

Guide to Microsoft System Center Management Pack for SQL Server 2016 Replication

Microsoft Corporation

Published: June, 2017

The Operations Manager team encourages you to provide any feedbacks on the management pack by sending them to [sqlmpsfeedback@microsoft.com](mailto:sqlmpsfeedback@microsoft.com).

Copyright

This document is provided "as-is". Information and views expressed in this document, including URL and other Internet website references, may change without notice. You bear the risk of using it.

Some examples depicted herein are provided for illustration only and are fictitious. No real association or connection is intended or should be inferred.

This document does not provide you with any legal rights to any intellectual property in any Microsoft product. You may copy and use this document for your internal, reference purposes. You may modify this document for your internal, reference purposes.

© 2017 Microsoft Corporation. All rights reserved.

Microsoft, Active Directory, Windows, and Windows Server are trademarks of the Microsoft group of companies.

All other trademarks are property of their respective owners.

Contents

[Guide History 5](#_Toc486006380)

[Getting started 6](#_Toc486006381)

[Supported Configurations 6](#_Toc486006382)

[Management Pack Scope 7](#_Toc486006383)

[Prerequisites 8](#_Toc486006384)

[Files in this Management Pack 8](#_Toc486006385)

[Mandatory Configuration 9](#_Toc486006386)

[Management Pack Purpose 10](#_Toc486006387)

[Monitoring Scenarios 10](#_Toc486006388)

[Discovery of SQL Server Replication objects 10](#_Toc486006389)

[Distributor Discovery and monitoring 11](#_Toc486006390)

[Publisher Discovery and monitoring 11](#_Toc486006391)

[Subscriber Discovery and monitoring 11](#_Toc486006392)

[Publication Discovery and monitoring 11](#_Toc486006393)

[Subscription Discovery and monitoring 11](#_Toc486006394)

[Many Publication Snapshots on the same drive 11](#_Toc486006395)

[SQL Server Agent state 12](#_Toc486006396)

[Maintenance Job failure 12](#_Toc486006397)

[Job failure 12](#_Toc486006398)

[Data Flow 13](#_Toc486006399)

[Logical structure 13](#_Toc486006400)

[Publication flow 14](#_Toc486006401)

[Replication Database Health 16](#_Toc486006402)

[Configuring the Management Pack 19](#_Toc486006403)

[Best Practice: Create a Management Pack for Customizations 19](#_Toc486006404)

[How to import a Management Pack 20](#_Toc486006405)

[How to enable Agent Proxy option 21](#_Toc486006406)

[How to configure Run As profile 21](#_Toc486006407)

[Security Configuration 21](#_Toc486006408)

[Run As Profiles 22](#_Toc486006409)

[Required permissions 22](#_Toc486006410)

[Low-Privilege Environments 23](#_Toc486006411)

[TLS 1.2 Protection 29](#_Toc486006412)

[Viewing Information in the Operations Manager Console 30](#_Toc486006413)

[Version-independent (generic) views and dashboards 30](#_Toc486006414)

[SQL Server 2016 Replication views 30](#_Toc486006415)

[Dashboards 31](#_Toc486006416)

[Replication Top Level Datacenter Dashboard 32](#_Toc486006417)

[Replication Components Datacenter Dashboard 32](#_Toc486006418)

[SQL Server 2016 Replication Datacenter Dashboard 33](#_Toc486006419)

[Links 33](#_Toc486006420)

[Appendix: Terms and Definitions 34](#_Toc486006421)

[Appendix: Management Pack Views and Dashboards 35](#_Toc486006422)

[Appendix: Management Pack Objects and Workflows 37](#_Toc486006423)

[Appendix: Run As Profiles 74](#_Toc486006424)

[Appendix: Known Issues and Troubleshooting 79](#_Toc486006425)

# Guide to Microsoft System Center Management Pack for SQL Server 2016 Replication

This guide is based on version 6.7.31.0 of the Management Pack for Microsoft SQL Server 2016 Replication.

## Guide History

| **Release Date** | **Changes** |
| --- | --- |
| June, 2017 (version 6.7.31.0 RTM) | * Added Distributor name caching to Subscription discovery * Restricted the length of some string class properties * Improved the internal structure of SQL scripts storage * Fixed variable types in SQL scripts * Fixed connectivity issues in SmartConnect module * Introduced minor updates to the display strings * Updated the visualization library |
| December, 2016 (version 6.7.15.0 RTM) | * Added support for configurations where computer host names are longer than 15 symbols * Fixed: Wrong source detection in logging * Updated the visualization library |
| June, 2016 (version 6.7.2.0) | * Decreased database timeout value for some workflows to match new connection logic |
| June, 2016 (version 6.7.1.0) | * Updated the visualization library |
| May, 2016 (version 6.7.0.0) | * Fixed percentage threshold comparison of deactivated subscriptions workflow in Distributor * Implemented support for TLS 1.2 in connection logic |
| April, 2016 (version 6.6.7.30) | * Reviewed threading implementation * Fixed issue: Distributor Discovery could fail for Replication * Fixed error logging, added more details * Fixed "Availability of the Distribution database" monitor issue: added missing overridable parameter * Assigned SDK profile to the Replication Database Health Discovery * Fixed replication monitoring issue: compatibility with SQL 2005 as a part of Replication * Fixed Publisher Discovery issue: unable to cast object of type 'System.DBNull' to type 'System.String' * Added timeout support for .Net modules * Fixed issue: SQL Server Event Log Collection Target was not discovered Associate due to invalid path in DataSource * Fixed Replication Agent State monitor type cookdown issue * Fixed issue: failing replacement warning in "One or more of the Replication Agents are retrying on the Distributor" monitor * Dashboards fixes: added bindings to the tiles; added Datacenter Classes (L1 dashboard for Replication) * Fixed upgradeability * Fixed Knowledge Base articles and display strings * Updated Known Issues and Troubleshooting section of the guide |
| January, 2016 (version 6.6.7.5) | Original release of this management pack |

## Getting started

In this section:

* [Supported Configurations](#_Supported_Configurations)
* [Management Pack Scope](#_Management_Pack_Scope)
* [Prerequisites](#_Prerequisites)
* [Mandatory Configuration](#_Mandatory_Configuration)

### Supported Configurations

This management pack is designed for the following versions of System Center Operations Manager:

* System Center Operations Manager 2012 (Except Dashboards)
* System Center Operations Manager 2012 SP1
* System Center Operations Manager 2012 R2
* System Center Operations Manager 2016

A dedicated Operations Manager management group is not required for this management pack.

The following table details the supported configurations for the Management Pack for Microsoft SQL Server 2016 Replication:

|  |  |
| --- | --- |
| **Configuration** | **Support** |
| SQL Server 2016 | 64-bit SQL Server 2016 Database Engine on 64-bit OS |
| Clustered servers | No |
| Agentless monitoring | Not supported |
| Virtual environment | Yes |

Note that neither SQL Server Express edition (SQL Server Express, SQL Server Express with Tools, SQL Server Express with Advanced Services) support SQL Server Agent, Log Shipping, Always On, OLAP Services and Data Mining, SQL Server In-Memory OLTP, Analysis Services and Integration Services.

Also, SQL Server Express and SQL Server Express with Tools don't support Reporting Services and Full text search. However, SQL Server Express with Advanced Services support Full text search and Reporting Services with limitations.   
All SQL Server Express editions support Database mirroring as Witness, and Replication as Subscriber only.

For more information, see features supported by SQL Server 2016 editions:

<https://msdn.microsoft.com/library/cc645993(v=sql.130).aspx>

### Management Pack Scope

Management Pack for Microsoft SQL Server 2016 Replication enables the monitoring of following features:

* SQL Server 2016 Replication

Important

Agentless monitoring is not supported by Management Pack for Microsoft SQL Server 2016 Replication.

Note

Please refer to “[Monitoring Scenarios](#_Monitoring_Scenarios)” section for a full list of monitoring scenarios supported by this management pack.

Note

For more information and detailed instructions on setup and configuration see “[Configuring the Management Pack for Microsoft SQL Server 2016 Replication](#_Configuring_the_Management)” section of this guide.

Note

This management pack doesn’t discover database engines and database objects. It is recommended to import the Microsoft System Center Management Pack for SQL Server 2016 management pack to enable discovery, monitoring and health rollup for SQL Server 2016 Replication databases. This management pack depends on management pack for SQL Server 2016, i.e. installation of management pack for SQL Server 2016 is required.

### Prerequisites

As a best practice, you should import the Windows Server Management Pack for the operating system you are using. The Windows Server Management Packs monitor aspects of the operating system that influence the performance of computers running SQL Server, such as disk capacity, disk performance, memory utilization, network adapter utilization, and processor performance.

