HP Business Service Management

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Running HP BSM and HP BSM Data Collectors in Virtual Environments – Best Practices

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Contents

Chapter 1: Introduction

This document contains basic recommendations and requirements for designing installations for HP BSM and its data collectors on virtual servers. For additional information including up-to-date software version recommendations, see the HP BSM Software Requirements and Support Matrixes document.

Chapter 2: Overview

HP Business Service Management (BSM) is a software suite that acts as a performance dashboard to present a comprehensive view of the network, software, and system operations of a corporate data center. This software can include:

- **Applications Performance Management (APM)** – Software designed to keep your business healthy by monitoring applications across traditional, mobile, virtual, and cloud environments. It provides insight into every transaction, for quick resolution of application issues, and helps reduce costs by giving you a common tool for pre-production and production. APM improves application performance by monitoring end-user experience and aligning IT performance with business goals. Detailed diagnostics and real-time topology-based analytics improve application quality.

- **Operations Management i (OMi)** – Universal event-correlation software for diverse IT domains. Via the HP Run-time Service Model (RTSM), OMi uses IT topology to automatically correlate related events for quicker and easier root-cause identification—essential in today's complex virtualized and cloud environments—and for heightened efficiency of Information Technology Infrastructure Library (ITIL) event and incident management.

- **Network Node Manager i (NNMi)** – Provides powerful capabilities to enable your network operations team to efficiently manage a network of any size, reduce the business risk of downtime, and increase network service levels. NNMi is the one solution for managing fault, availability, performance, and advanced network services for your physical, virtualized, hybrid, and cloud network environments.

HP BSM uses a number of data collectors to aggregate and report on the performance of a data center. Data collectors that are optional to HP BSM, but cannot run without HP BSM include:

- HP Business Process Monitor (BPM)

- HP Real User Monitor (RUM)

- HP Transaction Vision (TV)

- HP BSM Connector

Data collectors that can integrate with HP BSM, but can also run independently include:

- HP SiteScope

- HP Operations Manager (integrates via Operations Manager i)

- HP Diagnostics

HP BSM can be installed on either physical or virtual servers. However, there are some best practices you should adhere to for this software to be successfully installed in a virtual environment. A list of supported virtual environments and a best practices section follow.

Chapter 3: Supported Virtual Environments

The following virtual environments are supported for HP BSM and for each of its data collectors.

- **HP Business Service Management (BSM)**

  - VMware ESX, ESXi

  - Microsoft Hyper-V

- **HP BSM Data Collectors:**

  - **HP Business Process Monitor (BPM)**

    - VMware vSphere Hypervisor (ESXi)

  - **HP Real User Monitor (RUM)**

    - VMware ESX, ESXi

  - **HP Transaction Vision (TV)**

    - VMware ESX, ESXi

  - **HP BSM Connector**

    - VMware ESX, ESXi

    - Microsoft Hyper-V

  - **HP SiteScope**

    - VMware and Hyper-V virtual machines are supported for all supported operating systems.

    - For VMware, VMware tools must be installed on the guest operating system.

  - **HP Operations Manager (OMW/OMU)**

    - VMware ESX

    - VMware ESXi

    - VMware GSX / VMware Server

    - Microsoft Hyper-V

- **HP Operations Agent**

  - HP Integrity Virtual Machines (Integrity VM)

  - Microsoft Hyper-V

  - VMware ESX/ESXi

  - Oracle Solaris Zones

  - KVM/Xen (Extended Virtualized Environment)

  - IBM AIX LPARS/WPARS

- **HP Network Node Manager i (NNMi)**

  - VMware ESX, ESXi

  - Microsoft Hyper-V

- **HP Diagnostics**

  - VMware ESX , ESXi

Chapter 4: Best Practices

HP BSM and each of its data collectors run as high performance software. Typically, each software application is designed to run as the sole or primary software application on a physical server, with immediate and uninterrupted access to all of the servers' physical resources.

HP BSM and many data collectors have, however, been installed successfully and have had some performance testing completed in virtual environments. As corporate data centers move more towards a virtualized environment, it is HP Software's desire to provide for properly designed installations of HP BSM and its data collectors on virtual servers.

HP Business Service Management (BSM) Recommendations

- VMware ESX, ESXi and Microsoft Hyper-V are officially supported.

- Use of a virtual server is strongly discouraged for the BSM Database Server (either Oracle or SQL Server).

- If virtual servers are being used for a production BSM system, HP recommends:

    - Dedicating a physical infrastructure for BSM (no additional virtual instances or applications running)

    - Using the same physical infrastructure for the Data Processing and Gateway Servers

- HP BSM has had success on virtual servers for small- and medium-sized model deployments typical of development, test, and proof of concept (POC) type environments.

