

# SolarWinds

Database Performance Analyzer

Administrator Guide

Version 10.1

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# About SolarWinds

SolarWinds, Inc. develops and markets an array of network management, monitoring, and discovery tools to meet the diverse requirements of today's network management and consulting professionals.

SolarWinds products continue to set benchmarks for quality and performance and have positioned the company as the leader in network management and discovery technology. The SolarWinds customer base includes over 85 percent of the Fortune 500 and customers from over 170 countries. Our global business partner distributor network exceeds 100 distributors and resellers.

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# Installation

## Introduction

You can use SolarWinds Database Performance Analyzer to monitor, diagnose, and resolve performance problems for Oracle, SQL Server, MySQL, DB2, and Sybase databases.

SolarWinds DPA has agentless architecture that allows for extended database monitoring without draining performance from production systems.

### SolarWinds DPA architecture

SolarWinds Database Performance Analyzer consists of:

- A SolarWinds DPA server
- A SolarWinds DPA repository database
- One or more database instances you want to monitor

The SolarWinds DPA server collects performance data from a set of database instances you choose to monitor. SolarWinds DPA stores this data in the repository database.

For optimal performance, the repository and the monitored database instances must reside on the same high-speed local area network (LAN). If your environment contains database instances that are on separate LANs, SolarWinds recommends setting up a repository on each LAN.

The SolarWinds DPA server provides a web interface that displays performance data in a web browser from any computer with access to the SolarWinds DPA server.

SolarWinds recommends installing one SolarWinds DPA instance on a computer. If you must install multiple instances on the same computer, contact [www.solarwinds.com/support](http://www.solarwinds.com/support).

### Two key functions of the SolarWinds DPA server

- Collecting data from the monitored database instances and storing the data in the repository database.
- Providing a web interface that displays performance data from any computer with access to the SolarWinds DPA server. From this interface, you can configure monitoring, alerting, and email reports.

### Monitored database instances

SolarWinds DPA remotely connects to each database instance using Java Database Connectivity (JDBC). SolarWinds DPA causes less than 1% overhead on the instance. No software is installed on the monitored server.

## Monitored virtualization environment

In a virtual environment, SolarWinds DPA can remotely connect to each VMware vCenter Server, ESX, or ESXi host. SolarWinds DPA causes less than 1% overhead on the monitored systems. No software is installed in the vCenter Server, ESX or ESXi host, or virtual machines.

## Before you install

1. Identify the server where SolarWinds DPA will be installed. Make sure the server:
  - Is powerful enough to handle the load of the potential number of monitored database instances that you will register. See the [Server requirements](#).
  - Has network connectivity to the SolarWinds DPA repository and each of the monitored database instances that you will register. SolarWinds DPA can be installed on the same server as the repository instance, although it is not required or recommended.
2. Identify the Microsoft SQL Server or Oracle database instance that will host the SolarWinds DPA repository and make sure:
  - a. The repository is not installed in a critical production database instance.
  - b. You have credentials with SYSADMIN privileges for a Microsoft SQL Server repository.
  - c. You have credentials with database administrator (DBA) privileges for an Oracle repository.
3. Obtain login credentials for each of the monitored databases. See the table below.

 SolarWinds DPA performs best if a high-speed network exists between the repository and the monitored database instances. Although monitoring will work across a wide area network (WAN) or low-speed network, it may be necessary to reduce the frequency that SolarWinds DPA collects performance data.

SOFTWARE	REQUIREMENT
Oracle	Non-SYS database administrator (DBA) user name and password SYS password
SQL Server	SYSADMIN user name and password
DB2	SYSADM user name and password
Sybase	SA_ROLE user name and password
MySQL	Non-SYS DBA user name and password SYS password
VMware	Read-only user with access to vCenter or ESX

## Requirements

See the following requirements for installing SolarWinds DPA and monitoring databases:

- [Server requirements](#)
- [Repository database requirements](#)
- [Database versions you can monitor](#)
- [Web browsers](#)
- [MySQL requirements](#)
- [Java requirements](#)

## Server requirements

You can install SolarWinds DPA on any physical or virtual Windows, UNIX, or Linux server that supports the Java Runtime Environment (JRE) 1.6, 1.7, or 1.8.

You can also launch SolarWinds DPA in the Amazon Elastic Compute Cloud (Amazon EC2) from an Amazon Machine Image (AMI). The AMI contains a SolarWinds DPA server and a built-in Microsoft SQL Server instance configured as the SolarWinds DPA repository.

## Requirements for a self-managed SolarWinds DPA server

SolarWinds DPA does not require a JRE on Windows. You must install JRE 1.6, 1.7, or 1.8 on UNIX or Linux.

### Supported operating systems

- Windows 2008
- Windows 2008 R2
- Windows 2012
- Windows 2012 R2
- Windows 8 and 8.1
- Windows 10
- UNIX
- Linux

The other minimum requirements for the server specifications and operating system architecture depend on the number of database instances you plan to monitor.

MONITORED DATABASE INSTANCES	CPUS	RAM DEDICATED TO DPA	OS ARCHITECTURE
1 - 20	1	1 GB	64-bit
20 - 50	2	2 GB	64-bit
51 - 100	4	4 GB	64-bit
101 - 250	4	8 GB	64-bit

### More than 250 monitored instances

Do you plan to monitor more than 250 database instances? Consider using more than one SolarWinds DPA server and [Link together separate DPA servers](#).

## Requirements for an Amazon EC2 SolarWinds DPA server

The minimum required Amazon EC2 instance type for the SolarWinds DPA server AMI is m3.medium. Smaller instance types are not supported.

An m3.medium size instance can reliably monitor 10 database instances. You may need a larger instance type to reliably monitor more than 10 database instances.

## Repository database requirements

The repository database stores the data collected by SolarWinds DPA. You can host the repository database on an instance of Oracle or Microsoft SQL Server:

DATABASE	EDITION	VERSION
Microsoft SQL Server		2008 SP4
	Express	2008 R2 SP3
	Standard	2012 SP2
	Enterprise	2014
		2014 SP1
Oracle	Express	11.2
	Standard	12.1 (single tenant and multi-tenant)
	Enterprise	

SolarWinds recommends against using Express editions of Oracle or SQL Server for the repository because of the database size limits.

Do not host the repository on a database instance that you plan to monitor, because this affects the performance of that instance.

SolarWinds DPA does not support using Amazon Relational Database Service (RDS) instances as a repository. You can host a self-managed Oracle or SQL Server database on Amazon EC2 to use as your repository.

## Minimum system requirements for the repository database server

If you install SolarWinds DPA on the same server as the repository database, you need these requirements in addition to the SolarWinds DPA requirements.

MONITORED DATABASE INSTANCES	CPUS	RESERVED RAM	OS ARCHITECTURE
1 - 20	1	2 GB	64-bit
20 - 50	2	4 GB	64-bit
51 - 100	4	8 GB	64-bit

MONITORED DATABASE INSTANCES	CPU'S	RESERVERED RAM	OS ARCHITECTURE
101 - 250	4	16 GB	64-bit

## Adequate disk space for the repository database

The amount of disk space your repository uses is determined by the number of database instances you are monitoring and the activity level of each instance.

DATABASE INSTANCE ACTIVITY LEVEL	DISK SPACE REQUIRED
Low	1 GB
Medium	3 GB
High	5 GB

### Example

You are monitoring 5 low, 3 medium, and 2 high activity database instances.

$$(5 \times 1\text{GB}) + (3 \times 3\text{GB}) + (2 \times 5\text{GB}) = 24 \text{ GB}$$

Reserve at least 24 GB to provide adequate disk space for this repository database.

## Administrator credentials are required

You must know the database administrator (DBA) credentials (Oracle) or the Sysadmin credentials (SQL Server) for the database instance hosting your repository.

## Database versions you can monitor

SolarWinds DPA can monitor database instances you manage on both physical and virtual servers or Amazon RDS instances hosted in the Amazon Elastic Compute Cloud (EC2). You can monitor Microsoft SQL Server, Oracle, MySQL, SAP ASE, and IBM DB2 database instances. The server hosting SolarWinds DPA must be able to connect to the monitored server.

## Self-managed databases

DATABASE	REQUIRED PRIVILEGES	SUPPORTED VERSION
Oracle	SYS user	<ul style="list-style-type: none"> <li>■ 11.2</li> <li>■ 12.1 (single tenant and multi-tenant)</li> </ul>
Microsoft SQL Server	SYSADMIN role	<ul style="list-style-type: none"> <li>■ 2008 SP4</li> <li>■ 2008 R2 SP3</li> <li>■ 2012 SP3</li> <li>■ 2014</li> <li>■ 2014 SP1</li> </ul>

DATABASE	REQUIRED PRIVILEGES	SUPPORTED VERSION
SAP Sybase ASE	SA_ROLE	<ul style="list-style-type: none"> <li>■ 15.5</li> <li>■ 15.7</li> <li>■ 16</li> </ul>
IBM DB2 LUW	SYSADM	<ul style="list-style-type: none"> <li>■ 9.5</li> <li>■ 9.7</li> <li>■ 10.1</li> <li>■ 10.5</li> </ul>
MySQL	SYS user	<ul style="list-style-type: none"> <li>■ 5.6.10 and later</li> <li>■ 5.7</li> <li>■ Percona 5.6</li> </ul>

## Amazon RDS databases

SolarWinds DPA can monitor Amazon RDS Oracle, Microsoft SQL Server, and MySQL instances. Some features that are available on self-managed database instances are not available for Amazon RDS instances, because of Amazon RDS access restrictions.

