# HP Smart Plug-in for DB2 Databases

for the UNIX, Linux and Windows operating systems

Software Version: 4.00

# Concepts and Troubleshooting Guide

Manufacturing Part Number: n/a Document Release Date: January 2014 Software Release Date: January 2014



# Legal Notices

#### Warranty

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

The information contained herein is subject to change without notice.

#### **Restricted Rights Legend**

Confidential computer software. Valid license from HP required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

#### **Copyright Notices**

 $\ensuremath{\mathbb{C}}$  Copyright 2001-2014 by NiCE IT Management Solutions GmbH, Germany. All rights reserved.

Reproduction, adaptation, or translation of this document without prior written permission is prohibited, except as allowed under the copyright laws.

#### **Trademark Notices**

Microsoft®, Windows®, and Windows NT® are U.S. registered trademarks of Microsoft Corporation.

UNIX® is a registered trademark of The Open Group.

IBM® and DB2® are registered trademarks of IBM Corporation. Instruction texts contained in certain monitor policies have been, in part or in whole, reprinted by permission from International Business Machines Corporation.

All other product names are the property of their respective trademark or service mark holders and are hereby acknowledged.

# **Documentation Updates**

The title page of this document contains the following identifying information:

- Software Version number, which indicates the software version.
- Document Release Date, which changes each time the document is updated.
- Software Release Date, which indicates the release date of this version of the software.

To check for recent updates or to verify that you are using the most recent edition of a document, go to:

#### http://h20230.www2.hp.com/selfsolve/manuals

This site requires that you register for an HP Passport and sign in. To register for an HP Passport ID, go to:

#### http://h20229.www2.hp.com/passport-registration.html

Or click the New users - please register link on the HP Passport login page.

You will also receive updated or new editions if you subscribe to the appropriate product support service. Contact your HP sales representative for details.

# Support

Visit the HP Software Support web site at:

#### www.hp.com/go/hpsoftwaresupport

This web site provides contact information and details about the products, services, and support that HP Software offers.

HP Software online support provides customer self-solve capabilities. It provides a fast and efficient way to access interactive technical support tools needed to manage your business. As a valued support customer, you can benefit by using the support web site to:

- Search for knowledge documents of interest
- Submit and track support cases and enhancement requests
- Download software patches
- Manage support contracts
- Look up HP support contacts
- Review information about available services
- Enter into discussions with other software customers
- Research and register for software training

Most of the support areas require that you register as an HP Passport user and sign in. Many also require an active support contract. To register for an HP Passport ID, go to:

#### http://h20229.www2.hp.com/passport-registration.html

To find more information about support access levels, go to:

#### http://h20230.www2.hp.com/new\_access\_levels.jsp

# Contents

1	Introduction	8
2	Overview	11
	What is DB2 UDB?	11
	What are HP Operations Manager and Smart Plug-ins?	11
	What is the DB2SPI?	12
	DB2SPI Integrations into HP Operations	13
3	Concepts and Architecture	14
	Overview	15
	ATOP Communication Layer	16
	Architecture ATOP Server on the Display Station	17 18
	ATOP Server on the Operations Manager	18
	ATOP Client on the Managed Node (DB2 Server)	19
	Firewall considerations	
	DB2SPI in the HP OM GUI	19
	DB2SPI Node Groups	21
	DB2SPI Tools	21
	DB2SPI User Profiles (User Roles)	
	DB2SPI Policies	
	DB2SP1 Internal Architecture	
	DB2 Entities	
	Monitoring Log Flies	
	Performance Data Collection	
	Service Management with HP OM	

4	Files and Directories	
	Installed File Locations on the Operations Manager Management Server	49
	Installed File Locations on the DB2 Servers	50
	Configuration Files	52
	DB2SPI Runtime License File	55
	Log Files	55
	Metric Storage on Managed Nodes	56
5	Troubleshooting	57
	Troubleshooting Checklist	57
	DB2SPI Installation and Components	
	Troublesheeting Installation on HP UV	50
	DB9SPI Usaga	
	DD2011 Usage	
	DB2SPI Configuration Issues	
	DB2SPI Process Monitoring Issues	61
	No Messages from DB2 Log Files	61
	Unknown Messages for Switch-User Events	61
	Message about Missing MeasureWare	62
	No Messages from Metric Monitoring	62
	Intermittent Connection Errors when collecting Data	63
	"Incomplete Snapshot" Messages appear in the Browser	63
	"Missing Keyword" Messages appear in the Browser	63
	Error Reported when Forwarding Data to DDFLOG	64
	Service Tree Update does not happen	64
	Application Windows do not pop up	65
	Tracing	66
	Tracing Section in the SPI Configuration File	66
	Trace Configuration File	68
	Configuring the Trace Area	68
	DB2SPI Trace Files	71
	Tracing Other Scripts	72
	Self-Management of the DB2SPI	73
	DB2SPI Log Files	73

	DB2SPI File Size Monitoring DB2SPI Trace Control	7474
	Processes, Services and Scripts	74
	ATOP Services	78
6	Appendix A: Monitored DB2 Processes	79
7	Appendix B: DSI2DDF Decision Tree	81
	Is CODA Installed?	82
	Nocoda.opt exists	82
	Nocoda.opt does not exist	83

# 1 Introduction

# Audience

This document is meant for the HP Operations Manager Administrator and Operators that are responsible for DB2 monitoring, its configuration and troubleshooting.

# Prerequisites

The reader should be familiar with the HP Operations Manager product as well as have some understanding of general troubleshooting, the affected operating systems as well as DB2 concepts.

# **Related Documents**

This section illustrates what information is available for the NiCE DB2SPI. Most of them are delivered together with the NiCE DB2SPI. On HP Operations Manager for UNIX/Linux systems you may find them at /opt/OV/doc/C/db2spi/.

All Guides may also be downloaded from the NiCE Customer Portal *www.nice.de/login.html*.

The following manuals come with the DB2SPI:

• Installation Guide

Explains installation and removal of the DB2SPI in HP Operations Manager environments (management server and managed nodes).

• Administrator's Guide

Explains the basic configuration, deployment and administrative tasks to keep the SPI up and running successfully in the management environment. • Operator's Guide

Explains the tasks and applications for the HP OM operator that is responsible for DB2 server monitoring.

Concepts and Troubleshooting Guide

Explains the architecture and components of the DB2SPI, the files and directories used and provides sample scenarios for efficient troubleshooting.

• Reference Guide

Explains the performance data collected, the rules they depend on and the collection characteristics.

Release Notes

Gives the most recent information about the product and is updated with every patch released.

In addition to the documentation for the DB2SPI, related HP Software products also provide a comprehensive set of manuals, which aim to assist you in using the products and improving your understanding of the underlying concepts.

# **Print History**

The manual printing date and part number indicate its current edition. The printing date will change when a new edition is printed. Minor changes may be made at reprint without changing the printing date. The manual part number will change when extensive changes are made.

Manual updates may be issued between editions to correct errors or document product changes. To ensure that you receive the updated or new editions, you should subscribe to the appropriate product support service. See your HP sales representative for details:

First edition: June 2001

Second edition (Release A.01.10): March 2002

Third edition (Release A.01.20): December 2002

Fourth edition (Release A.02.00 / B.02.00): October 2003

Fifth edition (Release A.02.05 / B:02.05): January 2004, reprint March 2004

Sixth edition (Release A.02.08 / B.02.08): June 2004

Seventh edition (Release B.02.10): March 2005 Eighth edition (Release A.03.00): December 2005 Release A/B.03.20: November 2006 / January 2007 Release B.03.30: September 2007 Release 03.50: March 2008 Release 03.51 / 03.61: September 2008 Release 03.80: December 2009 Release 04.00: January 2014

.]

# 2 Overview

This section describes what the DB2SPI is, what it may do, and how you may use it to improve the management of your DB2 environment. This section covers the following topics:

- What is DB2 UDB?
- What are HP Operations Manager and Smart Plug-ins?
- What is the DB2SPI?

## What is DB2 UDB?

DB2 Universal Database (DB2 UDB) is a powerful relational database management system (RDBMS) from IBM. It is available on a number of different platforms, ranging from Windows, Linux to various UNIX platforms.

Scalability of DB2 for LUW platforms is provided by a range of different editions whose names reflect the product's scope and scale, for example, "Express", "Workgroup" and "Enterprise" Edition.

DB2 is also available for distributed DB2 environments. These setups are only supported by the "Enterprise Server Edition with Database Partition Feature". The Database Partitioning Feature allows load and data distribution across a large number of physical and logical processing units.

## What are HP Operations Manager and Smart Plug-ins?

HP Operations Manager (HP OM) is the market leading event processing system for IT management. It provides a wealth of functionality to collect operational statuses from various platforms in the network, saving and processing them at a central instance.

Smart Plug-ins (SPIs) are extensions of the HP Operations Manager that add application specific monitoring capabilities to the HP OM platform. This enhances the generic platform with very detailed information. There are about 40 different SPIs available, ranging from databases via middleware up to applications. HP OM is a smart event collection and processing engine, which may act as the endpoint in pure operations management setups, but also as an entry point towards higher management levels like service or business management.

SPIs may benefit from this integration capability in an equivalent way, thus making the application monitoring an integral part of the IT management at all levels.

## What is the DB2SPI?

The DB2SPI is designed to simplify the management and monitoring of DB2 databases by integrating specific DB2 components into HP Operations Manager.

The integration of these two products allows you to use the powerful problemmanagement features of HP OM to manage and monitor the DB2 environment from one central location.

The DB2SPI provides the following high-level features:

- Monitoring of DB2 log files that relate to serious or critical issues in the DB2 environment
- Monitoring DB2 processes and proper alerting if essential processes are discovered to have died or run in excessive numbers
- Integrating DB2 applications into the HP OM GUI (DB2 administration capabilities)
- Collecting a large amount of performance data at various detail levels
- Threshold monitoring of selected performance data
- Definition and management of multiple DB2 instances and databases
- Integration of DB2 instances and databases into the HP Software Service Navigator (HP OM for UNIX or Linux) resp. the integrated service view (HP OM for Windows), thus treating them as services
- Graphing of collected performance data with HP Performance Manager Software
- Service reports are provided with the HP Reporter Software integration, enabling comprehensive reporting of the DB2 system status
- DB2SPI 04.00 is "OMi ready", i.e., the events can be forwarded to the OMi integration platform where additional event and status correlations may be executed

## **DB2SPI Integrations into HP Operations**

The DB2SPI consists of various components that are installed or distributed in the managed environment:

- HP Operations Manager intrinsic components, for example policies
- Perl scripts, database access libraries and binary programs on the management server and the managed nodes
- A common communication interface for application interaction (ATOP, Application Tunnel for **OP**erations) on the management server, the managed nodes, HP OM for UNIX or Linux Java display stations and HP OM for Windows management consoles.
- Reports are provided for the HP Reporter to enable efficient service reporting of performance data and database availability. Note, that the HP Performance Agent (PA, formerly known as MWA) or the embedded performance agent (CODA) is required for that.
- Graphs are provided for the HP Performance Manager to enable the graphical display of current performance data and database availability. Note, that the HP Performance Agent (PA, formerly known as MWA), the embedded performance agent (CODA) or the HP Operations Agent 11 is required for that.



#### Figure 1: Components of the DB2SPI

# 3 Concepts and Architecture

This section describes the general architecture and processing of the DB2SPI. It includes the following areas:

- Processing overview
- Operations Manager configuration items
- Internal architecture
- ATOP communication layer
- DB2 logfile monitoring
- DB2 process monitoring
- DB2 performance monitoring
- Service Management

# Overview

A closer look at the managed node shows the principal components that make up the DB2SPI.

- The **Discovery** determines the DB2 configuration (instances, databases, partitions, table spaces, buffer pools etc.) for the automatic creation of the service tree and UCMDB CI hierarchies. This is a binary program using IBM DB2 libraries.
- The **Monitoring** closely monitors DB2 log files for new events and DB2 processes for their operational status. This is done with Perl scripts in our DB2SPI.
- The **Calculation and Consolidation** collects a lot of detailed performance data from DB2. The data is buffered, transformed to meaningful values and stored for subsequent use by the graphing and reporting tools. Data is obtained from DB2 intrinsic health monitors using IBM DB2 libraries.

Alarming, service tree maintenance and forwarding to BSM/UCMDB/OMi is achieved via the Operations Agent and the HP Operations Manager.

#### **Figure 2: Technical Architecture**



# **ATOP** Communication Layer

The DB2SPI uses a communication layer of its own for the execution of interactive applications on UNIX, Linux and Windows managed nodes. This layer is called the "Application Tunnel for Operations" (ATOP). It provides input / output functionality across all platforms the DB2SPI may be installed on.