### Files in this Management Pack

The Management Pack for Microsoft SQL Server 2016 Replication includes the following files:

| **File** | **Description** |
| --- | --- |
| Microsoft.SQLServer.2016.Replication.Discovery.mpb | This Management Pack discovers Microsoft SQL Server 2016 Replication objects. The management pack only contains the discovery logic and requires the separate monitoring management pack to be imported to monitor the discovered objects. |
| Microsoft.SQLServer.2016.Replication.Monitoring.mpb | The Microsoft SQL Server 2016 Replication (Monitoring) Management Pack enables the monitoring of Microsoft SQL Server 2016 Replication related objects and depends on the Microsoft SQL Server 2016 Replication (Discovery) Management Pack. |
| Microsoft.SQLServer.2016.Replication.Views.mpb | This management pack defines views for Microsoft SQL Server 2016 Replication. |
| Microsoft.SQLServer.2016. Replication.Presentation.mp | This Management Pack adds SQL Server 2016 Replication Dashboard. |
| Microsoft.SQLServer.Replication.Library.mpb | Microsoft SQL Server Replication Library contains base Replication components required for SQL Server 2016 Replication. |
| Microsoft.SQLServer.Replication.Library.Views.mpb | This management pack defines the version-independent views for Microsoft SQL Server Replication. |
| Microsoft.SQLServer.Replication.Library.Presentation.mp | This Management Pack adds SQL Server Replication Summary Dashboard. |
| Microsoft.SQLServer.Generic.Presentation.mp | This Management Pack defines common folder structure and views. |
| Microsoft.SQLServer.Generic.Dashboards.mp | This Management Pack contains generic SQL Server dashboards. |
| Microsoft.SQLServer.Visualization.Library.mpb | This Management Pack contains base visual components required for SQL Server dashboards. |

### Mandatory Configuration

To configure Management Pack for Microsoft SQL Server 2016 Replication complete following steps:

* Review the “[Configuring the Management Pack for Microsoft SQL Server 2016 Replication](#_Configuring_the_Management)” section of this guide.
* Grant required permissions as described in “[Security Configuration](#_Security_Configuration)” section of this guide.
* Enable the Agent Proxy option on all agents that are installed on servers, which host an Instance of SQL Server 2016 Replication. For more information about enabling Agent Proxy option see “[How to enable Agent Proxy option](#_How_to_enable)” section of this guide.
* Import the Management Pack.
* Associate SQL Server 2016 Replication Run As profiles with accounts that have appropriate permissions. For more information about configuring Run As profiles see “[How to configure Run As profile](#_How_to_configure)” section of this guide.

## Management Pack Purpose

In this section:

* [Monitoring Scenarios](#_Monitoring_Scenarios)
* [Data Flow](#_Data_Flow_1)

Note

For details on the discoveries, rules, monitors, views, and reports contained in this management pack, see following sections of this guide:

* [Appendix: Management Pack Objects and Workflows](#_Appendix:_Management_Pack)
* [Appendix: Management Pack Views and Dashboards](#_Appendix:_Management_Pack_1)

### Monitoring Scenarios

#### Discovery of SQL Server Replication objects

The Management Pack for Microsoft SQL Server 2016 Replication automatically discovers stand-alone and clustered replication instances across all managed systems that run the System Center Operations Manager agent service. This management pack enables the monitoring of Microsoft SQL Server 2016 Replication objects. The following objects are automatically discovered:

* Distributor
* Publisher
* Subscriber
* Publication
* Subscription

Each managed replication object is discovered and monitored using a number of rules and monitors. Please refer to the “[Appendix: Management Pack Objects and Workflows](#_Appendix:_Management_Pack)” section for the full list of rules and monitors targeted to replication objects.

#### Distributor Discovery and monitoring

For each managed database engine, the distributors on it are discovered and monitored using a number of rules and monitors. Please refer to the “[Appendix: Management Pack Objects and Workflows](#_Appendix:_Management_Pack)” section for the full list of rules and monitors targeted to distributor.

For more information, see [Distributor and Publisher Information Script in the MSDN Library](http://msdn.microsoft.com/library/ms151797.aspx)

#### Publisher Discovery and monitoring

For each managed database engine, the publishers on it are discovered and monitored using a number of rules and monitors. Please refer to the “[Appendix: Management Pack Objects and Workflows](#_Appendix:_Management_Pack)” section for the full list of rules and monitors targeted to publisher.

For more information, see [Distributor and Publisher Information Script in the MSDN Library](http://msdn.microsoft.com/library/ms151797.aspx)

#### Subscriber Discovery and monitoring

For each managed database engine, the subscribers on it are discovered and monitored using a number of rules and monitors. Please refer to the “[Appendix: Management Pack Objects and Workflows](#_Appendix:_Management_Pack)” section for the full list of rules and monitors targeted to subscriber.

#### Publication Discovery and monitoring

For each managed publisher instance, the publications on it are discovered and monitored using a number of rules and monitors. Please refer to the “[Appendix: Management Pack Objects and Workflows](#_Appendix:_Management_Pack)” section for the full list of rules and monitors targeted to publication.

#### Subscription Discovery and monitoring

For each managed subscriber instance, the subscriptions on it are discovered and monitored using a number of rules and monitors. Please refer to the “[Appendix: Management Pack Objects and Workflows](#_Appendix:_Management_Pack)” section for the full list of rules and monitors targeted to subscription.

#### Many Publication Snapshots on the same drive

Space monitoring introduced by this management pack may be noisy in environments where many publications’ snapshots share the same media. In such cases, an alert for a publication’s snapshot is generated when the amount of free space on the hard drive reaches the threshold. To reduce the noise, turn off the space monitors for “Snapshot Available Space (%)” and use Operating System Management Pack to monitor space on the hard drive.

#### SQL Server Agent state

The management pack defines a monitors targeted to Distributors and Subscribers. These monitors oversee the SQL Server agents and change the state when the SQL Server Agent is not running or running but the “Startup Type” is “Manual”. An alert is registered if an SQL Server Agent is not running.

You may also consider the “[Job failure](#_Job_failure)” scenario for per-job failure monitoring.

#### Maintenance Job failure

Replication uses the maintenance jobs that are monitored by the “**MSSQL 2016 Replication: The Maintenance Job(s) Failed on Distributor Alert Rule**”:

* Reinitialize subscriptions having data validation failures
* Agent history clean up: distribution
* Replication monitoring refresher for distribution.
* Replication agents checkup
* Distribution clean up: distribution
* Expired subscription clean up

For more information, see [Run Replication Maintenance Jobs (SQL Server Management Studio) in the MSDN Library](http://msdn.microsoft.com/library/ms151232.aspx)

#### Job failure

The management pack defines a monitor targeted at the Distributor and Subscriber. These monitors oversee the replication agents’ jobs and change the monitor state when the job has the following states:

* Job Exist But Never Run and Has Not Schedule
* Job Expired
* Job Failed
* Job is Disabled
* Job is Enabled but Schedule is Disabled
* Job Execution Failed and was Not in Accordance with the Schedule
* Job is Retry
* Job Never Run
* Job Never Run But Schedule Exist
* Job Successfully Done But Not in Accordance with the Schedule
* Job Execution was Stopped and was Not in Accordance with the Schedule
* Previous Job Execution Failed
* Previous Job Execution was Stopped
* Unknown State of the Job

Please refer to “[Appendix: Management Pack Objects and Workflows](#_Appendix:_Management_Pack)” section for the full list of rules and monitors targeted to Replication Agents.

### Data Flow

The following diagrams show the data flows in this management pack for:

* [Logical structure](#_Logical_structure)

* [Publication flow](#_Publication_flow_1)

* [Replication Database Health](#_Replication_Database_Health_1)

See [Terms and Definitions Appendix](#_Appendix:_Terms_and) for more details on the diagrams contents.

#### Logical structure



#### Publication flow







#### Replication Database Health

Replication Database Health is built for the Databases participating in replication process as published database.

##### Top-level structure



##### Virtual Distributor level structure



**Replication agent** files are located under <*drive*>:\Program Files\Microsoft SQL Server\100\COM. The following table lists the replication executable names and file names. Click the link for an agent to view its parameter reference.

|  |  |
| --- | --- |
| **Agent Executable** | **File Name** |
| [Replication Snapshot Agent](http://msdn.microsoft.com/library/ms146939.aspx) | snapshot.exe |
| [Replication Distribution Agent](http://msdn.microsoft.com/library/ms147328.aspx) | distrib.exe |
| [Replication Log Reader Agent](http://msdn.microsoft.com/library/ms146878.aspx) | logread.exe |
| [Replication Queue Reader Agent](http://msdn.microsoft.com/library/ms147378.aspx) | qrdrsvc.exe |
| [Replication Merge Agent](http://msdn.microsoft.com/library/ms147839.aspx) | replmerg.exe |

In addition to replication agents, a replication has a number of jobs that perform scheduled and on-demand maintenance.