AMAZON RDS	SUPPORTED VERSIONS	KEY DIFFERENCES
Oracle	11.2 12.1	<p>Unavailable alerts:</p> <ul style="list-style-type: none"> <li>■ Oracle Alert Log Error uses V\$DIAG_ALERT_EXT instead of X\$DBGALERTEXT.</li> </ul> <p>Explain plans:</p> <ul style="list-style-type: none"> <li>■ Explain plans cannot be generated with a SYS account. You must specify a different account to generate the live plan.</li> </ul> <p>Workarounds for not having a SYS.UTL_CON package:</p> <ul style="list-style-type: none"> <li>■ To kill a real time session, use RDSADMIN.RDSADMIN_UTIL.KILL.</li> <li>■ Trace session permissions granted through START_TRACE_IN_SESSION and STOP_TRACE_IN_SESSION.</li> </ul>
Microsoft SQL Server	2008 SP4 2008 R2 SP3 2012 SP3 2014 2014 SP1	<p>Unavailable alerts:</p> <ul style="list-style-type: none"> <li>■ SQL Server Windows Service Not Running</li> <li>■ SQL Server Long Running Jobs</li> <li>■ SQL Server Log Has Many Virtual Logs</li> <li>■ SQL Server Job Failure</li> <li>■ SQL Server Error Log Alert</li> </ul>

AMAZON RDS	SUPPORTED VERSIONS	KEY DIFFERENCES
		<p>Explain plans:</p> <ul style="list-style-type: none"> <li>■ The DPA monitoring user does not have a sysadmin role and may have limited access to objects. You can specify a different user to generate the live plan before you generate the plan.</li> </ul> <p>WMI-based statistics are not available:</p> <ul style="list-style-type: none"> <li>■ CPU Queue Length</li> <li>■ CPU Utilization</li> <li>■ Disk Queue Length</li> <li>■ Memory Paging Rate</li> <li>■ Memory Utilization</li> <li>■ Physical I/O Rate</li> <li>■ Physical Read Rate</li> <li>■ Physical Write Rate</li> </ul> <p>Workaround for not having a sysadmin role:</p> <ul style="list-style-type: none"> <li>■ DPA user is a member of processadmin role</li> </ul>
MySQL	5.6.10 and later 5.7	No differences

### You can repoint MySQL but not Oracle or Microsoft SQL Server instances

It is not possible to transfer a registered Oracle or Microsoft SQL Server database instance between Amazon RDS and a self-managed database, and retain SolarWinds DPA historical data. Any Oracle or Microsoft SQL Server database instance transferred between Amazon RDS and a self-managed instance opens as separate instances.

MySQL database instances can be repointed. You can continue monitoring where you left off after transferring a database instance between Amazon RDS and self-managed. To repoint, update the connection details of the registered database to point to the new location.

### Web browsers

SolarWinds DPA supports the following browsers:

- Microsoft Internet Explorer 9, 10, and 11

 Do not use IE compatibility view. It may cause SolarWinds DPA to function incorrectly.

- Mozilla Firefox: latest stable version
- Google Chrome: latest stable version

## MySQL requirements

SolarWinds recommends the following settings to optimize reporting capabilities for a MySQL database instance.

### MySQL Performance Schema

The Performance Schema monitors server events and collects performance data. If the Performance Schema is not enabled, SolarWinds DPA provides limited data. Monitoring with the Performance Schema disabled excludes the following data:

- All instrumented wait events
- All wait operations
- All file wait time, broken out by file
- All object wait time, broken out by index and table
- SQL statistics
- Performance-schema dependent alerts

The Performance Schema must be enabled at server startup. In MySQL versions 5.6.6 and later, the Performance Schema is enabled by default.

### Global Instrumentation and Thread Instrumentation

Global Instrumentation and Thread Instrumentation must be enabled in the Performance Schema configuration. Disabling these instruments has the same effect as disabling the Performance Schema.

By default, SolarWinds DPA enables these instruments in the configuration. However, if you select the Leave As Is option for Performance Schema setup, you must verify that Global Instrumentation and Thread Instrumentation are enabled in the existing Performance Schema configuration.

### show\_compatibility\_56 system variable

If the monitored database instance is MySQL 5.7.6 or later, we recommend turning on the `show_compatibility_56` system variable. If this variable is on, SolarWinds DPA can collect data for all metrics. For more information about turning on this variable, see the [MySQL documentation](#).

If this variable is off and the Performance Schema is enabled, SolarWinds DPA cannot collect data for the following metrics:

- Selects
- Inserts
- Updates
- Deletes

## Java requirements

SolarWinds DPA requires Java 1.6, 1.7, or 1.8 on a UNIX or Linux SolarWinds DPA server.

To upgrade Java on UNIX or Linux:

1. Download and install Java.
2. Remove old Java information by deleting the `cat.txt` and `cat.end` files from the following directory:  
`<DPA Install Dir>/iwc/tomcat/ignite_config/`
3. At a command line, go to the SolarWinds DPA installation directory.
4. Enter the following command:  
`./startup.sh`

## Installation overview

1. Install SolarWinds DPA on a Windows, UNIX, or Linux computer.
2. Use the setup wizards to:
  - a. Create and configure a repository database on a non-production instance of Microsoft SQL Server or Oracle.
  - b. Register database instances for SolarWinds DPA to monitor. You should not monitor the same database instance from more than one installation of SolarWinds DPA.

## Install on Windows

SolarWinds DPA for Microsoft Windows comes as a typical Windows installer. You can download the 64-bit installer as a .zip file from the [SolarWinds customer portal](#).

If you require the 32-bit installer, open a technical support ticket at [www.solarwinds.com/support/ticket](http://www.solarwinds.com/support/ticket).

## Start the Installer

The default installation folder is `C:\Program Files\Solarwinds\DPA`. If you choose not to specify a custom installation folder during the installation process, this folder becomes the SolarWinds DPA Home directory.

The installation process creates a Windows service called Ignite PI Server. This service is set to run automatically when the server is restarted. You can stop SolarWinds DPA by shutting down this service. You can change the Startup type of this service to Manual.

1. Log in to your Windows server as an administrator.
2. Extract and run the installer program file from the .zip file.
3. Follow the instructions in the installer.

## After installation

1. Open a web browser and go to `http://yourserver:8123`.
2. Complete the Repository Creation Wizard.
3. Register database instances for monitoring in the Register Instance Wizard.

## Install on UNIX or Linux

The installer requires Java 1.6, 1.7, or 1.8. If you do not have Java, you can still proceed by following the manual unzip instructions. The procedure below includes both sets of instructions.

1. Download the installer from the [SolarWinds customer portal](#).
2. Create a directory to hold this version of SolarWinds DPA. For example: `/home/dpa`.
3. Extract the downloaded `.tar` file into the new directory.
4. There are two options for running the `dpa_<version>_installer.sh` script:
  - Make it executable and run it directly:

```
chmod +x dpa_<version>_installer.sh
./dpa_<version>_installer.sh
```
  - Run it in the shell:

```
sh dpa_<version>_installer.sh
```
5. The installer prompts you for information, including creating a directory on the server for installation. This becomes the SolarWinds DPA Home directory.
6. Start SolarWinds DPA.
  - a. From the SolarWinds DPA Home directory, run `./startup.sh`.
  - b. Open a web browser and go to `http://yourserver:8123/`.

When you run SolarWinds DPA for the first time, a wizard walks you through the process of creating a repository and monitoring database instances.

## After installation

1. Open a web browser and go to `http://yourserver:8123`.
2. Complete the Repository Creation Wizard.
3. Register database instances for monitoring in the Register Instance Wizard.

## Install on Amazon Web Services

You can deploy SolarWinds DPA in the Amazon Elastic Compute Cloud (Amazon EC2) from an Amazon Machine Image (AMI).

## Differences between Amazon Web Services (AWS) and self-managed servers

### Runs on default HTTP/HTTPS ports 80 and 443

You can access the SolarWinds DPA user interface on the standard HTTP port 80 and HTTPS port 443. The Windows Firewall settings have been set to allow inbound HTTP and HTTPS traffic.

### Preconfigured SolarWinds DPA repository

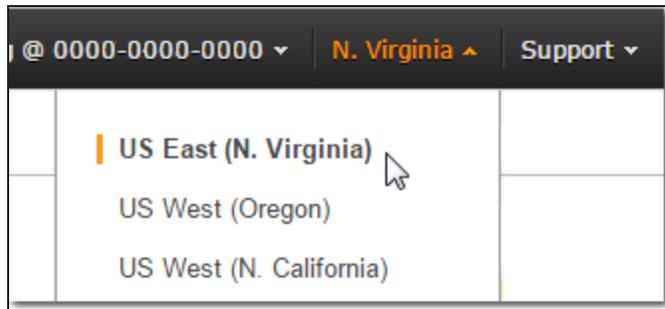
This server comes with a Microsoft SQL Server SolarWinds DPA repository that stores monitoring data.

## Preconfigured administrator account: dpa

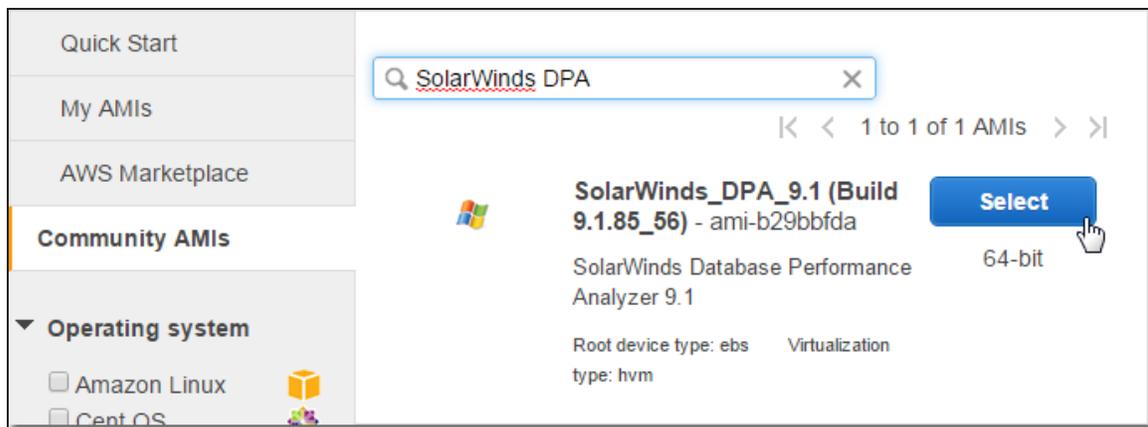
The password is the Amazon Instance ID of the server. You can find the Instance ID in your Amazon EC2 dashboard.