Please note that <u>all</u> platforms may communicate with <u>all</u> platforms – all OM GUIs may start DB2SPI tools on Windows, Linux or UNIX, regardless of the Operations Manager server platform.

### Architecture

Internally, an IP communication channel is created separate from the Operations Manager communication as can be seen in the figure below.

ATOP uses the same IP connection between:

- the Managed Nodes (DB2) and the Operations Manager
- the Operations Manager to the Display Station (Java GUI stations or Management Consoles)

In order to work correct, the configuration has to be consistent between all three types – Operations Manager, Managed Nodes, and Display Stations.

This is achieved automatically when using the default configuration. For more information about changing the configuration of the IP communication channel see section "ATOP Configuration Files"

#### Figure 3: ATOP Architecture underlying DB2SPI



ATOP consists of two modules:

- The **ATOP client** is installed on the managed node when deploying the DB2SPI scripts (instrumentation).
- The **ATOP server** is installed on the HP Operations Manager server automatically with the DB2SPI package.
- The **ATOP server** needs to be installed on the Display Station as well if not working directly on the OM server itself.

### ATOP Server on the Display Station

#### Java GUI

In the case of using the **Java GUI of OM for UNIX/Linux** a separate installation of the ATOP Server is necessary. For the installation of the ATOP Server see the relevant section of the "DB2SPI Install Guide".

For many Windows platforms it will start automatically and run in the background. For Windows Vista, Windows 7 or Windows 8 as well as UNIX however, the ATOP Server needs to be started manually and may be kept running in the background. The executable is located in "<OvInstallDir>/bin/DB2SPI" and is called "atopsrv".

#### Terminal Server Usage / Remote Desktop

Although ATOP does not support Terminal Services in general, it may be used under the right circumstances.

A separate whitepaper describes how to open a remote session on the OM for Windows server that will pass on all windows opened on the OM for Windows server including ATOP windows. The main issue is that remote sessions will pass on most windows but not ATOP windows. To get ATOP windows it is necessary to open a **console session** using the "/console" parameter with the call of the Remote Desktop client on the Connecting Windows client.

Please refer to that document, which can be found on the NiCE Customer Portal at *www.nice.de/login.html*.

#### ATOP on the OM for Windows Console

ATOP server is automatically set up as a Windows® service on the management console when the DB2SPI\_console package is being installed. This means, that the DB2SPI tools can be executed from the OM for Windows console on the management console.

#### ATOP Server on the Operations Manager

The ATOP server is installed on the HP Operations Manager server automatically with the DB2SPI package.

### ATOP Client on the Managed Node (DB2 Server)

The ATOP client is installed on the managed node when deploying the DB2SPI scripts (instrumentation). No consideration is necessary here.

#### **Firewall considerations**

If there is a firewall between the Operations Manager, Managed Nodes, and Display Stations, the communication ports used by ATOP need to be open.

This might be done by one of the following:

- opening the ATOP default ports on the firewall
- configuring ATOP to use a port that is already open

In this case, the server and client ports have to be consistent between all three types of servers (Operations Manager, Managed Nodes, Display Station).

For more information about changing the configuration of the IP communication channel see the following section.

### **ATOP Configuration Files**

The configuration values are stored in the configuration files atop.cfg on the managed nodes and atopsrv.cfg on the management server.

The file atopsrv.cfg is found in the directories

OM for UNIX or Linux: /opt/OV/atop/bin

OM for Windows: %OvInstallDir%\bin\DB2SPI

on the management server.

For deployment to the managed nodes, copies of atop.cfg are kept in all supported platform-specific directories for the managed nodes, hence

OM for UNIX or Linux: /var/opt/OV/share/databases/OpC/mgd\_node/customer/DB2S PI/Instrumentation

HP OM for Windows:

 $OvSharedDir\New DB2SPI$ 

on the management server.

On Microsoft Windows display stations running the Java GUI (related to HP OM for UNIX or Linux), or OM for Windows management consoles, the file can be found in

```
\Program Files\HP OpenView\bin\DB2SPI
```

Note: Whenever changes need to be made to the ATOP configuration file, especially regarding the port information, this must be re-distributed to the Managed Nodes and Display Stations.

#### Default Settings and their Modification

The default configuration of ATOP consists of the following settings:

There is one important field, the ATOP\_SERVERPORT, which acts as the key for all successful communication between the managed nodes and the display stations. This port must be enabled in the IP network connecting the systems.

If the predefined port 55551 should not be suitable for your environment, please change the configuration on the management server and make sure to distribute it to all nodes in the management domain (managed nodes using ATOP, Java GUI display stations, and OM for Windows consoles) as described next.

A simple way to achieve this is the Perl script db2s\_atopcfg-pl, as explained in section the DB2SPI Installation Guide.

#### A Note on Strange Characters

Sometimes strange characters may be shown in ATOP windows, especially when executing tools on UNIX systems. This is not a defect, just some terminal test sequences (tset, ttytype etc.) that are launched when sessions are switched and the user profile requests such action. The following sections describe in detail how the different monitoring areas work and interact with each other.

# DB2SPI in the HP OM GUI

### **DB2SPI** Node Groups

During the installation of the DB2SPI software, the DB2SPI adds the node groups listed in Table 1 to the Operations Manager GUI.

Table	1:	DB2SPI	Node	Groups
-------	----	--------	------	--------

Node Group	Description	
DB2-UNIX	For DB2 servers running on supported UNIX platforms	
DB2-WINDOWS	For DB2 servers running on supported Windows platforms	

Note, that the DB2SPI automatically assigns the appropriate policy groups to the DB2SPI operating system specific node groups. Consequently, it is not necessary to perform any additional steps to configure DB2 servers apart from adding the DB2 managed nodes to the appropriate, operating-system-specific node groups.

### **DB2SPI** Tools

During the installation of the DB2SPI software, the DB2SPI adds the tools as shown in the next few figures.

Note, that most of these interactive tools are executed in separate windows on the user's display station by making use of either Operations Managerintrinsic methods or the DB2SPI-intrinsic windowing system (ATOP).

The ATOP server needs to be running to execute the interactive tools. For more information on ATOP, refer to the ATOP section of this guide and the DB2SPI Install Guide.

On top level, just two tool groups are added that allow a distinction between administrative (DB2SPI Admin) and operational (DB2) tools.

All tools may be executed on any platform for any DB2 server.

#### **DB2SPI** Admin Tools

The DB2SPI Admin Tools tool group looks as follows in OM for Windows:

Figure 4:	DB2SPI	Admin	Tools	Group
-----------	--------	-------	-------	-------

Name 🛆	Description
🕎 DB2SPI Maintenance	DB2SPI Maintenance
👫 Config Delete	Erase settings on selected node
👫 Config Setup	Initializes settings on selected node
👖 Datastore Delete	Delete the metric stores
👖 Datastore Setup	Set up the metric stores
🏋 DB2SPI Disable	Disables monitoring capability of the DB2SPI
👫 DB2SPI Enable	Enables the monitoring capability of the DB2SPI
👫 DB2SPI Test	Tests the DB2SPI operation and returns database status
👖 Discovery Filter	This tool allows the maintanance of DB2SPI's discovery filter. The
👫 Discovery Trigger	This tool triggers the discovery of new DB2 elements and sets $\ensuremath{nev}$
👫 Entity Filter	Define the list of entities to be monitored.
👫 License Add	Install new DB2SPI licenses
👫 License Check	Check the DB2SPI licenses for managed nodes
👫 License List	List all DB2SPI licenses added on the MgmtSvr
👫 OPCMON Disable	Disables metric forwarding to OVO via opcmon
👫 OPCMON Enable	Enables the metric forwarding to OVO via opcmon
👖 PerfRep Disable	Disables the forwarding of metric data to performance agents
👫 PerfRep Enable	Enables the forwarding of metric data to performance agents
🟋 Snapshot Disable	Stops the DB2 snapshots from being created
👫 Snapshot Enable	Starts the DB2 snapshots to be created

The embedded "DB2SPI Maintenance" group provides a set of administrative tools described in the DB2SPI Administrators Guide.

#### DB2 Tools

The DB2 Tools tool group shows the tools that are accessible to the DB2 operator and appear as follows:

#### Figure 5: DB2 Tools Tool Group

I II phow phabelloc phow shapelloc data tot a selected database

The embedded "DB2 Management" group provides a large set of interactive, administrative tools described in the DB2SPI Operator Guide.

Table 2 lists all tools that are available for managed nodes.

Tool Group	ΤοοΙ	Description
DB2 Tools	ASCII Report	Select an area and create drill-down report for metrics of this area Executes the db2 utility on the managed node to enter commands interactively Displays the DB2 manager configuration data
	DB2 CLP	Execute the db2 utility on the managed node to enter commands interactively Displays the DB2 manager configuration data
	Instance List	List all managed DB2 instances and databases present on the DB2 server and their monitoring status
	Instance Start	Start a DB2 instance
	Instance Stop	Stop a DB2 instance
	Replication Status	Check and report the status of DB2 replication
	Show DB Config	Display configuration of a selectable DB2 instance / database)
	Show Mgr Config	Display configuration of the DB2 manager
	Show Snapshot	Show metric data for a selectable instance / database
	DB2 Management	Interactive tools that allow administrative tasks on instances and databases
DB2SPI Admin	Config Setup	Define the instances that need to be managed
	Config Delete	Remove the instance definition file
	Datastore Delete	Delete the metric stores
	Datastore Setup	Set up the metric stores
	DB2SPI Disable	Stop all monitoring of DB2 on the selected node
	DB2SPI Enable	Start all monitoring of DB2 on the selected node

## Table 2: DB2SPI Tool Groups for managed nodes

Tool Group	ΤοοΙ	Description
	Discovery Filter	Maintain the DB2SPI's instance scope: The instance scope defines those DB2 instances are visible to DB2SPI.
	Entity Filter	Define DB2 object exclusion lists for all managed objects
	DB2SPI Test	Test the operation of DB2SPI by collecting the database status metric and showing all database status as an xml file
	License Check	Check the DB2SPI license for the managed node
	PerfRep Disable	Stop forwarding metric data to HP PA/CODA agent
	PerfRep Enable	Start forwarding metric data to HP PA/CODA agent
	OPCMON Disable	Stop forwarding metric data to Operations Manager agent
	OPCMON Enable	Start forwarding metric data to Operations Manager agent
	Snapshot Disable	Stop DB2 snapshot creation
	Snapshot Enable	Start DB2 snapshot creation
DB2SPI Maintenance	Export DB2SPI Config	Export the DB2SPI configuration to an XML file
	Import DB2SPI Config	Import the DB2SPI configuration from an XML file
	Rebind DB2SPI	Rebind the DB2SPI package to the DB2 databases
	Self-Healing Info DB2 Server	Collect data on the selected node for support calls
	ServiceTree Update	Enforce immediate DB2 service discovery
	Show DB2SPI log	Show the DB2SPI log file
	Show DB2SPI Version	Show the DB2SPI version string
	Trace Definition	Define tracing of DB2SPI processes (use only for troubleshooting)

In Table 3 the tools are listed that are executed on the Operations Manager management server.

Tool Group	ТооІ	Description
DB2 Tools	ServiceTree Assign	Assign the DB2 service tree to yourself (for OM for UNIX or Linux only)
DB2SPI Admin	License Add	Add DB2SPI licenses to the Operations Manager configuration (no deployment yet)
	License List	List all DB2SPI licenses added on the management server
	Self-Healing Info OVO Server	Collect data on the management server for support calls

Table 3: DB2SPI Tools executable on Operations Manager server

Note, that all these tools are executed in separate windows on the user's display station by making use of either Operations Manager-intrinsic methods or the DB2SPI-intrinsic windowing system (ATOP).

### DB2SPI User Profiles (User Roles)

During the installation of the DB2SPI software, the DB2SPI adds the user profiles listed in Table 4 to the Operations Manager GUI for HP OM for UNIX/Linux.

The same functionality is provided by User Roles in HO PM for Windows. DB2SPI for OM for Windows contains corresponding User Roles as listed in Table 4.

User-Profile / User Roles	Description
DB2 Operator (Profile)	Operations Manager user profile/ user role for the DB2SPI user
DB2SPI Admin (Profile)	Operations Manager user profile/ user role for the DB2SPI administrator

 Table 4: DB2SPI User Profiles / Roles

The responsibility matrix for the DB2SPI user profiles automatically assigns the message group DB2 and all the DB2 node groups to the DB2 Operator Profile user profile.

The DB2 Operator profile is responsible for:

- a all messages with Message Group attribute "DB2" from any node contained in the node groups "DB2-UNIX" and "DB2-WINDOWS"
- b and, in addition, may execute any tool in the Tool Group "DB2"

Similarly, the message group DB2SPI and all the DB2 node groups are assigned by default to the DB2SPI Admin Profile user profile.