- If you already are on virtual servers and are moving to a physical environment, the priority of this move should be:

    a. BSM Database Server

    b. BSM Data Processing Server

    c. BSM Gateway Server(s)

    d. BSM Data Collectors (depending on how highly loaded and your concerns)

HP Business Process Monitor (BPM) Recommendations

- Deployment of BPM on VMware vSphere Hypervisor (ESXi) is officially supported.

- HP cannot guarantee accurate transaction response time metrics from BPM measurements on virtual servers due to the nature of the Hypervisor scheduling and resource allocation. HP recommends following these guidelines when deploying BPM servers in a virtual environment to minimize potential metric inaccuracies:

  - For most scripting protocols (tested using http/web protocols):

    - Using Virtual Machine Hardware Version: Windows 7 VMX (VMX-7) or higher

    - Using two virtual CPU cores, 4GB of RAM, 40GB Disk

    - Limit concurrent running scripts (mdrv.exe processes) to 12

    - Limit total number of scripts (or applications) to 130

    - Limit total number of transactions to 1000 (based on running transactions every 15 minutes)

  - For TruClient protocol (which typically requires more memory and CPU per Vuser):

    - Record the script using TruClient

    - Replay the script using a single Vuser in the controller and record the average CPU and memory consumption of the mdvr.exe process using process CPU usage and process private bytes counters

    - In accordance with your BPM machine's hardware and the memory and CPU consumption of the single Vuser, calculate the number of concurrent Vusers possible per virtual machine. The following example illustrates how to determine your capacity:

      - Assume a single Vuser consumes 80MB of memory and 10% of the CPU on average for a specific Business Process

      - Assume the load generating virtual machine has:

        - Eight virtual CPU cores

        - 4GB of RAM (3GB available for the Vusers)

      - If you limit the CPU utilization to 70%, you can have up to seven Vusers per core (consuming 7*10%=70% CPU utilization).

- With a total of eight CPU cores, you can have up to 8 CPU cores * 7 Vusers per core = 56 Vusers per BPM machine

- There is approximately 3G of memory available — 3GB / 80MB = approximately 37 Vusers per BPM machine.

- Select the lower number of Vusers (37 Vusers per BPM machine).

- From the HP Business Process Monitor Deployment Guide:

  - HP cannot guarantee accurate transaction response times for BPM measurements on VMware. Therefore, HP will not address or solve any support issues regarding transaction response times, unless the same behavior can be reproduced on a physical system.

  - Dedicated (not shared) resources for the BPM VMware instance (CPU cycles, memory, etc.) is mandatory.

  - A Gigabit network should be used.

  - DRS (Distributed Resource Scheduler) are not supported.

  - The total amount of configured resources for all virtualized environments within the same ESX server (for example, memory or CPU) must not exceed the ESX server's physical resources.

  - There is no hardware capacity calculator for determining the number of BPM scripts on a single BPM instance.

  - The key to effective performance benchmarking and service level management is having a consistent and reliable monitoring foundation. Consistency provides a basis for long term trending of metrics, comparison of metrics from one period to another, and the eventual support of contractual obligations associated with service level management. It is acceptable to have the metrics vary from the actual performance as long as they are consistent. If the metrics are not consistent in their variation or relation to the actual business service, then they cannot be used for production monitoring or performance analysis because no appropriate baseline will compensate for the variations. For this reason, response time metrics are not supported on VMware environments.

HP Real User Monitor (RUM) Recommendations

- VMware ESX, and ESXi are officially supported platforms for both the RUM Engine and RUM Probe.

- HP Software has not conducted or documented any performance benchmark testing of HP RUM on any virtual server.

- According to the RUM Installation and Upgrade Guide, for production systems you must install the RUM Engine, Probe, and database on separate physical disks, or on any high performance storage system.

- Read the section *Duplicating Traffic for RUM with VMware* in the RUM Deployment Planning Guide. This section describes the challenges, considerations, and solutions for deploying a RUM Probe on a VMware virtual server. This documentation describes and recommends:

  - Switch alternatives (regular virtual switch (VS) or distributed virtual switch (DVS)

  - Configuring ports and port mirroring

  - Limitations when using network taps and switch port mirroring

  - Limitations and best practices when attempting to monitor traffic when vMotion is enabled

  - The alternative of using Virtual Dedicated Taps

  - The advantages of installing a RUM Probe on the same ESX server as the monitored application

  - The advantages of installing the RUM Server Collector on the same ESX server as the monitored application

  - Security considerations

  - Additional references

HP TransactionVision (TV) Recommendations

- VMware ESX and VMware ESXi are officially supported platforms

- HP Software has not conducted or documented any performance benchmark testing of HP TV on any virtual server.

- Note the following from the TransactionVision Deployment Guide:

  - Sizing guidelines for a regular installation are not applicable

  - Performance of TransactionVision on a virtual machine can be expected to be slower than in a regular installation

  - TransactionVision capacities and performance vary according to the various server resources, such as CPU, memory, and network bandwidth, allocated to TransactionVision components.