## Launch a SolarWinds DPA instance in Amazon EC2

1. Log in to AWS.
2. Select the Amazon EC2 region in which you want to launch the instance. For example, US East (N. Virginia).



3. Click EC2.
4. Click Launch Instance.
5. On the Choose an AMI page:
  - a. Click the Community AMI tab.
  - b. Enter `SolarWinds DPA` in the search field, and click Select.



6. On the Choose an Instance Type page:

- a. Select an m3.medium instance type or larger. This table lists the recommended instance types:

GENERAL PURPOSE	COMPUTE OPTIMIZED	MEMORY OPTIMIZED
m3.medium	c3.large	r3.large
m3.large	c3.xlarge	
m3.xlarge	c3.2xlarge	
m3.2xlarge		

M3.medium is an economical choice and a logical instance type to start with. However, large deployments and managing active databases require the increased resources and optimizations available to the larger instance types. You can select the size you need right now and then resize to a larger instance type later.

- b. Click Next: Configure Instance Details.

7. On the Configure Instance Details Type page:

If you have used Amazon EC2 before, you may have an Amazon Virtual Private Cloud (VPC) network and subnet set up. Your existing network and subnet are selected by default.

- a. Make sure you enable Auto-assign public IP so you can connect to SolarWinds DPA from your computer.
- b. Click Next: Add Storage.

8. On the Add Storage page:

- a. You can configure additional storage beyond this default storage that the AMI provisions for you:

TYPE	SIZE
Root	50 GB
EBS	100 GB

The Delete on Termination option is not selected by default. SolarWinds recommends leaving this option cleared and separately deleting the data volume after terminating an instance.

- b. Click Next: Tag Instance.

9. On the Tag Instance page:

- a. Enter `SolarWinds DPA` in the Name tag to recognize your instance in Amazon EC2.
- b. Click Next: Configure Security Group.

10. On the Configure Security Group page:

a. Add rules that allow inbound access to the remote desktop (RDP), HTTP, and HTTPS ports.

TYPE	PROTOCOL	PORT RANGE
HTTP	TCP	80
HTTPS	TCP	443
RDP	TCP	3389

b. To restrict access to SolarWinds DPA to only your current IP address, change the Source rules to My IP. A Source set to Anywhere is less secure.

c. To restrict access to SolarWinds DPA to only people in your organization, select Custom IP for the Source and specify an IP range in classless inter-domain routing (CIDR) notation that matches the external IP addresses used in your organization.



d. Click Review and Launch.

11. On the Review Instance Launch page:

a. Review your instance options.

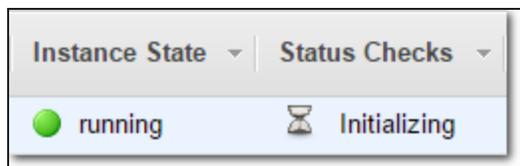
b. Click Launch.

Either the Select an existing key pair or the Create a new key pair dialog opens.

12. In the dialog box, secure your AMI instance with a public key pair.

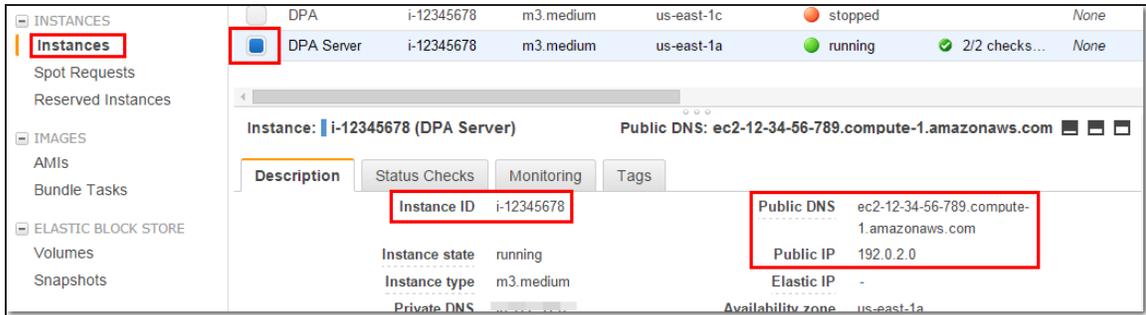
- If you do not have a key pair:
  - a. Select Create a new key pair.
  - b. Enter a Key pair name.
  - c. Click Download Key Pair.
  - d. Store this file in a secure and accessible location.
- If you have a key pair:
  - a. Select Choose an existing key pair.
  - b. Select a secure and accessible key pair.
  - c. Accept the acknowledgment.

13. Click Launch Instances.



## Log in to the AWS SolarWinds DPA server

1. On the Amazon EC2 Instances page, find:
  - The public domain name system (DNS) or public IP address of your new SolarWinds DPA server.
  - The instance ID



2. Open a web browser and go to the host name or IP address of your new SolarWinds DPA server.
3. Log in as the dpa user. The password is the Instance ID. For example, i-12345678.
4. Select your time zone, finish the configuration.

## Upgrade SolarWinds DPA

SolarWinds DPA 10.1 allows upgrades from:

- Confio Ignite 8.3 or later
- SolarWinds DPA 9.0 or later

To upgrade from an earlier version of the software, open a [SolarWinds Technical Support ticket](#).

### Upgrade on Windows

If you are upgrading from SolarWinds DPA 9.0 or earlier, you will use the new instance-based licenses provided with your upgrade. Before upgrading, log in to the [SolarWinds Customer Portal](#) and verify your instance-based keys listed as Category 1, Category 2, and VM Option.

1. Download the most recent version of SolarWinds DPA from the [SolarWinds Customer Portal](#).
2. Run the installer.
3. When prompted, verify your instance-based Category 1 or Category 2 activation key.
4. Follow the installer instructions.
5. Open a web browser and go to your SolarWinds DPA server.
6. Click Enter Activation Key.
7. Activate a key using the online or offline method, and click Done.
8. Click Proceed with Upgrade.

## Upgrade on UNIX or Linux

If you are upgrading from SolarWinds DPA 9.0 or earlier, you will use the new instance-based licenses provided with your upgrade. Before upgrading, log in to the [SolarWinds Customer Portal](#) and verify your instance-based keys listed as Category 1, Category 2, and VM Option.

1. Download the most recent version of SolarWinds DPA from the [SolarWinds Customer Portal](#).
2. Install the new version in a new directory on your existing server.
3. Run `./shutdown.sh` from the old installation directory.
4. Locate the directory that was created when you installed the new version:

`/home/dpa_x_x_xxx` = old installation home

`/home/dpa_10_1_xxx` = new SolarWinds DPA home

5. Copy or move these directories from the old installation to the new:

 Do not copy any hotfix files.

```
mv -fr OLD_home/iwc/tomcat/ignite_config/* NEW_home/iwc/tomcat/ignite_config/
```

```
mv -fr OLD_home/iwc/tomcat/logs/* NEW_home/iwc/tomcat/logs/
```

```
mv OLD_home/iwc/tomcat/licensing NEW_home/iwc/tomcat/
```

6. If you use Lightweight Directory Access Protocol (LDAPS), Secure Sockets Layer (SSL), or have changed the default SolarWinds DPA ports, then do the following:

- a. Copy `server.xml` to the new installation:

```
mv -fr OLD_home/iwc/tomcat/conf/server.xml NEW_home/iwc/tomcat/conf/
```

 If you are using LDAPS but not SSL, it is not necessary to copy `server.xml`.

- b. Copy the keystore to the new installation:

```
mv -fr OLD_home/iwc/tomcat/conf/.keystore NEW_home/iwc/tomcat/conf/
```

7. Run `./startup.sh` from the new directory.
8. Open a web browser and go to your SolarWinds DPA server.
9. Click Enter Activation Key.
10. Activate a key using the online or offline method, and click Done.
11. Click Proceed with Upgrade.

## Upgrade on an Amazon Machine Image instance

1. Open a remote desktop session to your SolarWinds DPA instance in Amazon EC2 and log in.
2. Download the most recent version of SolarWinds DPA from the [SolarWinds Customer Portal](#).
3. Run the installer and follow the wizard.

## Resize to a more powerful Amazon AWS instance type

The m3.medium Amazon EC2 instance type is sufficient only for monitoring up to 10 database instances. Resize your AWS Instance type as your monitoring needs grow.

For more information, search "Resizing Your Instance" at <http://aws.amazon.com/documentation>.

The brief steps are:

1. Go to the EC2 dashboard.
2. Stop the instance.
3. Click Actions > Instance Settings > Change Instance Type and then select a more suitable instance type.
4. Restart the instance and then reassociate any Elastic IP addresses.

## Licensing

SolarWinds DPA has a 14-day evaluation license. During the evaluation period, you can monitor and view data for an unrestricted number of database instances. After the end of the evaluation period, to continue monitoring you must purchase the appropriate quantity and type of licenses for your database instances.

### License types

Each database instance you monitor with SolarWinds DPA requires a license. You must buy a database instance license for each database instance you monitor. In addition, you may buy virtual machine licenses to monitor the virtual infrastructure hosting a database instance.

### Database instance licenses

Purchase an instance license for each database instance you want to monitor. SolarWinds sells licenses by category according to the database edition they are authorized to monitor.

#### Category 1 licenses

- Oracle: all editions except Standard and Express
- Sybase: all editions except Express
- IBM DB2: all editions except Express

#### Category 2 licenses

- MySQL: all editions
- Microsoft SQL Server: all editions
- Oracle: Standard and Express editions
- Sybase: Express edition
- IBM DB2: Express edition

 If you run out of Category 2 licenses, use Category 1 licenses instead. Category 1 licenses can monitor all database types.