The DB2SPI Admin profile is responsible for:

- a the entire DB2 Operator profile
- b all messages with Message Group attribute "DB2SPI" from any node contained in the node groups "DB2-UNIX" and "DB2-WINDOWS"
- c and, in addition, may execute any tool in the Tool Group "DB2SPI" (and, implicitly, those of the group DB2 since the DB2 operator profile is embedded)

### **DB2SPI** Policies

During the installation of the DB2SPI software, the DB2SPI adds the policies and policy groups shown in Table 5 to the Operations Manager GUI.

Top Policy Group	Policy Group	Description
SPI for DB2	DB2SPI Core	Basic management components for all DB2 servers (UNIX and Windows)
	DB2SPI Detail	FCM
		HADR
		SQL Queries
		Table space + Buffer pools
	DB2SPI Logfiles	LogFiles for DB2 on UNIX
		LogFiles for DB2 on Windows
	DB2SPI MgmtSvr	This group contains the policy needed for monitoring the DB2SPI log file on the management server.

Table 5: DB2SPI Policy Groups

The DB2SPI Core policy group is automatically assigned to both DB2SPI node groups when installing the DB2SPI.

The platform-specific DB2SPI LogFiles policy groups are automatically assigned to the platform-specific node groups.

Note that the management server itself does not need to be a DB2SPI managed node, but it should receive the log file policy for the DB2SPI log on the management server.

# **DB2SPI Internal Architecture**

The following picture gives a closer look at the DB2SPI modules and configuration data:



#### Figure 6: DB2SPI Internal Architecture

#### **DB2** Entities

#### Discovery and Configuration of DB2 Entities

A DB2 environment may consist of a number of individual DB2 instances, each being the home for a set of databases. The databases themselves may be spread across multiple (physical) systems in partitioned database environments (DPF). The DB2SPI allows you to monitor any number of DB2 instances in a DB2 environment.

In the initial configuration of the DB2SPI the user defines which DB2 instances and databases shall be monitored. This is a two-step process.

In the first step, a basic discovery of the instances installed is performed and results in a list, the **instance scope**. The instance scope is displayed and visibility for the next step may be turned off or on for each instance:

```
The following DB2 instances are in DB2SPI's instance scope:
1. db2inst1 (-)
2. db2inst2 (+)
```

Note that the visibility of db2inst1 is switched off while the visibility of db2inst2 is on.

The instance scope may later be changed with the help of the tool **Discovery** Filter.

In the second step (continue with DB2SPI setup) visible instances may be selected to be monitored. Those instances will now be discovered fully with its databases, partitions, table spaces and buffer pools.

Within each monitored instance, all databases are managed by default, but databases may also be excluded individually in the next step of the configuration.

If a database is managed, all its underlying objects (partitions, table spaces, buffer pools, and processes) are also monitored by default. This may be changed later on with the help of the tool **Entity filter**.

During the initial configuration information about the location of the DB2SPI diagnostic and notification log files is collected as well.

#### **Discovery Filter Tool**

Since the DB2SPI must support multiple DB2 versions of the same or different levels installed on the same system the "Discovery Filter" is applied before the actual discovery is executed.

This filter scans the standard DB2 installation paths on the system to determine the different instances available. It also provides the DB2SPI administrator to enable or disable instances for the drilldown DB2SPI discovery process.

If instances are not found during the "Discovery Filter" scan, they may be added manually.

The "Discovery Filter" is executed during the initial configuration, but may also be started at any time using the "Discovery Filter" Tool from the DB2SPI Admin toolbox, for example after installing a new DB2 version.

#### Automatic DB2 Discovery and Monitoring State

For convenience, new databases belonging to monitored instances are discovered automatically, and dropped databases disappear from the monitoring scope.

The DB2SPI discovery performing this automatic configuration adaptation is executed at regular intervals. By default it runs once an hour and analyzes all instances, which are enabled for discovery by the "Discovery Filter" Tool.

Also the service views in the Operator Console are updated. New partitions, table spaces or buffer pools are discovered and monitored automatically, if their hosting database is monitored at the time of discovery.

The following table shows the settings applied to the various DB2 entities that might be detected during the discovery. A "+" means the entity is monitored, a "-" means not monitored.

Activity (Setup, Discovery or Filter Definition)	Instance	Database	Table spaces, Buffer pools, Processes
Initial Configuration	User decides + / –	User decides + / –	Same as database
Automatic Discovery			
New instance discovered	<ul> <li>not monitored by default</li> </ul>	<ul> <li>not monitored by default</li> </ul>	<ul> <li>not monitored</li> <li>by default</li> </ul>
New database discovered		+ /, as the instance	+ /, as the instance

#### Table 6: Monitoring state for discovered objects

New table space discovered		+ / – as the database
New buffer pool discovered		+ / – as the database
New partition discovered		+ / – as the database
Manual configuration		
"Discovery Filter" tool	Add instance and switch + / –	

#### **Entity Filter tool**

The "Entity Filter" tool allows changing the monitoring status of every DB2 object (entity) in the configuration, from high level DB2 **databases** down to the level of table spaces, buffer pools and processes. It also allows to configure the log file paths for monitoring.

Only those instances are shown that have been set to "visible" in the "Discovery Filter" tool.

**Instances** are configured using the "Discovery Filter" tool, either by the automatic detection cycle or by manual execution of the tool. Instances which are switched to not visible ("–") by this tool will not be visible in the "Entity Filter" and may not be set to "monitored".

#### **New Instances**

DB2SPI permanently checks the configuration of DB2 for changes after the initial setup has been performed. This applies only to visible instances!

New instances that might have been created must be "registered" for the DB2SPI as follows:

- To make them "visible" to the DB2SPI, first start the "**Discovery Filter**" tool and declare this new instance to be "visible" for deeper discovery.
- Wait about one hour to allow the DB2SPI performing a deeper discovery of all databases, partitions etc. of this new instance (not monitored yet, however!)

This might be limited to databases if discovery needs user and password for a database to connect to it for deeper discovery. To add user and password, see "Entity Filter" tool in the DB2SPI Administrator's Guide.

To speed things up, the "**Discovery Trigger**" tool may be used instead of waiting.

• Enable their monitoring via the "Entity Filter" tool described in the DB2SPI Administrator's Guide.

#### New Databases

Newly discovered databases belonging to already known instances are monitored by default. This makes it very comfortable to add or remove databases without additional configuration effort of the DB2SPI. If discovery needs user and password for a database to connect to it for deeper discovery, add user and password using the Entity Filter tool. See "Entity Filter" tool in the DB2SPI Administrator's Guide.

If you want to disable some databases from being monitored you may run the "**Entity Filter**" tool from the DB2SPI Admin tool group at any time to define exclusion lists of databases.

The instance configuration and all the subentities and their monitoring state also determine the elements shown or omitted in the DB2 branch of the ServiceNavigator display described in "Service Management with HP OM" later on.

#### **Resulting Data**

The DB2SPI monitors all instance-specific log files and processes separately and provides detailed information about the instances and databases where problems have been detected.

Individual databases belonging to a monitored instance may be omitted from monitoring via the "Entity Filter", for example, to ignore test databases or others under development.

Note that the DB2SPI collects performance data for all DB2 instances monitored on a given DB2 server and for all databases making up these instances, if they are configured to be monitored. This might generate a significant amount of data.

For example, the DB2SPI collects data for more than 130 metrics from each enabled database in each individual DB2 instance. The data collected is kept in the HP Software Performance Agent (PA) or embedded performance component (CODA) database for a defined period before they are removed automatically. The global usage of PA / CODA for DB2 data collection may be switched on and off with a configuration parameter or from the Operations Manager application desktop.

### **Monitoring Log Files**

#### DB2 Log Files

Various log files are used by DB2 to detect status changes, problems or other information. With the help of DB2SPI, important entries are identified from the logs and forwarded as events to the Operations Manager message browser.

#### Administration Log File

With DB2 8.1 IBM introduced a new log file in UNIX environments holding important events, the administration log file. It exists once per instance.

In Windows environments the administration log is included in the Windows event log.

In these administration log files or administration event logs, DB2 event entries are identified and forwarded to the Operations Manager message browser.

For DB2 servers on Windows, this is done with the help of the "DB2\_opcmsg" Message Interface while for DB2 servers running on UNIX/Linux use the policy "DB2\_admlog\_unix".

Messages from the admin log will be indicated out-of-the-box as "normal". To increase the benefit of this monitoring capabilities we recommend to adapt the policies mentioned above. Important entries should be signaled with a higher severity while less important or informational messages may be suppressed.

#### **Replication Log Files**

Replication log files are written rapidly by DB2, and they are monitored for status hints if replication monitoring has been activated during the "Config Setup".

#### Log File Size Monitoring

Alerts are created when log files exceed a predefined size. By default, these are rather strict (200000 Bytes). The following log files are monitored in regard to their file size:

- Administrative log file
- Audit log file
- DB2SPI's own log file
- DB2SPI's own trace files
- Diagnostic log file

To set the thresholds more lenient and to set different thresholds for the various log and trace files, adapt the rules of the policy "DB2SPI\_fsize".

#### DB2SPI's own Log File

There is a log file for internal logging of the DB2SPI, db2s\_spi.log. Important messages are created from this log file by the policy "DB2SPI\_ownlog1" which should be deployed to any monitored DB2 server.

#### The DB2SPI Process Monitor

All work performed by a running DB2 UDB is done by specialized DB2 processes. If important processes fail to run properly, the system as a whole might be affected. The result may be that users cannot log on to the database, database logs are not written or that massive performance bottlenecks occur, lowering the effectiveness of all involved database applications and database users.

The elaborate ability to recognize if specific DB2 UDB processes are running in the proper multiplicity at a certain point in time is implemented in DB2SPI's Process Monitoring Application.

Some processes defined for monitoring are optional and their monitoring may be switched off in the "**Entity Filter**" tool. Also the minimum or maximum number of processes of each type may be set there. Set the section "Configuration" for detailed information.

#### About DB2 Processes

DB2 processes may be classified by numerous characteristics. Some are started within the system startup framework, others show up when an instance is started and others may appear only when a database becomes active. The multiplicity is often dependent to the number of instances and databases on a DB2 server and to several Database and Database Manager Configuration settings. Detailed information on DB2 and its processes may be found in the IBM DB2 UDB Information Center.

Please note that on Windows platforms most DB2 processes are implemented as threads and therefore not visible by their names in common system information tools.

#### Note:

A good DB2SPI Process Monitor configuration that produces meaningful results is only achieved by knowing the characteristics of the observed DB2 UDB system.

#### Configuration

The configuration of the monitoring objects for the DB2SPI Process Monitor is done via the DB2SPI admin tool "**Entity Filter**".

From the DB2SPI Process Monitoring application's point of view a DB2 process is represented as a monitored object with several attributes. These attributes influence the way the monitor handles the object to perform its monitoring task. The attributes are:

• Process name

The actual DB2 process name as may be seen in various system tool's output, e.g. the "ps" command on UN\*X. Please note that with the current version of DB2SPI a process identified by its name may appear only once in a single instance/database/partition context.

• Management State

A monitoring object may either be managed or unmanaged. Use this flag to control if a configured entity should be processed by the DB2SPI Process Monitor.

• Affiliation

This parameter may be used to associate a process to different scopes on a DB2 server. The available affiliations are:

— no special affiliation

By setting this parameter the DB2SPI Process Monitor checks only for the configured process name without regarding any other constraints that might be present

— affiliated to the idle pool

If this parameter is set the monitor only counts the processes given in Process Name if it is currently assigned to the idle pool

affiliated to a specific database

Configuring a process to be monitored with the database affiliation setting causes the DB2SPI Process Monitor to only count it if it is assigned to the database the configuration is done for.

• Minimum number of process instances running

If the actual number of running instances of a process is lower than the value specified, the DB2SPI Process Monitor generates an alarm by sending an Operations Manager message.

Set this parameter to '-1' if the minimum number is not relevant for the monitoring object.

• Maximum number of process instances running

If the DB2SPI Process Monitor determines there are more process instances of a configured process running than the configured maximum, it will trigger an alarm by sending an Operations Manager message.

As with the minimum number, enter '-1' here to tell the monitor to not consider this parameter.

If both maximum and minimum thresholds are configured, an alert will be triggered if the counted number of process instances either drops below the minimum or exceeds the maximum threshold configured.

An initial and automatic configuration is set during the initial setup of DB2SPI on the target managed node. Whenever the scheduled automatic DB2SPI Discovery encounters new databases on the target managed node, this default configuration is also applied. Additional processes are configured by default if the Database Partitioning Feature (DPF) is in use on the target managed node. Table 11 in Appendix A shows this default configuration.

#### Scheduling and Alarming Messages

The scheduling of the planned monitor runs is set via the DB2SPI schedule policy '**DB2\_procmon'**.

