
- Discover if Windows Computer is Virtual Machine (Infront)

The version-specific object discoveries in this management pack (shown here) are:

Hyper-V (Windows Server 2008 RTM/SP1/R2)
- Discover if Windows Computer is Virtual Machine (Infront)
- Discovers local properties of a virtual baseboard on Hyper-V
- Discovers Hyper-V Integration Services Details
- Discovery Operating System Properties (Hyper-V Dynamic Memory Safe)

VMware (ESX or vSphere)
- Discovers local properties of a virtual baseboard on VMware
- Discovers VMware Tools Details

Xen (Open Source **or** Citrix XenServer**)**
- Discovers local properties of a virtual baseboard on Xen
- Discovers Xen Tools Details

> **Note:** For best performance, it is recommended that default discovery intervals should not be modified.

Understanding Management Pack Operations

Objects the Management Pack Discovers (Classes)*

The Infront Virtual Machine Discovery Management Pack discovers the object types listed in the following table. For information about discovering objects, see 'Object Discoveries in Operations Manager 2007 R2' in Operations Manager 2007 R2 and 2012 Help (http://go.microsoft.com/fwlink/?LinkId=108505).

Object Type	Discovered Automatically	Object Properties
Windows Virtual Machine Baseboard - Hyper-V (Infront) Infront.Virtual.Machine.HyperV.Baseboard.Windows	Yes	Display Name PhysicalHostPlatform PhysicalHostNameFullyQualified BaseBoardSerialNumber BaseBoardUUID VirtualMachineIsEnlightened VirtualMachineToolVersion DynamicMemoryEnabled RemoteFXEnabled
Windows Virtual Machine Baseboard - VMware (Infront) Infront.Virtual.Machine.VMware.BaseBoard.WIndows	Yes	Display Name PhysicalHostPlatform PhysicalHostNameFullyQualified BaseBoardSerialNumber BaseBoardUUID VirtualMachineIsEnlightened VirtualMachineToolVersion DynamicMemoryEnabled
Windows Virtual Machine Baseboard - Xen (Infront) Infront.Virtual.Machine.Xen.BaseBoard.Windows	Yes	Display Name PhysicalHostPlatform PhysicalHostNameFullyQualified BaseBoardSerialNumber BaseBoardUUID VirtualMachineIsEnlightened VirtualMachineToolVersion DynamicMemoryEnabled

Table 2 – Object Types

Computer and Instance Groups*

The Infront Virtual Machine Discovery Management Pack contains the following groups, which can be useful in tuning and reporting activities.
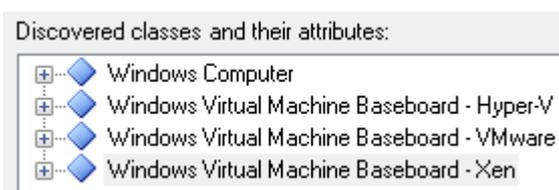
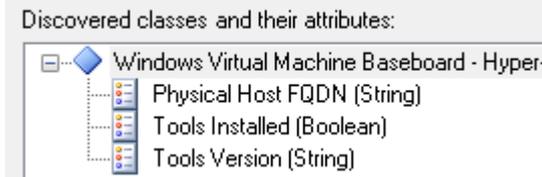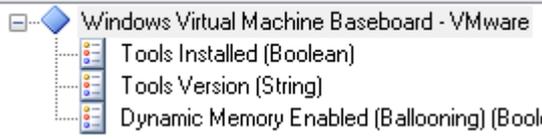| Object Type	Description
All Windows Physical Machines (Infront)	Contains all instances of the Windows Computer class where IsVirtualMachine = false
All Windows Virtual Machines (Infront)	Contains all instances of the Windows Computer class where IsVirtualMachine = true
All Windows Virtual Machines on Hyper-V (Infront)	Contains all instances of the Windows Computer class where IsVirtualMachine = true and are hosted on a Hyper-V server
All Windows Virtual Machines on VMware (Infront)	Contains all instances of the Windows Computer class where IsVirtualMachine = true and are hosted on a VMware server
All Windows Virtual Machines on Xen (Infront)	Contains all instances of the Windows Computer class where IsVirtualMachine = true and are hosted on a (Citrix) XEN Server
All Windows Cluster Virtual Servers (Infront)	Contains virtual nodes within a cluster, which may incorrectly appear as a physical server under normal circumstances.

The (Infront) moniker is included in class and group names to clearly identify the source of the group or class to ensure they are not confused with those provided by other Microsoft or third party management packs.

Table 3 - Group Names and Descriptions

Discovery Rules in the Management Pack

The Infront Virtual Machine Discovery Management Pack contains the following object discoveries to discover the object types defined in the management pack. The table below includes a list of object discoveries from the management pack.