### Virtual machine licenses

Purchase optional virtual machine (VM) licenses to see information related to the virtual infrastructure of database instances in the Virtualization view. You can use each license to see VM-related information for one database instance.

A VM license can be applied only to a database instance for which you purchased a database instance license.

## Purchase licenses

Contact our sales team to purchase licenses directly from SolarWinds.

 Only buy licenses for active database instances. Standby database instances used for disaster recovery or high availability do not need licenses.

- <http://www.solarwinds.com/onlinequotes>
- [sales@solarwinds.com](mailto:sales@solarwinds.com)
- 866-530-8100

## View purchased licenses

View your SolarWinds DPA licenses in the [SolarWinds customer portal](#).

The licenses for your SolarWinds DPA product are in the License Management section of the customer portal. The licenses are listed by category.

Category 1 is for Oracle, Sybase, and DB2.

Category 2 is for MySQL, SQL Server, Oracle Std/Express, Sybase Express, and DB2 Express.

## Activate your licenses

After activating, you can allocate your licenses on the License Allocation page for the database instances you want to monitor.

## Activate licenses online

1. Log in to the [SolarWinds customer portal](#).
2. Locate the license, and expand it.
3. Copy the activation key.
4. In SolarWinds DPA, click License Management > License Manager.
5. Click Enter Activation Key.
6. Select Online Activation, and click Next.
7. On the Online Activation page, paste the activation key into the correct field.
8. In the Amount to Activate section, select All Available or Specify Amount.

 Unactivated licenses can be activated later. You can reuse an activation key on a different SolarWinds DPA server and activate remaining licenses there.

9. Enter the remaining information, and click Activate.

## Activate licenses offline

Offline activation requires a transfer of files between the SolarWinds DPA server and a computer connected to the Internet. You can use email, shared storage, or a USB flash drive.

1. In SolarWinds DPA, click License Management > License Manager.
2. Click Enter Activation Key.
3. Select Offline Activation, and click Next.
4. On the Offline Activation page, copy the text string next to the license type you want to activate, and save it to a text file. This is your unique machine ID. Include the brackets. For example:  

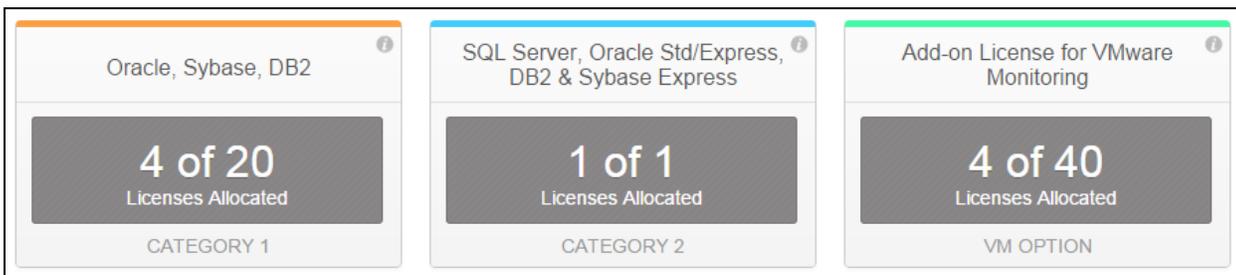
```
[7R12-X2QN-U8XM-WXTD-23H7-0TD7-59QH-6ERF-5BRN-2M17-328G-0DT2-MNMS-005C-000Z-04Q2-0000]
```
5. Transfer this text file to a computer with Internet access.
6. Log in to the [SolarWinds customer portal](#).
7. Locate the license, and expand it.
8. Click Activate license manually.
9. Paste the text string into the Unique Machine ID field, and enter the other required information.
10. Click Generate License File to download the license file.
11. Transfer the license file to the SolarWinds DPA server.
12. On the Offline Activation page, click Choose File and browse to the license file you just transferred.
13. Click Activate.

## Allocate licenses to database instances

Use License Allocation to configure how your licenses are allocated to database instances. Allocate your SolarWinds DPA licenses to your registered database instances. SolarWinds DPA starts monitoring new instances immediately after you allocate your licenses. Category 1 and 2 licenses collect the data shown in the Performance view. VM licenses collect the data shown in the Virtualization view.

### Current license allocation

1. Open a web browser and go to the SolarWinds DPA server.
2. On the Home page, click License Management.
3. See the current license allocations in the summary boxes near the top of the License Allocation page.



## Allocate licenses to database instances to monitor and collect information

1. On the License Allocation page, find the registered database instance to monitor.
2. Select the Category 1 or 2 check box next to the instance.
3. Click Save.

The license count updates after you allocate a license.

## Allocate VM licenses to VM database instances

If you have VM licenses, you must allocate a license to each database instance you want to collect virtual infrastructure-related data from. VM licenses are an addition to the regular SolarWinds DPA licenses required to normally monitor the database instance.

1. From the list, locate a VM-hosted database instance that has a Category 1 or 2 license allocated to it.
2. Select the VM check box next to the instance.
3. Click Save.

## Deallocate licenses

Deallocate licenses to make licenses available to register other database instances. Clear the Category 1 or 2 check box to deallocate licenses.

 If you clear a Category 1 or 2 license from an instance that also has a VM license, SolarWinds DPA automatically clears the VM license as well.

## Deactivate your licenses

Deactivate licenses on a SolarWinds DPA server to make the licenses available elsewhere.

If you used online activation for your licenses, you can deactivate online.

### Deactivate online

1. On the Home page, click License Management > License Manager.
2. In the Licenses section, locate the License Key you want to deactivate.
3. Click Deactivate.

### Deactivate offline

To deactivate a license offline in SolarWinds DPA 10.0 or earlier, contact [SolarWinds customer support](#).

To deactivate a license offline in SolarWinds DPA 10.1 and later, see [this knowledge base article](#).

## Troubleshoot over-allocated licenses

A red banner appears on the home page if SolarWinds DPA is monitoring more registered database instances than you have licenses to monitor. This can happen in two situations:

- A license expires when you have unexpired licenses of the same type on the server.
- You deactivate a license and have other licenses of the same type on the server.

If SolarWinds DPA licenses are over-allocated, you cannot view or analyze your database instances until you deallocate the extra licenses. SolarWinds DPA continues monitoring the databases, so you will not lose data while you bring the allocated licenses to an allowable level.

To correct an issue of over-allocated licenses, deallocate database instances until you reach the proper number of licenses. If Category 2 licenses are over-allocated, assign available Category 1 licenses to cover the shortage.

1. On the Home page, click License Management.
2. Locate the over-allocated license type on the allocations chart. Over-allocated license types are shown in red.
3. Clear Category 1, 2, or VM check boxes until the chart is no longer red.
4. Click Save.

You should now see your database instances in your views.

# Get started

## Get started

Answer critical performance questions about your database with SolarWinds Database Performance Analyzer. SolarWinds DPA helps you find the root cause of database delays that affect business applications.

In this section, you will learn how to:

- Identify the top three queries that delay application response time.
- Correlate these queries with system resources to gain perspective.
- Determine the wait bottlenecks that delay response time.
- Diagnose current performance issues.

SolarWinds DPA works with Oracle, SQL Server, MySQL, DB2 LUW, and Sybase. SolarWinds DPA is an agentless solution that causes less than 1% load on each monitored database. Best results are seen on a heavily used database with problems to solve.

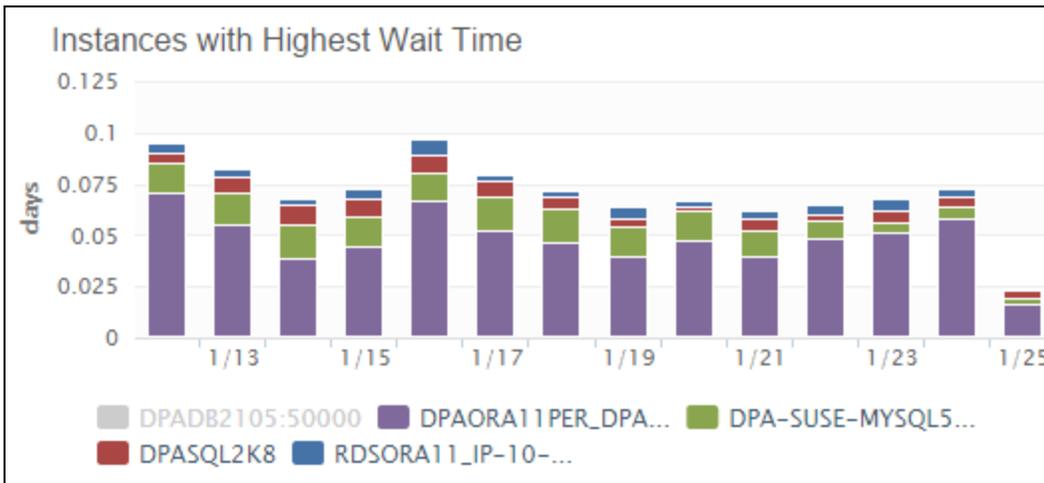
This section assumes SolarWinds DPA is installed and you have started monitoring a database.

## Identify the top three query problems

The efficiency of processing SQL queries is one of the most important indicators of database performance. SolarWinds recommends determining which queries are creating the largest delays in the database. The response-time measure is critical because it reflects where users wait on the database. Identifying and improving response time for SQL queries has the biggest affect on the service delivered by your database.