[**Replication Maintenance Jobs**](javascript:void(0))

Replication uses the following jobs to perform scheduled and on-demand maintenance.

|  |  |  |
| --- | --- | --- |
| **Clean up job** | **Description** | **Default schedule** |
| Agent History Clean Up: Distribution | Removes replication agent history from the distribution database. | Runs every ten minutes |
| Distribution Clean Up: Distribution | Removes replicated transactions from the distribution database. Deactivates subscriptions that have not been synchronized within the maximum distribution retention period. | Runs every ten minutes |
| Expired Subscription Clean Up | Detects and removes expired subscriptions from publication databases. | Runs every day at 1:00 A.M. |
| Reinitialize Subscriptions Having Data Validation Failures | Detects all subscriptions that have data validation failures and marks them for re-initialization. The next time the Merge Agent or Distribution Agent runs, a new snapshot will be applied at the Subscribers. | No default schedule (not enabled by default). |
| Replication Agents Checkup | Detects replication agents that are not actively logging history. It writes to the Microsoft Windows event log if a job step fails. | Runs every ten minutes. |
| Replication monitoring refresher for distribution | Refreshes cached queries used by Replication Monitor. | Runs continuously. |

##### Virtual Publisher level structure



##### Virtual Subscriber level structure



## Configuring the Management Pack

This section provides guidance on configuring and tuning this management pack.

In this section:

* [Best Practice: Create a Management Pack for Customizations](#_Best_Practice:_Create)

* [How to import a Management Pack](#_How_to_import)
* [How to enable Agent Proxy option](#_How_to_enable)
* [How to configure Run As profile](#_How_to_configure)
* [Security Configuration](#_Security_Configuration)
  + [Run As Profiles](#_Run_As_Profiles)

* + [Required permissions](#_Required_permissions)

### Best Practice: Create a Management Pack for Customizations

The Management Pack for Microsoft SQL Server 2016 Replication is sealed so that you cannot change any of the original settings in the management pack file. However, you can create customizations, such as overrides or new monitoring objects, and save them to a different management pack. By default, the Operations Manager saves all customizations to the default management pack. As a best practice, you should instead create a separate management pack for each sealed management pack you want to customize.

Creating a new management pack for storing overrides has the following advantages:

 When you create a management pack for the purpose of storing customized settings for a sealed management pack, it is helpful to base the name of the new management pack on the name of the management pack that it is customizing, such as “Microsoft SQL Server 2016 Replication Overrides”.

* Creating a new management pack for storing customizations of each sealed management pack makes it easier to export the customizations from a test environment to a production environment. It also makes it easier to delete a management pack, because you must delete any dependencies before you can delete a management pack. If customizations for all management packs are saved in the Default Management Pack and you need to delete a single management pack, you must first delete the Default Management Pack, which also deletes customizations to other management packs.

For more information about sealed and unsealed management packs, see [Management Pack Formats](http://go.microsoft.com/fwlink/?LinkId=108355). For more information about management pack customizations and the default management pack, see [About Management Packs](http://go.microsoft.com/fwlink/?LinkId=108356).

How to Create a New Management Pack for Customizations

|  |
| --- |
| 1. Open the Operations console, and then click the Administration button.  2. Right-click Management Packs, and then click Create New Management Pack.  3. Enter a name (for example, MSSQL2016 Replication MP Customizations), and then click Next.  4. Click Create. |

### How to import a Management Pack

For more information about importing a management pack, see [How to Import an Operations Manager Management Pack](http://technet.microsoft.com/library/hh212691.aspx).

### How to enable Agent Proxy option

To enable **Agent Proxy option** complete following steps:

1. Open the Operations Console and click the **Administration** button.

2. In the Administrator pane, click Agent Managed.

3. Double-click an agent in the list.

4. On the Security tab, select Allow this agent to act as a proxy and discover managed objects on other computers.

### How to configure Run As profile

To configure **Run As profile** complete following steps:

1. Identify the names of the target computers where the default action account has insufficient rights to monitor SQL Server 2016 Replication.
2. For each system, create or use an existing set of credentials that have at least the set of privileges discussed in the “[Security Configuration](#_Security_Configuration)” section of this management pack guide.
3. For each set of credentials identified in step 2, make sure a corresponding **Run As Account** exists in the management group. Create the **Run As Account** if necessary.
4. Setup the mappings between the targets and the **Run As Accounts** on the Run As Accounts tab of each of the **Run As Profiles**.

Note

Please refer to “[Run As Profiles](#_Run_As_Profiles)” section for the detailed explanation of what Run As profiles are defined in Management Pack for Microsoft SQL Server 2016 Replication.

Note

Please refer to “[Appendix: Run As Profiles](#_Appendix:_Run_As)” section for the full list of discoveries, rules and monitors to identify rules and monitors associated with each **Run As Profile**.

### Security Configuration

This section provides guidance on configuring the security for this management pack.

In this section:

* [Run As Profiles](#_Run_As_Profiles)
* [Required Permissions](#_Required_permissions)
* [Low-Privilege Environments](#_Low-Privilege_Environments)
* [TLS 1.2 Protection](#_TLS_1.2_Protection)

#### Run As Profiles

When the Management Pack for Microsoft SQL Server 2016 Replication is imported for the first time, it creates four new Run As profiles:

* Microsoft SQL Server Replication Discovery Run As Profile
* Microsoft SQL Server Replication Distributor Availability from Subscriber Monitoring Run As Profile
* Microsoft SQL Server Replication Monitoring Run As Profile
* Microsoft SQL Server Replication SCOM SDK Discovery Run As Profile

By default, all discoveries, monitors and rules defined in the SQL Server 2016 Replication management pack use accounts defined in the “Default Action Account” Run As profile. If the default action account for a given system does not have the necessary permissions to discover or monitor the objects of SQL Server 2016 Replication, then those systems can be bound to more specific credentials in “Microsoft SQL Server Replication …” Run As profiles.

**Note**

For more information about configuring Run As profiles see “[How to configure Run As profile](#_How_to_configure)” section of this guide.

Note

Please refer to “[Appendix: Run As Profiles](#_Appendix:_Run_As)” section for the full list of discoveries, rules and monitors to identify rules and monitors associated with each **Run As Profile**.

#### Required permissions

This section describes how to configure required permissions for the Management Pack for Microsoft SQL Server 2016 Replication. All workflows (discoveries, rules and monitors) in this management pack are bound to Run As profiles described in “[Run As Profiles](#_Run_As_Profiles)” section. To enable the monitoring, appropriate permissions should be granted to Run As accounts and these accounts should bound to respective Run As Profiles. Subsections below describe how to grant permissions at Operating System and SQL Server level.

Note

Please refer to “[Run As Profiles](#_Run_As_Profiles)” section for the detailed explanation of what Run As profiles are defined in Management Pack for Microsoft SQL Server 2016 Replication.

**Note**

For more information about configuring Run As profiles see “[How to configure Run As profile](#_How_to_configure)” section of this guide.

Note

Please refer to “[Appendix: Run As Profiles](#_Appendix:_Run_As)” section for the full list of discoveries, rules and monitors to identify rules and monitors associated with each **Run As Profile**.

#### Low-Privilege Environments

##### To configure permissions in Active Directory

1. In Active Directory, create four domain users that will be commonly used for low-privilege access to all target SQL Server instances:
2. SSReplDiscovery
3. SSReplAvDB
4. SSReplMonitoring
5. SSReplSDK
6. Create a domain group named SSReplMPLowPriv and add the following domain users:
7. SSReplDiscovery
8. SSReplMonitoring
9. SSReplAvDB
10. SSReplSDK
11. Grant special permission: Read-only Domain Controllers – “Read Permission” to the SSReplMPLowPriv

##### To configure permissions on the agent machine

1. On the agent machine, add the SSReplMonitoring domain user to the “Performance Monitor Users” local group.
2. Add the SSReplMonitoring domain user to “EventLogReaders” local group.
3. Go to HKEY\_LOCAL\_MACHINE\System\CurrentControlSet\Services\EventLog, Open Permissions settings, add Low-Privilege group SSReplMPLowPriv to the security list, and grant a special permission (besides the default one):
4. - Set Value
5. - Create Subkey
6. - Read Control
7. Add the SSReplMPLowPriv domain group as a member to the local **Users** group.
8. Go to Local Computer Policy – Windows Settings – Security Settings – Local Policies – User Rights Assignment and configure the “Allow log on locally” policy to add the SSReplMPLowPriv domain group in order to log on locally.
9. Grant Read permission on “**HKLM:\Software\Microsoft\Microsoft SQL Server”** registry path for SSReplMPLowPriv.
10. Grant “Execute Methods”, “Enable Account”, “Remote Enable”, “Read Security” permissions to SSReplMPLowPriv for the following WMI namespaces:
    * **root**
    * **root\cimv2**
    * **root\default**
    * **root\Microsoft\SqlServer\ComputerManagement11(12)**
11. Grant permissions to **SSReplSDK** for all SQL Server services.

Read the existing privileges for a given service (using **SC sdshow**) and then grant additional privileges to the **SSReplSDK** user for that server.

