IBM

IBM Workload Automation
Best practices
Version 10.2.7

Note

Before using this information and the product it supports, read the information in Notices on page xiii.

This edition applies to version 10, release 2, modification level 7 of IBM® Workload Scheduler (program number 5698-T09) and to all subsequent releases and modifications until otherwise indicated in new editions.

Contents

Chapter 1. Configuring the dynamic domain manager after installing or upgrading

Ensure your dynamic domain manager is correctly configured after completing an installation or an upgrade.

About this task

After setting up a new master domain manager, update specific configuration files and database tables to ensure that dynamic agents and pools can authenticate and communicate using the new hostnames and IP addresses.

LDAP user authentication

About this task

When connecting from the Dynamic Workload Console to the master domain manager using an LDAP user, you might not be able to access the views in the dynamic domain manager database.

1. Stop WebSphere Application Server Liberty on the master domain manager, as described in the topic about starting and stopping the application server in *Administration Guide*.
2. Open the `broker_role_mapping.xml` file on the master domain manager. The file path varies depending on the operating system:

   On Windows operating systems

   <*MDM_installation_directory*>`\usr\servers\engineServer\configDropins\defaults`

   On UNIX operating systems

   <*MDM_installation_directory*>`/usr/servers/engineServer/configDropins/defaults/`
3. Uncomment the `<special-subject type="ALL_AUTHENTICATED_USERS"/>` line for all roles: `Operator`, `Submitter`, and `Configurator`. This modification grants access to **all authenticated users**. For tighter security, administrators can map specific LDAP groups to these roles. The uncommented section looks like this:
   Example

   ```
   <security-role id="operatorRole" name="Operator">
   <special-subject type="ALL_AUTHENTICATED_USERS"/>
   </security-role>
   <security-role id="submitterRole" name="Submitter">
   <special-subject type="ALL_AUTHENTICATED_USERS"/>
   </security-role>
   <security-role id="configuratorRole" name="Configurator">
   <special-subject type="ALL_AUTHENTICATED_USERS"/>
   </security-role>
   ```
4. Restart WebSphere Application Server Liberty, as described in the topic about starting and stopping the application server in *Administration Guide*.

Verification of dynamic domain manager settings

About this task

Run the following steps to verify your dynamic domain manager settings after upgrading:

1. Update the URLs of the Resource Advisor on the master domain manager, as follows:

    a. Browse to `<MDM_installation_dir>/TDWB/bin`.

    b. Export the list of dynamic domain manager instances by running the following command:

    ```
    ./exportserverdata.sh -dbUsr <database_user> -dbPwd <database_password>
    ```

    For more information about this command, see the topic about exportserverdata in *User's Guide and Reference*.

    c. Review the generated `server.properties` file. Ensure the IP address or hostname for both the master domain manager and the backup master domain manager are correct.

    d. If the information is not correct, update the `server.properties` file as necessary.

    e. Apply the updates by running the following command:

    ```
    ./importserverdata.sh -dbUsr <database_user> -dbPwd <database_password>
    ```

    For more information about this utility, see the topic about importserverdata in *User's Guide and Reference*.

2. Align the data in the `BrokerWorkstation.properties` file.

    During a parallel upgrade, the new master domain manager is first installed as a backup master domain manager and only later promoted to the role of master domain manager. Because it is initially configured as a backup, the `BrokerWorkstation.properties` file is created with incomplete information. This file is not automatically updated when the backup master domain manager is promoted to master, which results in missing or outdated configuration details. In addition, this behavior causes the dynamic domain manager—which is installed by default on every master domain manager and backup —to use the incorrect information stored in the *BrokerWorkstation.properties* file.

    To prevent this problem, copy the `BrokerWorkstation.properties` file from the master domain manager and modify it with the information related to the new master domain manager. Ensure the following properties are correct and up-to-date:

    - all hostnames
    - **MasterDomainManager.Name**
    - **MasterDomainManager.HostName**
    - **DomainManager.Workstation.Name**
    - **DomainManager.Workstation.Address**

    Also add the following line, if not already present:**Broker.CertificateExpirationInterval**.