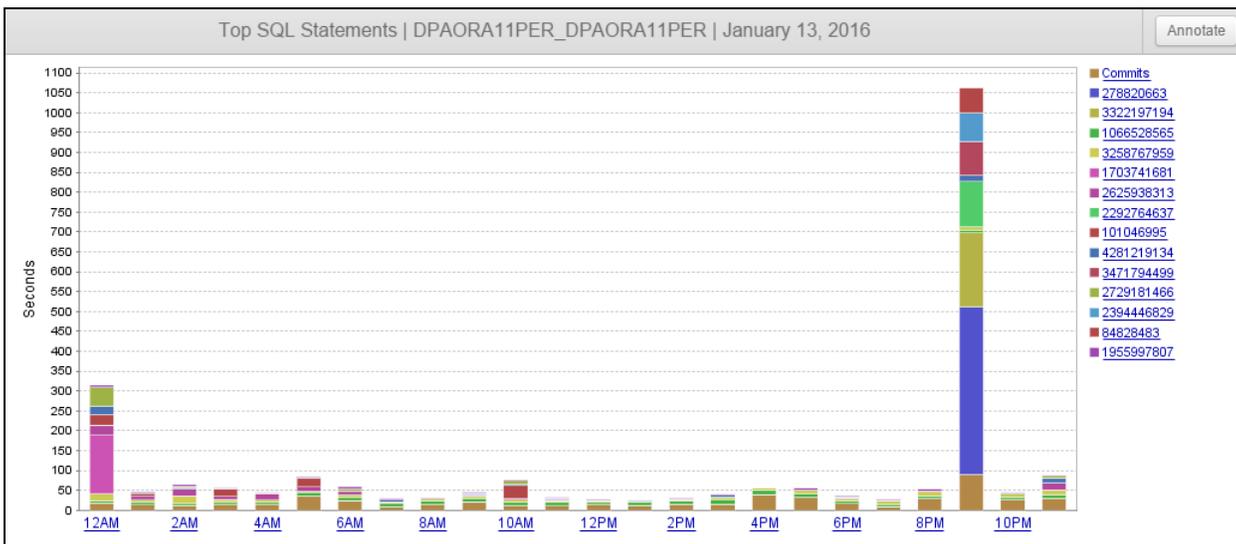
 Before continuing, let SolarWinds DPA capture at least two days of performance data so you have a representative sample.

The example below shows the instances with the highest wait time. The legend entries are sorted by total database wait time.



For the best results, record your results at each step of the process. To help you track your progress and record important information, use the [SolarWinds DPA worksheet](#).

Pick a day and click the bar that represents the instance with the highest wait time. The Trends view displays the top SQL statements for the day.



The length of each bar represents the total wait time across all sessions. The longer the bar, the longer the users had to wait for the database. The colors represent the individual SQL queries, identified by hash values accumulating the response time delay.

Note the top three SQL query hash values with the highest performance priority and enter this information into the [SolarWinds DPA worksheet](#).

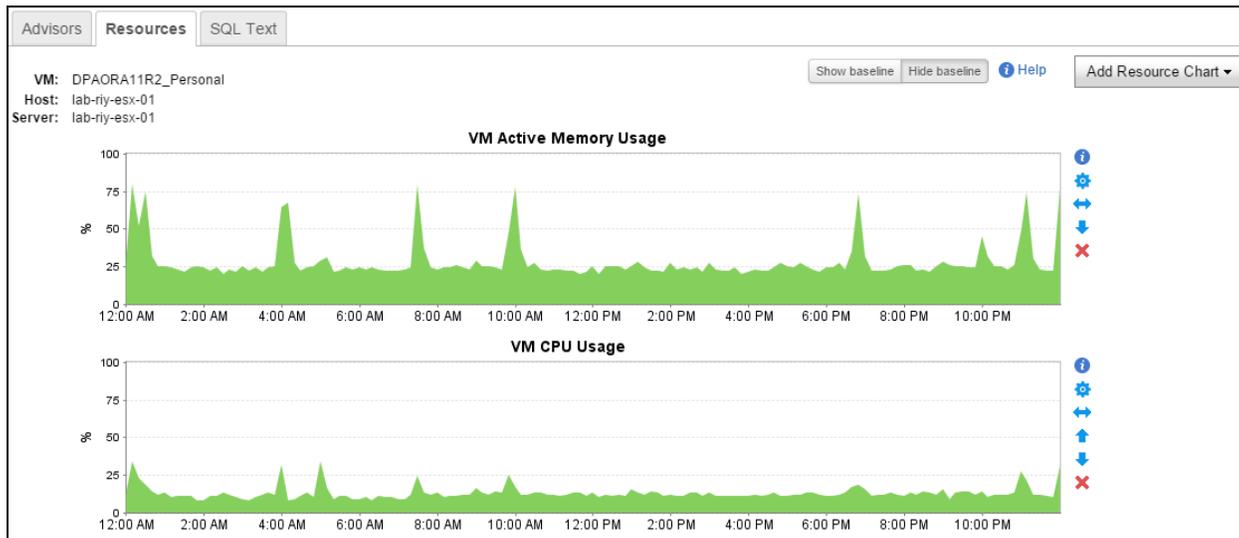
Click the SQL hash number in the legend to load the SQL Name dialog. Assign a name to your top queries to use in SolarWinds DPA reports.

Assign names to your top three SQL query problems.

# Correlate response time with system resources

You can compare the response time results with system resource usage such as CPU, I/O, and memory. You will learn if specific response time spikes are related to server resources by comparing chart results at the same times.

On the home screen, click a database instance. Below the Top SQL Statements chart, click the Resources tab to see the default resources. Make changes with the controls to the right of each resource.



Click Add Resource Chart to choose from the resources of most interest. Customize this page so you can quickly return and correlate with the response time chart.

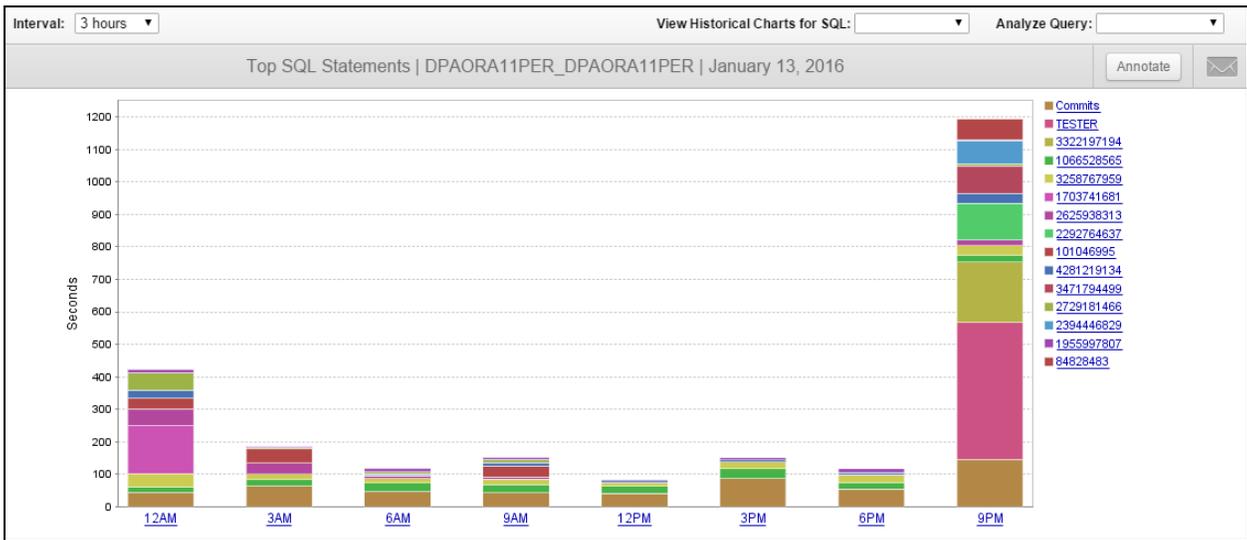
Viewing the specific top Wait Types/Events will help you determine which resources have the biggest effect on database response time. For example, if you have `db_file_sequential_read` as a top Wait Type/Event, you should monitor storage layer resource metrics.

Choose the two or three resources of most interest at your site and customize your tab. Note the resource names in the [SolarWinds DPA worksheet](#).

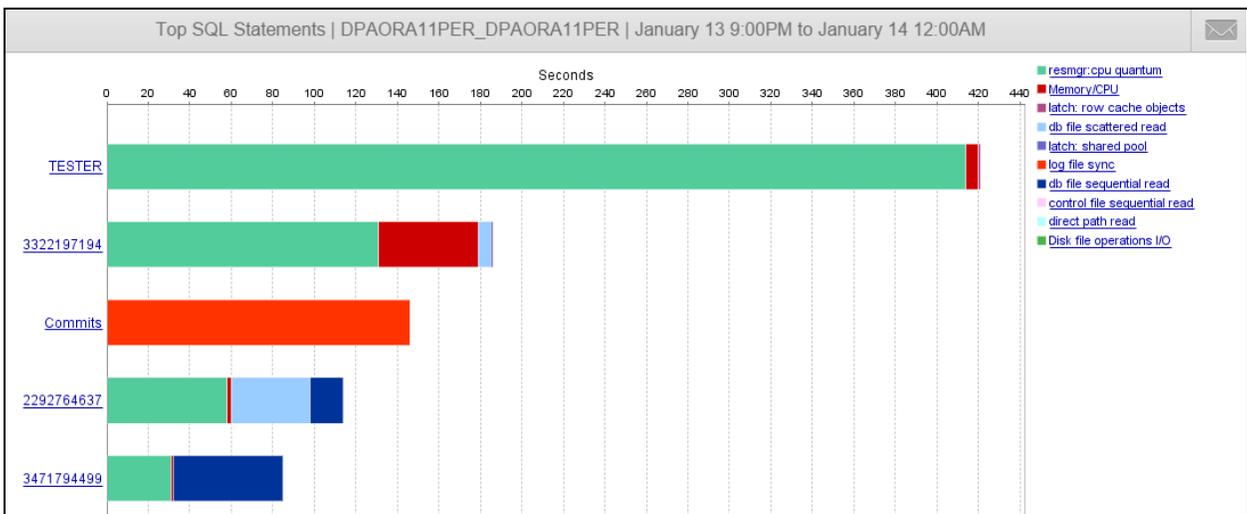
## Determine wait bottlenecks that delay response time

After you have the basics of identifying problem SQL queries based on response time analysis and impact, you can drill down for more detail about the problem and identify the cause of the bottleneck.