For example, suppose the results of the **SC sdshow** command for SQL Server service are as follows:

**D:(A;;CCLCSWRPWPDTLOCRRC;;;SY)(A;;CCDCLCSWRPWPDTLOCRSDRCWDWO;;;BA)(A;;CCLCSWLOCRRC;;;IU)(A;;CCLCSWLOCRRC;;;SU)S:(AU;FA;CCDCLCSWRPWPDTLOCRSDRCWDWO;;;WD)**

In this case, the following command line grants sufficient access to **SSReplSDK** for remote reading information about the SQL Server service (please replace colored strings with appropriate values and keep everything on a single text line):

**sc sdset SQLServerServiceName D:(A;;GRRPWP;;;SID for SSReplSDK)(A;;CCLCSWRPWPDTLOCRRC;;;SY)(A;;CCDCLCSWRPWPDTLOCRSDRCWDWO;;;BA)(A;;CCLCSWLOCRRC;;;IU)(A;;CCLCSWLOCRRC;;;SU)S:(AU;FA;CCDCLCSWRPWPDTLOCRSDRCWDWO;;;WD)**

Also, if you didn't change the settings before, it is necessary to change Service Control Manager default security settings to get non-administrators remote access to the Service Control Manager:

**sc sdset SCMANAGER D:(A;;CCLCRPRC;;;AU)(A;;CCLCRPWPRC;;;SY)(A;;KA;;;BA)S:(AU;FA;KA;;;WD)(AU;OIIOFA;GA;;;WD)**

For more information, see [Sc sdset](http://go.microsoft.com/fwlink/?LinkId=193876) page.

Note

You can obtain SID of a user through WMIC USERACCOUNT command.   
For example,  
wmic useraccount where (name='SSReplSDK' and domain='%userdomain%') get name,sid

Note

The monitoring account user must have the following permissions to 'C:\Windows\Temp' folder:

* + Modify
  + Read & Execute
  + List Folder contents
  + Read
  + Write

##### To configure the low-privilege environment on the agent machine in cluster

1. For each node in the cluster, execute the steps outlined in “[To configure the low-privilege environment on the agent machine](#_To_configure_permissions)” section.
2. Grant “Remote Launch” and “Remote Activation” DCOM permissions to the SSReplMPLowPriv using DCOMCNFG. Please note that both defaults and limits should be adjusted. Under DCOM config, select Windows Management and Instrumentation properties; on Security tab, grant “Remote Launch” and “Remote Activation” to the SSReplMPLowPriv group.
3. Allow Windows Remote Management through the Windows Firewall.
4. Grant “Read” and “Full Control” access for the cluster to the SSReplMPLowPrivusing Failover Cluster Manager.

##### To configure permissions on the SQL Server 2016 Replication Distribution Database

1. In SQL Server Management Studio, for the instance of SQL Server Database Engine (which appears to be the Distributor), create a login for “SSReplMPLowPriv”.
2. Create an SSReplMPLowPriv user in all Distribution Databases.
3. Assign db\_datareader and replmonitor roles for SSReplMPLowPriv on all distribution databases (see [How to: Allow Non-Administrators to Use Replication Monitor (Replication Transact-SQL Programming)](https://technet.microsoft.com/en-us/library/ms147320%28v=sql.105%29.aspx) for more details).
4. On all instances, it is necessary to assign SQLAgentReaderRole and db\_datareader roles to msdb for the **SSReplMPLowPriv**.
5. In Studio, grant the **SSReplMPLowPriv** user db\_owner rights to all subscription and publication databases (see [Security Role Requirements for Replication](https://msdn.microsoft.com/en-us/library/ms152528%28v=sql.90%29.aspx) for more details). Also, if the current **SSReplMPLowPriv** user has not been created – create it.
6. Create a new executor role if it has not been created.

USE msdb;

go

CREATE ROLE db\_executor;

GRANT EXECUTE TO db\_executor;

go

Then, grant execute permissions for **SSReplMPLowPriv** user by means of this role.

USE msdb;

go

EXEC sp\_addrolemember 'db\_executor', ' yourdomain\SSReplMPLowPriv';

go

1. For each Publication, select Properties – Publication Access List and add **SSReplMPLowPriv** user to the list.
2. Also, other permissions need to be granted in all Replication instances.

use master

go

grant select on master.dbo.sysperfinfo to [yourdomain\SSReplMPLowPriv]

go

grant execute on master.dbo.xp\_sqlagent\_notify to [yourdomain\SSReplMPLowPriv]

go

grant execute on master.dbo.xp\_sqlagent\_enum\_jobs to [yourdomain\SSReplMPLowPriv]

go

grant execute on master.dbo.xp\_sqlagent\_param to [yourdomain\SSReplMPLowPriv]

go

grant execute on master.dbo.xp\_sqlagent\_is\_starting to [yourdomain\SSReplMPLowPriv]

go

grant execute on master.dbo.xp\_instance\_regenumvalues to [yourdomain\SSReplMPLowPriv]

go

use msdb

go

grant execute on msdb.dbo.sp\_help\_alert to [yourdomain\SSReplMPLowPriv]

go

grant execute on msdb.dbo.sp\_help\_notification to [yourdomain\SSReplMPLowPriv]

go

grant select on msdb.dbo.sysalerts to [yourdomain\SSReplMPLowPriv]

go

grant select on msdb.dbo.sysoperators to [yourdomain\SSReplMPLowPriv]

go

grant select on msdb.dbo.sysnotifications to [yourdomain\SSReplMPLowPriv]

go

grant select on msdb.dbo.sysjobschedules to [yourdomain\SSReplMPLowPriv]

go

grant select on msdb.dbo.sysschedules to [yourdomain\SSReplMPLowPriv]

go

grant select on msdb.dbo.sysjobhistory to [yourdomain\SSReplMPLowPriv]

go

grant select on msdb.dbo.sysjobservers to [yourdomain\SSReplMPLowPriv]

go

grant execute on msdb.dbo.agent\_datetime to [yourdomain\SSReplMPLowPriv]

go

grant select on msdb.dbo.sysjobs to [yourdomain\SSReplMPLowPriv]

go

**Note**

The Distributor may have more than one Distribution database (one for specific Publisher).

##### To configure permissions on the System Center Operations Manager Management Server

1. Grant Local Administrator permissions to SSREPLSDK account.

##### To configure permissions on the System Center Operations Manager

1. Open SCOM Console and navigate to “Administration” pane.
2. Select “User Roles” view (located under “Security” folder).
3. Right click on “Operations Manager Operators” role and click “Properties” in the context menu.
4. In the “General Properties” tab click “Add” button.
5. Find SSREPLSDK user and click “OK”.
6. Click “OK” button to apply the changes, and close “User Role Properties” dialog.

##### To configure System Center Operations Manager

1. Import the SQL Server Management Pack if it has not been imported.
2. Create SSReplDiscovery, SSReplMonitoring, SSReplAvDB and SSREPLSDK Run As accounts with “Windows” account type. For more information about how to create a Run As account, see [How to Create a Run As Account in Operations Manager 2007](http://go.microsoft.com/fwlink/?LinkId=193877) or [How to Create Run As Account in Operations Manager 2012](http://technet.microsoft.com/library/hh321655.aspx). For more information about various Run As Account types, see [Run As Accounts and Run As Profiles in Operations Manager 2007](http://go.microsoft.com/fwlink/?LinkId=193879) or [Managing Run As Accounts and Profiles in Operations Manager 2012](http://technet.microsoft.com/library/hh212714.aspx).
3. Perform the following procedure to the created SSReplDiscovery, SSReplMonitoring and SSReplAvDB Run As accounts: open Properties - Distribution tab in the created Run As account, and add computer names that are to be discovered. Perform the following procedure to SSREPLSDK Run As account: open Properties - Distribution tab in the created Run As account, and add the management server with the management group (SCOM).
4. On the System Center Operations Manager console, configure the Run As profiles as follows:
   1. Set “Microsoft SQL Server Replication Discovery Run As Profile” to use the SSReplDiscovery Run As account.
   2. Set “Microsoft SQL Server Replication Distributor Availability from Subscriber Monitoring Run As Profile” to use the SSReplAvDb Run As account.
   3. Set “Microsoft SQL Server Replication Monitoring Run As Profile” to use the SSReplMonitoring Run As account.
   4. Set “Microsoft SQL Server Replication SCOM SDK Discovery Run As Profile” to use the **SSREPLSDK** Run As account.

#### TLS 1.2 Protection

Operating protection of connections in SQL Server is provided by means of TLS protocol. In order to have the ability to use TLS 1.2 protocol, your environment should meet the following prerequisites:

1. SQL Server should be updated to version that supports TLS 1.2.
2. Make sure that your environment meets the prerequisites provided in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| **OS Version** | **SCOM Version** | **.NET Version** | **PowerShell version** |
| Windows 2012 and above | **version**>= MINIMAL\_SUPPORTED\*\* | (2.0<=**version**<4.0) with TLS 1.2 update\* and (4.0<=**version**<4.6) with TLS 1.2 update\* | >=3.0 |
| Windows 2012 and above | **version**>= MINIMAL\_SUPPORTED\*\* | (2.0<=**version**<4.0) with TLS 1.2 update\* and **version**>=4.6 | >=3.0 |
| Windows 2008R2 and below | **version**>=2012 SP1 UR10 **version**>=2012 R2 UR7 | (2.0<=**version**<4.0) with TLS 1.2 update\*and **version**>=4.6 | >=2.0 |
| Windows 2008R2 and below | **version**>=2012 SP1 UR10 **version**>=2012 R2 UR7 | (2.0<=**version**<4.0) with TLS 1.2 update\* and (4.0<=**version**<4.6) with TLS 1.2 update\* | >=2.0 |
| Windows 2008R2 and below | **version**<2012 SP1 UR10 2012 R2<=**version**<2012 R2 UR7 | (2.0<=**version**<4.0) with TLS1.2 update\* | 2.0 |

\* .NET Framework TLS 1.2 updates can be downloaded from [TLS 1.2 support for Microsoft SQL Server](https://support.microsoft.com/kb/3135244) page (**Client component downloads** section).