    The file is available in the following path, depending on your operating system:

    On Windows systems

    `<TWA_home>\broker\config`

On UNIX systems

<*TWA_DATA_DIR*>/broker/config

For more information about this file, see the topic about the `BrokerWorkstation.properties` file in *Administration Guide*.

3. Restart WebSphere Application Server Liberty, as described in the topic about starting and stopping the application server in *Administration Guide*. The database tables are automatically updated based on the information in the `BrokerWorkstation.properties` file.

Pool creation - Checking values in the database

Before you begin

Before creating pools, ensure data in the following database tables is correct:

dynamic domain manager

DWB.PPS_PRODUCT_PROPERTIES

master domain manager

mdl.OPR_OBJ_PROPERTIES

About this task

To check current values for the dynamic domain manager, run the following query on the database of the dynamic domain manager:

```
db2 "select PPS_PROPERTY_NAME,PPS_PROPERTY_VALUE from DWB.PPS_PRODUCT_PROPERTIES"
```

This example applies to Db2, but you can apply it to any supported database by using the appropriate syntax.

The expected values are as follows:

DomainManager.Workstation.Name [https://domainmanager.workstation.name/]

This is the workstation name of the new dynamic domain manager. Verify the current value is the expected one. You can obtain this value using the conman command line or from the **MDL.WKS_WORKSTATIONS** table on the master domain manager.

MasterDomainManager.HostName

This is the full qualified host name or the IP of the new master domain manager. Verify the current value is the expected one. You can obtain this value using the conman command line or from the **MDL.WKS_WORKSTATIONS** table on the master domain manager.

MasterDomainManager.Name [https://masterdomainmanager.name/]

This is the workstation name of the new master domain manager. Verify the current value is the expected one. You can obtain this value using the conman command line or from the **MDL.WKS_WORKSTATIONS** table on the master domain manager.

MasterDomainManager.URIs

This is the list of the master domain managers to be contacted by the dynamic domain manager The list must contain in the first position the new master domain manager and in second position the new backup master domain manager, for example `https://wa-server.example.com:31116/JobManagerRESTWeb/JobScheduler/resource`.

DomainManager.Workstation.Address

This is the full qualified host name or the IP address of the new dynamic domain manager.

To check current values for the master domain manager, run the following query on the database of the master domain manager:

```
db2 "select * from mdl.OPR_OBJ_PROPERTIES where OPR_OBJECT_TYPE='W'"
```

This example applies to Db2, but you can apply it to any supported database.

The relevant part is column **OPR_VALUE**. The format of the URI should be similar to the following example, containing the hostname or IP address of master domain manager and backup master domain manager.

```
https://wa-server.example.com:31116/JobManagerRESTWeb/JobScheduler
[https://wa-server.example.com:31116/JobManagerRESTWeb/JobScheduler];
https://127.0.0.1:31116/JobManagerRESTWeb/JobScheduler
[https://127.0.0.1:31116/JobManagerRESTWeb/JobScheduler]
```

Note: The whole address must be on a single line.

Chapter 2. Database recommendations

This chapter contains a list of recommended practices for database usage.

Oracle RAC (active-active or multi-node) configuration

Scenario

Multiple nodes share the same storage. Connections must be spread across nodes, and if one fails, the client must instantly move to another node.

Best practice

Use the Single Client Access Name (SCAN) address. The following example shows the XML configuration:

```
<dataSource id="twsdb" jndiName="jdbc/twsdb">
            <connectionManager
            minPoolSize="10"
            maxPoolSize="100"
            preTestConnection="true"
            validationTimeout="5s"
            agedTimeout="30m"/>
            <properties.oracle
            URL="jdbc:oracle:thin:@(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)

 (HOST=my-scan-address.example.com)(PORT=1521)))(CONNECT_DATA=(SERVICE_NAME=myHwaService)(FAILOVER_MODE=
            (TYPE=SELECT)(METHOD=BASIC)(RETRIES=20)(DELAY=5))))"
            user="YOUR_USER"
            password="your_password"/>
            </dataSource>
```

Note: The `preTestConnection="true"` property ensures that IBM® Workload Scheduler checks if the connection to the RAC node is still active before sending a job command.