Target	Discovery Rule Name / Description	Default setting
Windows Computer	Discovered classes and their attributes: ⊞ ◆ Windows Computer ⊞ ◆ Windows Virtual Machine Baseboard - Hyper-V ⊞ ◆ Windows Virtual Machine Baseboard - VMware ⊞ ◆ Windows Virtual Machine Baseboard - Xen **Discover if Windows Computer is a Virtual Machine (Infront)** *Script-based discovery which sets the IsVirtualMachine property to TRUE for all Microsoft, VMware, Xen and VirtualBox virtual machines running a Windows operating system. Sets IsVirtulMachine = FALSE for physical machines. Also discovers a virtual motherboard oject hosted on the computer. This allows building groups of virtual machines based on their virtualization technology.*	Enabled
Virtual Machine Baseboard - Hyper-V	**Discover properties of a Hyper-V virtual baseboard (Infront)**	

Target	Discovery Rule Name / Description	Default setting

	This is the base discovery of Hyper-V specific virtual machine properties.
	
	Discovered classes and their attributes:
	⊟ ◇ Windows Virtual Machine Baseboard - Hyper-V
	    Serial Number (String)
	    UUID (String)	
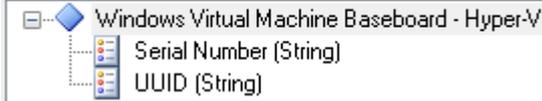
Virtual Machine Baseboard - Hyper-V	**Discover Hyper-V Integration Services details (Infront)**
	Script based discovery that checks if Hyper-V integration Services are installed and optionally discovers the parent host
	Discovered classes and their attributes:
	⊟ ◇ Windows Virtual Machine Baseboard - Hyper-V
	    Physical Host FQDN (String)
	    Tools Installed (Boolean)
	    Tools Version (String)
	name.
		Enabled

Virtual Machine Baseboard - Hyper-V	**Discover Windows Operating System Properties (Infront: Hyper-V Dynamic Memory Safe)** *Discover properties on the Operating System type. Works around a potential config churn issue when Hyper-V Dynamic Memory is in use.*	Enabled

Virtual Machine Baseboard - VMware	**Discover properties of Vmware virtual baseboard (Infront)**
	Discovered classes and their attributes:
	⊟ ◇ Windows Virtual Machine Baseboard - VMware
	    Serial Number (String)
	    UUID (String)
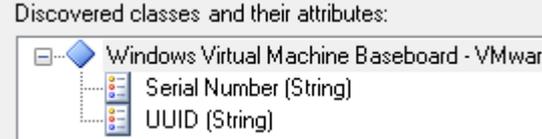	
	This is the base discovery of VMware specific virtual machine properties.
		Enabled

Virtual Machine Baseboard - VMware	**Discover VMware Tools details (Infront)**
	Script based discovery that checks if VMware Tools are
	Discovered classes and their attributes:
	⊟ ◇ Windows Virtual Machine Baseboard - VMware
	    Tools Installed (Boolean)
	    Tools Version (String)
	    Dynamic Memory Enabled (Ballooning) (Boolean)
	installed
		Enabled

Virtual Machine Baseboard - Xen	**Discover properties of Xen virtual baseboard (Infront)**	Enabled

Target	Discovery Rule Name / Description	Default setting
	This is the base discovery of VMware specific virtual machine properties.` Discovered classes and their attributes: Windows Virtual Machine Baseboard - Xen Tools Installed (Boolean) Tools Version (String) Dynamic Memory Enabled (Ballooning) (Boolean)	
Virtual Machine Baseboard - Xen	**Discovers Xen Tools details (Infront)** *Script based discovery that checks if Xen Tools are installed*	Enabled

Table 4 - Object Discoveries

Service Model (Classes and Relationships)