Additionally, the DB2SPI policy "**DB2\_opcmsg**" may be edited to achieve an even more explicit alarming. The DB2SPI Process Monitor application is able to check the number of configured DB2 processes for a specific database on a specific database partition in a specific instance's context.

It implements three different metrics that result in three different alert types if the rules defined in its configuration are violated:

- Number of running DB2 process instances running is higher than the configured maximum
- Number of running DB2 process instances running is lower than the configured minimum
- Number of running DB2 process instances running is out of configured boundaries

Take a look at the messages "DB2 processes too high", "DB2 processes too low" and "DB2 processes out of bounds" as a template to set your own rules.

#### **Configuration Examples**

In the following section four detailed examples of DB2SPI Process Monitor monitoring object configurations are given. These examples are only applicable on UN\*X managed nodes due to the DB2 process architecture on Windows platforms.

• Example 1

The main DB2 system engine 'db2sysc' is intended to run once per active instance. The DB2SPI Process Monitor should check if the process is present and if there is only one instance running. The attributes of the monitoring object would be as follows:

Process Name	db2sysc
Mgmt. State	managed
Affiliation	none
Minimum	1
Maximum	1

• Example 2

On all DB2 servers all database requests are handled via designated agent processes 'db2agent'. These are dynamically instantiated by the DB2 system engine and assigned to a specific database the request is made for. To avoid the computational overhead that results in the instantiation itself, the engine keeps some agents in an idle state (idle pool affiliation) for faster processing. The relevant DB2 Database Manager Configuration parameters that influence this behavior are 'MAXAGENTS', 'NUM\_POOLAGENTS' and 'NUM\_INITAGENTS'. A meaningful configuration for the DB2SPI Process Monitor would be to send an alarm if the number of agents in the idle pool drop below a specified number, e.g. 20. The attributes of the monitoring object would be as follows :

Process Name	db2agent
Mgmt. State	managed
Affiliation	Idle pool
Minimum	20
Maximum	-1

• Example 3

The DB2 local deadlock detector process 'db2dlock' scans the lock lists of a specific database for deadlock situations (database affiliation). The DB2SPI Process Monitor checks that there is exactly one process instance running for the configuration context's database when this configuration is applied.

Process Name	db2dlock
Mgmt. State	managed
Affiliation	database
Minimum	1
---------	---
Maximum	1

• Example 4

The DB2 panic agent 'db2panic' handles urgent requests if agent limits have been reached on any of the database's partitions. It is present in multipartitioned database environments only. In inactive state it is affiliated to the idle pool, when it becomes active it is assigned to the database where the resource bottleneck occurred. Therefore a meaningful configuration would cause the DB2SPI Process Monitor to generate an alarm if the panic agent is not assigned to the idle pool.

Process Name	db2panic
Mgmt. State	managed
Affiliation	Idle pool
Minimum	1
Maximum	1

#### Services Interaction

With the current release of DB2SPI the messages generated by the DB2SPI Process Monitor affect the service tree at the partition level.

I.e., we do not show all processes monitored in the service tree, but alarms raised for processes cause a status (color) change of the respective database partition.

## Performance Data Collection

This chapter tells how performance data is collected and processed by the DB2SPI and how the general information flow may be affected by the DB2SPI Administrator.

Performance data may be collected in either HP PA or CODA (embedded performance collection) data stores.

The chapter "Format of the Data Store" describes how these defaults may be changed.

In the following, metric storage is described regardless of the format, unless specifics must be considered.

#### General Data Flow

The DB2SPI is able to collect a big amount of performance data that are supplied by DB2. The collection is done as shown in the following picture:

#### Figure 7: Data flow for DB2 metric data



The data flow may be described as follows:

#### Collection of Data from DB2

DB2 may be configured by their internal "snapshot monitor switches" to collect performance information in some internal tables.

The data is obtained by internal requests directly from those tables by function calls ("embedded SQL", ESQL). This provides direct access to the data source with maximum throughput.

#### **Data Processing**

Further on the raw data is processed:

- Raw data is requested for the calculation of derived information, like percentages, ratios etc. which are the DB2SPI metrics.
- Some data object monitor elements are requested by the DB2SPI and are stored as delivered.

Both kinds of metrics are retrieved from DB2 by proper filtering and calculation.

- The metric values may be forwarded to HP PA or CODA to dedicated performance stores.
- The Operations Manager agent performs threshold monitoring and provides an alert if a metric is outside the valid range.
- The data stores may be viewed with HP PM and with HP Reporter, if that software is available.

#### Affecting the Metric Data Processing

There are three switches that affect processing of the performance data:

• DB2 Snapshot creation may be enabled and disabled with the "Snapshot Enable" resp. "Snapshot Disable" tools.

If disabled for an instance, all databases won't provide any performance data. This minimizes the system load, but also inhibits any kind of monitoring performance, availability etc.

Enabling or disabling the DB2 snapshots requires a restart of the instance, and this functionality is NOT provided within the tool, because it is a pretty invasive step.

The restart needs to be done by a database administrator in a separate step to avoid unnecessary restarts of instances. DB2SPI provides tools to start or stop a whole instance as well as a tool to show the DB2 database manager configuration.

• Forwarding metric data to the Operations Manager agent may be enabled or disabled with the "OPCMON Enable" / "OPCMON Disable" tools.

This is useful if the Operations Manager monitor agent should not be used for threshold monitoring and alarming, but performance data should be collected for HP Performance Manager and / or HP Reporter.

• Forwarding metric data to the HP PA/CODA may be enabled or disabled by another pair of tools ("PerfRep Enable / Disable").

This is useful if HP PA/CODA is not available or not installed at all on the DB2 server.

When executing "PerfRep Disable", threshold monitoring still is active and alerts will be sent by the Operations Manager monitor agent. Performance data is collected by DB2 itself when snapshot collection is enabled. Since this gathering requires resources, this will often be disabled on DB2 servers while they are not managed systems.

The installation of the DB2SPI does not change any settings of the DB2 internal collection. Therefore, before the DB2SPI can monitor any DB2 metrics, you have to ensure that the collection of DB2 internal performance data is started on the DB2 server.

#### Naming Scheme for Metrics

The naming scheme for the metrics and associated Operations Manager monitor policies is consistent and as self-explaining as possible.

Example: DB2\_20503\_DB\_Status

Each metric consists of a prefix (DB2\_), a five-digit number (e.g. 20503) and the meaning in abbreviated form.

The abbreviation of the meaning is required due to HP PA restrictions – no more than 20 characters are allowed to identify metrics in HP PA, and some of them are already reserved for the product key.

The five digits number contain information about the level (1. digit) and the metric area (2. and 3. digit) as well as of a serial number (4. and 5. digit).

In the example we have database level metric (2) from the Database metric area (05) with the serial number 03.

For the first three digit numbers the following lists apply:

Table	7:	Metric	name	key	component
-------	----	--------	------	-----	-----------

1 <sup>st</sup> Digit	Level	2 <sup>nd</sup> 3 <sup>rd</sup> digit	Metric Area
1	Instance	01	Database Manger / Instance
2	Database	05	Database
3	Application	06	HADR
4	FCM / Partition	10	Table spaces
5	Table space	11	Buffer pool
6	Buffer pool	20	aggregated Database
		21	aggregated Buffer pool
		22	Application / FCM connection
		23	FCM buffers and channels
		24	FCM connection
		25	Application memory
		26	DB, DBM memory
		27	SQL statements
		28	aggregated table space

## Metric Collection and Resource Consumption

The metric collection may be somewhat "expensive" in terms of requiring system resources. Thus, it might desirable to adjust the metric collection to limit the impact upon the system if possible.

The following points should act as a guideline where to look into and what to consider, but there is no "best solution", as it always depends on the needs and desires of each customer as well as the DB2 environment.

In order to reduce the workload from the managed node required for metric processing, you might:

- Read Reference Guide carefully and decide about the importance of each metric for your environment
- Call less metrics with db2s\_dbmon.pl script in the out-of-the-box scheduling policies

- Adapt schedule of the out-of-the-box scheduling policies to call some metric collection less often
- Forward less metrics to opemon (add NO\_OVO for those metrics in db2s\_metrics.cfg)
- Store less metrics in the data stores (add NO\_PERF for those metrics in db2s\_metrics.cfg)

#### Note

Make sure that nothing else is changed in the db2s\_metrics.cfg, because it may corrupt the syntax.

Backup your changes to the db2s\_metrics.cfg, because the file will be overwritten when re-deploying the instrumentation from the OM management server.

#### Amount of Data Collected

In DB2SPI nearly 150 different values are gathered directly or derived from original DB2 performance monitor data. A comprehensive list may be found in the DB2SPI Reference Guide.

To store the data collected, the following disk space must be available (assuming one year of data):

•	Reporter HP PA data:	59 Mb per node	
---	----------------------	----------------	--

- Graphing HP PA data: 5 Mb per database
- Drilldown data 50 Mb per instance + database + table space

#### Note

These are maximum values of disk space to the storage.

The time frame may be set to either 1 years or 6,3 or 1 months of data when setting up the performance data stores.

Example:

If you are managing 3 instances with a total of 10 databases and 23 table spaces, you need

59 Mb + 10 \* 4 Mb + 23 \* 47 Mb = 1180 Mb disk space.

This gross amount may only affected by reducing the data collection rate or the time frame for storing, not by removing certain metrics from being collected.

#### Data Store Requirement

DB2SPI uses the DSIDDF tools to store data for HP PA/CODA. They should be deployed from the OM management server as the "SPI Data Collector" instrumentation.

These tools are not installed automatically with the DB2SPI, but should be available when the DB2SPI configuration ("Config Setup") is performed.

If they are not available at that point in time, the setup of the data stores needs to be done separately after the Config Setup has been completed AND the "SPI Data Collector" instrumentation has been deployed. Use the tool "Datastore Setup" to create the performance data stores.

#### **Configuring Data Collection**

Data collection is configured in a three-step approach:

1 Format of the Data Store

This depends on the tools available and applies to all SPIs on the respective managed node. The tools that might be used are HP PA or CODA.

2 Data Collection Schedule

Data is provided by DB2 snapshot monitors at predefined rates between five and 60 minutes. This is done using the scheduled task policies which start the metric data collection (DB2SPI\_Collect\_\*).

3 Data Storing Schedule:

The metric values are forwarded to HP PA/CODA every five minutes by default, regardless of the collection schedule.

This is done using a scheduled task policy which starts the data forwarding (DB2SPI\_PerfLogger).

#### Format of the Data Store

DB2SPI uses the DSIDDF tools to store data for HP PA/CODA/EPC.

These tools contain a predefined logic about default storage formats, depending on the platform and HP Agent version they are just operating:

- With older agents on UNIX systems, HP PA format may be the default data source
- With older agents on Windows systems, CODA format may be the default data source.

• With newer agents, all operating systems apply the embedded performance component (EPC).

These defaults may be overridden by providing a special file, nocoda.opt, in a specific place in conjunction with the existence (installation) of certain tools. See Appendix B for more detailed information.

#### Note that these settings affect all other SPIs as well.

Data Collection Scheduling

Data collection means sending inquiries to DB2 for the managed databases and analyzing the response supplied by DB2.

The DB2SPI provides three default policies for data collection, implemented as schedule policies named:

- DB2SPI\_Collect\_5m
- DB2SPI\_Collect\_30m
- DB2SPI\_Collect\_60m

The desired metrics for each time resolution are specified in the command line of the script called by these schedule policies by their number. These numbers can constitute a list of comma-separated values like this 20533,20535,20537 or ranges like 20503-20508.

Please note that spaces are not allowed in the metrics list.

Example: db2s\_dbmon.pl -metrics 10108,20503-20508,20517,20528-20530,20533,20535

All data is collected every 60 minutes and only a subset every 30 or 5 minutes depending on their importance.

Note that collecting all data poses a noticeable load to your system. That is why only the more important metrics are collected by default.

Use your judgment when collecting more metrics from the DB2SPI Details policy groups.

#### HP PA / CODA Data Forwarding

Data collected from the DB2 are stored temporarily in value files of the DB2SPI itself before these are forwarded to the HP Performance Agent (HP PA) or the embedded collection agent (CODA).

Per default, data is forwarded every five minutes. Data that are collected at lower rates than five minutes are transferred with the latest value available from last collection cycle. The data forwarding to CODA / HP PA is controlled by the HP OM schedule policy "DB2SPI\_PerfLogger".

#### **Configuring Alert Thresholds**

If snapshot taking and metric calculation is enabled, most metrics are sent to the Operations Manager monitoring agent to be checked for threshold violations. See the DB2SPI Reference Guide for the complete list of metrics and their threshold values.

In order to change the thresholds, the respective Operations Manager monitor policy may to be modified and re-distributed to the managed node(s).