  - It is highly recommended that you use dedicated (physical) hardware for the Processing Server and database server in production environments where performance is a concern.

  - It is strongly recommended that you do not run a database server containing TransactionVision

databases on a virtual machine if the database files reside on a virtual disk.

■ Use a Gigabit network card.

BSM Connector Recommendations

- The HP BSM Connector Release Notes and the HP BSM Connector Installation and Upgrade Guide do not list any supported virtual platforms.

- HP Software has not conducted or documented any performance benchmark testing of HP BSM Connector on any virtual server.

- HP will not address or solve any support issues regarding BSM Connector performance unless the same behavior can be reproduced on a physical system.

HP SiteScope Recommendations

All information below is documented in the HP SiteScope Deployment Guide.

- VMware and Hyper-V virtual machines are supported for all supported operating systems.

- For VMware, VMware tools must be installed on the guest operating system.

- For better performance and stability, especially in a highly-loaded SiteScope environment, it is recommended to use physical hardware.

- The following configuration was functionally tested and is considered to be a guideline for production environments. These are not hard-and-fast support limitations, but going beyond this configuration and expectations will increase the risk of problems occurring:

  ■ VMware configuration:

    ○ Four VMware Virtual Machines (VM) on one physical server

    ○ Each VM with 2 CPUs at 2.39GHz, 8GB memory, and 40GB disk space

    ○ Storage used is HP EVA 8400/22G

    ○ Physical server: ESX host is HP BL490c G6 with 8x Intel Xeon x5570 CPU, 72GB RAM with VMware ESX

    ○ VMware tools must be installed

    ○ The resources allocated to the SiteScope VM should not be shared with other VMs.

  ■ SiteScope configuration:

- ○ 1250 remote servers monitored

- ○ 16000 total monitors

- ○ 2000 monitor runs per minute

- ■ Minimum system requirements (not a limitation, but a guideline)

  - ○ Computer/Processor: 4 Intel Xeon physical processors, 2GHz each

  - ○ Operating System: Microsoft Windows

  - ○ Memory (RAM): 4GB

  - ○ Free Hard Disk Space: 20GB

  - ○ Hard Disk Speed: 7200 rpm

  - ○ Network Card: 1 physical gigabit Network Interface Card

  - ○ Other Software: VMware tools must be installed

Note: Monitor capacity and velocity can be significantly impacted by numerous factors including, but not limited to the following: SiteScope server hardware, operating system, patches, third-party software, network configuration and architecture, location of the SiteScope server in relation to the servers being monitored, monitor types and distribution by type, monitor frequency, monitor execution time, Business Service Management integration, and database logging. The published maximums should not be assumed to be possible in every environment.

HP Operations Manager (OMW/ OMU) Recommendations

- VMWare ESX, VMWare ESXi, VMware GSX / VMware Server, Microsoft Hyper-V are supported.

- VMware vMotion is supported for the Operations Manager server.

- Performance throughput (events per second) may be lower on virtual platforms, but Operations Manager will buffer all events in its application buffers. Data is not lost and the application remains stable. Because of this, Operations Manager may be the least risky data collector to deploy on a virtual servers.

- If extensive performance degradation is noticed, it is best practice to increase available virtual resources.

- Refer to your database vendor support site for virtualization specifications applicable to Oracle and Microsoft SQL Server VM environments. Operations Manager is dependent on a database that is validated as supportable by the database vendor.

HP Operations Agent Recommendations

You can use the HP Operations Agent to monitor the health and performance of a virtual system, as well as the physical system that hosts the virtual system. The HP Operations Agent supports the following virtualization technologies:

- **HP Integrity Virtual Machines (Integrity VM):** The Operations Agent can be installed on the VM Hosts and on individual Virtual machines (guests). When you install the HP Operations agent on the VM Host, other than the System-wide performance, application, transaction, and resource usage data, it also collects performance and resource data for individual guest operating systems.

- **Microsoft Hyper-V:** The Operations Agent can be installed on both the root and child partitions. From the root partition, the HP Operations Agent can also collect the details of different logical (guest) systems available on the Hyper-V system.

- **KVM/Xen:** In a KVM or Xen environment, you can install the HP Operations Agent on the host systems. The HP Operations Agent uses the libvirt library in the host machines to collect the metrics related to the guest machines. Memory metrics on KVM using libvirt version 0.8.0 or lower show missing value or <Not applicable>. The HP Operations Agent can also be installed on the guest machines running on the host systems.

- **VMware ESX/ESXi:** The HP Operations agent cannot be installed on the ESX/ESXi Host. VMware tools must be installed on the guest operating system for accurate metric values.