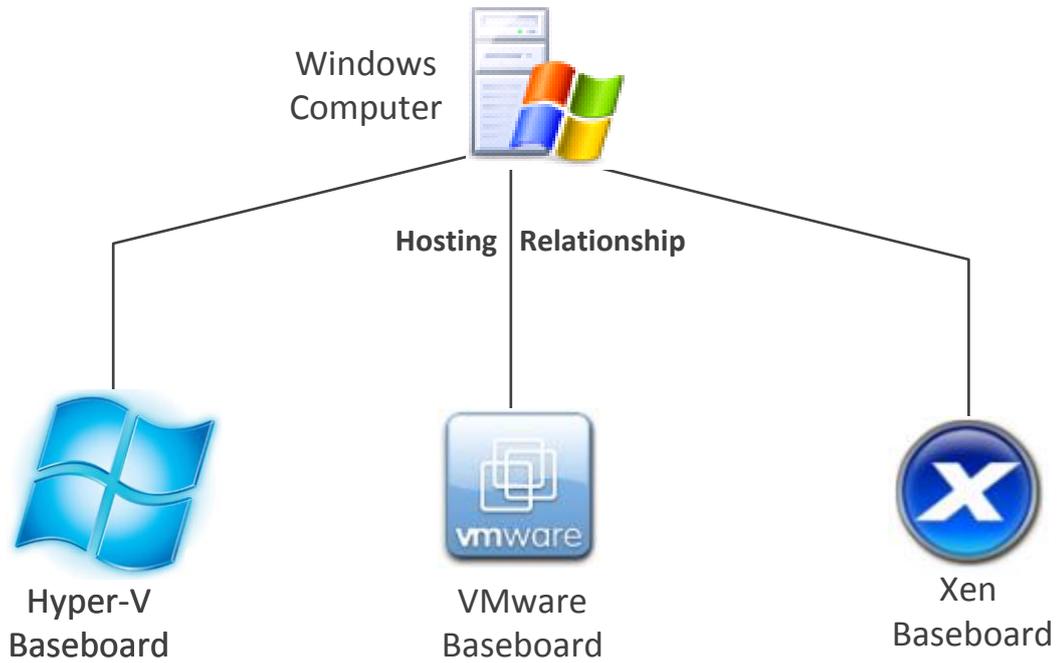The following diagram shows the classes defined in this management pack.

Figure 1 - Class Diagram (Presentation)

Overrides

The following overrides are provided in this management pack to enable the more granular object discovery and to disable default and redundant virtual machine discovery rules.

Name	Description
Disable default IsVirtualMachine = FALSE discovery (Infront)	Disables the default virtual machine discovery provided by Microsoft
Disable default IsVirtualMachine = TRUE discovery (Infront)	Disables the second virtual machine discovery provided by Microsoft
Disable default Windows OS discovery for Hyper-V VMs (Infront)	Disables the default OS properties discovery provided by Microsoft

Health Roll Up

There are no rollup monitors associated with this management pack

Rules, Monitors and Alerts

Rules

There are no tasks associated with this management pack.

Name and Target	Description
Name: Virtual machine parent host change notification (Infront) **Target:** Infront.Virtual.Machine.HyperV.Baseboard.Windows	Notifies on changes to 'PhysicalHostNameFullyQualified' registry value after a move of a VM in a Hyper-V cluster. This is used to quickly identify when a virtual machine guest has been moved to a new host.

Unit Monitors

There are no unit monitors associated with this management pack.

Aggregate Monitors

There are no aggregate rollup monitors associated with this management pack.

Dependency Monitors

There are no dependency rollup monitors associated with this management pack.

Console Views

There are no views associated with this management pack.

Console Tasks

There are no tasks associated with this management pack.

Reports

There are no tasks associated with this management pack.

Appendix A: Scripts

The Infront Virtual Machine Discovery Management Pack uses scripts for discovery of virtual machines and virtual machine properties. Scripts included in the management pack and their default run interval are shown in the table below.

Script	Purpose	Discoveries, Rules and Monitors	Interval
DiscoverVirtualMachines AndBoards.vbs	Script-based discovery which sets the IsVirtualMachine property to TRUE for all Microsoft, VMware, Xen and VirtualBox virtual machines running a Windows operating system. Sets IsVirtulMachine = FALSE for physical machines. Also discovers a virtual motherboard oject hosted on the computer. This allows building groups of virtual machines based on their virtualization technology.	Infront.Virtual.Machine.Discovery.IsVirtualMachine	85100 seconds
DMemSafe_DiscoverWindowsOSProperties.vbs	Discover properties on the Operating System type. Works around a potential config churn issue when Hyper-V Dynamic Memory is in use.	Infront.Virtual.Machine.Discovery.WindowsOSProperties.Discovery	85600 seconds
DiscoverHyperVIntegrationServices.vbs	Script based discovery that checks if Hyper-V integration Services are installed and optionally discovers the parent host name.	Infront.Virtual.Machine.Discovery.HyperVIntegrationServices	86700 seconds
DiscoverVMwareTools.vbs	Script based discovery that checks if VMware Tools are installed	Infront.Virtual.Machine.Discovery.VMwareTools	86700 seconds
DiscoverXenTools.vbs	Script based discovery that checks if Xen Tools are installed	Infront.Virtual.Machine.Discovery.XenTools	86700 seconds
RegistryModificationEvent.vbs	Used to write an event when registry has been modified. will be called after Infront.Virtual.Machine.Discovery.RegistryModification.DataSource identifies a change in the registry indicating a virtual machine guest has been migrated to a new host. It used to write a windows event after a VM migration, which is used to trigger re-discovery so virtual machine host value is accurate	Infront.Virtual.Machine.HyperVIntegrationServices.RegistryModification	Event triggered (when virtual machine is migrated to new host)

Table 5 - Management Pack Scripts