A multiplicity of thresholds is supported with the help of "template name spaces", where copies of the policies may be applied with different threshold values, just by adding a prefix. This is described in the DB2SPI Administrator's Guide.

Note, that the Operations Manager platform is NOT able to provide local thresholds that would allow different thresholds to be compared to on different nodes or even instances or databases. If there should be a need for specific thresholds, please request assistance from support.

## Service Management with HP OM

Both OM for UNIX or Linux and OM for Windows provide service management capabilities by tracking status changes of services due to messages collected from the managed nodes. The presentation of the services differs significantly between the two platforms.

Service management capabilities of OM for UNIX or Linux are offered in the Operations Manager Java GUI. The Service Navigator provides a static, flat view to the service tree.

In OM for Windows, service display is a dynamic picture where you may zoom into any area you like.

Both systems, however, act identical on incoming data and can apply the same hierarchic model.

#### **DB2** Service Hierarchy

In this context DB2 services are defined as the databases monitored by the DB2SPI, and these databases are organized in a four-tier hierarchical manner.

## **Table 8: Service Tree Levels**

Level	Meaning	Description
Top Level	DB2	This is the top level hook to access any DB2 service. The icon shown in the service tree is the DB2SPI base icon with the DB2 logo attached.
Level 1	DB2 Server	This level is linked to the DB2 top level service. It contains all managed DB2 servers.
Level 2	Instance	This level is linked to the DB2 Server level. It consists of all instances on the DB2 server.
		The icon shown in the service tree is the DB2SPI base icon with a frame containing some database sets in a grey background.
Level 3	Database	This level is linked to the instance level. For each instance, all managed databases are linked to it. The names of the services are just the database names.
		The icon is the DB2SPI base icon with some symbolic tables on white ground.
Level 4	Partition (Node)	This level is linked to the database level. In DPF environments each database may consist of a set of partitions, spread across many servers.
Level 5	Area	This level shows two areas of interest, buffer pools and table spaces. It has been introduced into the service tree to keep the display manageable by unfolding only of them.
Level 6	Table space, Buffer pool	All table spaces or buffer pools monitored in this branch of the service tree are displayed here.
		Please note that in some cases (e.g. PeopleSoft DB2 databases) this may consist of hundreds of individual icons!

Figure 8 shows the screenshot of the hierarchy for a simple setup.

Figure 8: Typical DB2 service tree



Note, that OM for UNIX / Linux users can see the DB2 service tree only if they are entitled to. This can be achieved by executing the tool "Assign ServiceTree" from the operator's tool group, and this needs to be done only once.

## DB2 Service Functionality of the DB2SPI

The DB2SPI provides the following functionality to achieve DB2 service management:

- service discovery
- automatic update after configuration changes

• enforced update with the tool "ServiceTree Update" from the DB2SPI Maintenance tool group

#### Service Discovery

The DB2SPI automatically determines the service tree on a managed node by analyzing the general configuration file db2s\_instances.cfg for instances, databases and its subordinate elements. This is done automatically every hour on the managed node, but change reports are sent to the management server only if changes have occurred (typically if there are new or missing databases etc.).

Initial discovery takes place when the Config Setup tool has been executed and the DB2SPI policies have been distributed to the managed node and are being started.

#### Enforced Service Tree Update

The tool "ServiceTree Update" is available in the "DB2SPI Maintenance" tool group to enforce synchronization between the configuration of the DB2 server and the service tree visualization.

#### Status Propagation from Messages to Services

Most events detected by the DB2SPI may affect the service tree, i.e., colorize the icons shown there. Different levels may be affected by events:

Instance Level: Events causing the entire instances to be affected directly map into the instance level of the DB2 service tree.

Database Level: Events which are specific for one database map to its respective symbol in the DB2 service tree.

Table space Level:Events which are specific for one table space map toits respective symbol in the DB2 service tree.

Buffer pool Level: Events which are specific for one buffer pool map to its respective symbol in the DB2 service tree.

The Operations Manager message severity for the event directly determines the status of the service.

Also, within the DB2 service tree "most-critical" propagation model is followed; i.e., the most severe status found in the subordinate level determines the color of a service symbol.

#### Note

Events from other applications and even events from DB2SPI self-monitoring do not affect the status (and color) of the node level in the DB2 service tree.

Its color is solely determined by the underlying DB2 instances and their states.

# 4 Files and Directories

# Installed File Locations on the Operations Manager Management Server

The installation of the DB2SPI software copies the required files to the Operations Manager management server. In addition to the standard locations already available on an Operations Manager management server, the following directories are created.

Note, that the management server must be a managed node itself.

On HP-UX and Solaris (OM for UNIX):

/var/opt/OV/atop/log	log and trace files for the communication layer
/opt/OV/atop/bin/	configuration files for the communication layer
/var/opt/OV/share/log/db2spi	log and trace files
/var/opt/OV/share/conf/db2spi	configuration files
/opt/OV/db2spi/bin	script files
/opt/OV/doc/C/db2spi	documentation files

On Windows (OM for Windows):

%OvInstallDir%\bin\DB2SPI\log	log and trace files for the communication layer
%OvInstallDir%\bin\DB2SPI	configuration and software files for the communication layer
%OvShareDir%\tmp\db2spi	temporary storage
%OvShareDir%\log\db2spi %OvShareDir%\log\SPIInstallLogs	log and trace files
%OvShareDir%\shared\conf\DB2SPI	configuration files
%OvInstallDir%\bin\DB2SPI	script files
%OvInstallDir%\help\en	documentation files

# Installed File Locations on the DB2 Servers

Installing and activating the DB2SPI components on the DB2 server (the Operations Manager managed node) establishes the following directories on the Operations Manager managed node.

Note that besides them some files are also kept in the standard "instrumentation" directory.

## On HP-UX:

/var/opt/OV/atop	log and trace files for the communication layer
Instrumentation Directory	configuration files for the communication layer
/var/opt/OV/tmp/db2spi	temporary storage
/var/opt/OV/log/db2spi	log and trace files
/var/opt/OV/db2spi/history	(currently unused)
/var/opt/OV/db2spi/metrics	metric definition files
/var/opt/OV/conf/db2spi	configuration files
/var/opt/OV/bin/instrumenta tion	templates for configuration files and monitor scripts

#### On Solaris:

/var/opt/OV/atop	log and trace files for the communication layer
Instrumentation Directory	configuration files for the communication layer
/var/opt/OV/tmp/db2spi	temporary storage
/var/opt/OV/log/db2spi	log and trace files
/var/opt/OV/db2spi/history	(currently unused)
/var/opt/OV/db2spi/metrics	metric definition files
/var/opt/OV/conf/db2spi	configuration files
/var/opt/OV/bin/instrumenta tion	templates for configuration files and monitor scripts

On AIX:

/var/opt/OV/bin/instrumenta tion	log and trace files for the communication layer
Instrumentation Directory	configuration files for the communication layer
/var/opt/OV/tmp/db2spi	temporary storage
/var/opt/OV/log/db2spi	log and trace files
/var/opt/OV/db2spi/history	(currently unused)
/var/opt/OV/db2spi/metrics	metric definition files
/var/opt/OV/conf/db2spi	configuration files
/var/opt/OV/bin/instrumenta tion	templates for configuration files and monitor scripts

## On Linux:

/var/opt/OV/atop	log and trace files for the communication layer
Instrumentation Directory	configuration files for the communication layer
/var/opt/OV/tmp/db2spi	temporary storage
/var/opt/OV/log/db2spi	log and trace files
/var/opt/OV/db2spi/history	(currently unused)
/var/opt/OV/db2spi/metrics	metric definition files
/var/opt/OV/conf/db2spi	configuration files
/var/opt/OV/bin/instrumenta tion	templates for configuration files and monitor scripts

On Windows:

%OvDataDir%\atop	log and trace files for the communication layer
%OvDataDir%\bin\Instrumentation	configuration files for the communication layer
%OvDataDir%\tmp\db2spi	temporary storage
%OvDataDir%\log\db2spi	log and trace files
%OvDataDir%\db2spi\metrics	metric definition files
%OvDataDir%\conf\db2spi	configuration files
%OvDataDir%\db2spi\history	(currently unused)
%OvDataDir%\bin\Instrumentation	templates for configuration files and monitor scripts

## **Configuration Files**

## ATOP Communication Layer

On the management server the central configuration file is atopsrv.cfg

#### Please see the section "

Files and Directories" to locate the directory containing it on your management server.

This should act as the primary source for all modifications.

For distribution to the managed nodes, equivalent files atop.cfg are kept in all supported platform-specific directories for the managed nodes

```
/var/opt/OV/share/databases/OpC/mgd_node/customer/<...>/
cmds
```

on the management server. After distributing the actions / commands / monitors a copy is kept in the instrumentation directory on the managed node.

On Microsoft Windows based Operations Manager Java display stations, the file may be found in

\Program Files\Hewlett-Packard\NiCE\ATOP

Note: Whenever changes need to be made to the ATOP configuration file, especially regarding the port information, this must be re-distributed to the

## **DB2SPI** Configuration Files

The most important DB2SPI configuration file is installed as part of the DB2SPI instrumentation, distributed and then used on the managed nodes.

It contains the default settings of the DB2SPI configuration:

db2s spi.cfg Default configuration file for DB2SPI operation

After executing "Config Setup", the following files are created in the configuration directory .../conf/db2spi on the managed node:

db2s\_spi.cfg Active image of the default configuration file db2s\_spi.cfg; this copy may be modified to change the default behavior of the DB2SPI on the managed node, like enabling / disabling performance monitoring or switching trace options.

db2s\_instances.cfg This file contains information about the DB2 version and edition present on the managed node and the instances that have been configured during "Config Setup". This file is encrypted.

db2s\_replicpaths.cfg When SQL replication log file monitoring is set up this file is created in the configuration file directory. It contains the paths of the SQL replication log files. The capture log file paths are extracted from the CAPTURE\_PATHS column in the <your\_schema>.IBMSNAP\_CAPPARMS table. The apply logfile paths for each apply qualifier are obtained from the APPLY\_PATHS column in the ASN.IBMSNAP\_APPPARMS. If these values are not set, please ask you DBA to specify the paths with the help of the Replication Center in the corresponding tables and edit the file db2s\_replicpath.cfg\_accordingly.

db2s\_ilist.cfg This file contains information about the visibility of existing DB2 instances on this machine. It is modified by the "Discovery Filter" tool by the user if necessary.

Self-Healing Services Configuration Files

Installation Description File

The installation description file db2s\_install.xml contains all data about the (deployed) version of the DB2SPI on the managed node.

This file is used by the HP Self-Healing Client to find out the products installed on a managed node.

It is located in the instrumentation directory on the managed node.

#### SHS Collector Information File

The SHS collector information file db2s\_shscollin.xml is an XML file which specifies the data to be collected. The data is grouped into "contexts". The context is a label that is used to specify what data is to be collected.

It is located in the instrumentation directory on the managed node.

#### **Registration Files**

There are two registration files, one for Windows nodes and one for UNIX nodes. In the registration file, the "source-name" attribute is the "source name" component of the SPI's application identifier (see section "Implementation details") and the "name" attribute is the "source description" component of the application identifier.

These files are named db2s\_shsreg\_unix.xml and db2s\_shsreg\_win.xml and can be found in the instrumentation directory on the managed node.

## **DB2SPI Service Tree Configuration**

The DB2SPI Service Tree configuration file keeps the former state of the monitored DB2 services: .../conf/db2spi/db2s svctree.cfg.

This file is used to determine the need of updating the service tree on the management server, which is otherwise skipped if no changes have occurred in the managed objects.

It is referenced and possibly updated whenever the DB2SPI service discovery runs, instance configuration or database filtering is executed or when the user requests an update of the service tree.

## Other Configuration Files

Many functions of the DB2SPI are written in a very generic way, and their effective action is determined via configuration files. All these files are also kept in the instrumentation directory of the managed nodes. Their common identifiers are:

- a prefix "db2s\_"
- a postfix ".cfg"

These files must not be modified by the user to assure proper operation of the DB2SPI. The db2\_metrics.cfg might be modified according to the rules of this guide.

If any file should be deleted or get corrupted on the managed node, simply redeploy the instrumentation for a reset.

## DB2SPI Runtime License File

The DB2SPI runtime license file, db2s\_license.dat, is kept in the instrumentation directory. This file contains all runtime licenses in encrypted form the user has installed. It is read by the DB2SPI and must not be modified at any time to preserve DB2SPI operation.

If this file should be deleted or get corrupted on the managed node, simply redeploy the instrumentation for a reset.

#### Note:

With the tool "License Check" you can verify the validity of the runtime licenses on each managed node.

With the tool "License List" you can list all licenses that are installed on the management server.