On the Top SQL Statements by Total Wait view, click a day to see more detail. The daily wait time chart loads, which shows the response time delay in each hour of the day and the SQL queries that created the delay. This is similar data, but is now focused on one day with each bar representing an hour. Select a value from the Interval list to adjust the time interval.



Was there an hour that had problems or that represents commonly found problems? Click an hour, such as 9PM above, for more information.



This view ranks the query bottlenecks in the chosen period. The SQL queries with the most accumulated wait time across all sessions are charted to show the total delay. Click the name or hash to see details on the SQL query.

**SQL: TESTER (278820663)** Name SQL

**Statistics**

Executions	8	Rows Processed	1,600
Parses	5	Disk Reads	0
Sorts	0	Buffer Gets	120,630

**SQL Text**

Live Plan Go

```

/* SQL Analyze(136,1) */
/* OracleOEM */
SELECT
/*+ INDEX(ts) */
o.object_type,

```

The SQL text and execution statistics are shown in the image above. Click a tab in the top row to see details based on programs, machines, sessions, and so on.

Click the Programs tab to see which programs were executing the query you chose and note the program name in the [SolarWinds DPA worksheet](#).

Now you have detailed visibility to the problem SQL query. Use the SolarWinds DPA screens to identify the cause of the bottleneck.

Use the breadcrumb trail in the top banner to go to previous screens and keep track of where you are. Click the time interval to return to the Top SQL Statements for that period.

**solarwinds** Database Performance Analyzer

Performance Virtualization

[DPAORA11PER\\_DPAORA11PER\(Oracle\)](#) Jan 13 9PM-12AM SQL TESTER

For the first query, note how the majority of the bar corresponds to a Wait called *resmgr:cpu quantum*. This is the item causing delay.

Timeslice: **SQL** Waits Programs DB Users O/S Users

View Historic

Top SQL Statements | DPAORA11PER

SQL Name: TESTER

Wait: resmgr:cpu quantum

Wait Time: 06:54 (mm:ss)

Total Wait Time for SQL: 07:01 (mm:ss)

% of Total Wait Time: 98%

SQL Text

```

/* SQL Analyze(136,1) */ /* OracleOEM */ SELECT /*+
INDEX(ts) */ o.object_type, u.name, o.object_name,
o.partition, o.lob_column, o.seg_type, ts.name, 4 FROM
(SELECT 1 "OBJECT_TYPE", o.owner# "USER_NAME#",
o.name "OBJECT_NAME", "" "PARTITION", "" "LOB_COLUMN",
1 "SEG_TYPE", ts# "TABLESPACE#" FROM sys."_CURRENT_EDITION_OBJ"
0, ...

```

Click the bar or axis label to drill

Refreshed on: 01/26/16 10:33:59 AM

(N/A)

Show SQL Text

- resmgr:cpu quantum
- Memory/CPU
- latch: row cache objects
- db file scattered read
- latch: shared pool
- log file sync
- db file sequential read
- control file sequential read
- direct path read
- Disk file operations I/O

Click the Wait in the legend to see an explanation of the bottleneck and solutions.

SolarWinds DPA isolated the top SQL queries creating increased user response time and displayed the Waits responsible for the response time in each one.

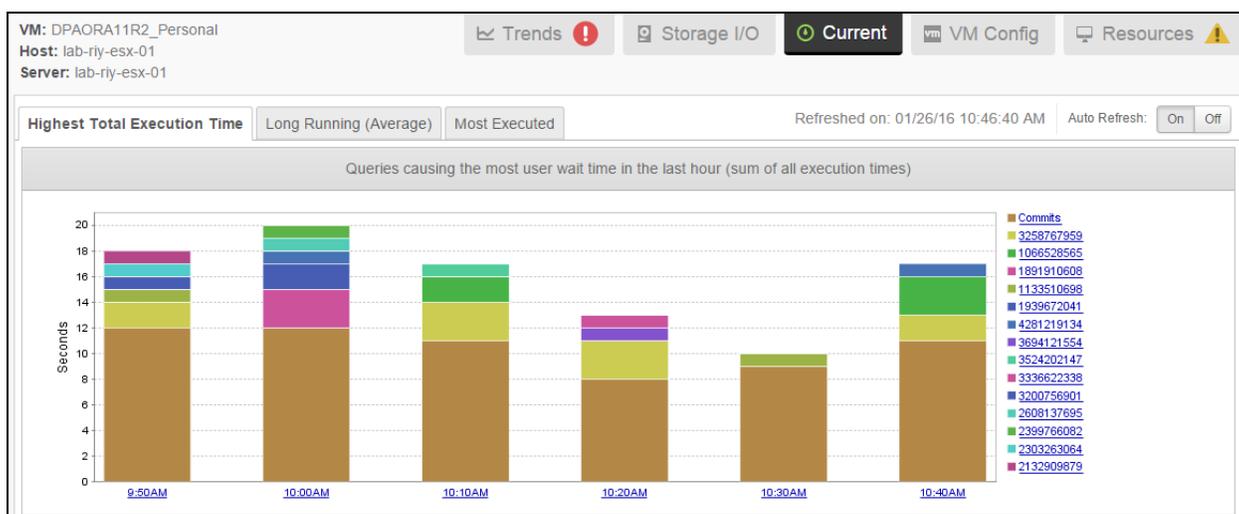
For the three SQL queries of interest, identify the two or three Waits that comprise more than 75% of the total response time. In many cases, one wait bottleneck is responsible for most of the delay.

## Diagnose current performance issues

In the previous sections the analysis focused on historical Trend view data. But when a problem is occurring, you must be able to diagnose it immediately.

To see current performance issues, click the Current view and examine response time and resources from the past hour.

On the home screen, click a database instance. Click the Current tab to see an overview of the last hour divided into 10-minute intervals.



Click an interval to drill down into the top SQL queries and performance for smaller time increments. Click the Timeslice tab to see a per-minute breakdown of the response time and resource data. Examine the response time charts, and scroll down to the resources to identify a possible correlation.

Evaluate the current performance situation. Record queries and resources that show performance problems in the [SolarWinds DPA worksheet](#).

## The SolarWinds DPA worksheet

Record your action steps from each of the preceding pages.

### Identify the top three query problems

Record three SQL statements by hash value:

- 1.
- 2.
- 3.

Assign names to the three SQL statements identified above:

- 1.
- 2.
- 3.

### Correlate response time with system resources

Record the system resources that correlate with bottlenecks in response time:

- 1.
- 2.
- 3.

### Determine wait bottlenecks that delay response time

Record the program generating the most wait time:

- 

Record the top waits for each SQL query:

SQL1 name:

WAIT	PERCENTAGE OF TIME

SQL2 name:

WAIT	PERCENTAGE OF TIME

SQL3 name:

WAIT	PERCENTAGE OF TIME

WAIT	PERCENTAGE OF TIME

**Diagnose performance issues**

Record current queries and wait events:

CURRENT QUERIES	CURRENT WAIT EVENTS

# Admin guide

## Users and groups

Create and manage different types of users who can access repository data. Assign users access to only view data or access to start and stop monitoring database instances or change the monitoring parameters. Each user in an installed instance of SolarWinds DPA must have a unique user name.

Create groups to send alert notifications to several users at once.

### Create a user

1. Click Options > Administration > User Administration.
2. Click Create User.
3. Enter a name and password, and select a role. Permissions are set based on role.
4. Customize permissions by selecting or clearing check boxes for one or more database instances.
5. Click Save.

If you configured SolarWinds DPA to point to your Active Directory or LDAP server, you will see an option to either create a user or a group. The group corresponds to a group in Active Directory or LDAP.

### Create a group

1. Click Options > Administration > Contacts and Contract Groups.
2. Click Create Group.
3. Enter a name and description.
4. Add available contacts, and click Save.

## User authentication options

SolarWinds DPA supports Active Directory (AD) and Lightweight Directory Access Protocol (LDAP) authentication. Using your existing authentication infrastructure eliminates the need to duplicate your user accounts in SolarWinds DPA. After you configure AD or LDAP authentication, users can log in with their domain account or a custom user account created by SolarWinds DPA.

### Active Directory user authentication

SolarWinds DPA integrates with Windows Active Directory (AD). SolarWinds DPA uses the security group information from AD to assign permissions to groups.

To configure SolarWinds DPA user authentication and permissions using AD, see [this knowledge base article](#).

### LDAP user authentication

SolarWinds DPA integrates with most LDAP implementations to assign permissions to groups.

To configure SolarWinds DPA user authentication and permissions using LDAP, see [this knowledge base article](#).

## Single sign-on

Using single sign-on (SSO), your AD users can log in to SolarWinds DPA without re-entering the domain credentials they used to log in to their operating system. Before configuring SSO, configure SolarWinds DPA for AD authentication.

To configure SolarWinds DPA for SSO, see [this knowledge base article](#).

## Common Access Cards

You can use a Common Access Card (CAC) to log in to Windows and SolarWinds DPA. Before using a CAC, configure SolarWinds DPA for AD, and then for SSO as described in the sections above.

# Reports

Click Reports from the top of the SolarWinds DPA main page.

### Reports tab

Under Create a New Report, select a Database Instance and Report Type. Some report types require an additional parameter, such as Wait Event or SQL Hash Value.

Click Report Options to change the default parameters, such as date range, interval, and time of day.

Under Reports, view saved reports. Filter reports by database instance.

### Report Groups tab

A report group is a group of reports that are displayed together. Group reports together to see related data on one page.

### Report Schedules tab

Report schedules are used to automatically email a report (or group of reports) at regular intervals. For example, you can create a schedule to email a list of the top 10 worst performing SQL statements every Monday at 9:00 a.m.

## Report types

SolarWinds DPA has many standard reports that include the most commonly used wait time statistics. You can customize the reports to see more detailed trends in your databases.