\*\* Minimal supported SCOM versions are stated in Supported Configurations section.

## Viewing Information in the Operations Manager Console

### Version-independent (generic) views and dashboards

This management pack uses common folder structure introduced with the first release of Management Pack for SQL Server 2016. Following views and dashboards are version-independent and show information about all versions of SQL Server:

 SQL Server Replication

Active Alerts

All Replication Related Objects

 SQL Server Replication Database Health

“All Replication Related Objects” diagram view provides an information about all SQL Server Replication objects and their relations.

“SQL Server Replication Database Health” state view provides information about all databases participating in replication as published database. From this view, it is easy to open the diagram view specific to the published database.

### SQL Server 2016 Replication views

The Management Pack for Microsoft SQL Server 2016 Replication introduces the comprehensive set of state, performance and alert view, which can be found in the dedicated folder:

Monitoring

Microsoft SQL Server

SQL Server Replication

 SQL Server 2016 Replication

 SQL Server Replication Views

Note

Please refer to “[Appendix: Management Pack Views and Dashboards](#_Appendix:_Management_Pack_1)” section of this guide for the full list of views.

Note

Some views may contain very long list of objects or metrics. To find a specific object or group of objects, you can use the Scope, Search, and Find buttons on the Operations Manager toolbar. For more information, see the “[Finding Data and Objects in the Operations Manager Consoles](http://technet.microsoft.com/library/hh212890.aspx)” article in the Operations Manager Help.

### Dashboards

This management pack includes a set of rich dashboards, which provide detailed information about SQL Server 2016 Replication. Each dashboard has a navigation widget (located in the leftmost part of the dashboard), which can be used to switch the current presentation context, i.e. the information displayed by other widgets depends on the object selected in the navigation widget.

Note

The Replication dashboards have three personalization settings:

* “Refresh Rate” – this setting defines how often dashboard refreshes data on a client. This setting does not change the actual collection frequency of metrics on a server.
* “Time Interval” – this setting defines for which period to display data. The Performance widget on the “Instance” view depends on this setting.
* “Background Color” – change background color for all views.

**Note**

Use menu button  of Datacenter Dashboard or a group In order to add a group or tile.

Note

To delete or edit a tile just right click on the tile and select required action.

Note

Background color, time interval and refresh rate settings are applied to the Datacenter Dashboard and all Instance Dashboards and can be set from the Datacenter Dashboard menu.

For more information, see Guide to Microsoft System Center Management Pack for Microsoft SQL Server Dashboards

#### Replication Top Level Datacenter Dashboard

The Top Level Datacenter Dashboard is the main dashboard for SQL Server Replication. This dashboard contains only one group by default: SQL Server Replication Database Health.

This class is a dynamic application used to group distributors, publishers and subscribers, which are linked with a one exact published Database.

The collapsed group tile consists of two parts, the left part displays the number of objects in the most critical state. The right part of the widget shows the number of alerts with the highest severity.



#### Replication Components Datacenter Dashboard

The Replication Components Datacenter Dashboard is dashboard for SQL Server version-independent Replication. This dashboard has more detail than the Top Level Dashboard and contains four groups by default: Replication Database Health Group, Distributors Group, Publishers Group and Subscribers Group.



#### SQL Server 2016 Replication Datacenter Dashboard

The SQL Server 2016 Replication Datacenter Dashboard is a specific dashboard for SQL Server 2016 Replication. This dashboard contains only SQL Server 2016 Replication group by default that contains all SQL Server 2016 Distributors, Publishers and Subscribers.



## Links

The following links connect you to information about common tasks that are associated with System Center Management Packs:

1. [Management Pack Life Cycle](http://go.microsoft.com/fwlink/?LinkId=717826)
2. [How to Import an Operations Manager Management Pack](http://go.microsoft.com/fwlink/?LinkId=717823)
3. [Creating a Management Pack for Overrides](http://go.microsoft.com/fwlink/?LinkId=717827)
4. [Managing Run As Accounts and Profiles](http://technet.microsoft.com/library/hh212714.aspx)
5. [How to Export an Operations Manager Management Pack](http://go.microsoft.com/fwlink/?LinkId=717828)
6. [How to Remove an Operations Manager Management Pack](http://go.microsoft.com/fwlink/?LinkId=717829)

For free training on System Center Operations Manager, see the [System Center 2012 R2 Operations Manager Management Pack](http://go.microsoft.com/fwlink/?LinkId=717830) course at the Microsoft Virtual Academy (MVA).

For questions about the Operations Manager and management packs, see the [System Center Operations Manager community forum](http://go.microsoft.com/fwlink/?LinkID=179635) (http://go.microsoft.com/fwlink/?LinkID=179635).

Important

All information and content on non-Microsoft sites is provided by the owner or the users of the website. Microsoft makes no warranties, express, implied, or statutory, as to the information at this website.

## Appendix: Terms and Definitions

| Term | Definition |
| --- | --- |
| Distributor | Distributor is a database instance that acts as a store for replication specific data associated with one or more Publishers. Each Publisher is associated with a single database (known as a distribution database) at the Distributor. In many cases, a single database server instance acts as both Publisher and Distributor. This is known as a local Distributor. When Publisher and Distributor are configured on separate database server instances, the Distributor is known as a remote Distributor. |
| Distribution database | Distribution database stores replication status data, metadata about the publication, and, in some cases, acts as a queue for data moving from Publisher to Subscribers. In many cases, a single database server instance acts as both Publisher and Distributor. This is known as a local Distributor. When Publisher and Distributor are configured on separate database server instances, the Distributor is known as a remote Distributor. |
| Publisher | Publisher is a database instance that makes data available to other locations through replication. A Publisher can have one or more publications, each defining a logically related set of objects and data to replicate. |
| Publication | Publication is a collection of one or more articles from one database. Such grouping of multiple articles into a publication makes it easier to specify a logically related set of data and database objects that are replicated as a unit. A publication can contain different types of articles, including tables, views, stored procedures, and other objects. When tables are published as articles, filters can be used to restrict the columns and rows of the data sent to Subscribers. |
| Article | Article identifies a database object that is included in a publication. |
| Subscriber | Subscriber is a database instance that receives replicated data. A Subscriber can receive data from multiple Publishers and publications. Depending on the selected replication type, a Subscriber can also pass data changes back to the Publisher, or republish the data to other Subscribers. |
| Subscription | Subscription is a request for a copy of a publication to be delivered to a Subscriber. A subscription defines what publication will be received, where and when. There are two types of subscriptions: push and pull. |
| Push subscription | Push subscription is represented by a subscription created and administered at the Publisher. The distribution agent or merge agent for this subscription runs at the Distributor. For more information about subscriptions, see [Subscribe to Publications](http://msdn.microsoft.com/library/ms151170.aspx). |
| Pull Subscription | Pull subscription is represented by a subscription configured and maintained at each recipient. The subscribers administer the synchronization schedules and can pull changes whether they consider it necessary. For more information about subscriptions, see [Subscribe to Publications](http://msdn.microsoft.com/library/ms151170.aspx). |
| Virtual Distributor | Virtual Distributor is a virtual entity, which serves to represent a real distributor on the diagram view for a Replication Database Health. |
| Virtual Publisher | Virtual Publisher is a virtual entity serves to represent a real publisher on the diagram view for a Replication Database Health. |
| Virtual Subscriber Host | Virtual Subscriber Host is a virtual entity that contains Virtual Subscribers. |
| Virtual Subscriber | Virtual Subscriberis a virtual entity serves to represent a real Subscriber on the diagram view for a Replication Database Health. |
| Virtual Publication Host | Virtual Publication Host is a virtual entity that contains Publications. |
| Publication database | Publication database is the database on the Publisher that is the source of data and database objects to be replicated. |
| Virtual Subscription | Virtual Subscriptionis a virtual entity serves to represent a real **subscription** on the diagram view for a Replication Database Health. The purpose of this entity is to hide all subscriptions when the diagram is opened for the first time. |

## Appendix: Management Pack Views and Dashboards

 Root

 Microsoft SQL Server

SQL Server Replication [version independent folder]

Active Alerts – [target: Replication Alerts Scope Group, scope: SQL Server Replication Objects]



All Replication Related Objects – [target: Replication Flow Group, scope: All replication related objects]



 SQL Server Replication Database Health – [target: Distribution Databases, scope: SQL Server Published Databases]

Replication 2016 [version dependent folder]

Active Alerts – [target: SQL Server 2016 Replication Alerts Scope Group, scope: SQL Server 2016 Replication Objects]

Distributors – [target: Distributor SQL 2016, scope: SQL Server 2016 Replication Distributors]

Publications – [target: Publication SQL 2016, scope: SQL Server 2016 Replication Publications]

Publishers – [target: Publisher SQL 2016, scope: SQL Server 2016 Replication Publishers]

Subscribers – [target: Subscriber SQL 2016, scope: SQL Server 2016 Replication Subscriber]

Subscriptions – [target: Subscription SQL 2016, scope: SQL Server 2016 Replication Subscription]



Summary

Performance

 Distributor Performance Collections – [target: Distributor SQL 2016, scope: Performance counter objects]

 Publisher Performance Collections – [target: Publisher SQL 2016, scope: Performance counter objects]

 Subscriber Performance Collections – [target: Subscriber SQL 2016, scope: Performance counter objects]

SQL Server Replication Views [version independent folder]

Distributors – [target: Generic Distributor, scope: SQL Server Replication Distributors]

Publications – [target: GenericPublication**,** scope: SQL Server Replication Publications]

Publishers – [target: Generic Publisher, scope: SQL Server Replication Publishers]

Subscribers – [target: Generic Subscriber, scope: SQL Server Replication Subscribers]

Subscriptions – [target: Generic Subscription, scope: SQL Server Replication Subscriptions]

## Appendix: Management Pack Objects and Workflows

The Management Pack for Microsoft SQL Server 2016 Replication discovers the object types described in the following sections.