## Log Files

#### **ATOP Log Files**

The ATOP log file lists extraordinary states and problems that are encountered when the ATOP communication layer executes. ATOP log files may be found on all systems that run components of the ATOP subsystem, i.e., the management server, the managed nodes and the Java GUI display stations.

Please see "

Files and Directories" to locate the directory containing the following logs:

• On the management server (running the ATOP server as an OV service):

atopsrv.log

• On the managed node (running the ATOP client to execute interactive tools):

atop.log

• On Windows based Java GUI display stations (running the ATOP server as a service):

```
\Program Files\Hewlett-
Packard\NiCE\ATOP\Logs\atop server.log
```

#### **DB2SPI** Log File

All important internal states and messages are written to a log file on the managed node: .../log/db2spi/db2s\_spi.log. All configuration events as well as important events during operation are logged to this file.

Many of the entries (but not all) are monitored by the DB2SPI itself, using the policy "DB2\_opcmsg".

Since the Operations Manager logfile monitoring does not provide accurate timing and sequencing in the OM message browser, check this log file to determine all details and the complete history.

## Metric Storage on Managed Nodes

Metric data is stored in several files in the metrics directory as listed in the "Files and Directories" section above.

Please make sure that these files are not modified or deleted in order to guarantee proper operation of the DB2SPI.

# 5 Troubleshooting

This section describes how to troubleshoot the DB2SPI. The information provided is designed to help you find, analyze, and fix problems with the DB2SPI quickly and efficiently. In this section, you will find information about:

- Troubleshooting Checklist
- DB2SPI Installation and Components
- Files and Directories
- DB2SPI Usage
- Tracing
- Tracing
- Processes, Services and Scripts

Problems may occur in different areas, and you should first look at the Troubleshooting Checklist to find out which area is causing the trouble in your environment.

# **Troubleshooting Checklist**

This checklist shall assist you in isolating and identifying the problem. Most often it will help to solve the problem yourself, and if not, gives hints what to collect and prepare when calling support for the product.

What concerns your problem?	Try section
Installation / De-installation	DB2SPI Installation and Components
Initial Configuration (Config Setup)	DB2SPI Configuration Issues
Config Setup aborts	License Issues
ATOP window does not open	Application Windows do not pop up
DB2SPI licensing	License Issues
No license found (error 33)	License Issues
License file corrupt (error 34)	License Issues

Unidentified "su" events in the message browser	Unknown Messages for Switch-User Events
No message from the DB2 logs	No Messages from DB2 Log Files
Message about missing processes	DB2SPI Process Monitoring Issues
No messages from metric monitoring at all	No Messages from Metric Monitoring
Messages show up about "incomplete snapshot	Intermittent Connection Errors when collecting Data
Message about "missing ddflog"	Error Reported when Forwarding Data to DDFLOG
Message about "missing keyword"	"Missing Keyword" Messages appear in the Browser
Message about "missing MeasureWare"	Message about Missing MeasureWare
No Service Tree updates	Service Tree Update does not happen

As a first step, make sure that the base installation of Operations Manager is operating correctly. For more information about basic troubleshooting in HP OM, see the *HP Operations Manager for UNIX Administrator's Reference* resp. *HP Operations Manager for Windows Online Help*.

The DB2SPI provides the following tools, which may be used to find and analyze problems:

Browser Messages indicating start / stop problems encountered

Logging All important steps / events regarding the operation of the DB2SPI itself (configuration, errors encountered etc.) are logged in a log file on the managed node.

TracingUseful information may be collected about each individual step performed during the operation of the DB2SPI.

However, tracing must be switched on explicitly.

## **DB2SPI** Installation and Components

To verify that the installation of the DB2SPI completed successfully on the Operations Manager management server, consult the DB2SPI Install Guide.

Locate the section "Verifying Installation of DB2SPI" for either HP OM for Windows or HP OM for UNIX/Linux.

- 1 Verify the software installation with the platform specific tool ("Add / Remove Programs", swlist, pkginfo or rpm)
- 2 Check that the DB2SPI components listed in the DB2SPI Install Guide have been added to the Operations Manager GUI.

## Troubleshooting Installation on HP-UX

Check the following log files for more specific information relating to installation problems:

- /var/adm/sw/swagent.log
- /var/adm/sw/swinstall.log

Check that the Operations Manager configuration elements are all available in the Operations Manager Administrator GUI. If not, you can check the files:

- opccfgupld.log
- opccfgupld.old

for possible problems during upload. Note, that these files are overwritten by subsequent configuration uploads.

## **DB2SPI Usage**

This section describes the troubleshooting scenarios that you are likely to encounter when using the DB2SPI. Each problem is described in terms of possible symptoms and a likely cause, which is designed to help you pinpoint the problem and solve it as quickly and efficiently as possible.

## **DB2SPI** Configuration Issues

Please also see the sections "License Issues" and "Application Windows do not pop up" for symptoms.

Symptom: In the window of the Config Setup tool an error message (OpC30-913) is shown for opcmsg, adjacent with the text:

"This is a warning only since there is no opcmsg policy yet.

Completion of DB2SPI installation will provide one."

Possible Cause: There is no opcmsg policy on the managed node that could intercept the message generated by the Config Instance tool. This problem is not critical: when installing the DB2SPI later, the appropriate opcmsg policy will be installed automatically.

Action: None required.

## License Issues

#### Error 33 (no valid license)

Symptom: "Config Setup" or any other tool aborts with an "Error 33 (no valid license)".

Tools cannot be started.

Messages in the message browser contain the string "Error 33 (no valid license)".

Possible Cause: The DB2SPI license might have expired (common at the end of the evaluation period) or not installed at all.

Action: The DB2SPI Administrator may check the globally available valid licenses with the "License List" tool. He should rerun the "License Add" tool to provide a valid license and distribute the DB2SPI instrumentation and monitors to the managed nodes again.

#### Error34 (license corrupt)

Symptom: "Config Setup" aborts with an "Error 34 (license corrupt)".

Tools cannot be started.

Messages in the message browser contain the string "Error 34 (license corrupt)".

Possible Cause: Either the file db2s\_license.dat got damaged on the managed node, or an invalid license string has been added with the "License Add" tool, for example an "HP SPI Installation License Key" rather than a "NiCE DB2SPI Runtime License Key".

Action: Step 1: Re-deploy the instrumentation and monitors from the management server.

If that does not solve the problem, try step 2.

Step 2: Delete all occurrences of the db2s\_license.dat file on the management server (from all platform directories in the instrumentation!) and re-run "License Add".

Be sure to add only the license key file(s) supplied by NiCE.

## **DB2SPI Process Monitoring Issues**

Symptom: Many messages appear from process monitoring that are obviously wrong.

Possible Cause:DB2SPI relies on the DB2 edition specification given by the user. Maybe this was not given correctly or the database has been upgraded / reconfigured later on.

Action: Reconfigure the DB2SPI process monitoring with the "Entity Filter" tool.

## No Messages from DB2 Log Files

Symptom: New entries in the DB2 notification log do not generate messages and, as a consequence, no messages appear in the Message Browser window.

Possible Cause: The DB2 database instance specific log file may have been moved after the DB2SPI has been configured

Action: Either provide a link at the old place or adapt the log file configuration file in the DB2SPI configuration directory manually.

## Unknown Messages for Switch-User Events

Symptom: Many messages with "unknown" severity appear in the Message Browser window

Possible Cause: If you have configured the standard syslog policy for HP-UX, or sulog (AIX) on the managed node, each time a DB2SPI process monitoring is to be executed an "su" is performed and logged to the syslog log file. The "su" event is trapped but does not have a severity assigned in the standard policy.

Action: Improve the syslog policy to suppress these messages as explained here:

For HP-UX, add one or more suppress conditions to the syslog (HP-UX) policy with text patterns like:

su : + <\*> root-<InstanceUserName>

For AIX, add a suppress condition to the sulog (AIX) policy with a text pattern like:

SU <\*> + <\*> root-<InstanceUserName>

Note that you need a match for each name an instance user has been set up with on the DB2 servers and their instances to be managed. We recommend you use generic names such as db2inst<n> in order to simplify management.

## Message about Missing MeasureWare

Symptom: The following message appears from time to time in the Message Browser window:

```
"HP PA not installed on <Hostname>. Disabling metric recording"
```

Possible Cause:The MeasureWare agent (PA) is not running on the managed node, but you have configured (standard) performance monitoring with the DB2SPI, which cannot find the PA agent.

Action: Either:

- install PA on the managed node
- specify the use of CODA for the Performance data storage (see Appendix B: DSI2DDF Decision Tree)
- disable forwarding of performance data by running the appropriate "PerfRep Disable" tool from the DB2SPI Admin tool group

## No Messages from Metric Monitoring

Symptom: No Performance messages appear in the Message Browser window

Possible Cause: If you successfully distributed the DB2SPI policies, the performance monitoring scripts are operating, but may be suffering from a lack of data. DB2 provides performance data only if the collection of performance data is enabled.

Action: Run the tool "Snapshot Enable" on the Operations Manager managed node in question and restart the DB2 instance to make sure that the database server has enabled data collection.

## Intermittent Connection Errors when collecting Data

Symptom: Messages show up in the message browser (or in the DB2SPI log file) that indicate problems when connecting to databases

Possible Cause: This may indicate that there are not enough DB2 agent processes available to connect the DB2SPI concurrently with other processes.

Action: You may modify the connection characteristics of the DB2SPI with regards to the number of retries and the rate of attempting. In the configuration file **db2s\_spi.cfg**, you may adjust the following section if needed:

# DB2SPI CONNECT SLEEP: # \_\_\_\_\_ # Wait time between DB2 connection retries in [s] DB2SPI CONNECT SLEEP 2 \_\_\_\_\_ # DB2SPI CONNECT RETRY: # \_\_\_\_\_ maximum number of retries when attempting to # connect to a DB2 database # DB2SPI CONNECT RETRY 5

## "Incomplete Snapshot" Messages appear in the Browser

Symptom: Messages like Incomplete snapshot for <database> appear in the message browser window

Possible Cause: This indicates that the DB2 instance is not configured to collect all performance metrics that were requested.

Action: Run the tool "Snapshot Enable" for the instance in question to make sure that the database server has enabled data collection. For more information, see the DB2SPI Operator's Guide for details. *This Guide is available on the* NiCE Customer Portal at *www.nice.de/login.html*.

## "Missing Keyword" Messages appear in the Browser

Symptom: Messages complaining about missing keywords in the DB2 snapshots appear in the message browser window

Possible Cause: This may happen if DB2 does not provide values for all metrics that were requested. A typical case is the FCM area: If this is not available, but the metrics are requested such messages will appear.

Action: Create a snapshot with the "Show Snapshot" tool and check for the areas covered by DB2. Disable (remove) the respective metrics from the schedule policy.

## Error Reported when Forwarding Data to DDFLOG

Symptom: During data collection an error is reported with "ddflog" keyword.

Possible Cause: The DDFLOG tool may not be installed on the managed node. Action: Just deploy the "DSI2DDF" category in the instrumentation deployment on the OM for the managed node(s) affected.

Possible cause: PA data files may have been deleted or corrupted.

Action: Unfortunately PA cannot recover from lost or corrupted data.

Try to delete and set up the data stores with the DB2SPI admin tools.

The last option is to re-configure the DB2SPI (run "Config Delete" and "Config Setup" in sequence).

## Service Tree Update does not happen

Symptom: There is no update in the service tree although DB2 or DB2SPI configuration has been changed

Possible Cause:The schedule policy for service discovery, DB2SPI\_discover\_svctree, is not enabled or the Message Interface policy db2s\_opcmsg does not work.

Action: Make sure the policies mentioned above are enabled on the managed node.

Run the tool "ServiceTree Update" on the Operations Manager managed node in question to make sure that all configuration files and DB2 itself are checked.

Symptom: Messages with "svctree" in the tool attribute and names of databases in the message text are appearing in the Message Browser window and do not disappear automatically.

Possible Cause:Normally, an automatic action is performed on the management server to process the service tree configuration changes transmitted from the managed nodes.

If they do not get processed, the automatic action (script db2s\_svctree\_mdfy.pl) cannot be executed on the management server or the service engine might not respond.

Action: Make sure that the management server is a managed node. Check that the service engine is running. Check if the node is allowed to execute remote actions on the HPOM Management Server.

## Application Windows do not pop up

## ATOP Server not running

Symptom: When running a DB2SPI tool, no window appears at all although Operations Manager does not report a problem.

Possible Cause: ATOP server is not running on all parts of your environment.

Action: Check that the service engine is running on:

- OM management server
- Display Station (when using the Management Console or Java GUI)

On the OM for UNIX management server, run "ovstatus atop\_server".

On OM for Windows check the "ATOP server service" in the "Services" window of the control panel or the task manager to see whether the atopsrv.exe was started.