- **AIX Logical Partitions (LPAR) and Workload Partitions (WPAR):** The Operations Agent can be installed on individual LPAR/WPAR, You can also install the HP Operations agent on an AIX LPAR to collect performance data about other LPARs running on the same AIX frame.

- **Solaris Zones:** On the global zone, the HP Operations agent can log resource utilization data by individual zones. You can also run HP Operations Agent inside non-global zones.

See the latest HP Operations Agent Concepts Guide for more information. See the Support Matrices for Operations Center products to check the versions of the virtualization technologies supported.

HP Network Node Manager i (NNMi) Recommendations

All information below is documented in the HP Network Node Manager i Software System and Device Support Matrix.

- VMware ESX Server and ESXi

  - Virtual environment must meet the x86-64 or AMD64 hardware requirements listed in the HP Network Node Manager i Software System and Device Support Matrix

  - Bridged network environment is required. NAT network environments are not supported.

  - VMware vmotion (for DRS and DPM) of the NNMi management server is supported

- Microsoft Hyper-V

  - Host OS: Windows Server

  - Guest OS: Any of the Windows operating systems listed in the Windows section of the HP Network Node Manager i Software System and Device Support Matrix.

  - Only supported for Medium Tier environments or lower

For deploying NNMi in a very large tier, see Deploying NNMi in a "Very Large" Tier VMWare ESXi Linux Environment.

HP Diagnostics Recommendations

- VMware ESX and ESXi are officially supported on each server as specified in the Diagnostics Server Support Matrix.

- System requirements for virtual server deployments are identical to system requirements on physical server deployments and are specified in the Diagnostics Release Notes.

- Instructions for configuring a Diagnostics Collector for the collection of data on VMware nodes are specified in the Diagnostics Server Installation and Administration Guide.

- Additional requirements for Time Synchronization of Diagnostics Java Probes running on VMware are specified in the Diagnostics Server Installation and Administration Guide.

- Diagnostics Java Probes running on VMware do not work on every operating system. A list of operating systems is available in the 'Works in VMware' column in the Diagnostics Java Agent document.

- Additional requirements for Time Synchronization of Diagnostics .NET Probes running on VMware are specified in the Diagnostics Server Installation and Administration Guide.

Chapter 5: Key Concerns

Many information technology organizations work in a business environment that is not able to provide special considerations for running specialized, high performance software in a virtual environment. This type of deployment environment is characterized with the following traits:

- The deployment of virtual servers and the applications running on these servers is uniform across the enterprise. No exceptions can be made to this policy.

- All resources must be shared across large physical servers. An administration team may allocate more initial resources to specific virtual instances or may prioritize specific virtual instances (required use of VMware Distributed Resource Scheduler across the enterprise), but all resources are shared across the physical server. Dedicated resources are not possible.

- No physical resources can be dedicated to a specific virtual instance or software application.

- All virtual servers must be able to be dynamically moved to a different virtual machine on the same physical server or on a different physical server while applications are running (use of vMotion on the VMware platform is required for all instances).

- All virtual servers must be able to be dynamically failed over to a different virtual machine on the same physical server or on a different physical server while the applications are running (use of VMware failover clusters is required for all instances).

- Communication between the team that administers the software application and the team that administers the virtual infrastructure is limited. Virtual administrators are unaware of any special considerations that need to be made for HP BSM.

If HP BSM and its data collectors are to be installed in a virtual environment, flexibility and special consideration is key. Data centers which do not have a way to provide this flexibility or are not able to utilize virtual platforms that are officially supported by HP are better served to install HP BSM and each of its data collectors on dedicated, physical servers.

Data centers that are setting up production, enterprise-sized monitoring infrastructures using HP BSM and its data collectors are better served by installing HP BSM on dedicated, physical servers.

Chapter 6: Conclusion

HP BSM and its data collectors can be installed on either physical or virtual servers. There are, however some best practices that need to be adhered to if this software is going to be successfully installed in a virtual environment. Users of HP BSM and its data collectors should review this document carefully and adhere to its information. Remember that performance of HP BSM and each of its data collectors installed on virtual servers may be significantly lower than deployments on physical servers.

The best practices listed above for HP BSM and the data collectors you are using may be difficult or impossible to adhere to in your environment. If this is the case, we recommend using physical servers for HP BSM and any of the data collectors that present adherence challenges.

For high performance, highly loaded production HP BSM systems, physical servers are recommended for the HP BSM servers to ensure peak performance at all times and to reduce risk.

For high performance, highly loaded BSM data collectors, it is imperative to review the support policies and best practices for the data collector. A thorough review of the support policies and best practices for each utilized data collector will provide guidance and help customers decide whether a physical or virtual system is appropriate.

For high performance, high loaded database servers (for either BSM or its data collectors), it is generally not best practice to use a virtual server to host a database. Check with your database vendor for their support policies and performance implications.

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