**Microsoft SQL Server Replication Seed**

An installation of Microsoft SQL Server Replication Seed

**Microsoft SQL Server Replication Seed - Discoveries**

**MSSQL 2016 Replication: Discover SQL Server 2016 Replication (seed)**

This discovery rule discovers a seed for a Microsoft SQL Server 2016 Replication Database Health. This object indicates that the particular server computer contains an installation of Microsoft SQL Server 2016 with Replication Distributor configured.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 14400 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | |  |
|  |  |  |

**MSSQL 2016 Replication: Alerts Scope Group**

SQL Server 2016 Replication Alerts Scope Group

**MSSQL 2016 Replication: Alerts Scope Group - Discoveries**

**MSSQL 2016 Replication: Alerts Scope Group Discovery**

Discovery of Alerts Scope Group

**MSSQL 2016 Replication: Distributor**

SQL Server 2016 Distributor is a SQL Server instance that acts as a store for replication specific data associated with one or more Publishers

**MSSQL 2016 Replication: Distributor - Discoveries**

**MSSQL 2016 Replication: Distributor Discovery**

The object discovery discovers all Distributors of an instance of Microsoft SQL Server 2016.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 14400 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Distributor - Unit monitors**

**Percent of Expired Subscriptions**

Percent of Expired Subscriptions Monitor

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Error Threshold | Error Threshold | 10 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | | Warning Threshold | The monitor will change the state to Warning if the value drops below this threshold. | 0 | |  |
|  |  |  |

**Availability of the Distribution database from a Subscriber**

This monitor checks availability of the Distribution database from the Subscriber.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | No | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | CredSsp Enabled | Indicates that CredSsp is enabled prior to running this workflow. Will leave it enabled after the run | true | | Database Names | List of names for databases that should be checked, delimited by ',' symbol |  | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Port | Port of wsman service | 5985 | | Prefix | Name of the wsman service | wsman | | Subscriber Names | List of names of subscribers that should be used as a check source, delimited by '|' symbol |  | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | | Transport | Prefix of the protocol to access the wsman service | http | |  |
|  |  |  |

**Replication Snapshot Agent State for Distributor (aggregated for all Publications)**

This monitor checks the state of the Snapshot Agent services for all Publications on the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Replication Agents failed on the Distributor**

This monitor checks if the following Replication agent jobs are in healthy state: Distribution agent, Merge agent, Queue Reader agent, Log reader agent or Snapshot agent. If any of the agents are in failed state, the monitor will be triggered.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Failed jobs count threshold | Failed jobs count threshold | 1 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Per-Job threshold | Per-Job threshold | 1 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Replication Log Reader Agent State for the Distributor (aggregated for all Publications)**

This monitor checks the state of the Replication Log Reader for all Publications serviced by the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**One or more of the Replication Agents are retrying on the Distributor**

This monitor checks if any of the following Replication Agents are retrying an operation: Distribution Agent, Log Reader Agent, Merge Agent, Queue Reader Agent or Snapshot Agent.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Failed jobs count threshold | Failed jobs count threshold | 1 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Per-Job threshold | Per-Job threshold | 3 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Availability of the Distribution database**

This monitor checks the availability of the Distribution database from the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Replication Merge Agent State for the Distributor (aggregated for all Subscriptions)**

This monitor checks the state of the Merge agents for all Subscriptions on the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Pending Commands on Distributor**

There are pending commands on the Distributor waiting for delivery.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Number of samples | Indicates how many times a measured value should breach a threshold before the state is changed. | 6 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Threshold | Threshold | 5 | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**SQL Server Agent State for Distributor**

This monitor checks if the SQL Server Agent is running on Distributor.

**Publication Snapshot Available Space**

The monitor reports a warning when the available disk space for the publication Snapshot drops below the Warning Threshold setting. This is indicated as a percentage of the snapshot files folder size. The monitor reports a critical alert when the available space drops below the Critical Threshold.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Error Threshold | Error Threshold | 10 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | | Warning Threshold | Warning Threshold | 20 | |  |
|  |  |  |

**Replication Queue Reader Agent State for Distributor (aggregated for all Publications)**

This monitor checks the status of the Queue Reader Agent services for all Publications on the Distributor. Note: This monitor is disabled by default. Please use overrides to enable it when necessary.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | No | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Distribution Agents state (aggregated for all Publications)**

This monitor checks the state of the Distribution agents for all publications serviced by this Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Total daily execution time of the replication agent**

This monitors the total daily execution time of the replication agents, Distribution, Log Reader, Merge, Queue Reader and Snapshot on the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Error Threshold | Error Threshold | 4 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Measurement Period (hours) | Period of time used for measurement (hours) | 24 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | | Warning Threshold | The monitor will change the state to Warning if the value drops below this threshold. | 3 | |  |
|  |  |  |

**Percent of Deactivated Subscriptions**

Percent of Deactivated Subscriptions Monitor

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Error Threshold | Error Threshold | 10 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | | Warning Threshold | The monitor will change the state to Warning if the value drops below this threshold. | 0 | |  |
|  |  |  |

**Unsynchronized Subscriptions on Distributor**

This monitor detects unsynchronized subscriptions for specific Distributors.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Number of samples | Indicates how many times a measured value should breach a threshold before the state is changed. | 12 | | Per-Subscription threshold | Per-Subscription threshold | 0 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | | Unhealthy subscriptions count threshold | Unhealthy subscriptions count threshold | 0 | |  |
|  |  |  |

**MSSQL 2016 Replication: Distributor - Dependency (rollup) monitors**

**Microsoft SQL Server 2016 Replication Database Performance Rollup**

This monitor rolls up the performance state from Database to Microsoft SQL Server 2016 Replication

**MSSQL 2016 Replication: Distributor - Rules (alerting)**

**MSSQL 2016 Replication: The Maintenance Job(s) Failed on Distributor Alert Rule**

The Maintenance Job(s) Failed on Distributor Alert Rule

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Priority | Defines Alert Priority. | 2 | | Severity | Defines Alert Severity. | 2 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Distributor - Rules (non-alerting)**

**MSSQL 2016 Replication: Snapshot Agent: Delivered Commands per Second**

The number of commands per second delivered to the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of the Snapshot Agents Instances for the Distributor**

Count of the Snapshot Agent Instances for the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Distribution Agent: Delivered Commands per Second**

The number of commands per second delivered to the Subscriber.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Distribution Agent: Delivered Transactions per Second**

The number of transactions per second delivered to the Subscriber.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Snapshot Agent: Delivered Transactions per Second**

The number of transactions per second delivered to the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Log Reader Agent: Delivery Latency**

The current amount of time (in milliseconds) elapsed from when transactions are applied at the Publisher to when they are delivered to the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of Subscriptions for the Distributor**

Count of Subscriptions for the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Deactivated Subscriptions (%)**

The percentage of Deactivated Subscriptions for the Distributor

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of the Queue Reader Instances for the Distributor**

Count of the Queue Reader Instances for the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of Failed Replication Agents Jobs on the Distributor**

Count of Failed Replication Agents Jobs on the Distributor

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of the Log Reader Agent Instances for the Distributor**

Count of the Log Reader Agent Instances for the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of Pending Commands in the Distribution Database**

Count of commands in the Distribution database pending replication.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Log Reader Agent: Delivered Transactions per Second**

The number of transactions per second delivered to the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of the Merge Agent Instances for the Distributor**

Count of the Merge Agent Instances for the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Expired Subscriptions (%)**

The Percentage of Expired Subscriptions for the Distributor

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Merge Agent: Download Changes per Second**

The number of rows per second replicated from the Publisher to the Subscriber (aggregated for Distributor).