Db2 HADR (active-passive with automatic client reroute) configuration

Scenario

The configuration consists of two nodes: a primary read/write node and a standby node. If the primary node fails, the standby node takes over.

Best practice

Define the alternate server directly in the properties. The following example shows the XML configuration:

```
<dataSource id="twsdb" jndiName="jdbc/twsdb">
                <connectionManager
                minPoolSize="5"
                maxPoolSize="80"
                connectionTimeout="180s"/>
                <properties.db2.jcc
```

```
                databaseName="TWS"
                serverName="primary-node.example.com"
                portNumber="50000"
                clientRerouteAlternateServerName="standby-node.example.com"
                clientRerouteAlternatePortNumber="50000"
                enableSeamlessFailover="1"
                maxRetriesForClientReroute="10"
                retryIntervalForClientReroute="5"/>
                </dataSource>
```

Note: The `enableSeamlessFailover="1"` property sets the Db2 driver to attempt to replay the transaction on the standby node without returning an exception to IBM® Workload Scheduler.

MSSQL Server (Always On availability groups) configuration

Scenario

A listener sits in front of multiple SQL nodes.

Best practice

Point IBM® Workload Scheduler to the Availability Group Listener and enable the `multiSubnetFailover` property if the nodes are located in different data centers. The following example shows the XML configuration:

```
<dataSource id="twsdb" jndiName="jdbc/twsdb">
                <connectionManager maxPoolSize="100"/>
                <properties.microsoft.sqlserver
                serverName="ag-listener.example.com"
                portNumber="1433"
                databaseName="TWS"
                multiSubnetFailover="true"
                loginTimeout="30"/>
                </dataSource>
```

Note: The `multiSubnetFailover="true"` property is vital if your SQL nodes are located in different IP subnets (disaster recovery scenarios), because it allows the driver to try all IP addresses associated with the listener simultaneously.

PostgreSQL (Patroni, HAProxy, or external load balancer) configuration

Scenario

A cluster of PostgreSQL nodes is managed by Patroni, and is typically accessed through a load balancer (LB) or a virtual IP (VIP).

Best practice

Use a validation query to ensure that the connection has not been silently interrupted by the load balancer. The following example shows the XML configuration:

```
<dataSource id="twsdb" jndiName="jdbc/twsdb">
                <connectionManager
                minPoolSize="5"
                maxPoolSize="50"
                preTestConnection="true"/>
                <properties.postgresql
                serverName="pg-load-balancer.example.com"
                portNumber="5432"
                databaseName="TWS"/>
                </dataSource>
```

Note: For PostgreSQL databases accessed by using a load balancer, always set the `agedTimeout` property in the `connectionManager` element to a value lower than the idle timeout of the load balancer. For example, if the load balancer timeout is 30 minutes, set `agedTimeout="25m"`.

Chapter 3. Resource usage settings for UNIX workstations - ulimit parameter

In UNIX operating systems, the **ulimit** parameter defines and controls the amount of resources that processes are allowed to consume. It acts as a safety mechanism to prevent any single process from exhausting system resources such as memory, CPU time, or the number of open files.

Before installing or upgrading on UNIX workstations, apply the following minimum values. For high-volume environments, setting these to `unlimited` is recommended.

- data segment process (option **-d**) = `unlimited`
- file size (option **-f**) = `unlimited`
- max user processes (option **-u**) = >`260000` up to `unlimited`
- open files (option **-n**) = >`100000` up to `unlimited`
- max memory size (option **-m**) = `unlimited`
- stack size (option **-s**) = >`33000` up to `unlimited`

Changes made directly in a shell are temporary. You can make these settings permanent at the operating system level by editing the `limits` file. For more information about the file, see the documentation of the operating system.

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