On the Display Station check the "ATOP server service" in the "Services" window of the control panel or the task manager to see whether the atopsrv.exe was started manually.

#### **Firewall**

Symptom: When running a DB2SPI tool, no window appears at all although Operations Manager does not report a problem.

Possible Cause: There could be problems with the network connection (ports are blocked at firewalls, ATOP port could be used by any other program).

Action: Check the atop.cfg configuration files as described Firewall considerations and ATOP Configuration Files.

Verify that the same ports are defined on both the managed node and the management server (resp. Java GUI stations) for the communication; check the ATOP configuration files for this.

#### System Load

Symptom: When running a DB2SPI tool, no window appears at all although Operations Manager does not report a problem.

Possible Cause:Problems when starting the tool interface could arise due to resource problems on the managed node or the ATOP Server nodes.

Action: Check all system load.

# Tracing

This section describes how you can use the tracing feature incorporated in the DB2SPI to help you in your troubleshooting. The information written to the trace files is designed to help you pinpoint and solve problems as quickly and efficiently as possible. This section covers the following troubleshooting areas:

Note: Tracing can produce large amounts of data in the trace file, and there is no file-size limitation for this logging. You should therefore use tracing only when necessary and, in addition, make sure that tracing is switched off after you have successfully solved the problems you are using tracing to investigate.

## Tracing Section in the SPI Configuration File

The default configuration file, db2s\_spi.cfg, is transferred during the initial distribution of DB2SPI monitors from the Operations Manager management server to the Operations Manager managed nodes (DB2 servers).

Besides some other flags and settings that are usually affected and modified by proper tools in the DB2SPI Admin tool group, there are four entries that determine the trace behavior:

- DB2SPI\_TRACE\_CONFIG\_FILE
- DB2SPI\_TRACE\_STATUS
- DB2SPI\_TRACE\_PROCESS
- DB2SPI\_TRACE\_PLUS

The following listing shows the default contents of the configuration file, db2s\_spi.cfg.

#### Example 1: Default DB2SPI -Configuration File (trace section only)

```
******
#
# File:
          db2s spi.cfg
# Description: The general configuration file of the DB2SPI
# Package: HP OpenView Operations SMART Plug-In for IBM DB2
#
# Copyright NiCE GmbH, 2000-2013
**********
#
        DB2SPI VERSION:
#
         _____
         Code version of the SPI installed.
#
#
         Note: DO NOT REMOVE OR CHANGE THIS LINE.
#
        IT IS MAINTAINED AUTOMATICALLY DURING UPGRADES.
DB2SPI VERSION 04.00.000
#_____
         DB2SPI TRACE CONFIG FILE:
#
#
         -----
#
         Define the name of the tracing configuration file
#
        for advanced DB2SPI tracing.
#
        Values: <name> Fully qualified file name
#
               OFF Advanced tracing disabled (default)
DB2SPI TRACE CONFIG FILE OFF
#______
#
         DB2SPI TRACE STATUS:
#
         _____
#
         Status of DB2SPI tracing on managed node.
        Values: ON Tracing enabled
#
              OFF Tracing disabled (default)
#
#
        Note: This flag is evaluated only if the advanced
                  tracing is not defined
DB2SPI TRACE STATUS OFF
#-----
                 ------
#
         DB2SPI TRACE PROCESS:
#
         _____
#
         Program name to be traced, e.g. db2s showsnap.pl
         Values: ALL Trace all programs
#
#
               <name> Name of program to be traced
#
                     default is: no program
#
         If more than one program is to be traced, add one
#
         one line for each program
#
         Note: This flag is evaluated only if the advanced
#
               tracing is not defined
DB2SPI_TRACE_PROCESS db2s_anyname.pl
#______
```

```
#
        DB2SPI TRACE PLUS:
#
        _____
#
        Trace addition area (extra information)
#
        #
          WARNING
        >
          _____
#
        >
#
        > This can produce an EXCESSIVE amount
#
        > of data; use it only when requested
#
        #
        Values: OFF Add nothing (default)
#
                ENV
                     Add environment settings
#
                DIAGLOG Add diagnostic log records
#
                METRICS Add metric value records
#
                SNAP Add snapshot data
#
        Note: This flag is evaluated only if the advanced
              tracing is not defined
#
DB2SPI TRACE PLUS OFF
#______
```

## **Trace Configuration File**

The DB2SPI may be traced independently from Operations Manager by using its separate configuration file, which contains the appropriate settings for DB2SPI specific tracing. This file is kind of a XML files that describes the different areas and processes that comprise the DB2SPI.

The default trace configuration file, db2s\_tracedef.cfg, is transferred during the initial distribution of DB2SPI monitors from the management server to the managed nodes (DB2 servers). During instance configuration with the "Config Setup" tool the configuration file is placed in the DB2SPI configuration directory .../conf/db2spi on the managed node (given for all UNIX systems here).

## Configuring the Trace Area

There is a tool in the DB2SPI Admin tool group to define the trace area you are interested in on a generic or rather detailed level. The tool is called "Trace Define", and it provides an interactive session to change the trace definition for different levels.

The highest level is the "Area", and if you turn on tracing at this level, all functions, tools and scripts belonging to the selected area will produce trace output. With an "Area" selected, different "Functions" are available, and often there is another level below, the "Process" or "Script" level.

This allows a very granular definition of the desired trace profile.

The following table lists all the areas, functions, and scripts/binaries that may be traced:

Table 9: Tracing Areas

Area	Function	Scripts
DB2 Metrics	Metric Collection	db2s_dbmon.pl db2s_metcoll
	Metric Reporting and Graphing	db2s_mwalog.pl
DB2 Service Discovery	Discovery	db2s_discover.pl db2s_discover
	Service Tree	db2s_svctree_dif.pl
DB2 Logfile Monitoring	Administrative Log Entries	db2s_diag.pl
	Replication Log Entries	db2s_repliclog.pl
	File Size Monitoring	db2s_fsize.pl
	DB2SPI Logfile Compression	db2s_ziplog.pl
DB2 Process Monitoring	Processes	db2s_ruleprocmon.pl
DB2 Administration Tools	Flexible Management	db2s_flexapp.pl
	Common Management	db2s_rundb2.pl
	Snapshot Data Collection	db2s_snap_switch.pl
DB2 Information and Reports	Instance List	db2s_ilist.pl
	DB2 Configuration	db2s_showdbcfg.pl
	DB2 Manager Configuration	db2s_showmgrcfg.pl
	Show Snapshot	db2s_showsnap.pl
	Show Replication Status	db2s_replic_status.pl
	Show Metric Report	db2s_asciirep.pl
DB2SPI Administration	Entity Filter	db2s_entyfilter.pl
	Global Metric Collection from DB2	db2s_metrmon.pl

	Metric Forwarding to HP PA/CODA	db2s_mwafwd.pl
	Metric Forwarding to OVO	db2s_opcfwd.pl
Other DB2SPI Tools and Services	License Report	db2s_licrep.pl
	Instance Start/Stop	db2s_istart.pl

A sample trace definition session is shown in the following listing. Tracing is switched on for the whole area "DB2 Administration Tools".

The "+" or "-" in front of any object gives the current tracing state: "-" means that tracing is switched off and "+" means that tracing is switched on.

```
Current entity:
                   ALL
Choose a subentity
  0
         Exit program
  1
         - DB2 Metrics
  2
        - DB2 Service Discovery
  3
         - DB2 Logfile Monitoring
  4
         - DB2 Process Monitoring
  5
         - DB2 Administration Tools
  6
         - DB2 Information and Reports
  7
         - DB2SPI Administration
         - Other DB2SPI Tools and Services
  8
Enter one index: 5
Chosen subentity: ALL:DB2 Administration Tools
Select a function
         Cancel
  0
  1
         Open DB2 Administration Tools
         Get trace for DB2 Administration Tools
  2
  3
         Disable tracing DB2 Administration Tools
Enter one index: 2
Current entity:
                   ALL
Choose a subentity
  0
        Exit program
  1
         - DB2 Metrics
  2
         - DB2 Service Discovery
  3
         - DB2 Logfile Monitoring
  4
         - DB2 Process Monitoring
  5
         + DB2 Administration Tools
  6
         - DB2 Information and Reports
  7
         - DB2SPI Administration
         - Other DB2SPI Tools and Services
  8
Enter one index: 0
```

#### Extending Trace Information: DB2SPI\_TRACE\_PLUS

Sometimes it may be helpful to extend the amount of trace information in order to see environmental data, previous metric values, original logfile entries etc. in context of the DB2SPI processing. This is the purpose of the DB2SPI\_TRACE\_PLUS switch.

Depending on the area given there, a lot of additional data may be collected and put into the DB2SPI trace file.

This function should only be used if requested by the DB2SPI support.

If activated once, it should be disabled as soon as possible because it produces very large trace logs.

## **DB2SPI** Trace Files

#### **Regular Trace Files**

DB2SPI trace data is written to the following file in the DB2SPI log directory:

.../log/db2spi/db2s\_trace.log

#### Note

There are no file-size limitations for the db2s\_trace.log file while tracing is enabled. The size is monitored and reported as soon as the threshold of 500000 Bytes is crossed.

Be careful to switch off tracing when finished.

Traces are generated in a two-step approach:

For each process / script that is given in a DB2SPI\_TRACE\_AREA command in the configuration file, a separate trace file is created where the traces are stored. When the process / script ends regularly, this file is appended to the general trace file db2s\_trace.log.

These interim trace files are kept in the same directory as the comprehensive one and may easily be identified by their name, which contains "db2s\_trace" and a PID. If the process / script should abort before regular termination and merge, the separate trace file is preserved there.

#### Special Trace Files

There are some special trace files that are always created, namely in the area of basic configuration and upgrade.

These files are also kept in the regular place, but with a different name:

- db2s\_setup\_trace.log
- db2s\_upgrade\_trace.log
- db2s\_shs\_trace.log

These traces are enforced programmatically just as an additional precaution in case any of these critical steps should behave unexpectedly.

The files may be compressed, and then have a date code and a ".Z" suffix added to their names.

## **Tracing Other Scripts**

In order to trace scripts not listed in Table 9: Tracing Areas, do the following tasks in the configuration file db2s spi.cfg locally on the managed node:

- Switch off DB2SPI\_TRACE\_CONFIG\_FILE parameter
- Configure script to be traced
- Activate tracing

#### Switch off DB2SPI\_TRACE\_CONFIG\_FILE parameter

The parameter DB2SPI\_TRACE\_CONFIG\_FILE needs to be set to "OFF". Edit the configuration file db2s\_spi.cfg locally on the managed node and replace the line:

DB2SPI TRACE CONFIG FILE db2s tracedef.cfg

With

DB2SPI TRACE CONFIG FILE OFF

In order to switch back to the usual tracing mechanism, reverse the changes again or use the Trace Definition tool.
#### Configuring Script to be traced: DB2SPI\_TRACE\_PROCESS

You may specify which programs you want to trace by setting the DB2SPI\_TRACE\_PROCESS variable in the db2s\_spi.cfg file and using the appropriate program name as the value. For example:

```
DB2SPI_TRACE_PROCESS db2s_platfpath.pl
```

#### Activating DB2SPI Tracing: DB2SPI\_TRACE\_STATUS

You can activate (or de-activate) the tracing in the DB2SPI by setting the DB2SPI\_TRACE\_STATUS variable in the configuration file, db2s\_spi.cfg, to either "ON" or "OFF", respectively. For example, to activate DB2SPI tracing, set the following variable as indicated:

```
DB2SPI TRACE STATUS ON
```

Tracing starts automatically after the DB2SPI writes the "ON" flag back to disk; there is no need to restart any processes. In order to de-activate tracing, reset the DB2SPI\_TRACE\_STATUS parameter to "OFF". Tracing stops automatically after the DB2SPI writes the "OFF" flag back to disk. You do not need to restart any processes.

# Self-Management of the DB2SPI

## **DB2SPI** Log Files

The DB2SPI is configured to monitor its own status and notifies the user of any changes in status, problems, and errors etc. as follows:

- The DB2SPI self-management feature generates messages for all internal state changes and any problems and sends the messages to the DB2SPI administrator.
- Most of the messages generated by the DB2SPI contain instruction text, which offers a potential explanation as to why the message was generated.

This self-management is primarily achieved via the DB2SPI log file described earlier and an HP OM log file policy, DB2SPI\_ownlog1, which is contained in the DB2SPI Core policy group and hence get distributed to all managed nodes, which are hosting a DB2 management.

The policy DB2SPI\_ownlog0, which is deployed to the Management Server node, does the same like the DB2SPI\_ownlog1, but specifically for the

events that might show up in the db2s\_spi.log file on the management server (service tree, licensing, help related).