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Log Reader Agent: Delivered Commands per Second**

The number of commands per second delivered to the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Replication Snapshot Available Space (%)**

The amount of space left on media hosting a Replication Snapshot.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Distribution Agent: Delivery Latency**

The current amount of time (in milliseconds) elapsed from when transactions are delivered to the Distributor to when they are applied at the Subscriber.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Merge Agent: Conflicts per Second**

The number of conflicts per second occurring during the merge process.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of Publications for the Distributor**

Count of Publications for the Distributor.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Merge Agent: Uploaded Changes per Second**

The number of rows per second replicated from the Subscriber to the Publisher.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of the Distribution Agent Instances for the Distributor**

Count of the Distribution Agent Instances for the Distributor

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Frequency (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of Unsynchronized Subscriptions for the Distributor**

Count of unsynchronized subscriptions for the Distributor

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Threshold | Threshold | 0 | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Event Log Collection Target**

This object is used to collect module errors from event logs of computers that have Replication components.

**MSSQL 2016 Replication: Event Log Collection Target - Discoveries**

**MSSQL 2016 Replication: Event Log Collection Target Management Server Discovery**

This discovery rule discovers an event log collection target for a Microsoft SQL Server 2016 Replication. This object is used to collect module errors from event logs of management server computers.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 14400 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | |  |
|  |  |  |

**MSSQL 2016 Replication: Event Log Collection Target Discovery**

This discovery rule discovers an event log collection target for a Microsoft SQL Server 2016 Replication. This object is used to collect module errors from event logs of computers that have Replication components.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 14400 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | |  |
|  |  |  |

**MSSQL 2016 Replication: Event Log Collection Target - Rules (alerting)**

**MSSQL 2016 Replication: Replication Management Pack Module Error Event Alert Rule**

Microsoft SQL Server 2016 Replication Management Pack Module Error Event Alert Rule

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | Yes | | Priority | Defines Alert Priority. | 2 | | Severity | Defines Alert Severity. | 2 | |  |
|  |  |  |

**MSSQL 2016 Replication: Group**

A group containing all SQL Server 2016 Replication components

**MSSQL 2016 Replication: Group - Discoveries**

**MSSQL 2016 Replication: Populate SQL Server 2016 Replication Group**

This discovery rule populates the SQL Server 2016 Replication group with all SQL Server 2016 Replication components.

**MSSQL 2016 Replication: Publication**

A publication is a collection of one or more articles from one database. The grouping of multiple articles into a publication makes it easier to specify a logically related set of database data and objects that are replicated as a unit.

**MSSQL 2016 Replication: Publication - Discoveries**

**MSSQL 2016 Replication: Publication Discovery**

The object discovery discovers all publications of a Publisher of Microsoft SQL Server 2016

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 14400 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Publication - Unit monitors**

**All Subscriptions are Synchronizing for Publication**

All Subscriptions are Synchronizing

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Replication Snapshot Agent State**

This monitor checks the status of the Replication Snapshot Agent service for Publications.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Replication Log Reader Agent State for Publication**

This monitor checks the status of the Replication Log Reader Agent service for Publications.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Publisher**

SQL Server 2016 Publisher is a SQL 2016 instance that makes data available to other locations through replication.

**MSSQL 2016 Replication: Publisher - Discoveries**

**MSSQL 2016 Replication: Publisher Discovery**

The object discovery discovers Publishers of an instance of Microsoft SQL Server 2016.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 14400 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Publisher - Unit monitors**

**SQL Server Agent State for Publisher**

This monitor checks if the SQL Server Agent is running on Publisher.

**Subscriptions state for Publisher**

This monitor checks whether there are any inactive subscriptions for any publications.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Publisher - Rules (non-alerting)**

**MSSQL 2016 Replication: Count of Publications for the Publisher**

Count of Publications for the Publisher.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Subscriber**

SQL Server 2016 Subscriber is a SQL 2016 instance that receives replicated data.

**MSSQL 2016 Replication: Subscriber - Discoveries**

**MSSQL 2016 Replication: Subscriber Discovery**

The object discovery discovers Subscribers of an instance of Microsoft SQL Server 2016.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 14400 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Subscriber - Unit monitors**

**Subscriber Agent is Retrying**

The Subscriber Agent (Distribution, Log Reader, Merge, Queue Reader and Snapshot) is Retrying Monitor. Note that SQL Server Agent Windows Service is not supported by any edition of SQL Server Express. Therefore, this monitor is not applicable for SQL Server Express cases.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Failed jobs count threshold | Failed jobs count threshold | 1 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Per-Job threshold | Per-Job threshold | 3 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Load of Replication agents on Subscriber**

Replication agents (Distribution and Merge) load on Subscriber

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Error Threshold | Error Threshold | 4 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Measurement Period (hours) | Period of time used for measurement (hours) | 24 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | | Warning Threshold | The monitor will change the state to Warning if the value drops below this threshold. | 3 | |  |
|  |  |  |

**SQL Server Agent State for Subscriber**

This monitor checks if the SQL Server Agent is running on Subscriber. Note that SQL Server Agent Windows Service is not supported by any edition of SQL Server Express. Therefore, this monitor is not applicable for SQL Server Express cases.

**MSSQL 2016 Replication: Subscriber - Rules (non-alerting)**

**MSSQL 2016 Replication: Count of Subscriptions for the Subscriber**

Count of Subscriptions for the Subscriber.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 900 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Count of the Failed Replication Jobs for the Subscriber**

Count of the Failed Replication Jobs for the Subscriber

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Subscription**

SQL Server 2016 Subscription is a request for a copy of a publication to be delivered to a Subscriber.

**MSSQL 2016 Replication: Subscription - Discoveries**

**MSSQL 2016 Replication: Subscription Discovery**

The object discovery discovers all subscriptions of a Subscriber of Microsoft SQL Server 2016

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 14400 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Subscription - Unit monitors**

**Subscription Pending Commands**

There are pending commands on the Distributor for specific Subscription waiting delivery.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Number of samples | Indicates how many times a measured value should breach a threshold before the state is changed. | 6 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Threshold | Threshold | 20 | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Distribution Agent State for Subscription**

This monitor checks the status of the Replication Distribution Agent services for Subscription. Note that SQL Server Agent Windows Service is not supported by any edition of SQL Server Express. Therefore, this monitor is not applicable for SQL Server Express cases.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Subscription latency**

This monitor checks the latency for commands in the Distribution database waiting to be delivered to the Subscribers.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Threshold | Threshold | 60 | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**Replication Merge Agent State for Subscription**

This monitor checks the status of the Replication Merge Agent service for Subscription. Note that SQL Server Agent Windows Service is not supported by any edition of SQL Server Express. Therefore, this monitor is not applicable for SQL Server Express cases.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | True | | Estimated Job Duration | Threshold which is being used to check the job schedule compliance | 15 | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Show Jobs with Unknown State | Include jobs with unknown state to the monitor output and alert context. Will affect health. | false | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

**MSSQL 2016 Replication: Subscription - Rules (non-alerting)**

**MSSQL 2016 Replication: Count of Pending Commands**

Count of commands pending replication in distribution database for the Subscription.

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  | |  |  |  | | --- | --- | --- | | **Name** | **Description** | **Default value** | | Enabled | Enables or disables the workflow. | Yes | | Generate Alerts | Defines whether the workflow generates an Alert. | No | | Interval (seconds) | The recurring interval of time in seconds in which to run the workflow. | 300 | | Synchronization Time | The synchronization time specified by using a 24-hour format. May be omitted. |  | | Timeout (seconds) | Specifies the time the workflow is allowed to run before being closed and marked as failed. | 300 | | Timeout for database connection (seconds) | The workflow will fail and register an event, if it cannot access the database during the specified period. | 15 | |  |
|  |  |  |