Below are some of the available reports:

## Top SQLs

This report shows the top five SQL statements ranked by total wait time across a custom interval. You can change the report to display the top 10 or select specific SQL statements from the SQL Statements tab on the Report Properties dialog. The report will show a descriptive name for the SQL if it has been defined.

## Top Waits for single SQL

This report identifies the top wait events (up to 50), ranked by wait time, for a specific SQL statement.

## Top SQLs for single Wait

This report identifies the top SQL statements for a single database wait.

## Typical Day of Wait

This report displays a bar graph showing the average hourly wait time for a database. It displays the distribution of average wait time versus time of day.

## Typical Day of Wait for single SQL

This report displays a stacked graph showing average hourly wait time for the top waits contributing to the total wait time for an individual SQL statement. The top of the bar is the sum of all other waits. This report can identify the peak loads during your business hours based on long-term observation of the system.

## Top Waits

This report charts waits for an entire database. SolarWinds DPA displays the waits with the highest accumulated wait time.

## Top Programs

This report displays the total accumulated wait time for programs.

## Top Files

This report displays the busiest files ranked by total I/O wait time. SolarWinds DPA calculates the total wait time for all I/O operations on each file for selected intervals.

## Trend reports

Use trend reports to communicate the long-term performance of your databases across your organization. You can capture the results of performance tuning, important database resources, or database trends and send reports to managers, team members, and customers. Trend reports supply evidence to support your work across the organization, highlighting database trends for up to five years. Trend report examples include the top five resource bottlenecks and the highest SQL statement utilization.

### Trend reports use summarized data

Trend reports are different from the detailed data displayed in the typical SolarWinds DPA charts. Trend reports are available for summarized data that extend over months or years. Detailed repository data are accessible for a shorter data storage period, typically 30 days. Trend reports can show data captured over longer intervals and display long-term trends.

To generate trend reports, SolarWinds DPA summarizes repository data to make long-term information available in a manageable size. The data are summarized by hour and available for 90 days. After 90 days, the data are summarized by day and available for five years.

### Minimum data to create a trend report

Trend reports show data trends over hours, days, months, and years. SolarWinds DPA requires a one-hour minimum of collection. Detailed repository data, with detail down to the second, display information within 10 minutes of initial collection. SolarWinds recommends letting the repository collection run for 24 hours before creating a trend report.

### Create a Top SQL Statements report

1. Click Reports from the top of the SolarWinds DPA main page.
2. Select the Database Instance, and select Top SQLs from the Report Type list.
3. Click Preview Report.
4. Click Save As, enter a report name and description, and click OK.

### Schedule a report for email delivery

1. Click Options from the top of the SolarWinds DPA main page.
2. Under Reports, Metrics & Alerts, click Report Schedules.
3. Click Create Schedule.
4. Name the schedule and enter an email subject and body text.
5. Select the delivery pattern, the day of week or month, the delivery time, and then click Add.
6. Under Available Reports, select the report created earlier, and click Add.
7. Under Available Contacts, select the recipients of the report, and click Add.
8. Click Create Schedule.

Does your network or firewall require an internal SMTP server? If so, see [this knowledge base article](#).

# Alerts

Click Alerts from the top of the SolarWinds DPA main page.

SolarWinds DPA alerts give you proactive control of the database, notifying you of issues before they become problems for database customers.

Set thresholds on key Wait Time statistics or on standard administration indicators so the DBA group receives an early warning of potential problems, and can take steps to solve the underlying issue before users are affected.

The result is improved customer service, fewer trouble tickets, and increased compliance with database service-level agreements.

## **Alert Status tab**

View the status and frequency of saved alerts. Filter alerts by database instance.

## **Manage Alerts tab**

Under Create a New Alert, select an Alert Category and Alert Type.

Under Alerts, view and edit saved alerts.

## **Alert Groups tab**

An alert group defines a set of alerts to be run against a set of database instances.

## **Alert Blackouts tab**

If you want to stop alerting for a period of time, create a blackout.

## **Alert types**

Alerts, like trend reports, are designed to be used out-of-the-box and allow a high degree of customization to give you a tool tailored to your specific needs. There are three preconfigured SolarWinds DPA alerts:

### **Wait time alerts**

Wait time alerts are based on the amount of time users or applications waited on the database. For example, the Average SQL Wait Time alert fires when a SQL statement causes wait time that exceeds a threshold. These alerts are critical because they ensure that you are only alerted when users and applications are being affected.

### **Database administration alerts**

Database administration alerts are typical alerts surrounding the health of the database system. For example, the Database Parameter Changes alert notifies you when any database parameter has changed. The Database Availability alert notifies you when the database instance is no longer accessible. For example, the database crashed or the network went down.

## Custom alerts

Custom Alerts are user-specified queries that are run against the monitored database or the Database Performance Analyzer Repository. The query returns a number (or set of numbers) that may trigger an alert depending on user-defined threshold settings.

For example, you can enter a query to detect the number of canceled orders in the last 10 minutes:

```
select count(*) from orders where status='CANCELLED' and date > sysdate - 10/1440;
```



You can write a SQL query to set alerts on SQL Server health metrics.

You can see which type of orders have high cancellation rates:

```
select order_type, count(*) from orders where status='CANCELLED' and date > sysdate - 10/1440 group by order_type;
```

Finally, you may want complex logic to determine if an order has truly been canceled. In this case, you can write a function or procedure on the monitored database instance.

- Oracle: `select mycustomfunction(param1) from dual`
- SQL Server: `select mycustomfunction(param1)`
- Sybase: `mycustomprocedure(param1)`
- DB2: `select dbo.mycustomfunction(param1) from SYSIBM.SYSDUMMY1`
- MySQL: `mycustomprocedure(param1)`

These functions or procedures are written in the native programming language of the database.

## Alert attributes

When creating an alert, you must specify the following attributes:

### Active

Active alerts are executed by SolarWinds DPA. Clear the Active check box to disable an alert but not delete it.

### Execution Interval

The interval indicates how often the alert is run. SolarWinds recommends a 10-minute interval so the alert does not put too much load on the monitored database instance. For Wait Time alerts, this value also indicates the time period SolarWinds DPA uses to examine data, from the time the alert runs. For example, if the execution interval is 10 minutes, SolarWinds DPA executes the alert every 10 minutes and also queries the last 10 minutes of performance data as alert input.

## Notification Text

This text is sent with the notification email or page. You can include an explanation of the alert and the suggested resolution.

## Database Instances to monitor

Specify the database instances to be monitored with this alert. Certain alert types allow you to add multiple database instances.

## Alert Levels

Alert levels specify the ranges of values that will trigger an alert notification. For example, a SQL statement has a service-level agreement to execute in under four seconds, but typically executes in less than two seconds. Enter 2 as the Min value and 4 as the Max value.

## Notification Group or Contact

SolarWinds DPA can send alerts to an individual, a group, or an enterprise management console such as SolarWinds Server & Application Monitor using SNMP traps.

## Notification Policy

You can change the notification policy by editing a single alert, or globally in Advanced Options.

## SNMP alerts

SolarWinds DPA alerts can be configured to send SNMPv2c traps to an SNMP-enabled Network Management Station (NMS) when an alert level is reached. The trap contains the name of the monitored database, alert name, alert level, and response instructions.

## Create an SNMP contact

The NMS that will receive the trap is represented as an SNMP contact in SolarWinds DPA.

1. Click Options from the top of the SolarWinds DPA main page.
2. Click the Administration tab.
3. Under Users & Contacts, click Contact and Contact Groups.
4. Click Create SNMP Contact.
5. Enter the required information, and click Send Test SNMP Trap.
6. Click Save.

The SNMP is now available as a notification group or contact.

## Alert on increases in SQL wait times

Use SolarWinds DPA to find the routine performance history. You also can generate summary reports to review queries.

You will determine the average execution response time for each of your SQL queries, and then set Alerts to warn you of significant deviations.

### Determine the average execution time for your queries

1. From the home screen, click a Database Instance.
2. Select the first query from the View Historical Charts for SQL list.
3. Scroll down to the Average Wait Time per Execution chart.  
This chart shows the average execution time for the SQL statement on each day. The black bar denotes the average wait for this query across the days in the chart.
4. Point the cursor to each bar to see details for the day.
5. Point the cursor to the black bar to see the baseline of average wait time for this query for all executions for the month.  
SolarWinds recommends alerting if the average wait time is twice as long as this baseline.  
For example, if the baseline of average wait time for the month is 1.5 seconds, set the alert to 3 seconds.

For each of the top three queries you identified, estimate the typical wait time. Choose a threshold, approximately twice as long, that you will use to create alerts.

### Create an alert based on the wait threshold

1. Click Alerts from the top of the SolarWinds DPA main page.
2. Click the Manage Alerts tab.
3. Verify Wait Time is selected as the Alert Category.
4. Select Average Wait Time for a Single SQL from the Alert Type list.
5. Click Create Alert.
6. Name the alert and enter notification text.
7. Set the Execution Interval to 10 minutes or more. This allows time for valid samples and prevents unnecessary alerts from a single slow execution.
8. Select an Available Database Instance, and click Add.
9. Under Alert Parameters, search for one of the three SQL queries you identified earlier.  

 SolarWinds DPA always returns the hash value from a search, even when you select a named query.
10. Under Alert Levels & Notifications, choose an alert level and enter a minimum time in seconds. This value should be twice as long as the baseline of average wait time for this query.  

 The average wait time is specific to the execution interval. If the interval is 10 minutes, SolarWinds DPA looks at the average wait time for the SQL statement chosen for that 10-minute period and compares these values to your thresholds.
11. Select a Notification Group or Contact.

12. Click Test Alert, and verify you received the email.
13. Click Save.
14. Repeat steps 3 - 13 for the other two SQL queries you identified.

## Advanced analysis

The main screen shows a table of the monitored database instances. You can see different database types on the same screen. You can start or stop monitoring here.