### DB2SPI File Size Monitoring

All files written to the DB2SPI log directory on the managed node are checked by an HP OM monitor policy to get alerts if their size is getting larger than expected.

## **DB2SPI Trace Control**

The trace configuration on the managed node is checked by an HP OM monitor policy if any tracing is active or not. An alert is sent to the OM message browser if so, indicating the area, function or process found to be traced.

This is to help avoiding a permanent tracing in background, which could fill up considerable space.

# Processes, Services and Scripts

A number of scripts and processes are installed and run on the managed nodes during the installation and deployment of the DB2SPI. The following lists give a brief explanation of the various files:

Note: The operator never needs to start any of the scripts in the following list directly. These scripts are activated by DB2SPI tools or monitors.

Script Name	Description
atop (atop.exe)	ATOP client to process DB2SPI tools
db2s_appevent.pl	Application Event log monitoring on Windows DB2 Servers
db2s_appevent.vbs	helper script for Application Event log monitoring on Windows
db2s_asciirep.pl	creates ASCII reports (interactively or as automatic actions)
db2s_Balanced.pm	component for XML parsing and processing
db2s_bind2db2.pl	Binds the DB2SPI libraries to the monitored DB2 databases
db2s_cmdinstswitch.pl	switches monitoring of DB2 instances on the command line
db2s_dallilib.pm	module to utilize DalliLib application extensions

#### Table 10: Scripts on the managed nodes

db2s_db2spi.pl	enable / disable the DB2SPI
db2s_dbdiscover.pl	discovers the DB2 configuration (databases, partitions, table spaces and buffer pools)
db2s_dbmon.pl	executes the entire performance data collection
db2s_df.bat	used for disk size estimation on windows
db2s_df.vbs	used for disk size estimation on windows
db2s_diag.pl	pre-process the administration log files
db2s_ds_migrate.pl	migrates datasources of some DB2SPI versions
db2s_entyfilter.pl	defines the monitoring status of all DB2 components
db2s_export_icfg.pl	exports instance configuration in a XML format for easy editing
db2s_flexapp.pl	runs the flexible tools
db2s_fsize.pl	process file size monitoring of various log files
db2s_genlib.pm	library holding general functions of the DB2SPI. Required by all other scripts
db2s_globdef.pm	library file for global DB2SPI variables
db2s_ilist.pl	list all instances and databases defined / managed on the DB2 server
db2s_import_icfg.pl	imports instance configuration in a XML format
db2s_instlib.pm	library holding functions for DB2 instance management. Required by all scripts accessing DB2
db2s_langtext.pm	library for dynamic export of lanuguage text
db2s_istart.pl	start / stop a selected DB2 instance
db2s_licrep.pl	license reporting
db2s_list_conf.pl	configuration listing (OM for Windows only)
db2s_metcoll*	binary programs for metric collection
db2s_mg_ilist.pl	defines the visibility of DB2 instances
db2s_mwafwd.pl	tool to enable / disable forwarding of performance data to the MeasureWare or CODA agent
db2s_mwalog.pl	forward the intermediate performance data collected to PA
db2s_opcfwd.pl	tool to enable / disable forwarding of performance data to the Operations Manager monitor agent
db2s_perflib.pm	library holding functions for metric data processing

db2s_perfstore.pl	create and removes the performance data stores.
db2s_platfpath.pl	determine path of files depending on the platform
db2s_psspi.pl	integrates DB2SPI with PeopleSoft SPI
db2s_qreg.vbs	Used for simple Windows registry queries
db2s_replic_status.pl	show status of DB2 replication
db2s_replicdiag.pl	analyze the replication log files
db2s_root.pl	one-time utility for setup in non-root environments
db2s_ruleprocmon.pl	performs process monitoring
db2s_rundb2.pl	start the DB2 command line processor
db2s_setcp.bat	set the path to DB2 CLP
db2s_setupinst.pl	define the instances to be managed on the DB2 server
db2s_showdbcfg.pl	displays the DB2 database configuration
db2s_showlog.pl	show the db2spi.log file on the selected node
db2s_showmgrcfg.pl	tool to display the database manager configuration
db2s_showsnap.pl	tool to display a performance snapshot in a window
db2s_showstmt.pl	shows the top used sql statements
db2s_shs_collect.pl	collects environment information for the SHS support tools
db2s_snap_switch.pl	enable / disable DB2 performance data collection
db2s_start	starts all our scripts in well-defined environment
db2s_startcoll	prepares the environment for metric collection (UNIX only)
db2s_stmt_switch.pl	switches the sql statement analyzer
db2s_stmtcoll.pl	collects sql statement for analysis
db2s_sudo	switches between users in non-root environments
db2s_svctree_diff.pl	determines changes for the service tree
db2s_tracedef.pl	define the objects to be traced
db2s_tracemon.pl	Shows if any tracing is active
db2s_updateparm.pl	updates the integration with HP PA to collect performance data about DB2
db2s_upgrade.pl	performs DB2SPI upgrade to activate new code
db2s_xmllib.pm	library holding generic functions of the XML parser

db2s_ziplog.pl	compresses the DB2SPI log file
spi_db2.cmd	Self-Healing services collection file
spi_db2_runSHSCollect or.cmd	Self-Healing services collection file
db2s_discover*	binary programs for detailed DB2 discovery

On the Management Server, the following scripts are installed:

Script Name	Description				
atop.exe	executable for the graphical infrastructure ATOP				
atopservice.exe	starts windows service for ATOP				
atopsrv.exe	server part of ATOP client-server communication				
atopwin.exe	client part of ATOP client-server communication				
db2s_Balanced.pm	component for XML parsing and processing				
db2s_dallilib.pm	Perl interface to C library				
db2s_genlib.pm	library holding general functions of the DB2SPI. Required by all other scripts				
db2s_globdef.pm	library file for global DB2SPI variables				
db2s_helptext.pl	searches and returns the instruction text from the instructions reference file				
db2s_langtext.pm	library for dynamic export of language text				
db2s_licrep.pl	license reporting				
db2s_nicelice.pl	install or add new DB2SPI licenses				
db2s_start	starts all our scripts in well-defined environment				
db2s_svctree_mdfy.pl	tool to prepare the XML file for the HP Service Navigator resp. OM for Windows helper tool to delete DB2 related service tree entries				
db2s_xmllib.pm	library holding generic functions of the XML parser				
db2s_upgrade.pl	performs DB2SPI upgrade to activate new code				
spi_db2.cmd	Self-Healing services collection file				
spi_db2_runSHSCollect or.cmd	Self-Healing services collection file				

## **ATOP Services**

On Java display stations, the "ATOP2 server" service is installed automatically when downloading the ATOP Java GUI from the management server.

It may be checked with normal Windows means in the "Services" window.

On the Operations Manager management server for UNIX and Linux, the "atop\_server" is set up during installation of the package.

It may be checked with the ovstatus command.

# 6 Appendix A: Monitored DB2 Processes

Process Name	State	min	max	Affiliation	Platform	
db2sysc	managed	1	1	none		
db2disp	unmanaged	1	1	none		
db2syslog	syslog unmanaged 1 1 none		none			
db2chkau	unmanaged	1	1	none		
db2hmon	unmanaged	1	1	none		
db2ipccm	managed	1	1	none		
db2tcpcm	managed	1	1	none		
db2tcpdm	unmanaged	1	1	none		
db2snacm	unmanaged	1	1	none		
db2loggr	managed	1	1	database	all UN*X	
db2loggw	managed	1	1	database		
db2lfr	managed	1	1	database		
db2pfchr	managed	1	1	none		
db2pcInr	managed	1	1	none		
db2resync	unmanaged	1	1	none		
db2estor	unmanaged	1	1	none		
db2reorg	unmanaged	1	1	none		
db2srvlst	unmanaged	1	1	none		
db2fmp	managed	1	1	none		
db2fmcd	managed	1	1	none		
db2fmd	unmanaged	1	1	none		
db2dlock	managed	1	1	none		

#### Table 11: Default DB2SPI Process Monitor Configuration

db2ckpwd	managed	1	1	none	
db2gds	managed	1	1	none	
db2wdog	managed	1	1	none	
db2dasrrm	unmanaged	1	1	none	
db2agent	managed	1	-1	idle pool	
db2fcmdm	managed	1	1	none	
db2glock	managed	1	1	database	
db2lpart	unmanaged	1	1	None	
db2lload	unmanaged	1	1	None	all UN*X
db2lrdfl	unmanaged	1	1	None	with
db2llqcl	unmanaged	1	1	None	DPF
db2lmctk	unmanaged	1	1	None	
db2panic	managed	1	1	idle pool	
db2pdbc	managed	1	1	None	
db2syscs.exe	managed	1	1	None	
db2fmp.exe	managed	1	1	None	
db2licd.exe	managed	1	1	None	
db2sec.exe	managed	1	1	None	Windows
db2jds.exe	managed	1	1	None	windows
db2dasrrm.exe	unmanaged	1	1	None	
db2dasstm.exe	unmanaged	1	1	None	
db2rcmd.exe	unmanaged	1	1	None	

# 7 Appendix B: DSI2DDF Decision Tree

The SPI Data Collector or DSI2DDF tools determine the following decision whether to use CODA or HP PA for data storage.

These tools contain a predefined logic about default storage formats, depending on the platform they are operating:

- On UNIX systems, HP PA format is the default data source
- On Windows systems, CODA format is the default data source.

These defaults may be overridden by providing a special file, nocoda.opt, in a specific place in conjunction with the existence (installation) of certain tools.

#### Note that these settings affect all other SPIs as well.

Is CODA installed?				
yes: Is data source overridden? (see below)		no:		
yes: use HP PA	no: use CODA	use HP PA		

#### To determine if a data source is overridden, the following applies:

Does nocoda.opt exist?							
Nocoda.opt exists.				Nocoda.opt does not exist.			
yes				no			
Does it contain data?				Does ddfcomp exist?			
yes			No	yes	no		
ls it "ALL"?	Is it the current data source?				Does HP PA exist?		
use HP PA	yes use HP PA	no use CODA	use CODA	use CODA	yes use HP PA	no use CODA	

# Is CODA Installed?

To determine if CODA is installed, the code looks for the CODA executable in platform dependent locations.

- On AIX, the code looks for /usr/lpp/OV/bin/coda.
- On Tru64 UNIX (not supported by the DB2SPI), the code looks for /usr/opt/OV/bin/coda.
- On all other UNIX platforms, the code looks for /opt/OV/bin/coda.
- On Windows, the code uses the NT Registry key
  [HKEY\_LOCAL\_MACHINE\SOFTWARE\Hewlett-Packard\HP
  OpenView\AgentInstallDir]. The code adds the bin directory to the
  registry key value.

#### For example:

```
C:\Program Files\HP OpenView\Installed
Packages\{790C06B4-844E-11D2-972B-
080009EF8C2A}\bin\coda.exe
```

## Nocoda.opt exists

To determine if the data source is overridden, the code looks at the contents of the nocoda.opt file. The location of this file is platform dependent.

- On AIX, the code looks for /var/lpp/OV/conf/dsi2ddf/nocoda.opt.
- On all other UNIX platforms, the code looks for /var/opt/OV/conf/dsi2ddf/nocoda.opt.
- On Windows, the code uses the NT Registry key [HKEY\_LOCAL\_MACHINE\SOFTWARE\Hewlett-Packard\HP OpenView\AgentDataDir]. The code adds the conf\dsi2ddf directory to the registry key value.

For example:

```
C:\Program Files\HP OpenView\Installed
Packages\{790C06B4-844E-11D2-972B-
080009EF8C2A}\conf\dsi2ddf\nocoda.opt.
```

With nocoda.opt given, its contents could even be used to determine different types for different data sources, as listed below in the decision tree.

# Nocoda.opt does not exist

If the nocoda.opt file is not on the system, the code determines if ddfcomp is running from the OM for Windows location.

- On AIX, the OM for Windows location is /var/lpp/OV/instrumentation/ddfcomp.
- On all other UNIX platforms, the OM for Windows location is /var/opt/OV/bin/instrumentation/ddfcomp.
- On Windows, the OM for Windows location is any path that includes "instrumentation" or its short form "instru~".

The DB2SPI requires the installation of ddfcomp on the managed node. If it should not exist during setup, the data stores need to be created later with the tool "Datastore setup" when the SPI Data Collector tools including ddfcomp are

#### present on the DB2 server.

The code uses platform dependent methods to determine if HP PA is installed.

On UNIX platforms, the code looks for /var/opt/perf/perflbd.rc. If the file exists, HP PA is installed.

On Windows, the code uses the NT Registry key [HKEY\_LOCAL\_MACHINE\SOFTWARE\Hewlett-Packard\MeasureWare Agent\CurrentVersion\CommonDataPath]. If the NT Registry key

exists, then HP PA is installed.