## Appendix: Run As Profiles

| **Run As Profile** | **Workflow Type** | **Workflow** |
| --- | --- | --- |
| Microsoft SQL Server Replication Discovery Run As Profile | Discovery | Microsoft SQL Server 2016 Replication: Distributor Discovery |
| Discovery | Microsoft SQL Server 2016 Replication: Event Log Collection Target Discovery |
| Discovery | Microsoft SQL Server 2016 Replication: Event Log Collection Target Management Server Discovery |
| Discovery | Microsoft SQL Server 2016 Replication: Publication Discovery |
| Discovery | Microsoft SQL Server 2016 Replication: Publisher Discovery |
| Discovery | Microsoft SQL Server 2016 Replication: Discover SQL Server 2016 Replication (seed) |
| Discovery | Microsoft SQL Server 2016 Replication: Subscriber Discovery |
| Discovery | Microsoft SQL Server 2016 Replication: Subscription Discovery |
| Microsoft SQL Server Replication Distributor Availability from Subscriber Monitoring Run As Profile | Monitor | Availability of the Distribution database from a Subscriber. |
| Microsoft SQL Server Replication SCOM SDK Discovery Run As Profile | Discovery | Microsoft SQL Server Replication Database Health Discovery |
| Monitor | All Publishers Discovered for Distributor |
| Microsoft SQL Server Replication Monitoring Run As Profile | Monitor | Distribution Agents state (aggregated for all Publications) |
| Monitor | Availability of the Distribution database. |
| Monitor | Pending Commands on Distributor |
| Monitor | Replication Log Reader Agent State for the Distributor (aggregated for all Publications) |
| Monitor | Replication Merge Agent State for the Distributor (aggregated for all Subscriptions) |
| Monitor | Percent of Deactivated Subscriptions |
| Monitor | Percent of Expired Subscriptions |
| Monitor | Publication Snapshot Available Space |
| Monitor | Replication Queue Reader Agent State for Distributor (aggregated for all Publications) |
| Monitor | Replication Agents failed on the Distributor. |
| Monitor | One or more of the Replication Agents are retrying on the Distributor. |
| Monitor | Total daily execution time of the replication agent. |
| Monitor | Replication Snapshot Agent State for Distributor (aggregated for all Publications) |
| Monitor | SQL Server Agent State for Distributor |
| Monitor | Unsynchronized Subscriptions on Distributor |
| Monitor | Replication Log Reader Agent State for Publication |
| Monitor | Replication Snapshot Agent State |
| Monitor | All Subscriptions are Synchronizing for Publication |
| Monitor | SQL Server Agent State for Publisher |
| Monitor | Subscriptions state for Publisher |
| Monitor | Subscriber Agent is Retrying |
| Monitor | Load of Replication agents on Subscriber. |
| Monitor | SQL Server Agent State for Subscriber |
| Monitor | Subscription latency |
| Monitor | Subscription Pending Commands |
| Monitor | Distribution Agent State for Subscription |
| Monitor | Replication Merge Agent State for Subscription |
| Rule | MSSQL 2016 Replication: Count of Failed Replication Agents Jobs on the Distributor |
| Rule | MSSQL 2016 Replication: Count of Pending Commands in the Distribution Database |
| Rule | MSSQL 2016 Replication: Deactivated Subscriptions (%) |
| Rule | MSSQL 2016 Replication: Expired Subscriptions (%) |
| Rule | MSSQL 2016 Replication: Replication Snapshot Available Space (%) |
| Rule | MSSQL 2016 Replication: Count of Unsynchronized Subscriptions for the Distributor |
| Rule | MSSQL 2016 Replication: Merge Agent: Conflicts per Second |
| Rule | MSSQL 2016 Replication: Distribution Agent: Delivered Commands per Second |
| Rule | MSSQL 2016 Replication: Distribution Agent: Delivery Latency |
| Rule | MSSQL 2016 Replication: Distribution Agent: Delivered Transactions per Second |
| Rule | MSSQL 2016 Replication: Count of the Distribution Agent Instances for the Distributor |
| Rule | MSSQL 2016 Replication: Merge Agent: Download Changes per Second |
| Rule | MSSQL 2016 Replication: Count of the Log Reader Agent Instances for the Distributor |
| Rule | MSSQL 2016 Replication: Log Reader Agent: Delivered Commands per Second |
| Rule | MSSQL 2016 Replication: Log Reader Agent: Delivery Latency |
| Rule | MSSQL 2016 Replication: Log Reader Agent: Delivered Transactions per Second |
| Rule | MSSQL 2016 Replication: Count of the Merge Agent Instances for the Distributor |
| Rule | MSSQL 2016 Replication: Count of the Queue Reader Instances for the Distributor |
| Rule | MSSQL 2016 Replication: Count of Publications for the Distributor |
| Rule | MSSQL 2016 Replication: Count of Subscriptions for the Distributor |
| Rule | MSSQL 2016 Replication: Count of the Snapshot Agents Instances for the Distributor |
| Rule | MSSQL 2016 Replication: Snapshot Agent: Delivered Commands per Second |
| Rule | MSSQL 2016 Replication: Snapshot Agent: Delivered Transactions per Second |
| Rule | MSSQL 2016 Replication: Merge Agent: Uploaded Changes per Second |
| Rule | MSSQL 2016 Replication: Count of Publications for the Publisher |
| Rule | MSSQL 2016 Replication: Count of the Failed Replication Jobs for the Subscriber |
| Rule | MSSQL 2016 Replication: Count of Subscriptions for the Subscriber |
| Rule | MSSQL 2016 Replication: Count of Pending Commands |
| Rule | MSSQL 2016 Replication: The Maintenance Job(s) Failed on Distributor Alert Rule |
| Rule | MSSQL 2016 Replication: Microsoft SQL Server 2016 Replication Management Pack Module Error Event Alert Rule |

## Appendix: Known Issues and Troubleshooting

##### Error events similar to “Loading managed module type in "Microsoft.SQLServer.2012.Replication. Module.Discovery…” assembly may occur in the Operations Manager Windows event log.

**Issue:** The distributor, publisher and subscriber workflows may throw this error after the Replication MP is installed.

**Resolution:** No action is required since the errors occur only once when the management packs are imported.

##### Warning events in Windows event log on the agent-servers.

**Issue:** When there is a configured distributor but it is not used by any publishers, the distributor performance counters are registered but have no objects. In the performance view, performance rules will be initialized by since the objects do not exist they return nothing.

Resolution: No resolution.

##### Alerts from the "All Publishers Discovered for Distributor" monitor are not placed into the Active Alerts folders of the SQL Server MPs.

**Issue:** Since the monitored objects are managed by the management group and are hosted by virtual objects, it is impossible to map them to the view.

**Resolution:** The objects may be found in the root folder: Monitoring\Active Alerts

##### Incorrect databases are listed in the "SQL Server Replication Database Health" view.

**Issue:** If a user enters incorrect databases in the replication jobs, the databases will be discovered and put in the view. Such objects will have no properties and throw errors each time the user tries to work with them.

Resolution: No resolution.

##### Alert description does not change untill the whole alert is resolved.

**Issue:** The alert context of the aggregated monitors lists all objects that have issues. The context will not be updated until the whole alert is resolved.

Resolution: This is a known SCOM issue. There is no known workaround at the moment.

##### Replication jobs without history cause crttical alerts.

**Issue:** TheReplication MP treats all replication jobs that have empty history as having unsuccessfully runs and notifies about them. Even if such jobs have a schedule and are run, an alert will be raised.

Resolution: No resolution. The alert will be automatically resolved at the moment the job run is completed.

##### The "Distribution Database Availability from Subscriber" monitor throws the following error "Cannot configure CredSSP" for Subscriber on Windows Server 2008 R2 Enterprise.

**Issue:** By default,PowerShell 2.0 is installed on Windows 2008 and PowerShell 4.0 on Windows 2012. If Distributors are run on Windows 2012 and Subscribers are run on Windows 2008, the PowerShell versions are different, and there are two possible errors: "Cannot configure CredSSP" and “Failed to configure CredSSP on Distributor”.

Resolution: Install the same PowerShell version on Subscribers as the one installed on the Distributors. Enable CredSSP for servers running Windows 2008.

##### The Subscription for Merge Replication is shown as Inactive.

**Issue:** Subscriptions that are synchronizing by schedule are shown as Inactive and alerts are raised about Inactive Subscriptions. Incorrect state for subscriptions are caused by incorrect data in the distribution database. The monitor gets data from the distribution database without taking into account the “active” property (MSmerge\_subscriptions table). The SQL Server Management Studio takes this state from the publication database (by executing sp\_helpmergesubscription).

Resolution: No resolution.

##### "Pending Commands on Distributor" monitor does not change the state.

**Issue:** "Pending Commands on Distributor" monitor does not change the state to “Warning” after generation of error logs in Job on Publisher. The monitor works correctly for Transaction and Snapshot publications. Merge publication is skipped, i.e. for merge replication the monitor is always healthy.

Resolution: No resolution.

##### "Discovery data couldn't be inserted to the database" error may occur upon creation of a new subscription.

**Issue:** Upon installation of the MP, DB engine may fail to discover all the data during the first launch, and the above error may appear in the log.

Resolution: The Discovery Distributor may need some extra time to discover the data. The second option is to clear the cash of the agent manually.

##### When SQL Express instance is used, Subscriber targeted rules and minitors may throw an error.

**Issue:** When SQL Express instance is used, rules and monitors that target on Subscriber can throw the following error: "The filename, directory name, or volume label syntax is incorrect" in the event log.

Resolution: No resolution.

##### An error may occur due to discovery timeout conflict.

**Issue:** If discovery of Distributor or Subscriber is completed earlier than discovery of the database of this object (e.g. discovery of database on Distributor instance) according to the set timeout, the Operations Manager may throw the following error with relationship target: "Discovery data couldn't be inserted to the database, RelationshipInstance TypeId".

Resolution: To avoid the issue, make sure that the timeout in overrides for database discovery in DB-engine is less or equal to the timeout in overrides for Distributor or Subscriber instances discovery.

##### Monitrong workflows throw "Access denied" exception when a default Run As profile is used.

**Issue:** A number of monitoring workflows throw "Access denied" exception when a default Run As profile is used, and monitoring agent uses Local System account.

Resolution: A domain account (or account with access to all Replication machines) should be used for default Run As profile.

##### Publications and Subscriptions on unaccessible databases may get undiscovered in SCOM.

**Issue:** If a database participating in Replication goes offline, Publications and/or Subscriptions from this database may get undiscovered in the Operations Manager.

Resolution: No resolution.