### Instance groups

You can group monitored databases using the Instance Groups feature. The repository above has database groups defined as the various database types, but you can define any mix of groups.

SolarWinds DPA automatically groups Oracle Real Application Clusters (RAC) instances, but does not automatically group other databases.

In addition, SolarWinds DPA 10.1 and later automatically groups Oracle multi-tenant container databases (CDB) containing pluggable databases (PDB).

### Monitoring

Monitoring is always active once started. It is not necessary to restart the SolarWinds DPA monitor if the repository instance or the monitored database instance was unavailable for a period of time. Monitoring resumes when both are available again.

If there is a period of time when monitoring should not occur, you can [stop monitoring a database instance](#).

### Logs

Next to a database instance, click Action > Log to see the SolarWinds DPA monitoring log. This helps determine why the monitor cannot start, or if data are missing.

Click Options > Support tab > Utilities > Log Viewer to see log entries for all monitored database instances.

## Stop monitoring a database instance for a period of time

A blackout is a period of time when SolarWinds DPA stops monitoring a certain database instance.

1. Click Options from the top of the SolarWinds DPA main page.
2. Under Database Instances, click Monitor Blackout Periods.
3. Select a database instance from the list on top.
4. Set a day and time to stop and start monitoring, and click Add New Blackout Period.

## Enable SNMP Monitoring in SCOM

You can set up SolarWinds DPA to use SNMP to monitor System Center Operations Manager (SCOM).

1. From the main menu, go to Options > Contacts and Contact Groups > Create SNMP Contact.
2. Enter the Trap Receiver information with the SCOM HOST IP address and port. The default port is 162.
3. Enter the community string that was set up on the SNMP Service on the SCOM host.
4. On the SolarWinds DPA server, make sure the SNMP service is running and the community string set matches the string you entered in the SNMP Contact window.

 This string is case sensitive.

## Automatic grouping of Oracle CDBs

SolarWinds DPA 10.1 and later automatically groups Oracle multi-tenant container databases (CDB) containing pluggable databases (PDB).

Newly registered PDB instances are automatically grouped by the corresponding CDB. If a DBA moves a PDB to a new CDB, SolarWinds DPA processes and groups the instance accordingly.

SolarWinds DPA creates a group for a CDB when you monitor two or more PDBs in the CDB. This group is used for all registered PDBs from the CDB.

## Turn off automatic grouping of Oracle CDBs

1. Click Options from the top of the SolarWinds DPA main page.
2. Click the Administration tab.
3. Under Configuration, click Advanced Options.
4. Click the ORACLE\_CDB\_AUTO\_GROUP system option.
5. Select False from the New Value list, and click Update.

After you set this option to false, grouping of registered database instances does not change. Only newly registered or updated database instances are affected, and are not grouped.

## Link together separate DPA servers

Use Central Server mode to link separate SolarWinds DPA servers together. This is useful if:

- You want to monitor more than 250 database instances. You can divide monitoring tasks between different SolarWinds DPA servers.
- Your monitored databases are distributed geographically. You can install separate SolarWinds DPA servers in each location.

The SolarWinds DPA Central Server collects information from your remote servers and consolidates the data into a single interface.

## Set up a Central Server

1. Install SolarWinds DPA on a server. This will be your Central Server.
2. Log in to that instance as an administrator.

3. Click Options > Administration > Manage Central.

Your SolarWinds DPA server should be listed as the Central DPA Server in the list of Registered Servers.

## Configure authentication for Central Server

You can authenticate to the Central Server and the remote servers using one account. The account must be added to each server as a SolarWinds DPA user, or through an Active Directory (AD) or LDAP group.

### Log in with a SolarWinds DPA user

You must create the user on the Central Server and each remote server. See [Create a user](#) for more information.

 The password must match on all servers.

Read-only permissions are sufficient to view data from the remote repositories.

### Log in with an Active Directory or LDAP user

You must first set up AD or LDAP on the Central Server and each remote server. See [User authentication options](#) for more information.

Next, create the AD or LDAP group of the user on the Central Server and each remote server. See [Create a group](#) for more information.

Read-only permissions are sufficient to view data from the remote repositories.

## Add remote DPA servers

The user credentials must match between the Central and remote DPA servers. See [Configure authentication for Central Server](#) for more information.

1. Click Options > Administration > Manage Central.
2. Click Add Server.
3. Enter information about the remote SolarWinds DPA server.
4. Click Test connection, and click Save.

 A successful test indicates that SolarWinds DPA can communicate with the remote server through the provider host and port. It does not indicate that DPA can authenticate users.

If the test fails, check the host name in the Server Name field. Does it contain an underscore ( \_ ) character? An underscore is not valid for host names. If you cannot rename the host, enter the IP address.

5. Repeat steps 1 - 4 for the remaining remote SolarWinds DPA servers.

The details of your remote SolarWinds DPA servers are not stored in the repository, but in a file on your Central Server, located here:

```
/iwc/tomcat/ignite_config/iwc/central/RemoteRepositories.json
```

This is a plain-text JavaScript Object Notation (JSON) file. No sensitive data is stored in this file.

## View the Central Server page

The default home page of a Central Server is the SolarWinds DPA home page. Navigate to the Central Server page to see information from all registered remote servers.

1. Log in to your SolarWinds DPA Central Server as an administrator.
2. Click Options > Administration > Manage Central.
3. Click the Central button.

## Central Server advanced configuration

You may need to change the Central Server configuration to make it run more efficiently in your environment.

To change the default behavior, you can edit the `system.properties` file in the `/iwc/tomcat/ignite_config/idc` directory of your Central Server and add the desired setting.

### Thread pool settings

These settings control the number of threads that are used by the Central Server to make web service calls to other remote servers. The default settings are set for a few concurrent users hitting up to 100 remote instances. If you have more than 100 instances or many concurrent users, SolarWinds recommends adjusting these settings.

SETTING	VALUE	DESCRIPTION
<code>com.confio.iwc.centralServiceTaskExecutor.corePoolSize</code>	20	The core number of threads that Central Server uses to make web service calls to remote servers.
<code>com.confio.iwc.centralServiceTaskExecutor.maxPoolSize</code>	40	The maximum number of threads that Central Server uses to make web service calls to the remote servers. Central Server adds more threads only when all core threads are in use and the task queue is full.
<code>com.confio.iwc.centralServiceTaskExecutor.queueCapacity</code>	1000	The maximum number of requests in the queue before Central Server either spawns new threads to help with the work or rejects the request. Tasks are rejected if all 40 threads cannot keep up with the requests being made.
<code>com.confio.iwc.centralServiceTaskExecutor.keepAliveSeconds</code>	120	The number of seconds to keep

SETTING	VALUE	DESCRIPTION
		an idle thread before removing it.

## General Central Server settings

SETTING	VALUE	DESCRIPTION
com.confio.iwc.central.enabled	true (default) false	Enables or disables the use of Central Server mode.
com.confio.iwc.token.login.supported	true (default) false	Enables or disables the use of encrypted login tokens when jumping from the Central Server to a remote instance.  If true, a web service call authenticates the user and creates a temporary token to identify the incoming user and bypass the login process.  If false, the user is always prompted to log in to the remote instance.
com.confio.iwc.show.all.errors	true false (default)	Determines which users see failures in the Unavailable SolarWinds DPA Servers section.  If true, all users see failures for all instances.  If false, only administrators see failures. Set this option to false if you do not want all users to know about other SolarWinds DPA instances in the organization.
com.confio.iwc.automatic.update	true (default) false	Enables or disables a process that performs simple checks on the file when SolarWinds DPA starts.  For example, flagging any local instances as the Central Server.
com.confio.iwc.alarm.level	Warning	The minimum message level to include on the Alarm Details tab. Valid values are below. If (empty) is set, details are disabled. <ul style="list-style-type: none"> <li>■ Critical</li> <li>■ Warning</li> <li>■ Normal</li> <li>■ (empty)</li> </ul>
com.confio.iwc.alarm.count	200	The number of detail rows to show on the Alarm Details tab.

## Client factory cache

A client factory creates web service clients that talk to remote instances on a per-user basis. One client factory is created per host:port combination (not per user), so the same factory is used to create individual clients for different users. Factory creation is expensive because an initial handshake is done between the client and server, and kept in a cache for reuse.

SETTING	VALUE	DESCRIPTION
com.confio.iwc.client.factory.cache.size	100	The maximum number of client factories held in the cache.  The default is 100, which equates to 100 unique remote SolarWinds DPA instances.  Increase this value if you are connecting to more than 100 remote instances.
com.confio.iwc.client.factory.cache.timeout	1800	The number of seconds a client factory remains in the cache without being used.  The default is 1800 seconds, which is equal to 30 minutes.
com.confio.iwc.client.factory.connection.timeout	15	The number of seconds a client attempts to establish a connection before it times out.  The default is 15.  Zero (0) specifies that the client will continue to attempt to open a connection indefinitely.
com.confio.iwc.client.factory.read.timeout	30	The number of seconds the client waits for a response before it times out.  The default is 30 seconds.  Zero (0) specifies that the client will wait indefinitely.
com.confio.iwc.client.factory.enable.chunking	true false (default)	Enables or disables HTTP chunking.  False is the safer option.
com.confio.iwc.client.factory.enable.log	true (default) false	Enables logging of inbound and outbound messaging to capture the web service calls. Log levels are still controlled in the <code>log4j.xml</code> file.  Set this value to false to disable logging.

# Troubleshooting tips

View logs in the `installDir/iwc/tomcat/logs/` directory.

Make sure a firewall is not running on the computer.

Make sure another process is not using the default SolarWinds DPA ports. If the ports are being used by another process:

- Change the default ports of 8123, 8124, and 8127 by editing:  
`installDir/iwc/tomcat/conf/server.xml`
- Update the following lines with new port numbers:

```
<Server port="8127" shutdown="SHUTDOWN">  
  <Connector port="8123"/>  
  <Connector port="8124"/>
```